USER'S MANUAL

SHB160 Series

Intel® Socket 1700 Core™ i7/ i5/ i3 Processors PICMG® v1.3 Full-size CPU Card

User's Manual

AXIOMTEK®

www.axiomtek.com

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CAUTION

Wrong type of batteries may cause 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.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with 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. Doing so can discharge static electricity from your body.
- Wear a grounding wrist strap, available from most electronic component stores, when handling boards and components.

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Section 1
Introduction

The SHB160 PICMG® v1.3 full-size Single Board Computer supports an LGA1700 socket for Intel® Core i7/ i5/ i3 desktop processors. The transfer rate reaches 4400 MHz. The board integrates an Intel® R680E/H610E chipset that delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions. There are four 288-pin DDR5 DIMM sockets for dual channel DDR5 4800 MHz with maximum memory capacity up to 128GB support ECC(R680E) /Non ECC memory. The board also features dual 2.5 Gigabit Ethernet, SATA 6Gbps with SATA RAID 0/1/5/10(R680E) by PCH, USB 2.0, and USB 3.2 (Gen1x1/Gen2x1) high speed compliant ports and built-in Intel® HD Audio Digital Header to achieve the best stability and reliability for industrial applications.

1.1 Features

- LGA1700 socket 12th/13th Generation Intel® Core processors up to 125W
- Intel® R680E/H610E PCH
- 4 DDR5 unbuffered DIMM max. up to 128GB memory capacity
- Intel® iAMT (R680E/H610 PCH) and TPM2.0 module supported (optional)
- PCIe Gen. 4 at 16GT/s supported
- USB 3.2 (Gen2x1 , 10Gbps) supported

1.2 Specifications

- **CPU**
  - LGA1700 socket 12th/13th Generation Intel® Core™ i7/i5/i3, Pentium® and Celeron® processors (Raptor Lake) up to 125W

- **System Chipset**
  - Intel® R680E
  - Intel® H610E

- **CPU Socket**
  - LGA1700 socket

- **DRAM Transfer Rate**
  - 4400 MHz

- **BIOS**
  - AMI BIOS via SPI interface with socket

- **System Memory**
  - Four 288-pin DDR5 4400MHz DIMM sockets
  - Maximum up to 128GB DDR5 memory
  - Supports the memory with ECC function (R680E Only)

- **L1, L2, L3 Cache: Integrated in CPU**

- **Onboard Multi I/O**
  - Serial ports: two RS-232/422/485 port in 2x5-pin (pitch=2.54mm) box-header (COM 1/2) and two RS-232 ports in 2x5-pin (pitch=2.54mm) box-header (COM 3/4)
  - Parallel Port: one 26-pin 2.54-pitch box-header; SPP/EPP/ECP supported

- **USB Interface**

  R680E
  - Four USB3.2 (Gen1x1) ports on internal box header
  - Two USB3.2 (Gen2x1) ports on rear I/O
  - Two USB2.0 ports on internal pin header
  - One USB2.0 ports with 180D internal type A
  - Four USB2.0 ports via SHB connector-C via golden fingers

  H610E
  - Two USB3.2 (Gen1x1) ports on internal box header
  - Two USB3.2 (Gen2x1) ports on rear I/O
  - Two USB2.0 ports on internal pin header
  - Four USB2.0 ports via SHB connector-C via golden fingers

- **Onboard Graphics**
  - Integrated Intel® UHD graphics supporting DVI-I
  - Integrated Intel® UHD graphics supporting DisplayPort (internal header)
  - DVI/VGA: Max. resolution is 1920x1200 at 60 Hz.
  - Internal DP1.4 Connector: Max resolution is 4096 x 2160 at 60Hz. Must use with Axiomtek DP kit.

- **Ethernet**
  - LAN1/LAN2: Intel® i225LM with iAMT / Intel® i225V Ethernet controller
  - Support 2500/1000/100/10Mbps Gigabit/Fast Ethernet

- **Storage**
  - Serial ATA:
    Six SATA 3.0 ports (6Gbps performance) with SATA RAID 0/1/5/10 (R680E)
    Four SATA 3.0 ports (6Gbps performance) (H610E)
  - One M.2 2280 Key M (R680E Only)

- **Audio**
  - Supports HD audio interface as a 2x8 pin header
  - Supports audio kit AX93242 with MIC-in/Line-in/speaker-out (option kit)

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels

- **Hardware Monitor**
  - Monitoring temperatures, voltages and cooling fan status

- **Dimensions**
  - 338mm x 126mm

- **Expansion Interface**
  - One PCI-Express x16 (Gen.4)
  - One PCI-Express x4 (or four PCI-Express x1) (Gen.4)
  - Four PCI

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

1.3 Packing list

- 1 x slot CPU card
- 1 x Driver DVD
- 1 x SATA cable
- 1 x COM cable

SHB160 series required specially designed cooler "711000001X00", please order as set

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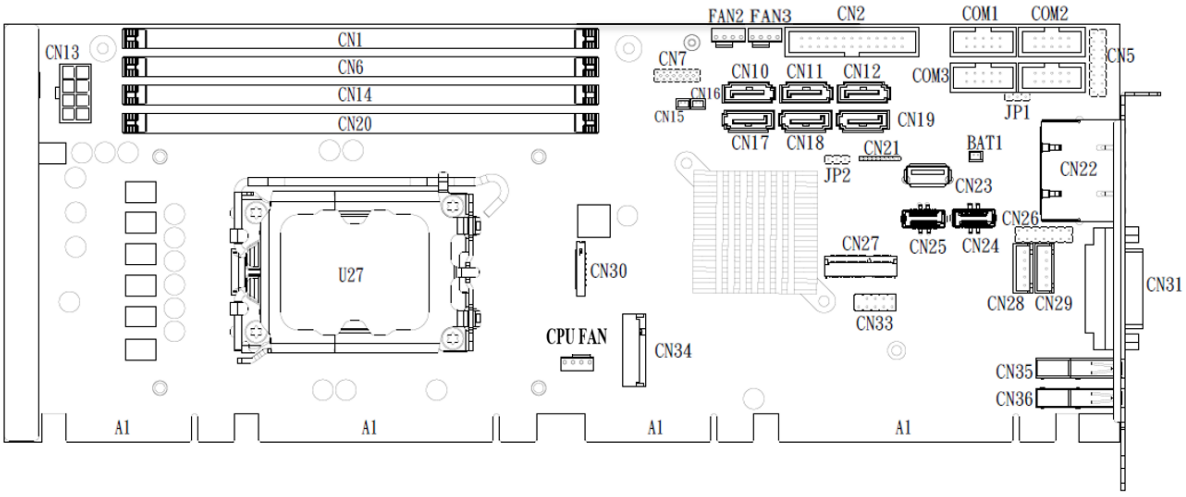
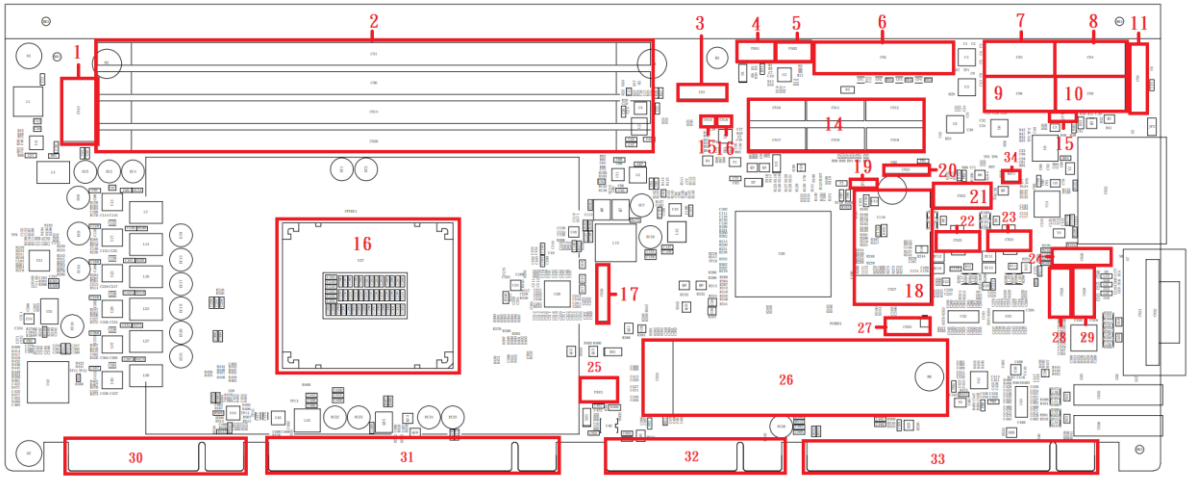
Section 2
Board and Pin Assignments

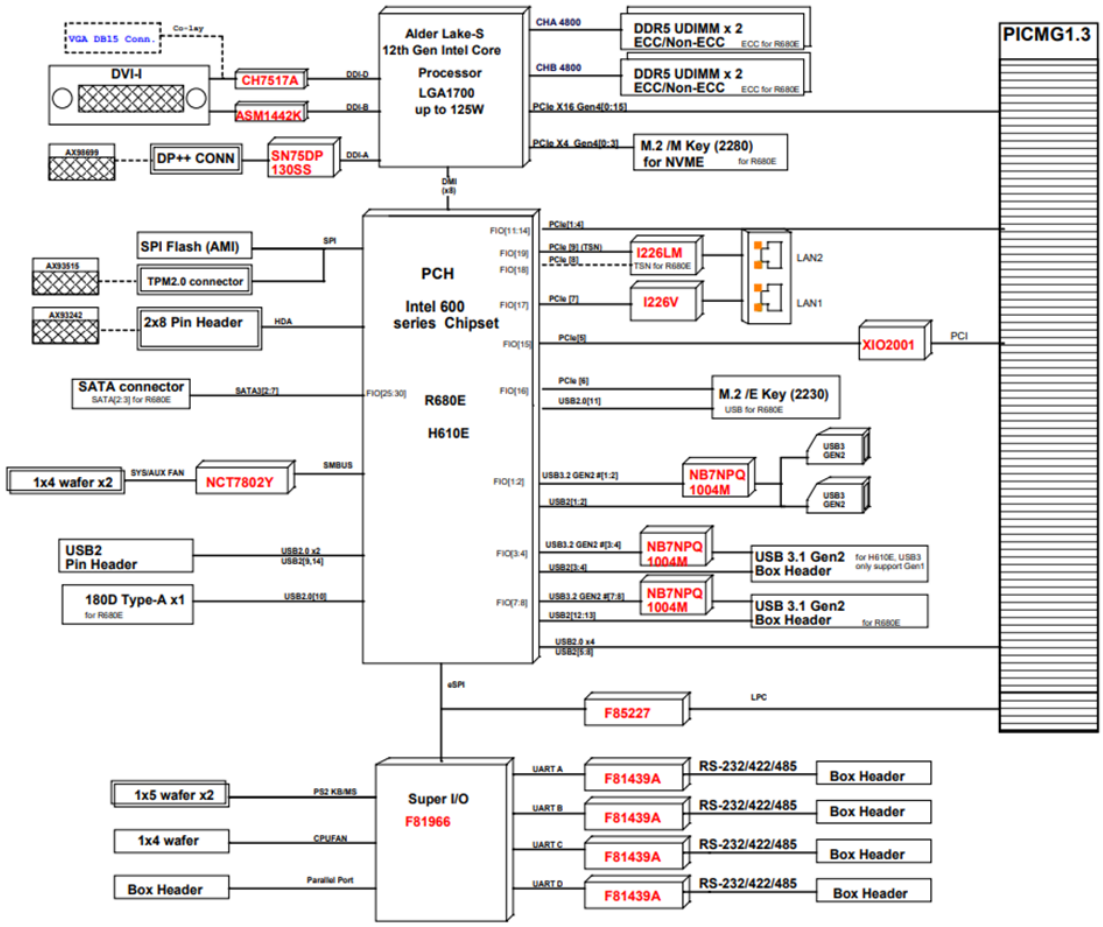
2.1 Board Layout





Top View

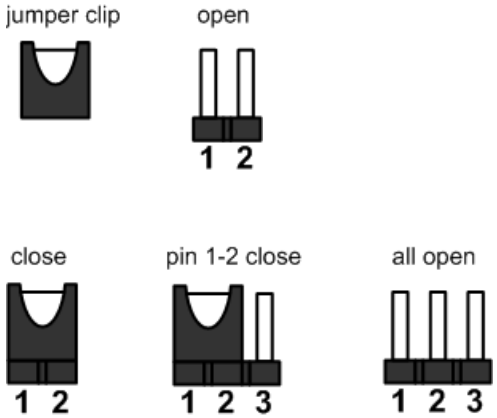
2.2 Block Diagram



R680E

2.3 Jumper Settings

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



Before applying power to the SHB160 series, please make sure all of the jumpers are in factory default position. Below you can find a summary table and onboard default settings.

Note ***Turn off power before changing any default jumper settings.***

Jumper	Description	Setting
JP1	Auto Power On Default: Enable	1-2 Close
JP2	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close

2.3.1 Auto Power On (JP1)

If JP3 is enabled for power input, the system will be automatically powered on without pressing soft power button. If JP1 is disabled for power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Enable auto power on (Default)	1-2 close
Disable auto power on	2-3 close

2.3.2 Restore BIOS Optimal Defaults (JP2)

Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal operation (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close

2.4 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 all connectors on the board.

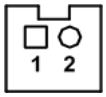
Jumpers/Headers/Connectors			
1	ATX Power Connector (CN13)	18	M.2 /E Key (2230)(CN27)
2	DDR5 Socket (DIMM0.DIMM1)	19	Restore BIOS Optimal Defaults (JP2)
3	TPM Pin Header (CN7)	20	DEBUG PORT Connector(CN21)
4	FAN Connector (FAN2)	21	Internal USB 2.0 Connector(CN23)
5	FAN Connector (FAN3)	22	Internal USB 3.2 Gen1x1 Connector (CN25)
6	Parallel Port Connector (CN2)	23	Internal USB 3.2 Gen1x1 Connector(CN24)
7	COM Connector (COM1)	24	Front Panel Connector (CN26)
8	COM Connector (COM2)	25	FAN Connectors (CPU Fan)
9	COM Connector (COM3)	26	M.2 2280 Key M NVMe SSD (CN34)
10	COM Connector (COM4)	27	Internal USB 2.0 Connector(CN33)
11	HD Audio Digital Header For AX93242(CN5)	28	Internal PS/2 Mouse Connector (CN28)
12	Temperature Sensor Connector (CN15)	29	Internal PS/2 Keyboard Connector (CN29)
13	Temperature Sensor Connector (CN16)	30	PICMG_1.3 Gold Finger
14	SATA 3.0 Connector (CN10~CN12/CN17~19)	31	PICMG_1.3 Gold Finger
15	Auto Power On (JP1)	32	PICMG_1.3 Gold Finger
16	12th Intel® Alder Lake LGA 1700 socket	33	PICMG_1.3 Gold Finger
17	Display Port 1.4 Connector (CN30)	34	RTC Battery Socket (BAT1)

Rear I/O Jumpers/Headers/Connectors			
35	Ethernet Ports (CN22)	37	DVI-I Connector (CN31)
36	Ethernet Ports (CN22)	38	Rear I/O l USB 3.2 Gen2x1 Connector (CN35 and CN36)

2.4.1 Temperature Sensor Connector (CN15 AND CN16) (Optional)

This is a 2-pin connector for temperature sensor (NTC thermistor) interface. The thermistor value should be 10K and its B value is 3435K.

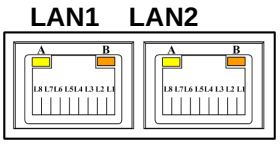
Pin	Signal
1	Sensor Input
2	GND



2.4.2 Ethernet Ports (CN22)

The board has two RJ-45 connectors: LAN1 (i226V) and LAN2 (i226LM). Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 2500/1000/100/ Base-T hub.

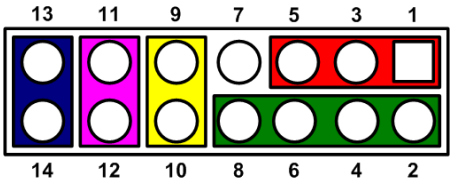
Pin	1000 Base-T	100/10 Base-T	Description
L1	BI_DA+	TX+	Bidirectional or Transmit Data+
L2	BI_DA-	TX-	Bidirectional or Transmit Data-
L3	BI_DB+	RX+	Bidirectional or Receive Data+
L4	BI_DC+	N.C.	Bidirectional or Not Connected
L5	BI_DC-	N.C.	Bidirectional or Not Connected
L6	BI_DB-	RX-	Bidirectional or Receive Data-
L7	BI_DD+	N.C.	Bidirectional or Not Connected
L8	BI_DD-	N.C.	Bidirectional or Not Connected
A	Speed LED 2500: Green 1000: Orange 100/10: OFF		
B	Active Link LED (Yellow) Off: No link Blinking: Data activity detected		



2.4.3 Front Panel Connector (CN26)

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

Pin	Signal
1	PWRLED+
2	EXT SPK-
3	GND
4	Buzzer
5	PWRLED-
6	N.C.
7	N.C.
8	EXT SPK+
9	PWRSW-
10	PWRSW+
11	HW RST-
12	HW RST+
13	HDDLED-
14	HDDLED+



Power LED

Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on. Pin 3 is defined as GND.

External Speaker and Internal Buzzer

Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the CPU board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

Power On/Off Button

Pin 9 and 10 connect the power button on a front panel to the CPU board, which allows users to turn on or off power supply.

System Reset Switch

Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

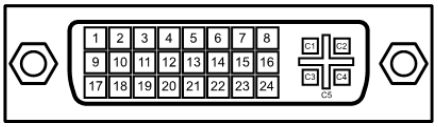
HDD Activity LED

This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED; pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

2.4.4 DVI-I Connector (CN31)

DVI-I (integrated, combining digital and analog in the same connector; digital may be single or dual link) provides transmission of fast and high quality digital video from a source device (graphics card) to a display device.

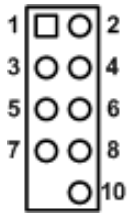
Pin	Signal	Pin	Signal
1	DVI_DATA2-	2	DVI_DATA2+
3	GND	4	VGA_DDCSCL
5	VGA_DDCSDA	6	DVI_SPC
7	DVI_SPD	8	VGA_VSYNC_R .
9	DVI_DATA1-	10	DVI_DATA1+
11	GND	12	N.C.
13	N.C.	14	+5V
15	GND	16	DVI_HTPLG
17	DVI_DATA0-	18	DVI_DATA0+
19	GND	20	N.C.
21	N.C.	22	GND
23	DVI_CLK+	24	DVI_CLK-
C1	Analog red	C2	Analog green
C3	Analog blue	C4	Analog horizontal sync
C5	Analog ground		



2.4.5 Internal USB 2.0 Connectors (CN33)

These are 5x2-pin P=2.54mm headers for USB 2.0 interface.

Pin	Signal	Pin	Signal
1	USB2_PWR78	2	USB2_PWR78
3	USB _IN	4	USB _JN
5	USB _IP	6	USB _JP
7	GND	8	GND
		10	GND

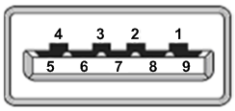


2.4.6 Rear I/O USB 3.2 (Gen2x1, 10Gbps) Connectors (CN35 and CN36)

These are standard USB (Universal Serial Bus) 3.0 connectors on the rear I/O for connecting USB peripherals such as a keyboard, mouse, scanner, etc.

Pin	Signal
1	USB3_PWR12
2	D-
3	D+
4	GND
5	StdA_SSRX-
6	StdA_SSRX+
7	GND_DRAIN
8	StdA_SSTX-
9	StdA_SSTX+

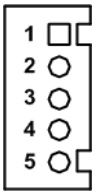
CN35: USB 3.2 port 0
CN36: USB 3.2 port 1



2.4.7 Internal PS/2 Keyboard and Mouse Connectors (CN28 and CN29)

The board has two 5-pin connectors for PS/2 keyboard (CN29) and mouse (CN28) interfaces.

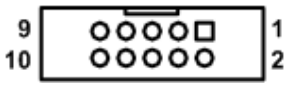
Pin	Signal
1	Clock
2	DATA
3	No connector
4	GND
5	+5VDUAL



2.4.8 COM Connectors (COM1~COM4)

This is a 10 pin (Pitch = 2.54mm) connector which is compliant with CATCH 1137-000-10S. and it supports RS-232/RS-422/RS-485 mode operation for COM1 ~ COM4. See the table below for the pin assignments.

Pin	RS-232	RS-422	RS-485
1	Data Carrier Detect (DCD)	TX-	DATA-
2	Data Set Ready (DSR)	No connector	No connector
3	Receive Data (RXD)	TX+	DATA+
4	Request to Send (RTS)	No connector	No connector
5	Transmit Data (TXD)	RX+	No connector
6	Clear to Send (CTS)	No connector	No connector
7	Data Terminal Ready (DTR)	RX-	No connector
8	Ring Indicator (RI)	No connector	No connector
9	Ground (GND)	GND	GND
10	Disconnect (NI)	NI	NI

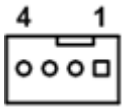


2.4.9 FAN Connectors (CPU FAN, FAN2 and FAN3)

Fans are needed for cooling down CPU and system temperature. The board has three fan connectors. You can find fan speed option(s) at BIOS Setup Utility if fan is installed via either connector. For further information, see BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

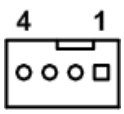
Auxiliary and system fan interfaces are available through FAN2 and FAN3. See the table below.

Pin	Signal
1	GND
2	+12V level
3	Rotation detection
4	Speed Control



CPU fan interface is available through CPU FAN. See the table below.

Pin	Signal
1	Ground
2	+12V
3	Rotation Detection
4	Speed Control

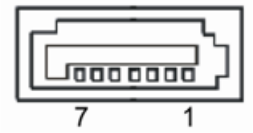


2.4.10 SATA 3.0 Connectors (CN10~CN12/CN17~19)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for high-speed SATA 3.0 interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives.

This board has six SATA 3.0 ports with speed at 6Gb/s.

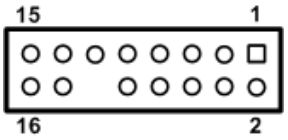
Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



2.4.11 Intel® HD Audio Digital Header (CN5)

This is a 2x8-pin header for connecting an external HD Audio board (AX93242).

Pin	Signal	Pin	Signal
1	BCLK	2	GND
3	RST#	4	DVDD_IO
5	SYNC	6	GND
7	SDO	8	+3.3V
9	SDIO	10	+12VS
11	SDI1	12	
13	N.C	14	3.3VAUX
15	N.C	16	GND



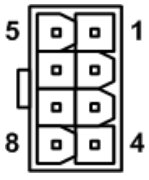
2.4.12 ATX Power Connector (CN13)

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

The external power supply plug fits into this connector in only one orientation. Properly press down the power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

The ATX2 is an 8-pin ATX power connector. Its pin assignments are given in table below.

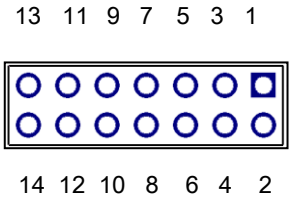
Pin	Signal	Pin	Signal
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V



2.4.13 TPM Pin Header (CN7)

These are 7x2-pin p=2.0mm headers for SPI interface with an AX93515 TPM module.

Pin	Signal	Pin	Signal
1	+3.3VDUAL	2	GND
3	SPI_PCH_MOSI	4	SPI_PCH_MOSI
5	SPI_PCH_CLK	6	SPI_PCH_CS2_N
7	PLTRST_0_N	8	SPI_TPM_IRQ
9	SPI_TPM_PP	10	NC
11	NC	12	NC
13	NC	14	MC



Note

The screw type is M2*0.4.

2.4.14 Parallel Port Connector (CN2)

This board has a multi-mode parallel port to support:

- **Standard Mode**:

  IBM PC/XT, PC/AT and PS/2™ are compatible with a bi-directional parallel port.

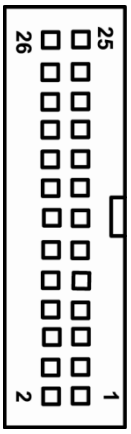
- **Enhanced Mode**:

  Enhance Parallel Port (EPP) is compatible with EPP 1.7 and EPP 1.9 (IEEE 1284 compliant).

- **High Speed Mode**:

  Microsoft and Hewlett Packard Extended Capabilities Port (ECP) is IEEE 1284 compliant.

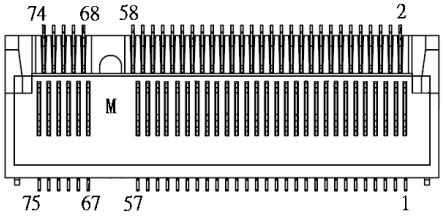
Pin	Signal	Pin	Signal
1	Strobe#	2	Auto Form Feed#
3	Data 0	4	Error#
5	Data 1	6	Initialize#
7	Data 2	8	Printer Select In#
9	Data 3	10	GND
11	Data 4	12	GND
13	Data 5	14	GND
15	Data 6	16	GND
17	Data 7	18	GND
19	Acknowledge#	20	GND
21	Busy	22	GND
23	Paper Empty#	24	GND
25	Printer Select	26	N.C



2.4.15 M.2 2280 Key M NVMe SSD (CN34)

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		

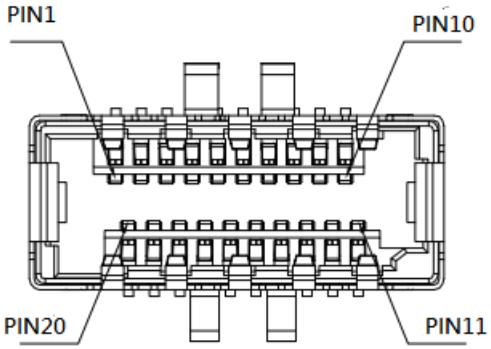


Note ***M.2 2280 Key M***

2.4.16 Internal USB 3.2 Gen1x1 (5 Gbps) Connector (CN24 AND CN25)

The CN24 and CN25 are internal box connectors for installing versatile USB 3.2 Gen1x1 compliant peripherals.
And Connector is compliant with (LOTES AUSB0418-P001A)

Pin	Signal	Pin	Signal
1	GND	11	GND
2	SSTX2+	12	SSTX3-
3	SSTX2-	13	SSTX3+
4	GND	14	GND
5	SSRX2+	15	SSRX3-
6	SSRX2-	16	SSRX3+
7	GND	17	GND
8	USBP3P_C	18	USBP4P_C
9	USBP3N_C	19	USBP4N_C
10	GND	20	+3.3VS



2.4.17 Display Port 1.4 Connector (CN30)

The CN11 is an internal box connector which is defined by Axiomtek for installing Display Port 1.4 Connector peripherals. The Display Port 1.4 Connector peripherals are available as an optional kit.

Pin	Signal	Pin	Signal
1	GND	16	DPC_AUX_D+
2	DDSP_TX_0_D+	17	DPC_AUX_D-
3	DDSP_TX_0_D-	18	+5VS
4	GND	19	DDPD_HPD_C
5	DDSP_TX_1_D+	20	+3.3V
6	DDSP_TX_1_D-	21	+3.3V
7	GND	22	+3.3V
8	DDSP_TX_2_D+	23	+3.3V
9	DDSP_TX_2_D-	24	GND
10	GND	25	GND
11	DDSP_TX_3_D+	26	GND
12	DDSP_TX_3_D-	27	GND
13	GND	28	+5V
14	HDMI_C_DNG_DETECT	29	+5V
15	GND	30	+5V

Section 3
Hardware Installation

3.1 Installing the Processor

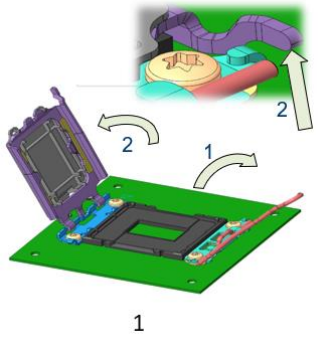
The LGA1700 processor socket comes with a cover to protect the processor. Please install the processor into the CPU socket step by step as illustrated below:

Note

Make sure that you install the correct CPU only designed for the LGA1700 socket . DO NOT install a CPU designed for LGA1156, LGA1155 or LGA1150 CPU on the LGA1700 socket.

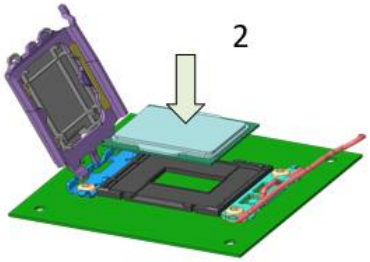
Step 1 Opening the socket:

- Disengage the load lever by pressing the lever down and pulling it slightly away by the hook. This will release the load lever from the retention tab.
- Rotate the load lever to open position at approximately 135°.
- Rotate the load plate to open position at approximately 150°.



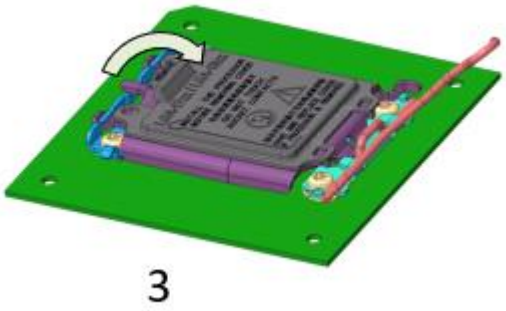
Step 2 Removing the socket protective cover:

- Place the thumb against the front edge of the protective cover and rest the index finger on the rear grip to maintain control of the cover.
- Lift the front edge of the protective cover to disengage from the socket. Keep control of the cover by holding the rear grip with the index finger.
- Lift the protective cover away from the socket. Be careful not to touch the electrical contacts.



Step 3 Processor installation:

- Lift the processor package from shipping media by grasping the substrate edges.
- Scan the processor package gold pads for any presence of foreign material. If necessary, the gold pads can be wiped clean with a soft lint-free cloth and isopropyl alcohol.
- Locate connection 1 indicator on the processor which aligns with connection 1 indicator chamfer on the socket, and notice processor keying features that line up with posts along socket walls.



3

Note

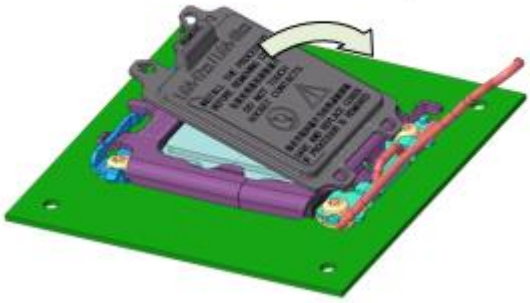
Never touch fragile socket contacts to avoid damage and do not touch processor sensitive contacts at any time during Installation.

- Carefully place the processor into the socket body vertically (see image below).

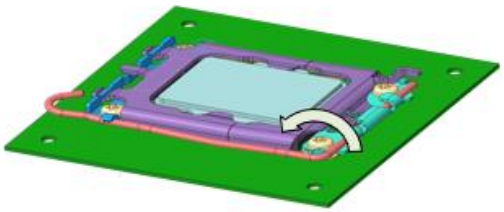
Step 4 Close the socket (see image below):

- Gently lower the load plate.
- Make sure the load plate's front edge slides under the shoulder screw cap as the lever is lowered.
- Latch the lever under the top plate's corner tab, being cautious not to damage the motherboard with the tip of the lever.

4



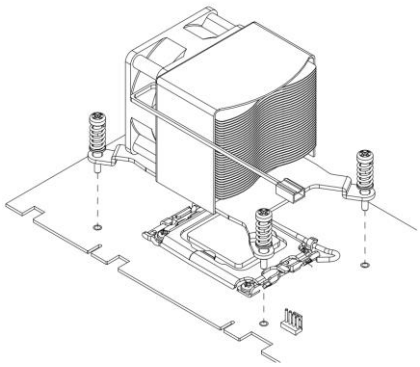
Step 5



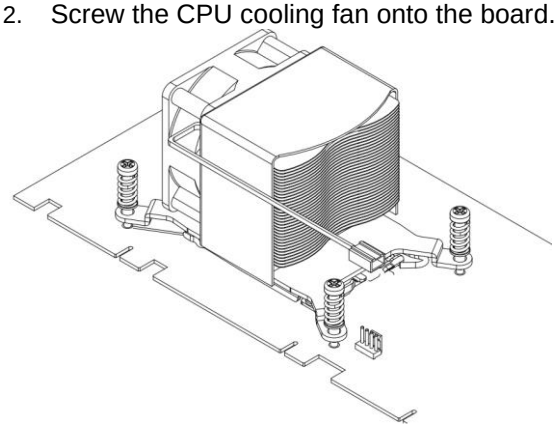
5

Step 6 Fan heatsink handling:

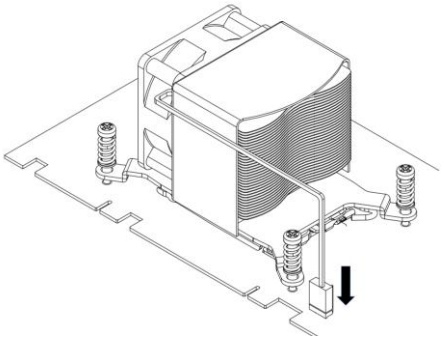
1. Orientate the CPU cooling fan to fixing holes on the board.



2. Screw the CPU cooling fan onto the board.



3. Make sure the CPU fan is plugged to the CPU fan connector.



CAUTION

Axiomtek strongly recommends that you choose our verified heat sink or cooler from the optional list on datasheets; we DO NOT recommend that you use the heat sink or cooler without verification, since it may cause damage or bend to the PCBA. Axiomtek's heat sink or cooler has passed our testing including heat dissipation capacity.

For SHB160 series
Cooler list:
For 1U Chassis: 711000001400
For 2U /4U /Shoebox chassis: 711000001500

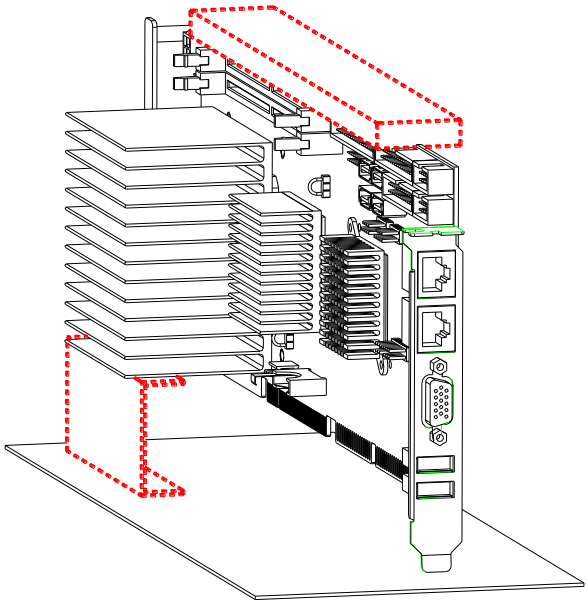
SHB160 series required specially designed cooler "711000001X00", please order as set

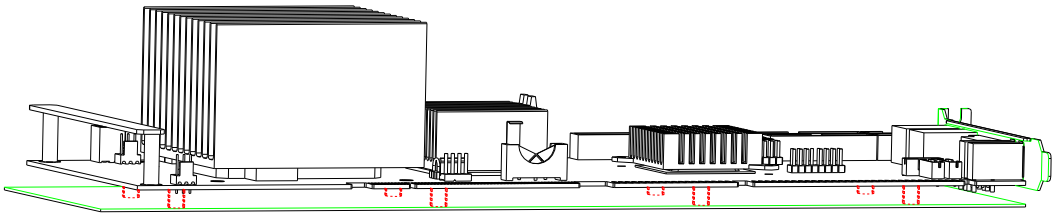
CAUTION

Please always hold the PCBA with two hands by card edges when you install the cooler or heatsink to avoid bending or breaking it; Careless or improper installation of the cooler or heatsink can result in damage and components may snap or come off from the PCBA.

CAUTION

Due to the weight of the cooler may cause the PCBA damage or unexpected issues. In addition, some applications highly require stability and Axiomtek suggests customer use a stand (as the red parts below) to support the cooler to prevent such issues.
If you have any technical problems, please contact our technical window; if there are any requirements for system integration, Axiomtek can provide evaluation and customized services.





3.2 Installing the Memory

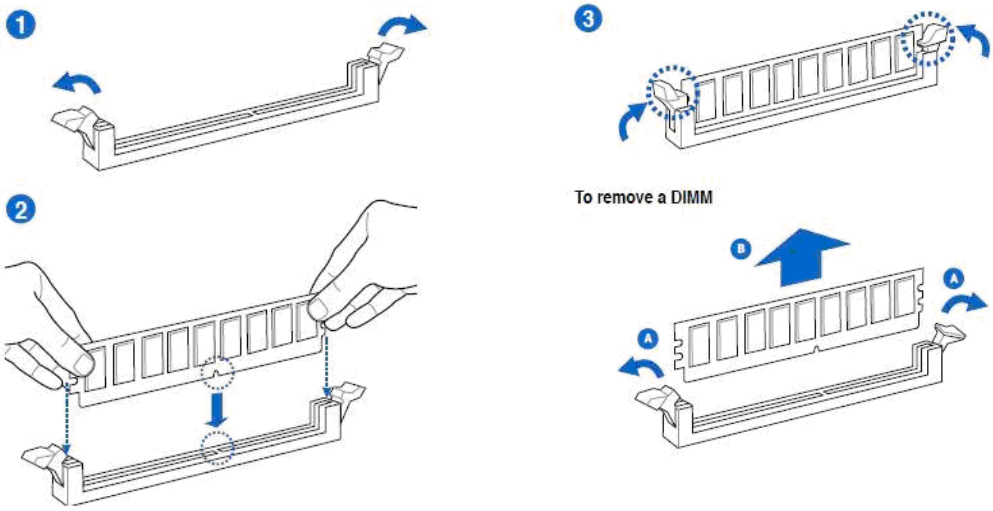
The board supports four 288-pin DDR5 DIMM memory sockets with maximum memory capacity up to 128GB.

Please follow steps below to install the memory modules:

- Please insert your DDR5 memory modules from the CH0_DIMM1 slot first.
- Push down latches on each side of the DIMM socket.
- Align the memory module with the socket to ensure that notches of the memory module match the socket keys for a correct installation.
- Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the DIMM.
- Install any remaining DIMM modules.

Note

To remove a DIMM, push down the latches on each side of the DIMM socket to loosen the DIMM, and then lift the DIMM carefully.



Section 4
Hardware Description

4.1 Microprocessors

The SHB160 Series supports Intel® 12th/13th Core™ i7/ i5/ i3 processors, which enable your system to operate under Windows® 11 and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damage.

4.2 BIOS

The SHB160 Series uses AMI Plug and Play BIOS with a single 256Mbit SPI Flash.

4.3 System Memory

The SHB160 Series supports four 288-pin DDR5 DIMM sockets for maximum memory capacity up to 128GB DDR5 SDRAMs. The memory module comes in sizes of 2GB, 4GB, 8GB, 16GB and 32GB.

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Section 5
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.

5.1 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 menus.

Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting JP2 (see section 2.3.2).

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.

5.2 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.

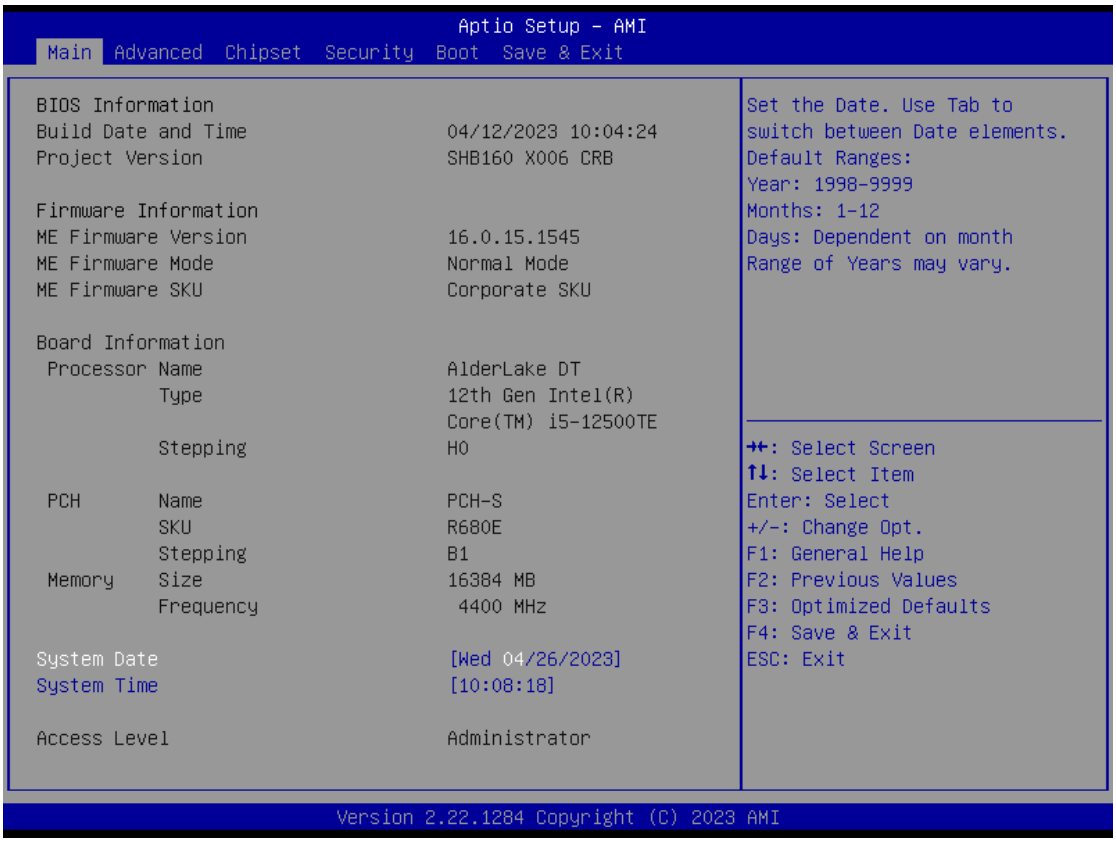
Note

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.

5.3 Main Menu

The first time you 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 auto-detected 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.

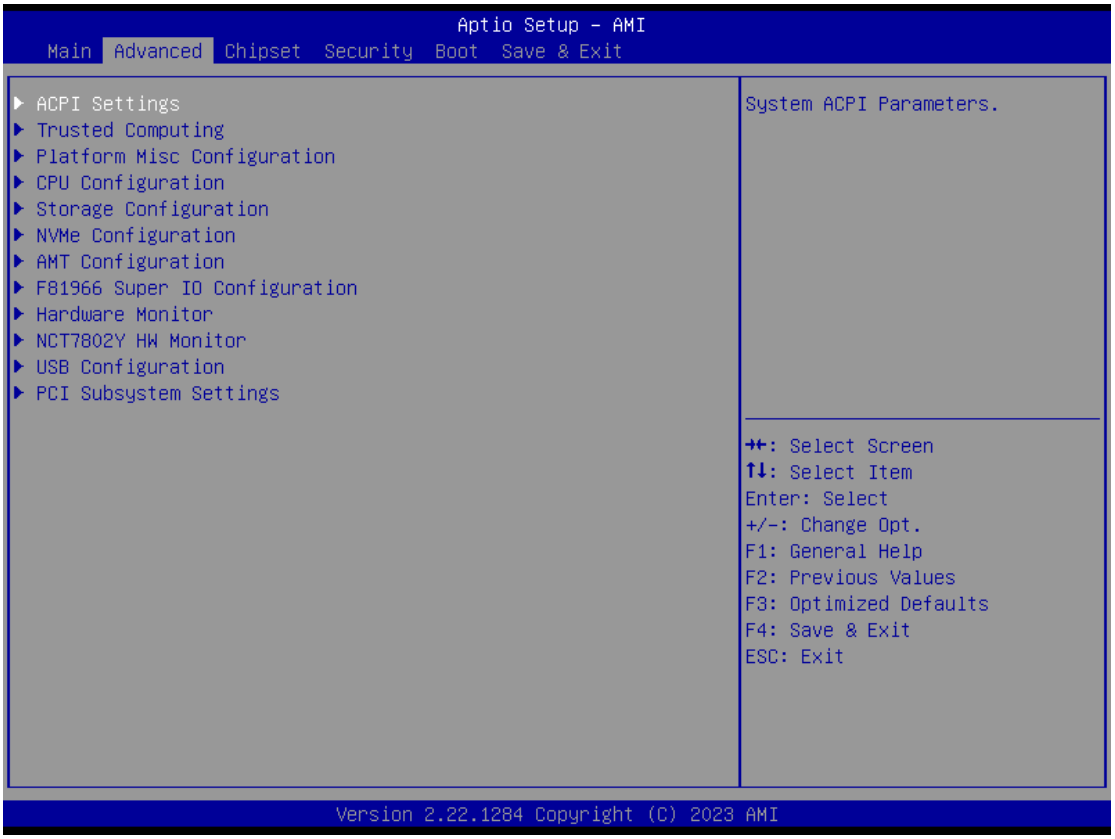
Access Level
Display the access level of the current user.

5.4 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:

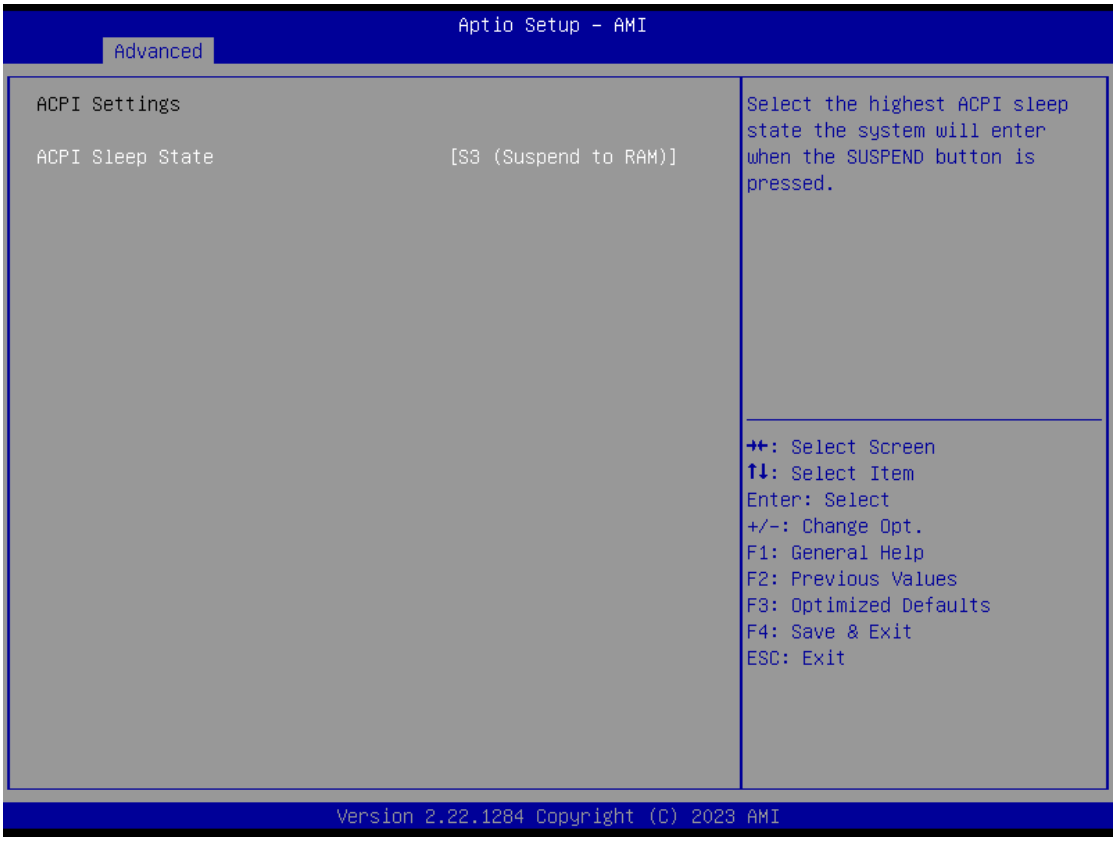
- ACPI Settings
- Trusted Computing
- Platform Misc Configuration
- CPU Configuration
- Storage Configuration
- NVNe Configuration
- AMT Configuration
- F81966 Super IO Configuration
- Hardware Monitor
- NCT7802Y HW Monitor
- USB Configuration
- PCI Subsystem Settings

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

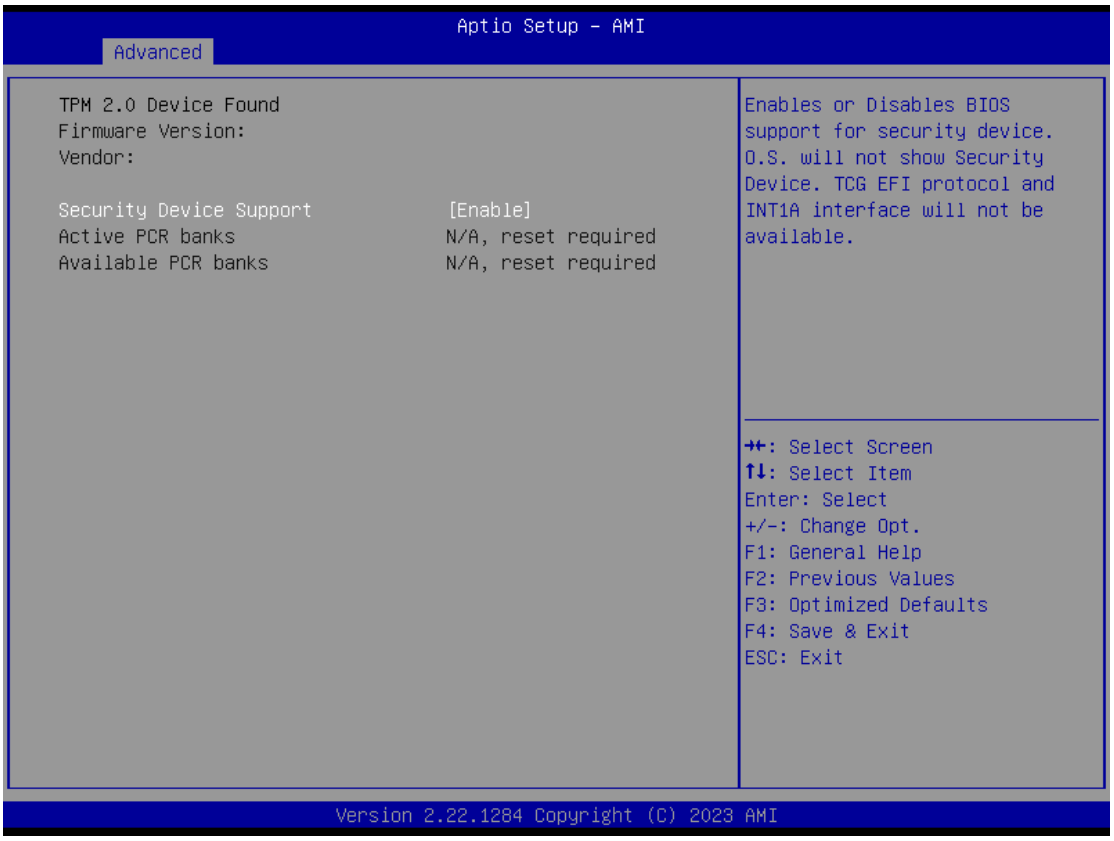


- **ACPI Settings**

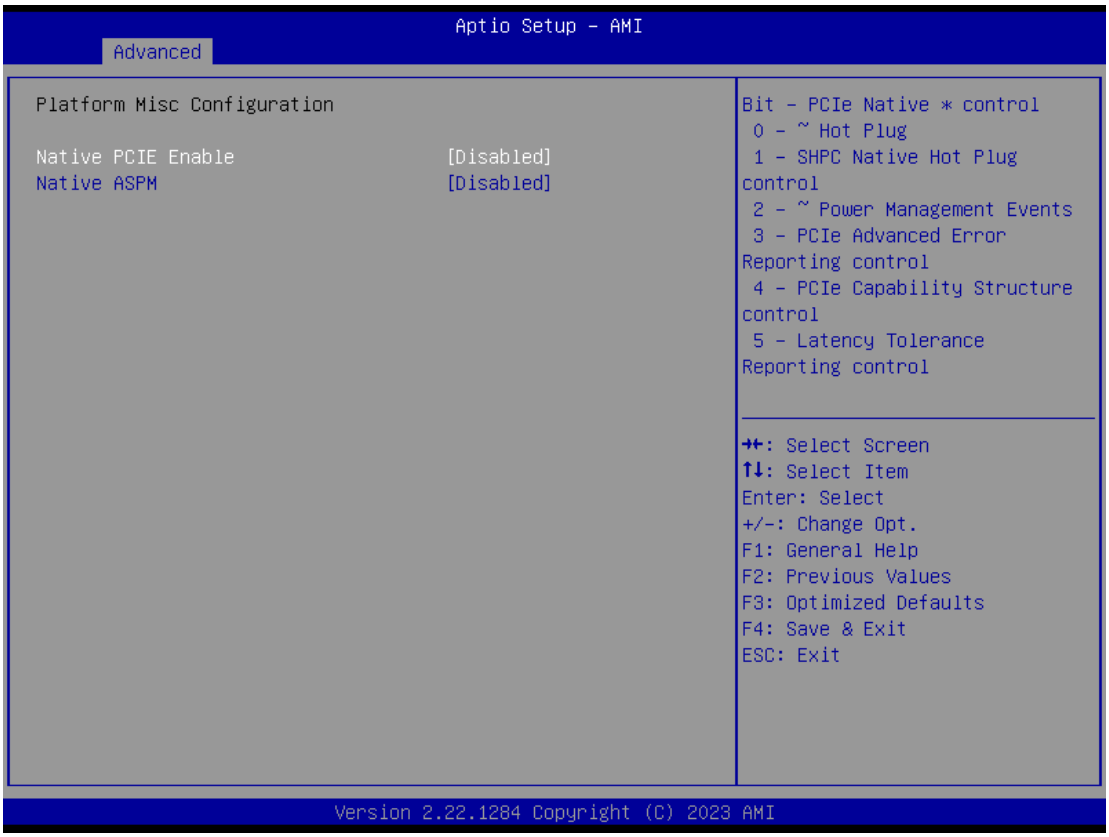
You can use this screen to select options for the ACPI Settings, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.



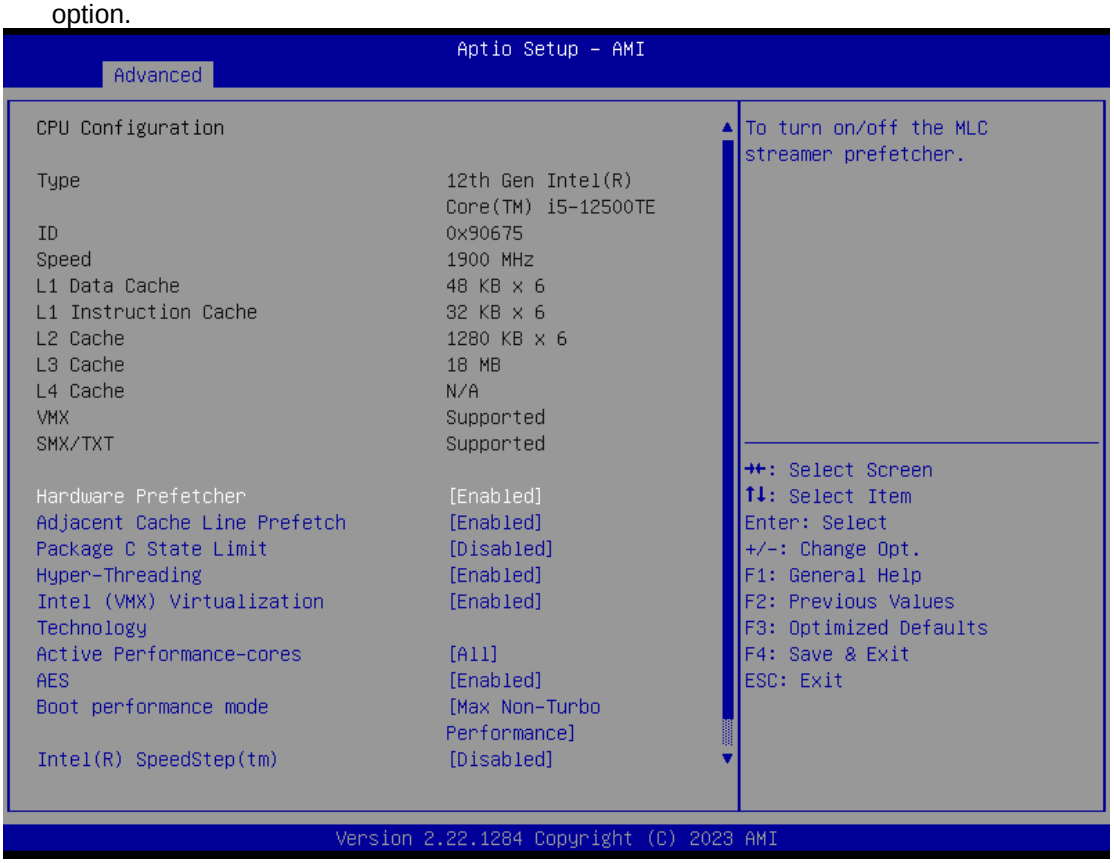
- **Trusted Computing**
  Enable or disable security device support.



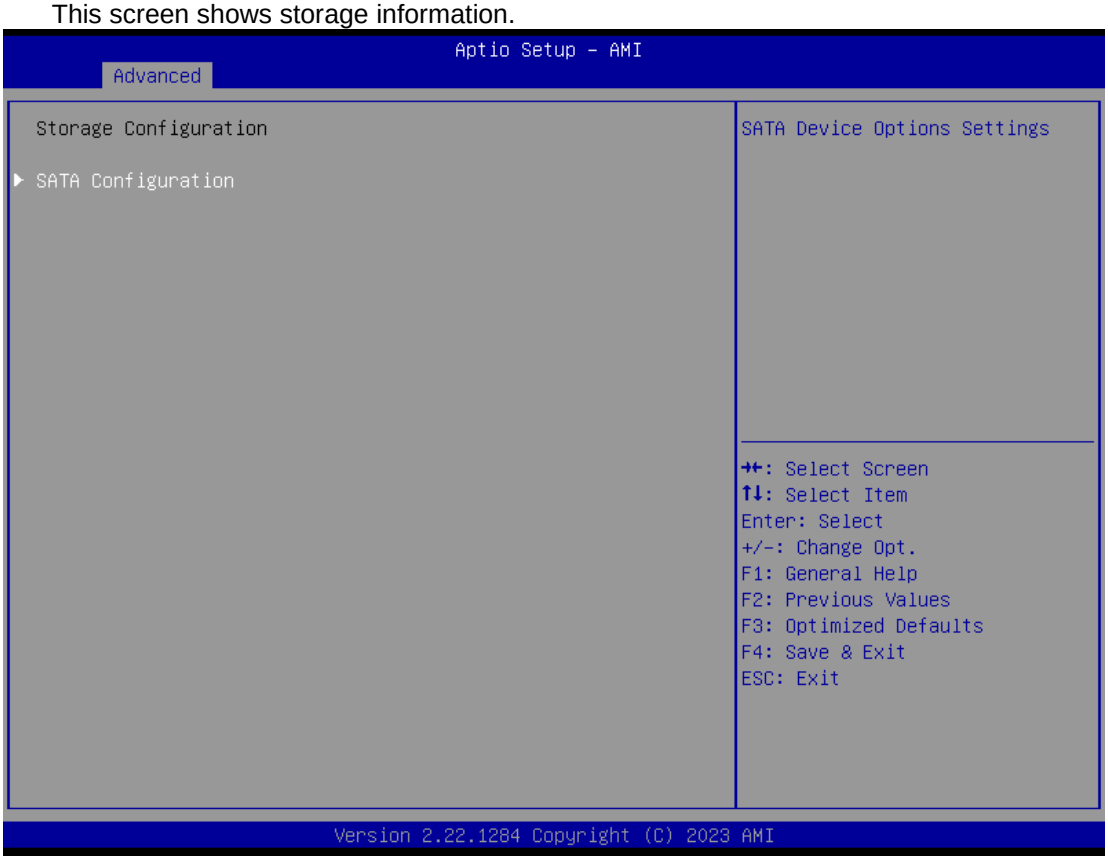
- **Platform Misc Configuration**
  This screen allows you to set Platform Misc Configuration.



- **CPU Configuration**
  This screen shows CPU information, and you can change the value of the selected option.



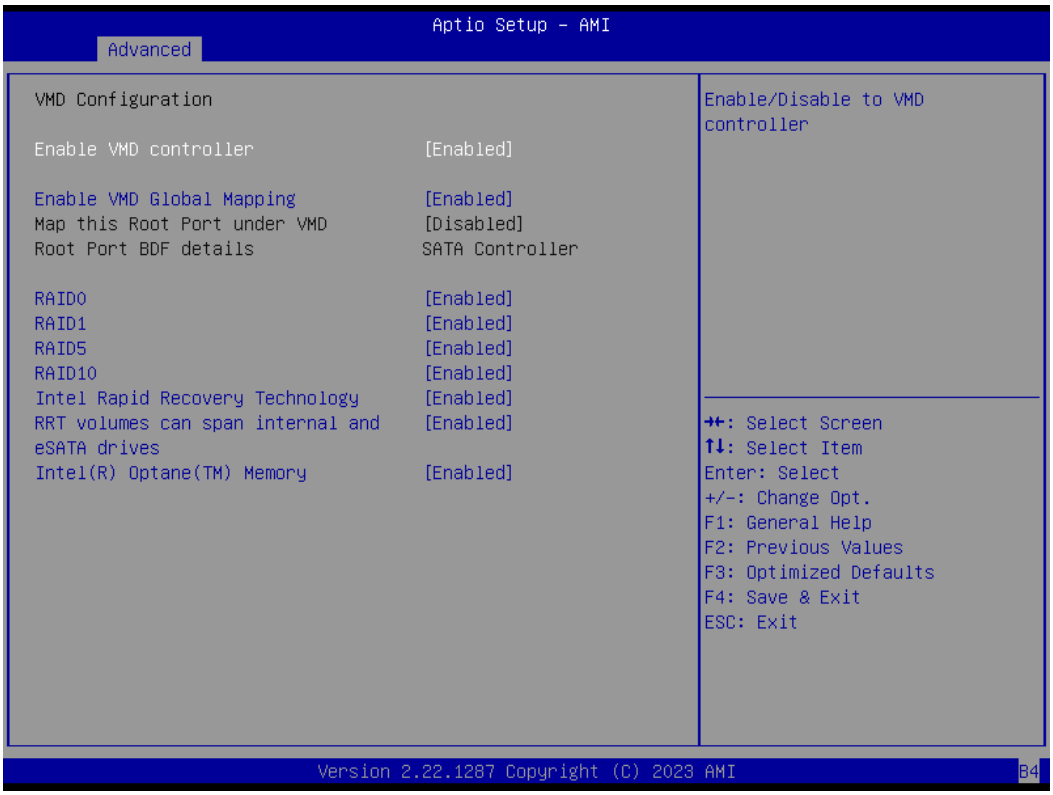
- **Storage Configuration**
  This screen shows storage information.



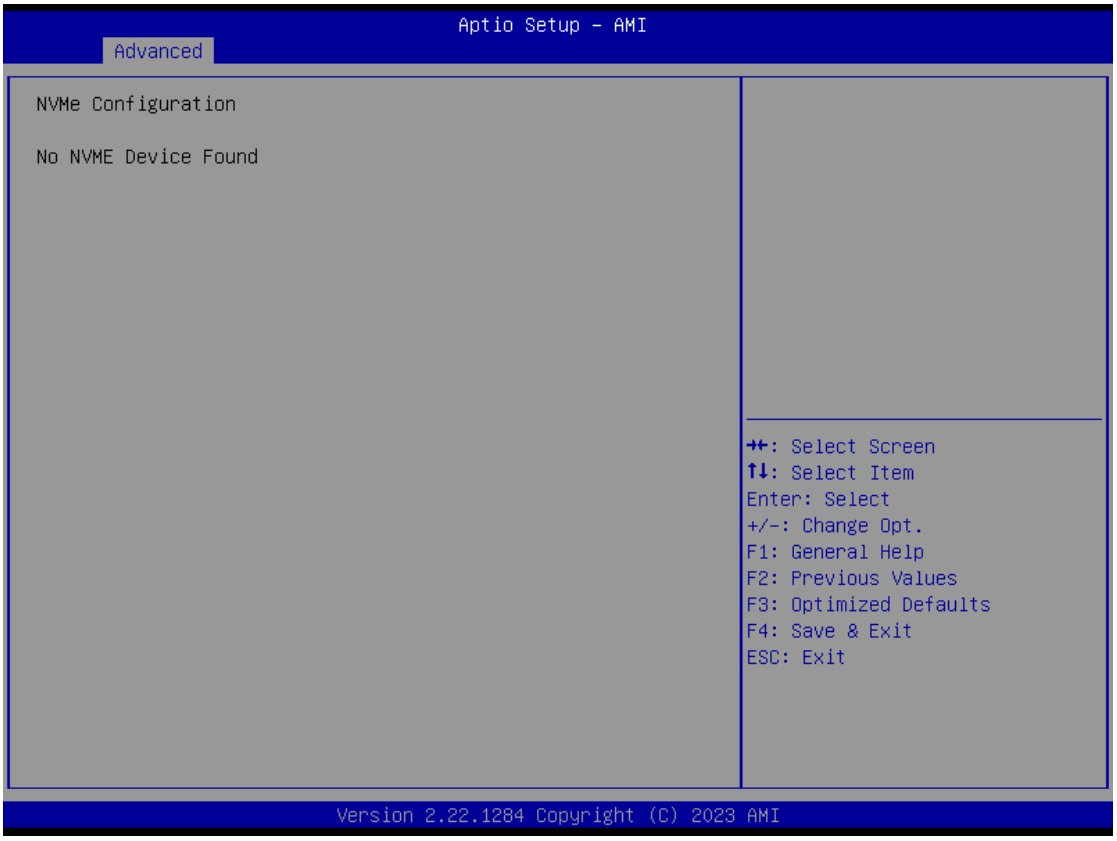
- **SATA Configuration**
  During system boot up, the BIOS automatically detects the presence of SATA devices. In the SATA Configuration menu, you can see the hardware currently installed in the SATA ports.

SATA Controller(s)
Enable or disable the SATA Controller feature. The default is Enabled.

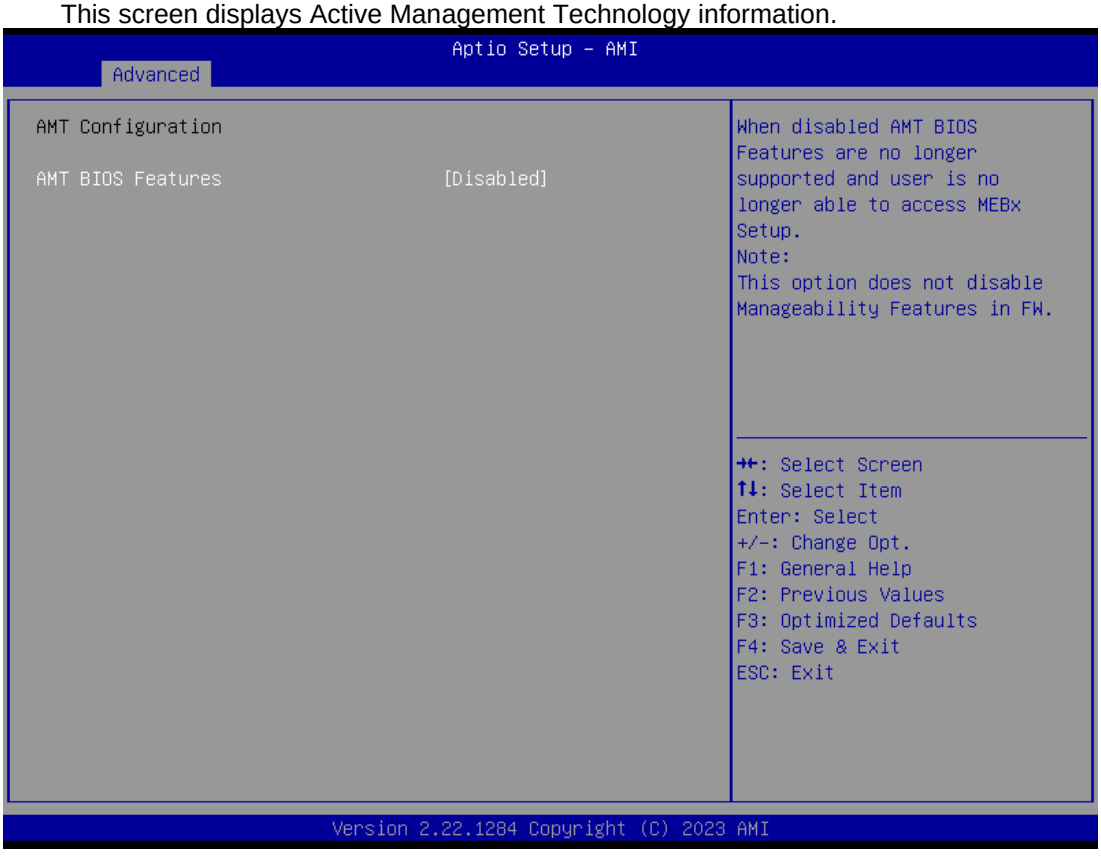
VMD Setup Menu
VMD Configuration settings. The default is Disabled.



- **NVMe Configuration**
  This screen shows NVMe device information.



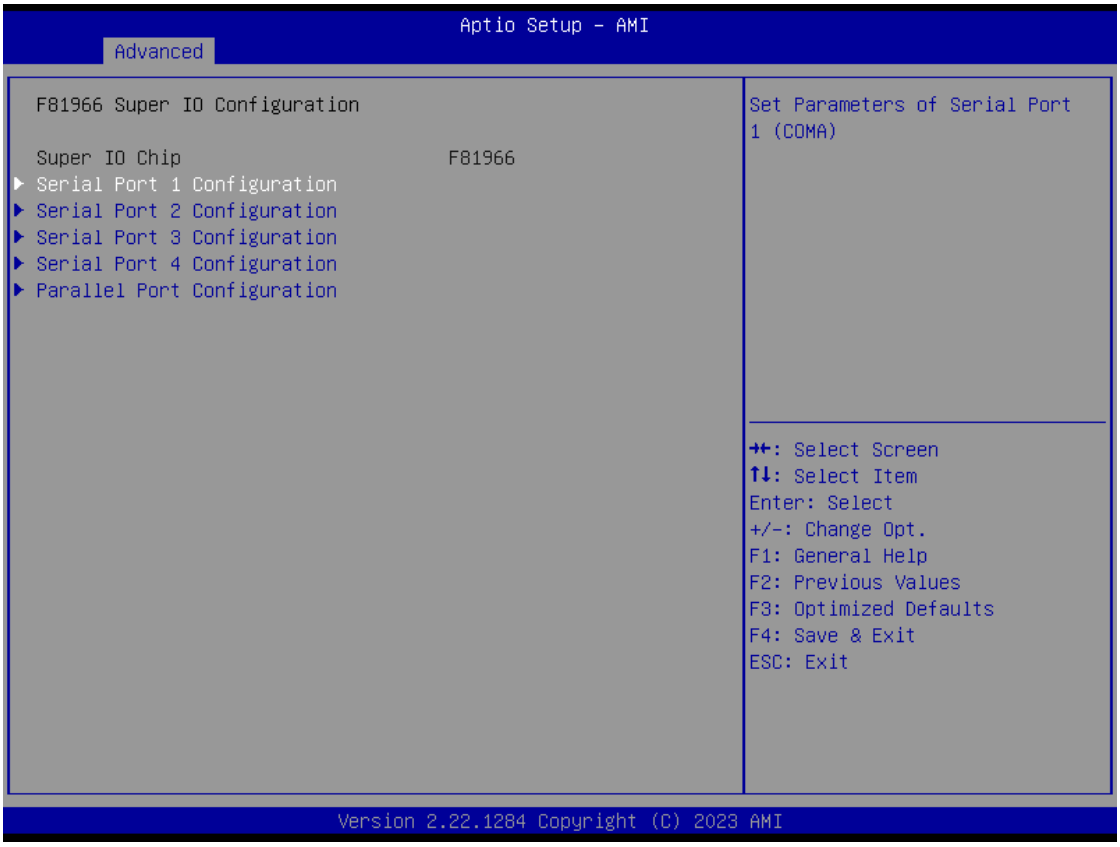
- **AMT Configuration**
  This screen displays Active Management Technology information.



AMT BIOS Features

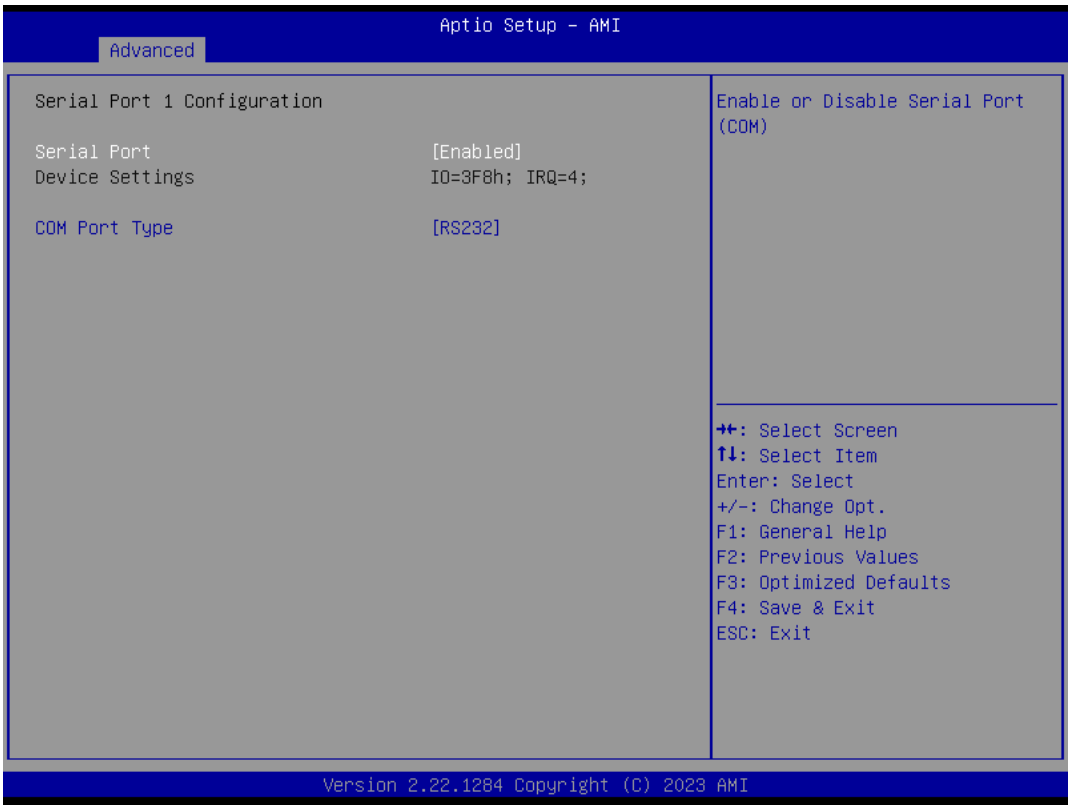
Enable or disable Active Management Technology BIOS features. The default is Enabled.

- **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.

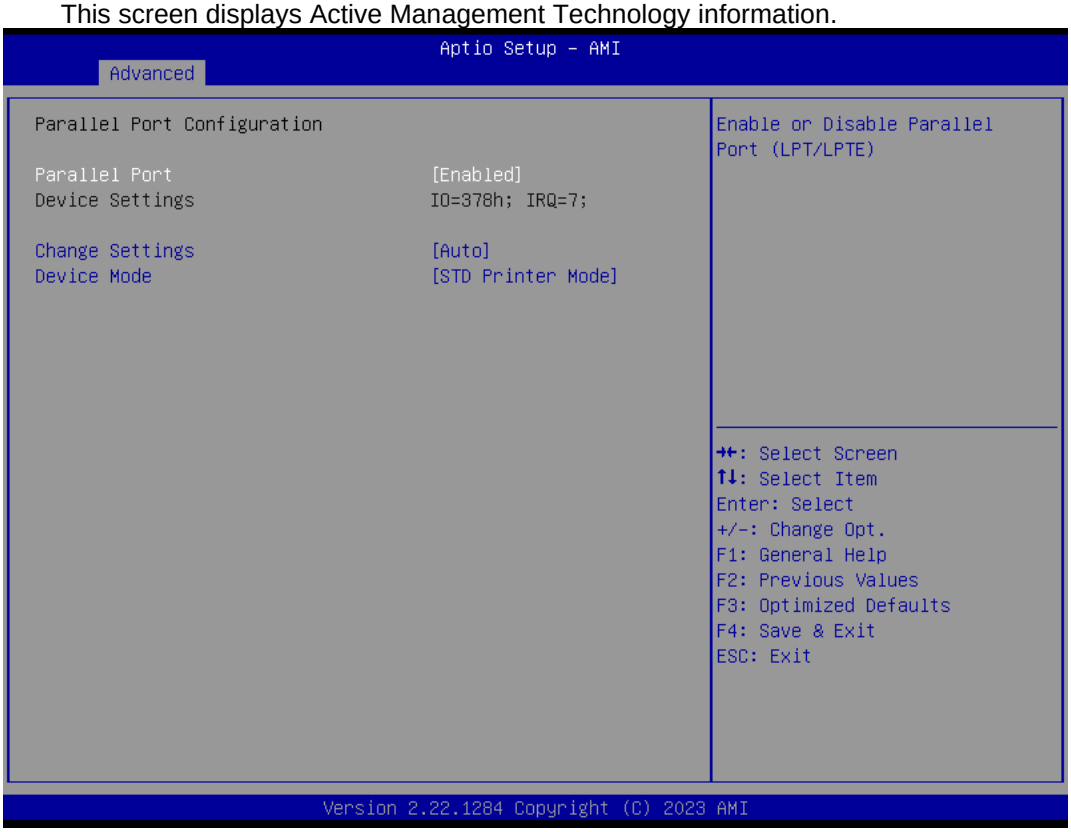


Serial Port 1~4
This item allows you to use it as RS232/422/485. The default is RS232.

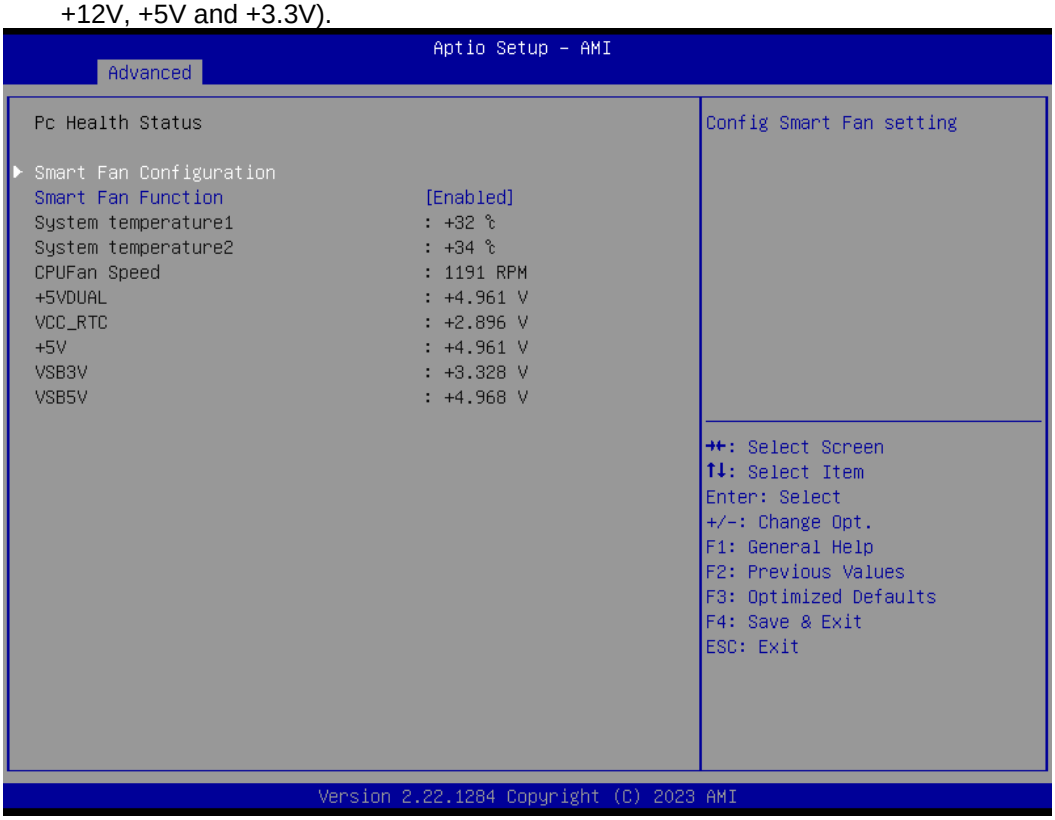
- **Serial Port 1~4 Configuration**
  Use these items to set parameters related to serial port 1 ~4 .



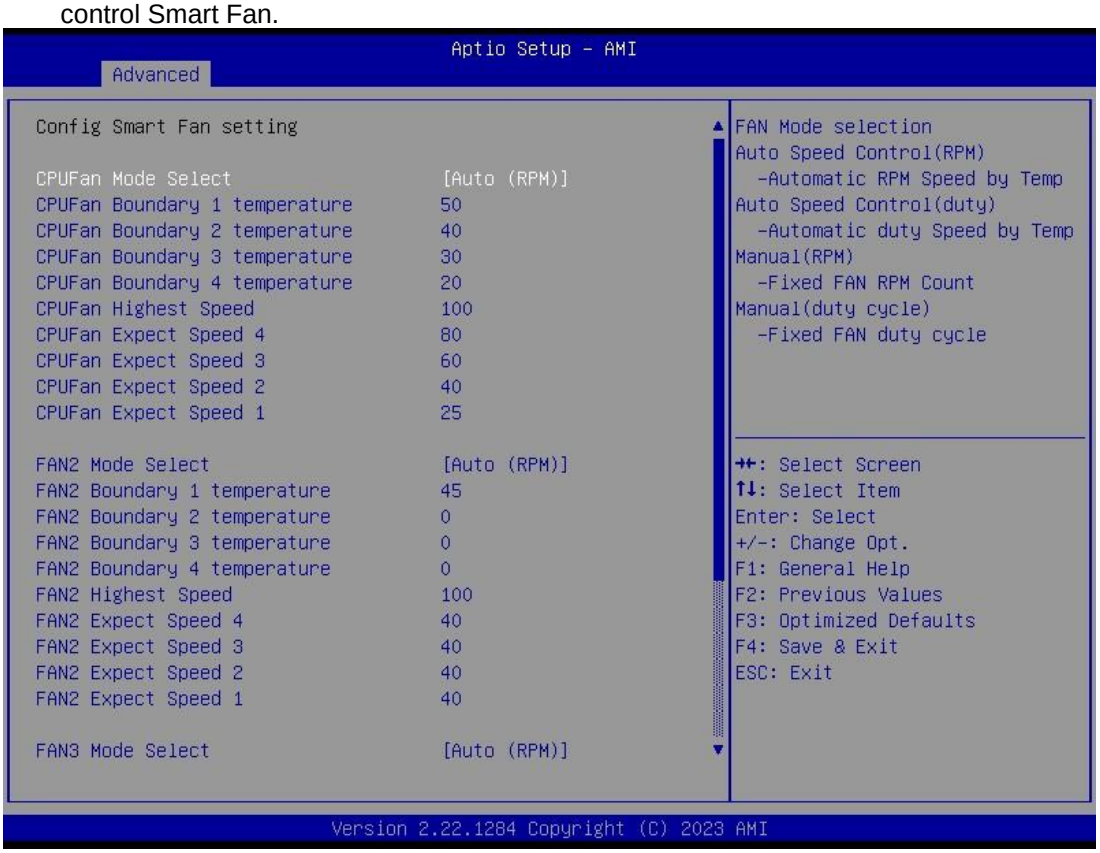
- **Parallel Port Configuration**
  This screen displays Active Management Technology information.

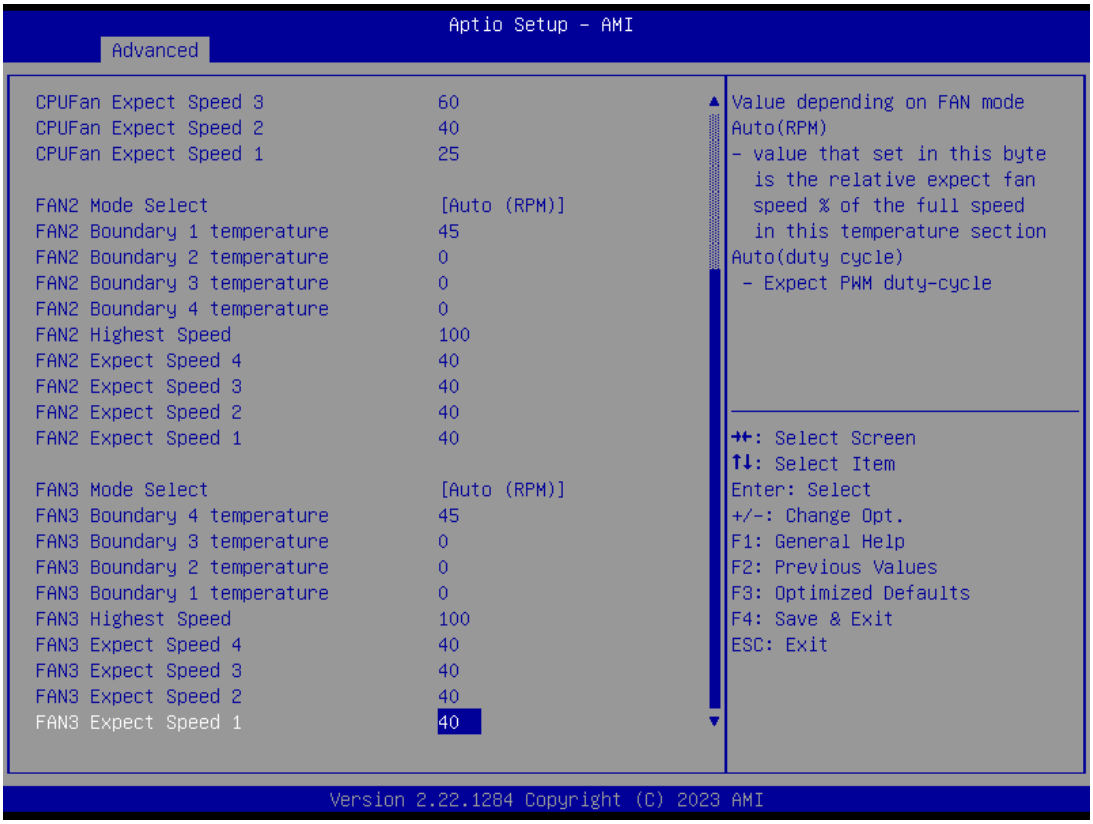


- **Hardware Monitor**
  This screen monitors hardware health status. This screen displays the temperature of system and CPU, cooling fans speed in RPM and system voltages (VCC_CPU, DDR, +12V, +5V and +3.3V).

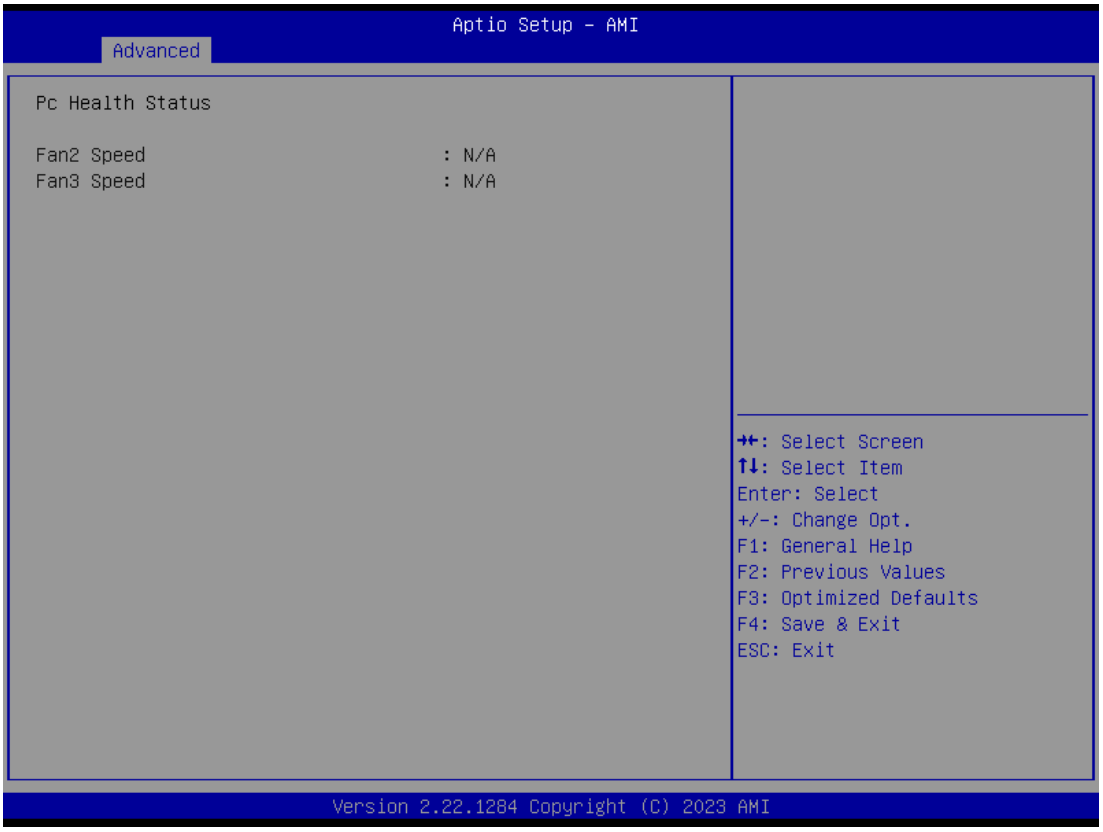


- **Smart fan configuration**
  This screen allows you to configure Smart Fan mode. You can use Smart Fan function to control Smart Fan.

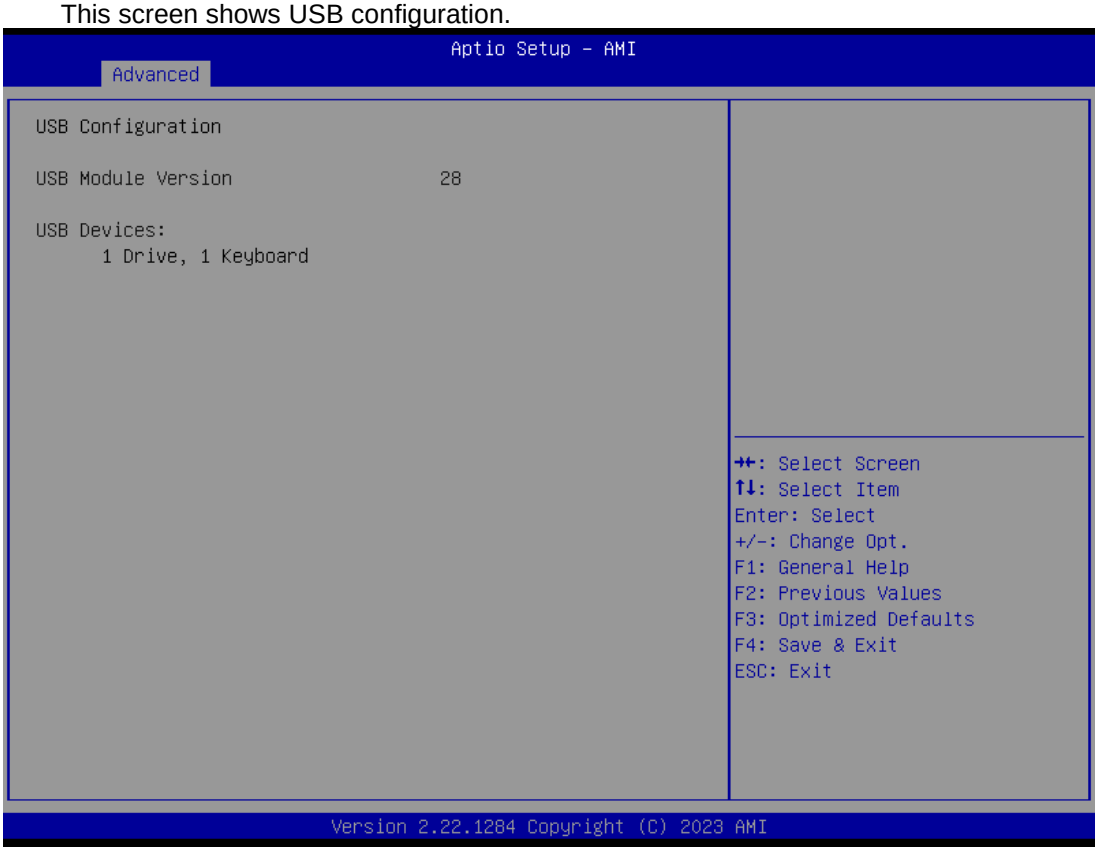




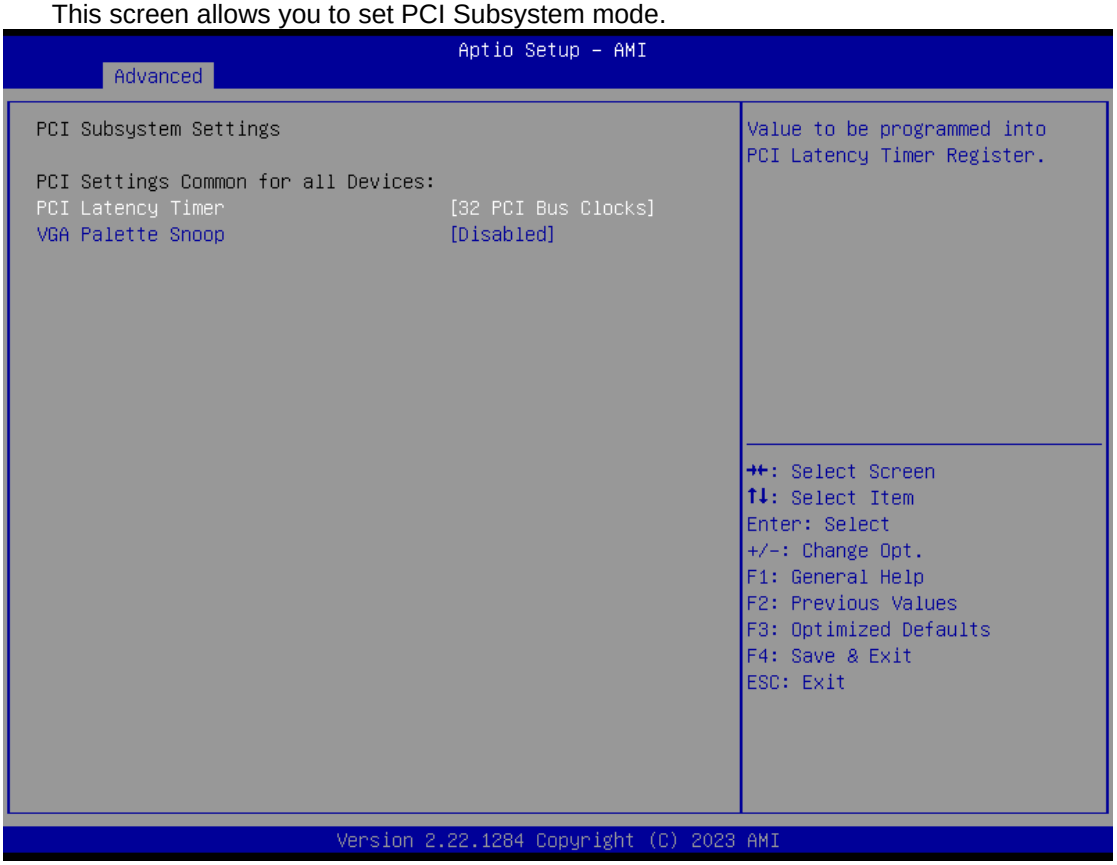
- **NCT7802Y Hardware Monitor**
  This screen monitors Fans status.



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



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



PCI Latency Timer
Set the value to be programmed into PCI Latency Timer Register.

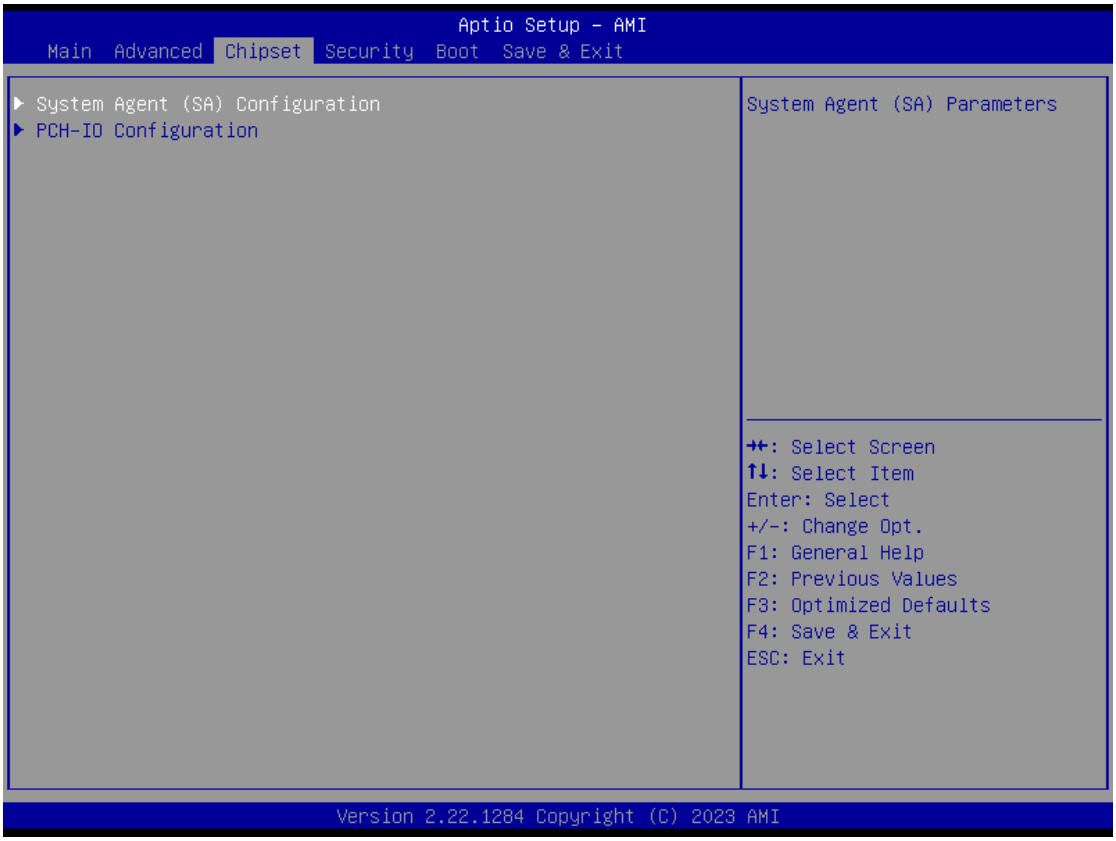
VGA Palette Snoop
Enables or Disables VGA Palette Registers Snooping.

5.5 Chipset Menu

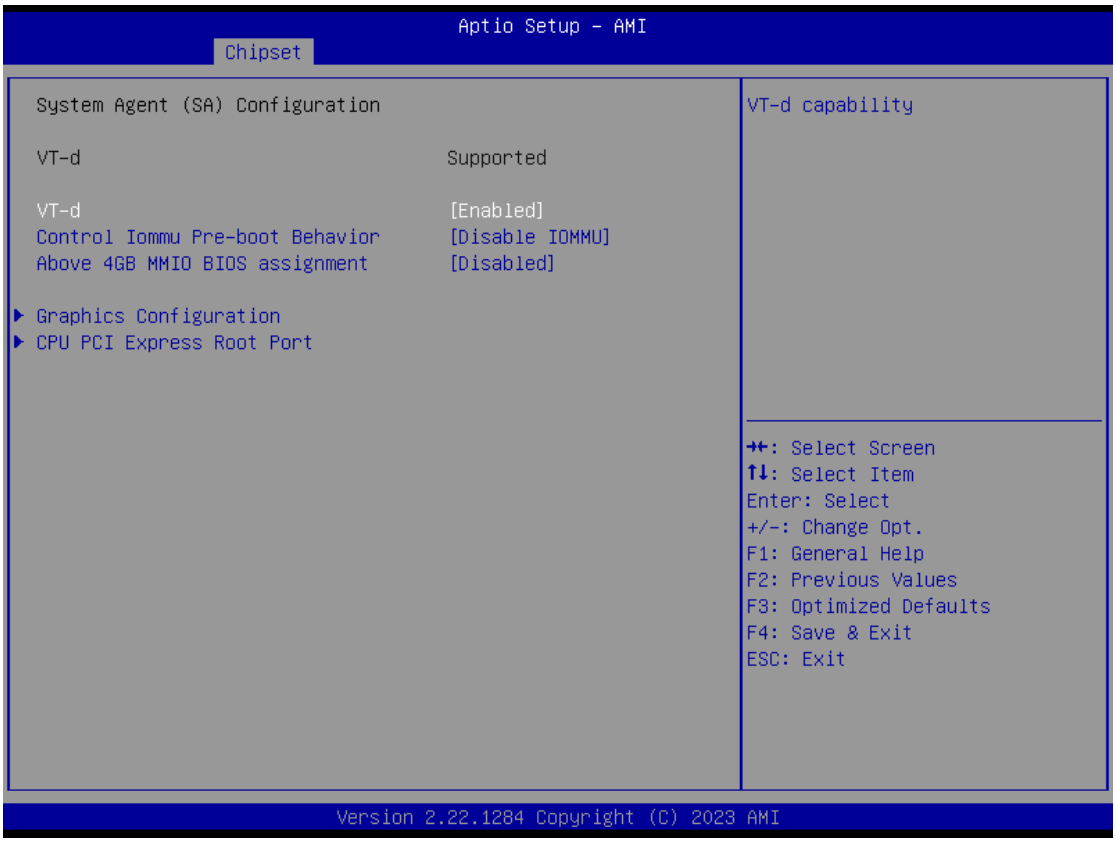
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

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

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



- **System Agent (SA) Configuration**
  This screen shows System Agent information.



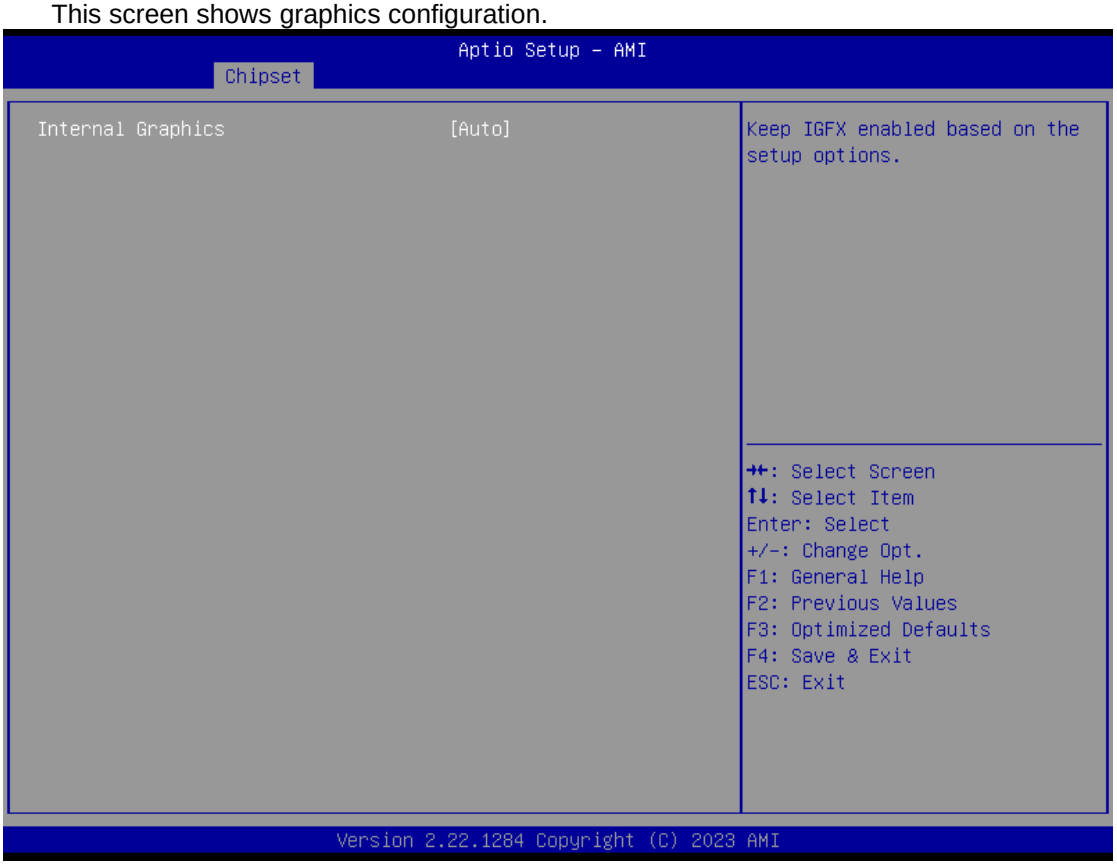
VT-d
Check to enable VT-d function on MCH.

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

Graphics Configuration
Open the sub menu for parameters related to graphics configuration.

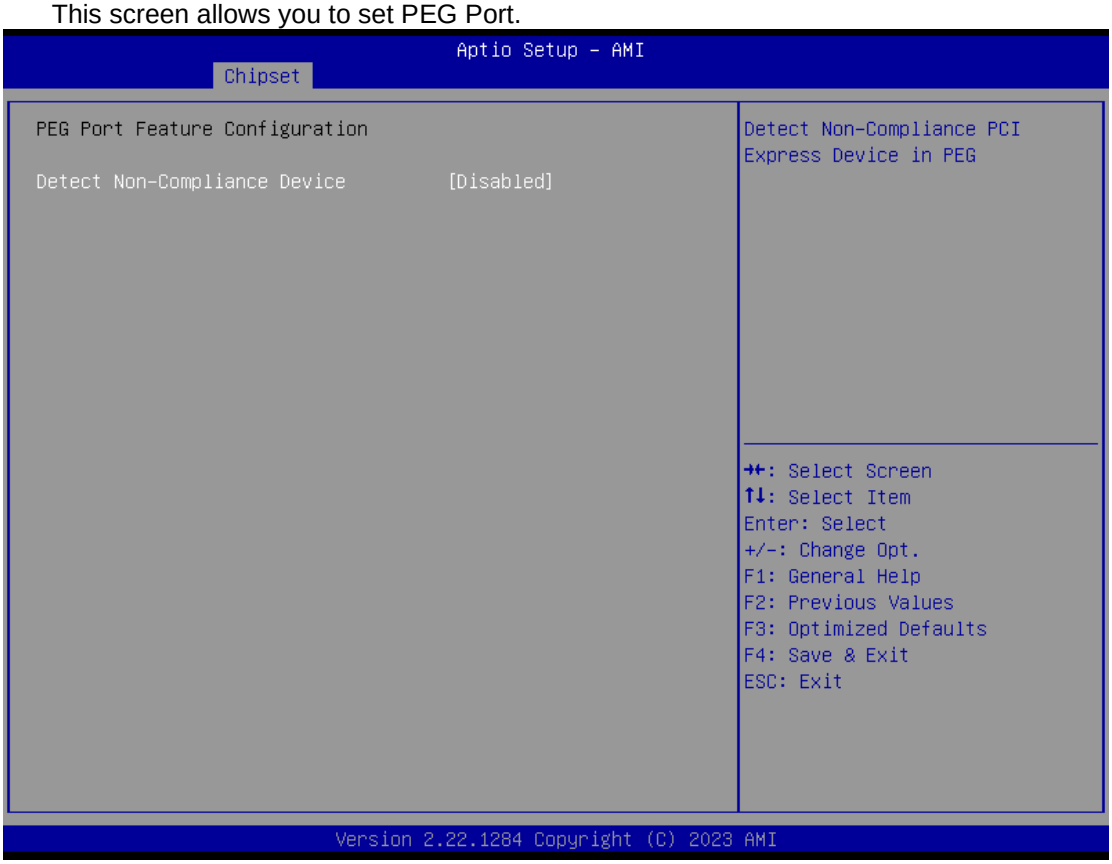
CPU PCI Express Root Port
Set the ASPM Level and PCI Express Speed.

- **Graphics Configuration**
  This screen shows graphics configuration.

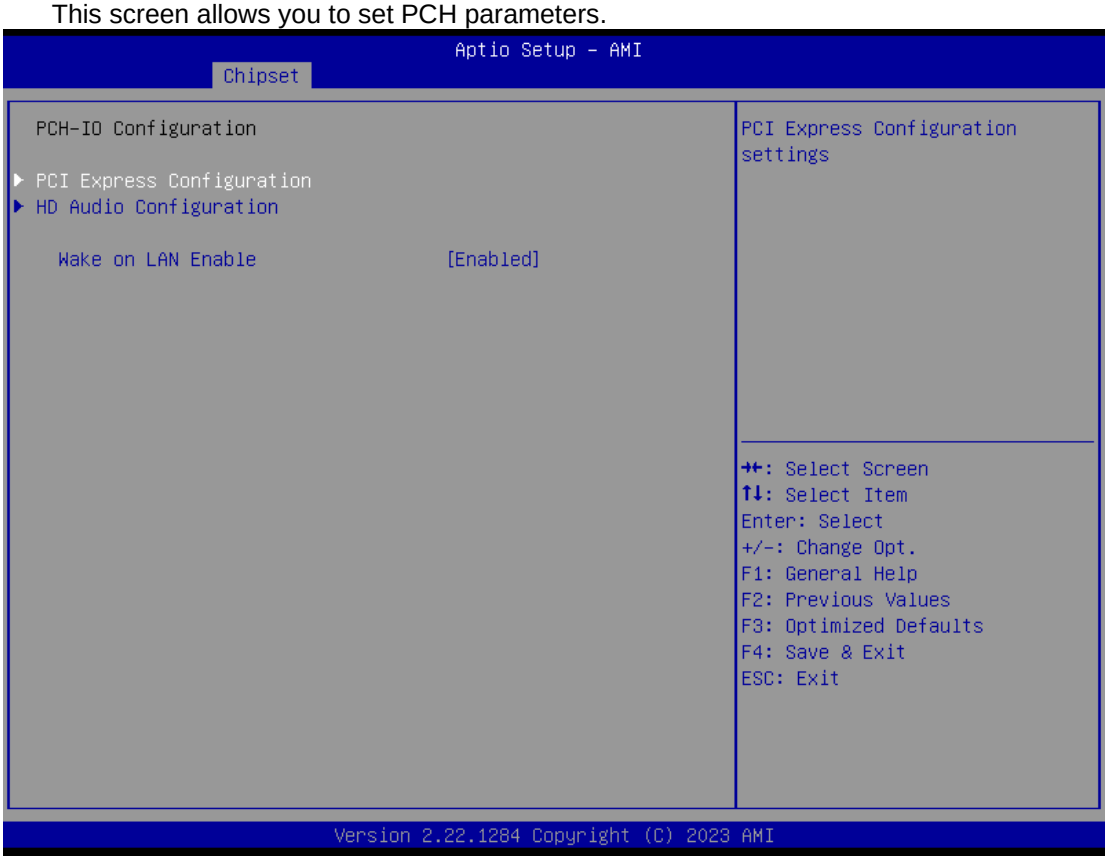


Internal Graphics
Keep IGFX enabled based on the setup options.

- **PEG Port Feature Configuration**
  This screen allows you to set PEG Port.



- **PCH-IO Configuration**
  This screen allows you to set PCH parameters.

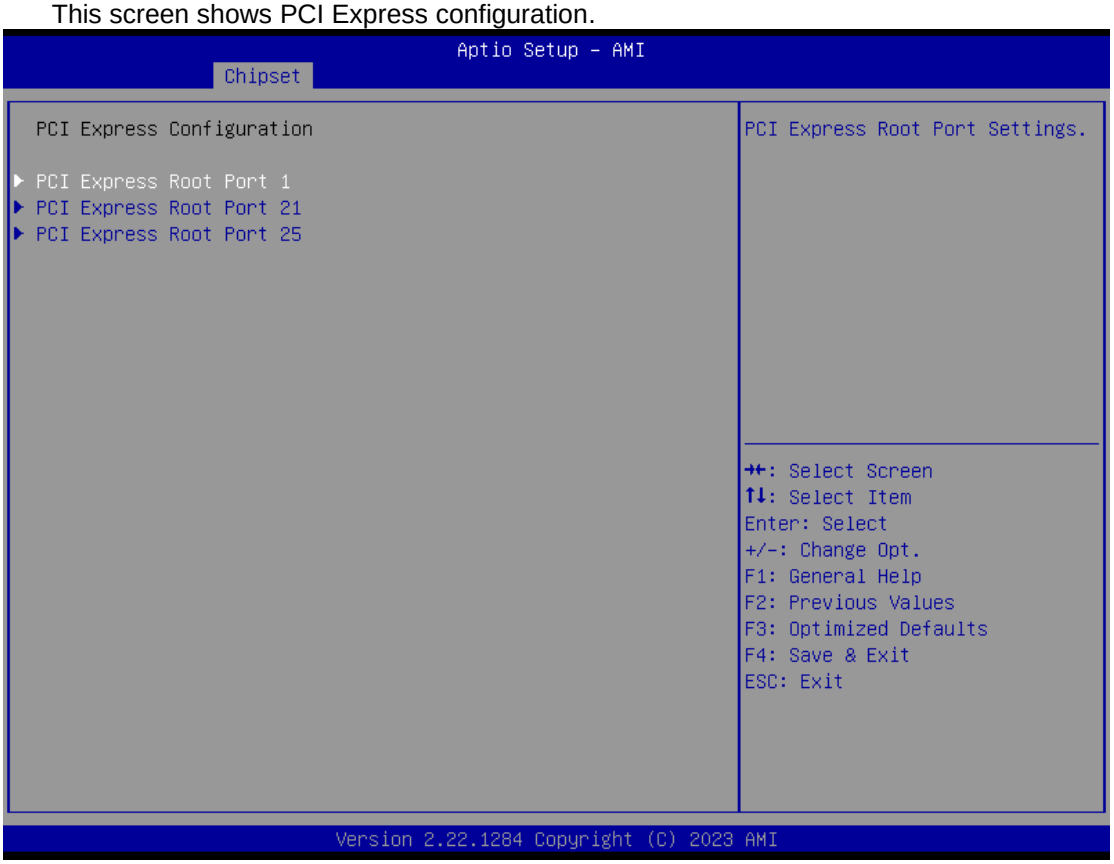


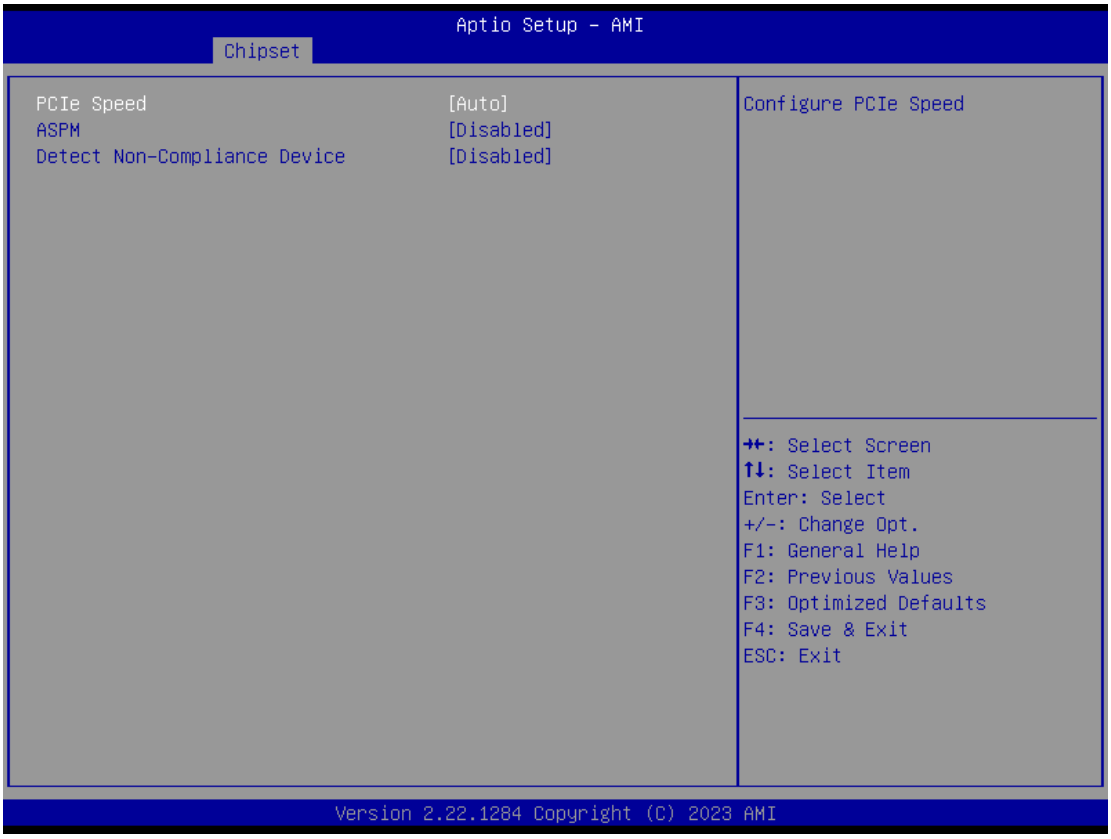
PCI Express Configuration
Configure PCIe Speed.

HD Audio Configuration
Enable or disable HD Audio.

Wake on LAN Enable
Enable or disable integrated LAN to wake the system.

- **PCI Express Configuration**
  This screen shows PCI Express configuration.



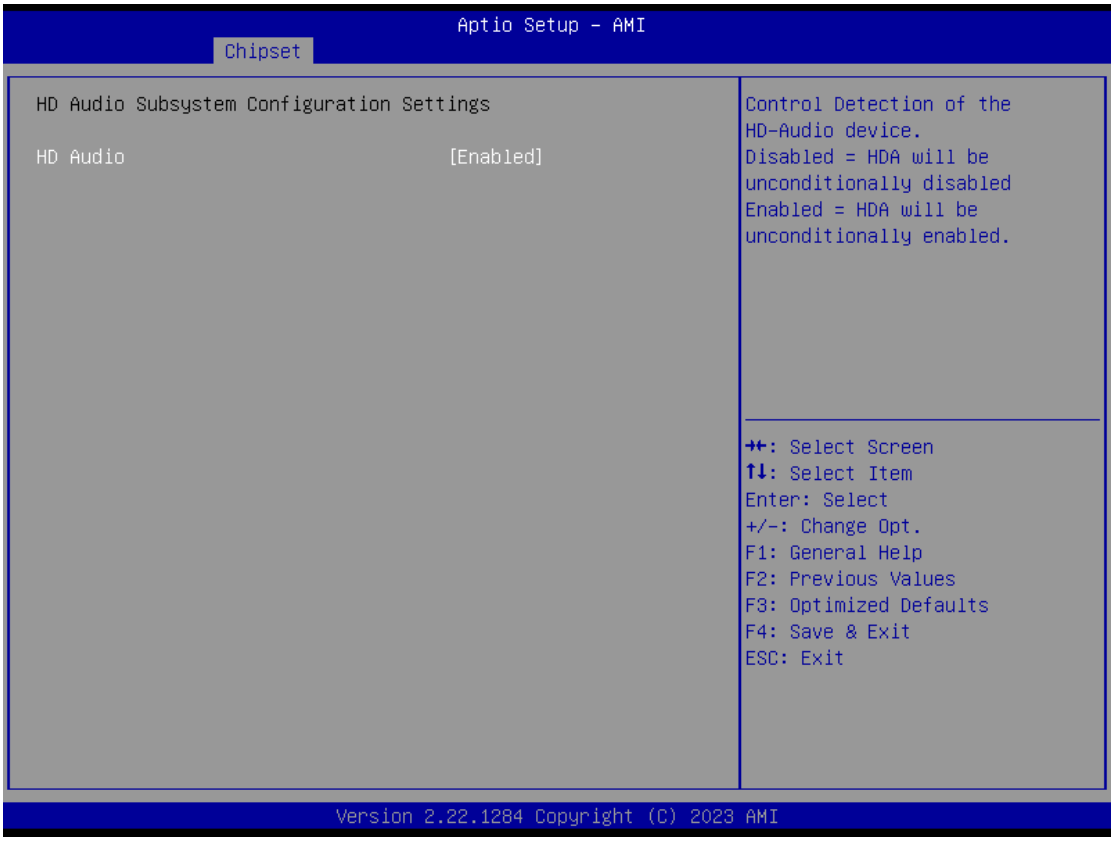


PCIe Speed
Configure PCIe Speed.

ASPM
Set the ASPM Level:
L1 - Force all links to L1 State.
AUTO - BIOS auto configure.
DISABLE - Disables ASPM.

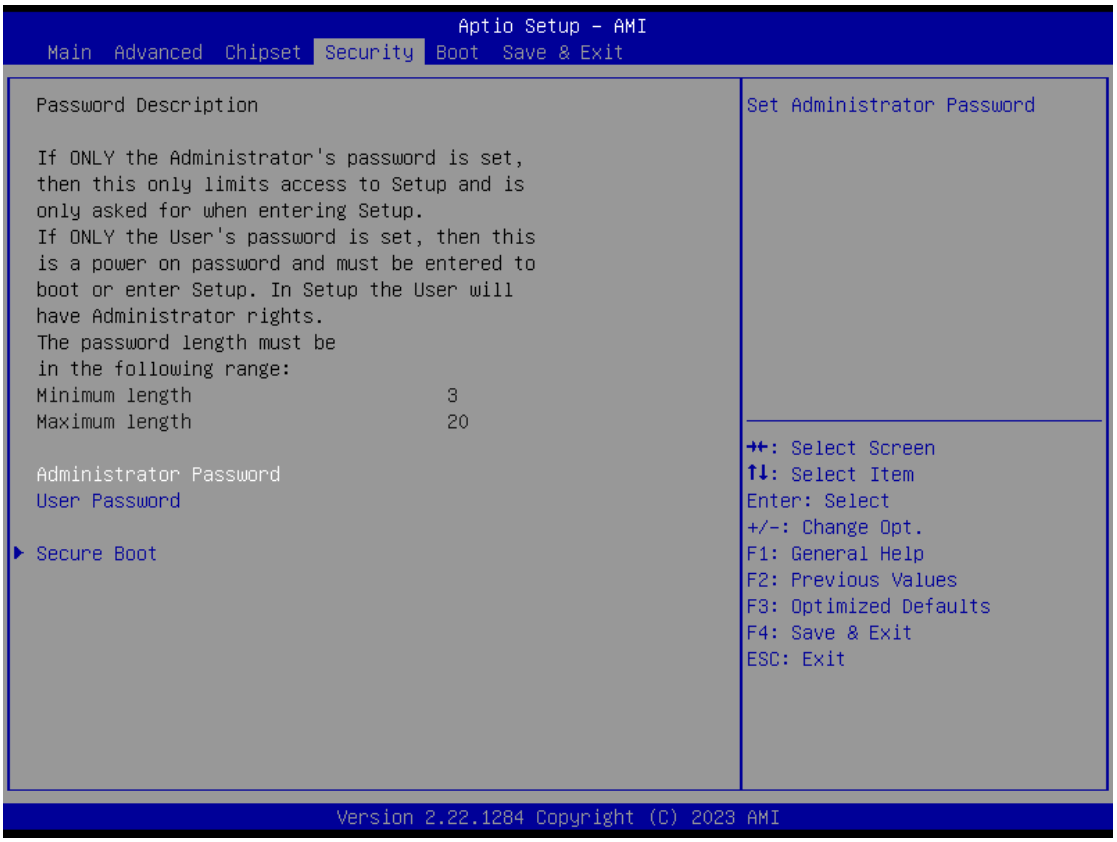
Detect Non-Compliance Device
Detect Non-Compliance PCI Express Device. If enabled, it will take more time at POST time.

- **HD Audio Configuration**
  This screen shows HD Audio information



5.6 Security Menu

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



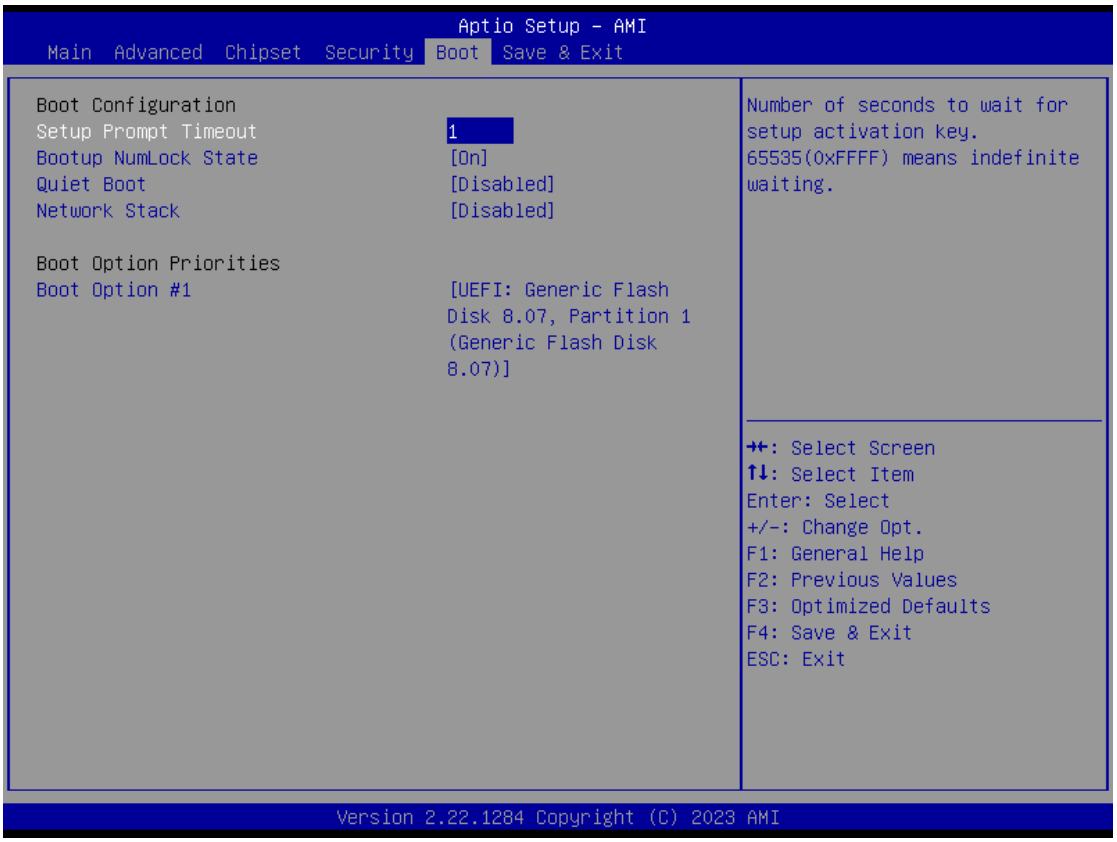
- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

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

- **Secure Boot**
  This item is available on the UEFI firmware to provide a secure environment.

5.7 Boot Menu

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



- **Setup Prompt Timeout**
  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.

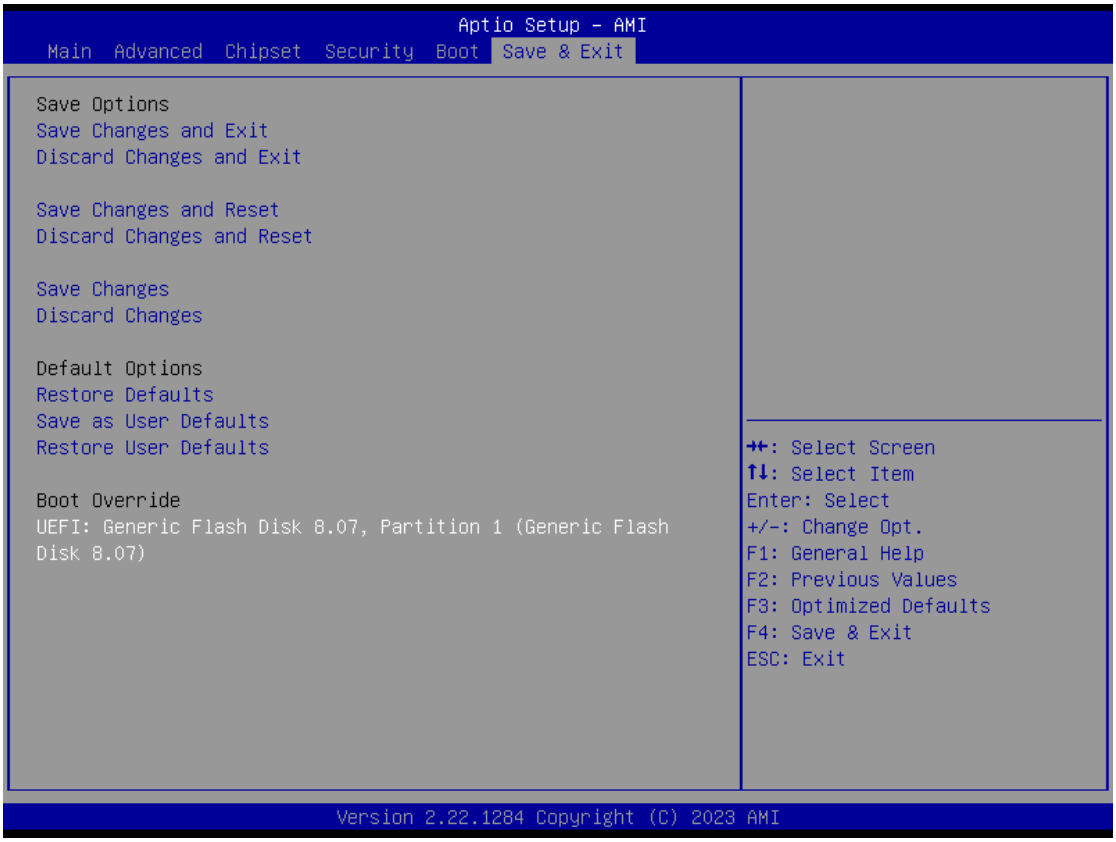
- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Network Stack**
  Use this item to run the BIOS of your device through the internet instead of Hard Drives

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

5.8 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 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.

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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 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.

A.2 How to Use Watchdog 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;

}
```

- 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

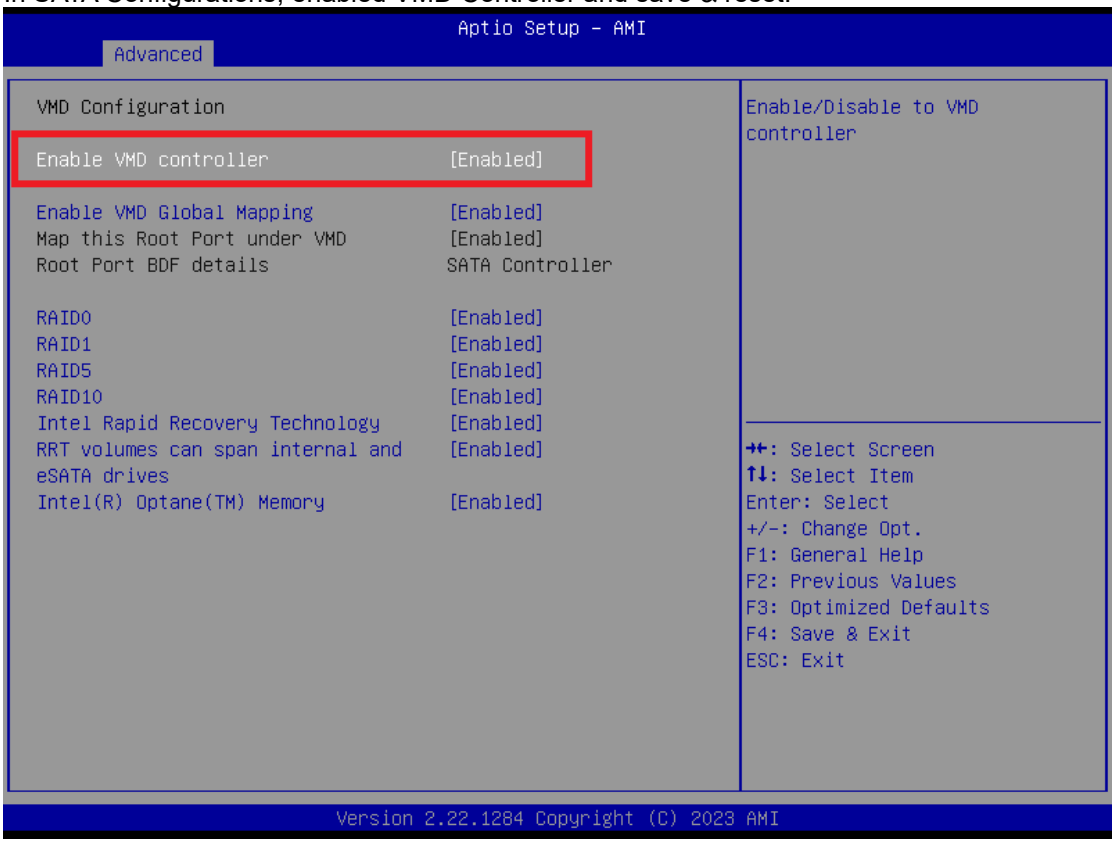
If N=08h, the time base is set to minute.
M = time value
00h: Time-out Disable
01h: Time-out occurs after 1 minute
02h: Time-out occurs after 2 minutes
03h: Time-out occurs after 3 minutes
.
.
FFh: Time-out occurs after 255 minutes

Appendix B
VMD(RAID) Configuration

How to Create Raid?

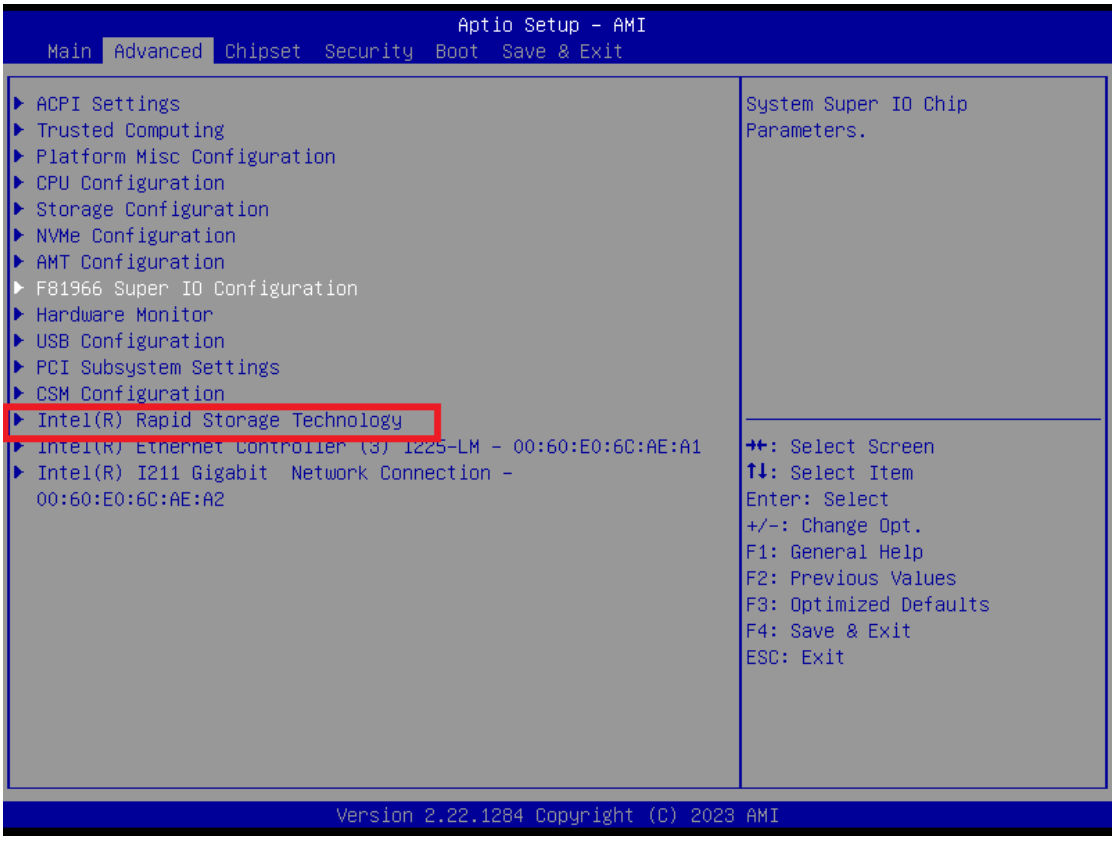
Step 1

In SATA Configurations, enabled VMD Controller and save & reset.



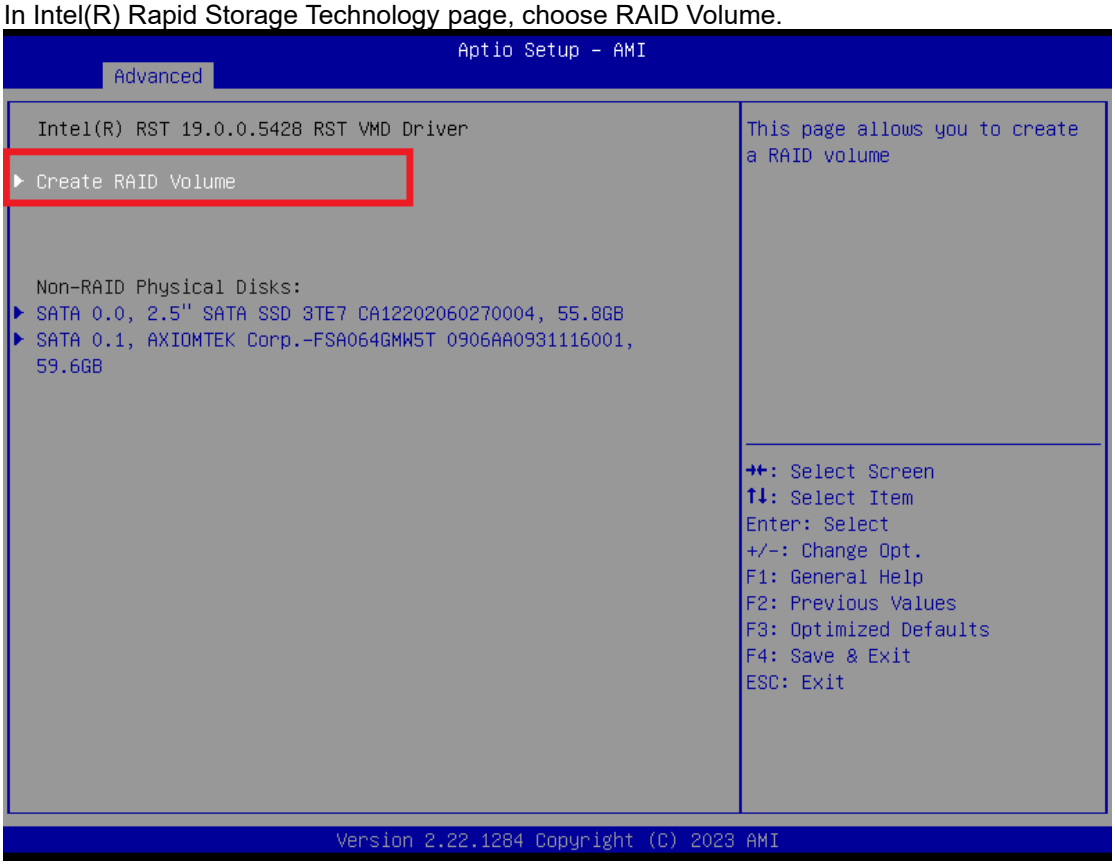
Step 2

After Restart, enter <del> to Bios Setup Menu. In Advanced Page, choose Intel(R) Rapid Storage Technology.

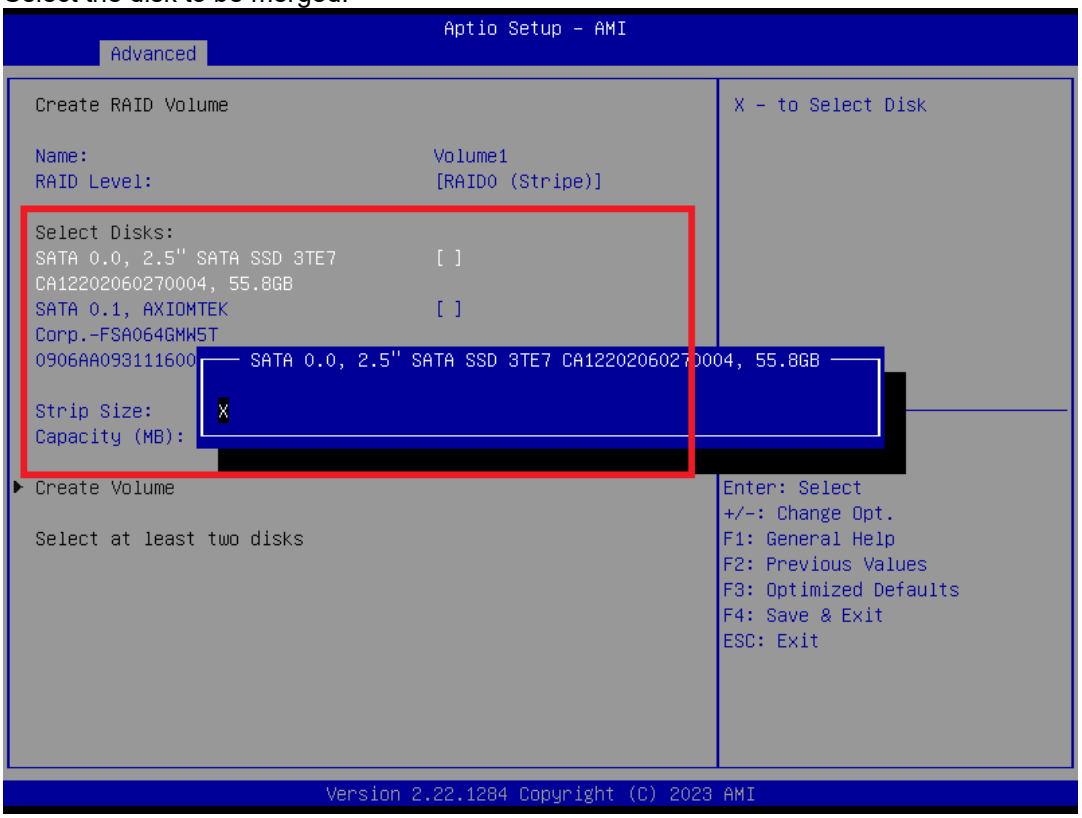


Step 3

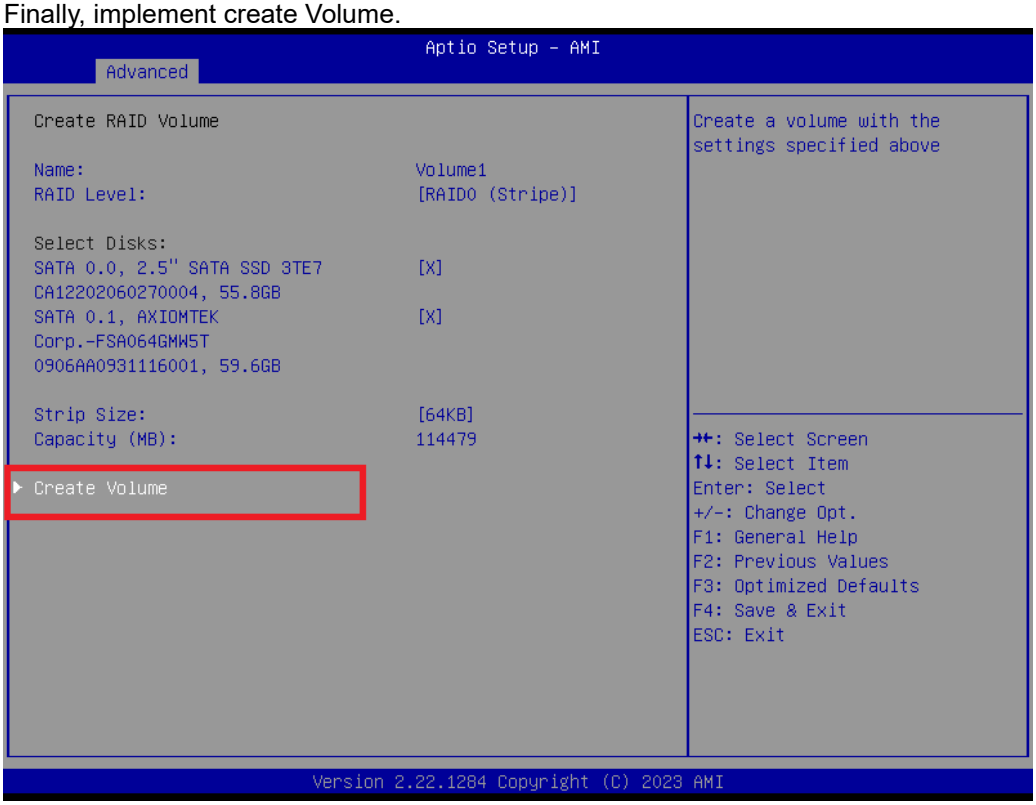
In Intel(R) Rapid Storage Technology page, choose RAID Volume.



Step 4.
Select the disk to be merged.



Step5.
Finally, implement create Volume.



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Appendix C
PCI IRQ Routing

C.1 PICMG® PCI IRQ Routing

Device	ID	Slot	Int
PCI Slot 0	31	0	BCDA
PCI Slot 1	30	1	CDAB
PCI Slot 2	29	2	DABC
PCI Slot 3	28	3	ABCD

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Appendix D
iAMT Settings

The Intel® Active Management Technology (Intel® AMT) utilizes built-in platform capabilities and popular third-party management and security applications to allow IT administrators to remotely discover, repair and better protect their networked computing assets, thus significantly improving IT management efficiency.

In order to use Intel® AMT you must enter the ME BIOS , change the ME BIOS password, and then select “Intel® iAMT” as the manageability feature.

Entering Management Engine BIOS Extension (MEBx)

1. Go to AMT configuration to enable the iAMT function.
2. After restarting BIOS, exit and enter MEBx Setting.

Set and Change Password

1. You will be asked to set a password at first login. The default password is “admin”.

2. You will be asked to change the password before setting ME.

3. Confirm your new password while revising. The new password must consist of eight characters, including at least:

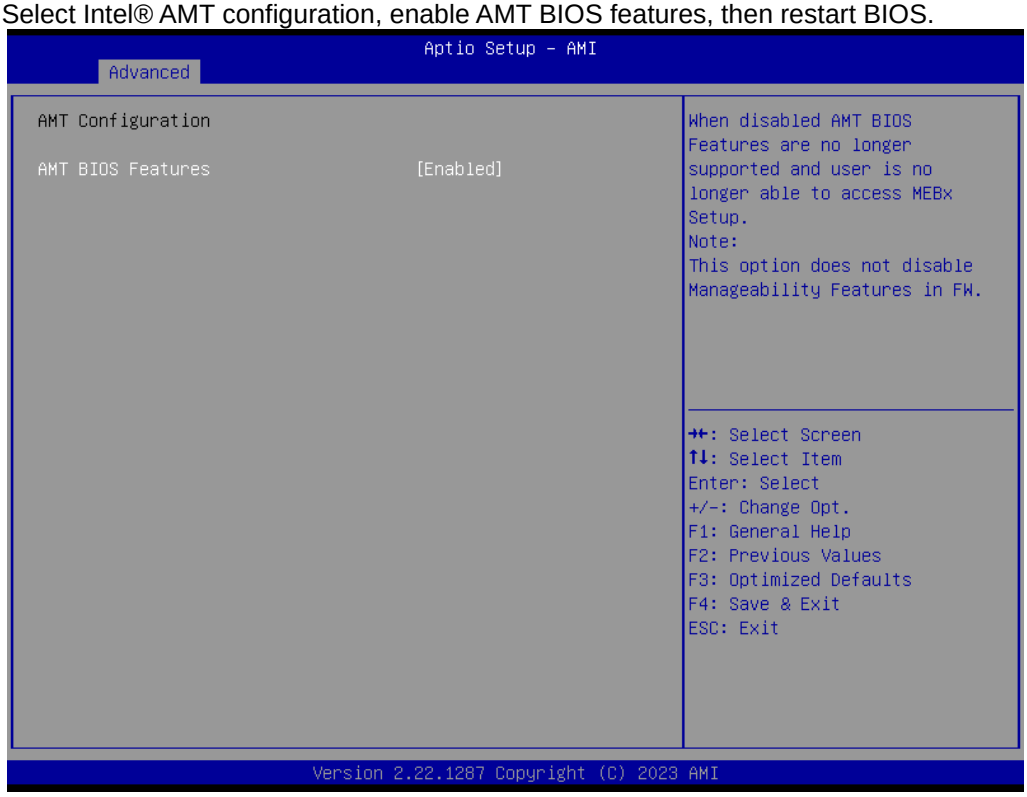
   - One upper- case letter
   - One lower- case letter
   - One number
   - One special symbol, such as ‘!’, ‘$’, ‘;’ (except: ‘:’, ‘,’, ‘”’)

   The default demonstrates an example of a valid password: **!!11qqQQ**

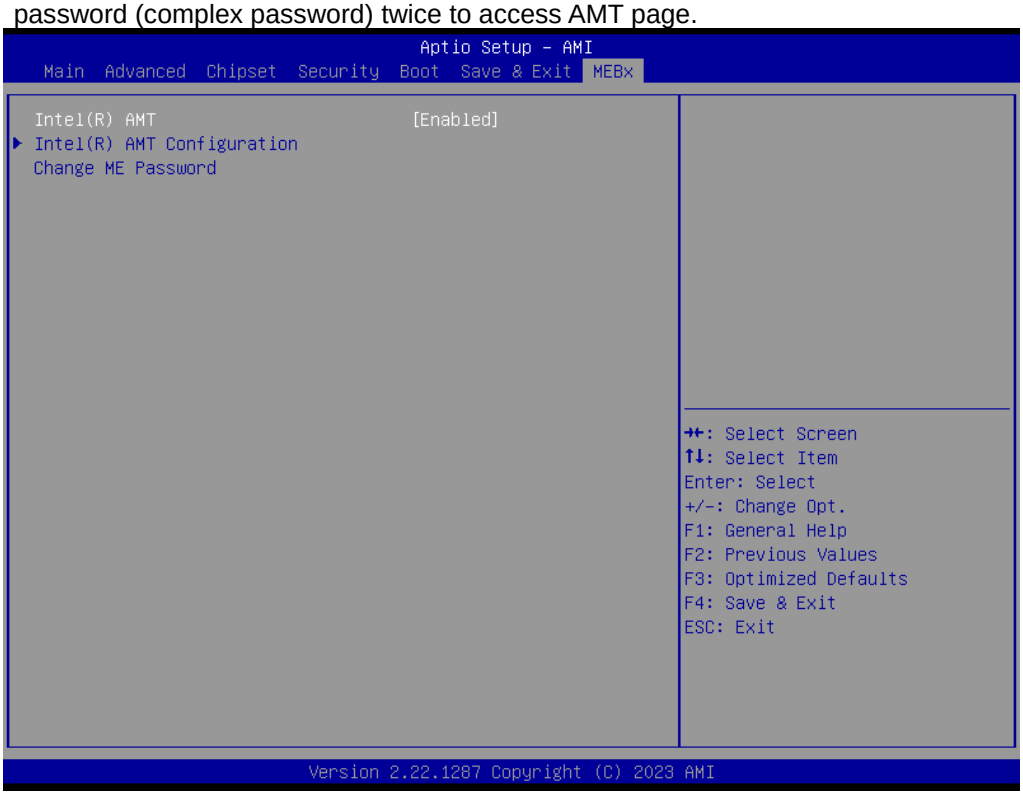
   Underline and space are valid characters for the password.

iAMT Settings

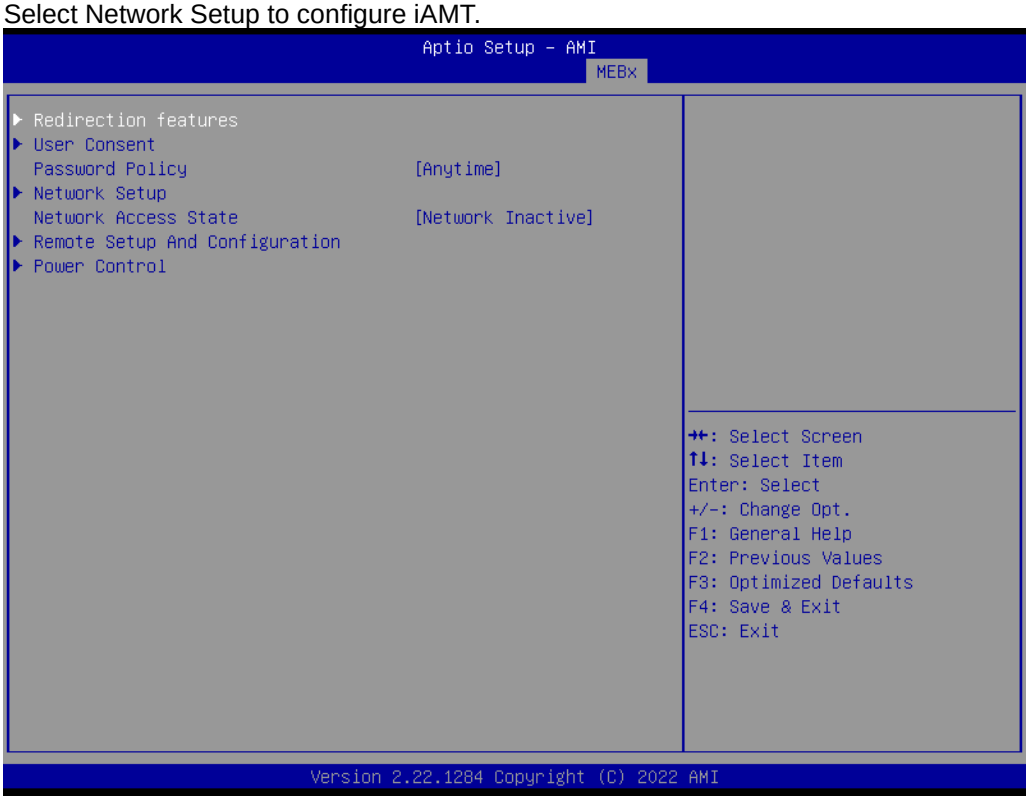
1. Select Intel® AMT configuration, enable AMT BIOS features, then restart BIOS.



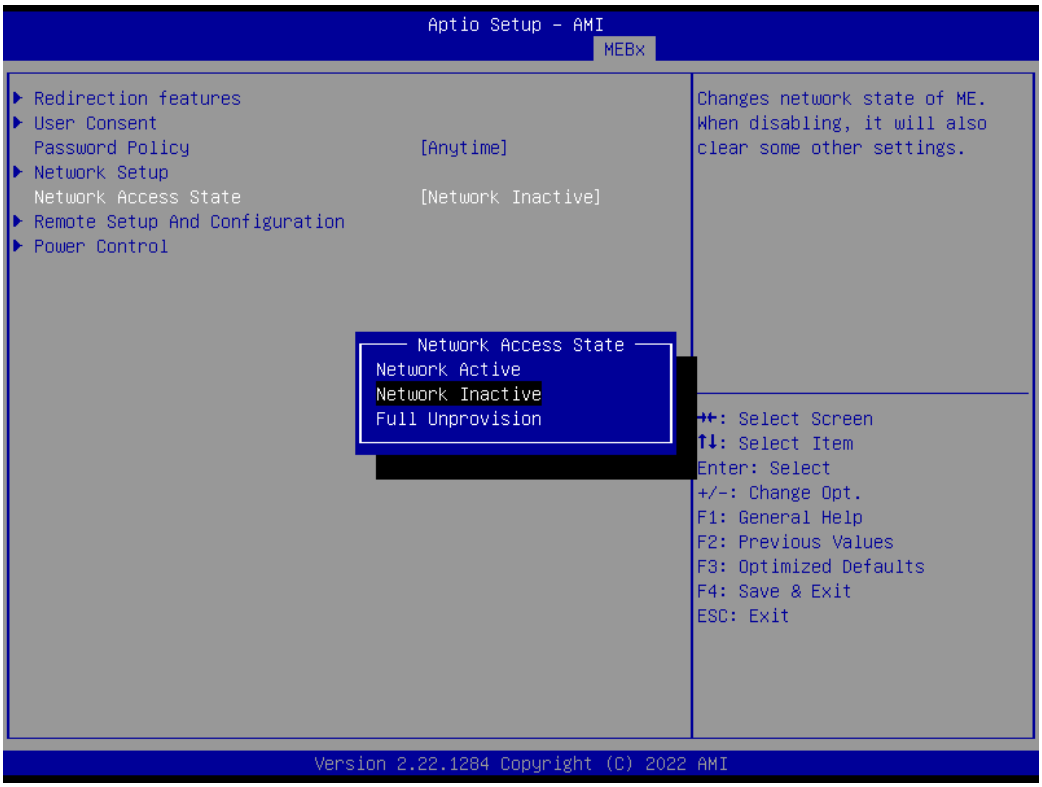
2. Go to MEBx page, enter thedefault password “admin” for first time login, then enter new password (complex password) twice to access AMT page.



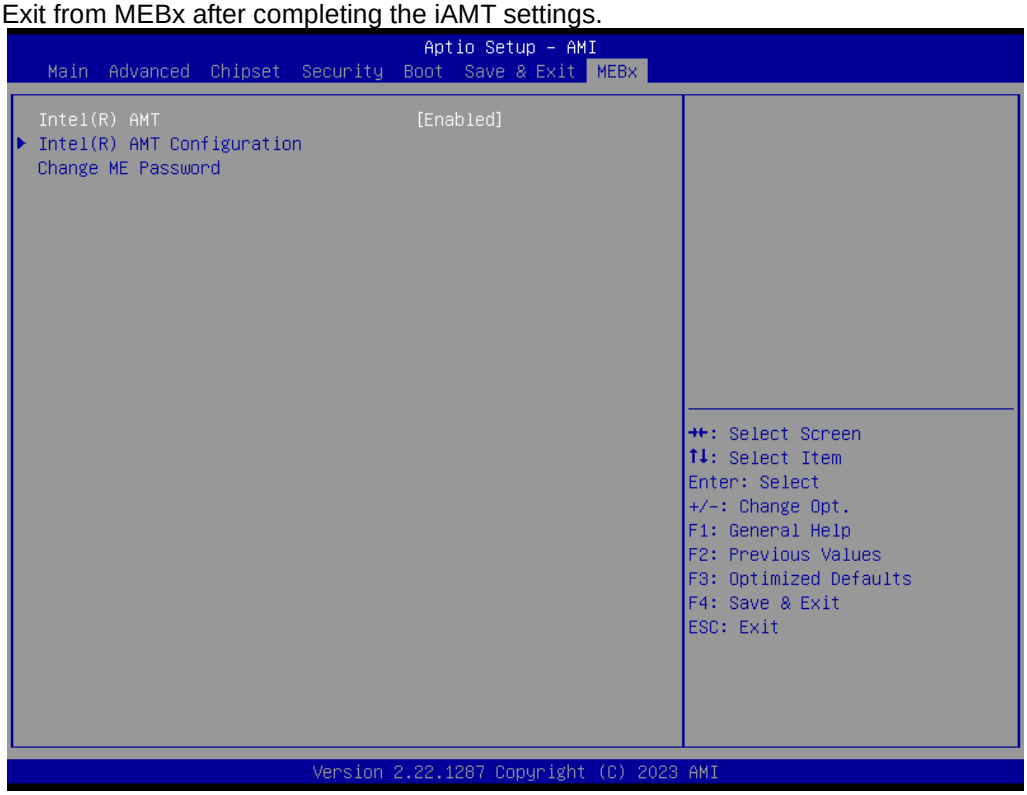
3. Select Network Setup to configure iAMT.



4. Go back to Intel® AMT Configuration, then select Activate Network Access and press <Enter>.



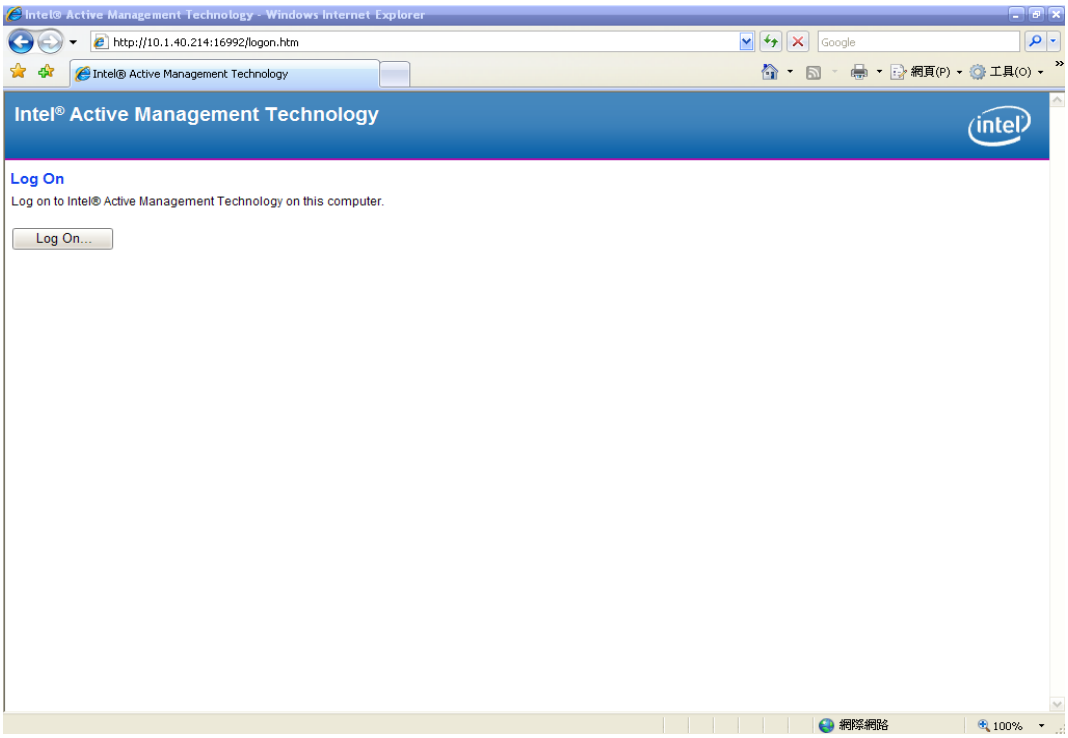
5. Exit from MEBx after completing the iAMT settings.



iAMT Web Console

1. On a web browser, type http://(IP ADDRESS):16992, which directs to iAMT Web.

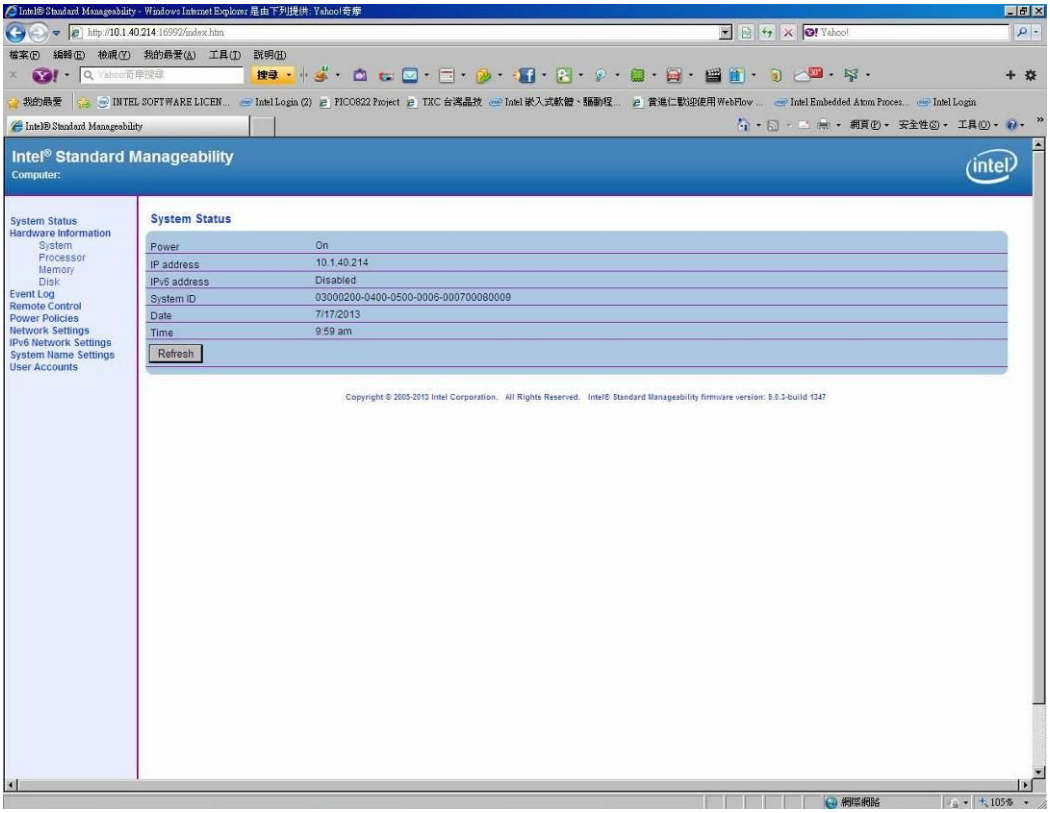
   Example: http://10.1.40.214:16992



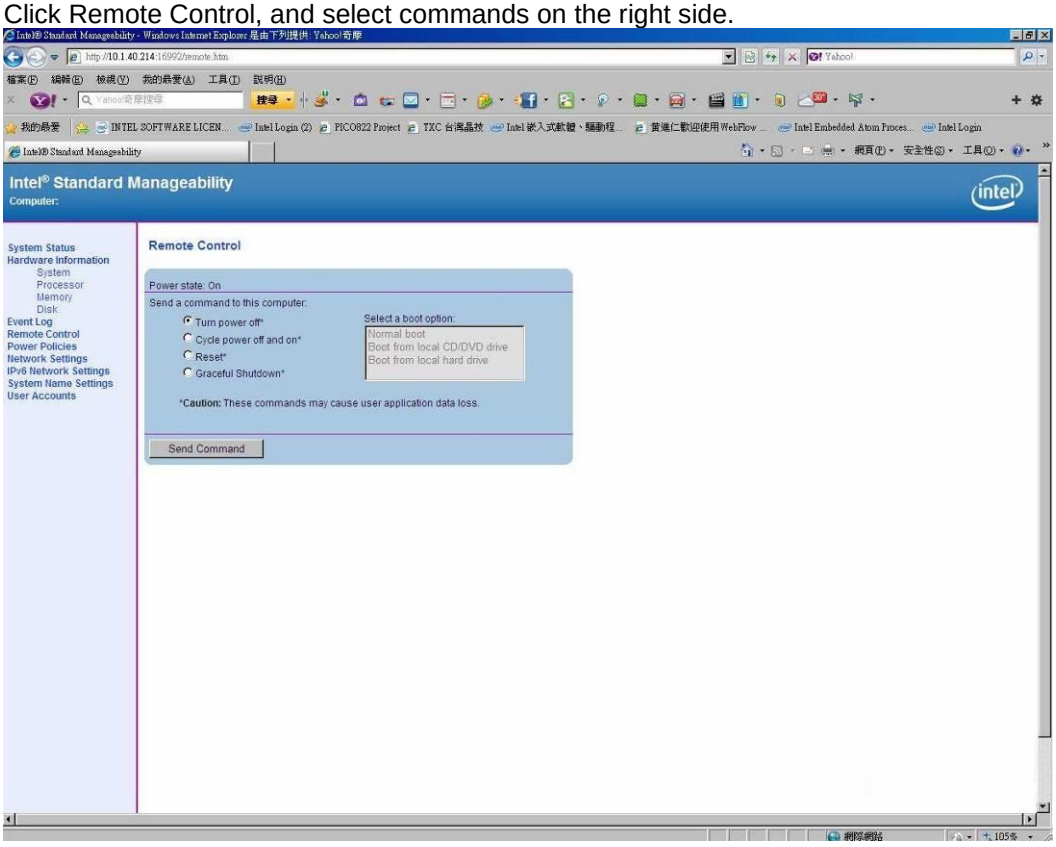
2. To log in, you will be required to type in your username and password for access to the Web.

   USER: admin (default)
   PASS: (MEBx password)

3. Enter the iAMT Web.



4. Click Remote Control, and select commands on the right side.



5. When you have finished using the iAMT Web console, close the Web browser.

Appendix E
PICMG® v1.3 Interface Definition

x16 PCIe Connector A			x16 PCIe Connector C		
No.	**Side B**	**Side A**	**No.**	**Side B**	**Side A**
1	N.C	N.C	1	USB0P	GND
2	GND	GND	2	USB0N	GND
3	N.C	N.C	3	GND	USB1P
4	N.C	N.C	4	GND	USB1N
5	N.C	WAKE#	5	USB2P	GND
6	PWRBT#	PME#	6	USB2N	GND
7	PWRGD	PSON#	7	GND	USB3P
8	SHB_RST#	PERST#	8	GND	USB3N
9	CFG0	CFG1	9	USBOC0#	GND
10	CFG2	CFG3	10	GND	USBOC1#
11	RSVD	GND	11	USBOC2#	GND
Mechanical Key					
12	GND	N.C	12	GND	USBOC3#
13	b_PETp0	GND	13	N.C	GND
14	b_PETn0	GND	14	N.C	GND
15	GND	b_PERp0	15	GND	N.C
16	GND	b_PERn0	16	GND	N.C
17	b_PETp1	GND	17	N.C	GND
18	b_PETn1	GND	18	N.C	GND
19	GND	b_PERp1	19	GND	N.C
20	GND	b_PERn1	20	GND	N.C
21	b_PETp2	GND	21	N.C	GND
22	b_PETn2	GND	22	N.C	GND
23	GND	b_PERp2	23	GND	N.C
24	GND	b_PERn2	24	GND	N.C
25	b_PETp3	GND	25	N.C	GND
26	b_PETn3	GND	26	N.C	GND

Mechanical Key					
27	GND	b_PERp3	27	GND	N.C
28	GND	b_PERn3	28	GND	N.C
29	REFCLK0+	GND	29	N.C	GND
30	REFCLK0-	GND	30	N.C	GND
31	GND	REFCLK1+	31	N.C	N.C
32	RSVD	REFCLK1-	32	N.C	N.C
33	REFCLK2+	GND	33	N.C	N.C
34	REFCLK2-	GND	34	N.C	GND
35	GND	REFCLK3+	35	N.C	GND
36	RSVD	REFCLK3-	36	GND	N.C
37	REFCLK4+	GND	37	GND	N.C
38	REFCLK4-	GND	38	N.C	GND
39	GND	N.C	39	N.C	GND
40	RSVD	N.C	40	GND	N.C
41	N.C	GND	41	GND	N.C
42	N.C	GND	42	+3.3V	+3.3V
43	GND	N.C	43	+3.3V	+3.3V
44	GND	N.C	44	+3.3V	+3.3V
45	a_PETp0	GND	45	+3.3V	+3.3V
46	a_PETn0	GND	46	+3.3V	+3.3V
47	GND	a_PERp0	47	+3.3V	+3.3V
48	GND	a_PERn0	48	+3.3V	+3.3V
49	a_PETp1	GND	49	+3.3V	+3.3V
50	a_PETn1	GND	50	+3.3V	+3.3V
51	GND	a_PERp1	51	GND	GND
52	GND	a_PERn1	52	GND	GND
53	a_PETp2	GND	53	GND	GND
54	a_PETn2	GND	54	GND	GND
55	GND	a_PERp2	55	GND	GND
56	GND	a_PERn2	56	GND	GND
57	a_PETp3	GND	57	GND	GND

Mechanical Key					
58	a_PETn3	GND	58	GND	GND
59	GND	a_PERp3	59	+5V	+5V
60	GND	a_PERn3	60	+5V	+5V
61	a_PETp4	GND	61	+5V	+5V
62	a_PETn4	GND	62	+5V	+5V
63	GND	a_PERp4	63	GND	GND
64	GND	a_PERn4	64	GND	GND
65	a_PETp5	GND	65	GND	GND
66	a_PETn5	GND	66	GND	GND
67	GND	a_PERp5	67	GND	GND
68	GND	a_PERn5	68	GND	GND
69	a_PETp6	GND	69	GND	GND
70	a_PETn6	GND	70	GND	GND
71	GND	a_PERp6	71	GND	GND
72	GND	a_PERn6	72	GND	GND
73	a_PETp7	GND	73	+12V	+12V
74	a_PETn7	GND	74	+12V	+12V
75	GND	a_PERp7	75	+12V	+12V
76	GND	a_PERn7	76	+12V	+12V
77	N.C	GND	77	+12V	+12V
78	+3.3V	+3.3V	78	+12V	+12V
79	+3.3V	+3.3V	79	+12V	+12V
80	+3.3V	+3.3V	80	+12V	+12V
81	+3.3V	+3.3V	81	+12V	+12V
82	RSVD	RSVD	82	+12V	+12V

x8 PCIe Connector B			x8 PCIe Connector D		
No.	**Side B**	**Side A**	**No.**	**Side B**	**Side A**
1	+5Vaux	+5Vaux	1	INTB#	INTA#
2	GND	N.C	2	INTD#	INTC#
3	a_PETp8	GND	3	GND	N.C
4	a_PETn8	GND	4	REQ3#	GNT3#
5	GND	a_PERp8	5	REQ2#	GNT2#
6	GND	a_PERn8	6	PCI_RST#	GNT1#
7	a_PETp9	GND	7	REQ1#	GNT0#
8	a_PETn9	GND	8	REQ0#	SERR#
9	GND	a_PERp9	9	N.C	+3.3V
10	GND	a_PERn9	10	GND	N.C
11	N.C	GND	11	N.C	GND
Mechanical Key					
12	GND	N.C	12	CLKC	CLKD
13	a_PETp10	GND	13	GND	+3.3V
14	a_PETn10	GND	14	CLKA	CLKB
15	GND	a_PERp10	15	+3.3V	GND
16	GND	a_PERn10	16	AD31	GND
17	a_PETp11	GND	17	AD29	+3.3V
18	a_PETn11	GND	18	N.C	AD30
19	GND	a_PERp11	19	AD27	AD28
20	GND	a_PERn11	20	AD25	GND
21	a_PETp12	GND	21	GND	AD26
22	a_PETn12	GND	22	C/BE3#	AD24
23	GND	a_PERp12	23	AD23	+3.3V
24	GND	a_PERn12	24	GND	AD22
25	a_PETp13	GND	25	AD21	AD20
26	a_PETn13	GND	26	AD19	N.C
27	GND	a_PERp13	27	+5V	AD18
28	GND	a_PERn13	28	AD17	AD16

Mechanical Key					
29	a_PETp14	GND	29	C/BE2#	GND
30	a_PETn14	GND	30	PCI_PRST#	FRAME#
31	GND	a_PERp14	31	IRDY#	TRDY#
32	GND	a_PERn14	32	DEVSEL#	+5V
33	a_PETp15	GND	33	LOCK#	STOP#
34	a_PETn15	GND	34	PERR#	GND
35	GND	a_PERp15	35	GND	C/BE1#
36	GND	a_PERn15	36	PAR	AD14
37	N.C	GND	37	N.C	GND
38	N.C	N.C	38	GND	AD12
39	GND	GND	39	AD15	AD10
40	GND	GND	40	AD13	GND
41	GND	GND	41	GND	AD09
42	GND	GND	42	AD11	C/BE0#
43	GND	GND	43	AD08	GND
44	+12V	+12V	44	GND	AD06
45	+12V	+12V	45	AD07	AD05
46	+12V	+12V	46	AD04	GND
47	+12V	+12V	47	GND	AD02
48	+12V	+12V	48	AD03	AD01
49	+12V	+12V	49	AD00	GND

Note

Please contact your vendor to get the backplane design guide if it's required. The backplane design guide is NDA required.

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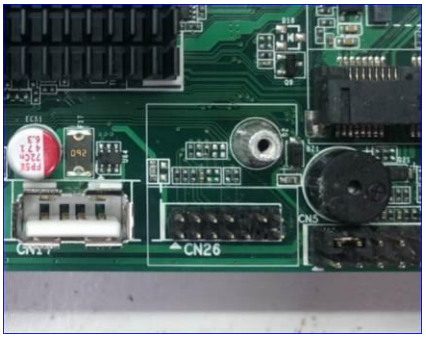
Appendix F
TPM Module Installation

The TPM 2.0 (Trusted Platform Module 2.0) module is a modularized design applying to the SHB150R and provides enhanced hardware security for the computer. In this appendix you will learn how to install the TPM 2.0 module into the SHB150R. Please read and follow the instructions below carefully.

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

AX93515 TPM module

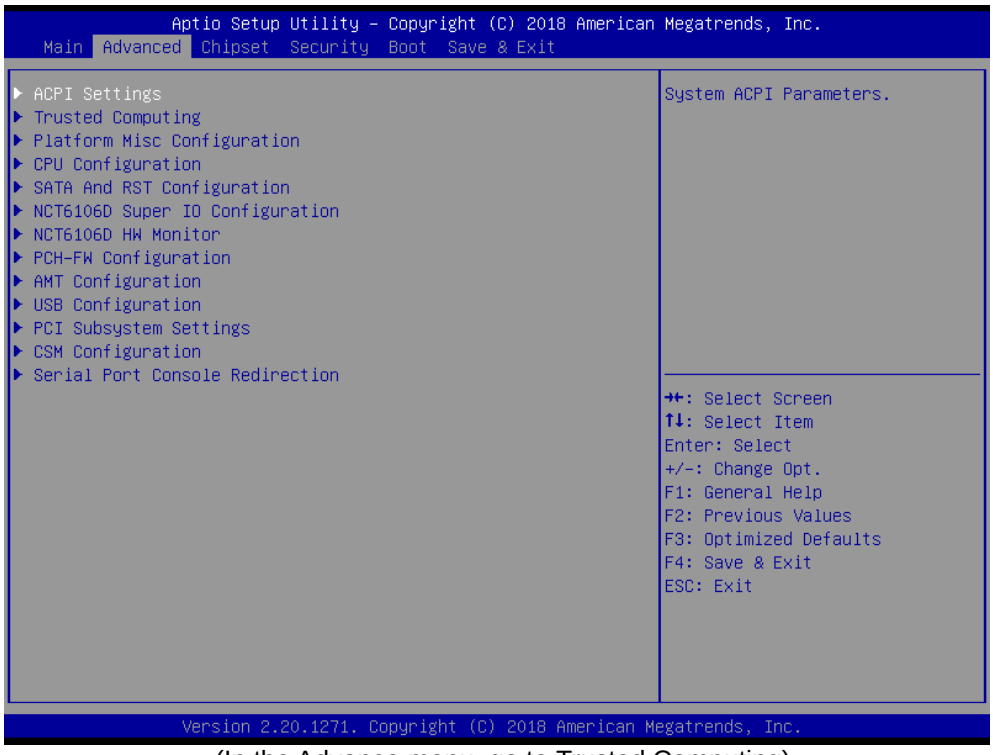


TPM SPI interface

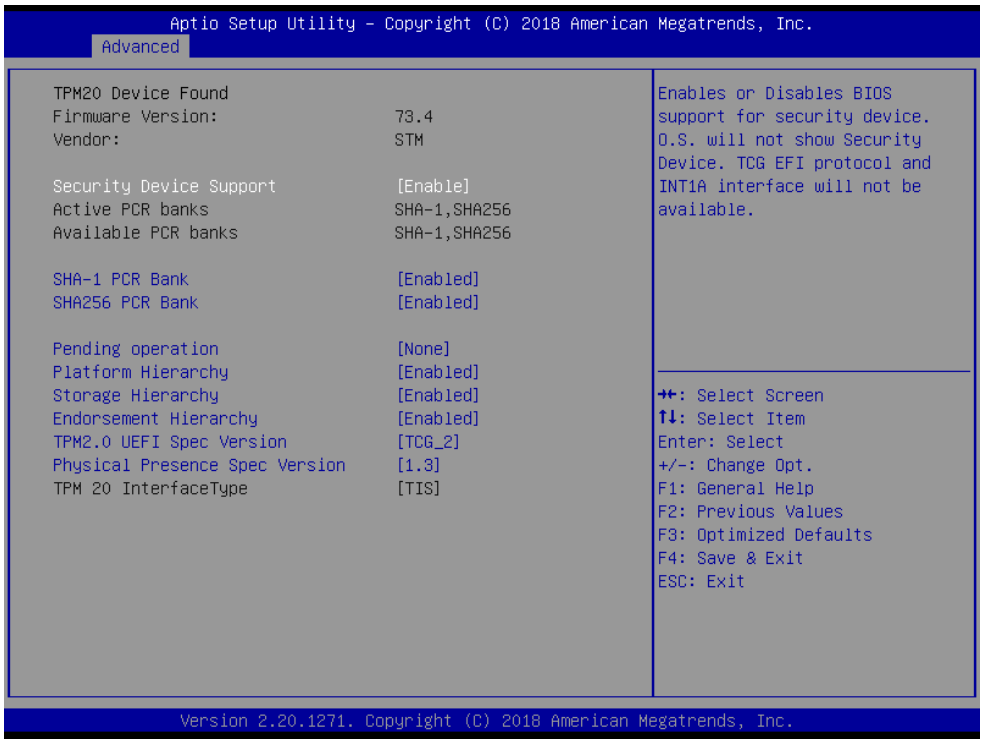
TPM module Put On

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”.

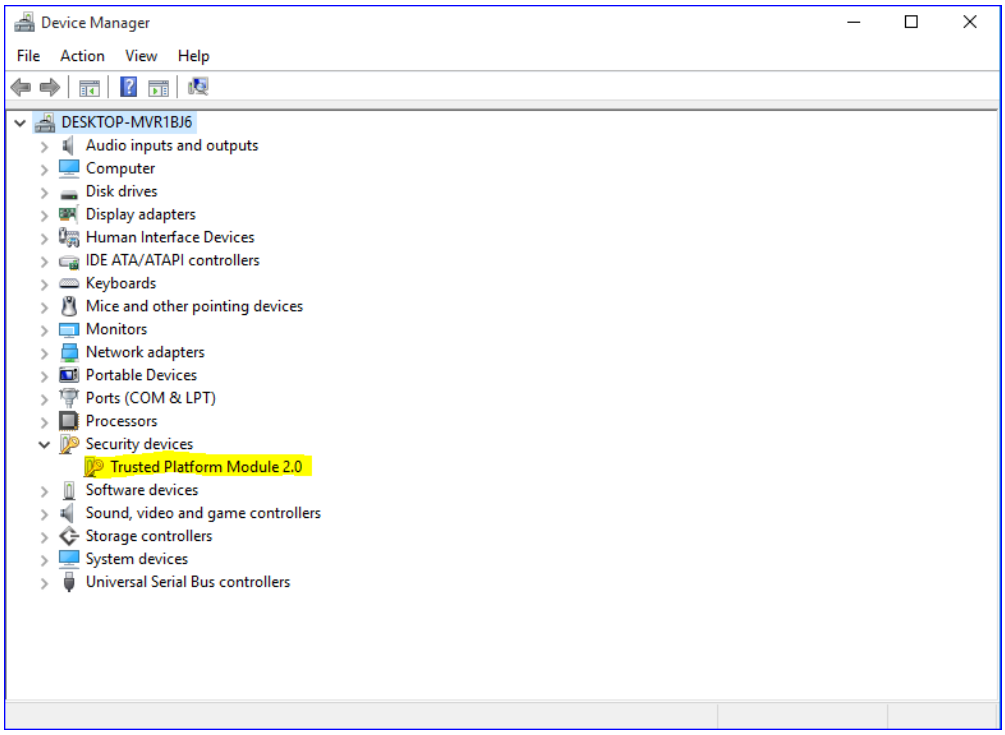
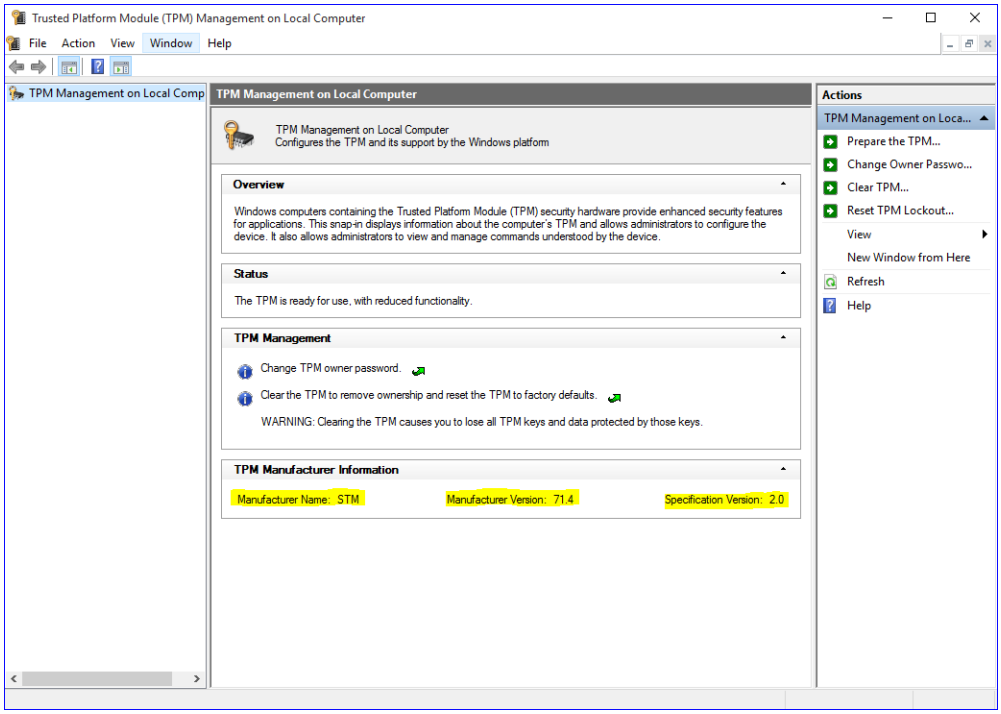


(In the Advance menu, go to Trusted Computing)



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

b. In the Windows 10 OS environment, enter Device Manager, and select the item of Security devices. The screen will show “Trusted Platform Module 2.0” if the installation is successful.



c. In the Windows 10 OS environment, enter Control Panel, select the item of BitLocker Drive Encryption, and enter TPM Administration. The screen will show the information below if the installation is successful.