SBC-6512

Full-size PICMG1.3 SBC

Supports Intel 12th/13th/14th Generation
Core i3/i5/i7 Processor

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Packing List

Please check the content:

SBC-6512 Single Board Computer	1 PC
Utility CD (including user manual)	1 PC
SATA Cable	2 PCS

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Chapter 1 Product Introduction

1.1 Product Overview

The **SBC-6512** is a full-size PICMG 1.3 Single Board Computer, based on the 12th/13th/14th Generation Intel® Core™ i7/ i5/ i3/ Celeron® processors in LGA1700 socket with Intel® R680E/H610E PCH. The optimized **SBC-6512** is specially designed for better computing and visual performance; ideally used in every major industry for tasks ranging from financial modeling to designing complex buildings and vehicles.

With its built-in last Intel® HD Graphics technology, this industrial grade SBC delivers great 3D visual performance with triple display capability through DVI and VGA ports demanded by professional-grade CAD and media/entertainment fields.

In addition, the **SBC-6512** supports Intel® Turbo Boost 2.0 technology, Intel® Hyper-Threading technology, Intel® HD Graphics with DX11 support, 3-D Tri-Gate transistors, 128GB DDR5 4400MHz memory, and PCI-Express 3.0 x16 slot. It also features Intel® Active Management Technology 11 (iAMT), SATA RAID, as well as PCI-Express x4. x1 expansion making it ideal for applications with added security features.

1.2 Product Specifications

General Specification	
Form Factor	PICMG 1.3 Full-size Single Board Computer
CPU	LGA1151 for 12th/13th/14th generation Intel® Core™ processors, TDP up to 125W
Memory	(2) 288-pin DDR5-4400 un-buffered DIMM max. up to 128 GB, R680E supports ECC
Chipset	Intel® R680E/H610E Express Chipset
BIOS	AMI BIOS via SPI interface with socket
Watchdog Timer	System reset programmable watchdog timer with 1~255min.
Serial ATA	Intel® R680E PCH built-in (6) Serial ATAIII interface up to 600MB/s Support RAID 0, 1, 5, 10 and Intel Rapid Storage Technology. Intel® H310 PCH built-in (4) Serial ATAIII

Multiple I/O Ports	
Chipset	FINTEK® F81966 Controller
Serial Port	(2) RS-232 and (2) RS232/422/485 serial ports
Parallel Port	(1) 26-pin 2.54-pitch box-header; SPP/EPP/ECP supported
Keyboard/Mouse	Internal PS/2 keyboard and mouse ports with header
USB	R680E: (3) USB 2.0 & (2) USB 3.2 Gen.2 & (4) USB 3.2 Gen.1 ports H610: (2) USB 2.0 & & (2) USB 3.2 Gen.2 & (2) USB 3.2 Gen.1 ports

Smart Fan	One CPU fan and one chassis fan connectors for fan speed controllable

Display	
Graphic Engine	Intel® Core™ integrated HD Graphics Technology
Frame Buffer	Up to 1.7GB shared with system memory
Display Type	DVI-I with DVI-D and VGA output Onboard internal DP 1.4 connector
Resolution	DVI/VGA Resolution max. up to 1920 x 1200 @ 60Hz DP1.4 Resolution max. up to 4096 x 2304

Ethernet	
Controller	LAN1/LAN2: Intel® i225LM with iAMT / Intel® i225V Ethernet controller
Type	2500/1000/100/10Mbps Auto-switching Fast Ethernet Full duplex, IEEE802.3U compliant
Connector	Two External RJ45 connectors on rear I/O panel

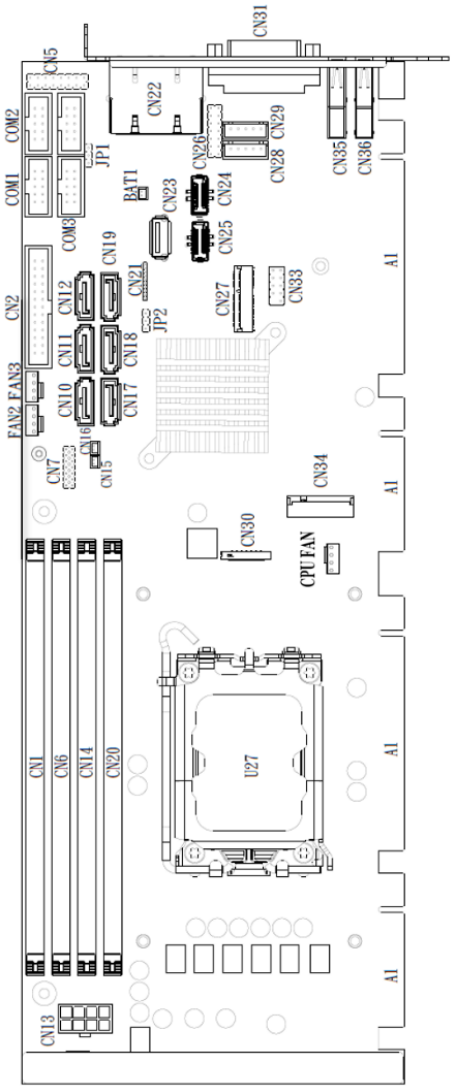
Audio	
Codec	Optional Audio Codec with module

Expansion	
PCI	(4) 32-bit PCI slots
PCI Express	One PCI-Express x16 (Gen.3) One PCI-Express x4 (or four PCI-Express x1) (Gen.3)

Power & Environment	
Power Requirement	Standard 24-pin ATX power supply
Dimension	338 (L) x 126 (H) mm
Temperature	Operating within 0° ~ 60°C (32° ~ 140°F) Storage within -20° ~ 85°C (-4° ~ 185°F)

Chapter 2 Hardware Installation

2.1Board Layout



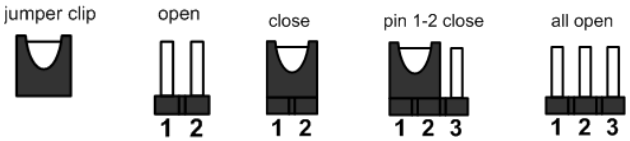
2.3 Connector & Jumper List

Connector		Function
1	**CN13**	ATX Power Connector
2	**DIMM0/DIMM1**	DDR5 DIMM Socket
3	**CN7**	TPM Pin Header
4	**FAN2**	FAN Connector
5	**FAN3**	FAN Connector
6	**CN2**	Parallel Port Connector
7	**COM1**	Serial Port Connector
8	**COM2**	Serial Port Connector
9	**COM3**	Serial Port Connector
10	**COM4**	Serial Port Connector
11	**CN5**	Optional Audio Digital Module Header
12	**CN10~CN12/CN17~19**	SATA 3.0 Connector
13	**CN15**	Temperature Sensor Connector
14	**CN16**	Temperature Sensor Connector
15	**CN30**	Display Port 1.4 Connector
16	**CN27**	M.2 E Key 2230 interface
17	**JP2**	Clear BIOS CMOS Jumper
18	**JP1**	Auto Power On Jumper
19	**CN21**	DEBUG PORT Connector
20	**CN23**	Internal USB 2.0 Connector
21	**CN25**	Internal USB 3.2 Gen1x1 Connector
22	**CN24**	Internal USB 3.2 Gen1x1 Connector
23	**CN26**	Front Panel Connector
24	**CPU Fan**	CPU FAN Connector
25	**CN34**	M.2 2280 Key M interface for NVMe SSD

26	**CN33**	Internal USB 2.0 Connector
27	**CN28**	Internal PS/2 Mouse Connector
28	**CN29**	Internal PS/2 Keyboard Connector
29	**BAT1**	RTC Battery Socket
30	**CN22**	RJ45 LAN Port
31	**CN22**	RJ45 LAN Port
32	**CN31**	DVI-I Connector
33	**CN35/CN36**	USB 3.2 Gen2x1 Connector

2.4 Jumpers

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins for close. And remove jumper clip from 2 jumper pins for open. The following illustration shows how to set up jumper.



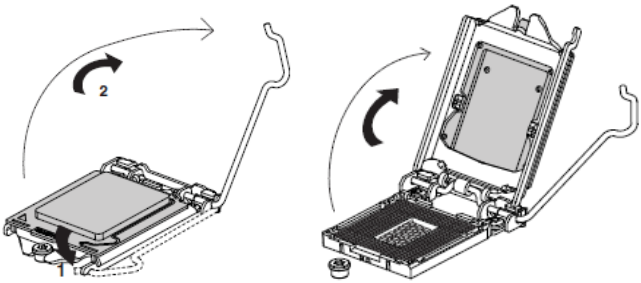
Jumper	Function	Default
JP1	Auto Power On Default: Disable	1-2 Close
JP2	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close

2.4 CPU Installation

The LGA1151 processor socket comes with a cover to protect the processor. Please install the processor into the CPU socket step by step as below:

Step 1: Open the socket

- Disengage load lever by releasing down and out on the hook. This will clear retention tab.
- Rotate load lever to open position at approximately 135 °
- Rotate load plate to open position at approximately 150 °

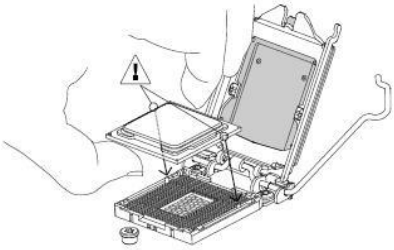


Step 2: Removing the socket protective cover

- Place thumb against the front edge of the protective cover and rest 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 index finger.
- Lift protective cover away from the socket, being careful not to touch the electrical contacts.
- Carefully place the processor into the socket body vertically (see image below)

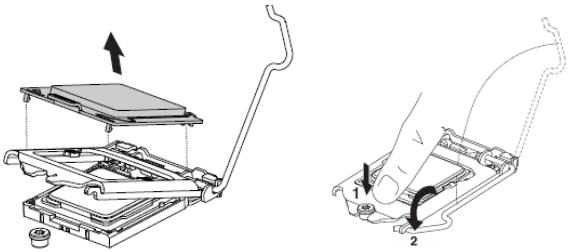
Step 3: Processor installation

- Lift 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,



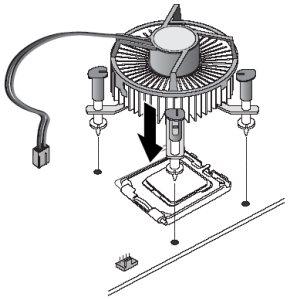
Step 4: Close the socket (see image below)

- Gently lower the load plate.
- Make sure 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.

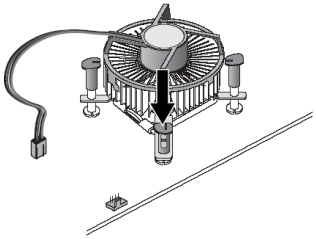


Step 5: Fan and Heatsink handling

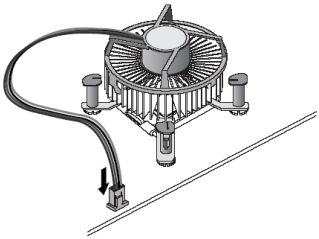
1. Orientate the CPU cooling fan to fixing holes on the board.



2. Screw the CPU cooling fan onto the board.



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

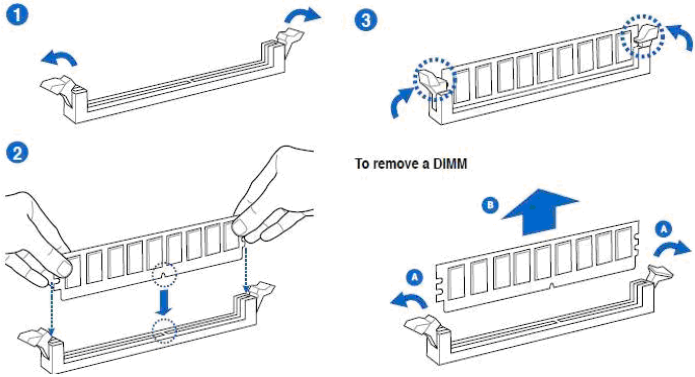


2.5 Memory Installation

The board supports two 288-pin DDR5 DIMM memory sockets with maximum 128GB.

Please follow steps below to install the memory modules:

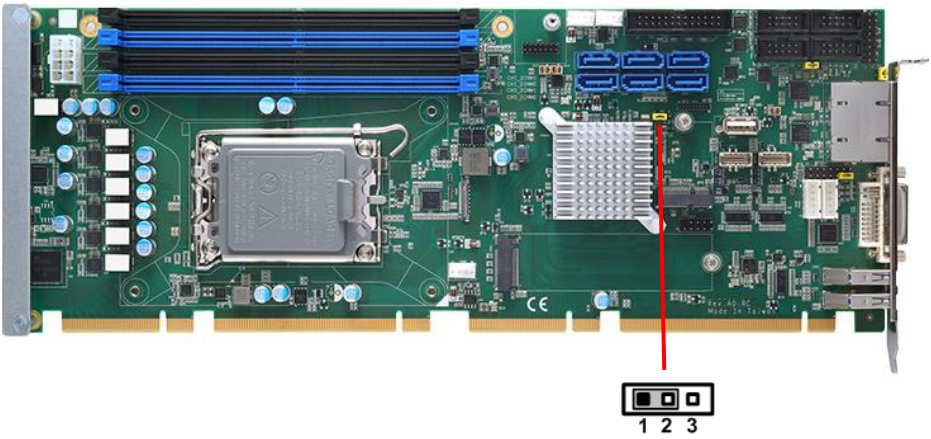
- Push down latches on each side of the DIMM socket.
- Align the memory module with the socket that notches of memory module must match the sokcet keys for a correct installation.
- Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered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



2.6 CMOS Setup

JP2 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin 2 and pin 3 on **JP2** for 5 seconds. If you need to clear the CMOS after updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS. Please be noted that the password, date, time, user default profile and MAC address will be cleared only if the CMOS battery is removed.

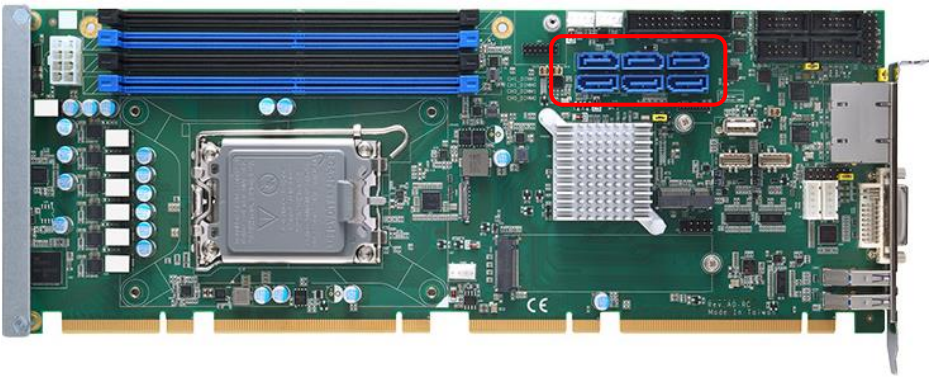
JP2	Mode
1-2	Normal Operation
2-3	Clear CMOS
Default setting: 1-2	



2.7 Serial ATA Ports

The board has six Serial ATA III interfaces with RAID function, the transfer rate of the Serial ATA III can be up to 600MB/s, but not supports SATAII device. Based on Intel® PCH, it supports Intel® Matrix Storage Technology with combination of RAID 0, 1, 5 and 10. The main features of RAID on Intel® R80E PCH are listed below:

- Supports for up to RAID volumes on a single, two-hard drive RAID array.
- Supports for two, two-hard drive RAID arrays on any of six Serial ATA ports.
- Supports for Serial ATA ATAPI devices.
- Supports for RAID spares and automatic rebuild.
- Supports on RAID arrays, including NCQ and native hot plug.



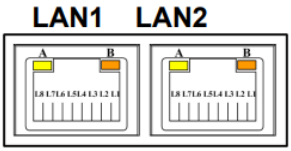
2.8 Ethernet Interface

The board integrates with one Intel I226V 2.5 Gigabit Ethernet & one Intel I226-LM controllers, as the PCI Express bus. The Intel I226V & I226-LM supports triple speed of 100/1000/2500 Base-T, with IEEE802.3 compliance and Wake-On-LAN supported.

Onboard Intel® I226LM controller support Intel® AMT feature on primary LAN port. The BIOS is ready to support Intel® AMT feature. The necessary prerequisite is your CPU must support Intel® vPro technology, ex : Intel® Core™ i7

LAN Port LED Indications

Activity/Link LED		SPEED LED	
Status	**Description**	**Status**	**Description**
OFF	No link	OFF	10/100Mbps connection
Blinking	Data activity	Orange	1000Mbps connection
ON	Link	Green	2.5Gbps connection



2.9 Audio Interface (CN5)

The board supports HD audio with optional expansion board through CN5.

Intel HD Audio Digital Header (CN5)

Pin	Description	Pin	Description
1	BCLK	2	Ground
3	RST#	4	N/C
5	SYNC	6	Ground
7	SDO	8	+3.3VS
9	SDIO	10	+12VS
11	N/C	12	
13	N/C	14	N/C
15	N/C	16	Ground

2.10 USB Ports

Besides two USB 3.1 ports on the I/O panel, there are three headers on this board. Each USB 2.0 header can support two ports.

CN33: USB 2.0 Port

Pin	Description	Pin	Description
1	PWR	2	PWR
3	USB DX-	4	USB DY-
5	USB DX+	6	USB DY+
7	Ground	8	Ground
9		10	Ground

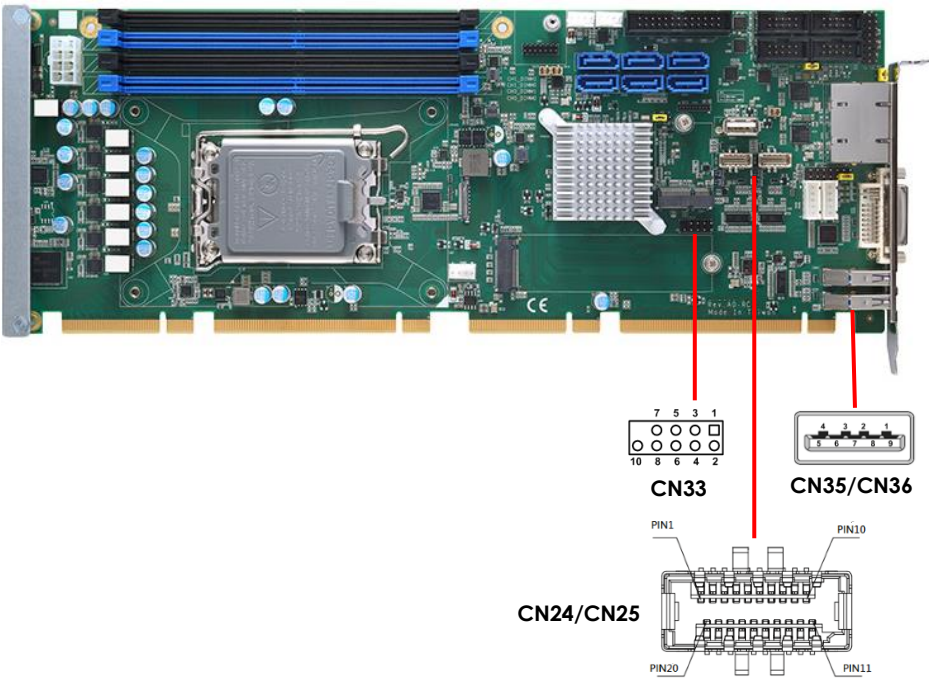
CN35/CN36: USB 3.2 Gen.2x1 Port

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

The CN24 & CN25 are internal box connectors for versatile USB 3.2 Gen. 1x1 compliant peripherals. These connectors are compatible with LOTES AUSB0418-P001A.

CN24/CN25: internal USB 3.2 Gen.1x1 Port

Pin	Description	Pin	Description
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


7 5 3 1
10 8 6 4 2
CN33
4 3 2 1
5 6 7 8 9
CN35/CN36
CN24/CN25
PIN1
PIN10
PIN20
PIN11

2.11 Serial Ports (COM1~4)

COM1 to COM4 are 10-pin (Pitch = 2.54mm) connectors, which are compliant with CATCH 1137-000-10S, and support RS/232/422/485 modes through BIOS settings.

RS-232:

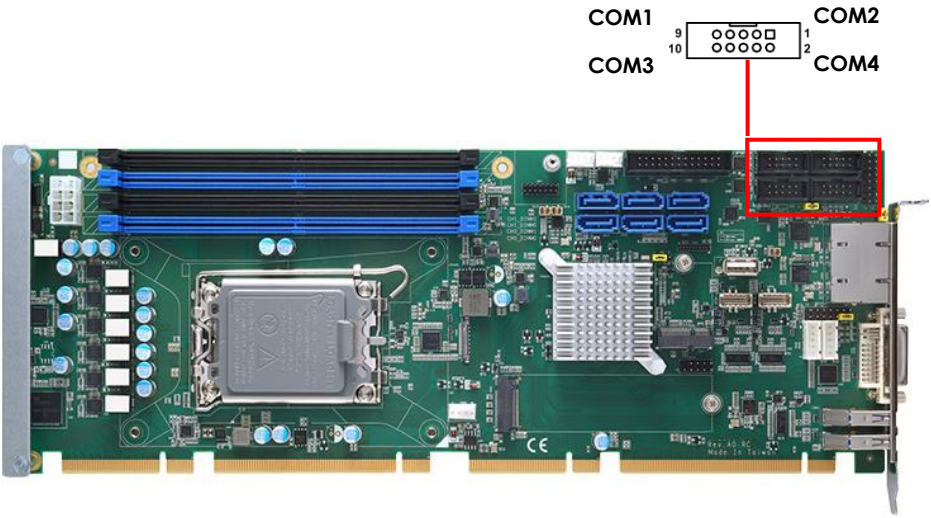
Pin	Description	Pin	Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	N/C

RS-422:

Pin	Description	Pin	Description
1	TX-	2	N/C
3	TX+	4	N/C
5	RX+	6	N/C
7	RX-		

RS-485:

Pin	Description	Pin	Description
1	RTX-	2	N/C
3	RTX+	4	N/C
5	N/C	6	N/C


COM1
COM2
9
10
1
2
COM3
COM4

2.12 Parallel Port (CN2)

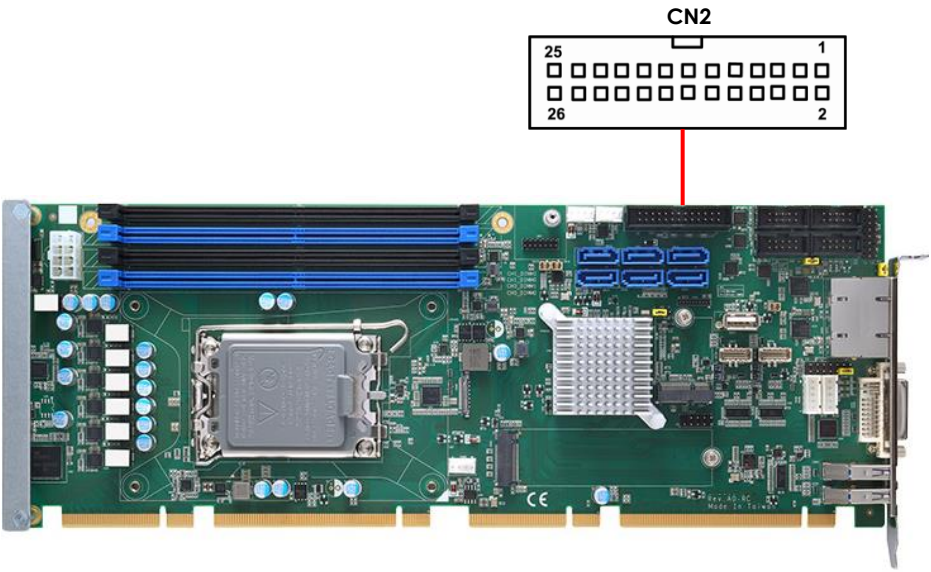
The board provides one parallel port with multiple mode.

1. Standard Mode: IBM PC/XT, PC/AT and PS/2 are compatible with bi-direction.

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

3. High Speed Mode: Microsoft and Hewlett Packard Extended Capabilities Port (ECP) is IEEE 1284 compliant.

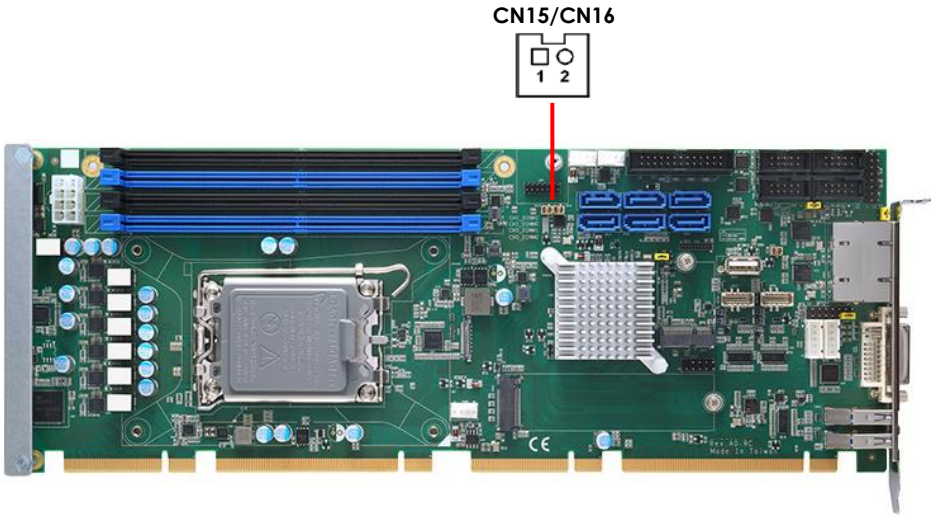
Pin	Description	Pin	Description
1	Strobe#	2	Auto Form Feed#
3	Data 0	4	Error#
5	Data 1	6	Initialize#
7	Data 2	8	Printer Select In#
9	Data 3	10	GND
11	Data 4	12	GND
13	Data 5	14	GND
15	Data 6	16	GND
17	Data 7	18	GND
19	Acknowledge#	20	GND
21	Busy	22	GND
23	Paper Empty#	24	GND
25	Printer Select	26	N.C


CN2
25
1
26
2

2.13 Temperature Sensor Connector (CN15/CN16)

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	Description
1	Sensor Input
2	Ground

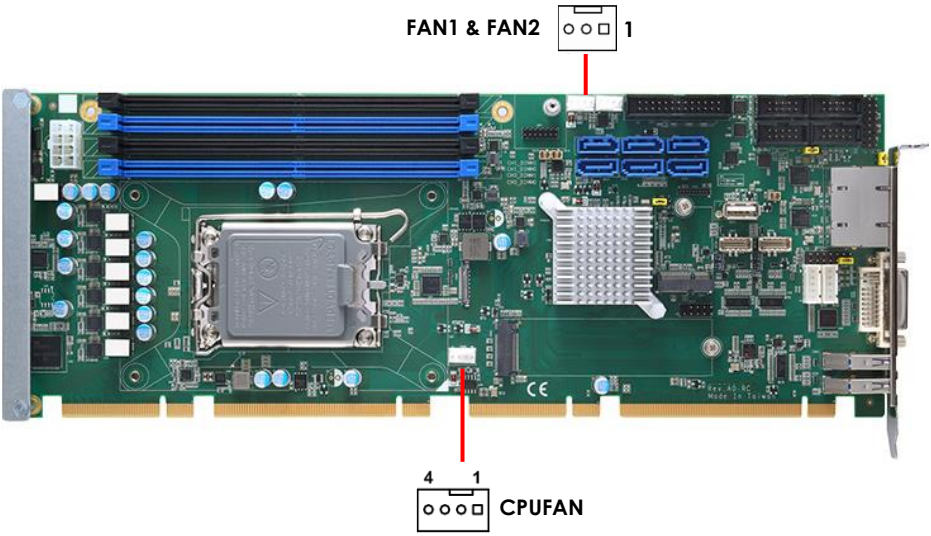


2.14 Fan Connectors (CPUFAN/FAN2/FAN3)

The CPUFAN is for CPU fan interfaces, FAN1 & FAN2 are for system cooling. Please connect the CPU fan cable to the connector and match the black wire to the ground pin.

Pin	FAN3 Signal
1	GND
2	+12V
3	CPU_FAN_SPEED
4	FAN_SPEED_CONTROL

Pin	FAN1 & FAN2 Signal
1	GND
2	+12V
3	CPU_FAN_SPEED



2.15 Power Connectors (CN13)

The CN13 is an 8-pin ATX power connector. Please connect a 12V ATX power supply to this connector.

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

Auto Power On (JP1)

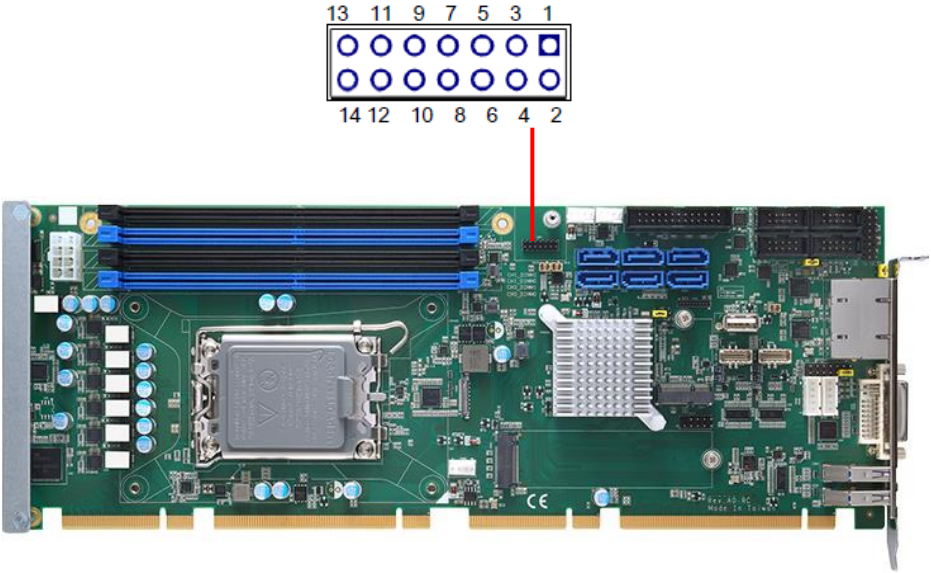
If JP1 is enabled for power input, the system will be automatically powered on without pressing the soft power button. If JP 3 is disabled for power input, it is necessary to manually press the soft power button to power on the system.

JP1	Mode
1-2	Disable auto power on (Default)
2-3	Enable auto power on
Default setting: 1-2	

2.16 TPM Connector (CN7)

CN7 is 7x2 pin p=2.0mm header for SPI interface with a TPM module.

Pin	Description	Pin	Description
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



2.17 Front Panel Header (CN26)

This header accommodates several system front panel functions.

PWRBTN (Power Switch)

Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

RESET (Reset Switch)

Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED)

Connect to the power status indicator on the chassis front panel. The LED is ON when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is OFF when the system is in S4 sleep state or powered off (S5).

HDLED (Hard Drive Activity LED)

Connect to the hard drive activity LED on the chassis front panel. The LED is ON when the hard drive is reading or writing data.

Pin	Description	Pin	Description
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+


13 11 9 7 5 3 1
14 12 10 8 6 4 2

Chapter 3 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.

3.1 Starting

To enter the setup screens, follow the steps below:

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

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

3.2 Menu Bar

The top of the screen has a menu bar with the following selections:

Menu Bar	Description
Main	To set up the system time/date information.
Advanced	To set up the advanced BIOS features.
H/W Monitor	To display current hardware status.
Boot	To set up the default system device to locate and load the Operating System.
Security	To set up the security features.
Exit	To exit the current screen or the BIOS setup utility.
Menu Bar	Description

Use <→ > key or < ←> key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

3.3 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>, <F7>, <Enter>, <ESC>, <Arrow> keys, and so on.

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.
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.
F1	The <F1> key allows you to display the General Help screen.
F7	Discard changes.
F9	The <F9> key allows you to load optimal default values for all the settings.
F10	The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> 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.

3.4 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

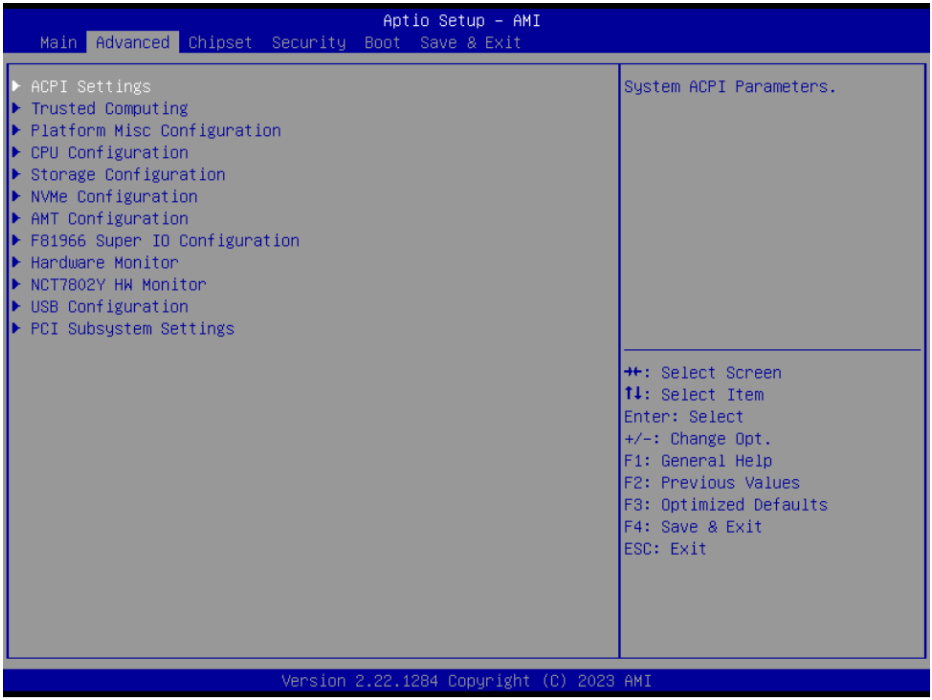
Display the auto-detected BIOS information.

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.

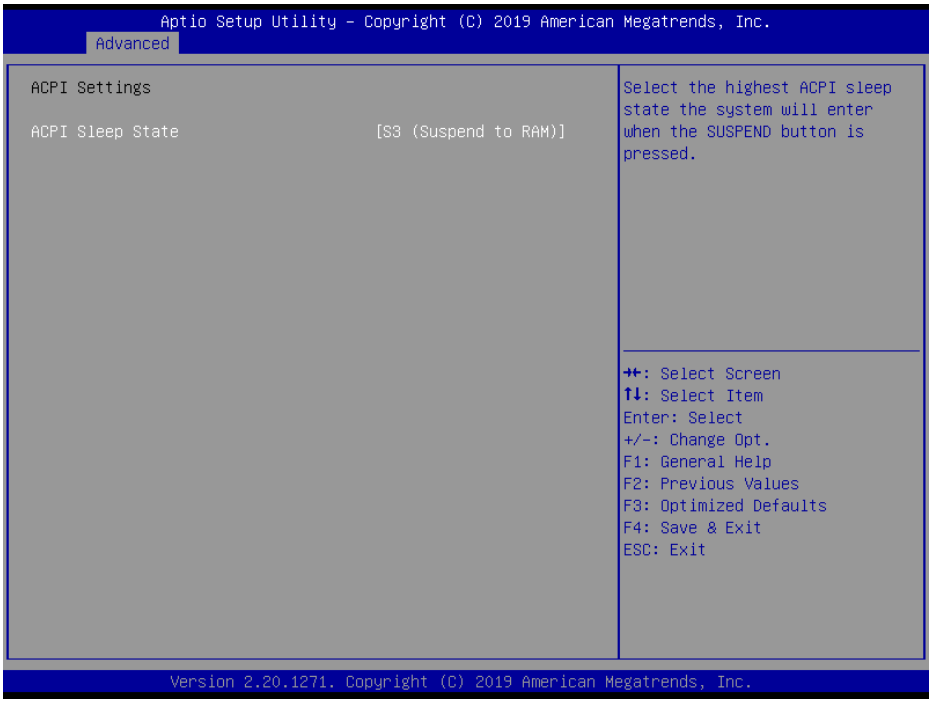
3.5 Advanced Menu

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:



3.5.1 ACPI Settings

You can use this menu to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



ACPI Sleep State

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

3.5.2 Trusted Computing

This menu provides function for specify the Trusted Computing.

Security Device Support

Enable or disable BIOS support for security device. The default setting is Disabled.

TPM State

Once the Security Device Support is Enabled, TPM (Trusted Platform Module) can be used by the operating system.

Current Status Information

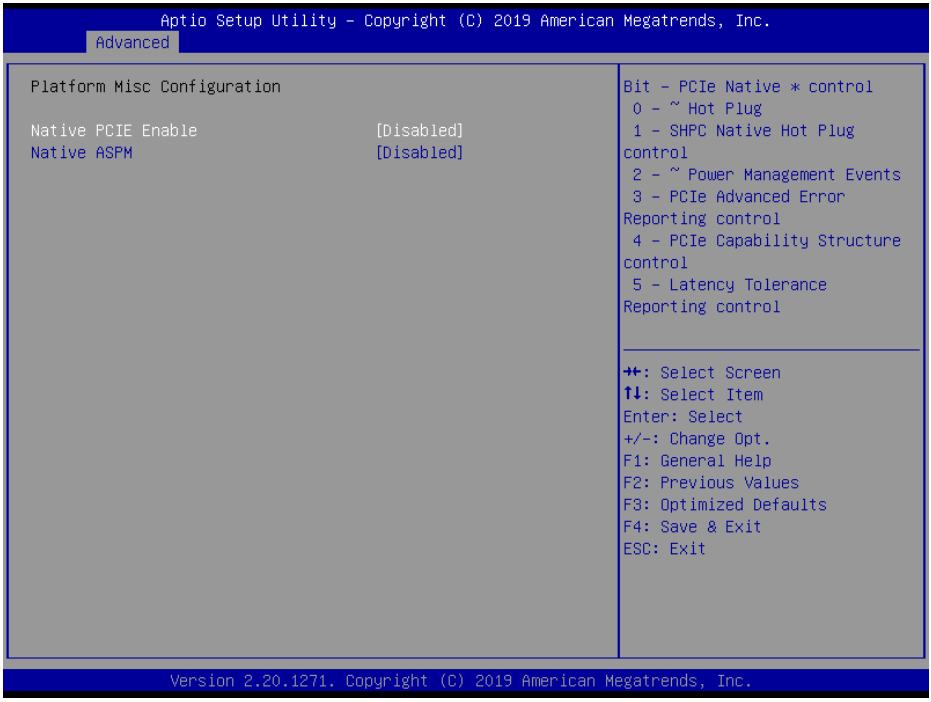
Display current TPM status information.

Pending Operation

Schedule a TPM operation which will take effect at the next boot up process.

3.5.3 Platform Misc Configuration

This screen allows you to set Platform Misc Configuration.



Native PCIE Enable

Bit PCIe Native * control n 0 ~ Hot Plug n 1 SHPC Native Hot Plug control n 2 ~ Power Management Events n 3 PCIe Advanced Error Reporting control n 4 PCIe Capability Structure control n 5 Latency Tolerance Reporting control

Native ASPM

Enabled OS Controlled ASPM, Disabled BIOS Controlled ASPM

3.5.4 CPU Configuration

This menu shows the CPU information, and let you change the value of the selected option.

Hyper-threading

Enable or disable Hyper-Threading Technology. When enabled, it allows a single physical processor to multitask as multiple logical processors. When disabled, only one thread per enabled core is enabled.

Intel Virtualization Technology

Enable or disable Intel Virtualization Technology. When enabled, a VMM (Virtual Machine Mode) can utilize the additional hardware capabilities. It allows a platform to run multiple operation systems and applications independently, hence enabling a single computer system to work as several virtual systems.

AES

Enable / Disable AES (Advanced Encryption Standard)

Boot performance mode

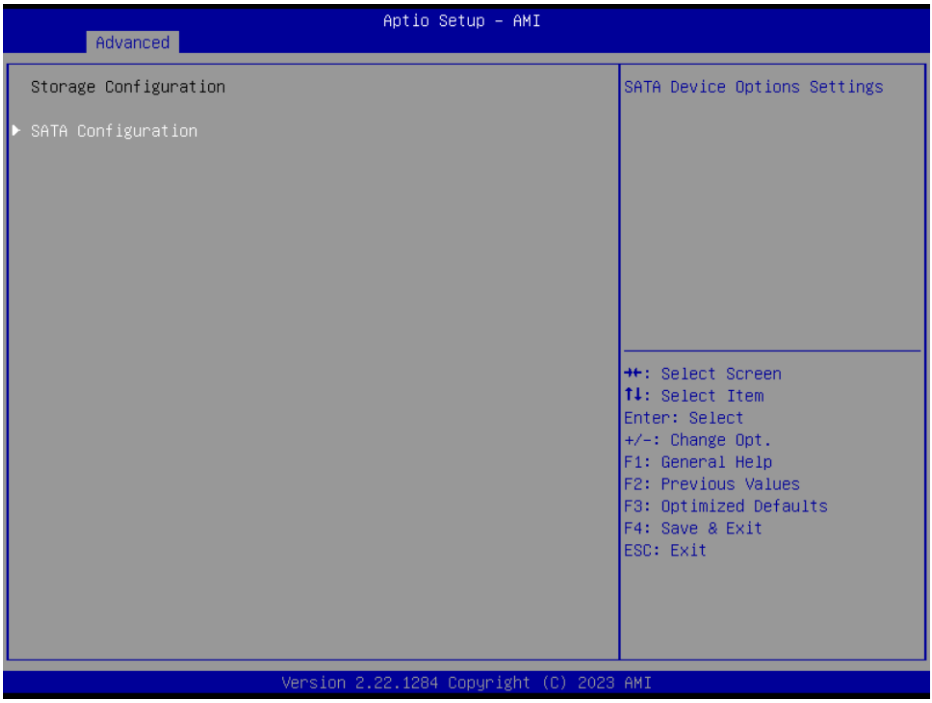
Select the performance state that the BIOS will set starting from reset vector.

Intel (R) SpeedStep(tm)

Allows more tha n two frequency ranges to be supported.

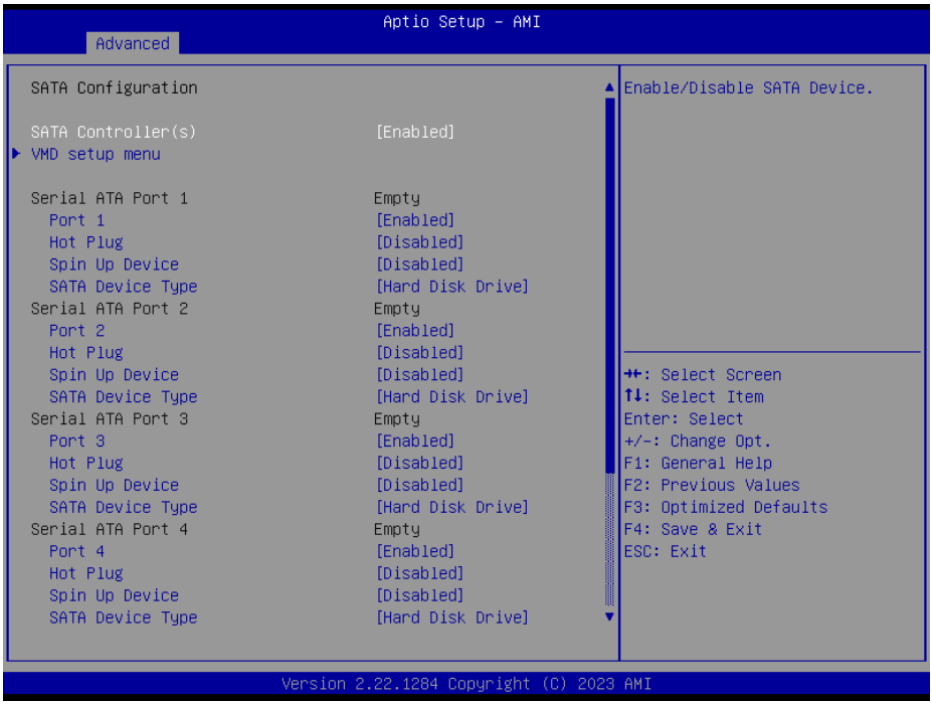
3.5.5 Storage Configuration

This screen shows storage information.



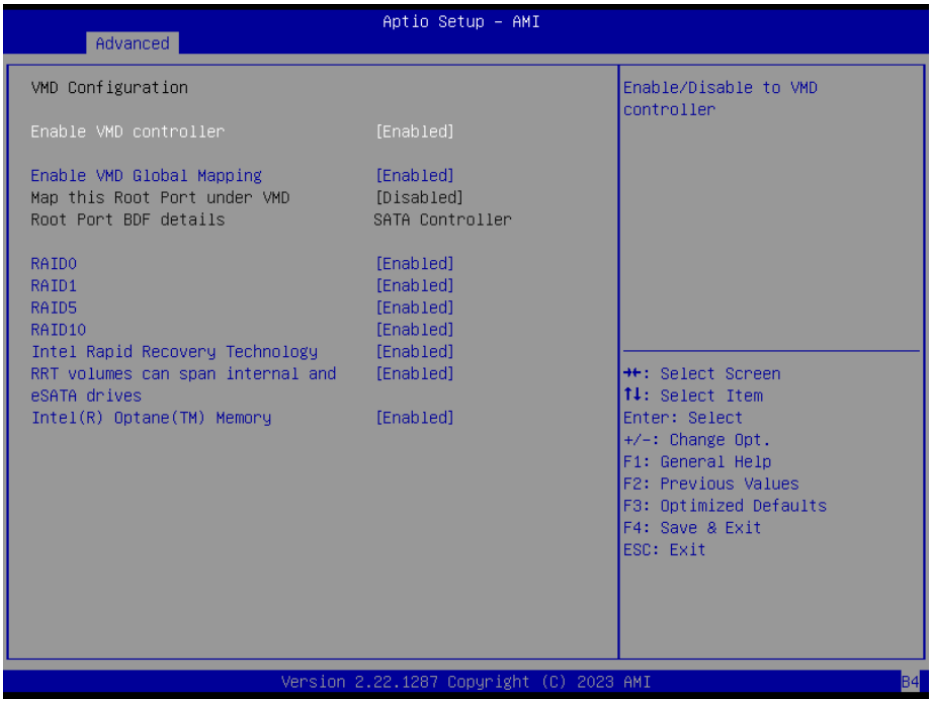
SATA Controller(s)

Enable or disable SATA controller feature.



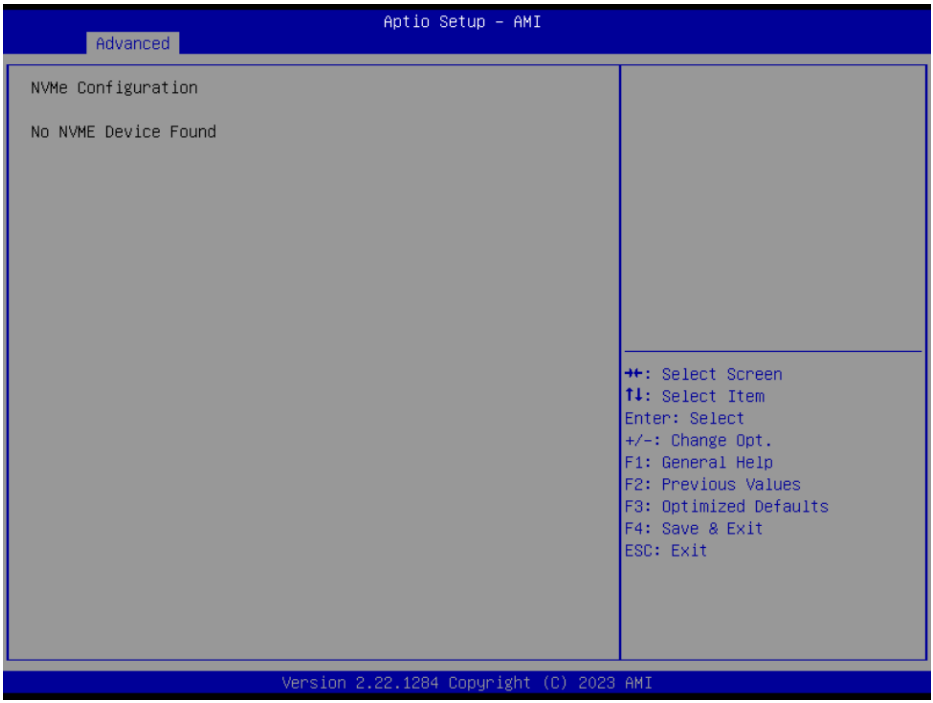
VMD Setup Menu

VMD Configuration settings. The default is Disabled.



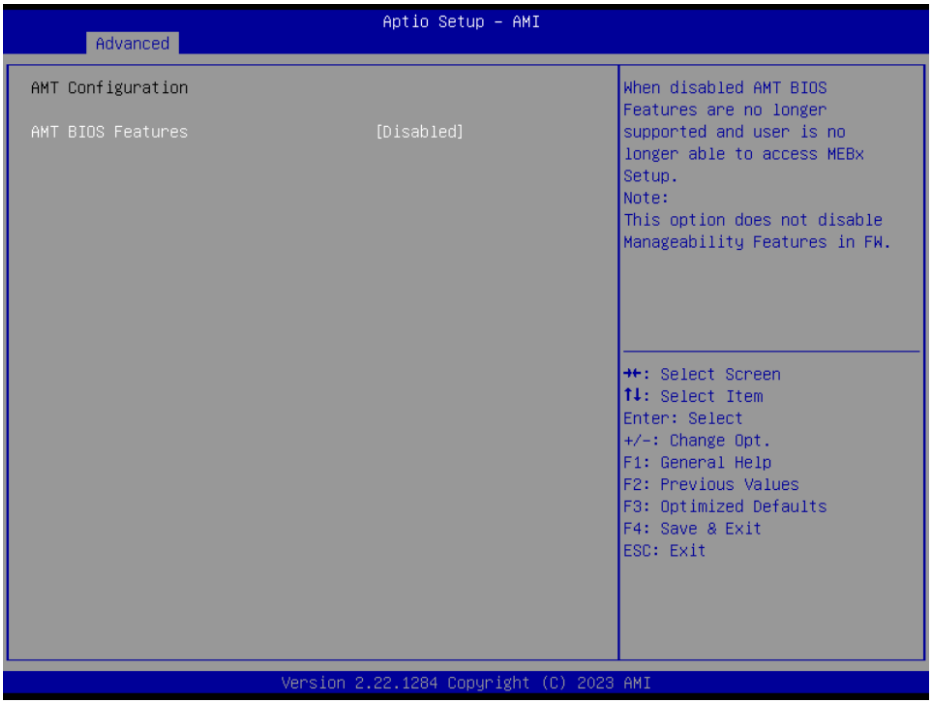
3.5.6 NVMe Configuration

This screen shows NVMe device information.



3.5.7 AMT Configuration

This screen displays Active Management Technology information.

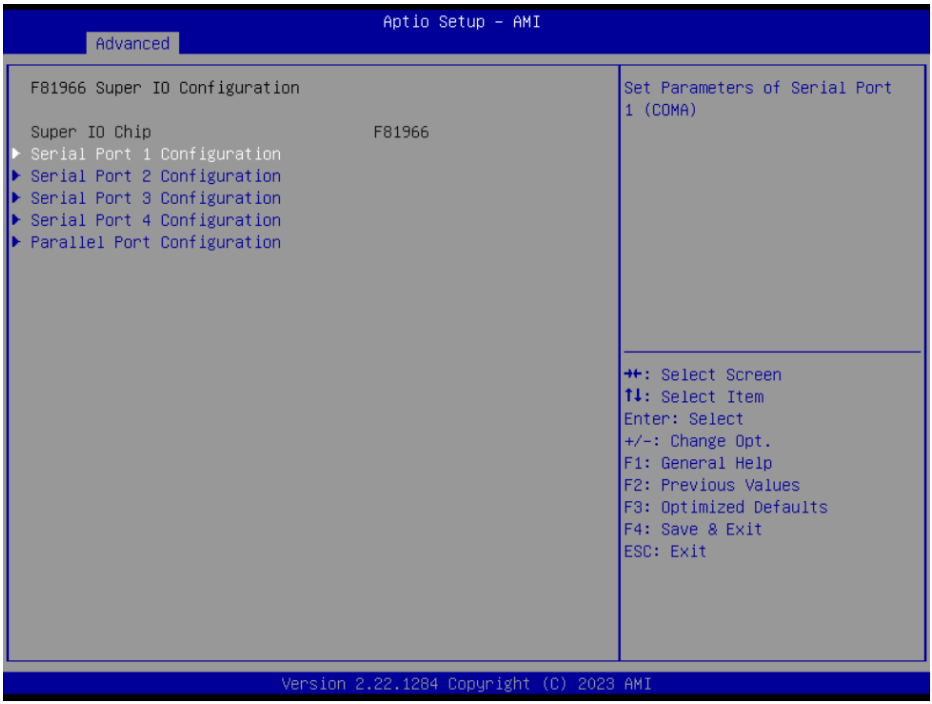


AMT BIOS Features

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

3.5.8 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.

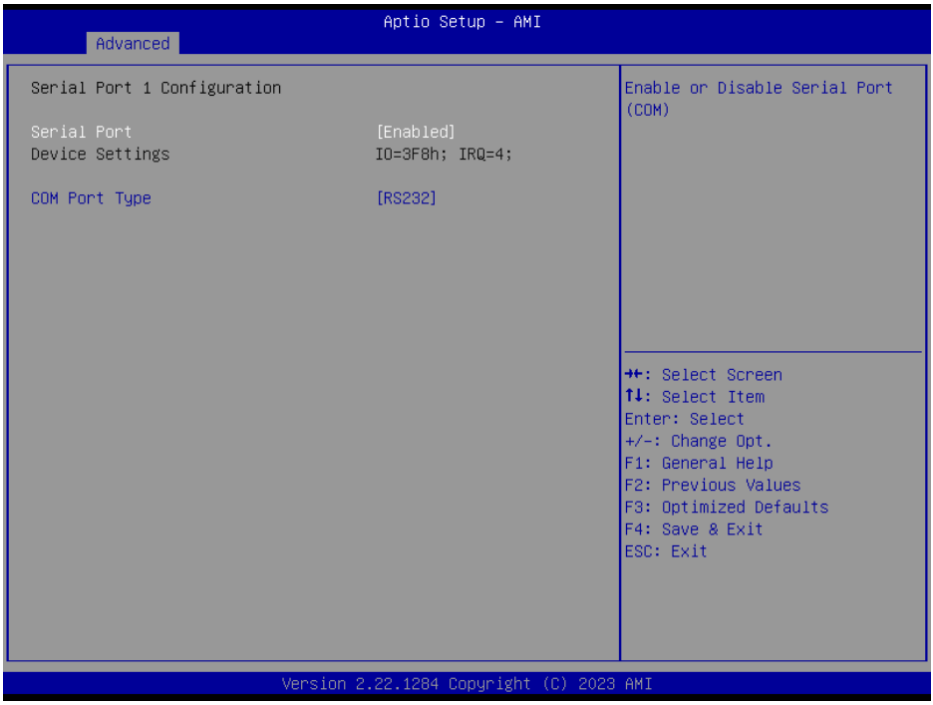


Serial Port 1~4

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

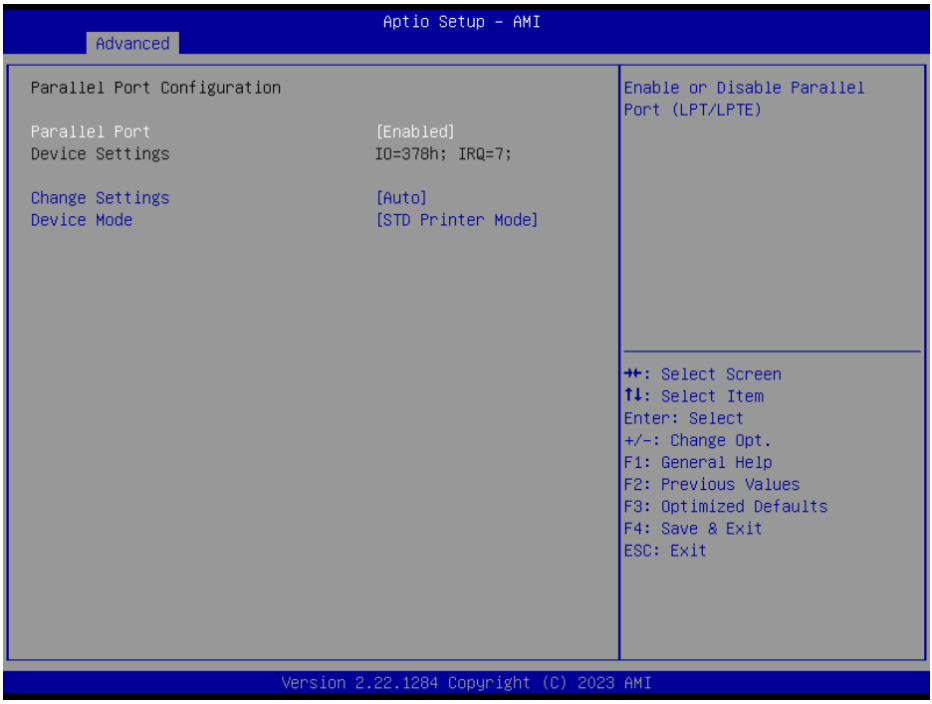
Serial Port 1~4 Configuration

Use these items to set parameters related to serial port 1 ~4.



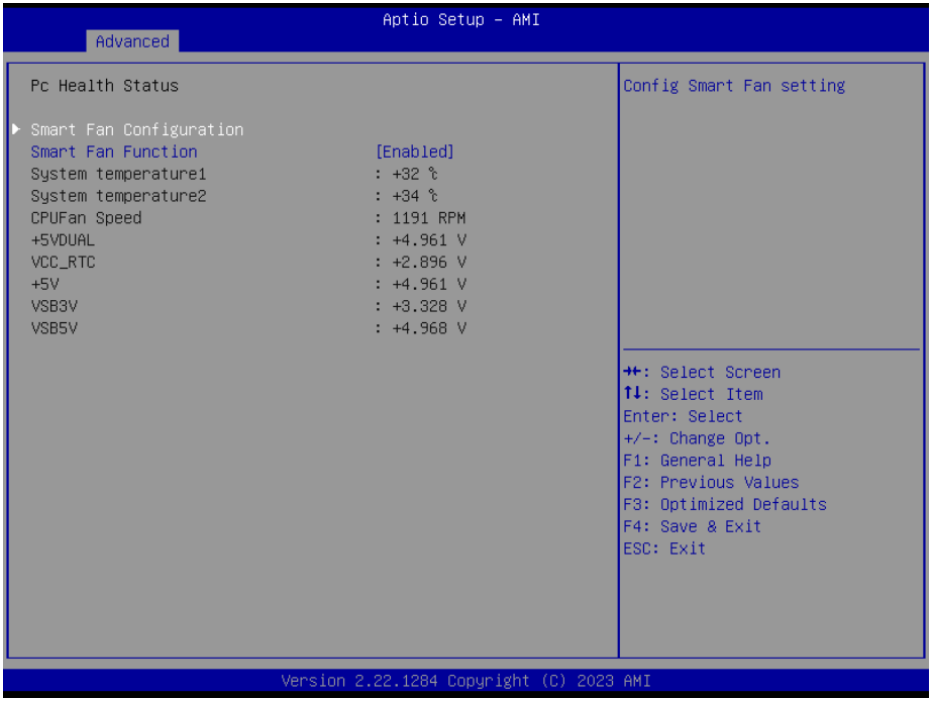
Parallel Port Configuration

This screen displays Active Management Technology information.



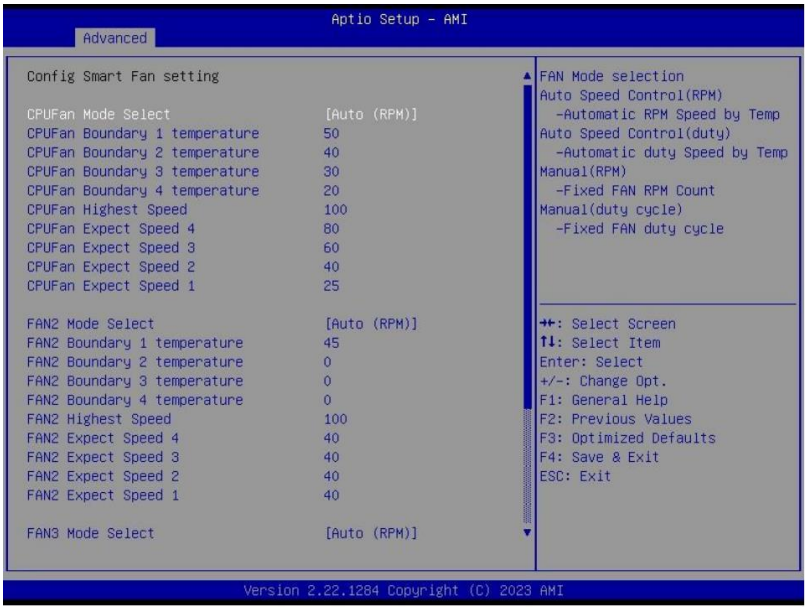
3.5.9 Hardware Monitor

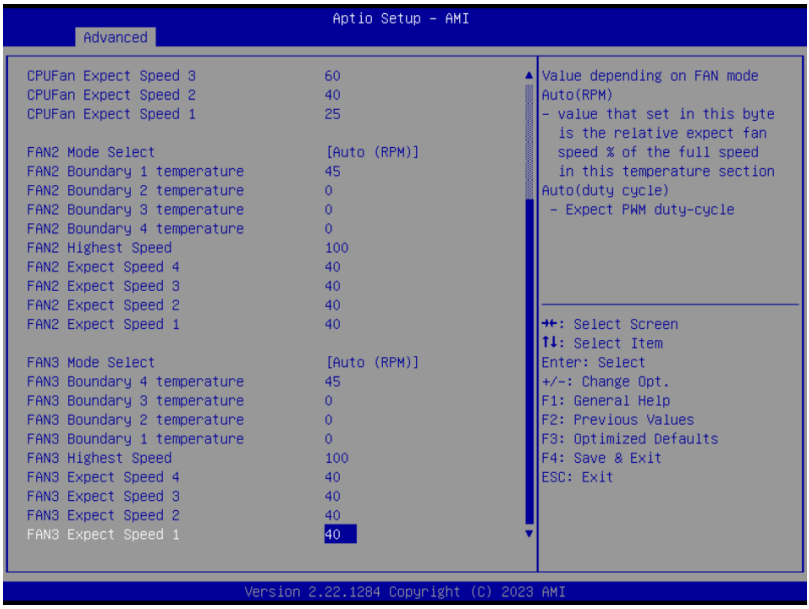
This screen monitors hardware health status. This screen displays the temperature of system and CPU, cooling fans speed in RPM and system voltages (VCC_CPU, DDR, +12V, +5V and +3.3V).



Smart fan configuration

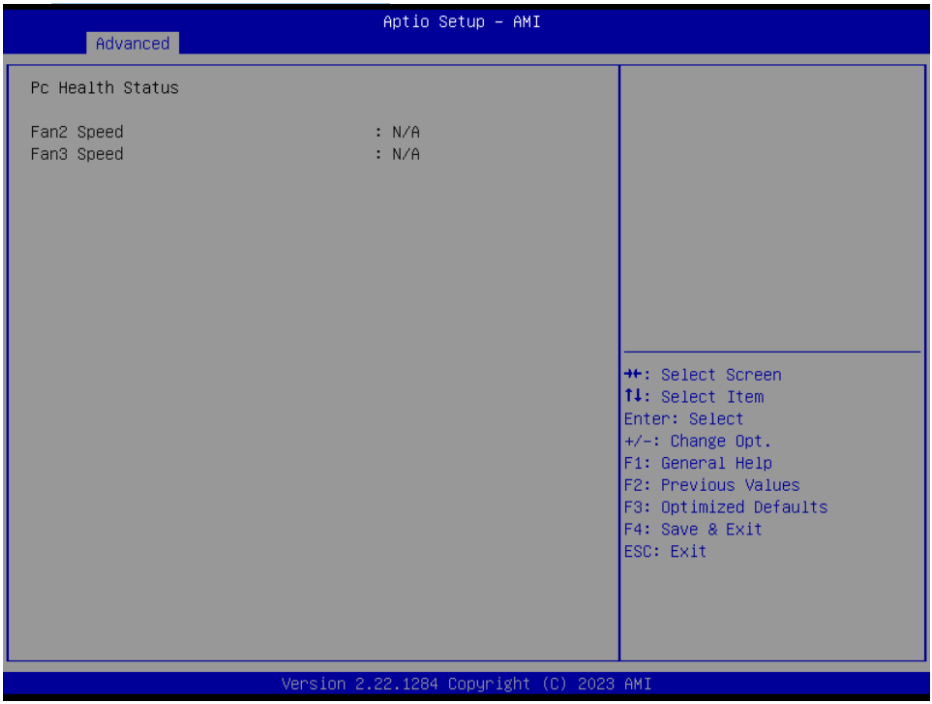
This screen allows you to configure Smart Fan mode.





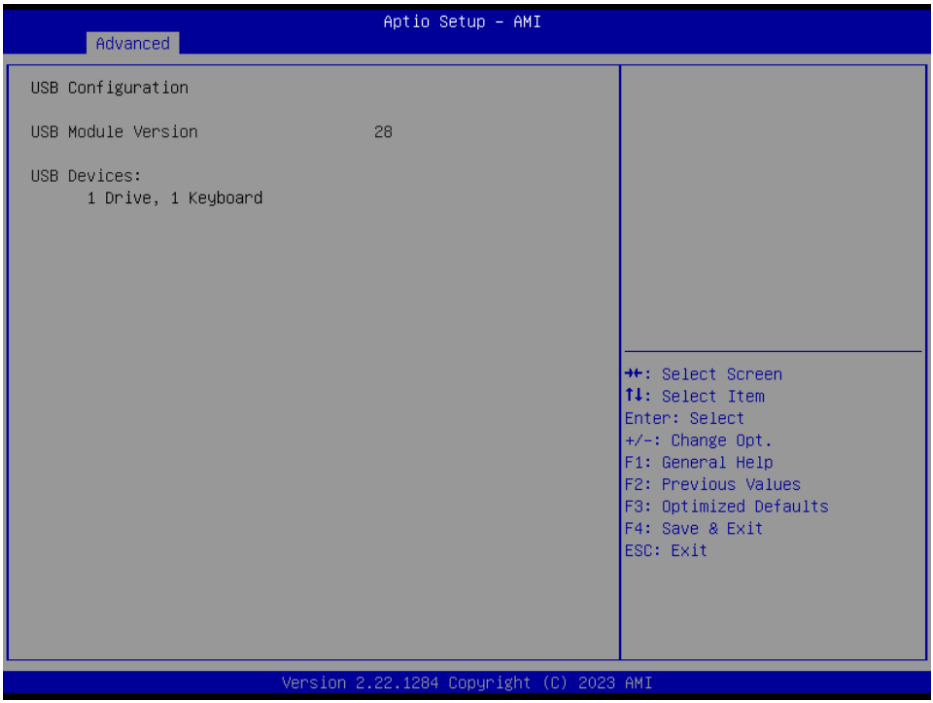
3.5.10 NCT7802Y Hardware Monitor

This screen monitors Fans status.



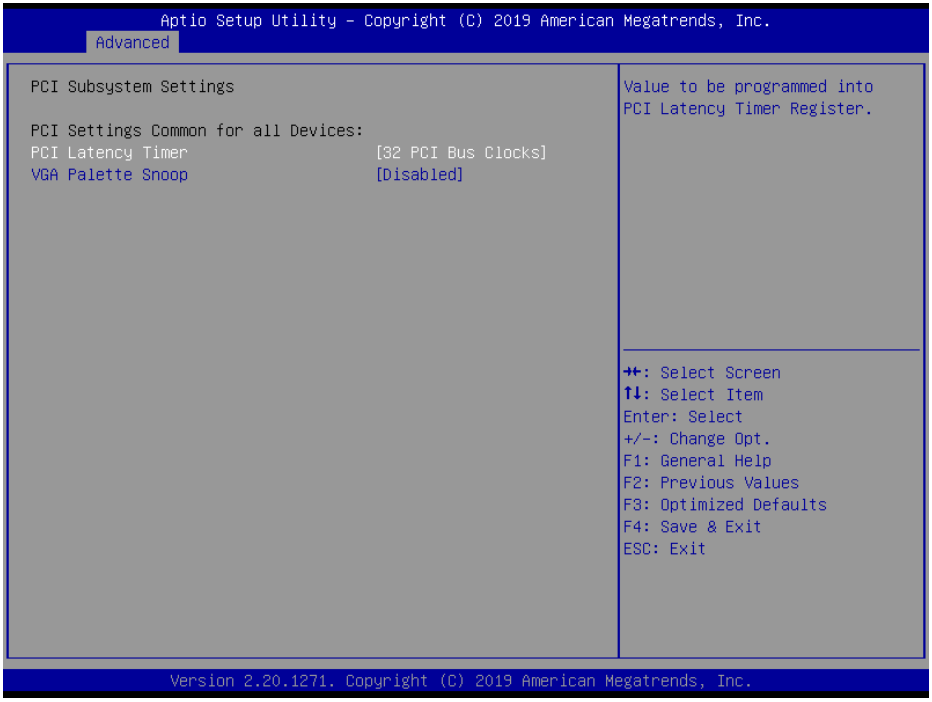
3.5.11 USB Configuration

This screen shows USB configuration.



3.5.12 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.

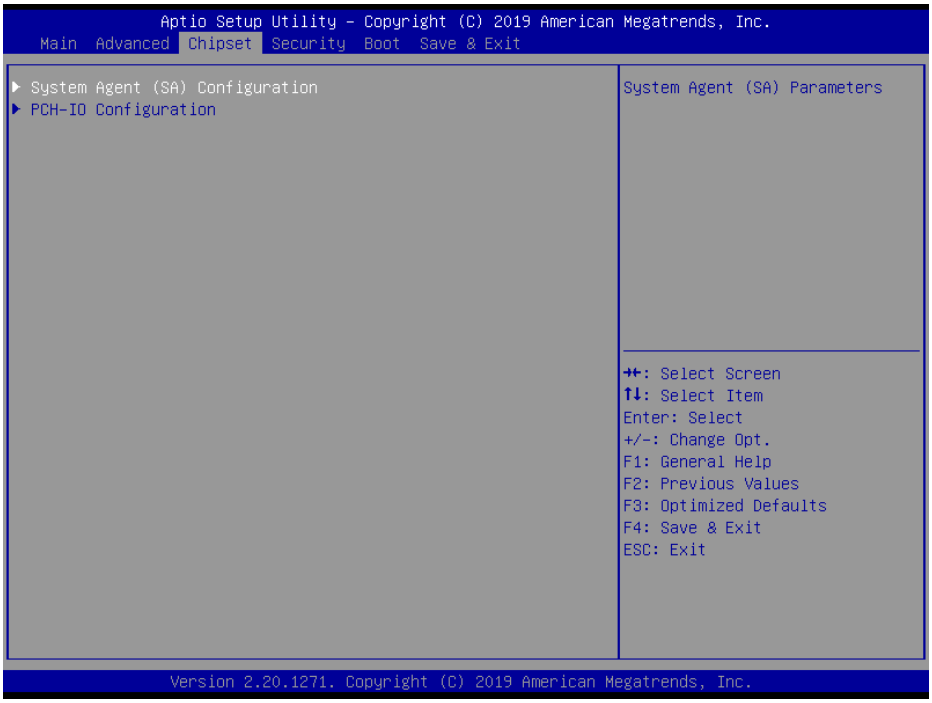
3.6 Chipset Menu

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

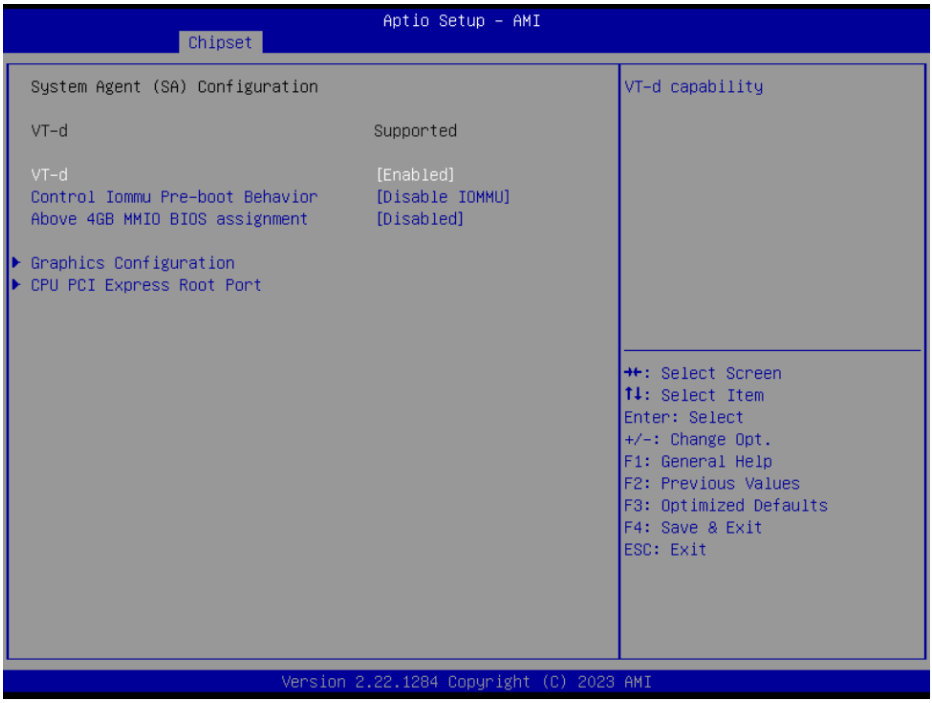
►PCH-IO Configuration

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



3.6.1 System Agent (SA) Configuration

This screen shows System Agent information



VTd

VT d capability

Above 4GB MMIO BIOS assignment

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

Graphics Configuration

Open the sub menu for parameter s related to graphics configuration

CPU PCI Express Root Port

Set the ASPM Level and PCI Express Speed.

Graphics Configuration

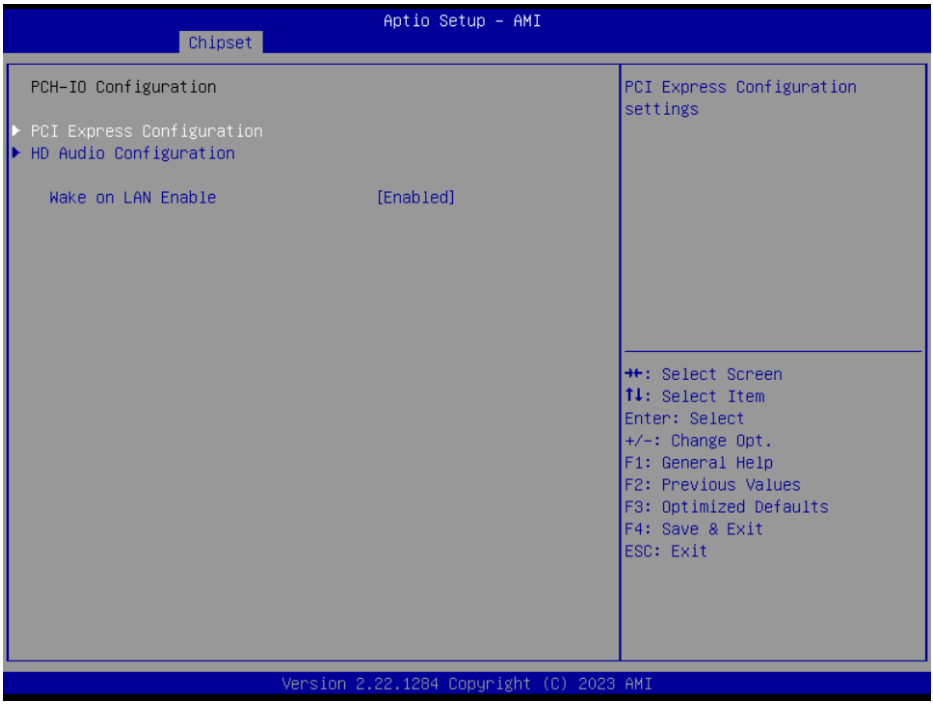
This screen shows graphics configuration.

Internal Graphics

Keep IGFX enabled based on the setup options.

3.6.2 PCH-IO Configuration

This screen shows system memory information.



PCI Express Configuration

Configure PCIe Speed.

HD Audio Configuration

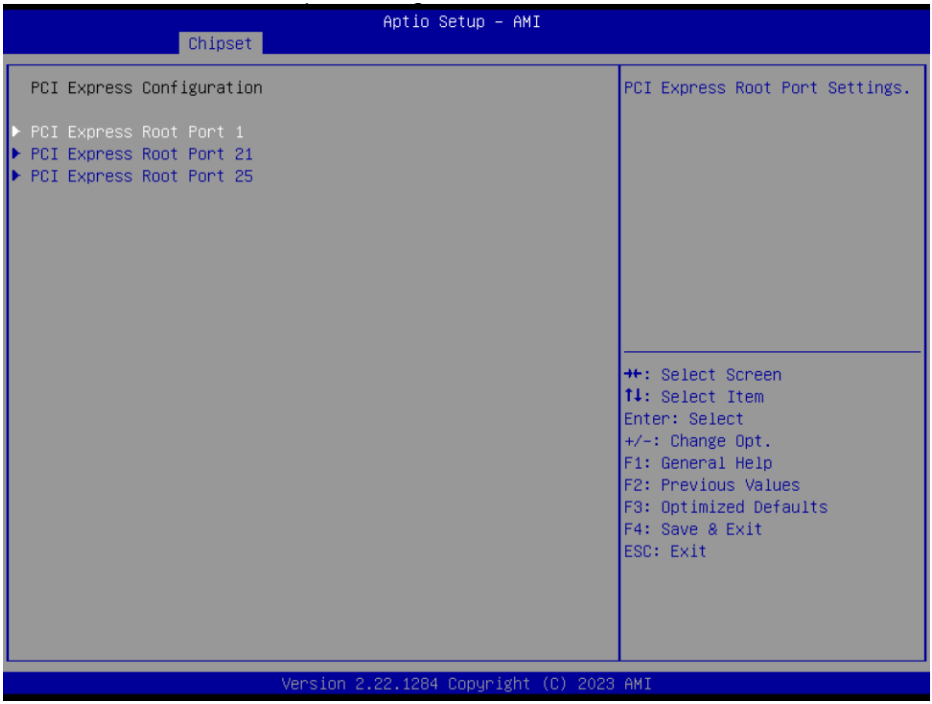
Enable or disable HD Audio.

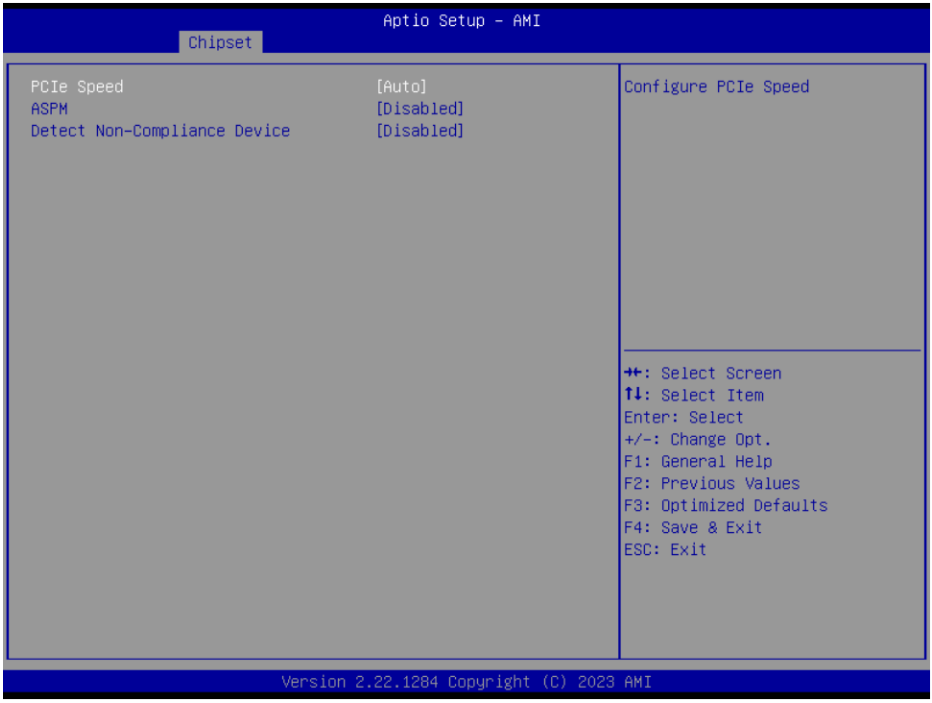
Wake on LAN Enable

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.

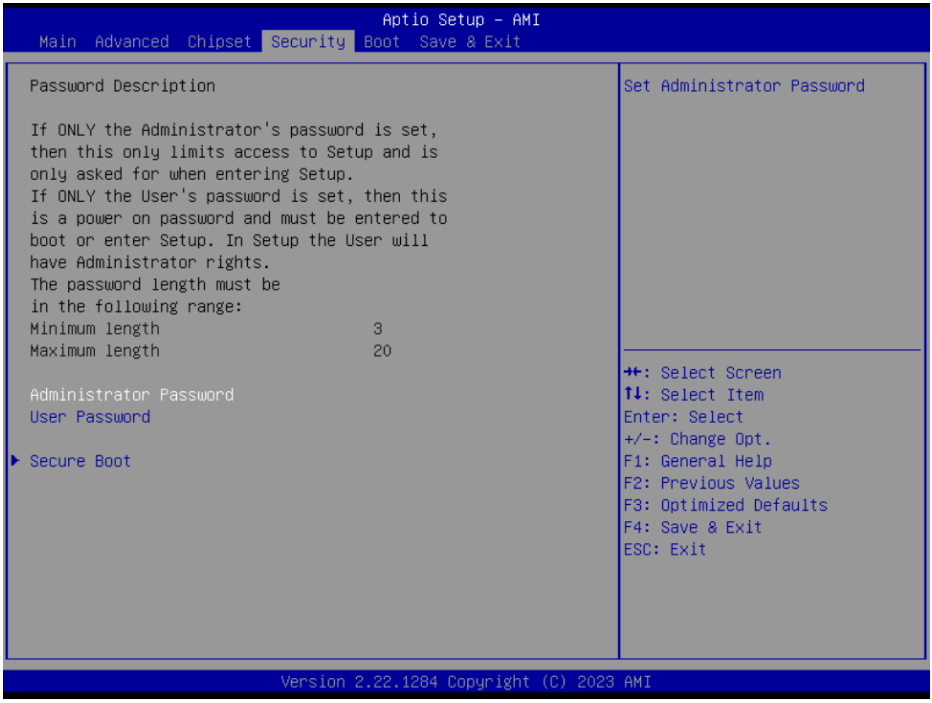
DISABLE - Disables ASPM.

Detect Non-Compliance Device

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

3.7 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 (install or uninstalled).

User Password

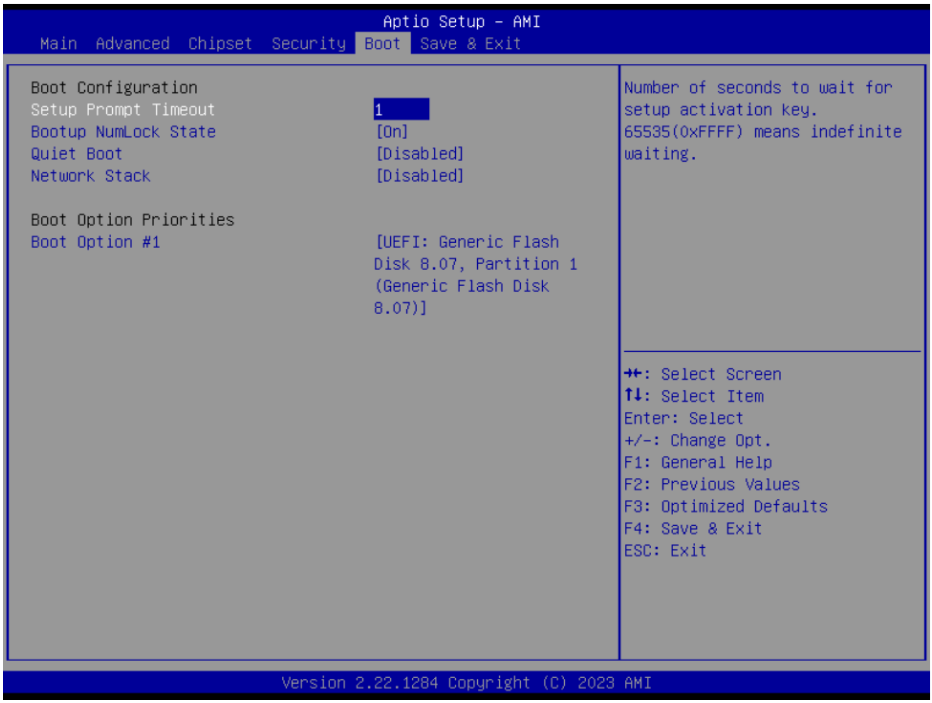
This item indicates whether a user password has been set (installed or uninstalled).

Secure Boot

This item is available on the UEFI firmware to provide a secure environment.

3.8 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.

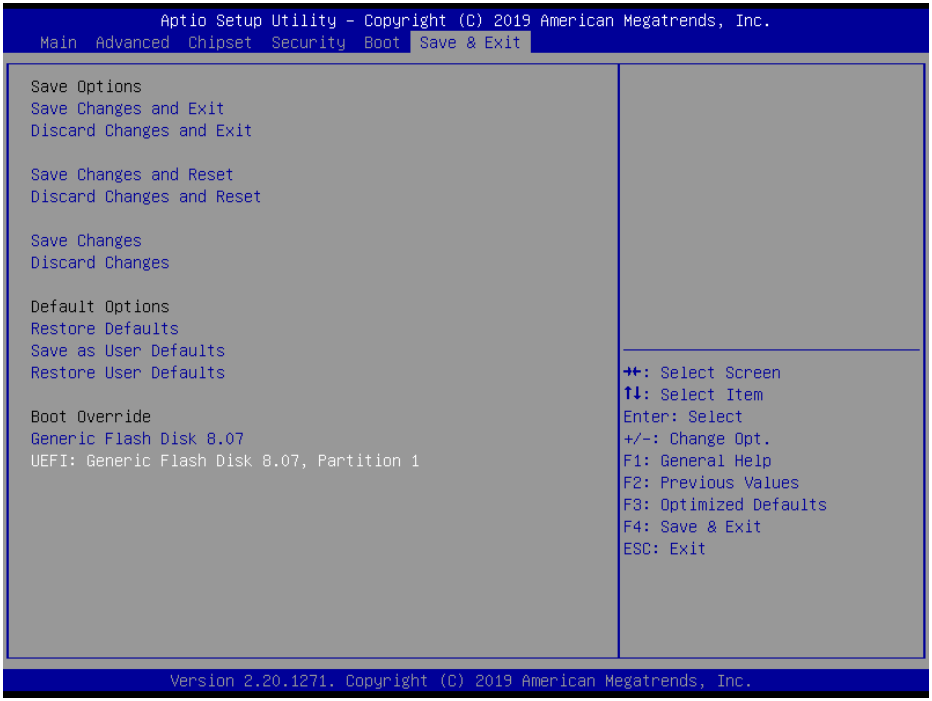
Network Stack

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

3.9 Save & Exit Menu



Save Changes and Exit

When you select this option, it will pop-out the following message, "Save configuration changes and exit setup?". Select OK to save the changes and exit the UEFI setup utility.

Discard Changes and Exit

When you select this option, it will pop-out the following message, "Discard changes and exit setup?". Select OK to exit the UEFI setup utility without saving any changes.

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 the changes and reset.

Discard Changes and Rest

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 complete 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 Default 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.

Chapter 4 System Configuration

4.1 Watchdog Timer

After the system stops working for a while, it can be auto-reset by the watchdog timer.

```
#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;
```

58 Watchdog Timer

```
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

4.2 VMD (RAID) Configuration

4.2.1 Configuring SATA Hard Drive(s) for RAID (Controller: Intel® R680E)

Before you begin the SATA configuration, please prepare:

Two SATA hard drives (to ensure optimal performance, it is recommend 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 drives:

1. Install SATA hard drives in your system
2. Enter the BIOS setup to configure SATA controller mode and boot sequence.
3. Configure RAID by the RAID BIOS.

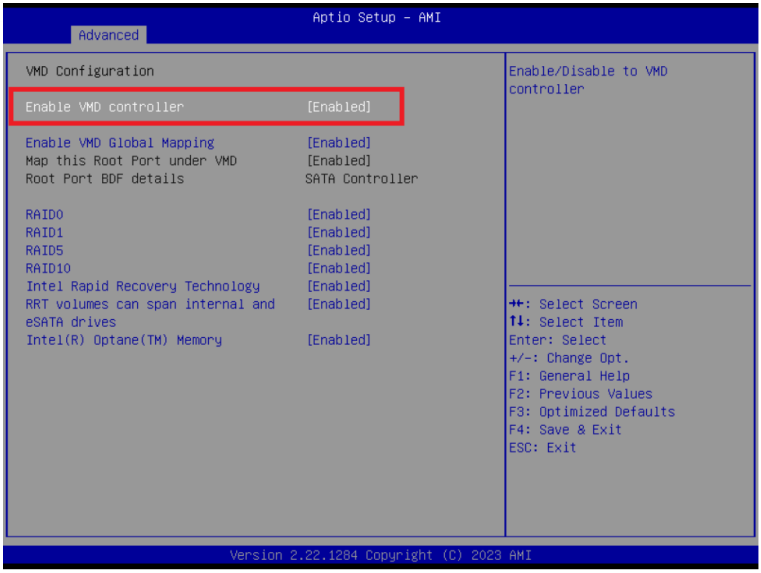
Installing SATA hard drives in your system

Connect one end of the SATA signal cable to the rear of the SATA hard drives, and the other end to available SATA ports on the board. Then connect the power connector of power supply to the hard drives.

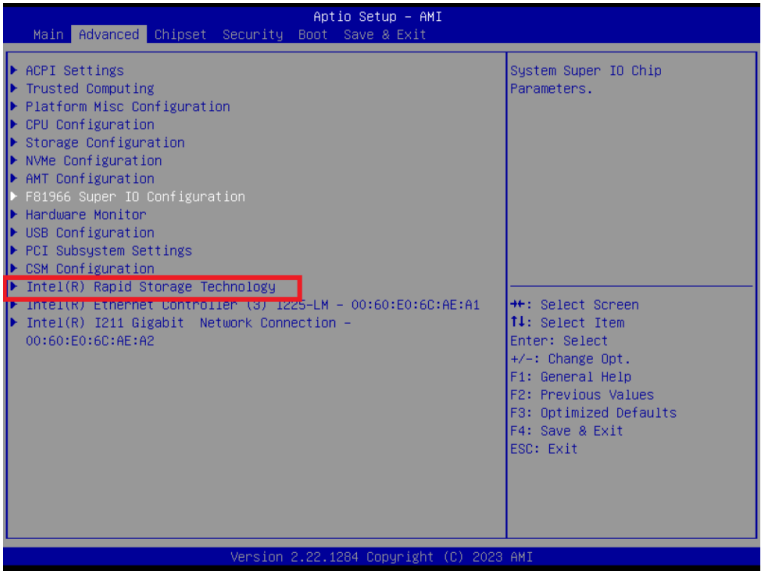
Configuring SATA controller mode and boot sequence by the BIOS setup

Please make sure whether the SATA controller is configured correctly by the system BIOS setup and setup BIOS boot sequence for the SATA hard drives.

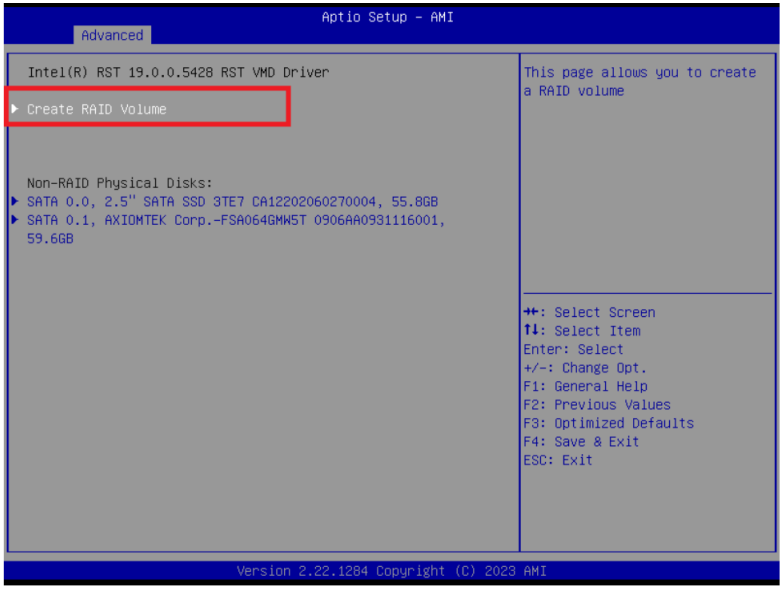
In SATA Configurations, enabled VMD Controller and save & reset.



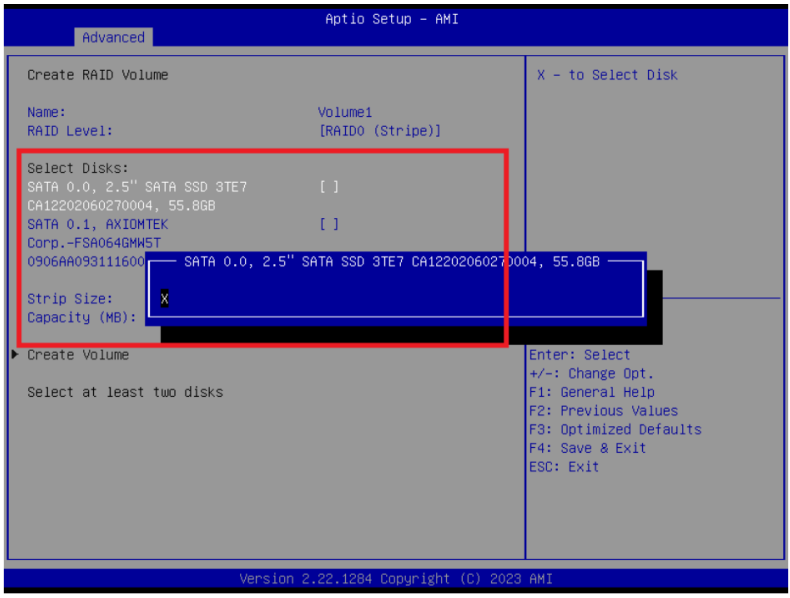
After Restart, enter <del> to Bios Setup Menu. In Advanced Page, choose Intel(R) Rapid Storage Technology.



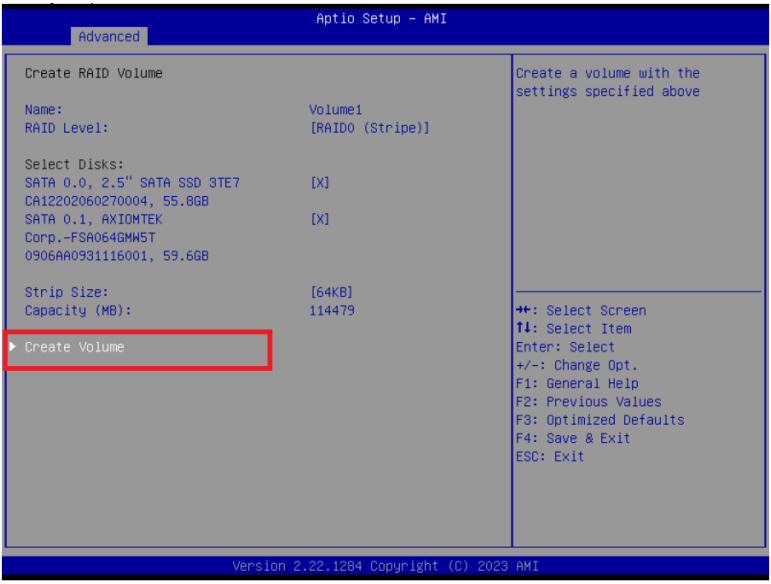
In Intel(R) Rapid Storage Technology page, choose RAID Volume



Select the disk to be merged.



Finally, implement create Volume.



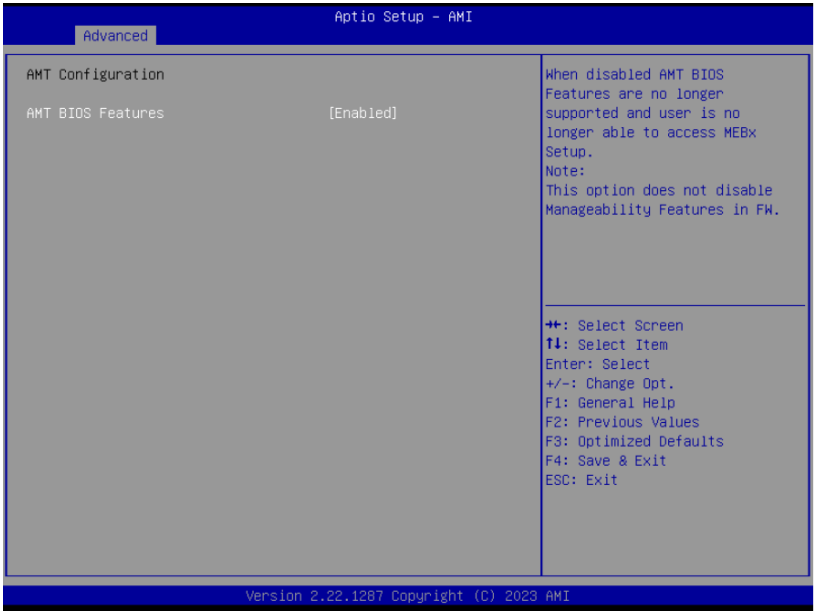
4.3 iAMT Settings

The Intel Active Management Technology (Intel iAMT) has decreased a major barrier to IT efficiency, that use built-in platform capabilities and popular third-party management and security applications to allow IT a better discovering, healing, and protection their networked computing assets.

In order to utilize Intel iAMT you must enter the ME BIOS (<Ctrl+P> during system startup), change the ME BIOS password, and then select "Intel iAMT" as the manageability feature.

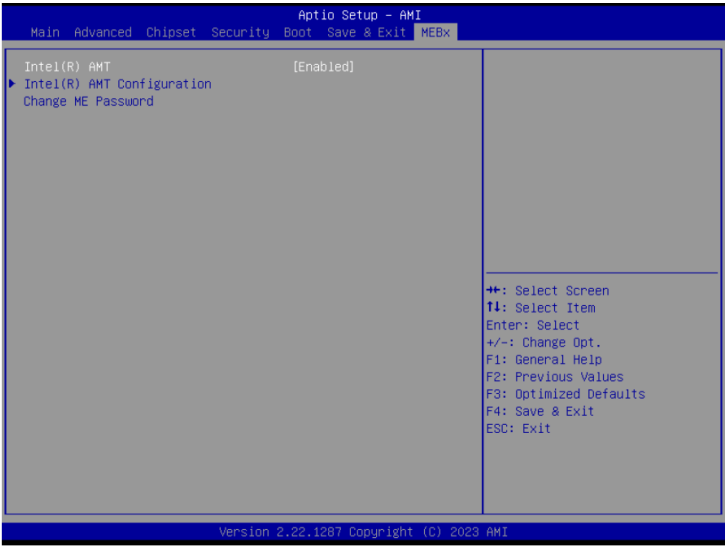
4.3.1 Entering MEBx

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

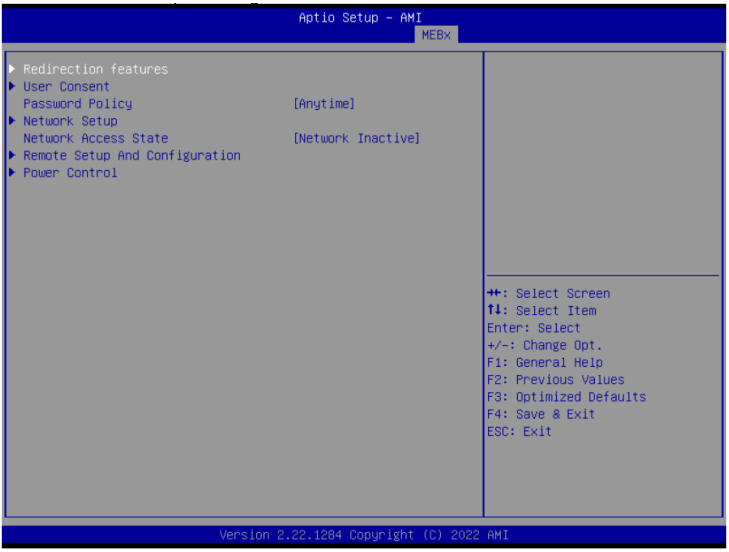


4.3.2 Set and Change Password

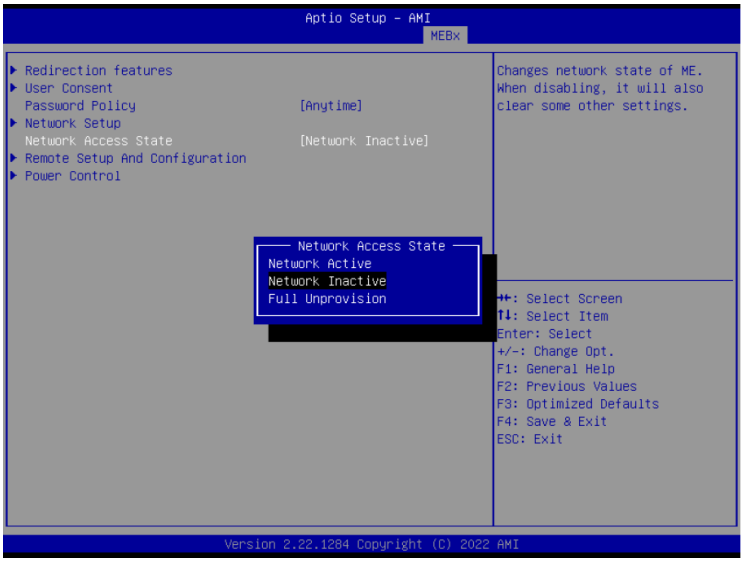
Go to MEBx page, enter the default password “admin” for first time login, and then enter new password (complex password) twice to access AMT page.



Select Network Setup to configure iAMT.



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

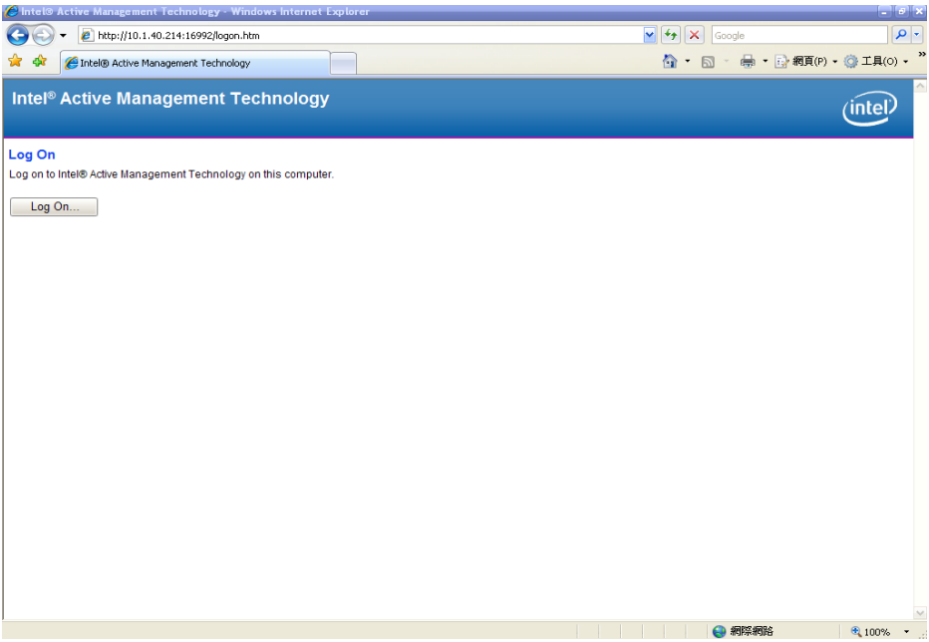


Exit from MEBx after completing the iAMT settings.

4.3.3 iAMT Settings

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

Example: http://10.1.40.214:16992

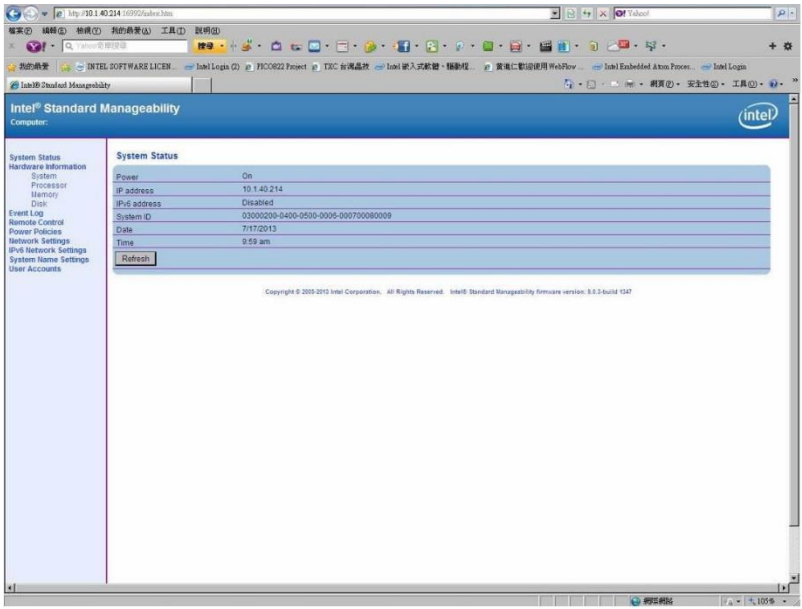


To log in, you will be required to type in your username and password for access to the Web.

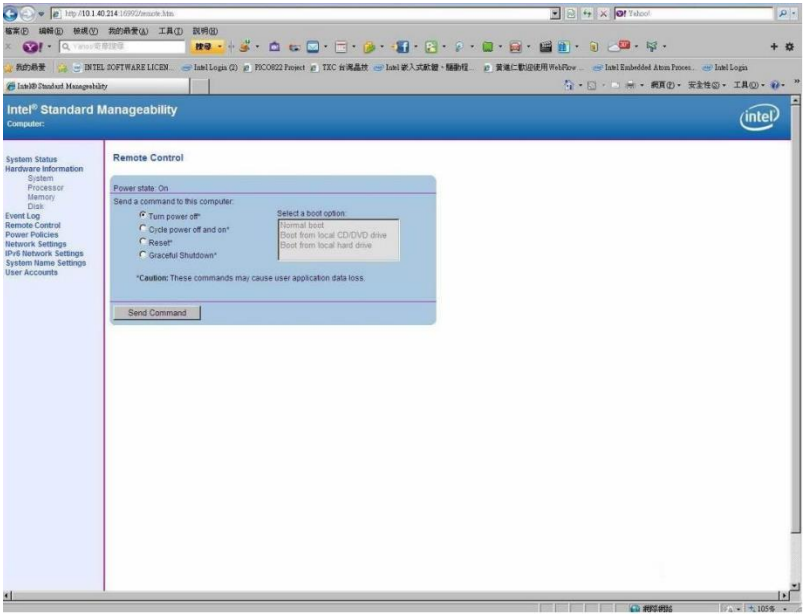
USER: admin (default)

PASS: (MEBx password)

Enter the iAMT Web.



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



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