# **User Manual**

# **BPC-3040**

Fanless Embedded Box PC with Intel® Apollo Lake Pentium® N4200 Processor,
Support 0~60°C Operation Temperature



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Arestech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase. This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Arestech, or which have been subject to misuse, abuse, accident or improper installation. Arestech assumes no liability under the terms of this warranty as a consequence of such events. Because of Arestech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Arestech product is defective, it will be repaired or replaced at no charge during the warranty period. For out of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

- Collect all the information about the problem encountered. (For example, CPU speed, Arestech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
- 2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
- 3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return



- more quickly.
- 4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt)in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
- 5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.



## **Safety Instructions**

- 1. Read these safety instructions carefully.
- 2. Keep this User Manual for later reference.
- 3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- 4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
- 5. Keep this equipment away from humidity.
- 6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
- 7. The openings on the enclosure are for air convection. Protect the equipmentfrom overheating. DO NOT COVER THE OPENINGS.
- 8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Position the power cord so that people cannot step on it. Do not place anything over the power cord.
- 10. All cautions and warnings on the equipment should be noted.
- 11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- 12. Never pour any liquid into an opening. This may cause fire or electrical shock.
- 13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
- If one of the following situations arises, get the equipment checked by service personnel:
- The power cord or plug is damaged.
- Liquid has penetrated into the equipment.
- > The equipment has been exposed to moisture.
- The equipment does not work well, or you cannot get it to work according to the user's manual.
- > The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.
- 14. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THESTORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C(140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENTSHOULD BE IN A CONTROLLED ENVIRONMENT.
- 15. CAUTION: DANGER OF EXPLOSION IF BATTERY IS



INCORRECTLYREPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPERECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIESACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

## **Safety Precaution - Static Electricity**

Follow these simple precautions to protect yourself from harm and the products from damage.

- ➤ To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.



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## **Chapter 1. General Introduction**

#### 1.1 Overview:

The BPC-3040 fanless Box PC is ideal for embedded and automation applications. This embedded hardware platform is designed with the Intel® Pentium® N4200 processor. This processor runs at 2.5GHz and supports Dual Channel DDR3L 1866 MHz while maintaining low power consumption and attractive price point. The most feature of BPC-3040 is that it supports up to 4 COM ports while maintaining compact mechanical size. BPC-3040 also has a rugged case designed to protect against electromagnetic interference, extremes of cold and heat, and highlights a passive cooling design for quiet, fanless operation ideal for the Digital Signage, Medical and automation industries.





### 1.2 Key Features:

- Intel® Pentium® N4200 Processor
- Support 4 COM, 6 USB or 3 COM, 4 USB and 32bit Programmable Digital I/O
- Support Wide Range 9~36V DC input
- Support 0∼ 60°C Extended Operation Temperature
- 1 Mini PCIe(for LTE/3G and WLAN Module) and 1 M.2 2242(SATA)

## 1.3 Hardware Specification:

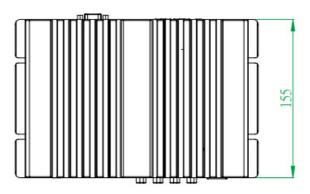
Model		BPC-3040-1A1 B	PC-3040-2A1	BPC-3040-3A1	
	CPU	Intel® Pentium® N4	200 Processor	Intel® Celeron	N3350
				Processor	
Draceser	Frequency	Quad Core,1.1GHz, up to 2.5GHz		Dual Core 1.1GHz up to	
Processor				2.4GHz	
System	Cache	2MB			
	System Chipset	N/A			
	BIOS	UEFI			
	Technology	Dual Channel DDR3	BL 1867 MHz SDRA	M	
Memory	Max. Capacity	8 GB			
	Socket	2 x 204-pin SO-DIM	IM		
	Graphics Engine	Intel® HD Graphics 500			
Display	VGA	1 VGA up to 1920 x 1200@60Hz			
Display	HDMI	1 HDMI 1.4b up to	3840 x 2160@30ŀ	łz	
	Dual Display	VGA + HDMI			
	USB	2 USB 3.0, 4	2 USB 3.0	2 US	B 3.0, 4 USB2.0
		USB2.0	2 USB 2.0		
I/O Interface	Serial Port	3 RS-232,	2 RS-232, 3 RS-232,		-232,
1/O Interface		1 RS-232/422/485	1RS-232/422/485 1 RS-232/422		-232/422/485
	Digital I/O	8bit GPIO	32bit Programmable 8bit GPIO(Op		GPIO(Option)
		(Option)	Digital Input / Output		
Ethernet	Controller	Dual GbE, Intel® i210, 10/100/1000 Mbps			
	Chipset	Realtek High Defini	tion Audio (HD)		
Audio	Connector	Line out			
Chausas	SATAIII	1 (2.5" HDD/SSD)			
Storage	M.2	1 M.2 2242			



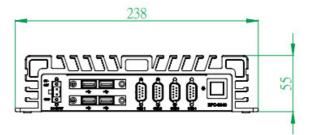
	Power Type	AT / ATX				
	Power Supply Voltage	9-36 V DC input	9-36 V DC input 6.7-1.7 A			
Power	Power Consumption (Typical)	0.37 A @ 12 V (4.73 W)	0.38A @ 12 V (4.93W)	0.37 A @ 12 V (4.73 W)		
	Power Consumption (Max)	0.68 A @ 12 V (7.83 W)	0.70 A @ 12 V (8.03 W)	0.68 A @ 12 V (7.83 W)		
	Power Consumption (Max contain USB)	3.98 A @ 12 V (47.76W)	4.05 A @ 12 V (48.6W)	3.96 A @12 V (47.52W)		
	Operational	0~60° C (14~140° F) (Humidity: 60° C @ 80% RH Non-condensing) w/ Extend Temp. RAM & SSD				
	Non-Operational	-40~85° C (-40~185° F) (Humidity: 50° C @ 95% RH Non-condensing)				
Vibration y, z 3 axes (w/ SSD only)  1 Grms, IEC 60068-2-64,			ns, IEC 60068-2-64, random, 5~500 Hz, 1 Oct/min., 1hr/axis, x, axes (w/ SSD only) ns, IEC 60068-2-64, random, 5~500 Hz, 1 Oct/min., 1hr/axis, x, axes (w/ 2.5" HDD)			
	Shock	50 G, IEC 60068-2-27, half sine, 11 ms duration (w/ SSD only) 20 G, IEC 60068-2-27, half sine, 11 ms duration (w/ 2.5" HDD)				
Certificate	Certification	TBD				
	Dimensions(W x H x D)	238 x 55 x 165 mm (9.37" x 2.16" x 6.5")				
General	Weight	1.78 kg (3.921 lb)	1.8 kg (3.96lb)	1.78 kg (3.921lb)		
	Operating System	Windows 10 IoT, Ubuntu 16.04 LTS				

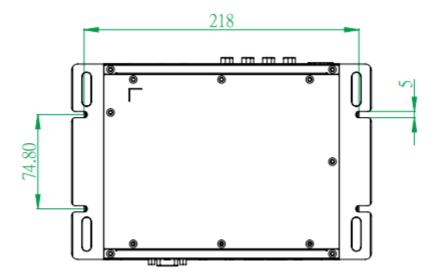


## 1.4 Mechanical Dimensions:











### 1.5 Power Requirement:

Power Input: support 9~36V DC Input

Power adaptor:12V@5A,60W

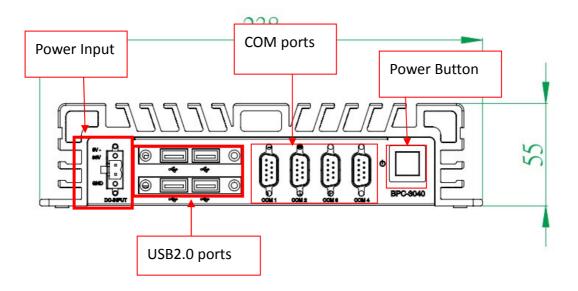
### 1.6 Environment Specification:

(1) Operating Temperature: 0~60° C (32~140° F)w/ 2.5" SSD

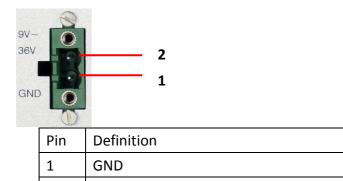
(2) Operational humidity: 60° C @ 95% RH Non-condensing

# **Chapter2.Connector(Pin-Definition)**

### 2.1 ExternalInterface(Front):



### 2.1.1 Power Input(9~36V DC):



Vin+ (9~36V DC)

2



#### 2.1.2COM Ports:

Option:RS232/422/485 for COM1

(NOTE: The parameter for COM1 can be set by Jumper setting)

RS232 for COM2 to COM4



Desription

5V/12V/RI signal select jumper for Serial port header#1 (JCOM11)

<sup>2</sup> 1-2 Close: 5V (Power COM)

<sup>2</sup> 1 6 3-4 Close: RI (Stand COM)

2 6 5-6 Close: 12V (power COM)

Pin No.	Definition
1	VCC
2	RI1-/5V/12V
3	NRI1-
4	RI1-/5V/12V
5	+12V
6	RI1-/5V/12V

RS232/RS422/RS485 select jumper for Serial port header#1 (JCOM12/JRS13/JRS14/JRS11/JRS12)

<sup>2</sup> 1-2 Close: RS232

<sup>2</sup><sub>1</sub> 3-4 Close: RS422

<sup>2</sup>
<sub>1</sub>
<sub>5</sub>

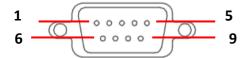
5-6 Close: RS485

1-2 Close: RS422/RS485

2-3Close: RS232 (Default setting)

Pin No.	Definition
1	RXD232
2	RXD1
3	RXD422
4	RXD1
5	RXD485
6	RXD1





## - COM1 Port(RS-232):

Pin	Definition	Pin	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI/5V/12V
5	GND		

## - COM1 Port(RS-422):

Pin	Definition	Pin	Definition
1	TX-	6	N/A
2	TX+	7	N/A
3	RX+	8	N/A
4	RX-	9	RI/5V/12V
5	GND		

## -COM1 Port(RS-485):

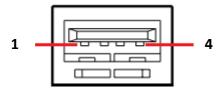
Pin	Definition	Pin	Definition
1	DATA-	6	
2	DATA+	7	
3		8	
4		9	RI/5V/12V
5	GND		

## -COM2 to COM 4Ports(RS-232):

Pin	Definition	Pin	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	N/A
5	GND		

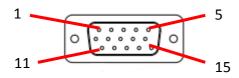


## 2.1.3 USB Ports(USB2.0):



Pin	Definition
1	+5V
2	USB-
3	USB+
4	GND

## 2.1.4 GPIO Port(DB-15 Male)

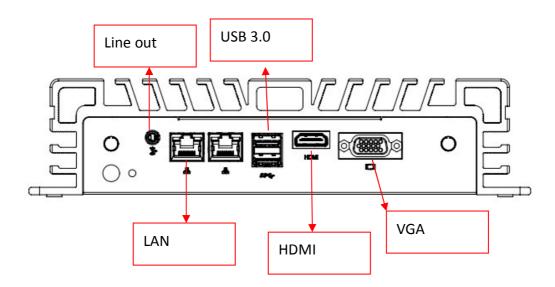


Pin	Definition	Pin	Definition
1	SOGPO_1	9	SMB_CLK
2	SOGPO_2	10	SMB_DATA
3	SOGPO_3	11	+5VS
4	SOGPO_4	12	GND
5	SOGPI_1	13	NC
6	SOGPI_2	14	NC
7	SOGPI_3	15	NC
8	SOGPI_4		

Remark: SOGPO--> output | SOGPI--> input



# 2.2 External Interface(Rear):



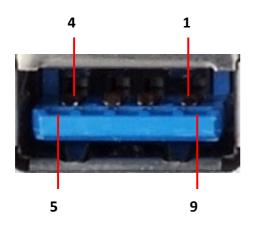
### 2.2.1 Audio Ports:



Pin	Definition
Black	Line_Out



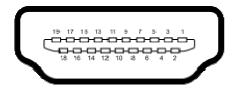
# 2.2.2 USB Ports(USB3.0):



Pin	Definition
1	+5V
2	USB-
3	USB+
4	GND
5	StdA_SSRX-
6	StdA_SSRX+
7	GND_DRAIN
8	StdA_SSTX-
9	StdA_SSTX+



### 2.2.3 HDMI Ports:



Pin	Definition	Pin	Definition
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2 -	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1-
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0-	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock-
13	Reserved	14	Reserved
15	SCL	16	SDA
17	DDCGround	18	+5 V Power
19	Hot Plug Detect		

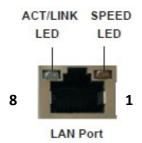
### 2.2.4 VGA Ports:



Pin	Definition	Pin	Definition
1	RED	9	VCC
2	GREEN	10	GND
3	BLUE	11	NC
4	NC	12	DAT
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	CLK
8	GND		



### 2.2.5 LAN Ports:



### - Pin Definition:

#### 10/100BASE-T:

Pin	Definition	Pin	Definition
1	TX_D0+	5	NC
2	TX_D0-	6	RX_D1-
3	RX_D1+	7	NC
4	NC	8	NC

#### 1000BASE-T:

Pin	Definition	Pin	Definition
1	TX_D0+	5	BI_D2-
2	TX_D0-	6	RX_D1-
3	RX_D1+	7	BI_D3+
4	BI_D2+	8	BI_D3-

### - LAN Port LED Indications:

Activity/Link LED		
Status	Description	
Off	No Link	
Blinking	Data Activity	
On	Link	

SPEED LED		
Status	Description	
Off	10Mbps connection	
Off	100Mbps connection	
Green	1Gbps connection	



## 2.3 Internal Interface:

## 2.3.1 SATA Connector:



Pin	Definition
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

### 2.3.2 SATA Power Connector:



Pin	Definition
1	+5V
2	GND
3	GND
4	+12V



# **Chapter 3. System Installation**

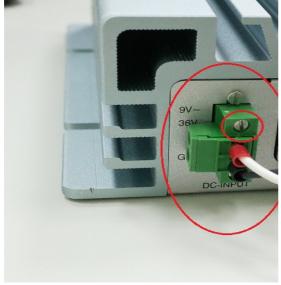
#### 3.1 Installation Procedures:

#### 1. Connecting Power Cord

The BOX-PC(BPC-3040) can support wide range DC-input (9~36V). Be sure to handle the power cord by holding the plug end only. Follow these procedures to connect the power cord:

- (1) Connect the male end(Phoenix connector) of the power cord to the DC-Input connector of BPC-3040 and lock it.
- (2) Connect the 3-pin male plug of the power cord to an electrical outlet.







#### 2.Connecting Keyboard and Mouse

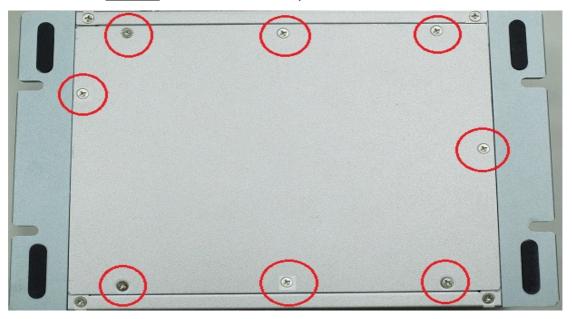
Connect the mouse and keyboard to the USB connector of BPC-3040.

#### 3. Switching on Power

The power button is located at the right side on the front cover of BPC-3040.

## 3.2 Installing HDD/SSD:

1. Unfasten the <u>8screws</u> on the chassis and open the bottom cover.



2. Unfasten the SATA cable and SATA power cable on the HDD/SSD





3. Unfasten the  $\underline{4}$  screws on the HDD/SSD bracket.



4.Installanother HDD/SSD and fasten all screws.



## **Chapter 4. BIOS Setting**

The BIOS (Basic Input / Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system. The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility.

When you turn on the computer, the BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility.

When you enter the BIOS Setup utility, the top of the screen has a menu bar with the following selections:

- Main To set up the system time/date information
- Advanced To set up the advanced UEFI features
- Chipset To set up the chipset features
- Security To set up the security features
- Boot To set up the default system device to locate and load the Operating System
- Save & Exit To exit the current screen or the UEFI SETUP UTILITY

Use  $\leftarrow$ key or  $\rightarrow$  key to choose among the selections on the menu bar.

Use<Enter>key to get into the sub screen or an item.

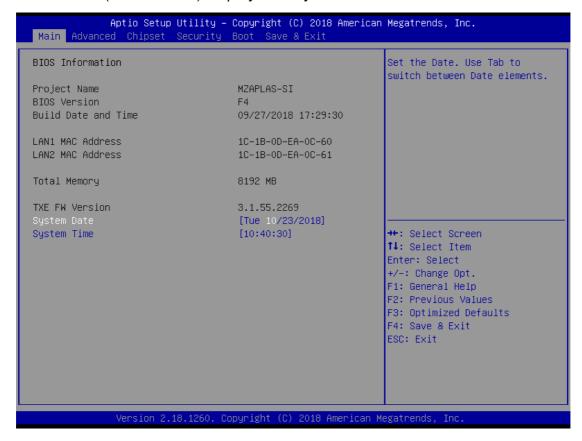
Use  $\downarrow$  key or  $\uparrow$  key to move cursor down or up to select items.

Use <Esc> key to exit current screen.



#### 4.1 Main

This section (Main screen) displays the system overview.



**Note: Clear CMOS** 

As shown, short two PINs can clear CMOS

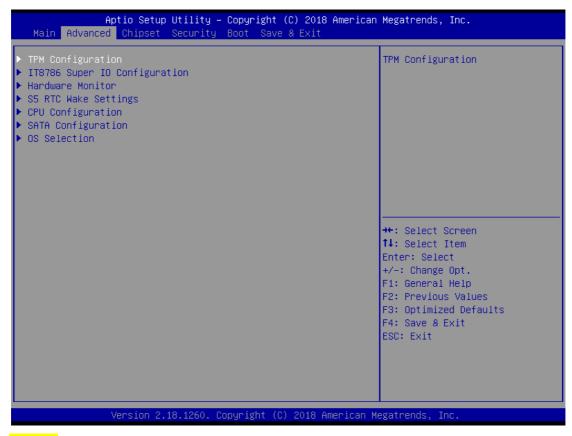




#### 4.2 Advanced

This section allows users to set the configurations for the following items:

- TPM Configuration.
- IT8786 Super IO Configuration.
- Hardware Monitor Configuration.
- S5 RTC Wake Setting.
- CPU Configuration.
- SATA Configuration
- OS Selection

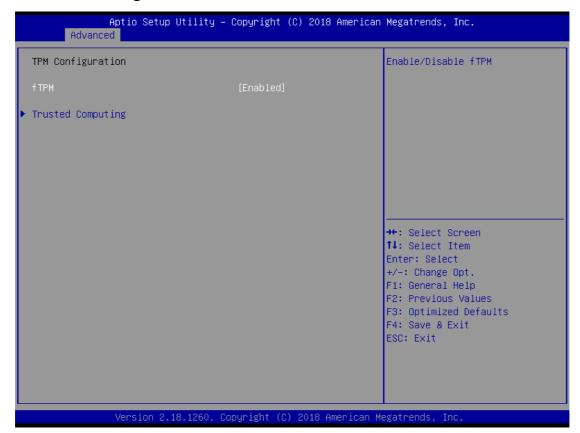


#### NOTE:

Setting wrong values in this section may cause the system to malfunction.



#### 4.2.1 TPM Configuration



#### 4.2.1.1 fTPM

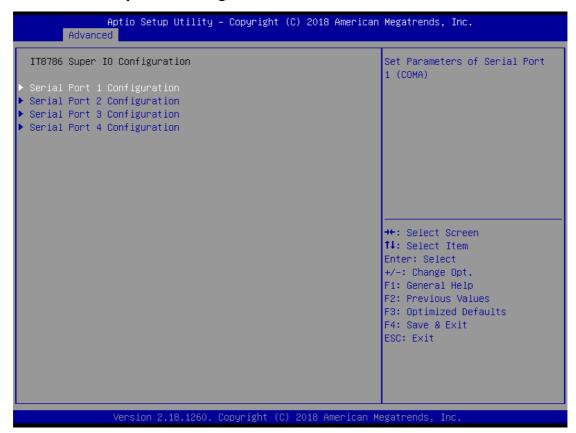
This item allows users to enable or disable the fTPM.

#### 4.2.1.1-1 Trusted Computing

This item allows users to enable or disable the Security Device Support.



#### 4.2.2 IT8786 Super IO Configuration



#### 4.2.2.1 COM1 Configuration

This item allows users to enable or disable COM1.

#### 4.2.2.2 COM2 Configuration

This item allows users to enable or disable COM2.

#### 4.2.2.3 COM3 Configuration

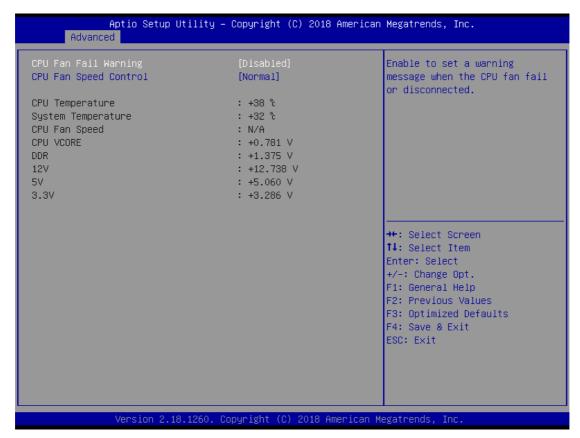
This item allows users to enable or disable COM3.

#### 4.2.2.4 COM4 Configuration

This item allows users to enable or disable COM4.



#### 4.2.3 Hardware Monitor



#### 4.2.3.1 CPU Fan Fail Warning

This item allows users to enable or disable the CPU Fan Fail Warning.

#### 4.2.3.2 CPU Fan Speed Control

This item allows users to select CPU Fan Speed "Normal" or "Full Speed".



#### 4.2.4 S5 RTC Wake Configuration

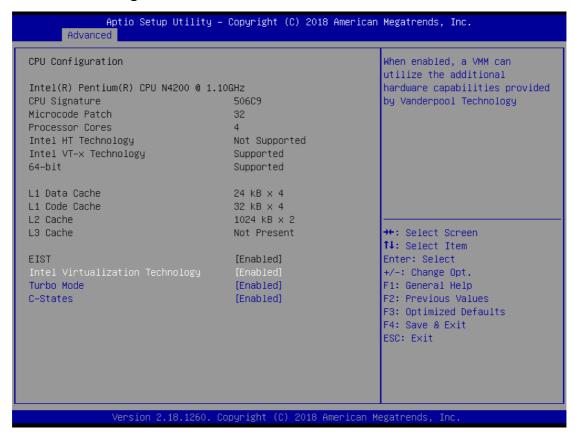


#### 4.2.4.1 Wake system from S5

This item allows users to FixedTime or disable System wake on alarm event. SelectTime System will wake on the hr:: min::sec:: specified.



#### 4.2.5 CPU Configuration



#### 4.2.5.1 Intel Virtualization Technology

This item allows users to enable or disable Intel Virtualization Technology. select [Enabled] can utilize the additional hardware capbilities provided by Vanderpool Technology.

#### 4.2.5.2 Turbo mode

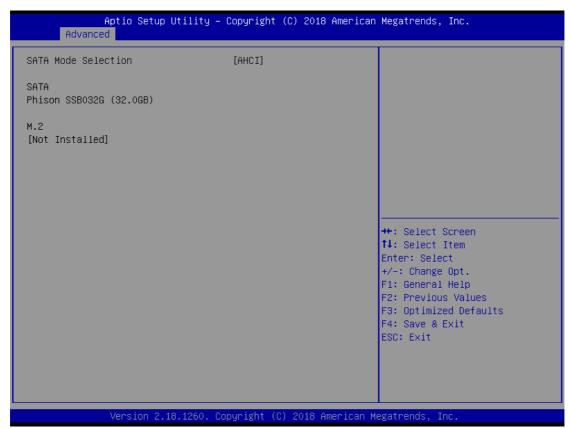
This item allows users to enable or disable Turbo mode.

#### 4.2.5.3 C-States

This item allows users to enable or disable C-States.



#### 4.2.6 SATA Configuration



#### 4.2.6.1 SATA Mode Selection

The new M/B only supports AHCI mode

#### 4.2.6.2 SATA

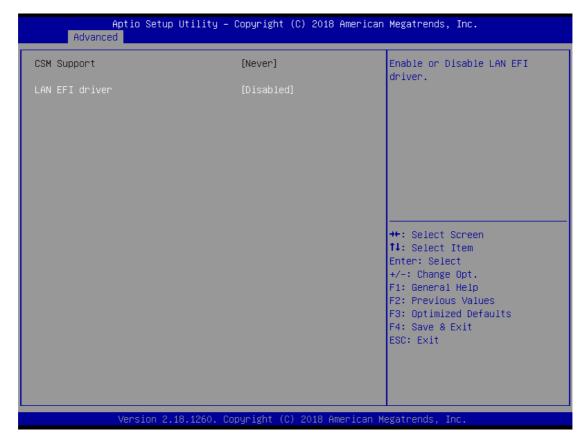
Can confirm the hard disk model and capacity.

#### 4.2.6.3 M.2

Can confirm the M.2 SSD model and capacity.



#### 4.2.7 OS Selection



#### **4.2.7.1 CSM Support**

Never support CSM

#### 4.2.7.2 LAN EFI driver

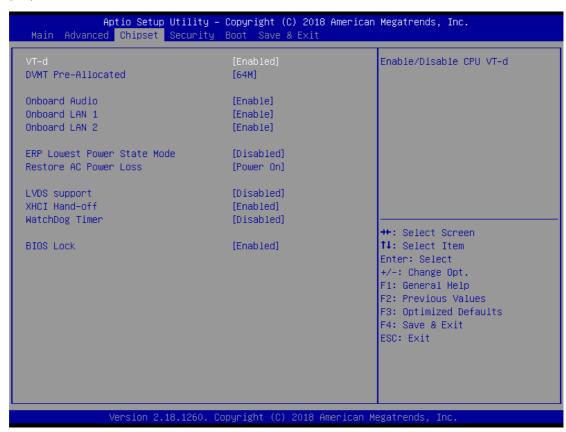
This item allows users to enable or disable the LAN EFI Driver.



#### 4.3 Chipset

This section allows users to set the configurations for the following items:

- (1)VT-d
- (2) DVMT Pre-Allocated
- (3)Onboard Audio
- (4)Onboard LAN 1
- (5)Onboard LAN 2
- (6) ERP Lowest Power State mode
- (7) Restore AC Power Loss
- (8)LVDS support
- (9)XHCI Hand-off
- (10)WatchDog Timer
- (11)BIOS Lock



#### 4.3.1 VT-d

This item allows users to enabled or disabled the VT-d This default value is [Enabled]



#### 4.3.2 DVMT Pre-Allocated

This item allows users to set DVMT [64M],[128M],[256M]or[512M] The default value is [64M].

#### 4.3.3 Onboard Audio

This item allows users to enable or disable the Onboard Audio.

The default value is [Enabled].

#### 4.3.4 Onboard LAN 1

This item allows users to enable or disable the Onboard LAN 1.

The default value is [Enabled].

#### 4.3.5 Onboard LAN 2

This item allows users to enable or disable the Onboard LAN 2.

The default value is [Enabled].

#### 4.3.6 ERP Lowest Power State Mode

This item allows users to enable or disable the ERP Lowest Power State Mode.

The default value is [Disabled].

#### 4.3.7 Restore AC Power Loss(AT/ATX Power setting)

This item allows users to set Restore AC Power Loss [Power On],[Power Off]or [Last State].

The default value is [Power On].

#### 4.3.8 LVDS support

This item allows users to enable or disabled the LVDS support

The default value is [disabled].

#### 4.3.9 XHCI Hand-off

This item allows users to enable or disabled the XHCI Hand-off.

The default value is [Enabled].

#### 4.3.10 WatchDog Timer

This item allows users to set WatchDog Timer [15S],[30S],[45S],[60S] or [Disable]

The default value is [Disabled].

#### **4.3.11 BIOS Lock**

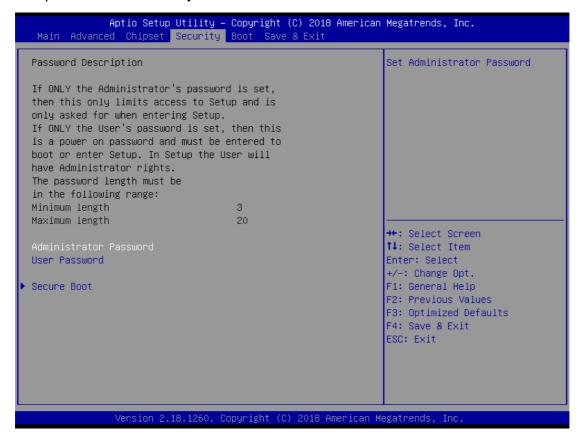
This item allows users to enable or disabled the BIOS Lock.

The default value is [Enabled].



#### 4.4 Security

In this section, you may set, change or clear the Administrator/user password for the system.



#### 4.4.1 Administrator Password

Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility.

Leave it blank and press enter to remove the password.

#### 4.4.2 User Password

Set or change the password for the user account. Users are unable to change the settings in the UEFI Setup Utility.

Leave it blank and press enter to remove the password.

#### 4.4.3 Secure Boot

#### 4.4.3.1Secure Boot Control

This item allows users to enable or disabled the Secure Boot Control The default value is [Enabled].

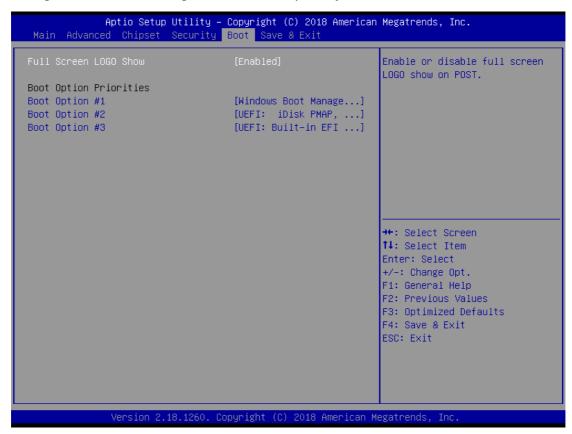
#### 4.4.3.2 Secure Boot Mode

This item allows users to [Standard] or [Custom] the Secure Boot Mode The default value is [Standard]



#### 4.5 Boot

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.



#### 4.5.1Full Screen LOGO Show

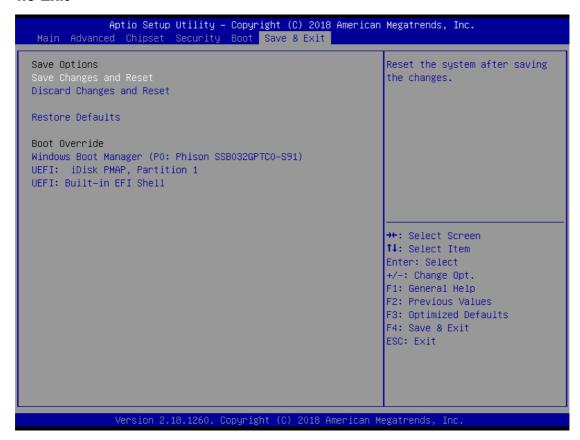
This item allows users to enable or disabled the Full Screen LOGO Show. The default value is [disabled].

#### 4.5.2 Boot Option #1

This item allows users to set the system boot order.



#### 4.6 Exit



#### 4.6.1 Save Changes and Reset

When you select this option, it will pop-out the following message, "Save configuration changes and reset?"

Select [OK] to save the changes and exit the UEFI SETUP UTILITY.

#### 4.6.2 Discard Changes and Reset

When you select this option, it will pop-out the following message, "Reset without saving?"

Select [OK] to exit the UEFI SETUP UTILITY without saving any changes.

#### 4.6.3 Restore Defaults

Restore/Load default values for all setup options.

#### 4.6.4 Boot override

Let the user select the boot device.



### **About Arestech**

Arestech, founded in 2011, employs a highly talented R&D team with over a decade of product development experience in intelligent embedded computing.

With our dynamic expertise in the embedded market, Arestech offers a full range of intelligent systems, including embedded Box PCs, industrial multi-touch displays and multi-touch Panel PCs.

Arestech's dedication to product development is matched by its commitment to world class customer support with a minimum 5-year product lifecycle plan, product longevity, and added value for our partners.

Additionally, Arestech strategically aligns itself with key industry software and system integration partners to deliver top-notch design services and turnkey solutions, enabling our partners to better build and grow their businesses.

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