



SO630

ATX 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.

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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 occur 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 SO630 motherboard
- 1 I/O shield TBD
- 1 Cooler TBD

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

- TBD

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 a hard disk drive.
- Power supply

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® EPYC™ Embedded 3451, 16 Core, 32 Threads, 2.14GHz (3GHz), 80-100W AMD® EPYC™ Embedded 3351, 12 Core, 24 Threads, 1.9GHz (3GHz), 60-80W
	Memory	8 DDR4 RDIMM/UDIMM up to 256GB
	BIOS	Insyde
EXPANSION	Interface	3 x PCIe x16 (up to 6 PCIe x8) 1 x PCI 1 x M.2 M Key (PCIe x4 NVMe) 1 x M.2 M Key (SATA/PCIe x2 NVMe)
ETHERNET	Controller	2 x Intel i210AT
REAR I/O	Ethernet	2 x GbE (RJ-45)
	USB	6 x USB 3.1 Gen1
	Serial	1 x RS-232/422/485 (DB-9) 1 x RS-232 (DB-9)
INTERNAL I/O	USB	2 x USB 3.1 Gen1
	SATA	3 x SATA 3.0 2 x SATA 3.0 support RAID 0/1
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	TPM2.0 (opt.)
POWER	Type	ATX power input
	Consumption	TBD
	RTC Battery	CR2032 Coin Cell
OS SUPPORT		Windows 10 Windows Server 2019 Linux
ENVIRONMENT	Temperature	Operating: -5 to 65°C Storage: -40 to 85°C

Humidity	Operating: 10 to 90% RH Storage: 10 to 90% RH
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MTBF	TBD
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MECHANICAL	Dimensions	ATX Form Factor: 305mm (12") x 244mm (9.6")
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► 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

Two Intel® Gigabit LAN controllers (Intel® I210AT PCIe) support up to 1Gbps data transmission.

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.

PCI Express

PCI Express is a high bandwidth I/O infrastructure that possesses the ability to scale speeds by forming multiple lanes. The x4 PCI Express lane supports transfer rate of 4 Gigabyte per second (2 directions). 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).

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.

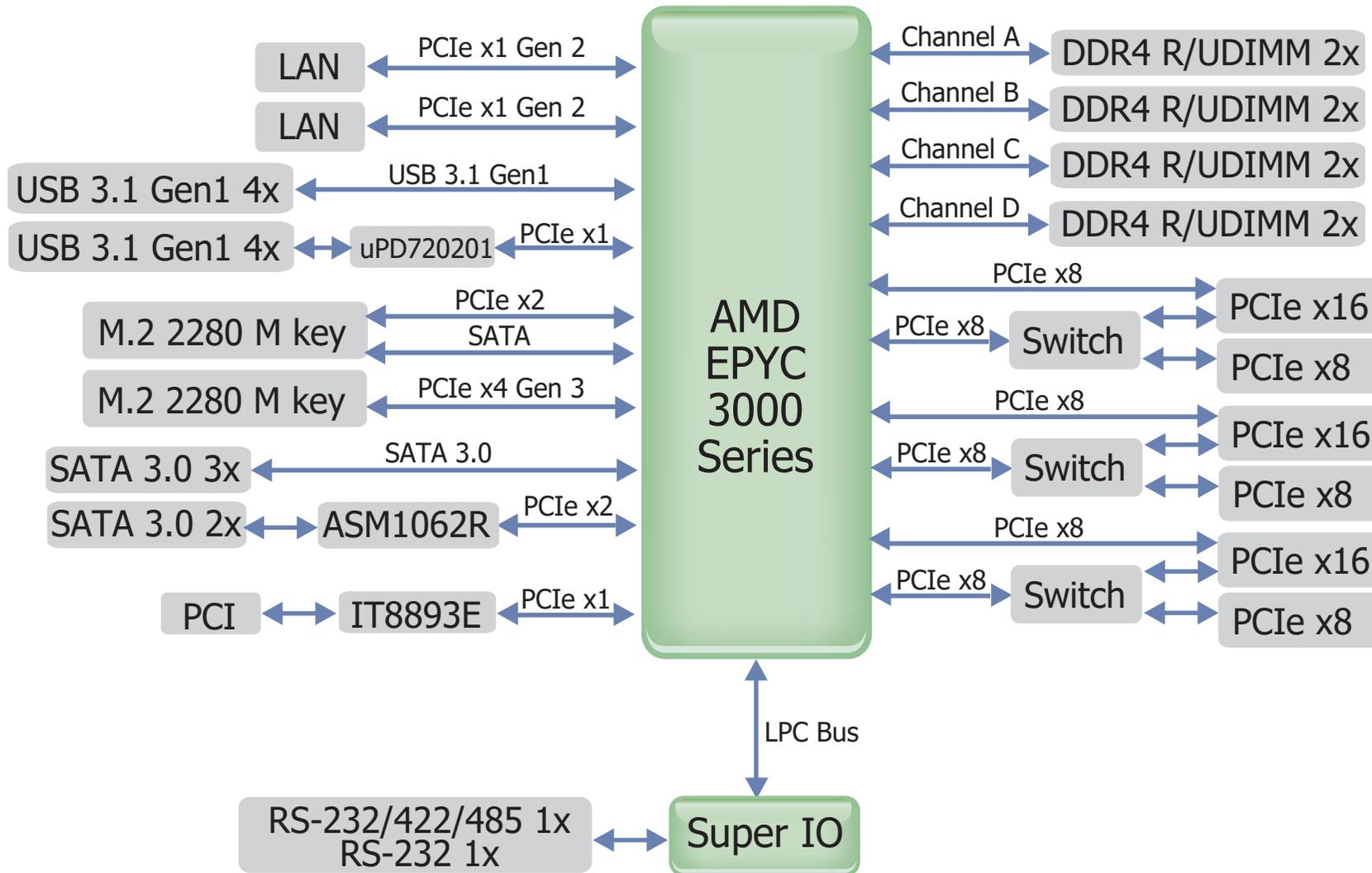
USB

The system board supports the new USB 3.1 Gen 1. 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 3.1 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.

RTC Timer

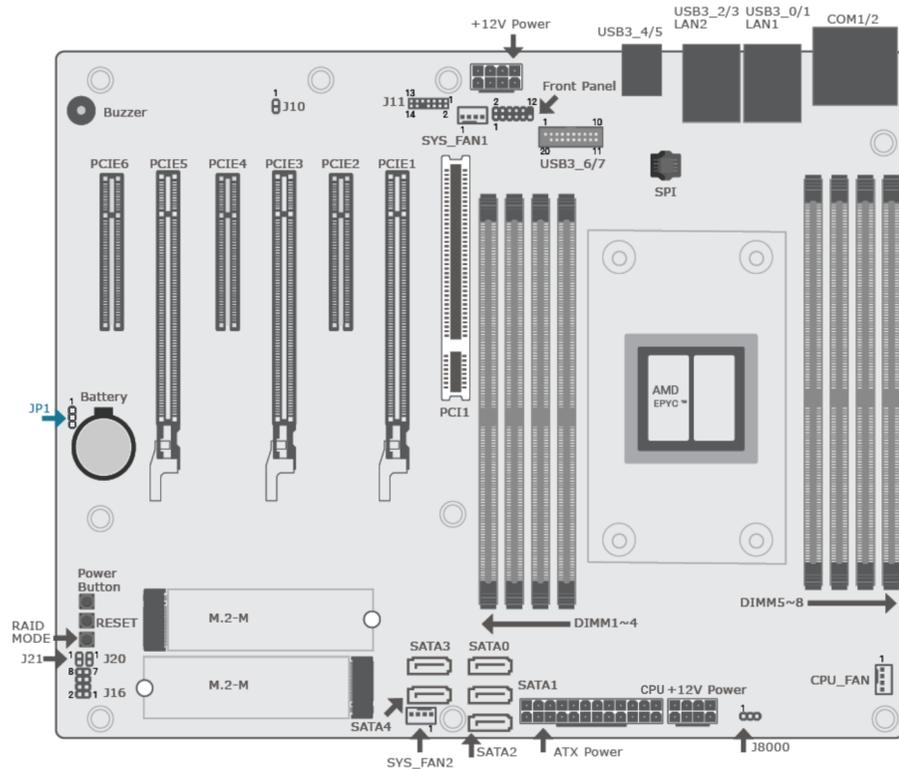
The Real Time Clock (RTC) installed on the system board allows your system to automatically power-on on the set date and time.

► Block Diagram



Chapter 2 - Hardware Installation

► Board Layout

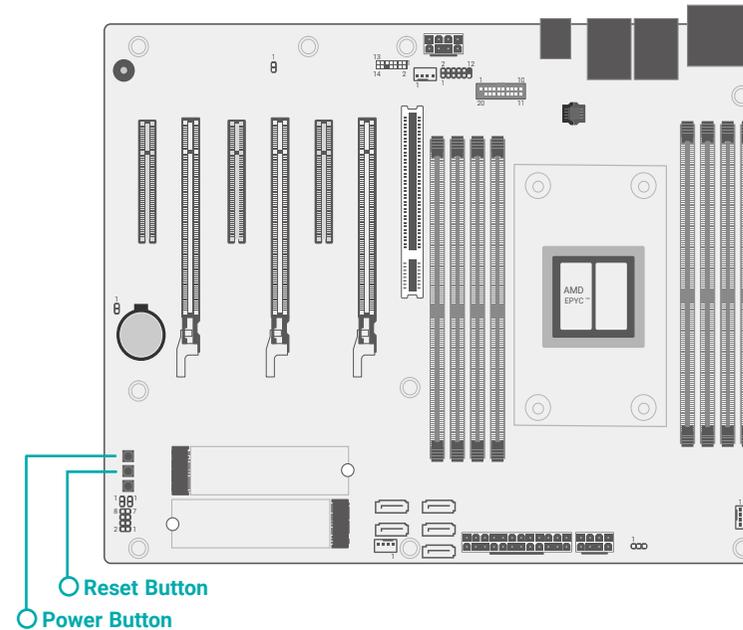


Note:
Some components are optional and only available upon request.

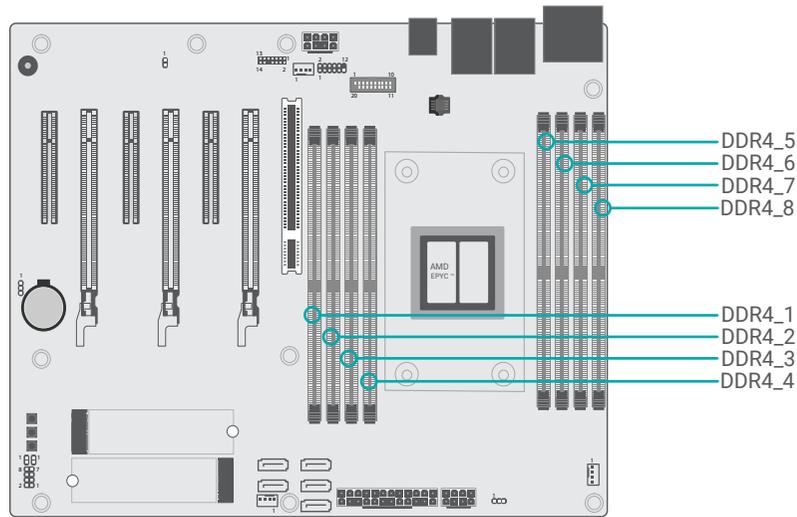


Important:
Electrostatic discharge (ESD) can damage your board, processor, disk drives, add-in boards, and other components. Perform installation procedures at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching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

► LED and Switch



► System Memory



The system board supports the following memory interface.

Single Channel (SC)

Data will be accessed in chunks of 64 bits from the memory channels. DIMMs are on the same channel. DIMMs in a channel can be identical or completely different. However, we highly recommend using identical DIMMs. Not all slots need to be populated.

Features

- Eight RDIMM/UDIMM up to 256GB



Important:

CH-A: DIMM 1, 2 CH-B: DIMM 3, 4
CH-C: DIMM 5, 6 CH-D: DIMM 7, 8

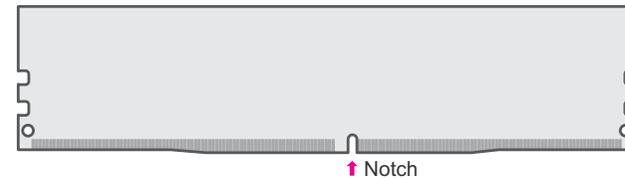
While only one DIMM is installed in a channel, it should be installed in even number DIMM (DIMM 2/4/6/8).

► System Memory

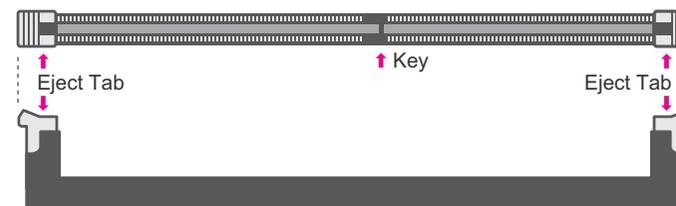
Installing the DIMM Module

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



◀◀ Memory Module



◀◀ Socket Top View

◀◀ Socket Side View

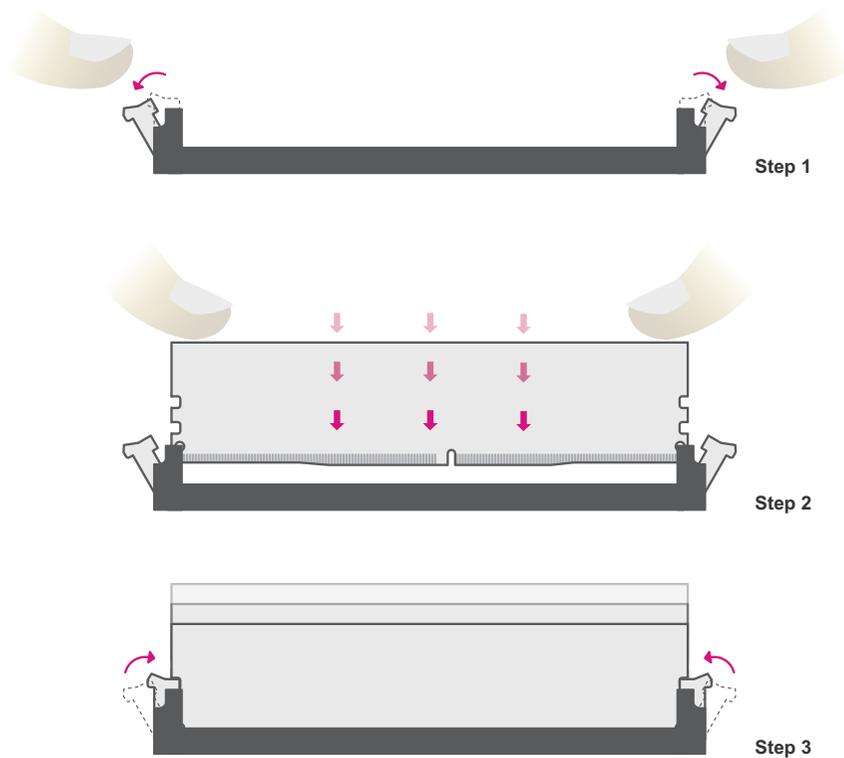
► System Memory ► Installing the DIMM Module

Please follow the steps below to install the memory card into the socket.

Step 1:
Press the eject tabs at both ends of the socket outward and downward to release them from the locked position.

Step 2:
Insert the memory card into the slot while making sure the notch and the key are aligned. Press the card down firmly with fingers while applying and maintaining even pressure on both ends.

Step 3:
The tabs snap automatically to the edges of the card and lock the card in place.



► System Memory

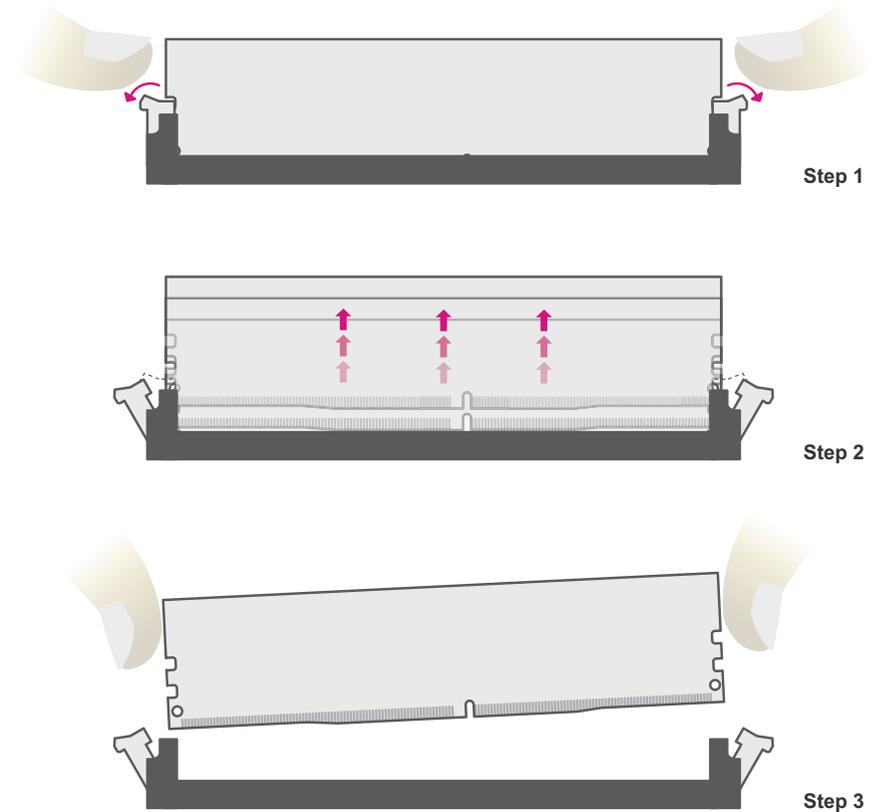
Removing the DIMM Module

Please follow the steps below to remove the memory card from the socket.

Step 1:
Press the eject tabs at both ends of the socket outward and downward to release them from the locked position.

Step 2:
The memory card ejects from the slot automatically.

Step 3:
Hold the card by its edges and remove it from the slot.



► CPU

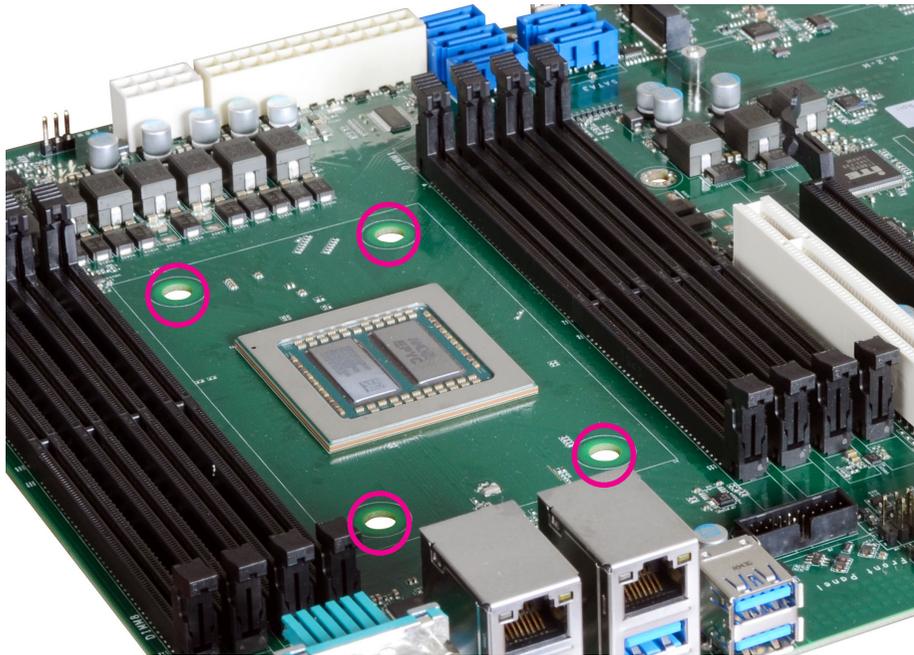
The system board is embedded with a AMD® EPYC™ Embedded CPU.

Installing the CPU Fan and Heat Sink

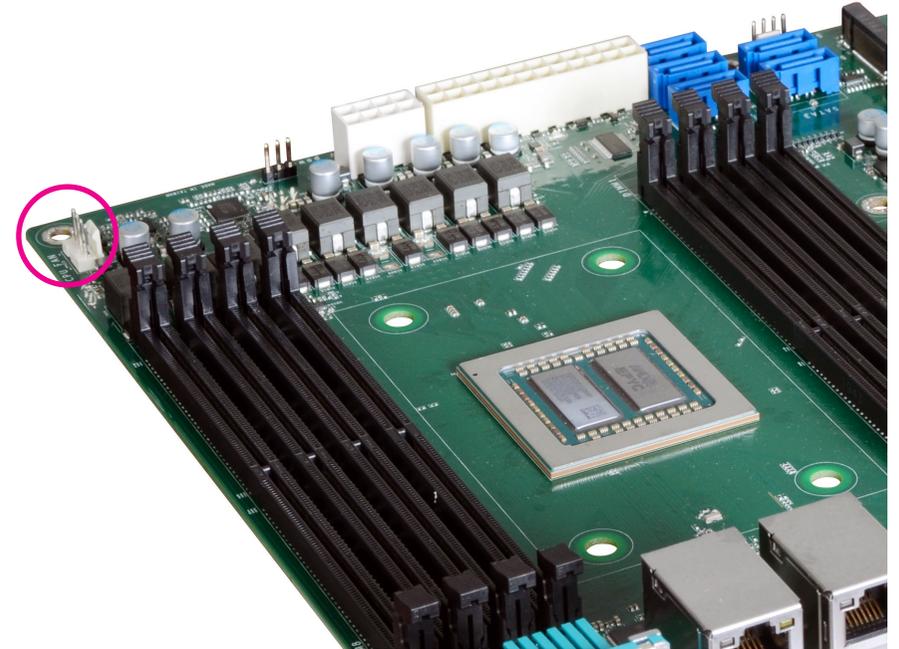
The CPU must be kept cool by using a CPU fan with heat sink. Without sufficient air circulation across the CPU and heat sink, the CPU will overheat damaging both the CPU and system board.

Before you place the heat sink on the CPU, you must apply a thermal paste onto the top of the heat sink. The thermal paste is usually supplied when you purchase the fan with heat sink assembly. Do not spread the paste all over the surface. When you later place the CPU on top of the heat sink, the compound will disperse evenly.

Some heat sinks come with a patch of pre-applied thermal paste. Do not apply thermal paste if the fan with heat sink already has a patch of thermal paste on its underside. Peel the strip that covers the paste before you place the CPU on top of the heat sink.



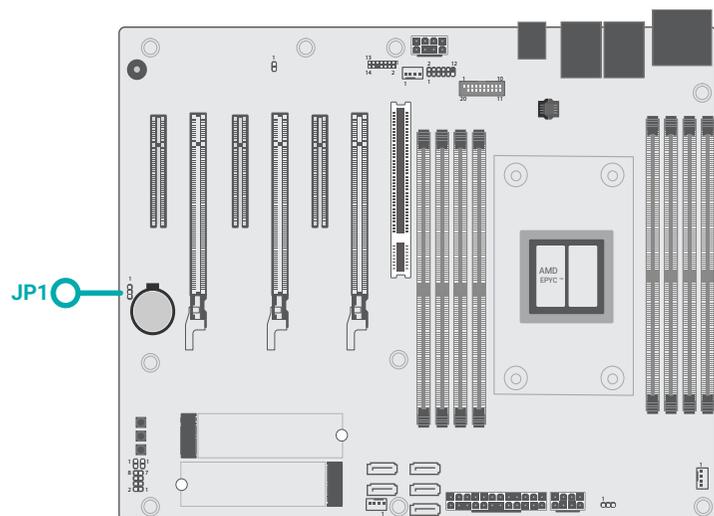
There are 4 screw holes around the CPU for the heat sink to be mounted.



Align the 4 screw holes and tighten the heat sink up by inserting screws, DO remember to connect the fan cable on the board.

► Jumper Settings

CLEAR CMOS Data



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.



■ 1-2 On: Normal (default)

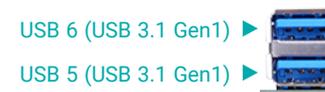
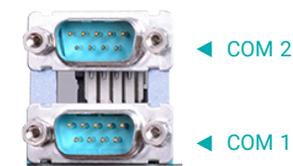


■ 2-3 On: Clear CMOS Data

► Rear I/O Ports



■ Rear I/O Connectors



► Rear I/O Ports

COM (Serial) 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.

The two COM ports support RS232 – two DB9 connector at the rear side and one internal pin-header connector for monitoring the BMC.

■ COM Port Pin Assignment

	RS232	RS422	RS485
Pin	COM1/2	COM1	COM1
1	DCD	TXD-	Data-
2	RXD	TXD+	Data+
3	TXD	RXD+	
4	DTR	RXD-	
5	GND	GND	GND
6	DSR	---	---
7	RTS	---	---
8	CTS	---	---
9	RI	---	---

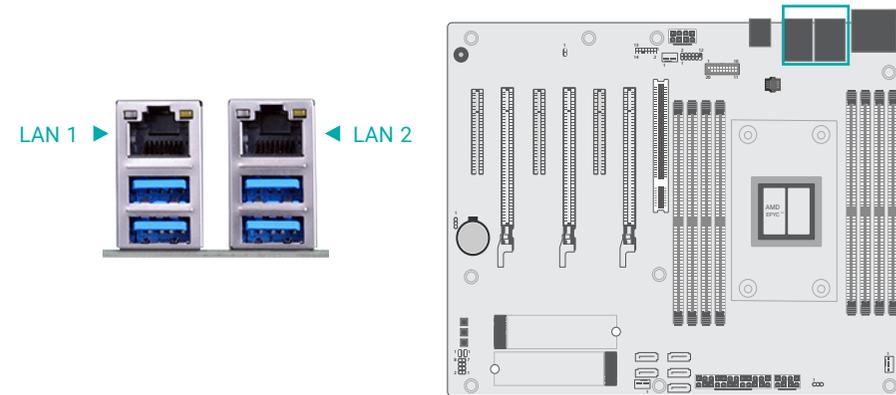


Note:

The BMC COM port is used to monitor the IPMI, and may not be present when your model does not support IPMI.

► Rear I/O Ports

RJ45 LAN Ports

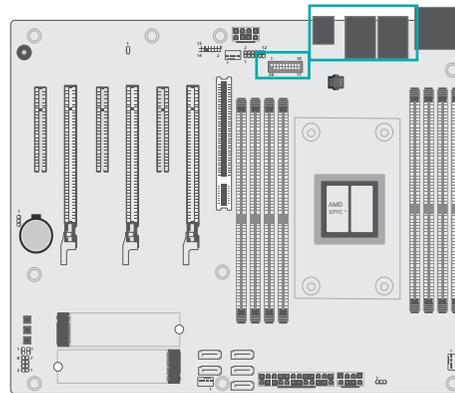


Features

- 2 x (10/100/1000Mbps)

► Rear I/O Ports

USB Ports



■ USB 3.1 Box Headers

Pin	Assignment	Pin	Assignment
1	5V_USB3	11	USB2_1P_C_3
2	USB3_RX1_DN_C_3	12	USB2_1N_C_3-
3	USB3_RX1_DP_C_3	13	GND
4	GND	14	USB3_TX2_DP_C_3
5	USB3_TX1_DN_C_3	15	USB3_TX2_DN_C_3
6	USB3_TX1_DP_C_3	16	GND
7	GND	17	USB3_RX2_DP_C_3
8	USB2_0N_C_3	18	USB3_RX2_DN_C_3
9	USB2_0P_C_3	19	5V_USB3
10	5V/GND	20	---

The internal 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.

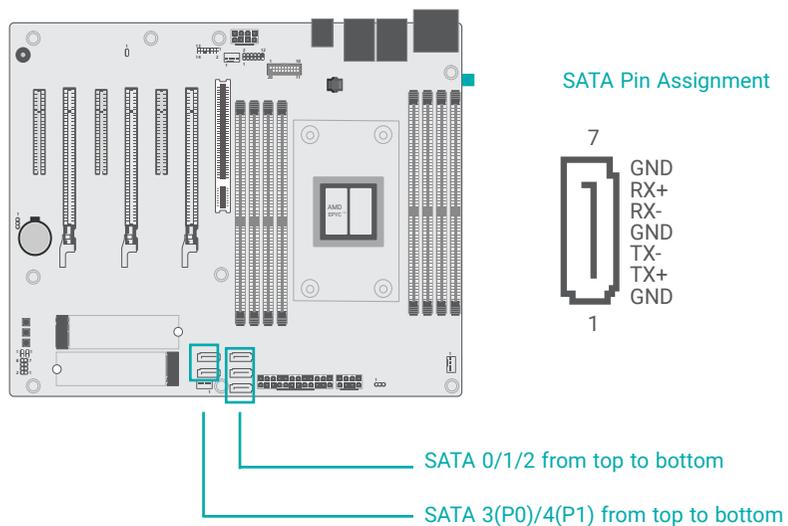
Note: It's advised to plug one device first in any of USB3 1/2/3/4 to operate in DOS.

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 multiple USB ports as listed below:

- 6 x USB 3.1 Gen 1 rear ports (USB 1/2/3/4/5/6)
- 2 x USB 3.1 Gen 1 internal ports, box headers (USB 7/8)

► Internal I/O Connectors

SATA (Serial ATA)



The Serial ATA (SATA) connectors are used to connect the Serial ATA device. SATA 3.0 is supported by the five SATA ports 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.

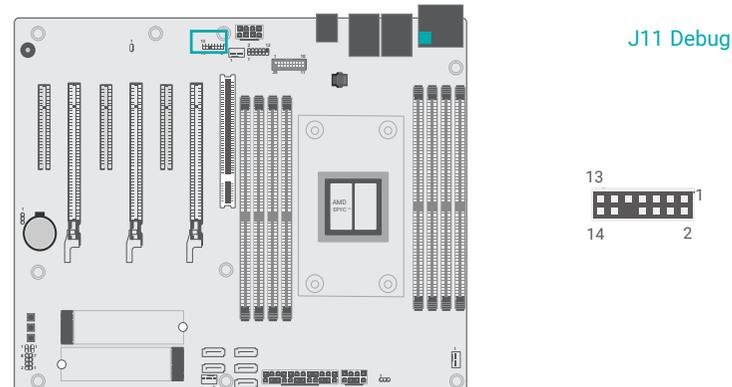
SATA 3 (P0) and SATA 4 (P1) support RAID.

Features

- 5 Serial ATA 3.0 ports with data transfer rate up to 6Gb/s
- Integrated Advanced Host Controller Interface (AHCI) controller
- Support RAID 0, RAID 1, SPAN

► Internal I/O Connectors

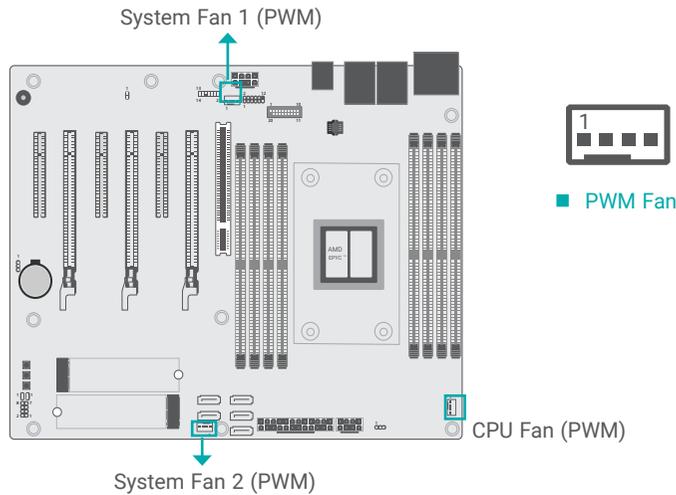
Debug



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

Internal I/O Connectors

Cooling Fan Connectors



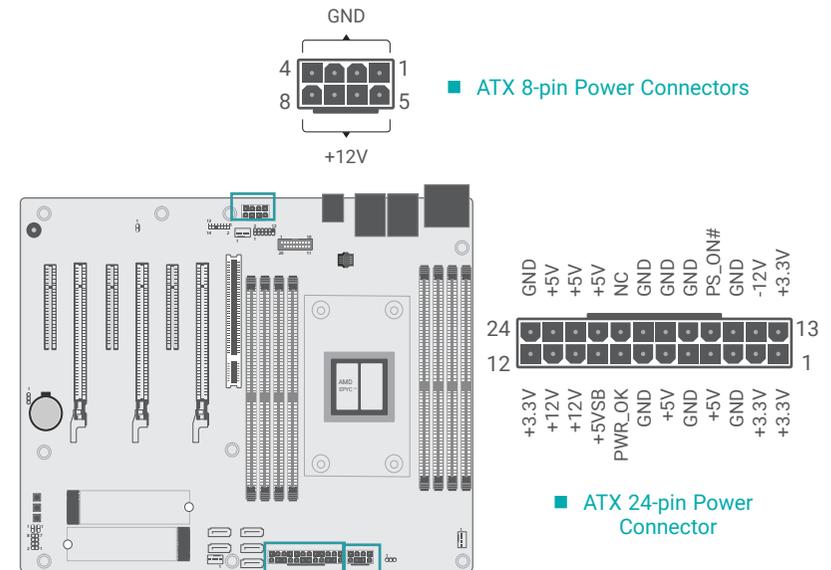
These fan connectors are used to connect cooling fans. The cooling fans will provide adequate airflow throughout the chassis to prevent overheating the CPU and system board components. The 4-pin fans provide PWM to modulate fan speed.

■ 4-pin Fan Pin Assignment

Pin	Assignment
1	Ground
2	12V
3	RPM
4	Control

Internal I/O Connectors

Power Connector



Use a power supply that complies with the ATX12V Power Supply Design Guide Version 1.1. An ATX12V power supply unit has a standard 24-pin ATX main power connector that must be inserted into the 24-pin connector. The 8-pin +12V power connector enables the delivery of more +12VDC current to the processor's Voltage Regulator Module (VRM).

The power connectors from the power supply unit are designed to fit the 24-pin and 8-pin connectors in only one orientation. Make sure to find the proper orientation before plugging the connectors.

The system board requires a minimum of 300 Watt power supply to operate. Your system configuration (CPU power, amount of memory, add-in cards, peripherals, etc.) may exceed the minimum power requirement. To ensure that adequate power is provided, we strongly recommend that the system is supplied with a minimum of 400 Watt power.

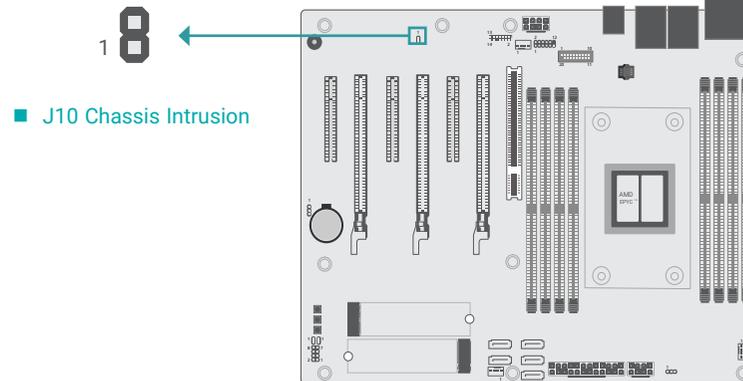


Important:

Insufficient power supplied to the system may result in instability or malfunction of the add-in boards and peripherals. Calculating the system's approximate power usage is important to ensure that the power supply meets the system's consumption requirements.

▶ Internal I/O Connectors

Chassis Intrusion



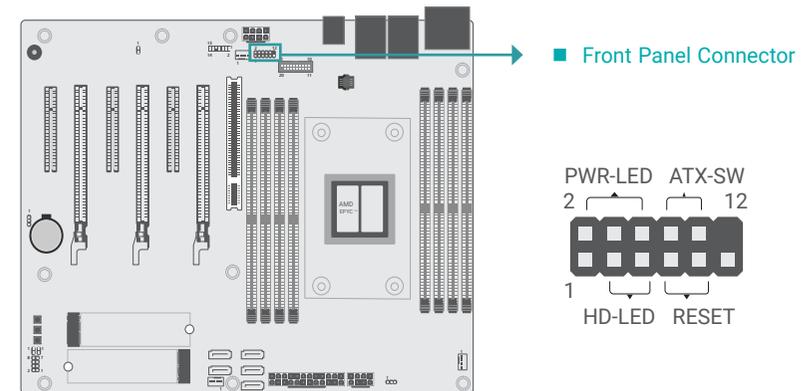
The board supports the chassis intrusion detection function. Connect the chassis intrusion sensor cable from the chassis to this connector. When the system's power is on and a chassis intrusion occurred, an alarm will sound. When the system's power is off and a chassis intrusion occurred, the alarm will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

■ Chassis Intrusion Pin Assignment

Pin	Assignment	Pin	Assignment
1	Signal	2	GND

▶ Internal I/O Connectors

Front Panel



■ Front Panel Pin Assignment

Pin	Assignment	Pin	Assignment
1	N.C.	2	3V3SB
3	3V3	4	3V3SB
5	HD_LED	6	SUS_LED
7	Ground	8	Ground
9	PM_SYSRST	10	PWR_BTN-
11	N.C.	12	--

HDD LED - Hard Disk Drive LED

Lighting of the LED indicates that the hard drive is being accessed.

RESET - Reset Switch

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

Power/Standby LED

When the system's power is on, this LED will light up. When the system is in the S1 (POS - Power On Suspend) state, it will blink at 1-second intervals. When the system is in the S3 (STR - Suspend To RAM) state, it will blink at 4-second intervals.

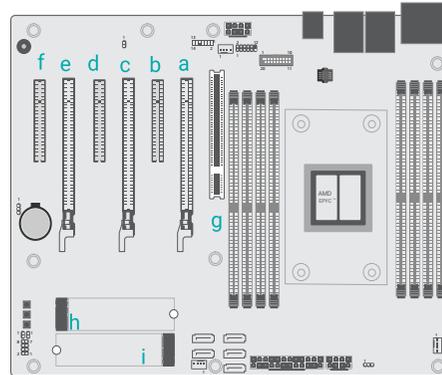
Power Button

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

► Internal I/O Connectors

Expansion Slots

- a PCIe 1 (PCIe x16; x8 when PCIe 2 in use)
- b PCIe 2 (PCIe x8, shared with PCIe 1)
- c PCIe 3 (PCIe x16; x8 when PCIe 4 in use)
- d PCIe 4 (PCIe x8, shared with PCIe 3)
- e PCIe 5 (PCIe x16; x8 when PCIe 6 in use)
- f PCIe 6 (PCIe x8, shared with PCIe 5)
- g PCI
- h M.2 M Key 2280 (PCIe x4 NVMe)
- i M.2 M Key 2280 (SATA/PCIe x2 NVMe)



PCI Express x16 Slot

Install a PCI Express x16 graphics card that complies to the PCI Express specifications into the PCI Express x16 slot. To install a graphics card into the x16 slot, align the graphics card to the socket and perpendicularly to the board, be cautious in aligning the locations of notch and key, and then press the card down firmly until it is completely seated. The retaining clip of the slot will close up automatically to hold the graphics card in place.

PCI Express x8 Slots

Install PCI Express cards such as network cards, drives, or other cards that comply to the PCI Express specifications into the PCI Express slots.

M.2 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.



Note:

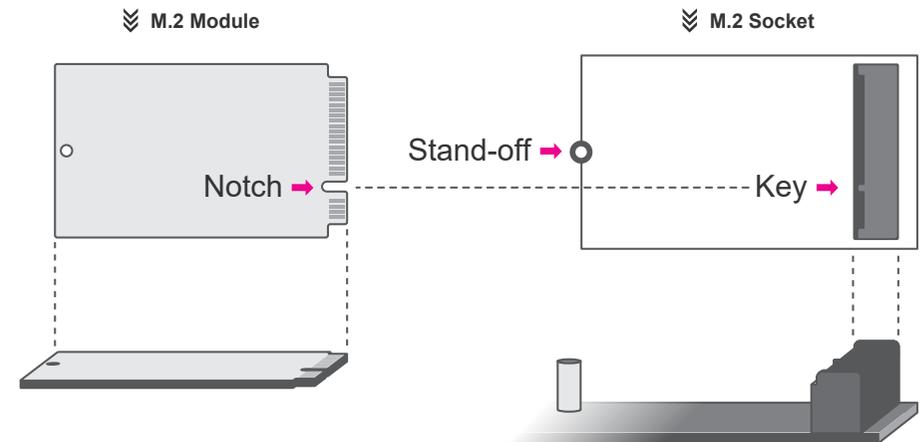
The PCIe x16 slot will automatically switch to x8 bandwidth when the paired PCIe x8 slot is in use.

► Internal I/O Connectors ► Expansion Slots

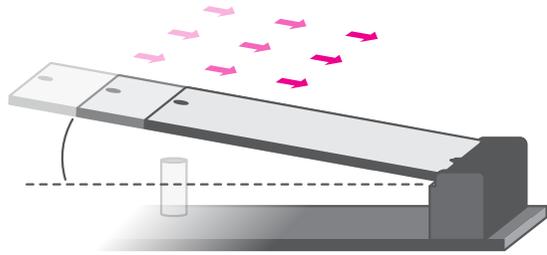
Installing the M.2 Module

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

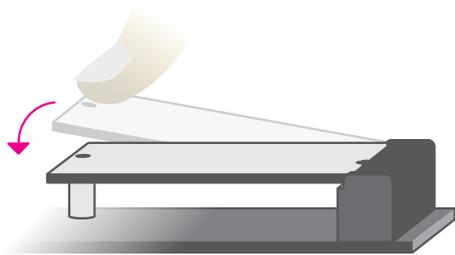
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.



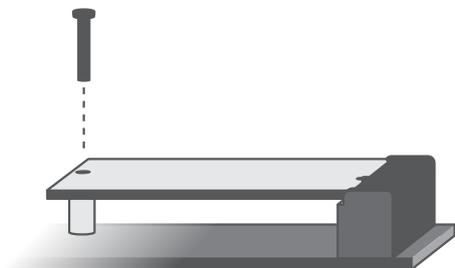
Please follow the steps below to install the card into the socket.



Step 1:
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.

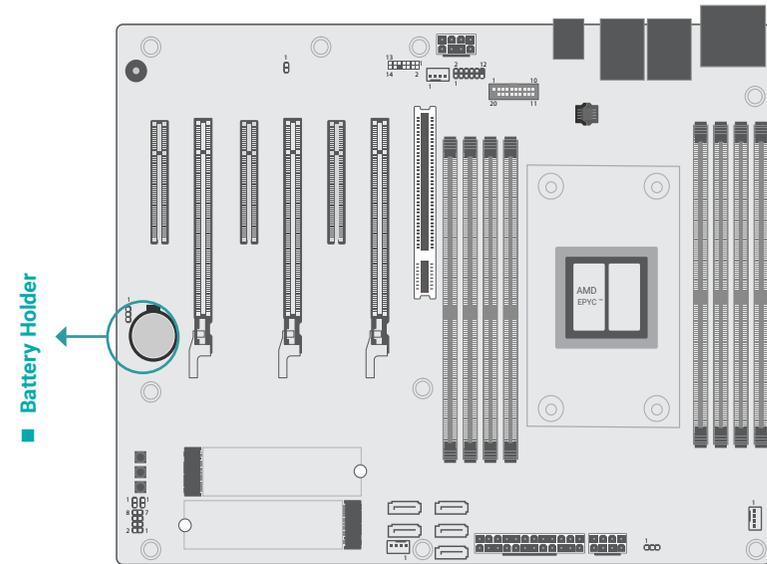


Step 2:
Press the end of the card far from the socket down until the gap between the card and the stand-off closes up.



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.

Battery



The lithium ion battery addendum supplies power to the real-time clock and CMOS memory as an auxiliary source of power when the main power is shut off. Insert a coin cell battery into the holder and make sure the polarities are correctly oriented – the cap side (rimmed rounded edge) is negative and should be facing the holder; the flat side with a + mark is positive and should be facing away from the holder.

Safety Measures

- There exists explosion hazard if the battery is incorrectly installed.
- Replace only with the same or equivalent type recommended by the manufacturer.
- Dispose of used batteries according to local ordinances.

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 / 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
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

Scroll Bar

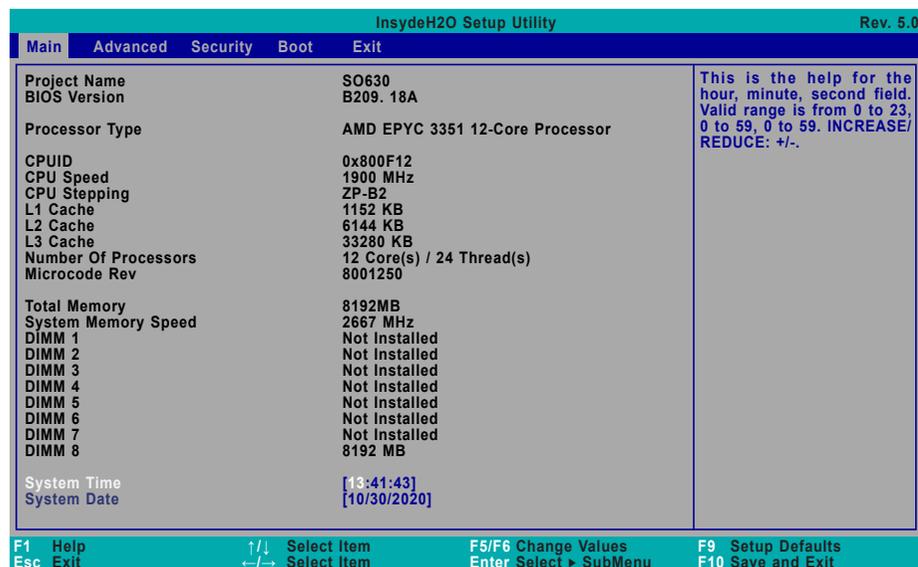
When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

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.



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.

System Date

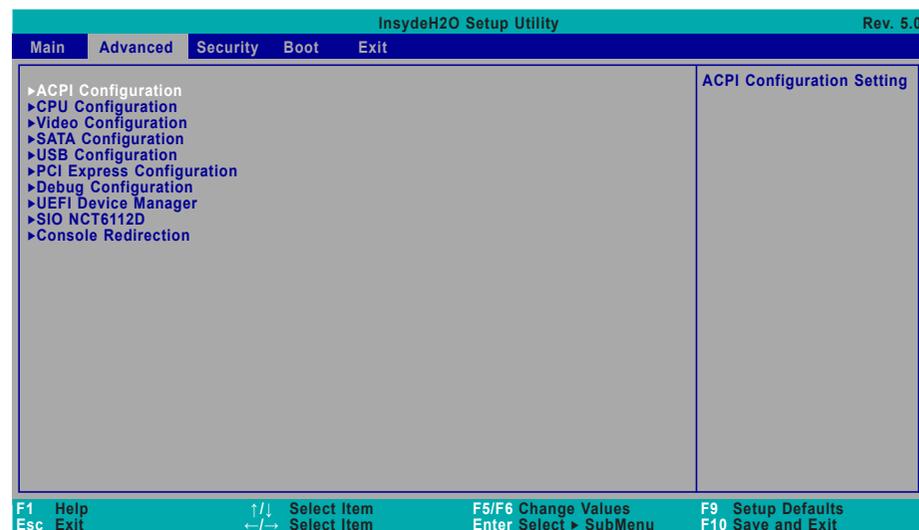
The date format is <month>, <date>, <year>. Month displays the month, from 01 to 12. Date displays the date, from 01 to 31. Year displays the year, from 2000 to 2099.

► 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.

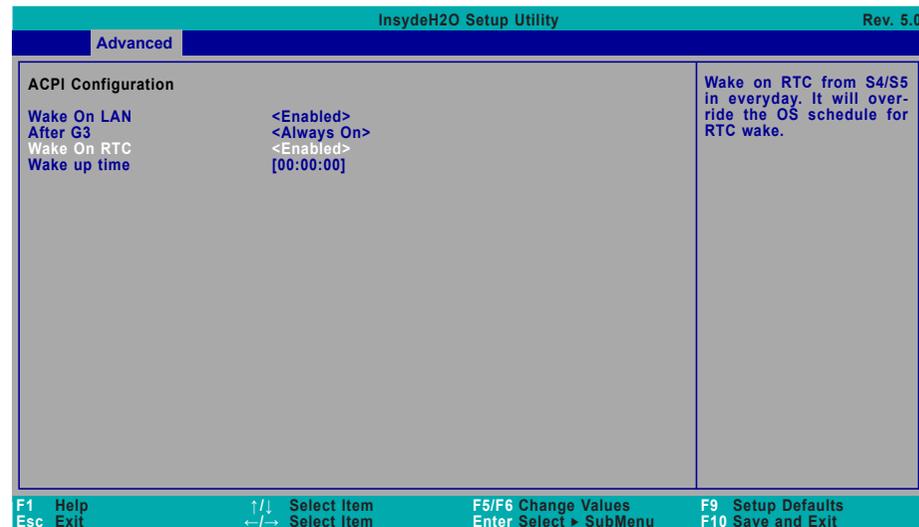
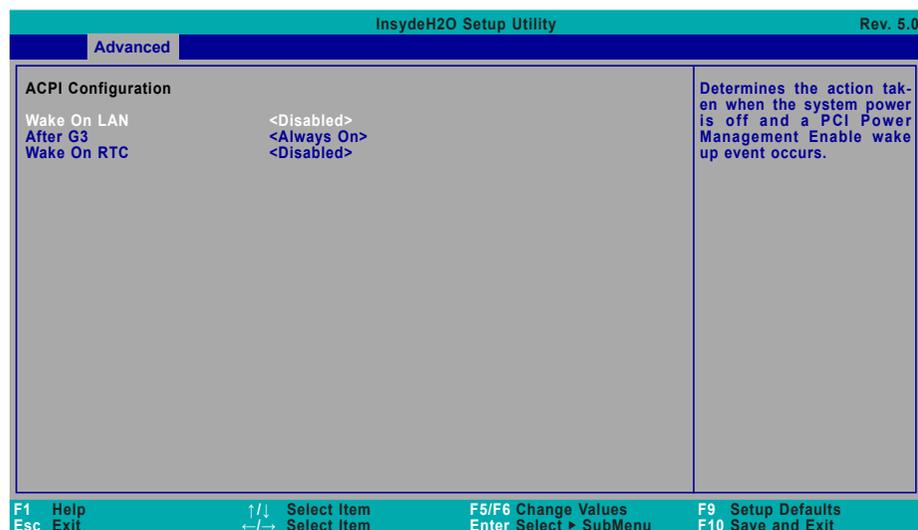


Important:
Setting incorrect field values may cause the system to malfunction.



► Advanced

ACPI Configuration



Wake On LAN

Enable or Disable this field to allow LAN signal to power up the system.

After G3

This field is to specify what state the system should be in when power is re-applied after a power failure.

Always On The system automatically powers on after power failure.

Always Off The system remains power off after power failure. Power-on signal input is required to power up the system.

BGRT Logo

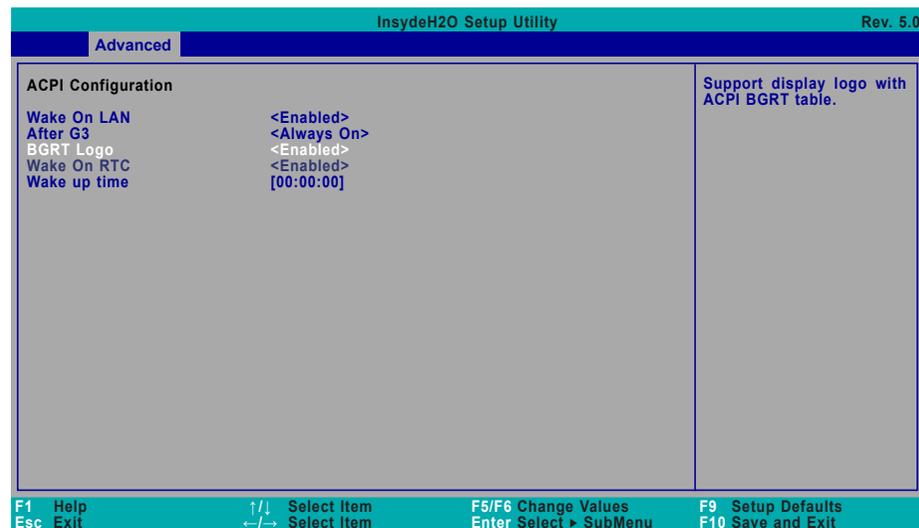
This field is used to enable or disable to support display logo with ACPI BGRT table.

Wake On RTC

When Enabled, the system will automatically wake up from S4/S5 state at a designated time every day via the Real-time clock (RTC) battery.

[Wake up time]

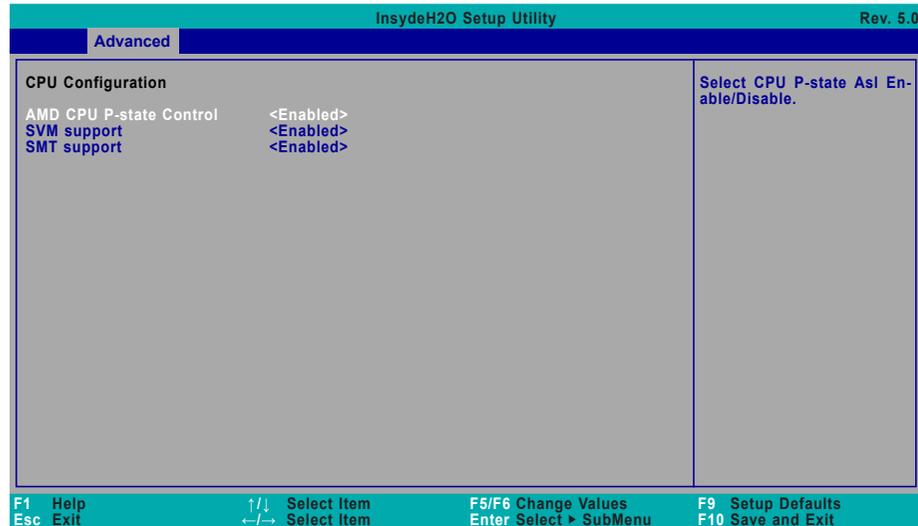
Configure the time of day the system will wake on RTC – [HH:MM:SS]. This field will only appear when "Wake On RTC" is enabled.



▶ Advanced

CPU Configuration

Configure CPU processing related settings in this page.



AMD CPU P-state Control

Enable or disable CPU P-state Asl to control the power consumption and performance.

SVM support

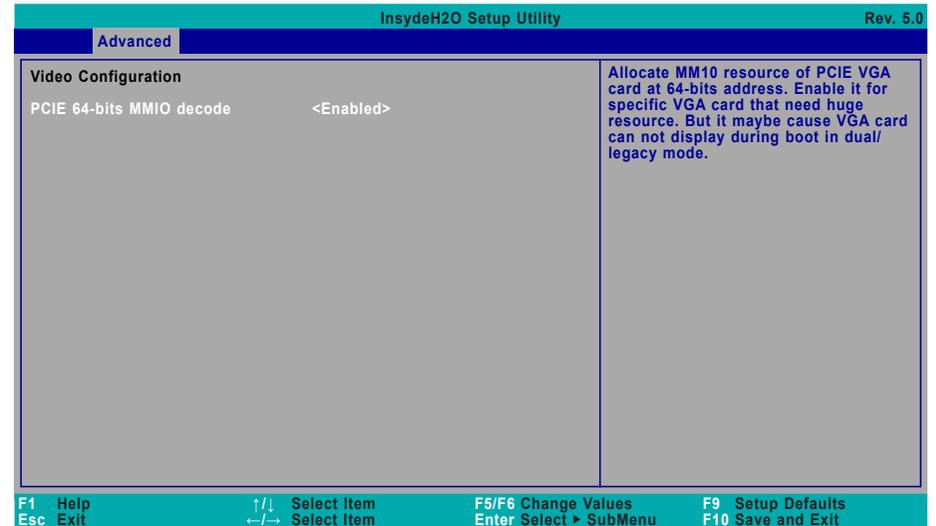
Enable or disable Secure Virtual Machine (SVM) for CPU virtualization.

SMT support

Enable or disable Simultaneous Multi-Threading. When it is enabled, a physical core will perform as two logical processors, and the user may experience better computational efficiency of the system. Please make sure that the OS operating on your system is optimized for SMT, or update to a version supports SMT. This field is only available with the CPU supported.

▶ Advanced

Video Configuration

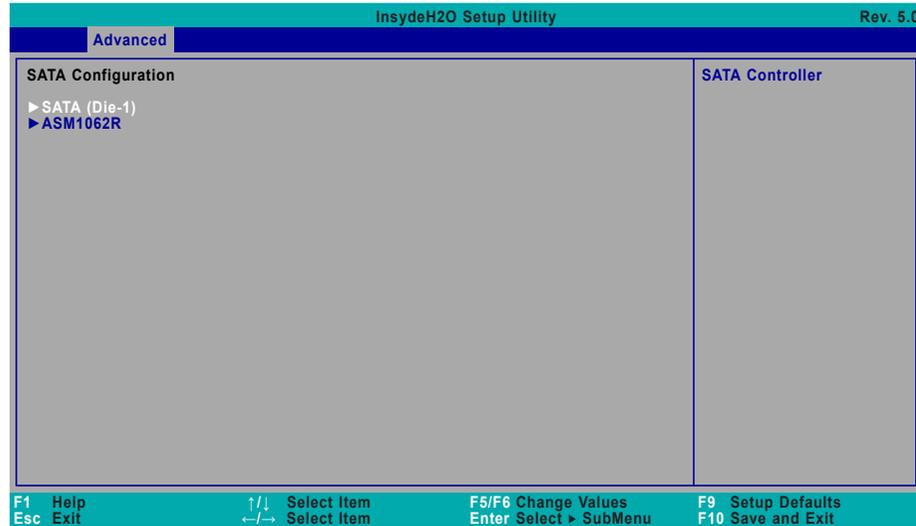


PCIE 64-bits MMIO decode

Select Enabled or Disabled to allocate MMIO resource of PCIE VGA card at 64-bits address. Enable it for specific VGA card that need huge resource. But it may cause VGA card to not display during boot in dual/legacy mode.

► Advanced

SATA Configuration



► SATA (Die-1)

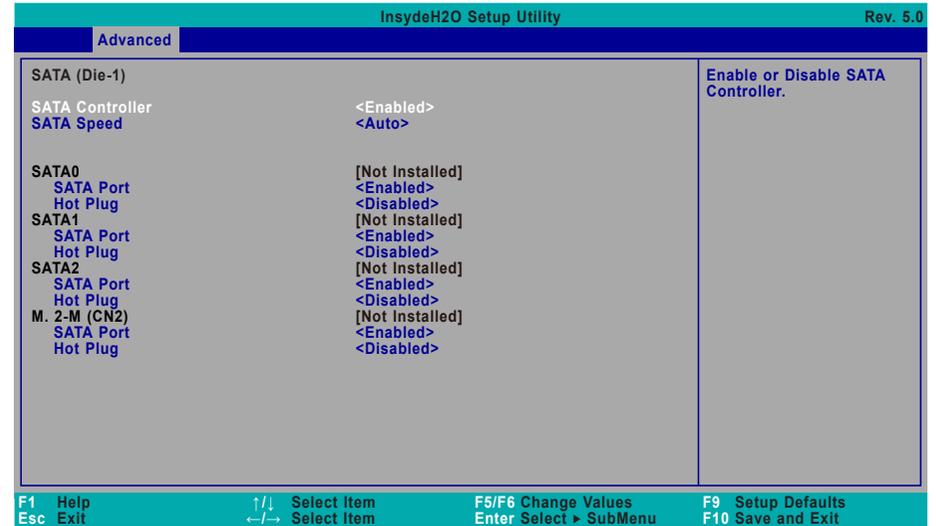
Press Enter to enter the sub-menu and configure on-board SATA controllers.

► ASM1062R

Press Enter to enter the sub-menu and configure the M.2 SATA storage device.

► Advanced ► SATA Configuration

► SATA (Die-1)



SATA Controller(s)

Enable or disable the Serial ATA controller. This following fields will only be displayed when this field is enabled.

SATA Speed

Select Serial ATA controller(s) speed – Auto, Gen1 (1.5 Gbit/s), Gen2 (3 Gbit/s) or Gen 3 (6 Gbit/s).

Configure SATA as

The mode selection determines how the SATA controller(s) operates.

AHCI This option allows the Serial ATA controller(s) to use AHCI (Advanced Host Controller Interface).

RAID This option allows the Serial ATA controller(s) to use UEFI, RAID, and Intel Rapid Storage Technology.

SATA Port 0-2/Hot Plug

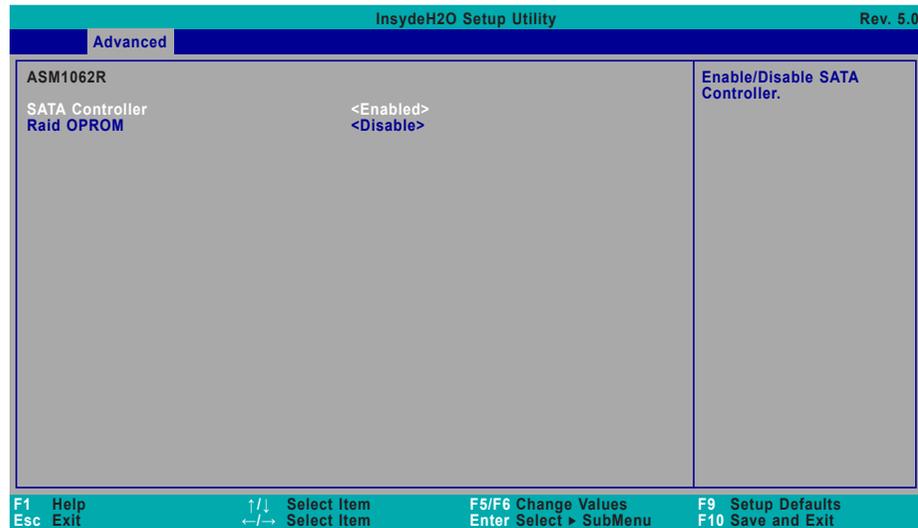
Enable or disable each Serial ATA port and its hot plug function.

M.2-M (CN2)/Hot Plug

Enable or disable each Serial ATA port and its hot plug function.

▶ Advanced ▶ SATA Configuration

▶ **ASM1062R**



SATA Controller

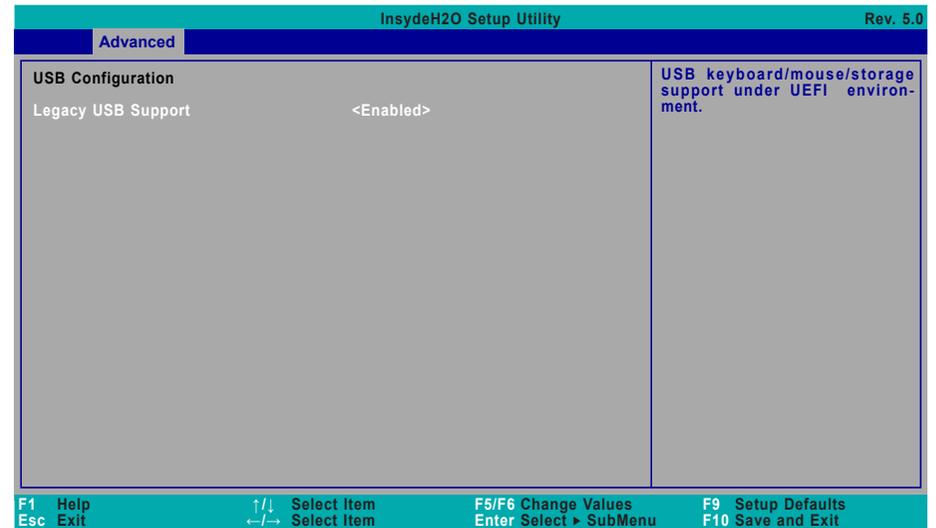
Enable or disable the Serial ATA controller. This following fields will only be displayed when this field is enabled.

Raid OPROM

Enable to OPROM for RAID management.

▶ Advanced

USB Configuration

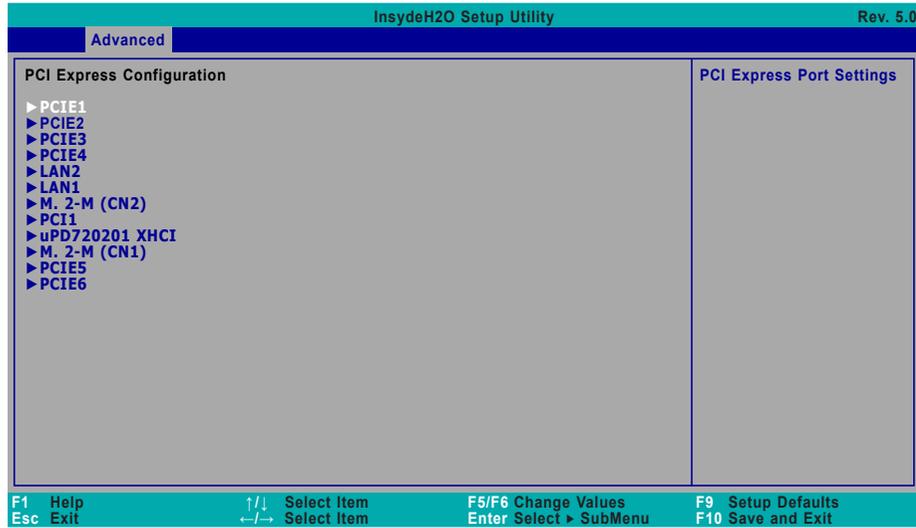


Legacy USB Support

- Enabled** Enable Legacy USB support.
- Disabled** Keep USB devices available only for EFI applications.

► Advanced

PCI Express Configuration



► PCI E1/PCI E2/PCI E3/PCI E4/PCI E5/PCI E6/LAN1/LAN2/M.2 M (CN1)/M.2 M (CN2)/PCI1/
uPD720201 XHCI

Port Enable

Enable or disable the PCI Express Root Port.

PCIe Speed

Select PCIe Speed of the current port – AUTO, Gen1 (2.5 GT/s), Gen2 (5 GT/s), or Gen3 (8 GT/s). Gen 3 is only available for the PCI E1 port. This field may not appear when the speed of the port is not configurable.

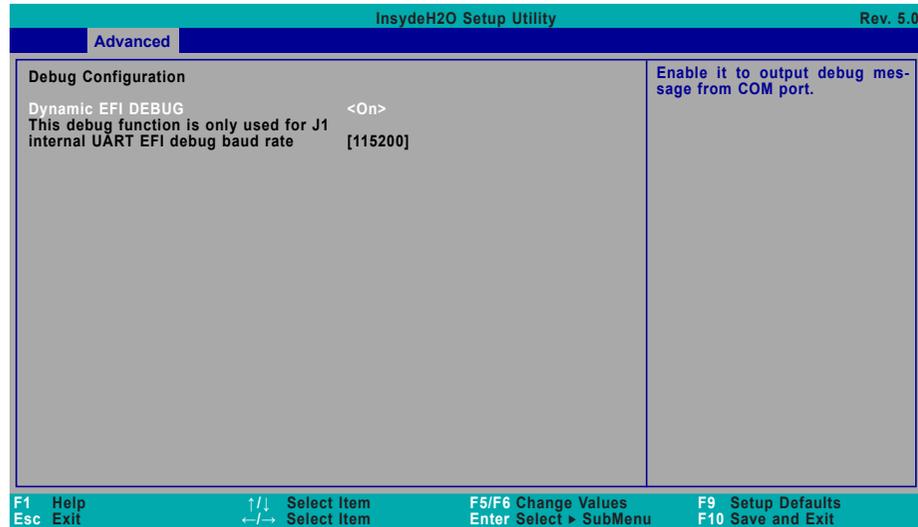
Hot Plug

Enable or disable hot plug function of the port. This field may not appear when the port does not support hot plug.

► Advanced

Debug Configuration

This section configures Debug setting.



Dynamic EFI DEBUG

This field is used to turn on or off the function to output debug message from COM port. When this field is set to "On", the following EFI debug configurations will be displayed.

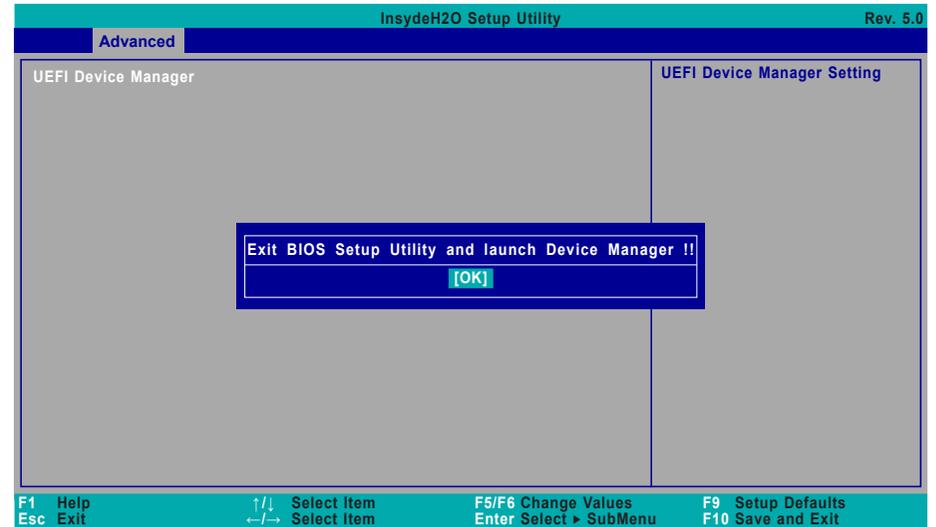
This debug function is only used for J1 internal UART EFI debug baud rate

Enter the baud rate to output EFI debug message. The default is 115200.

► Advanced

UEFI Device Manager

Configure UEFI device with option ROM, such as LAN card, etc.



Press "Enter" and "OK" to enter UEFI Device Manager setup page. More device settings can be configured in the UEFI Device Manager, including LAN, Network Stacks, and etc.



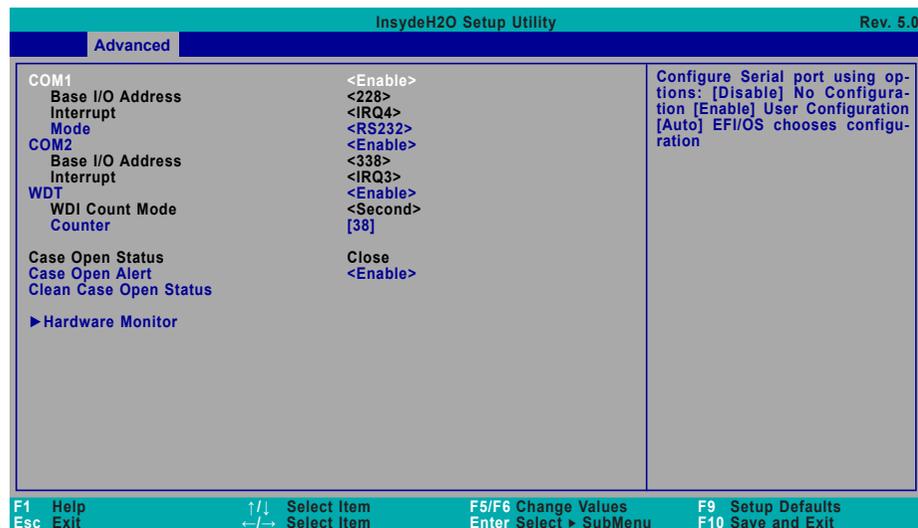
Note:

Network Device will not be configurable in Device Manager if "Network Stack" is disabled in the "Boot" menu.

► Advanced

SIO NCT6112D

Configure Super I/O settings in this submenu. Scroll by moving the cursor up or down to reveal more options.



COM1

Enables or disables the serial ports (COM). The following bracketed fields will only appear when the port is enabled.

COM2

Enables or disables the serial ports (COM). The following bracketed fields will only appear when the port is enabled.

WDT

Enable or disable the Watchdog Timer (WDT) function. A counter will appear if you select to enable WDT. Input any value between 1 to 255 seconds.

▼ WDT = [Enable]

Counter

Set the timeout value of the WDT – 1-255 seconds.

Case Open Alert

Enable or disable case open alert.

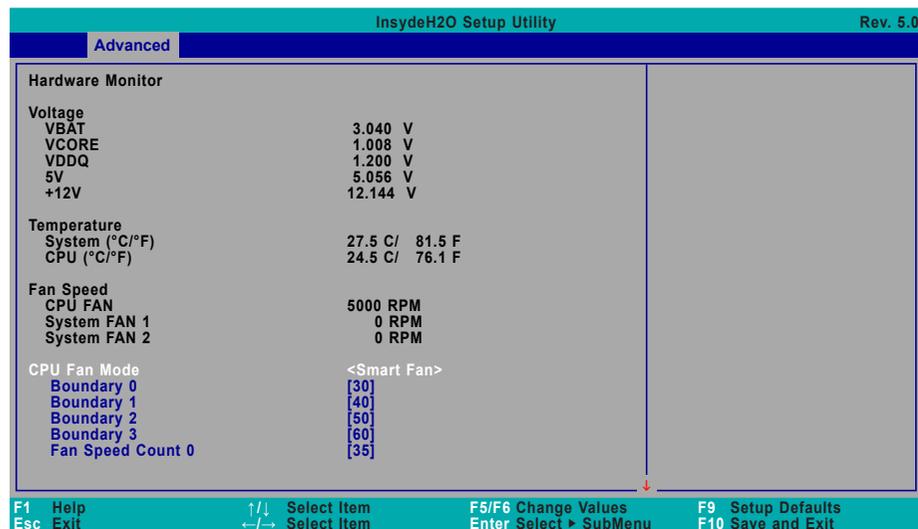
Clean Case Open Status

Clean current case open status including alert.

▶ Advanced ▶ SIO NCT6112D

▶ **Hardware Monitor**

This section displays the PC health status.



Smart Fan

Smart Fan is a fan speed moderation strategy that depends 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.

SYS Smart Fan/CPU Smart Fan Control

Enable or disable the system smart fan. When disabled, fan speed will not be controllable according to different system temperatures. Instead, a Fix Fan Speed Count field will be displayed to configure at which speed the fan will always be fixed regardless of system temperature.

▼ **CPU / Sytem Fan Mode = [Smart Fan]**

Boundary 0 to Boundary 3

Set the boundary temperatures that determine the fan speeds accordingly, the value ranging from 0-127°C. 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 0 to Fan Speed Count 3

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.

▼ **CPU / System Fan Mode = [Manual]**

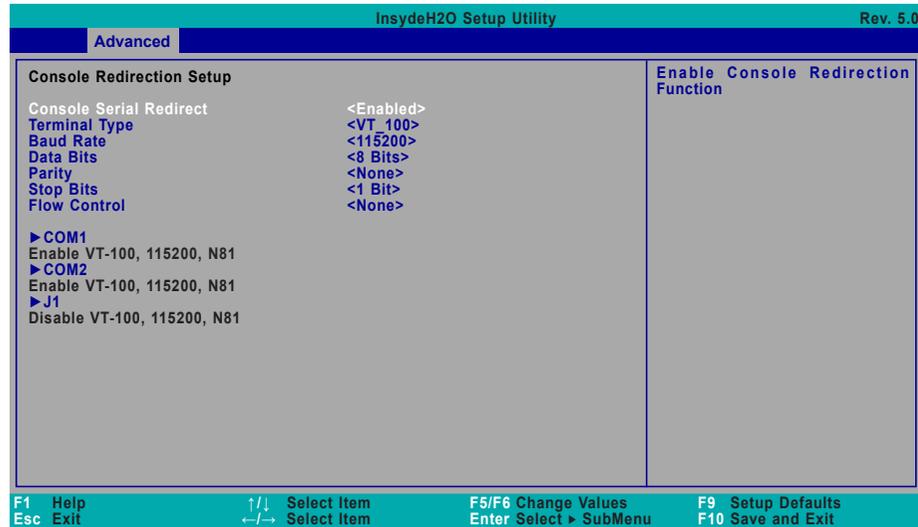
Fan Speed Count

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**

Console Redirection

Configure COM port serial settings in the submenu.



Terminal Type

Select terminal type – VT_100, VT_100+, VT_UTF8 or PC_ANSI.

Baud Rate

Select baud rate – 115200, 57600, 38400, 19200, 9600, 4800, 2400 or 1200.

Data Bits

Select data bits – 7 bits or 8 bits.

Parity

Select parity bits – none, even or odd.

Stop Bits

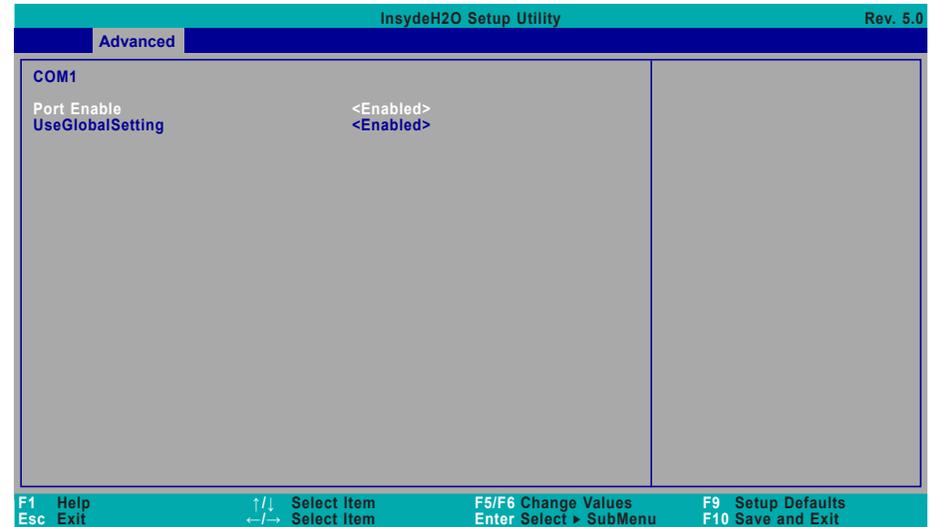
Select stop bits – 1 bit or 2 bits.

Flow Control

Select flow control type – none, RTS/CTS or XON/XOFF.

► **COM1/COM2/J1**

Configure individual COM port serial settings in the submenu.



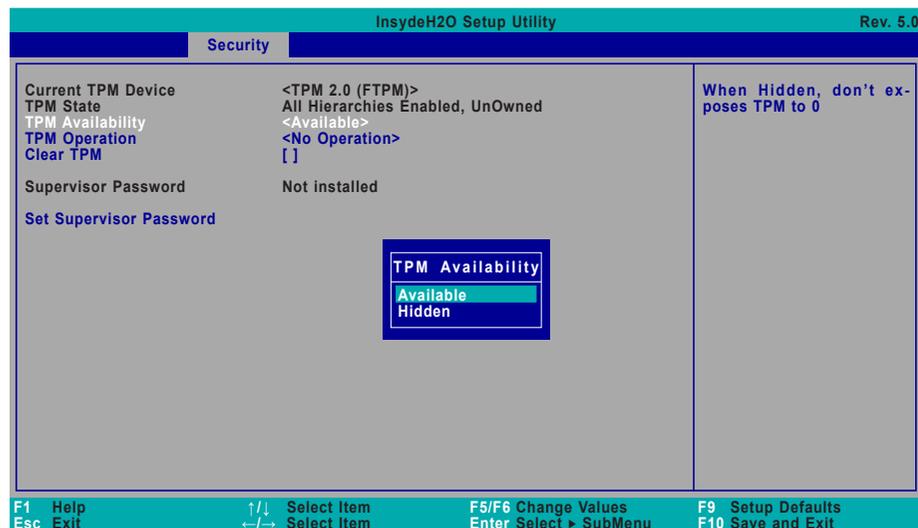
Port Enable

This field is used to enable or disable the COM port to redirect the console.

Use Global Setting

This field is to enable or disable using the global setting. When "Use Global Setting" is enabled, settings of the current port will dependent on Console Redirection settings. When "Use Global Setting" is disabled, settings of the current port can be configured independently in this section.

► Security



TPM Availability

Show or hide the TPM availability and its configurations.

TPM Operation

Select one of the supported operation to change TPM2 state – No Operation, Enable, or Disable.

Clear TPM

Remove all TPM context associated with a specific Owner.

Set Supervisor Password

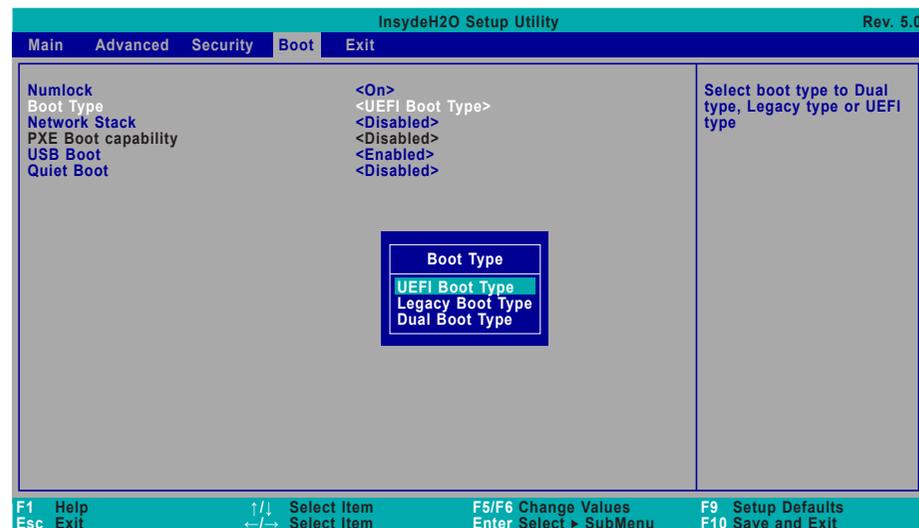
Set the supervisor's password. The length of the password must be greater than one character.



Note:

The devices shown here are based on a carrier board that may not resemble your actual carrier board. The actual I/O devices depend entirely on those present on your actual carrier board.

► Boot



Numlock

Select the power-on state for numlock.

Boot Type

Select the boot type – UEFI Boot Type, Legacy Boot Type or Dual Boot Type. If you select "UEFI Boot Type" or "Dual Boot Type", the "Network Stack", "PXE Boot capability", "USB Boot" and "Quiet Boot" will show up. If you select "Legacy Boot Type", "PXE Boot to LAN", "USB Boot" and "Quiet Boot" will show up.



Note:

Please press F10 to save the settings and re-start the system board after changing "Boot Type".

Network Stack

This field is used to enable or disable network stacks, i.e. IPv4 or IPv6 network protocols.

► **Boot**

PXE Boot capability

This field is only available when "Boot Type" is set to "UEFI Boot Type" or "Dual Boot Type", and when "Network Stack" is enabled.

Disabled Support Network Stack

UEFI IPv4/IPv6

Legacy Legacy PXE OPRM only

PXE Boot to LAN

Enable or disable Boot into the Pre-boot Execution Environment (PXE) stored in the LAN. This field is only available when "Boot Type" is set to "Legacy Boot Type" or "Dual Boot Type", and when "Network Stack" is enabled.

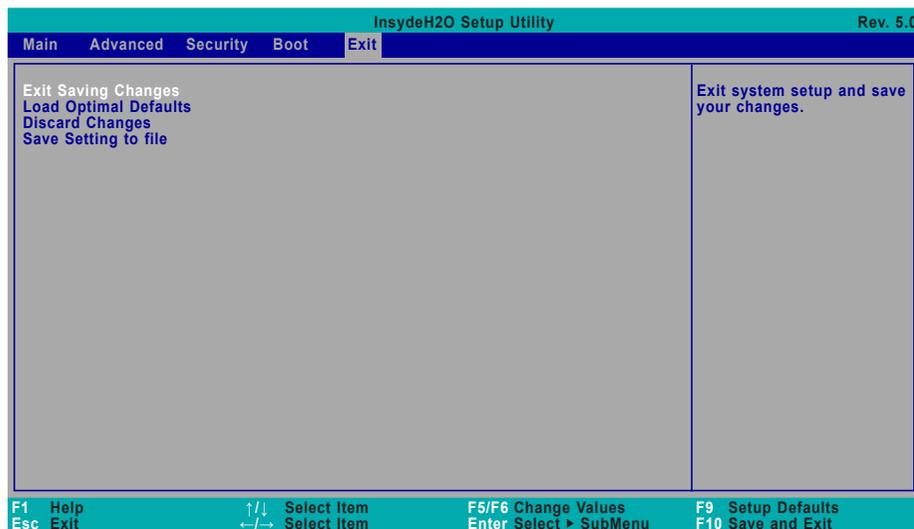
USB Boot

Enable or disable booting to USB boot devices.

Quiet Boot

Enable or disable booting in text mode.

► Exit

**Exit Saving Changes**

Select Yes and press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select YES and press <Enter> to load optimal defaults.

Discard Changes

Select YES and press <Enter> to exit the system setup without saving your changes.

Save Setting to file

Select this option to save BIOS configuration settings to a USB flash device.

Restore Setting from file

This field will appear only when a USB flash device is detected. Select this field to restore setting from the USB flash device.

► 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 Insyde BIOS in UEFI mode, you may refer to the how-to video at <https://www.dfi.com/tw/knowledge/video/31>.

► 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.

Chapter 4 - RAID

The system board allows configuring RAID on Serial ATA drives. It supports RAID 0, RAID 1, and SPAN.

► RAID Levels

RAID 0 (Striped Disk Array without Fault Tolerance)

RAID 0 uses two new identical hard disk drives to read and write data in parallel, interleaved stacks. Data is divided into stripes and each stripe is written alternately between two disk drives. This improves the I/O performance of the drives at different channel; however it is not fault tolerant. A failed disk will result in data loss in the disk array.

RAID 1 (Mirroring Disk Array with Fault Tolerance)

RAID 1 copies and maintains an identical image of the data from one drive to the other drive. If a drive fails to function, the disk array management software directs all applications to the other drive since it contains a complete copy of the drive's data. This enhances data protection and increases fault tolerance to the entire system. Use two new drives or an existing drive and a new drive but the size of the new drive must be the same or larger than the existing drive.

RAID 5

RAID 5 stripes data and parity information across hard drives. It is fault tolerant and provides better hard drive performance and more storage capacity.

RAID 10 (Mirroring and Striping)

RAID 10 is a combination of data striping and data mirroring providing the benefits of both RAID 0 and RAID 1. Use four new drives or an existing drive and three new drives for this configuration.

RAID Level	Min. Drives	Protection	Description
RAID 0	2	None	Data striping without redundancy
RAID 1	2	Single Drive Failure	Disk mirroring
RAID 5	3	Single Drive Failure	Block-level data striping with distributed parity
RAID 10	4	1 Disk Per Mirrored Stripe (not same mirror)	Combination of RAID 0 (data striping) and RAID 1 (mirroring)
SPAN	2	None	Extends capacity to the sum of total drives, the second drive won't be used until the first one is full.

► Setup Procedure

To enable the RAID function, the following settings are required.

1. Install SATA drives.
2. Enter the RAID menu
3. Create RAID 0/RAID 1/SPAN

Step 1: Install SATA Drives

Refer to chapter 2 for details on connecting the Serial ATA drives.



Important:

1. Please make sure the SATA drives that you are to create a RAID volume with are connected and powered, and are able to be detected by the system. Otherwise, the RAID BIOS utility would not be accessible.
2. While creating a RAID volume, please make sure the system, drives, and cables are perfectly steady and mounted correctly. Disturbance during creating a RAID volume will result in irreversible data corruption sorted on the drive.

Step 2: Enter the RAID Menu

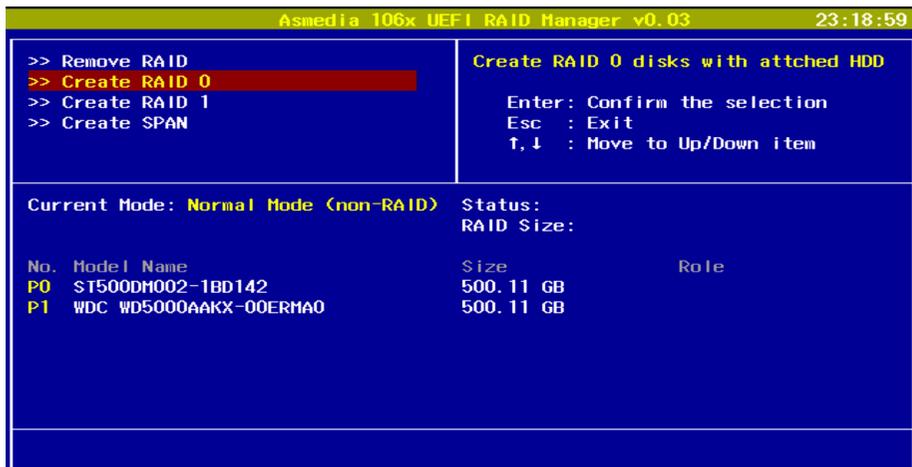
1. Power-on the system then press 'Ctrl-R' to enter the RAID menu.

```
Asmedia 106x SATA Controller UEFI Ver 1.11 AHCI Mode
Copyright (C) Asmedia Technologies, Inc. All Right reserved.
Firmware version: 190920_00_00_00
Press 'Ctrl-r' to enter RAID menu...
```

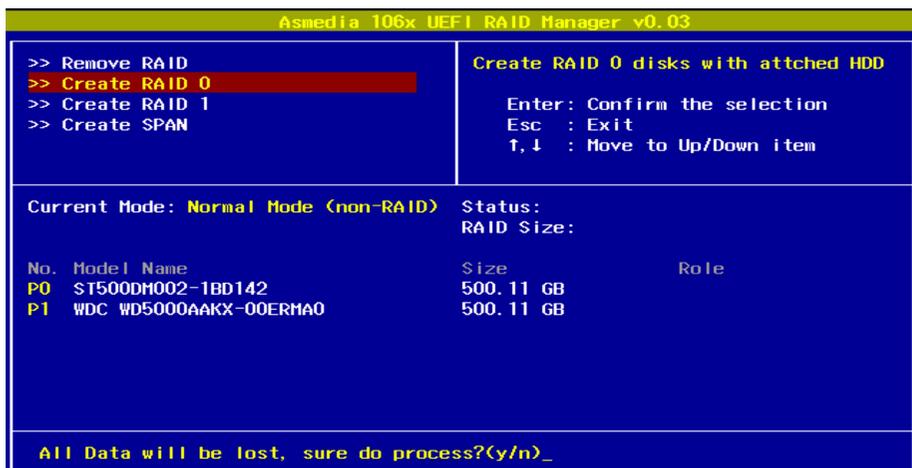
► Setup Procedure

Step 3: Create RAID 0/RAID 1/ SPAN

1. Select the desired mode and press <Enter>.

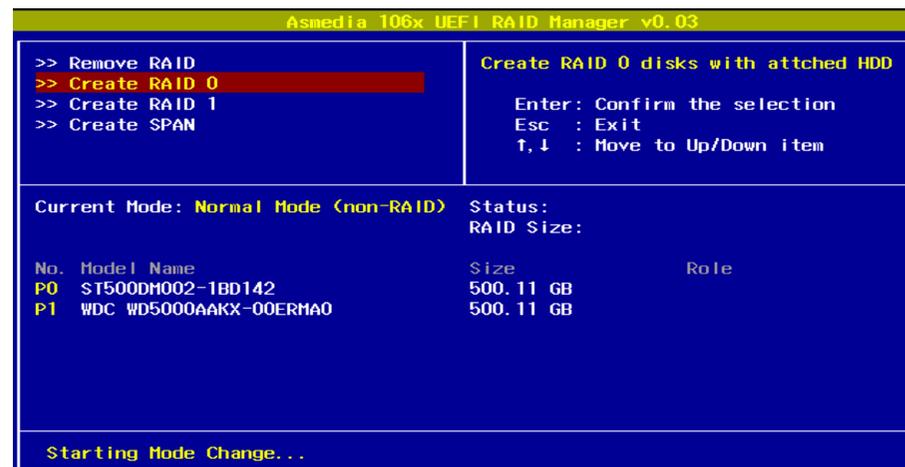


2. Press <Y> to confirm the process.

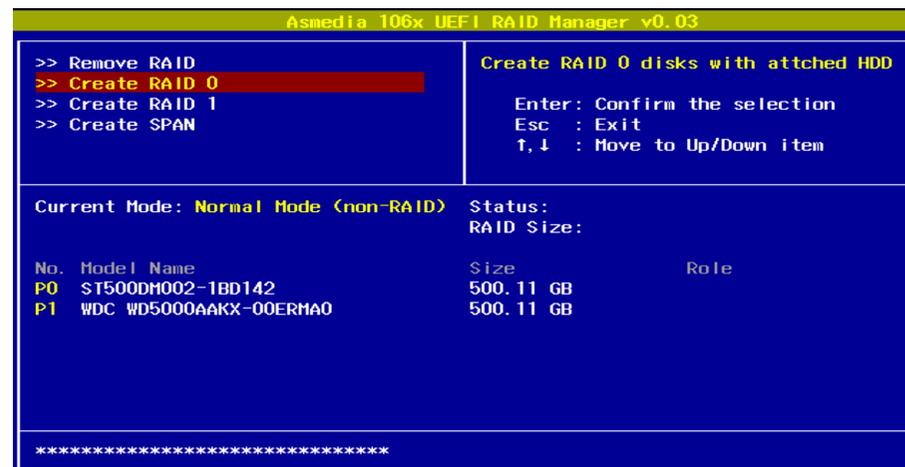


► Setup Procedure

3. Wait the process to start, the whole process takes about several seconds depends on the volume amounts.



4. "*" shown on bottom indicates the progress.



5. Relevant information will appear with the message "Mode change is completed." on bottom.

```

Asmedia 106x UEFI RAID Manager v0.03      23:19:16
>> Remove RAID
>> Create RAID 0
>> Create RAID 1
>> Create SPAN

Create RAID 0 disks with attached HDD
Enter: Confirm the selection
Esc : Exit
↑,↓ : Move to Up/Down item

Current Mode: RAID 0      Status: Good
RAID Size: 1,000.20 GB

No. Model Name      Size      Role
P0 ST500DM002-1BD142 500.11 GB RAID 0 Seq. 0
P1 WDC WD5000AAKX-00ERMA0 500.11 GB RAID 0 Seq. 1

Mode Change is completed.
  
```

Other RAID modes follow the same procedure as well.