
ARTS-7670

IP69K Waterproof Fanless Computer with
Intel® 14th/13th/12th Generation Core™ CPU

User Manual

Version 1.0

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Revision History

Version	Release Time	Description
1.0	January, 2026	Initial release

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Copyright Notice

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Under no circumstances will the manufacturer be liable for any direct, indirect, special, incidental, or consequential damages arising from the use or inability to use the product or documentation, even if advised of the possibility of such damages.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this document may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

Declaration of Conformity

CE

The CE symbol on the computer indicates that it is in compliance with the directives of the European Union (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Class A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A 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 commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH –Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Important Safety Instructions

Read these safety instructions carefully

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.
5. Keep this equipment away from humidity.
6. The openings on the enclosure are for air convection and protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. Never pour any liquid into opening. This may cause fire or electrical shock.
9. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
10. If one of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user manual.
 - e. The equipment has been dropped or damaged.
 - f. The equipment has obvious signs of breakage.
11. Keep this User Manual for later reference.

Product Heat



The computer generates heat during operation. Contact the computer's chassis with your body could cause discomfort or even a skin burn.

Warning

The Box PC and its components contain very delicately Integrated Circuits (IC). To protect the Box PC and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your Box PC from the power source when you want to work on the inside.
2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the Box PC, whenever components are separated from the system.

Replacing Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user manual first at:

<http://www.arbor-technology.com>

Please do not hesitate to e-mail our customer service when you still cannot find out the answer.

E-mail: info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

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Chapter 1

Introduction

1.1. The Computer

- IP69K-rated dustproof and waterproof
- Intel® 14th/13th/12th-Gen. Core™ 35W/ 65W CPU
- Rugged -40°C to 70°C fanless operation
- 4 x PoE+ 2.5GbE ports via M12 X-coded with 100W power budget
- 1 x waterproof USB3.2 Type-C port support DisplayPort and USB3.2 dual output
- 2 x isolated CAN FD port via M12 A-coded
- 6 x USB 2.0, 1 x isolated RS-232 and 1 x isolated RS-422/485 ports
- 9V to 48V DC input with built-in ignition power control
- E-Mark compliant & MIL-STD-810H Shock/ Vibration certified
- Support dTPM2.0 & Windows® 11



1.2. About this Manual

This manual is meant for the experienced users and integrators with hardware knowledge of personal computers. If you are not sure about the description herein, consult your vendor before further handling.

We recommend that you keep one copy of this manual for the quick reference for any necessary maintenance in the future. Thank you for choosing ARBOR products.

1.3. Specifications

System	
CPU	Intel® 14th/13th/12th-Gen Core™ CPU (LGA1700 socket, 35W/ 65W)
Memory	2 x DDR5 SO-DIMM sockets, support 4800 MHz up to 96GB
Chipset	Intel® Q670E platform controller
Graphics	Integrated Intel® UHD Graphics
LAN Chipset	4 x Intel® i226-IT 2.5GbE controller
TPM	Support dTPM 2.0
Watchdog Timer	1~255 levels reset
I/O Ports	
Serial Port	1 x isolated RS-232 port (COM1) and 1 x isolated RS-422/485 ports (COM2) (via 1 x M12 A-coded, 8-pin connector)
USB Port	1 x USB 3.2 Gen1 (5 Gbps) port in type-C waterproof connector 6 x USB 2.0 (via 3 x M12 A-coded, 8-pin connector)
LAN	4 x PoE + 2.5GbE port via M12 X-coded
PoE	IEEE 802.3at PoE+ PSE for 4 x 2.5GbE ports 100W total power budget
CAN Bus	2 x isolated CAN FD port (via 1 x M12 A-coded, 8-pin connector)
Display	1 x DisplayPort in Type-C waterproof connector, resolution up to 4096x2304@60Hz 1 x VGA (M12 A-coded, 17-pin connector), resolution up to 1920x1200@60Hz
Expansion Bus	2 x full-size mini-PCIe (PCIe Gen3x1 + USB2.0) w/ 1 x SIM card slot for Wi-Fi/BT/LTE module 1 x M.2 B-key 3042/3052 (PCIe Gen3x1 + USB3.0 +USB2.0) w/ 2 x SIM cards slot for 4G/5G module
Others	Support accelerometer(G-Sensor) and Gyroscope
Storage	
Type	1 x M.2 M-key 2242/2280 (PCIe Gen4x4) for storage 2 x 2.5" SATA HDD/ SSD ; supports RAID 0/1
Power Requirement	
Power Input	9V to 48V DC input with built-in ignition power control, MAX 60V (M12 L-coded, 5-pin)
Environmental	
Operating Temperature	with 35W CPU -40°C ~ 70°C with 65W CPU -40°C ~ 70°C (configured as 35W TDP mode) -40°C ~ 50°C (configured as 65W TDP mode)

Introduction

Storage Temperature	-40°C ~ 85°C (-40°F ~ 185°F)
Operating Humidity	10% ~ 90% (non-condensing)
Vibration	MIL-STD-810H, Method 514.8, Category 4
Shock	MIL-STD-810H, Method 516.8, Procedure I
Mechanical	
Button	1 x waterproof Power button with LED (Green)
LED indicator	1 x PWR LED (Green), 1 x HDD LED (Red)
Antenna	4 x Antenna Holes (with rubber cover pre-installed)
Mounting	Desktop/ Wall-mount
Weight	4.2 kg
Dimensions (W x H x D)	225 x 92 x 264 mm
Waterproof	IP69K-rated dustproof and waterproof
Qualification	
Certification	CE/FCC Class A, E-Mark compliant
OS Support	
Operating System	Windows® 10 / Windows® 11 / Linux Ubuntu 22.04

1.4. Inside the Package

Upon opening the package, carefully inspect the contents. If any of the items is missing or appears damaged, contact your local dealer or distributor. The package should contain the following items:



IP69K Waterproof Fanless Computer:
ARTS-7670



Accessory Box that contains the following items:

- 1 x Information Card
- 1 x Wall Mounting Bracket Kit
- 1 x Thermal-Pad for RAM
- Screws for SSD/HDD/Wall Mount







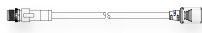



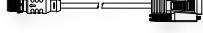
1.5. Ordering Information

ARTS-7670	Intel® 14th/13th/12th-Gen Core™ CPU (LGA1700 socket, 35W/ 65W)
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Introduction

1.5.1. Optional Accessories

The following items are normally optional, but some vendors may include them as a standard package, or some vendors may not carry all the items.

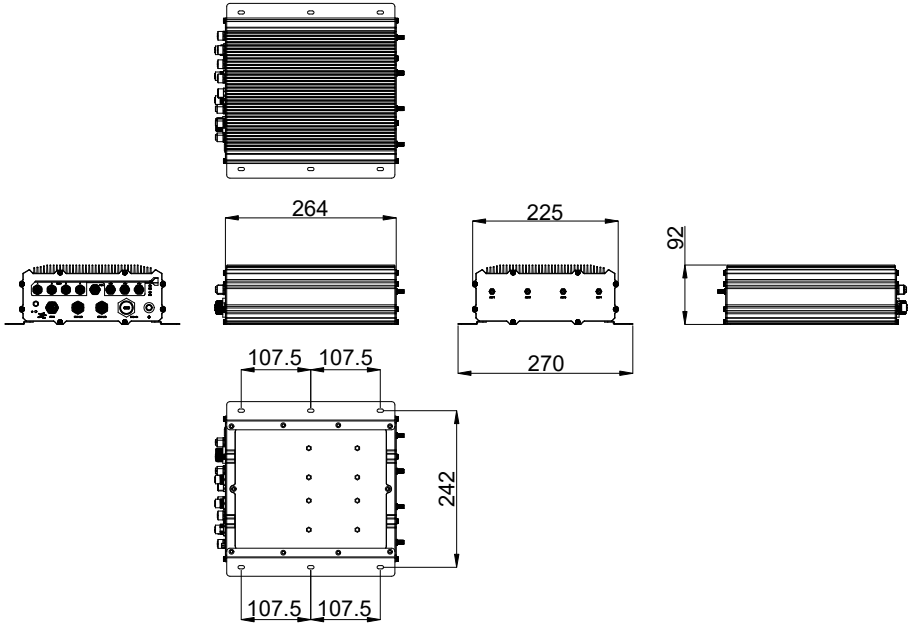
PAC-280W8C-MW-ES	24V/11.67A, 280W AC/DC Adapter , -30~+70°C, w/ EU & USA Power Cord	
CBL-M12L5-PWR-200CM	Power Cable, M12 5P(L-coded) TO 3P OPEN, Length: 200CM	
CBL-M12-7670	ARTS-7670 M12 cable kit, including: 4 x CBL-M12X8M-RJ45-50CM 3 x CBL-M12A8M-2U2TA-50CM 1 x CBL-M12A8M-2DB9COM2-50CM 1 x CBL-M12A8M-1DB9CAN2-50CM 1 x CBL-M12A17M-VGA-150CM	
WiFi-AT4550	Atheros QCNFA324 mPCIe Wi-Fi+BT Module Kit (w/ 2 x 30cm RF Cable)	
LTE-4450	Quectel EG25-G mPCIe LTE Cat 4 Module Kit (for Global, w/ 1 x 25cm RF Cable)	
ANT-P14	IP67 2.4G/5G/6G WIRELESS ANTENNA KIT W/ CABLE FOR WiFi-AT4550	
ANT-P11	IP67 5G/4G LTE ANTENNA KIT W/ CABLE FOR LTE-4450	
CBL-M12-7670 (Cable Kit Details)		
CBL-M12X8M-RJ45-50CM	M12(8-pole-X-coded) to RJ45, CAT6, Length : 50CM	
CBL-M12A8M-2U2TA-50CM	M12 (8-pole-A-coded) to 2x USB 2.0 type A (female), Length: 50CM	
CBL-M12A8M-2DB9COM2-50CM	M12 (8-pole-A-coded) to 2x DB9 for COM1/ COM2 (Male), Length: 50CM	
CBL-M12A8M-1DB9CAN2-50CM	M12 (8-pole-A-coded) to 1x DB9 for 2 x CANFD (Male), Length: 50CM	
CBL-M12A17M-VGA-150CM	M12 (17-pole-A-coded) to 1 DE15 VGA (Male), Length: 150CM	

Chapter 2

Getting Started

2.1. Dimensions

The following illustration shows the dimensions of the computer, with the measurements in width, depth, and height called out. (Unit: mm)



2.2. Take A Tour

The computer has some I/O ports, status LED light. The following illustrations show all the components called out.

Front View



Rear View



- **Status LED Lamps:**

LED	LED Color	Description
HDD	Red	Flashes when SSD/HDD is being accessed.
Power	Green	Lights when power is turn on.

2.3. Driver Installation Notes

To install the drivers, please visit our website at www.arbor-technology.com and download the driver pack from the **Download Center**.

Chapter 3

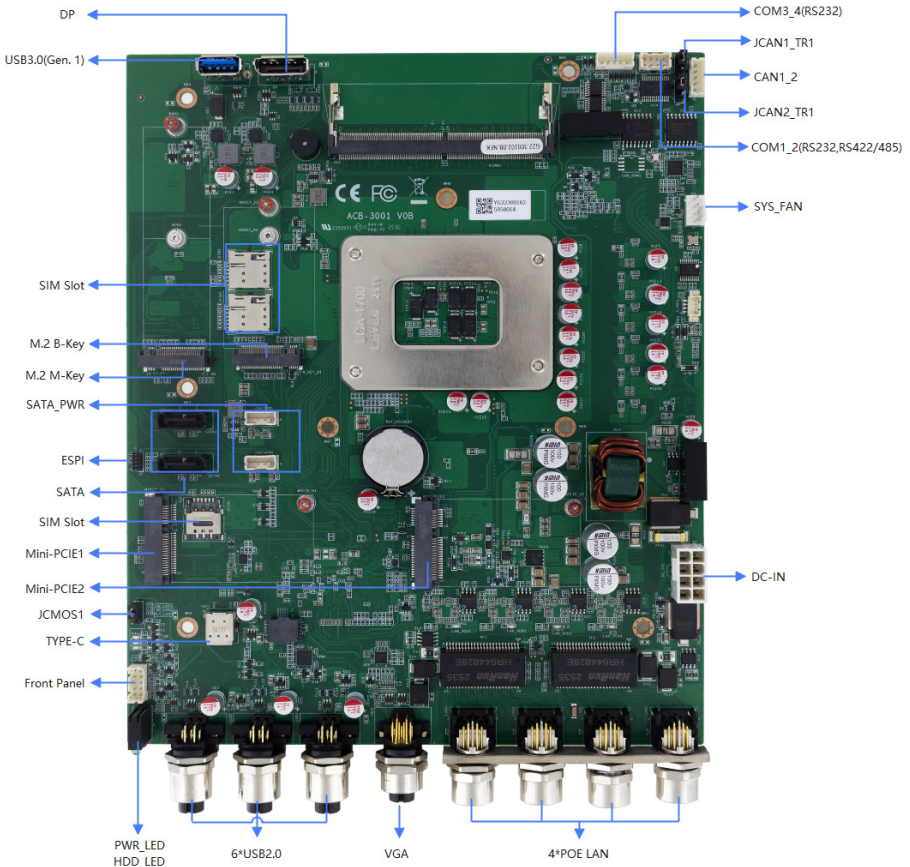
System Configuration

3.1. Board Layout

The engine of the computer is constructed by a main board. Following in this section you will be guided through the main board of the computer.

3.1.1. Main Board

Board Top



3.2. Jumpers and Connectors

The Main board comes with some connectors to join devices and some jumpers to alter the computer's hardware configuration. The following in this chapter will explicate these components.

3.2.1. Jumpers

JCMOS1

Function: Clear CMOS Settings

Jumper Type: Onboard 1x3-pin header



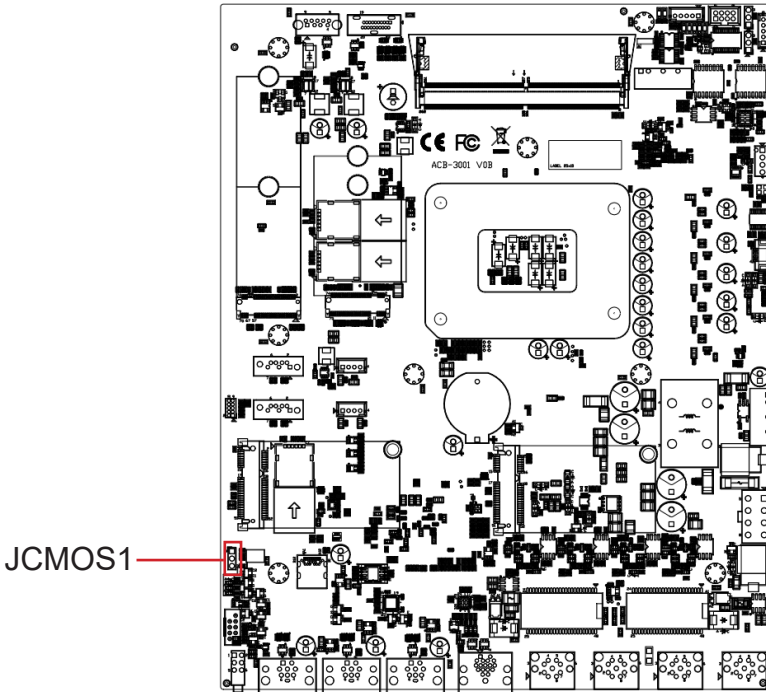
Setting: Short pin 1 and pin 2 for Normal.
(Default)



Short pin 2 and pin 3 for clear CMOS.



Board Top



JCAN1_TR1/JCAN1_TR2

Function: CAN BUS 1/2 Terminator Selector

Jumper Type: Onboard 1x3-pin header



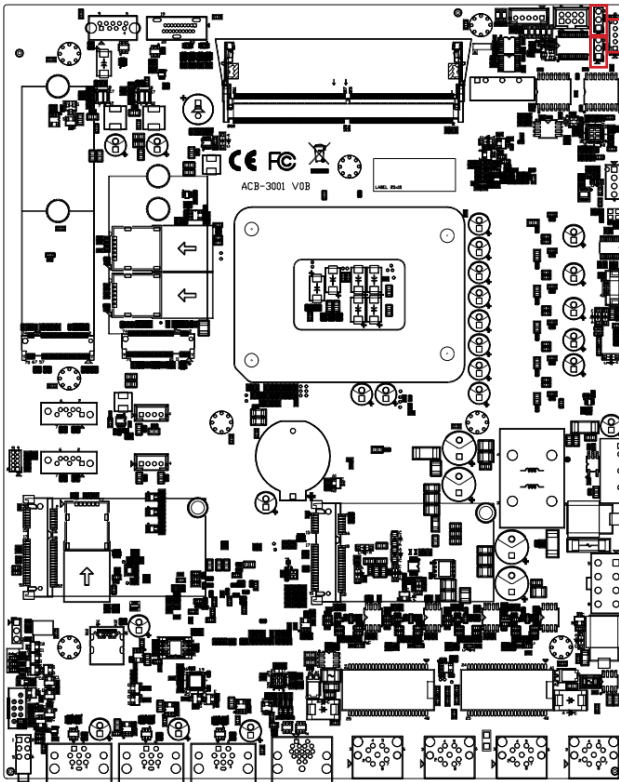
Setting: 1-2 CAN BUS1/2 no terminator



2-3 CAN BUS1/2 with 120 ohm terminator (Default)



Board Top



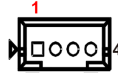
JCAN1
JCAN2

3.2.2. Connectors

SATA Power

Function: SATA HDD Power Connector

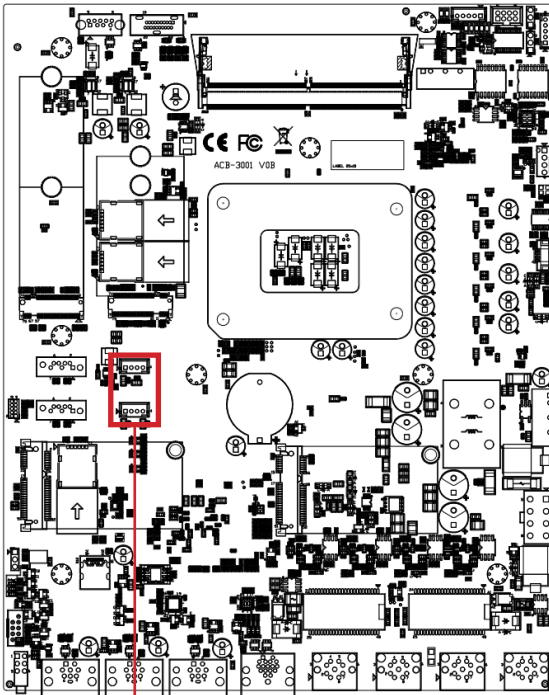
Connector Type: Onboard 4-pin connector



Setting:

Pin	Description
1	PVCC5
2	GND
3	GND
4	PVCC12

Board Top



SATA Power

ESPI

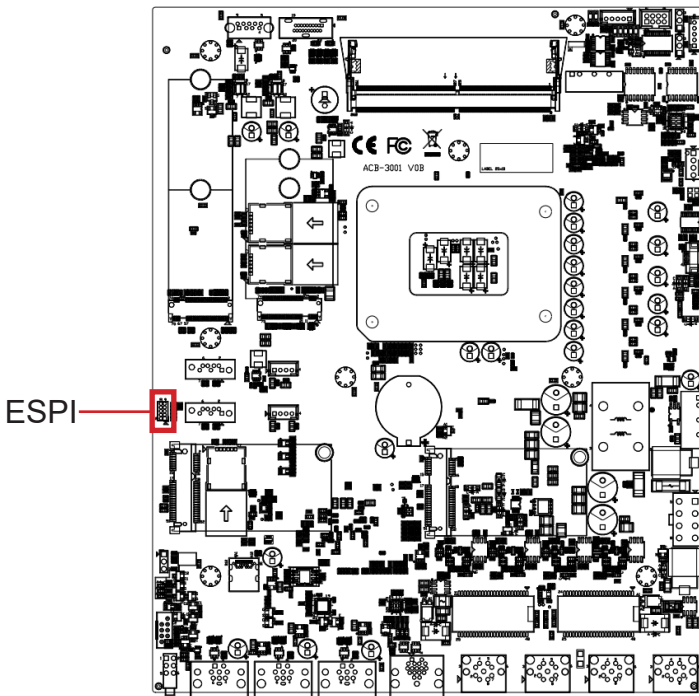
Function: Debug Port

Connector Type:



Setting:

Pin	Description	Pin	Description
1	DB_ESPI_CLK	2	DB_ESPI_AD0
3	DB_RST_N	4	DB_ESPI_AD1
5	DB_ALERT_N	6	DB_ESPI_AD2
7	DB_CS_N	8	DB_ESPI_AD3
9	P3VSB	10	GND



Front Panel

Function: Front Panel setting

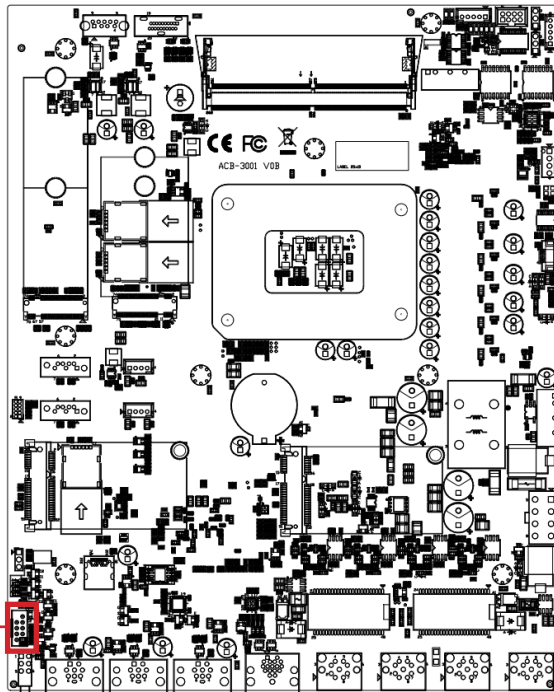
Connector Type:



Setting:

Pin	Description	Pin	Description
1	SATALED_P	2	PWRLED_P
3	SATALED#	4	PWRLED#
5	GND	6	PWRBTN_N
7	SYS_RESET#	8	GND
9	NC		

Front Panel

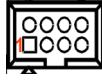


System Configuration

COM1: RS-232 (Tx, Rx)
COM2: RS-422/485

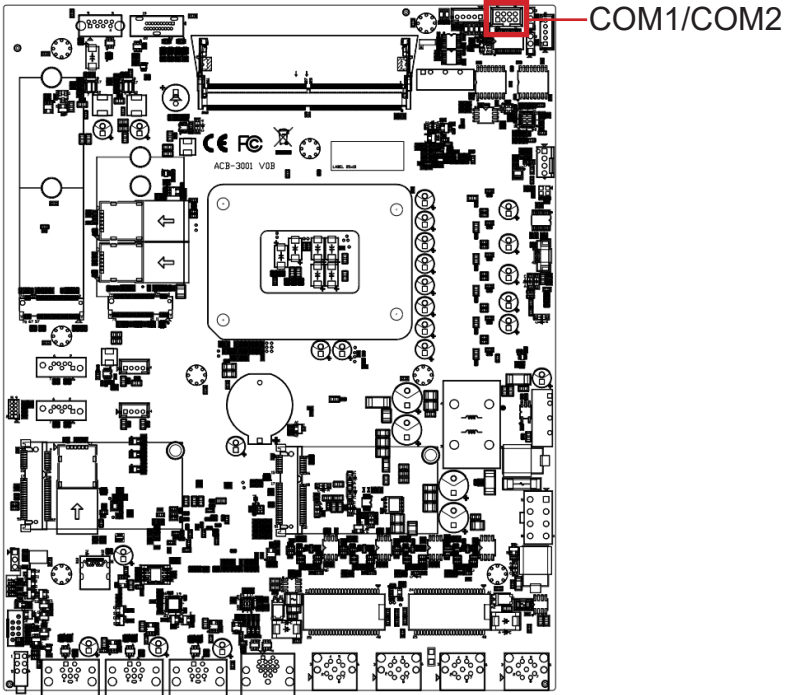
Function: RS-232/422/485 setting

Connector Type:



Setting:

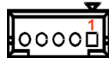
Pin	Description	Pin	Description
1	COM1_SOUT	2	COM2_TXD485N_C
3	COM1_SIN	4	COM2_TXD485P_C
5	GND	6	COM2_RXD422N_C
7	GND	8	COM2_RXD422P_C



COM3/COM4 (Tx, Rx)

Function: RS-232 setting

Connector Type:



Setting:

Pin	Description
1	COM3_SOUT
2	COM3_SIN
3	COM4_SOUT
4	COM4_SIN
5	GND

CAN1_2

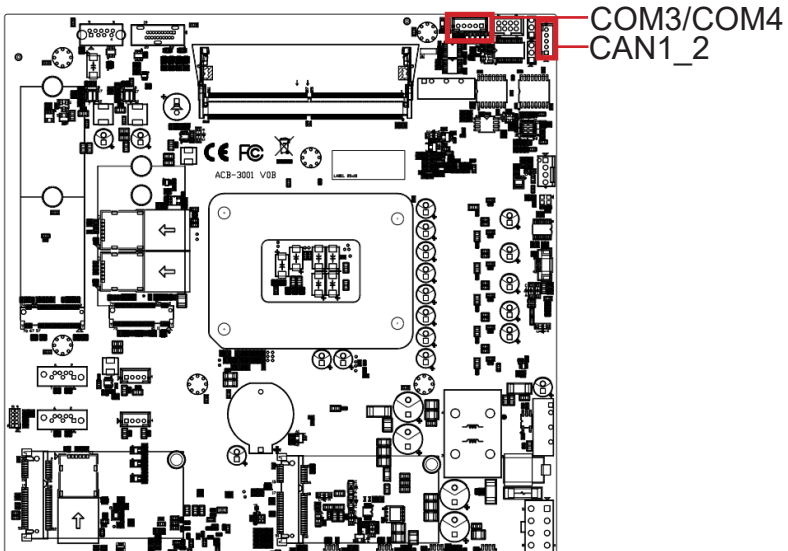
Function: CAN1/CAN2 setting

Connector Type:



Setting:

Pin	Description
1	CAN1H_C
2	CAN1L_C
3	CAN2H_C
4	CAN2L_C
5	GND



System FAN

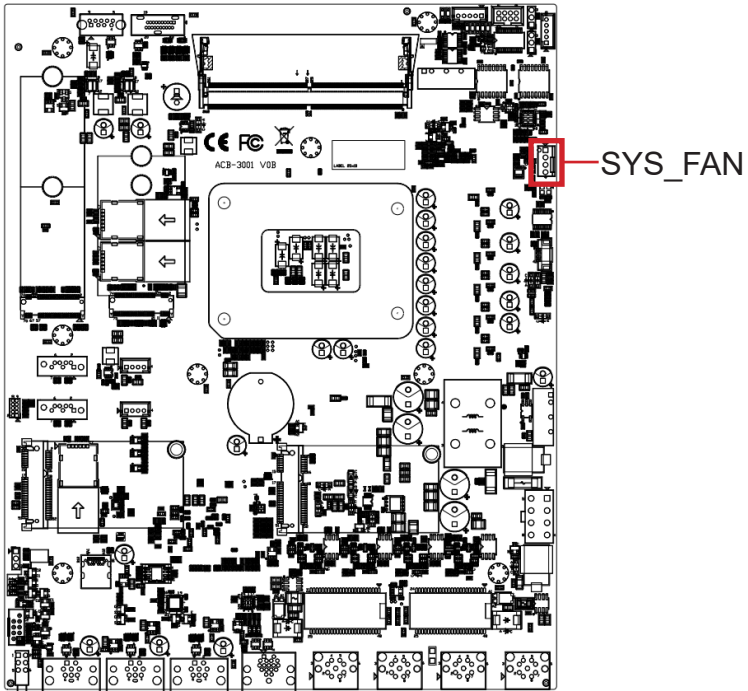
Function: System FAN connector

Connector Type: Onboard 4-pin connector



Setting:

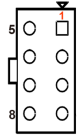
Pin	Description
1	SYS_FAN1_CTRL
2	SYS_FAN1_TACH
3	PVCC12
4	GND



DC-IN

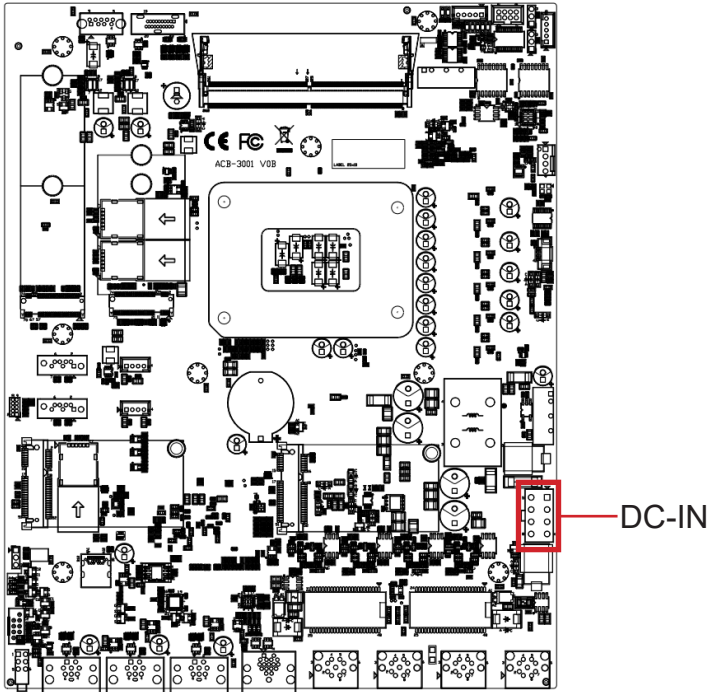
Function: RS-232/422/485 setting

Connector Type: Onboard 8-pin connector

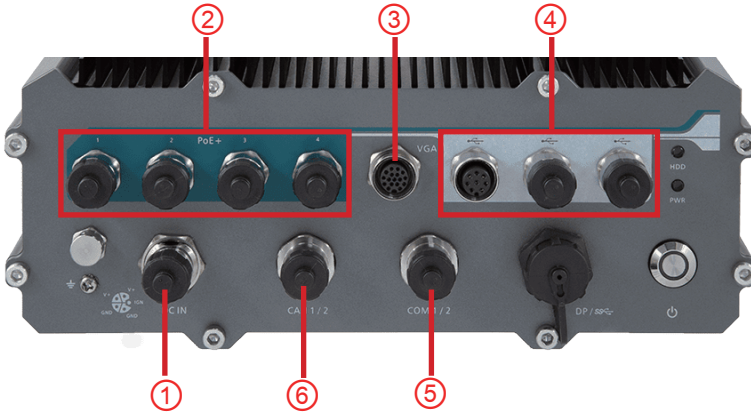


Setting:

Pin	Description	Pin	Description
1	GND	5	DC_IN
2	GND	6	DC_IN
3	GND	7	DC_IN
4	GND	8	Ignition

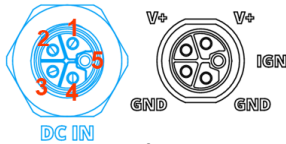


3.2.3. Front Panel Connectors



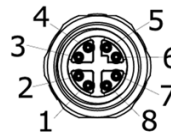
① DC-IN

Pin	Description
1	V+
2	V+
3	V-
4	V-
5	Ignition



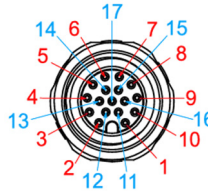
② PoE/LAN

Pin	Description	Pin	Description
1	LAN P3	5	LAN P0
2	LAN N3	6	LAN N0
3	LAN N2	7	LAN P1
4	LAN P2	8	LAN N1



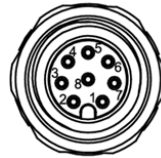
③ VGA

Pin	Description	Pin	Description
1	RED	10	GND
2	VSYNC_CN	11	GND
3	HSYNC_CN	12	GND
4	VGA_SCL	13	GND
5	VGA_SDA	14	GND
6	GND	15	GND
7	BLUE	16	GND
8	GND	17	P5V_VGA
9	GREEN		



④ USB 2.0

Pin	Description	Pin	Description
1	D1+	5	GND
2	D1-	6	VCC_USB
3	VCC_USB	7	D2-
4	GND	8	D2+



⑤ COM1/COM2

	Pin	Description
COM1	1	RXD1
	6	TXD1
	7	GND
COM2	2	TXP2
	3	TXN2
	4	RXP2
	5	RXN2
	6	GND



⑥ CAN1/CAN2

	Pin	Description
	1	NC
	2	NC
CAN1	3	CAN1H
	4	CAN1L
	5	NC
CAN2	6	CAN2H
	7	CAN2L
	8	GND



Chapter 4

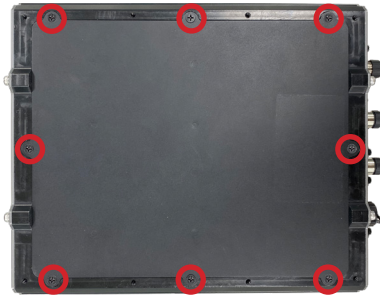
Installation and Maintenance

4.1. Disassembling and Assembling the Computer

4.1.1. Disassembling the Computer

To use onboard jumpers/connectors or to install/remove internal components, you will need to open the computer to access the inside of the computer. Follow through the guide below to disassemble the computer.

1. Position the computer with the bottom side facing up and remove screws securing the chassis as shown below.



2. Then lift the bottom chassis away from the assemble (You can disconnect the SATA SSD connectors)
3. You are ready to access the components on the main board and make required configurations and connections.



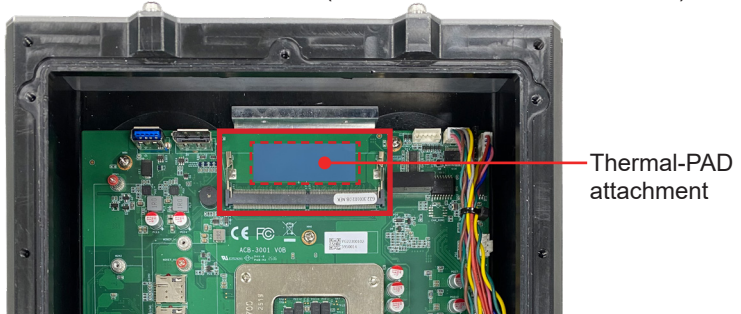
4.1.2. Assembling the Computer

After completing the required hardware installation and jumpers settings, assemble the computer by performing the proceeding steps in reverse order.

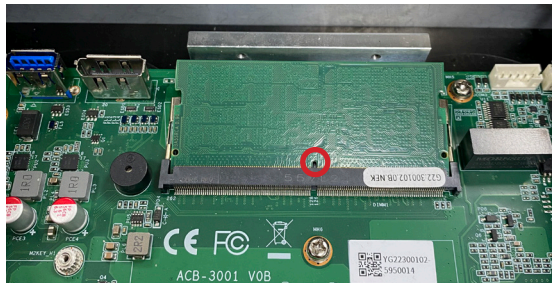
4.2. Installing Hardware

4.2.1. Installing Memory Module

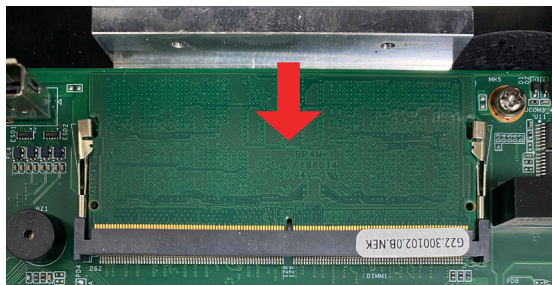
1. Locate the memory module socket.
Attach the Thermal-PAD to the main board (Position as below dotted line area)



2. Align the notch on the memory module with the key in the module socket.



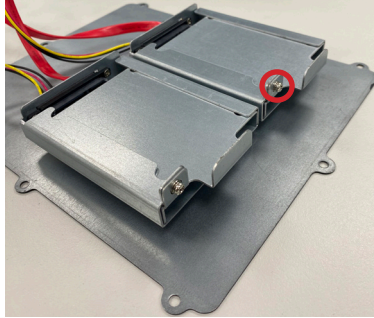
3. Slide the module into place. Once the memory module is fully inserted into the socket, press down on the top edge of the device to latch it into place.



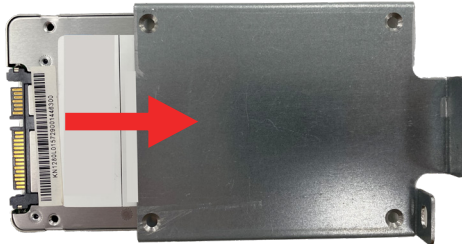
4. This way it's flat to the laptop's bottom. The carrier should snap into place with latches.

4.2.2. Installing/Replacing a SSD or HDD

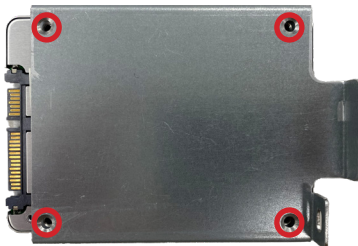
1. Remove the hard drive bracket from the bottom side chassis by loosening the screw as shown below.



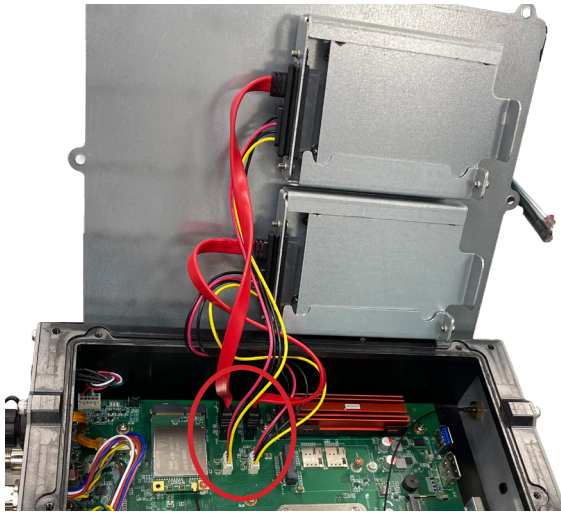
2. Slide the 2.5" HDD or SSD storage device into the drive bracket and ensure it connects to the SATA connector.



3. Using 4 screws coming with the storage device kit, fix the storage device in place.



4. Secure the drive bracket back and connect the SATA interface/power connectors on the main board.



4.2.3. Installing M.2 Module

The computer has a M.2 M-Key 2242/2280 socket for storage. This section will use a 22 x 80 form factor as the installation example.

1. Locate the M.2 M-Key on-board connector.



2. Insert the M.2 module into the socket by aligning the notch on the module with the small slot on the M.2 socket.



3. Insert and fasten the screw into the standoff.



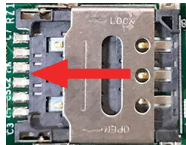
4.2.4. Install/uninstall SIM Card

You can install the SIM card as and when required.

1. Locate the SIM card on-board slot.



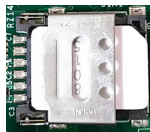
2. Slide the SIM card holder cover towards the OPEN edge and then lift the cover to open it.



3. Insert the SIM card into the card holder as shown below.



4. Close the SIM card holder door and slide the door to LOCK edge to lock into place.

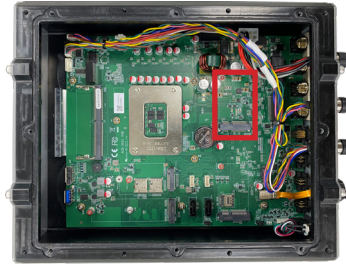


To uninstall the SIM card:

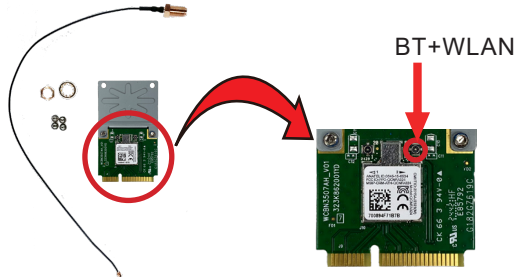
Perform the SIM card installation steps in reverse order.

4.2.5. Installing Wi-Fi Module

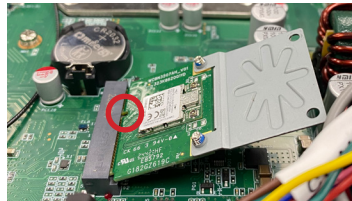
1. Locate the Mini-PCIe card socket for wireless module.



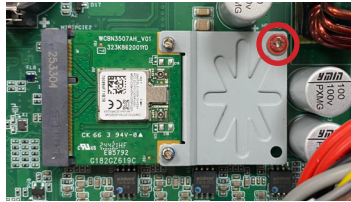
2. Prepare the WiFi-AT4550 Wi-Fi module kit. The module is a half-size module of PCI Express Mini-card form factor, tighten with the extension plate to expand into full-size form factor.



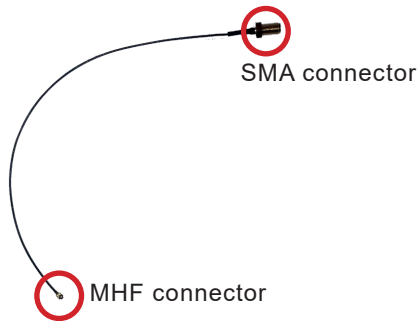
3. Plug the Wi-Fi module to the socket's connector by a slanted angle. Fully plug the module, and note the notch on the wireless module should meet the break of the connector.



4. Press down the module and fix the module in place using one screw.



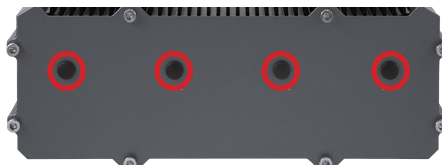
5. Have the RF antenna. The antenna has an SMA connector on one end and an MHF connector on the other.



6. Connect the RF antenna's MHF connector to the Wi-Fi module's "BT+WLAN" connector.

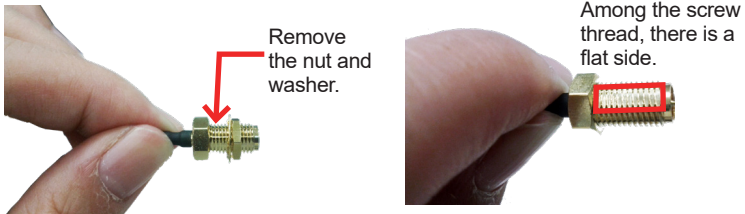


7. Locate the SMA antenna and remove one plastic plug from the computer's panel to make antenna hole(s). Keep the plastic plug for any possible restoration in the future.



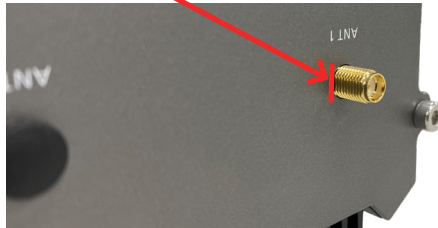
Installation & Maintenance

- From the other end of the RF antenna, which is an SMA connector, remove the washer and the nut. Save the washer and nut for later use. Note the SMA connector has the form of a threaded bolt, with one flattened side.

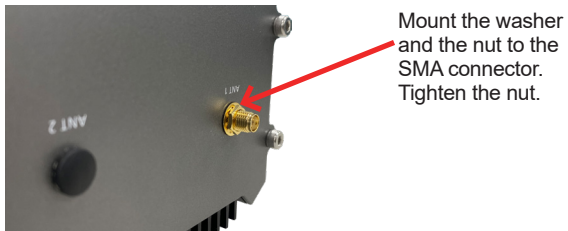


- Pull the SMA connector through the above mentioned antenna hole. Note to meet the aforesaid flattened side with the antenna hole's flat side.

Arrange the flat side of the SMA connector to meet the flat side of the antenna hole.



- Mount the washer first and then the nut to the SMA connector. Make sure the nut is tightened.



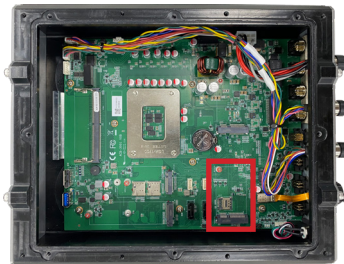
11. Have an external antenna. Screw and tightly fasten the antenna to the SMA connector.



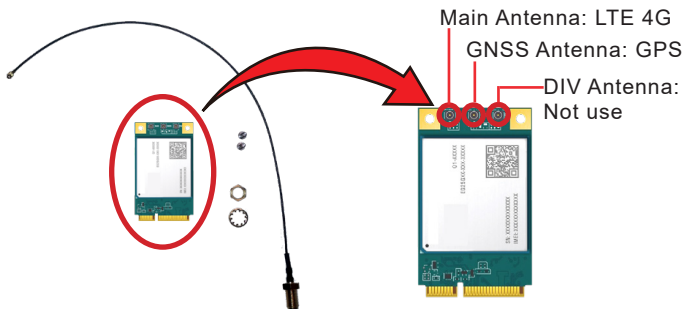
12. Assemble the computer's bottom cover.

4.2.6. Installing LTE Module

1. Locate the Mini-PCIe card socket for LTE module.



2. Prepare the LTE-4450 module kit.

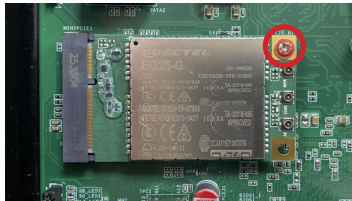


Installation & Maintenance

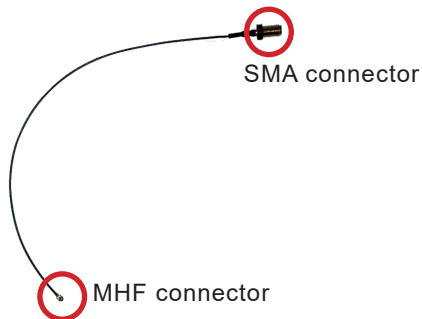
3. Plug the LTE module to the socket's connector by a slanted angle. Fully plug the module, and note the notch on the wireless module should meet the break of the connector.



4. Press down the module and fix the LTE module in place using one screw.



5. Have the RF antenna. The antenna has an SMA connector on one end and an MHF connector on the other.



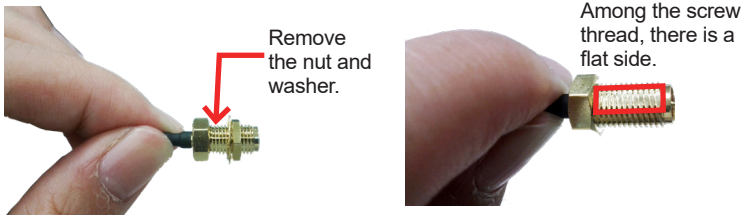
6. Connect the RF antenna's MHF connector to the LTE module's "Main Antenna" connector.



7. Locate the SMA antenna and remove one plastic plug from the computer's panel to make antenna hole(s). Keep the plastic plug for any possible restoration in the future.

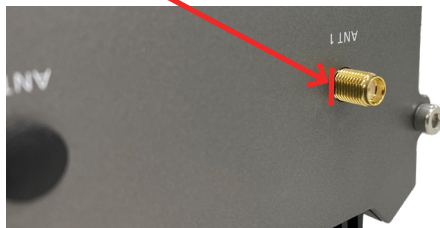


8. From the other end of the RF antenna, which is an SMA connector, remove the washer and the nut. Save the washer and nut for later use. Note the SMA connector has the form of a threaded bolt, with one flattened side.



9. Pull the SMA connector through the above mentioned antenna hole. Note to meet the aforesaid flattened side with the antenna hole's flat side.

Arrange the flat side of the SMA connector to meet the flat side of the antenna hole.



Installation & Maintenance

10. Mount the washer first and then the nut to the SMA connector. Make sure the nut is tightened.



Mount the washer and the nut to the SMA connector. Tighten the nut.

11. Have an external antenna. Screw and tightly fasten the antenna to the SMA connector.

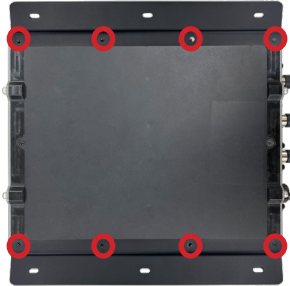


12. Assemble the computer's bottom cover.

4.3. Mount the Computer

Follow through the guide below to mount the computer to a wall.

1. Tighten the wall mounting bracket on the bottom cover as shown below:



2. Find the cutouts as marked in the illustration below, mount the computer to a wall by the said cutouts.



4.4. Wire DC-IN Power Source

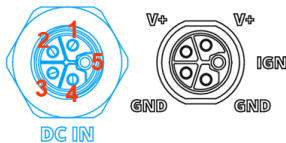
Warning

Only trained and qualified personnel are allowed to install or replace this equipment.

Connecting the computer to a DC-input power source.



Pin	Description
1	V+
2	V+
3	V-
4	V-
5	Ignition



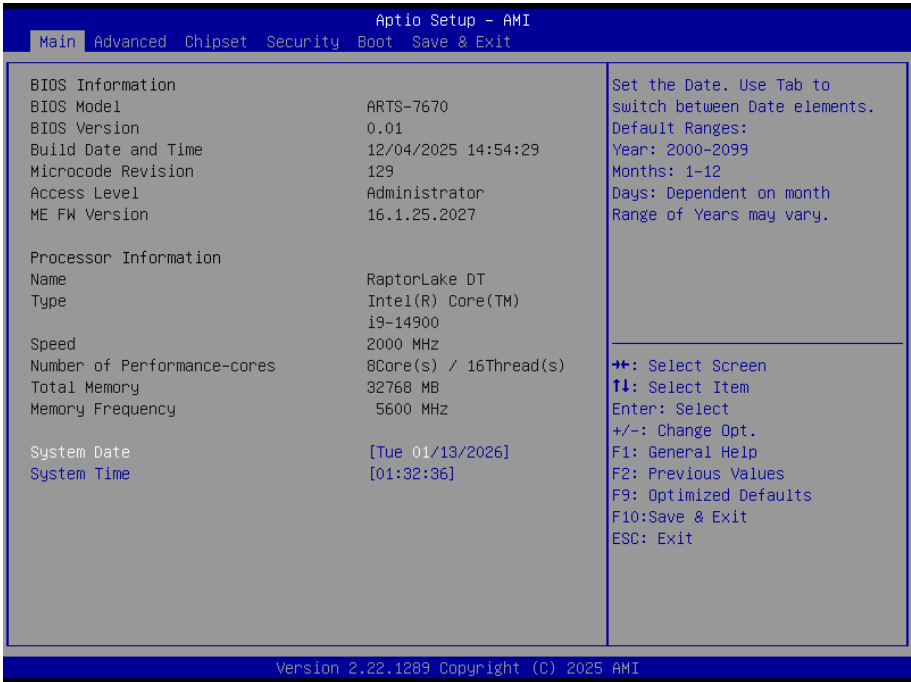
Chapter 5

BIOS

BIOS

The BIOS Setup utility for the computer is featured by American Megatrends Inc to configure the system settings stored in the system's BIOS ROM. The BIOS is activated once the computer powers on. When the computer is off, the battery on the main board supplies power to BIOS RAM.

To enter the BIOS Setup utility, keep hitting the “Delete” key upon powering on the computer.



The BIOS featured menus are:

Menu	Description
Main	See 5.1. Main on page 44
Advanced	See 5.2. Advanced on page 45
Chipset	See 5.3. Chipset on page 59
Security	See 5.4. Security on page 65
Boot	See 5.5. Boot on page 67
Save & Exit	See 5.6. Save & Exit on page 68

Key Commands

The BIOS Setup utility relies on a keyboard to receive user's instructions. Hit the following keys to navigate within the utility and configure the utility.

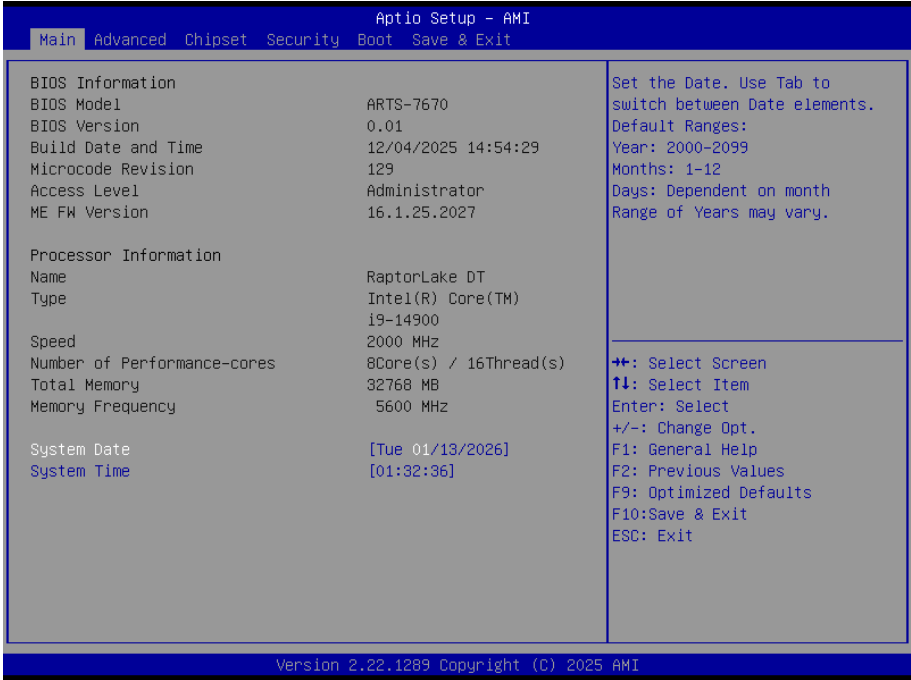
Keystroke	Function
← →	Moves left/right between the top menus.
↓ ↑	Moves up/down between highlight items.
Enter	Selects an highlighted item/field.
Esc	<ul style="list-style-type: none"> ▶ On the top menus: Use Esc to quit the utility without saving changes to CMOS. (The screen will prompt a message asking you to select OK or Cancel to exit discarding changes.) ▶ On the submenus: Use Esc to quit current screen and return to the top menu.
Page Up / +	Increases current value to the next higher value or switches between available options.
Page Down / -	Decreases current value to the next lower value or switches between available options.
F1	Opens the Help of the BIOS Setup utility.
F2	Previous values.
F9	Load Optimized Defaults (The screen then prompts a message asking you to select Yes or No to restore to default.)
F10	Exits the utility saving the changes that have been made. (The screen then prompts a message asking you to select Yes or No to exit saving changes.)

Note:

This BIOS Setup utility is updated from time to time to improve system performance and hence the screenshots hereinafter may not fully comply with what you actually have onscreen.

5.1. Main

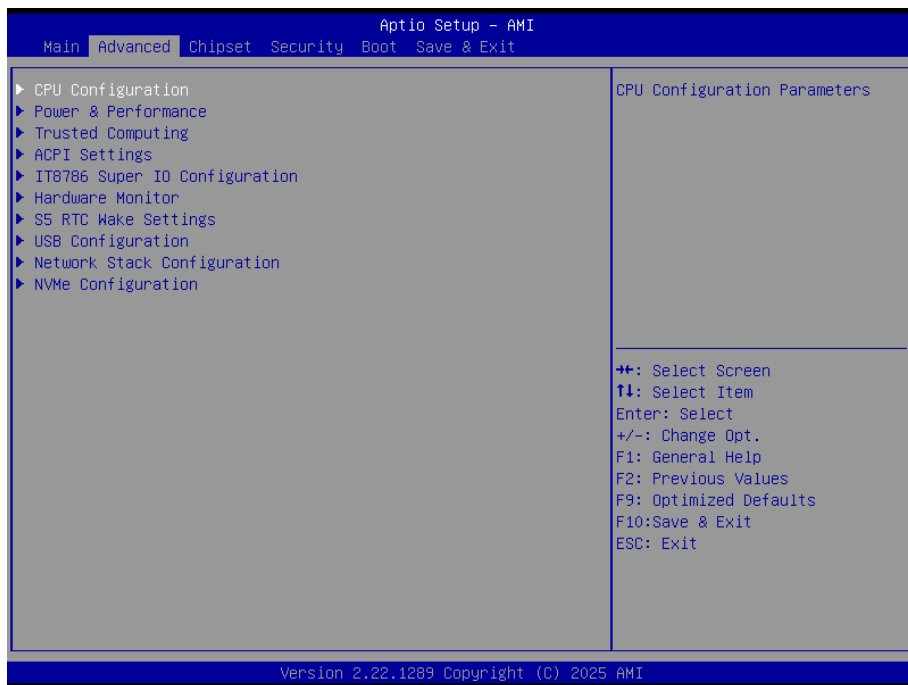
The **Main** menu features the settings of **System Date** and **System Time** and displays some BIOS and system information.



The feature settings are:

Setting	Description
System Date	<p>Set the system date. Use Tab to switch between Date elements. Note that the 'Day' automatically changes when you set the date.</p> <ul style="list-style-type: none"> ▶ The date format is: <ul style="list-style-type: none"> Day: Sun to Sat Month: 1 to 12 Date: 1 to 31 Year: 2000 to 2099
System Time	<p>Set the system time. Use Tab to switch between Time elements.</p> <ul style="list-style-type: none"> ▶ The time format is: <ul style="list-style-type: none"> Hour: 00 to 23 Minute: 00 to 59 Second: 00 to 59

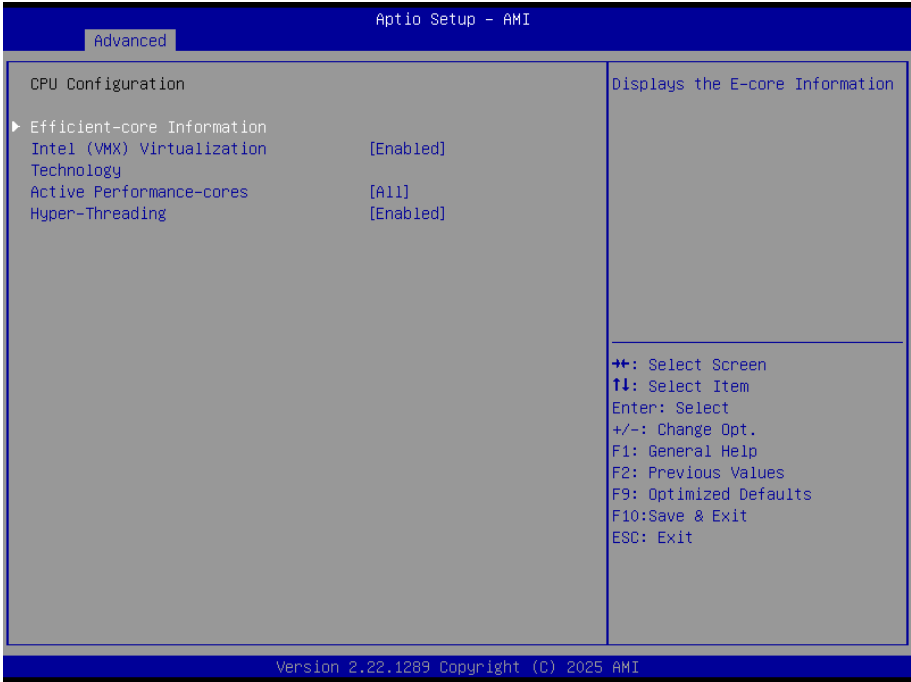
5.2. Advanced



The feature settings and submenus are:

Setting	Description
CPU Configuration	See 5.2.1. CPU Configuration on page 46.
Power & Performance	See 5.2.2. Power & Performance on page 47.
Trusted Computing	See 5.2.3. Trusted Computing on page 49.
ACPI Settings	See 5.2.4. ACPI Settings on page 50.
IT8786 Super IO Configuration	See 5.2.5. IT8786 Super IO Configuration on page 51.
Hardware Monitor	See 5.2.6. Hardware Monitor on page 53.
S5 RTC Wake Settings	See 5.2.7. S5 RTC Wake Settings on page 54.
USB Configuration	See 5.2.8. USB Configuration on page 55.
Network Stack Configuration	See 5.2.9. Network Stack Configuration on page 57.
NVMe Configuration	See 5.2.10. NVMe Configuration on page 58.

5.2.1. CPU Configuration



The feature settings are:

Setting	Description
Efficient-core Information	Displays the E-core Information.
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. ▶ Options: Enabled (default) or Disabled
Active Performance-cores	Number of P-cores to enable in each processor package. ▶ Options: All (default), 1, 2, 3, 4, 5, 6, 7
Hyper-Threading	Enable or Disable Hyper-Threading Technology. ▶ Options: Enabled (default) or Disabled

5.2.2. Power & Performance



The feature settings are:

Setting	Description
CPU - Power Management Control	CPU - Power Management Control Options Boot performance mode: ▶ Options: Boot performance mode: Max Battery, Max Non-Turbo Performance (Default), Turbo Performance Intel(R) SpeedStep(tm): ▶ Options: Disabled, Enabled (Default) Turbo Mode: ▶ Options: Disabled (Default), Enabled View/Configure Turbo Options: ▶ View/Configure Turbo Ratio Limit Options C States: ▶ Options: Disabled, Enabled (Default)

GT - Power Management Control

RC6(Render Standby): Check to enable render standby

- ▶ Options: **Disabled / Enabled**(Default)

Maximum GT frequency: Maximum GT frequency limited by the user.

- ▶ Options: **Default Max Frequency**(Default), **100Mhz~1200Mhz**

Disable Turbo GT Frequency: Enabled/Disabled GT Frequency.

- ▶ Options: **Disabled**(Default) / **Enabled**

5.2.3. Trusted Computing

Advanced		Aptio Setup - AMI	
TPM 2.0 Device Found			Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Firmware Version:	600.18		
Vendor:	INTC		
Security Device Support	[Enabled]		
Active PCR banks	SHA256		
Available PCR banks	SHA256,SHA384,SM3		
SHA256 PCR Bank	[Enabled]		
SHA384 PCR Bank	[Disabled]		
SM3_256 PCR Bank	[Disabled]		
Pending operation	[None]		
Platform Hierarchy	[Enabled]		⇧⇩: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Storage Hierarchy	[Enabled]		
Endorsement Hierarchy	[Enabled]		
Physical Presence Spec Version	[1.3]		
TPM 2.0 InterfaceType	[CRB]		
Device Select	[Auto]		

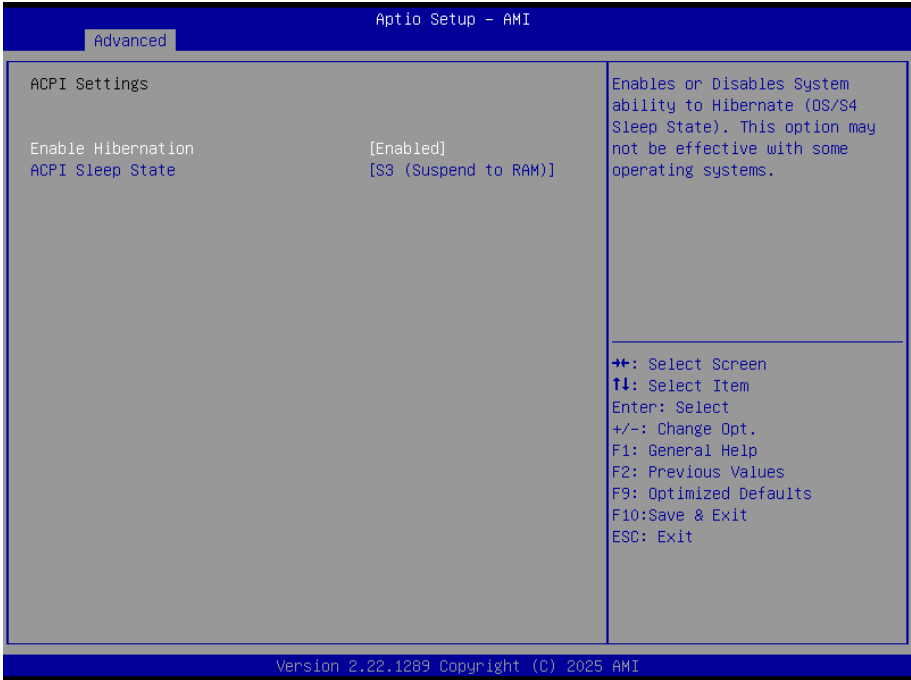
Version 2.22.1289 Copyright (C) 2025 AMI

The feature settings are:

Setting	Description
Security Device Support	Enables or disables BIOS support for security device. OS will not show Security Device. ▶ Options: Enabled (Default) / Disabled
SHA256 PCR Bank	Enables or disables SHA256 PCR Bank. ▶ Options: Enabled (Default) / Disabled
SHA384 PCR Bank	Enables or disables SHA384 PCR Bank. ▶ Options: Enabled / Disabled (Default)
SM3_256 PCR Bank	Enables or disables SM3_256 PCR Bank. ▶ Options: Enabled / Disabled (Default)
Pending operation	Schedule an operation for the security device. ▶ Options: None (Default) / TPM Clear
Platform Hierarchy	Enables or disables Platform Hierarchy. ▶ Options: Enabled (Default) / Disabled
Storage Hierarchy	Enables or disables Storage Hierarchy. ▶ Options: Enabled (Default) / Disabled
Endorsement Hierarchy	Enables or disables Endorsement Hierarchy. ▶ Options: Enabled (Default) / Disabled
Physical Presence Spec Vision	This item select to tell O.S. to support PPI Spec Version 1.2 or 1.3. ▶ Options: 1.3 (Default) / 1.2

Device Select	<p>TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both TPM 2.0 devices and TPM 1.2 devices.</p> <p>► Options: Auto (Default) / TPM 1.2 / TPM 2.0</p>
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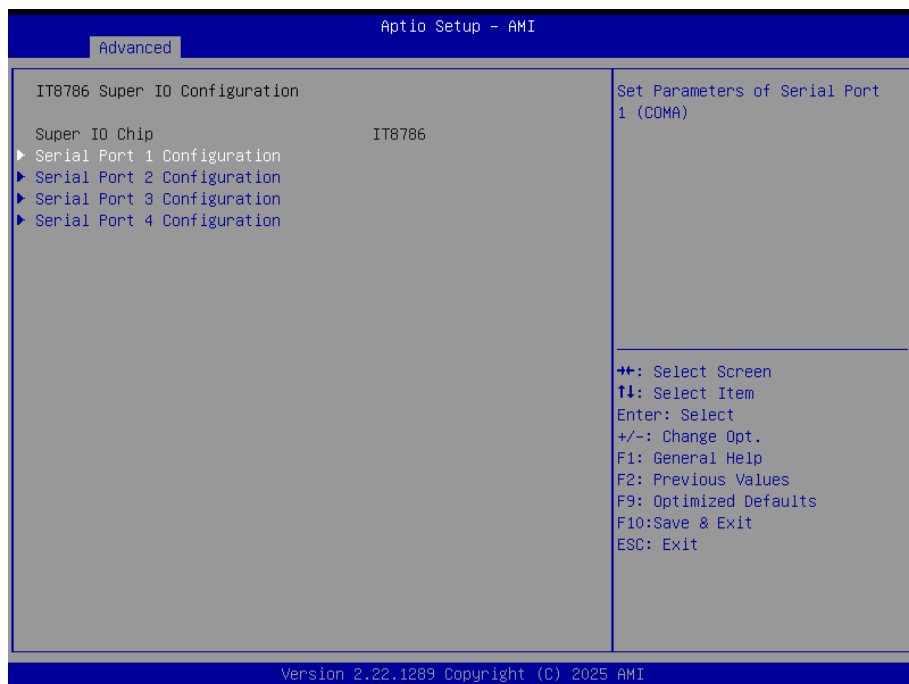
5.2.4. ACPI Settings



The feature settings are:

Setting	Description
Enable Hibernation	Enables (default) or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. ► Options: Suspend Disabled , S1 (CPU Stop Clock) and S3 (Suspend to RAM) (Default)

5.2.5. IT8786 Super IO Configuration

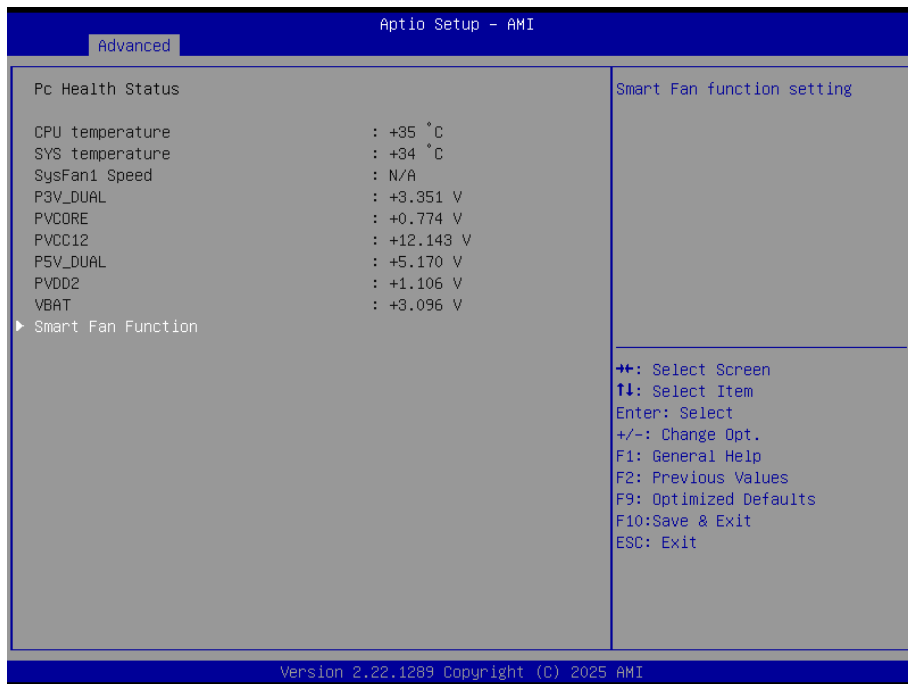


The feature settings are:

Setting	Description
Serial Port 1 Configuration	<p>To configure each COM port settings. Serial Port 1 (RS232 Only) Serial Port: Enable or Disable Serial Port (COM) ▶ Options: Enabled (default), Disabled</p> <p>Change Settings: Select an optimal settings for Super IO Device ▶ Options: Auto (default), IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;</p>

<p>Serial Port 2 Configuration</p>	<p>To configure each COM port settings. Serial Port 2 Serial Port: Enable or Disable Serial Port (COM) ▶ Options: Enabled (default), Disabled</p> <p>Change Settings: Select an optimal settings for Super IO Device ▶ Options: Auto (default), IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;</p> <p>RS485 Autoflow Control: Select Function Mode ▶ Options: RS485 (default), RS422</p>
<p>Serial Port 3/4 Configuration</p>	<p>Serial Port 3/4 (RS232 Only) Serial Port: Enable or Disable Serial Port (COM) ▶ Options: Enabled, Disabled</p> <p>Change Settings: Select an optimal settings for Super IO Device ▶ Options: Auto, IO=3E8h; IRQ=7; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;</p>

5.2.6. Hardware Monitor



Setting	Description
Smart Fan Function	Smart Fan function setting.
	Smart Fan 2 Mode: Smart Fan Mode Select
	▶ Options: Software Mode, Automatic Mode
	Temperature Select: Temperature input selection
	▶ Options: TMPIN1, TMPIN2 and TMPIN3
	Fan off temperature limit : Fan will off when temperature lower than this limit.
	▶ Select an optimal settings
	Fan start temperature limit : Fan will work when temperature higher than this limit.
	▶ Select an optimal settings
	Fan full speed temperature limit : Fan will full speed when temperature higher than this limit.
▶ Select an optimal settings	
Fan start PWM: Fan will start with this PWM value	
▶ Select an optimal settings	
PWM SLOPE SETTING: PWM SLOPE Selection	
▶ Select an optimal settings	

5.2.7. S5 RTC Wake Settings



Setting	Description
Wake System from S5	<p>Enable or Disable (default) system wake on alarm event.</p> <ul style="list-style-type: none"> Options available are: <ul style="list-style-type: none"> Disabled (default): Fixed Time: System will wake on the hr::min::sec specified. DynamicTime: If selected, you need to set Wake up minute increase from 1 - 5. System will wake on the current time + increase minute(s).

5.2.8. USB Configuration

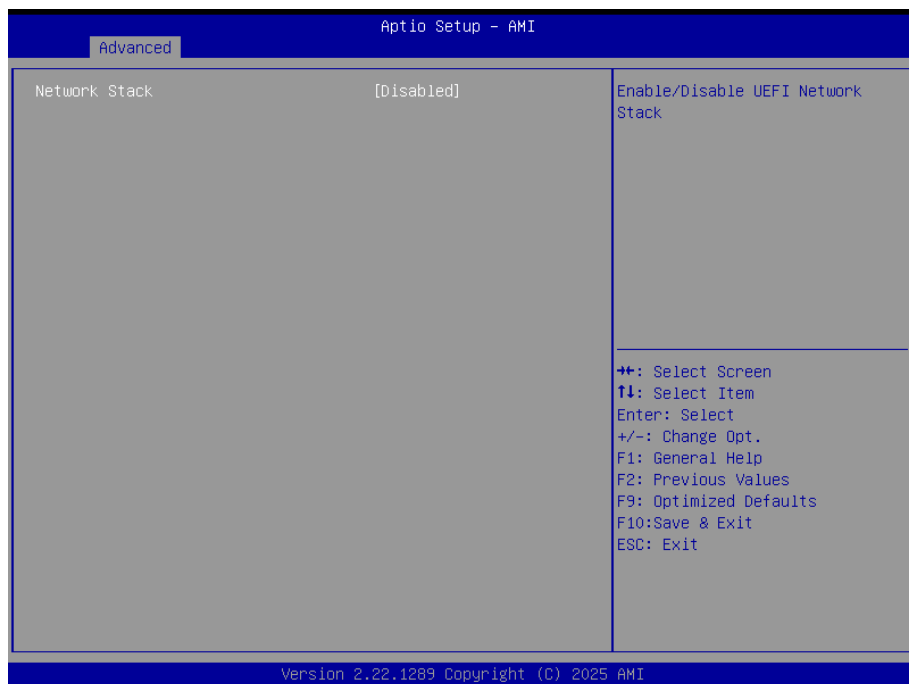


The feature settings are:

Setting	Description
Legacy USB Support	<p>Enables/disables legacy USB support.</p> <ul style="list-style-type: none"> ▶ Options available are Enabled (default), Disabled and Auto. ▶ Select Auto to disable legacy support if no USB device are connected. ▶ Select Disabled to keep USB devices available only for EFI applications.
XHCI Hand-off	<p>This is a workaround for OSES without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.</p> <ul style="list-style-type: none"> ▶ The optional settings are: Enabled (default) / Disabled
USB Mass Storage Driver Support	<p>Enables/disables USB Mass Storage Driver Support.</p> <ul style="list-style-type: none"> ▶ The optional settings are: Enabled (default) / Disabled

<p>USB transfer time-out</p>	<p>Use this item to set the time-out value for control, bulk, and interrupt transfers.</p> <p>▶ Options: 1 sec, 5 sec, 10 sec, 20 sec (default)</p>
<p>Device reset time-out</p>	<p>Use this item to set USB mass storage device start unit command time-out.</p> <p>▶ Options: 10 sec, 20 sec (default), 30 sec, 40 sec</p>
<p>Device power-up delay</p>	<p>Use this item to set maximum time the device 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.</p> <p>▶ Options available are: Auto: Default Manual: Select Manual you can set value for the following sub-item: 'Device Power-up delay in seconds', the delay range in from 1 to 40 seconds, in one second increments.</p>
<p>USB DISK 2.0 PMAP</p>	<p>Mass storage device emulation type. 'AUTO' enumerates devices according to their media format. Optical drives are emulated as 'CDROM', drives with no media will be emulated according to a drive type.</p> <p>▶ Options: Auto, Floppy, Forced FDD, Hard Disk and CD-ROM</p>

5.2.9. Network Stack Configuration



Setting	Description
Network Stack	Enable or Disable (default) UEFI network stack

5.2.10. NVMe Configuration



Access this submenu to view the NVMe controller and driver information.

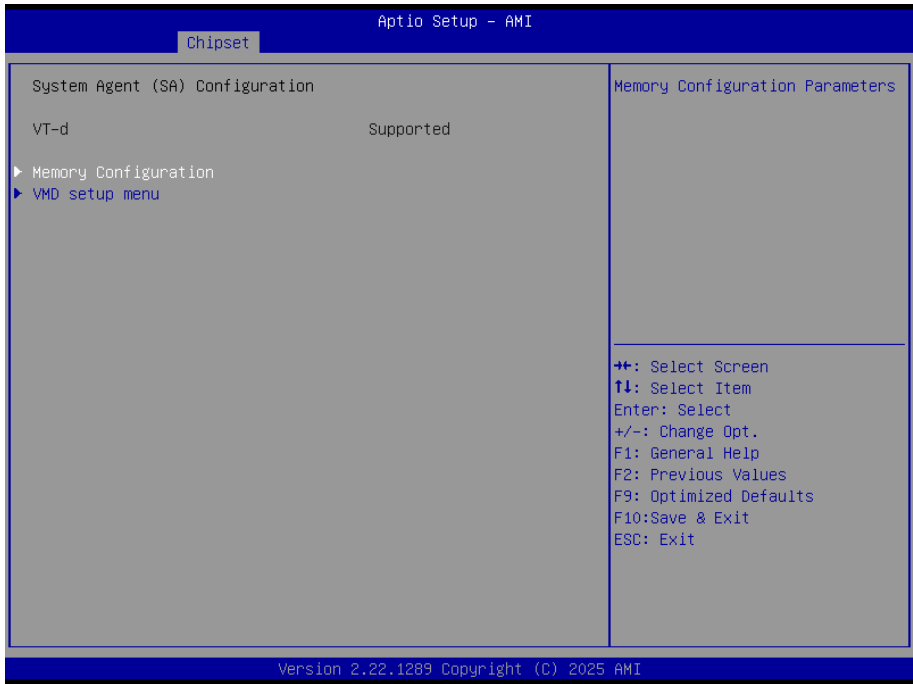
5.3. Chipset



The feature settings are:

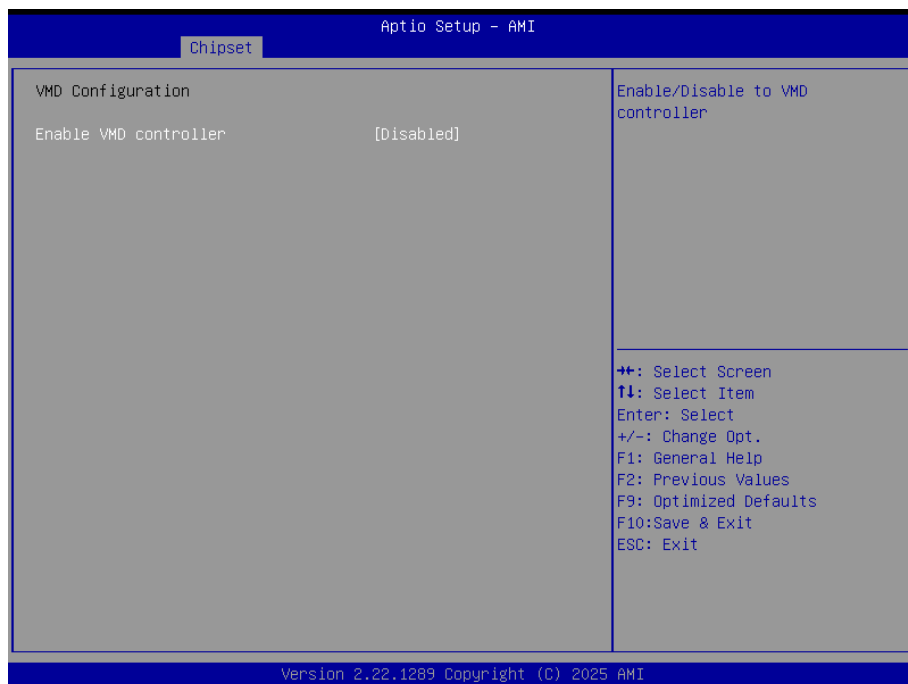
Setting	Description
System Agent (SA) Configuration	See 5.3.1. System Agent (SA) Configuration on page 60
PCH-IO Configuration	See 5.3.2. PCH-IO Configuration on page 62

5.3.1. System Agent (SA) Configuration



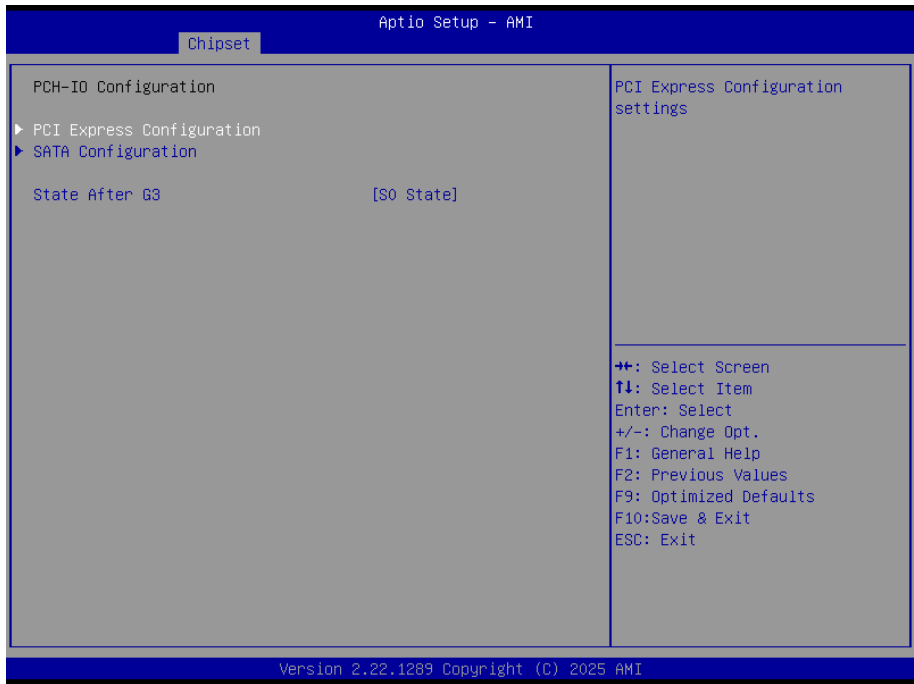
Setting	Description
Memory Configuration	Access this submenu to view the memory configuration
VMD setup menu	See 5.3.1.1. VMD Configuration on page 61

5.3.1.1. VMD Configuration



Setting	Description
Enable VMD controller	Enable/Disable to VMD controller. ▶ Options: Enabled, Disabled
Enable VMD Global Mapping	Enable/Disable to VMD Global Mapping. ▶ Options: Enabled, Disabled
Map this Root Port under VMD	Map/UnMap this Root Port to VMD. ▶ Options: Enabled, Disabled
RAID0/1	Enable/Disable RAID0/1 support. ▶ Options: Enabled, Disabled

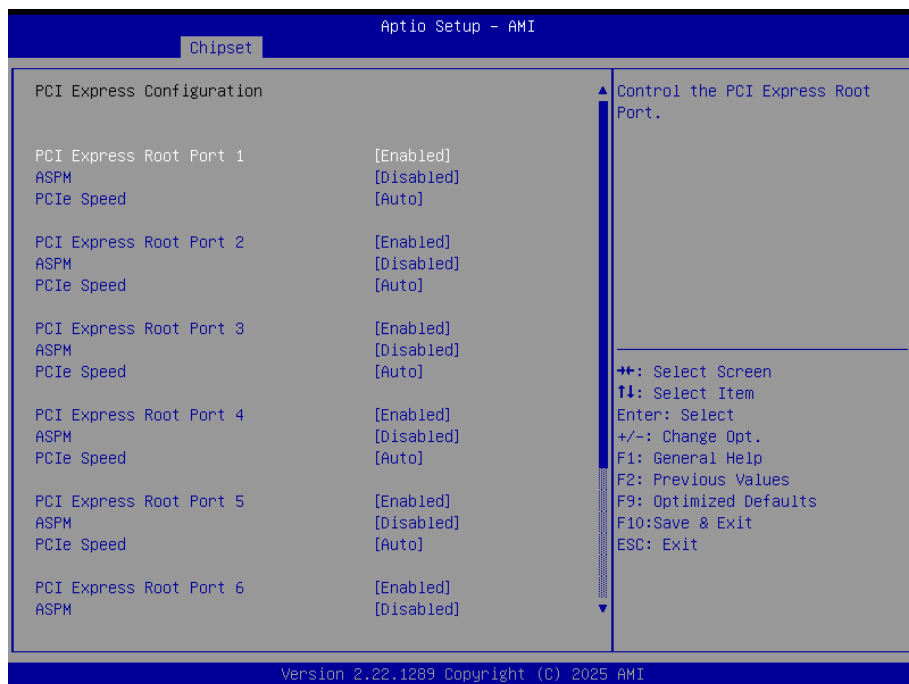
5.3.2. PCH-IO Configuration



The feature settings are:

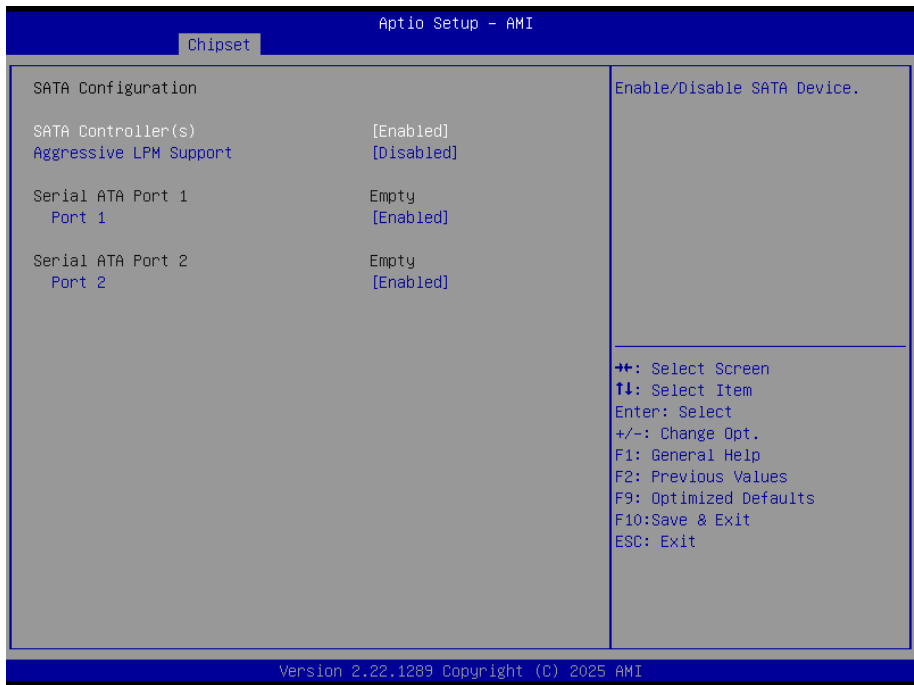
Setting	Description
PCI Express Configuration	See 5.3.2.1. PCI Express Configuration on page 63
SATA Configuration	See 5.3.2.2. SATA Configuration on page 64
State After G3	Specify what state to go to when power is re-applied after a power failure(G3 state). ▶ Options: S0 State (default), S5 State

5.3.2.1. PCI Express Configuration



Setting	Description
PCI Express Root Port 1~8	Control the PCIe Express Root Port. ► Options: Enabled, Disabled
ASPM	Set the ASPM Level. ► Options: Disabled, L1 and Auto
PCIe Speed	Configure PCIe Speed. ► Options: Auto, Gen1, Gen2, Gen3 and Gen4

5.3.2.2. SATA Configuration



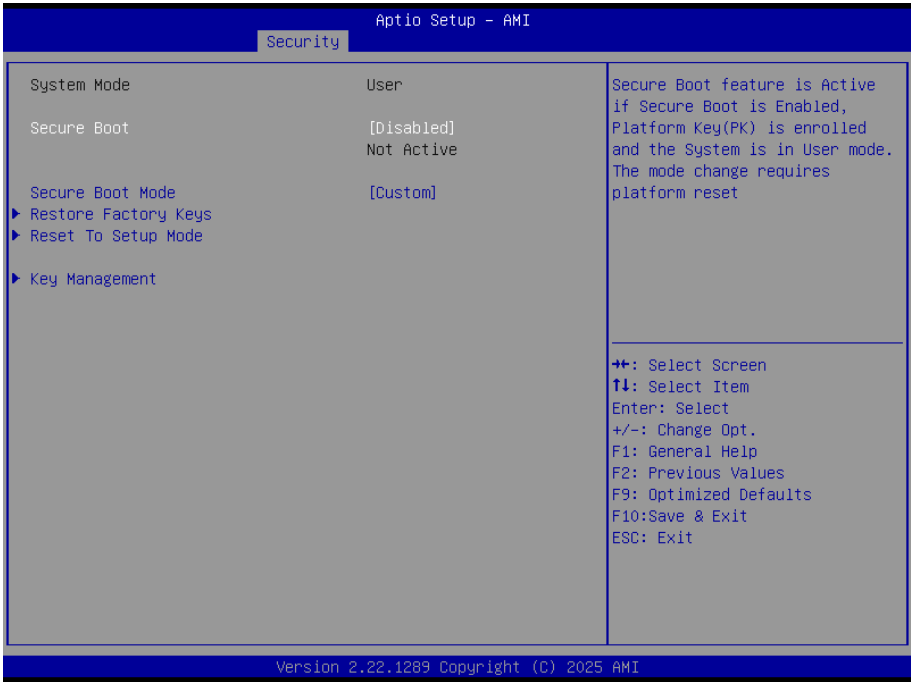
Setting	Description
SATA Controller(s)	Enables (default) / disables SATA device.
Aggressive LPM Support	Enable PCH to aggressively enter link power state. ► Options: Enabled, Disabled
Port 0/1	Enables (default) / disables SATA port.

5.4. Security



Setting	Description
Administrator Password	To set up an administrator password: 1. Select Administrator Password . 2. An Create New Password dialog then pops up onscreen. 3. Enter your desired password that is no less than 3 characters and no more than 20 characters. 4. Hit [Enter] key to submit.
Secure Boot	See 5.4.1 Secure Boot on page 66

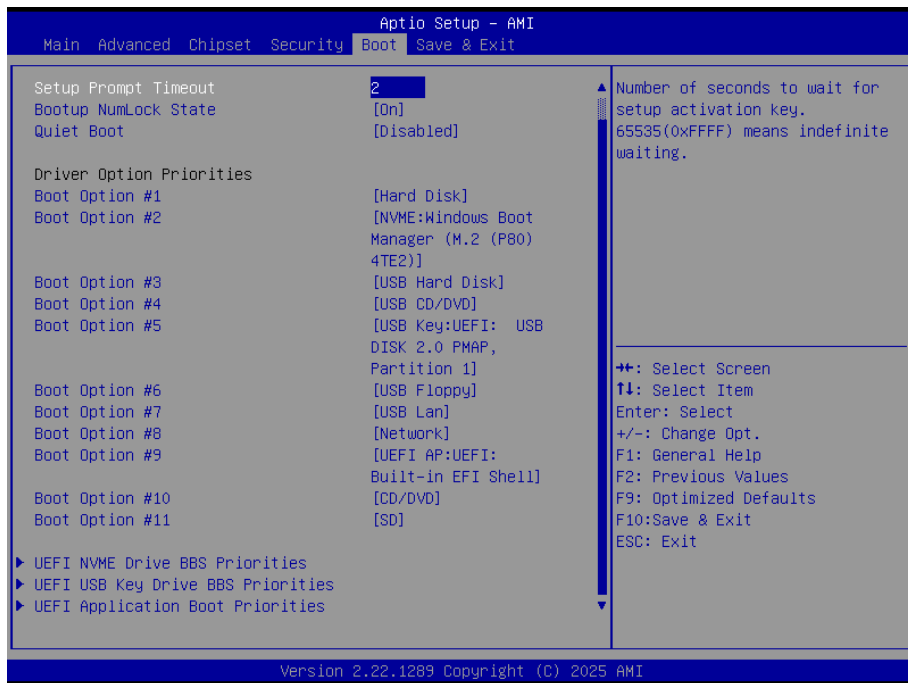
5.4.1 Secure Boot



The feature settings are:

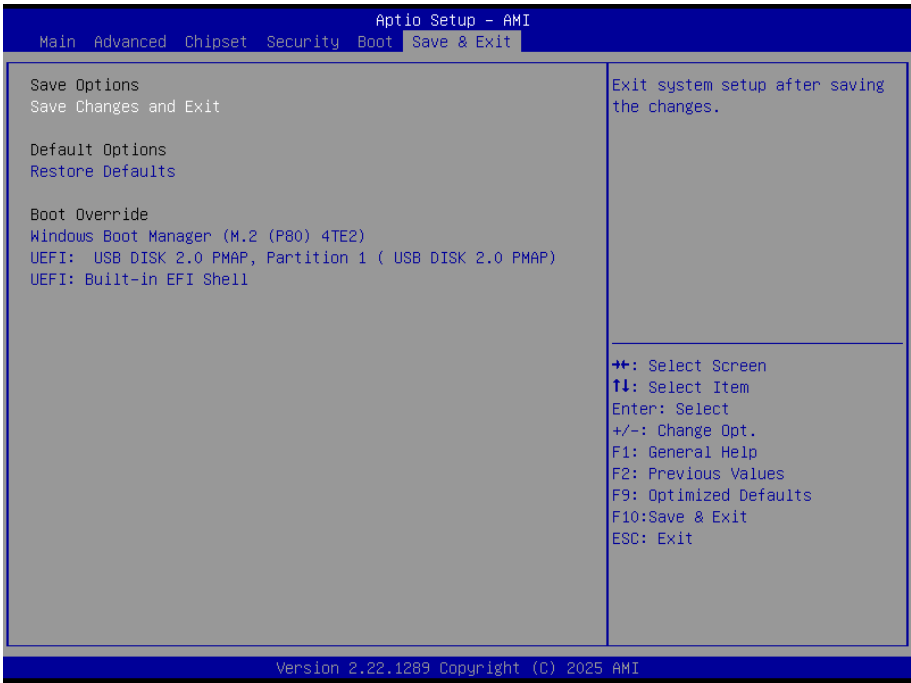
Setting	Description
Secure Boot	Enable/Disable (default) secure boot.
Secure Boot Mode	Allow users to set the secure boot selector. ▶ Options: Standard (default) / Custom mode.
Restore Factory Keys	Force system to restore default secure boot key database.
Reset to Setup Mode	Delete all secure boot key databases.
Key Management	Allow users to modify secure variables and set key management page.

5.5. Boot



Setting	Description
Setup Prompt Timeout	Set how long to wait for the prompt to show for entering BIOS Setup. <ul style="list-style-type: none"> ▶ The default setting is 1 (sec). ▶ Set it to 65535 to wait indefinitely.
Bootup NumLock State	Sets whether to enable or disable the keyboard's NumLock state when the system starts up. <ul style="list-style-type: none"> ▶ Options available are On (default) and Off.
Quiet Boot	Sets whether to display the POST (Power-on Self Tests) messages or the system manufacturer's full screen logo during booting. <ul style="list-style-type: none"> ▶ Select Disabled to display the normal POST message, which is the default.
Boot Option Priority	Set the system boot priorities.

5.6. Save & Exit



Setting	Description
Save Changes and Exit	Saves the changes and quits the BIOS Setup utility.
Restore Defaults	Restores all settings to defaults. ▶ This is a command to launch an action from the BIOS Setup utility.
Boot Override	Boot Override presents a list in context with the boot devices in the system. ▶ P0 : Select the device to boot up the system regardless of the currently configured boot priority. ▶ Launch EFI Shell from filesystem device : Attempts to launch EFI Shell Application (Shell.efi) from one of the available filesystem devices.