RNO171

Mini-ITX Industrial Motherboard
User's Manual

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FCC and DOC Statement on Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

2. Shielded interface cables must be used in order to comply with the emission limits.

Table of Contents

About this Manual

This manual can be downloaded from the website. The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.

2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.

3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.

4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface.

4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

> **Important:**
> Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

• To avoid damage to the system, use the correct AC input voltage range.

• To reduce the risk of electric shock, unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- 1 RNO171 motherboard

- 1 I/O shield A49-GH1710-000G

- 1 Cooler

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Optional Items

Item Name	Part Number	Description
SATA signal and power cable	A81-002013-000G	
USB port cable	332-253010-026G	Length: 200mm
COM port cable	A81-015041-018G	Length: 300mm
Cooler	A71-108114-010G A71-108113-000G	for 15W, height: 35mm for 45W, height: 47mm

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Before Using the System Board

When installing the system board in a new system, you will need at least the following internal components.

- Memory module

- Storage device such as hard disk drive .

- Power adaptor

External system peripherals may also be required for navigation and display, including at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

▶ **Specifications**

System	Processor	AMD® Ryzen™ V2000 Series Processors AMD® Ryzen™ V2748, 8C/16T, 4MB Cache, 7 CU, 2.9GHz (4.25GHz),45W AMD® Ryzen™ V2546, 6C/12T, 3MB Cache, 6 CU, 3.0GHz (3.95GHz),45W AMD® Ryzen™ V2718, 8C/16T, 4MB Cache, 7 CU, 1.7GHz (4.15GHz),15W AMD® Ryzen™ V2516, 6C/12T, 3MB Cache, 6 CU, 2.1GHz (3.95GHz),15W
	Memory	Two 260-pin SODIMM up to 64GB Dual channel DDR4 up to 3200MHz (ECC/ non ECC support)
	BIOS	AMI BIOS
Graphics	Controller	AMD® Radeon Graphics
	Feature	OpenGL 4.6, DirectX 12, OpenCL 2.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H265, VP8, VP9 HW Encode: MPEG2, AVC/H264, JPEG, HEVC/H265, VP8, VP9
	Display	4 x DP++ DP++: resolution up to 4096x2160 @ 60Hz
Expansion	Interface	1 x PCIe x16 (x8 Gen3) (Max. 75W) 1 x M.2 2242/2280 M Key (SATA 3.0/ PCIe x4)
Audio	Audio Codec	Realtek ALC888S-VD2-GR
Ethernet	Controller	2 x Realtek RTL8119-CG (10/100/1000Mbps)
Rear I/O	Ethernet	2 x GbE (RJ-45)
	Serial	1 x RS-232/422/485 (DB-9) 1 x RS-232 (DB-9)
	USB	2 x USB 3.1 Gen1 2 x USB 2.0
	Display	4 x DP++
	Audio	1 x Mic-in 1 x Line-in 1 x Line-out
Internal I/O	Serial	4 x RS-232 (2.0mm pitch) (TX/RX signal only)
	USB	4 x USB 2.0 (2.54mm pitch) (One signal is shared with the USB 2.0 Vertical Type A) 1 x USB 2.0 Vertical Type A
	Audio	1 x S/PDIF 1 x Audio (Mic-in/Line-out)
	SATA	2 x SATA 3.0 (up to 6GB/s) (with 7-pin VCC support) 2 x SATA Power
Watchdog Timer	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
Security	TPM	TPM2.0 (opt.)

Power	Type	Single 12V +/-5% DC
	Connector	Straight Type Connector (4-pin) DC-in Jack (available upon request) Right Angle Connector (4-pin) (available upon request)
	Consumption	TBD
	RTC Battery	CR2032 Coin Cell
OS Support	Microsoft	Windows 10
	Linux	Linux
Environment	Temperature	Operating: -5 to 65°C Storage: -40 to 85°C
	Humidity	Operating: 10 to 90% RH Storage: 10 to 90% RH
	MTBF	TBD
Mechanical	Dimension	Mini-ITX Form Factor 170mm (6.7") x 170mm (6.7")

▶ Features

Watchdog Timer

The Watchdog Timer function allows your application to regularly "clear" the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

DDR4

DDR4 delivers increased system bandwidth and improves performance. The advantages of DDR4 provide an extended battery life and improve the performance at a lower power than DDR3/DDR2.

Serial ATA

Serial ATA is a storage interface that is compliant with SATA 1.0a specification. With speed of up to 6Gb/s (SATA 3.0), it improves hard drive performance faster than the standard parallel ATA whose data transfer rate is 100MB/s.

Gigabit LAN

The Realtek RTL8119-CG Gigabit Ethernet Controllers support data transmission at 1Gbps.

Audio

The Realtek ALC888S-VD2-GR audio codec provides 7.1 channel High Definition audio output.

Wake-On-LAN

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

Wake-On-USB

This function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.

ACPI STR

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enables PCs to implement Power Management and Plug-and-Play with operating systems that support OS Direct Power Management. ACPI when enabled in the Power Management Setup will allow you to use the Suspend to RAM function.

With the Suspend to RAM function enabled, you can power-off the system at once by pressing the power button or selecting "Standby" when you shut down Windows® without having to go through the sometimes tiresome process of closing files, applications and operating system. This is because the system is capable of storing all programs and data files during the entire operating session into RAM (Random Access Memory) when it powers-off. The operating session will resume exactly where you left off the next time you power-on the system.

Power Failure Recovery

When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

RTC Timer

The Real Time Clock (RTC) installed on the system board allows your system to automatically power-on on the set date and time.

Chapter 2 - Hardware Installation

▶ Board Layout
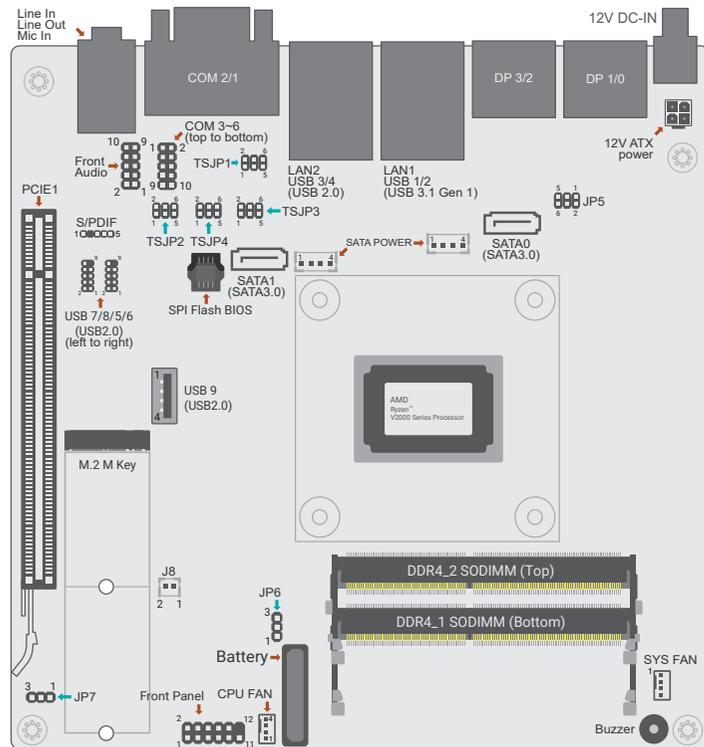
Note:
Specifications of these components are model-specific. Please refer to the specifications for detail.

Important:
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

► **System Memory**
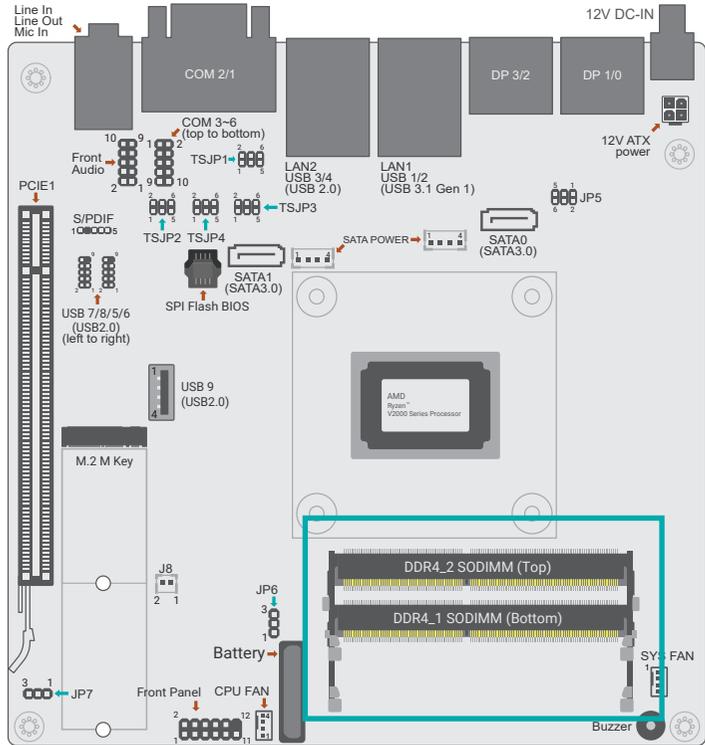
The system board supports one dual channel DDR4 SO-DIMM memory module.

Single Channel (SC)
Data will be accessed in chunks of 64 bits from the memory channels.

Dual Channel (DC)
Data will be accessed in chunks of 128 bits from the memory channels. Dual channel provides better system performance because it doubles the data transfer rate.

Features

- 260-pin SO-DIMM up to 64GB

- DDR4 3200MHz

Installing the SO-DIMM Module

Before installing the memory module, please make sure that the following safety cautions are well-attended.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.

2. Disconnect all power cords and cables.

3. Locate the SO-DIMM socket on the system board

4. Make sure the notch on memory card is aligned to the key on the socket.

▶ **System Memory** ▶ **Installing the SO-DIMM Module**
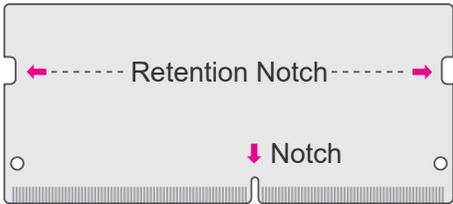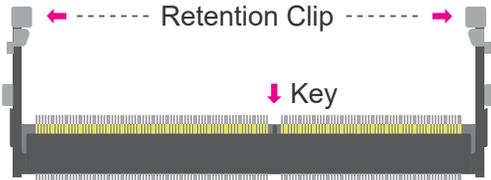
Please follow the steps below to install the memory card into the socket.
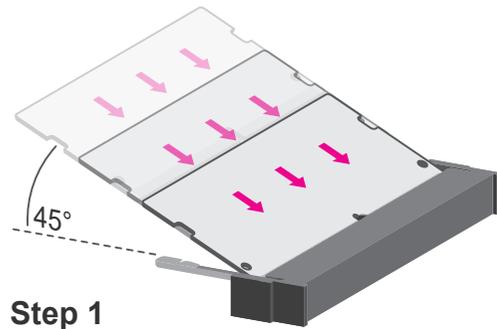
Step 1:
Insert the memory card into the slot while making sure 1) the notch and the key are aligned, and 2) the non-connector end rises approximately 45 degrees horizontally. Press the card firmly into the socket while applying and maintaining even pressure on both ends.
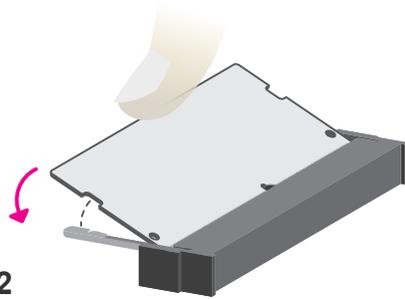
Step 2:
Press the end of the card far from the socket down while making sure the retention notch and the clip align as indicated by the dotted line in the illustration. If the retention notch and the clip do not align, please remove the card and re-insert it. Press the card all the way down.
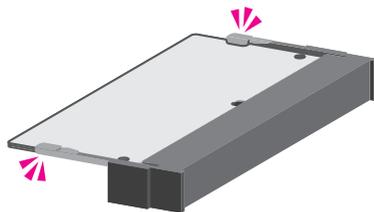
Step 3:
The clips snap automatically and abruptly to the retention notches of the card sounding a distinctive click, and lock the card in place. Inspect that the clip sits in the notch. If not, please pull the clips outward, release and remove the card, and mount it again.

▶ **Jumper Settings**

SATA Power Selection (JP5)
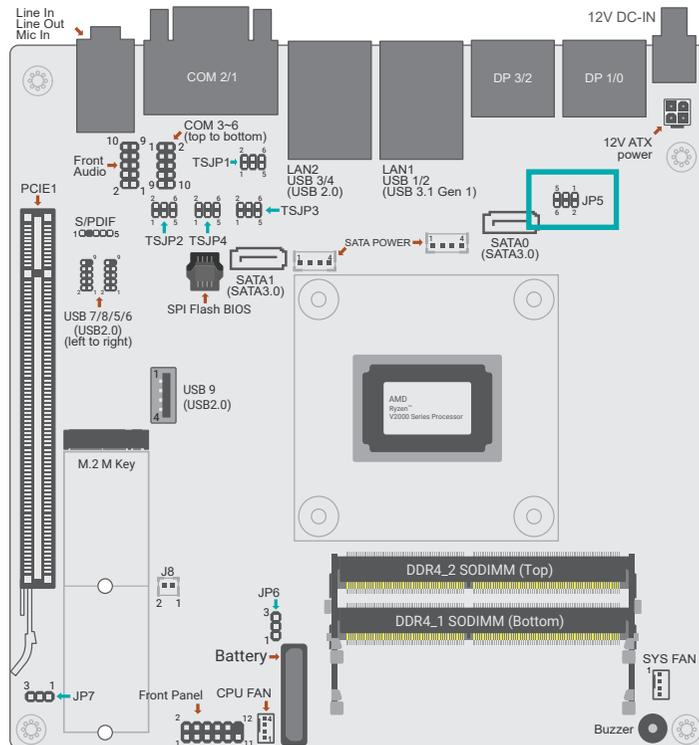
SATA Power Selection	JP5
Standard SATA	1-3 On / 2-4 On
SATA+Power	3-5 On / 4-6 On

This switch is used to determine the SATA power output.

▶ **Jumper** Settings

Clear CMOS (JP6)
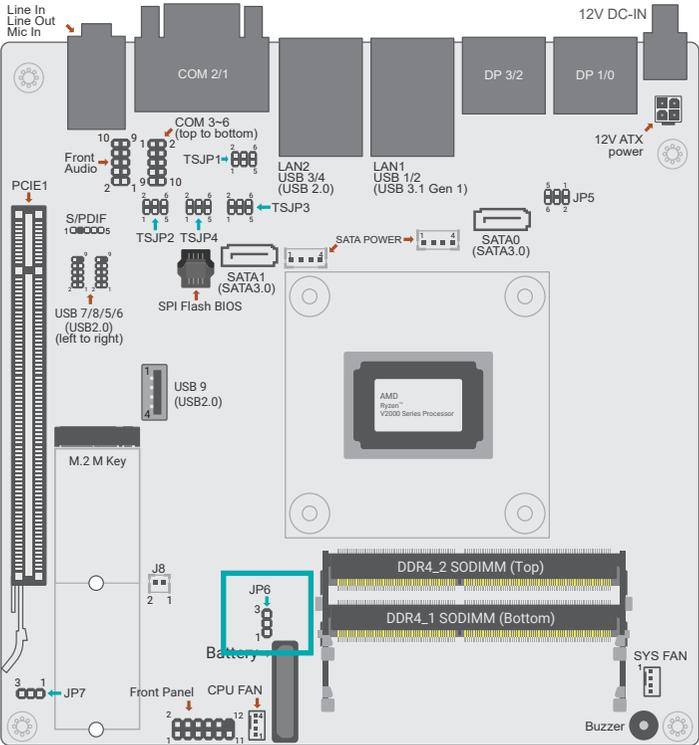
Clear CMOS	JP6
Normal (default)	1-2 On
Clear CMOS Data	2-3 On

If any anomaly of the followings is encountered —
• a) CMOS data is corrupted;
• b) you forgot the supervisor or user password;
• c) failure to start the system due to BIOS mis-configuration

— it is suggested that the system be reconfigured with default values stored in the ROM BIOS. To load the default values stored in the ROM BIOS, please follow the steps below.
• 1. Power-off the system and unplug the power cord.
• 2. Put a jumper cap on pin 2 and pin 3. Wait for a few seconds and set it back to its default setting, i.e. jumper cap on pin 1 and pin 2.
• 3. Plug the power cord and power-on the system.

▶ **Jumper** Settings

Power Selection COM2 (TSJP1)
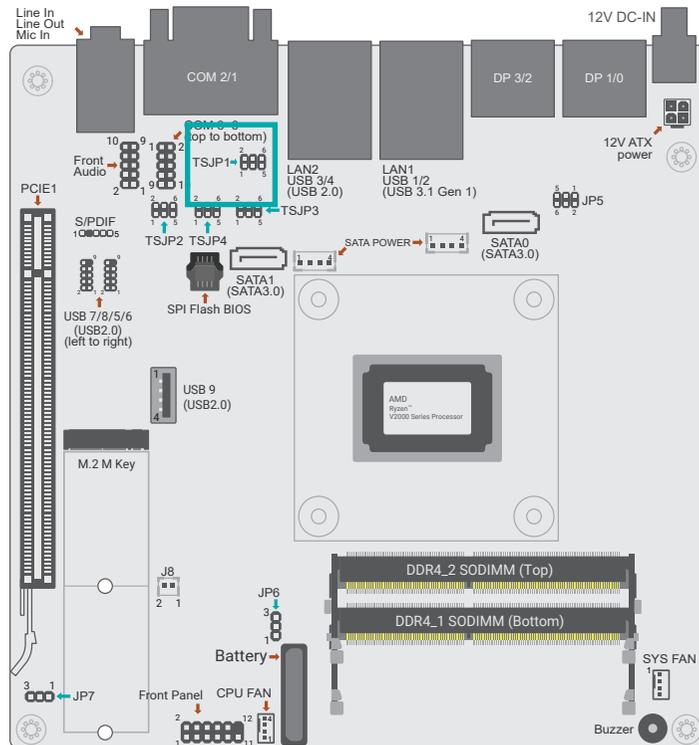
Power Selection COM 2	TSJP1
RS232 Standard (Deafult)	1-3 On / 2-4 On
RS232 With Power	3-5 On / 4-6 On

To switch the COM2 power output type.

▶ **Jumper** Settings

Selection for COM2 (TSJP2)
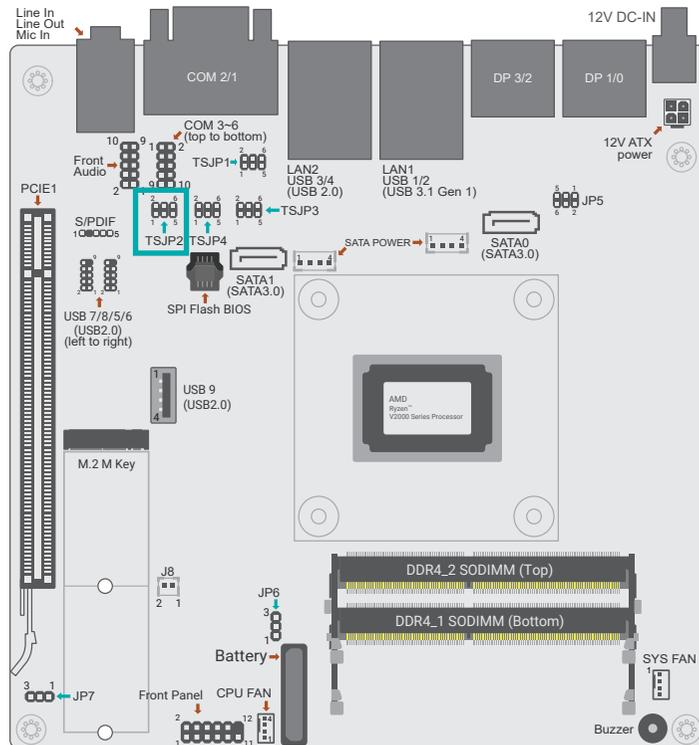
Selection for COM 2	TSJP2
RS232 (Deafult)	1-3 On / 4-6 On
RS422	3-5 On / 4-6 On
RS485	3-5 On / 2-4 On

To switch the COM2 output type.

▶ **Jumper** Settings

Selection for COM2 (TSJP3/TSJP4)
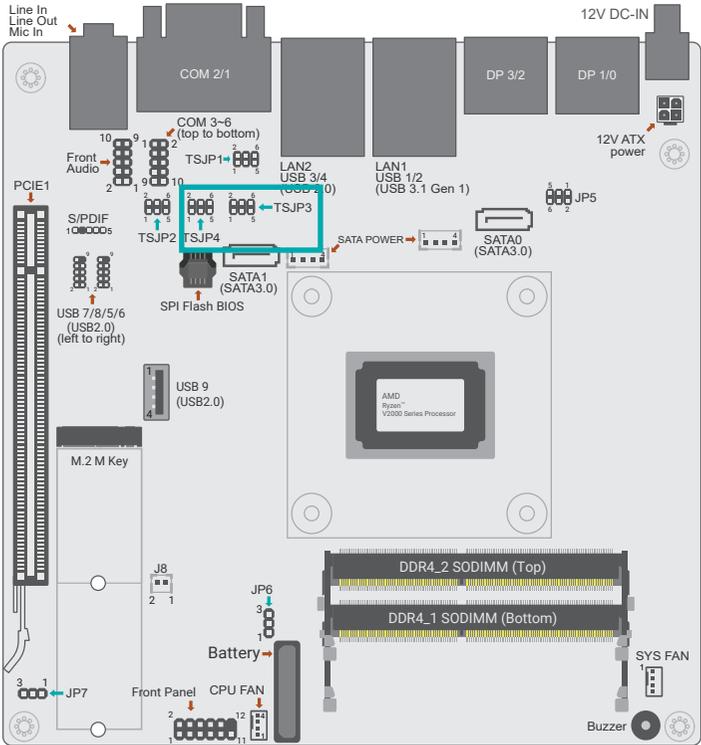
Selection for COM 2	TSJP3/TSJP4
RS232 (Deafult)	1-3 On / 2-4 On
RS422	3-5 On / 4-6 On
RS485	3-5 On / 4-6 On

To switch the COM2 output type.

▶ **Jumper** Settings

AT/ATX Mode (JP7)
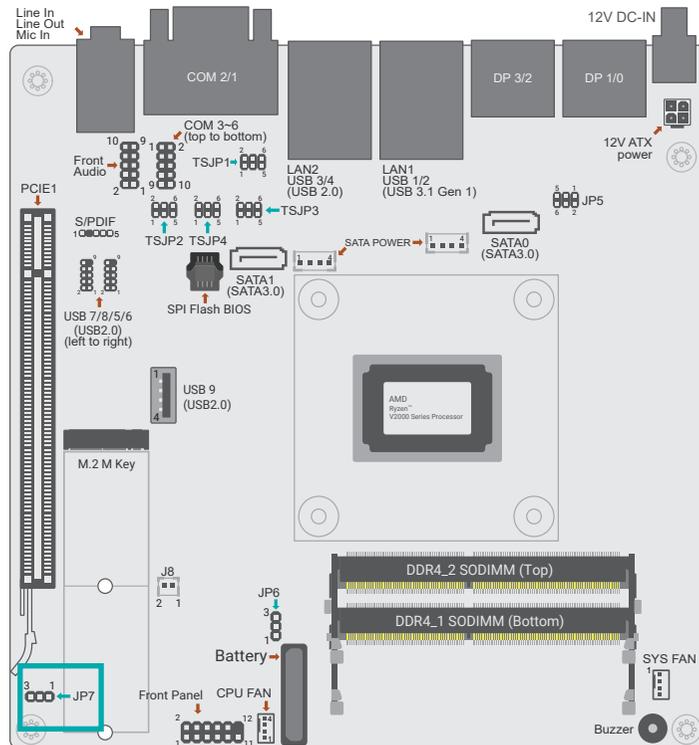
18 **AT/ATX Mode**	**JP7**
AT Mode (default)	1-2 On
ATX Mode	2-3 On

To switch the Power mode.

▶ **Rear I/O Ports**
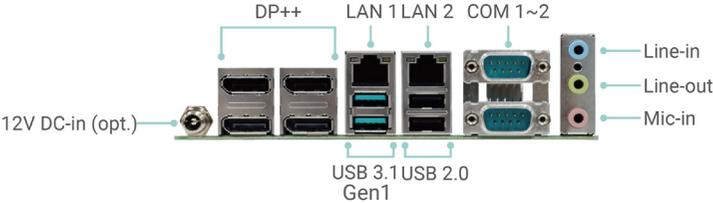
The rear panel I/O ports consist of the following:

- 4 DP++ ports
- 1 DC-In, optionally internal vertical 4-pin connector
- 2 RJ45 LAN ports
- 2 USB 3.1ports, 2 USB 2.0 ports
- 2 COM ports
- Audio Ports

Graphics Display
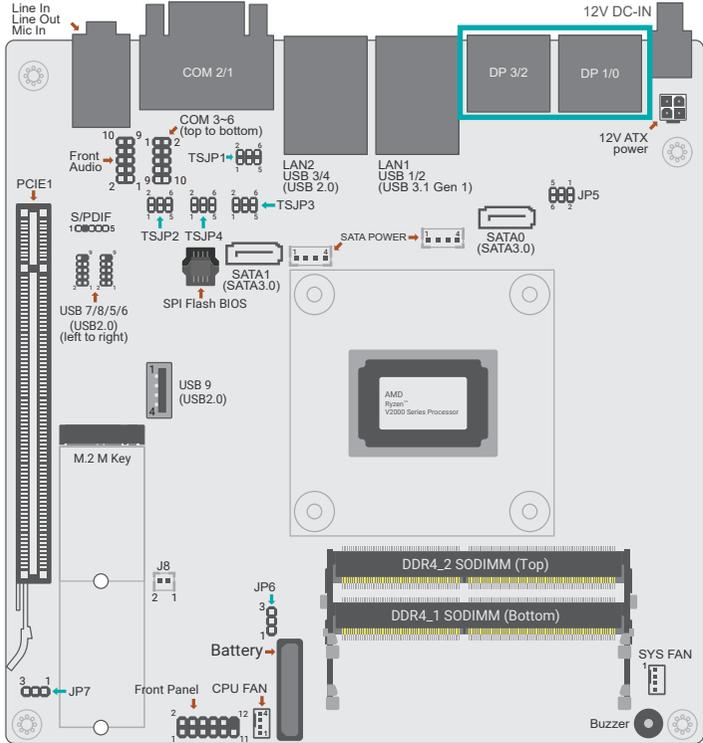
DisplayPort ++

The DisplayPort (DP) is a digital display interface used to connect a display device such as a computer monitor. It is used to transmit audio and video simultaneously. The interface, which is developed by VESA, delivers higher performance features than any other digital interface.

USB Ports

RJ45 LAN Ports
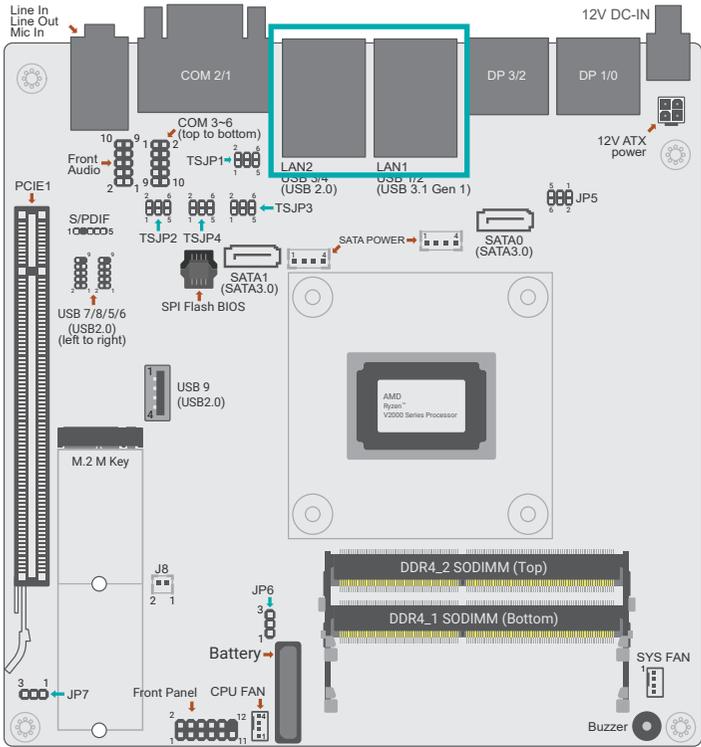
USB allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals. The system board is equipped with multiple USB Type A ports at the rear side — two USB 3.1 Gen1 and two USB 2.0.

Wake-On-USB Keyboard/Mouse

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S3 (STR - Suspend To RAM) state.
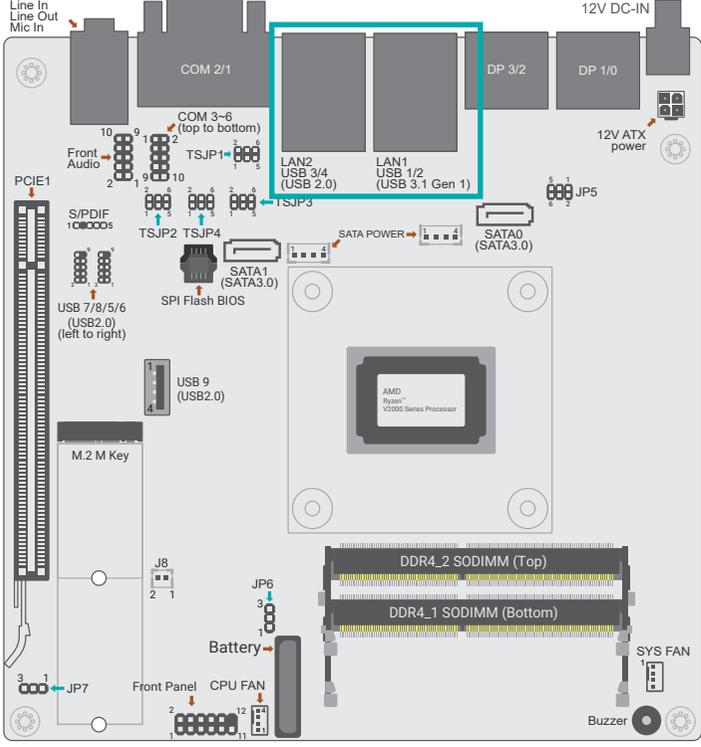
The two LAN ports allow the system board to connect to a local area network by means of a network hub.

Features

• 2 x Realtek RTL8119-CG (10/100/1000Mbps)

▶ **Rear I/O Ports**

COM Ports
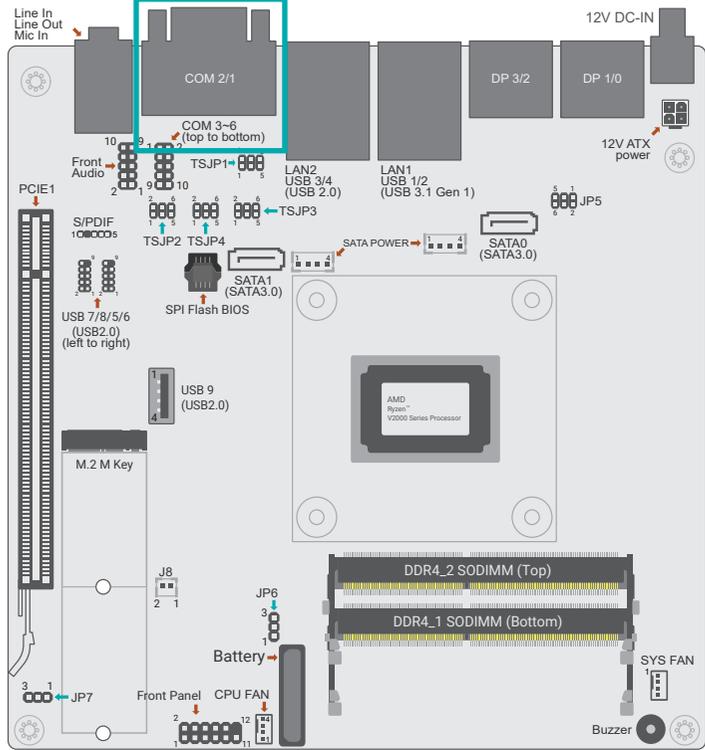
The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

▶ **Rear I/O Ports**

Audio Ports
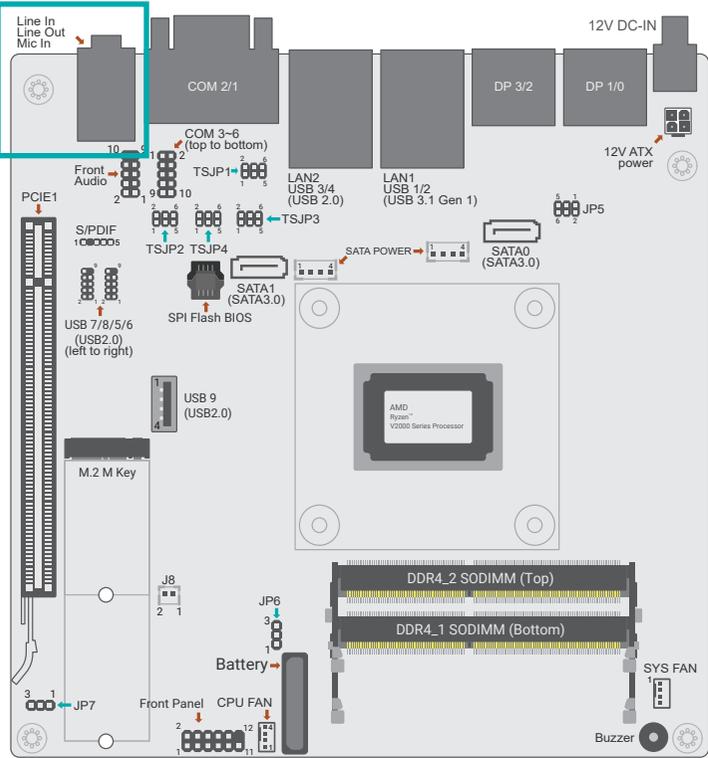
The system board is equipped with 3 audio jacks. A jack is a one-hole connecting interface for inserting a plug.

• Line-in Jack (Light Blue)
This jack is used to connect any audio devices such as Hi-fi set, CD player, tape player, AM/FM radio tuner, synthesizer, etc.

• Line-out Jack (Lime)
This jack is used to connect a headphone or external speakers.

• Mic-in Jack (Pink)
This jack is used to connect an external microphone

▶ **Rear I/O Ports**

DC 12V
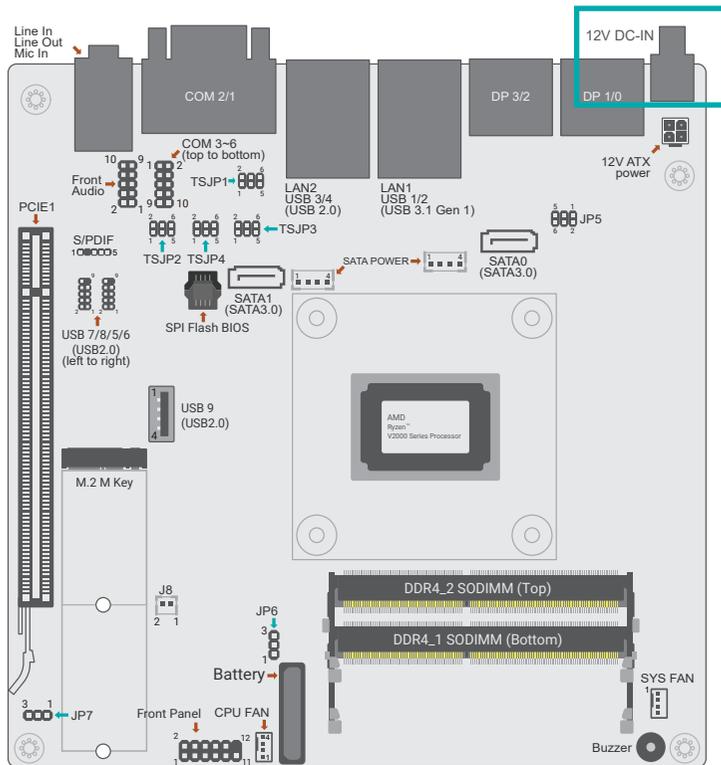
Connect the DC jack to the 12V DC-IN for power supply.

> ⚠ **Important:**
> Using a voltage higher than the recommended range may result in failure in starting and booting the system or causing irreversible damage to the system board. A power adaptor/converter is necessary when the power source on site does not comply with the power specifications of the board.

▶ **Internal I/O Connectors**

12V DC-In
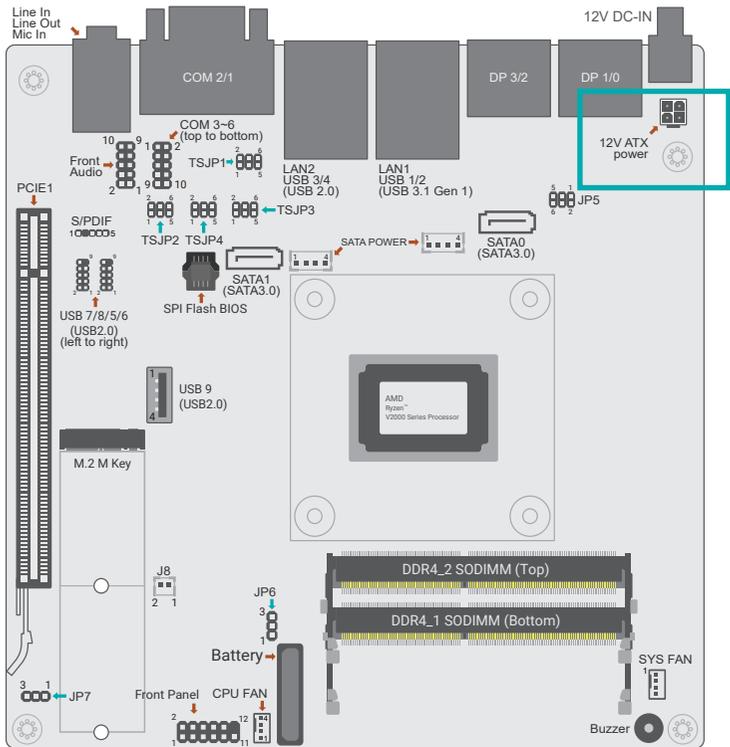
Connect a 4-pin DC power cord to the power connector for DC supply. The coaxial type is avaible upon request.

> ⚠️ **Important:**
> Using a voltage higher than the recommended range may result in failure in start-ing and booting the system or causing irreversible damage to the system board. A power adaptor/converter is necessary when the power source on site does not comply with the power specifications of the board.

SATA (Serial ATA) and SATA Power
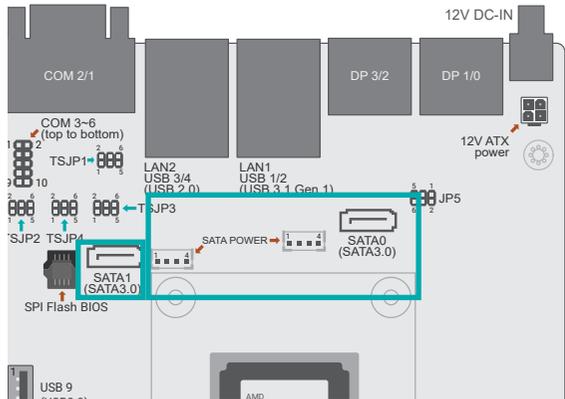
The Serial ATA (SATA) connector is used to connect the Serial ATA device. The system board support one SATA port and provides data rate up to 6Gb/s. Connect one end of the Serial ATA cable to a SATA connector and the other end to your Serial ATA device.

■ SATA Pin Assignment


```
7
   GND
   RX+
   RX-
   GND
   TX-
   TX+
   GND
1
```
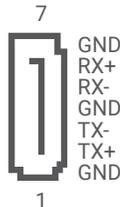
■ SATA Power Pin Assignment
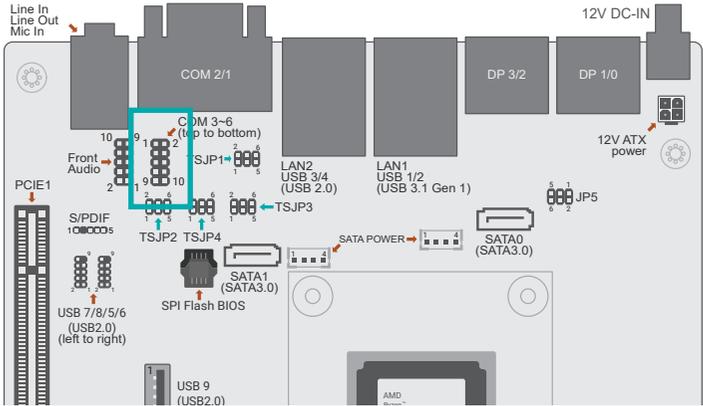

```
+5V
GND
GND
+12V
```

COM (Serial) Port

The serial ports are asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

Pin	Function	Pin	Function
1	MTD3	2	MTD4
3	MRD3	4	MRD4
5	GND	6	GND
7	MTD5	8	MTD6
9	MRD5	10	MRD6
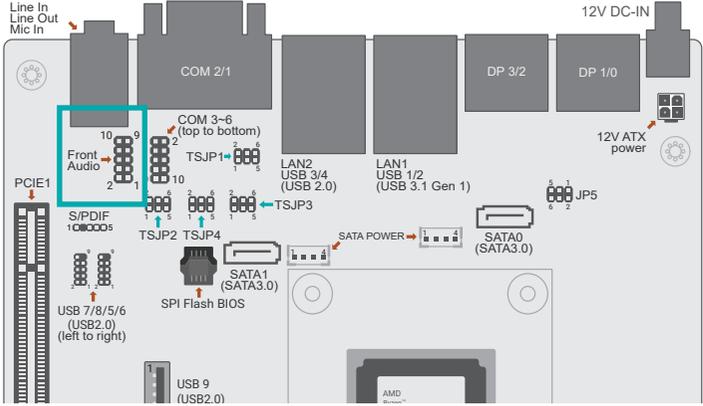
Front Audio

The Front Audio internal connector allows you to connect to the second line-out and mic-in jacks that are at the front panel of your system.

Pin	Function	Pin	Function
1	MIC2-L	2	AGND_AUDIO
3	MIC2-R	4	N.C.
5	LINE2-R	6	MIC2-JD
7	AGND_AUDIO	8	--
9	LINE2-L	10	LINE2-JD
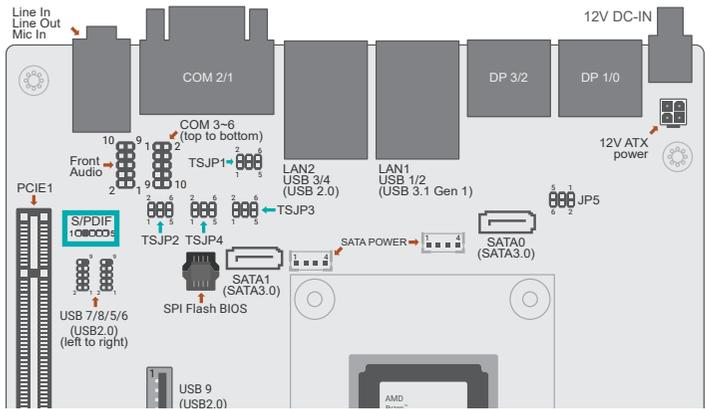
S/PDIF

The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned with pin 1 of the S/PDIF connector.

Pin	Function
1	A5V
2	--
3	SPOUT
4	GND
5	SPIN
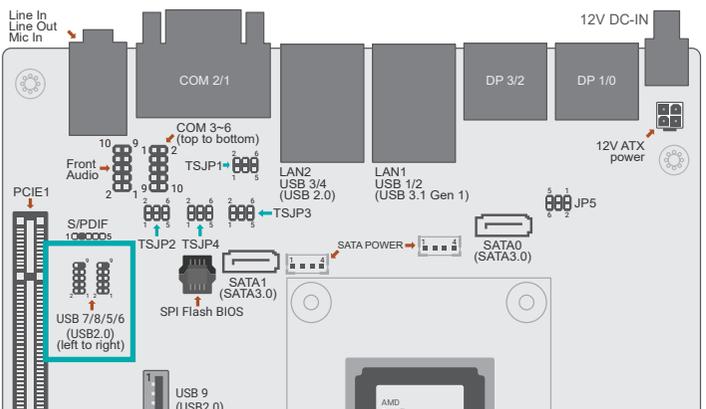
USB Ports

The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

In addition to the rear USB ports as introduced previously in this chapter, the system board is equipped with two internal USB 2.0 ports (one pin-header connector) and as illustrated above.

The internal USB pin headers may be connected to a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

Wake-On-USB Keyboard/Mouse

The Wake-On-USB Keyboard/Mouse function allows you to use a USB keyboard or USB mouse to wake up a system from the S state(s).

USB 2.0 7/8

Pin	Function	Pin	Function
1	USB2_PWR67	2	USB2_PWR67
3	P6_N	4	P7_N
5	P6_P	6	P7_P
7	GND	8	GND
9	---	10	N.C.

USB 2.0 5/6

Pin	Function	Pin	Function
1	USB2_PWR23	2	USB2_PWR23
3	P2_N	4	P3_N
5	P2_P	6	P3_P
7	GND	8	GND
9	---	10	N.C.

▶ **Internal I/O Connectors**

System Intrusion
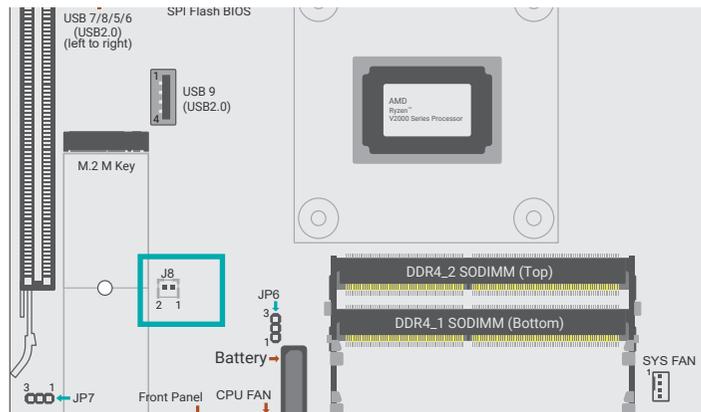
The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will sound only when the system restarts.

Pin	Function	Pin	Function
1	CASEOPEN-	2	GND

Front Panel
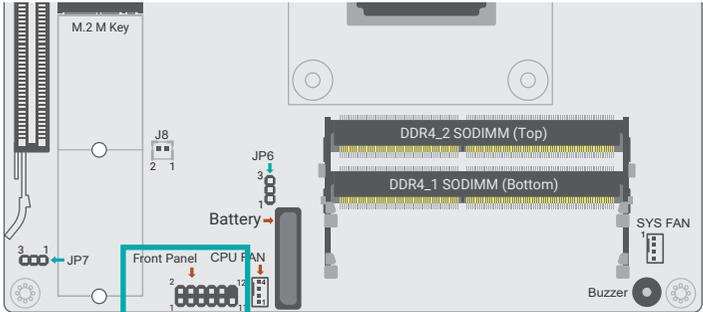
HDD_LED - HDD LED

This LED will light when the hard drive is being accessed.

SYS_RST - Reset Switch

This switch allows you to reboot without having to power off the system.

PWR_BTN - ATX Power Switch

This switch is used to power on or off the system.

SUS_LED - Power/Standby LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

Pin	Function	Pin	Function
1	N.C.	2	3V3SB
3	3V3	4	3V3SB
5	HDD_LED	6	SUS_LED
7	GND	8	GND
9	SYS_RST	10	PWR_BTN
11	N.C.	12	--

CPU FAN
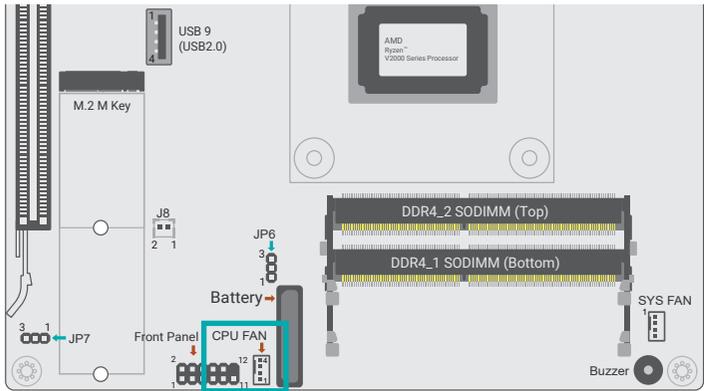
These fan connectors are used to connect to cooling fans. Cooling fans provide adequate air circulation throughout the chassis and dissipate heat to prevent overheating of the system board and components.

Pin	Function
1	GND
2	12V
3	RPM
4	CTRL

SYS FAN
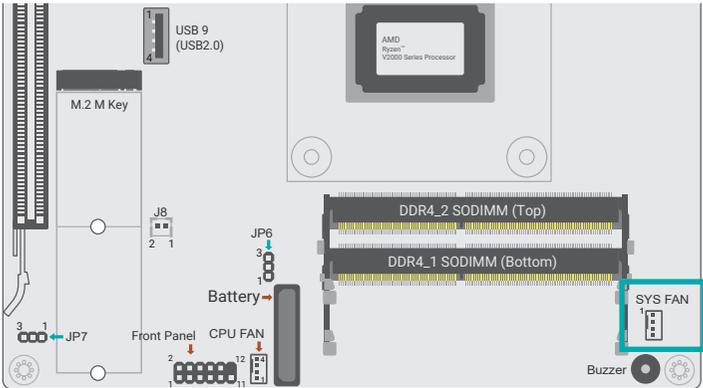
The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

Pin	Function
1	GND
2	12V
3	RPM
4	CTRL

LPC
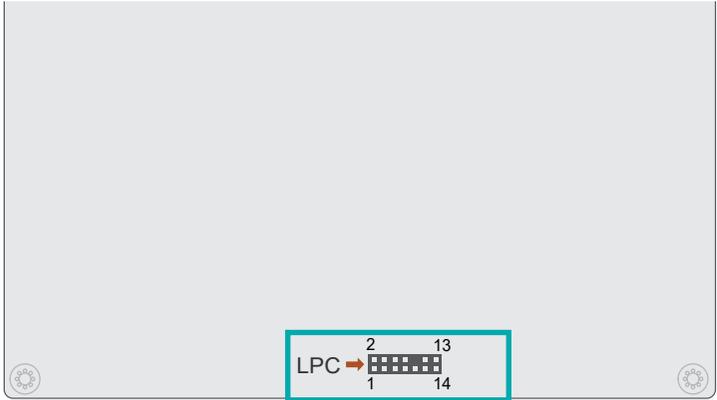
The LPC connector is used for debugging. It's located in the bottom side of the board.

Pin	Function	Pin	Function
1	CLK	2	LAD1
3	RST#	4	LAD0
5	FRAME#	6	VCC3
7	LAD3	8	GND1
9	LAD2	10	--
11	SERIRQ	12	GND2
13	5VSB	14	5V

▶ **Internal I/O Connectors**

Expansion Slots
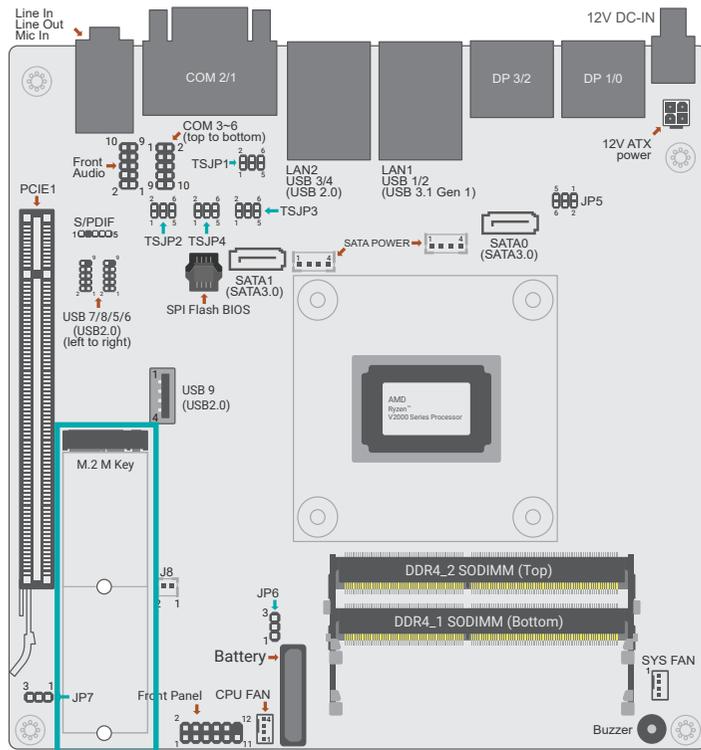
M.2 Sockets

The M.2 socket is the Next Generation Form Factor (NGFF) which is designed to support multiple modules and make the M.2 more suitable in application for solid-state storage.

Installing the M.2 Module

Before installing the M.2 module into the M.2 socket, please make sure that the following safety cautions are well-attended.

1. Make sure the PC and all other peripheral devices connected to it has been powered down.

2. Disconnect all power cords and cables.

3. Locate the M.2 socket on the system board

4. Make sure the notch on card is aligned to the key on the socket.

5. Make sure the standoff screw is removed from the standoff.
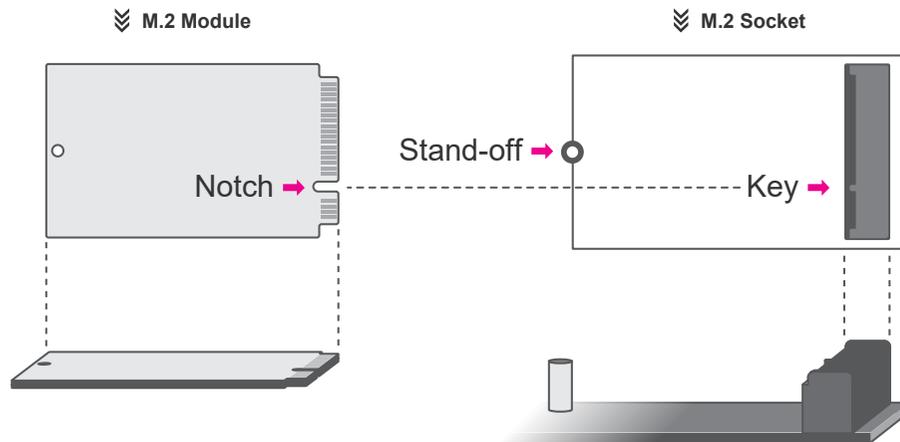
Please follow the steps below to install the card into the socket.
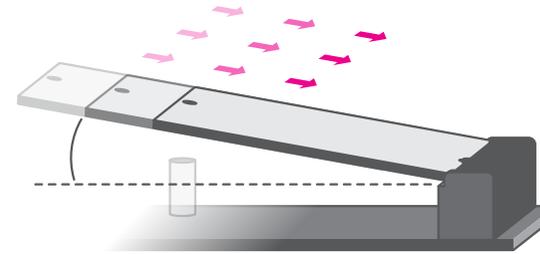
Step 1:
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.
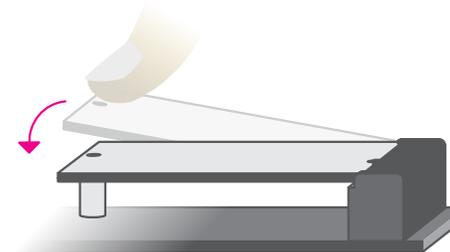
Step 2:
Press the end of the card far from the socket down until against the stand-off.
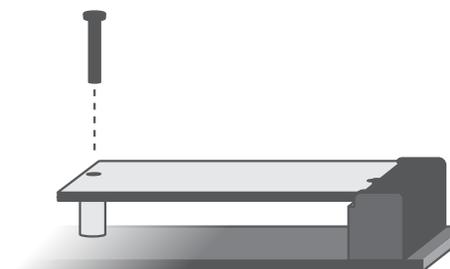
Step 3:
Screw tight the card onto the stand-off with a screw driver and a stand-off screw until the gap between the card and the stand-off closes up. The card should be lying parallel to the board when it's correctly mounted.

M.2 Module

M.2 Socket

Stand-off

Notch

Key

Chapter 3 - BIOS Settings

▶ Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board.

The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.

Note:
The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and <Del> keys simultaneously.

Legends

Keys	Function
Right / Left arrow	Move the highlight left or right to select a menu
Up / Down arrow	Move the highlight up or down between submenus or fields
<Enter>	Enter the highlighted submenu
+ (plus key)/F6	Scroll forward through the values or options of the highlighted field
- (minus key)/F5	Scroll backward through the values or options of the highlighted field
<F1>	Display general help
<F2>	Display previous values
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "▶" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

▶ Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.

```
                      Aptio Setup - American Megatrends International, LLC.
   Main   Advanced   Security   Boot   Save & Exit

   Project Name              RNO171                    Set the Date. Use Tab to
   BIOS Version              B21C.17A                  switch between Date ele-
                                                       ments.
   Memory Information                                  Default Ranges:
   Total Memory              4096 MB (DDR4)            Year: 2005-2099
   Memory Speed              2133MHz                   Months: 1-12
   DIMM 1                    4096 MB                   Days: dependent on month
   DIMM 2                    N/A

   Processor Information
   Name                      AMD Ryzen Embedded
                             V2516 with Radeon
                             Graphics                  →←: Select Screen
   Speed                     2100MHz                   ↑↓: Select Item
   ID                        00860F01                  Enter: Select
   Number of Processors      12                        +/- : Change Opt.
                                                       F1: General Help
   System Language           [English]                 F2: Previous Values
                                                       F9: Optimized Defaults
   System Date               [Mon 01/07/2022]          F10: Save & Exit
   System Time               [21:01:32]                ESC: Exit

                      Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.
```

System Date

The date format is <month>, <date>, <year>. Press "Tab" to switch to the next field and press "-" or "+" to modify the value.

System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

▶ Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

> **Important:**
> Setting incorrect field values may cause the system to malfunction.

```
                      Aptio Setup - American Megatrends International, LLC.
   Advanced

   ▶ Trusted Computing                                 System ACPI Parameters.
   ▶ Chipset Configuration
   ▶ ACPI Configuration
   ▶ NCT6216D Super IO Configuration
   ▶ NCT6216D HW Monitor
   ▶ Serial Port Console Redirection
   ▶ CPU Configuration
   ▶ SATA Configuration
   ▶ USB Configuration
   ▶ Network Stack Configuration
   ▶ USB Power Control
                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/- : Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F9: Optimized Defaults
                                                       F10: Save & Exit
                                                       ESC: Exit

                      Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.
```

▶ **Advanced**

Trusted Computing

Aptio Setup - American Megatrends International, LLC.		
Advanced		
TPM 2.0 Device Found Firmware Version Vendor:	7.2 NTC	Enables or Disables BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Security Device Support Pending operation	[Enable] [None]	
		→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.		

Security Device Support

This field is used to enable or disable BIOS support for the security device such as an TPM 2.0 to achieve hardware-level security via cryptographic keys.

Pending operation

To clear the existing TPM encryption, select "TPM Clear" and restart the system. This field is not available when "Security Device Support" is disabled.

▶ **Advanced**

Chipset Configuration

Aptio Setup - American Megatrends International, LLC.		
Advanced		
▶ GFX Configuration AC Power Loss Control DRAM ECC Enable NB Azalia	 [Always On] [Disabled] [Enabled]	GFX Configuration
		→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.		
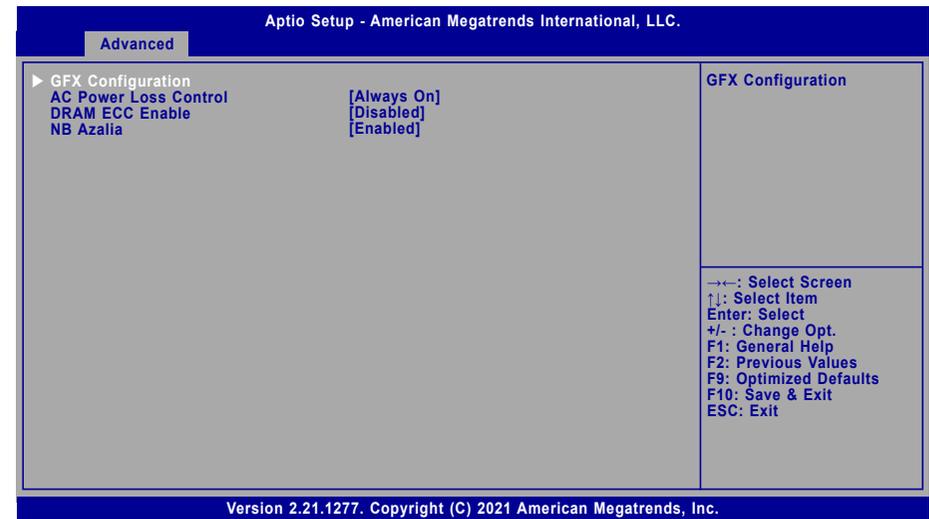
▶ **GFX Configuration**

iGPU Configuration

Auto	Auto mode
iGPU Disabled	Disable iGPU
UMA_SPECIFIED	To specify the UMA Frame buffer Size

UMA Frame buffer Size

To switch the size among 64M~2G.

AC Power Loss Control

Select AC Power Loss Control method: Always off / Always On / Last State

DRAM ECC Enable

Use this option to enable / disable DRAM ECC.

NB Azalia

Enable or disable integrate HD Audio controller.

▶ **Advanced**

ACPI Configuration

Aptio Setup - American Megatrends International, LLC.		
Advanced		
Wake On PCIE	[Disabled]	Enable/Disable integrated LAN to wake the system.
Wake on RTC from S5	[Disabled]	
		→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.		
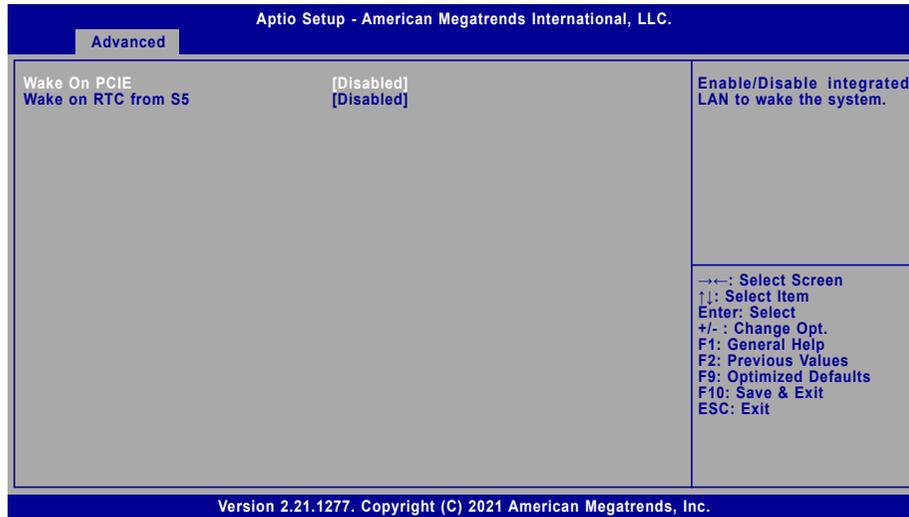
Wake on PCIE

Enable/Disable integrated LAN to wake the system.

Wake on RTC from S5

When Enabled, the system will automatically power up at a designated time every day. Once it's switched to [Enabled], please set up the time of day — hour, minute, and second — for the system to wake up.

▶ **Advanced**

NCT6216D Super IO Configuration

Aptio Setup - American Megatrends International, LLC.		
Advanced		
NCT6216D Super IO Configuration		WatchDog Timer Unit Selection
Super IO Chip	NCT6216D	
WatchDog Timer Unit	[Second]	
SuperIO WatchDog Timer	0	
▶ Serial Port 1 Configuration		
▶ Serial Port 2 Configuration		
▶ Serial Port 3 Configuration		
▶ Serial Port 4 Configuration		
▶ Serial Port 5 Configuration		
▶ Serial Port 6 Configuration		→←: Select Screen ↑↓: Select Item Enter: Select +/- : Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.		

WatchDog Timer Unit

Select WatchDog Timer Unit — Second or Minute.

SuperIO WatchDog Timer

Set SuperIO WatchDog Timer Timeout value. The range is from 0 (disabled) to 255.

> **Note:**
> The sub-menus are detailed in following sections.

▶ **Advanced** ▶ **NCT6216D Super IO Configuration**

▶ Serial Port Configuration

```
                    Aptio Setup - American Megatrends International, LLC.
  ┌──────────┐
  │ Advanced │
  └──────────┘
  Serial Port 1 Configuration                                      Enable or Disable Serial
                                                                   Port (COM)
  Serial Port                          [Enabled]
  Device Settings                      IO=3F8h; IRQ=4;


                                                                   →←: Select Screen
                                                                   ↑↓: Select Item
                                                                   Enter: Select
                                                                   +/- : Change Opt.
                                                                   F1: General Help
                                                                   F2: Previous Values
                                                                   F9: Optimized Defaults
                                                                   F10: Save & Exit
                                                                   ESC: Exit


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```

Serial Port

Enable or disable the current serial COM port.

▶ **Advanced**

NCT6216D HW Monitor

```
                    Aptio Setup - American Megatrends International, LLC.
  ┌──────────┐
  │ Advanced │
  └──────────┘
  Pc Health Status                                                 Smart Fan function setting

  ▶ Smart Fan Function

  Case Open                            [Disabled]

  System temperature                   : +37 oC
  CPU temperature                      : +33 oC
  SYS_FAN                              : N/A
  CPU_FAN                              : 3470 RPM                  →←: Select Screen
  VBAT                                 : +3.040 V                  ↑↓: Select Item
  VCORE                                : +1.216 V                  Enter: Select
  +VDDQ                                : +1.200 V                  +/- : Change Opt.
  5V                                   : +4.998 V                  F1: General Help
  +12V                                 : +12.144 V                 F2: Previous Values
                                                                   F9: Optimized Defaults
                                                                   F10: Save & Exit
                                                                   ESC: Exit


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```

▶ Smart Fan Function

Smart FAN relevant controls, see next page.

Case Open

Enable or disable system intrusion alert.

▶ **Advanced** ▶ **NCT6216D HW Monitor**

▶ **Smart Fan Function**

```
Aptio Setup - American Megatrends International, LLC.
  Advanced

SYS_FAN                  <SMART FAN IV>                    Fan control mode select.
  Boundary 1             30
  Boundary 2             40
  Boundary 3             50
  Boundary 4             60
  Speed Count 1          35
  Speed Count 2          60
  Speed Count 3          80
  Speed Count 4          100
CPU_FAN                  [SMART FAN IV]
  Boundary 1             30
  Boundary 2             40
  Boundary 3             50                               →←: Select Screen
  Boundary 4             60                               ↑↓: Select Item
  Speed Count 1          35                               Enter: Select
  Speed Count 2          60                               +/- : Change Opt.
  Speed Count 3          80                               F1: General Help
  Speed Count 4          100                              F2: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit

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```

Smart Fan is a fan speed moderation strategy dependent on the current system temperature. When the system temperature goes higher than the Boundary setting, the fan speed will be turned up to the setting of the Fan Speed Count that bears the same index as the Boundary field.

▼ **Fan Control = [SMART FAN IV]**

Boundary 1 to Boundary 4

Set the boundary temperatures that determine the fan speeds accordingly, the value ranging from 0-127℃. For example, when the system temperature reaches Boundary 1 setting, the fan speed will be turned up to the designated speed of the Fan Speed Count 1 field.

Fan Speed Count 1 to Fan Speed Count 4

Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will operate according to the specified boundary temperatures above-mentioned.

▼ **Fan Control = [Manual Mode]**

Manual PWM

Set the fan speed, the value ranging from 1-100%, 100% being full speed. The fans will always operate at the specified speed regardless of gauged temperatures.

▶ **Advanced**

Serial Port Console Redirection

```
Aptio Setup - American Megatrends International, LLC.
  Advanced

COM1                                                      Console Redirection En-
  Console Redirection          [Enabled]                  able or Disable.
  ▶ Console Redirection Settings
COM2
  Console Redirection          [Disabled]
  ▶ Console Redirection Settings
COM3
  Console Redirection          [Disabled]
  ▶ Console Redirection Settings
COM4                                                      →←: Select Screen
  Console Redirection          [Disabled]                 ↑↓: Select Item
  ▶ Console Redirection Settings                          Enter: Select
COM5                                                      +/- : Change Opt.
  Console Redirection          [Disabled]                 F1: General Help
  ▶ Console Redirection Settings                          F2: Previous Values
COM6                                                      F9: Optimized Defaults
  Console Redirection          [Disabled]                 F10: Save & Exit
  ▶ Console Redirection Settings                          ESC: Exit

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```

Console Redirection

By enabling Console Redirection of a COM port, the sub-menu of console redirection settings will become available for configuration as detailed in the following.

▶ **Advanced** ▶ **Serial Port Console Redirection**

▶ **Console Redirection Settings**

```
                Aptio Setup - American Megatrends International, LLC.
   ┌─────────────┐
   │  Advanced   │
   └─────────────┘
   COM1                                                    Select Terminal Type
   Console Redirection Settings

   Terminal Type                    [VT100+]
   Bits per second                  [115200]
   Data Bits                        [8]
   Parity                           [None]
   Stop Bits                        [1]

                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/- : Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit

                Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.
```

Configure the serial settings of the current COM port.

Terminal Type

Select terminal type: VT100, VT100+, VT-UTF8 or ANSI.

Bits per second

Select serial port transmission speed: 9600, 19200, 38400, 57600 or 115200.

Data Bits

Select data bits: 7 bits or 8 bits.

Parity

Select parity bits: None, Even, Odd, Mark or Space.

Stop Bits

Select stop bits: 1 bit or 2 bits.

▶ **Advanced**

CPU Configuration

```
                Aptio Setup - American Megatrends International, LLC.
   ┌─────────────┐
   │  Advanced   │
   └─────────────┘
   CPU Configuration                                       When enabled, a VMM can
                                                           utilize the additional hard-
   PSS Support                      [Enabled]              ware capabilities provided
   NX Mode                          [Enabled]              by Vanderpool Technology.
   SVM Mode                         [Enabled]

                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/- : Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit
                                                           ESC: Exit

                Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.
```
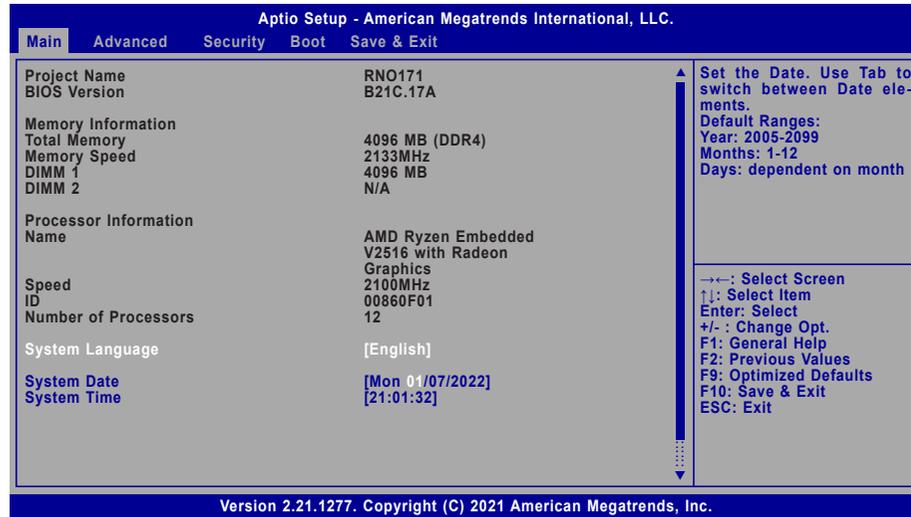
PSS Support

Enabled or disable the generation of ACPI _PPC, _PSS, and _PCT objects.

NX Mode

Enabled or disable no-execute page protection function.

SVM Mode

Enable or disable CPU Virtualizaiton.

▶ Advanced

SATA Configuration

```
                    Aptio Setup - American Megatrends International, LLC.
         Advanced

  SATA Configuration                                              Enable  or  disable  SATA
                                                                  controller.
  SATA Controller                    [Enabled]
  Port0:                             Not Present
  Port1:                             Not Present




                                                                  →←: Select Screen
                                                                  ↑↓: Select Item
                                                                  Enter: Select
                                                                  +/- : Change Opt.
                                                                  F1: General Help
                                                                  F2: Previous Values
                                                                  F9: Optimized Defaults
                                                                  F10: Save & Exit
                                                                  ESC: Exit


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```

SATA Controller

This field is used to enable or disable the Serial ATA controller.

▶ Advanced

USB Configuration

```
                    Aptio Setup - American Megatrends International, LLC.
   ┌──────────────┐
   │   Advanced   │
   └──────────────┘
   USB Configuration                                              This is a wordaround for
                                                                  OSes without XHCI hand-
   XHCI Hand-off                        [Enabled]                 off support. The XHCI own-
   USB Mass Storage Driver Support      [Enabled]                 ership change should be
                                                                  claimed by XHCI driver.


                                                                  →←: Select Screen
                                                                  ↑↓: Select Item
                                                                  Enter: Select
                                                                  +/- : Change Opt.
                                                                  F1: General Help
                                                                  F2: Previous Values
                                                                  F9: Optimized Defaults
                                                                  F10: Save & Exit
                                                                  ESC: Exit


                    Version 2.21.1277. Copyright (C) 2021 American Megatrends, Inc.
```

XHCI Hand-off

Enable or disable XHCI Hand-off.

USB Mass Storage Driver Support

Enable or disable USB Mass Storage Driver Support.

▶ Advanced

Network Stack Configuration

```
                    Aptio Setup - American Megatrends International, LLC.
   ┌──────────────┐
   │   Advanced   │
   └──────────────┘
   Network Stack                        [Enabled]                 Enable/Disable UEFI Net-
   Ipv4 PXE Support                     [Disabled]                work Stack
   Ipv6 PXE Support                     [Disabled]
   PXE boot wait time                   0
   Media detect count                   1


                                                                  →←: Select Screen
                                                                  ↑↓: Select Item
                                                                  Enter: Select
                                                                  +/- : Change Opt.
                                                                  F1: General Help
                                                                  F2: Previous Values
                                                                  F9: Optimized Defaults
                                                                  F10: Save & Exit
                                                                  ESC: Exit


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```

Network Stack

Enable or disable UEFI network stack. The following fields will appear when this field is enabled.

Ipv4 PXE Support

Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

Ipv6 PXE Support

Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

PXE boot wait time

Set the wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

Set the number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

▶ **Advanced**

USB Power Control

```
                        Aptio Setup - American Megatrends International, LLC.
        Advanced

USB2_1/2 USB3_1/2              [5V_Dual]
USB2_3/4 USB3_3/4             [5V_Dual]
USB2_5/6/9                    [5V_Dual]
USB2_7/8                      [5V_Dual]



                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/- : Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit
                                                    ESC: Exit



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```
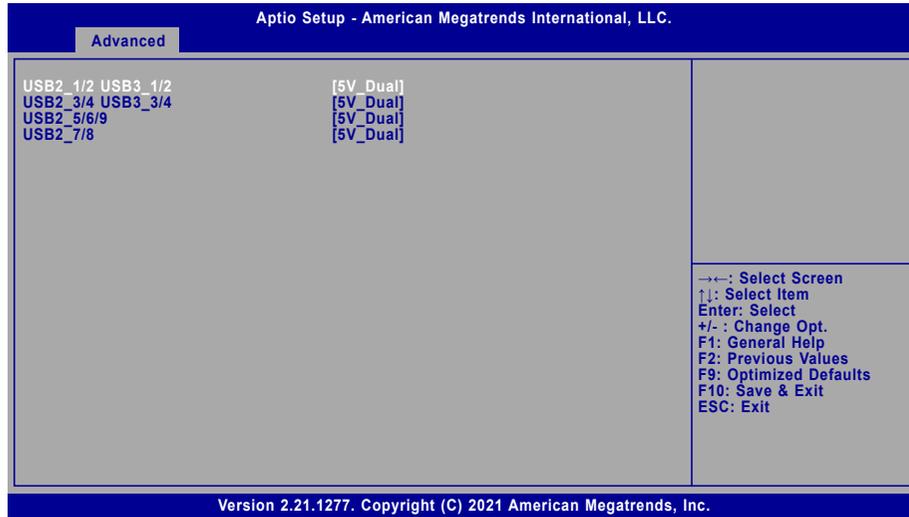
USB Ports

Switch the power output mode.

5V_Dual   Support system wake up from S3/S4 by USB keyboard and mouse.

5V   Doesn't support system wake up from S3/S4 by USB keyboard and mouse.

▶ **Security**

```
                    Aptio Setup - American Megatrends International, LLC.
  Main    Advanced   Chipset   Security   Boot   Save & Exit

  Password Description                              Set Administrator Pass-
                                                   word
  Minimum length              3
  Maximum length              20

  Administrator Password
  User Password

  ▶ Secure Boot
                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/- : Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

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```

Administrator Password

Set the administrator password. To clear the password, input nothing and press enter when a new password is asked. Administrator Password will be required when entering the BIOS.

▶ **Security**

Secure Boot

```
                    Aptio Setup - American Megatrends International, LLC.
                                                   Security

  System Mode             Setup                    Secure Boot activated
  Vendor Keys             Not Modified             when: Secure Boot is ena-
                                                   bled Platform Key(PK) is
  Secure Boot             [Disabled]               enrolled, System mode is
                          Not Active               User/Deployed, and CSM is
                                                   disabled
  Secure Boot Customization  [Custom]
  ▶ Restore Factory Keys
  ▶ Reset To Setup Mode
                                                   →←: Select Screen
  ▶ Key Management                                 ↑↓: Select Item
                                                   Enter: Select
                                                   +/- : Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit
                                                   ESC: Exit

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```

Secure Boot

The Secure Boot store a database of certificates in the firmware and only allows the OSes with authorized signatures to boot on the system. To activate Secure Boot, please make sure that "Secure Boot" is "[Enabled]", Platform Key (PK) is enrolled, "System Mode" is "User", and CSM is disabled. After enabling/disabling Secure Boot, please save the configuration and restart the system. When configured and activated correctly, the Secure Boot status will be "Active".

Secure Boot Customization

Select the secure boot mode — Standard or Custom. When set to Custom, the following fields will be configurable for the user to manually modify the key database.

Restore Factory Keys

Force system to User Mode. Load OEM-defined factory defaults of keys and databases onto the Secure Boot. Press Enter and a prompt will show up for you to confirm.

Reset To Setup Mode

Clear the database from the NVRAM, including all the keys and signatures installed in the Key Management menu. Press Enter and a prompt will show up for you to confirm.

▶ Security   ▶ Secure Boot

▶ Key Management

```
┌─────────────────────────────────────────────────────────────────────────────────┐
│              Aptio Setup - American Megatrends International, LLC.                 │
│  ┌──────────┐                                                                      │
│  │ Security │                                                                      │
│ ─┴──────────┴──────────────────────────────────────────────────────────────────── │
│                                                                                    │
│   Factory Key Provision              [Disabled]          Provision factory default│
│   ▶ Restore Factory Keys                                 keys on next re-boot only │
│   ▶ Reset To Setup Mode                                  when System in Setup      │
│   ▶ Export Secure Boot variables                         Mode                      │
│   ▶ Enroll Efi Image                                                               │
│                                                                                    │
│   Device Guard Ready                                                               │
│   ▶ Remove 'UEFI CA' from DB                                                       │
│   ▶ Restore DB defaults                                                            │
│                                                                                    │
│   Secure Boot variable   |Size|Keys| Key Source                                    │
│   ▶ Platform Key(PK)     |  0 |  0 | No         →←: Select Screen                  │
│   ▶ Key Exchange Keys    |  0 |  0 | No         ↑↓: Select Item                    │
│   ▶ Authorized Signatures|  0 |  0 | No         Enter: Select                      │
│   ▶ Forbidden Signatures |  0 |  0 | No         +/- : Change Opt.                  │
│   ▶ Authorized TimeStamps|  0 |  0 | No         F1: General Help                   │
│   ▶ OsRecovery Signatures|  0 |  0 | No         F2: Previous Values                │
│                                                 F9: Optimized Defaults             │
│                                                 F10: Save & Exit                   │
│                                                 ESC: Exit                          │
│                                                                                    │
│ ─────────────────────────────────────────────────────────────────────────────────│
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└─────────────────────────────────────────────────────────────────────────────────┘
```
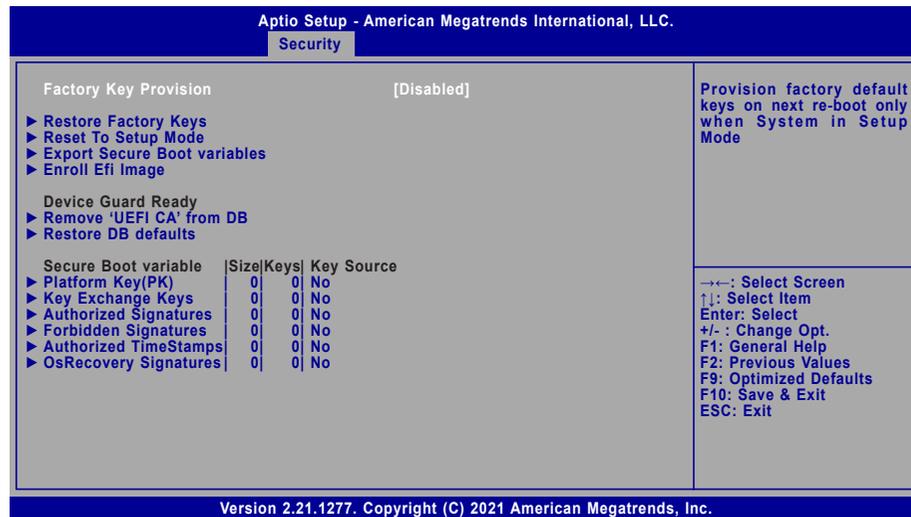
Factory Key Provision

Enable or disable the provision factory default keys on next re-start. This will only take place when the "System Mode" in the previous menu is in "Setup", which can be achieved by moveing the cursor to the "Reset To Setup Mode" and press Enter.

Restore Factory Keys

Force system to User Mode. Configure NVRAM to contain OEM-defined factory default Secure Boot keys.

Reset To Setup Mode

Clear the database from the NVRAM, including all the keys and signatures installed in the Key Management menu. Press Enter and a prompt will show up for you to confirm.

Export Secure Boot variables

Export the Secure Boot settings (i.e. all keys and signatures) as files to the root directory of a file system device. Press Enter and select a storage device listed in the pop-up menu. The saved files will be named automatically according to the type of key/signature as listed below.

- "PK" for Platform Keys
- "KEK" for Key Exchange Keys
- "db" for Authorized Signatures
- "dbx" for Forbidden Signatures

Enroll Efi Image

Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db). Press Enter and select a storage device listed in the pop-up menu, select a directory, and then select the EFI Image document.

Remove 'UEFI CA' from DB

Remove Microsoft UEFI CA from the Authorized Signature database. For systems that support Device Guard, Microsoft UEFI CA must NOT be included in the Authorized Signature database.

Restore DB defaults

Press Enter to restore the database variable to factory defaults.

Manually configure the following keys and signatures. Move the cursor to the field and press Enter, and then a pop-up menu will show up.

Platform Key(PK), Key Exchange Keys, Authorized Signatures, Forbidden Signatures, Authorized TimeStamps, OsRecovery Signatures

Details	List the information of enrolled keys and signatures
Export	Save the key or signature as a file to the root directory of a file system. The saved files will be named automatically according to the type of key/signature as previously listed in the "Export Secure Boot Variables".
Update	Load factory default database
Append	Enroll keys and signatures from a file system
Delete	Delet keys and signatures

▶ **Boot**

```
                    Aptio Setup - American Megatrends International, LLC.
  Main   Advanced   Chipset   Security   Boot   Save & Exit

  Boot Configuration                                      The number of seconds
  Setup Prompt Timeout              1                     that the firmware will wait
  Bootup NumLock State              [Off]                 before booting the original
  Quiet Boot                        [Enabled]             default boot selection.

  Boot Option Priorities


                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/- : Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit

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```

Setup Prompt Timeout

Set the number of seconds to wait for the setup activation key. 65535 (0xFFFF) denotes indefinite waiting.

Bootup NumLock State
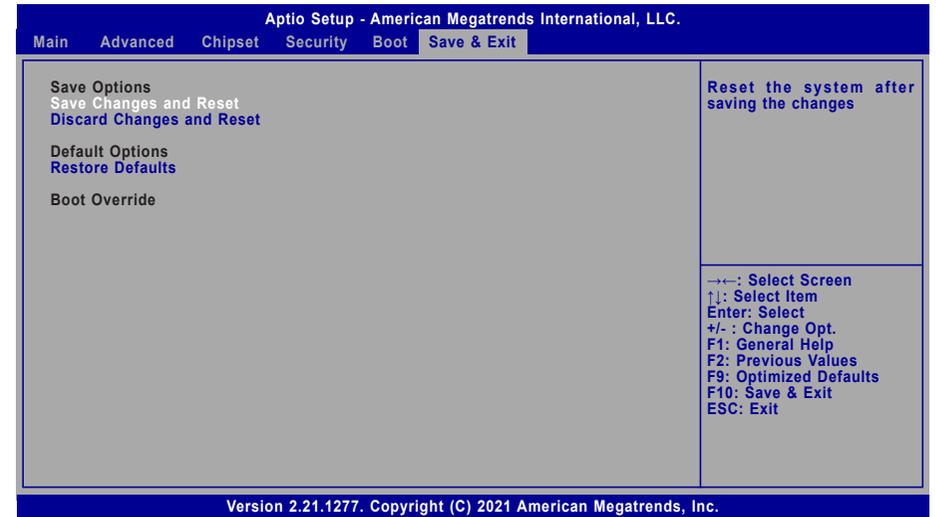
Select the keyboard NumLock state: On or Off.

Quiet Boot

This section is used to enable or disable quiet boot option.

Boot Option Priorities

Rearrange the system boot order of available boot devices.

▶ **Save & Exit**

```
                    Aptio Setup - American Megatrends International, LLC.
  Main   Advanced   Chipset   Security   Boot   Save & Exit

  Save Options                                            Reset the system after
  Save Changes and Reset                                  saving the changes
  Discard Changes and Reset

  Default Options
  Restore Defaults

  Boot Override


                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/- : Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit
                                                          ESC: Exit

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```

Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

Boot Override

Move the cursor to an available boot device and press Enter, and then the system will immediately boot from the selected boot device. The Boot Override function will only be effective for the current boot. The "Boot Option Priorities" configured in the Boot menu will not be changed.

▶ Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility. For updating AMI BIOS in UEFI mode, you may refer to the how-to video at https://www.dfi.com/Knowledge/Video/5.

▶ Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.

2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.

3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.

> **Note:**
> a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
> b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.