USER'S MANUAL

IMB760

Dual Intel® LGA4189 Xeon® Scalable Ice Lake-SP Processor EATX Industrial Motherboard with 4 PCIe x16, 2 PCIe x8, VGA, NVMe & IPMI

User's Manual

AXIOMTEK

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.

CAUTION

The wrong type of batteries might cause an explosion. It is recommended that users only replace with the same or equivalent type of batteries as suggested by the manufacturer once properly disposing of any used ones.

June 2022, Version A1

Printed in Taiwan

ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please follow the precautions:

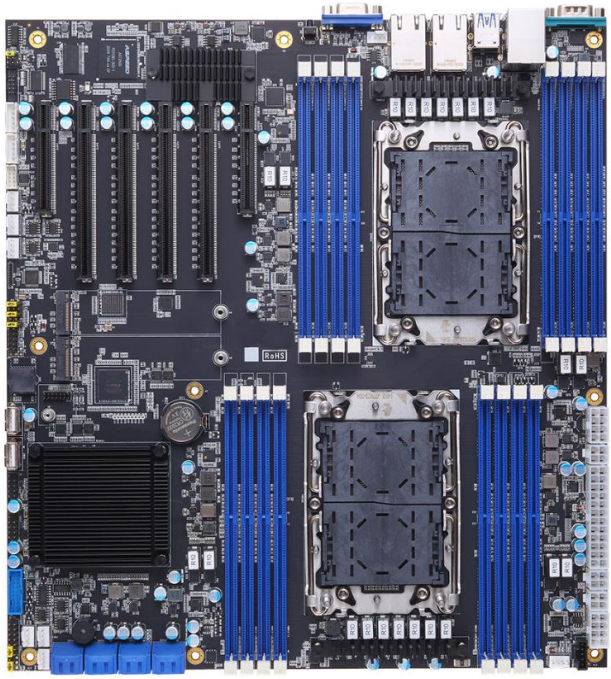
- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds to discharge static electricity from your body.
- Wear a grounding wrist strap, available from most electronic component stores, when handling boards and components.

Trademarks Acknowledgments

Table of Contents

This page is intentionally left blank.

Section 1
Introduction



The IMB760 is an advanced EATX industrial severboard based on the Intel® Xeno® Scalable Ice Lake-SP processors in dual LGA4189 socket, and it comes with an Intel® C627A chipset. Featuring optimal computing and visual performance, the IMB760 motherboard is an ideal solution for developing major industry applications ranging from financial modeling to deep learning AI and complex video analytics.

To maximize the expandibility, the Intel® Ice Lake-SP-based IMB760 comes with an internal USB dongle, six USB 3.1 Gen1 and eight USB 2.0, one RS-232/422/485, two 10 Gigabit LANs with Intel® X550-AT2 and one IPMI LAN via Intel® I210-AT.Also, it provides eight-channel programmable digital I/O, one HD Codec audio connector, SMBus, plus one PS/2 keyboard and mouse interface. It also supports VGA display interface and multiple accelerator card slots to deliver superior graphics performance, while Trusted Platform Module 2.0 (TPM 2.0) is available for option to ensure critical information security.

1.1 Features

- Dual Intel® Xeon® Scalable Ice Lake-SP platform up to 270W TDP
- 16 x 288-pin DDR4-3200 RDIMM for up to 1TB of system memory
- 4 PCIe x16, 2 PCIe x8
- Supports two M.2 Key M
- Supports TPM 2.0 (optional)
- IPMI (optional)
- Supports multiple accelerator cards
- Supports internal USB dongle

1.2 Specifications

- **CPU**
  - LGA4189 Socket Intel® Xeno® Scalable Ice Lake-SP processor

- **Chipset**
  - Intel® C627A

- **BIOS**
  - AMI BIOS

- **System Memory**
  - C627A:
    - 16 x 288-pin DIMM sockets
    - Maximum 1TB DDR4 R-DIMM memory (max. 64GB per slot)
    - Supports 3200MHz
    - Supports the memory with ECC function

- **Onboard Multi I/O**
  - 1 x RS-232/422/485 (rear I/O, BIOS selection)
  - 1 x PS/2 keyboard (internal box header)

- **USB Interface**
  - 6 x USB3.1(Gen1) ports (4 x real I/O, 2 x internal box header)
  - 6 x USB 2.0 ports (4 x internal box header, 2 x 180D TypeA)

- **Ethernet**
  - LAN1: 10Gbps Gigabit/Fast Ethernet supports Wake-on-LAN, PXE Boot ROM with Intel® X550-AT2
  - LAN2: 10Gbps Gigabit/Fast Ethernet supports Wake-on-LAN, PXE Boot ROM with Intel® X550-AT2
  - LAN3: IPMI LAN via Intel® i210-AT 1000/100/10Mbps Gigabit/Fast Ethernet, PXE Boot ROM (shared with BMC AST2500)

- **Storage**
  - 8 x SATAIII with RAID 0/1/5/10
  - 2 x M.2 M-Key 2280 with PCIe x4 / SATA signal for NVMe SSD (with RAID0 & 1 supported)

- **Display**
  - 1 x 15-pin D-Sub as VGA connector. Maximum resolution up to 1920x1200 @60Hz
  - Graphics controller via AST2500 BMC

- **Expansion Interface**
  - 4 x PCI-Express x16 slots
  - 2 x PCI-Express x8 slots

- **Power Input**
  - 1 x 24-pinATX power input connector
  - 1 x 12V ATX power input connector
  - 4 x 12V ATX power input connector for CPU Power

- **Operating Temperature**
  - 10°C ~ 35°C, depends on cooler solution

- **Storage Temperature**
  - -20°C ~ 85°C

- **Operating Humidity**
  - 10% to 95% relative humidity, non-condensing

- **Dimensions**
  - 305 x 330mm (12” x 13”)

Note

All specifications and images are subject to change without notice.

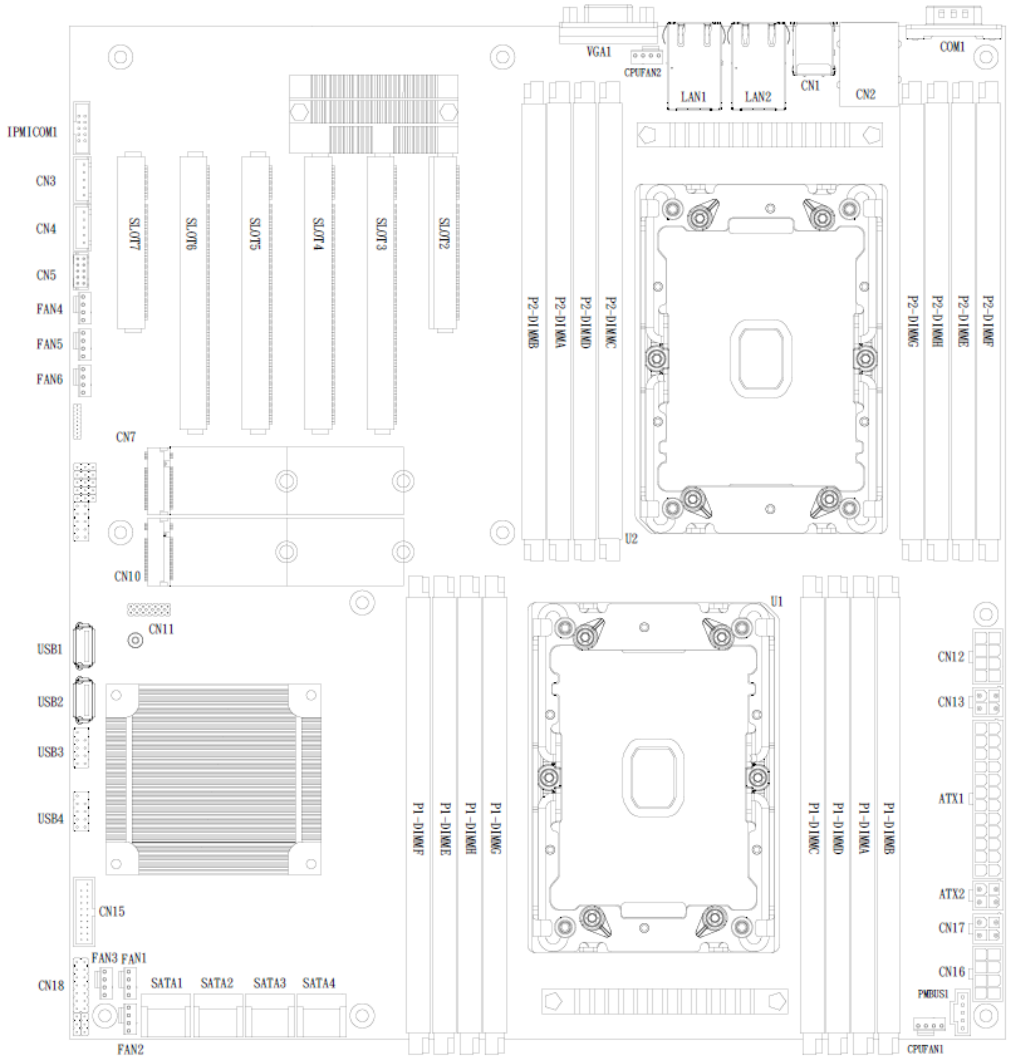
1.3 Packing list

- **Bulk packing**
  - 1 x Motherboard
  - 1 x I/O bracket

- **Gift box**
  - 1 x Motherboard
  - 1 x I/O bracket

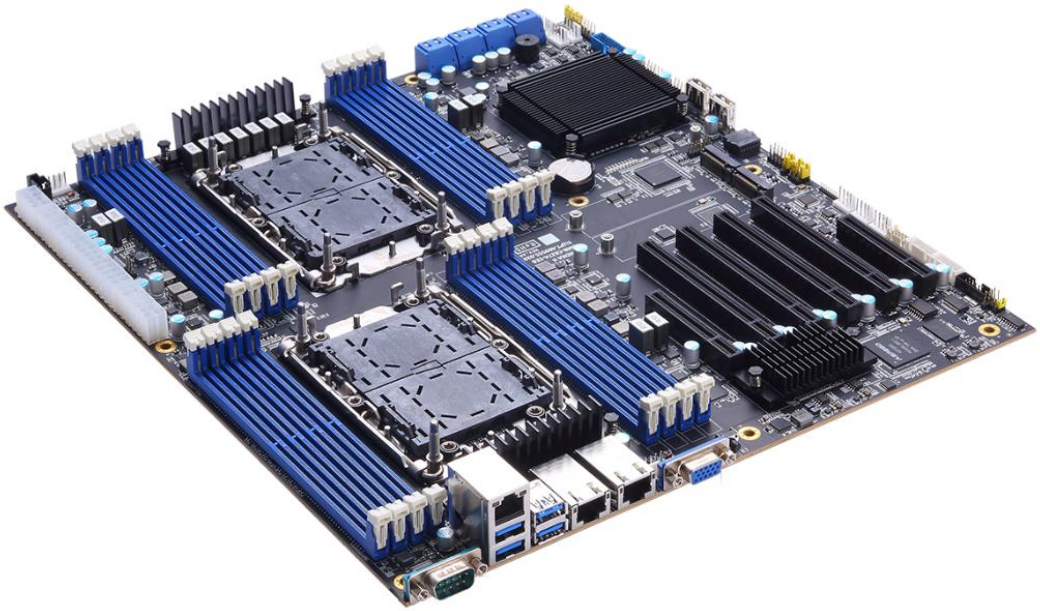
Section 2
Board and Pin Assignments

2.1 Board Layout

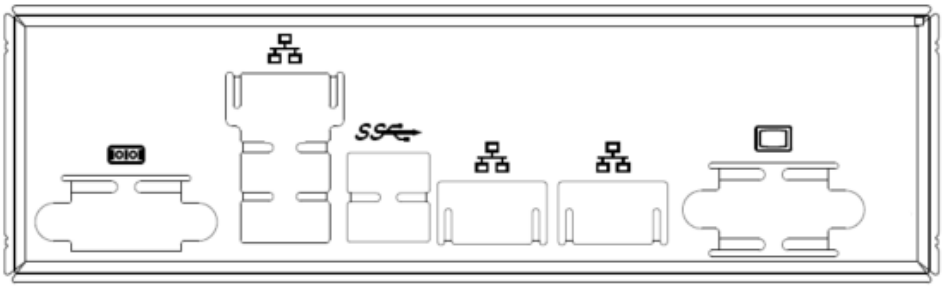


Top view

2.2 Rear I/O

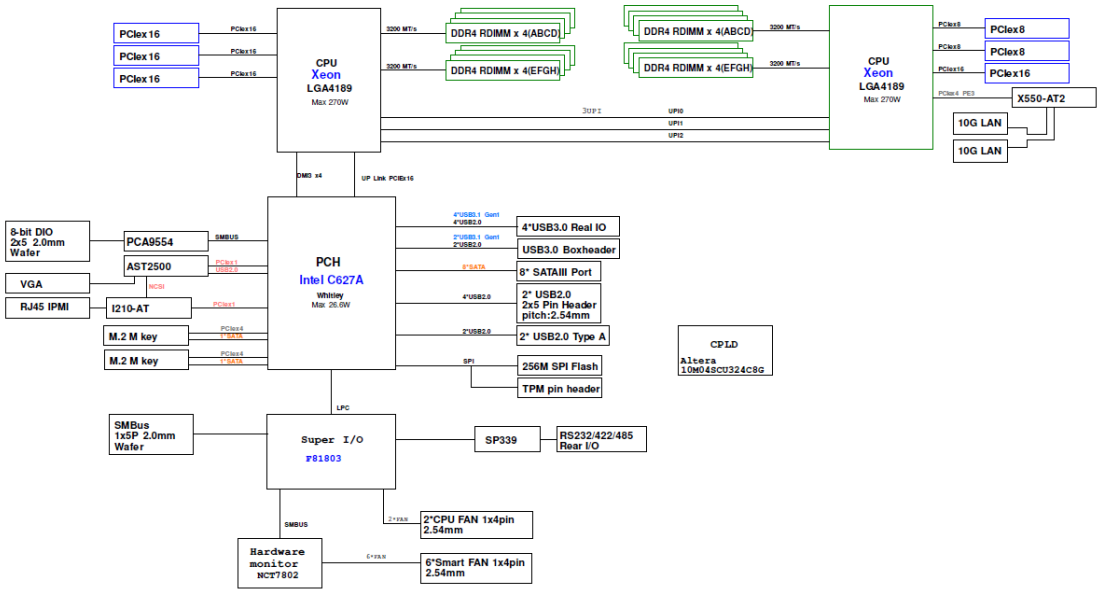


I/O side



I/O bracket

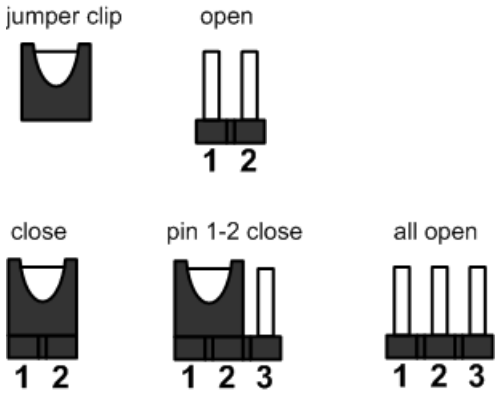
2.3 Block Diagram



2.4 Jumper Settings

Pin description

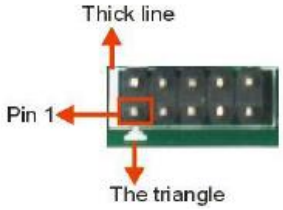
A jumper is a small component consisting of a jumper clip and jumper pins. Install a jumper clip on two jumper pins to close the jumper pins. Remove the jumper clip from two jumper pins to open the jumper pins. The following illustration shows how to set up a jumper.



Note

To identify the first pin of a header or jumper, please refer to the following information:

- ***Usually, there is a thick line or a triangle mark near the header or jumper pin 1.***



- ***A square pad, which you can find on the back of the motherboard, is usually used for pin 1.***

Before connecting the power to the IMB760 series motherboard, make sure all of the jumpers are in factory default position. Below you can find a summary table of all jumpers and onboard default settings.

Note

Turn off the power before changing any default jumper settings.

Jumper	Description	Setting
JP7	Clear CMOS Default: Normal operation	1-2 Close
JP10	AT/ATX power mode select Default: AT mode	1-2 Close

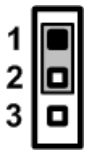
2.4.1 Clear CMOS (JP7)

This jumper (3x1-pin p=2.54mm) allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information such as system passwords.

To erase the RTC RAM:

1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper clip from pins 1-2 (default) to pins 2-3. Keep the clip on pins 2-3 for about 5~10 seconds, then move the clip back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the <Del> key during the boot process and enter BIOS setup to re-set the data.

Function	Setting
Normal operation (Default)	1-2 close
Clear CMOS	2-3 close



2.4.2 AT/ATX Mode Select (JP10)

This jumper (3x1-pin p=2.54mm) allows you to select AT or ATX power mode.

Function	Setting
AT mode (Default)	1-2 close
ATX mode	2-3 close

2.5 Connectors

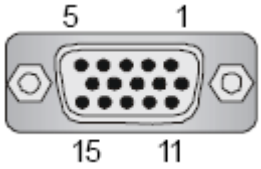
Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, Make sure all connectors are properly and firmly connected. Here is a summary table showing the connectors on the hardware.

Connector	Description
VGA1	VGA Connector
CN2	LAN (Shared IPMI LAN) + USB3.1 GEN1 Connector
CN1	USB3.1 GEN1 Connector
LAN1	10G LAN Connector
LAN2	10G LAN Connector
CN11	TPM 2.0 Connector (Optional)
CN7	M.2 Connector
CN10	M.2 Connector
U1	CPU1 Socket
U2	CPU2 Socket
CN18	Front Panel Header
ATX1	24-pin ATX Power Input Connector
CN16	CPU1 Power Input Connector
CN17	CPU1 AUX Power Input Connector
CN12	CPU2 Power Input Connector
CN13	CPU2 AUX Power Input Connector
ATX2	CPU2 ATX 12V Power Input Connector
PMBUS1	PMBUS Connector
CN15	Internal USB3.1 GEN1 Connector
COM1	COM port Connector
FAN1~6	System Fan Connectors
CPUFAN1	CPU1 Fan Connector
CPUFAN2	CPU2 Fan Connector
USB1	Internal USB2.0 Type A Connector
USB2	Internal USB2.0 Type A Connector
USB3	Internal USB2.0 Headers
USB4	Internal USB2.0 Headers
Slot2, Slot7	PCI-Express x8 Slots (Gen4)
Slot3, Slot4, Slot5, Slot6	PCI-Express x16 Slots (Gen4)
SATA1~SATA4	SATA III Connector
CN3	Internal PS2 Key Board Connector
CN4	Internal PS2 Mouse Connector
IPMICOM1	Internal IPMI COM Connector
CN5	Internal DIO Connector
JP26, JP27	LAN Active LED connectors
JP28	Programmable LED connectors
P1-DIMMA~P1-DIMMH	CPU1 DDR4 RDIMM Connector
P2-DIMMA~P2-DIMMH	CPU1 DDR4 RDIMM Connector

2.5.1 VGA Connector (VGA1)

The 15-pin D-Sub connector is for VGA display.

Pin	Signal	Pin	Signal
1	Red	2	Green
3	Blue	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		

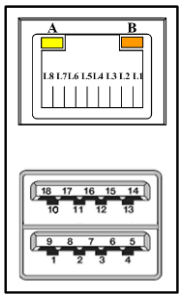


2.5.2 LAN with IPMI and USB 3.1 Connectors (CN2)

The motherboard comes with one plug and play Ethernet interfaces (RJ-45) which supports IPMI management, which is fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end to a 1000/100/10 Base-T hub.

The Universal Serial Bus compliant with USB 3.1 Gen1 (CN2) connectors on the rear I/O are used for connecting USB peripherals such as a keyboard, mouse, scanner, etc.

Pin	LAN Signal	Pin	LAN Signal
L1	Tx+ (Data transmission positive)	L2	Tx- (Data transmission negative)
L3	Rx+ (Data reception positive)	L4	RJ-1 (For 1000 Base-T only)
L5	RJ-1 (For 1000 Base-T only)	L6	Rx- (Data reception negative)
L7	RJ-1 (For 1000 Base-T only)	L8	RJ-1 (For 1000 Base-T only)
A	100 LAN LED (Green) / 1000 LAN LED (Orange)	B	Active LED



LAN

USB

2.5.3 USB 3.1 Connectors (CN1)

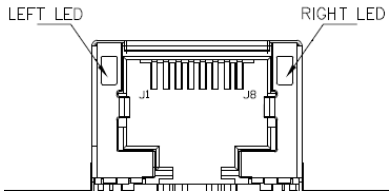
The Universal Serial Bus compliant with USB 3.1 Gen1 (CN1) connectors on the rear I/O are used for installing USB peripherals such as a keyboard, mouse, scanner, etc.

USB

2.5.4 10GbE LAN port (LAN1 & 2)

The IMB760 comes with two 10GbE LAN ports. The pin assignments are listed on the following table.

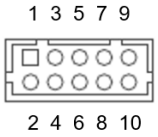
Pin	Description
J1	MDI0+
J2	MDI0-
J3	MDI1+
J4	MDI2+
J5	MDI2-
J6	MDI1-
J7	MDI3+
J8	MDI3-
Left LED	Speed LED： 10G (Green) 1G (Orange) 100M (No light)
Right LED	Active LED (Green)



2.5.5 GPIO Header (CN5)

This header (5x2-pin p=2.00mm) is for digital I/O interface.

Pin	Signal	Pin	Signal
1	DIO1	2	DIO8
3	DIO2	4	DIO7
5	DIO3	6	DIO6
7	DIO4	8	DIO5
9	NC	10	GND



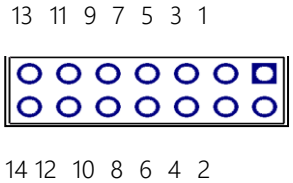
Note

The default value of DIO1 to DIO8 is set as GPI with high level.

2.5.6 TPM Pin Header (CN11)

The header (7x2-pin p=2.0mm) is for SPI interface with an AX93515 TPM module.

Pin	Signal	Pin	Signal
1	VCC3P3	2	GND
3	MOSI	4	MISO
5	CLK	6	CS2
7	RST	8	PIRQ
9	PP	10	NC
11	NC	12	NC
13	NC	14	MC

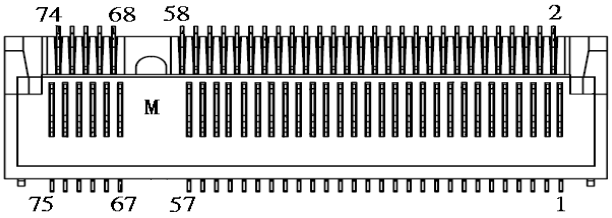


Note

The screw type is M2*0.4.

2.5.7 M.2 2280 Key M PCIe x4 SSD slot (CN7 and CN10)

The IMB760 comes with two M.2 2280 Key M slot with PCIe x4 for NVMe SSD storage or SATA signal for NGFF SSD.

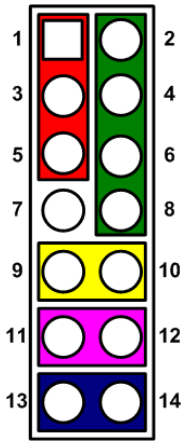


Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	+3.3V	3	GND	4	+3.3V
5	PEX3_RX-	6	NC	7	PEX3_RX+	8	NC
9	GND	10	LED_1#	11	PEX3_TX-	12	+3.3V
13	PEX3_TX+	14	+3.3V	15	GND	16	+3.3V
17	PEX2_RX-	18	+3.3V	19	PEX2_RX+	20	NC
21	GND	22	NC	23	PEX2_TX-	24	NC
25	PEX2_TX+	26	NC	27	GND	28	NC
29	PEX1_RX-	30	NC	31	PEX1_RX+	32	NC
33	GND	34	NC	35	PEX1_TX-	36	NC
37	PEX1_TX+	38	M.2_DEVSLP	39	GND	40	NC
41	PEX0_RX-	42	NC	43	PEX0_RX+	44	NC
45	GND	46	NC	47	PEX0_TX-	48	NC
49	PEX0_TX+	50	PERST#	51	GND	52	CLKREQ#
53	PEX0_REFCLKn	54	PEWAKE#	55	PEX0_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		

2.5.8 Front Panel Header (CN18)

This is a front panel header (7x2-pin p=2.54mm).

Pin	Signal
1	Power LED+
2	SPK- [*]
3	GND
4	BUZZER
5	Power LED-
6	N/C
7	N/C
8	SPK+ [*]
9	PWR-
10	PWR+
11	RESET-
12	RESET+
13	HD LED-
14	HD LED+



Note

[*]: The buzzer on the motherboard will be active when pin 2 and pin 4 are connected; the external speaker on the chassis will be active when pin 2 and pin 4 are open.

2.5.9 Power Input Connectors (ATX1, ATX2, CN12, CN13, CN16 and CN17)

Steady and sufficient power can be supplied to all components on the motherboard by connecting the power connector. Please make sure all components and devices are properly installed before connecting the power connector.

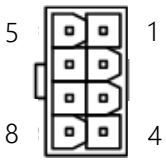
An external power supply plug fits into ATX1/2, CN12/13 and CN16/17 in only one orientation. Properly press down the power supply plug until it firmly fits into the connector. Loose connection may cause system instability.

ATX13 & CN17 AUX CPU power input connector:

Pin	ATX2 Signal	Pin	ATX2 Signal
1	GND	3	+12V
2	GND	4	+12V

CN12 & CN16 CPU power input connector:

Pin	ATX2 Signal	Pin	ATX2 Signal
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V

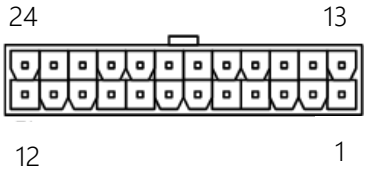


ATX2 ATX 12V power input connector:

Pin	ATX2 Signal	Pin	ATX2 Signal
1	GND	3	+12V
2	GND	4	+12V

ATX1 24-pin ATX power input connector:

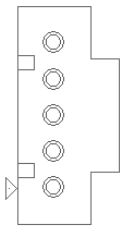
Pin	CN26 Signal	Pin	CN26 Signal
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWR OK	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND



2.5.10 PMBUS Connector (PMBUS1)

The PMBUS (Power System Management BUS) monitors the power supply, system temperature and fan. The connector pin assignments are listed on the following table.

Pin	Signal
1	PMBUS CLOCK
2	PMBUS DATA
3	PMBUS ALEAR
4	GND
5	N/A

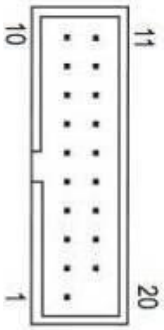


PMBUS1

2.5.11 Internal USB 3.1 Gen1 Connector (CN15)

The CN15 is a 19-pin internal connector for USB 3.1 compliant peripherals.

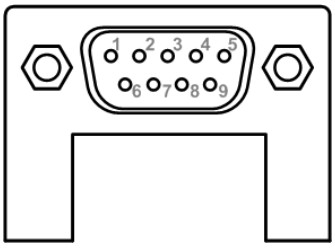
Pin	Signal	Pin	Signal
1	VBUS0		
2	SSRX5-	19	VBUS1
3	SSRX5+	18	SSRX6-
4	GND	17	SSRX6+
5	SSTX5-	16	GND
6	SSTX5+	15	SSTX6-
7	GND	14	SSTX6+
8	USB10-	13	GND
9	USB10+	12	USB11-
10	ID	11	USB11+



2.5.12 COM1 Connector (COM1)

This is a high rise type 9-pin D-Sub connector for COM1 serial port interface. The pin assignments of RS-232/422/485 are listed in the table below.

Pin	RS-232 [*]	RS-422 [*]	RS-485 [*]
1	DCD#	TX-	485-
2	RXD	TX+	485+
3	TXD	RX+	N/C
4	DTR#	RX-	N/C
5	GND	GND	GND
6	DSR#	N/C	N/C
7	RTS#	N/C	N/C
8	CTS#	N/C	N/C
9	RI#	N/C	N/C



Note ***[*]: COM1 can be used for RS-232/422/485 signals through BIOS settings.***

2.5.13 Fan Connectors (FAN1~FAN6 and CPU FAN1/2)

This motherboard has eight fan connectors. Find fan speed option(s) at BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

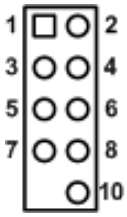
FAN1~6 (4x1-pin p=2.54mm) are for the the system fan connectors.
CPU FAN1/2 (4x1-pin p=2.54mm) are for the the CPU fan connector.

Pin	Signal
1	GND
2	+12V
3	FAN Speed Detection
4	FAN Speed Control

2.5.14 Internal USB Headers (USB3~4)

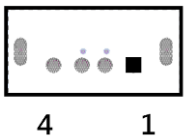
The USB 3~4 are 5x2-pin p=2.54mm headers is for USB 2.0 interface.

Pin	Signal	Pin	Signal
1	+5 V_DUAL	2	+5 V_DUAL
3	USB 5, 7	4	USB 6, 8
5	USB 5, 7	6	USB 6, 8
7	GND	8	GND
		10	GND



USB 1 and USB 2 is a Type-A 180D connector with USB 2.0 signal.

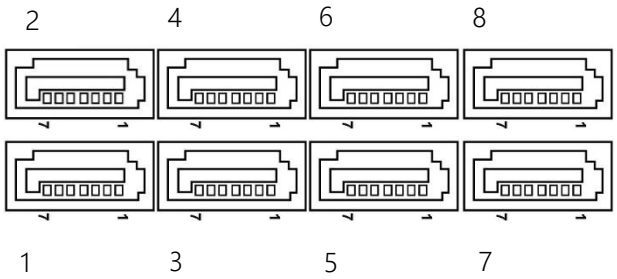
Pin	Signal
1	+5V_DUAL
2	USB-
3	USB+
4	GND



2.5.15 SATA 3.0 Connectors (SATA1 ~ SATA4)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for SATA 3.0 interface allowing up to 6.0Gb/s data transfer rate. It is a computer bus interface for connecting to devices such as a hard disk drive.

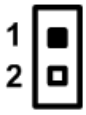
Pin	Signal
1	*GND*
2	*SATA_TX+*
3	*SATA_TX-*
4	*GND*
5	*SATA_RX-*
6	*SATA_RX+*
7	*GND*



2.5.16 LAN Active LED connectors (JP26 and JP27)

There are two LAN active LED connectors for the front panel (2x1-pin p=2.54mm).
JP 26 is for LAN1 active LED.
JP 27 is for LAN2 active LED.

Pin	Signal
1	P3V3_AUX
2	L1_LINK/ACT#



2.5.17 Programmable LED connectors (JP28)

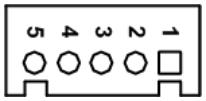
JP 28 is for programmable LED connector (2x1-pin p=2.54mm).

Pin	Signal
1	P3V3_AUX
2	GPIO

2.4.18 Internal Keyboard Connector (CN3)

The internal keyboard (PS/2 type) interface is available through a 5-pin connector.

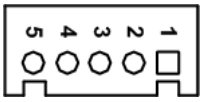
Pin	Signal
1	Keyboard Clock
2	Keyboard Data
3	NC
4	GND
5	+5V level



2.5.19 Internal Mouse Connector (CN4)

The internal mouse (PS/2 type) interface is available through a 5-pin connector.

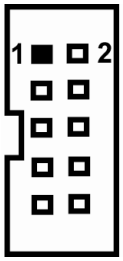
Pin	Signal
1	Mouse Clock
2	Mouse Data
3	NC
4	GND
5	+5V level



2.5.20 Serial Port Connector (IPMICOM1)

The COM port pin assignments are listed on the following table.

Pin	Signal
1	Data Carrier Detect (DCD)
2	Data Set Ready(DSR)
3	Receive Date(RXD)
4	Request to Send(RTS)
5	Transmit Data(TXD)
6	Clear to Send(CTS)
7	Data Terminal Ready(DTR)
8	Ring Indicator(RI)
9	GND
10	NC



2.6 Hardware Installation

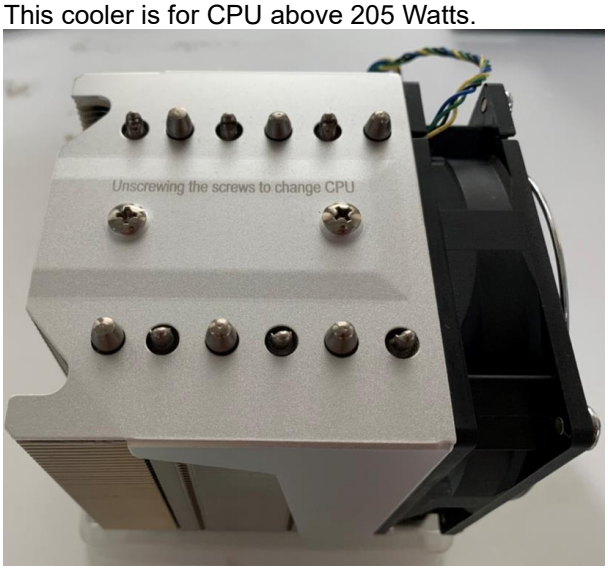
This section provides information on how to install the IMB760 Series.

2.6.1 Installing the CPU

The LGA4189 processor socket comes with a cover to protect the processor. Please install the processor into the CPU socket step by step as illustrated below.
There are two cooler modules as shown in the following pictures:

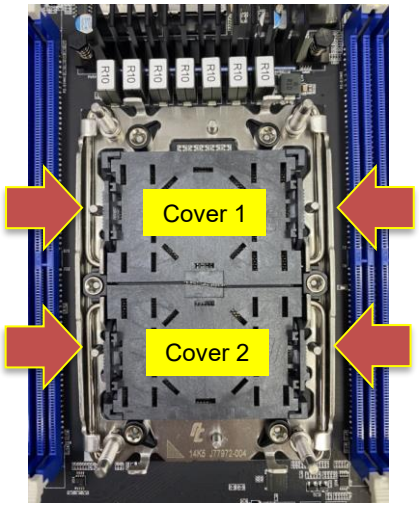
This cooler is for CPU under 205 Watts.

This cooler is for CPU above 205 Watts.

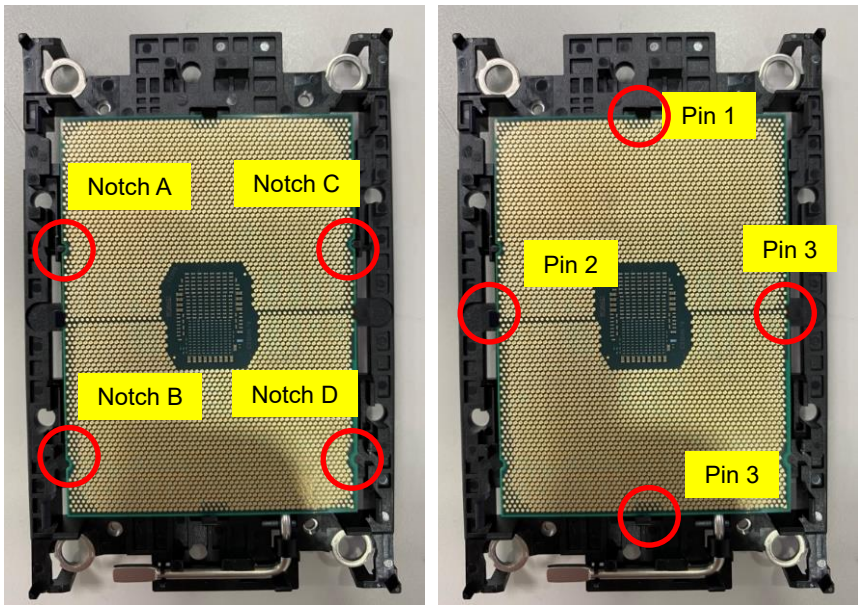


This sequence is for installing the CPU cooler under 205 Watts:

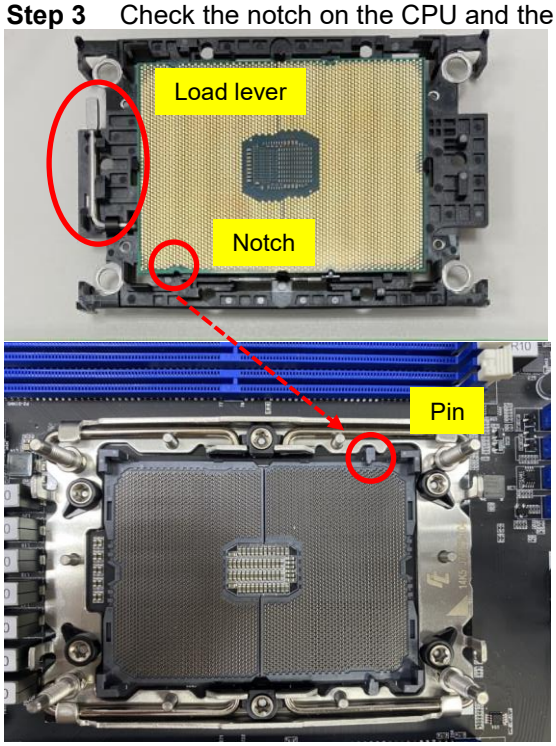
Step 1 Remove the socket protective covers. Press the load lever and release it from the retention tab. There are two levers for each CPU socket.



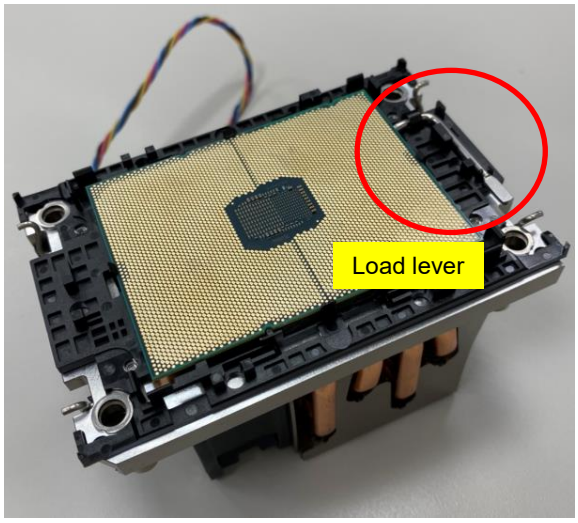
Step 2 Insert the CPU onto the CPU clip and align notch A to D on the CPU clip, then latch pin 1 to 4.



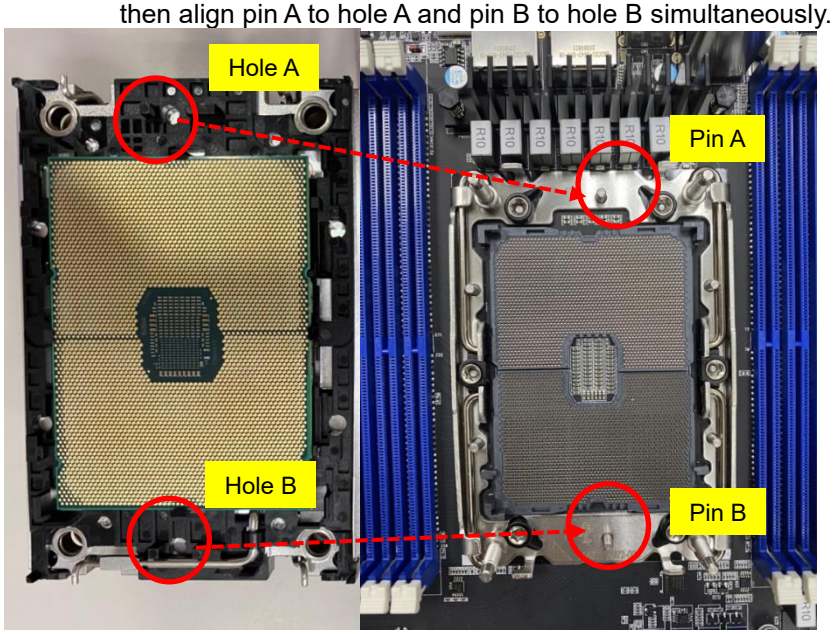
Step 3 Check the notch on the CPU and the pin on the CPU socket of IMB760.



Follow the installation direction and Install the CPU clip and CPU on the cooler module.

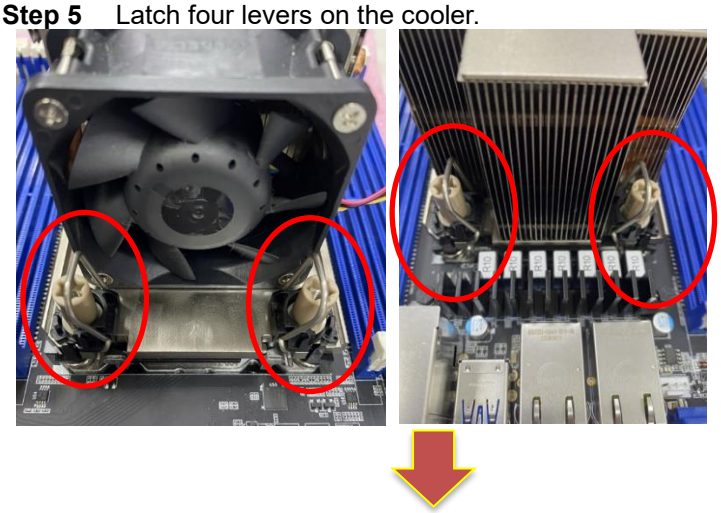


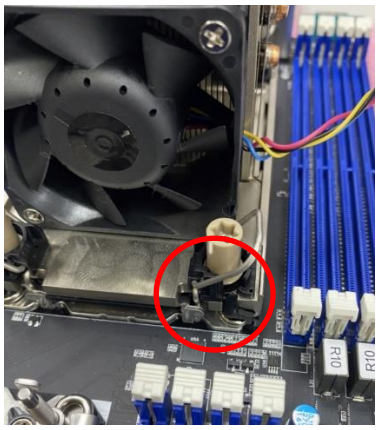
Step 4 Place the CPU cooler module on the CPU socket on the motherboard, and then align pin A to hole A and pin B to hole B simultaneously.



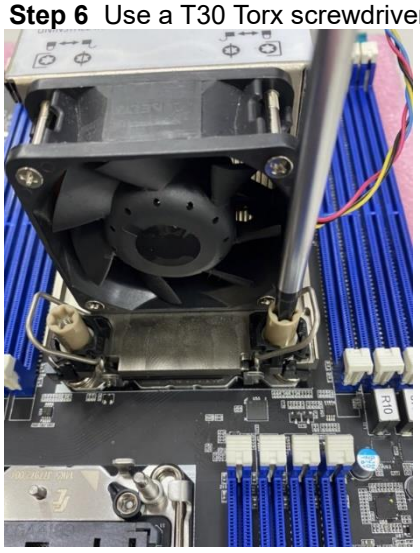
Note ***The installation direction of CPU on the clip and cooler module can affect how the air flows through chassis, please follow the installing instructions to ensure that the CPU is properly installed for best cooling performance.***

Step 5 Latch four levers on the cooler.



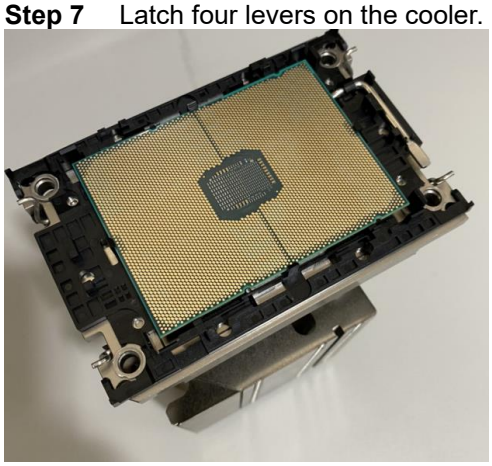


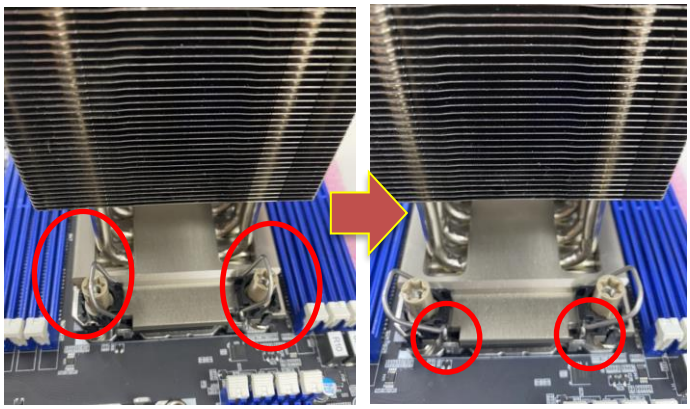
Step 6 Use a T30 Torx screwdriver (8in-LBF) to tighten the screws on the cooler.



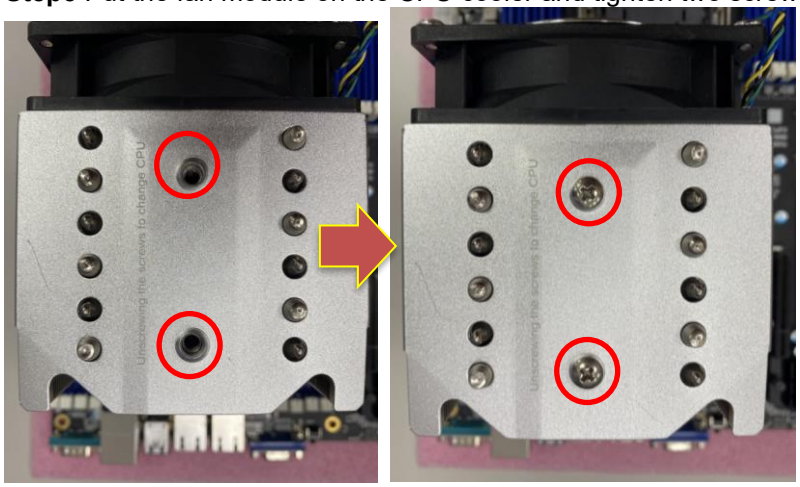
This sequence is for installing the CPU cooler above 205 Watts:
Repeat step1 to 3 for installing CPU on CPU cooler.

Step 7 Latch four levers on the cooler.





Step5 Put the fan module on the CPU cooler and tighten two screws (8in-LBF).



This page is intentionally left blank.

Section 3
Hardware Description

3.1 Microprocessors

The IMB760 series supports Intel® Xeno® Scalable Ice Lake-SP processors, which enable your system to operate under Windows® server 2019 and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your microprocessor to prevent the CPU from damage.

Note

Caution: Make sure to turn off power supply before you install the processor into the CPU socket.

3.2 BIOS

The IMB760 series uses AMI Plug and Play BIOS.

3.3 System Memory

The IMB760 supports six 288-pin DDR4 RDIMM sockets for maximum memory capacity up to 1TB of DDR4 RAMs. The memory module comes in sizes of 16GB, 32GB, and 64GB.

This page is intentionally left blank.

Section 4
AMI BIOS Setup 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 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.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press <Del> during the Power On Self Test (POST) to enter BIOS setup, otherwise, POST will continue with its test routines.
2. Once you enter the BIOS, 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 menus.

Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting JP8 (see section 2.4.1).

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.

4.2 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.

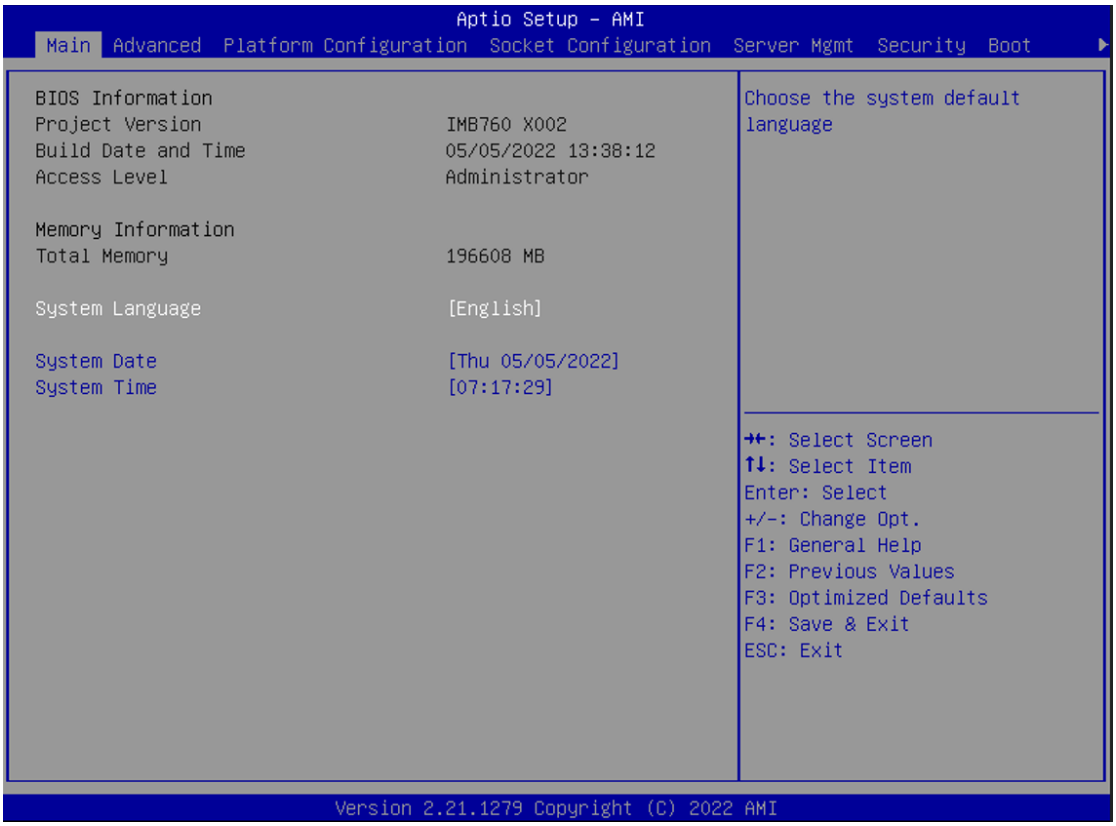
Note

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.
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.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
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.

4.3 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.

Access Level
Display the access level of current user.

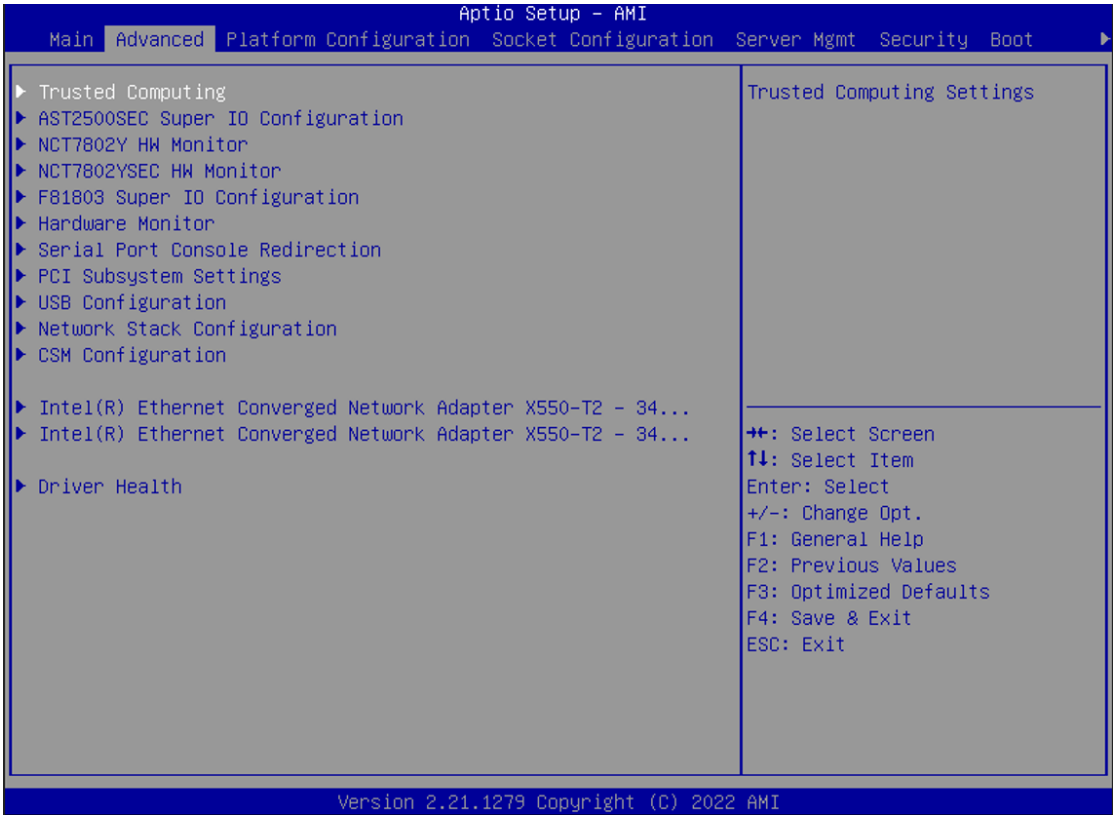
System Date/Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.4 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:

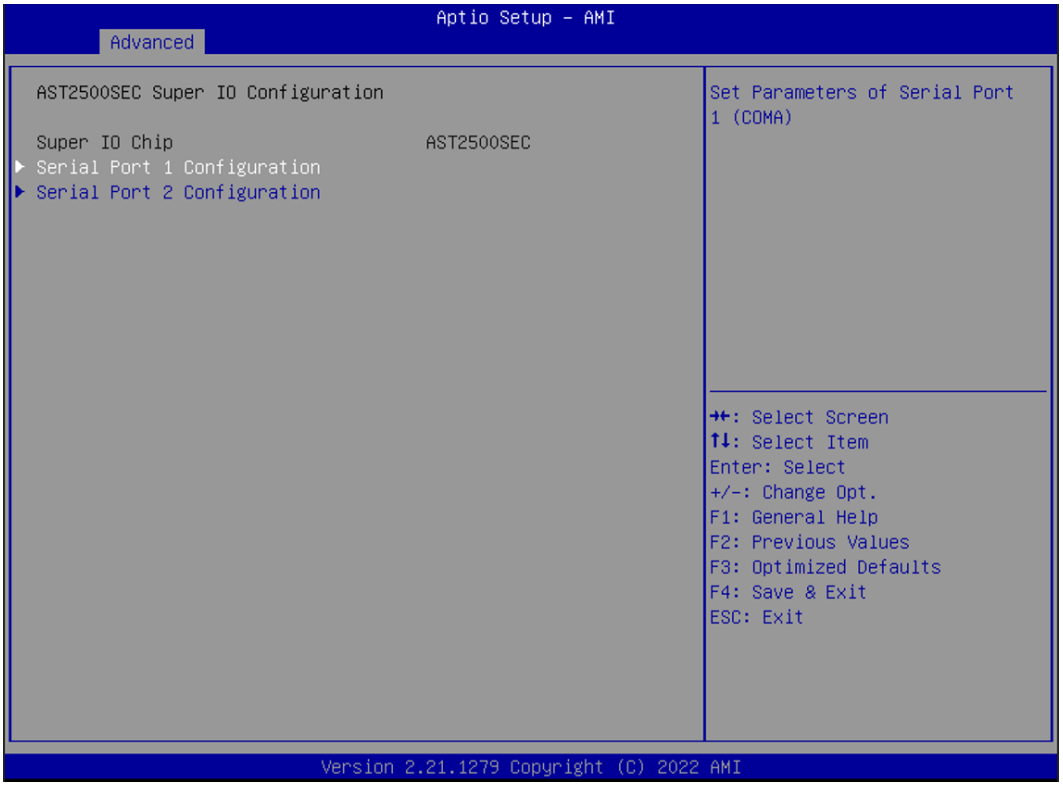
- ▶ Trusted Computing
- ▶ AST2500SEC Super IO Configuration
- ▶ NCT7802Y HW Monitor
- ▶ NCT7802YSEC HW Monitor
- ▶ F81803 Super IO Configuration
- ▶ Hardware Monitor
- ▶ Serial Port Console Redirection
- ▶ PCI Subsystem Settings
- ▶ USB Configuration
- ▶ Network Stack Configuration
- ▶ CSM Configuration

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

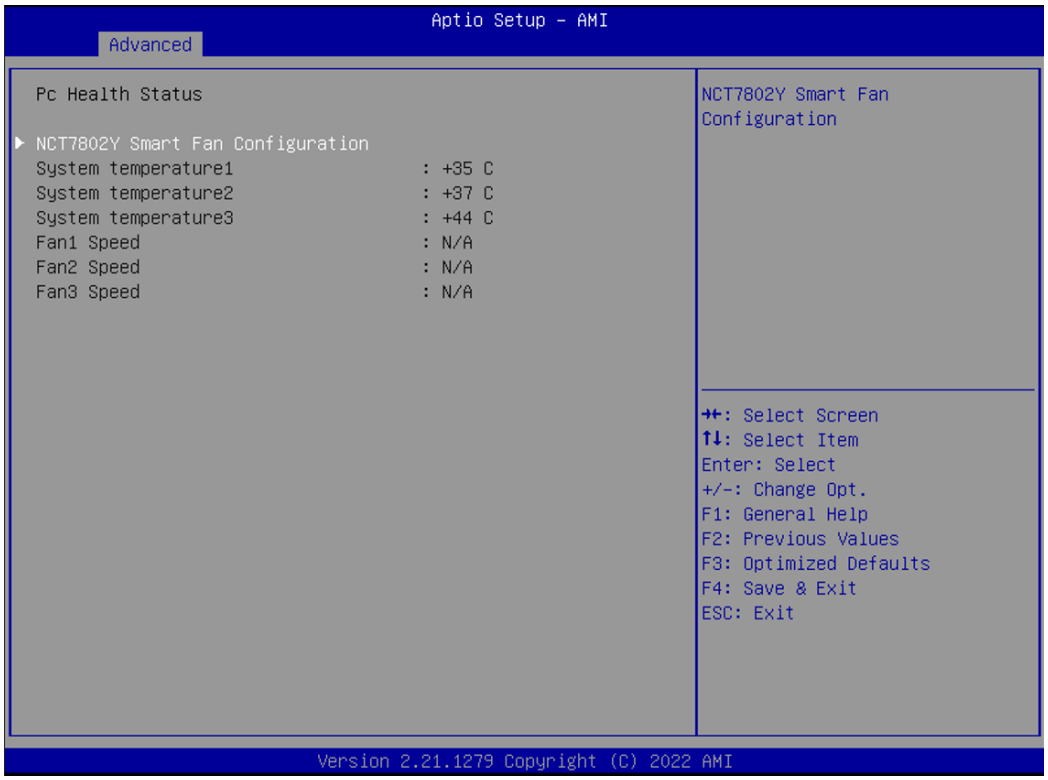


- **Trusted Computing**
  Enable or disable security device support.

- **AST2500SEC 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.



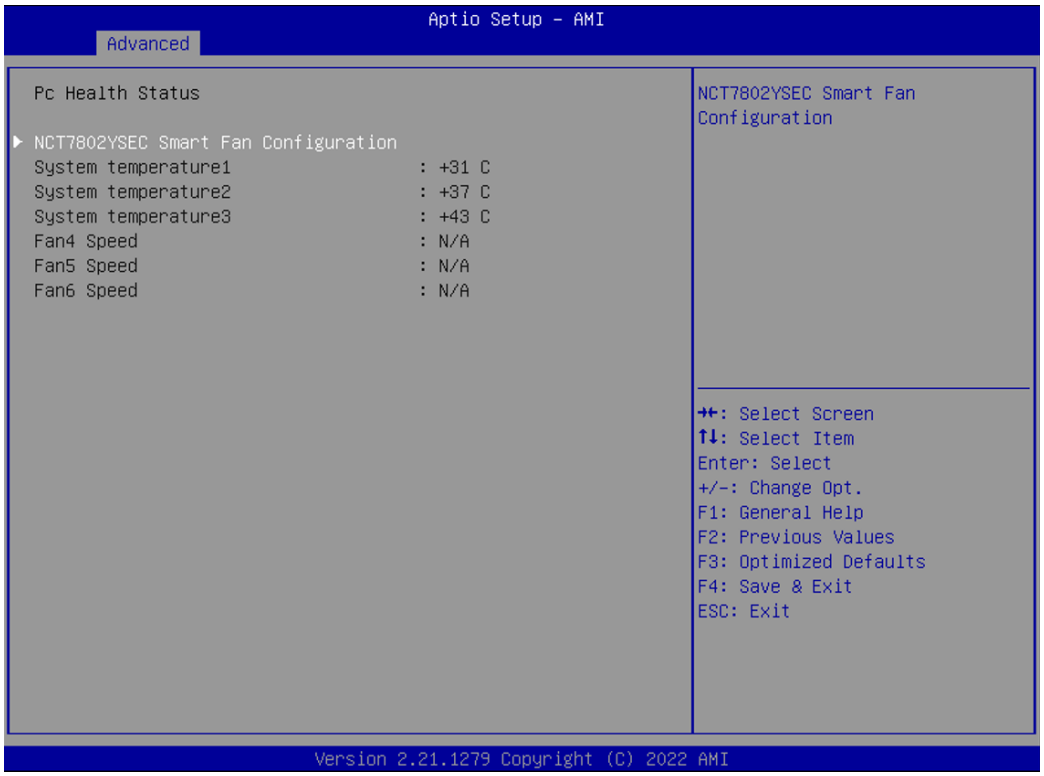
- **NCT7802Y Hardware Monitor**
  This screen monitors hardware health status.



This screen displays the temperature of system and cooling fans speed in RPM.

Note ***SYS FA = FAN1, 2 & 3.***

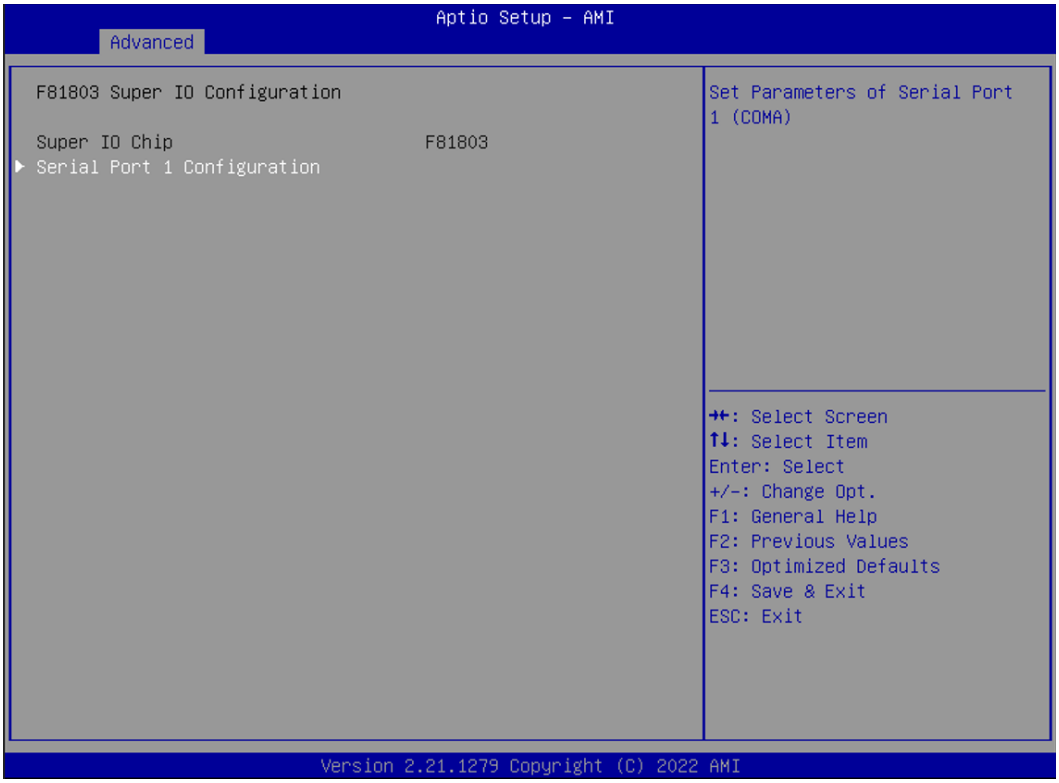
- **NCT7802YSEC Hardware Monitor**
  This screen monitors hardware health status.



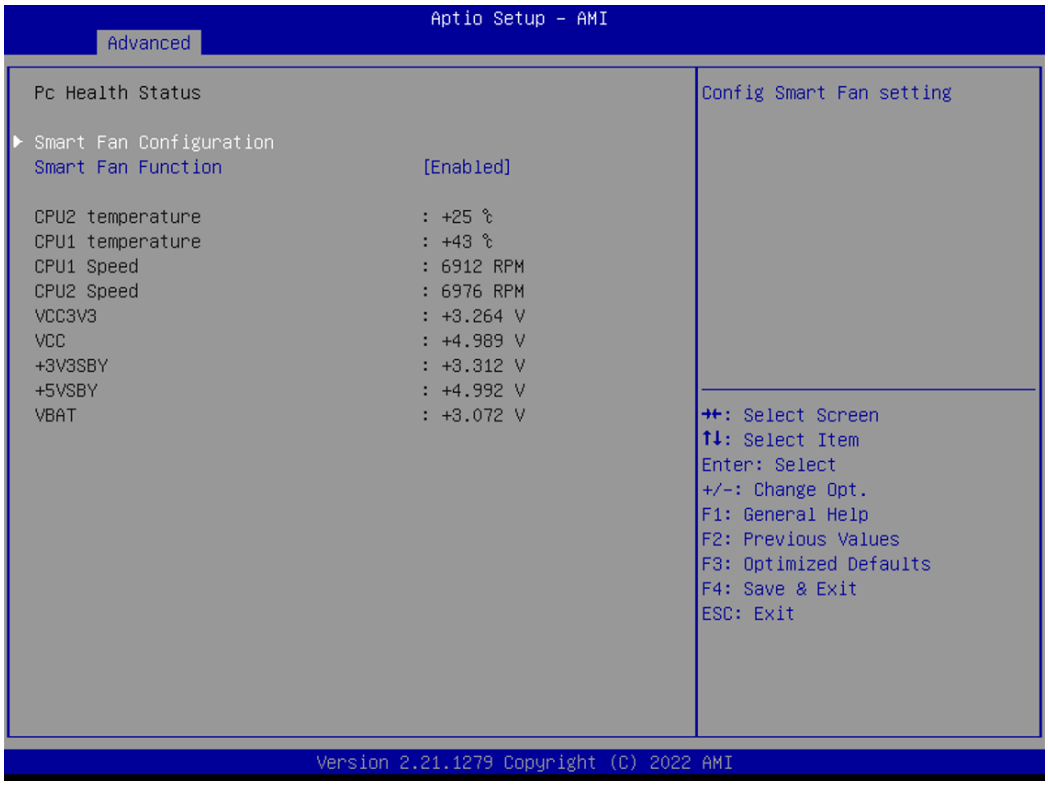
This screen displays the temperature of system and cooling fans speed in RPM.

Note ***SYS FA = FAN4, 5 & 6.***

- **F81803 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.

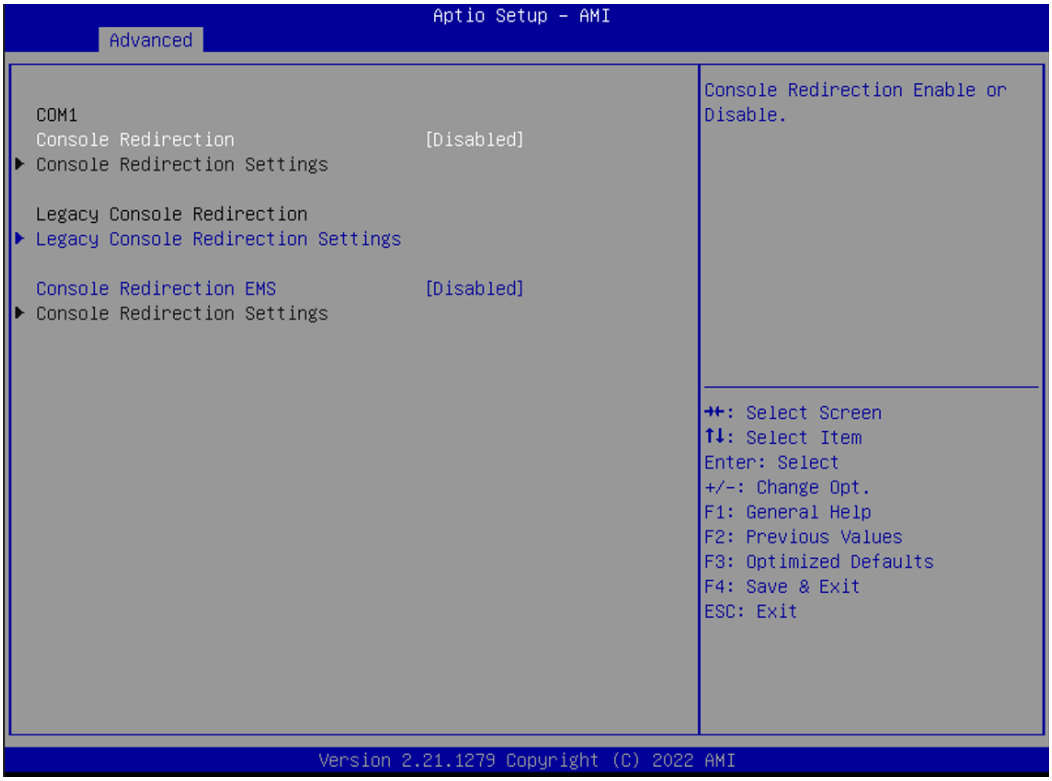


- **Hardware Monitor**
  This screen monitors hardware health status.

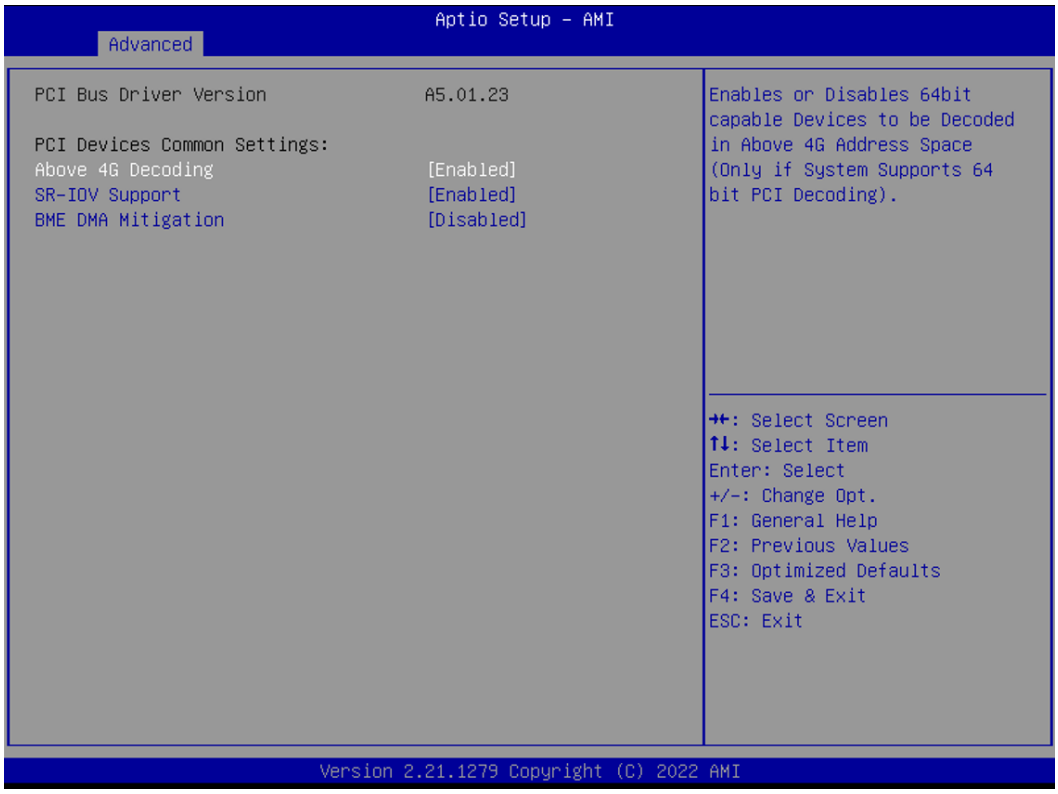


This screen displays the temperature of system and CPU, cooling fans speed in RPM and system voltages (VCC3V, VCC, +3VSBY, +5VSBY and VBAT).

- **Serial Port Console Redirection**
  This screen allows you to set serial port console redirection.



- **PCI Subsystem Settings**
  This screen allows you to set PCI Subsystem mode.

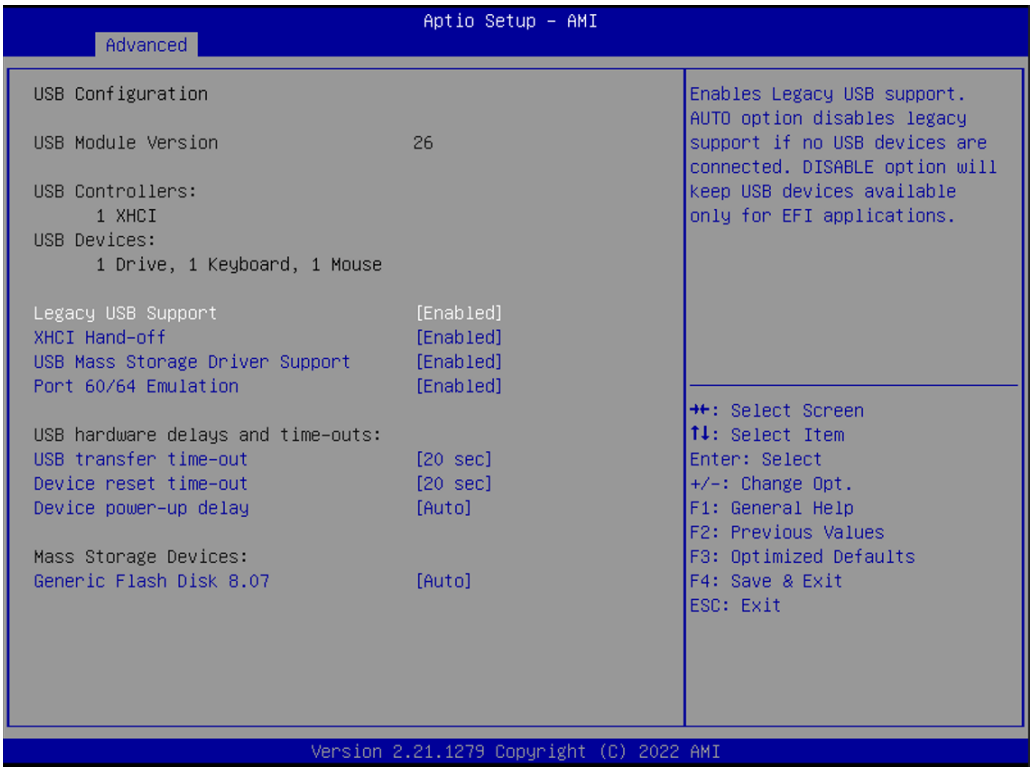


Above 4G Decoding
Ebable or disable above 4G decoding.

SR-IOV Support
Ebable or disable SR-IOV support.

BME DMA Mitigation
Ebable or disable BME DMA Mitigation.

- **USB Configuration**
  This screen shows USB configuration.



USB Devices
Displays all detected USB devices.

Legacy USB Support
Enables Legacy USB support. The AUTO option disables legacy support if no USB devices are connected.

XHCI Hand-off
This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

USB Mass Storage Driver Support
Enable/Disable USB Mass Storage Driver Support.

Port 60/64 Emulation
Enable/Disable port60/64 emulation.

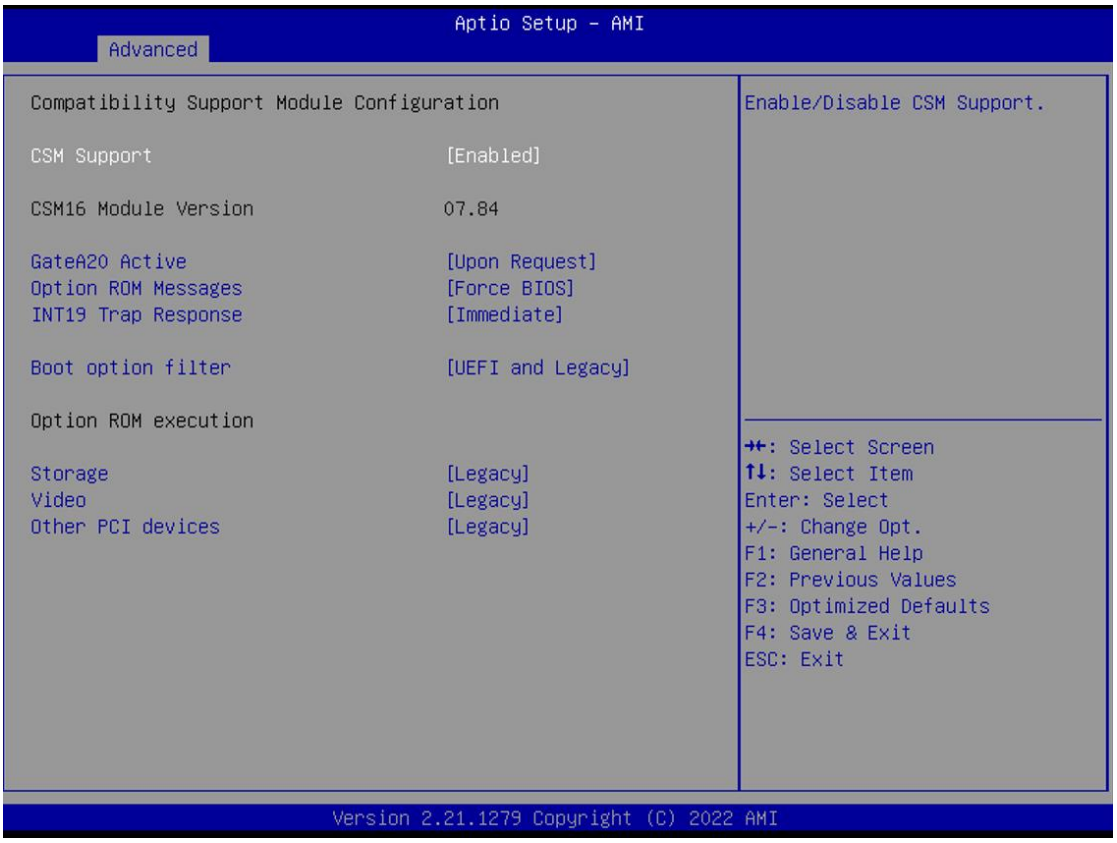
USB transfer time-out
The time-out value for Control, Bulk, and Interrupt transfers.

Device reset time-out
USB mass storage device Start Unit command time-out. 待 BIOS RD 說明

Device power-up delay
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.

- **Network Stack Configuration**
  On this screen, you can select PXE LAN port.

- **CSM (Compatibility Support Module) Configuration**
  This screen displays CSM information.



CSM Support
Enabled / Disable CSM Support.

GateA20 Active
UPON REQUEST - GA20 can be disabled using BIOS services. ALWAYS - do not allow disabling GA20. This option is useful when any RT code is executed above 1MB.

Option ROM Messages
Set display mode for Option ROM.

INT19 Trap Response
BIOS reaction on INT19 trapping by Option ROM: IMMEDIATE - execute the trap right away; POSTPONED - execute the trap during legacy boot.

Boot option filter
This option controls Legacy/UEFI ROMs priority.

Storage
Controls the execution of UEFI and Legacy Storage OpROM.

Video
Controls the execution of UEFI and Legacy Video OpROM.

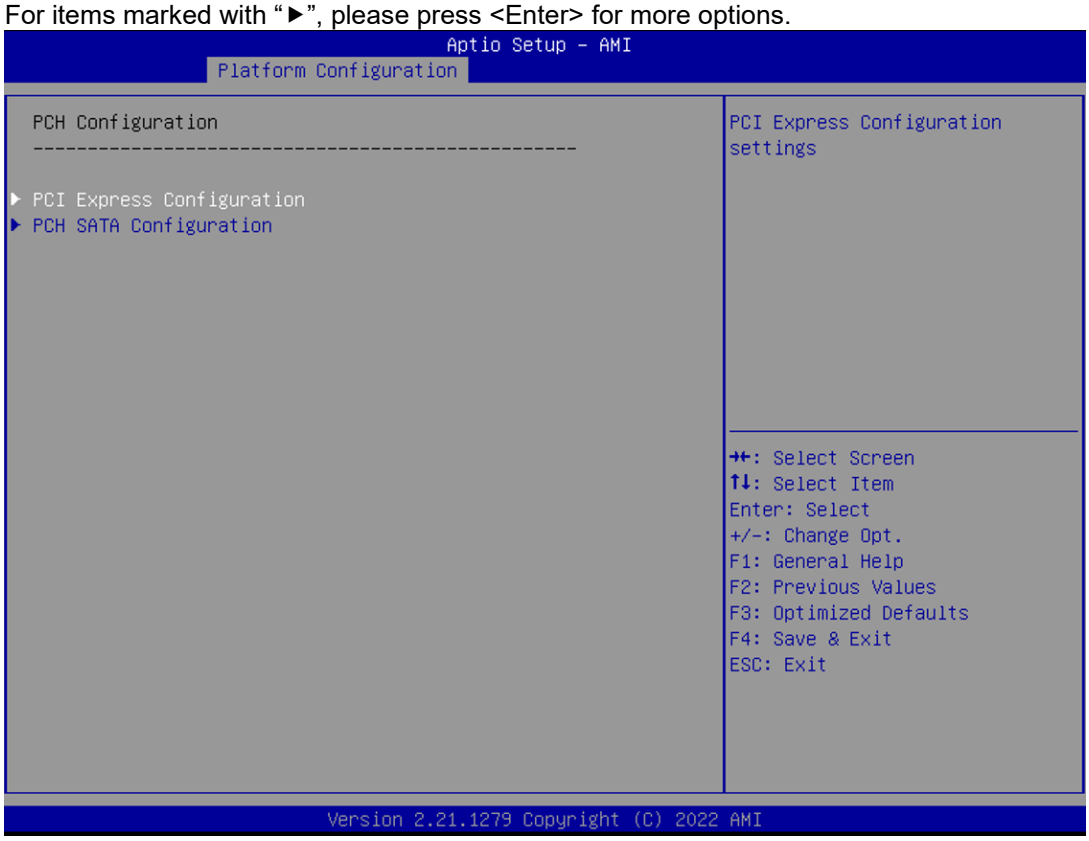
Other PCI devices
Determines OpROM execution policy for devices other than Network, Storage, or Video.

4.5 Platform Configuration

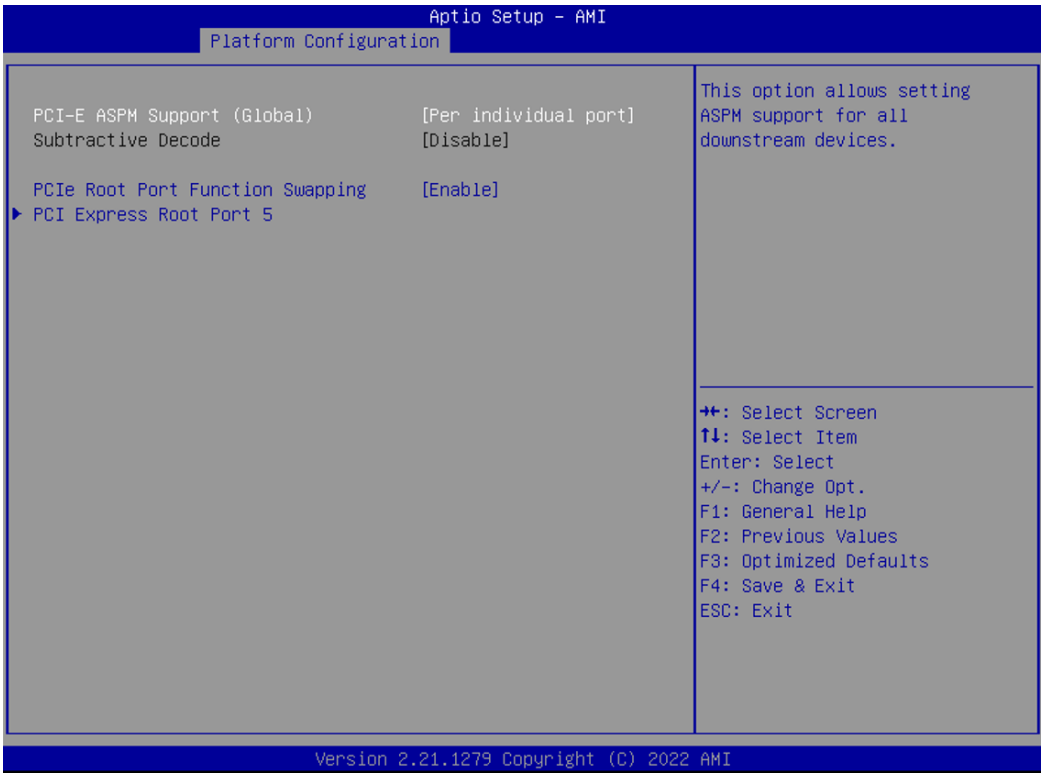
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► PCI Express Configuration
- ► PCH SATA Configuration

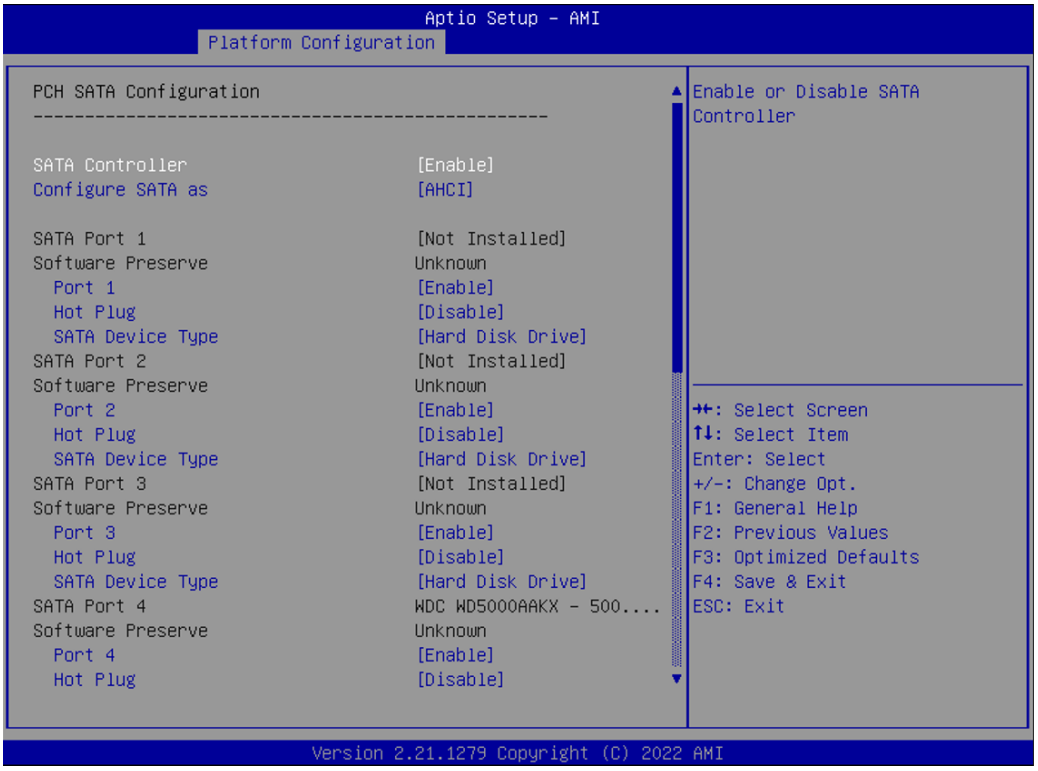
For items marked with "►", please press <Enter> for more options.



- **PCI Express Configuration**
  The screen shows PCI Express Configuration.



- **PCH SATA Configuration**
  During system boot 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.

Configuration SATA as
Determine how SATA controller(s) operate. Operation mode options are RAID and AHCI (Advanced Host Controller Interface). The default is the AHCI mode.

Port
Enable or disable the SATA port.

Hot Plug
Designates this port as Hot Pluggable.

SATA Device Type
Identify whether the SATA port is connected to a solid-state drive (SSD) or to a hard disk drive (HDD).

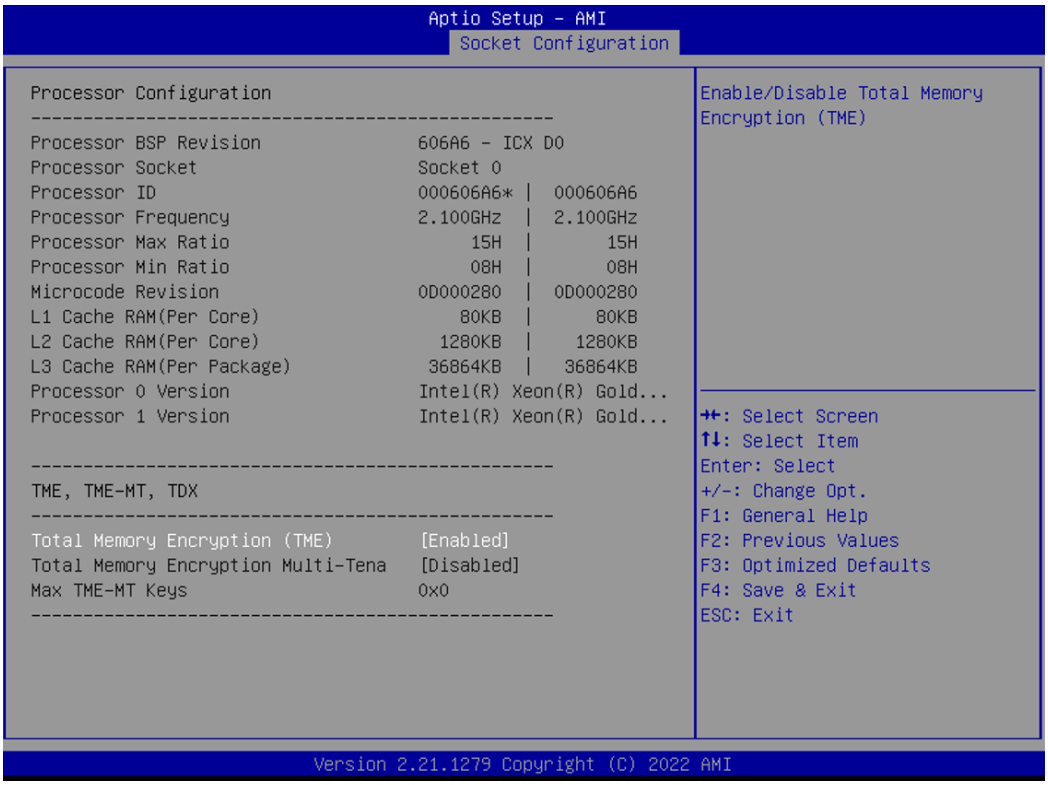
4.6 Socket Configuration

The socket configuration menu allows users to change the advanced socket settings.

- ► Processor Configuration
- ► IIO Configuration

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

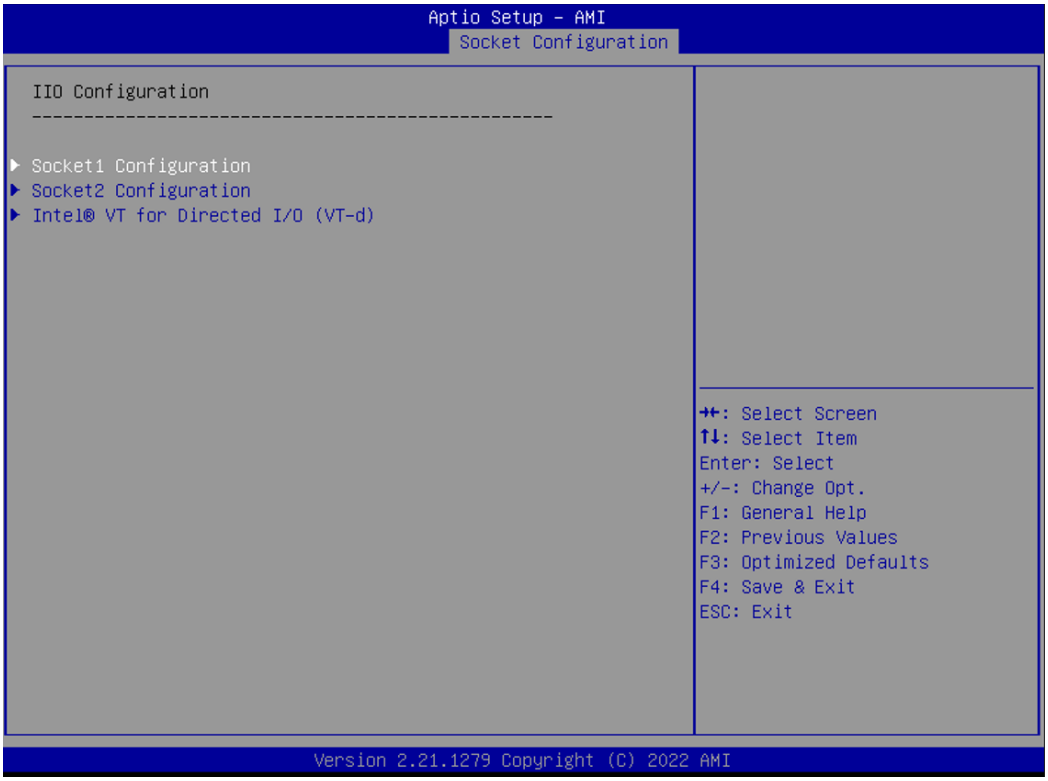
- **Processor Configuration**
  This screen shows processor information and set TME function.



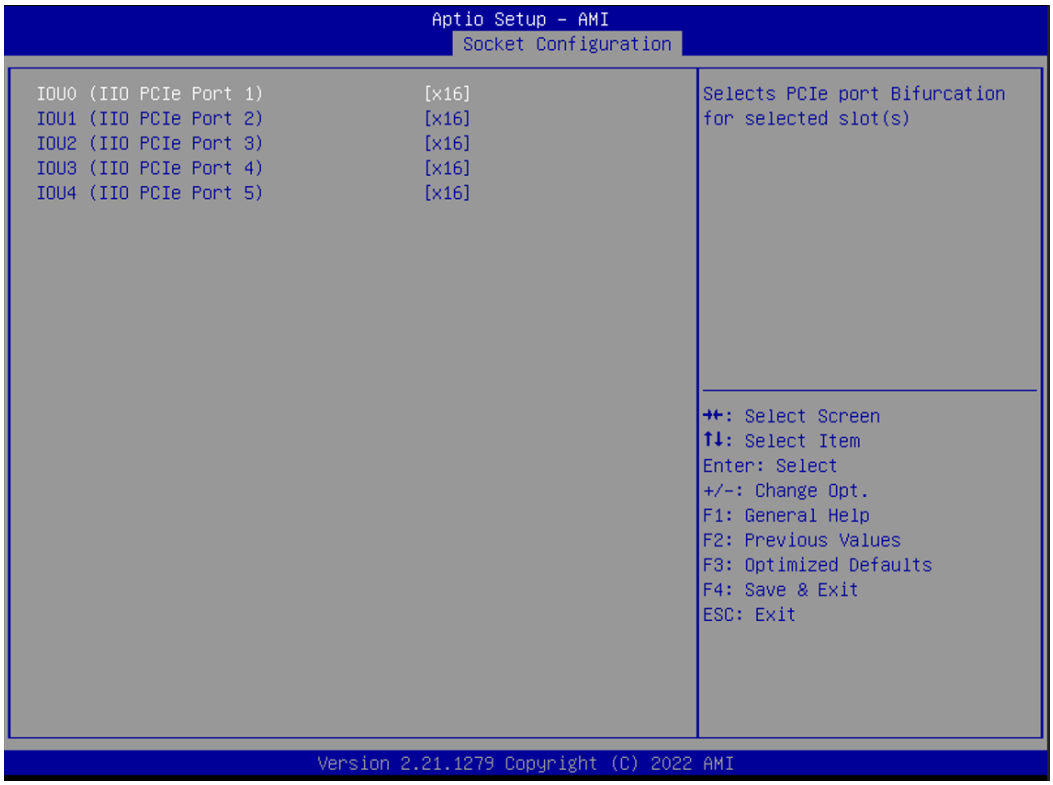
Total Memory Encryption (TME)
Enable or disable the TME function.

Total Memory Encryption Multi-Tena
Enable or disable the Multi-Tena function.

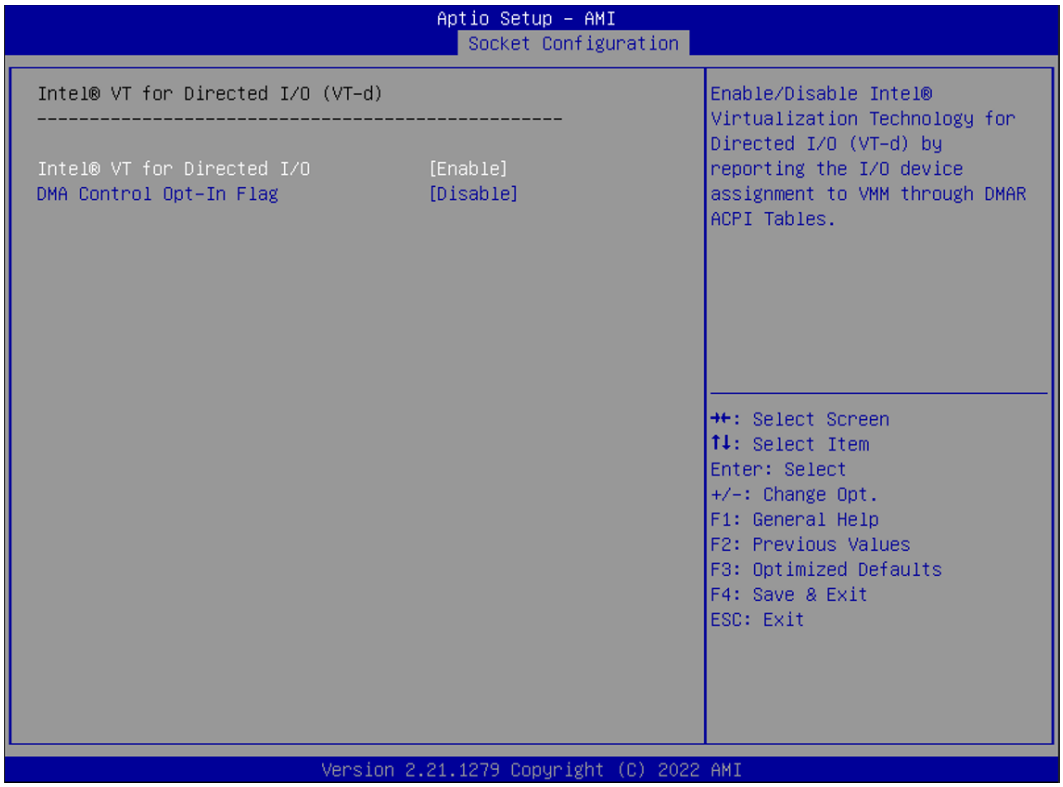
- **IIO Configuration**
  In this screen users to select options for the IIO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.



- **Socket1/2 Configuration**
  This screen shows the IO configuration of socket1/2 information.



- **Intel® VT for Directed I/O (VT-d)**
  This screen shows the VT-d function.



Intel® VT for Directed I/O
Enable or disable VT function.

DMA Control Opt-In Flag
Enable or disable DMA function.

4.7 Server Mgmt

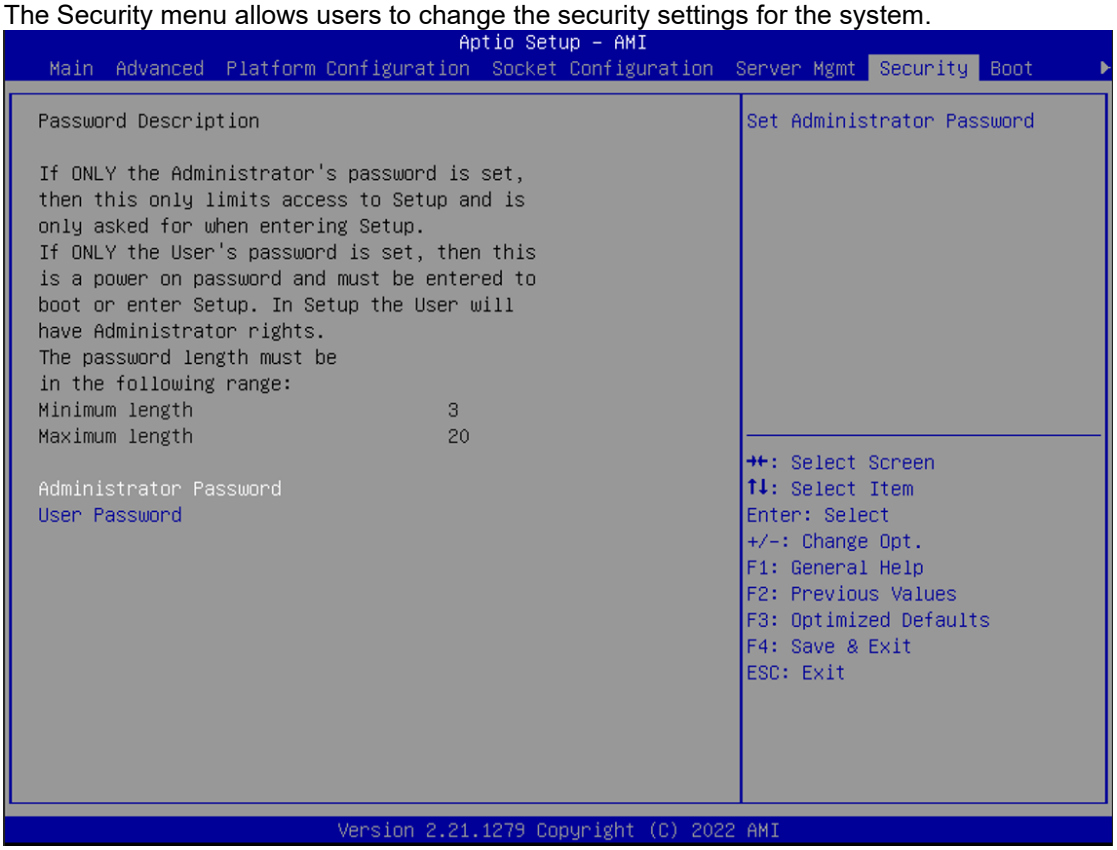
The Server Mgmt allows users to change the BMC settings for the system.

BMC Support
Enable or disable BMC support function

BMC network configuration
Displays BMC support configuration information.

4.8 Security Menu

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

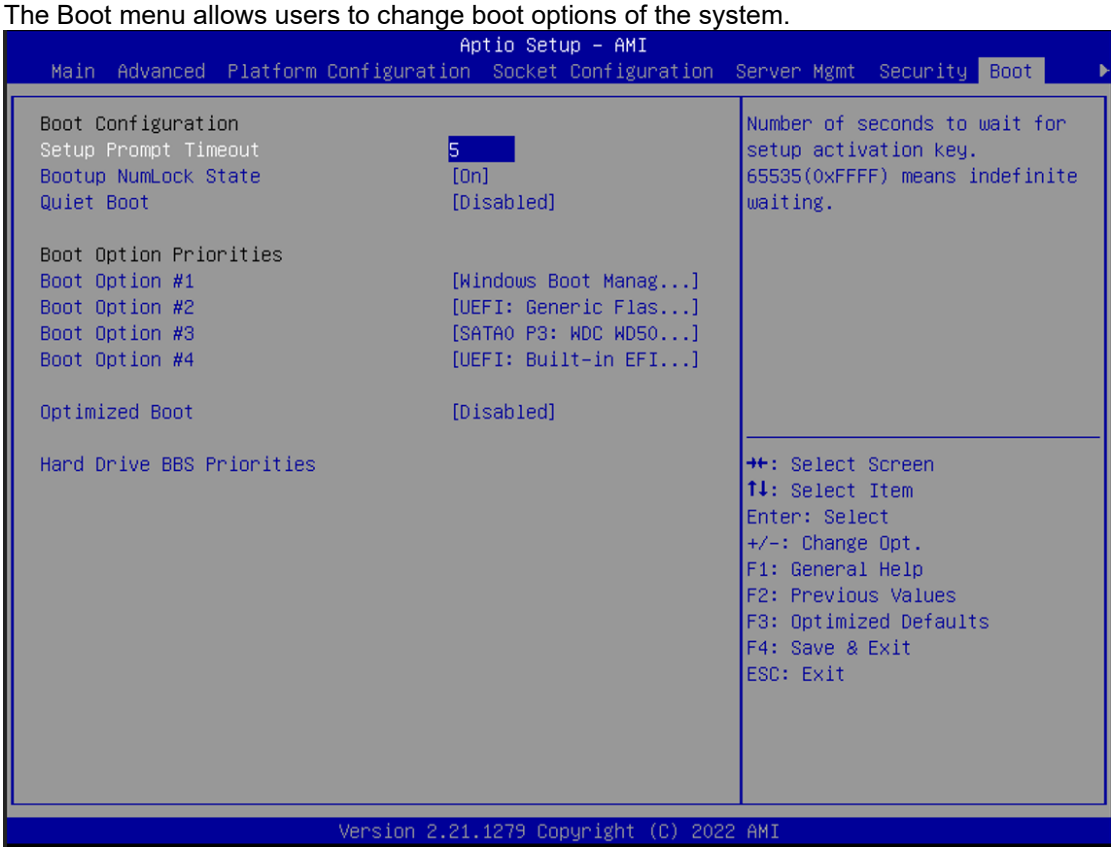


Administrator Password
This item indicates whether an administrator password has been set (installed or uninstalled).

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

4.9 Boot Menu

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



Setup Prompt Timeout
Enter the number of seconds to wait for the setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State
Use this item to select the power-on state for the keyboard NumLock.

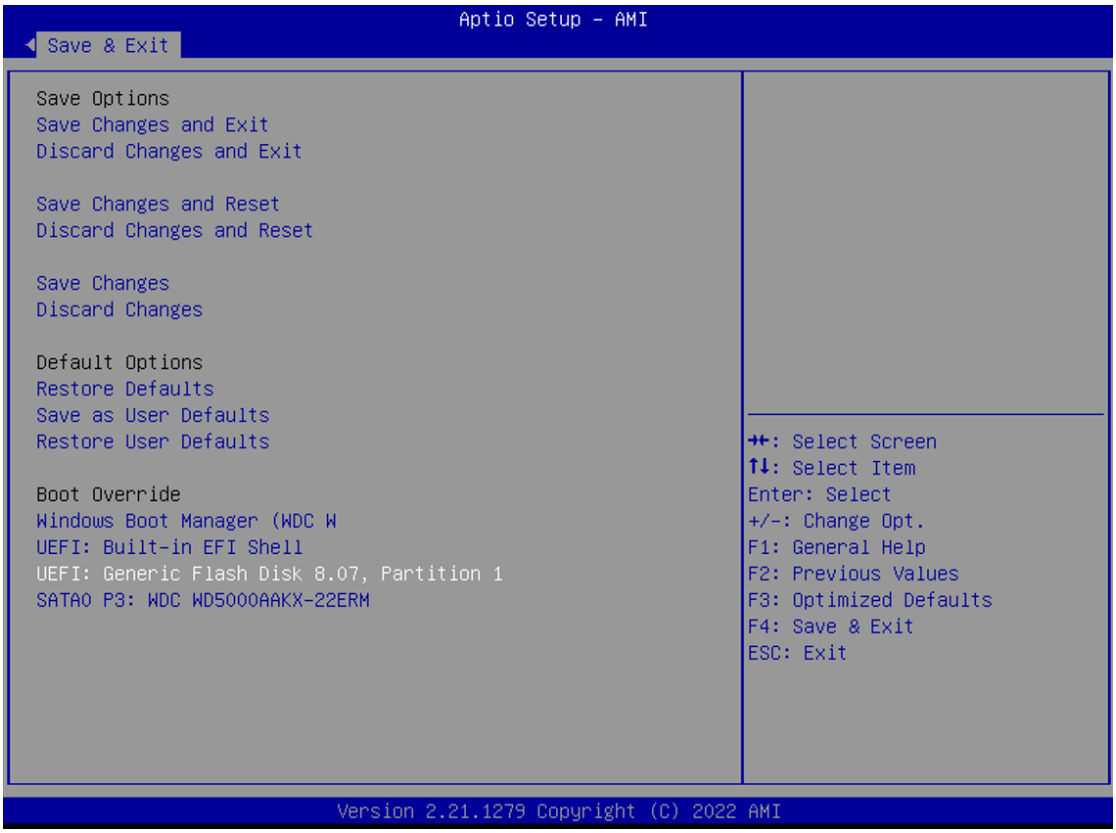
Quiet Boot
Select to display either POST output messages or a splash screen during boot-up.

Boot Option Priorities
These are settings for boot priority. Specify the boot device priority sequence from the available devices.

Optimized Boot
When the system BIOS boots using native UEFI graphic drivers, use this function to control and enable for compatibility with VMware ESXi on a system configured for UEFI Boot Mode, and to enable and use Secure Boot Mode

4.10 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 you have completed the system configuration changes, 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 you have completed the system configuration changes, 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 you have completed the system configuration changes, 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
It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

Save as User Defaults
Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

Restore User Defaults
It automatically sets all Setup options to a complete set of User Defaults when you select this option. 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.

Appendix A
Watchdog Timer

About Watchdog Timer

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

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.

How to Use Watchdog Timer

Start
↓
1. Enable configuration:
-O 2E 87
-O 2E 87
↓
2. Select logic device:
-O 2E 07
-O 2F 07
↓
3. Enable WDT:
-O 2E 30
-O 2F 01
↓
4. Activate WDT:
-O 2E F0
-O 2F 80
↓
5. Set base timer:
-O 2E F6
-O 2F 0A ; Set reset time. Ex: A->reset time=10sec
↓
6. Set timer unit (second or minute):
-O 2E F5
-O 2F 71 ; Set timer unit.
; Ex: 1->timer unit=second, 9->timer unit=minute

- Timeout Value Range
  - 1 to 255
  - Minute / Second

Note:

*If **N**=00h, the time base is set to second.*
***M** = time value*
00h: Time-out Disable
01h: Time-out occurs after 1 second
02h: Time-out occurs after 2 seconds
03h: Time-out occurs after 3 seconds
.
.
FFh: Time-out occurs after 255 seconds

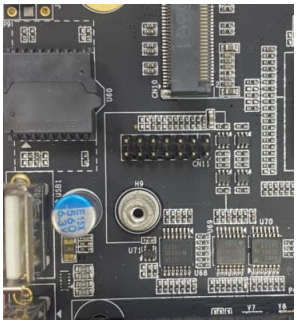
*If **N**=08h, the time base is set to minute.*
***M** = time value*
00h: Time-out Disable
01h: Time-out occurs after 1 minute
02h: Time-out occurs after 2 minutes
03h: Time-out occurs after 3 minutes
.
.
FFh: Time-out occurs after 255 minutes

Appendix B
TPM Module Installation

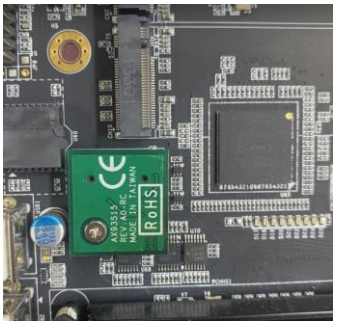
The TPM 2.0 (Trusted Platform Module 2.0) module features a modularized design compatible with the IMB760 and provides enhanced hardware security for the computer. In this appendix you will learn how to install the TPM 2.0 module into the IMB760. Please read and follow the instructions below carefully.

1. Insert TPM module into the SPI interface of the motherboard, as illustrated below.

AX93515 TPM module



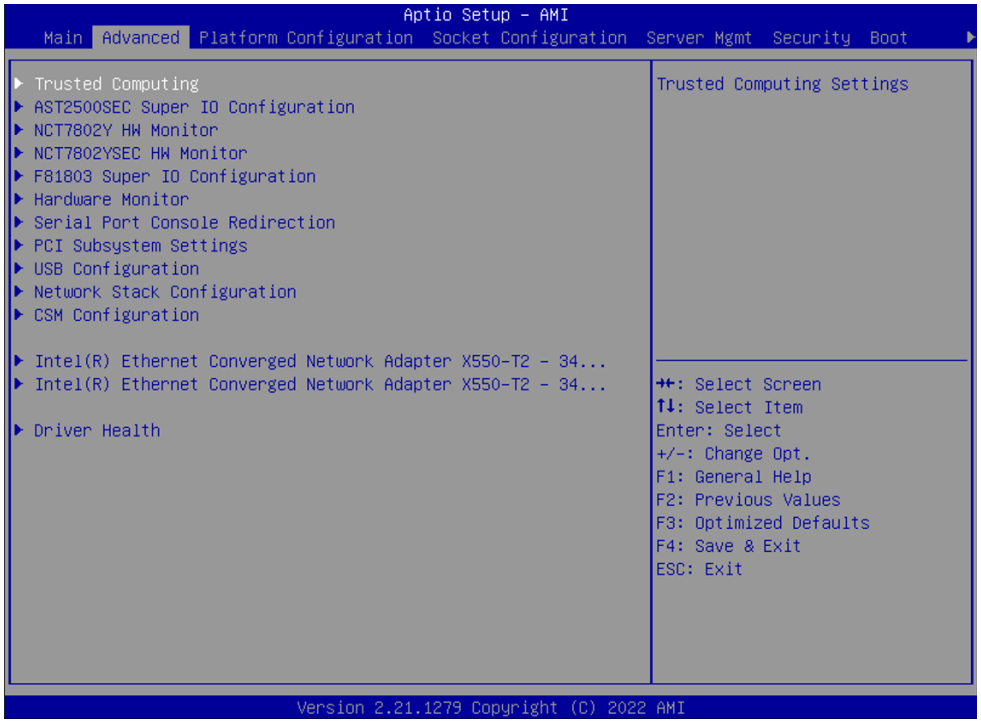
TPM SPI interface



TPM module put in place

2. There are two ways to confirm whether the TPM Module is installed successfully or not:

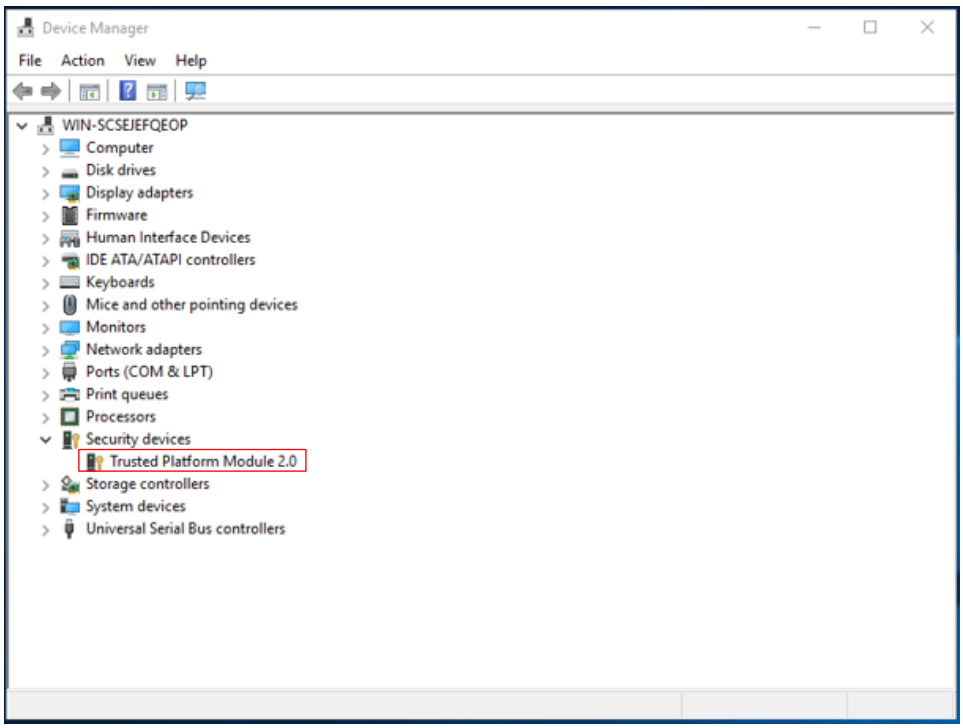
   a. Enter the BIOS setup menu and go to Trusted Computing. The first line will show "TPM2.0 Device Found".



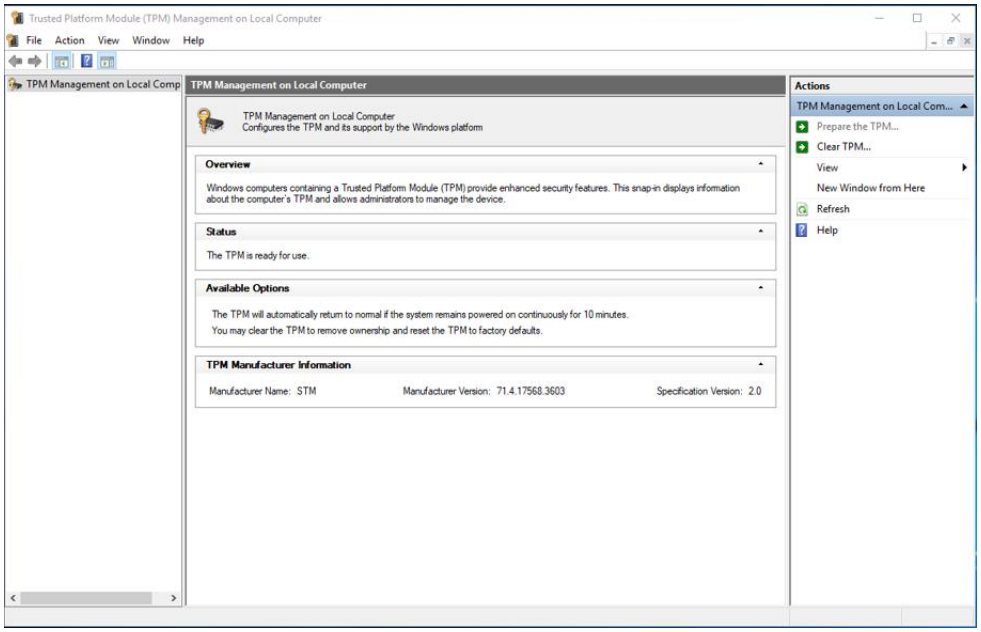
(In the Advance menu, go to Trusted Computing)

(In the Trusted Computing section, the first line will show “TPM2.0 Device Found”, if installation is successful.)

b. In the Windows Server 2019 OS environment, enter Device Manager, and select the item of Security devices. The screen will show “Trusted Platform Module 2.0” if installation is successful.



c. In the Windows Server 2019 OS environment, enter Control Panel, select the item of BitLocker Drive Encryption, and enter TPM Administration. The screen will show the information below if installation is successful.



This page is intentionally left blank.

Appendix C
Configuring SATA for RAID

Configuring SATA Hard Drive(s) for RAID Function

Before you begin the SATA configuration, please prepare:

- Two SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). If you do not want to create RAID with the SATA controller, you may prepare only one hard drive.

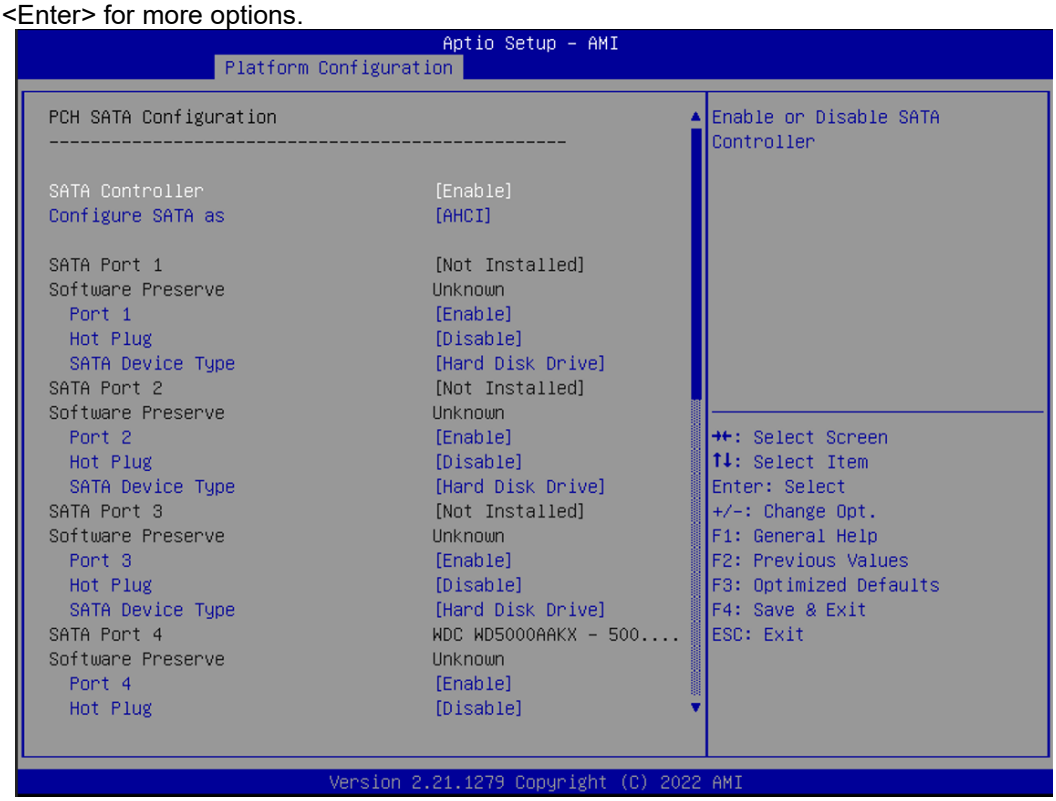
Please follow up the steps below to configure SATA hard drive(s):

1. Install SATA hard drive(s) in your system.
2. Enter the BIOS Setup to configure SATA controller mode and boot sequence.
3. Configure RAID by the RAID BIOS.

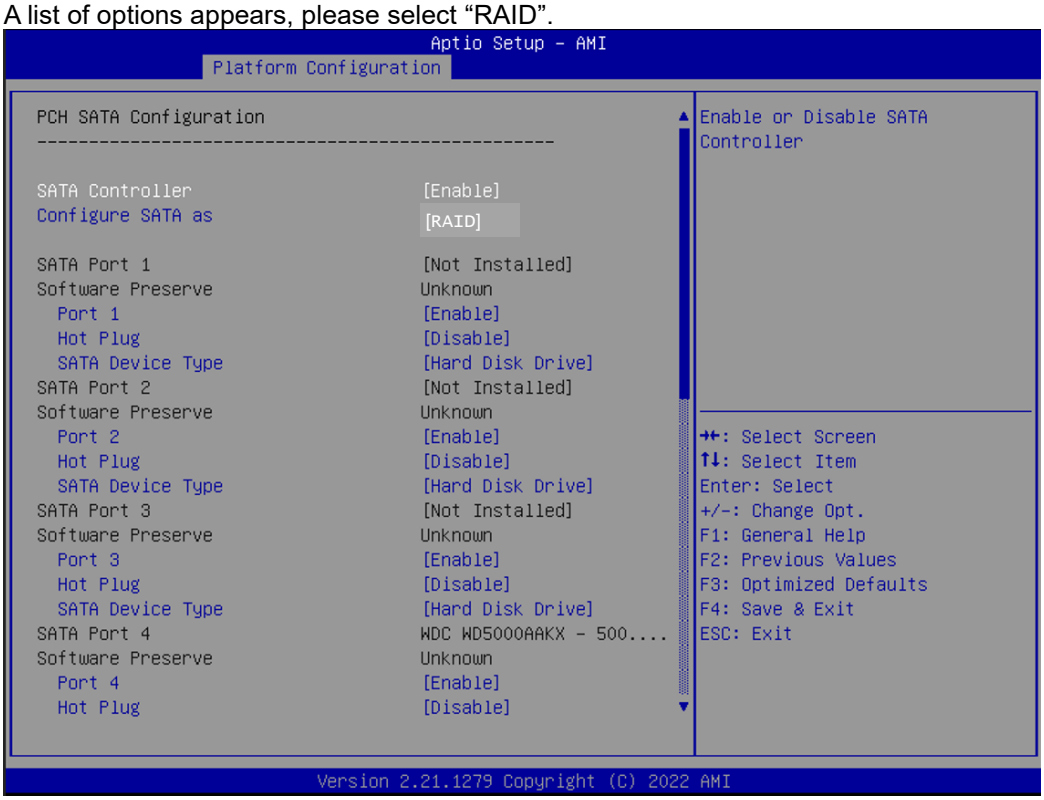
1. Installing SATA hard drive(s) in your system.
Connect one end of the SATA signal cable to the rear of the SATA hard drive, and the other end to available SATA port(s) on the board. Then, connect the power connector of power supply to the hard drive.

2. Configuring SATA controller mode and boot sequence by the BIOS Setup.
You have to make sure whether the SATA controller is configured correctly by system BIOS Setup and set up BIOS boot sequence for the SATA hard drive(s).

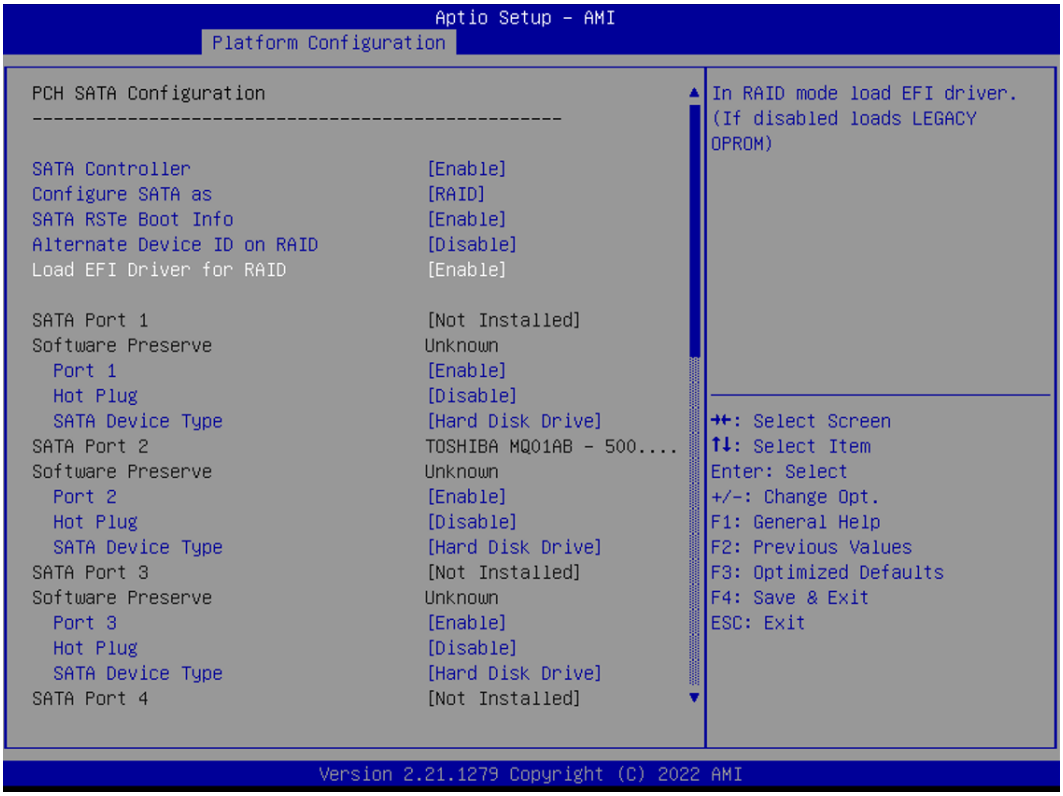
2.1. Turn on your system, and then press the <Del> button to enter BIOS Setup during running POST (Power-On Self Test). If you want to create RAID, just go to the Platform configuration/PCH SATA Configuration, select the “Configuration SATA as”, and press <Enter> for more options.



A list of options appears, please select “RAID”.

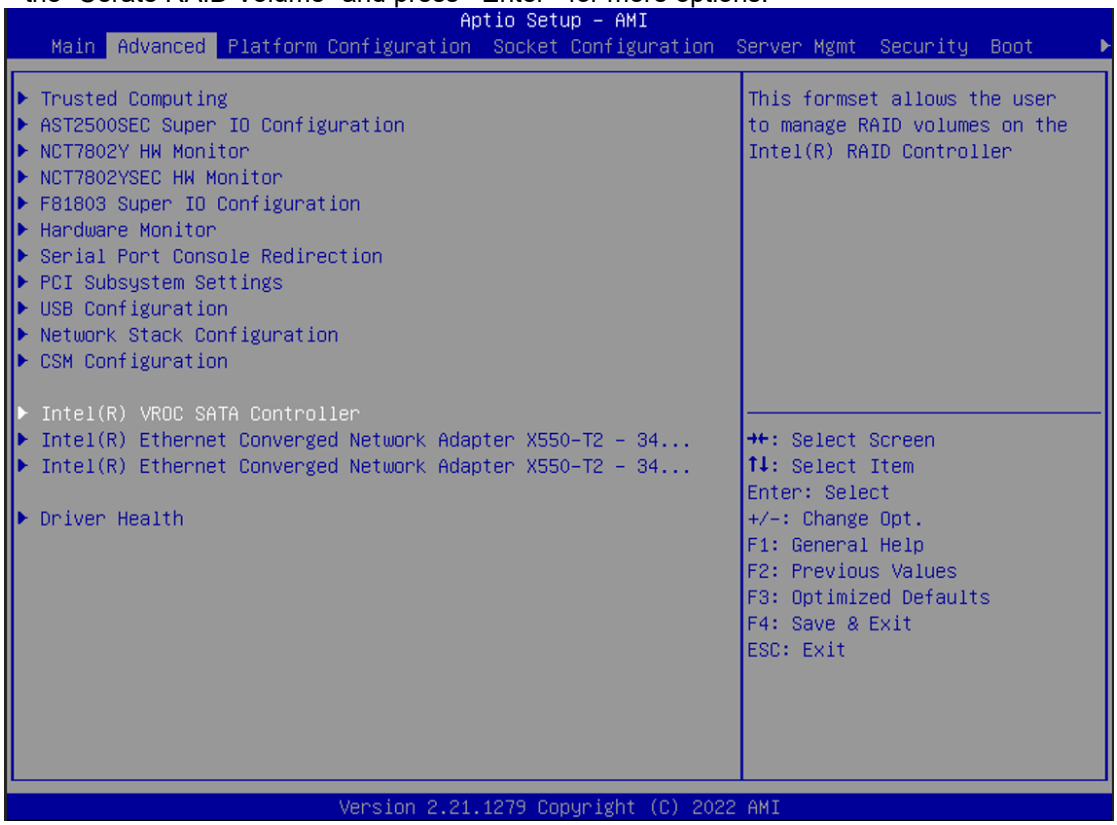


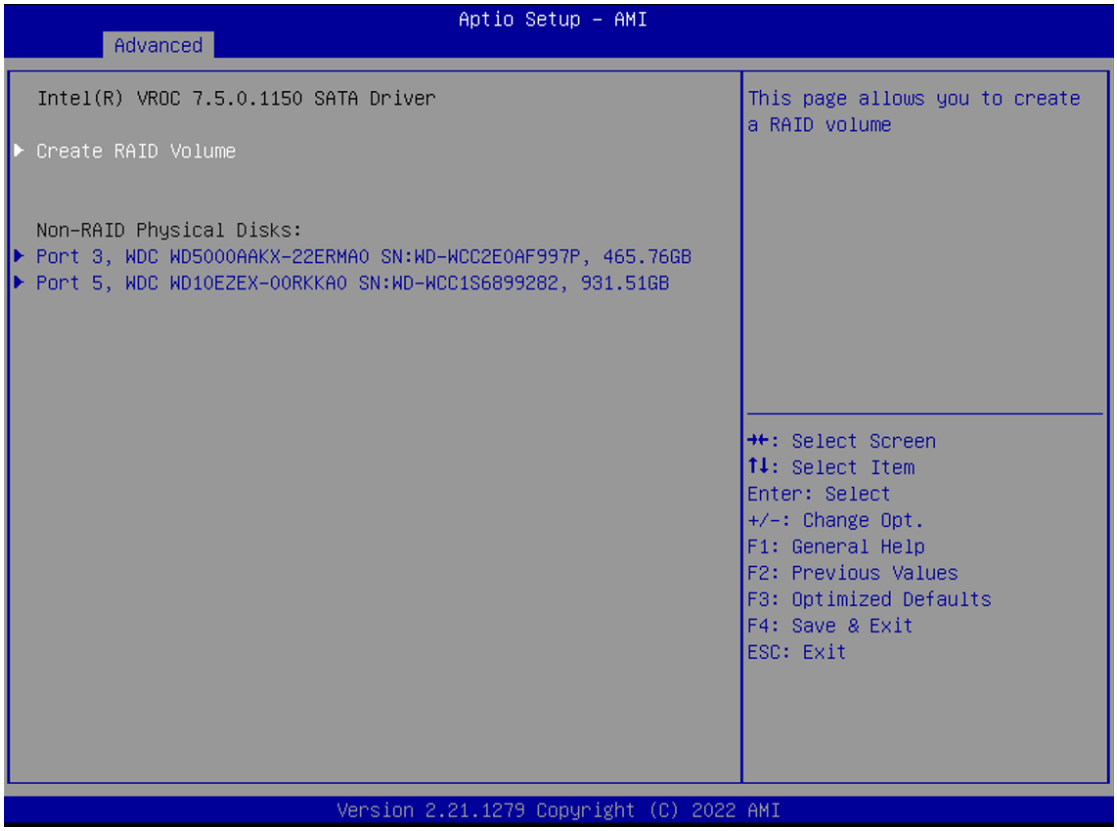
2.2. Enable the Load EFI Driver for RAID.



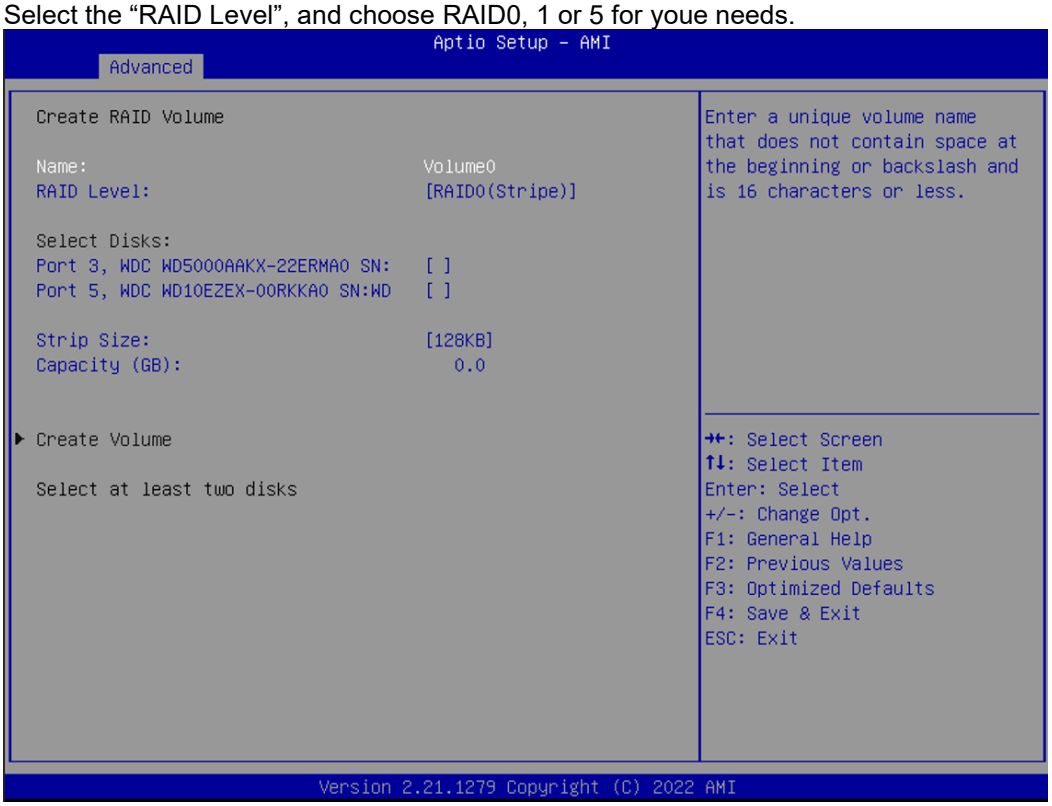
2.3. Under the Boot Settings menu, set DVD-ROM or USB flash drice for First Boot Option to boot DVD-ROM or USB flash drice after system restarts.

2.4. Go to the Advanced screen, select the “Intel(R) VROC SATA Controller”; furtherly, select the ”Cerate RAID Volume” and press <Enter> for more options.





2.5. Select the “RAID Level”, and choose RAID0, 1 or 5 for youe needs.



2.6. Save and exit the BIOS Setup.

This page is intentionally left blank.

Appendix D
Digital I/O

Digital I/O Software Programming

- I2C to GPIO PCA9554PW GPIO[3:0] is Output, GPIO[7:4] is Input.
- I2C address: 0b0100100x.
- IOBASE: 0xF040
- Registers:

Command byte

Command	Protocol	Function
0	Read byte	Input port register
1	Read/write byte	Output port register
2	Read/write byte	Polarity inversion register
3	Read/write byte	Configuration register

The command byte is the first byte to follow the address byte during a write transmission. It is used as a pointer to determine which of the following registers will be written or read.

Register 0: Input port register.
This register is a read-only port. It reflects the incoming logic levels of the pins, regardless of whether the pin is defined as an input or an output by Register 3. Writes to this register have no effect.

The default 'X' is determined by the externally applied logic level, normally '1' when no external signal is externally applied because of the internal pull-up resistors.

Bit	Symbol	Access	Value	Description
7	I7	Read only	X	Determined by externally applied logic level.
6	I6	Read only	X	
5	I5	Read only	X	
4	I4	Read only	X	
3	I3	Read only	X	
2	I2	Read only	X	
1	I1	Read only	X	
0	I0	Read only	X	

Register 1: Output port register.
This register reflects the outgoing logic levels of the pins defined as outputs by Register 3. Bit values in this register have no effect on pins defined as inputs. Reads from this register return the value that is in the flip-flop controlling the output selection, not the actual pin value.

Bit	Symbol	Access	Value	Description
7	O7	R	1*	Reflects outgoing logic levels of pins defined as outputs by Register 3.
6	O6	R	1*	
5	O5	R	1*	
4	O4	R	1*	
3	O3	R	1*	
2	O2	R	1*	
1	O1	R	1*	
0	O0	R	1*	

* : Default value

Register 2: Configuration register.
This register configures the directions of the I/O pins. If a bit in this register is set, the corresponding port pin is enabled as an input with high-impedance output driver. If a bit in this register is cleared, the corresponding port pin is enabled as an output. At reset, the I/Os are configured as inputs with a weak pull-up to VDD.

Bit	Symbol	Access	Value	Description
7	C7	R/W	1*	Configure the directions of the I/O pins. 0 = Corresponding port pin enabled as an output. 1 = Corresponding port pin configured as input (default value).
6	C6	R/W	1*	
5	C5	R/W	1*	
4	C4	R/W	1*	
3	C3	R/W	1*	
2	C2	R/W	1*	
1	C1	R/W	1*	
0	C0	R/W	1*	

* : Default value