

USER'S MANUAL

DSP501-527 Series

**Digital Signage Player with 8th Gen
Intel® Core™ i5/i3 & Celeron®
Processor**



www.axiomtek.com

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Safety Precautions

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

1. The DSP501-527 does not come with an operating system which must be loaded first before installation of any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing any internal components. Use a wrist grounding strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the DSP501-527 prior to making any installation. Be sure both the system and all external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the DSP501-527 is properly grounded.
4. Make sure the voltage of the power source is correct before connecting it to any power outlet.
5. Turn Off system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
6. Do not leave equipment in an uncontrolled environment where the storage temperature is below -40°C or above 80°C as it may damage the equipment.
7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
 - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help discharge any static electricity on human body.
 - When handling boards and components, wear a wrist grounding strap available from most electronic component stores.

Classifications

1. Degree of protection against electric shock: not classified
2. Degree of protection against ingress of water: IP40
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen or nitrous oxide.
4. Mode of operation: Continuous

General Cleaning Tips

Please keep the following precautions in mind while understanding the details fully before and during any cleaning of the computer and any components within.

A piece of dry cloth is ideal to clean the device.

1. Be cautious of any tiny removable components when using a vacuum cleaner to absorb dirt on the floor.
2. Turn the system off before clean up the computer or any components within.
3. Avoid dropping any components inside the computer or getting circuit board damp or wet.
4. For cleaning, be cautious of all kinds of cleaning solvents or chemicals which may cause allergy to certain individuals.
5. Keep foods, drinks or cigarettes away from the computer.

Cleaning Tools:

Although many companies have created products to help improve the process of cleaning computer and peripherals, users can also use house hold items accordingly for cleaning. Listed below are items available for cleaning computer or computer peripherals.

Pay special attention to components requiring designated products for cleaning as mentioned below.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, it is recommended to use a piece of cloth.
- Water or rubbing alcohol: A piece of cloth may be somewhat moistened with water or rubbing alcohol before being rubbed on the computer. Unknown solvents may be harmful to plastic parts.
- Absorb dust, dirt, hair, cigarette and other particles outside of a computer can be one of the best methods of cleaning a computer. Over time these items may restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swaps moistened with rubbing alcohol or water are applicable to reach areas in keyboard, mouse and other areas.
- Foam swabs: If possible, it is better to use lint free swabs such as foam swabs.



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

Please follow the steps below:

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

Scrap Computer Recycling

Please inform the nearest Axiomtek distributor as soon as possible for suitable solutions in case computers require maintenance or repair; or for recycling in case computers are out of order.

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SECTION 1 INTRODUCTION



This section contains general information and detailed specifications of the DSP501-527. Section 1 consists of the following sub-sections:

- General Descriptions
- System Specifications
- Dimensions
- I/O Outlets
- Packing List

1.1 General Descriptions

The DSP501-527 is a fanless digital signage player that comes with an Intel® Core™ i5-8365UE, i3-8145UE, or Celeron® 4305UE processor onboard (formally codename: Whiskey Lake) with low power consumption design. To fulfill the application needs of digital signage, smart retail, and smart cities, the embedded system supports Windows® 10 IoT and can be wall-mounted and VESA mounted as optional requests.

The DSP501-527 features an ultra-slim size, low power consumption, and functions fundamental to successful digital signage deployment. It is equipped with dual 260-pin DDR4-2400/2666 SO-DIMMs with up to 32GB memory capacity and has a full range of I/O interfaces to support RS-232, audio, USB 3.0 and USB 2.0 signals. This compact fanless signage player is capable of serving two independent displays with 4K resolution through its DisplayPort and HDMI ports. Furthermore, the DSP501-527 is offering 12 voltage DC power input and four antenna connectors for setting up Wi-Fi or 4G LTE networks.

Features

- 8th generation Intel® Core™ i5-8365UE 4.1GHz, i3-8145UE 3.9GHz, Celeron® 4305UE 2.0GHz ULT SoC
- 2 x DDR4-2400/2666 SO-DIMM max. up to 32GB
- 1 COM port, 5 USB ports and 1 GbE LANs
- 1 HDMI and 1 DP++ output for 4K UHD content
- 1 x M.2 M Key 2280 (SATA/NVMe) for storage
- 1 x M.2 E Key 2230 for WLAN and WWAN
- 1 x M.2 B Key 3042 for 4G/LTE option
- Fanless, ultra-slim and compact design
- Suitable for digital signage and smart retail applications

Reliable and Stable Design

The DSP501-527 signage player comes equipped with Intel® Core™ i5-8365UE 4.1GHz, i3-8145UE 3.9GHz, Celeron® 4305UE 2.0GHz, ultra-slim size and basic functions, providing the best solution for smart retails and light industries.

Flexible Connectivity

The DSP501-527 comes with basic interfaces including one RS-232 port, four USB 3.1 ports, one USB 2.0 port, one HDMI, one DP++ and one GbE LAN port.

Embedded O.S. Supported

The DSP501-527 supports Windows® 10 IoT and Linux.

1.2 System Specifications

1.2.1 CPU

- **CPU**
 - 8th generation Intel® Core™ i5-8365UE 4.1GHz, i3-8145UE 3.9GHz, Celeron® 4305UE 2.0GHz ULT SoC
- **Chipset**
 - SoC integrated
- **BIOS**
 - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
- **System Memory**
 - Two 260-pin DDR4-2400/2666 SO-DIMM sockets, up to 32GB at the maximum.

1.2.2 I/O System

- **Display**
 - 1 x HDMI (HDMI 2.0 up to 4096 x 2160@60Hz)
 - 1 x DP (DP 1.2 up to 4096 x 2160@60Hz)
- **Ethernet**
 - 1 x 10/100/1000 Ethernet ports (i219LM)
- **USB Ports**
 - 1 x USB 2.0
 - 4 x USB 3.1
- **Serial Ports**
 - 1 x RS-232 (9-pin D-Sub male connector)
- **Expansion Interface**
 - 1 x M.2 E Key 2230 socket for WiFi/Bluetooth options
 - 1 x M.2 B Key 3042 socket for 4G/LTE options
 - 1 x M.2 M Key 2280 (SATA/NVMe)
- **Storage**
 - 1 x M.2 M Key 2280 (SATA/NVMe)
 - 1 x SIM slot
- **Audio**
 - HD audio compliant with Realtek ALC662
 - Support Line-out and MIC-in through 2 x audio jack.
- **Indicator**
 - 1 x Yellow LED as indicator for HDD active
- **Switch**
 - 1 x ATX PWR switch
 - 1 x Remote PWR switch
 - 1 x Reset switch
- **Antenna**
 - 4 x SMA type connector openings for antenna

1.2.3 System Specifications

- **Watchdog Timer**
 - 1~255 seconds or minutes; up to 255 levels.
- **Power Supply**
 - 12VDC /60W AC to DC adapter
- **Operation Temperature**
 - 0°C ~+50°C (32 °F ~ 122°F)
- **Humidity**
 - 10% ~ 90% (non-condensation)
- **Vibration Endurance**
 - 3Grms (5-500Hz, X, Y, Z directions)
- **Weight**
 - 1.15 kg (2.53 lb) without package
 - 1.50 kg (3.3 lb) with package
- **Dimension**
 - 200 mm (7.87") x 137.8 mm (5.43") x 20 mm (0.79")

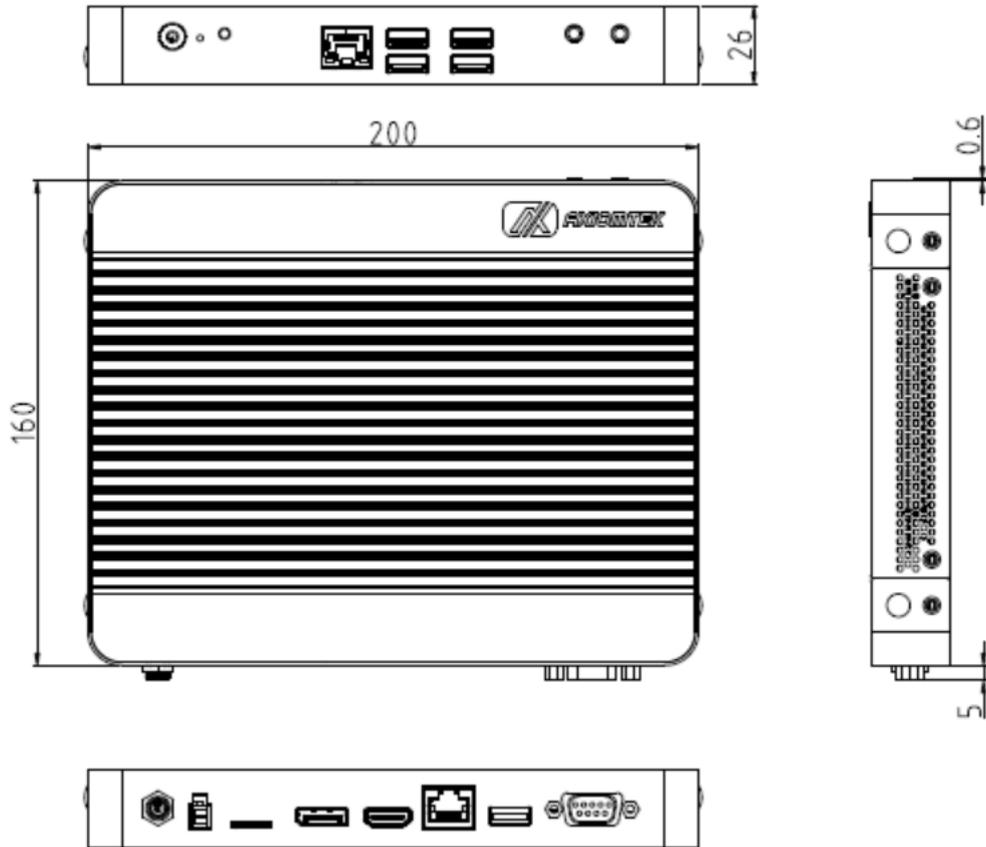


【Note】 : *All specifications and images are subject to change without notice.*

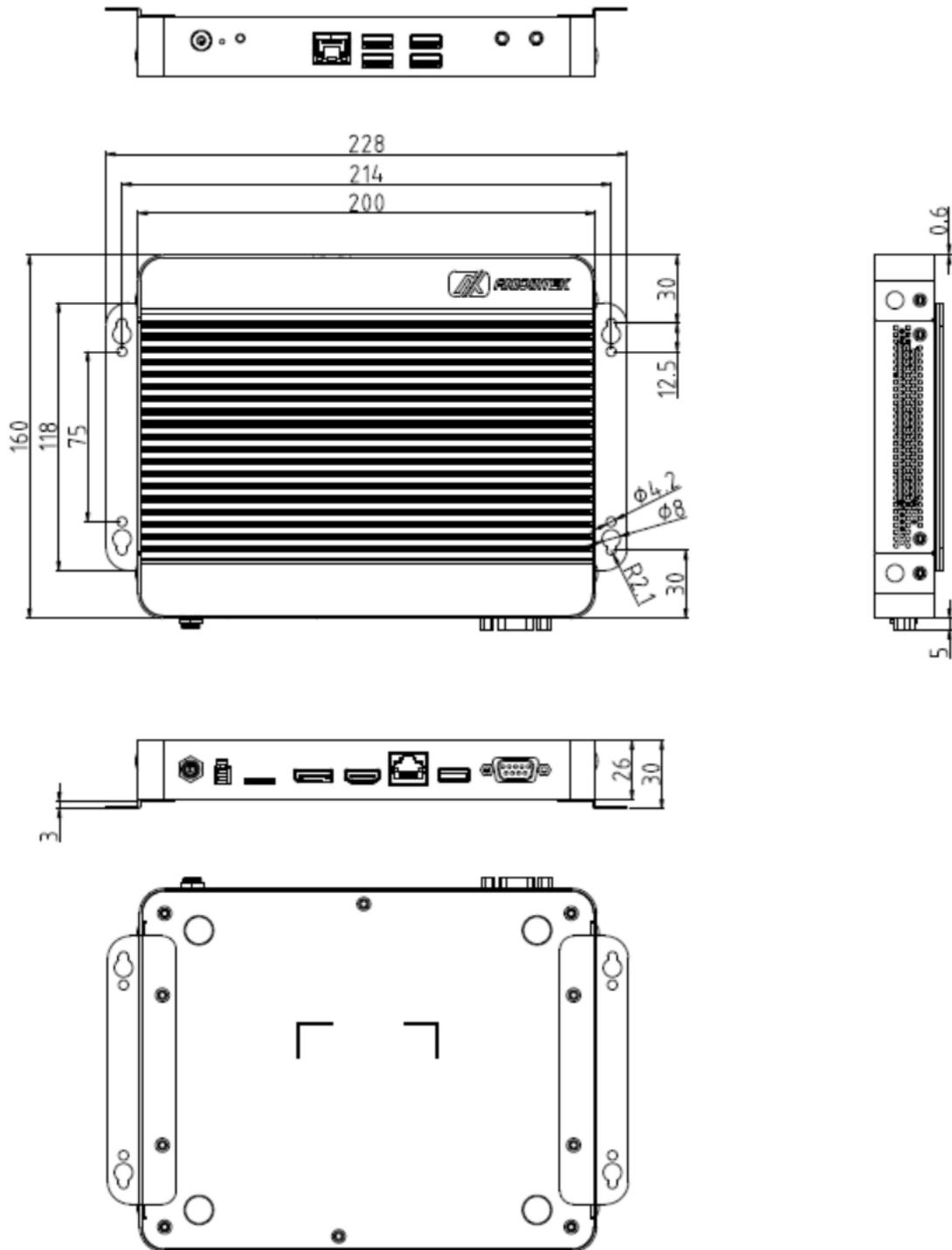
1.3 Dimensions

The following diagrams show dimensions and outlines of the DSP501-527.

1.3.1 System Dimensions



1.3.2 Wall-mount Bracket Dimensions



Instruction

Step 1: Screw the two pieces of wall-mount kits to the bottom plate of the device. Total four screws (metric 3 x6) are required.

Step 2: Use the device, with wall mount plate attached, as a guide to mark the correct locations of the four screws.

Step 3: Insert a tapping-screw (thread diameter less than 4mm) head through middle of the keyhole-shaped aperture on the plate, and then slide the device downwards. Tighten the screw head for added stability.

1.4 I/O Outlets

The following figures show I/O outlets on the DSP501-527.

Front View



Rear View



1	12VDC power input	9	Mic in
2	Remote power switch	10	Line out
3	SIM card	11	Clear EDID
4	DP++	12	USB 3.1
5	HDMI	13	GbE LAN port
6	Device management port	14	HDD LED
7	USB 2.0	15	Reset switch
8	RS-232	16	Power switch

1.5 Packing List

The DSP501-527 comes with the following bundle package:

- DSP501-527 System Unit x 1
- Quick Installation Guide x 1
- Foot Pad x 4
- Screw Type AC 60W (12V/5A) Adaptor x 1
- Wall-mount bracket x 2
- Optional DDR4 SO-DIMM Memory
- Optional Antenna
- Optional M.2 WiFi/BT module
- Optional M.2 2280 SSD
- Optional Power Cord

SECTION 2 HARDWARE INSTALLATION

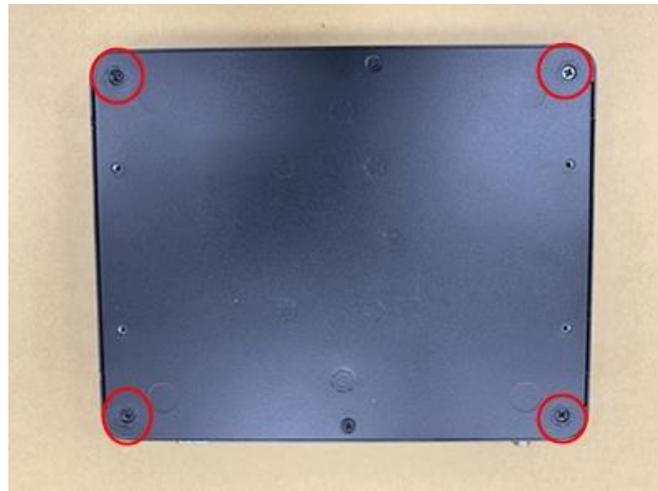
The DSP501-527 is convenient for various hardware configurations such as DRAM, SSD (Solid State Drive) and M.2 modules. Section 2 contains guidelines for hardware installation.

2.1 Installation of SO-DIMM Memory

Installation of Memory DIMM1 / DIMM2 Device

Step 1 Turn off the system and unplug the power cord.

Step 2 Turn the system upside down to locate screws at the bottom and then loosen all screws.



Step 3 Open the top cover.

Step 4 Identify the DIMM socket on the main board.

Step 5 Insert the memory module by pushing its gold colored contact into the socket, and then press down the module until it is locked by the two end latches.



Step 6 Put the top cover and fasten four screws back onto the system.

2.2 Installation of M.2 SATA/NVMe SSD

Step 1 Turn off the system and unplug the power cord.

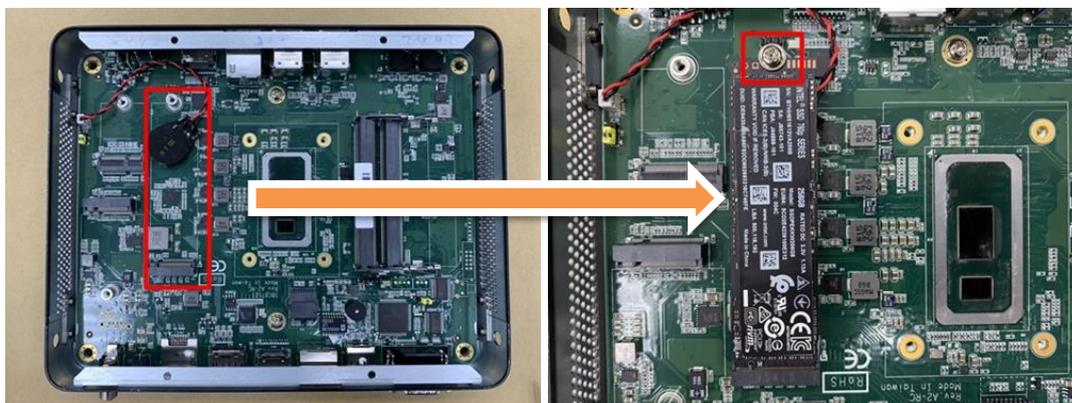
Step 2 Turn the system upside down to locate screws at the bottom and then loosen all screws.



Step 3 Open the top cover.

Step 4 Located the M.2 socket on main board.

Step 5 Insert a M.2 module into the socket and then fasten a screw to secure the module in place.

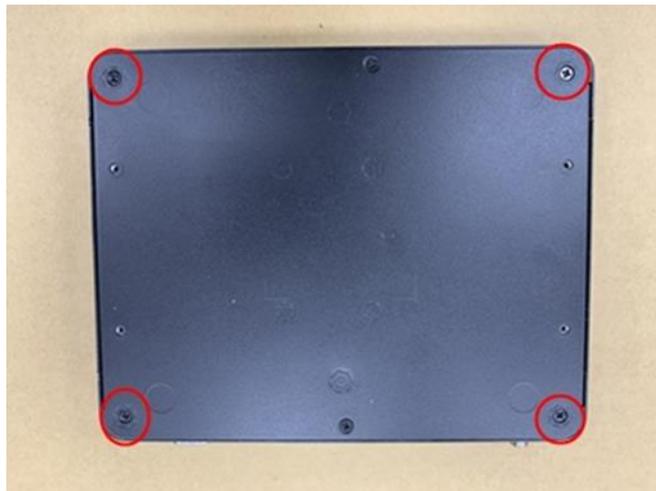


Step 6 Put the TOP cover and fasten four screws back onto the system.

2.3 Installation of M.2 Key B 4G/LTE Module

Step 1 Turn off the system and unplug the power cord.

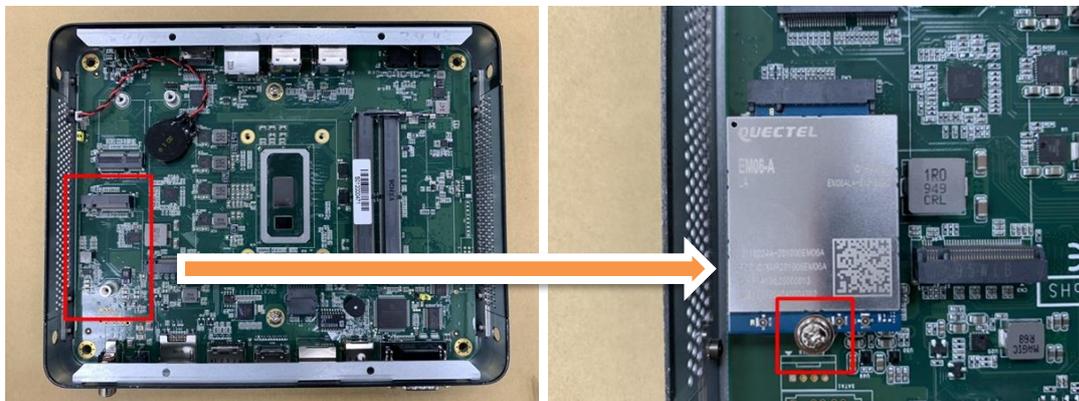
Step 2 Turn the system upside down. Locate and loosen the four screws at the bottom, as illustrated below.



Step 3 Open the top cover.

Step 4 Identify the M.2 Key B for 4G/LTE socket on the main board.

Step 5 Insert a M.2 Key B for 4G/LTE module into the socket and then fasten a screw to secure the module in place.

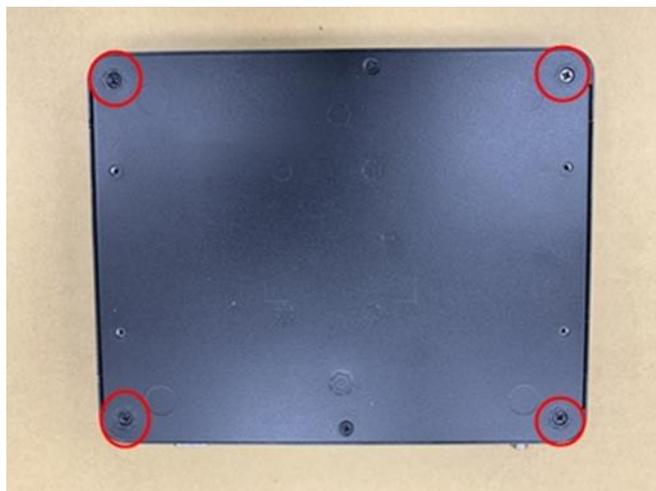


Step 6 Put the top cover and fasten four screws back onto the system.

2.4 Installation of M.2 Key E WiFi/BT Module

Step 1 Turn off the system and unplug the power cord.

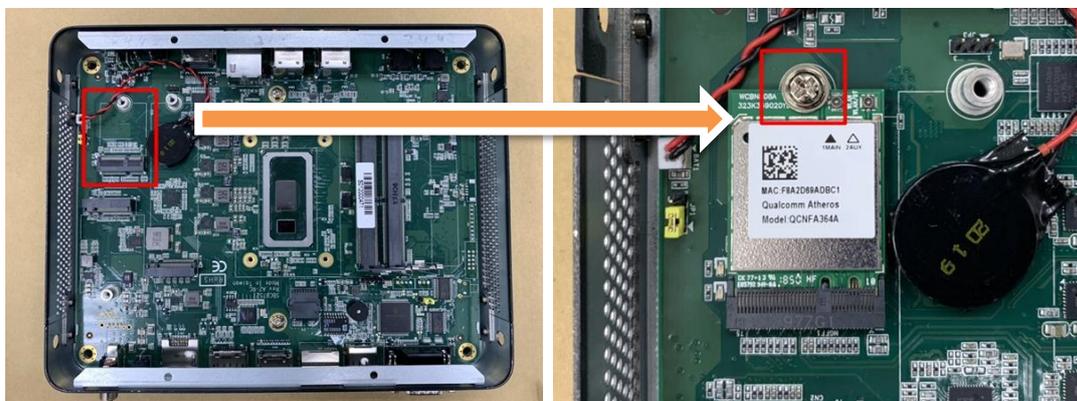
Step 2 Turn the system upside down. Locate and loosen the four screws at the bottom, as illustrated below.



Step 3 Open the top cover.

Step 4 Identify the M.2 Key E 2230 for Wi-Fi socket on the main board.

Step 5 Insert a M.2 Key E 2230 for WiFi module into the socket and then fasten a screw to secure the module in place.



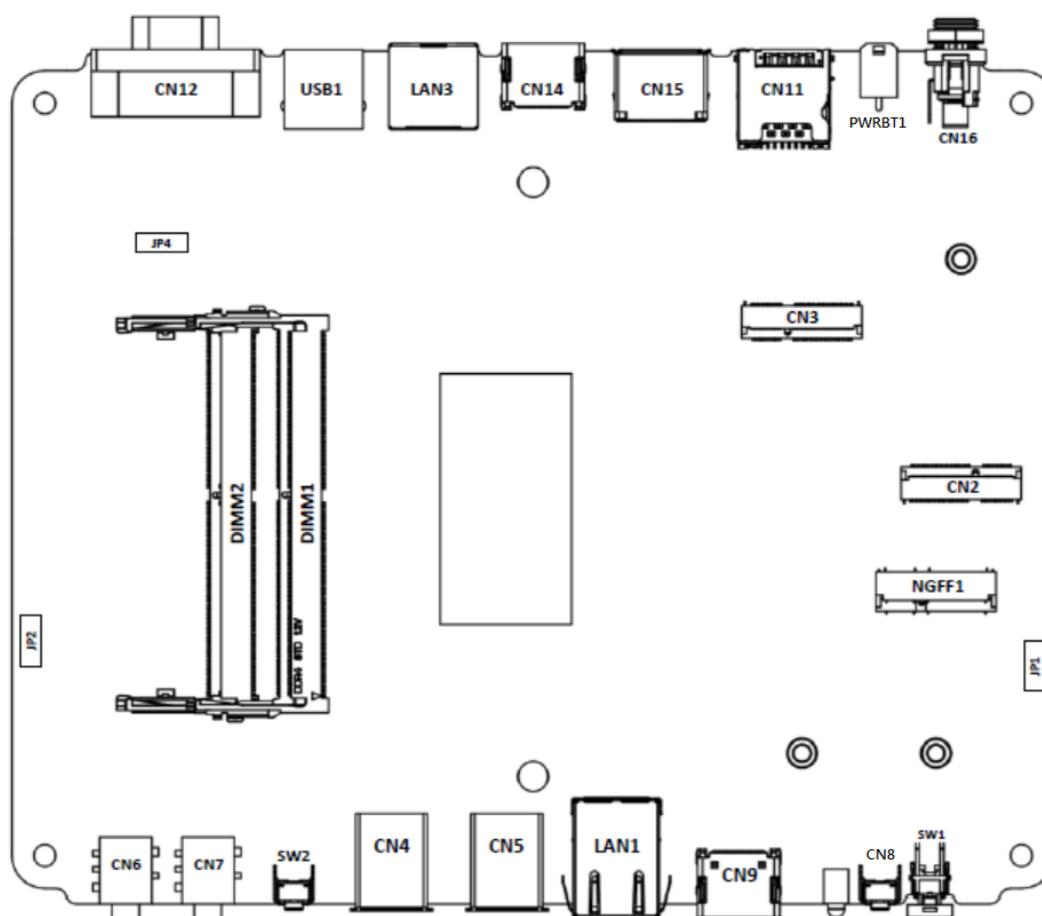
Step 6 Put the top cover and fasten four screws back onto the system.

SECTION 3 JUMPER & CONNECTOR SETTINGS

Proper jumper settings configure the DSP501-527 to meet various application needs.-Hereby all jumpers settings along with their default settings are listed for devices onboard.

3.1 Locations of Jumpers & Connectors

SBC87527 Top View



【Note】 : *It is strongly recommended that any unmentioned jumper settings should not be modified without instructions by Axiomtek FAEs. Any modifications without instructions might cause system failure.*

3.2 Summary of Jumper Settings

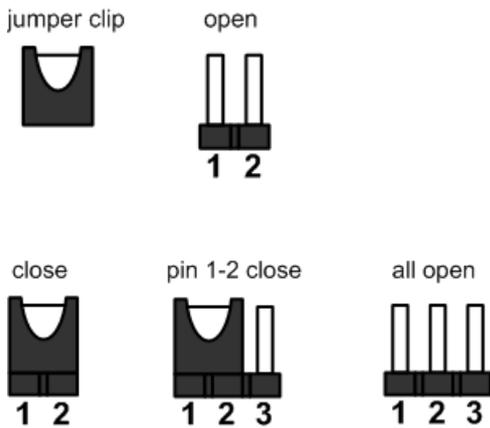
Proper jumper settings configure the DSP300-318 to meet various application purposes. A table of all jumpers and their default settings is listed below.

Jumper	Description	Setting
JP1	Restore BIOS Optimal Defaults	1-2 Normal (Default)
	Default: Normal Operation	2-3 Enable
JP4	Auto Power On	1-2 Enable (Default)
	Default: Enable	2-3 Disable



【Note】 : How to setup Jumpers

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



【Note】 : Once the default jumper or switch setting needs to be changed, please do it under power-off condition.

3.2.1 Restore BIOS Optimal Defaults (JP1)

To restore BIOS optimal defaults, please put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2.

Functions	Settings
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close



3.2.2 Auto Power On (JP4)

If the pin 1_2 of JP4 is shorted, the system will be automatically power on without pressing soft power button. If the pin 2_3 of JP4 is shorted, it is necessary to manually press soft power button to power on the system.

Functions	Settings
Auto Power On: Enabled (Default)	1-2 close
Auto Power On: Disabled	2-3 close



3.3 Connectors

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

Connector	Description
CN16	DC Power Jack
CN12	COM1 DB9 Connector
CN14	HDMI Connector
LAN1	Ethernet Port
SW1	ATX Power On/Off Button
CN8	Reset Button
PWRBT1	Remote Power Switch Connector
USB1	USB 2.0 Port
CN4/5	USB 3.1 Port
CN15	DP Port
CN7	Audio Jack(Line Out)
CN6	Audio Jack(MIC In)
CN2	M.2 B Key Socket
CN11	SIM Card Slot
CN3	M.2 M Key Socket
NGFF1	M.2 E Key Socket
LAN3	Device Management Port
SW2	Clear EDID Button
DIMM1	260-Pin DDR4 Channel A SO-DIMM Socket
DIMM2	260-Pin DDR4 Channel B SO-DIMM Socket

3.3.1 DC Power Jack Connector (screw type) (CN16)

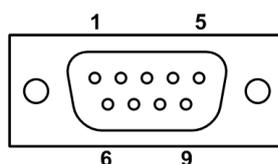
The system supports 12V DC-in connector for system power input. The CN16 is a DC jack with a screw. Firmly insert an adapter with at least 60W power output into this connector. To prevent system instability caused by loose connection, make sure all components/devices are properly installed before connecting.



3.3.2 COM1 DB9 Connector (CN12)

The system has one serial port. COM1 is an RS-232 port.

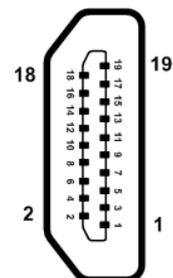
Pins	Signals
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



3.3.3 HDMI Connector (CN14)

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

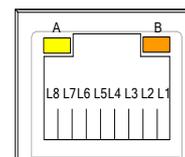
Pins	Signals	Pins	Signals
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	N.C.	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		



3.3.4 Ethernet Ports (LAN1)

The system has one RJ-45 connectors: LAN1. 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 1000/100/10-Base-T hub.

Pins	1000 Base-T	100/10 Base-T	Descriptions
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	Active Link LED (Yellow) Off: No link Blinking: Data activity detected		
B	Speed LED 1000: Orange 100: Green 10: OFF		



3.3.5 ATX Power On/Off button (SW1)

The ATX power button is on the I/O side. It allows users to control DSP501-527 power on/off.

Functions	Descriptions
On	Turn on/off system
Off	Keep system status



3.3.6 Reset button (CN8)

The Reset button allows users to reset DSP501-527 when an abnormal situation occurs during system operation.

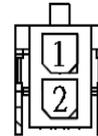
Functions	Descriptions
On	Reset system
Off	Keep system status



3.3.7 Remote Power Switch Connector (PWRBT1)

The system has one 2-pin connector output for remote power on/off switch.

Functions	Descriptions
Short(1-2)	Turn on/off system
Open	Keep system status



3.3.8 USB 2.0 Port (USB1)

The USB1 is a Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connector on the rear I/O. It is commonly used for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pins	Signals
1	USB VCC (+5V_SBY)
2	USB #4_D-
3	USB #4_D+
4	GND

CN14

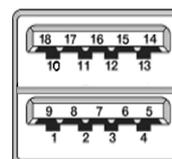


3.3.9 USB 3.0 Port (CN4/CN5)

The Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) connector on the rear I/O is for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pin	Signal	Pin	Signal
1	USB_VCC (+5V_SBY)	10	USB_VCC (+5V_SBY)
2	USB_Data3-	11	USB_Data4-
3	USB_Data3+	12	USB_Data4+
4	GND	13	GND
5	SSRX3-	14	SSRX4-
6	SSRX3+	15	SSRX4+
7	GND	16	GND
8	SSTX3-	17	SSTX4-
9	SSTX3+	18	SSTX4+

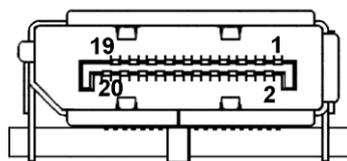
CN4/5



3.3.10 DisplayPort Connector (CN15)

The DP is a digital display interface which is capable of transmitting high-definition video.

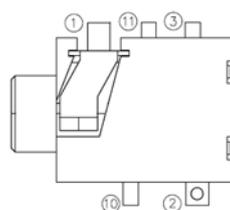
Pin	Signal
1	DPB_LANE0
2	GND
3	DPB_LANE0#
4	DPB_LANE1
5	GND
6	DPB_LANE1#
7	DPB_LANE2
8	GND
9	DPB_LANE2#
10	DPB_LANE3
11	GND
12	DPB_LANE3#
13	Detect Pin
14	GND
15	DPB_AUX
16	GND
17	DPB_AUX#
18	DPB_HPDE
19	GND
20	+3.3V



3.3.11 Audio Jack Line-out Connector (CN7)

The DSP501-527 provides one HD audio jack Line_out connector.

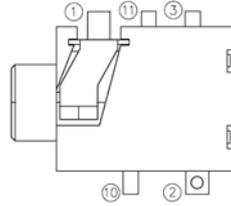
Pins	Signals
1	GND
2	LINEOUT_L
3	LINEOUT_R
10	NC
11	NC



3.3.12 Audio Jack MIC-in Connector (CN6)

The DSP501-527 provides one HD audio jack MIC_in connector.

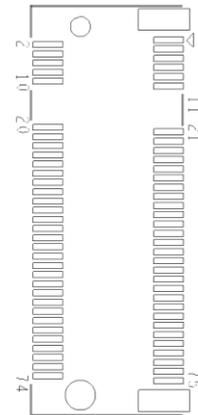
Pins	Signals
1	GND
2	MIC_L
3	MIC_R
10	NC
11	NC



3.3.13 M.2 B Key Connector (CN2)

The DSP501-527 has one M.2 B Key 3042 socket.

Pins	Signals	Pins	Signals
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_POWER_OFF
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	GPIO_9/DAS/DSS#(I/O)/LED1#
11	GND	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	GPIO_5(I/O)
21	CONFIG_0	22	GPIO_6(I/O)
23	GPIO_11	24	GPIO_7(I/O)
25	DPR	26	GPIO_10(I/O)
27	GND	28	GPIO_8(I/O)
29	PERn1/USB3.0-Rx-/SSIC-RxN	30	UIM-RESET
31	PERp1/USB3.0-Rx+/SSIC-RxP	32	UIM-CLK
33	GND	34	UIM-DATA
35	PETn1/USB3.0-Tx-/SSIC-TxN	36	UIM-PWR
37	PETp1/USB3.0-Tx+/SSIC-TxP	38	DEVSLP
39	GND	40	GPIO_0(I/O)
41	PERn0/SATA-B+	42	GPIO_1(I/O)

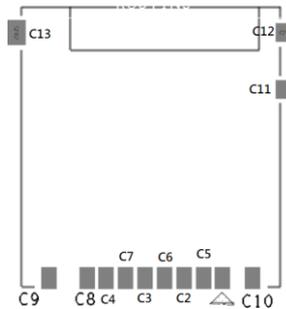


43	PERp0/SATA-B-	44	GPIO_2(I/O)
45	GND	46	GPIO_3(I/O)
47	PETn0/SATA-A-	48	GPIO_4(I/O)
49	PETp0/SATA-A+	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKN	54	PEWAKE#
55	REFCLKP	56	N/C_56
57	GND	58	N/C_58
59	ANTCTL0	60	COEX3
61	ANTCTL1	62	COEX2
63	ANTCTL2	64	COEX1
65	ANTCTL3	66	SIM DETECT
67	RESET#	68	SUSCLK(32kHz)
69	CONFIG_1	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	CONFIG_2		

3.3.14 SIM Card slot (CN11)

This system has one CN11 socket for inserting a SIM Card. In order to work properly, the SIM Card must be used together with a 4G/LTE module which is inserted into CN2. It is mainly used in 4G/LTE wireless network application.

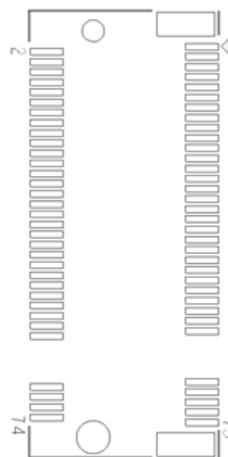
Pins	Signals
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC
9	SIM_DETECT
10	NC
11	NC
12	GND
13	GND



3.3.15 M.2 M KEY Connector (CN3)

This system has one M.2 M key socket for inserting M.2 2280 SATA/NVMe SSD module.

Pins	Signals	Pins	Signals
1	GND	2	+3.3V
3	GND	4	+3.3V
5	NC	6	NC
7	NC	8	NC
9	GND	10	LED1#
11	NC	12	+3.3V
13	NC	14	+3.3V
15	GND	16	+3.3V
17	NC	18	+3.3V
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	DEVSLP
39	GND	40	NC
41	SATA2_RXP	42	NC
43	SATA2_RXN	44	NC
45	GND	46	NC
47	SATA2_TXN	48	NC
49	SATA2_TXP	50	PERST#
51	GND	52	NC
53	NC	54	PEWARK#
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC

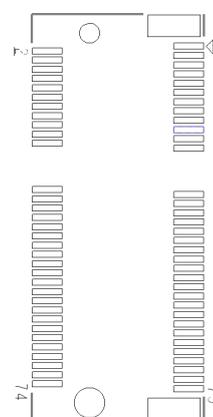


Pins	Signals	Pins	Signals
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		-

3.3.16 M.2 E KEY Connector (NGFF1)

The system has one M.2 E Key 2230 socket on the top side supporting PCI Express x1 and USB 2.0.

Pin	Signal	Pin	Signal
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	LED1#(I)(OD)
7	GND	8	PCM_CLK/I2S SCK
9	SDIO CLK(O)(0/1.8V)	10	PCM_SYNC/I2S WS
11	SDIO CMD(IO)(0/1.8V)	12	PCM_IN/I2S SD_IN
13	SDIO DATA0(IO)(0/1.8V)	14	PCM_OUT/I2S SD_OUT
15	SDIO DATA1(IO)(0/1.8V)	16	LED2#(I)(OD)
17	SDIO DATA2(IO)(0/1.8V)	18	GND
19	SDIO DATA3(IO)(0/1.8V)	20	UART WAKE#(I)(0/3.3V)
21	SDIO WAKE#(I)(0/1.8V)	22	UART RXD(I)(0/1.8V)
23	SDIO RESET#(O)(0/1.8V)	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	UART_TXD(O)(0/1.8V)
33	GND	34	UART_CTS(I)(0/1.8V)
35	PETp0	36	UART_RTS(O)(0/1.8V)
37	PETn0	38	VENDOR DEFINED_38
39	GND	40	VENDOR DEFINED_40
41	PERp0	42	VENDOR DEFINED_42
43	PERn0	44	COEX3(IO)(0/1.8V)
45	GND	46	COEX2(IO)(0/1.8V)
47	REFCLKP0	48	COEX1(IO)(0/1.8V)
49	REFCLKN0	50	SUSCLK(32kHz)(O)(0/3.3V)
51	GND	52	PERST0#(I)(0/3.3V)
53	CLKREQ0#(IO)(0/3.3V)	54	W_DIS2#(I)(0/3.3V)

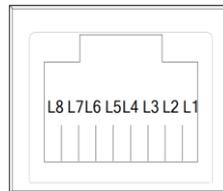


55	PEWAKE0#(IO)(0/3.3V)	56	W_DIS1#(I)(0/3.3V)
57	GND	58	I2C DATA(IO)(0/3.3V)
59	RSVD/PETp1	60	I2C CLK(I)(0/3.3V)
61	RSVD/PETn1	62	ALERT#(O)(0/3.3V)
63	GND	64	RSVD_64
65	RSVD/PERp1	66	UIM_SWP/PERST1#
67	RSVD/PERn1	68	UIM_PWR_SNK/CLKREQ1#
69	GND	70	UIM_PWR_SRC/GPIO1/PEWAKE1#
71	RSVD/REFCLKP1	72	+3.3V
73	RSVD/REFCLKN1	74	+3.3V
75	GND		-

3.3.17 Device Management Port (LAN3)

The system provides one device management port supporting remote device management (RDM) function. Please contact with FAE to get detailed information.

Pin	Signal
L1	MCU_TXP1
L2	MCU_TXN1
L3	MCU_RXP1
L4	GND
L5	GND
L6	MCU_RXN1
L7	GND
L8	GND



3.3.18 Clear EDID Button (SW2)

The clear EDID button allows users to clear the EDID data when the connected display monitors cannot be recognized. Please press the button at least 3 seconds to make sure the EDID data have been reset.

Functions	Descriptions
Pressed	Reset EDID
Off	Keep the original EDID data



SECTION 4 BIOS SETUP UTILITY

This section provides users with detailed descriptions in terms of how to set up basic system configurations through the BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

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

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

4.2 Navigation Keys

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

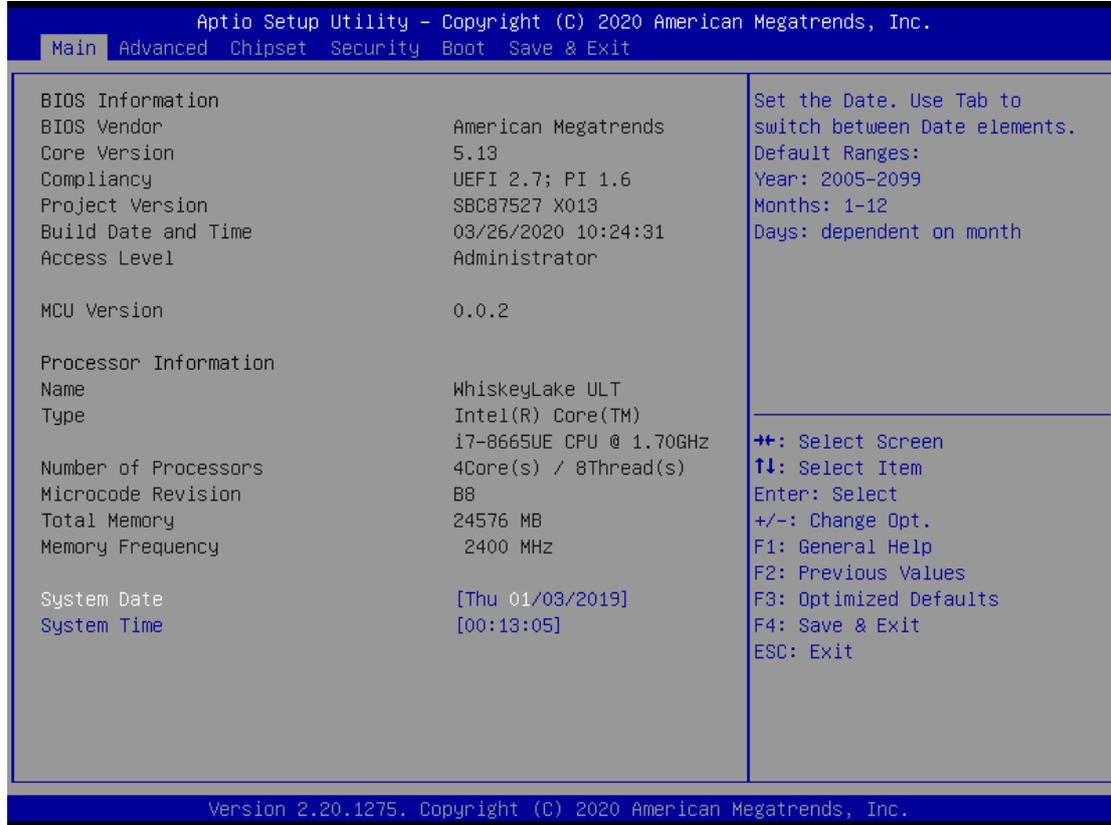


【Note】 : *Some of the navigation keys differ from one screen to another.*

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

4.3 Main Menu

The Main Menu screen is the first screen users see when entering the setup utility. Users 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 also shown below.



BIOS Information

Display the auto-detected BIOS information.

System Date/Time

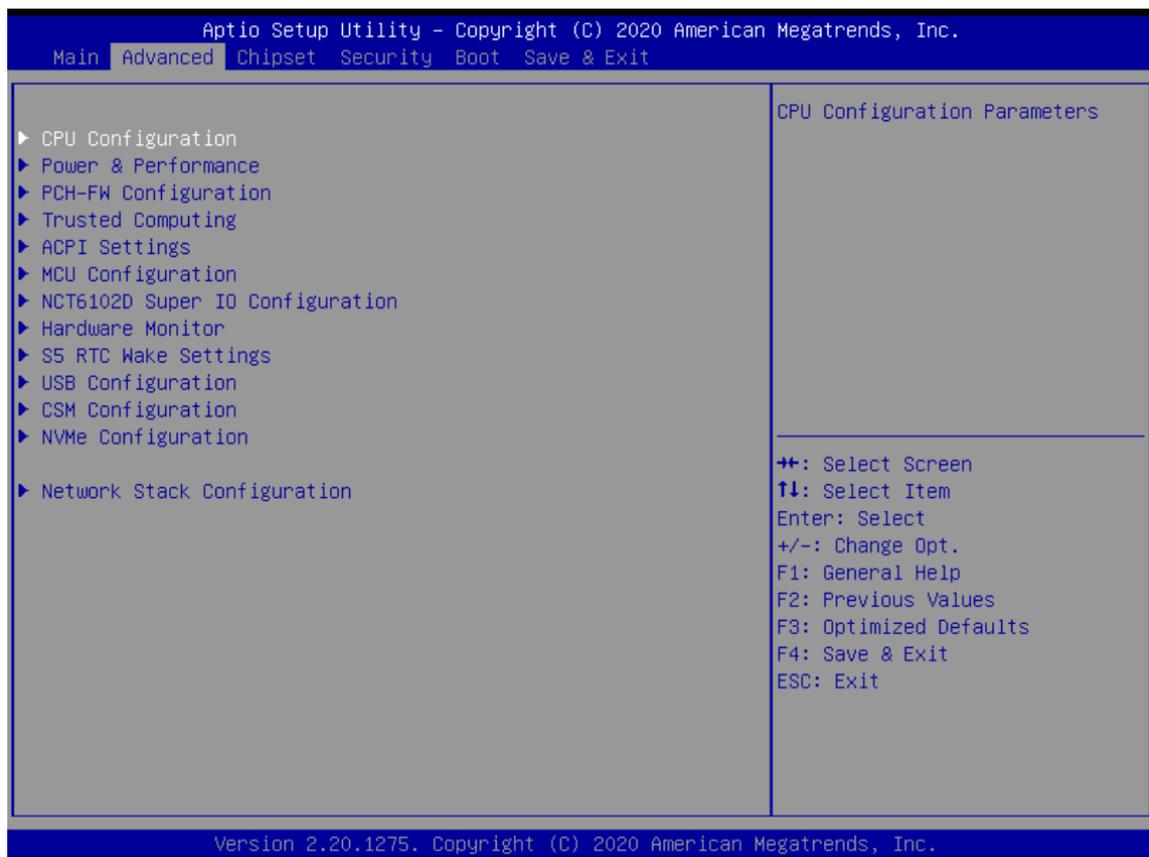
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.4 Advanced Menu

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

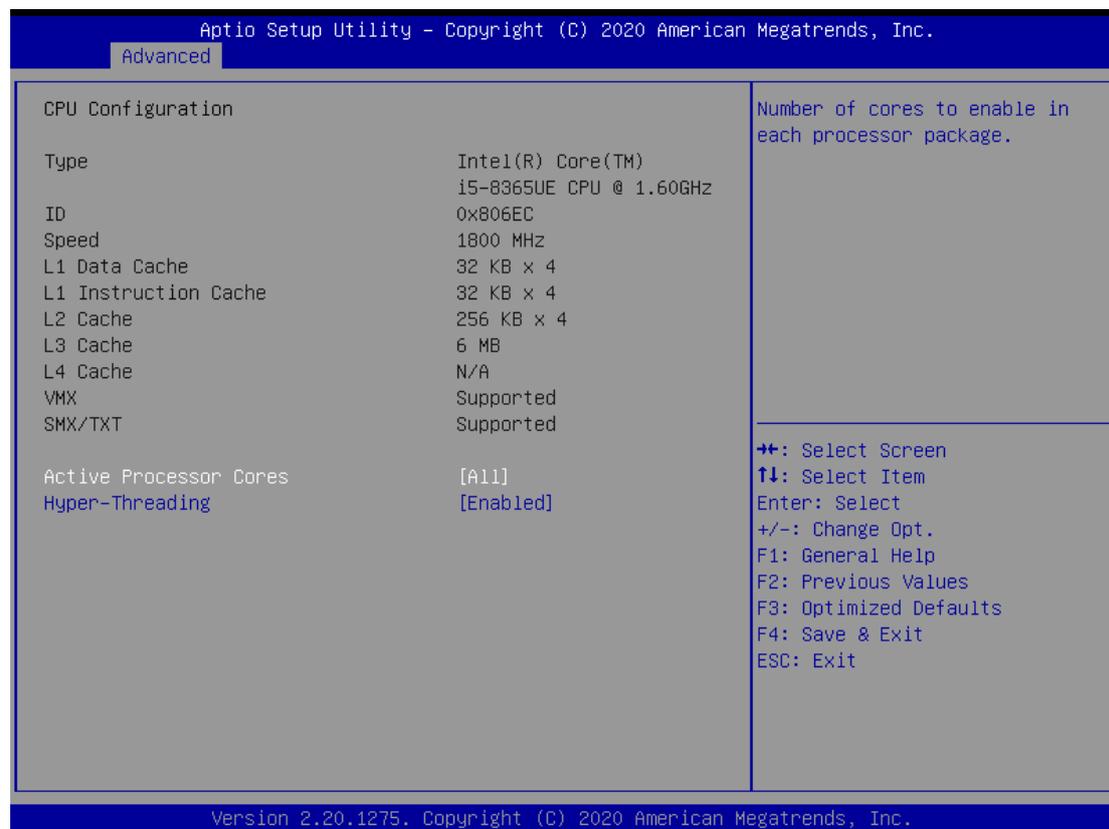
- ▶ CPU Configurations
- ▶ Power & Performance
- ▶ PCH-FW Configuration
- ▶ Trusted Computing
- ▶ ACPI Settings
- ▶ MCU Configuration
- ▶ NCT6102D Super IO Configurations
- ▶ Hardware Monitor
- ▶ S5 RTC Wake Settings
- ▶ USB Configuration
- ▶ CSM Configuration
- ▶ NVMe Configuration
- ▶ Network Stack Configuration

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



CPU Configurations

This screen shows the CPU version and its detailed information.



Active Processor Cores

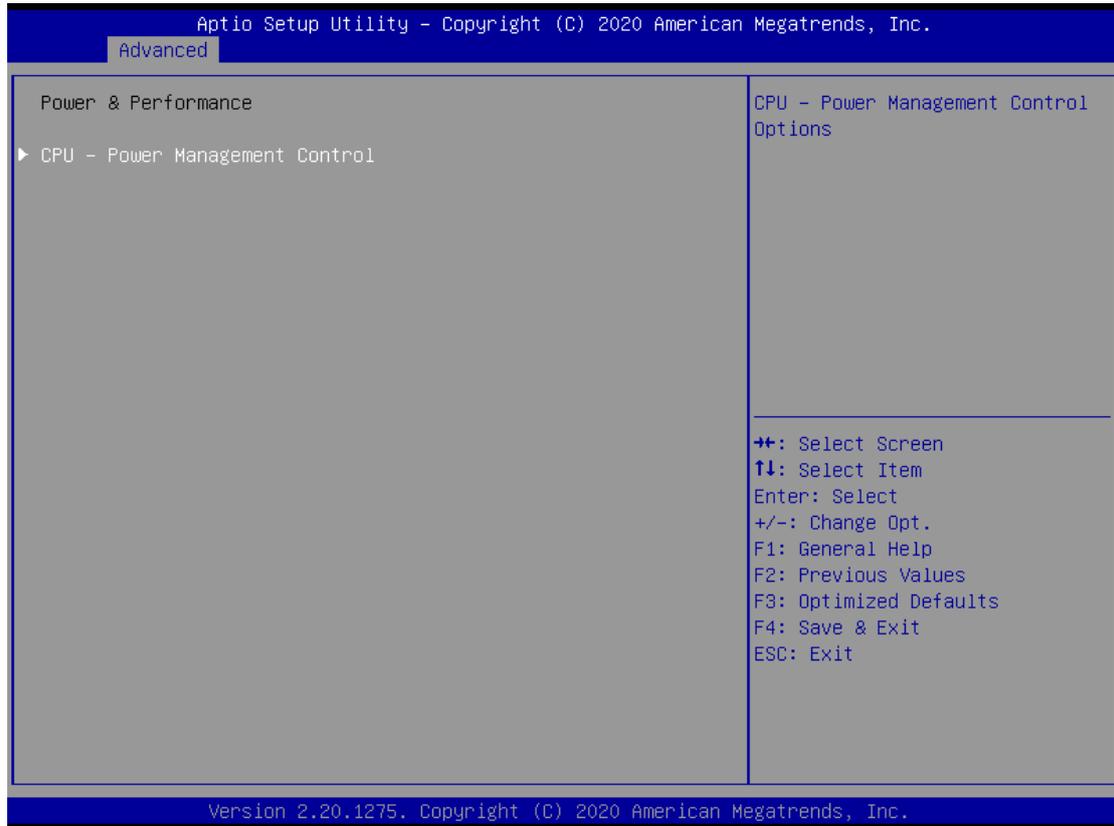
Enable all cores of processor.

Hyper-Threading

Enable or disable to the logical processor threads. The default is enabled.

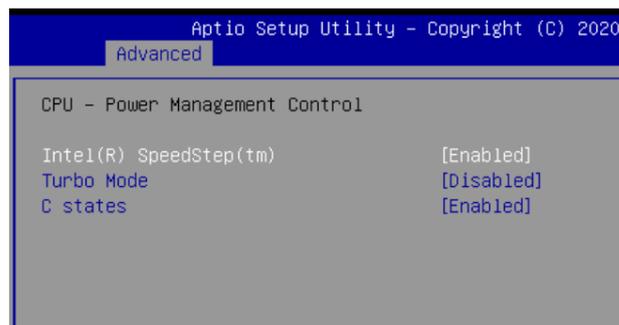
Power & Performance

This screen shows the CPU Power management control options. For items marked with "▶", please press <Enter> for more options.



CPU – Power Management Control

Use these items to set parameters related to CPU-Power management control.



Intel® SpeedStep™

Enable or disable the system to dynamically adjust processor voltage and core frequency. The default is enabled.

Turbo Mode

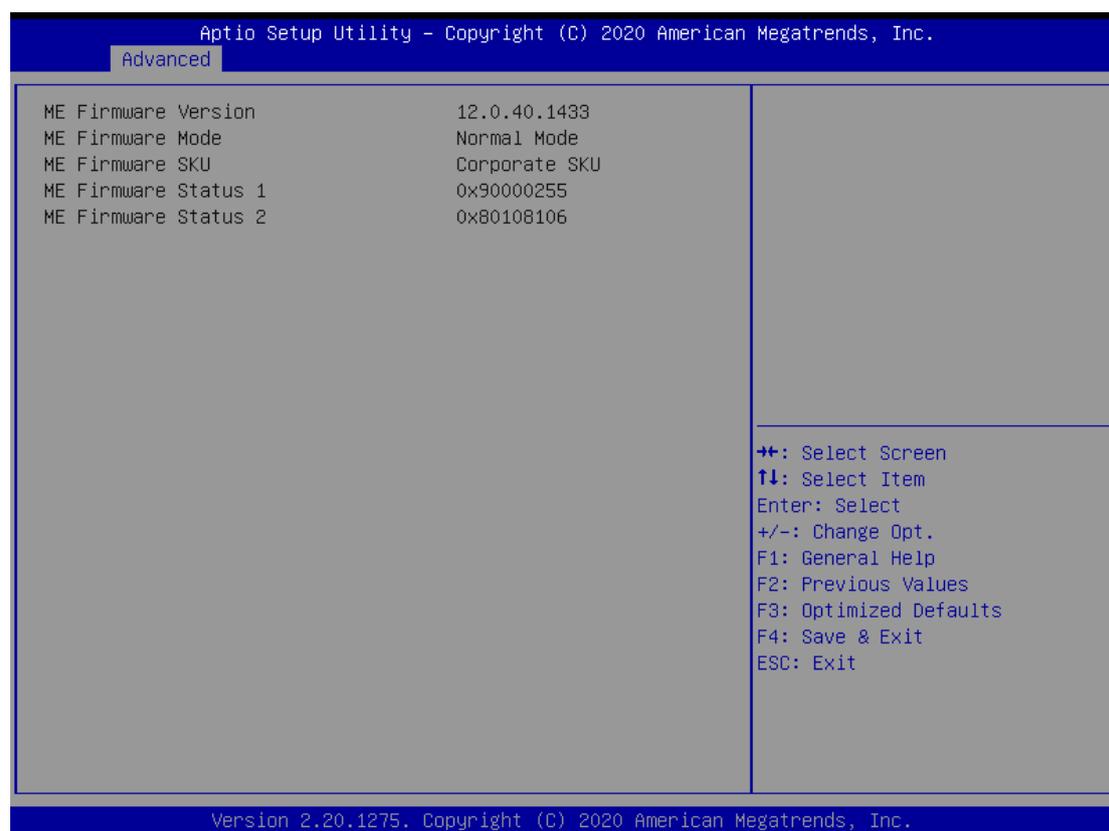
Enable or disable the turbo mode. The default is disabled.

C states

Enabled or disabled C states. The default is enabled.

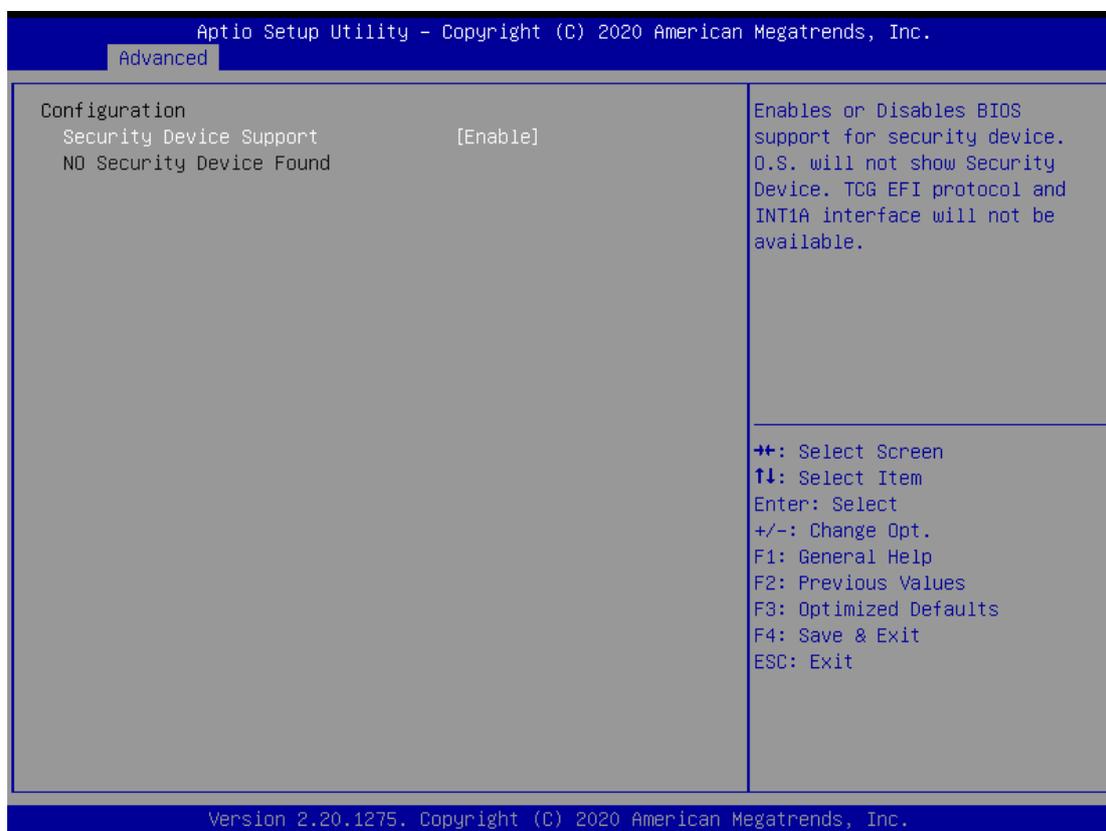
PCH-FW Configuration

This screen shows the ME firmware information.



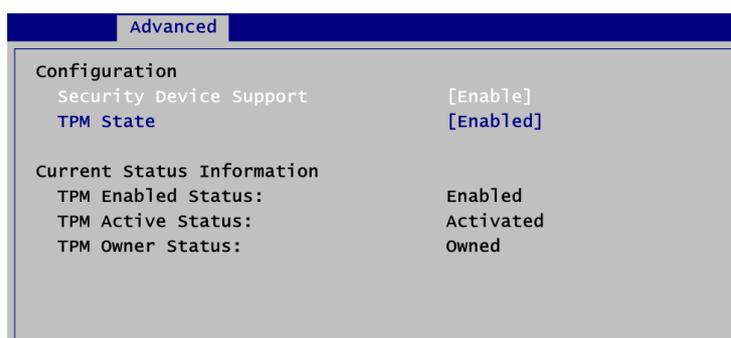
Trusted Computing

You can use this screen for TPM (Trusted Platform Module) configuration. It also shows current TPM status information.



Security Device Support

Enable or disable BIOS support for security device. The default is Disabled. Once the Security Device Support is enabled, you will see the following screen.



TPM State

Specify whether TPM can be used by the operating system.

Current Status Information

Display current TPM status information.

ACPI Settings

Use this screen 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.



Enable Hibernation

Enable or disable system ability to Hibernate (OS/S4 sleep state). The default is Enabled.

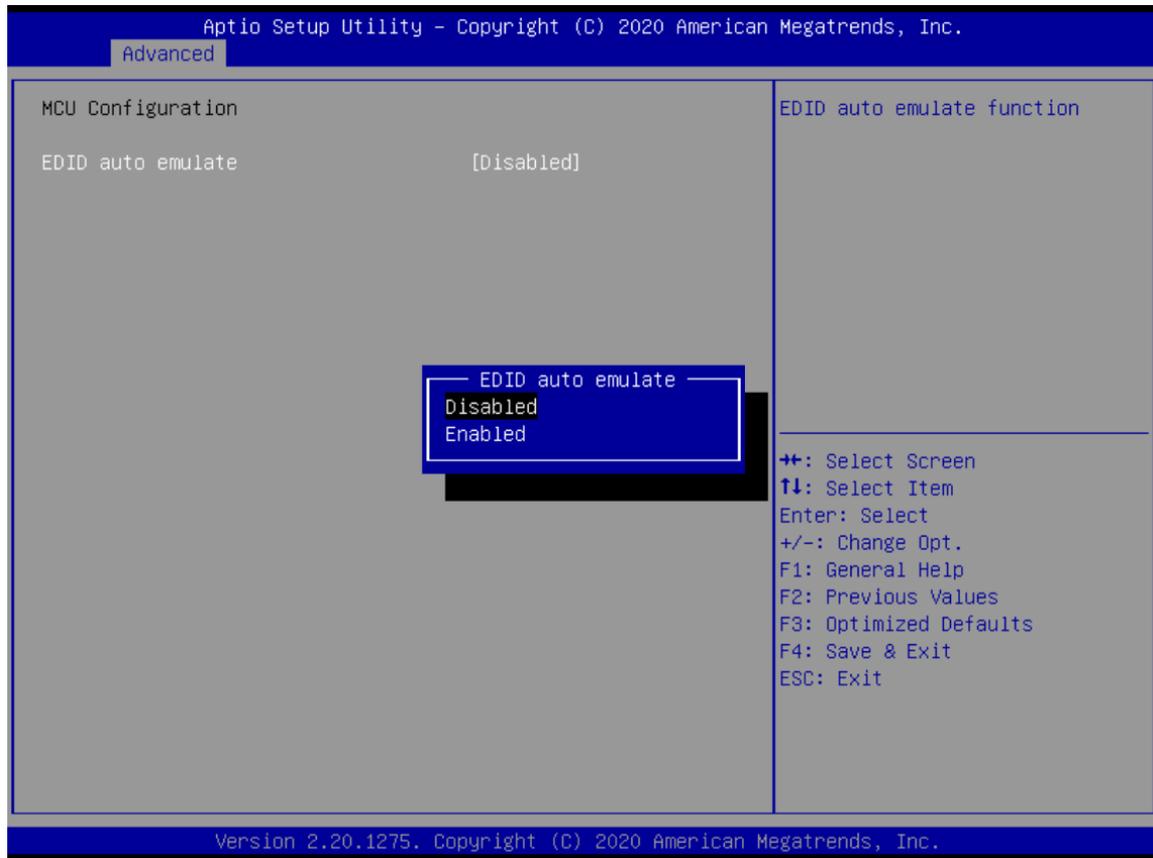
ACPI Sleep State

When the sleep button is pressed, the system will be in the ACPI sleep state.

The default is S3 (Suspend to RAM).

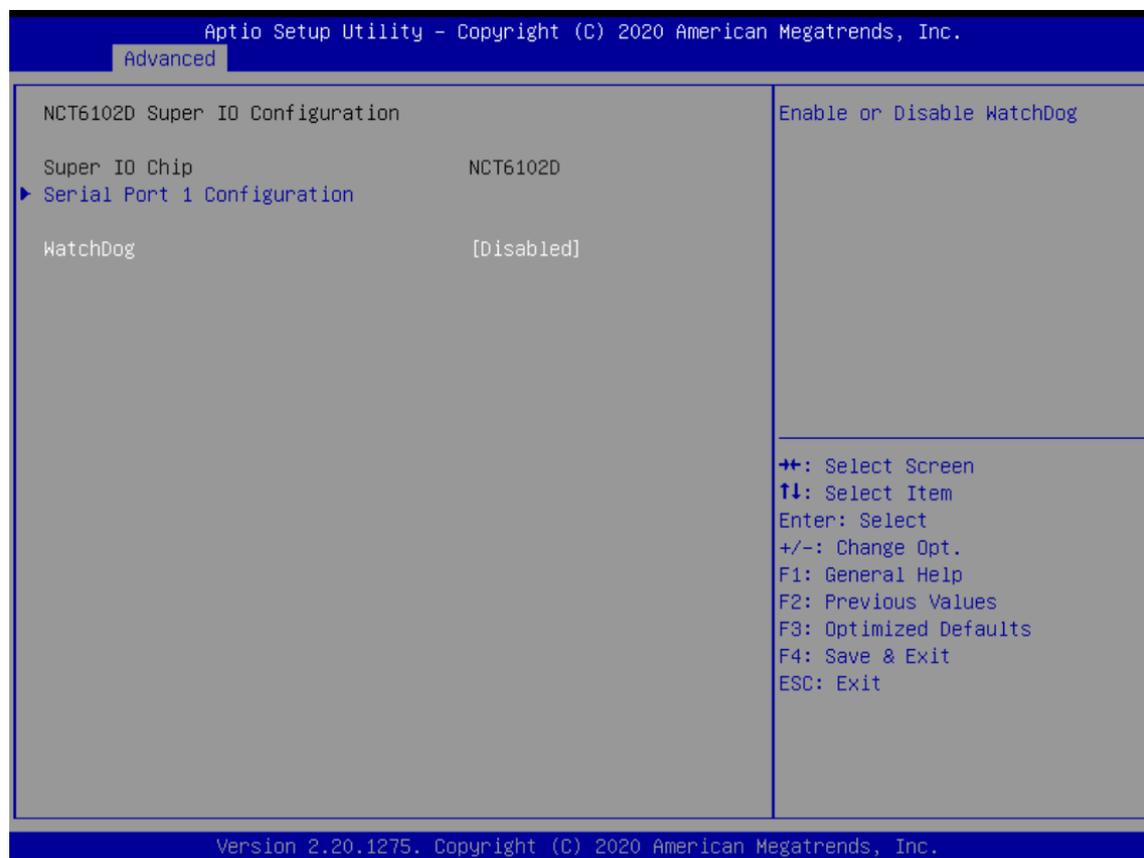
MCU Configurations

Use this screen to Enabled or Disable EDID auto emulate function.
The default is Disabled.



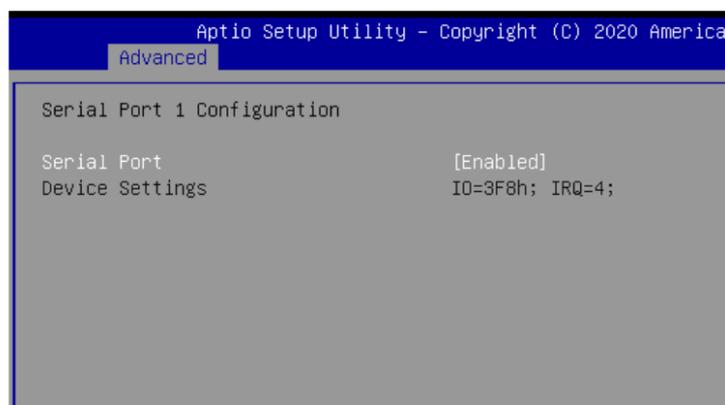
NCT6102D Super IO Configurations

Use this screen to select options for the NCT6102D Super IO Configurations, 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.



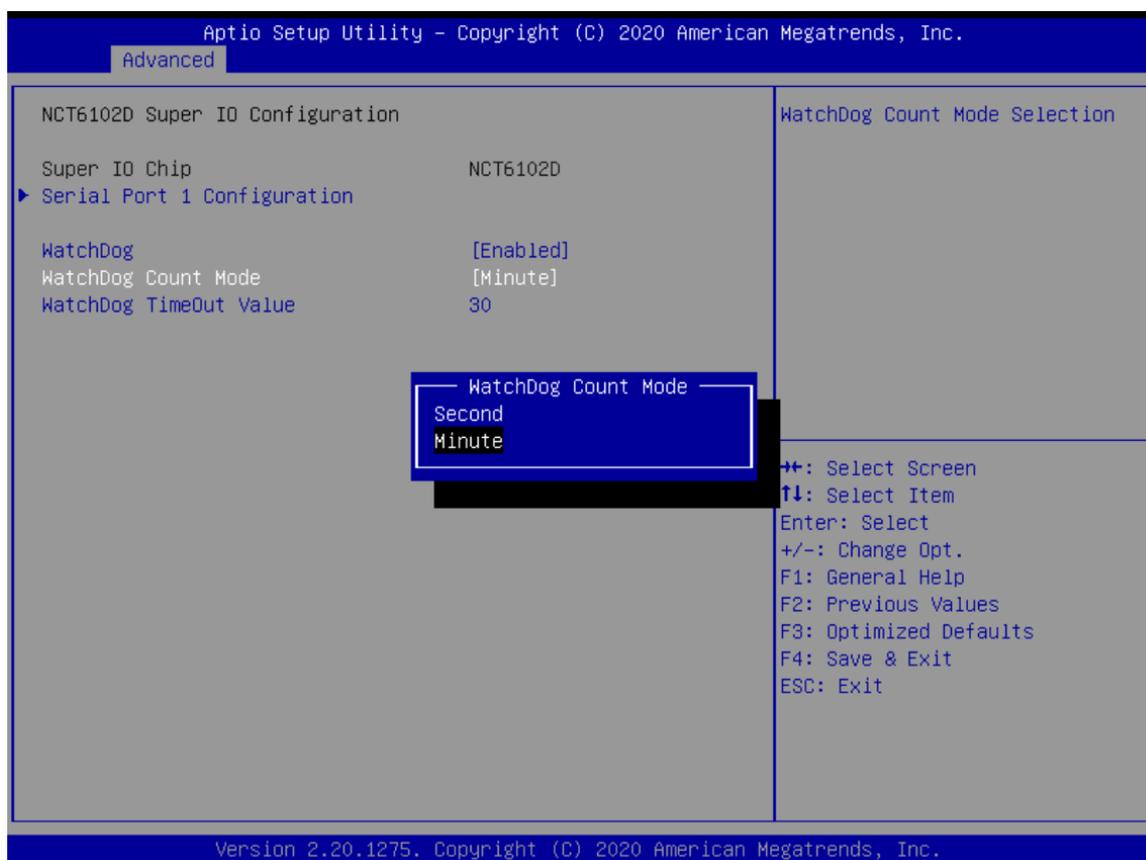
Serial Port 1 (COM1) Configuration

Enable or disable serial port(COM).



WatchDog

Use the items to set WatchDog parameters.



Hardware Monitor

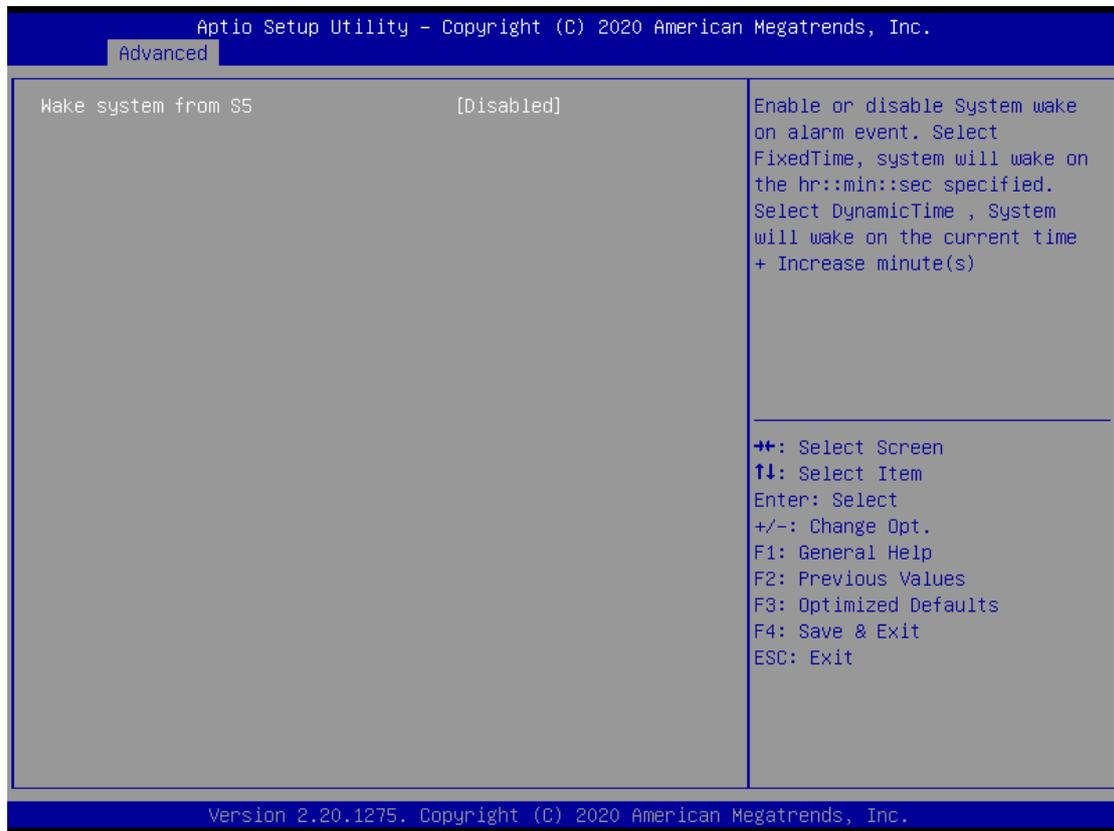
This screen monitors hardware health status.



This screen displays the temperature of the system and CPU as well as system voltages (VCORE, +3.3V, +12V and +5V).

S5 RTC Wake Settings

This screen monitors hardware health status.

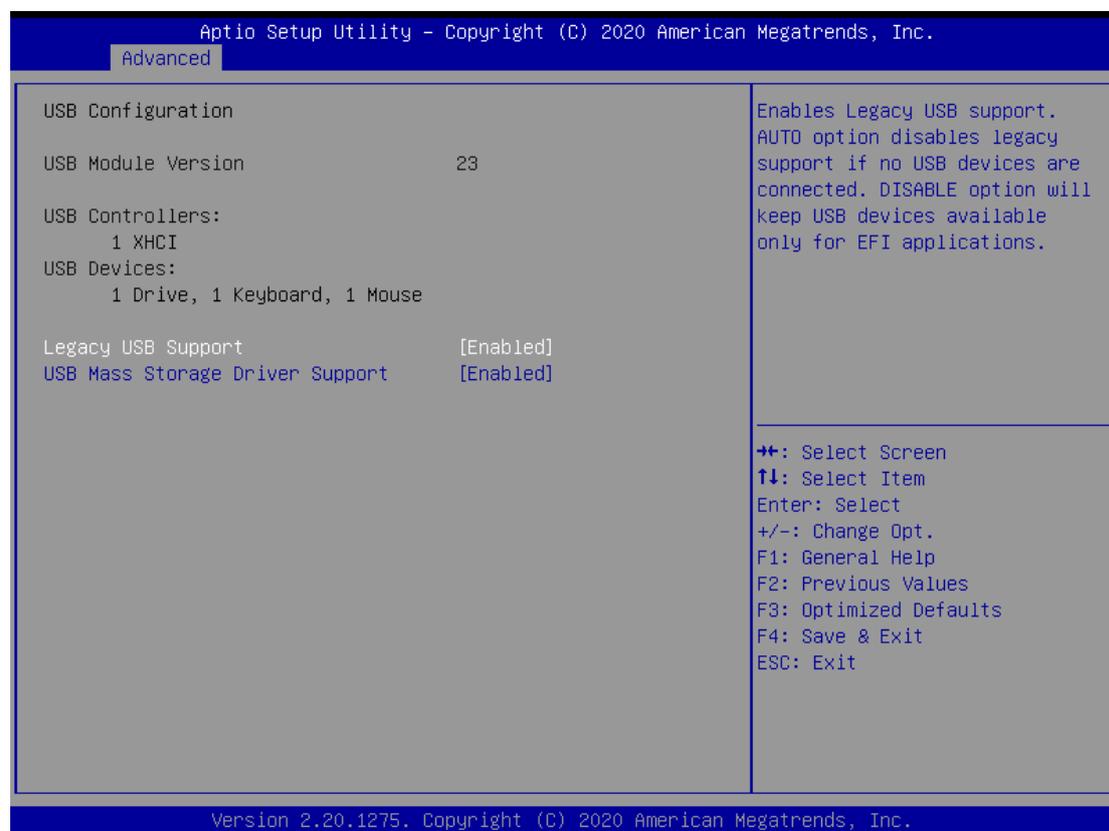


Wake system from S5

Enable or disable system alarm event. The default is Disabled.

USB Configurations

This screen specifies USB settings.



Legacy USB Support

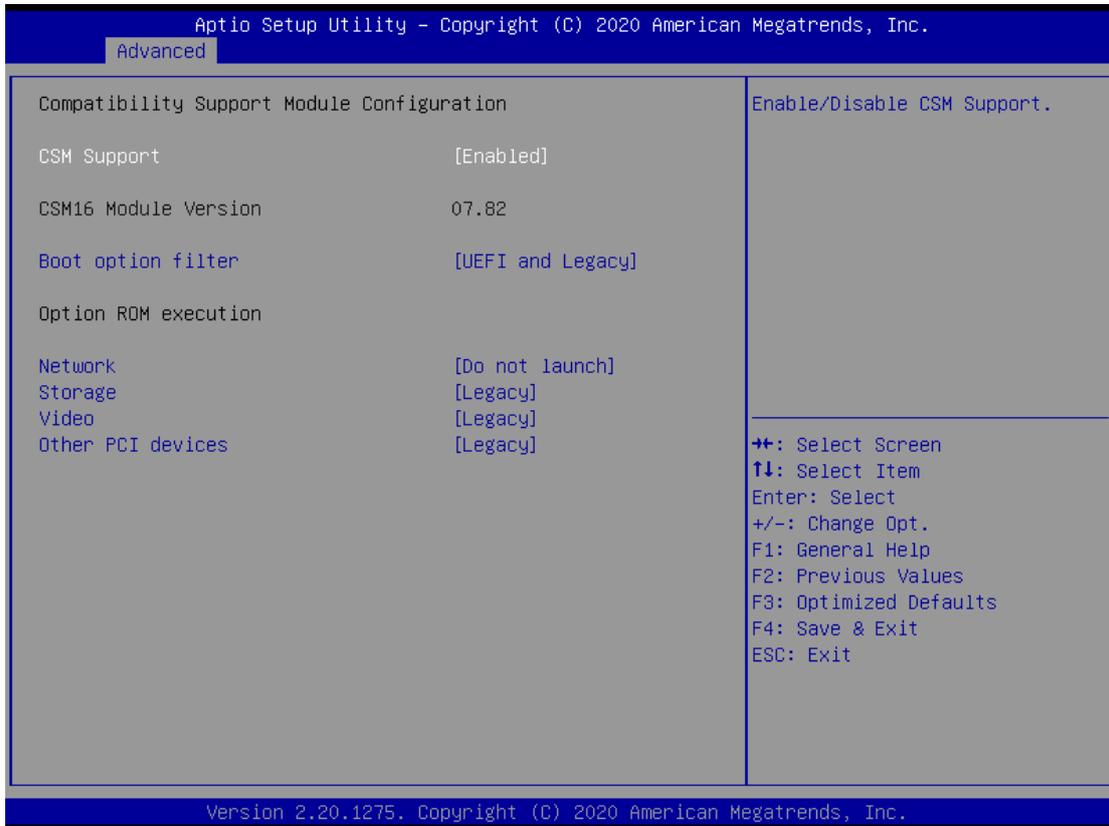
Enable or disable legacy USB support. The default is Enabled.

USB Mass Storage Driver Support

Mass storage device emulation type. Auto option enumerates devices according to their media format. Optical drives are emulated as CDROM; drives with no media will be emulated according to a drive type.

CSM (Compatibility Support Module) Configuration

Use this screen to enable/disable CSM support.



CSM Support

Enable or disable CSM support. The default setting is Enabled.

Boot optional filter

Controls the priority of Legacy and UEFI ROMs.

Network

Controls the execution of UEFI and Legacy PXE OpROM.

Storage

Controls the execution of UEFI and Legacy Storage OpROM.

Video

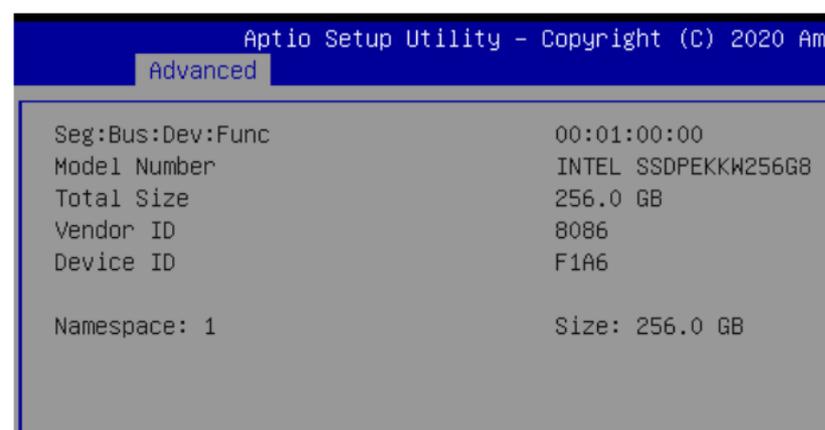
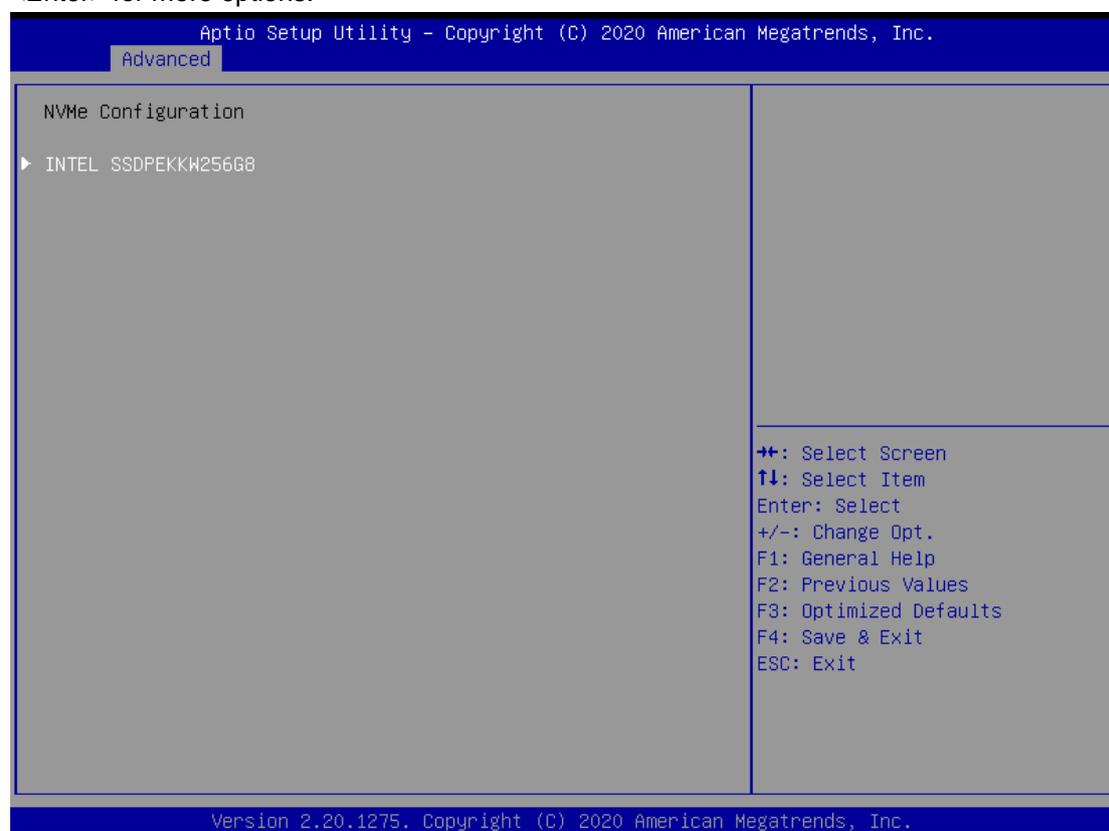
Controls the execution of UEFI and Legacy Video OpROM.

Other PCI Devices

Determines OpROM execution policy for devices other than network, storage or video.

NVMe Configuration

This screen specifies NVMe storage information. For items marked with “▶”, please press <Enter> for more options.



Network Stack Configuration

Network Stack Enable or disable UEFI Network stack. The default setting is disabled.

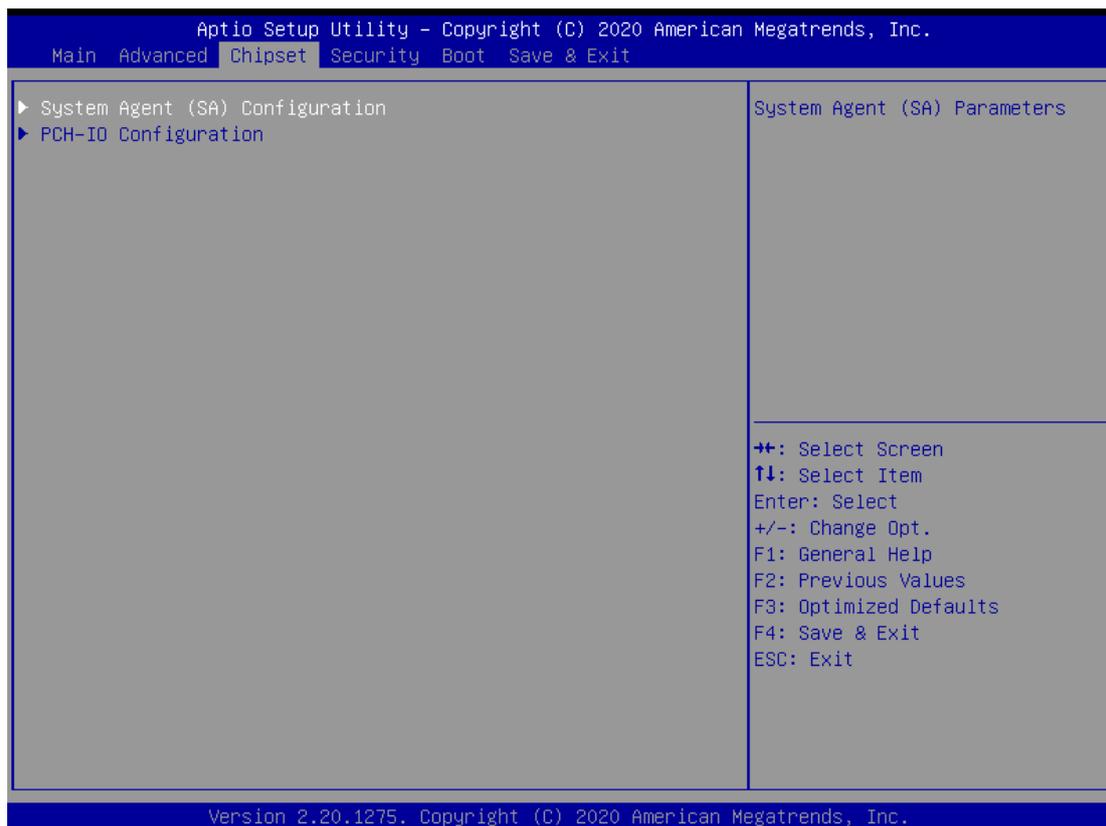


4.5 Chipset Menu

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

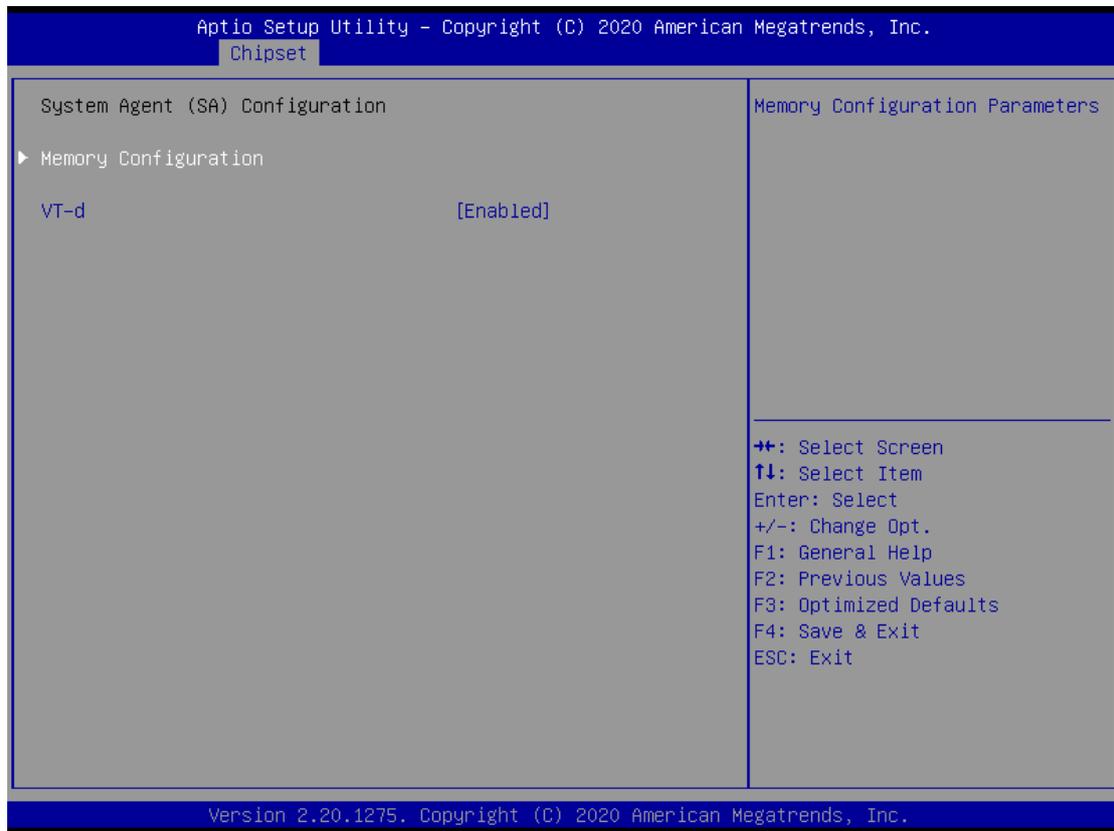
- ▶ System Agent (SA) Configuration
- ▶ PCH-IO Configuration

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



System Agent (SA) Configuration

This screen allows users to configure memory parameters.

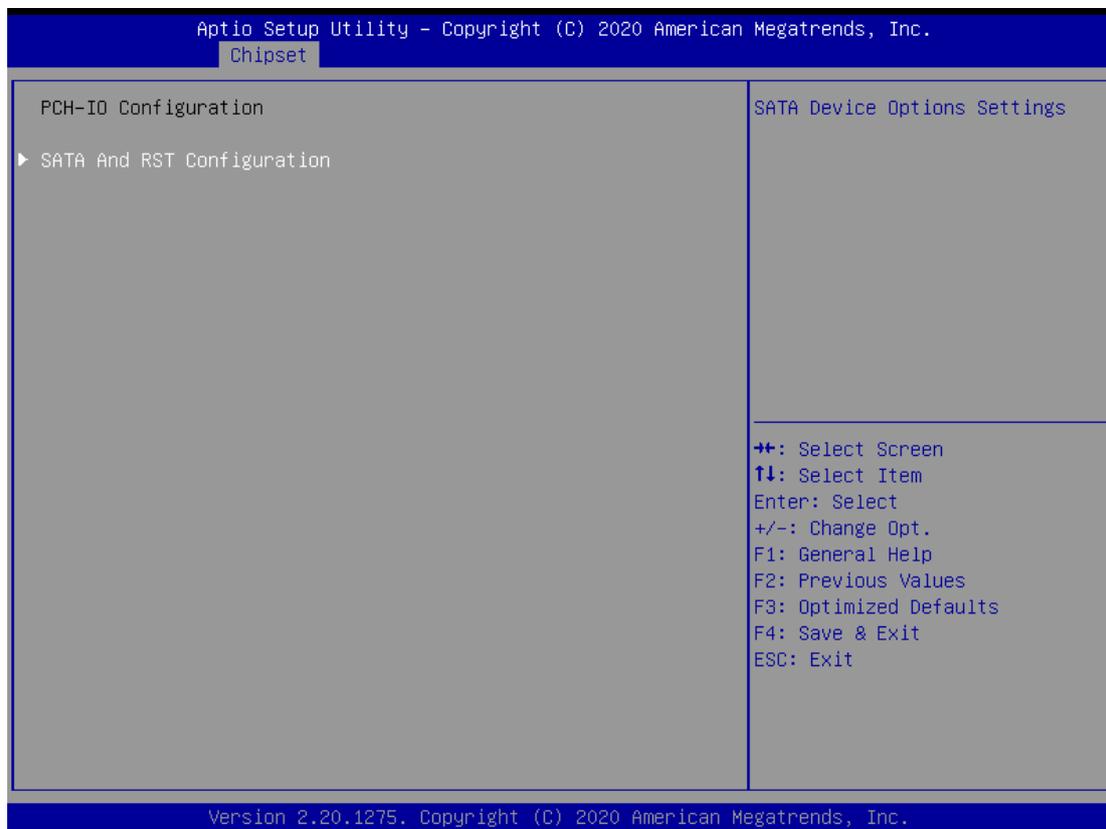


Memory Information

Display system memory information.

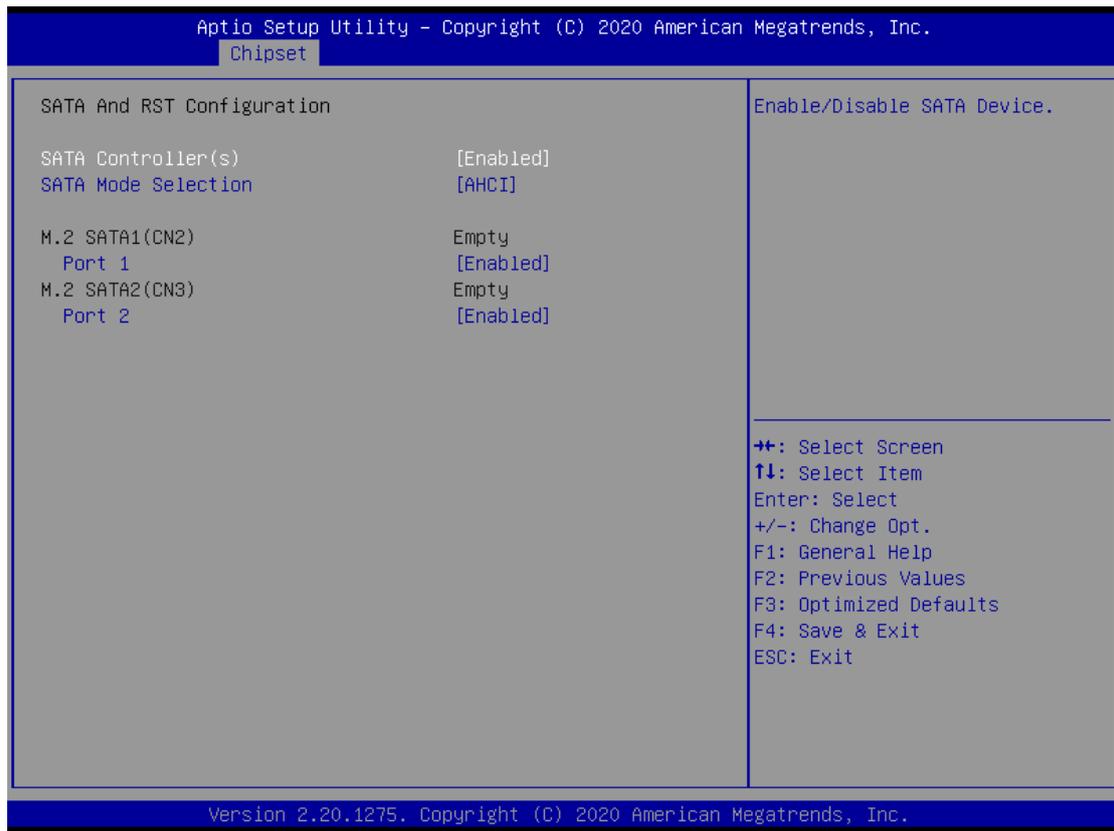
PCH-IO Configuration

This screen shows the information of South Bridge chipset. For items marked with “▶”, please press <Enter> for more options.



SATA and RST Configurations

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



SATA Controller(s)

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

SATA Mode Selection

Determine how SATA controller(s) operate. Operation mode options are AHCI(Advanced Host Controller Interface) and Intel RST Premium mode. The default is AHCI mode.

4.6 Security Menu

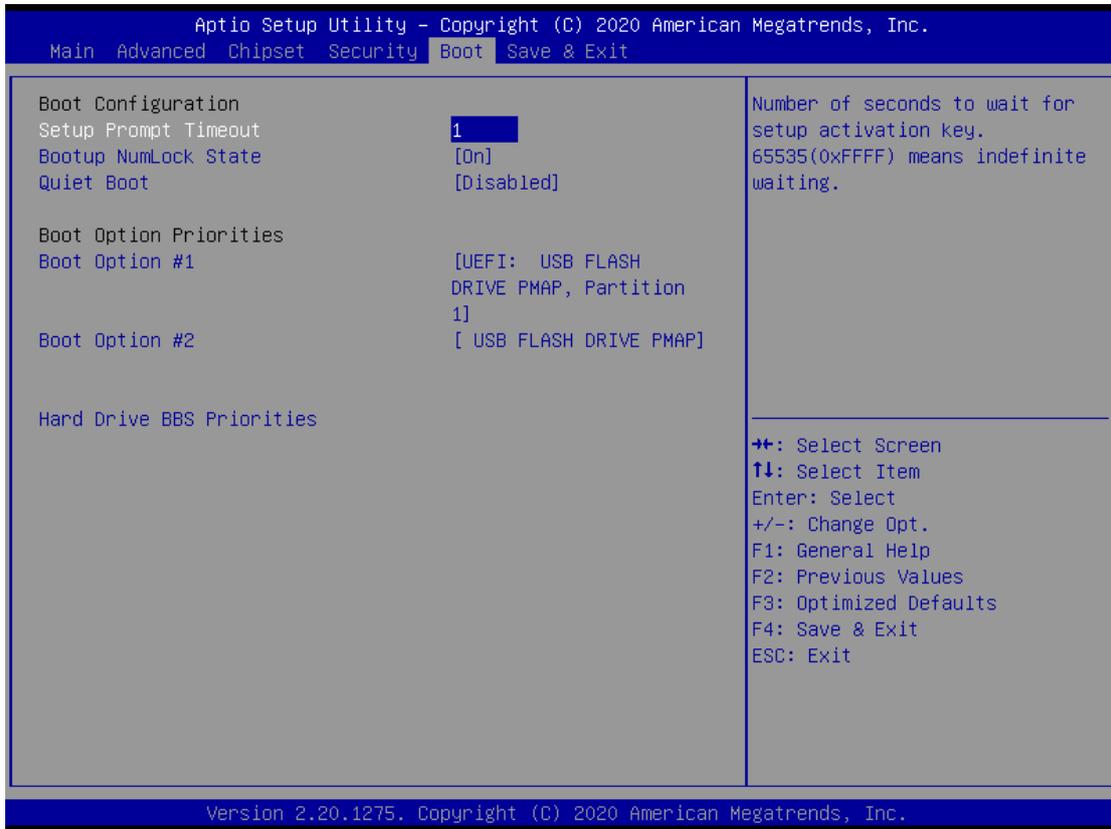


Administrator Password

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

Boot Menu

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



Setup Prompt Timeout

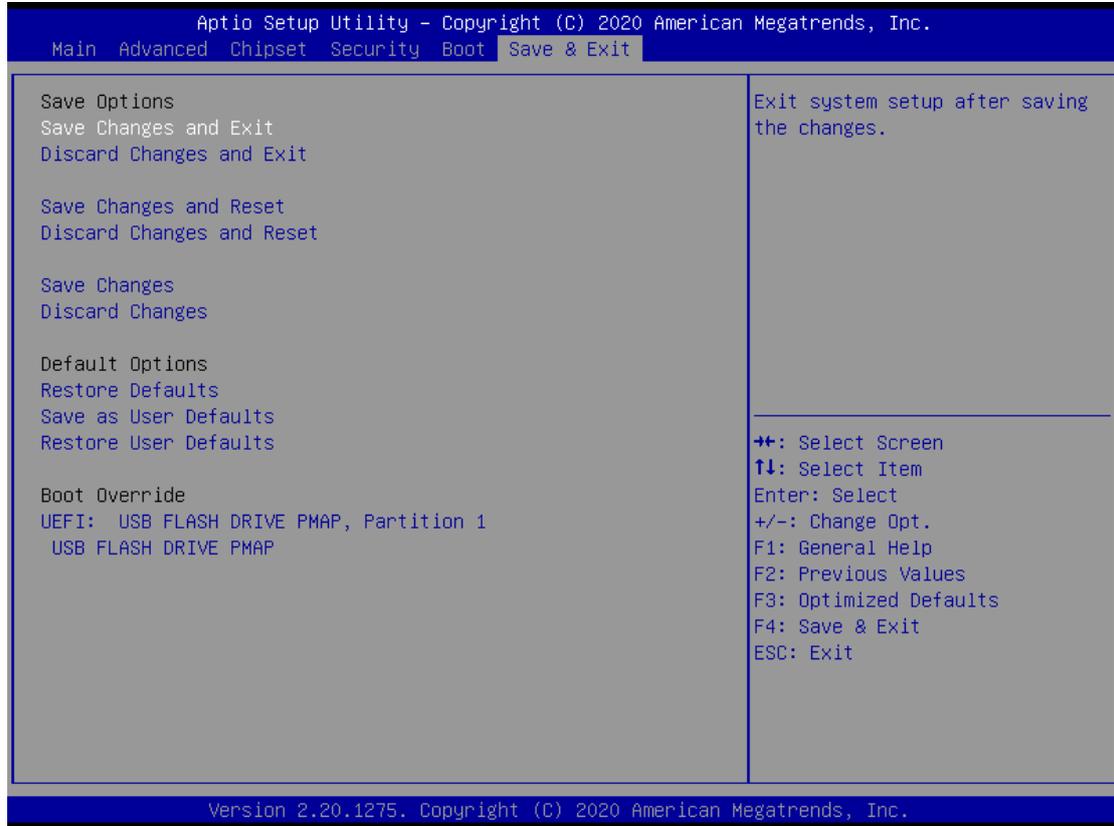
Use this item to set up number of seconds to wait for setup activation key where 65535(0xFFFF) means indefinite waiting.

Boot Option Priorities

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

4.7 Save & Exit Menu

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



Save Changes and Exit

When users 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 configurations 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 completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configurations 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 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 configurations. 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 users 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 users 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

About Watchdog Timer

Software stability is major issue in most applications. Some embedded systems are not watched by human 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 solutions in this regard.

The watchdog timer is a counter that triggers a system to 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, it means the software has crashed, the system will reboot.

Sample Program

The following example enables configurations using debug tool.

Enable WDT

↓

Enable configuration:

2E 87; Un-lock super I/O

2E 87

↓

Select logic device:

2E 07

2F 08

↓

WDT device enable:

2E 30

2F 01

↓

Set timer unit:

2E F0

2F 00 ; (00: Sec; 08:Minute)

↓

Set base timer:

2E F1

2F 0A; Set reset time (where 0A (hex) = 10sec)

Disable WDT

↓

Enable configuration:

2E 87; Un-lock super I/O

2E 87

↓

Select logic device:

2E 07

2F 08

↓

WDT device disable:

2E 30

2F 00