

ASRock®

A520M TW

User Manual

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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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Chapter 1 Introduction

Thank you for purchasing ASRock A520M TW 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 TW Motherboard (Micro ATX Form Factor)
- ASRock A520M TW Quick Installation Guide
- ASRock A520M TW Support CD
- 1 x I/O Panel Shield
- 2 x Serial ATA (SATA) Data Cables (Optional)
- 2 x Screws for M.2 Sockets (Optional)

1.2 Specifications

- Platform**
- Micro ATX Form Factor
 - Solid Capacitor design

- CPU**
- Supports 3rd Gen AMD AM4 Ryzen™ / future AMD Ryzen™ Processors (3000 and 4000 Series Processors)*
- * Not compatible with AMD Ryzen™ 5 3400G and Ryzen™ 3 3200G.
- 6 Power Phase design

- Chipset**
- AMD A520

- Memory**
- Dual Channel DDR4 Memory Technology
 - 2 x DDR4 DIMM Slots
 - AMD Ryzen series CPUs (Matisse) 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 & non-ECC, un-buffered memory*
 - 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 & non-ECC, un-buffered memory*
- * Please refer to Memory Support List on ASRock's website for more information. (<http://www.asrock.com/>)
- * Please refer to page 20 for DDR4 UDIMM maximum frequency support.
- Max. capacity of system memory: 64GB
 - Supports Extreme Memory Profile (XMP) memory modules
 - 15μ Gold Contact in DIMM Slots

- Expansion Slot**
- 1 x PCI Express 3.0 x16 Slot (PCIe1: x16 mode)*
- * Supports NVMe SSD as boot disks
- 1 x PCI Express 3.0 x1 Slot
 - 1 x M.2 Socket (Key E), supports type 2230 Wi-Fi/BT module

Graphics

- Integrated AMD Radeon™ 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.

- Three graphics output options: D-Sub, HDMI and DisplayPort 1.4
- Supports Triple Monitor
- Supports HDMI 2.1 with max. resolution up to 4K x 2K (4096x2160) @ 60Hz
- Supports DisplayPort 1.4 with max. resolution up to 5K (5120x2880)@120Hz
- 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 and DisplayPort 1.4 Ports
- Supports 4K Ultra HD (UHD) playback with HDMI 2.1 and DisplayPort 1.4 Ports
- Supports Microsoft PlayReady*

Audio

- 7.1 CH HD Audio (Realtek ALC887 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

- Antenna Bracket
- 1 x PS/2 Mouse/Keyboard Port
- 1 x D-Sub Port
- 1 x HDMI Port
- 1 x DisplayPort 1.4
- 2 x USB 3.2 Gen1 Type-A Ports (Supports ESD Protection)
- 4 x USB 2.0 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

Storage

- 4 x SATA3 6.0 Gb/s Connectors, support RAID (RAID 0, RAID 1 and RAID 10), NCQ, AHCI and Hot Plug
- 1 x Ultra M.2 Socket (M2_1), supports M Key type 2280 M.2 SATA3 6.0 Gb/s module and M.2 PCI Express module up to Gen3 x4 (32 Gb/s)*

* Supports NVMe SSD as boot disks

* Supports ASRock U.2 Kit

Connector

- 1 x COM Port Header
- 1 x SPI TPM Header
- 1 x Chassis Intrusion and Speaker Header
- 1 x RGB LED Header
- * Supports in total up to 12V/3A, 36W LED Strip
- 1 x CPU Fan Connector (4-pin)
- * The CPU Fan Connector supports the CPU fan of maximum 1A (12W) fan power.
- 3 x Chassis/Water Pump Fan Connectors (4-pin) (Smart Fan Speed Control)
- * The Chassis/Water Pump Fan supports the water cooler fan of maximum 2A (24W) fan power.
- * CHA_FAN1/WP, CHA_FAN2/WP and CHA_FAN3/WP can auto detect if 3-pin or 4-pin fan is in use. Fans connected to CHA_FAN3/WP will use the same settings as CHA_FAN2/WP.
- 1 x 24 pin ATX Power Connector
- 1 x 8 pin 12V Power Connector
- 1 x Front Panel Audio Connector
- 2 x USB 2.0 Headers (Support 4 USB 2.0 ports) (Supports ESD Protection)

- 2 x USB 3.2 Gen1 Headers (Support 4 USB 3.2 Gen1 ports)
(Supports ESD Protection)

BIOS Feature

- AMI UEFI Legal BIOS with GUI support
- Supports “Plug and Play”
- ACPI 5.1 compliance wake up events
- Supports jumperfree
- SMBIOS 2.3 support
- 1.8V, DRAM, VDDP Voltage Multi-adjustment

Hardware Monitor

- Temperature Sensing: CPU, Chassis/Water Pump Fans
- Fan Tachometer: CPU, Chassis/Water Pump Fans
- Quiet Fan (Auto adjust chassis fan speed by CPU temperature): CPU, Chassis/Water Pump Fans
- Fan Multi-Speed Control: CPU, Chassis/Water Pump Fans
- CASE OPEN detection
- Voltage monitoring: +12V, +5V, +3.3V, CPU Vcore

OS

- Microsoft® Windows® 10 64-bit

Certifica- tions

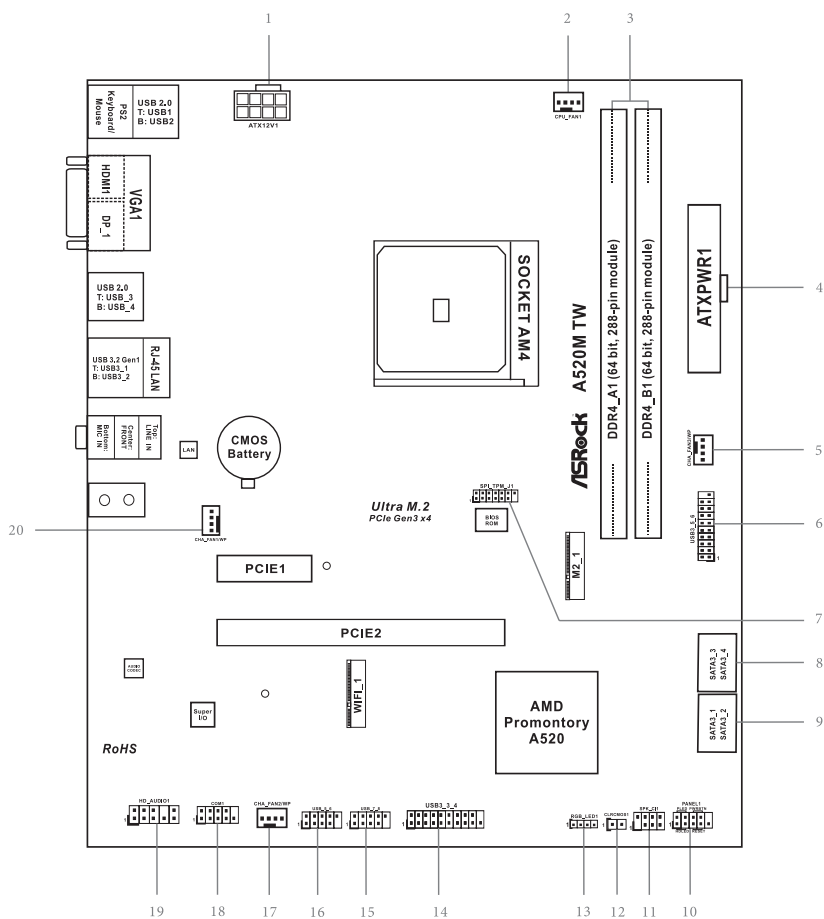
- FCC, CE
- ErP/EuP ready (ErP/EuP ready power supply is required)

* For detailed product information, please visit our website: <http://www.asrock.com>



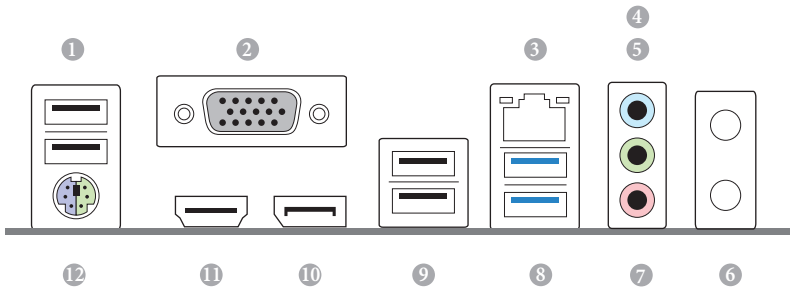
Please realize that there is a certain risk involved with overclocking, including adjusting the setting in the BIOS, applying Untied Overclocking Technology, or using third-party overclocking tools. Overclocking may affect your system's stability, or even cause damage to the components and devices of 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



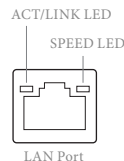
No.	Description
1	8 pin 12V Power Connector (ATX12V1)
2	CPU Fan Connector (CPU_FAN1)
3	2 x 288-pin DDR4 DIMM Slots (DDR4_A1, DDR4_B1)
4	ATX Power Connector (ATXPWR1)
5	Chassis/Water Pump Fan Connector (CHA_FAN3/WP)
6	USB 3.2 Gen1 Header (USB3_5_6)
7	SPI TPM Header (SPI_TPM_I1)
8	SATA3 Connector (SATA3_3) (Upper), SATA3 Connector (SATA3_4) (Lower)
9	SATA3 Connector (SATA3_1) (Upper), SATA3 Connector (SATA3_2) (Lower)
10	System Panel Header (PANEL1)
11	Chassis Intrusion and Speaker Header (SPK_C11)
12	Clear CMOS Jumper (CLRCMOS1)
13	RGB LED Header (RGB_LED1)
14	USB 3.2 Gen1 Header (USB3_3_4)
15	USB 2.0 Header (USB_7_8)
16	USB 2.0 Header (USB_5_6)
17	Chassis/Water Pump Fan Connector (CHA_FAN2/WP)
18	COM Port Header (COM1)
19	Front Panel Audio Header (HD_AUDIO1)
20	Chassis/Water Pump Fan Connector (CHA_FAN1/WP)

1.4 I/O Panel



No.	Description	No.	Description
1	USB 2.0 Ports (USB12)	7	Microphone (Pink)**
2	D-Sub Port	8	USB 3.2 Gen1 Type-A Ports (USB3_12)
3	LAN RJ-45 Port*	9	USB 2.0 Ports (USB_3_4)
4	Line In (Light Blue)**	10	DisplayPort 1.4
5	Front Speaker (Lime)**	11	HDMI Port
6	Antenna Bracket	12	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.

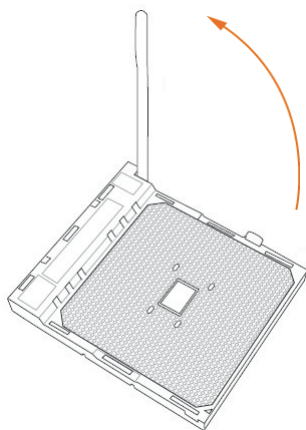
- Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.
- In order to avoid damage from static electricity to the motherboard's components, NEVER place your motherboard directly on a 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

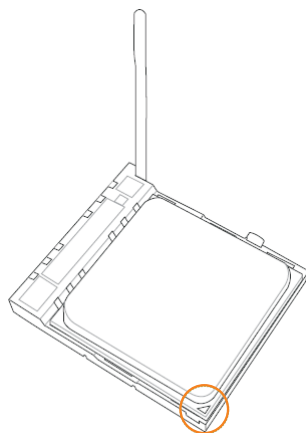


Unplug all power cables before installing the CPU.

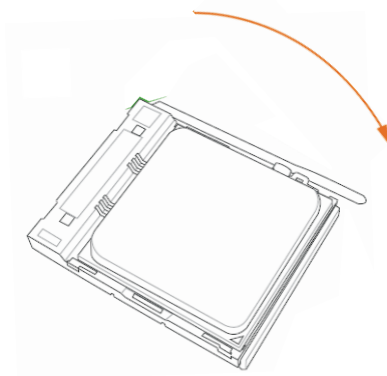
1



2



3



2.2 Installing the CPU Fan and Heatsink

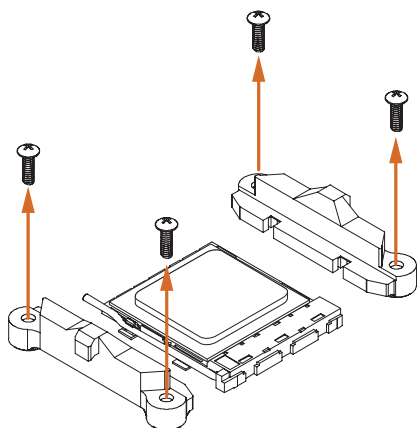
After you install the CPU into this motherboard, it is necessary to install a larger heatsink and cooling fan to dissipate heat. You also need to spray thermal grease between the CPU and the heatsink to improve heat dissipation. Make sure that the CPU and the heatsink are securely fastened and in good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



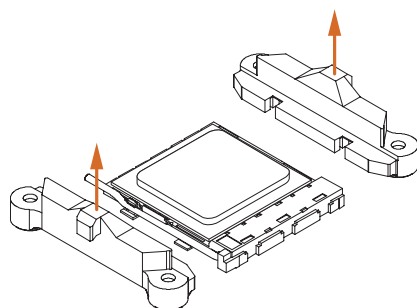
Please turn off the power or remove the power cord before changing a CPU or heatsink.

Installing the CPU Box Cooler SR1

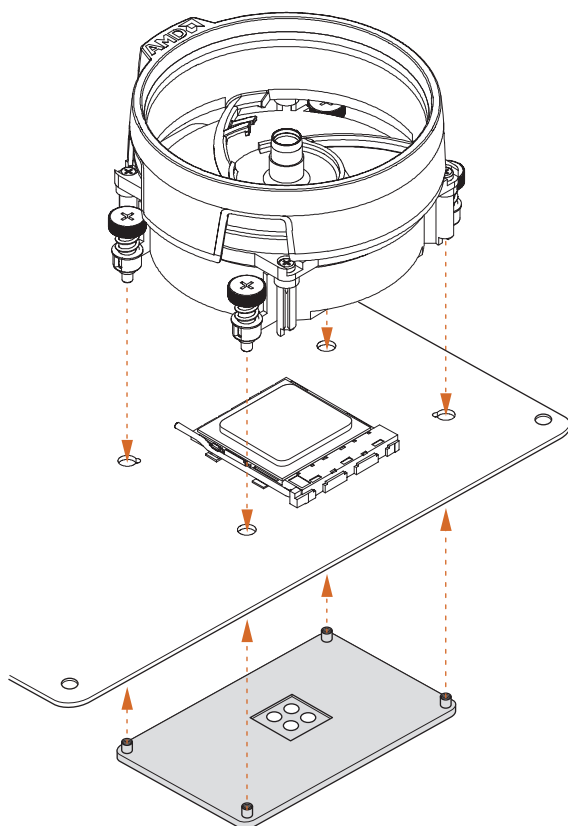
1



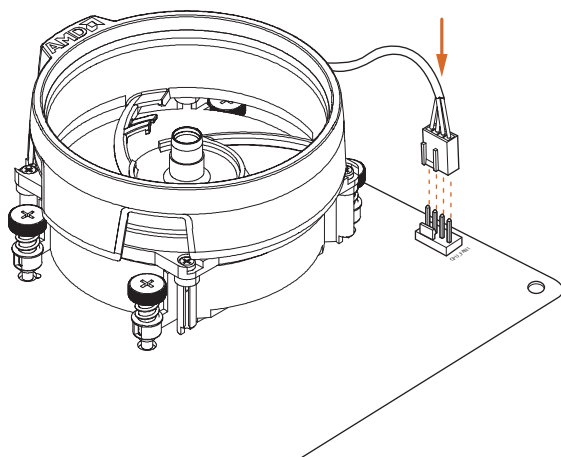
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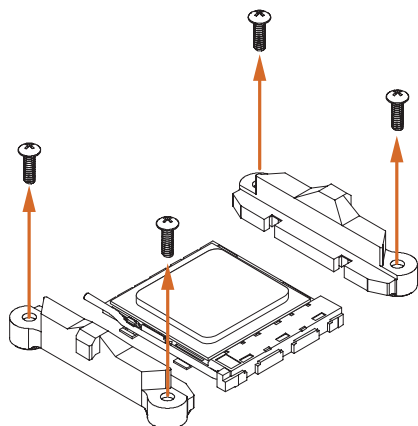


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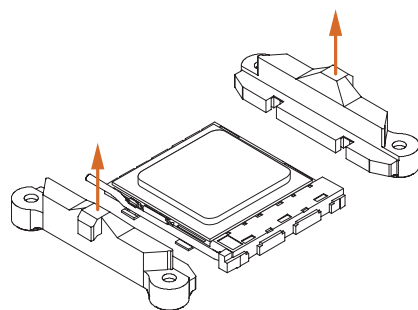


Installing the AM4 Box Cooler SR2

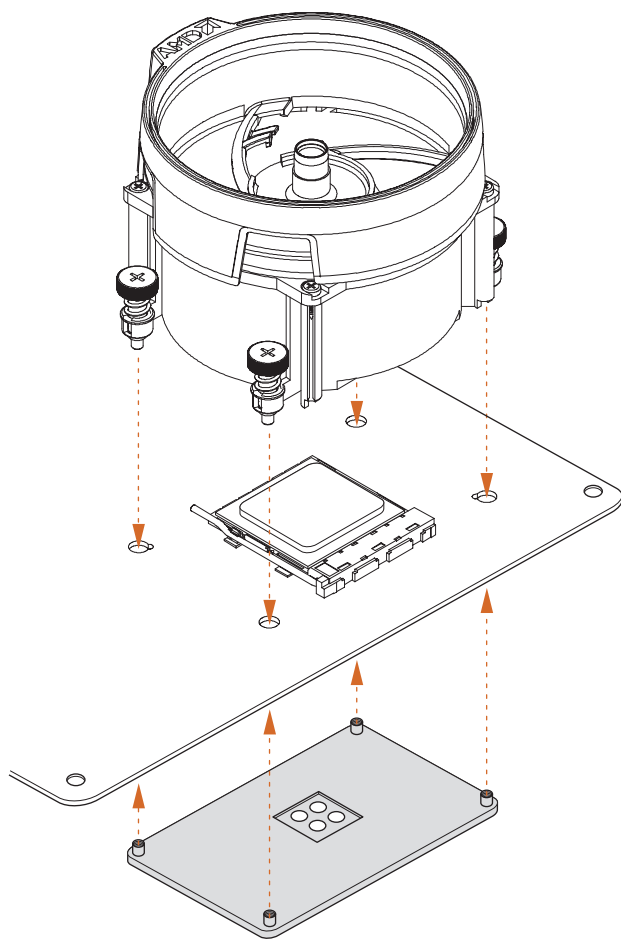
1



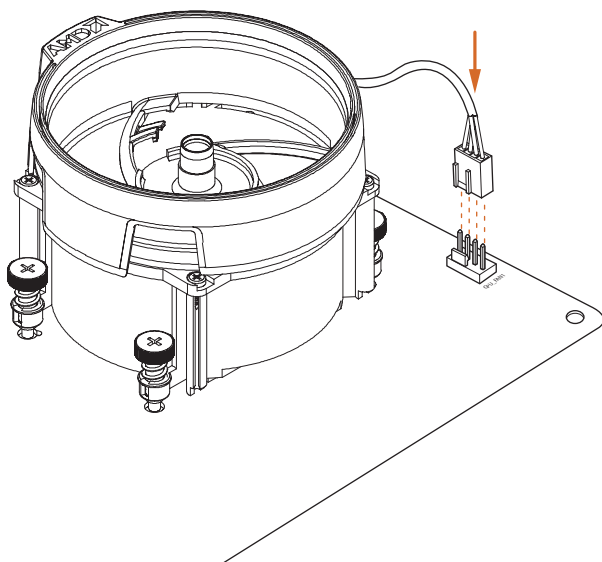
2



3



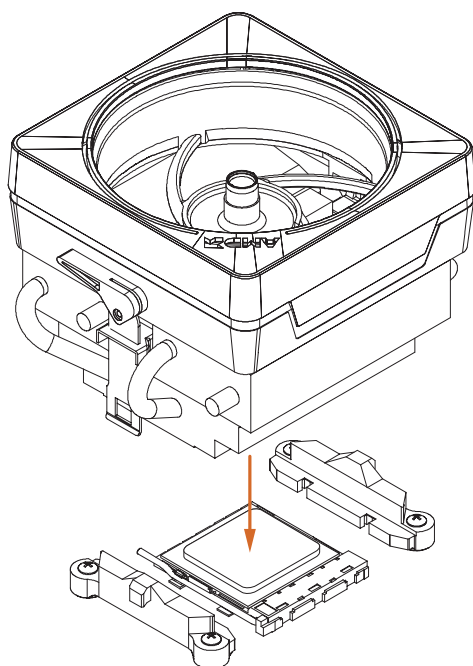
4



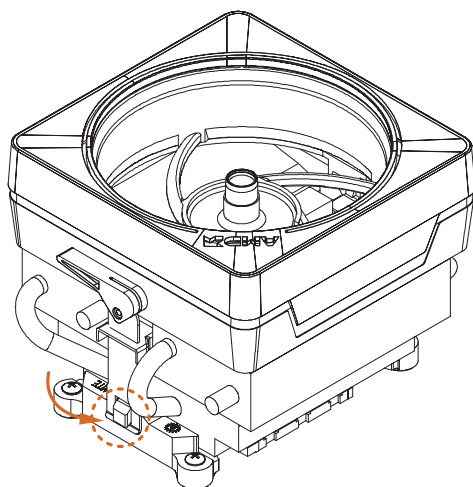
*The diagrams shown here are for reference only. The headers might be in a different position on your motherboard.

Installing the AM4 Box Cooler SR3

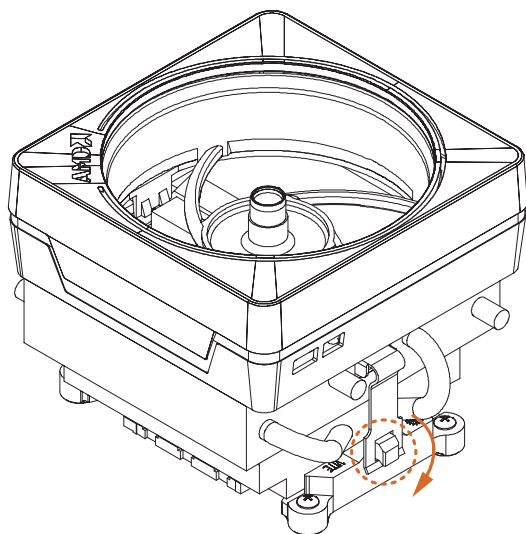
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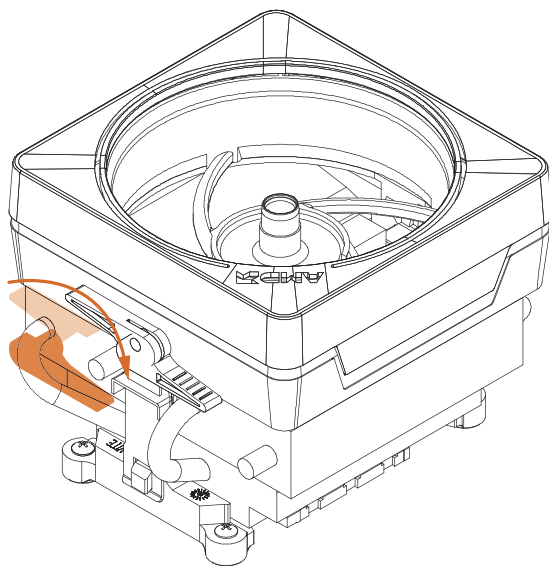
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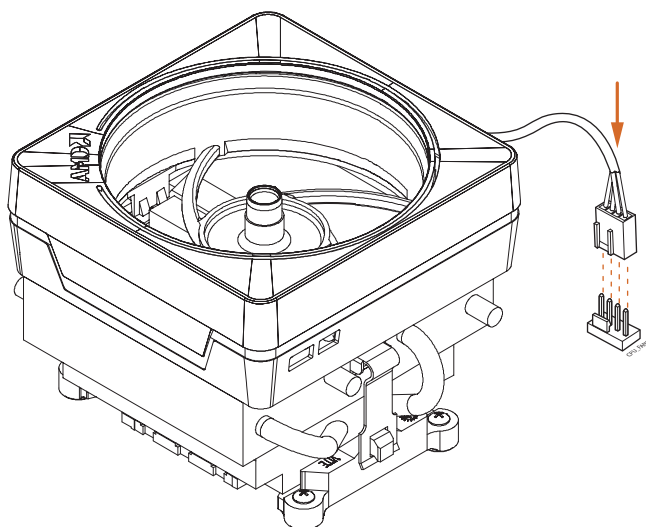
3



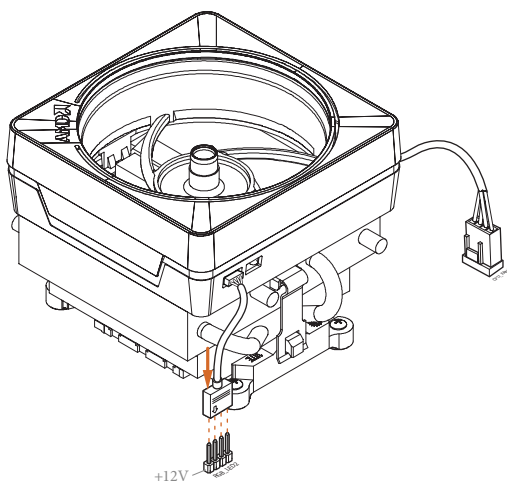
4



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 (Matisse):

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

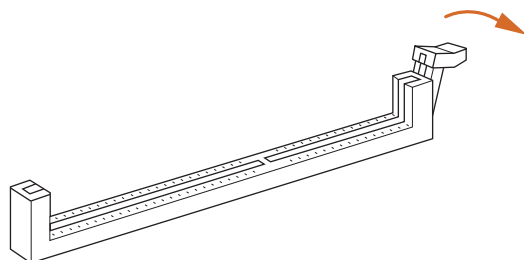
Ryzen Series APUs (Renoir):

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

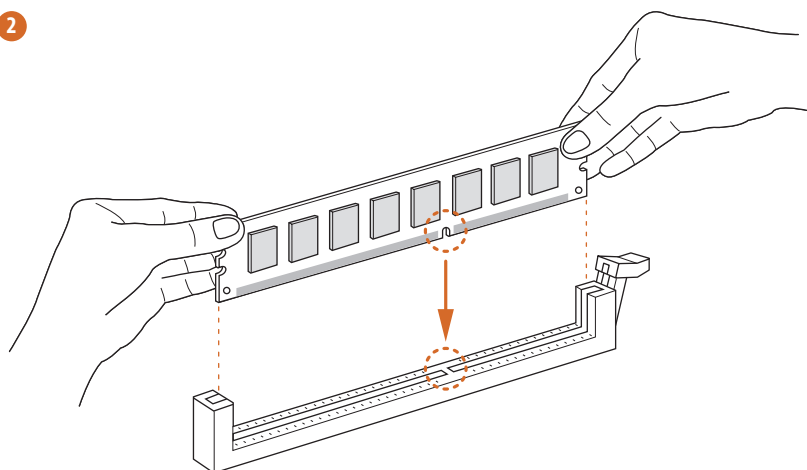


The DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the DIMM if you force the DIMM into the slot at incorrect orientation.

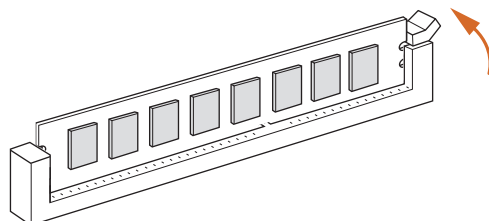
1



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 x16 slot) is used for PCI Express x16 lane width graphics cards.

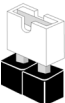
PCIE2 (PCIe 3.0 x1 slot) is used for PCI Express x1 lane width cards.



For a better thermal environment, please connect a chassis fan to the motherboard's chassis fan connector (CHA_FAN1/WP, CHA_FAN2/WP or CHA_FAN3/WP) 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”.



Short



Open

Clear CMOS Jumper
(CLRCMOS1)
(see p.6, No. 12)



2-pin Jumper

Short: Clear CMOS
Open: Default

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, then use a jumper cap to short the pins on CLRCMOS1 for 3 seconds. Please remember to remove the jumper cap after clearing the CMOS. 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.



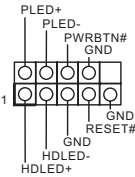
If you clear the CMOS, the case open may be detected. Please adjust the BIOS option “Clear Status” to clear the record of previous chassis intrusion status.

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.6, No. 10)



Connect the power button, reset button 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 Button):

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

RESET (Reset Button):

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

PLED (System Power LED):

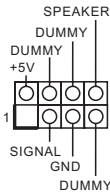
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

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 button, reset button, 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_C11)
(see p.6, No. 11)



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

Serial ATA3 Connectors

(SATA3_1:

see p.6, No. 9) (Upper)

(SATA3_2:

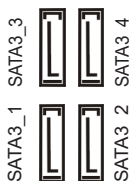
see p.6, No. 9) (Lower)

(SATA3_3:

see p.6, No. 8) (Upper)

(SATA3_4:

see p.6, No. 8) (Lower)



These four SATA3

connectors support SATA

data cables for internal

storage devices with up to

6.0 Gb/s data transfer rate.

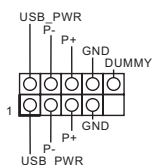
USB 2.0 Headers

(9-pin USB_5_6)

(see p.6, No. 16)

(9-pin USB_7_8)

(see p.6, No. 15)



There are two headers

on this motherboard.

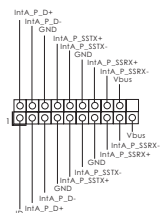
Each USB 2.0 header can

support two ports.

USB 3.2 Gen1 Headers

(19-pin USB3_3_4)

(see p.6, No. 14)



There are two headers on

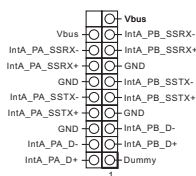
this motherboard. Each

USB 3.2 Gen1 header can

support two ports.

(19-pin USB3_5_6)

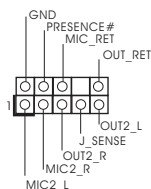
(see p.6, No. 6)



Front Panel Audio Header

(9-pin HD_AUDIO1)

(see p.6, No. 19)



This header is for

connecting audio devices

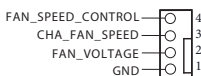
to the front audio panel.



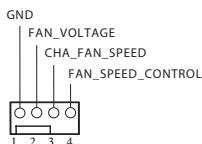
1. High Definition Audio supports Jack Sensing, but the panel wire on the chassis must support HDA to function correctly. Please follow the instructions in our manual and chassis manual to install your system.
2. If you use an AC'97 audio panel, please install it to the front panel audio header by the 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 Water Pump Fan Connectors

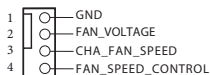
(4-pin CHA_FAN1/WP)
(see p.6, No. 20)



(4-pin CHA_FAN2/WP)
(see p.6, No. 17)

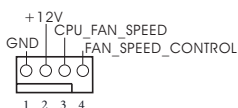


(4-pin CHA_FAN3/WP)
(see p.6, No. 5)



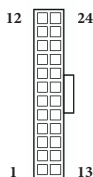
This motherboard provides three 4-Pin water cooling chassis fan connectors. If you plan to connect a 3-Pin chassis water cooler fan, please connect it to Pin 1-3.

CPU Fan Connector
(4-pin CPU_FAN1)
(see p.6, No. 2)



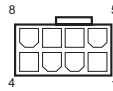
This motherboard provides a 4-Pin CPU fan (Quiet Fan) connector. If you plan to connect a 3-Pin CPU fan, please connect it to Pin 1-3.

ATX Power Connector
(24-pin ATXPWR1)
(see p.6, 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.

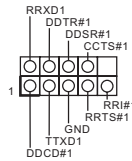
ATX 12V Power
Connector
(8-pin ATX12V1)
(see p.6, No. 1)



This motherboard provides an 8-pin ATX 12V power connector. To use a 4-pin ATX power supply, please plug it along Pin 1 and Pin 5.

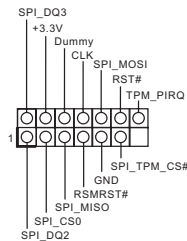
***Warning: Please make sure that the power cable connected is for the CPU and not the graphics card. Do not plug the PCIe power cable to this connector.**

Serial Port Header
(9-pin COM1)
(see p.6, No. 18)



This COM1 header supports a serial port module.

SPI TPM Header
(13-pin SPI_TPM_J1)
(see p.6, No. 7)



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

RGB LED Header
(4-pin RGB_LED1)
(see p.6, No. 13)



This RGB header is used to connect RGB LED extension cable which allows users to choose from various LED lighting effects.

Caution: Never install the RGB LED cable in the wrong orientation; otherwise, the cable may be damaged.

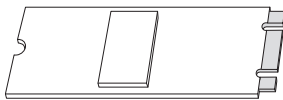
*Please refer to page 43 for further instructions on these two headers.

2.7 M.2_SSD (NGFF) Module Installation Guide (M2_1)

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.

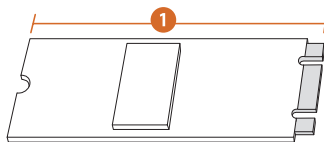
The Ultra M.2 Socket (M2_1) supports M Key type 2280 M.2 SATA3 6.0 Gb/s module and M.2 PCI Express module up to Gen3 x4 (32 Gb/s).

Installing the M.2_SSD (NGFF) Module



Step 1

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

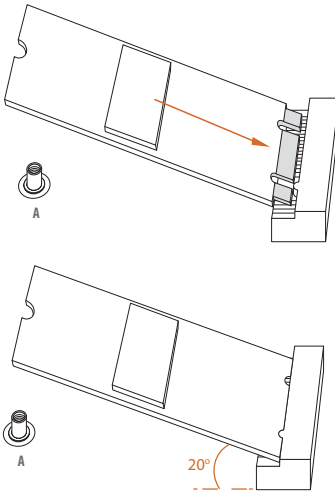


Step 2

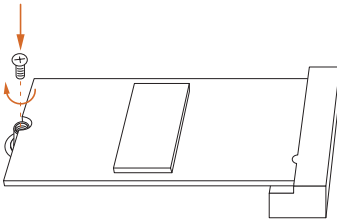
Depending on the PCB type and length of your M.2_SSD (NGFF) module, find the corresponding nut location to be used.



No.	1
Nut Location	A
PCB Length	8cm
Module Type	Type2280

**Step 3**

Align and 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 4**

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)
Intel	PCIe	SSDPEKKF512G7 NVME / 512GB
Intel	SATA	540S-SSDSCKKW240H6 / 240GB
Kingston	PCIe	Kingston SHPM2280P2 / 240G (Gen2 x4)
Samsung	PCIe	Samsung XP941-MZHPU512HCGL(Gen2x4)
Samsung	PCIe	SM951 (NVME) / 512GB
Samsung	PCIe	SM951 (MZHPV512HDGL) / 512GB
ADATA	SATA	ADATA - AXNS381E-128GM-B
ADATA	PCIe	ASX8000NP-512GM-C / 512GB
ADATA	PCIe	ASX7000NP-512GT-C / 512GB
ADATA	SATA	ASU800NS38-512GT-C / 512GB
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
Kingston	PCIe	SKC1000/480G
Kingston	PCIe	SKC1000/960GB NVME
LITEON	SATA	LITEON LJH-256V2G-256GB (2260)
PLEXTOR	SATA	PLEXTOR PX-128M6G-2260-128GB
PLEXTOR	SATA	PLEXTOR PX-128M7VG-128GB
PLEXTOR	PCIe	PX-512M8PeG/ 512GB
SanDisk	SATA	SanDisk X400-SD8SN8U-128G
SanDisk	SATA	Sandisk Z400s-SD8SNAT-128G-1122
SanDisk	SATA	SanDisk-SD6SN1M-128G
Transcend	SATA	Transcend TS256GMTS800-256GB
Transcend	SATA	TS512GMTS800 / 512GB
V-Color	SATA	V-Color 120G
V-Color	SATA	V-Color 240G
WD	SATA	WD GREEN WDS240G1G0B-00RC30
WD	PCIe	WDS512G1X0C-00ENX0 (NVME) / 512GB

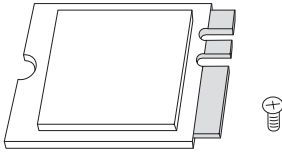
For the latest updates of M.2_SSD (NFGG) module support list, please visit our website for details: <http://www.asrock.com>

2.8 M.2 WiFi/BT Module Installation Guide (WIFI_1)

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 M.2 Socket (Key E) supports type 2230 WiFi/BT module.

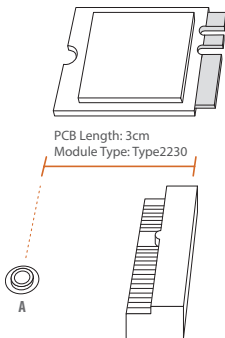
* The M.2 socket does not support SATA M.2 SSDs.

Installing the WiFi/BT module



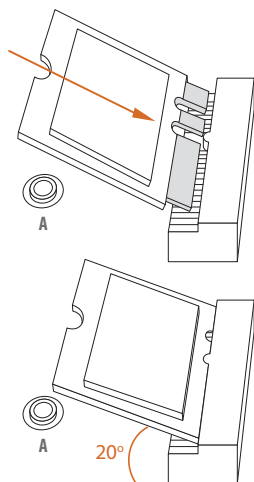
Step 1

Prepare a type 2230 WiFi/BT module and the screw.



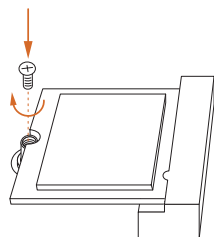
Step 2

Find the nut location to be used.



Step 3

Gently insert the WiFi/BT module into the M.2 slot. Please be aware that the module only fits in one orientation.



Step 4

Tighten the screw with a screwdriver to secure the module into place. Please do not overtighten the screw as this might damage the module.

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)

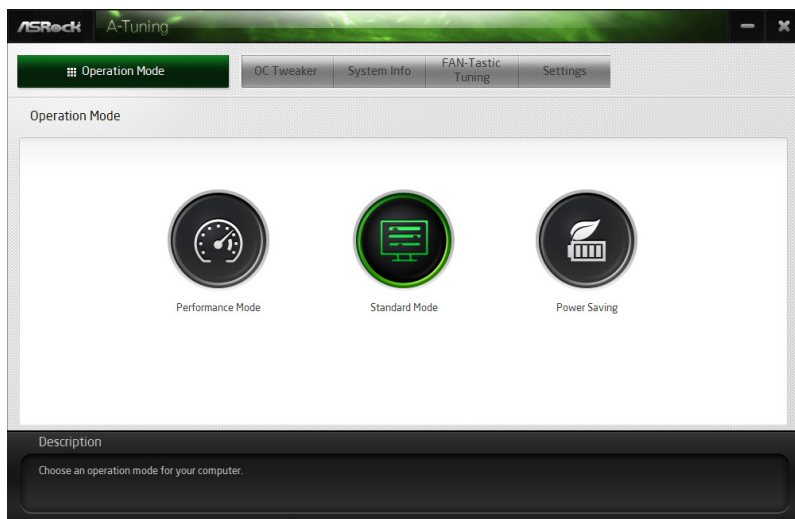
ASRock Motherboard Utility (A-Tuning) can be downloaded from ASRock Live Update & APP Shop. After the installation, you will find the icon "ASRock Motherboard Utility (A-Tuning)" on your desktop. Double-click the "ASRock Motherboard Utility (A-Tuning)"  icon, ASRock Motherboard Utility (A-Tuning) main 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, OC Tweaker, System Info, FAN-Tastic Tuning and Settings.

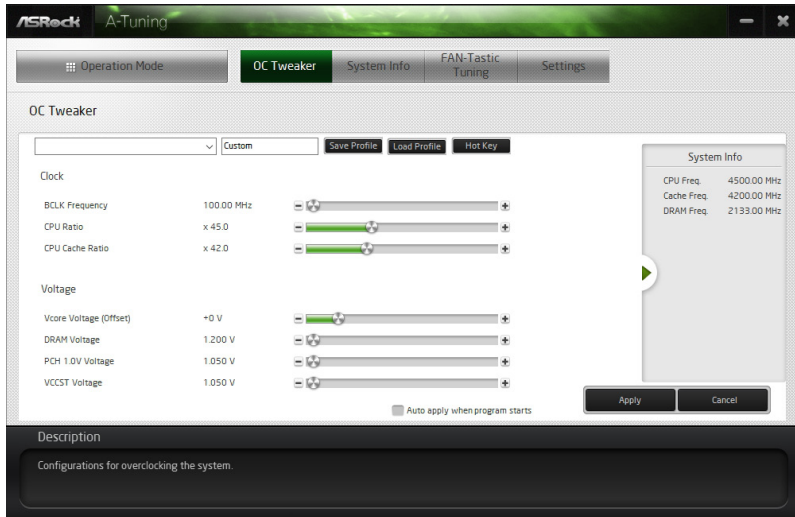
Operation Mode

Choose an operation mode for your computer.



OC Tweaker

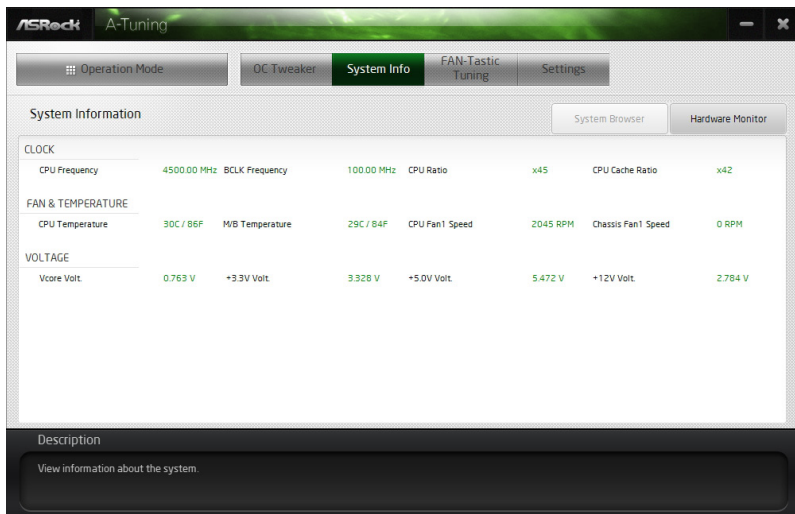
Configurations for overlocking the system.



System Info

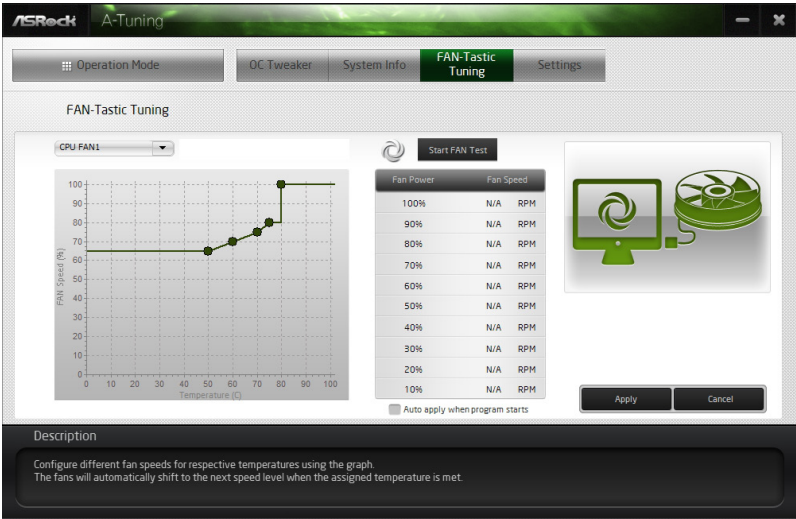
View information about the system.

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



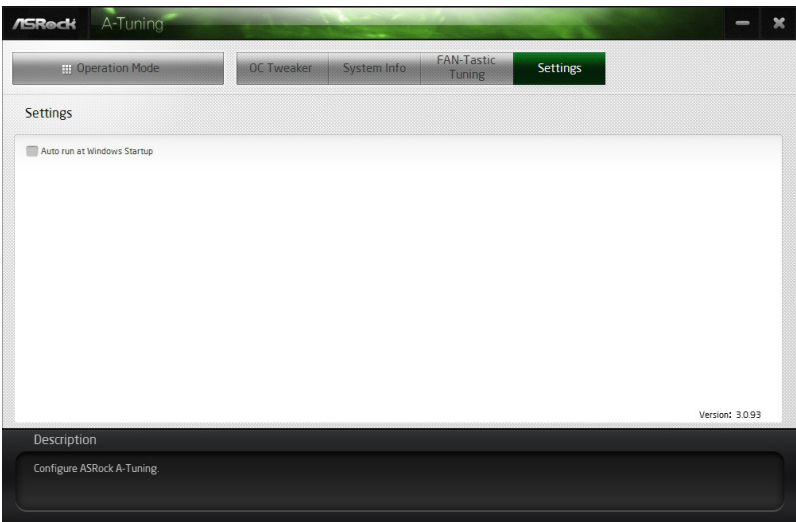
FAN-Tastic Tuning

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.




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.



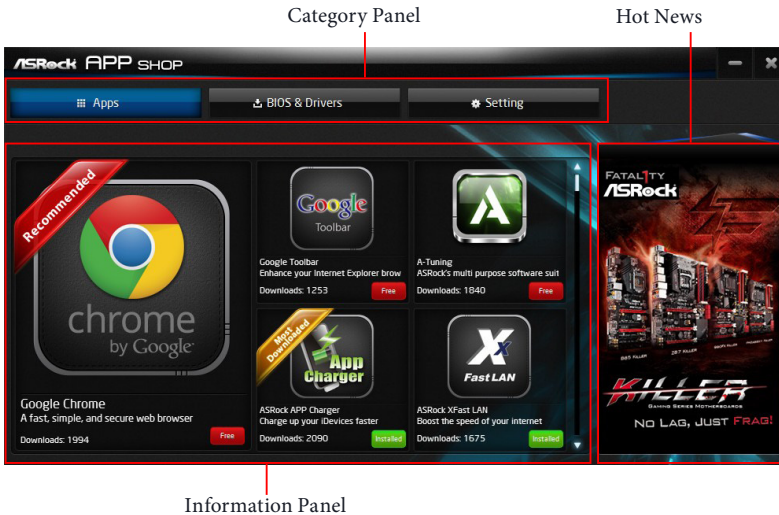
3.3 ASRock Live Update & APP Shop

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.

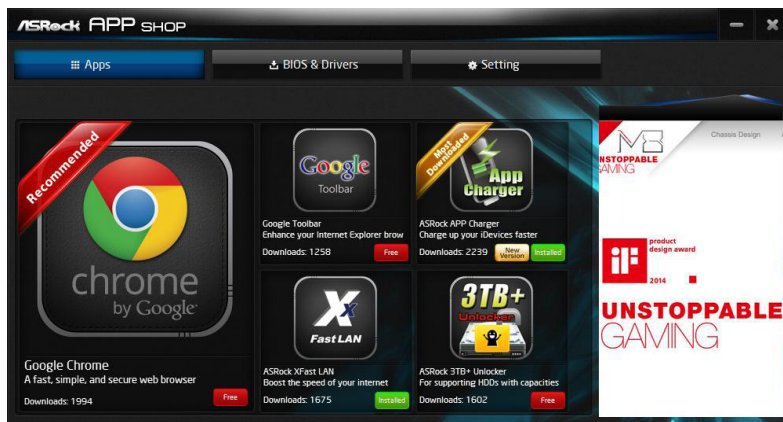
3.3.2 Apps

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.

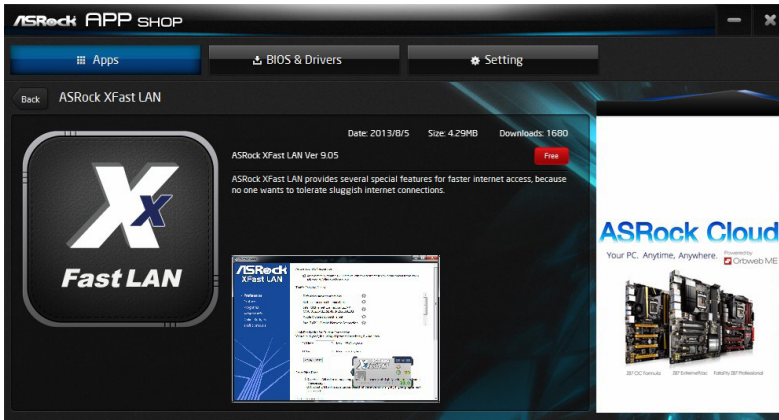
Installed - The green "Installed" icon means the app is installed on your computer.

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.

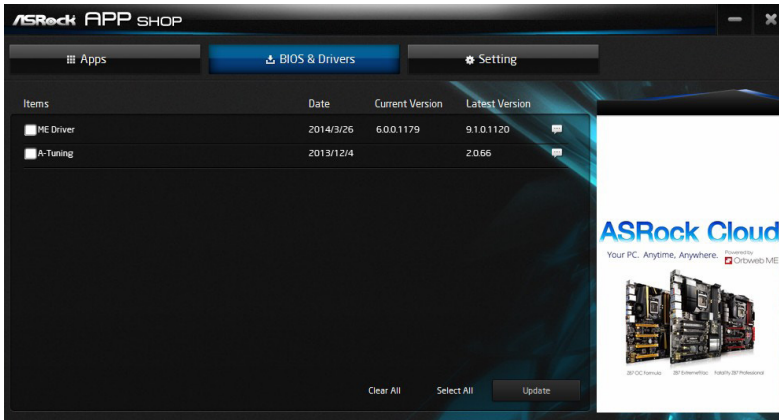
Step 2

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

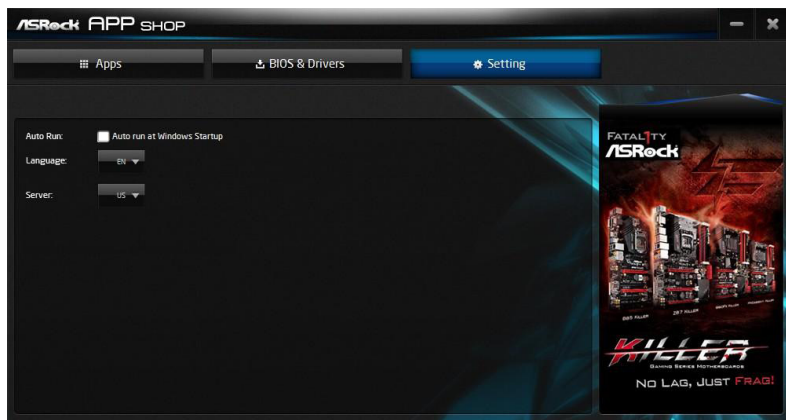
Click to select one or more items you want to update.

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.

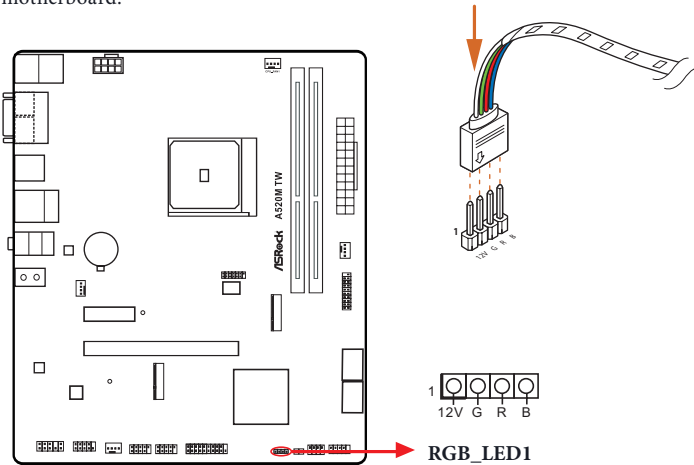


3.4 ASRock Polychrome SYNC

ASRock Polychrome SYNC is a lighting control utility specifically designed for unique individuals with sophisticated tastes to build their own stylish colorful lighting system. Simply by connecting the LED strip, you can customize various lighting schemes and patterns, including Static, Breathing, Strobe, Cycling, Music, Wave and more.

Connecting the LED Strip

Connect your RGB LED strip to the **RGB LED Header (RGB_LED1)** on the motherboard.



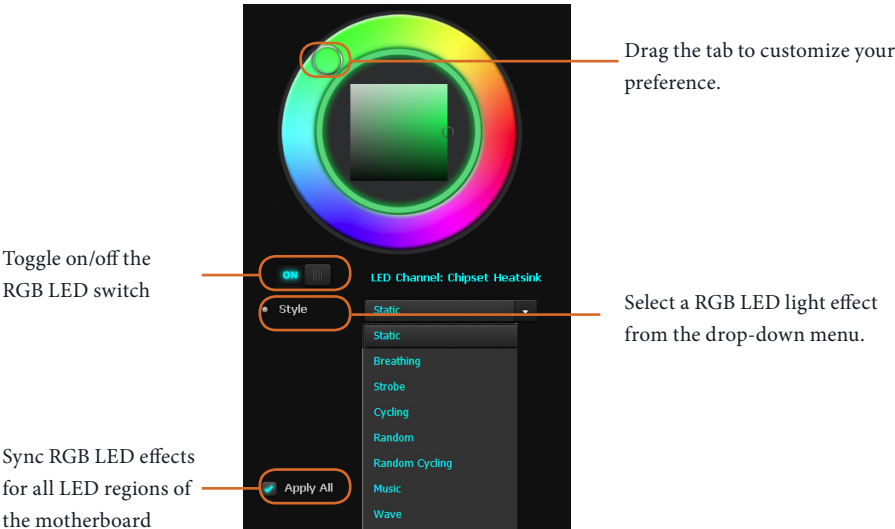
1. Never install the RGB LED cable in the wrong orientation; otherwise, the cable may be damaged.
2. Before installing or removing your RGB LED cable, please power off your system and unplug the power cord from the power supply. Failure to do so may cause damages to motherboard components.



1. Please note that the RGB LED strips do not come with the package.
2. The RGB LED header supports standard 5050 RGB LED strip (12V/G/R/B), with a maximum power rating of 3A (12V) and length within 2 meters.

ASRock Polychrome SYNC Utility

Now you can adjust the RGB LED color through the ASRock Polychrome SYNC Utility. Download this utility from the ASRock Live Update & APP Shop and start coloring your PC style your way!



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 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 <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.

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
OC Tweaker	For overclocking configurations
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

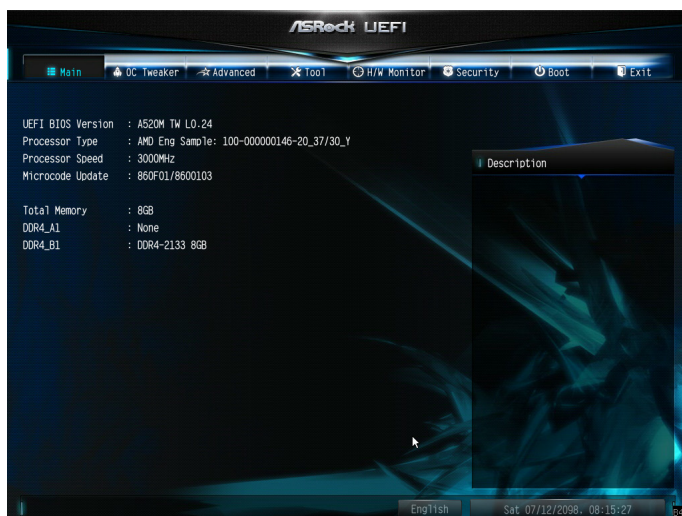
Use <←→> key or <→> key to choose among the selections on the menu bar, and use <↑> key or <↓> key to move the cursor up or down to select items, then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

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

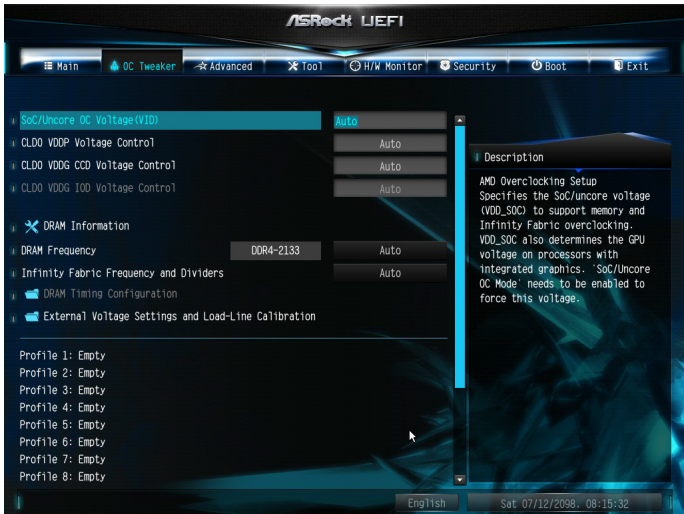
4.2 Main Screen

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



4.3 OC Tweaker Screen

In the OC Tweaker screen, you can set up overclocking features.



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.

SoC/Uncore OC Voltage(VID)

Specify the SoC/Uncore voltage (VDD_SOC) in mV to support memory and Infinity Fabric overclocking. VDD_SOC also determines the GPU voltage on processors with integrated graphics. “SoC/Uncore OC Mode” needs to be enabled to force this voltage.

CLD0 VDDP Voltage Control

AMD Overclocking Setup VDDP is a voltage for the DDR4 bus signaling (PHY), and it is derived from your DRAM Voltage (VDDIO_Mem). As a result, VDDP voltage in mV can approach but not exceed your DRAM Voltage.

CLD0 VDDG CCD Voltage Control

AMD Overclocking Setup VDDG CCD represents voltage for the data portion of the Infinity Fabric. It is derived from the CPU SoC/Uncore Voltage (VDD_SOC). VDDG can approach but not exceed VDD_SOC.

CLD0 VDDG IOD Voltage Control

AMD Overclocking Setup VDDG IOD represents voltage for the data portion of the Infinity Fabric. It is derived from the CPU SoC/Uncore Voltage (VDD_SOC). VDDG can approach but not exceed VDD_SOC.

DRAM Information

Load XMP Setting

Load XMP settings to overclock the memory and perform beyond standard specifications.

DRAM Frequency

If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically. Setting DRAM Frequency can adjust DRAM Timing.

Infinity Fabric Frequency and Dividers

AMD Overclocking Setup Set Infinity Fabric frequency (FCLK). Auto: FCLK = MCLK. Manual: FCLK must be less than or equal to MCLK for best performance in most cases. Latency penalties are incurred if FCLK and MCLK are mismatched, but sufficiently high MCLK can negate or overcome this penalty.

DRAM Timing Configuration

External Voltage Settings and Load-line Calibration

+1.8 Voltage

Configure the voltage for +1.8.

CPU VDD 1.8 Voltage

Configure the voltage for the CPU VDD 1.8.

DRAM Voltage

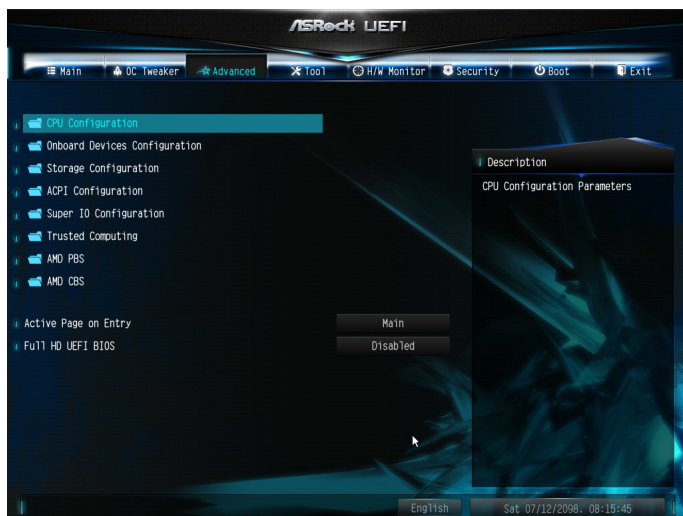
Use this to configure DRAM Voltage. The default value is [Auto].

VDDP

Configure the voltage for the VDDP.

4.4 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.

4.4.1 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].

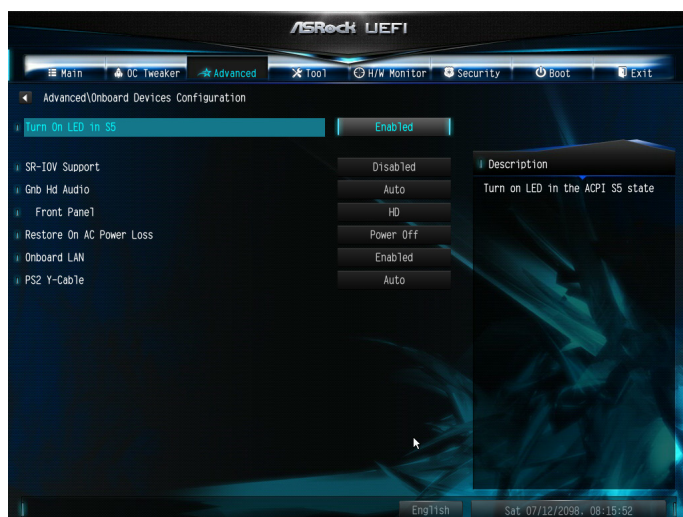
SMT Mode

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.

4.4.2 Onboard Devices Configuration



Turn On Onboard LED in S5

Turn on/off the LED in the ACPI S5 state.

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.

4.4.3 Storage Configuration



SATA Mode

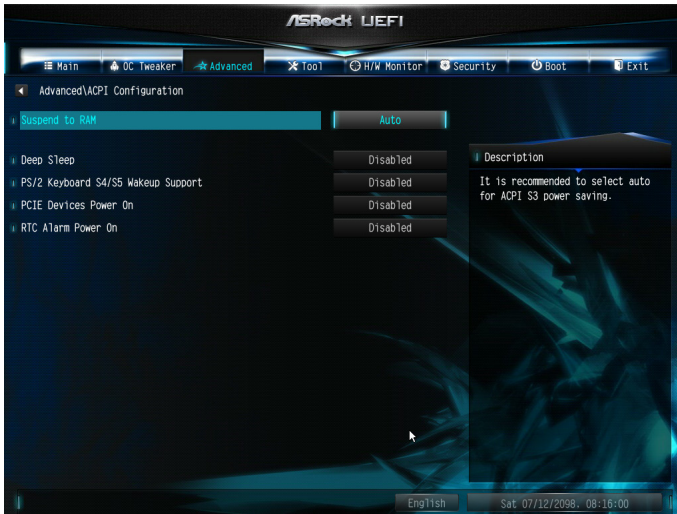
AHCI: Supports new features that improve performance.

RAID: Combine multiple disk drives into a logical unit.

SATA Hot Plug

Enable/disable the SATA Hot Plug function.

4.4.4 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. We recommend disabling Deep Sleep for better system compatibility and stability.

PS/2 Keyboard S4/S5 Wakeup Support

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

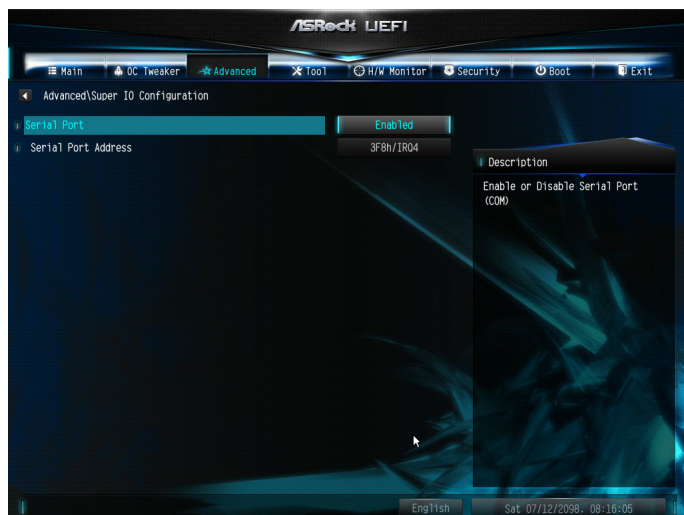
PCIE Devices Power On

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.

4.4.5 Super IO Configuration



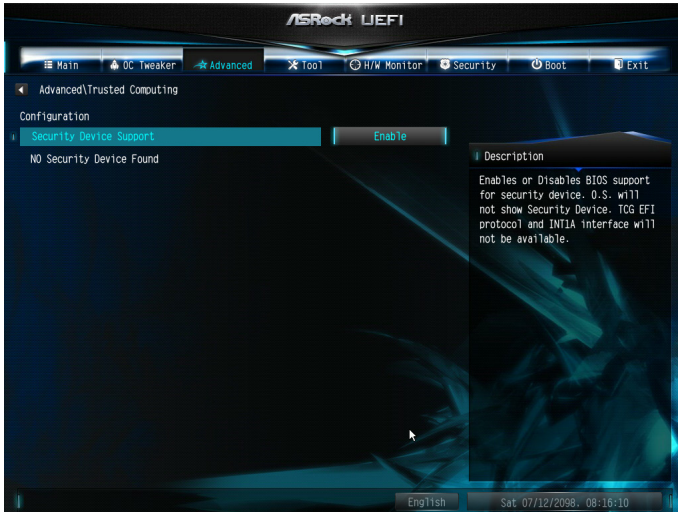
Serial Port

Enable or disable the Serial port.

Serial Port Address

Select the address of the Serial port.

4.4.6 Trusted Computing



Security Device Support

Enable or disable BIOS support for security device.

4.4.7 AMD PBS



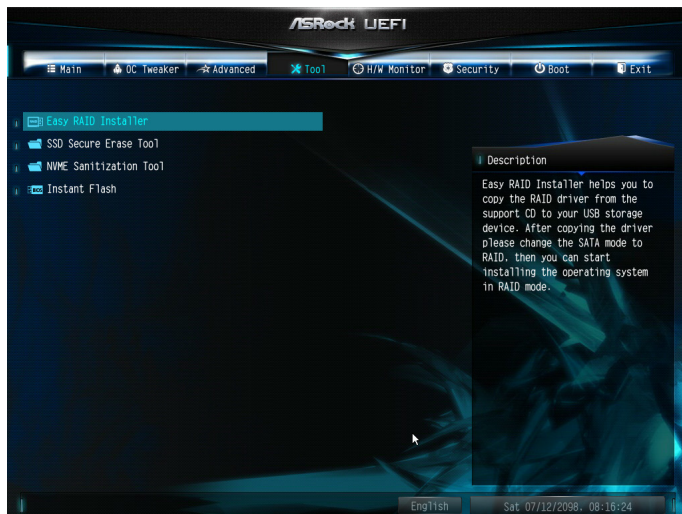
The AMD PBS menu accesses AMD specific features.

4.4.8 AMD CBS



The AMD CBS menu accesses AMD specific features.

4.5 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

All the SSD's listed that supports Secure Erase function.

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.

4.6 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.

FAN Configuration

CHA_FAN1/WP Switch

Select CHA_FAN1 or Water Pump mode.

Chassis Fan 1 Control Mode

Select PWM mode or DC mode for Chassis Fan 1 .

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.

CHA_FAN2/CHA_FAN3/WP Switch

Select CHA_FAN2, CHA_FAN3 or Water Pump mode.

Chassis Fan 2/Chassis Fan 3 Control Mode

Select PWM mode or DC mode for Chassis Fan 2 or Chassis Fan 3.

Chassis Fan 2/Chassis Fan 3 Setting

Select a fan mode for Chassis Fan 2, Chassis Fan 3 or choose Customize to set 5 CPU temperatures and assign a respective fan speed for each temperature.

Chassis Fan 2/Chassis Fan 3 Temp Source

Select a fan temperature source for Chassis Fan 2 or Chassis Fan 3.

Case Open Feature

Enable or disable Case Open Feature to detect whether the chassis cover has been removed.

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.

4.7 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

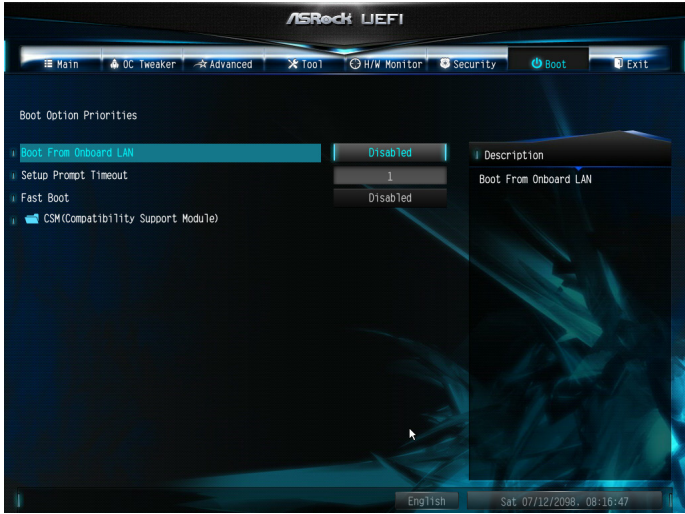
Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.

Secure Boot

Enable to support Secure Boot.

4.8 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.

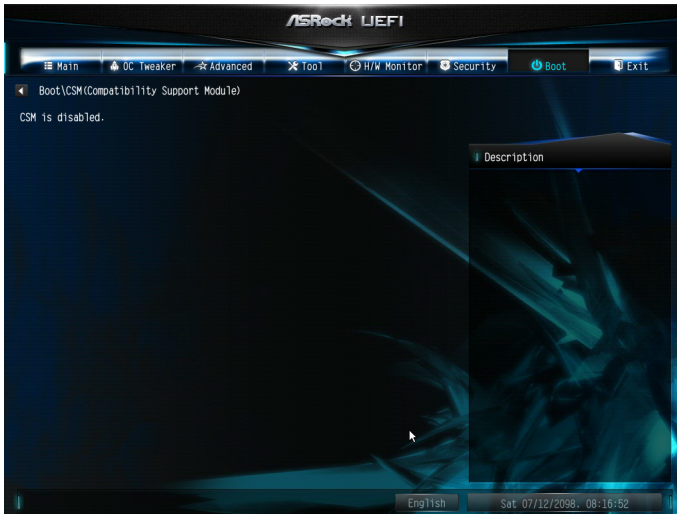
Setup Prompt Timeout

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.

4.9 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.

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 <http://www.asrock.com/support/tsd.asp>

ASRock Incorporation

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DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)



Responsible Party Name: ASRock Incorporation

Address: 13848 Magnolia Ave, Chino, CA91710

Phone/Fax No: +1-909-590-8308/+1-909-590-1026

hereby declares that the product

Product Name : Motherboard

Model Number : A520M TW

Conforms to the following specifications:

☒ FCC Part 15, Subpart B, Unintentional Radiators

Supplementary Information:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Representative Person's Name: James

Signature :

A handwritten signature in black ink, appearing to read 'James', written over a horizontal line.

Date : May 12, 2017

EU Declaration of Conformity



For the following equipment:

Motherboard

(Product Name)

A520M TW / ASRock

(Model Designation / Trade Name)

ASRock Incorporation

(Manufacturer Name)

2F., No.37, Sec. 2, Jhongyang S. Rd., Beitou District, Taipei City 112, Taiwan (R.O.C.)

(Manufacturer Address)

☒ **EMC —Directive 2014/30/EU (from April 20th, 2016)**

☐ EN 55022:2010/AC:2011 Class B

☒ EN 55024:2010/A1:2015

☒ EN 55032:2012+AC:2013 Class B

☒ EN 61000-3-3:2013

☒ EN 61000-3-2:2014

☐ **LVD —Directive 2014/35/EU (from April 20th, 2016)**

☐ EN 60950-1 : 2011+ A2: 2013

☐ EN 60950-1 : 2006/A12: 2011

☒ RoHS — Directive 2011/65/EU

☒ CE marking

(EU conformity marking)



ASRock EUROPE B.V.

(Company Name)

Bijsterhuizen 1111 6546 AR Nijmegen The Netherlands

(Company Address)

Person responsible for making this declaration:

(Name, Surname)

A.V.P

(Position / Title)

July 31, 2020

(Date)