



NexCOBOT Co., Ltd.

**Intelligent Platform & Services Business Unit**  
**Embedded Computing (Industrial Motherboard)**  
**NEX 619**  
User Manual

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# PREFACE

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## Acknowledgements

NEX 619 is a trademark of Nexcobot Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

## Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

## Declaration of Conformity

### FCC

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

### CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

## RoHS Compliance



### NexCOBOT RoHS Environmental Policy and Status Update

NexCOBOT is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NexCOBOT has established an engineering and manufacturing task force in to implement the introduction of green products. The task force will ensure that we follow the standard NexCOBOT development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NexCOBOT are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

### How to recognize NexCOBOT RoHS Products?

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NexCOBOT naming convention.

## Warranty and RMA

### NexCOBOT Warranty Period

NexCOBOT manufactures products that are new or equivalent to new in accordance with industry standard. NexCOBOT warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NexCOBOT.

### NexCOBOT Return Merchandise Authorization (RMA)

- Customers shall enclose the “NexCOBOT RMA Service Form” with the returned packages.
- Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the “NexCOBOT RMA Service Form” for the RMA number apply process.
- Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NexCOBOT is not responsible for the devices/parts.
- Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as “Out of Warranty.”
- Any products returned by NexCOBOT to other locations besides the customers’ site will bear an extra charge and will be billed to the customer.

### Repair Service Charges for Out-of-Warranty Products

NexCOBOT will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

#### System Level

- Component fee: NexCOBOT will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- Items will be replaced with NexCOBOT products if the original one cannot be repaired. Ex: motherboard, power supply, etc.
- Replace with 3rd party products if needed.
- If RMA goods can not be repaired, NexCOBOT will return it to the customer without any charge.

#### Board Level

- Component fee: NexCOBOT will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.
- If RMA goods can not be repaired, NexCOBOT will return it to the customer without any charge.

## Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

## Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

## Safety Information

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

## Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.



## Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect the equipment from any AC outlet before cleaning or installing a component inside the chassis. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. To prevent electrostatic build-up, leave the board in its anti-static bag until you are ready to install it.
5. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
6. Keep the board away from humidity.
7. Put the board on a stable surface. Dropping it or letting it fall may cause damage.
8. Wear anti-static wrist strap.
9. Do all preparation work on a static-free surface.
10. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
11. Hold the board only by its edges. Be careful not to touch any of the components, contacts or connections.
12. All cautions and warnings on the board should be noted.
13. Use the correct mounting screws and do not over tighten the screws.
14. Keep the original packaging and the anti-static bag; in case the board has to be returned for repair or replacement.

## Technical Support and Assistance

1. For the most updated information of NexCOBOT products, visit NexCOBOT's website at [www.nexcobot.com](http://www.nexcobot.com).
2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
  - Product name and serial number
  - Detailed information of the peripheral devices
  - Detailed information of the installed software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wordings of the error messages

### Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

## Conventions Used in this Manual



### Warning:

Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.



### Caution:

Information to avoid damaging components or losing data.



### Note:

Provides additional information to complete a task easily.

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## Package Contents

Before continuing, verify that the NEX 619 package that you received is complete. Your package should have all the items listed in the following table.

Item	Name	Qty
1	NEX 619 mainboard	1
2	SATA III cable	1
3	SATA power cable	1
4	COM cable	2
5	I/O shield	1



### Heat Spreader:

The heatspreader acts as a thermal coupling device to the module and is thermally coupled to the CPU via a thermal gap filler. On some modules, it may also be thermally coupled to other heat generating components with the use of additional thermal gap fillers. Although the heatspreader is the thermal interface where most of the heat generated by the module is dissipated, it is not to be considered as a heatsink. It has been designed as a thermal interface between the module and the application specific thermal solution.

## Ordering Information

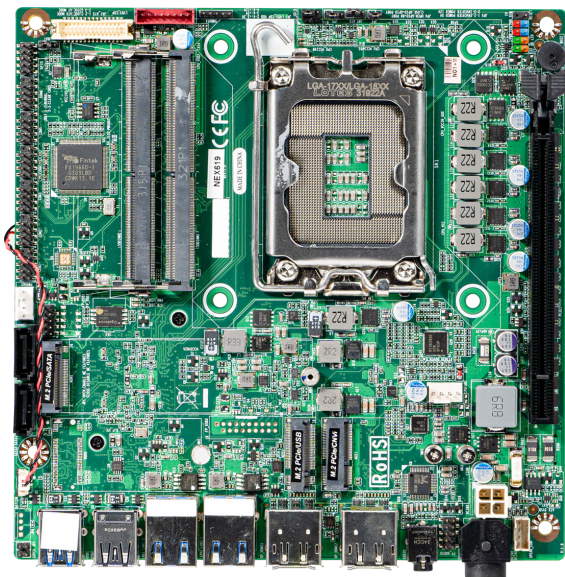
The following information below provides ordering information for NEX 619.

### **NEX619 (P/N: 6879G0006190F)**

Mini-ITX, 14th/13th/12th gen Intel® Core™, LGA 1700 socket, processor max 65W TDP, PCH H610 , 2x DDR5 SODIMM, 2 x HDMI®, 2 x DP, 3 x USB 3.2, 3 x USB 2.0, 2 x 2.5GbE, 2 x SATA III, 2 x RS-232/422/485, 4 x RS232, 3 x M.2

# CHAPTER 1: PRODUCT INTRODUCTION

## Overview



## Key Features

- 14th/13th/12th gen Intel® Core™ LGA1700 Processor
- 2 x DDR5 5600MHz/4800MHz SODIMM up to 64GB
- 2 x Intel i225-V2.5GbE
- 2 x HDMI® 2.0, 2 x DP 1.4, 1x LVDS/eDP support Triple displays
- 1 x M.2 2280 Key M slot
- 1 x M.2 2230 Key E slot support CNVio
- 1 x M.2 3042/3052 Key B slot support 4G/5G Module
- 2 x USB 3.2 (Gen 2), 1 x USB 3.2 (Gen1), 3 x USB 2.0
- 2 x SATA III (6 Gb/s)
- 6 x COM (2 x RS-232/422/485, 4 x RS-232)
- Mini-ITX form factor (170mm x 170mm)
- Support wide voltage 12V~36V DC-in

## Hardware Specifications

### CPU Support

- 14th/13th/12th gen Intel® Core™, LGA 1700 socket, Core i9/i7/i5/i3 Pentium/Celeron Processor Max. 65W TDP, Intel H610 PCH

### Main Memory

- SO-DIMM x 2, DDR5 5600/4800 MHz, up to 64GB Non-ECC
- Dual-Channel memory architecture

### BIOS

- AMI Flash ROM BIOS

### Display

- 2 x HDMI® 2.0b, Up to 4096 x 2160 @60Hz
- 2 x DP 1.4a , Up to 4096 x 2304 @60Hz
- 1 x LVDS/eDP ,up to 1920 x 1200 @60Hz,
- Support Triple Displays

### Ethernet

- 2 x Intel i225-V 2.5GbE

### Expansion Slots

- 1 x M.2 Key B (3042/3052, USB3.1/USB2.0/PCIe x1 interface) support 4G/5G module
- 1 x M.2 2230 Key E (2230, PCIe x1/USB2.0 interface)support CNVio for Wi-Fi
- 1 x PCIe Gen 4 x16, support PCIe card up to Max.70W

### Storage

- 2 x SATA III (6 Gb/s)
- 1 x M.2 2280 Key M

### Serial Port

- 2 x (RS-232/422/485), 4 x RS-232

### Audio

- 1 x HD Audio Realtek ALC888S(with 3W Amp)

### Watch Dog

- From Super I/O
- 256 segments (10sec~255min)

### Rear I/O

- 2 x DP 1.4a
- 2 x HDMI® 2.0b
- 2 x 2.5GbE
- 2 x USB 3.2 (Gen2)
- 1 x USB 3.2 (Gen1)
- 1 x USB 2.0
- 1 x Audio jack (Line-out / MIC combo)
- 1 x 12V~36V DC in jack

### Dimensions

- Mini-ITX Form Factor, 6.7" x6.7" (170mmx170mm)



## Power Requirement

- 12V~36 V DC in , AT/ATX Supported
- AT: Directly PWR on as Power input ready
- ATX: Press Button to PWR on after Power input ready

## Environment

- Board level operation temperature : 0°C to 60°C
- Storage temperature : -20°C to 85°C
- Relative humidity: 10% ~ 90% RH @40 0°C (non-condensing)

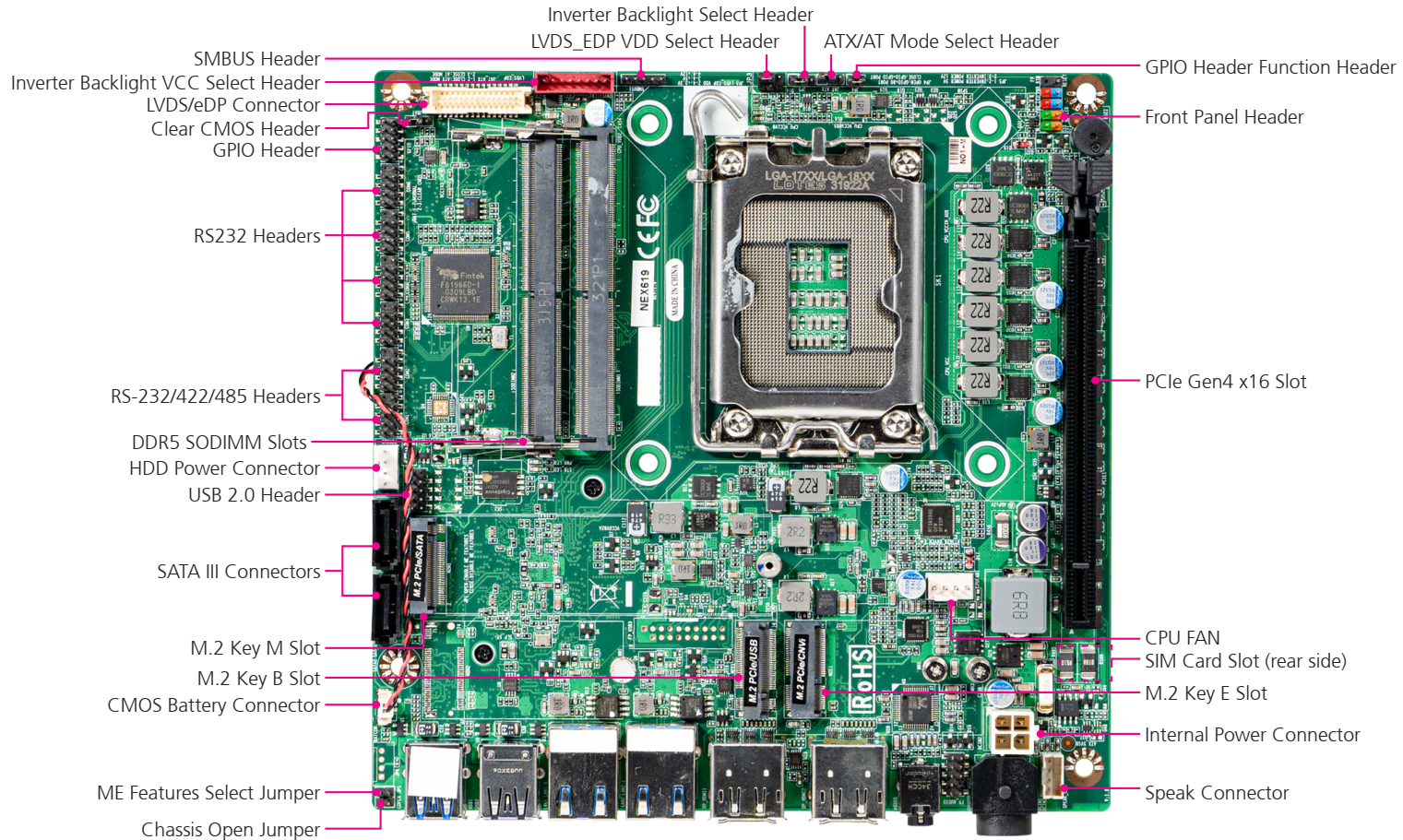
## Certifications

- Meet CE / FCC Class A

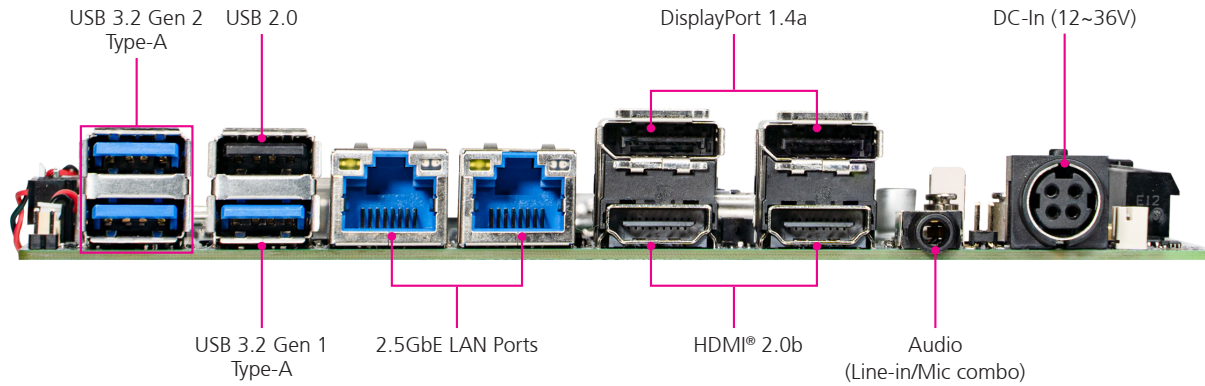
## OS Support

- Windows® 10 64-bit, Windows® 11 64-bit

# Knowing Your NEX 619



## Edge I/O View



## CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers and connectors on the NEX 619 motherboard.

### Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environments tend to have less static electricity than

dry environments. A grounding strap is warranted whenever danger of static electricity exists.

### Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

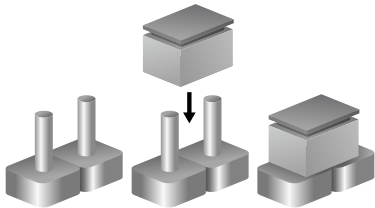
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

## Jumper Settings

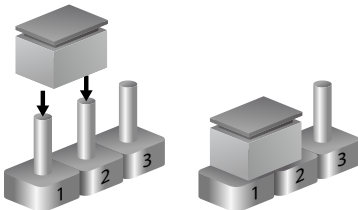
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)

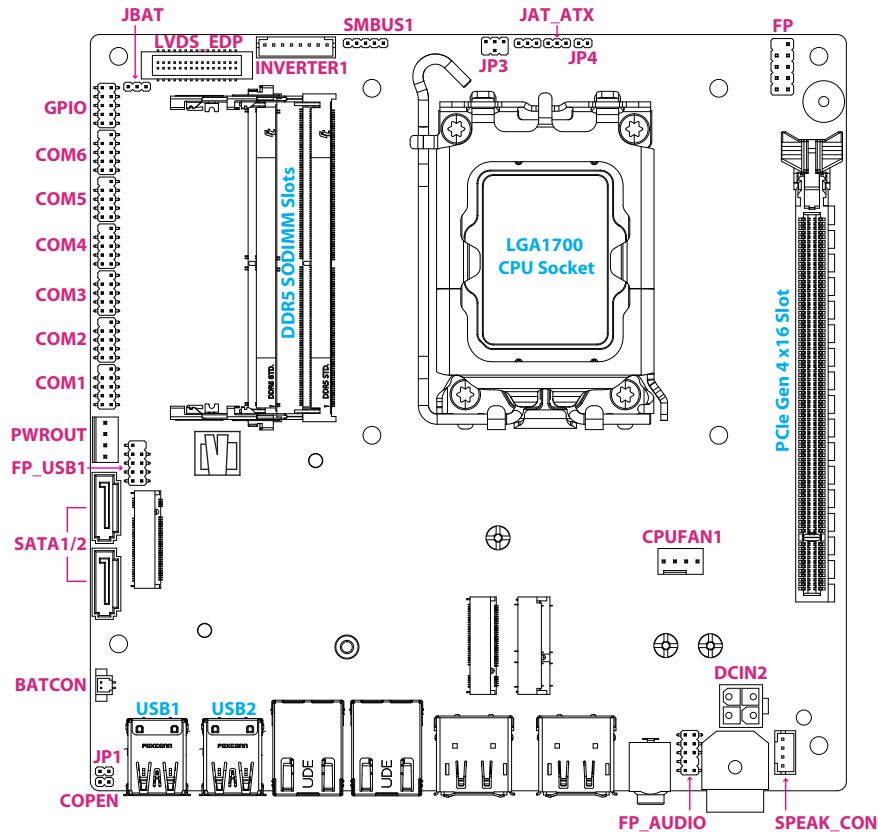


Three-Pin Jumpers: Pins 1 and 2 are Short



## Locations of the Jumpers and Connectors

The following figure shows the motherboard of NEX619, and indicates the locations of jumpers and connectors. Refer to this chapter for detailed pin setting and definitions of connectors marked in pink on this figure.



## Jumpers

### Chassis Intrusion

Connector type: 2-pin header

Connector location: COPEN

1  2

Pin	Settings
1-2 On	Enabled (Default)



To enable open chassis detection, short-circuit the COPEN pins and configure the [Case Open Detect](#) in the BIOS.

### AT/ATX Mode Selection

Connector type: 3-pin header

Connector location: JAT\_ATX

1  3

Pin	Settings
1-2 On	ATX mode (default)
2-3 On	AT mode



- Switching between [AT](#) and [ATX modes](#) should be consistent with the settings in BIOS.
- ATX Mode Selected:** Press the power button to turn on after power input is ready. **AT Mode Selected:** Power on directly when power is inputted.

## Clear CMOS

Connector type: 3-pin header  
Connector location: JBAT

1  3

Pin	Settings
1-2 On	Normal (default)
2-3 On	Clear CMOS

## ME Features Selection

Connector type: 2-pin header  
Connector location: JP1

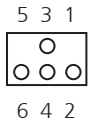
1  2

Pin	Settings
1-2 Off	Enable (default)
1-2 On	Disable



## LVDS/eDP VDD Selection

Connector type: 6-pin header  
Connector location: JP3



Pin	Settings
2-4 On	3.3V (default)
3-4 On	5V
4-6 On	12V

## GPIO Function Selection

Connector type: 2-pin header  
Connector location: JP4



Pin	Settings
1-2 Off	80 Port
1-2 On	GPIO (default)



Incorrect voltage settings can lead to screen burnout.

## Inverter Backlight VCC Selection

Connector type: 3-pin header

Connector location: JP5

1  3

Pin	Settings
1-2 On	5V (default)
2-3 On	12V



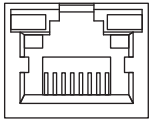
Incorrect voltage settings can lead to screen burnout.

## Edge I/O Connector

### 2.5GbE LAN Ports

Connector type: RJ-45

Activity/Link      Speed

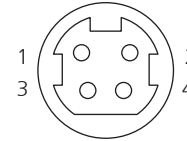


Activity/Link	Description	Speed	Description
Off	No Link	Off	10/100Mbps Link
Blinking	Data Activity	Orange	1Gbps Link
On	Link	Green	2.5Gbps Link

### DC-In Power Connector

Connector type: Mini-DIN 12V~36V

Connector location: DCIN3



Pin	Definition
1	+12V~36V DC_IN
2	+12V~36V DC_IN
3	GND
4	GND



In order to achieve the high speed transfer rate of up to 2.5 Gbps, it is necessary to use the CAT 5e UTP cable.



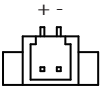
This motherboard features two types of connectors, one (DCIN3) located on the I/O panel and the other (DCIN2) located internally. Only one connector can be powered when the system is in use.

## Internal Connector Pin Definitions

### Battery Connector

Connector type: 2-pin header

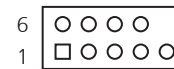
Connector location: BATCON



### Serial Port Headers

Connector type: 9-pin header

Connector location: COM1, COM2, COM3, COM4, COM5, and COM6



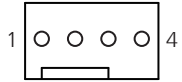
Pin	RS232	*RS422	*RS485
1	DCD-	TX-	DATA-
2	SIN-	TX+	DATA+
3	SOUT-	RX+	NC
4	DTR-	RX-	NC
5	GND	GND	GND
6	DSR-	NC	NC
7	RTS-	NC	NC
8	CTS-	NC	NC
9	RI-	NC	NC



By default, all COM ports are RS232. You can change the function of COM1 or COM2 to RS422 or RS485 using a compatible COM cable and configure the [Transmission Mode Select](#) settings in the BIOS.

## CPU Fan Connector

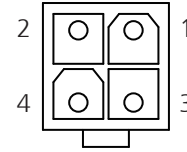
Connector type: 4-pin header  
Connector location: CPUFAN1



Pin	Definition
1	GND
2	+12V Fan Power
3	Fan Speed
4	Control

## Internal Power Connector

Connector type: 4-pin block, 12V~36V  
Connector location: DCIN2



Pin	Definition
1	GND
2	GND
3	+12V~36V
4	+12V~36V



**DO NOT** forget to connect the fan cables to the fan headers. Insufficient air flow inside the system may damage the motherboard components. These are not jumpers! **DO NOT** place jumper caps on the fan connectors!

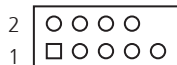


This motherboard features two types of connectors, one (**DCIN3**) located on the I/O panel and the other (**DCIN2**) located internally. Only one connector can be powered when the system is in use.

## Front Panel Header

Connector type: 9-pin header

Connector location: FP

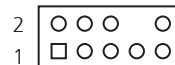


Pin	Definition	Pin	Definition
1	HDDLED+	2	PWRLED+
3	HDDLED-	4	PWRLED-
5	GND	6	PWRBT
7	RSTSW	8	GND
9	VCC		

## Front Panel Audio Header

Connector type: 9-pin header, Line-Out, Mic-In

Connector location: FP\_Audio

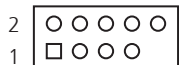


Pin	Definition	Pin	Definition
1	MIC2_L	2	GND
3	MIC2_R	4	AUDIO_JD
5	LINE_OUT2_R	6	MIC_JD
7	SENSE		
9	LINE_OUT2_L	10	LINE_OUT_JD

## Front Panel USB Port Header

Connector type: 9-pin header, USB 2.0

Connector location: FP\_USB1

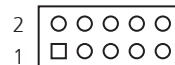


Pin	Definition	Pin	Definition
1	VCC	2	VCC
3	DATA-	4	DATA-
5	DATA+	6	DATA+
7	GND	8	GND
		10	NC

## GPIO/80 Port Header

Connector type: 10-pin header, 8-bit

Connector location: GPIO



Pin	Definition	Pin	Definition
1	SIO_GPIO80	2	SIO_GPIO81
3	SIO_GPIO82	4	SIO_GPIO83
5	SIO_GPIO84	6	SIO_GPIO85
7	SIO_GPIO86	8	SIO_GPIO87
9	GND	10	VCC



GPIO can operate as either a Debug display port or a GPIO port through the [JP4](#) jumper setting.

## LVDS/eDP Inverter Connector

Connector type: 8-pin header

Connector location: INVERTER1



Pin	Definition
1	Backlight Enable
2	Backlight PWM
3	PVCC
4	PVCC
5	GND
6	GND
7	Backlight Up SW
8	Backlight Down SW



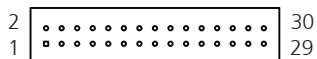
Identify the pin one ensure the proper installation direction.  
Failure to do so may result in damage to both the motherboard and display panel.



## LVDS/eDP LCD Panel Wafer

Connector type: 30-pin header

Connector location: LVDS\_EDP



Pin	Definition	Pin	Definition
1	LVDSB_DATAN	2	LVDSB_DATAP3
3	LVDSB_CLKN	4	LVDSB_CLKP
5	LVDSB_DATAN2	6	LVDSB_DATAP2
7	LVDSB_DATAN1	8	LVDSB_DATAP1
9	LVDSB_DATAN0	10	LVDSB_DATAPO
11	LVDS_DDC_SDA	12	LVDS_DDC_SCL
13	GND	14	GND
15	GND	16	GND

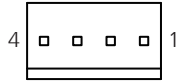
Pin	Definition	Pin	Definition
17	LVDSA_DATAP3	18	LVDSA_DATAN3
19	LVDSA_CLKP/eDP_AUXP	20	LVDSA_CLKN/eDP_AUXN
21	LVDSA_DATAP2/eDP_TX0P	22	LVDSA_DATAN2/eDP_TX0N
23	LVDSA_DATAP1/eDP_TX1P	24	LVDSA_DATAN1/eDP_TX1N
25	LVDSA_DATAPO	26	LVDSA_DATANO
27	LCD_VCC	28	LCD_VCC
29	LCD_VCC	30	LCD_VCC



The maximum current limit is 2A when using a 5V/12V [backlight power supply voltage](#). The maximum current limit is 2A when using a [3.3V/5V/12V LCD\\_VCC](#) supply voltage. Incorrect voltage settings can lead to screen burnout.

## HDD Power Connector

Connector type: 4-pin header  
Connector location: PWROUT



Pin	Definition
1	+5V
2	GND
3	GND
4	+12V

## SMBUS Header

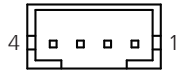
Connector type: 5-pin header  
Connector location: SMBUS1



Pin	Definition
1	SMBUS_CLK
2	SMBUS_DATA
3	SMBUS_ALERT-
4	GND
5	VCC3

## Speaker Connector

Connector type: 4-pin header, 3W 8Ω Amplifier Wafer  
Connector location: SPEAK\_CON



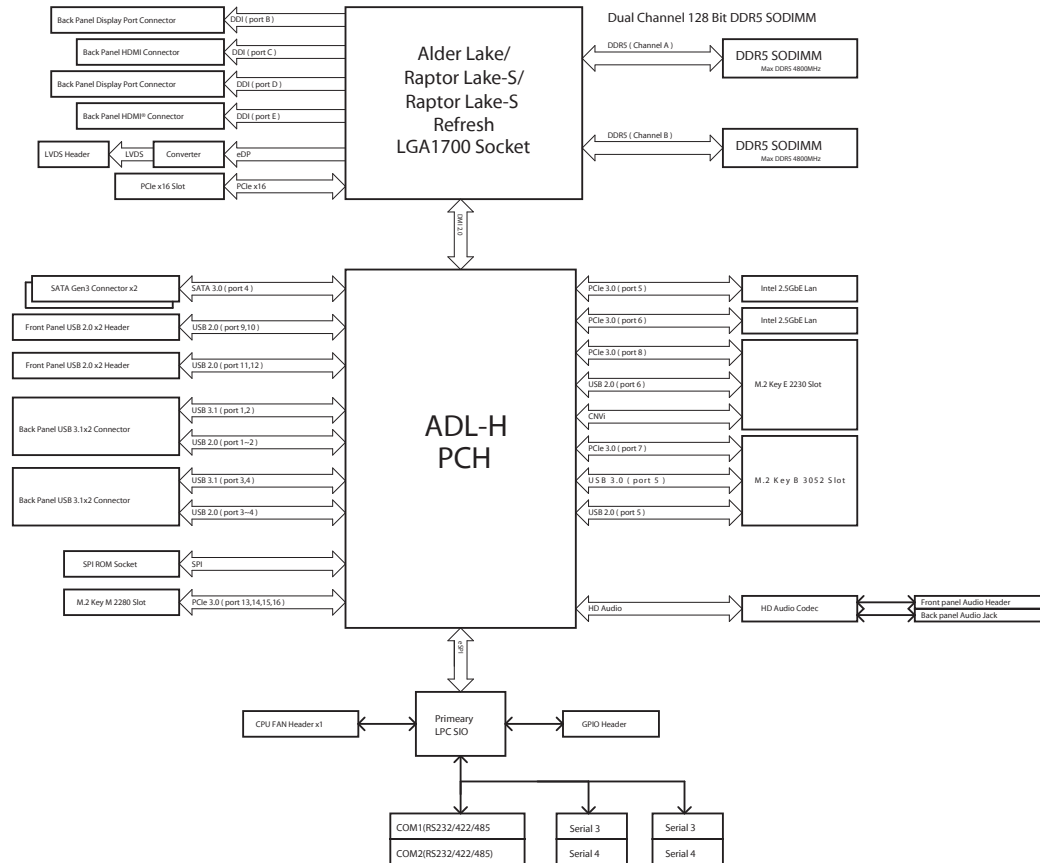
Pin	Definition
1	L-
2	L+
3	R+
4	R-

## Voltage and Current Limitation

The following table presents the maximum voltage and current limit specifications for various motherboard interfaces, such as slots, connectors, and headers for reference during configuration.

Interface		Working Voltage	Current Support
USB Ports	USB1	5V	2A
	USB2	5V	2A
	FP_USB1	5V	1.5A
FP		5V	1A
GPIO		5V	1A
SMBUS1		5V	0.5A
LVDS_EDP (JP3)		3.3V/5V/12V (via jumper setting)	2A
INVERTER1 (JP5)		5V/12V(via jumper setting)	2A
CPUFAN1		12V	1.5A

# Block Diagram



# CHAPTER 3: BIOS SETUP

This chapter describes how to use the BIOS setup program for NEX 619. The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

To check for the latest updates and revisions, visit the NexCOBOT website at [www.nexcobot.com](http://www.nexcobot.com).

## About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure such items as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

## When to Configure the BIOS

This program should be executed under the following conditions:

- When changing the system configuration
- When a configuration error is detected by the system and you are prompted to make changes to the setup program
- When resetting the system clock
- When redefining the communication ports to prevent any conflicts
- When making changes to the Power Management configuration
- When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

## 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 Setup











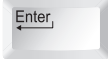
When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup.

Press the  key to enter Setup:


## Legends

Key	Function
	Moves the highlight left or right to select a menu.
	Moves the highlight up or down between sub-menu or fields.
	Exits the BIOS Setup Utility.
	Scrolls forward through the values or options of the highlighted field.
	Scrolls backward through the values or options of the highlighted field.
	Selects a field.
	Displays General Help.
	Load previous values.
	Load optimized default values.
	Saves and exits the Setup program.
	Press <Enter> to enter the highlighted sub-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  .



## BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from several setup functions and one exit. Use arrow keys to select among the items and press  to accept or enter the submenu.

### 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 Monday to Sunday. Month displays the month, from January to December. Date displays the date, from 1 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.



Setting incorrect field values may cause the system to malfunction.

## Connectivity Configuration

This section is used to configure a CNVi device. The configurations are available only when a CNVi device is plugged in.

**Auto Detection:** If discrete solution is discovered, it will be enabled by default. Otherwise integrated solution (CNVi) will be enabled.

**Disable Integrated:** This option disables the integrated solution.

## CPU Configuration

This section is used to display the current CPU information and configure the installed CPU.

### > Hyper-threading

Enable or disable hyper-threading technology.

### > Intel(R) (VMX) Virtualization Technology

When set to Enabled, the VMM can use the additional hardware capabilities provided by Vanderpool Technology.

### > Intel(R) SpeedStep(tm)

Enable or disable Intel SpeedStep.

### > C States

Enable or disable CPU C States support.

### > Turbo Mode

Enable or disable the process turbo mode. Ensure that Intel Speed Step and/or Intel Speed Shift is enabled.

### > Hyper-threading

Enable or disable hyper-threading technology.

### > Intel (VMX) Virtualization Technology

When set to Enabled, the VMM can use the additional hardware capabilities provided by Vanderpool Technology.

## SATA Configuration

This section is used to display and configure the SATA connection of the device.

### > SATA Controller(s)

Enable or disable the SATA controller. The options below will be available when enabling this item.

#### > M.2M1

##### > M.2M1 > Port

Enable or disable the SATA Port.

#### > SATA1/2

##### > SATA1/2 > Port

Enable or disable each SATA Port.

#### > SATA1/2 > Hot Plug

Enable or disable hot plugging feature on each SATA port.

## PCH-FW Configuration

This section is used to configure the options for updating the firmware.

### > TPM Device Selection

Use to select a TPM device. The options are dTPM and PTT.

**Warning!** PTT/dTPM will be disabled and all data saved on it will be lost.

### > Firmware Update Configuration

Press Enter to configure the following submenu.

#### > Firmware Update Configuration > ME FW Image Re-Flash

Enable or disable ME FW Image Re-Flash. If the option is set to Enabled, the system will turn off and reboot after 4 seconds.

## Trusted Computing

This section is used to configure the settings for the TPM (Trusted Platform Module).

### > Security Device Support

Enable or disable BIOS support for security device. Note that the O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available. More options will be available if the option is configured to Enabled.

### > Pending operation

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

### > TPM Device Selection

Use to select a TPM device. The options are PTT and dTPM.

**Warning!** All data saved on it will be lost, when PTT is disabled.

## ACPI Settings

This section is used for the configuration of the ACPI (Advanced Configuration and Power Interface) settings.

### > ACPI Settings

#### > ACPI Sleep State

Select ACPI sleep state the system will enter when the suspend button is pressed. The options are Suspend Disabled and S3 (Suspend to RAM).

## Wake-up function Settings

This section is used to configure the settings related to waking up the system.

### > Wake System with Fixed Time

Enables or disables system wake on alarm event. When enabled, the system will wake on the hr::min::sec specified.

### > Wake-up System with Dynamic Time

Enable or disable system wake on alarm event. This option is available when the **Wake System with Fixed Time** is set to Disabled. More options will be available if this option is configured to Enabled.

## Super I/O Configuration

This section is used to configure the input/output of the serial ports.

### > Super IO Configuration

#### > ERP Support

Set this option to Disabled to activate all wake-up functions. The available options are Auto and Disabled.

### > Serial Port 1/2/3/4/5/6 Configuration

Press Enter to configure the following submenu.

#### > Serial Port 1/2/3/4/5/6 Configuration > Serial Port

Enable or disable serial port. More options will be available if this option is configured to Enabled.

#### Serial Port 1/2/3/4 Configuration > Change Settings

Select an optimal setting for super IO device. This option is available when the **Serial Port** is set to Enabled.

#### > Serial Port 1/2 Configuration > Transmission Mode Select

Configure the serial port mode to RS232, RS422, or RS485.

#### > Serial Port 1/2 Configuration > Mode Speed Select

Configure the speed of the serial port modes

### > WatchDog Reset Timer

Enable or disable WatchDog Reset Timer reset function. When enabled, the following sub-menus will be available.

#### > WatchDog Timer Value

Configure the watchdog timer value between 4~255.

#### > WatchDog Timer Unit

Configure the metrics that will be used for the watchdog timer.

#### > ATX Power Emulate AT Power

Display the power mode status. Refer to [AT/ATX Mode Selection](#) to select the power mode.

#### > Case Open Detect

Enable or disable case open detection feature. The system will show the case open message during the computer POST (Power-On Self-Tests) if this feature is configured to Enabled. Refer to [Chassis Intrusion](#) to short the pins.

## PC Health Status

This section is used to monitor the hardware status such as temperature or fan speed.

### > SmartFan Configuration

Press Enter to configure the following submenu.

#### > SmartFan Configuration > CPUFAN Smart Mode

Enable or disable the CPU fan smart mode, more options will available when enabled.

#### > SmartFan Configuration > CPUFAN Smart Mode > CPUFAN Full-Speed Temperature

Set a temperature for CPUFAN. The fan will run at full speed above this temperature.

#### > SmartFan Configuration > CPUFAN Smart Mode > CPUFAN Full-Speed Duty

Set CPUFAN to full speed duty. The fan will run at full speed above the pre-set duty.

#### > SmartFan Configuration > CPUFAN Smart Mode > CPUFAN Idle-Speed Temperature

Set an idle temperature for CPUFAN. The fan will run at idle speed below the temperature.

#### > SmartFan Configuration > CPUFAN Smart Mode > CPUFAN Idle-Speed Duty

Set CPUFAN to idle speed duty. The fan will run at idle speed below the pre-set duty.

## Serial Port Console Redirection

This section is used to configure the serial port that will be used for console redirection.

### > COM1

#### > Console Redirection

Enable or disable Console Redirection. When enabled, the following sub-menus will be available.

#### > Console Redirection Settings

Specify how the host and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings. Enable or disable the console redirection. When enabled, the following sub-menus will be available.

#### > Console Redirection Settings > Terminal Type

The options are: VT100, VT100+, VT-UTF8, and SNSI.

**VT100:** ASCII character set.

**VT100+:** Extends VT100 to support color, function keys, etc.

**VT-UTF8:** Uses UTF8 encoding to map Unicode characters onto 1 or more bytes.

**ANSI:** Extended ASCII character set.

#### > Console Redirection Settings > Bits per second

Selects the serial port transmission speed. The speed must match the other side. Long or noisy lines may require a lower speed.

#### > Console Redirection Settings > Data Bits

The options are 7 and 8.

**> Console Redirection Settings > Parity**

A parity bit can be sent with the data bits to detect some transmission errors. Even Parity bit is 0 if the number of 1's in the data bits is even. Odd Parity bit is 0 if number of 1's in the data bits is odd.

**> Console Redirection Settings > Stop Bits**

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

**> Console Redirection Settings > Flow Control**

Flow control can prevent data loss from buffer overflow. When sending data and the receiving buffers are full, a "stop" signal can be sent to stop the data flow.

**> Console Redirection Settings > VT-UTF8 Combo Key Support**

Enable or disable VT-UTF8 combination key support for ANSI/VT100 terminals.

**> Console Redirection Settings > Recorder Mode**

When enabled, only text will be sent. This is to capture the terminal data.

**> Console Redirection Settings > Resolution 100x31**

Enable or disable extended terminal resolution.

**> Console Redirection Settings > Putty KeyPad**

Selects the Putty keyboard emulation type.

**> Legacy Console Redirection Settings > Redirection COM Port**

Configure a COM port to display redirection of legacy OS and legacy OPROM messages.

**> Legacy Console Redirection Settings > Resolution**

Configure the legacy OS redirection resolution.

**> Legacy Console Redirection Settings > Redirect After POST**

Enable or disable redirection after POST.

**> Console Redirection Settings Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS)****> Console Redirection Settings**

Specify how the host and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings. Enable or disable the console redirection. When enabled, the following submenus will be available.

**> Console Redirection Settings Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) > Terminal Type EMS**

The options are: VT100, VT100+, VT-UTF8, and SNSI. VT-UTF8 is the preferred terminal type for out-of-band management. Next choice is VT100+, then VT100.

**> Console Redirection Settings Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) > Bits per second EMS**

Select the serial port transmission speed. The speed must match the other side. Long or noisy lines may require a lower speed.

**> Console Redirection Settings Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) > Flow Control**

Flow control can prevent data loss from buffer overflow. When sending data and the receiving buffers are full, a “stop” signal can be sent to stop the data flow.

**> Console Redirection Settings Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) > Data Bits EMS**

This option will be available depending on the configuration.

**> Console Redirection Settings Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) > Parity EMS**

This option will be available depending on the configuration.

**> Console Redirection Settings Serial Port for Out-of-Band Management / Windows Emergency Management Services (EMS) > Stop Bits EMS**

This option will be available depending on the configuration.

## USB Configuration

This section is used to configure the USB functionality and related settings.

**> USB Configuration**

**> XHCI Hand-off**

This is a workaround for OSs that does not support XHCI hand-off. The XHCI ownership change should be claimed by the XHCI driver.

**> USB Mass Storage Driver Support**

Enable or disable USB mass storage driver support.

**> USB hardware delays and time-out**

**> USB Transfer Timer-out**

The time-out value for control, bulk, and, interrupt transfers

**> Device Reset Timer-out**

Select the USB mass storage device’s start unit command timeout.

**> Device Power-up Delay**

Maximum time the value will take before it properly reports itself to the Host Controller. “Auto” uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

Configure the temperature for Smart Fan IV Mode. The value is between 0 and 255.



## Network Stack Configuration

This section is used to configure the network stack.

### > Network Stack

Enable or disable UEFI network stack.

### > Ipv4 PXE Support

Enable or disable Ipv4 PXE Boot Support.

### > Ipv6 PXE Support

Enable or disable Ipv6 PXE Boot Support.

### > PXE boot wait time

Configure the wait time in second to press the ESC key to abort the PXE boot.

## NVMe Configuration

This section is used to display the information about the NVMe devices that are installed on the system.

### Intel(R) Ethernet Controller(3) I225-V - XX:XX:XX:XX:XX:XX

This section is used to displays information about the supported Ethernet chipsets.

### Intel(R) Ethernet Controller(3) I225-V - XX:XX:XX:XX:XX:XX

This section is used to displays information about the supported Ethernet chipsets.

## Chipset Menu

This section gives you functions to configure the system based on the specific features of the chipset. The chipset manages bus speeds and access to system memory resources.

### System Agent (SA) Configuration

Press Enter to configure the following submenus.

#### > System Agent (SA) Configuration > Memory Configuration

Press Enter to configure the following submenus.

#### > System Agent (SA) Configuration > Memory Configuration > Maximum Memory Frequency

Configure the maximum memory frequency.

#### > System Agent (SA) Configuration > Graphics Configuration

Press Enter to configure the following submenus.

#### > System Agent (SA) Configuration > Graphics Configuration > PCIe1 Slot

Enable or disable the PCIe root port.

#### > System Agent (SA) Configuration > Graphics Configuration > eDP/LVDS

Enable or disable the eDP/LVDS. More options will be available when enabled.

#### > System Agent (SA) Configuration > Graphics Configuration > Panel Type

Configure a panel type for the panel.

#### > System Agent (SA) Configuration > Graphics Configuration > Backlight Control

Configure the backlight control setting.

#### > System Agent (SA) Configuration > Graphics Configuration > Primary Display

Select which IGFX/PCIE graphics device should be primary display.

#### > System Agent (SA) Configuration > Graphics Configuration > Internal Graphics

Keep IGFX enabled based on the setup options.

#### > System Agent (SA) Configuration > Graphics Configuration > Aperture Size

Select the aperture size. The options are: 128MB, 256MB, 512MB, 1024MB, and 2048MB. Above 4GB MMIO BIOS assignment is automatically enabled when 2048MB aperture is selected. Please disable **CSM Support** to use this feature.

#### > System Agent (SA) Configuration > Graphics Configuration > DVMT Pre-Allocated

Configure the DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.

#### > System Agent (SA) Configuration > Graphics Configuration > DVMT Total Gfx Mem

Configure the DVMT5.0 Total Graphic Memory size used by the internal graphics device.

### > System Agent (SA) Configuration > VMD setup menu

Press Enter to configure the following submenus.

### PCH-IO Configuration

Press Enter to configure the following submenus.

#### > PCH-IO Configuration > HD Audio

Control detection of the HD audio device.

**Disabled:** HD audio will be unconditionally disabled.

**Enabled:** HD audio will be unconditionally enabled.

#### > PCH-IO Configuration > Onboard Lan1 Controller

Enable or disable onboard NIC. The **Wake on LAN Enable** option is available for configuration when **Enabled** is selected.

#### > PCH-IO Configuration > Onboard Lan2 Controller

Enable or disable the PCI Express Root port.

#### > PCH-IO Configuration > System State After Power Failure

Specify what state to go to when power is re-applied after a power failure (G3 state).

## Security

This section is used to configure the security related options for BIOS protection.

### Administrator Password

Select this to configure the administrator's password.

### User Password

Select this to configure the user's password.

### Secure Boot

Press Enter to configure the following submenus.

#### > Secure Boot

Enable or disable the secure boot. The platform key (PK) enrolled and the system is in user mode when secure boot is enabled. A platform reset is required to change modes.

#### > Secure Boot Mode

Select a secure boot mode for the system. The options are standard and custom. When in custom mode, secure boot policy variables can be configured by a physically present user without full authentication. More options are available if the option is set to **Custom**.

#### Secure Boot > Restore Factory Keys

Allow you to install factory default secure boot key databases.

#### Secure Boot > Reset To Setup Mode

Delete all Secure Boot Key databases from NVRAM.

#### Secure Boot > Key Management

Enable experienced users to modify Secure Boot variables, which includes the following items.

#### Secure Boot > Key Management > Factory Key Provision

Install the factory default secure boot keys after the platform has been reset and while the system is in the setup mode.

#### Secure Boot > Key Management > Restore Factory Keys

Force the system into User mode.

#### Secure Boot > Key Management > Reset To Setup Mode

Delete all Secure Boot key databases from NVRAM.

#### Secure Boot > Key Management > Enroll Efi Image

Run the image in Secure Boot Mode.

#### Secure Boot > Key Management > Export Secure Boot Variables

Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.

#### Secure Boot > Key Management > Platform Key (PK)/Key Exchange Keys/Authorized Signatures/Forbidden Signatures/Authorized TimeStamps/OsRecovery Signatures

Enroll factory defaults or load the keys from a file.

## Boot

This section is used to configure the boot features.

### Boot Configuration

#### Setup Prompt Timeout

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

#### Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

#### Quiet Boot

Enable or disable Quiet Boot option.

**Enabled:** Displays OEM logo instead of the POST messages.

**Disabled:** Displays normal POST messages.

#### Boot Option Priorities

Adjust the boot sequence of the system. Boot Option #1 is the first boot device that the system will boot from, next will be Boot Option #2 and so forth.

## Save & Exit

### Save Changes and Reset

Press Enter to save the changes and reset. Confirm by selecting Yes when a dialogue box appears.

### Discard Changes and Exit

Press Enter to exit the BIOS without saving the changes. You may be prompted to confirm again before exiting.

### Default Options

#### Restore Defaults

Press Enter to restore the BIOS to the default settings. Confirm by selecting Yes when a dialogue box appears.

#### Save as User Defaults

Press Enter to use the current configurations as user default settings for the BIOS. Confirm by selecting Yes when a dialogue box appears.

#### Restore User Defaults

Press Enter to restore the BIOS to the user default settings. Confirm by selecting Yes when a dialogue box appears.

### Boot Override

Select the desired device and press <Enter> to bypass the boot sequence from the boot option list and boot from a specific device.