



GH171

Mini-ITX Industrial Motherboard

User's Manual

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Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

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.

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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 consequential 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 GH171 motherboard
- I/O shield
- Cooler

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to 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

- SATA signal and power cable (Length: 300mm)

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance to 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

Before using the system board, prepare basic system components.

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

- Memory module
- Storage devices such as hard disk drive, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

Specifications

SYSTEM	Processor	AMD® Ryzen™ Embedded V1807B, 4C/8T, 2MB Cache, 11 CU, 3.35GHz (3.8GHz), 45W (35-54W) AMD® Ryzen™ Embedded V1756B, 4C/8T, 2MB Cache, 8 CU, 3.25GHz (3.6GHz), 45W (35-54W) AMD® Ryzen™ Embedded V1605B, 4C/8T, 2MB Cache, 8 CU, 2.0GHz (3.6GHz), 15W (12-25W) AMD® Ryzen™ Embedded V1202B, 2C/4T, 1MB Cache, 3 CU, 2.3GHz (3.2GHz), 15W (12-25W) AMD® Ryzen™ Embedded R1606G, 2C/4T, 3 CU, 2.6GHz (3.5GHz), 15W AMD® Ryzen™ Embedded R1505G, 2C/4T, 3 CU, 2.4GHz (3.3GHz), 15W AMD® Ryzen™ Embedded R2312, 3C/4T, 2MB Cache, 3CU, 2.7GHz (3.5GHz), 12~25W AMD® Ryzen™ Embedded R2314, 6C/12T, 4MB Cache, 6 CU, 2.1GHz (3.5GHz), 12~35W AMD® Ryzen™ Embedded R2514, 6C/12T, 4MB Cache, 8 CU, 2.1GHz (3.7GHz), 12~35W AMD® Ryzen™ Embedded R2544, 4C/8T, 4MB Cache, 8 CU, 3.35GHz (3.7GHz), 35~54W
	Memory	Two 260-pin SODIMM up to 32GB Dual Channel DDR4 up to 3200MHz
	BIOS	AMI BIOS
GRAPHICS	Controller	AMD® Radeon™ Vega Graphics
	Feature	OpenGL 4.5, 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 signal), (x4 signal with R1000) 1 x M.2 M Key (2280 PCIe x4), (x2 signal with R1000)
AUDIO	Audio Codec	Realtek Audio Codec with 5.1 Channel Support
ETHERNET	Controller	2 x Realtek Ethernet LAN Controller
REAR I/O	Ethernet	2 x GbE (RJ-45)
	USB	2 x USB 3.0 2 x USB 2.0
	Display	4 x DP++ (V1000) 3 x DP++ (R1000)
	Audio	1 x Mic-in 1 x Line-in 1 x Line-out
	Serial	1 x RS-232/422/485 (DB-9) 1 x RS-232 (DB-9)

INTERNAL I/O	Serial	4 x RS-232 (2.0mm pitch) (TX/RX signal only)
	USB	4 x USB 2.0 (2.54mm pitch) 1 x Vertical Type A USB 3.0 (V1000), 1 x Vertical Type A USB 2.0 (R1000)
	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 for 2.5"/3.5" HDD/SSD
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	TPM1.2/2.0
POWER	Type	Single 12V DC
	Connector	4-pin Vertical Type Connector (default) 4-pin Right Angle Type Connector (optional) DC-In Jack (optional)
	RTC Battery	CR2032 Coin Cell
OS SUPPORT	Microsoft /Linux	Windows 10 Ubuntu 18.04LTS
ENVIRONMENT	Temperature	Operating: 0 to 60°C Storage: -40 to 85°C
	Humidity	Operating: 10 to 90% RH Storage: 10 to 90% RH
MECHANICAL	Dimensions	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 at a lower power than DDR3/DDR2.

• Graphics

The integrated AMD® Radeon™ dual graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports 4 DP++ interfaces for display outputs.

• PCI Express

PCI Express is a high bandwidth I/O infrastructure that possesses the ability to scale speeds by forming multiple lanes. The PCI Express architecture also supports high performance graphics infrastructure by enhancing the capability of a PCIe x16 Gen 3 at 16GB/s bandwidth (8GB/s in each direction).

• 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.

• Audio

The Realtek audio codec provides 5.1-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.

• RTC Timer

The RTC installed on the system board allows your system to automatically power-on on the set date and time.

• 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

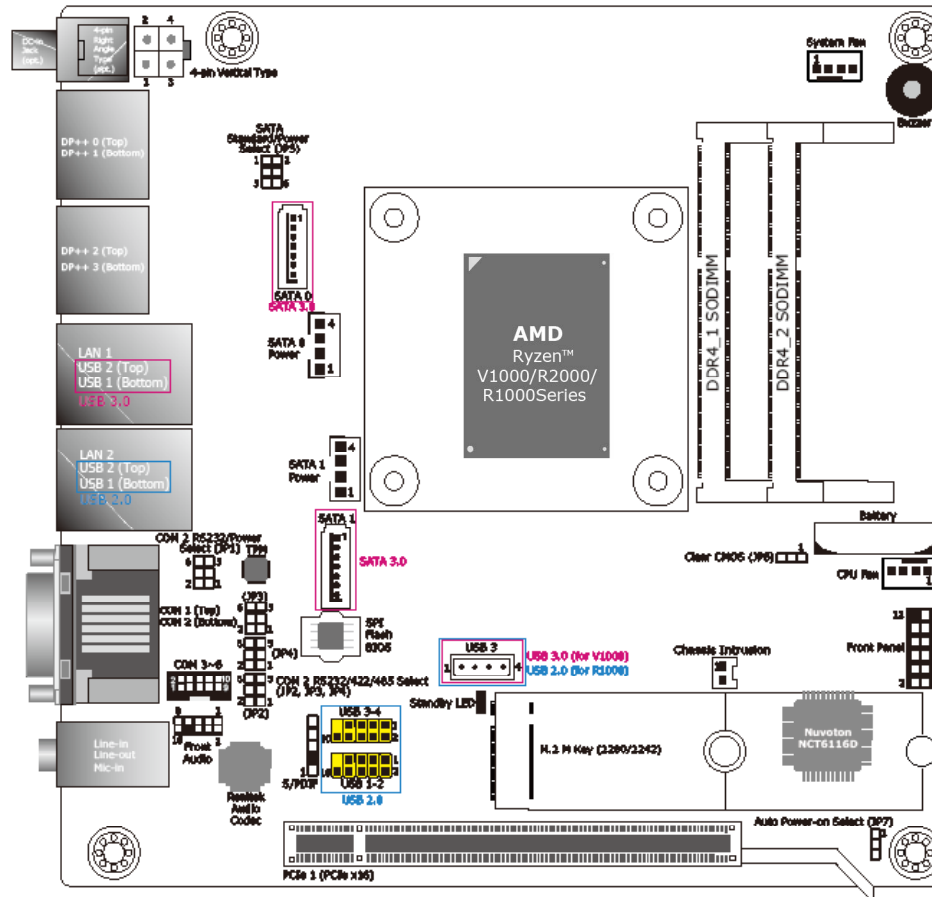
When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

• USB

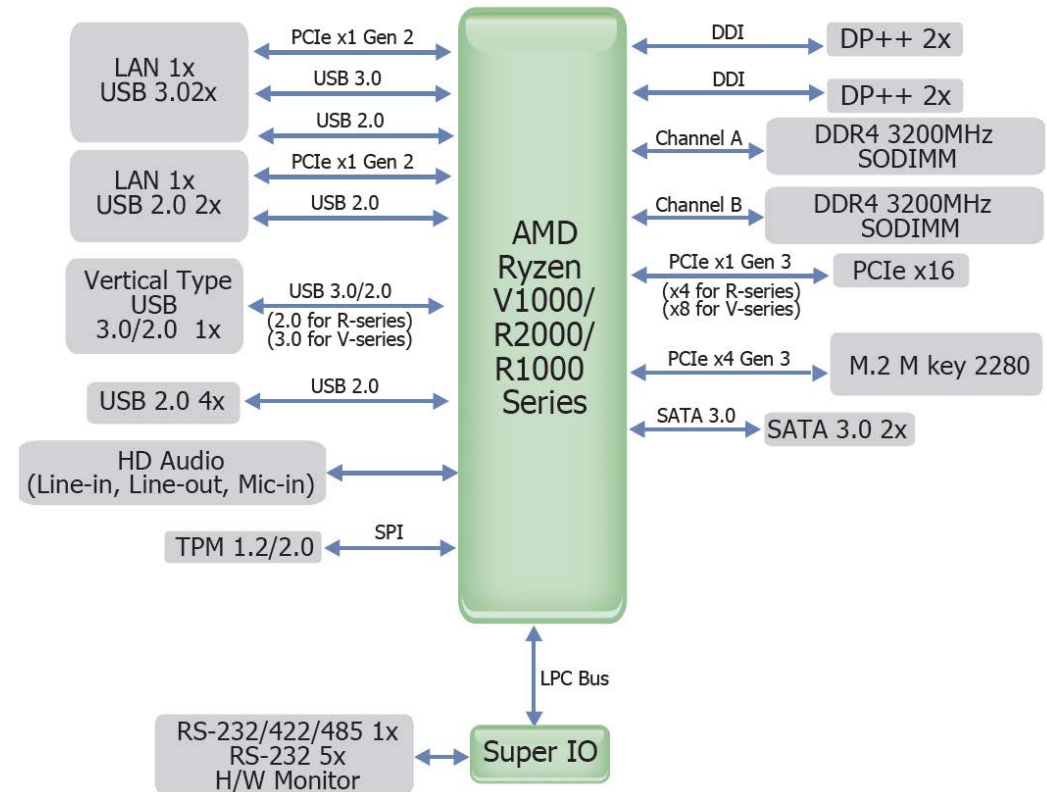
The system board supports the USB 3.0. It is capable of running at a maximum transmission speed of up to 5 Gbit/s (625 MB/s) and is faster than USB 2.0 (480 Mbit/s, or 60 MB/s) and USB 1.1 (12Mb/s). USB 3.0 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

Chapter 2 - Hardware Installation

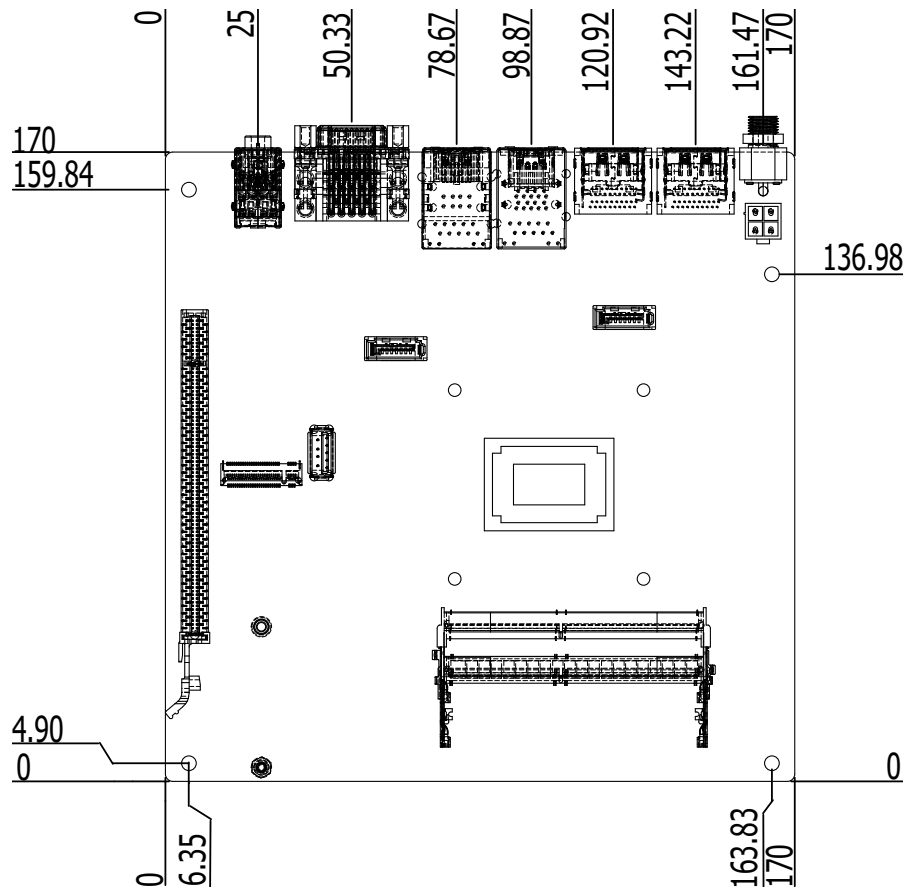
Board Layout



Block Diagram



Mechanical Diagram



Important:

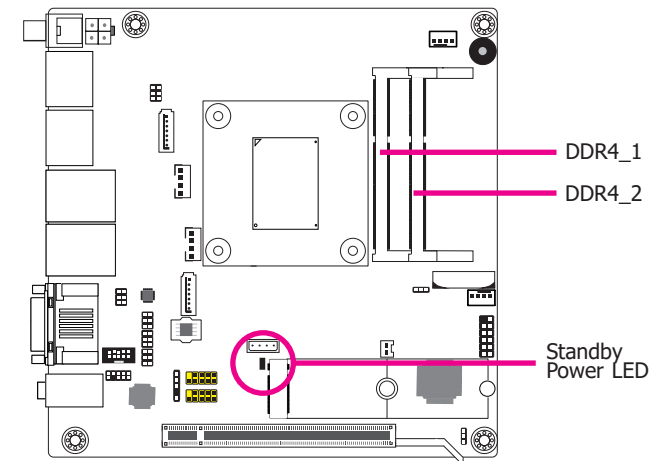
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to 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.



Important:

When the Standby Power LED lights red, it indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

System Memory



Features

- Two 260-pin SODIMM up to 32GB
- Dual Channel DDR4 up to 3200MHz

The system board supports the following memory interface.

Single Channel (SC)

Data will be accessed in chunks of 64 bits (8 Bytes) 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.

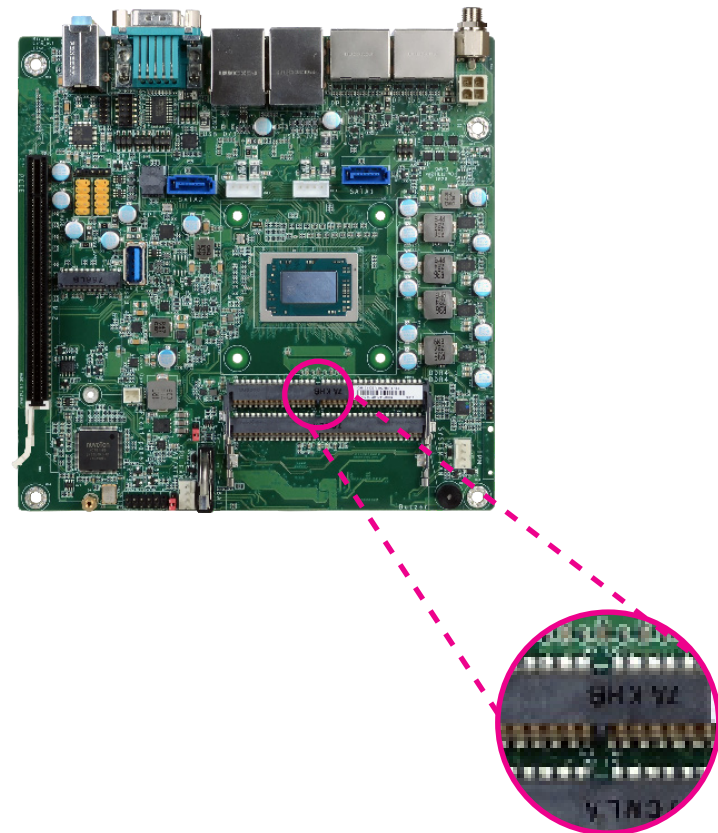
Installing the SODIMM Module



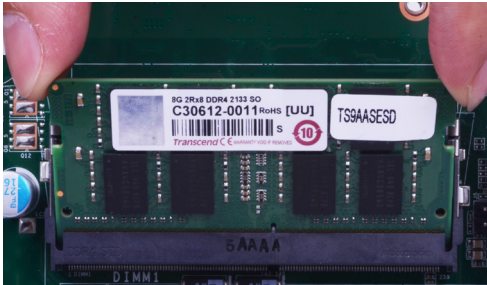
Note:

The system board used in the following illustrations may not resemble the actual board. These illustrations are for reference only.

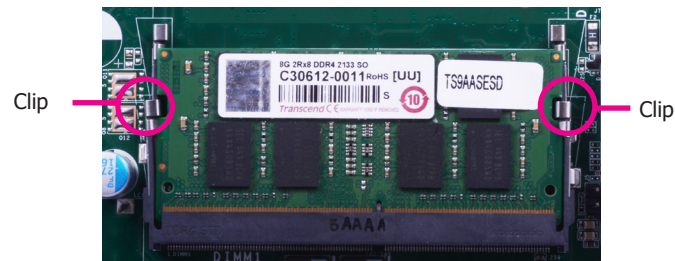
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the SODIMM socket on the system board.
4. Note the key on the socket. The key ensures the module can be plugged into the socket in only one direction.



- Grasping the module by its edges, align the module into the socket at an approximately 30 degrees angle. Apply firm even pressure to each end of the module until it slips down into the socket. The contact fingers on the edge of the module will almost completely disappear inside the socket.

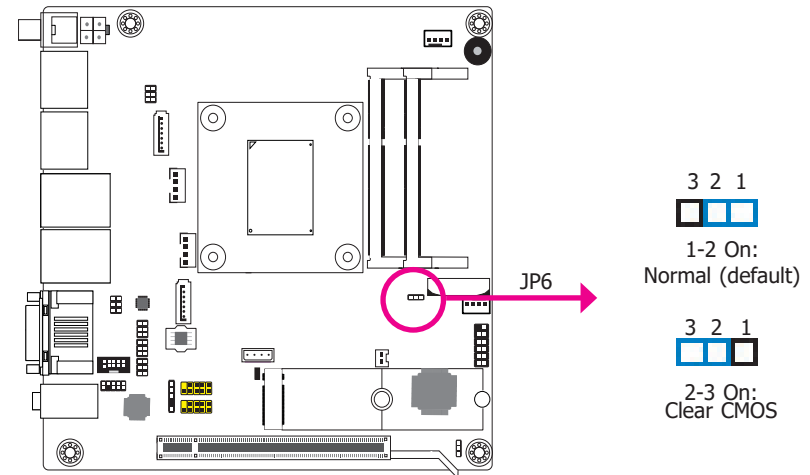


- Push down the module until the clips at each end of the socket lock into position. You will hear a distinctive “click”, indicating the module is correctly locked into position.



Jumper Settings

Clear CMOS

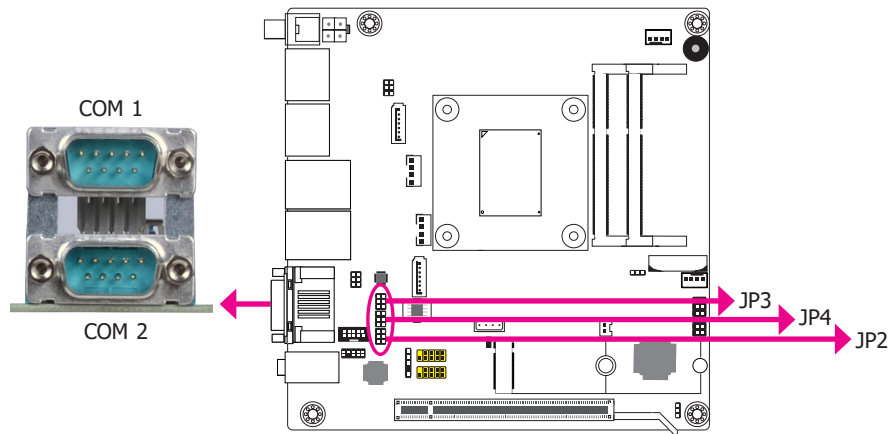


If you encounter that CMOS data becomes corrupted, you can reconfigure the system with the default values stored in the ROM BIOS.

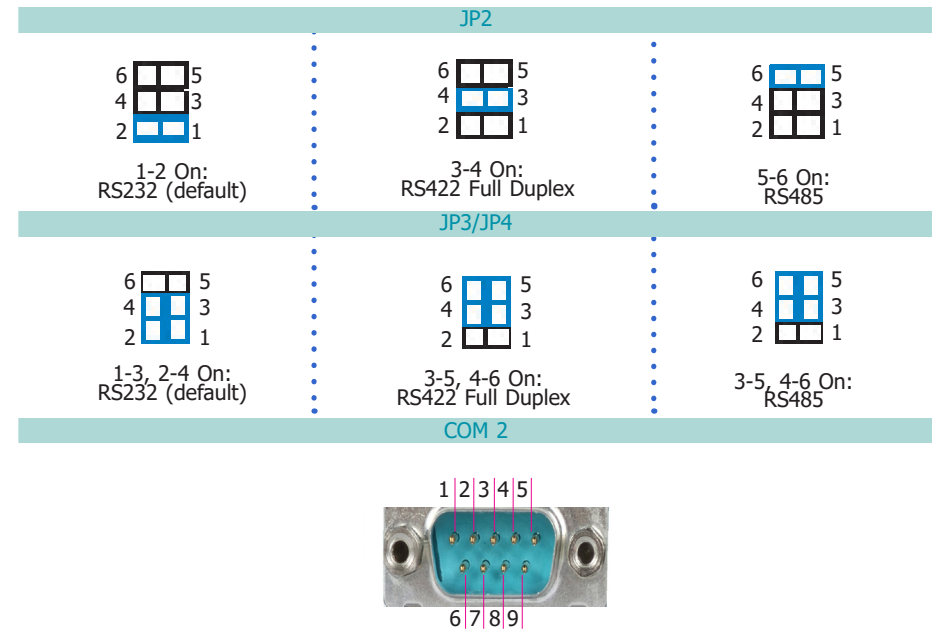
To load the default values stored in the ROM BIOS, please follow the steps below.

- Power-off the system and unplug the power cord.
- Set JP6 pins 2 and 3 to On. Wait for a few seconds and set JP6 back to its default setting, pins 1 and 2 On.
- Now plug the power cord and power-on the system.

COM 2 RS232/422/485 Select

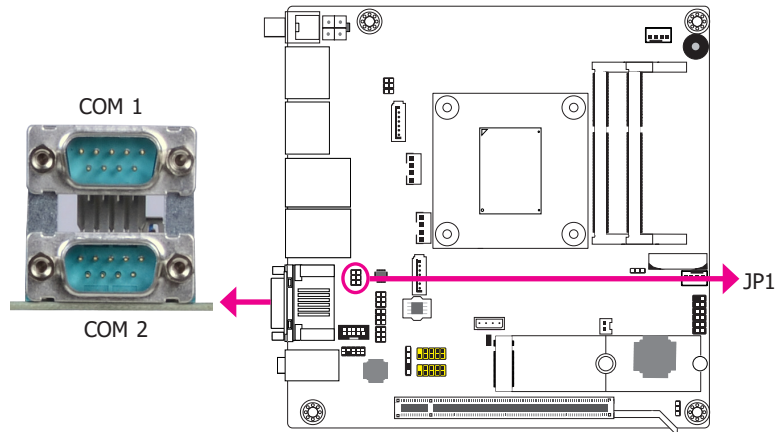


JP2/JP3/JP4 are used to configure the COM port 2 to RS232, RS422 (Full Duplex) or RS485. When COM 2 RS232/422/485 is selected, JP3 and JP4 must be set in accordance to JP2. The pin functions of the COM port 2 will vary according to the jumpers' setting.

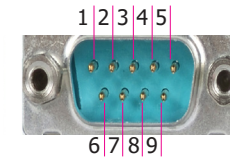
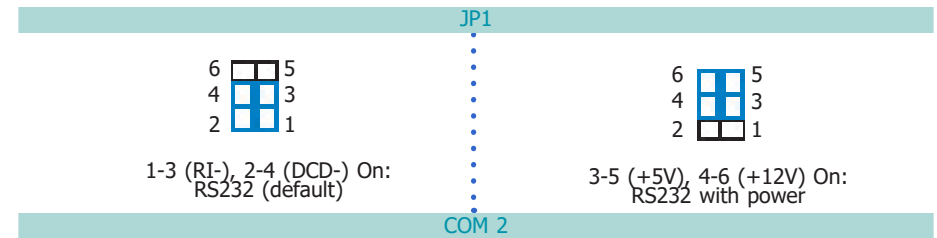


Pin	RS232	RS422 Full Duplex	RS485
1	DCD-	RX+	DATA+
2	RD	RX-	DATA-
3	TD	TX+	NC
4	DTR-	TX-	NC
5	GND	GND	GND
6	DSR-	NC	NC
7	RTS-	NC	NC
8	CTS-	NC	NC
9	RI-	NC	NC

COM 2 RS232/Power Select

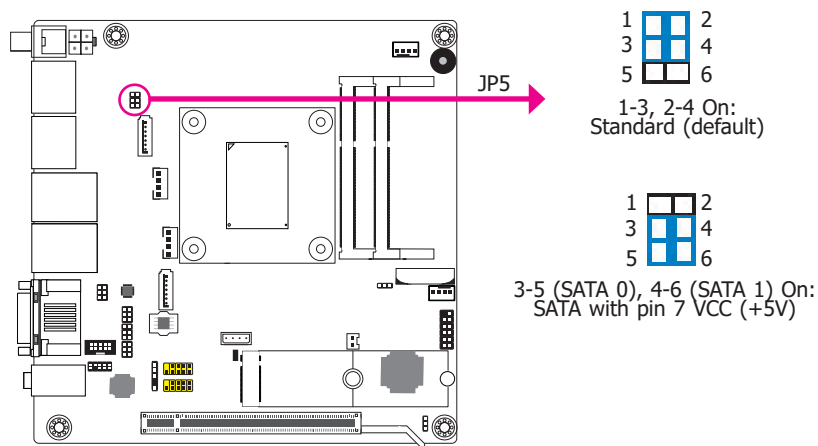


JP1 is used to configure Serial COM port 2 to pure RS232 or RS232 with power. The pin functions of COM 2 will vary according to JP1's setting.



Pin	RS232	RS232 with power
1	DCD-	+12V
2	RD	RD
3	TD	TD
4	DTR-	DTR-
5	GND	GND
6	DSR-	DSR-
7	RTS-	RTS-
8	CTS-	CTS-
9	RI-	+5V

SATA Standard/Power Select

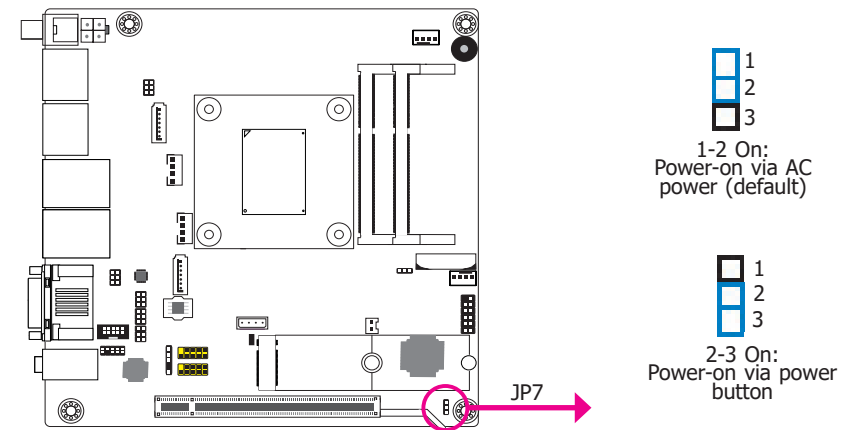


JP5 is used to select the standard SATA or SATA with power.

**Important:**

SATA with power is only compatible with storage devices such as SATA Disk-on-module that require power supply via Pin 7. For standard SATA storage devices, power is supplied via an extra cable, in which case SATA with pin 7 VCC shall not be configured. Mis-configuration may cause irreversible damage to your storage device.

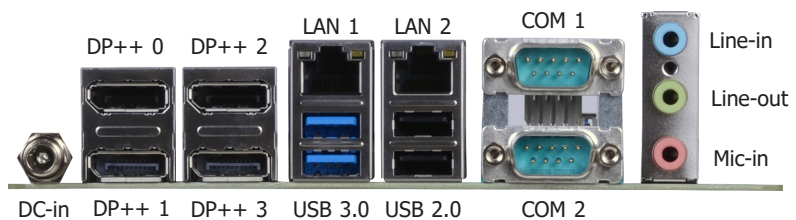
Auto Power-on Select



JP7 is used to select the method of powering on the system. If you want the system to power-on whenever AC power comes in, set JP7 pin 1 and pin 2 to On. If you want to use the power button, set pin 2 and pin 3 to On.

When using the JP7 "Power On" feature to power the system back on after a power failure occurs, the system may not power on if the power lost is resumed within 5 seconds (power flicker).

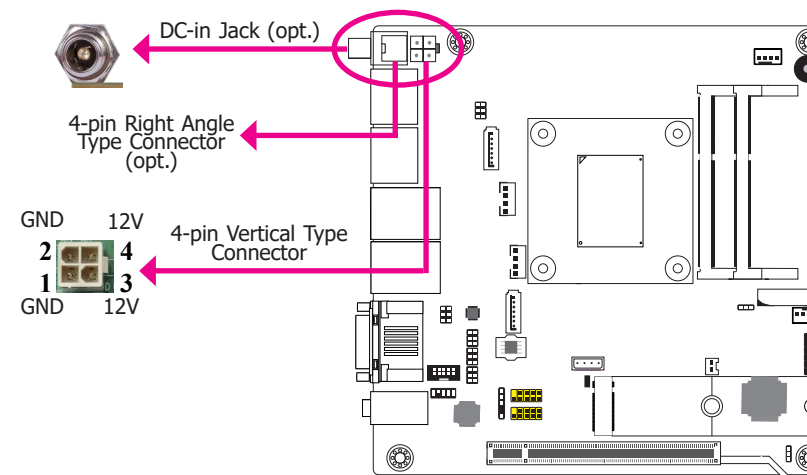
Rear Panel I/O Ports



The rear panel I/O ports consist of the following:

- 1 DC-in
- 4 DP++ ports
- 2 GbE (RJ-45)
- 2 USB 3.0 ports
- 2 USB 2.0 ports
- 2 Serial COM ports
- 1 Line-in jack
- 1 Line-out jack
- 1 Mic-in jack

12V DC-in

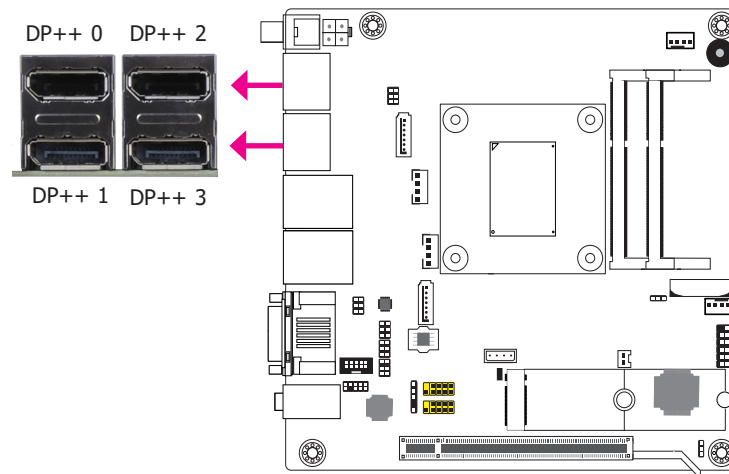


The system board is equipped with 4-pin vertical type connector (default). The DC-in jack or 4-pin right angle type connector is available upon request. Connect a DC power cord to the jack or the connector. Using a voltage more than the recommended range may fail to boot the system or cause damage to the system board.

Graphics Interface

The display ports consist of the following:

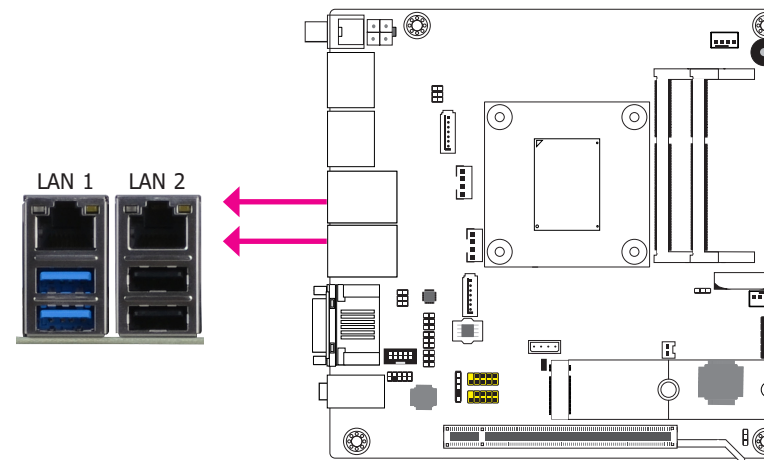
- 4 DP++



DP++

The DisplayPort 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.

RJ45 LAN Ports



Features

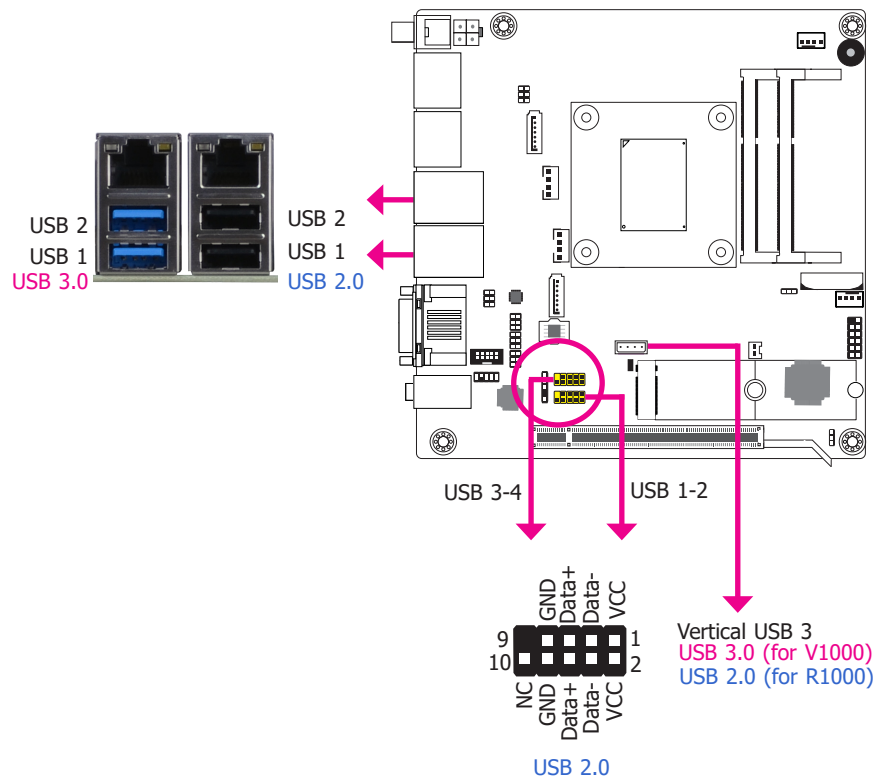
- Two Realtek Ethernet LAN Controllers

The LAN port allows the system board to connect to a local area network by means of a network hub.

BIOS Setting

Configure the onboard LAN ports in the Advanced menu ("ACPI Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

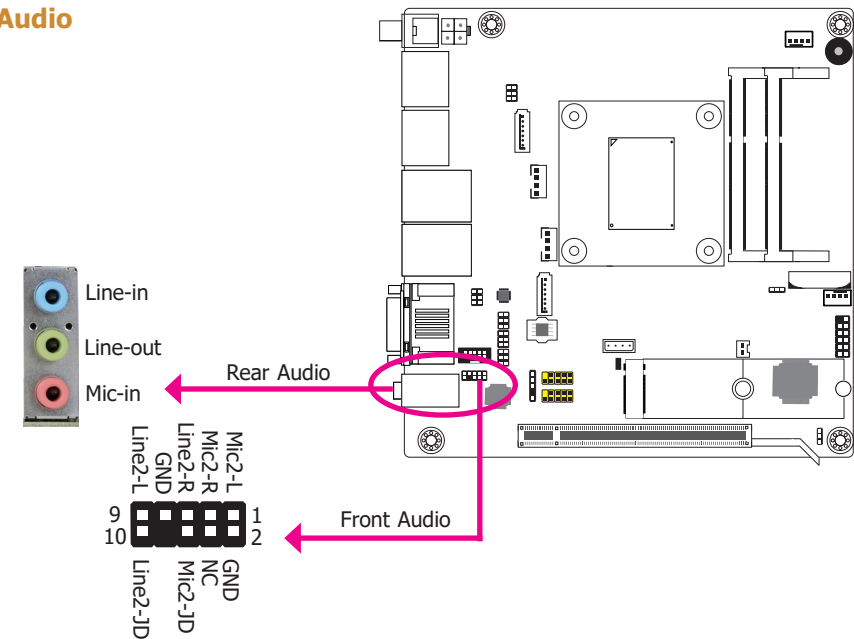
USB Ports



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

The system board is equipped with two onboard USB 3.0 ports (USB 1-2) and two onboard USB 2.0 ports (USB 1-2) at the rear panel I/O ports. The 10-pin connectors allow you to connect 4 additional USB 2.0 ports (USB 1-2/3-4). The additional USB ports may be mounted on 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.

Audio



Rear Audio

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.

Front Audio

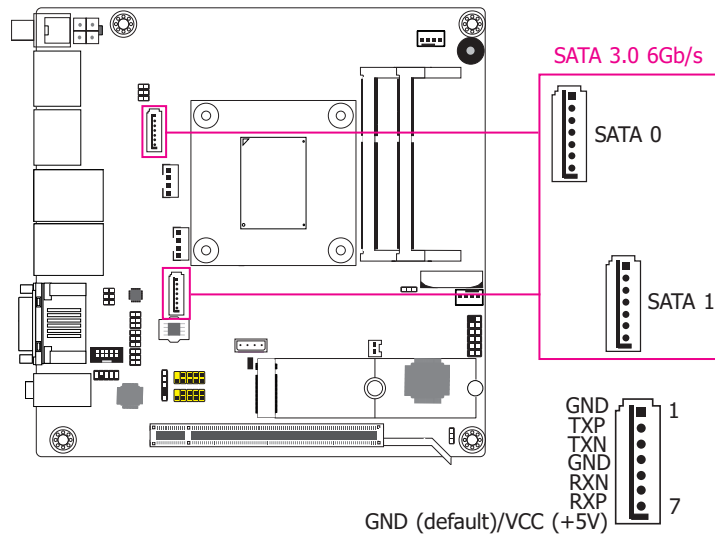
The front audio connector allows you to connect to the second line-out and mic-in jacks that are at the front panel of your system.

BIOS Setting

Configure these onboard Audio devices in the Advanced menu ("AMD CHIPSET Setting" > "GFX Configuration" > "NB Azalia") of the BIOS. Refer to the chapter 3 for more information.

I/O Connectors

SATA (Serial ATA) Connectors



Features

- 2 Serial ATA 3.0 ports with data transfer rate up to 6Gb/s (SATA 0 and SATA 1)
- Integrated Advanced Host Controller Interface (AHCI) controller

The Serial ATA connectors are used to connect Serial ATA devices. Connect one end of the Serial ATA data cable to a SATA connector and the other end to your Serial ATA device.

Jumper Setting

JP5 is used to select the standard SATA or SATA with power. Refer to "SATA Standard/Power Select" in this chapter for more information.



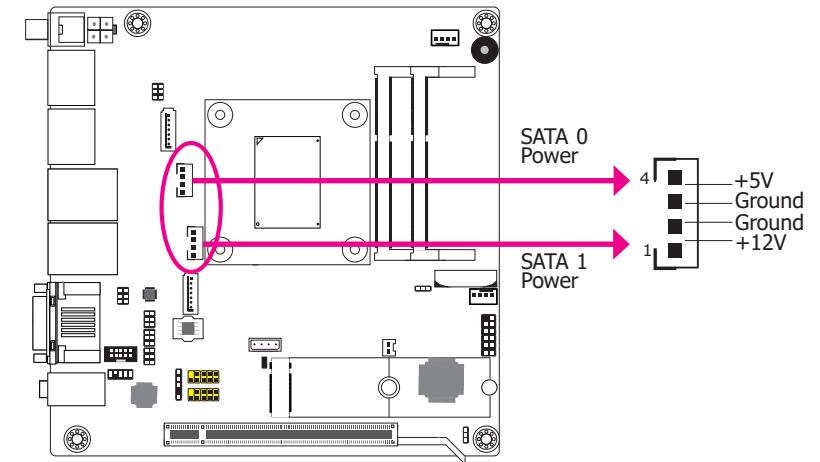
Important:

SATA with power is only compatible with storage devices such as SATA Disk-on-module that require power supply via Pin 7. For standard SATA storage devices, power is supplied via an extra cable, in which case SATA with pin 7 VCC shall not be configured. Mis-configuration may cause irreversible damage to your storage device.

BIOS Setting

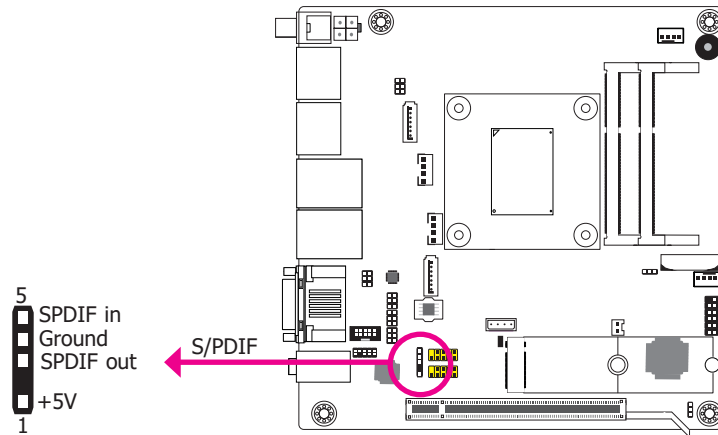
Configure the Serial ATA drives in the Advanced menu ("AMD CHIPSET Setting" > "SATA Configuration Options") of the BIOS. Refer to the chapter 3 for more information.

SATA (Serial ATA) Power Connectors



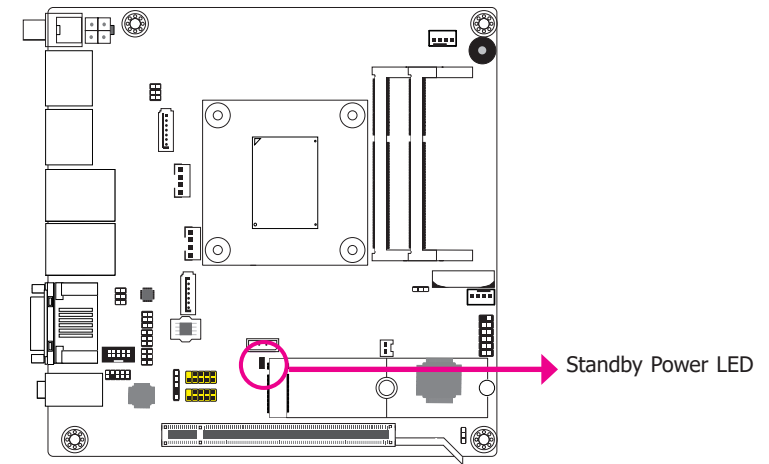
The SATA power connectors supply power to the SATA drive. Connect one end of the provided power cable to the SATA power connector and the other end to your storage device.

S/PDIF Connector



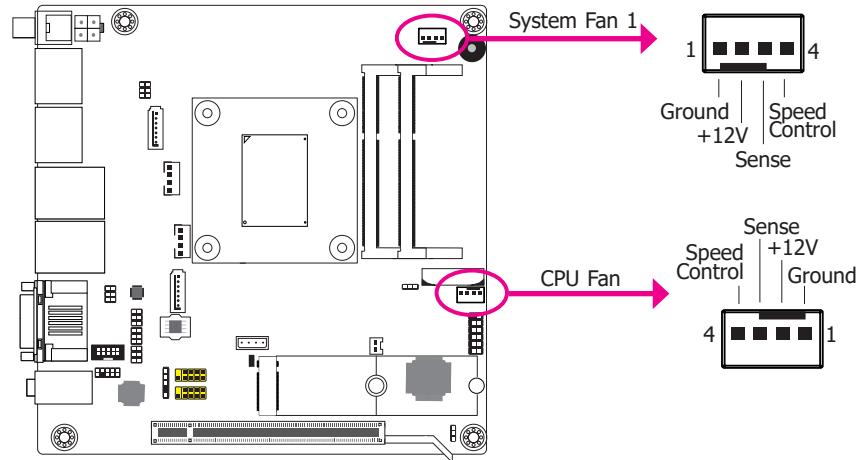
The S/PDIF connector is used to connect an external S/PDIF port. Your S/PDIF port may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then connect the audio cable to the S/PDIF connector. Make sure pin 1 of the audio cable is aligned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

Standby Power LED



This LED will lit red when the system is in the standby mode. It indicates that there is power on the system board. Power-off the PC and then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

Cooling Fan Connectors

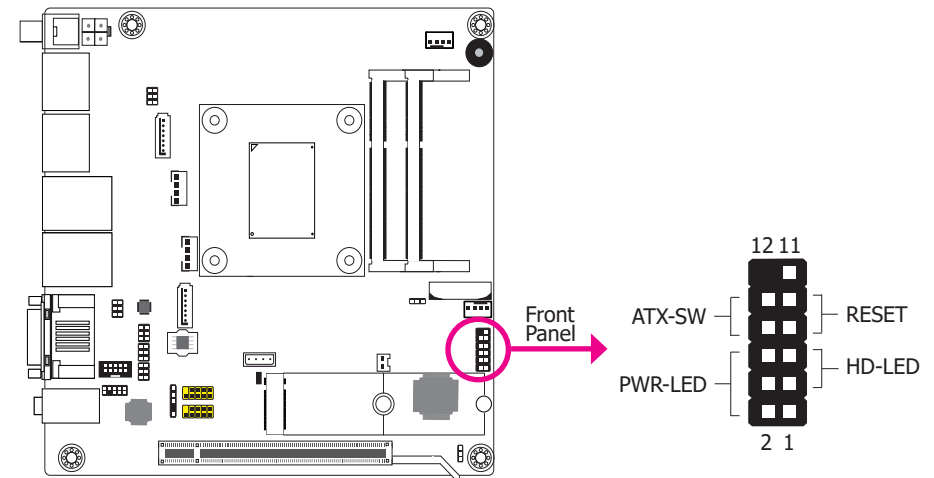


The fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components.

BIOS Setting

Configure the cooling fans in the Advanced menu ("NCT6116D HW Monitor" submenu) of the BIOS. Refer to the chapter 3 for more information.

Front Panel Connector



HD-LED - Hard Drive LED

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

RESET - Reset Switch

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

ATX-SW - Power Switch

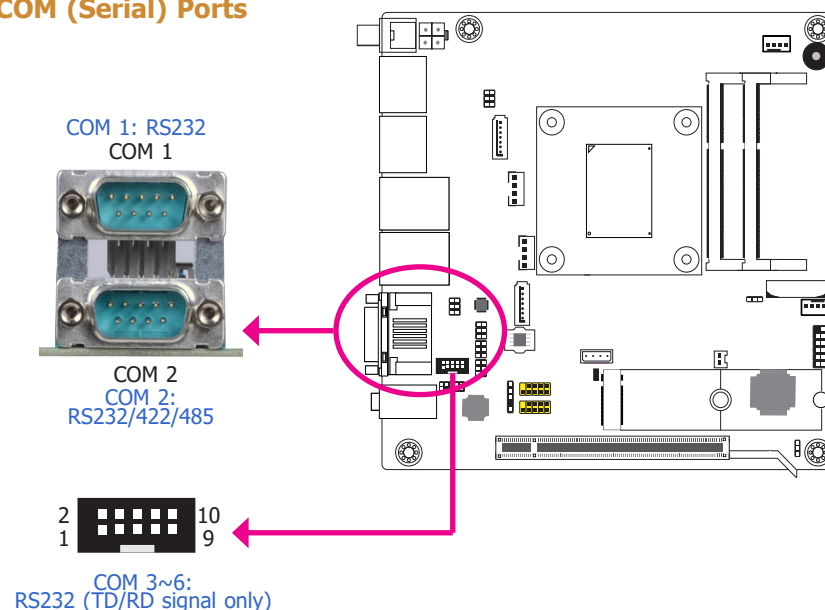
This switch is used to power on or off the system.

PWR-LED - Power/Standby LED

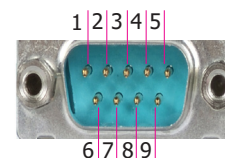
When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

	Pin	Function		Pin	Function
HD-LED	1	NC	PWR-LED	2	LED Power
	3	HDD Power		4	LED Power
	5	Signal		6	Signal
RESET	7	GND	ATX-SW	8	GND
	9	Signal		10	Signal
	11	NC		12	---

COM (Serial) Ports



COM 1



Pin	Assignment
1	DCD-
2	RD
3	TD
4	DTR-
5	GND
6	DSR-
7	RTS-
8	CTS-
9	RI-

COM 3~6



Pin	Assignment	Pin	Assignment
1	TD3	2	TD4
3	RD3	4	RD4
5	GND	6	GND
7	TD5	8	TD6
9	RD5	10	RD6

COM 1 and COM 3 to COM 6 are fixed at RS232. The pin functions are listed at right.

COM 2 can be selected among RS232, RS422 and RS485. The pin functions of COM 2 port will vary according to settings of JP1, JP2, JP3 and JP4. Refer to "COM2 RS232/422/485 Select" and "COM2 RS232/Power Select" in this chapter for more information.

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.

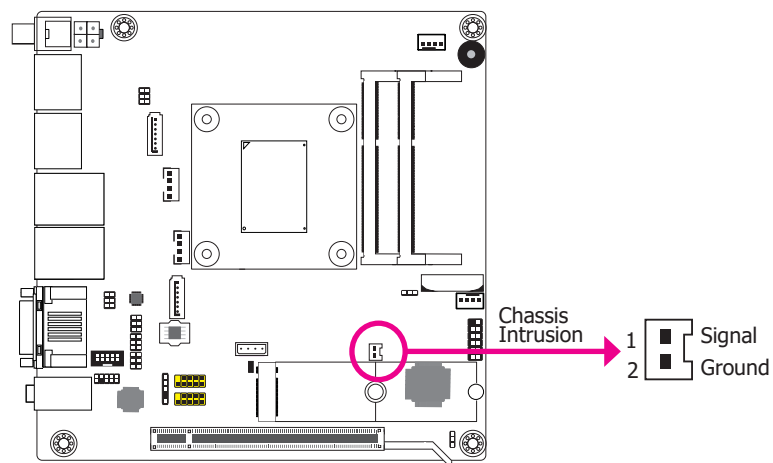
Connecting External Serial Ports

Your COM port may come mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis then insert the serial port cable to the COM connector. Make sure the colored stripe on the ribbon cable is aligned with pin 1 of the COM connector.

BIOS Setting

Configure the serial COM ports in the Advanced menu ("NCT6116D Super IO Configuration" submenu) of the BIOS. Refer to the chapter 3 for more information.

Chassis Intrusion Connector

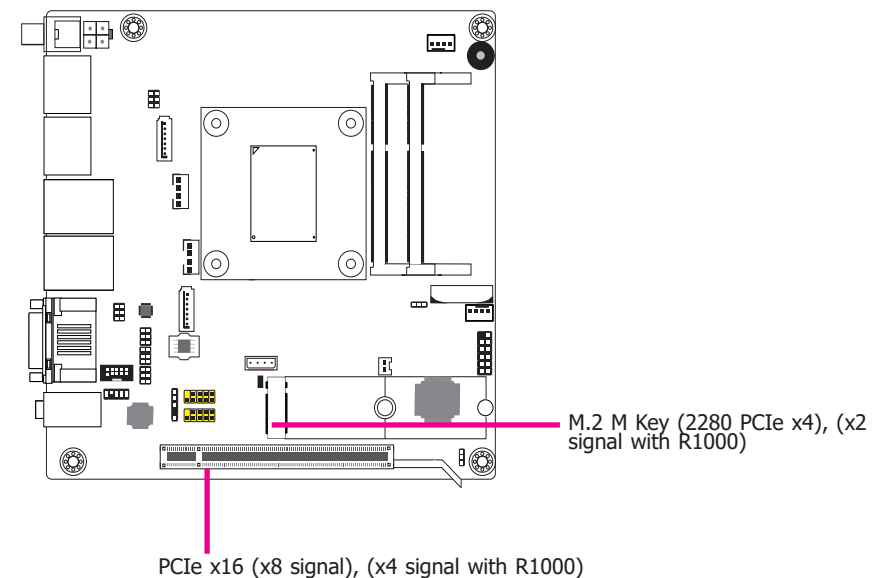


The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

BIOS Setting

Configure the chassis intrusion detection function in the Advanced menu ("NCT6116D Super IO Configuration" > "Case Open") of the BIOS. Refer to the chapter 3 for more information.

Expansion Slots



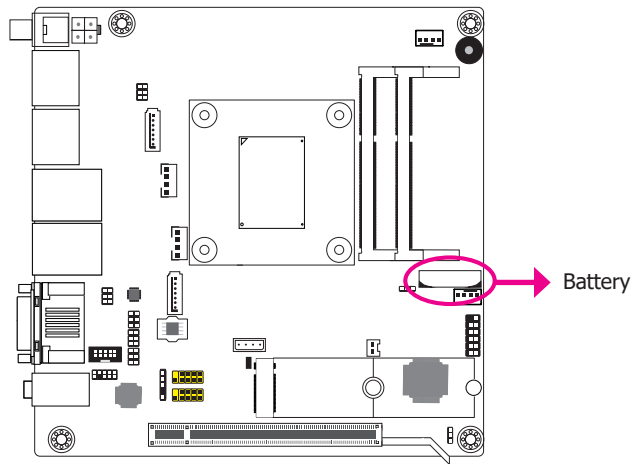
M.2 M key Socket

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.

PCI Express x16 Slot

Install PCI Express x16 graphics card, that comply to the PCI Express specifications, into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card above the slot then press it down firmly until it is completely seated in the slot. The retaining clip of the slot will automatically hold the graphics card in place.

Battery



The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

Safety Measures

- Danger of explosion if battery incorrectly replaced.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to local ordinance.

Chapter 3 - BIOS Setup

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 keys simultaneously.

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the highlight up or down between submenus or fields.
<Enter>	Press <Enter> to enter the highlighted submenu.
+ (plus key)	Scrolls forward through the values or options of the highlighted field.
- (minus key)	Scrolls backward through the values or options of the highlighted field.
<F1>	Displays general help
<F2>	Displays previous values
<F9>	Optimized defaults
<F10>	Saves and resets the setup program.
<Esc>	Exits to the BIOS Setup Utility.

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.

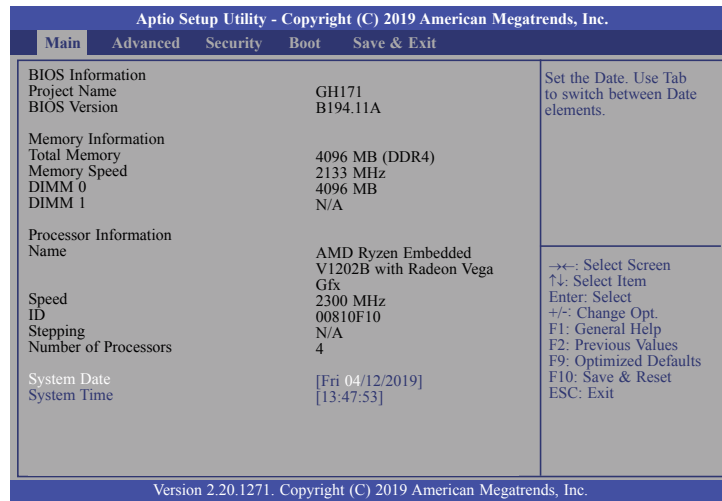
Submenu

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>.

AMI BIOS Setup Utility

Main

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



System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Sunday to Saturday. Month displays the month, from 01 to 12. Date displays the date, from 01 to 31. Year displays the year, from 2005 to 2099.

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.

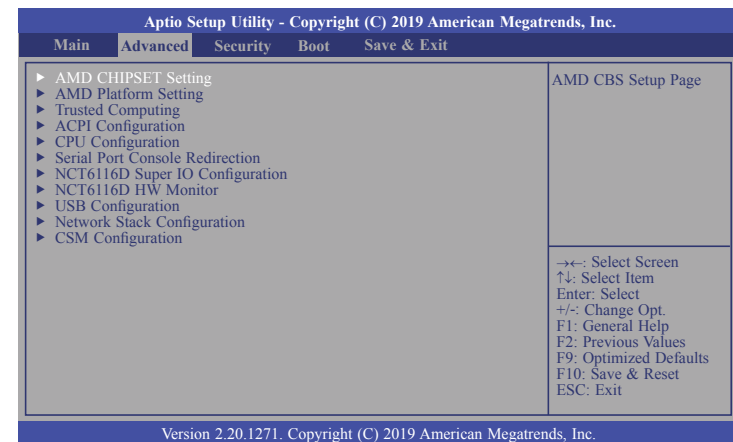
Advanced

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.



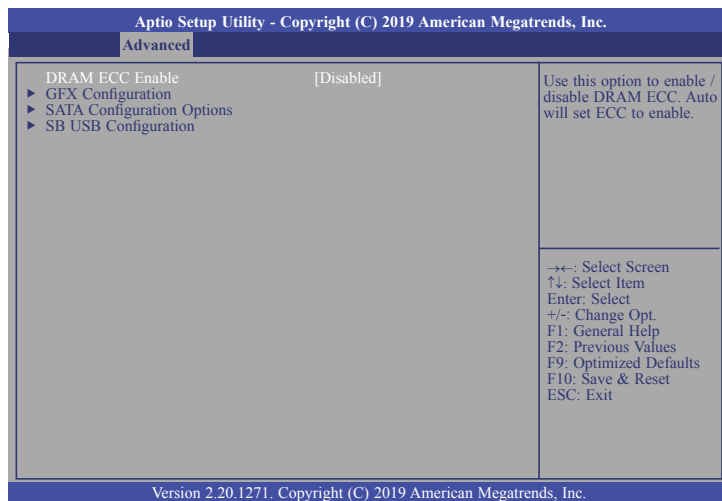
Important:

Setting incorrect field values may cause the system to malfunction.



AMD CHIPSET Setting

This section is used to configure the AMD CBS setup page.

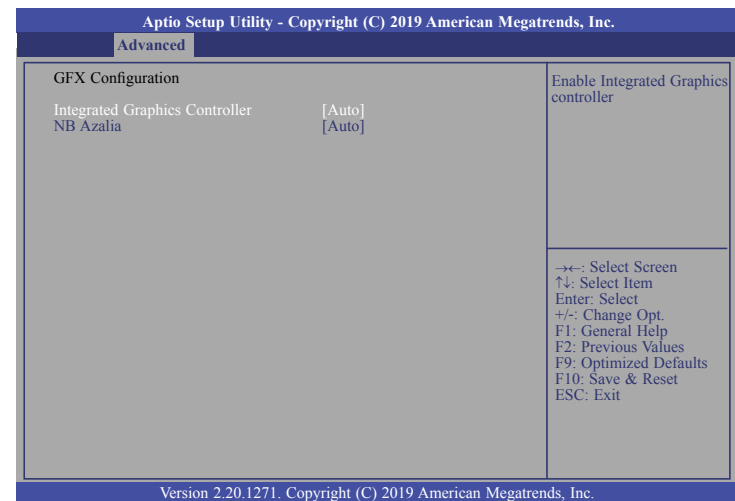


DRAM ECC Enable

This field is used to enable or disable the DRAM ECC.

GFX Configuration

This section is used to configure the GFX.



Integrated Graphics Controller

This field is used to enable or disable the Integrated Graphics controller. When set to **Forces**, **UMA Mode** will appear for configuration.

UMA Mode

This field is used to select UMA Mode: Auto or UMA_SPECIFIED. When set to **UMA_SPECIFIED**, **UMA FRAME buffer Size** will appear for configuration.

UMA Frame buffer Size

This field is used to select UMA Frame buffer Size: Auto, 64M, 128M, 256M, 384M, 512M, 1G or 2G.

NB Azalia

This field is used to enable or disable Integrate HD Audio controller.

SATA Configuration Options

This section is used to configure the SATA.

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.		
Advanced		
SATA Configuration Options		Disable or enable OnChip SATA controller
SATA Controller	[Auto]	
SATA Port0	Not Present	
SATA Port1	Not Present	
		→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Reset ESC: Exit
Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.		

SATA Controller

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

SB USB Configuration

This section is used to configure the SB USB.

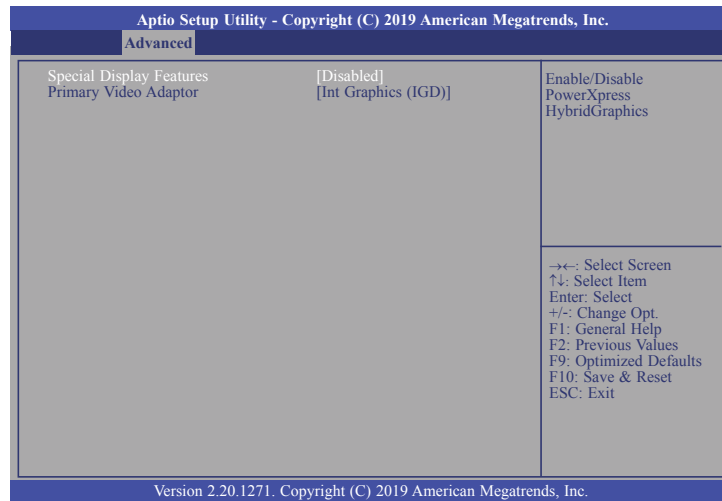
Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.		
Advanced		
USB2_1	[Enable]	Enabled/Disabled USB2_1
USB3_1	[Enable]	
USB3_2	[Enable]	
USB2_2	[Enable]	
USB3_3	[Enable]	
HUSB_1/2/3/4	[Enable]	
		→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Reset ESC: Exit
Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.		

USB2_1, USB3_1, USB3_2, USB2_2, USB3_3, HUSB_1/2/3/4

This field is used to enable or disable the USB.

AMD Platform Setting

This section is used to configure the AMD PBS setup page.



Special Display Features

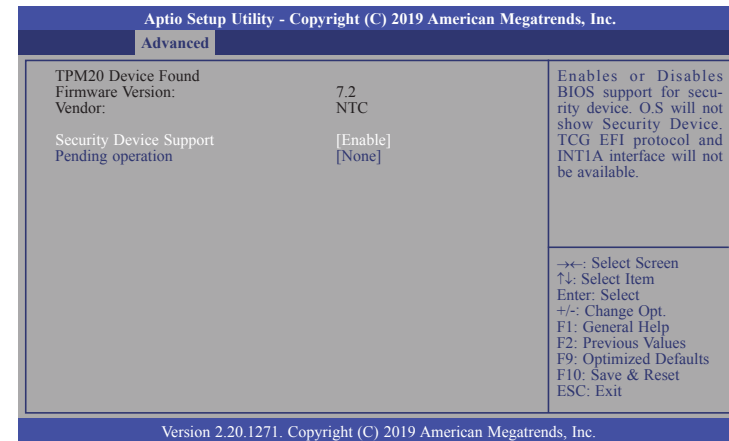
This field is used to enable or disable the PowerExpress HybridGraphics.

Primary Video Adaptor

This field is used to select Internal Graphics (IGD)/External Graphics (PEG).

Trusted Computing

This section configures settings relevant to Trusted Computing innovations.



Security Device Support

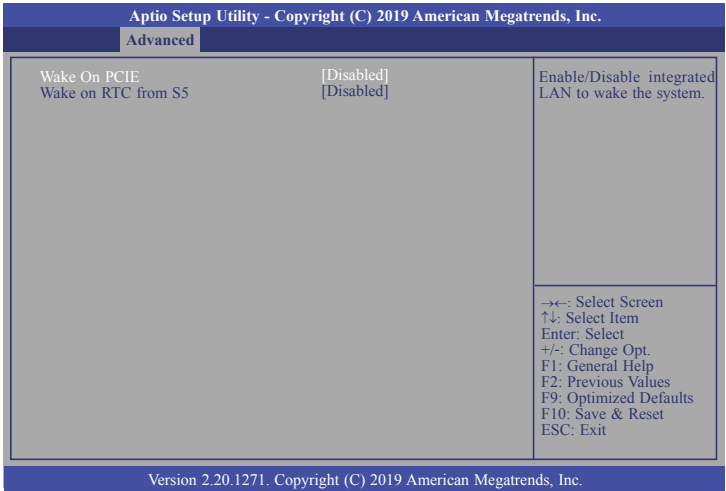
This field is used to enable or disable BIOS support for the security device. O.S will not show the security device. TCG EFI protocol and INT1A interface will not be available.

Pending operation

Schedule an operation for the security device. Your computer will reboot during restart in order to change state of the security device.

ACPI Configuration

This section is used to configure the system ACPI parameters.

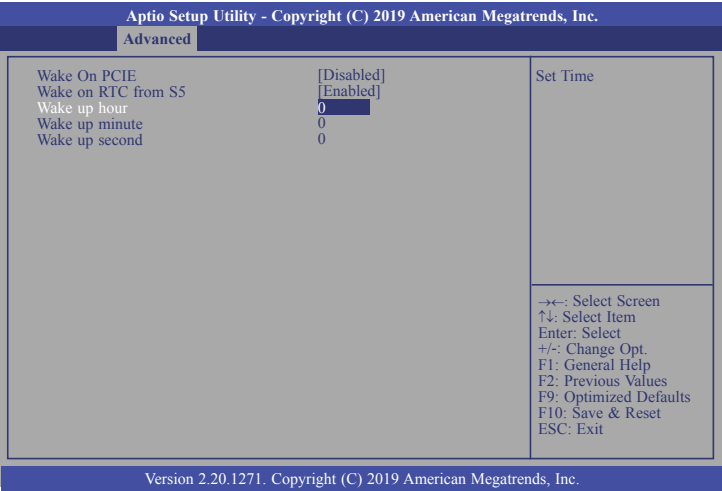


Wake On PCIE

This field is used to enable or disable integrated LAN to wake the system.

Wake on RTC from S5

When Enabled, the system resumes by the RTC alarm after S5 shutdown.



Wake up hour

Set hour from 0 to 23.

Wake up minute

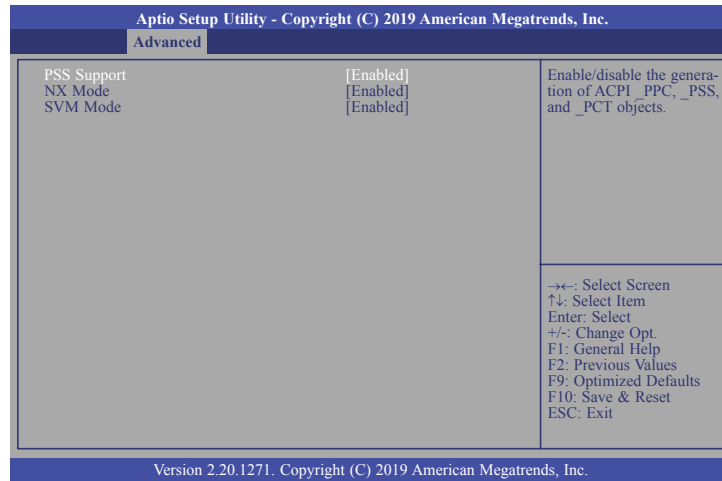
Set minute from 0 to 59.

Wake up second

Set second from 0 to 59.

CPU Configuration

This section is used to configure the CPU.



PSS Support

This field is used to enable or disable the generation of ACPI _PPC, _PSS, and _PCT objects.

NX Mode

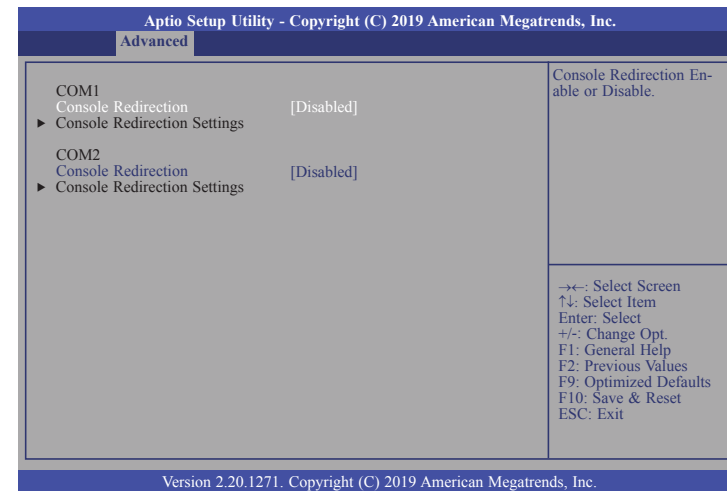
This field is used to enable or disable no-execute page protection function.

SVM Mode

This field is used to enable or disable CPU Virtualization.

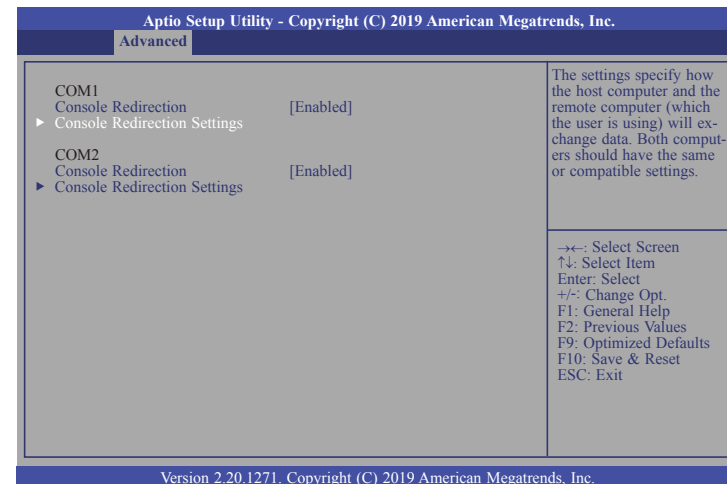
Serial Port Console Redirection

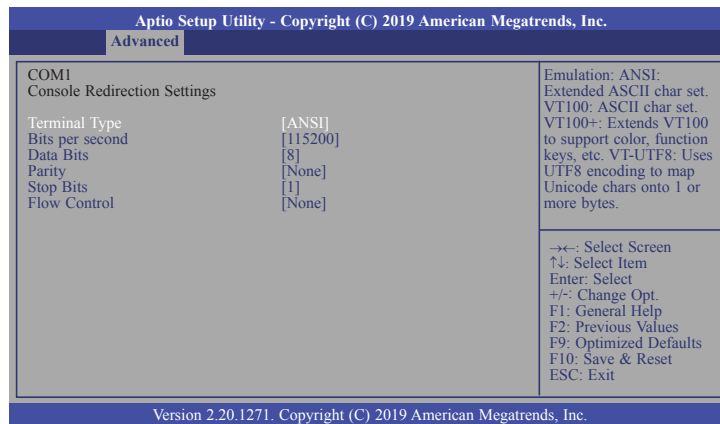
This section configures settings relevant to serial port console redirection.



Console Redirection

This field is used to enable or disable the console redirection function. When console redirection is set to enabled, **Console Redirection Settings** are available like below screen.





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, or Odd.

Stop Bits

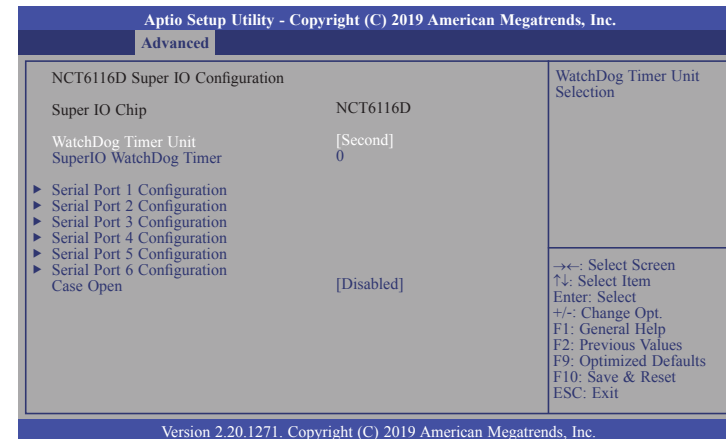
Select stop bits: 1 bit or 2 bits.

Flow Control

Select flow control: None or Hardware RTS/CTS.

NCT6116D Super IO Configuration

This section is used to configure the I/O functions supported by the onboard Super I/O chip.



WatchDog Timer Unit

Select WatchDog Timer Unit: Second or Minute.

SuperIO WatchDog Timer

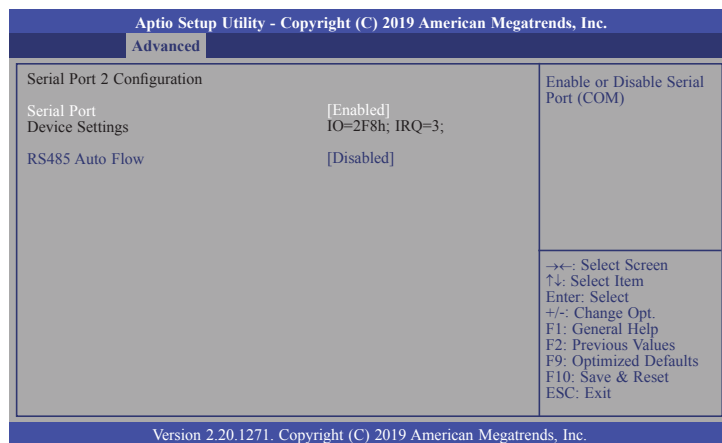
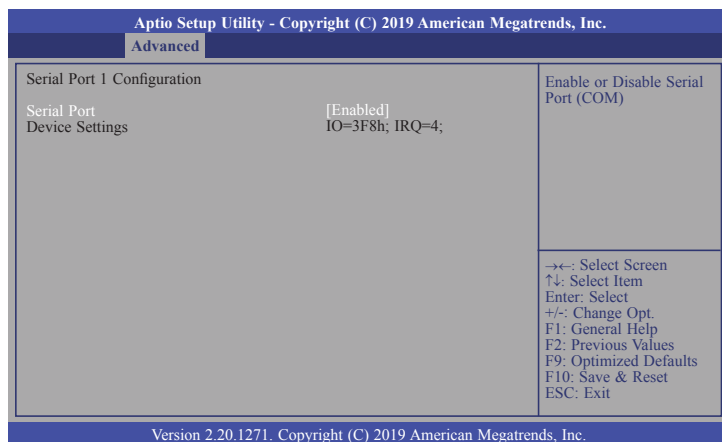
Set SuperIO WatchDog Timer Timeout Value. The range is from 0 (disabled) to 255.

Serial Port 1 Configuration to Serial Port 6 Configuration

Set the parameters of serial port 1 (COMA) to serial port 6 (COMF).

Case Open

Enable or disable the case open detection function.



Serial Port

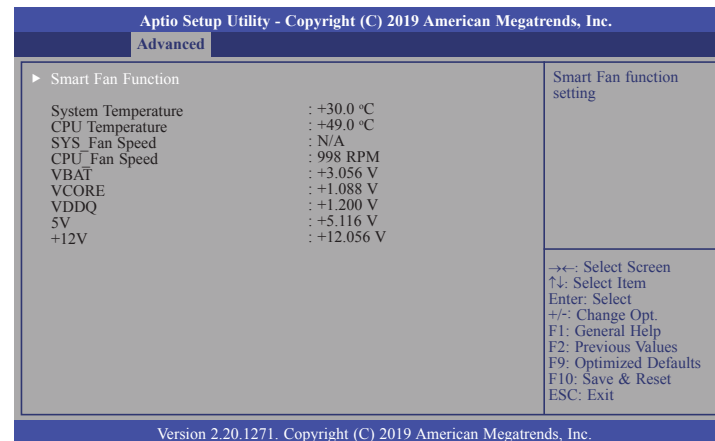
Enable or disable the serial COM port.

RS485 Auto Flow

Enable or disable RS485 auto flow.

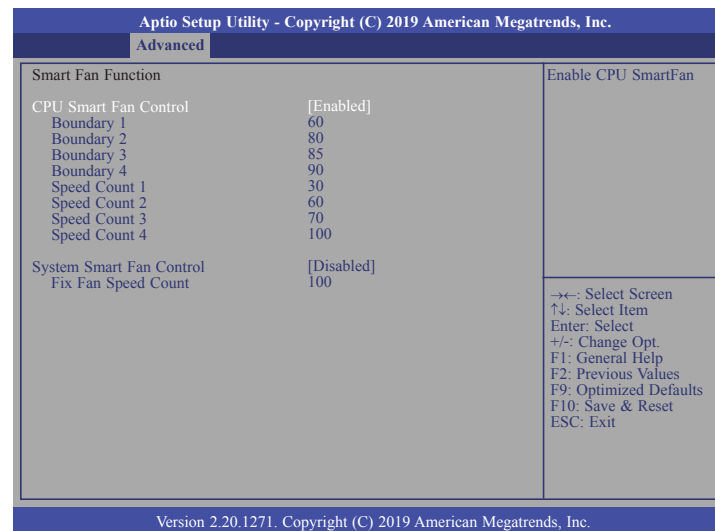
NCT6116D HW Monitor

This section displays the hardware health monitor and also configures smart fan functions.



Smart Fan Function

This section is for smart fan function setting.



CPU Smart Fan/System Smart Fan Control

Enable or disable the CPU smart fan or system smart fan.

Boundary 1 to Boundary 4

Set the boundary temperatures that determine the operation of the fan with different fan speeds accordingly. For example, when the system or the CPU temperature reaches boundary temperature 1, the system or CPU fan should be turned on and operate at the designated speed. The range is from 0-127°C.

Speed Count 1 to Speed Count 4

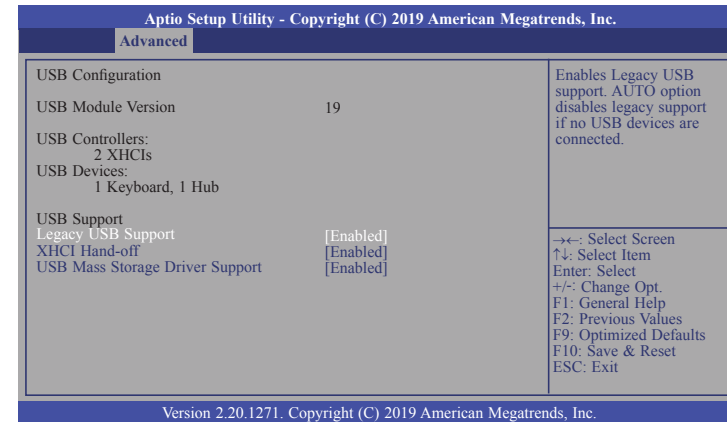
Set the fan speed. The range is from 1-100% (full speed).

Fix Fan Speed Count

Set the fix fan speed. The range is from 1-100% (full speed).

USB Configuration

This section is used to configure the USB settings.



Legacy USB Support

Enabled

Enable Legacy USB support.

Disabled

Keep USB devices available only for EFI applications.

XHCI Hand-off

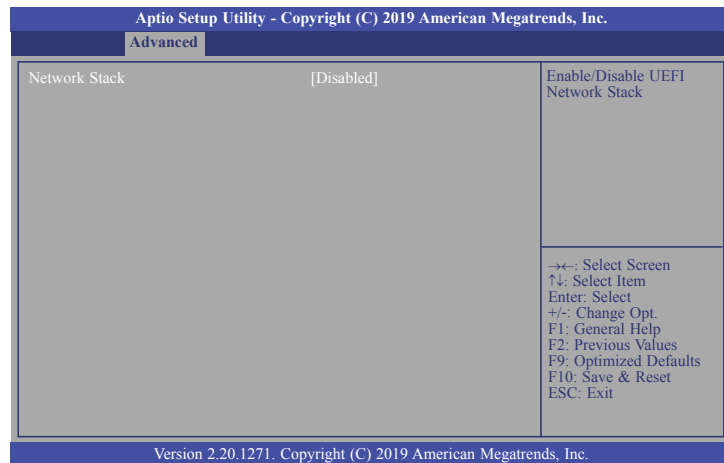
Enable or disable XHCI Hand-off.

USB Mass Storage Driver Support

Enable or disable USB Mass Storage Driver Support.

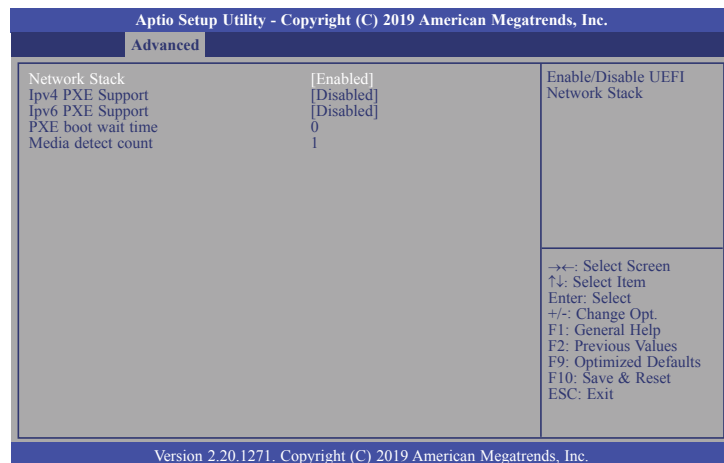
Network Stack Configuration

This section is used to configure the Network Stack settings.



Network Stack

This section is used to enable or disable UEFI network stack. When Network Stack is set to enabled, several fields will appear for configuration like below screen.



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.

CSM Configuration

This section is used to configure the Compatibility Support Module settings.

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.		
Advanced		
CSM Configuration		Enable/Disable CSM Support.
CSM Support	[Enabled]	
CSM16 Module Version	07.79	
Boot option filter	[UEFI and Legacy]	
Option ROM execution		
Network	[Do not launch]	
Storage	[Legacy]	
Video	[Legacy]	
Other PCI devices	[Do not launch]	
		→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Reset ESC: Exit

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CSM Support

This section is used to enable or disable CSM Support.

Boot option filter

This field controls Legacy/UEFI ROMs priority.

Network

This field controls the execution of UEFI and Legacy PXE OpROM.

Storage

This field controls the execution of UEFI and Legacy Storage OpROM.

Video

This field controls the execution of UEFI and Legacy Video OpROM.

Other PCI devices

This field determines OpROM execution policy for devices other than Network, Storage or Video.

Security

Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.	
Main	Advanced
Security	Boot Save & Exit
Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length 3 Maximum length 20 Administrator Password User Password ▶ Secure Boot	
Set Administrator Password →←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Reset ESC: Exit	

Version 2.20.1271. Copyright (C) 2019 American Megatrends, Inc.

Administrator Password

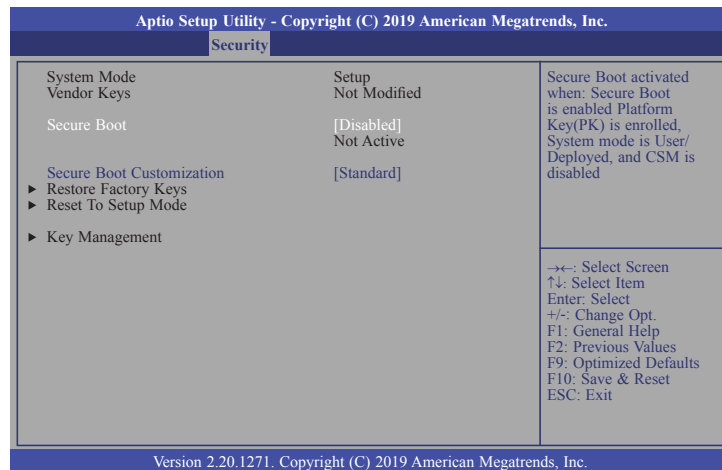
Set the administrator password.

User Password

Set the user password.

Secure Boot

This section is used to customize Secure Boot settings.



Secure Boot

Secure Boot is activated when: Secure Boot is enabled, Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM is disabled.

Secure Boot Customization

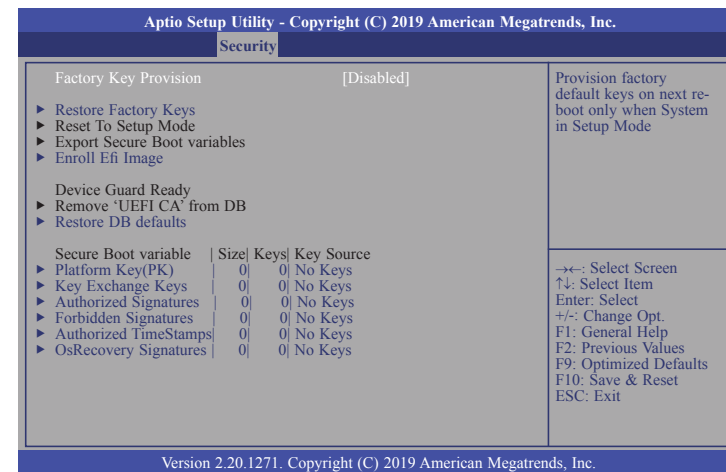
Select the secure boot customization mode: Standard or Custom. When set to Custom, Restore Factory Keys and Key Management are available for configuration.

Restore Factory Keys

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

Key Management

This section enables expert users to modify Secure Boot Policy variables without full authentication.



Factory Key Provision

Enable or disable the provision factory default keys on next re-boot only when System in Setup Mode.

Restore Factory Keys

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

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).

Restore DB defaults

This section is used to restore DB variable to factory defaults.

Platform Key(PK)

Enroll Factory Defaults or load certificates from a file on external media.

Key Exchange Keys

Enroll Factory Defaults or load certificates from a file on external media.

Authorized Signatures

Enroll Factory Defaults or load certificates from a file on external media.

Forbidden Signatures

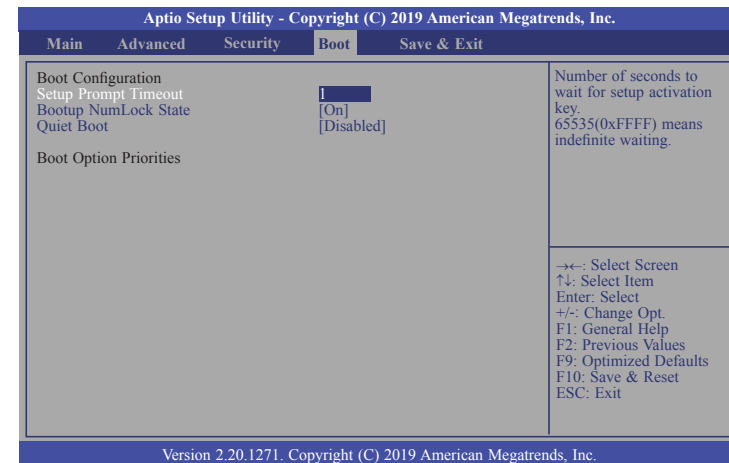
Enroll Factory Defaults or load certificates from a file on external media.

Authorized TimeStamps

Enroll Factory Defaults or load certificates from a file on external media.

OsRecovery Signatures

Enroll Factory Defaults or load certificates from a file on external media.

Boot**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.

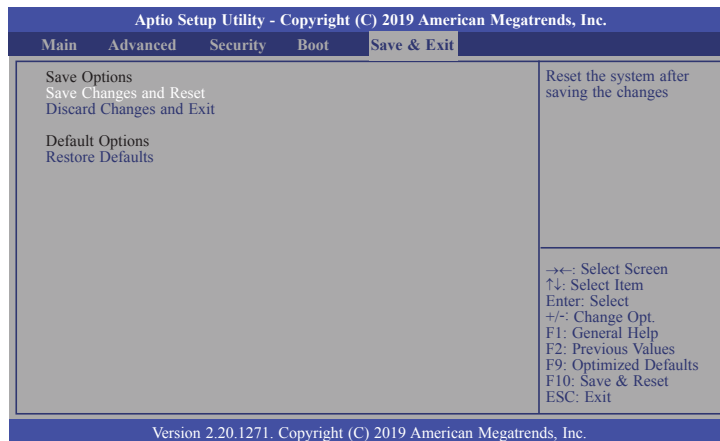
Quiet Boot

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

Boot Option Priorities

Select the system boot order.

Save & Exit



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 Exit

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.

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. You may refer to how-to-video, How to update AMI BIOS in UEFI mode on DFI products?, at <https://www.dfi.com/Knowledge/Video/5> for updating the BIOS steps.

Notice: BIOS SPI ROM

1. The 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 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.

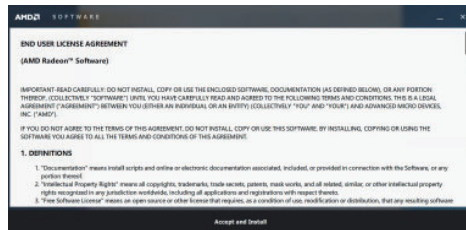
Chapter 4 - Supported Software

Please download drivers, utilities and software applications required to enhance the performance of the system board at <https://www.dfi.com/product/index/1404#download>.

AMD Chipset and VGA Drivers for Windows 10 RS1/5

To install the driver, download "GH171 AMD Driver" zip file at our website.

1. Read the license agreement then click "Accept and Install".

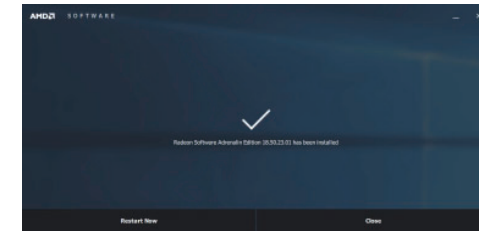


2. The step displays the installing status in the progress.



3. After completing installation, click "Restart Now" to exit setup.

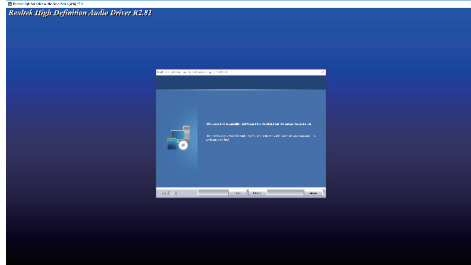
Restarting the system will allow the new software installation to take effect.



Audio Drivers for Windows 10 RS1/5

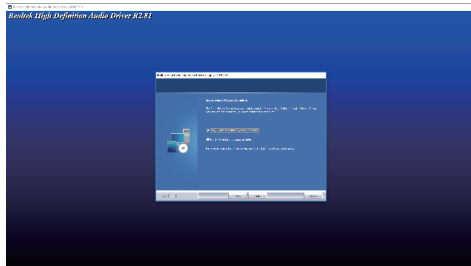
To install the driver, download "GH171 Audio Driver" zip file at our website.

1. Setup is ready to install the driver. Click "Next".



2. Click "Yes, I want to restart my computer now" then click "Finish".

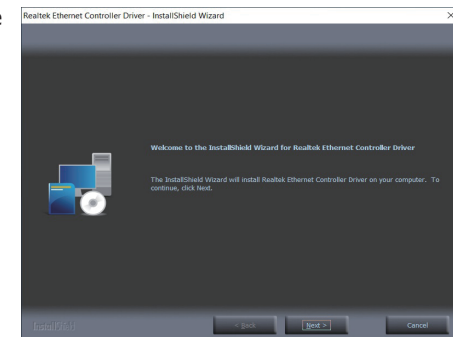
Restarting the system will allow the new software installation to take effect.



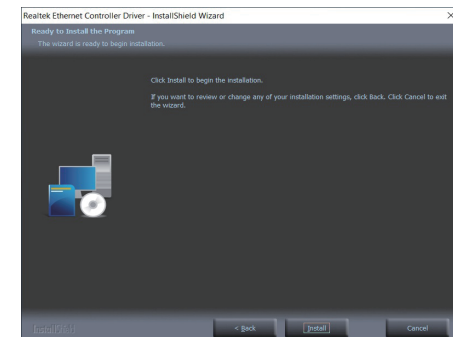
Realtek LAN Drivers

To install the driver, download "LAN" zip file at our website.

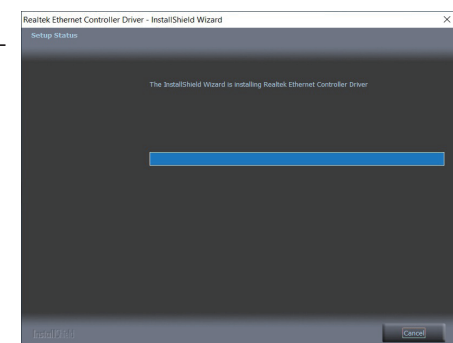
1. Setup is ready to install the driver. Click "Next".



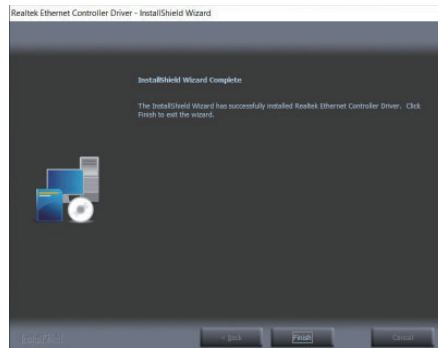
2. Click "Install" to begin the installation.



3. The step displays the installing status in the progress.



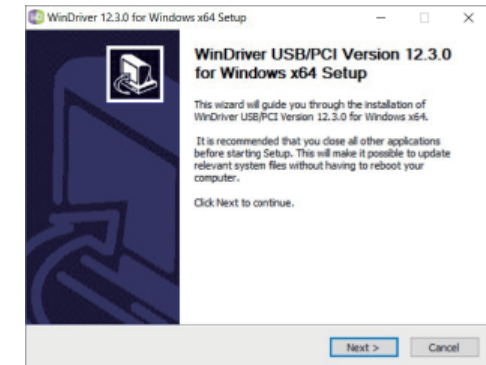
- After completing installation, click "Finish".



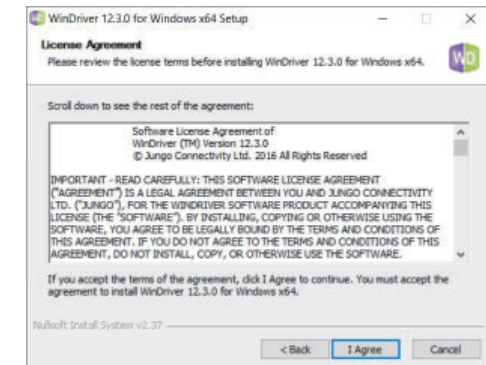
Gaming Driver

To install the driver, download "GH171 Gaming Driver" zip file at our website.

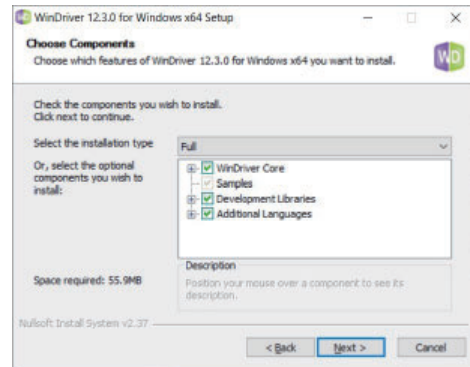
- Setup is ready to install the driver. Click "Next".



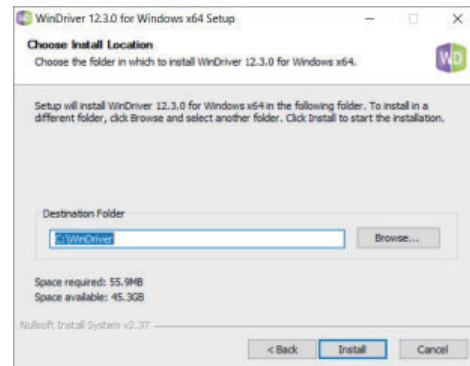
- Read the license agreement carefully. Click "I Agree".



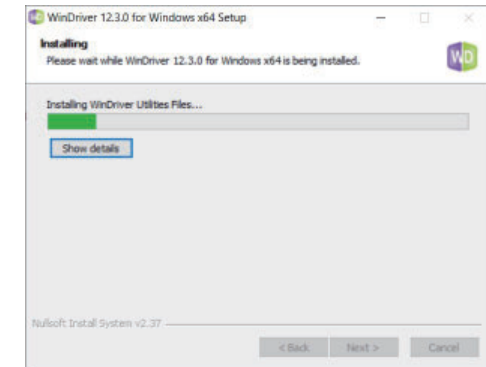
3. Choose features you want to install then click "Next".



4. Choose install location. Click "Install".



5. Setup is now installing the driver.



6. Click "Finish".

Restarting the system will allow the new software installation to take effect.

