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You can read the recommendations in the user guide, the technical guide or the installation guide for ASROCK 990FX EXTREME3. You'll find the answers to all your questions on the ASROCK 990FX EXTREME3 in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual ASROCK 990FX EXTREME3
User guide ASROCK 990FX EXTREME3
Operating instructions ASROCK 990FX EXTREME3
Instructions for use ASROCK 990FX EXTREME3
Instruction manual ASROCK 990FX EXTREME3

ASRock

990FX Extreme3

User Manual

Version 1.1
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Manual abstract:

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ASRock Website: <http://www.asrock.com>

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Introduction Thank you for purchasing ASRock 990FX Extreme3 motherboard, a reliable motherboard produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance. In this manual, chapter 1 and 2 contains introduction of the motherboard and step-by-step guide to the hardware installation. Chapter 3 and 4 contains the configuration guide to BIOS setup and information of the Support CD. Because the motherboard specifications and the BIOS software might be updated, the content of this manual will be subject to change without notice. In case any modifications of this manual occur, the updated version will be available on ASRock website without further notice. You may find the latest VGA cards and CPU support lists on ASRock website as well. ASRock website <http://www.asrock.com> If you require technical support related to this motherboard, please visit our website for specific information about the model you are using.

www.asrock.com/support/index.asp 1.1 Package Contents ASRock 990FX Extreme3 Motherboard (ATX Form Factor: 12.0-in x 8.6-in, 30.5 cm x 21.8 cm) ASRock 990FX Extreme3 Quick Installation Guide ASRock 990FX Extreme3 Support CD 1 x ASRock SLI_Bridge_2S Card 2 x Serial ATA (SATA) Data Cables (Optional) 1 x 3.5mm Audio Cable (Optional) 1 x I/O Panel Shield ASRock Reminds You.

.. To get better performance in Windows® 7 / 7 64-bit / Vista™ / Vista™ 64 bit, it is recommended to set the BIOS option in Storage Configuration to AHCI mode. For the BIOS setup, please refer to the "User Manual" in our support CD for details. 5 1.2 Specifications Platform CPU Chipset Memory Expansion

Slot Audio LAN - ATX Form Factor: 12.0-in x 8.6-in, 30.5 cm x 21.8 cm - All Solid Capacitor design (100% Japan-made high-quality Conductive Polymer Capacitors) - Support for Socket AM3+ processors - Support for Socket AM3 processors: AMD Phenom™ II X6 / X4 / X3 / X2 (except 920 / 940) / Athlon™ II X4 / X3 / X2 / Sempron processors - Supports 8-Core CPU - Supports UCC feature (Unlock CPU Core) (see CAUTION 1) - 4 + 1 Power Phase Design - Supports CPU up to 140W - Supports AMD's Cool 'n' Quiet™ Technology - FSB 2600 MHz (5).

2 GT/s) - Supports Untied Overclocking Technology (see CAUTION 2) - Supports Hyper-Transport 3.0 (HT 3.0) Technology - Northbridge: AMD 990FX - Southbridge: AMD SB950 - Dual Channel DDR3 Memory Technology (see CAUTION 3) - 4 x DDR3 DIMM slots - Supports DDR3 2100(OC)/1866/1600/1333/1066/800 non-ECC, un-buffered memory (see CAUTION 4) - Max. capacity of system memory: 32GB (see CAUTION 5) - 3 x PCI Express 2.0 x16 slots (PCIe2/PCIe3: x16 mode; PCIe4: x4 mode) - 1 x PCI Express 2.0 x1 slot - 2 x PCI slots - Supports AMD™ Quad CrossFire™XTM, 3-Way CrossFire™XTM and CrossFire™XTM - Supports NVIDIA® Quad SLITM and SLITM - 7.1 CH HD Audio with Content Protection (Realtek ALC892 Audio Codec) - Premium Blu-ray audio support - Supports THX TruStudio™ - PCIe x1 Gigabit LAN 10/100/1000 Mb/s - Broadcom BCM57781 - Supports Wake-On-LAN - Supports Energy Efficient Ethernet 802.3az - Supports PXE 6 Rear Panel I/O SATA3 USB 3.0 Connector BIOS Feature Support CD Unique Feature I/O Panel - 1 x PS/2 Mouse Port - 1 x PS/2 Keyboard Port - 1 x Coaxial SPDIF Out Port - 1 x Optical SPDIF Out Port - 6 x Ready-to-Use USB 2.0 Ports - 2 x Ready-to-Use USB 3.

0 Ports - 1 x eSATA3 Connector - 1 x RJ-45 LAN Port with LED (ACT/LINK LED and SPEED LED) - HD Audio Jack: Side Speaker/Rear Speaker/Central/Bass/ Line in/Front Speaker/Microphone (see CAUTION 6) - 5 x SATA3 6.



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0 Gb/s connectors, support RAID (RAID 0, RAID 1, RAID 5, and RAID 10), NCQ, AHCI and "Hot Plug" functions - 2 x Rear USB 3.0 ports by Etron EJ168A, support USB 1.0/2.0/3.

0 up to 5Gb/s - 5 x SATA3 6.0Gb/s connectors - 1 x IR header - 1 x COM port header - 1 x HDMI_SPDIF header - 1 x Power LED header - CPU/Chassis/Power FAN connector - 24 pin ATX power connector - 8 pin 12V power connector - Front panel audio connector - 3 x USB 2.0 headers (support 6 USB 2.0 ports) - 32Mb AMI UEFI Legal BIOS with GUI support - Supports "Plug and Play" - ACPI 1.1 Compliance Wake Up Events - Supports jumperfree - SMBIOS 2.

3.1 Support - CPU, VCCM, NB, SB Voltage Multi-adjustment - Drivers, Utilities, AntiVirus Software (Trial Version), CyberLink MediaEspresso 6.5 Trial - ASRock Extreme Tuning Utility (AXTU) (see CAUTION 7) - ASRock Instant Boot - ASRock Instant Flash (see CAUTION 8) - ASRock APP Charger (see CAUTION 9) - ASRock XFast USB (see CAUTION 10) - ASRock XFast LAN (see CAUTION 11) 7 Hardware Monitor OS Certifications - ASRock On/Off Play Technology (see CAUTION 12) - Hybrid Booster: - CPU Frequency Stepless Control (see CAUTION 13) - ASRock U-COP (see CAUTION 14) - Boot Failure Guard (B.F.G.) - Turbo 50 / Turbo 60 CPU Overclocking - Turbo UCC - CPU Temperature Sensing - Chassis Temperature Sensing - CPU/Chassis/Power Fan Tachometer - CPU Quiet Fan - CPU/Chassis Fan Multi-Speed Control - Voltage Monitoring: +12V, +5V, +3.3V, Vcore - Microsoft® Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit compliant - FCC, CE, WHQL - ErP/EuP Ready (ErP/Euust use FAT32/16/12 file system. 9. If you desire a faster, less restricted way of charging your Apple devices, such as iPhone/iPad/iPod Touch, ASRock has prepared a wonderful solution for you - ASRock APP Charger. Simply install the APP Charger driver, it makes your iPhone charge much quickly from your computer and up to 40% faster than before.

ASRock APP Charger allows you to quickly charge many Apple devices simultaneously and even supports continuous charging when your PC enters into Standby mode (S1), Suspend to RAM (S3), hibernation mode (S4) or power off (S5). With APP Charger driver installed, you can easily enjoy the marvelous charging experience. ASRock website: <http://www.asrock.com/Feature/AppCharger/index.asp> 10. ASRock XFast USB can boost USB storage device performance. The performance may depend on the properties of the device. 11. ASRock XFast LAN provides a faster internet access, which includes the benefits listed below.

LAN Application Prioritization: You can configure your application's priority ideally and/or add new programs. Lower Latency in Game: After setting online game's priority higher, it can lower the latency in games. Traffic Shaping: You can watch Youtube HD videos and download simultaneously. Real-Time Analysis of Your Data: With the status window, you can easily recognize which data streams you are transferring currently. 12.

ASRock On/Off Play Technology allows users to enjoy the great audio experience from the portable audio devices, such like MP3 player or mobile phone to your PC, even when the PC is turned off (or in ACPI S5 mode)! This motherboard also provides a free 3.5mm audio cable (optional) that ensures users the most convenient computing environment. 13. Although this motherboard offers stepless control, it is not recommended to perform over-clocking. Frequencies other than the recommended CPU bus frequencies may cause instability of the system or damage the CPU.

10 14. While CPU overheat is detected, the system will automatically shutdown. Before you resume the system, please check if the CPU fan on the motherboard functions properly and unplug the power cord, then plug it back again. To improve heat dissipation, remember to spray thermal grease between the CPU and the heatsink when you install the PC system. 15. EuP stands for Energy Using Product, was a provision regulated by the European Union to define the power consumption for the completed system. According to EuP, the total AC power of the completed system should be under 1.00W in off mode condition. To meet EuP standards, an EuP ready motherboard and an EuP ready power supply are required. According to Intel's suggestion, the EuP ready power supply must meet the standard of 5v, and the standby power efficiency should be higher than 50% under 100 mA current consumption.

For EuP ready power supply selection, we recommend you to check with the power supply manufacturer for more details. 11 1.3 Motherboard Layout 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 HDMI_SPDIF Header (HDMI_SPDIF1, Black) 19 ATX 12V Power Connector (ATX12V1) 20 CPU Heatsink Retention Module 21 CPU Fan Connector (CPU_FAN1) 22 CPU Fan Connector (CPU_FAN2) 23 AM3+ CPU Socket 24 2 x 240-pin DDR3 DIMM Slots 25 (Dual Channel B: DDR3_A1, DDR3_B1; Black) 26 2 x 240-pin DDR3 DIMM Slots 27 (Dual Channel B: DDR3_A2, DDR3_B2; Black) 28 ATX Power Connector (ATXPWR1) Chassis Fan Connector (CHA_FAN3) 29 Northbridge Controller SATA3 Connector (SATA3_5, Gray) 30 SATA3 Connectors (SATA3_3_4, Gray) 31 SATA3 Connectors (SATA3_1_2, Gray) Southbridge Controller 32 SPI Flash Memory (32Mb) 33 Power LED Header (PLED1) Chassis Speaker Header 34 (SPEAKER 1, Black) 35 System Panel Header (PANEL1, Black) Chassis Fan Connector (CHA_FAN2) Chassis Fan Connector (CHA_FAN1) Clear CMOS Jumper (CLRCMOS1) USB 2.0 Header (USB4_5, Black) USB 2.0 Header (USB8_9, Black) USB 2.0 Header (USB10_11, Black) Serial Port Connector (COM1) Infrared Module Header (IR1) Front Panel Audio Header (HD_AUDIO1, Black) PCI Express 2.0 x16 Slot (PCIE4; Black) PCI Slot (PCI2) PCI Express 2.0 x16 Slot (PCIE3; Black) PCI Slot (PCI1) PCI Express 2.0 x16 Slot (PCIE2; Black) PCI Express 2.0 x1 Slot (PCIE1; Black) Power Fan Connector (PWR_FAN1) 12 1.

4 I/O Panel 1 2 *3 4 5 6 7 8 PS/2 Mouse Port (Green) Coaxial SPDIF Out Port LAN RJ-45 Port USB 2.0 Ports (USB23) Side Speaker (Gray) Rear Speaker (Black) Central / Bass (Orange) Line In (Light Blue) **9 10 11 ***12 13 14 15 16 Front Speaker (Lime) Microphone (Pink) USB 3.0 Ports (USB12) eSATA3 Connector USB 2.0 Ports (USB67) USB 2.0 Ports (USB01) Optical SPDIF Out Port PS/2 Keyboard Port (Purple) * There are two LEDs next to the LAN port.

Please refer to the table below for the LAN port LED indications. LAN Port LED Indications Status SPEED LED Description Activity/Link LED Status Description ACT/LINK SPEED LED LED Off No Link Blinking Data Activity On Link Off Orange Green 10Mbps connection 100Mbps connection 1Gbps connection LAN Port ** If you use a 2-channel speaker, please connect the speaker's plug into "Front Speaker Jack". See the table below for connection details in accordance with the type of speaker you use. TABLE for Audio Output Connection Audio Output Channels Front Speaker Rear Speaker Central / Bass Side Speaker (No).



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9) (No.

6) (No. 7) (No. 5) 2 V -- -- -4 V V -- -6 V V V -8 V V V V 13 To enable Multi-Streaming function, you need to connect a front panel audio cable to the front panel audio header. After restarting your computer, you will find "Mixer" tool on your system. Please select "Mixer ToolBox", click "Enable playback multi-streaming", and click "ok". Choose "2CH", "4CH", "6CH", or "8CH" and then you are allowed to select "Realtek HDA Primary output" to use Rear Speaker, Central/Bass, and Front Speaker, or select "Realtek HDA Audio 2nd output" to use front panel audio. *** eSATA3 connector supports SATA Gen3 in cable 1M. 14 2. Installation This is an ATX form factor (12.0-in x 8.

6-in, 30.5 cm x 21.8 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it. Pre-installation Precautions Take note of the following precautions before you install motherboard components or change any motherboard settings. Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals, and/or components. 1. Unplug the power cord from the wall socket before touching any components. 2. To avoid damaging the motherboard's components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components. 3. Hold components by the edges and do not touch the ICs.

4.

Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that comes with the component. 5. When placing screws into the screw holes to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard. 15 2.1 CPU Installation Step 1.

Unlock the socket by lifting the lever up to a 90 angle. Step 2. Position the CPU directly above the socket such that the CPU corner with the golden triangle matches the socket corner with a small triangle. Step 3. Carefully insert the CPU into the socket until it fits in place. The CPU fits only in one correct orientation. DO NOT force the CPU into the socket to avoid bending of the pins. o Step 4. When the CPU is in place, press it firmly on the socket while you push down the socket lever to secure the CPU. The lever clicks on the side tab to indicate that it is locked.

Lever 90° Up CPU Golden Triangle Socket Corner Small Triangle STEP 1: Lift Up The Socket Lever STEP 2 / STEP 3: STEP 4: Match The CPU Golden Triangle Push Down And Lock To The Socket Corner Small The Socket Lever Triangle 2.2 Installation of CPU Fan and Heatsink After you install the CPU into this motherboard, it is necessary to install a suitable heatsink and cooling fan to dissipate heat. You also need to spray thermal grease between the CPU and the heatsink to improve heat dissipation. Make sure that the CPU and the heatsink are securely fastened and in good contact with each other. Then connect the CPU fan to the CPU FAN connector (CPU_FAN1, see Page 12, No. 4 or CPU_FAN2, see Page 12, No. 5). For proper installation, please kindly refer to the instruction manuals of the CPU fan and the heatsink. 16 2.3 Installation of Memory Modules (DIMM) This motherboard provides four 240-pin DDR3 (Double Data Rate 3) DIMM slots, and supports Dual Channel Memory Technology.

For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR3 DIMM pair in the slots. In other words, you have to install identical DDR3 DIMM pair in Dual Channel A (DDR3_A1 and DDR3_B1; Black slots; see p.12 No.7) or identical DDR3 DIMM pair in Dual Channel B (DDR3_A2 and DDR3_B2; Black slots; see p.12 No.

8), so that Dual Channel Memory Technology can be activated. This motherboard also allows you to install four DDR3 DIMMs for dual channel configuration, and please install identical DDR3 DIMMs in all four slots. You may refer to the Dual Channel Memory Configuration Table below. Dual Channel Memory Configurations (1) (2) (3)* slots. 1.

Please install the memory module into the slots DDR3_A2 and DDR3_B2 for the first priority. 2. If you want to install two memory modules, for optimal compatibility and reliability, it is recommended to install them either in the set of slots DDR3_A1 and DDR3_B1, or in the set of slots DDR3_A2 and DDR3_B2. 3. If only one memory module or three memory modules are installed in the DDR3 DIMM slots on this motherboard, it is unable to activate the Dual Channel Memory Technology. 4. If a pair of memory modules is NOT installed in the same Dual Channel, for example, installing a pair of memory modules in DDR3_A1 and DDR3_A2, it is unable to activate the Dual Channel Memory Technology. 5. It is not allowed to install a DDR or DDR2 memory module into DDR3 slot; otherwise, this motherboard and DIMM may be damaged. 6.

If you adopt DDR3 2100 memory modules on this motherboard, it is recommended to install them on DDR3_A2 and DDR3_B2 slots. DDR3_A1 (Black Slot) Populated - Populated DDR3_A2 (Black Slot) - Populated Populated DDR3_B1 DDR3_B2 (Black Slot) (Black Slot) Populated Populated Populated Populated * For the configuration (3), please install identical DDR3 DIMMs in all four 17 Installing a DIMM Please make sure to disconnect power supply before adding or removing DIMMs or the system components. Step 1. Unlock a DIMM slot by pressing the retaining clips outward. Step 2. Align a DIMM on the slot such that the notch on the DIMM matches the break on the slot. The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation. Step 3. Firmly insert the DIMM into the slot until the retaining clips at both ends fully snap back in place and the DIMM is properly seated.

18 2.4 Expansion Slots (PCI and PCI Express Slots) There are 2 PCI slots and 4 PCI Express slots on this motherboard. PCI Slots: PCI slots are used to install expansion cards that have the 32-bit PCI interface. PCIE Slots: PCIE1 (PCIE x1 slot; Black) is used for PCI Express cards with x1 lane width cards, such as Gigabit LAN card and SATA2 card. PCIE2 / PCIE3 (PCIE x16 slot; Black) is used for PCI Express x16 lane width graphics cards, or used to install PCI Express graphics cards to support SLITM and CrossFireXTM function.

PCIE4 (PCIE x16 slot; Black) is used for PCI Express x4 lane width cards, or used to install PCI Express graphics cards to support 3-Way CrossFireXTM function. 1. In single VGA card mode, it is recommended to install a PCI Express x16 graphics card on PCIE2 slot. 2. In CrossFireXTM or SLITM mode, please install PCI Express x16 graphics cards on PCIE2 and PCIE3 slots.



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Therefore, both these two slots will work at x16 bandwidth. 3. In 3-Way CrossFireXTM mode, please install PCI Express x16 graphics cards on PCIE2, PCIE3 and PCIE4 slots. Therefore, PCIE2 and PCIE3 slots will work at x16 bandwidth while PCIE4 slot will work at x4 bandwidth. 4. Please connect a chassis fan to motherboard chassis fan connector (CHA_FAN1, CHA_FAN2 or CHA_FAN3) when using multiple graphics cards for better thermal environment. Installing an expansion card Step 1. Before installing the expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation. Remove the system unit cover (if your motherboard is already installed in a chassis).

Remove the bracket facing the slot that you intend to use. Keep the screws for later use. Align the card connector with the slot and press firmly until the card is completely seated on the slot. Fasten the card to the chassis with screws. Replace the system cover. Step 2. Step 3. Step 4. Step 5. Step 6.

19 2.5 SLITM and Quad SLITM Operation Guide This motherboard supports NVIDIA® SLITM and Quad SLITM (Scalable Link Interface) technology that allows you to install up to three identical PCI Express x16 graphics cards. Currently, NVIDIA® SLITM technology supports Windows® XP / XP 64-bit / VistaTM / VistaTM 64-bit / 7 / 7 64-bit OS. NVIDIA® Quad SLITM technology supports Windows® VistaTM / VistaTM 64-bit / 7 / 7 64-bit OS only. Please follow the installation procedures in this section.

Requirements 1. For SLITM technology, you should have two identical SLITM-ready graphics cards that are NVIDIA® certified. For Quad SLITM technology, you should have two identical Quad SLITM-ready graphics cards that are NVIDIA® certified. 2. Make sure that your graphics card driver supports NVIDIA® SLITM technology.

Download the driver from NVIDIA® website (www.nvidia.com). 3. Make sure that your power supply unit (PSU) can provide at least the minimum power required by your system. It is recommended to use NVIDIA® certified PSU. Please refer to NVIDIA® website for details. 2.5.1 Graphics Card Setup 2.

5.1.1 Installing Two SLITM-Ready Graphics Cards Step 1. Install the identical SLITM-ready graphics cards that are NVIDIA® certified because different types of graphics cards will not work together properly. (Even the GPU chips version should be the same.) Insert one graphics card into the PCIE2 slot and the other graphics card to the PCIE3 slot. Make sure that the cards are properly seated on the slots. Step2. If required, connect the auxiliary power source to the PCI Express graphics cards. 20 Step3.

Align and insert ASRock SLI_Bridge_2S Card to the goldfingers on each graphics card. Make sure ASRock SLI_Bridge_2S Card is firmly in place. ASRock SLI_Bridge_2S Card Step4. Connect a VGA cable or a DVI cable to the monitor connector or the DVI connector of the graphics card that is inserted to PCIE2 slot. 2.

5.2 Driver Installation and Setup Install the graphics card drivers to your system. After that, you can enable the MultiGraphics Processing Unit (GPU) feature in the NVIDIA® nView system tray utility. Please follow the below procedures to enable the multi-GPU feature. For Windows® XP / XP 64-bit OS: (For SLITM mode only) A.

Double-click NVIDIA Settings icon on your Windows® taskbar. B. From the pop-up menu, select Set SLI and PhysX configuration. In Set PhysX GPU acceleration item, please select Enabled. In Select an SLI configuration item, please select Enable SLI. And click Apply. C. Reboot your system. D. You can freely enjoy the benefits of SLITM features.

21 For Windows® VistaTM / VistaTM 64-bit / 7 / 7 64-bit OS: (For SLITM and Quad SLITM mode) A. Click the Start icon on your Windows taskbar. B. From the pop-up menu, select All Programs, and then click NVIDIA Corporation. C. Select NVIDIA Control Panel tab. D. Select Control Panel tab. E. From the pop-up menu, select Set SLI and PhysX configuration.

In Set PhysX GPU acceleration item, please select Enabled. In Select an SLI configuration item, please select Enable SLI. And click Apply. F. Reboot your system.

G. You can freely enjoy the benefits of SLITM or Quad SLITM features. * SLITM appearing here is a registered trademark of NVIDIA® Technologies Inc., and is used only for identification or explanation and to the owners' benefit, without intent to infringe. 22 2.

6 CrossFireXTM, 3-Way CrossFireXTM and Quad CrossFireXTM Operation Guide This motherboard supports CrossFireXTM, 3-way CrossFireXTM and Quad CrossFireXTM features. CrossFireXTM technology offers the most advantageous means available of combining multiple high performance Graphics Processing Units (GPU) in a single PC. Combining a range of different operating modes with intelligent software design and an innovative interconnect mechanism, CrossFireXTM enables the highest possible level of performance and image quality in any 3D application. Currently CrossFireXTM features are supported with Windows® XP with Service Pack 2 / VistaTM / 7 OS. 3-way CrossFireXTM and Quad CrossFireXTM features are supported with Windows® VistaTM / 7 OS only. Please check the AMD website for AMDTM CrossFireXTM driver updates. 1. If a customer incorrectly configures their system they will not see the performance benefits of CrossFireXTM. All three CrossFireXTM components, a CrossFireXTM Ready graphics card, a CrossFireXTM Ready motherboard and a CrossFireXTM Edition co-processor graphics card, must be installed correctly to benefit from the CrossFireXTM multi-GPU platform. 2.

If you pair a 12-pipe CrossFireXTM Edition card with a 16-pipe card, both cards will operate as 12-pipe cards while in CrossFireXTM mode. 2.6.1 Graphics Card Setup 2.6.1.1 Installing Two CrossFireXTM-Ready Graphics Cards Different CrossFireXTM cards may require different methods to enable CrossFireXTM feature. In below procedures, we use Radeon HD 3870 as the example graphics card. For other CrossFireXTM cards that AMDTM has released or will release in the future, please refer to AMDTM graphics card manuals for detailed installation guides. Step 1.

Insert one Radeon graphics card into the PCIE2 slot and the other Radeon graphics card to the PCIE3 slot. Make sure that the cards are properly seated on the slots. 23 Step 2. Connect two Radeon graphics cards by installing CrossFire Bridge on CrossFire Bridge Interconnects on the top of Radeon graphics cards. (CrossFire Bridge is provided with the graphics card you purchase, not bundled with this motherboard.

Please refer to your graphics card vendor for details.) CrossFire Bridge or Step 3. Connect the DVI monitor cable to the DVI connector on the Radeon graphics card in the PCIE2 slot. (You may use the DVI to D-Sub adapter to convert the DVI connector to D-Sub interface, and then connect the D-Sub monitor cable to the DVI to D-Sub adapter.



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6.1.2 Installing Three CrossFireXTM-Ready Graphics Cards Step 1. Install one Radeon graphics card to the PCIE2 slot. For the proper installation procedures, please refer to section "Expansion Slots". Step 2. Install one Radeon graphics card to the PCIE3 slot. For the proper installation procedures, please refer to section "Expansion Slots". Step 3. Install one Radeon graphics card to the PCIE4 slot.

For the proper installation procedures, please refer to section "Expansion Slots". Step 4. Use one CrossFireTM Bridge to connect Radeon graphics cards on PCIE2 and PCIE3 slots, and use the other CrossFireTM Bridge to connect Radeon graphics cards on PCIE3 and PCIE4 slots. (CrossFireTM Bridge is provided with the graphics card you purchase, not bundled with this motherboard. Please refer to your graphics card vendor for details.) 25 CrossFireTM Bridge Step 5. Connect the DVI monitor cable to the DVI connector on the Radeon graphics card in the PCIE2 slot. (You may use the DVI to D-Sub adapter to convert the DVI connector to D-Sub interface, and then connect the D-Sub monitor cable to the DVI to D-Sub adapter.) 26 2.6.

2 Driver Installation and Setup Step 1. Power on your computer and boot into OS. Step 2. Remove the ATITM driver if you have any VGA drivers installed in your system. The Catalyst Uninstaller is an optional download.

We recommend using this utility to uninstall any previously installed Catalyst drivers prior to installation. Please check AMD website for ATITM driver updates. Step 3. Install the required drivers to your system. For Windows® XP OS: A.

AMD™ recommends Windows® XP Service Pack 2 or higher to be installed (If you have Windows® XP Service Pack 2 or higher installed in your system, there is no need to download it again): <http://www.microsoft.com/windowsxp/sp2/default.msp> B. You must have Microsoft .NET Framework installed prior to downloading and installing the CATALYST Control Center. Please check Microsoft website for details. For Windows® 7 / Vista™ OS: Install the CATALYST Control Center. Please check AMD website for details. Step 4.

Restart your computer. Step 5. Install the VGA card drivers to your system, and restart your computer. Then you will find "ATI Catalyst Control Center" on your Windows® taskbar. ATI Catalyst Control Center Step 6. Double-click "ATI Catalyst Control Center". Click "View", select "CrossFireXTM", and then check the item "Enable CrossFireXTM". Select "2 GPUs" and click "Apply" (if you installed two Radeon graphics cards). Select "3 GPUs" and click "OK" (if you installed three Radeon graphics cards). 27 Although you have selected the option "Enable CrossFire™", the CrossFireXTM function may not work immediately.

Your computer will automatically reboot. After restarting your computer, please confirm whether the option "Enable CrossFire™" in "ATI Catalyst Control Center" is selected or not; if not, please select it again, and then you are able to enjoy the benefits of CrossFireXTM features. Step 7. You can freely enjoy the benefits of CrossFireXTM, 3-Way CrossFireXTM or Quad CrossFireXTM features. * CrossFireXTM appearing here is a registered trademark of AMD™ Technologies Inc.

, and is used only for identification or explanation and to the owners' benefit, without intent to infringe. * For further information of AMD™ CrossFireXTM technology, please check AMD website for updates and details. 2.7 Surround Display Feature This motherboard supports Surround Display upgrade. With the external add-on PCI Express VGA cards, you can easily enjoy the benefits of Surround Display feature.

For the detailed instruction, please refer to the document at the following path in the Support CD: ..\Surround Display Information 28 2.8 Jumpers Setup The illustration shows how jumpers are setup. When the jumper cap is placed on pins, the jumper is "Short". If no jumper cap is placed on pins, the jumper is "Open". The illustration shows a 3-pin jumper whose pin1 and pin2 are "Short" when jumper cap is placed on these 2 pins. Jumper Setting Clear CMOS Jumper (CLRCMOS1) (see p.12, No. 22) Default Clear CMOS Note: CLRCMOS1 allows you to clear the data in CMOS.

The data in CMOS includes system setup information such as system password, date, time, and system setup parameters. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finished updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. 29 2.9 Onboard Headers and Connectors Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage of the motherboard! Serial ATA (SATA) Data Cable (Optional) SATA3_1_2 SATA3_3_4

Serial ATA3 Connectors (SATA3_1_2: see p.12, No.

14) (SATA3_3_4: see p.12, No. 13) (SATA3_5: see p.12, No. @@@@USB 2.

0 Headers (9-pin USB4_5) (see p.12 No. 23) (9-pin USB8_9) (see p.12 No. @@@@25) Infrared Module Header (5-pin IR1) (see p.

12 No. @@@@2. @@Connect Mic_IN (MIC) to MIC2_L. B. Connect Audio_R (RIN) to OUT2_R and Audio_L (LIN) to OUT2_L. C. Connect Ground (GND) to Ground (GND). D. MIC_RET and OUT_RET are for HD audio panel only. You don't need to connect them for AC'97 audio panel.

E. To activate the front mic. For Windows® XP / XP 64-bit OS: Select "Mixer". Select "Recorder". Then click "FrontMic". @@@@Note the positive and negative pins before connecting the cables. @@@@The LED is on when the system is operating. The LED keeps blinking when the system is in S1 sleep state. @@@@The LED is on when the hard drive is reading or writing data. The front panel design may differ by chassis.

@@@17) Please connect the chassis power LED to this header to indicate system power status. The LED is on when the system is operating. The LED keeps blinking in S1 state. The LED is off in S3/S4 state or S5 state (power off). 32 Chassis and Power Fan Connectors (4-pin CHA_FAN1) (see p.

12 No. 21) Please connect the fan cables to the fan connectors and match the black wire to the ground pin. CHA_FAN1/2/3 fan speed can be controlled through UEFI or AXTU. (3-pin CHA_FAN2) (see p.12 No.

20) (3-pin CHA_FAN3) (see p.12 No. 10) (3-pin PWR_FAN1) (see p.12 No. 35) CPU Fan Connectors (4-pin CPU_FAN1) (see p.12 No. 4) 1 2 3 4 Please connect the CPU fan cable to the connector and match the black wire to the ground pin.



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Though this motherboard provides 4-Pin CPU fan (Quiet Fan) support, the 3-Pin CPU fan still can work successfully even without the fan speed control function. If you plan to connect the 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3. Pin 1-3 Connected 3-Pin Fan Installation (3-pin CPU_FAN2) (see p.

12 No. 5) ATX Power Connector (24-pin ATXPWR1) (see p.12 No. 9) 12 24 Please connect an ATX power supply to this connector. 1 13 Though this motherboard provides 24-pin ATX power connector, it can still work if you adopt a traditional 20-pin ATX power supply. To use the 20-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 13. 20-Pin ATX Power Supply Installation 12 24 1 13 33 ATX 12V Power Connector (8-pin ATX12V1) (see p.12 No. 2) 5 8 1 4 Please connect an ATX 12V power supply to this connector. Though this motherboard provides 8-pin ATX 12V power connector, it can still work if you adopt a traditional 4-pin ATX 12V power supply.

To use the 4-pin ATX power supply, please plug your power supply along with Pin 1 and Pin 5. 5 1 4-Pin ATX 12V Power Supply Installation 8 4 Serial port Header (9-pin COM1) (see p.12 No.26) This COM1 header supports a serial port module. HDMI_SPDIF Header (2-pin HDMI_SPDIF1) (see p.

12 No. 1) HDMI_SPDIF header, providing SPDIF audio output to HDMI VGA card, allows the system to connect HDMI Digital TV/ projector/LCD devices. Please connect the HDMI_SPDIF connector of HDMI VGA card to this header. 34 2.10 Serial ATA3 (SATA3) Hard Disks Installation This motherboard adopts AMD SB950 chipset that supports Serial ATA3 (SATA3) hard disks and RAID (RAID 0, RAID 1, RAID 5 and RAID 10) functions.

You may install SATA3 hard disks on this motherboard for internal storage devices. This section will guide you to install the SATA3 hard disks. STEP 1: Install the SATA3 hard disks into the drive bays of your chassis. STEP 2: Connect the SATA power cable to the SATA3 hard disk. STEP 3: Connect one end of the SATA data cable to the motherboard's SATA3 connector. STEP 4: Connect the other end of the SATA data cable to the SATA3 hard disk. 2.11 Hot Plug and Hot Swap Functions for SATA3 HDDs This motherboard supports Hot Plug and Hot Swap functions for SATA3 in RAID / AHCI mode. The AMD SB950 chipset provides hardware support for Advanced Host controller Interface (AHCI), a new programming interface for SATA host controllers developed through a joint industry effort. NOTE What is Hot Plug Function? If the SATA3 HDDs are NOT set for RAID configuration, it is called "Hot Plug" for the action to insert and remove the SATA3 HDDs while the system is still power-on and in working condition.

However, please note that it cannot perform Hot Plug if the OS has been installed into the SATA3 HDD. What is Hot Swap Function? If SATA3 HDDs are built as RAID 1 or RAID 5 then it is called "Hot Swap" for the action to insert and remove the SATA3 HDDs while the system is still power-on and in working condition. 35 2.12 SATA3 HDD Hot Plug Feature and Operation Guide This motherboard supports Hot Plug feature for SATA3 HDD in RAID / AHCI mode.

Please read below operation guide of Hot Plug feature carefully. Before you process the SATA3 HDD Hot Plug, please check below cable accessories from the motherboard gift box pack. A. 7-pin SATA data cable B. SATA power cable with SATA 15-pin power connector interface A. SATA data cable (Red) B. SATA power cable SATA 7-pin connector The SATA 15-pin power connector (Black) connects to SATA3 HDD Caution 1x4-pin conventional power connector (White) connects to power supply 1. Without the SATA 15-pin power connector interface, the SATA3 Hot Plug cannot be processed. 2. Even some SATA3 HDDs provide both SATA 15-pin power connector and IDE 1x4-pin conventional power connector interfaces, the IDE 1x4-pin conventional power connector interface is definitely not able to support Hot Plug and will cause the HDD damage and data loss. Points of attention, before you process the Hot Plug: 1. Below operation procedure is designed only for our motherboard, which supports SATA3 HDD Hot Plug. * The SATA3 Hot Plug feature might not be supported by the chipset because of its limitation, the SATA3 Hot Plug support information of our motherboard is indicated in the product spec on our website: www.asrock.com 2. Make sure your SATA3 HDD can support Hot Plug function from your dealer or HDD user manual.

The SATA3 HDD, which cannot support Hot Plug function, will be damaged under the Hot Plug operation. 3. Please make sure the SATA3 driver is installed into your system properly. The latest SATA3 driver is available on our support website: www.asrock.com 4. Make sure to use the SATA power cable & data cable, which are from our motherboard package. 5. Please follow below instructions step by step to reduce the risk of HDD crash or data loss. 36 How to Unplug a SATA3 HDD: Points of attention, before you process the Hot Plug: Please follow the instructions below to process the Hot Plug, improper procedures will cause the SATA3 HDD damage and data loss.

Step 1 Please connect the SATA power cable's 1x4-pin end (White) to the power supply's 1x4-pin cable. Step 2 Connect the SATA data cable to the motherboard's SATAII / SATA3 connector. SATA power cable 1x4-pin power connector (White) Step 3 Connect the SATA 15-pin power cable's connector (Black) end to the SATA3 HDD. Step 4 Connect the SATA data cable to the SATA3 HDD. How to Hot Unplug a SATA3 HDD: Points of attention, before you process the Hot Unplug: Please follow the instructions below to process the Hot Unplug, improper procedures will cause the SATA3 HDD damage and data loss. Step 1 Unplug the SATA data cable from the SATA3 HDD's side. Step 2 Unplug the SATA 15-pin power cable's connector (Black) from the SATA3 HDD's side. 37 2.13 Driver Installation Guide To install the drivers to your system, please insert the support CD to your optical drive first. Then, the drivers compatible to your system can be auto-detected and listed on the support CD driver page.

Please follow the order from top to bottom to install those required drivers, so that the drivers you install can work properly. 2.14 Installing Windows® 7 / 7 64-bit / VistaTM / VistaTM 64-bit / XP / XP 64-bit With RAID Functions If you want to install Windows® 7 / 7 64-bit / VistaTM / VistaTM 64-bit / XP / XP 64-bit on a RAID disk composed of 2 or more SATA3 HDDs with RAID functions, please follow the procedures below according to the OS you install. 2.14. 1 Installing Windows® XP / XP 64-bit With RAID Functions If you want to install Windows® XP / XP 64-bit on a RAID disk composed of 2 or more SATA3 HDDs with RAID functions, please follow the steps below. STEP 1: Set up UEFI. A. Enter UEFI SETUP UTILITY Advanced screen Storage Configuration. B. Set the "SATA Mode" option to [RAID].



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STEP 2: Make a SATA3 Driver Diskette. (Please use an USB floppy or a floppy disk.) A. Insert the ASRock Support CD into your optical drive to boot your system. B. During POST at the beginning of system boot-up, press the <F11> key, and then a window for boot devices selection appears. Please select CD-ROM as the boot device. C. When you see the message on the screen, "Generate Serial ATA driver diskette [YN]?", press <Y>.

D. Then you will see these messages, Please insert a diskette into the floppy drive. WARNING! Formatting the floppy diskette will lose ALL data in it! Start to format and copy files [YN]? Please insert a floppy diskette into the floppy drive, and press any key. E. The system will start to format the floppy diskette and copy SATA3 drivers into the floppy diskette. 38 STEP 3: Use "RAID Installation Guide" to set RAID configuration. Before you start to configure RAID function, you need to check the RAID installation guide in the Support CD for proper configuration. Please refer to the BIOS RAID installation guide part of the document in the following path in the Support CD: .. \RAID Installation Guide STEP 4: Install Windows® XP / XP 64-bit OS on your system.

After step 1, 2, 3, you can start to install Windows® XP / XP 64-bit OS on your system. At the beginning of Windows® setup, press F6 to install a third-party RAID driver. When prompted, insert the SATA3 driver diskette containing the AMD RAID driver. After reading the floppy disk, the driver will be presented. Select the driver to install according to the OS you install.

2.14.2 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit With RAID Functions If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit on a RAID disk composed of 2 or more SATA3 HDDs with RAID functions, please follow below steps. STEP 1: Set up UEFI. A. Enter UEFI SETUP UTILITY Advanced screen Storage Configuration. B. Set the "SATA Mode" option to [RAID]. STEP 2: Use "RAID Installation Guide" to set RAID configuration. Before you start to configure RAID function, you need to check the RAID installation guide in the Support CD for proper configuration. Please refer to the BIOS RAID installation guide part of the document in the following path in the Support CD: .. \RAID Installation Guide STEP 3: Make a SATA3 Driver Diskette. Make a SATA3 driver diskette by following section 2.14.

1 step 2 on page 38. STEP 4: Install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system. 39 2.15 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64-bit Without RAID Functions If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit / XP / XP 64bit OS on your SATA3 HDDs without RAID functions, please follow the procedures below according to the OS you install. 2.15.1 Installing Windows® XP / XP 64-bit Without RAID Functions If you want to install Windows® XP / XP 64-bit on your SATA3 HDDs without RAID functions, please follow the steps below.

Using SATA3 HDDs with NCQ and Hot Plug functions (AHCI mode) STEP 1: Set up UEFI. A. Enter UEFI SETUP UTILITY Advanced screen Storage Configuration.

B. Set the option "SATA Mode" to [AHCI]. STEP 2: Make a SATA3 Driver Diskette. Make a SATA3 driver diskette by following section 2.14.

1 step 2 on page 38. STEP 3: Install Windows® XP / XP 64-bit OS on your system. You can start to install Windows® XP / XP 64-bit OS on your system. At the beginning of Windows® setup, press F6 to install a third-party AHCI driver. When prompted, insert the SATA3 driver diskette containing the AMD AHCI driver.

After reading the floppy disk, the driver will be presented. Select the driver to install according to the OS you install. Using SATA3 HDDs without NCQ and Hot Plug functions (IDE mode) STEP 1: Set up UEFI. A. Enter UEFI SETUP UTILITY Advanced screen Storage Configuration. B. Set the option "SATA Mode" to [IDE]. STEP 2: Install Windows® XP / XP 64-bit OS on your system. 40 2.15.

2 Installing Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit Without RAID Functions If you want to install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit on your SATA3 HDDs without RAID functions, please follow below steps. Using SATA3 HDDs with NCQ and Hot Plug functions (AHCI mode) STEP

1: Set up UEFI. A. Enter UEFI SETUP UTILITY Advanced screen Storage Configuration. B. Set the option "SATA Mode" to [AHCI]. STEP 2: Install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system. Using SATA3 HDDs without NCQ and Hot Plug functions (IDE mode) STEP 1: Set up UEFI. A. Enter UEFI SETUP UTILITY Advanced screen Storage Configuration.

B. Set the option "SATA Mode" to [IDE]. STEP 2: Install Windows® 7 / 7 64-bit / Vista™ / Vista™ 64-bit OS on your system. 2.16 Untied Overclocking Technology This motherboard supports Untied Overclocking Technology, which means during overclocking, FSB enjoys better margin due to fixed PCI / PCIE buses.

Before you enable Untied Overclocking function, please enter "Overclock Mode" option of UEFI setup to set the selection from [Auto] to [Manual].

Therefore, CPU FSB is untied during overclocking, but PCI / PCIE buses are in the fixed mode so that FSB can operate under a more stable overclocking environment. Please refer to the warning on page 9 for the possible overclocking risk before you apply Untied Overclocking Technology. 41 3. UEFI SETUP UTILITY 3.

1 Introduction This section explains how to use the UEFI SETUP UTILITY to configure your system. The SPI Memory on the motherboard stores the UEFI SETUP UTILITY. You may run the UEFI SETUP UTILITY when you start up the computer. Please press <F2> or during the Power-On-Self-Test (POST) to enter the UEFI SETUP UTILITY, otherwise, POST will continue with its test routines. If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing <Ctl> + <Alt> + <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on. Because the UEFI software is constantly being updated, the following UEFI setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen. 3.1.1 UEFI Menu Bar The top of the screen has a menu bar with the following selections:

Main To set up the system time/date information OC Tweaker To set up overclocking features Advanced To set up the advanced UEFI features H/W Monitor To display current hardware status Boot To set up the default system device to locate and load the Operating System Security To set up the security features

Exit To exit the current screen or the UEFI SETUP UTILITY Use < > key or < > key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen.

42 3.1.2 Navigation Keys Please check the following table for the function description of each navigation key.



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Navigation Key(s) // + / - <Enter> <F1> <F9> <F10> <ESC> Function Description Moves cursor left or right to select Screens Moves cursor up or down to select items To change option for the selected items To bring up the selected screen To display the General Help Screen To load optimal default values for all the settings To save changes and exit the UEFI SETUP UTILITY To jump to the Exit Screen or exit the current screen 3.2 Main Screen When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview. System Time [Hour:Minute:Second] Use this item to specify the system time. System Date [Day Month/Date/Year] Use this item to specify the system date. 43 3.3 OC Tweaker Screen In the OC Tweaker screen, you can set up overclocking features. OC Mode Use this to select OC Mode.

Configuration options: [Manual] and [CPU OC Mode]. The default value is [Manual]. CPU Configuration Overclock Mode Use this to select Overclock Mode. Configuration options: [Auto] and [Manual]. The default value is [Auto].

Spread Spectrum This item should always be [Auto] for better system stability. ASRock UCC ASRock UCC (Unlock CPU Core) feature simplifies AMD CPU activation. As long as a simple switch of the UEFI option "ASRock UCC", you can unlock the extra CPU core to enjoy an instant performance boost. When UCC feature is enabled, the dual-core or triple-core CPU will boost to the quad-core CPU, and some CPU, including quad-core CPU, can also increase L3 cache size up to 6MB, which means you can enjoy the upgrade CPU performance with a better price. Please be noted that UCC feature is supported with AM3/AM3+ CPU only, and in addition, not every AM3/AM3+ CPU can support this function because some CPU's hidden core may be malfunctioned. CPU Active Core Control This allows you to adjust the CPU Active Core Control feature. The configuration options depend on the CPU core you adopt. The default value is [Disabled]. 44 AMD Turbo Core Technology allows you to adjust the AMD Turbo Core Technology feature. The This default value is [Disabled]. Processor Maximum Frequency will display Processor Maximum Frequency for reference. It North Bridge Maximum Frequency will display North Bridge Maximum Frequency for reference. It Processor Maximum Voltage will display Processor Maximum Voltage for reference. It Multiplier/Voltage Change item is set to [Auto] by default. If it is set to [Manual], you may adjust This the value of Processor Frequency and Processor Voltage.

However, it is recommended to keep the default value for system stability. HT Bus Speed feature allows you selecting Hyper-Transport bus speed. This Configuration options: [200MHz] to [2600MHz]. HT Bus Width feature allows you selecting Hyper-Transport bus width. This Configuration options: [8 Bit] and [16 Bit]. DRAM Configuration DRAM Frequency [Auto] is selected, the motherboard will detect the memory module(s) If inserted and assigns appropriate frequency automatically. DRAM Timing Control 45 Power Down Enable Use this item to enable or disable DDR power down mode. Bank Interleaving Interleaving allows memory accesses to be spread out over banks on the same node, or accross nodes, decreasing access contention. Channel Interleaving It allows you to enable Channel Memory Interleaving. Configuration options: [Disabled], [Auto].

The default value is [Auto]. CAS# Latency (tCL) Use this item to change CAS# Latency (tCL) Auto/Manual setting. The default is [Auto]. RAS# to CAS# Delay (tRCD) Use this item to change RAS# to CAS# Delay (tRCD) Auto/Manual setting. The default is [Auto].

Row Precharge Time (tRP) Use this item to change Row Precharge Time (tRP) Auto/Manual setting. The default is [Auto]. RAS# Active Time (tRAS) Use this item to change RAS# Active Time (tRAS) Auto/Manual setting. The default is [Auto]. Command Rate (CR) Use this item to change Command Rate (CR) Auto/Manual setting.

Min: 1T. Max: 2T. The default is [Auto]. RAS# Cycle Time (tRC) Use this item to change RAS# Cycle Time (tRC) Auto/Manual setting. The default is [Auto].

Write Recovery Time (tWR) Use this item to change Write Recovery Time (tWR) Auto/Manual setting. The default is [Auto]. Refresh Cycle Time (tRFC) Use this item to change Refresh Cyle Time (tRFC) Auto/Manual setting. The default is [Auto]. RAS to RAS Delay (tRRD) Use this item to change RAS to RAS Delay (tRRD) Auto/Manual setting.

The default is [Auto]. Write to Read Delay (tWTR) Use this item to change Write to Read Delay (tWTR) Auto/Manual setting. The default is [Auto]. Read to Precharge (tRTP) Use this item to change Read to Precharge (tRTP) Auto/Manual setting. The default is [Auto]. 46 Four Activate Window (tFAW) Use this item to change Four Activate Window (tFAW) Auto/Manual setting. The default is [Auto]. Voltage Control DRAM Voltage Use this to select DRAM Voltage.

The default value is [Auto]. NB Voltage Use this to select NB Voltage.

The default value is [Auto]. HT Voltage Use this to select HT Voltage. The default value is [Auto]. CPU Load-Line Calibration CPU Load-Line Calibration helps prevent CPU voltage droop when the system is under heavy load. The default value is [Auto].

CPU VDDA Voltage Use this to select CPU VDDA Voltage. The default value is [Auto]. PCIE VDDA Voltage Use this to select PCIE VDDA Voltage. The default value is [Auto]. Would you like to save current setting user defaults? In this option, you are allowed to load and save three user defaults according to your own requirements.

47 3.4 Advanced Screen In this section, you may set the configurations for the following items: CPU Configuration, Nouth Bridge Configuration, South Bridge Configuration, Storage Configuration, Super IO Configuration, ACPI Configuration, and USB Configuration. Setting wrong values in this section may cause the system to malfunction. Instant Flash Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update the system's UEFI without entering operating systems first like MS-DOS or Windows®. Just launch this tool and save the new UEFI file to your USB flash drive, floppy disk or hard drive, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after the UEFI update process is completed. 48 3.

4.1 CPU Configuration Cool 'n' Quiet Use this item to enable or disable AMD's Cool 'n' Quiet™ technology. The default value is [Enabled].



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Configuration options: [Enabled] and [Disabled]. If you install Windows® 7 / Vista™ and want to enable this function, please set this item to [Enabled]. Please note that enabling this function may reduce CPU voltage and memory frequency, and lead to system stability or compatibility issue with some memory modules or power supplies. Please set this item to [Disable] if above issue occurs. Secure Virtual Machine When this option is set to [Enabled], a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by AMD-V. The default value is [Enabled]. Configuration options: [Enabled] and [Disabled].

Enhance Halt State (C1E) All processors support the Halt State (C1). The C1 state is supported through the native processor instructions HLT and MWAIT and requires no hardware support from the chipset. In the C1 power state, the processor maintains the context of the system caches. Core C6 State Use this item to enable Core C6 State to reduce power consumed by the CPU. The default value is [enabled].

CPU Thermal Throttle Use this item to enable CPU internal thermal control mechanism to keep the CPU from overheating. The default value is [Auto]. 49

3.4.2 North Bridge Configuration Primary Graphics Adapter This item will switch the PCI Bus scanning order while searching for video card.

It allows you to select the type of Primary VGA in case of multiple video controllers. The default value of this feature is [PCI Express]. Configuration options: [PCI] and [PCI Express]. IOMMU Use this to enable or disable IOMMU. The default value of this feature is [Disabled]. 50 3.4.3 South Bridge Configuration Onboard HD Audio Select [Auto], [Enabled] or [Disabled] for the onboard HD Audio feature. If you select [Auto], the onboard HD Audio will be disabled when PCI Sound Card is plugged. Front Panel Select [Auto] or [Disabled] for the onboard HD Audio Front Panel.

On/Off Play Use this item to enable or disable On/Off Play Technology. The default value is [Enabled]. When On/Off Play is enabled, Deep Sx will be disabled. If you want to enable Deep Sx, please disable On/Off Play first. Onboard LAN This allows you to enable or disable the onboard LAN feature. Good Night LED Enable this option to turn off Power LED and LAN LED when the system is power on. The keyboard LED will also be turned off in S1, S3 and S4 state. The default value is [Auto]. 51 3.4.

4 Storage Configuration SATA Controller Use this item to enable or disable the "SATA Controller" feature. SATA Mode Use this item to adjust SATA Mode. The default value of this option is [IDE Mode]. Configuration options: [AHCI Mode], [RAID Mode] and [IDE Mode]. If you set this item to RAID mode, it is suggested to install SATA ODD driver on SATA3_5 or eSATA3 port.

SATA IDE Combined Mode This item is for SATA3_5 and eSATA3 ports. Use this item to enable or disable SATA IDE combined mode. The default value is [Enabled]. If you want to build RAID on SATA3_5 and eSATA3 ports, please disable this item. Hard Disk S.

M.A.R.T. Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature.

Configuration options: [Disabled] and [Enabled]. 52 3.4.5 Super IO Configuration Serial Port Use this item to enable or disable the onboard serial port. Serial Port Address Use this item to set the address for the onboard serial port. Configuration options: [3F8h / IRQ4] and [3E8h / IRQ4]. Infrared Port Use this item to enable or disable the onboard infrared port. Infrared Port Address Use this item to set the address for the onboard infrared port. Configuration options: [2F8h / IRQ3] and [2E8h / IRQ3]. 53 3.

4.6 ACPI Configuration Suspend to RAM Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select [Auto] will enable this feature if the OS supports it. Check Ready Bit Use this item to enable or disable the feature Check Ready Bit. Restore on AC/Power Loss This allows you to set the power state after an unexpected AC/power loss.

If [Power Off] is selected, the AC/power remains off when the power recovers. If [Power On] is selected, the AC/power resumes and the system starts to boot up when the power recovers. PS/2 Keyboard Power On Use this item to enable or disable PS/2 keyboard to turn on the system from the power-soft-off mode. PCI Devices Power On Use this item to enable or disable PCI devices to turn on the system from the power-soft-off mode. Ring-In Power On Use this item to enable or disable Ring-In signals to turn on the system from the power-soft-off mode.

RTC Alarm Power On Use this item to enable or disable RTC (Real Time Clock) to power on the system. USB Keyboard/Remote Power On Use this item to enable or disable the system to wake from S5 using USB Keyboard/Remote. USB Mouse Power On Use this item to enable or disable the system to wake from S5 using USB Mouse. 54 ACPI HPET table Use this item to enable or disable ACPI HPET Table. The default value is [Enabled]. Please set this option to [Enabled] if you plan to use this motherboard to submit Windows® Vista™ certification. 55 3.4.7 USB Configuration USB 2.0 Controller Use this item to

enable or disable the use of USB 2.

0 controller. USB 3.0 Controller Use this item to enable or disable the use of USB 3.0 controller. Legacy USB Support Use this option to select legacy support for USB devices. There are four configuration options: [Enabled], [Disabled], [Auto] and [UEFI Setup Only]. The default value is [Enabled]. Please refer to below descriptions for the details of these four options: [Enabled] - Enables support for legacy USB. [Disabled] - USB devices are not allowed to use under legacy OS and UEFI setup when [Disabled] is selected. If you have USB compatibility issues, it is recommended to select [Disabled] to enter OS.

[Auto] - Enables legacy support if USB devices are connected. [UEFI Setup Only] - USB devices are allowed to use only under UEFI setup and Windows / Linux OS. Legacy USB 3.0 Support Use this option to enable or disable legacy support for USB 3.0 devices.

The default value is [Disabled]. 56 3.5 Hardware Health Event Monitoring Screen In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage. CPU Fan 1 & 2 Setting This allows you to set the CPU fan 1 & 2 speed. Configuration options: [Full On] and [Automatic Mode].

The default value is [Full On]. Chassis Fan 1 Setting This allows you to set the chassis fan 1 speed. Configuration options: [Full On], [Automatic Mode] and [Manual]. The default value is [Full On]. Chassis Fan 2 Setting This allows you to set the chassis fan 2 speed. Configuration options: [Full On] and [Manual]. The default value is [Full On]. Chassis Fan 3 Setting This allows you to set the chassis fan 3 speed. Configuration options: [Full On] and [Manual].



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