

**ASRock**<sup>®</sup>

# **A520M-HDV**

# **A520M-HVS**

User Manual

## Contact Information

If you need to contact ASRock or want to know more about ASRock, you're welcome to visit ASRock's website at <http://www.asrock.com>; or you may contact your dealer for further information. For technical questions, please submit a support request form at <https://event.asrock.com/tsd.asp>

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A520M-HDV R2.0



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A520M-HVS

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# Chapter 1 Introduction

Thank you for purchasing ASRock A520M-HDV R2.0 / A520M-HVS R2.0 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 documentation, Chapter 1 and 2 contains the introduction of the motherboard and step-by-step installation guides. Chapter 3 contains the operation guide of the software and utilities. Chapter 4 contains the configuration guide of the BIOS setup.



*Because the motherboard specifications and the BIOS software might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRock's website without further notice. If you require technical support related to this motherboard, please visit our website for specific information about the model you are using. You may find the latest VGA cards and CPU support list on ASRock's website as well. ASRock website <http://www.asrock.com>.*

## 1.1 Package Contents

- ASRock A520M-HDV R2.0 / A520M-HVS R2.0 Motherboard (Micro ATX Form Factor)
- ASRock A520M-HDV R2.0 / A520M-HVS R2.0 Quick Installation Guide
- ASRock A520M-HDV R2.0 / A520M-HVS R2.0 Support CD
- 1 x I/O Panel Shield
- 2 x Serial ATA (SATA) Data Cables (Optional)
- 1 x Screw for M.2 Socket (Optional)

## 1.2 Specifications

<b>Platform</b>	<ul style="list-style-type: none"><li>• Micro ATX Form Factor</li><li>• Solid Capacitor design</li></ul>
<b>CPU</b>	<ul style="list-style-type: none"><li>• Supports AMD AM4 Socket Ryzen™ 3000, 4000 G-Series and 5000 and 5000 G-Series Desktop Processors*</li></ul> <p>* Not compatible with AMD Ryzen™ 5 3400G and Ryzen™ 3 3200G.</p> <ul style="list-style-type: none"><li>• 6 Power Phase design</li></ul>
<b>Chipset</b>	<ul style="list-style-type: none"><li>• AMD A520</li></ul>
<b>Memory</b>	<ul style="list-style-type: none"><li>• Dual Channel DDR4 Memory Technology</li><li>• 2 x DDR4 DIMM Slots</li><li>• AMD Ryzen series CPUs (Vermeer) support DDR4 4600+(OC)/4533(OC)/4466(OC)/4400(OC)/4333(OC)/4266(OC)/4200(OC)/4133(OC)/4000(OC)/3866(OC)/3800(OC)/3733(OC)/3600(OC)/3466(OC)/3200/2933/2667/2400/2133 ECC &amp; non-ECC, un-buffered memory*</li><li>• AMD Ryzen series CPUs (Matisse) support DDR4 4600+(OC)/4533(OC)/4466(OC)/4400(OC)/4333(OC)/4333(OC)/4266(OC)/4200(OC)/4133(OC)/4000(OC)/3866(OC)/3800(OC)/3733(OC)/3600(OC)/3466(OC)/3200/2933/2667/2400/2133 ECC &amp; non-ECC, un-buffered memory*</li><li>• AMD Ryzen series APUs (Cezanne) support DDR4 4733+(OC)/4666(OC)/4600(OC)/4533(OC)/4466(OC)/4400(OC)/400(OC)/4333(OC)/4266(OC)/4200(OC)/4133(OC)/4000(OC)/3866(OC)/3800(OC)/3733(OC)/3600(OC)/3466(OC)/3200/2933/2667/2400/2133 ECC &amp; non-ECC, un-buffered memory*</li><li>• AMD Ryzen series APUs (Renoir) support DDR4 4733+(OC)/4666(OC)/4600(OC)/4533(OC)/4466(OC)/4400(OC)/4333(OC)/4266(OC)/4200(OC)/4133(OC)/4000(OC)/3866(OC)/3800(OC)/3733(OC)/3600(OC)/3466(OC)/3200/2933/2667/2400/2133 ECC &amp; non-ECC, un-buffered memory*</li></ul>

\* For Ryzen Series APUs (Cezanne and Renoir), ECC is only supported with PRO CPUs.

\* Please refer to Memory Support List on ASRock's website for more information. (<http://www.asrock.com/>)

\* Please refer to page 23 for DDR4 UDIMM maximum frequency support.

- Max. capacity of system memory: 64GB
- Supports Extreme Memory Profile (XMP) memory modules
- 15 $\mu$  Gold Contact in DIMM Slots

**Expansion Slot**

CPU:

- 1 x PCIe 3.0 x16 Slot (PCIE2), supports x16 mode\*

\* Supports NVMe SSD as boot disks

Chipset:

- 1 x PCIe 3.0 x1 Slot (PCIE1)

**Graphics**

- Integrated AMD Radeon<sup>TM</sup> Vega Series Graphics in Ryzen Series APU\*

\* Actual support may vary by CPU

- DirectX 12, Pixel Shader 5.0
- Shared memory default 2GB. Max Shared memory supports up to 16GB.

\* The Max shared memory 16GB requires 32GB system memory installed.

**A520M-HDV R2.0:**

- Three graphics output options: D-Sub, DVI-D and HDMI
- Supports Triple Monitor
- Supports HDMI 2.1 with max. resolution up to 4K x 2K (4096x2160) @ 60Hz
- Supports DVI-D with max. resolution up to 1920x1200 @ 60Hz
- Supports D-Sub with max. resolution up to 1920x1200 @ 60Hz
- Supports Auto Lip Sync, Deep Color (12bpc), xvYCC and HBR (High Bit Rate Audio) with HDMI 2.1 Port (Compliant HDMI monitor is required)
- Supports HDR (High Dynamic Range) with HDMI 2.1
- Supports HDCP 2.3 with DVI-D and HDMI 2.1 Ports
- Supports 4K Ultra HD (UHD) playback with HDMI 2.1 Port
- Supports Microsoft PlayReady®

**A520M-HVS:**

- Dual graphics output: support D-Sub and HDMI ports by independent display controllers
- Supports HDMI 2.1 with max. resolution up to 4K x 2K (4096x2160) @ 60Hz
- Supports D-Sub with max. resolution up to 1920x1200 @ 60Hz
- Supports Auto Lip Sync, Deep Color (12bpc), xvYCC and HBR (High Bit Rate Audio) with HDMI 2.1 Port (Compliant HDMI monitor is required)
- Supports HDR (High Dynamic Range) with HDMI 2.1
- Supports HDCP 2.3 with HDMI 2.1 Port
- Supports 4K Ultra HD (UHD) playback with HDMI 2.1 Port
- Supports Microsoft PlayReady®

**Audio**

- 7.1 CH HD Audio (Realtek ALC887/897 Audio Codec)
- Supports Surge Protection

**LAN**

- PCIE x1 Gigabit LAN 10/100/1000 Mb/s
- Realtek RTL8111H
- Supports Wake-On-LAN
- Supports Lightning/ESD Protection
- Supports Energy Efficient Ethernet 802.3az
- Supports PXE

**Rear Panel I/O**

- 1 x PS/2 Mouse/Keyboard Port
- 2 x USB 2.0 Ports (Supports ESD Protection)
- 4 x USB 3.2 Gen1 Ports (Supports ESD Protection)
- 1 x RJ-45 LAN Port with LED (ACT/LINK LED and SPEED LED)
- HD Audio Jacks: Line in / Front Speaker / Microphone

**A520M-HDV R2.0:**

- 1 x D-Sub Port
- 1 x DVI-D Port
- 1 x HDMI Port

**A520M-HVS:**

- 1 x D-Sub Port
- 1 x HDMI Port

<b>Storage</b>	<p>CPU:</p> <ul style="list-style-type: none"><li>• 1 x Ultra M.2 Socket (M2_1, Key M), supports type 2242/2260/2280 PCIe Gen3x4 (32 Gb/s) mode*</li></ul> <p>Chipset:</p> <ul style="list-style-type: none"><li>• 4 x SATA3 6.0 Gb/s Connectors</li></ul>
	<p>* Supports NVMe SSD as boot disks</p> <p>* Supports ASRock U.2 Kit</p>
<b>RAID</b>	<ul style="list-style-type: none"><li>• Supports RAID 0, RAID 1 and RAID 10 for SATA storage devices</li></ul>
<b>Connector</b>	<ul style="list-style-type: none"><li>• 1 x SPI TPM Header</li><li>• 1 x COM Port Header</li><li>• 1 x Chassis Intrusion and Speaker Header</li><li>• 1 x CPU Fan Connector (4-pin)</li></ul> <p>* The CPU Fan Connector supports the CPU fan of maximum 1A (12W) fan power.</p> <ul style="list-style-type: none"><li>• 2 x Chassis Fan Connectors (4-pin) (Smart Fan Speed Control)</li></ul> <p>* The Chassis Fan supports the water cooler fan of maximum 1A (12W) fan power.</p> <p>* CHA_FAN2 can auto detect if 3-pin or 4-pin fan is in use.</p> <ul style="list-style-type: none"><li>• 1 x 24 pin ATX Power Connector</li><li>• 1 x 4 pin 12V Power Connector</li><li>• 1 x Front Panel Audio Connector</li><li>• 2 x USB 2.0 Headers (Support 4 USB 2.0 ports) (Supports ESD Protection)</li><li>• 1 x USB 3.2 Gen1 Header (Supports 2 USB 3.2 Gen1 ports) (Supports ESD Protection)</li></ul>
<b>BIOS Feature</b>	<ul style="list-style-type: none"><li>• AMI UEFI Legal BIOS with GUI support</li><li>• Supports “Plug and Play”</li><li>• ACPI 5.1 compliance wake up events</li><li>• Supports jumperfree</li><li>• SMBIOS 2.3 support</li><li>• CPU, CPU VDDCR_SOC, DRAM, VDDP Voltage Multi-adjustment</li></ul>

<b>Hardware Monitor</b>	<ul style="list-style-type: none"><li>• Temperature Sensing: CPU, Chassis</li><li>• Fan Tachometer: CPU, Chassis Fans</li><li>• Quiet Fan (Auto adjust chassis fan speed by CPU temperature): CPU, Chassis Fans</li><li>• Fan Multi-Speed Control: CPU, Chassis Fans</li><li>• CASE OPEN detection</li><li>• Voltage monitoring: +12V, +5V, +3.3V, CPU Vcore</li></ul>
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<b>OS</b>	<ul style="list-style-type: none"><li>• Microsoft® Windows® 10 64-bit / 11 64-bit</li></ul>
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<b>Certifications</b>	<ul style="list-style-type: none"><li>• FCC, CE</li><li>• ErP/EuP ready (ErP/EuP ready power supply is required)</li></ul>
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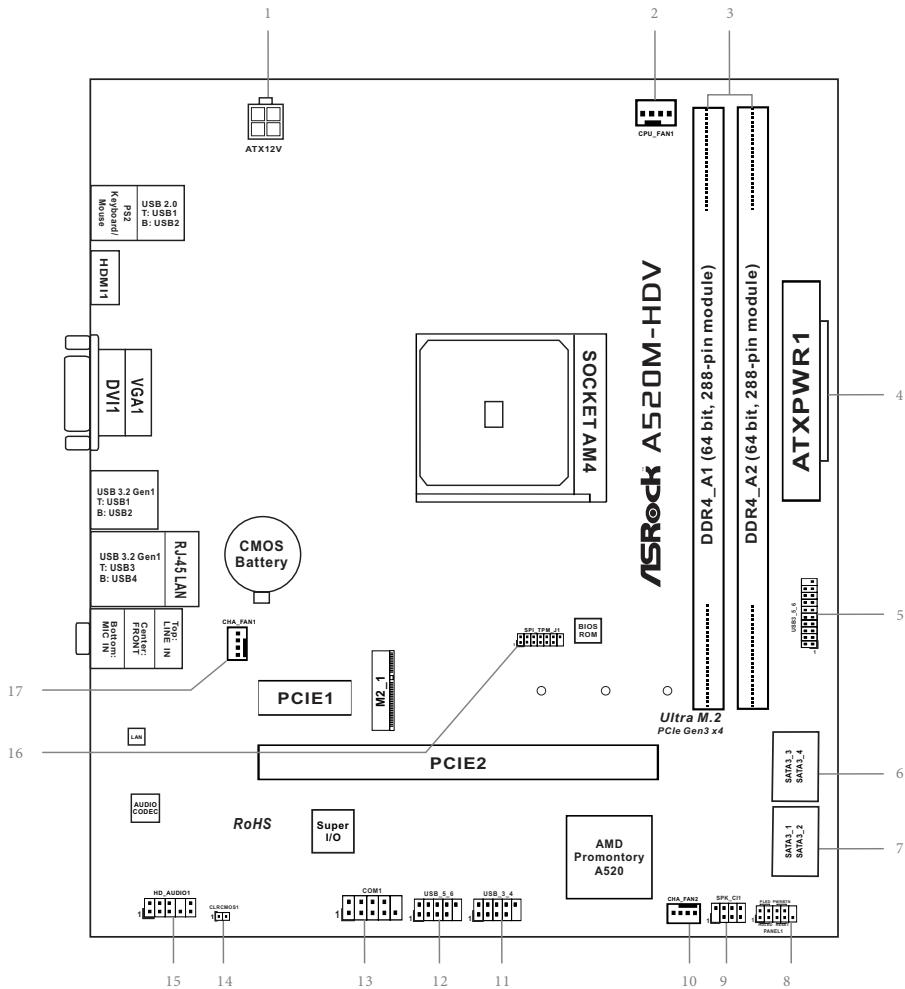
\* For detailed product information, please visit our website: <http://www.asrock.com>



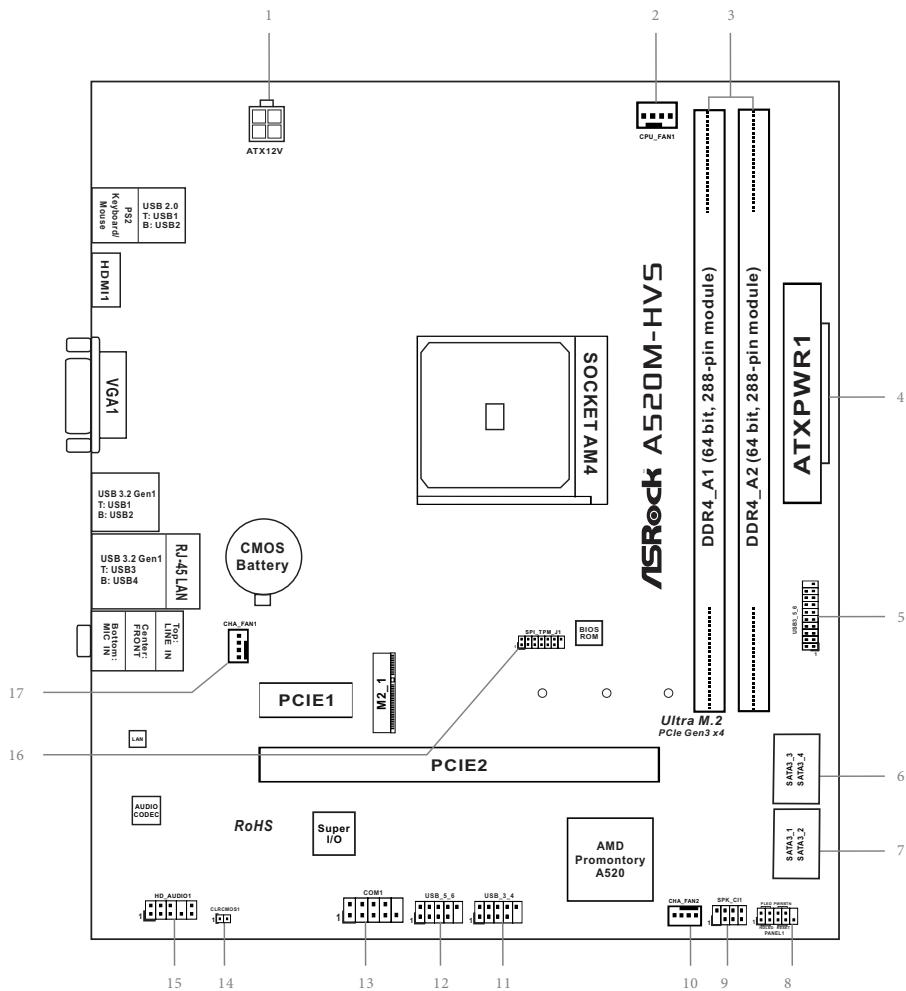
*Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of your system. It should be done at your own risk and expense. We are not responsible for possible damage caused by overclocking.*

### 1.3 Motherboard Layout

A520M-HDV R2.0:



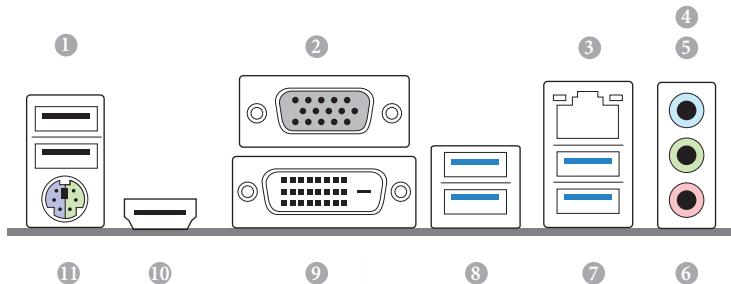
## A520M-HVS:



No.	Description
1	ATX 12V Power Connector (ATX12V1)
2	CPU Fan Connector (CPU_FAN1)
3	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1)
4	ATX Power Connector (ATXPWR1)
5	USB 3.2 Gen1 Header (USB3_5_6)
6	SATA3 Connector (SATA3_3) (Upper), SATA3 Connector (SATA3_4) (Lower)
7	SATA3 Connector (SATA3_4) (Upper), SATA3 Connector (SATA3_2) (Lower)
8	System Panel Header (PANEL1)
9	Chassis Intrusion and Speaker Header (SPK_CI1)
10	Chassis Fan Connector (CHA_FAN2)
11	USB 2.0 Header (USB_3_4)
12	USB 2.0 Header (USB_5_6)
13	COM Port Header (COM1)
14	Clear CMOS Jumper (CLRCMOS1)
15	Front Panel Audio Header (HD_AUDIO1)
16	SPI TPM Header (SPI TPM_J1)
17	Chassis Fan Connector (CHA_FAN1)

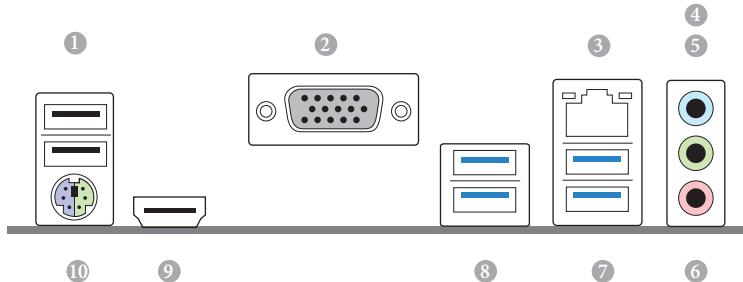
## 1.4 I/O Panel

### A520M-HDV R2.0:



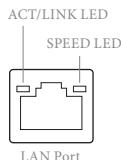
No.	Description	No.	Description
1	USB 2.0 Ports (USB_12)	7	USB 3.2 Gen1 Ports (USB3_34)
2	D-Sub Port	8	USB 3.2 Gen1 Ports (USB3_12)
3	LAN RJ-45 Port*	9	DVI-D Port
4	Line In (Light Blue)**	10	HDMI Port
5	Front Speaker (Lime)**	11	PS/2 Mouse/Keyboard Port
6	Microphone (Pink)**		

### A520M-HVS:



No.	Description	No.	Description
1	USB 2.0 Ports (USB_12)	6	Microphone (Pink)**
2	D-Sub Port	7	USB 3.2 Gen1 Ports (USB3_34)
3	LAN RJ-45 Port*	8	USB 3.2 Gen1 Ports (USB3_12)
4	Line In (Light Blue)**	9	HDMI Port
5	Front Speaker (Lime)**	10	PS/2 Mouse/Keyboard Port

\* There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.



Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Blinking	Data Activity	Orange	100Mbps connection
On	Link	Green	1Gbps connection

\*\* Function of the Audio Ports in 7.1-channel Configuration:

Port	Function
Light Blue (Rear panel)	Rear Speaker Out
Lime (Rear panel)	Front Speaker Out
Pink (Rear panel)	Central /Subwoofer Speaker Out
Lime (Front panel)	Side Speaker Out

# Chapter 2 Installation

This is a Micro ATX form factor 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.

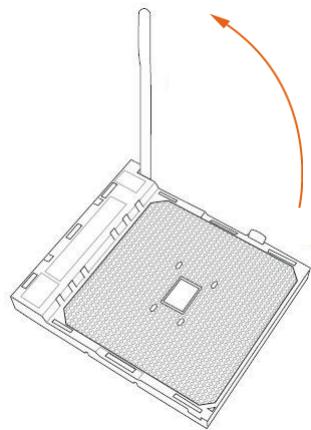
- Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.
- In order to avoid damage from static electricity to the motherboard's components, NEVER place your motherboard directly on a carpet. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle the components.
- Hold components by the edges and do not touch the ICs.
- Whenever you uninstall any components, place them on a grounded anti-static pad or in the bag that comes with the components.
- When placing screws to secure the motherboard to the chassis, please do not over-tighten the screws! Doing so may damage the motherboard.

## 2.1 Installing the CPU

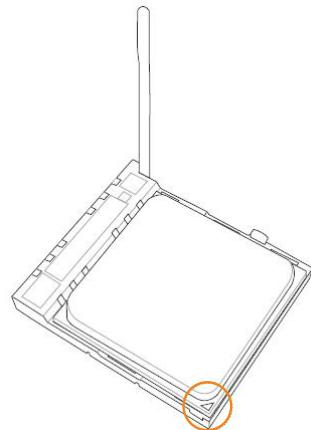


*Unplug all power cables before installing the CPU.*

1



2



3



## 2.2 Installing the CPU Fan and Heatsink

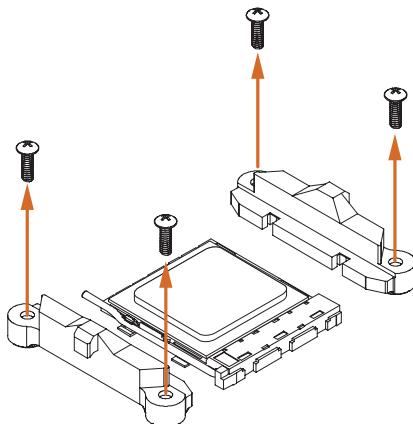
After you install the CPU into this motherboard, it is necessary to install a larger heatsink and cooling fan to dissipate heat. You also need to spray thermal grease between the CPU and the heatsink to improve heat dissipation. Make sure that the CPU and the heatsink are securely fastened and in good contact with each other.



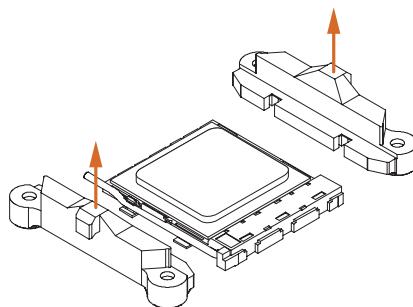
*Please turn off the power or remove the power cord before changing a CPU or heatsink.*

### Installing the CPU Box Cooler SR1

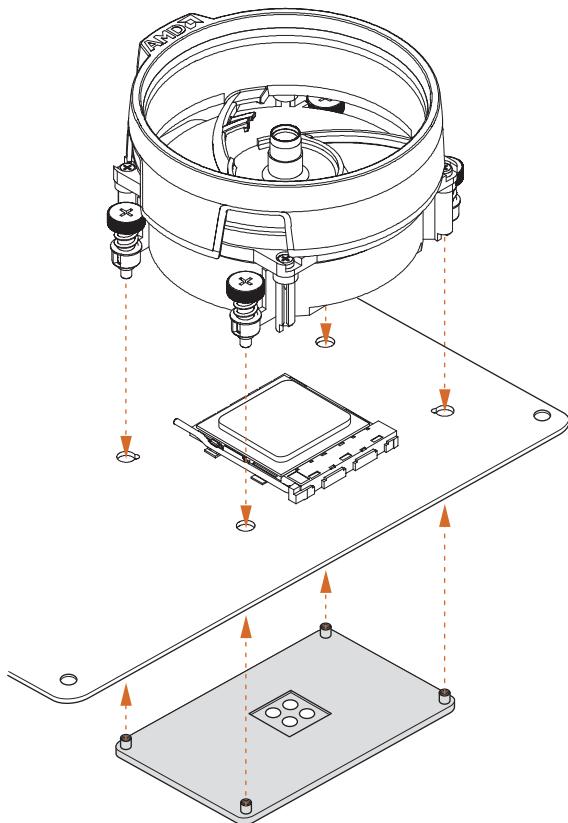
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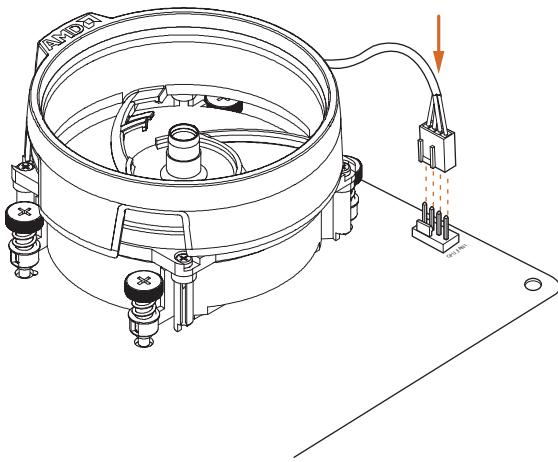
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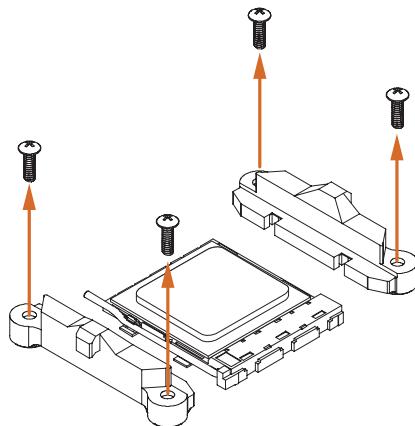


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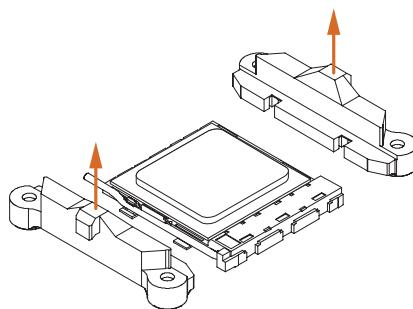


## Installing the AM4 Box Cooler SR2

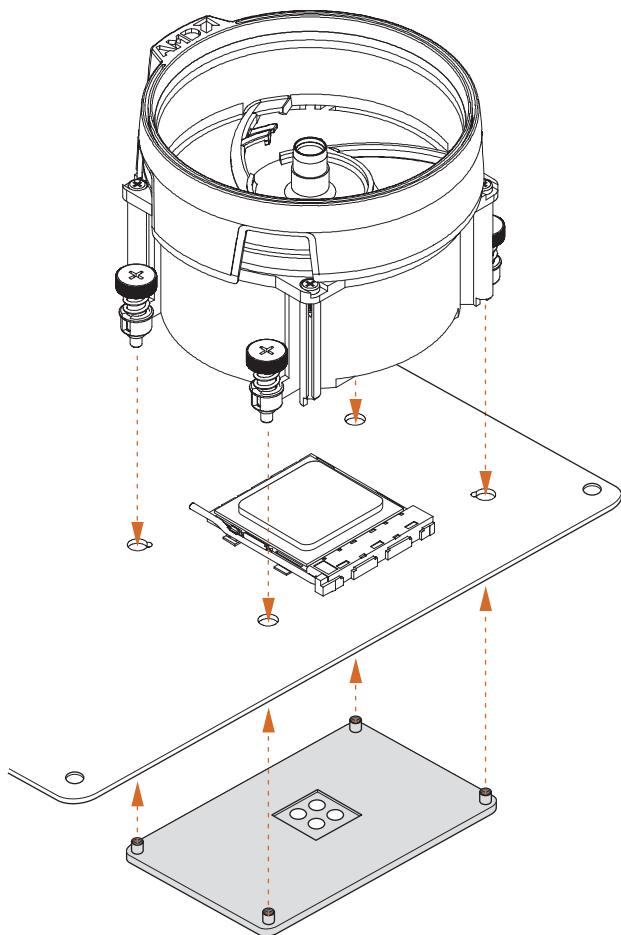
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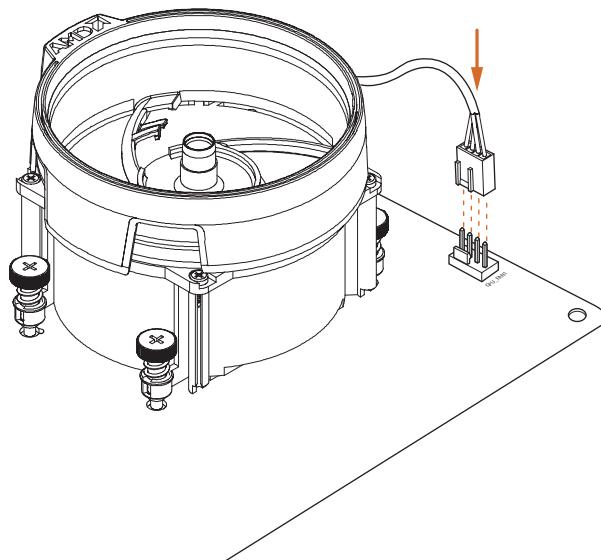
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3



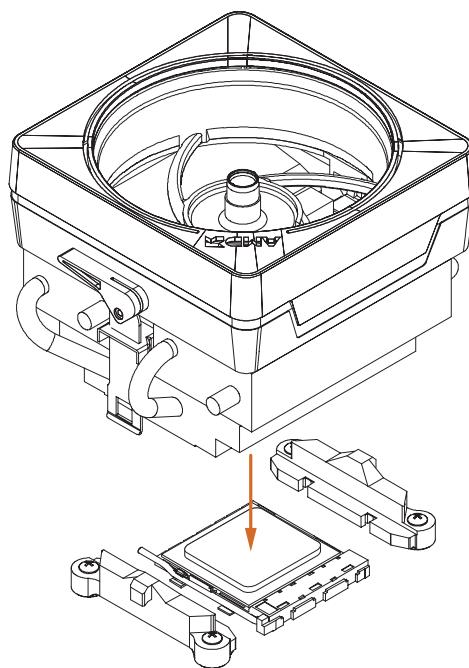
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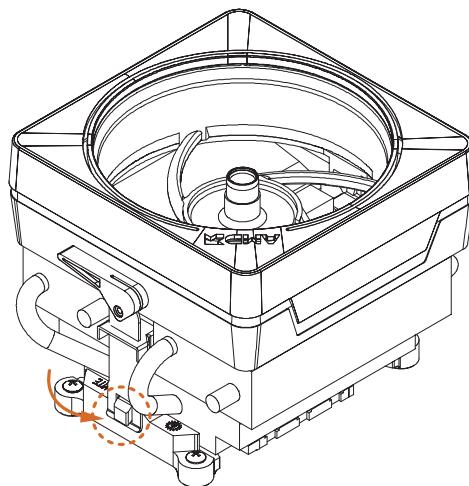
\*The diagrams shown here are for reference only. The headers might be in a different position on your motherboard.

## Installing the AM4 Box Cooler SR3

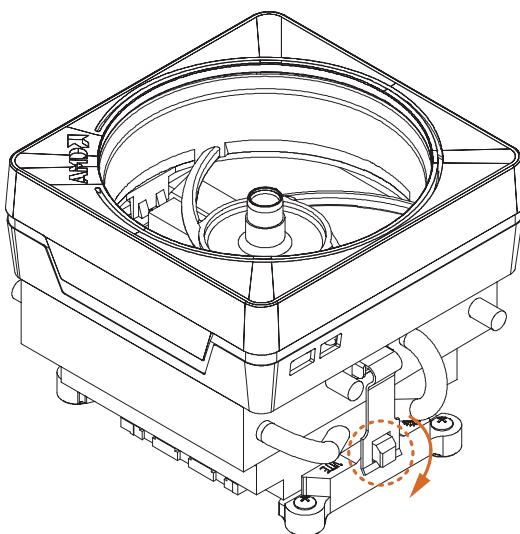
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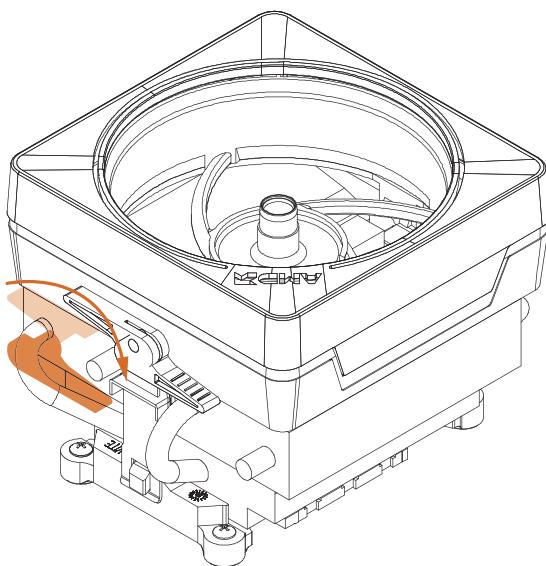
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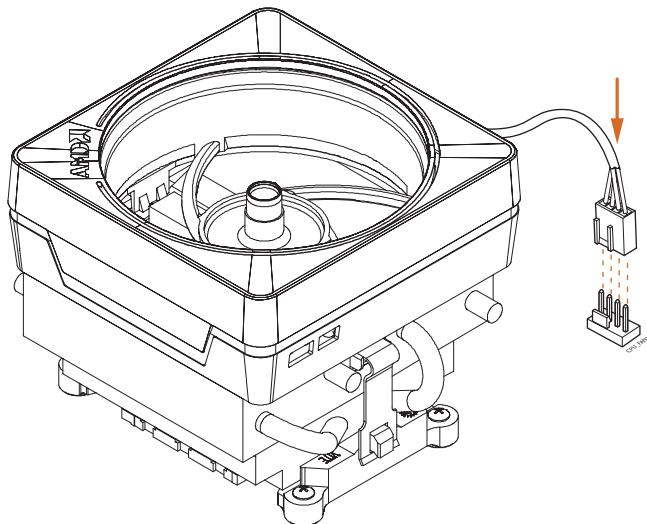
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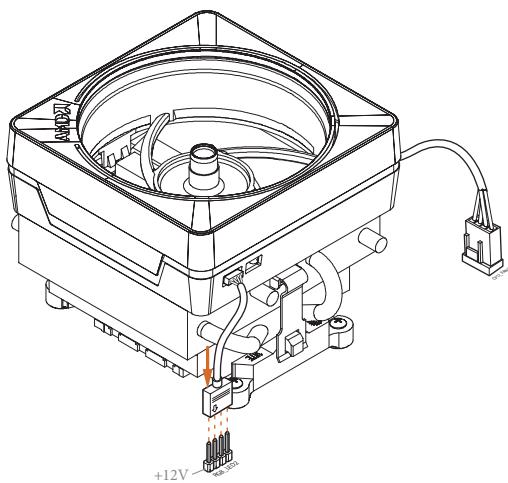
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5



6



\*The diagrams shown here are for reference only. The headers might be in a different position on your motherboard.

## 2.3 Installing Memory Modules (DIMM)

This motherboard provides two 288-pin DDR4 (Double Data Rate 4) DIMM slots, and supports Dual Channel Memory Technology.



1. *For dual channel configuration, you always need to install identical (the same brand, speed, size and chip-type) DDR4 DIMM pairs.*
2. *It is unable to activate Dual Channel Memory Technology with only one memory module installed.*
3. *It is not allowed to install a DDR, DDR2 or DDR3 memory module into a DDR4 slot; otherwise, this motherboard and DIMM may be damaged.*

### AMD non-XMP Memory Frequency Support

Ryzen Series CPUs (Vermeer):

UDIMM Memory Slot		Frequency (Mhz)
A1	B1	
SR	-	3200
-	SR	3200
DR	-	3200
-	DR	3200
SR	SR	3200
DR	DR	3200

Ryzen Series CPUs (Matisse):

UDIMM Memory Slot		Frequency (Mhz)
A1	B1	
SR	-	3200
-	SR	3200
DR	-	3200
-	DR	3200
SR	SR	3200
DR	DR	3200

Ryzen Series APUs (Cezanne):

UDIMM Memory Slot		Frequency (Mhz)
A1	B1	
SR	-	3200
-	SR	3200
DR	-	3200
-	DR	3200
SR	SR	3200
DR	DR	3200

Ryzen Series APUs (Renoir):

UDIMM Memory Slot		Frequency (Mhz)
A1	B1	
SR	-	3200
-	SR	3200
DR	-	3200
-	DR	3200
SR	SR	3200
DR	DR	3200

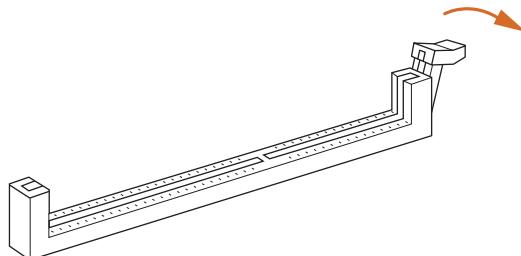
SR: Single rank DIMM, 1Rx4 or 1Rx8 on DIMM module label

DR: Dual rank DIMM, 2Rx4 or 2Rx8 on DIMM module label

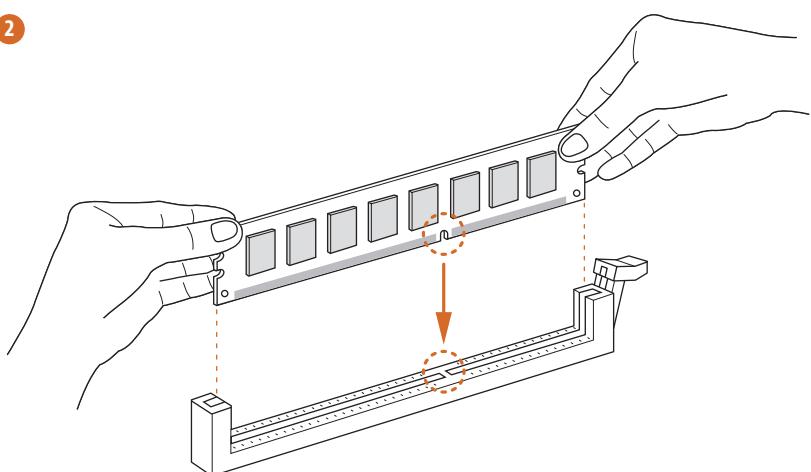


*The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.*

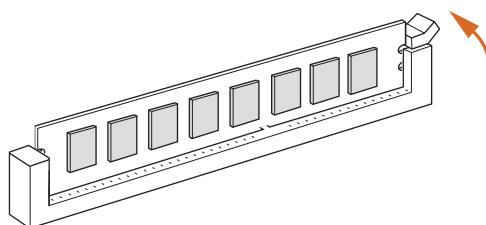
1



2



3



## 2.4 Expansion Slots (PCI Express Slots)

There are 2 PCI Express slots on the motherboard.



*Before installing an 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.*

### PCIe slots:

PCIE1 (PCIe 3.0 x1 slot) is used for PCI Express x1 lane width cards.

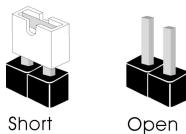
PCIE2 (PCIe 3.0 x16 slot) is used for PCI Express x16 lane width graphics cards.



*For a better thermal environment, please connect a chassis fan to the motherboard's chassis fan connector (CHA\_FAN1 or CHA\_FAN2) when using multiple graphics cards.*

## 2.5 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”.



Clear CMOS Jumper  
(CLRMOS1)  
(see p.7 or 8, No. 14)



Short: Clear CMOS  
Open: Default

CLRMOS1 allows you to clear the data in CMOS. 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 the pins on CLRMOS1 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 finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, and user default profile will be cleared only if the CMOS battery is removed. Please remember to remove the jumper cap after clearing the CMOS.



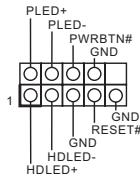
*If you clear the CMOS, the case open may be detected. Please adjust the BIOS option “Clear Status” to clear the record of previous chassis intrusion status.*

## 2.6 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 to the motherboard.*

System Panel Header  
(9-pin PANEL1)  
(see p.7 or 8, No. 8)



Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.



### PWRBTN (Power Switch):

Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

### RESET (Reset Switch):

Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

### PLED (System Power LED):

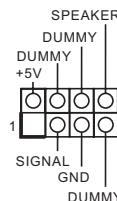
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

### HDLED (Hard Drive Activity LED):

Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

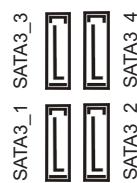
*The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.*

Chassis Intrusion and  
Speaker Header  
(7-pin SPK\_CI1)  
(see p.7 or 8, No. 9)



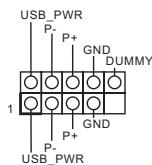
Please connect the  
chassis intrusion and the  
chassis speaker to this  
header.

Serial ATA3 Connectors  
Vertical:  
(SATA3\_1:  
see p.7 or 8, No. 7) (Upper)  
(SATA3\_2:  
see p.7 or 8, No. 7) (Lower)  
(SATA3\_3:  
see p.7 or 8, No. 6) (Upper)  
(SATA3\_4:  
see p.7 or 8, No. 6) (Lower)



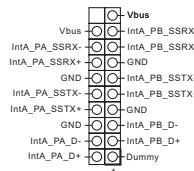
These four SATA3  
connectors support SATA  
data cables for internal  
storage devices with up to  
6.0 Gb/s data transfer rate.

USB 2.0 Headers  
(9-pin USB\_3\_4)  
(see p.7 or 8, No. 11)  
(9-pin USB\_5\_6)  
(see p.7 or 8, No. 12)



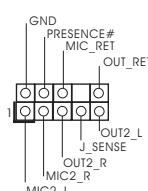
There are two headers  
on this motherboard.  
Each USB 2.0 header can  
support two ports.

USB 3.2 Gen1 Header  
(19-pin USB3\_5\_6)  
(see p.7 or 8, No. 5)



There is one header on  
this motherboard. This  
USB 3.2 Gen1 header can  
support two ports.

Front Panel Audio Header  
(9-pin HD\_AUDIO1)  
(see p.7 or 8, No. 15)



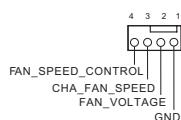
This header is for  
connecting audio devices  
to the front audio panel.



1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.
2. If you use an AC'97 audio panel, please install it to the front panel audio header by the steps below:
  - A. 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 the HD audio panel only. You don't need to connect them for the AC'97 audio panel.
  - E. To activate the front mic, go to the "FrontMic" Tab in the Realtek Control panel and adjust "Recording Volume".

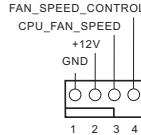
**Chassis Fan Connectors**  
(4-pin CHA\_FAN1)  
(see p.7 or 8, No. 17)

(4-pin CHA\_FAN2)  
(see p.7 or 8, No. 10)



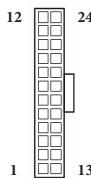
Please connect fan cables to the fan connectors and match the black wire to the ground pin.

**CPU Fan Connector**  
(4-pin CPU\_FAN1)  
(see p.7 or 8, No. 2)



This motherboard provides a 4-Pin CPU fan (Quiet Fan) connector. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.

**ATX Power Connector**  
(24-pin ATXPWR1)  
(see p.7 or 8, No. 4)



This motherboard provides a 24-pin ATX power connector. To use a 20-pin ATX power supply, please plug it along Pin 1 and Pin 13.

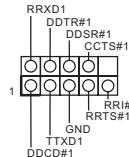
ATX 12V Power  
Connector  
(4-pin ATX12V1)  
(see p.7 or 8, No. 1)



Please connect an ATX  
12V power supply to this  
connector.

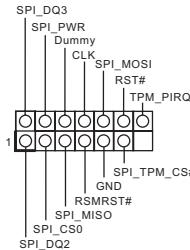
\*The power supply plug  
fits into this connector in  
only one orientation.

Serial Port Header  
(9-pin COM1)  
(see p.7 or 8, No. 13)



This COM1 header  
supports a serial port  
module.

SPI TPM Header  
(13-pin SPI\_TPM\_J1)  
(see p.7 or 8, No. 16)

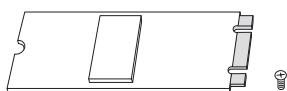


This connector supports SPI  
Trusted Platform Module (TPM)  
system, which can securely store  
keys, digital certificates, pass-  
words, and data. A TPM system  
also helps enhance network  
security, protects digital  
identities, and ensures platform  
integrity.

## 2.7 M.2\_SSD (NGFF) Module Installation Guide

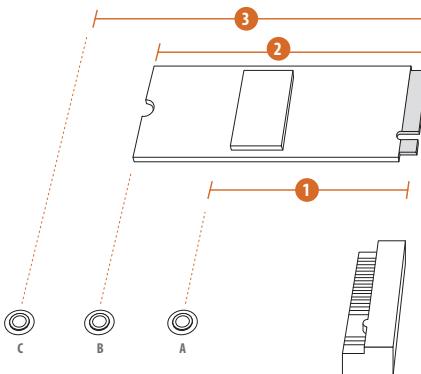
The M.2, also known as the Next Generation Form Factor (NGFF), is a small size and versatile card edge connector that aims to replace mPCIe and mSATA. The Ultra M.2 Socket (M2\_1, Key M) supports type 2242/2260/2280 SATA3 6.0 Gb/s & PCIe Gen3x4 (32 Gb/s) modes.

### Installing the M.2\_SSD (NGFF) Module



#### Step 1

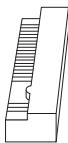
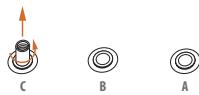
Prepare a M.2\_SSD (NGFF) module and the screw.



#### Step 2

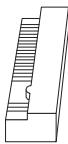
Depending on the PCB type and length of your M.2\_SSD (NGFF) module, find the corresponding nut location to be used.

No.	1	2	3
Nut Location	A	B	C
PCB Length	4.2cm	6cm	8cm
Module Type	Type 2242	Type 2260	Type 2280



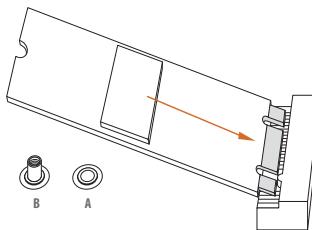
### Step 3

Move the standoff based on the module type and length. The standoff is placed at the nut location C by default. Skip Step 3 and 4 and go straight to Step 5 if you are going to use the default nut. Otherwise, release the standoff by hand.



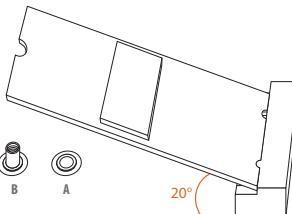
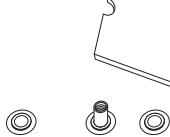
### Step 4

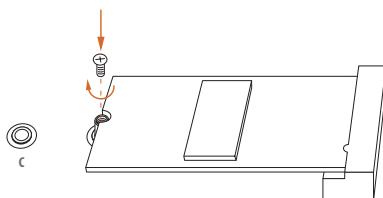
Peel off the yellow protective film on the nut to be used. Hand tighten the standoff into the desired nut location on the motherboard.



### Step 5

Gently insert the M.2 (NGFF) SSD module into the M.2 slot. Please be aware that the M.2 (NGFF) SSD module only fits in one orientation.





### Step 6

Tighten the screw with a screwdriver to secure the module into place.

Please do not overtighten the screw as this might damage the module.

## M.2\_SSD (NGFF) Module Support List

Vendor	Interface	P/N
SanDisk	PCIe	SanDisk-SD6PP4M-128G( Gen2 x2)
Intel	PCIe	INTEL 6000P-SSDPEKKF256G7 (nvme)
Intel	PCIe	INTEL 6000P-SSDPEKKF512G7 (nvme)
Kingston	PCIe	Kingston SHPM2280P2 / 240G (Gen2 x4)
Samsung	PCIe	Samsung XP941-MZHPU512HCGL(Gen2x4)
ADATA	SATA	ADATA - AXNS381E-128GM-B
Crucial	SATA	Crucial-CT240M500SSD4-240GB
ezlink	SATA	ezlink P51B-80-120GB
Intel	SATA	INTEL 540S-SSDSCKKW240H6-240GB
Kingston	SATA	Kingston SM2280S3G2/120G - Win8.1
Kingston	SATA	Kingston-RBU-SNS8400S3 / 180GD
LITEON	SATA	LITEON LJH-256V2G-256GB (2260)
PLEXTOR	SATA	PLEXTOR PX-128M6G-2260-128GB
PLEXTOR	SATA	PLEXTOR PX-128M7VG-128GB
SanDisk	SATA	SanDisk X400-SD8SN8U-128G
SanDisk	SATA	Sandisk Z400s-SD8SNAT-128G-1122
SanDisk	SATA	SanDisk-SD6SN1M-128G
Transcend	SATA	Transcend TS256GMTS800-256GB
V-Color	SATA	V-Color 120G
V-Color	SATA	V-Color 240G
WD	SATA	WD GREEN WDS240G1G0B-00RC30

For the latest updates of M.2\_SSD (NGFF) module support list, please visit our website for details: <http://www.asrock.com>

# Chapter 3 Software and Utilities Operation

## 3.1 Installing Drivers

The Support CD that comes with the motherboard contains necessary drivers and useful utilities that enhance the motherboard's features.

### Running The Support CD

To begin using the support CD, insert the CD into your CD-ROM drive. The CD automatically displays the Main Menu if "AUTORUN" is enabled in your computer. If the Main Menu does not appear automatically, locate and double click on the file "ASRSETUP.EXE" in the Support CD to display the menu.

### Drivers Menu

The drivers compatible to your system will be auto-detected and listed on the support CD driver page. Please click **Install All** or follow the order from top to bottom to install those required drivers. Therefore, the drivers you install can work properly.

### Utilities Menu

The Utilities Menu shows the application software that the motherboard supports. Click on a specific item then follow the installation wizard to install it.

## 3.2 ASRock Motherboard Utility (A-Tuning)

ASRock Motherboard Utility (A-Tuning) is ASRock's multi purpose software suite with a new interface, more new features and improved utilities.

### 3.2.1 Installing ASRock Motherboard Utility (A-Tuning)

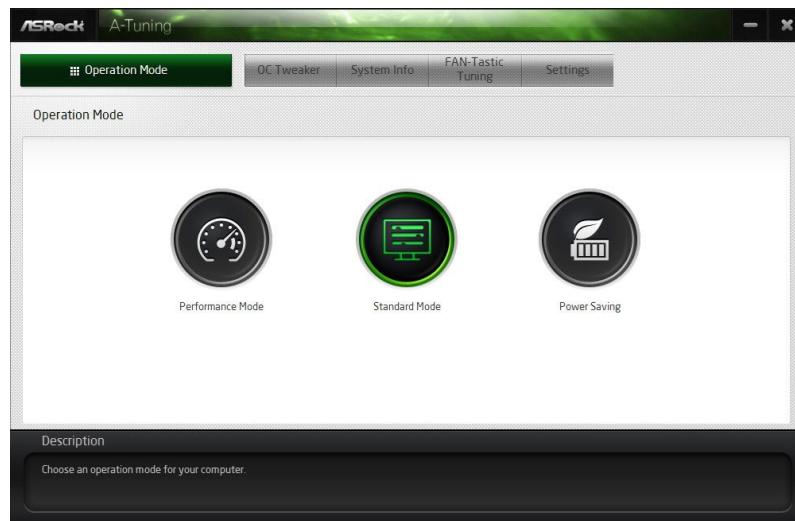
ASRock Motherboard Utility (A-Tuning) can be downloaded from ASRock Live Update & APP Shop. After the installation, you will find the icon "ASRock Motherboard Utility (A-Tuning)" on your desktop. Double-click the "ASRock Motherboard Utility (A-Tuning)"  icon, ASRock Motherboard Utility (A-Tuning) main menu will pop up.

### 3.2.2 Using ASRock Motherboard Utility (A-Tuning)

There are five sections in ASRock Motherboard Utility (A-Tuning) main menu: Operation Mode, System Info, FAN-Tastic Tuning and Settings.

#### Operation Mode

Choose an operation mode for your computer.



## System Info

View information about the system.

\*The System Browser tab may not appear for certain models.

The screenshot shows the ASRock A-Tuning software interface with the 'System Info' tab selected. The 'System Information' section displays various system parameters:

CLOCK	4500.00 MHz	BCLK Frequency	100.00 MHz	CPU Ratio	x45	CPU Cache Ratio	x42	
FAN & TEMPERATURE	30C / 86F	M/B Temperature	29C / 84F	CPU Fan1 Speed	2045 RPM	Chassis Fan1 Speed	0 RPM	
VOLTAGE	Vcore Volt:	0.765 V	+3.3V Volt:	3.328 V	+5.0V Volt:	5.472 V	+12V Volt:	2.784 V

Below the table, a 'Description' box contains the text: "View information about the system."

## FAN-Tastic Tuning

Configure up to five different fan speeds using the graph. The fans will automatically shift to the next speed level when the assigned temperature is met.

The screenshot shows the ASRock A-Tuning software interface with the 'FAN-Tastic Tuning' tab selected. The 'FAN-Tastic Tuning' section displays a graph and a table:

**Graph:** CPU FAN1

Temperature (C)	FAN Speed (%)
50	65
60	70
70	75
80	100

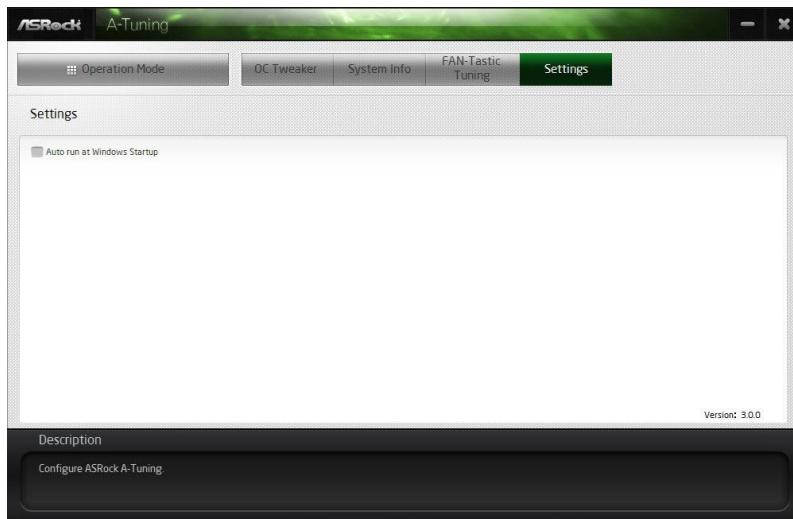
**Table:**

Fan Power	Fan Speed
100%	N/A RPM
90%	N/A RPM
80%	N/A RPM
70%	N/A RPM
60%	N/A RPM
50%	N/A RPM
40%	N/A RPM
30%	N/A RPM
20%	N/A RPM
10%	N/A RPM

Below the graph and table, a 'Description' box contains the text: "Configure different fan speeds for respective temperatures using the graph. The fans will automatically shift to the next speed level when the assigned temperature is met."

## Settings

Configure ASRock ASRock Motherboard Utility (A-Tuning). Click to select "Auto run at Windows Startup" if you want ASRock Motherboard Utility (A-Tuning) to be launched when you start up the Windows operating system.



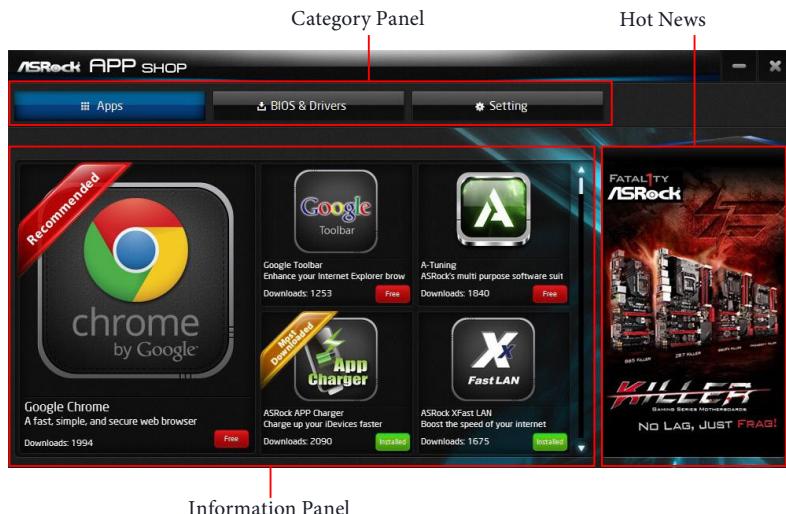
### 3.3 ASRock Live Update & APP Shop

The ASRock Live Update & APP Shop is an online store for purchasing and downloading software applications for your ASRock computer. You can quickly and easily install various apps and support utilities. With ASRock Live Update & APP Shop, you can optimize your system and keep your motherboard up to date simply with a few clicks.

Double-click  on your desktop to access ASRock Live Update & APP Shop utility.

*\*You need to be connected to the Internet to download apps from the ASRock Live Update & APP Shop.*

#### 3.3.1 UI Overview



**Category Panel:** The category panel contains several category tabs or buttons that when selected the information panel below displays the relative information.

**Information Panel:** The information panel in the center displays data about the currently selected category and allows users to perform job-related tasks.

**Hot News:** The hot news section displays the various latest news. Click on the image to visit the website of the selected news and know more.

### 3.3.2 Apps

When the "Apps" tab is selected, you will see all the available apps on screen for you to download.

#### Installing an App

##### Step 1

Find the app you want to install.



The most recommended app appears on the left side of the screen. The other various apps are shown on the right. Please scroll up and down to see more apps listed.

You can check the price of the app and whether you have already installed it or not.

- Free - The red icon displays the price or "Free" if the app is free of charge.
- Installed - The green "Installed" icon means the app is installed on your computer.

##### Step 2

Click on the app icon to see more details about the selected app.

### Step 3

If you want to install the app, click on the red icon  to start downloading.



### Step 4

When installation completes, you can find the green "Installed" icon appears on the upper right corner.



To uninstall it, simply click on the trash can icon .

\*The trash icon may not appear for certain apps.

## Upgrading an App

You can only upgrade the apps you have already installed. When there is an available new version for your app, you will find the mark of "New Version"  appears below the installed app icon.



### Step 1

Click on the app icon to see more details.

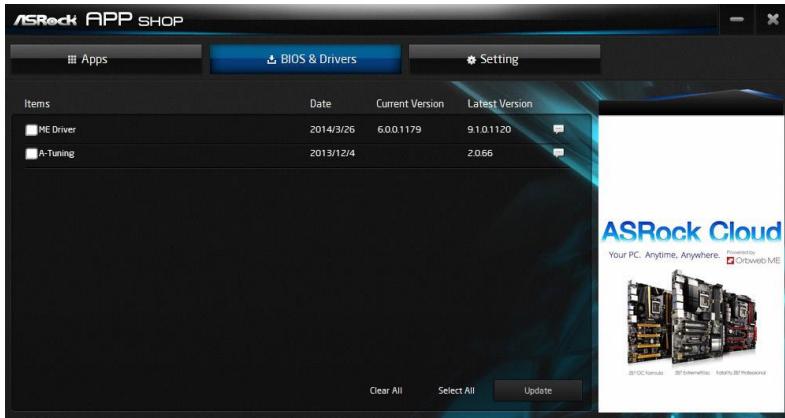
### Step 2

Click on the yellow icon  to start upgrading.

### 3.3.3 BIOS & Drivers

#### Installing BIOS or Drivers

When the "BIOS & Drivers" tab is selected, you will see a list of recommended or critical updates for the BIOS or drivers. Please update them all soon.



#### **Step 1**

Please check the item information before update. Click on  to see more details.

#### **Step 2**

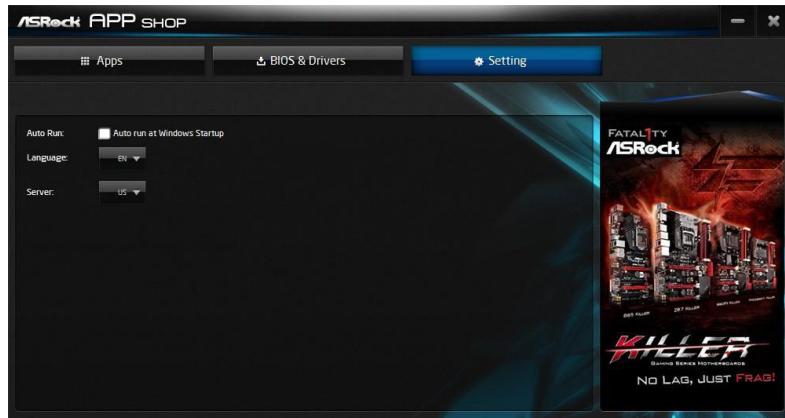
Click to select one or more items you want to update.

#### **Step 3**

Click Update to start the update process.

### 3.3.4 Setting

In the "Setting" page, you can change the language, select the server location, and determine if you want to automatically run the ASRock Live Update & APP Shop on Windows startup.



# Chapter 4 UEFI SETUP UTILITY

## 4.1 Introduction

This section explains how to use the UEFI SETUP UTILITY to configure your system. You may run the UEFI SETUP UTILITY by pressing **<F2>** or **<Del>** right after you power on the computer, otherwise, the Power-On-Self-Test (POST) will continue with its test routines. If you wish to enter the UEFI SETUP UTILITY after POST, restart the system by pressing **<Ctrl> + <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.*

### 4.1.1 UEFI Menu Bar

The top of the screen has a menu bar with the following selections:

**Main** For setting system time/date information

**Advanced** For advanced system configurations

**Tool** Useful tools

**H/W Monitor** Displays current hardware status

**Security** For security settings

**Boot** For configuring boot settings and boot priority

**Exit** Exit the current screen or the UEFI Setup Utility

## 4.1.2 Navigation Keys

Use <→> key or <→> key to choose among the selections on the menu bar, and use <↑> key or <↓> key to move the cursor up or down to select items, then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

Please check the following table for the descriptions of each navigation key.

Navigation Key(s)	Description
+ / -	To change option for the selected items
<Tab>	Switch to next function
<PGUP>	Go to the previous page
<PGDN>	Go to the next page
<HOME>	Go to the top of the screen
<END>	Go to the bottom of the screen
<F1>	To display the General Help Screen
<F7>	Discard changes and exit the SETUP UTILITY
<F9>	Load optimal default values for all the settings
<F10>	Save changes and exit the SETUP UTILITY
<F12>	Print screen
<ESC>	Jump to the Exit Screen or exit the current screen

## 4.2 Main Screen

When you enter the UEFI SETUP UTILITY, the Main screen will appear and display the system overview.

### A520M-HDV R2.0:



### A520M-HVS:



## 4.3 Advanced Screen

In this section, you may set the configurations for the following items: CPU Configuration, Onboard Devices Configuration, Storage Configuration, ACPI Configuration, Super IO Configuration, Trusted Computing, AMD PBS and AMD CBS.



Setting wrong values in this section may cause the system to malfunction.

### UEFI Configuration

#### Active Page on Entry

Select the default page when entering the UEFI setup utility.

#### Full HD UEFI

When [Auto] is selected, the resolution will be set to 1920 x 1080 if the monitor supports Full HD resolution. If the monitor does not support Full HD resolution, then the resolution will be set to 1024 x 768. When [Disable] is selected, the resolution will be set to 1024 x 768 directly.

### 4.3.1 CPU Configuration



#### PSS Support

Use this to enable or disable the generation of ACPI\_PPC, \_PSS, and \_PCT objects.

#### NX Mode

Use this to enable or disable NX mode.

#### SVM Mode

When this 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].

#### SMT Mode

This item can be used to disable symmetric multithreading. To re-enable SMT, a power cycle is needed after selecting [Auto].

Warning: S3 is not supported on systems where SMT is disabled.

#### AMD fTPM Switch

Use this to enable or disable AMD CPU fTPM.

### 4.3.2 Onboard Devices Configuration



#### SR-IOV Support

Enable/disable the SR-IOV (Single Root IO Virtualization Support) if the system has SR-IOV capable PCIe devices.

#### UMA Frame buffer Size (Only for processor with integrated graphics)

This item allows you to set the size of the UMA frame buffer.

#### Gnb HD Audio

Enable/disable onboard HD audio. Set to Auto to enable onboard HD audio and automatically disable it when a sound card is installed.

#### Front Panel

Enable/disable front panel HD audio.

#### Restore on AC/Power Loss

Select the power state after a power failure. If [Power Off] is selected, the power will remain off when the power recovers. If [Power On] is selected, the system will start to boot up when the power recovers.

#### Onboard LAN

Enable or disable the onboard network interface controller.

---

## PS2 Y-Cable

Enable the PS2 Y-Cable or set this option to Auto.

### 4.3.3 Storage Configuration



#### SATA Mode

AHCI: Supports new features that improve performance.

RAID: Combine multiple disk drives into a logical unit.

#### SATA Hot Plug

Enable/disable the SATA Hot Plug function.

#### 4.3.4 ACPI Configuration



##### Suspend to RAM

It is recommended to select auto for ACPI S3 power saving.

##### Deep Sleep

Configure deep sleep mode for power saving when the computer is shut down.

##### PS/2 Keyboard S4/S5 Wakeup Support

Allow the system to be waked up by a PS/2 Keyboard in S4/S5.

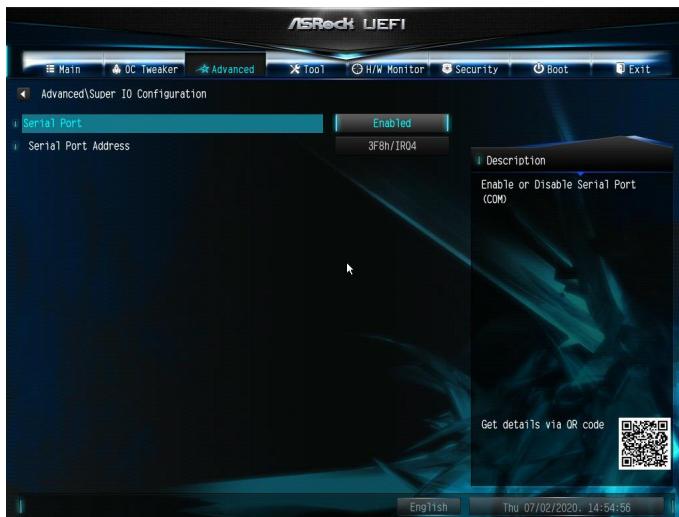
##### PCIE Devices Power On

Allow the system to be waked up by a PCIE device and enable wake on LAN.

##### RTC Alarm Power On

Allow the system to be waked up by the real time clock alarm. Set it to By OS to let it be handled by your operating system.

#### 4.3.5 Super IO Configuration



##### Serial Port 1

Enable or disable the Serial port 1.

##### Serial Port Address

Select the address of the Serial port.

### 4.3.6 Trusted Computing



#### Security Device Support

Enable or disable BIOS support for security device.

### 4.3.7 AMD PBS



The AMD PBS menu accesses AMD specific features.

### 4.3.8 AMD CBS



The AMD CBS menu accesses AMD specific features.

## 4.4 Tools



### Easy RAID Installer

Easy RAID Installer helps you to copy the RAID driver from the support CD to your USB storage device. After copying the drivers please change the SATA mode to RAID, then you can start installing the operating system in RAID mode.

### SSD Secure Erase Tool

Use this tool to securely erase SSD.

### NVME Sanitization Tool

After you sanitize SSD, all user data will be permanently destroyed on the SSD and cannot be recovered.

### Instant Flash

Save UEFI files in your USB storage device and run Instant Flash to update your UEFI.

## 4.5 Hardware Health Event Monitoring Screen

This section allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, fan speed and voltage.



### CPU FAN1 Setting

Select a fan mode for CPU Fan 1, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

### CPU FAN1 Temp Source

Select a fan temperature source for CPU Fan 1.

### FAN Configuration

#### Chassis Fan 1 Setting

Select a fan mode for Chassis Fan 1, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

#### Chassis Fan 1 Temp Source

Select a fan temperature source for Chassis Fan 1.

## Fan-Tastic

Select a fan mode for Fan, or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

## FanTuning

Detect the lowest fan speed in the system. It may take 3-5 minutes to complete.

## 4.6 Security Screen

In this section you may set or change the supervisor/user password for the system. You may also clear the user password.



### Supervisor Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

### User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

### Secure Boot

Enable to support Secure Boot.

## 4.7 Boot Screen

This section displays the available devices on your system for you to configure the boot settings and the boot priority.



### Boot From Onboard LAN

Allow the system to be waked up by the onboard LAN.

### Setup Prompt Timeout

Configure the number of seconds to wait for the setup hot key.

### Fast Boot

Fast Boot minimizes your computer's boot time. In fast mode you may not boot from an USB storage device.

## CSM (Compatibility Support Module)



### CSM

Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test.

#### Launch PXE OpROM Policy

Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.

#### Launch Storage OpROM Policy

Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only. Select Do not launch to not execute both legacy and UEFI option ROM.

#### Bootup Num-Lock

Select whether Num Lock should be turned on or off when the system boots up.

#### Full Screen Logo

Enable to display the boot logo or disable to show normal POST messages.

## AddOn ROM Display

Enable AddOn ROM Display to see the AddOn ROM messages or configure the AddOn ROM if you've enabled Full Screen Logo. Disable for faster boot speed.

## 4.8 Exit Screen



### Save Changes and Exit

When you select this option the following message, “Save configuration changes and exit setup?” will pop out. Select [OK] to save changes and exit the UEFI SETUP UTILITY.

### Discard Changes and Exit

When you select this option the following message, “Discard changes and exit setup?” will pop out. Select [OK] to exit the UEFI SETUP UTILITY without saving any changes.

### Discard Changes

When you select this option the following message, “Discard changes?” will pop out. Select [OK] to discard all changes.

### Load UEFI BIOS Defaults

Load UEFI BIOS Default values for all the setup questions. The F9 key can be used for this operation.

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- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

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## WARNING

THIS PRODUCT CONTAINS A BUTTOON BATTERY

If swallowed, a button battery can cause serious injury or death.

Please keep batteries out of sight or reach of children.

## ⚠ WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH** of **CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Battery type: CR2032
- Battery voltage: 3.3V
- Non-rechargeable batteries are not to be recharged.
- Do not force discharge, recharge, disassemble, heat above (manufacturer's specified temperature rating) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- This product contains an irreplaceable battery.
- This icon indicates that a swallowed button battery can cause serious injury or death.

Please keep batteries out of sight or reach of children.

### CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.

"Perchlorate Material-special handling may apply, see [www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)"

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DO NOT throw the motherboard in municipal waste. This product has been designed to enable proper reuse of parts and recycling. This symbol of the crossed out wheeled bin indicates that the product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.