IPC980 series

Industrial Computers

User's Manual

AXIOMTEK

USER'S MANUAL

www.axiomtek.com

Disclaimers

This manual has been carefully checked and believed to contain accurate information. Axiomtek Co., Ltd. assumes no responsibility for any infringements of patents or any third party's rights, and any liability arising from such use.

Axiomtek does not warrant or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information in this document. Axiomtek does not make any commitment to update the information in this manual.

Axiomtek reserves the right to change or revise this document and/or product at any time without notice.

No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Axiomtek Co., Ltd.

December 2025, Version A1

Printed in Taiwan

Safety Precautions

Before getting started, please read the following important safety precautions.

1. The IPC980 Series does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the IPC980 Series before making any installation. Be sure both the system and the external devices are turned OFF. A sudden surge of power could ruin sensitive components. Make sure the IPC980 Series is properly grounded.
4. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
5. Turn OFF the system power before cleaning. Clean the system using cloth only. Do not spray any liquid cleaner directly onto the screen.
6. Do not leave this equipment in an uncontrolled environment where the storage temperature is below -40℃ or above 80℃. It may damage the equipment.
7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
   - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.
   - When handling boards and components, wear a grounding wrist strap, available from most electronic component stores.

Classification

1. Degree of protection against electric shock: not classified
2. Degree of protection against the ingress of water: IP67
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture of air or with oxygen or nitrous oxide.
4. Mode of operation: Continuous
5. Type of protection against electric shock: Class I equipment

General Cleaning Tips

You may need the following precautions before you begin to clean the computer. When you clean any single part or component for the computer, please read and understand the details below fully.

When you need to clean the device, please rub it with a piece of dry cloth.

1. Be cautious of the tiny removable components when you use a vacuum cleaner to absorb the dirt on the floor.
2. Turn the system off before you start to clean up the component or computer.
3. Never drop the components inside the computer or get circuit board damp or wet.
4. Be cautious of all kinds of cleaning solvents or chemicals when you use it for the sake of cleaning. Some individuals may be allergic to the ingredients.
5. Try not to put any food, drink or cigarette around the computer.

Cleaning Tools

Although many companies have created products to help improve the process of cleaning your computer and peripherals, users can also use household items to clean their computers and peripherals. Below is a list of items you may need or want to use while cleaning your computer or computer peripherals.

Keep in mind that some components in your computer may require designated products for cleaning. If this is the case it will be mentioned in the cleaning instructions.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, we still recommend you to rub it with a piece of cloth.
- Water or rubbing alcohol: You may moisten a piece of cloth a bit with some water or rubbing alcohol and rub it on the computer. Unknown solvents may be harmful to the plastic parts.
- Vacuum cleaner: Vacuuming dust, dirt, hair, cigarette particles, and other particles out of a computer can be one of the best methods of cleaning a computer. Over time these items can restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas in your keyboard, mouse, and other locations.
- Foam swabs: Whenever possible it is better to use lint free swabs such as foam swabs.

 Note: It is strongly recommended that you should shut down the system before you start to clean any single components.

 Note: Please check the temperature of the system's surface before maintenance.

Please follow the steps below:

1. Close all application programs.
2. Close operating software.
3. Turn off power switch.
4. Remove all devices.
5. Pull out the power cable.

Scrap Computer Recycling

Please inform the nearest Axiomtek distributor as soon as possible of suitable solutions in case computers require maintenance or repair; or for recycling in case computers are out of order or no longer in use.

Table of Contents

SECTION 1
INTRODUCTION

This chapter contains general information and detailed specifications of the IPC980 Series. Chapter 1 includes the following sections:

General Description

System Specifications

Dimensions

I/O Outlets

Connectors

Package List

1.1 General Description

The IPC980 series is a fan-less systems that can support LGA1700 socket for Intel® Core™ Series 2 Processors (Bartlett Lake-S) and 14th/13th/12th Generation Intel® Core™ i9/i7/i5/i3 processors, up to 65W. The IPC980 are also built with a rugged design that makes the system suitable for the most endurable operation.

For operation systems, the IPC980 series not only supports Windows® 11 64-bit, Windows® 10 64-bit and Ubuntu, but also supports embedded OS.

1.2 System Specifications

1.2.1 System Features

- M12 connectors and IP67 housing
- Optional I/O for expansions
- Intelligent power management: Ignition, and USB power on/off control
- EN 61000-6-2 certified

Note: To maintain the IP67 protection and warranty coverage, please do not disassemble the system without prior approval from Axiomtek.

1.2.2 CPU Level

- Socket LGA1700 for Intel® Core™ Series 2 processors (Bartlett Lake-S) and 14th/13th/12th Generation Intel® Core™ i9/i7/i5/i3 processors, up to 65W
- Below is a list of supported CPUs.

Generation	Proc No	WATT
Intel® Core™ Series 2 (Bartlett Lake-S)	251E	65W
Intel® Core™ Series 2 (Bartlett Lake-S)	251TE	45W
Intel® Core™ Series 2 (Bartlett Lake-S)	221E	65W
Intel® Core™ Series 2 (Bartlett Lake-S)	221TE	45W
Intel® Core™ Series 2 (Bartlett Lake-S)	211E	65W
Intel® Core™ Series 2 (Bartlett Lake-S)	211TE	45W
Intel® Core™ Series 2 (Bartlett Lake-S)	201E	60W
Intel® Core™ Series 2 (Bartlett Lake-S)	201TE	45W
Raptor Lake	300	46W
Raptor Lake	300T	35W
14th Gen	i9-14901E	65W
14th Gen	i9-14901TE	45W
14th Gen	i7-14701E	65W
14th Gen	i7-14701TE	45W
14th Gen	i5-14501E	65W
14th Gen	i5-14401E	65W

14th Gen	i5-14501TE	45W
14th Gen	i5-14401TE	45W
14th Gen	i9-14900	65W
14th Gen	i9-14900T	35W
14th Gen	i7-14700	65W
14th Gen	i7-14700T	35W
14th Gen	i5-14400	65W
14th Gen	i5-14500	65W
14th Gen	i5-14400T	35W
14th Gen	i5-14500T	35W
14th Gen	i3-14100	60W
14th Gen	i3-14100T	35W
13th Gen	i9-13900E	65W
13th Gen	i9-13900TE	35W
13th Gen	i7-13700E	65W
13th Gen	i7-13700TE	35W
13th Gen	i5-13500E	65W
13th Gen	i5-13500TE	35W
13th Gen	i3-13100E	60W
13th Gen	i3-13100TE	35W
12th Gen	i9-12900E	65W
12th Gen	i9-12900TE	35W
12th Gen	i7-12700E	65W
12th Gen	i7-12700TE	35W
12th Gen	i5-12500E	65W
12th Gen	i5-12500TE	35W
12th Gen	i3-12100E	60W
12th Gen	i3-12100TE	35W
12th Gen	G7400E	46W
12th Gen	G7400TE	35W
12th Gen	G6900E	46W
12th Gen	G6900TE	35W

1.2.3 Specifications

The system specifications for the IPC980 are as follows:

Model Name	IPC980-H-F1
System chipset	H610E
System memory	• Intel® 13th/12th Generation Core™ i9/i7/i5/i3 processors: 2x DDR5 5600/4800 non-ECC SO-DIMM 262-pin, max up to 64GB • Intel® Core™ Series 2 Processors (Bartlett Lake-S) and 14th Generation Intel® Core™ i9/i7/i5/i3 processor: 2 x 262-pin DDR5 5600/4800 non-ECC SO-DIMM, up to 96GB
Ethernet	2 x 2.5GbE LAN (Intel® I226-V, M12 X-coded) 1 x GbE LAN (Intel® 1219-LM, M12 X-coded)
Serial	1 x RS-232 (4-wire)/RS-422/485 (default: RS-232, M12 A-coded)
USB	4 x USB 3.2 Gen1 (5G) Type-A 2 x USB 2.0 (M12 A-coded) 1 x USB 2.0 (internal, up to 30 mm) 180D Type-
Display	1 x HDMI 1.4b with 4096 x 2160 resolution supported
TPM	1 x TPM 2.0 on board
Storage	1 x SSD/HDD drive bay (7/9.5/15 mm height) 1 x SSD/HDD drive bay (optional, 7/9.5/15 mm height) 1 x M.2 key M 2280 socket (PCIe x4 Gen3)
Expansion	2 x blank I/O openings are reserved for expansion. 1 x full-size PCI Express Mini Card slot (USB & PCIe interface) with SIM slot and 3 x antenna openings
Power Input and Ignition Control	Input: 18 to 36 Vdc ACC ignition 1 x DC power connector (M12, A-coded) 1 x Power on/off button with LED (default ATX) AT/ATX mode through BIOS setting
Typical	24Vdc
Inrush current	+24V/12.8A
Power rating	18-36Vdc, 12.1-5.7A
Storage temperature	-40℃-80℃
Humidity	10%-90% (non-condensing)
Vibration	IEC 60068-2-64 2019 (with SSD: 3Grms STD, random, 5 to 500 IEC 60068-2-64 (with SSD: 3Grms, random, 5 to 500 Hz) MIL-STD-810H, Method 514.8, Category 20
Shock	IEC 60068-2-27 2008 (with SSD: 50G, half sine, 11 ms duration) MIL-STD-810H, Method 516.8, Procedure I
IP Rated	IP67

Dimensions (D x W x H)	255 x 230 x 86.5 mm

Note: Since Gen. 2 SSD with JMicron controller has a compatibility issue with Intel PCH, it is strongly recommended to use Gen. 3 SSD on system.

Note: System peripherals and optional I/O kit must be pre-assembled by Axiomtek.

Note: The system power rating might change based on differing combinations of attached devices.

1.2.4 Operating Temperature

- Below is a list of IPC980 series operating temperature w/ Intel® Core™ processor and industrial wide-temp SSD.

Generation	Proc No	WATT	Operating Temperature (0.7 m/s air flow)	Performance-core base frequency	Efficient-core base frequency
Intel® Core™ Series 2 (Bartlett Lake-S)	251E	65W	-20℃-50℃	2.1 GHz	1.6 GHz
Intel® Core™ Series 2 (Bartlett Lake-S)	251TE	45W	-20℃-50℃	1.4 GHz	1 GHz
Intel® Core™ Series 2 (Bartlett Lake-S)	221E	65W	-20℃-50℃	2.7 GHz	2.1 GHz
Intel® Core™ Series 2 (Bartlett Lake-S)	221TE	45W	-20℃-50℃	1.8 GHz	1.3 GHz
Intel® Core™ Series 2 (Bartlett Lake-S)	211E	65W	-20℃-50℃	2.7 GHz	2 GHz
Intel® Core™ Series 2 (Bartlett Lake-S)	211TE	45W	-20℃-50℃	1.7 GHz	1.3 GHz
Intel® Core™ Series 2 (Bartlett Lake-S)	201E	60W	-20℃-50℃	3.6 GHz	1.2 GHz
Intel® Core™ Series 2 (Bartlett Lake-S)	201TE	45W	-20℃-50℃	2.9 GHz	
Raptor Lake	300	46W	-20℃-50℃	3.9 GHz	
Raptor Lake	300T	35W	-20℃-60℃	3.4 GHz	
14th Gen	i9-14901E	65W	-20℃-50℃	2.8 GHz	
14th Gen	i9-14901TE	45W	-20℃-50℃	2.3 GHz	
14th Gen	i7-14701E	65W	-20℃-50℃	2.6 GHz	
14th Gen	i7-14701TE	45W	-20℃-50℃	2.1 GHz	
14th Gen	i5-14501E	65W	-20℃-50℃	3.3 GHz	
14th Gen	i5-14401E	65W	-20℃-50℃	2.5 GHz	
14th Gen	i5-14501TE	45W	-20℃-50℃	2.2 GHz	

14th Gen	i5-14401TE	45W	-20℃-50℃	2 GHz	
14th Gen	i9-14900	65W	-20℃-50℃	2 GHz	1.5 GHz
14th Gen	i9-14900T	35W	-20℃-60℃	1.1 GHz	800 MHz
14th Gen	i7-14700	65W	-20℃-50℃	2.1 GHz	1.5 GHz
14th Gen	i7-14700T	35W	-20℃-60℃	1.3 GHz	900 MHz
14th Gen	i5-14400	65W	-20℃-50℃	2.5 GHz	1.8 GHz
14th Gen	i5-14500	65W	-20℃-50℃	2.6 GHz	1.9 GHz
14th Gen	i5-14400T	35W	-20℃-60℃	1.5 GHz	1.1 GHz
14th Gen	i5-14500T	35W	-20℃-60℃	1.7 GHz	1.2 GHz
14th Gen	i3-14100	60W	-20℃-50℃	3.5 GHz	
14th Gen	i3-14100T	35W	-20℃-60℃	2.7 GHz	
13th Gen	i9-13900E	65W	-20℃-50℃	1.8 GHz	1.3 GHz
13th Gen	i9-13900TE	35W	-20℃-60℃	1.0 GHz	800 MHz
13th Gen	i7-13700E	65W	-20℃-50℃	1.9 GHz	1.3 GHz
13th Gen	i7-13700TE	35W	-20℃-60℃	1.1 GHz	800 MHz
13th Gen	i5-13500E	65W	-20℃-50℃	2.4 GHz	1.5 GHz
13th Gen	i5-13500TE	35W	-20℃-60℃	1.3 GHz	1.1 GHz
13th Gen	i3-13100E	60W	-20℃-50℃	3.3 GHz	3.3 GHz
13th Gen	i3-13100TE	35W	-20℃-60℃	2.4 GHz	2.4 GHz
12th Gen	i9-12900E	65W	-20℃-50℃	2.3 GHz	1.7 GHz
12th Gen	i9-12900TE	35W	-20℃-60℃	1.1 GHz	1.0 GHz
12th Gen	i7-12700E	65W	-20℃-50℃	2.1 GHz	1.6 GHz
12th Gen	i7-12700TE	35W	-20℃-60℃	1.4 GHz	1.0 GHz
12th Gen	i5-12500E	65W	-20℃-50℃	2.9 GHz	
12th Gen	i5-12500TE	35W	-20℃-60℃	1.9 GHz	
12th Gen	i3-12100E	60W	-20℃-50℃	3.2 GHz	
12th Gen	i3-12100TE	35W	-20℃-60℃	2.1 GHz	
12th Gen	G7400E	46W	-20℃-50℃	3.6 GHz	
12th Gen	G7400TE	35W	-20℃-60℃	3.0 GHz	
12th Gen	G6900E	46W	-20℃-50℃	3.0 GHz	
12th Gen	G6900TE	35W	-20℃-60℃	2.4 GHz	


Note: Users can obtain the best balance between system computing and system operating temperature by setting CPU configuration in BIOS to meet the diverse needs of different industrial environments.


Note: The IPC system may cause CPU frequency hopping when operating in an extremely high temperature environment, and thermal throttling may occur when the system remains in full loading conditions.

Note: The performance of the system might be adversely affected when operating at a temperature above the system's limitation or with an unrecommended processor.

Note: If the operating temperature is above 30°C, it is recommended to use a wide temperature SSD on the device.

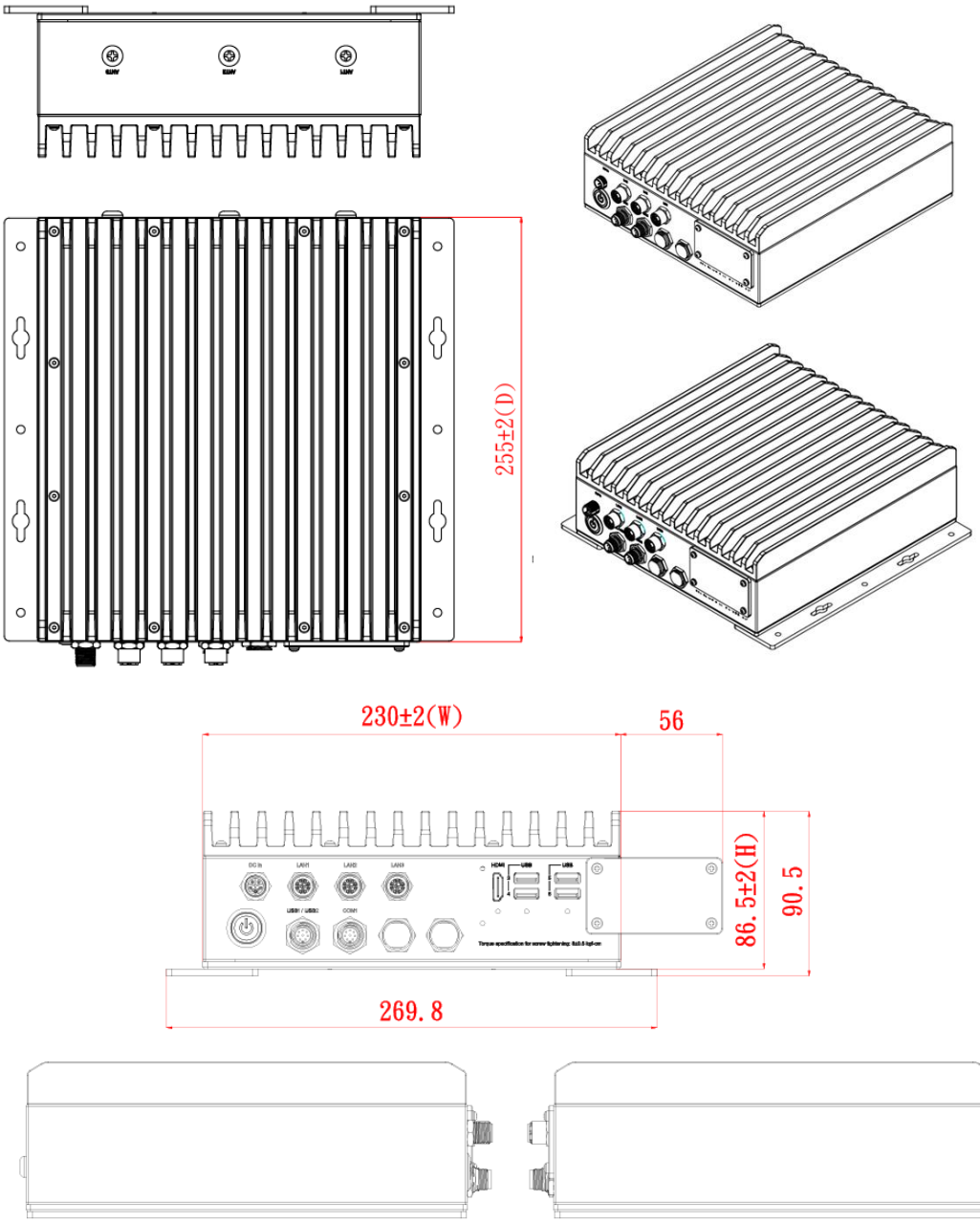
1.2.5 Certification

- CE (EN 61000-6-4, EN 61000-6-2)
- FCC

Note: All specifications and images are subject to change without notice.

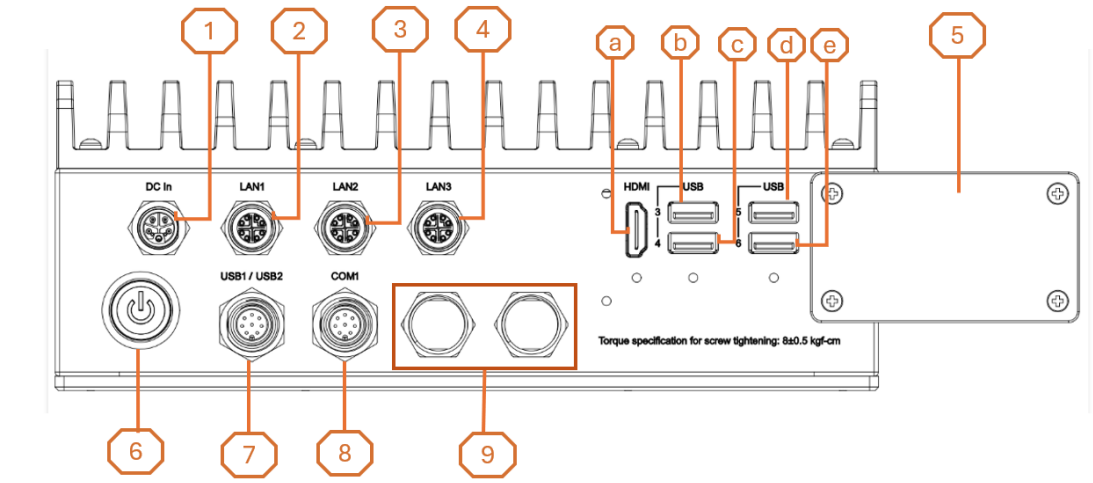
1.3 System Dimensions

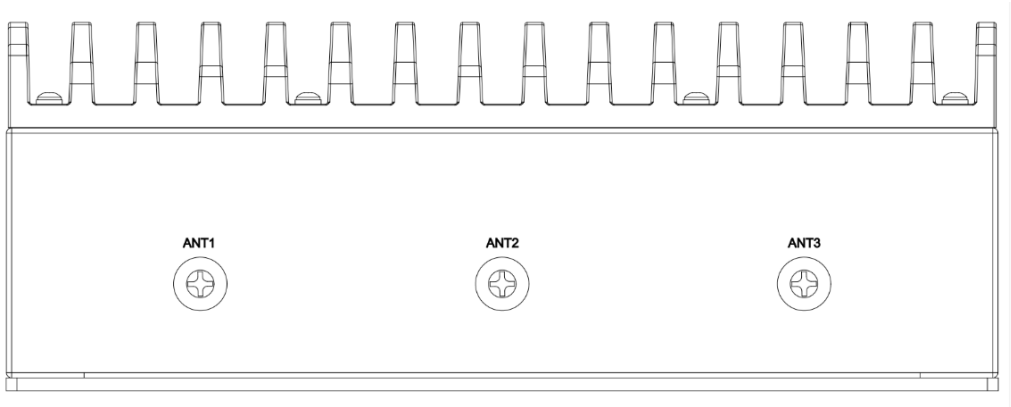
The following diagrams show you dimensions of the IPC980 series.



1.4 System I/O Outline Drawing

The outline below shows the location and designation of the I/O terminals on the device.





Mark	Description
1	1 x DC power connector (M12, A-coded 5-pin)
2	Intel® 1219-LM (M12 X-coded 8pin) (LAN1)
3	Intel® I226-V (M12 X-coded 8pin) (LAN2)
4	Intel® I226-V (M12 X-coded 8pin) (LAN3)
5	Maintenance I/O window a HDMI b USB 3.2 Gen1 (5G) (USB3) c USB 3.2 Gen1 (5G) (USB4) d USB 3.2 Gen1 (5G) (USB5) e USB 3.2 Gen1 (5G) (USB6)
6	Power button with LED
7	2 x USB 2.0 (M12, A-coded 8-pin) (USB1, USB2)
8	4-wire COM for RS-232/422/485 (M12, A-coded 8pin) (COM1)

9	2 x Optional I/O

Note: LAN port mapping may not function as expected if the system is not installed using Axiomtek's customized Windows IoT image.

Note: Taking off the maintenance I/O cover (Mark 5) could reduce the unit's IP rating performance.

Note: Please tighten the maintenance I/O cover (Mark 5) screws to a torque of 8 ± 0.5 kgf-cm to maintain IP67 protection.

1.5 Packing List

The package bundled with your IPC980 should contain the following items:

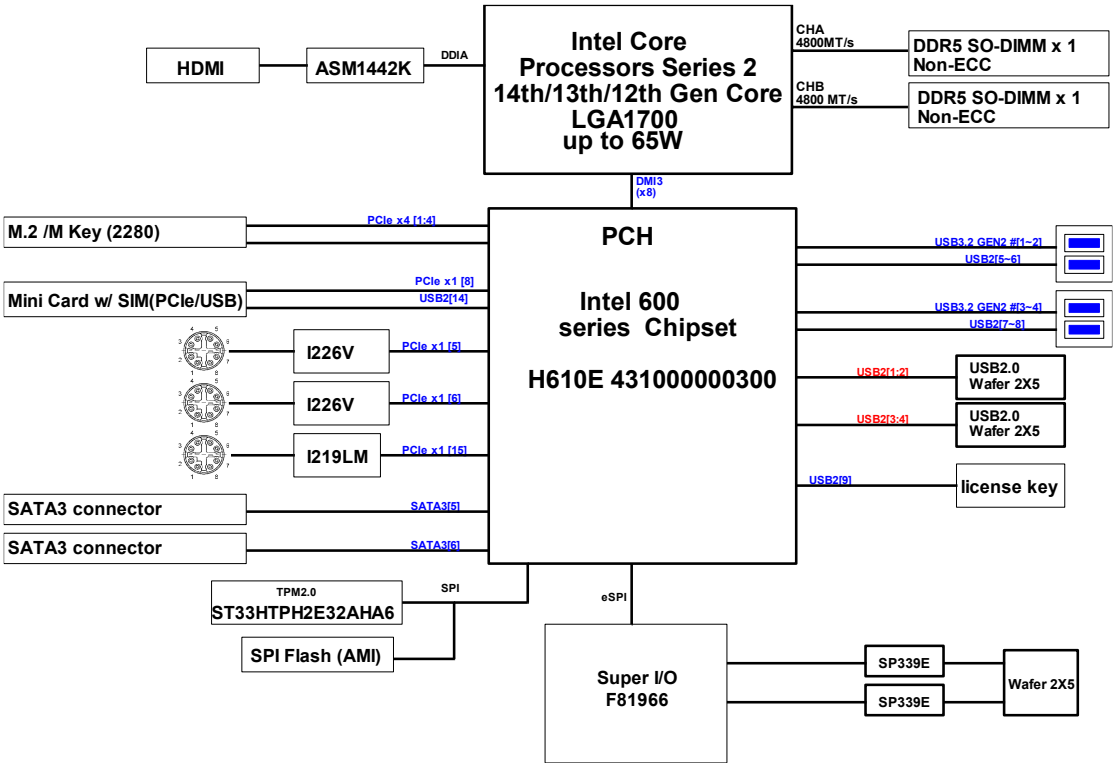
- IPC980 series unit x 1
- Screw pack x 1

If you cannot find this package or any items are missing, please contact Axiomtek distributors immediately.

1.6 Block Diagram

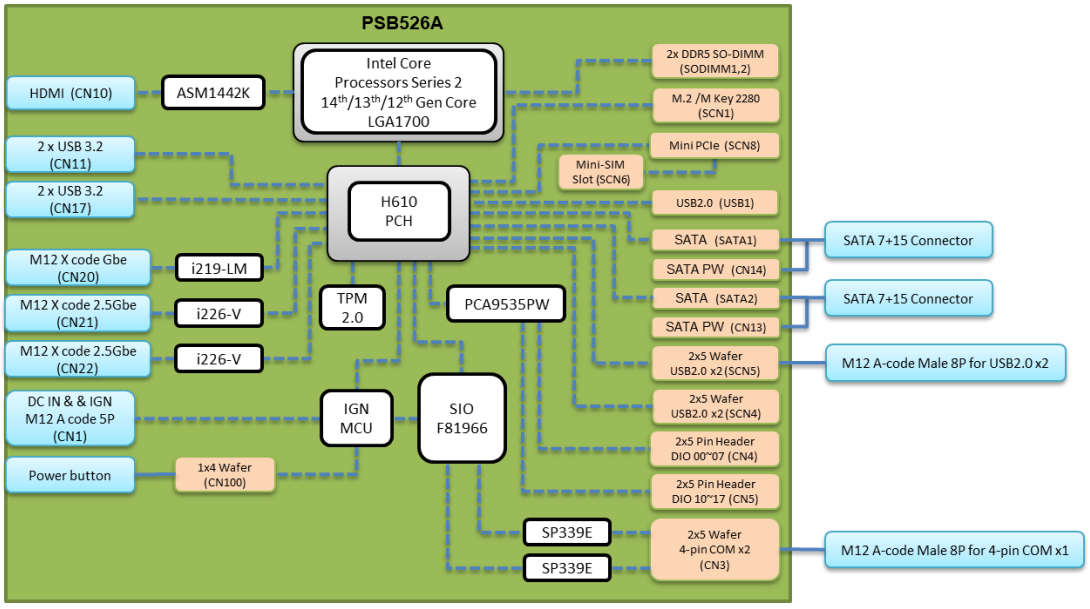
1.6.1 Main Board Block Diagram

The motherboard block diagram of the IPC980 is shown below.



1.6.2 System Block Diagram

The following illustrates the system block diagram of the IPC980.



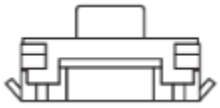
1.7 Switch & LED Settings

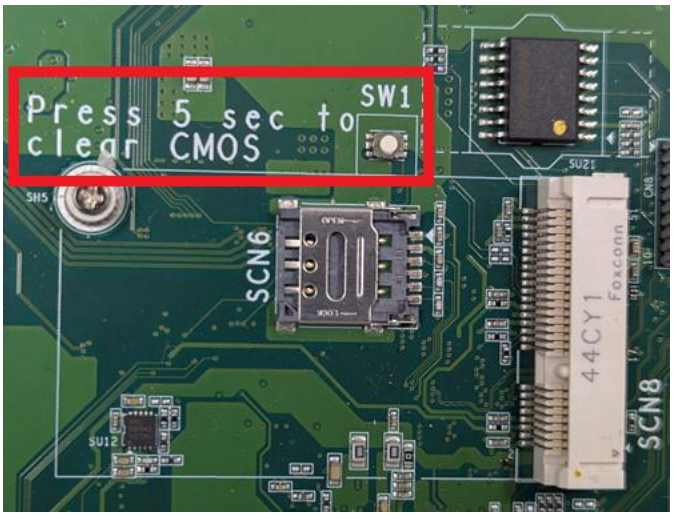
Properly configure switch settings on the PSB526A to meet your application purpose. Below you can find a summary table of all Switches and onboard default settings.

1.7.1 Restore BIOS Optimal Defaults (SW1)

Open system cover, then press touch switch for 5 seconds to restore BIOS optimal defaults.

Function	Setting
Normal operation (Default)	OPEN
Restore BIOS optimal defaults	Push (down) 5s





1.7.2 Power On/OFF Button (SW2) & LED (LED1)

The power button is on the I/O Side. It allows users to control IPC980 power on/off, the LED displays the current status, referring to the table below for information.

Function	Description
On	Turn on/off system
Off	Keep system status

Power button LED	Description
Off	System shut down
Light on	System power on

1.8 Connectors

Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected.

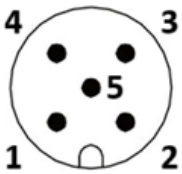
Here is a table summarizing all connectors on the board.

Connector	Description
DC In	DC power connector
LAN1	Gigabit Ethernet
LAN2, LAN3	2.5G Ethernet
HDMI	HDMI connector
USB3/4, USB5/6	Dual USB 3.2 Gen2 Type-A connector
CN13, CN14	SATA power wafer connector
SATA1, SATA2	SATA III connector
SCN1	M.2 Key M 2280 connector
SCN8	Mini card connector
USB1/USB2	M12 2x USB2.0 connector (A-coded 8pin)
COM1	M12 COM port connector (RS-232/422/485)
(Option I/O)	M12 Digital I/O connector (A-coded 12pin)
(Option I/O)	M12 2x CAN connector (A-coded 8pin)

1.8.1 DC Power Connector

The system supports 18VDC-36VDC M12 A-coded 5pin DC-in connector for system power input.

Pin	Definition
1	DC+
2	DC+
3	DC-
4	DC-
5	IGN



Note: For detailed functions, refer to the IGN chapter

1.8.2 Gigabit Ethernet (LAN1)

The system has one Gigabit Ethernet interface with M12 X-coded 8pin connectors: LAN1.

A connection can be established by plugging one end of the Ethernet cable into this M12 X-Code connector and the other end into a 1000/100/10-Base-T hub.

Pin	Definition
1	MDI 0+
2	MDI 0-
3	MDI 1+
4	MDI 1-
5	MDI 3+
6	MDI 3-
7	MDI 2-
8	MDI 2+

1.8.3 2.5G Ethernet (LAN2, LAN3)

The system has two 2.5GbE interfaces with M12 X-coded 8pin connectors: LAN2, LAN3.

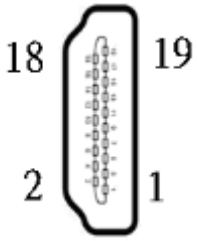
A connection can be established by plugging one end of the Ethernet cable into this M12 X-Code connector and the other end into a 2500/1000/100-Base-T hub.

Pin	Definition
1	MDI 0+
2	MDI 0-
3	MDI 1+
4	MDI 1-
5	MDI 3+
6	MDI 3-
7	MDI 2-
8	MDI 2+

1.8.4 HDMI Connector (HDMI)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable.

Pins	Signals	Pins	Signals
1	HDMI OUT_DATA2+	11	GND
2	GND	12	HDMI OUT Clock-
3	HDMI OUT_DATA2-	13	N.C.
4	HDMI OUT_DATA1+	14	N.C.
5	GND	15	HDMI OUT_SCL
6	HDMI OUT_DATA1-	16	HDMI OUT_SDA
7	HDMI OUT_DATA0+	17	GND
8	GND	18	+5V
9	HDMI OUT_DATA0-	19	HDMI_HTPLG
10	HDMI OUT Clock+		

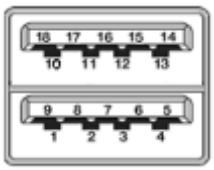


1.8.5 Dual USB 3.2 Type-A connector (USB3/4, USB5/6)

The Universal Serial Bus connectors are compliant with USB3.2 and ideal for installing USB peripherals such as scanners, cameras and USB devices.

H610E=USB3.2 GEN1 (5Gbps) + USB3.2 GEN2 (10Gbps)

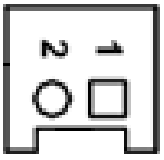
Pins	Signal USB Port 0	Pins	Signal USB Port 1
1	USB_VCC (+5V level standby power)	10	USB_VCC (+5V level standby power)
2	USB1_Data-	11	USB2_Data-
3	USB1_Data+	12	USB2_Data+
4	GND	13	GND
5	SSRX1-	14	SSRX2-
6	SSRX1+	15	SSRX2+
7	GND	16	GND
8	SSTX1-	17	SSTX2-
9	SSTX1+	18	SSTX2+



1.8.6 SATA power wafer connector (CN13, CN14)

The SATA power connector is used for interfacing SATA 2.5" HDD/SSD power supply.

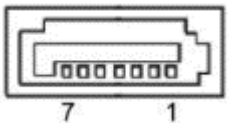
Pin	Signal
1	+5V
2	GND



1.8.7 SATA Connector (SATA1, SATA2)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are used as high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives. This board has two SATA 3.0 ports with 6Gb/s performance.

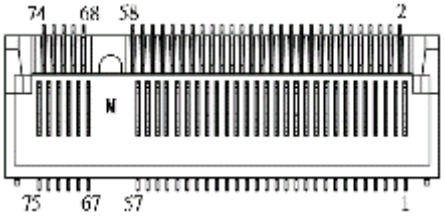
Pins	Signals
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



1.8.8 M.2 Key M 2280 connector (SCN1)

The M.2 2280 Key M NVM Express SSD for storage.

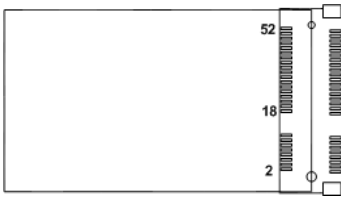
Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	+3.3V	3	GND	4	+3.3V
5	PERn3	6	NC	7	PERp3	8	NC
9	GND	10	LED_1#	11	PETn3	12	+3.3V
13	PETp3	14	+3.3V	15	GND	16	+3.3V
17	PERn2	18	+3.3V	19	PERp2	20	NC
21	GND	22	NC	23	PETn2	24	NC
25	PETp2	26	NC	27	GND	28	NC
29	PERn1	30	NC	31	PERp1	32	NC
33	GND	34	NC	35	PETn1	36	NC
37	PETp1	38	NC	39	GND	40	NC
41	PERn0	42	NC	43	PERp0	44	NC
45	GND	46	NC	47	PETn0	48	NC
49	PETp0	50	PERST#	51	GND	52	CLKREQ#
53	REFCLKn	54	PEWAKE#	55	REFCLKp	56	NC
57	GND	58	NC	59	CONNECTOR Key M	60	CONNECTOR Key M
61	CONNECTOR Key M	62	CONNECTOR Key M	63	CONNECTOR Key M	64	CONNECTOR Key M
65	CONNECTOR Key M	66	CONNECTOR Key M	67	NC	68	NC
69	NC	70	+3.3V	71	GND	72	+3.3V
73	GND	74	+3.3V	75	GND		



1.8.9 Mini card connector (SCN8)

A PCI-Express Mini Card connector is located on the top side. It complies with PCI-Express Mini Card Spec. V1.2.

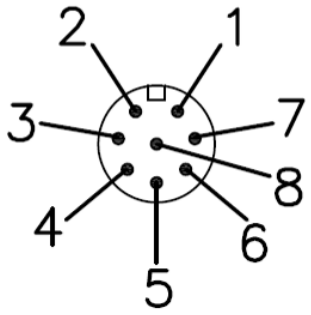
Pins	Signals	Pins	Signals
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	SIM_PWR
9	GND	10	SIM-DATA
11	REFCLK-	12	SIM_CLK
13	REFCLK+	14	SIM-RESET
15	GND	16	No use
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN3/	24	+3.3VSB
25	PE_RXP3/	26	GND
27	GND	28	+1.5V
29	GND	30	No use
31	PE_TXN3/	32	No use
33	PE_TXP3/	34	GND
35	GND	36	USB_D8-
37	GND	38	USB_D8+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



1.8.10 M12 2x USB2.0 connector (USB1/USB2)

This system supports two USB2.0 on one M12 A-coded 8pin connector, and the pin assignments are listed in the table below."

Pin	Definition
1	USB1_PWR
2	USB_DN1
3	USB_DP1
4	GND
5	USB2_PWR
6	USB_DN2
7	USB_DP2
8	GND



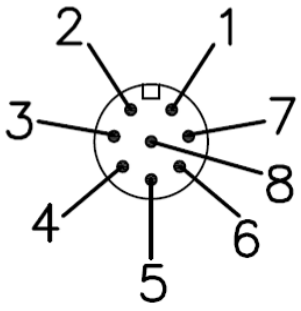
1.8.11 M12 COM port connector (COM1)

The pin assignments of M12 A-coded 8pin connector for 4-wire COM port of RS-232/422/485 are listed in the below table.

Set COM signals to operate in RS-232/422/485 by BIOS.

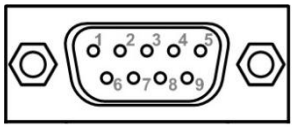
Supports High-Speed Mode 115.2 Kbps, up to 921 Kbps

Pin	RS-232	RS-422	RS-485
1	No use	No use	No use
2	RXD	TX+	Data+
3	TXD	RX+	No use
4	No use	No use	No use
5	No use	No use	No use
6	RTS	RX-	No use
7	CTS	TX-	Data-
8	No use	No use	No use
Shield	GND	GND	GND



The pin assignments with 594B8122100E cable are listed in the below table.

Pin	RS-232	RS-422	RS-485
1	No use	No use	No use
2	RXD	TX+	Data+
3	TXD	RX+	No use
4	No use	No use	No use
5	GND	GND	GND
6	No use	No use	No use
7	RTS	RX-	No use
8	CTS	TX-	Data-
9	No use	No use	No use



Following are reserved for option I/O

1.8.12 M12 Digital I/O connector (Option I/O)

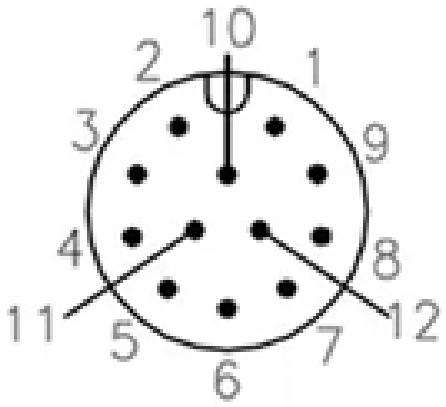
The pin assignments of M12 A-coded 12pin connector for digital I/O interface are listed in the table below.

- The voltage of TTL is 5V
- The programming is as follows:

  - I/O sink current is 8~10mA

  - Input/Output can be programmed

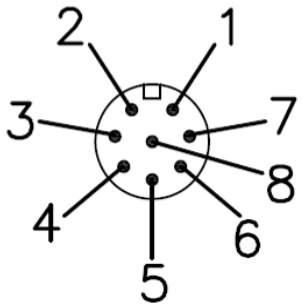
Pin	Definition
1	DIO1
2	DIO2
3	DIO3
4	DIO4
5	DIO5
6	DIO6
7	DIO7
8	DIO8
9	No use
10	No use
11	+5V
12	GND



1.8.13 M12 2x CAN connector (Option I/O)

The pin assignments of M12 A-coded 8pin connector for 2x CAN (with 826G9801040E_IPC980 MIO108 2 CAN kit) interface are listed in the table below.

Pin	CAN1	Pin	CAN2
1	CAN1_H	2	CAN2_H
7	CAN1_L	3	CAN2_L
6	GND	4	GND
8	No use	5	No use



This page is intentionally left blank.

SECTION 2
HARDWARE INSTALLATION

The IPC980 Series products are convenient for your various hardware configurations, such as CPU (Central Processing Unit), memory module, HDD (Hard Disk Drive). Chapter 2 will show you how to install these hardware parts.

 Note: The CPU, RAM, storage devices, and optional peripherals must be pre-assembled by Axiomtek

 Note: Before attempting to install or replace any internal components, carefully review the documentation that came with your system. Make sure that opening the system or replacing internal components will not void your warranty.

2.1 Installing the Processor

The Intel® Core™ Series 2 Processors (Bartlett Lake-S) and 14th/13th/12th Generation Intel® Core™ i9/i7/i5/i3 processors for the IPC980 system. Intel recommends the processors should be installed by a qualified computer professional since this electronic device may cause serious damage to the installer, system and processor if installed improperly.

Instructions:

1. Verify System Compatibility

Before installing the processor, ensure that the system supports Intel® Core™ Series 2 Processors (Bartlett Lake-S) and Intel® Core™ i9/i7/i5/i3/Celeron® processors.

- Refer to the system manufacturer's documentation to confirm CPU, BIOS, and thermal compatibility.
- Contact the system vendor if further confirmation is required.

This processor must be installed only in systems equipped with an LGA1700 socket supporting:

- Intel® Core™ Series 2 Processors (Bartlett Lake-S) (up to 65 W TDP)
- 14th, 13th, and 12th Generation Intel® Core™ i9/i7/i5/i3 processors (up to 65 W TDP)

Follow the instructions provided in your system documentation to access the processor socket.

2. Remove the Cooling Solution if Necessary

If the cooling solution obstructs access to the processor socket, remove it before proceeding.
Refer to the system's documentation for detailed instructions on how to properly remove the cooling solution.

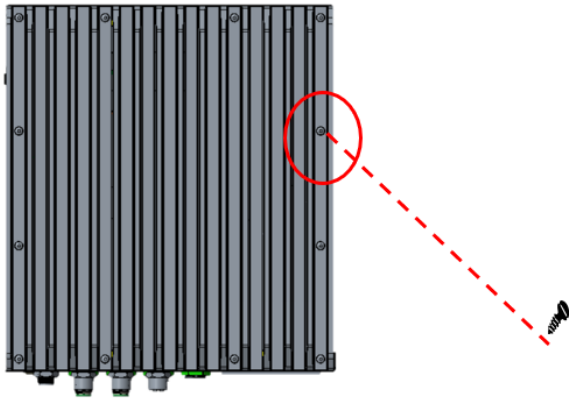
2.2 Procedure of Installation

This chapter will guide you on installing a processor.

Step 1 Turn off the system.

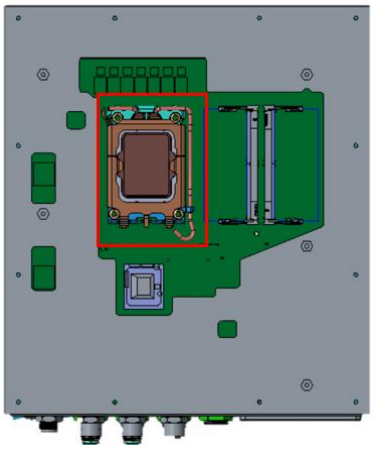
Step 2 Disconnect the power connector.

Step 3 Unscrew twelves screws to remove the heatsink cover from the chassis.



Note: To avoid damage, never touch the pins of the socket and the processor at any time during installation.

Step 4 After opening the heatsink cover, you can locate the CPU socket as marked. Align pins of the CPU with the pin holes of the socket. Beware of the CPU's orientation when you align the arrow mark on the CPU with the arrow key on the socket. Remove the Mylar before you install the CPU into the socket.



Step 5 Apply thermal grease on top of the CPU.

Step 6 After installing all components, then close the heatsink cover back to the chassis and fasten all screws.

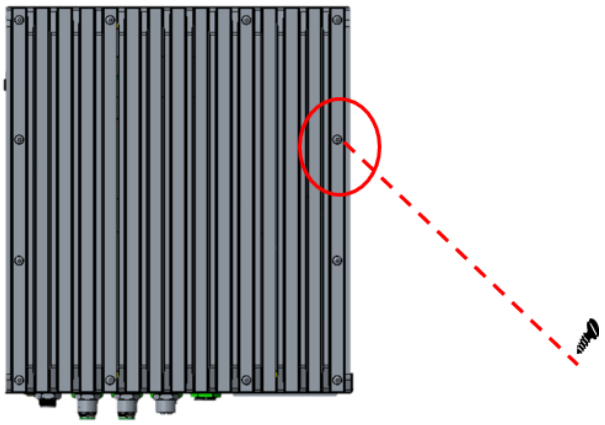
Note: Please tighten all heatsink-cover screws to a torque of 8 ± 0.5 kgf-cm to maintain IP67 protection.

2.3 Installing the Memory Module

Step 1 Turn off the system.

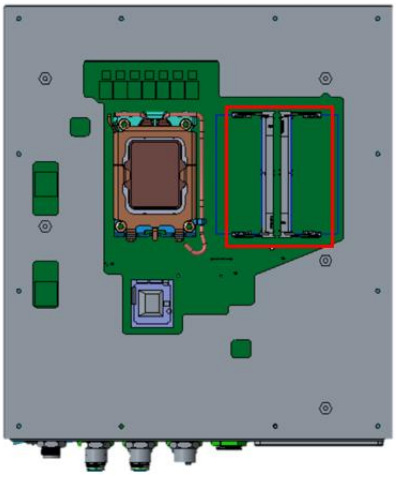
Step 2 Disconnect the power connector.

Step 3 Unscrew twelve screws and remove the heatsink cover from the chassis.



Step 4 Peel off the protective films from the thermal pads.

Step 5 Locate the memory slots as marked. Insert the module to slot and push it down firmly.



Step 6 Close the heatsink cover back to the chassis and fasten all screws. The installation is complete.

Note: Please tighten all heatsink-cover screws to a torque of 8 ± 0.5 kgf-cm to maintain IP67 protection.

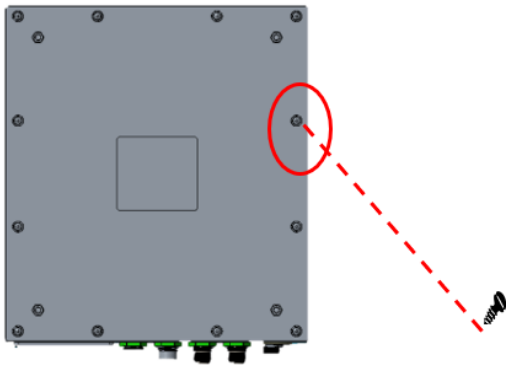
2.4 Installing the Hard Disk Drive

The IPC980 series offers two drive trays for users to install HDD/SSD. Please follow the steps to install:

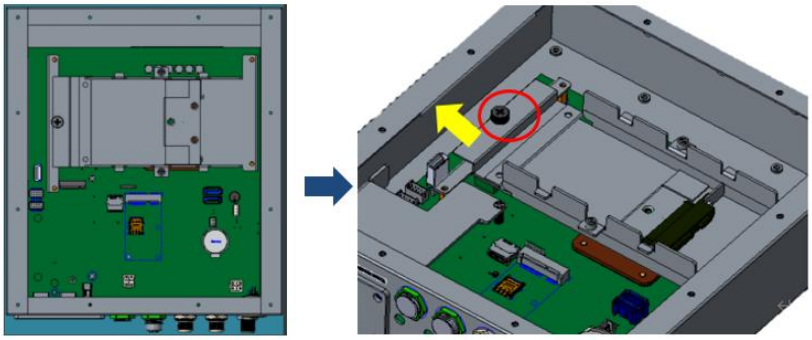
Step 1 Turn off the system.

Step 2 Disconnect the power connector.

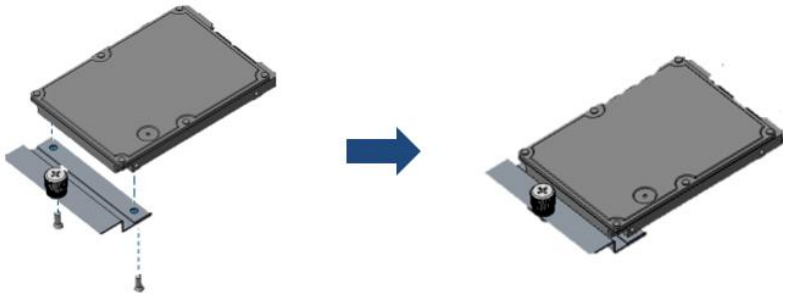
Step 3 Unscrew twelve screws and remove the back cover from the chassis.



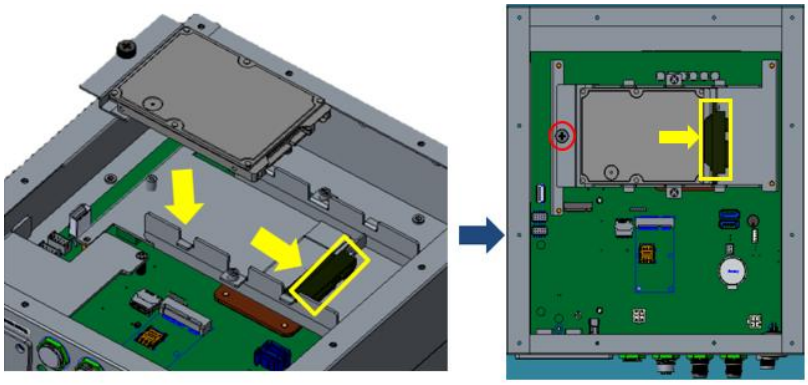
Step 4 Find the HDD tray, loosen the thumb screw, then slide the HDD bracket off the motherboard as shown in the illustration below.



Step 5 Fix HDD/SSD to the HDD bracket with two screws.

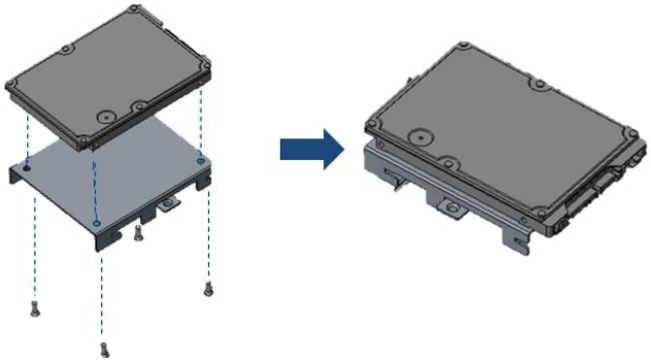


Step 6 Slide the HDD/SSD kit into the HDD tray and firmly connect it to the connector (highlighted in yellow below), then tighten the thumb screw. The first HDD/SSD assembly is complete.

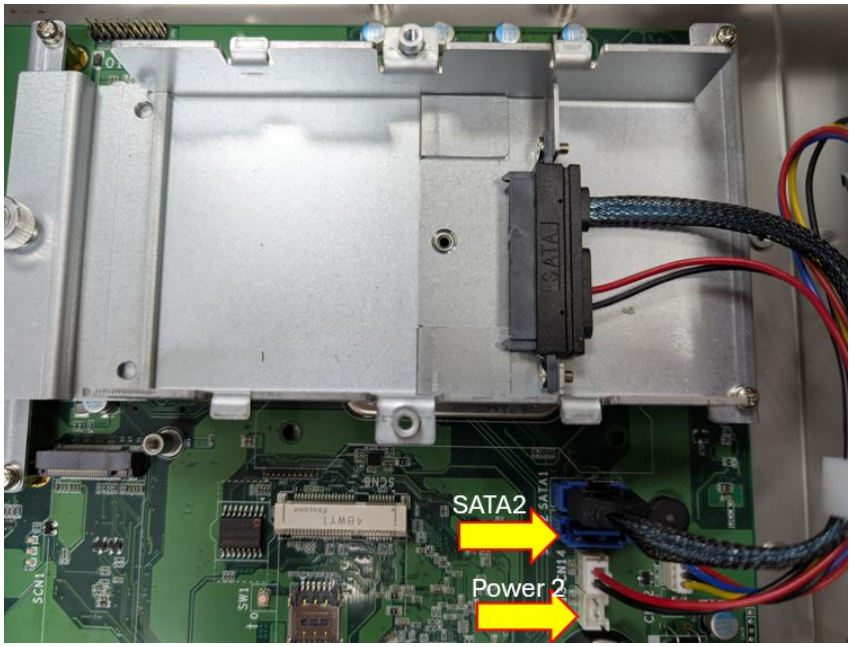


Step 7 The first HDD/SSD assembly is complete.

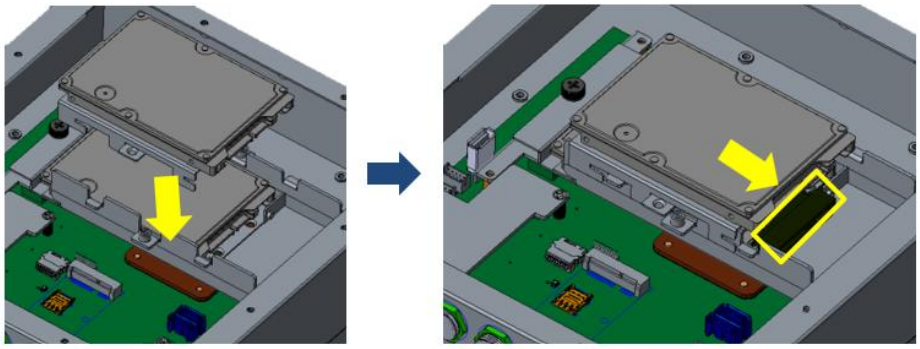
Step 8 The IPC980 supports an optional second HDD/SSD. Fix HDD/SSD to the HDD bracket with four screws.



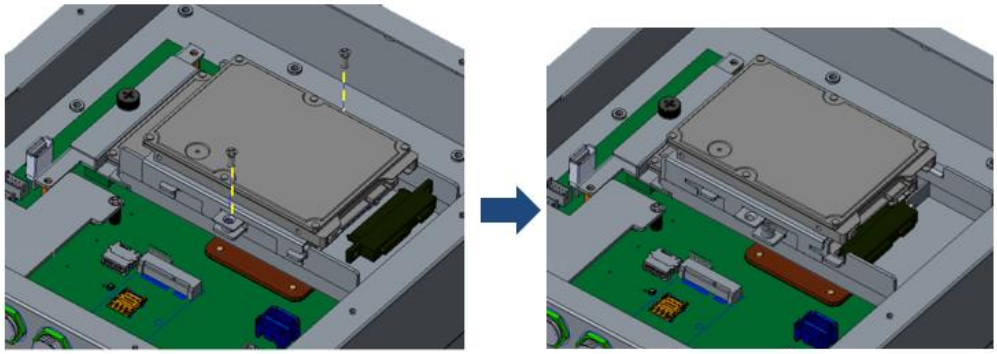
Step 9 Insert the SATA cable and power cable into the connectors.



Step 10 Put the second HDD/SSD kit above the first HDD tray and firmly connect it to the connector (highlighted in yellow below).



Step 11 Tighten 2 screws. The second HDD/SSD assembly is complete.



Step 12 Close the back cover back to the chassis and fasten all screws.

Note: Please tighten all back-cover screws to a torque of 8 ± 0.5 kgf-cm to maintain IP67 protection.

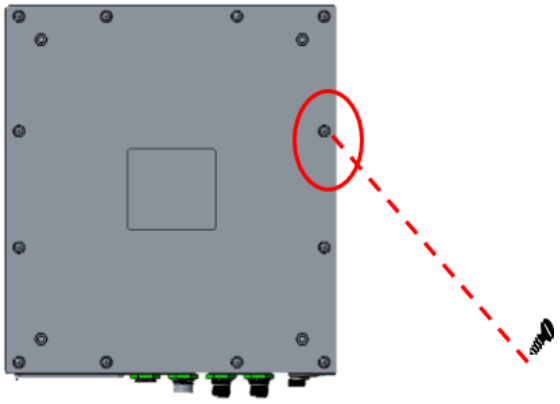
2.5 Installing USB dongle

The IPC980 provides an internal USB2.0 type A connector. The procedure of installing the USB dongle into the system is instructed below.

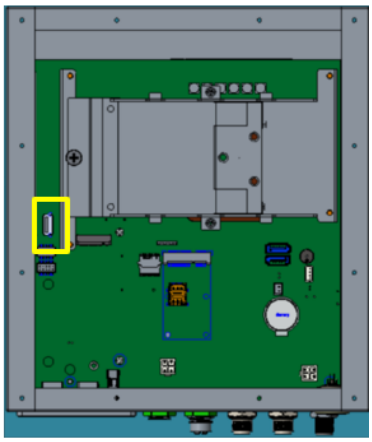
Step 1 Turn off the system.

Step 2 Disconnect the power connector.

Step 3 Unscrew twelve screws and remove the back cover from the chassis.



Step 4 Insert USB dongle into the connector.



Step 5 Close the back cover back to the chassis and fasten all screws. The installation is complete.

Note: Please tighten all back-cover screws to a torque of 8 ± 0.5 kgf-cm to maintain IP67 protection.

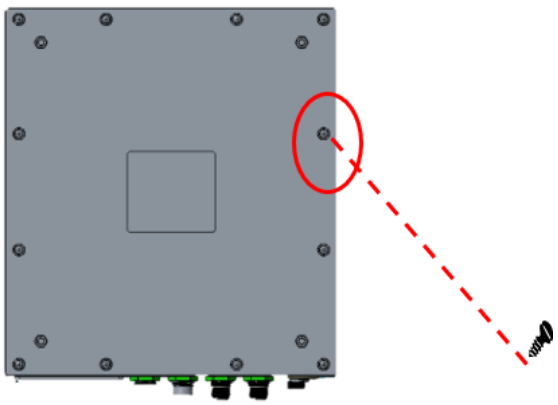
2.6 Installing the NVMe SSD

The IPC980 comes equipped with an M.2 key M socket for NVMe SSD. Please refer to the following instructions and illustrations for the installation of the module.

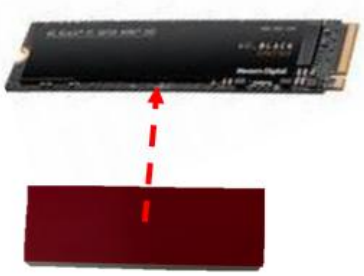
Step 1 Turn off the system.

Step 2 Disconnect the power connector.

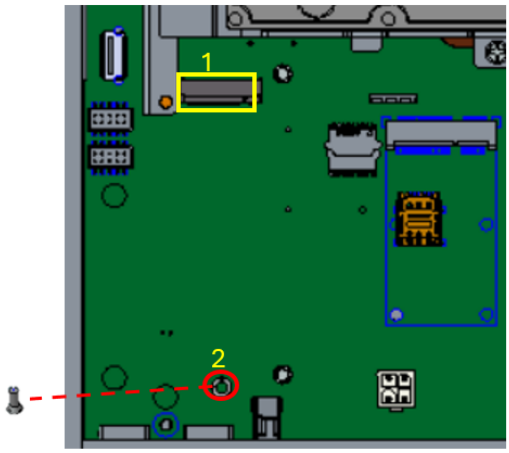
Step 3 Unscrew twelve screws and remove the back cover from the chassis.



Step 4 Peel off the protective film from the thermal pad, then adhere the pad to the bottom of the NVMe module. .

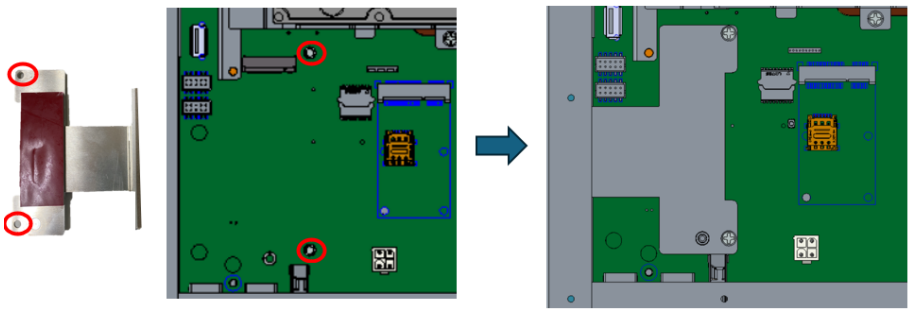


Step 5 Locate the NVMe socket on the mother board (marked as 1 below), then, remove the screw from the NVMe module mounting hole (marked as 2 below).



Step 6 Insert the module into the socket, then secure it firmly with the screw removed earlier.

Step 7 Peel off the protective film from the thermal pad on the NVMe bracket. Place the bracket with the thermal pad facing downward onto the module. Then, secure the bracket to the motherboard using two screws as shown below. (torque of 5 ± 0.5 kgf-cm)



Step 8 Close the back cover back to the chassis and fasten all screws. The installation is complete.

Note: Please tighten all back-cover screws to a torque of 8 ± 0.5 kgf-cm to maintain IP67 protection.

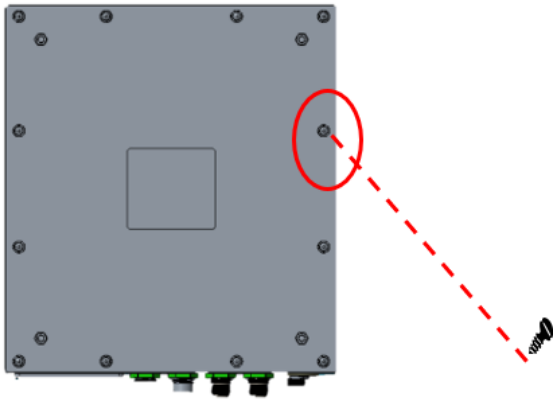
2.7 Installing the wireless module and antennas

The IPC980 provides a mini PCIe socket with a SIM socket and three antenna openings for wireless connectivity. Please follow the steps below to install the components:

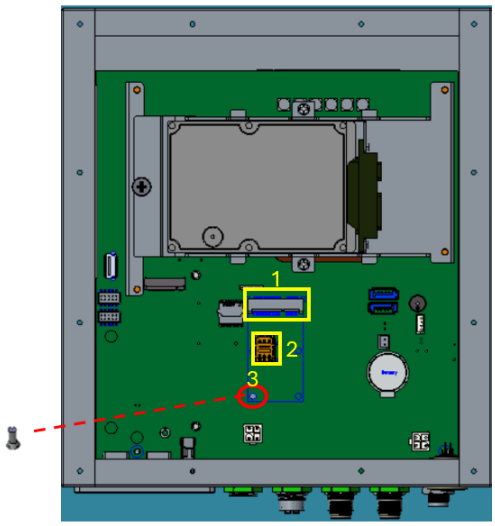
Step 1 Turn off the system.

Step 2 Disconnect the power connector.

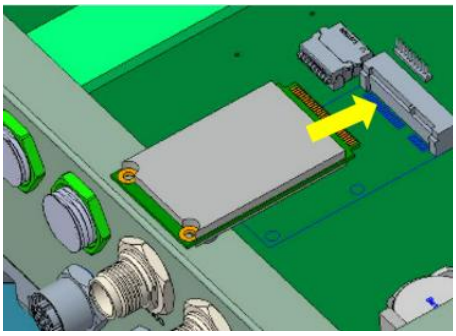
Step 3 Unscrew twelve screws and remove the back cover from the chassis.



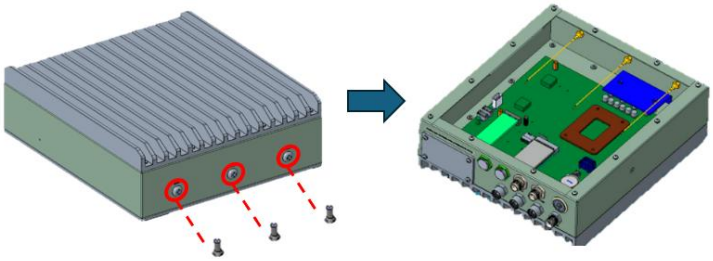
Step 4 Locate the mini PCIe socket (marked as 1 below) and the SIM slot (marked as 2 below). Then, remove the screw from the mini PCIe mounting hole (marked as 3 below).



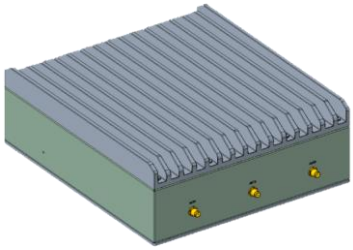
Step 5 Insert the module into the mini PCIe socket, then secure it firmly with the screw removed earlier. (torque of 2.5 ± 0.5 kgf-cm) (If a SIM card is required, insert it into the SIM slot before installing the mini PCIe module.)



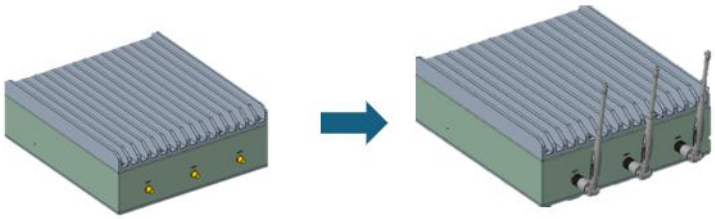
Step 6 Connect the internal wireless antenna(s) to the wireless LAN card. Then, remove the antenna screws from the antenna holes, place the internal antenna(s) into the designated positions, and secure them with screws.



Step 7 Close the back cover back to the chassis and fasten all screws.



Step 8 Connect the external antenna(s) to the connector(s) and secure them. The installation is complete.



Note: Please tighten all back-cover screws to a torque of 8 ± 0.5 kgf-cm to maintain IP67 protection.

Note: Please use an extended bracket when using a half-size Mini card

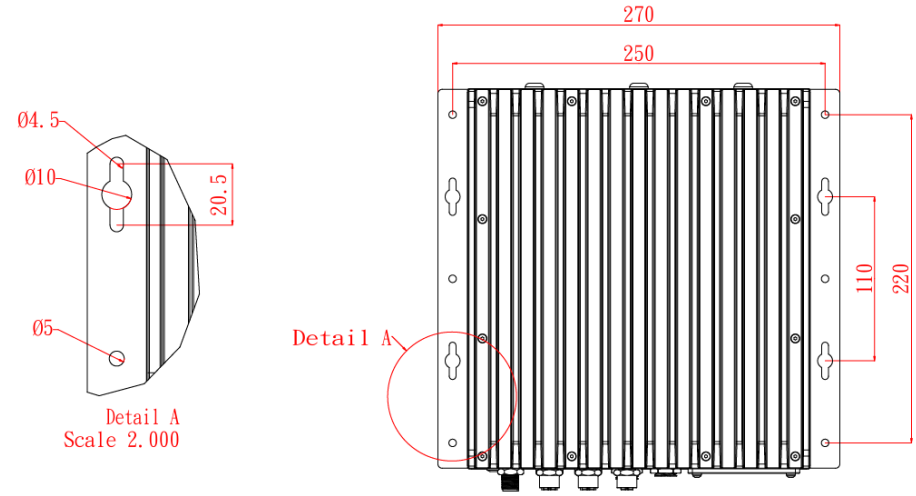
Note: Torque the antenna(s) according to the specifications provided by the antenna manufacturer.

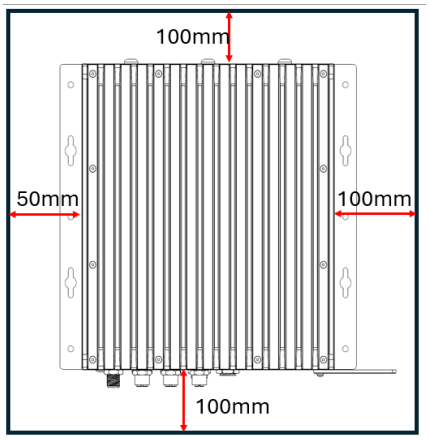
Note: There are three antenna holes in the system, please adjust the antenna placement according to the environment.

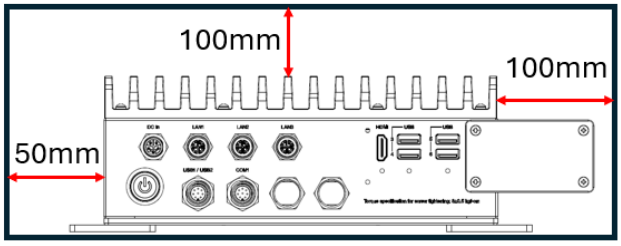
2.8 Mounting

The IPC980 provides an optional wall mount kit for different deployment field sites.

Dimensions



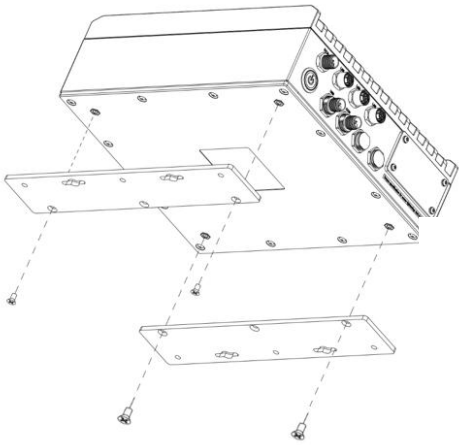


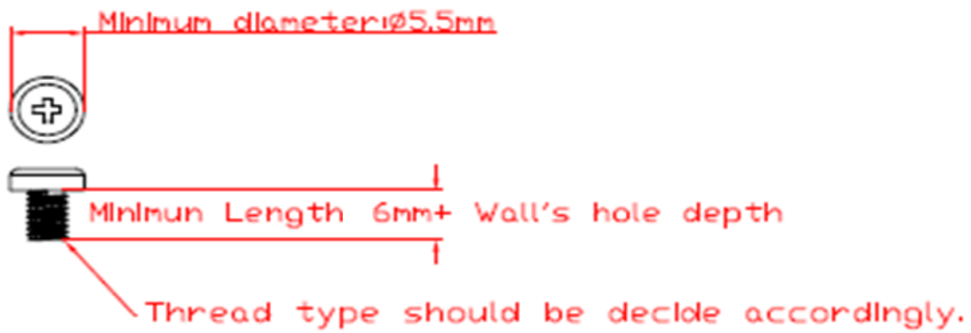


Note: Ensure that the minimum clearances to adjacent components or housing walls are maintained as specified.

Mounting

Secure the wall mount brackets to the system using four screws as shown below. Assembly is complete





SECTION 3
AMI BIOS UTILITY

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a 16MB flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

3.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menu.


Note: Press SW1 to restore the BIOS optimal default settings (refer to Section 1.7.1 for additional information).

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

3.2 Navigation Keys

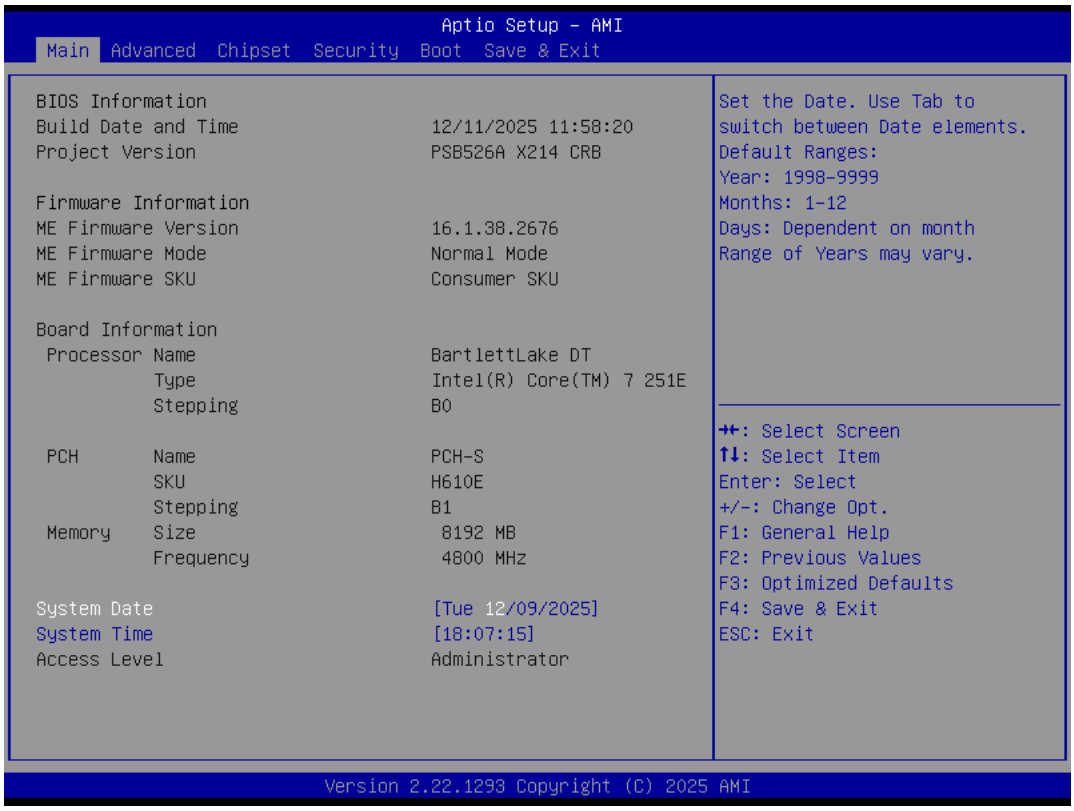
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

 Note: Some of the navigation keys differ from one screen to another.

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

3.3 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



- BIOS Information
  Display the BIOS information.
- System Date/Time
  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.
- Access Level
  Display the access level of current user.

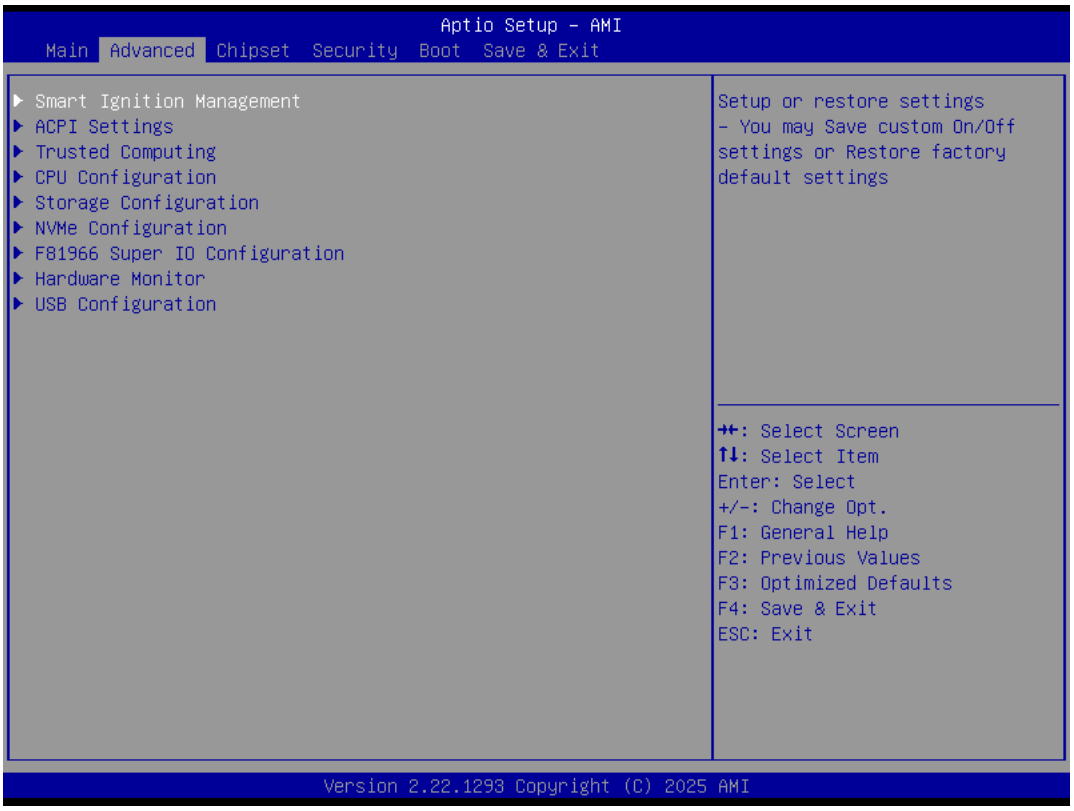
3.4 Advanced

- Advanced Menu

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

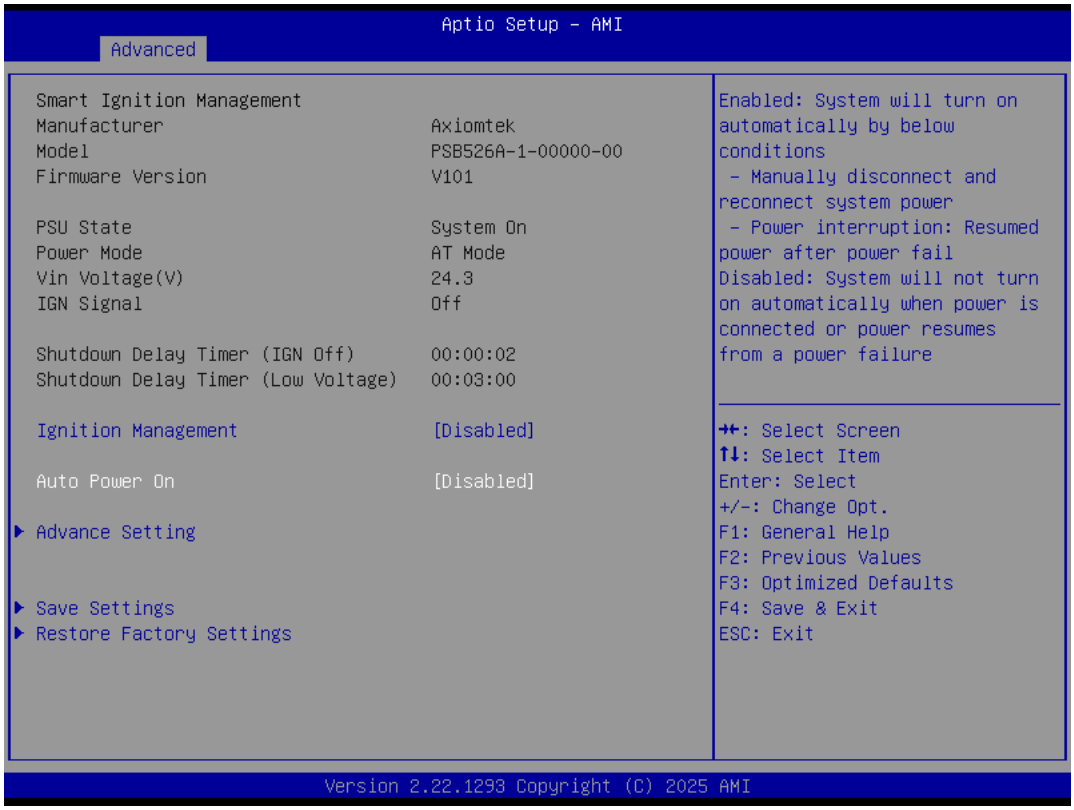
- Smart Ignition Management
- ACPI Settings
- Trusted Computing
- CPU Configuration
- Storage Configuration
- NVMe Configuration
- F81966 Super IO Configuration
- Hardware Monitor
- USB Configuration

For items marked with "►", please press <Enter> for more options.



- Smart Ignition Management

The Smart Ignition Management settings in BIOS allow for configurations tailored to automotive or industrial environments where power management is critical.

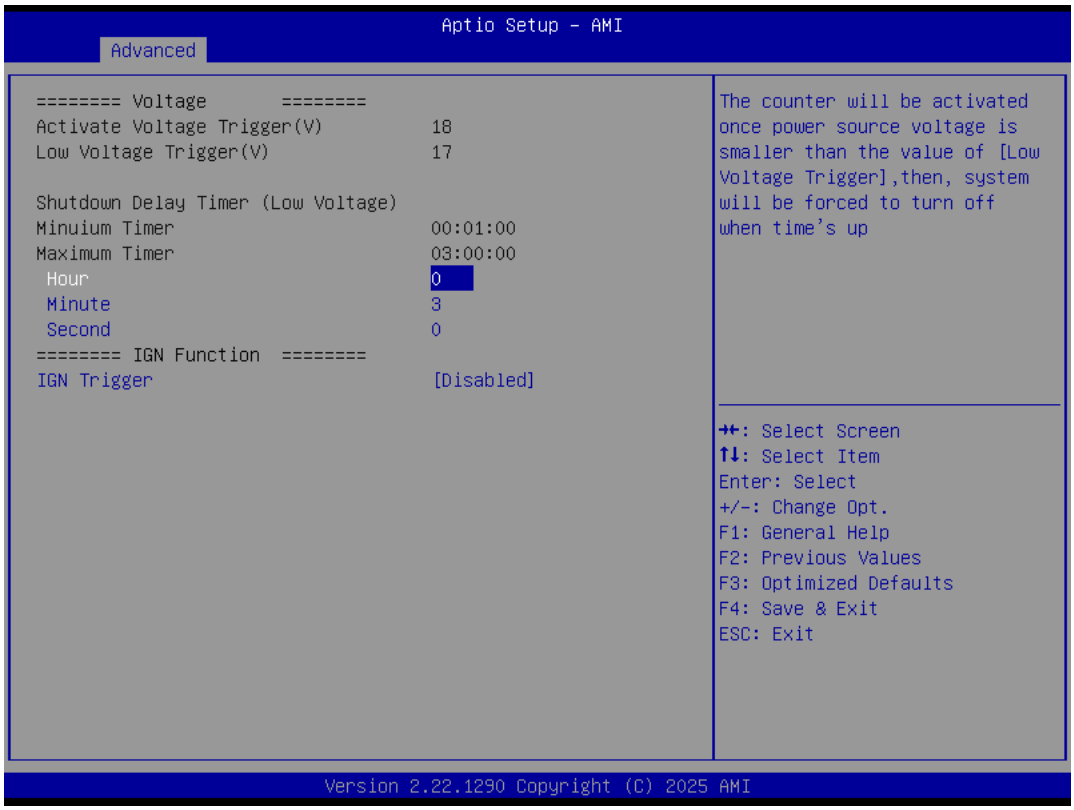


Ignition Management: Currently Disabled. Enabling this would allow for additional power control based on ignition signals, useful for in-vehicle scenarios.

If system doesn't detect IGN signals, Ignition Management cannot set to enabled.

Please connect to the ACC signal before setting this item.

Auto Power On: Enabled to automatically power on the system after a power loss.



This screen shows advanced settings under Smart Ignition Management, specifically focused on voltage triggers and shutdown delay timers. Here's a summary:

Voltage Triggers:

- Activate Voltage Trigger (V): Set to 18V. When the input voltage rises to or above this level, certain power functions may be activated.
- Low Voltage Trigger (V): Set to 17V. When the voltage drops below this threshold, it triggers a sequence that could lead to a shutdown.

Shutdown Delay Timer (Low Voltage):

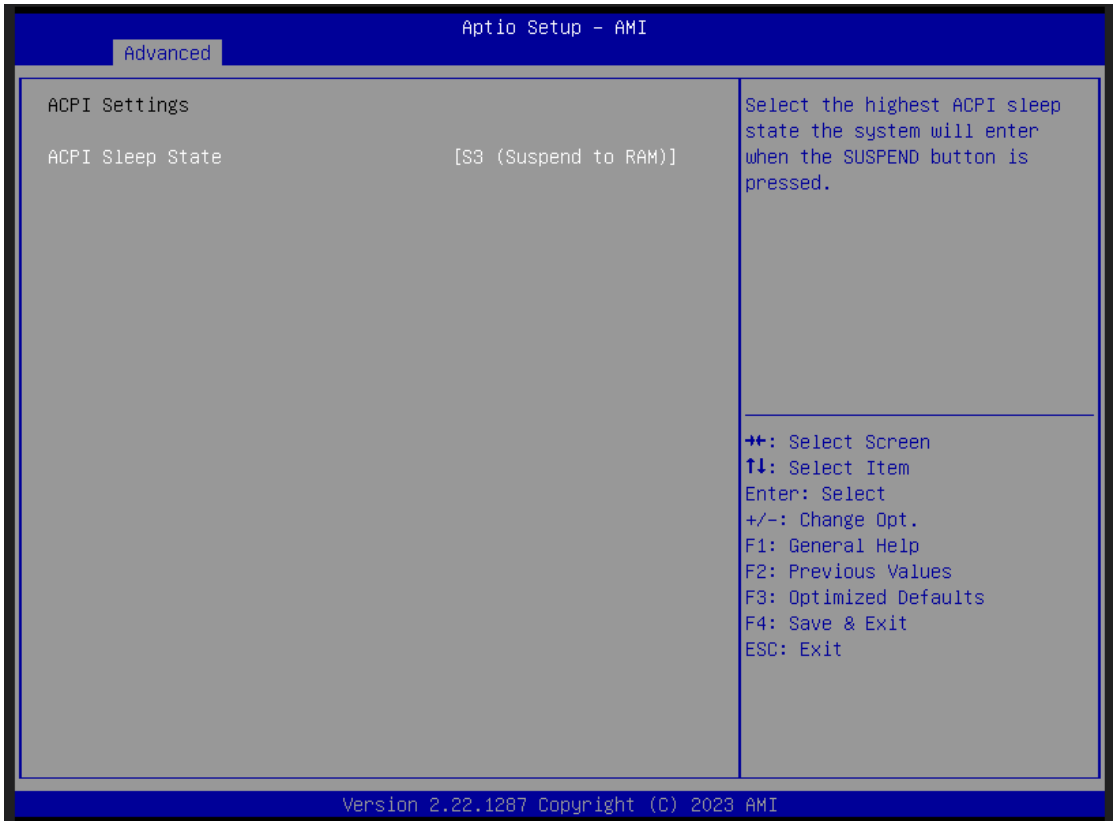
- Minimum Timer: Set to 1 minute. This is the shortest delay allowed before shutdown due to low voltage.
- Maximum Timer: Set to 3 hours (03:00:00), allowing up to a 3-hour delay before shutdown.
- Current Timer Setting: Configured to 3 minutes (0 hours, 3 minutes, 0 seconds), meaning the system will wait 3 minutes after detecting low voltage before shutting down.

IGN Function:

- IGN Trigger: Currently Disabled. If enabled, this would allow the system to react to an ignition signal, such as powering up or shutting down based on vehicle ignition status.

- ACPI Settings

ACPI configuration can be configured in ACPI Settings. A description of the selected item appears on the right side of the screen.

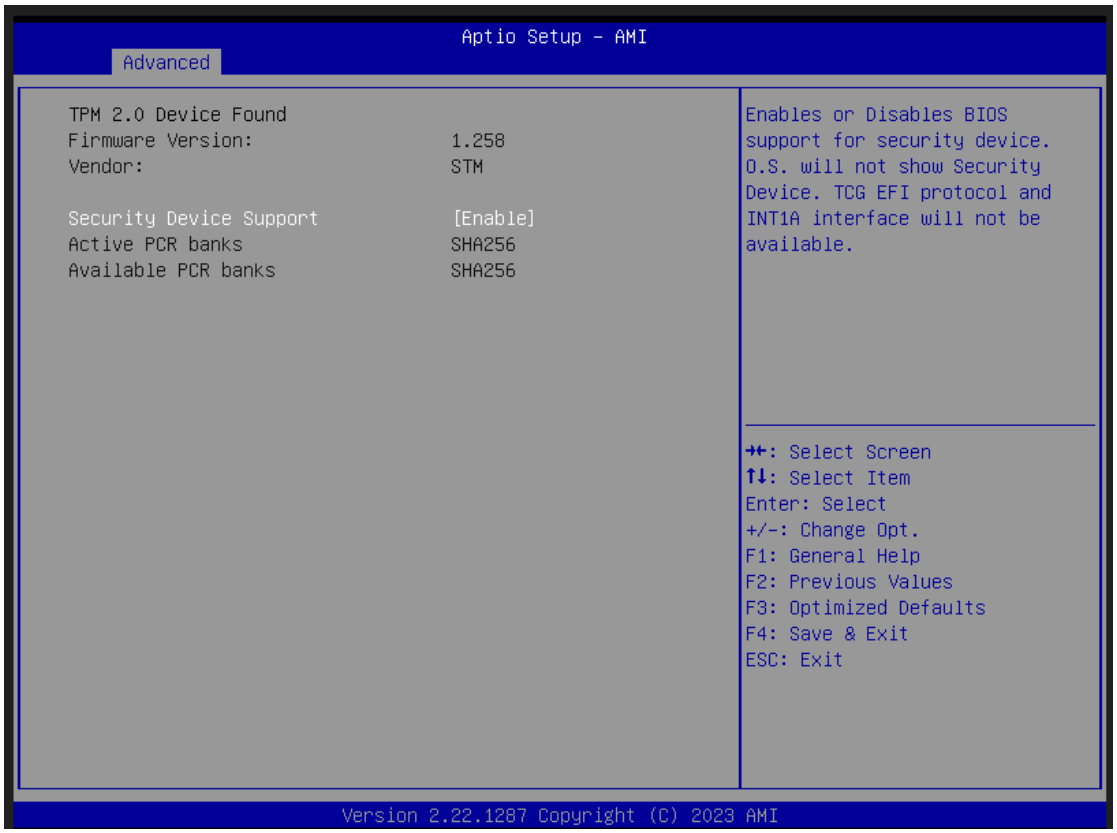


➢ ACPI Sleep State

Select the ACPI (Advanced Configuration and Power Interface) sleep state. Configuration options are Suspend Disabled and S3 (Suspend to RAM). The default is S3 (Suspend to RAM). This option selects the ACPI sleep state the system will enter when the suspend button is pressed.

- Trusted Computing

Select Security Device Support to enable or disable the TPM function.



➢ TPM Device Selection

Select TPM device:

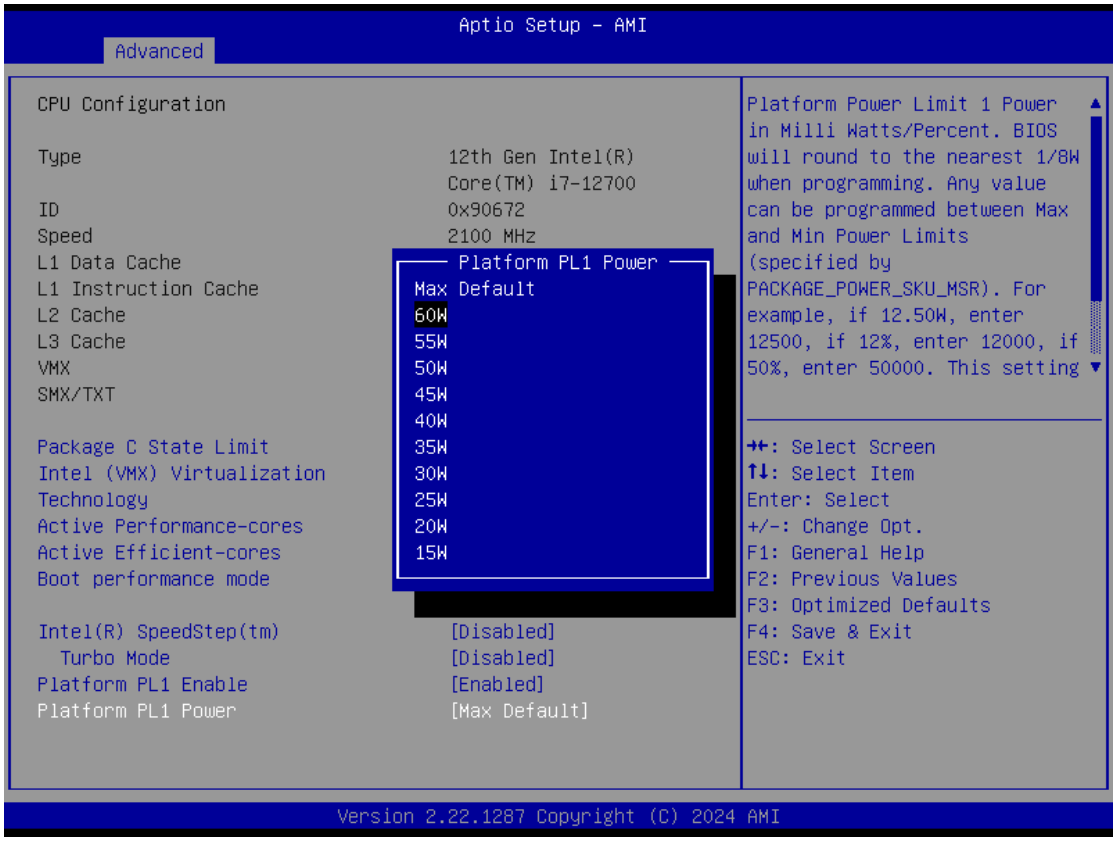
- PTT: Intel® built-in TPM. Enables PTT in SkuMgr.
- dTPM: External extended Infineon's TPM. Disables PTT in SkuMgr.

➢ Security Device Support

Enable or disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.

- CPU Configuration

This screen shows the CPU configuration, and you can change the value of the selected option.



- Hardware Prefetcher
  Turn on/off the MLC streamer prefetcher.
- Adjacent Cache Line Prefetch
  Turn on/off prefetching of adjacent cache lines.
- Package C State Limit
  Maximum Package C State Limit Setting. CPU Default: Sets to Factory default value. Auto: Initializes to deepest available Package C State Limit.
- Hyper-Threading
  Enable or disable Hyper-threading Technology, which allows a single physical processor to multitask as multiple logical processors. When disabled, only one thread per enabled core is enabled.
- Intel Virtualization Technology
  Enable or disable Intel Virtualization Technology. When enabled, a VMM (Virtual Machine Mode) can utilize the additional hardware capabilities. It allows a platform to run multiple operating systems and applications independently, hence enabling a single computer system to work as several virtual systems.
- Active Performance Cores
  Number of cores to enable in each processor package.

- Active Efficient Cores
  Number of E-cores to enable in each processor package. Note: Number of P-Cores and E-cores are counted together. When both are {0,0}, P-code will enable all cores.

  AES
  Enable / Disable AES (Advanced Encryption Standard)

- Boot performance mode
  Select the performance mode that the BIOS will run after the reset.

- Intel (R) SpeedStep(tm)
  Allows more than two frequency ranges to be supported.

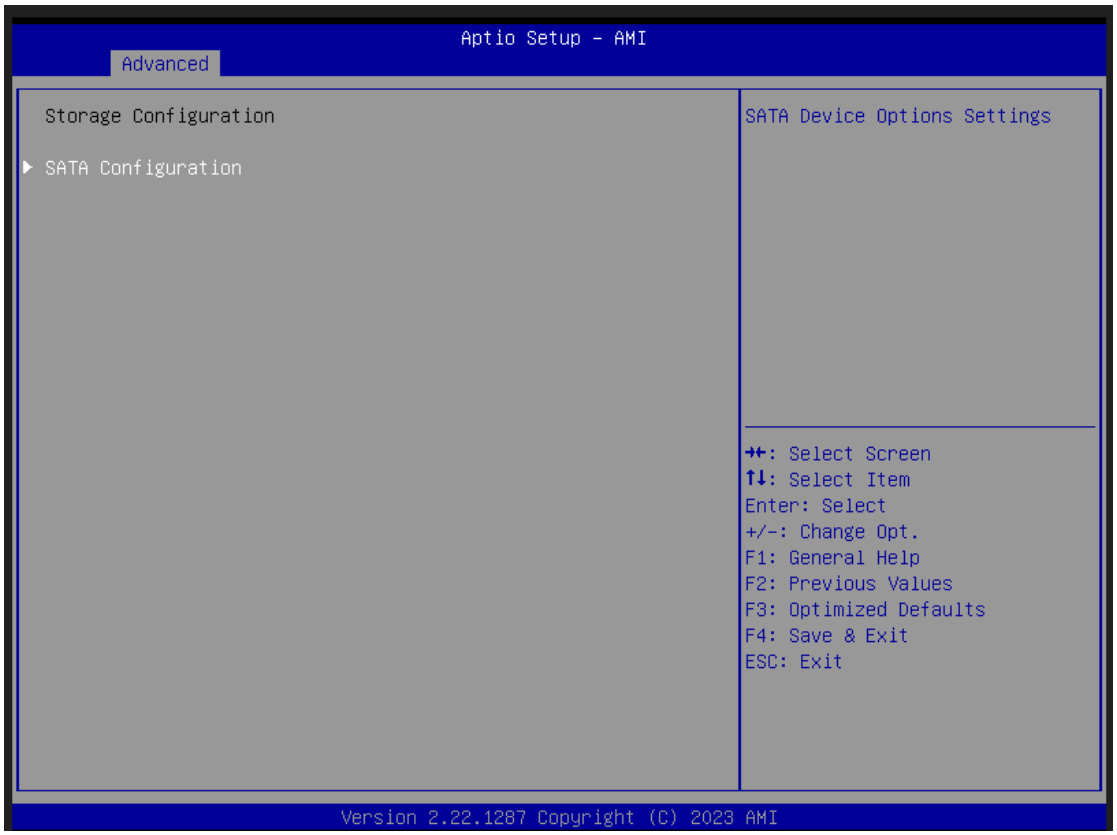
- Turbo Mode
  Allows to enable processor cores to raise the operating frequency.

- Platform PL1 Enable/Disable
  Enable/Disable Platform Power Limit 1 programming.

- Platform PL1 Power
  Allow to set processor Platform PL1 power.

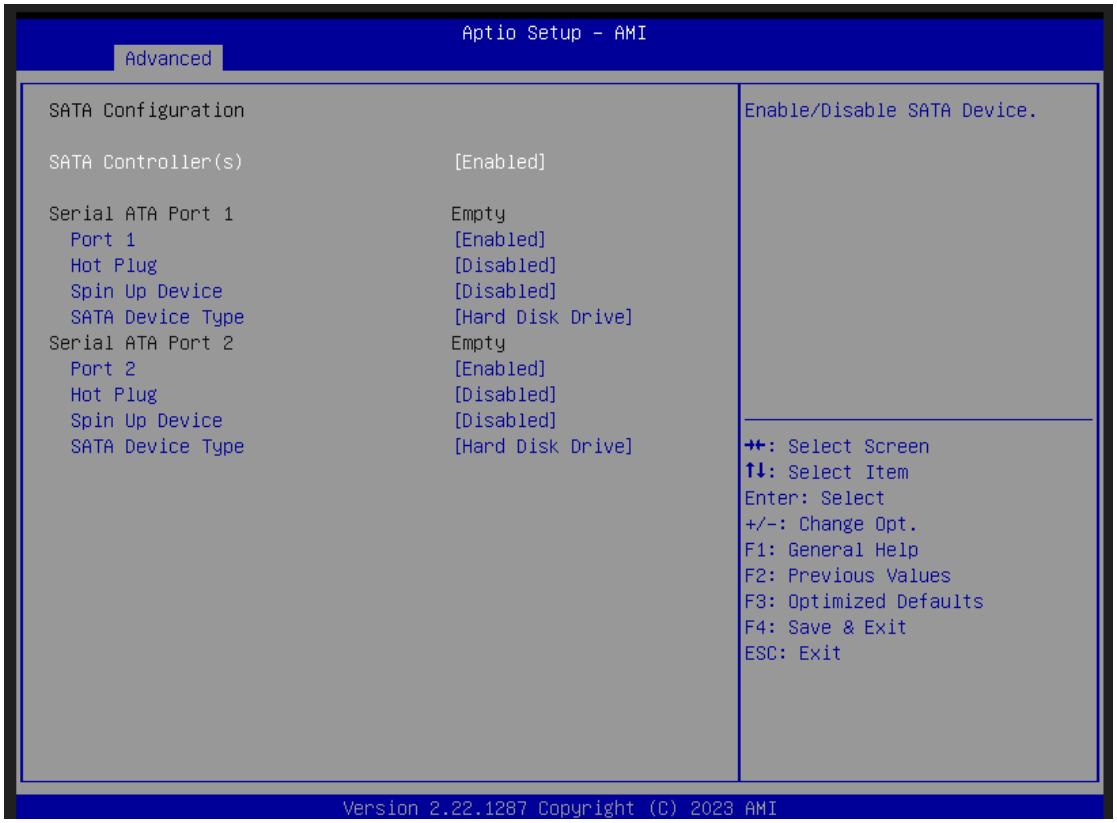
• Storage Configuration

This screen shows storage information.

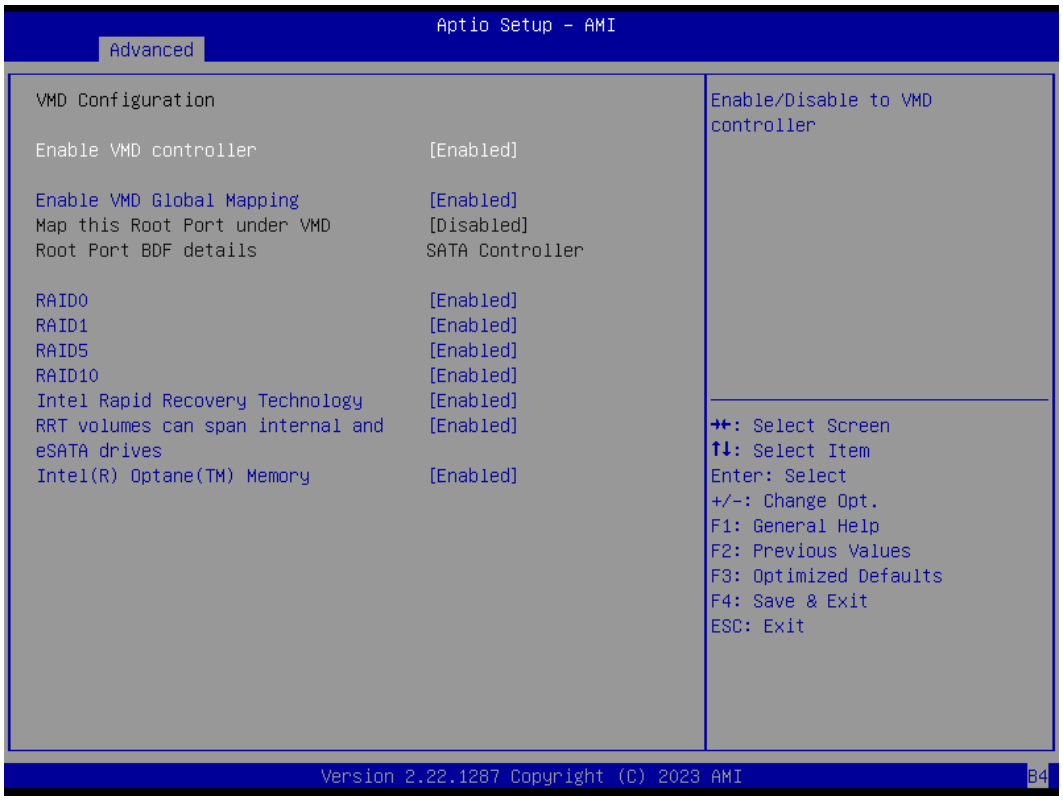


- SATA Configuration

During the system boots up, the BIOS automatically detects the presence of SATA devices. In the SATA Configuration menu, you can see the hardware currently installed in the SATA ports.



- SATA Controller(s)
  Enable or disable the SATA Controller feature. The default is Enabled.
- Hot Plug
  Designates this port as Hot Pluggable.
- Spin Up Device
  Staggered Spin Up will be performed when any of the drive is enabled for the performance strategy. Otherwise, all drives spin up at boot. Only HDD supports this function.
- SATA Device Type
  Identify the SATA port is connected to a solid-state drive (SSD) or hard disk drive (HDD).

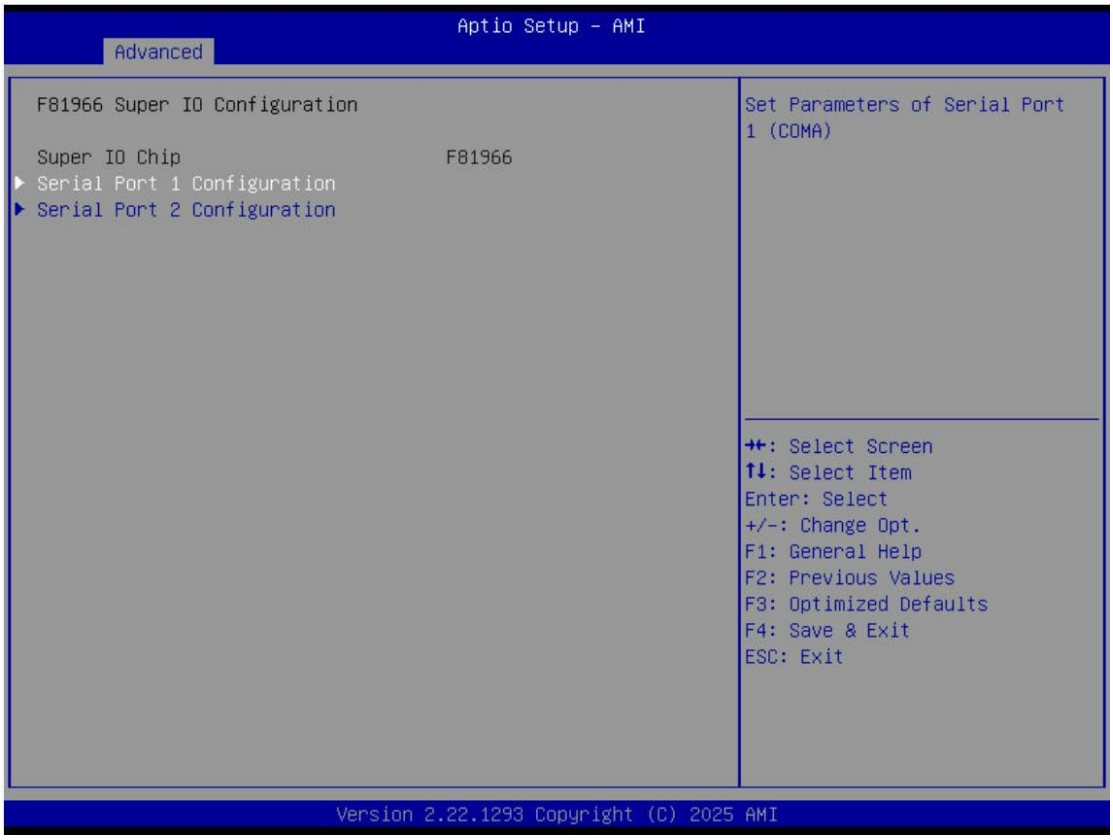


- NVMe Configuration

This screen shows NVMe device information.

- F81966 Super IO Configuration

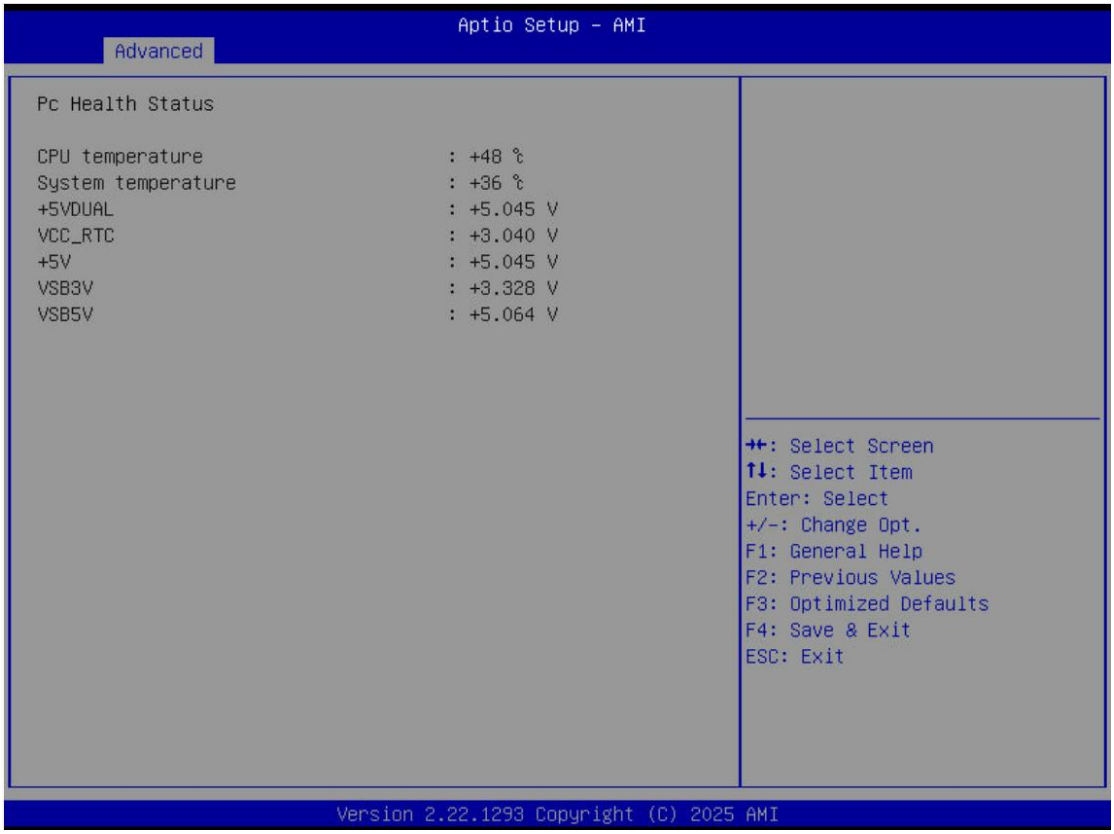
You can use this screen to select options for the Super IO Configuration and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.



➢ Serial Port 1
This item allows you to use it as RS232/422/485. The default is RS232.

- Hardware Monitor

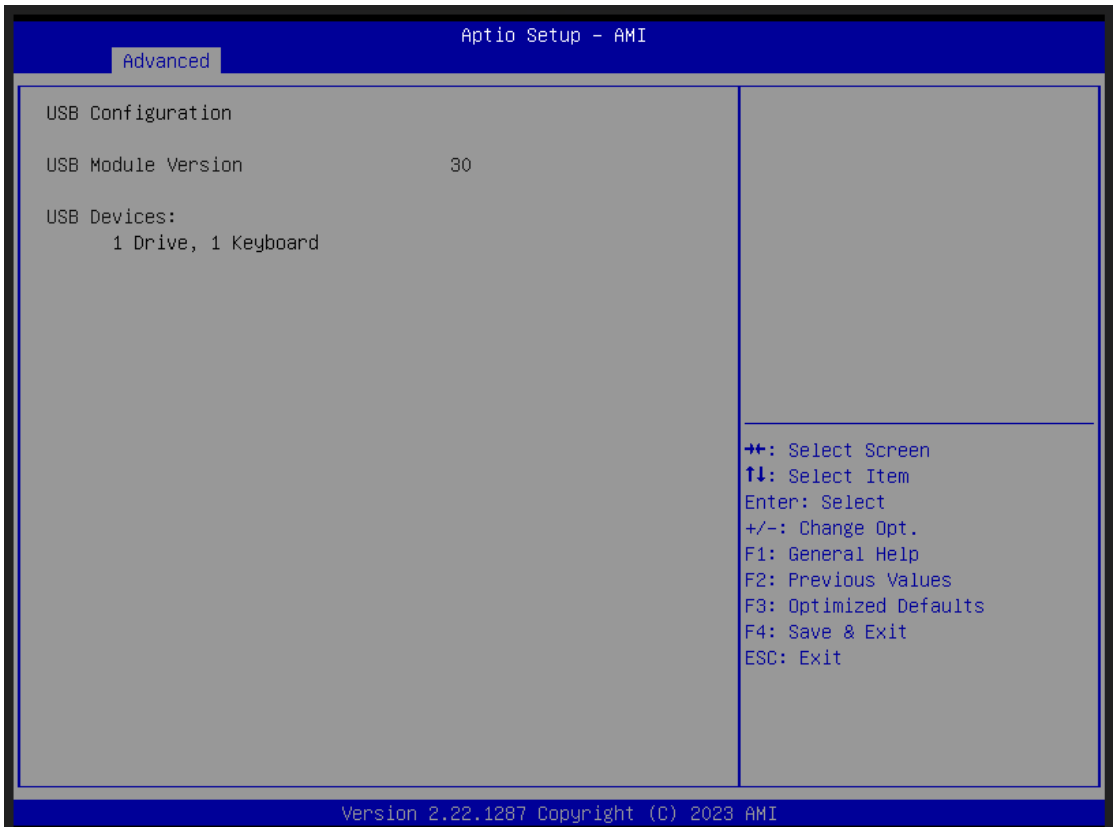
This screen monitors hardware health status.



This screen displays the temperature of system and CPU.

- USB Configuration

This screen shows USB configuration.

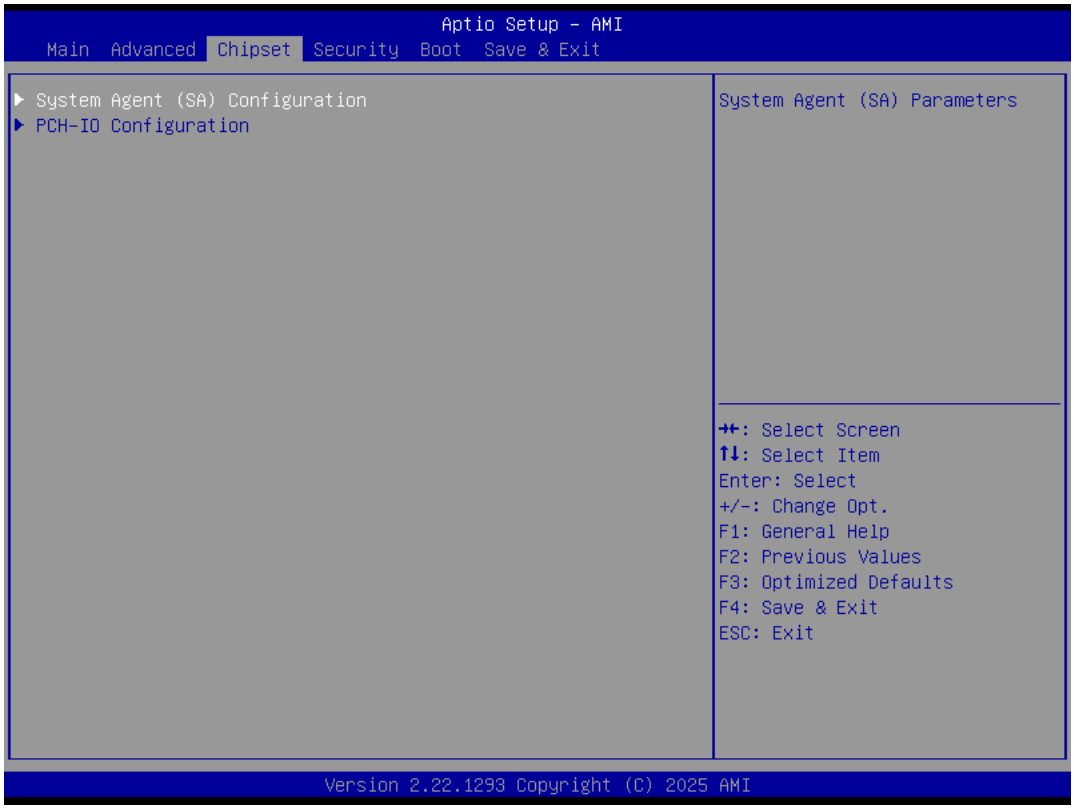


3.5 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

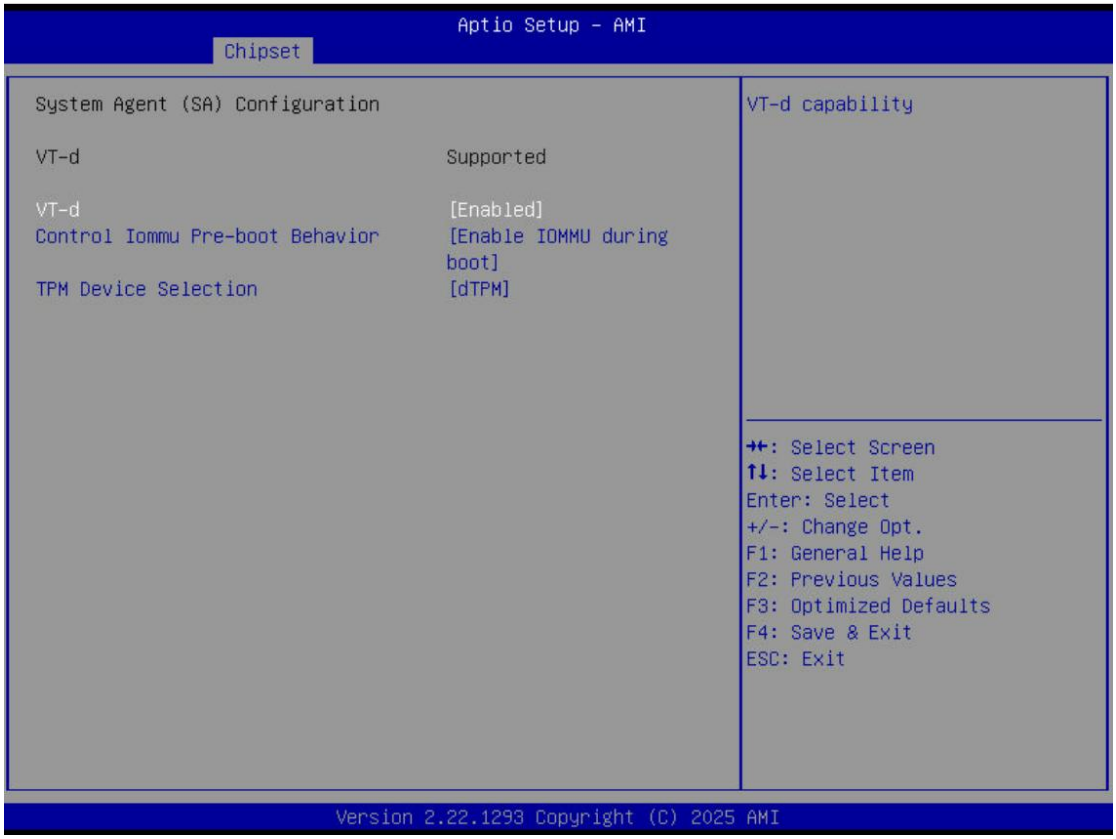
- System Agent (SA) Configuration
- PCH-IO Configuration

For items marked with "►", please press <Enter> for more options.



- System Agent (SA) Configuration

This screen allows users to configure System Agent (SA) parameters. For items marked with "►", please press <Enter> for more options.

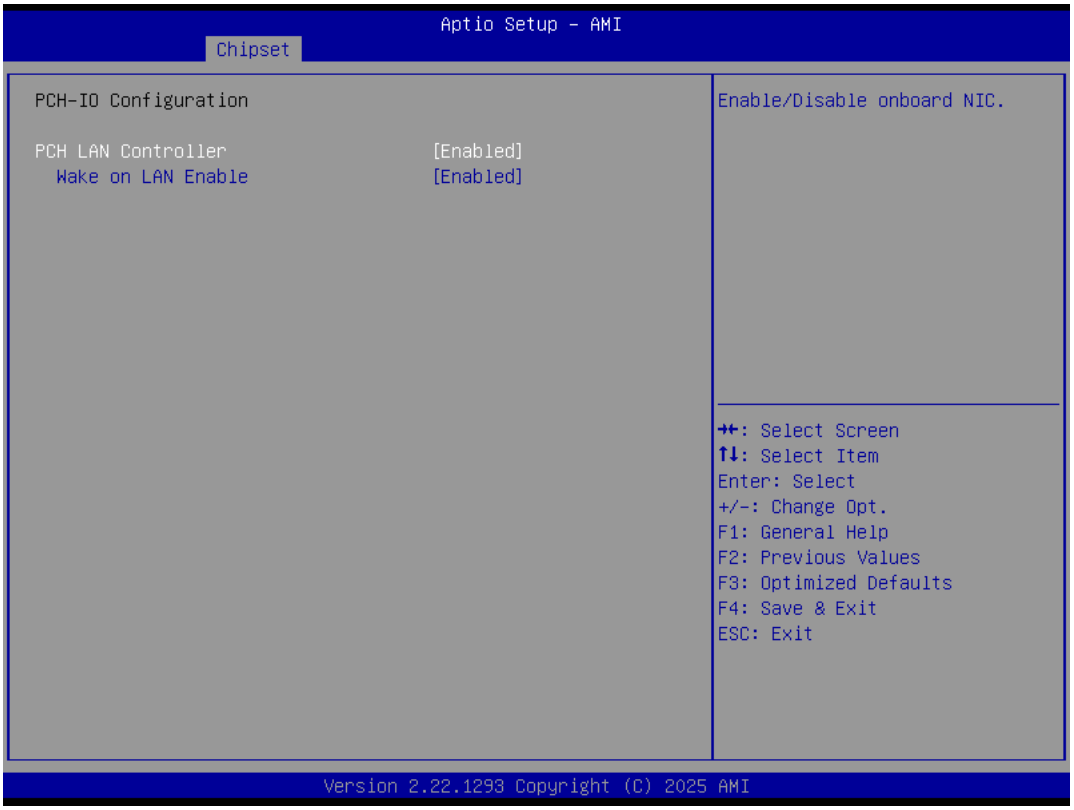


➢ VT-d
Check to enable VT-d function on MCH.

➢ Above 4GB MMIO BIOS assignment
Enable/Disable above 4GB Memory Mapped IO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

- PCH-IO Configuration

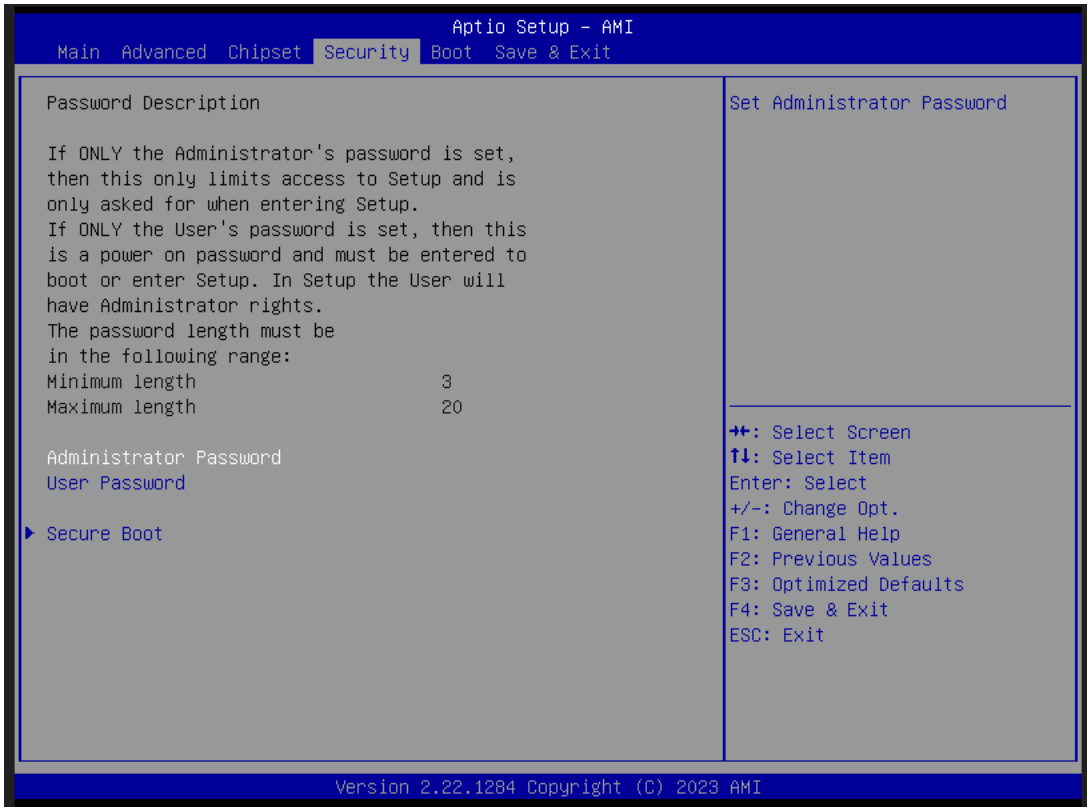
This screen allows you to set PCH parameters.



➢ Wake on LAN Enable
Enabled or disabled integrated LAN to wake the system.

3.6 Security Menu

The Security menu allows users to change the security settings for the system.



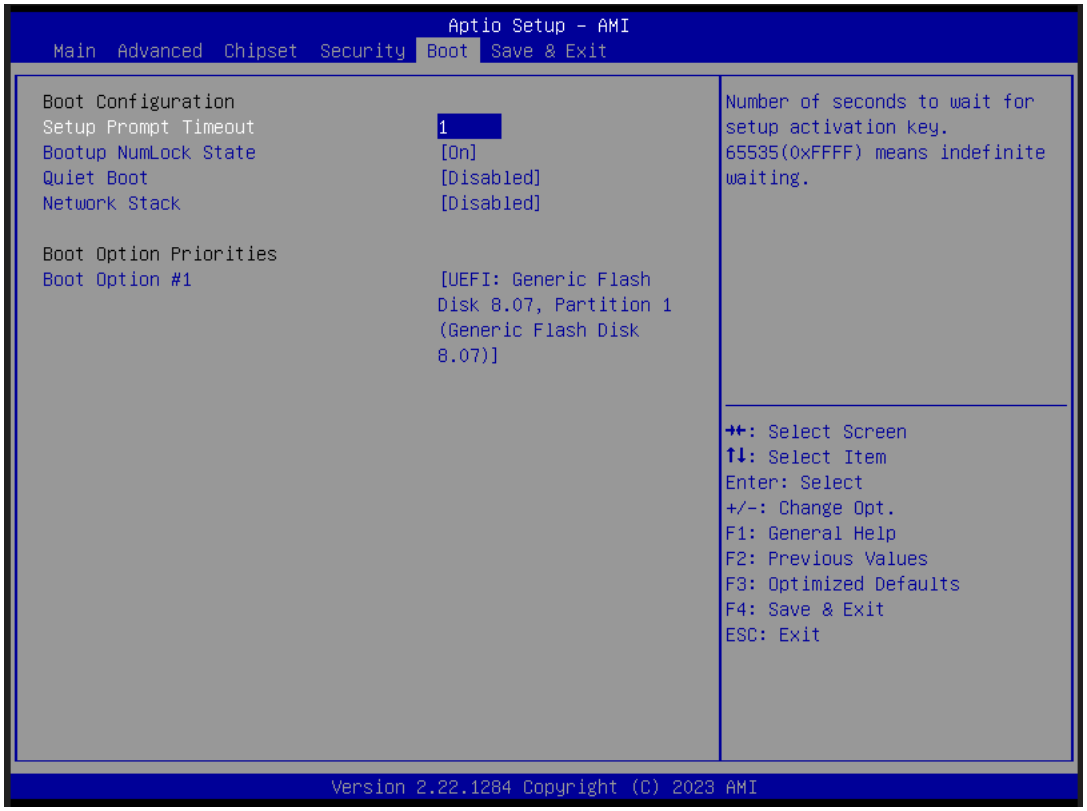
- Administrator Password
  This item indicates whether an administrator password has been set (installed or uninstalled).
- User Password
  This item indicates whether a user password has been set (installed or uninstalled).

- Secure Boot


Aptio Setup – AMI
Security
System Mode
Setup
Secure Boot
[Enabled]
Not Active
Secure Boot Mode
[Standard]
Restore Factory Keys
Reset To Setup Mode
Key Management
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.22.1287 Copyright (C) 2024 AMI

3.7 Boot Menu

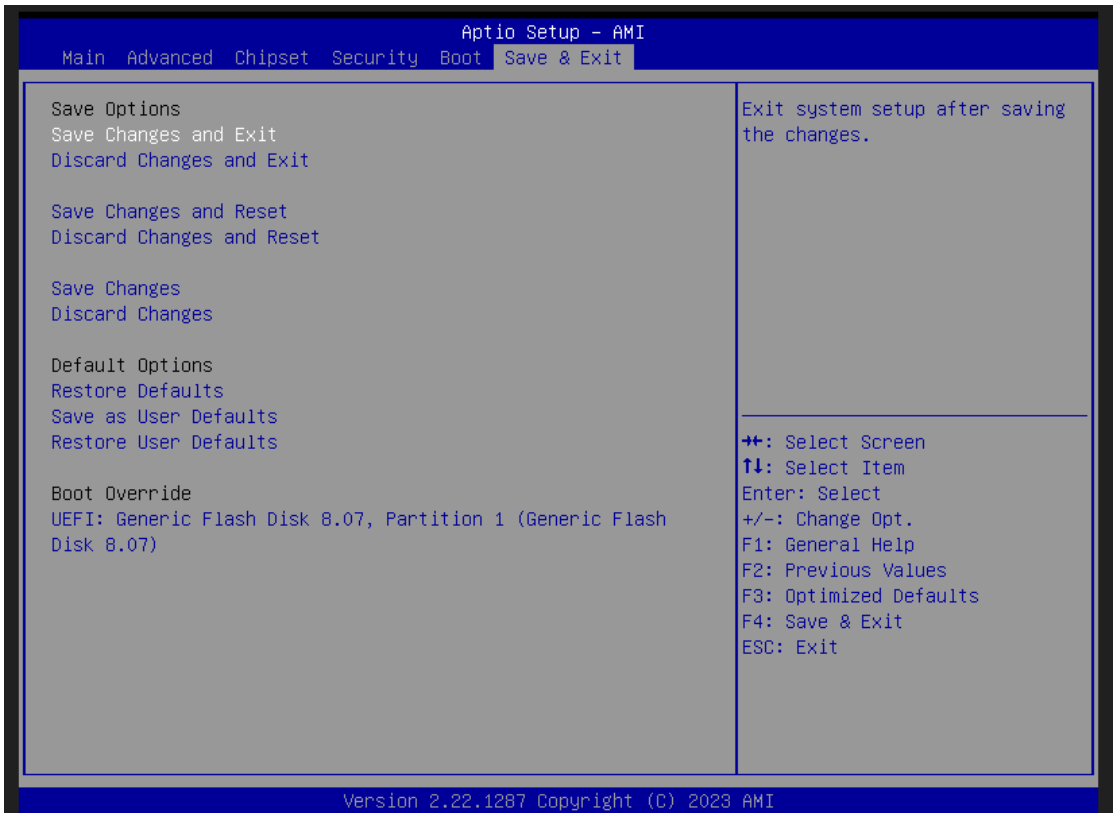
The Boot menu allows users to change boot options of the system.



- Setup Prompt Timeout
  Set the number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
- Bootup NumLock State
  Use this item to select the power-on state for the keyboard NumLock.
- Quiet Boot
  Select to display either POST output messages or a splash screen during boot-up.
- Network stack
  Use this item to enable or disable the boot ROM function of the onboard LAN chip when the system boots up.
- Boot Option Priorities
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

3.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- Save Changes and Exit
  When finishing the system configuration settings, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.
- Discard Changes and Exit
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.
- Save Changes and Reset
  When finishing the system configuration settings, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.
- Discard Changes and Reset
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.
- Save Changes
  When finishing the system configuration settings, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- Discard Changes
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.
- Restore Defaults
  After selecting this option, all the settings will be restored to defaults automatically. Select Restore Defaults from the Save & Exit menu and press <Enter>.
- Save as User Defaults
  Select this option to save your current system configuration settings as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.
- Restore User Defaults
  After selecting this option, all the settings will be restored to user defaults automatically. Select Restore User Defaults from the Save & Exit menu and press <Enter>.
- Boot Override
  Select a drive to immediately boot that device regardless of the current boot order.

This page is intentionally left blank.

APPENDIX A
WATCHDOG TIMER

A.1 About Watchdog Timer

Software stability is a major issue in most applications. Some embedded systems are not watched by an operator for 24 hours. It is usually too late to wait for someone to reboot when a computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us a solution in this regard.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts the counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

A.2 Sample Program

```
#include "stdafx.h"

#include <windows.h>
#include <stdio.h>
#include <tchar.h>
#include <stdlib.h>
#ifdef _DEBUG
#define new DEBUG_NEW
#endif
#pragma comment (lib, "User32.lib" )
#define IDT_TIMER WM_USER + 200
#define _CRT_SECURE_NO_WARNINGS 1
#define setbit(value,x) (value |=(1<<x))
#define clrbit(value,x) (value &=~(1<<x))
HINSTANCE hinstLibDLL = NULL;

LONG WDTDATA = 0;


typedef ULONG(*LPFNDLLGETIOSPACE)(ULONG);
LPFNDLLGETIOSPACE lpFnDll_Get_IO;
typedef void(*LPFNDLLSETIOSPACE)(ULONG, ULONG);
LPFNDLLSETIOSPACE lpFnDll_Set_IO;
int _tmain(int argc, _TCHAR* argv[])
{
int unit = 0;
```

```
int WDTtimer = 0;
if (hinstLibDLL == NULL)
{
hinstLibDLL = LoadLibrary(TEXT("diodll.dll"));
if (hinstLibDLL == NULL)
{
//MessageBox("Load diodll dll error", "", MB_OK);
}

}

if (hinstLibDLL)

{
lpFnDll_Get_IO = (LPFNDLLGETIOSPACE)GetProcAddress(GetModuleHandle("diodll.dll"),
"GetIoSpaceByte");
lpFnDll_Set_IO = (LPFNDLLSETIOSPACE)GetProcAddress(GetModuleHandle("diodll.dll"),
"SetIoSpaceByte");
}
printf("Input Watch Dog Timer type, 1:Second ; 2:Minute :");
scanf("%d",&unit);
printf("₩nInput Timer to countdown:");
scanf("%d", &WDTtimer);
printf("Start to countdown...");
//==Enter MB Pnp Mode==
lpFnDll_Set_IO(0x2e, 0x87);
lpFnDll_Set_IO(0x2e, 0x87);
lpFnDll_Set_IO(0x2e, 0x07);
lpFnDll_Set_IO(0x2f, 0x07); //SET LDN 07
//set LDN07 FA 10 to 11
lpFnDll_Set_IO(0x2e, 0xFA);
WDTDATA = lpFnDll_Get_IO(0x2f);
WDTDATA = setbit(WDTDATA, 0);
lpFnDll_Set_IO(0x2f, WDTDATA);
if (unit == 1)
{
lpFnDll_Set_IO(0x2e, 0xF6);
lpFnDll_Set_IO(0x2f, WDTtimer);
//start watchdog counting
lpFnDll_Set_IO(0x2e, 0xF5);
WDTDATA = lpFnDll_Get_IO(0x2f);
WDTDATA = setbit(WDTDATA, 5);
lpFnDll_Set_IO(0x2f, WDTDATA);
}
else if (unit == 2)
```

```
{
//set WDT Timer
lpFnDll_Set_IO(0x2e, 0xF6);
lpFnDll_Set_IO(0x2f, WDTtimer);
//set watchdog time unit to min
lpFnDll_Set_IO(0x2e, 0xF5);
WDTDATA = lpFnDll_Get_IO(0x2f);
WDTDATA = setbit(WDTDATA, 3);
lpFnDll_Set_IO(0x2f, WDTDATA);
//start watchdog counting
lpFnDll_Set_IO(0x2e, 0xF5);
WDTDATA = lpFnDll_Get_IO(0x2f);
WDTDATA = setbit(WDTDATA, 5);
lpFnDll_Set_IO(0x2f, WDTDATA);
}
system("pause");
return 0;
}
```

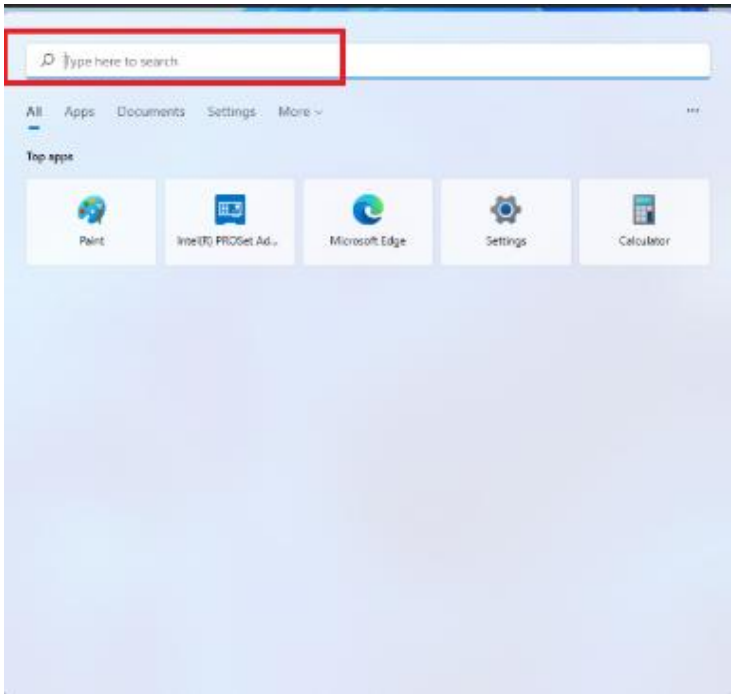
This page is intentionally left blank.

APPENDIX B
WAKE ON LAN

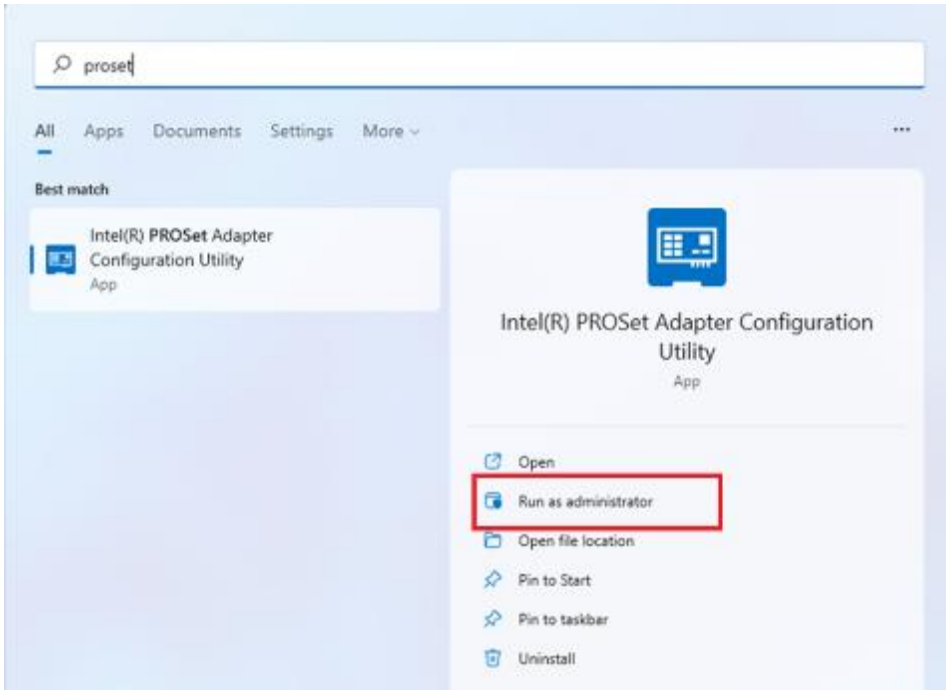
How to Set up Wake on LAN

Please follow the following steps to set up Wake on LAN on Windows 11.

1. Press " " w/ "S" or press " " on Windows desktop.
2. Enter "proset" in red area.

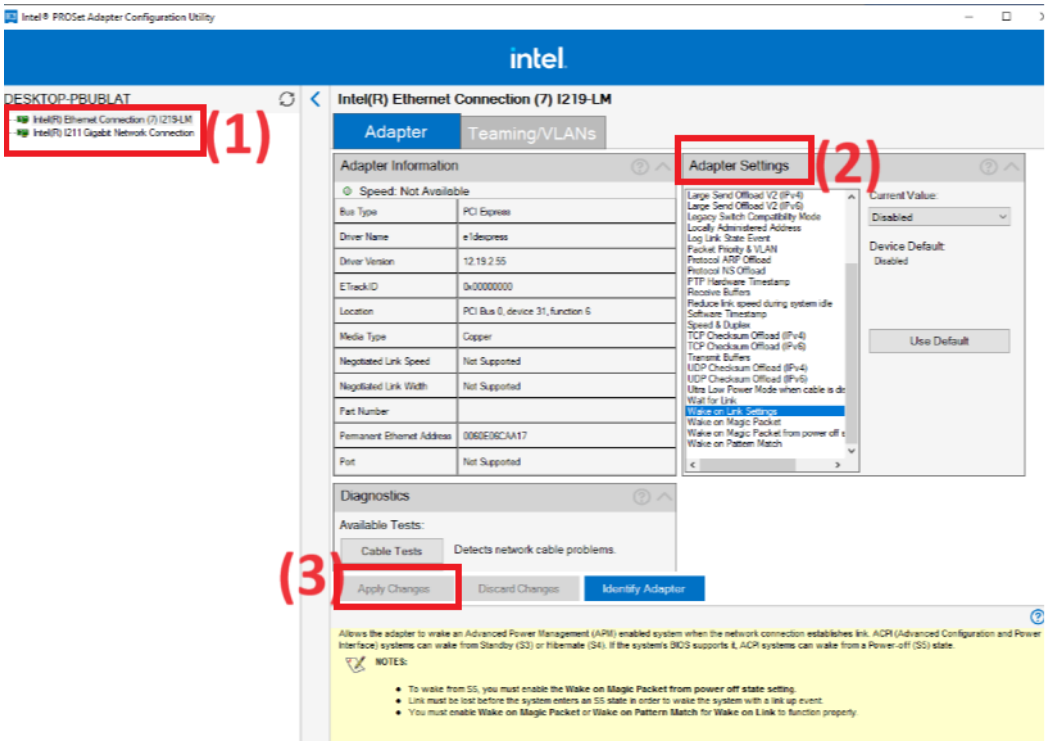


3. Select "Run as administrator"



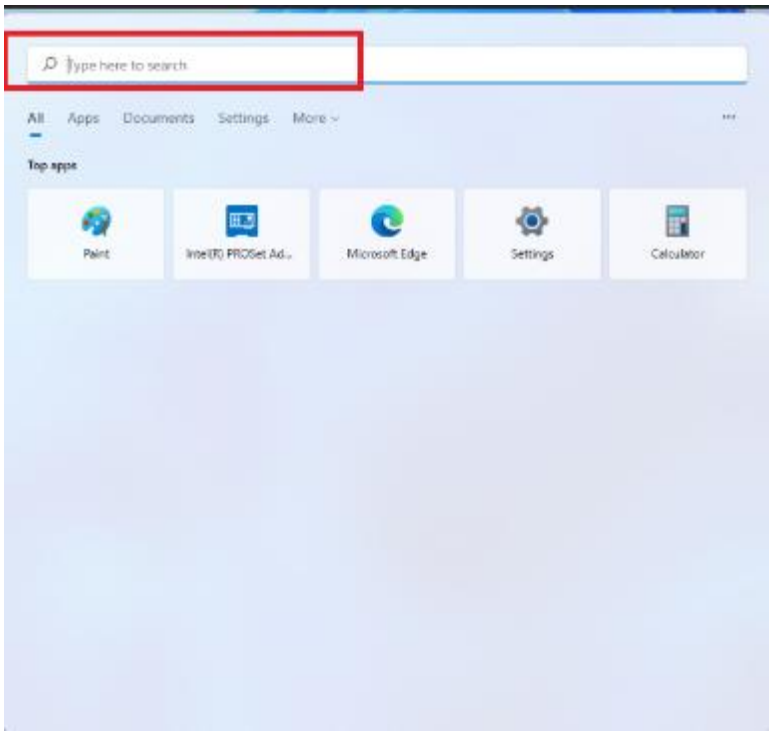
Select a LAN port (1) which will support "Wake on LAN", then enable functionality you need under "Adapter Settings" (2)

4. Press "Apply Changes" (3).

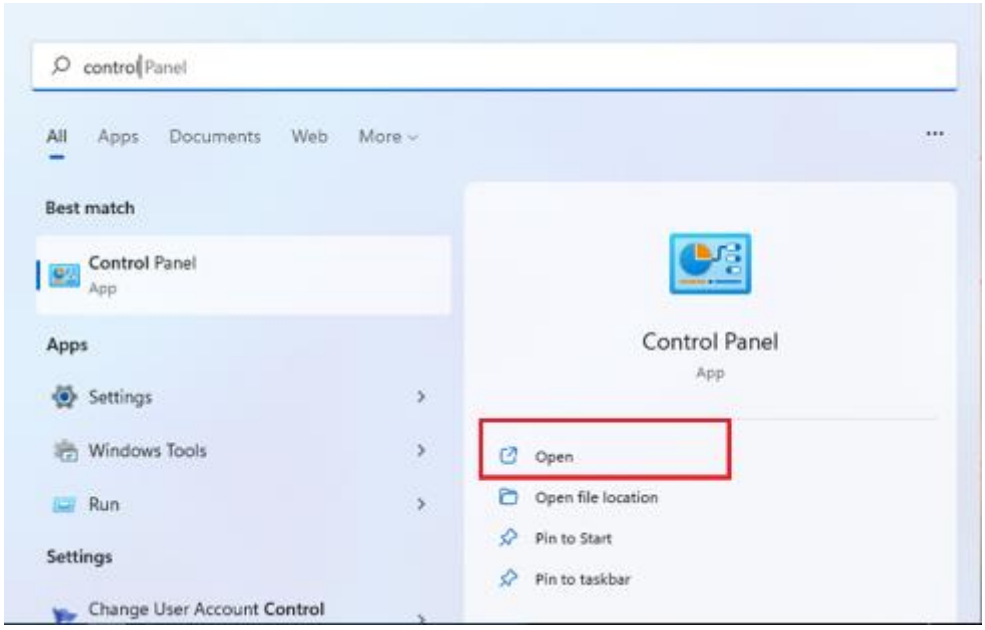


**Please follow step 4 and step 5 to set the other LAN ports for "Wake on LAN"

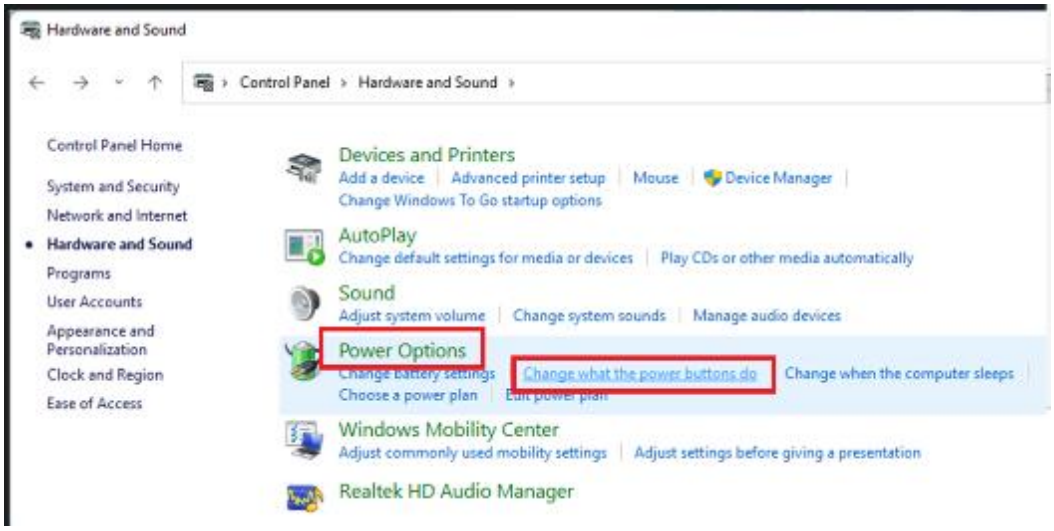
5. Press " " w/ "S" or press " " on Windows desktop.
6. Enter "control panel" in red area.



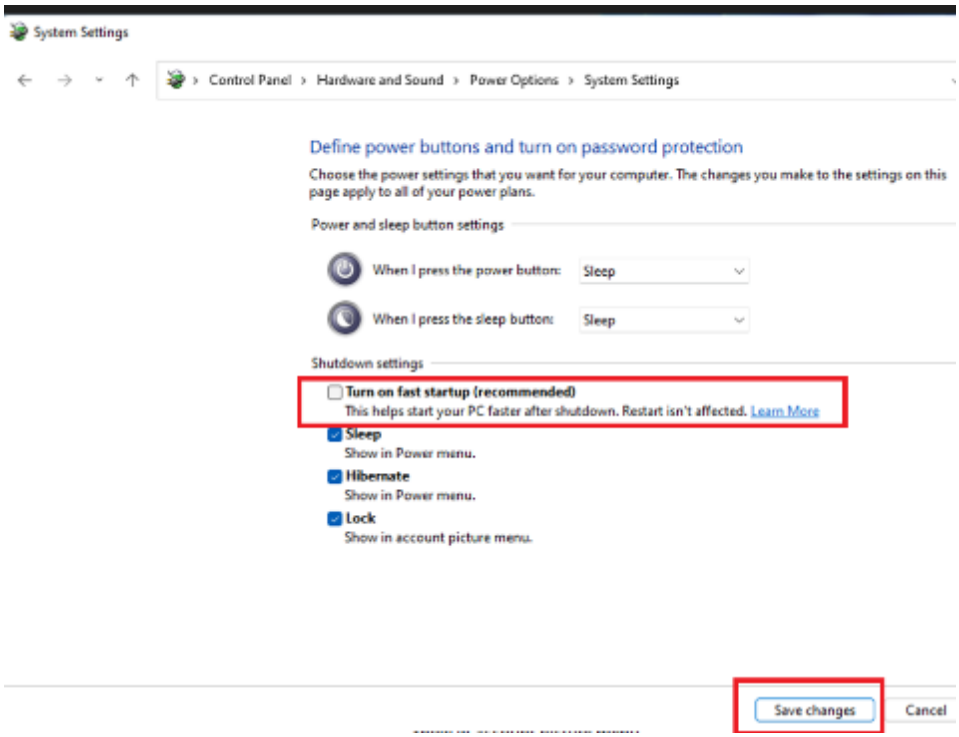
7. Select "Open".



8. Press Power options →Change what the power button do



9. Remove "  " from "Turn on fast startup", the press "Save changes".



10. Reboot the system to enable the above settings. Installation is completed.