# User Manual

# BPC-3072

Fanless Compact Embedded Box PC with 7th generation Intel® Core™ i5/i3 Kabylake-U processor

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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.
9. 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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# Chapter1.General Introduction

## 1.1 Overview:

The BPC-3072 fanless Box PC is ideal for embedded and automation applications. This embedded hardware platform is designed with the Intel®Core™ i5-7200U processor. This processor runs at 3.1GHz and supports Dual Channel DDR4 2133 MHz while maintaining low power consumption and attractive price point. The most feature of BPC-3072 is that it supports up to 4 COM ports while maintaining compact mechanical size. BPC-3072 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.

Front

Back



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## 1.2 Key Features:

- 7th Generation Intel® Core™ i5® Dual-Core
- 2/4 Gigabit Ethernet Ports
- 6 USB, 4 COM, 8bits GPIO
- 1 Mini PCIe (for WLAN Module),2 M.2 Expansion Slot
- 9-36 V DC Power Input

## 1.3 Hardware Specification:

| Model | | BPC-3072-1A1 | BPC-3072-2A1 | BPC-3072-3A1 |
|---|---|---|---|---|
| Processor System | CPU | Intel® Core™ i5-7200U | | Intel® Core™ i3-7100U |
| | Frequency | Dual-Core 3.1 GHz | | Dual-Core 2.4GHz |
| | L2 Cache | Intel® Smart Cache 3 MB | | |
| | BIOS | UEFI | | |
| Memory | Technology | DDR4 2133 MHz SDRAM | | |
| | Max. Capacity | 32 GB | | |
| | Socket | 2 x 260-pin SO-DIMM | | |
| Display | Graphics Engine | Intel® HD Graphics 620 | | |
| | HDMI | HDMI 2.0a, HDCP2.2, max resolution up to 4096 x 2160 @ 60Hz | | |
| | DP | DP 1.2, max resolution up to 3840 x 2160@ 60Hz | | |
| | Dual Display | HDMI + DP | | |
| Front I/O Interface | USB | 2 USB 2.0 | 2 USB 2.0 | 2 USB 3.0 |
| | Serial Port | 3 RS-232 | 2 RS-232 | 3 RS-232, |
| | Digital I/O | 8 bits GPIO(DB-15) | 8 bits GPIO(DB-15) (Optional) | 8bit GPIO(DB-15) |
| Rear I/O Interface | USB | 4 USB3.0 | 4 USB3.0 | 4 USB3.0 |
| | Serial port | 1 RS-232/422/485 | 1 RS-232/422/485 | 1 RS-232/422/485 |
| Ethernet | Controller | 2 GbE | 4 GbE | 2 GbE |
| Audio | Chipset | Realtek High Definition Audio (HD) | | |
| | Connector | Line out, Mic in | | |
| Storage | SATA | 1 (2.5" HDD/SSD), SATA III(Max. data transfer rate 600 MB/s) | | |
| | M.2 | 2 M.2, 1 M.2 2280 B/M key, 1 M.2 2230 A/E Key | | |



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| | | | | |
|---|---|---|---|---|
| Power | Power Type | AT / ATX | | |
| | Power Supply Voltage | 9-36 V DC input (Phoenix Connector) | | |
| | Power Consumption (Typical) | 0.61 A @ 12 V (7.32 W) | 0.63A @ 12 V (7.56W) | 0.55 A @ 12 V (6.6 W) |
| | Power Consumption (Max) | 1.51 A @ 12 V (18.12 W) | 1.54 A @ 12 V (18.48 W) | 1.49 A @ 12 V (17.88 W) |
| | Power Consumption (MAX contain USB ) | 5.61 A @ 12 V (67.32W) | 5.68 A @ 12 V (68.16W) | 5.52 A @ 12V (66.24W) |
| Environment | Operational | -20~60° C (-4~140° F) w/ Extend Temp. RAM & Extend Temp.2.5"SSD (Humidity:60° C @ 80% RH Non-condensing | | |
| | Non-Operational | -40~85° C (-40~185° F) (Humidity: 50° C @ 95% RH Non-condensing) | | |
| | Vibration | 5 Grms, IEC 60068-2-64, random, 5~500 Hz, 1 Oct/min., 1hr/axis, x, y, z 3 axes (w/ SSD only)<br>1 Grms, IEC 60068-2-64, random, 5~500 Hz, 1 Oct/min., 1hr/axis, x, y, z 3 axes (w/ 2.5” HDD) | | |
| | Shock | 50 G, IEC 60068-2-27, half sine, 11 ms duration (w/ SSD only)<br>20 G, IEC 60068-2-27, half sine, 11 ms duration (w/ 2.5” HDD) | | |
| Certificate | Certification | TBD | | |
| General | Dimensions (W x H x D) | 238 x 55 x 155 mm (9.37” x 2.17” x 6.1”) | | |
| | Weight | 1.78 kg (3.921 lb) | 1.8 kg (3.96lb) | 1.78 kg (3.921lb) |
| | Operating System | Windows 10 IoT, Ubuntu 18.04 LTS | | |



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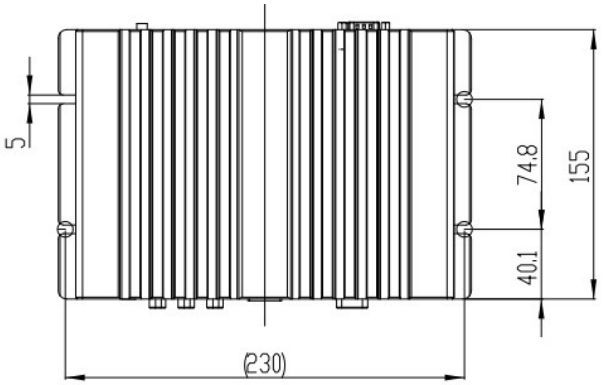
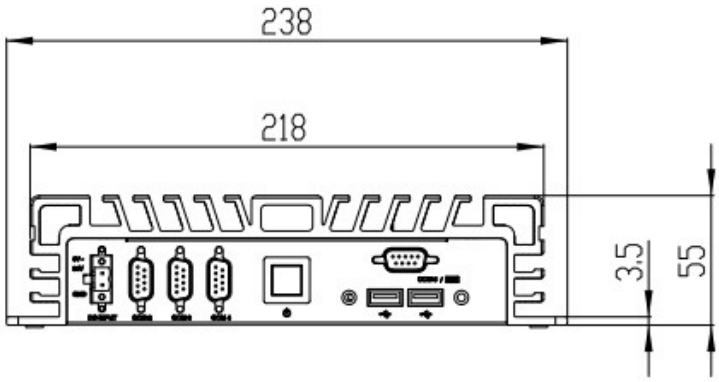
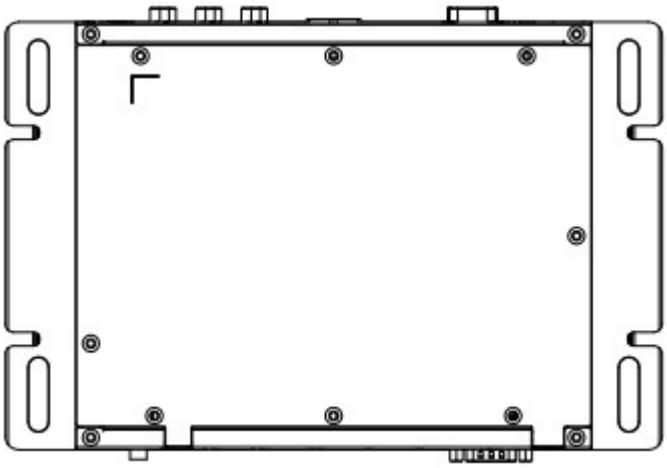
## 1.4 Mechanical Dimensions:



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## 1.5 Power Requirement:

Power Input: support 9~36V DC Input

Power adaptor:12V@5A,60W

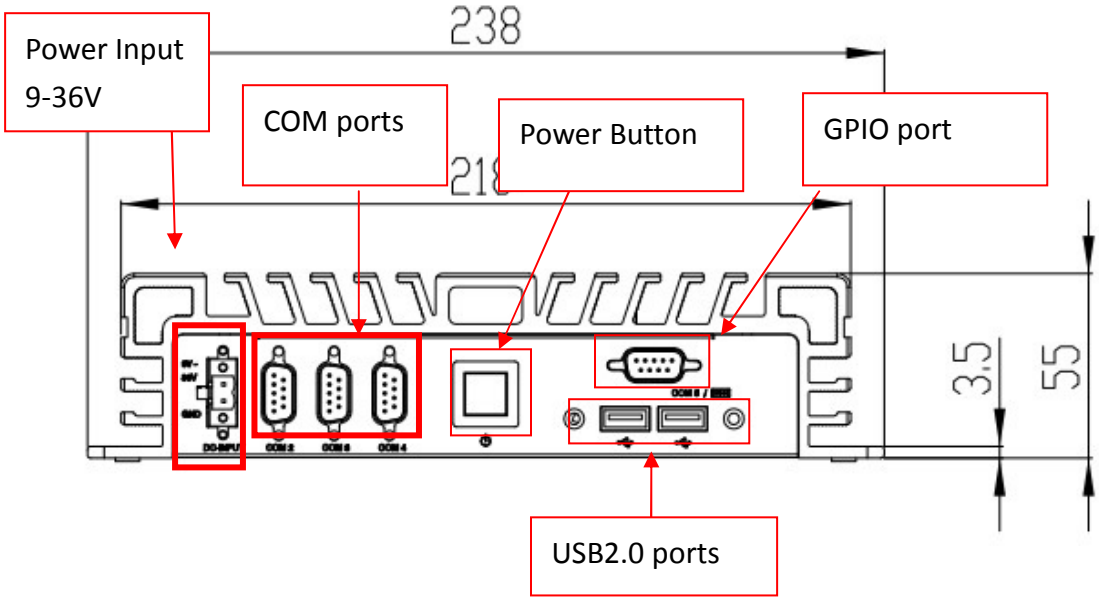
## 1.6 Environment Specification:

(1) Operating Temperature: -20~60° C (-4~140° F)w/ 2.5” SSD

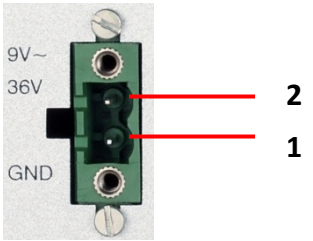
(2) Operational humidity: 60° C @ 95% RH Non-condensing

# Chapter2.Connector(Pin-Definition)

## 2.1 ExternalInterface(Front):




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




| Pin | Definition |
|---|---|
| 1 | GND |
| 2 | Vin+ (9~36V DC) |



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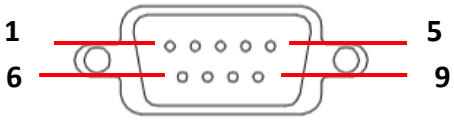
## 2.1.2 COM Ports:

Option:RS232/422/485 for COM1

RS232 for COM2 to COM4

(NOTE: The parameter for COM1 can be set by BIOS setup utility)




### - 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 | |
| 2 | TX+ | 7 | |
| 3 | RX+ | 8 | |
| 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 | | |



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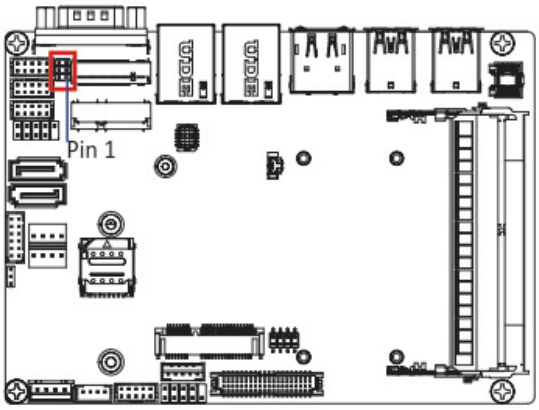
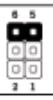
**JCOM1 (COM1 RI# pin RI#/5V/12V Select)**

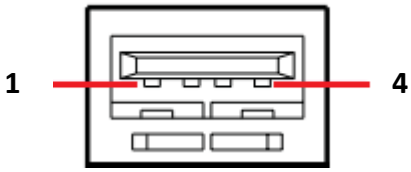



| JCOM11 Jumper Select | |
|---|---|
| | 1-2 Close:<br>5V (Power COM) |
| | 3-4 Close:<br>RI (Stand COM) |
|  | 5-6 Close:<br>12V (Power COM) |

## -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 |



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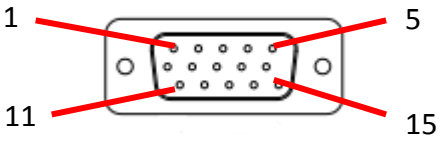
## 2.1.4 GPIO Port(DB-15 Male)




| 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



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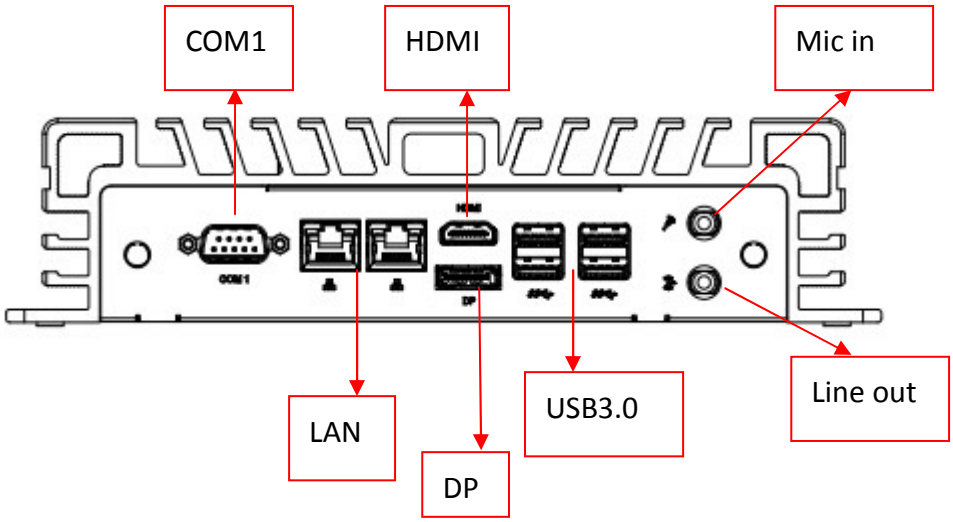
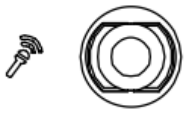
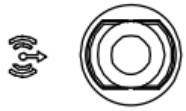
## 2.2 External Interface(Rear):




## 2.2.1 Audio Ports:







| Pin | Definition |
|---|---|
| Sliver(Top) | Mic in |
| Sliver(Under) | Line out |



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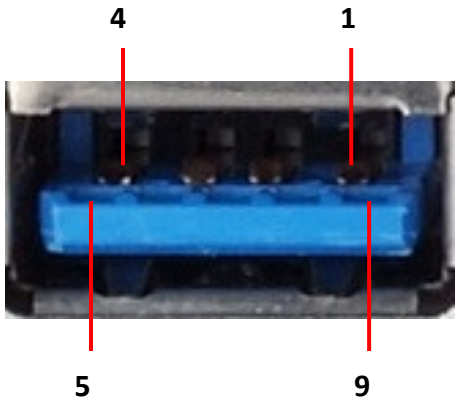
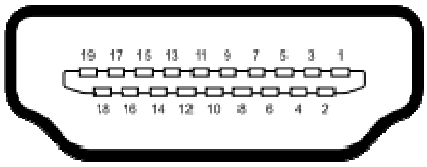
## 2.2.2 USB Ports(USB3.0):




| 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 Port:



| 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- |



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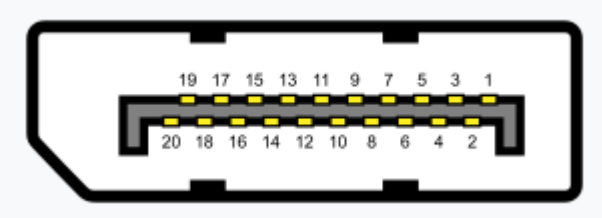
| | | | |
|---|---|---|---|
| 13 | Reserved | 14 | Reserved |
| 15 | SCL | 16 | SDA |
| 17 | DDCGround | 18 | +5 V Power |
| 19 | Hot Plug Detect | | |

## 2.2.4 DP Port:




| Pin | Definition | Pin | Definition |
|---|---|---|---|
| 1 | ML_Lane0[p] | 11 | GND |
| 2 | GND | 12 | ML_Lane3[n] |
| 3 | ML_Lane0[n] | 13 | GND |
| 4 | ML_Lane1[p] | 14 | GND |
| 5 | GND | 15 | AUX_CH[p] |
| 6 | ML_Lane1[n] | 16 | GND |
| 7 | ML_Lane2[p] | 17 | AUX_CH[n] |
| 8 | GND | 18 | Hot Plug |
| 9 | ML_Lane2[n] | 19 | DP_PWR Return |
| 10 | ML_Lane3[p] | 20 | DP_PWR |



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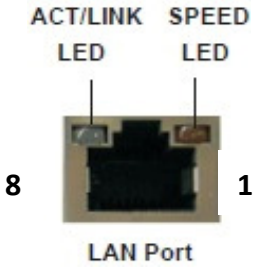
## 2.2.5 LAN Ports:




### - 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 |



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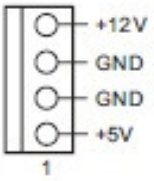
## 2.3 Internal Interface:

### 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 |



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# Chapter 3. System Installation

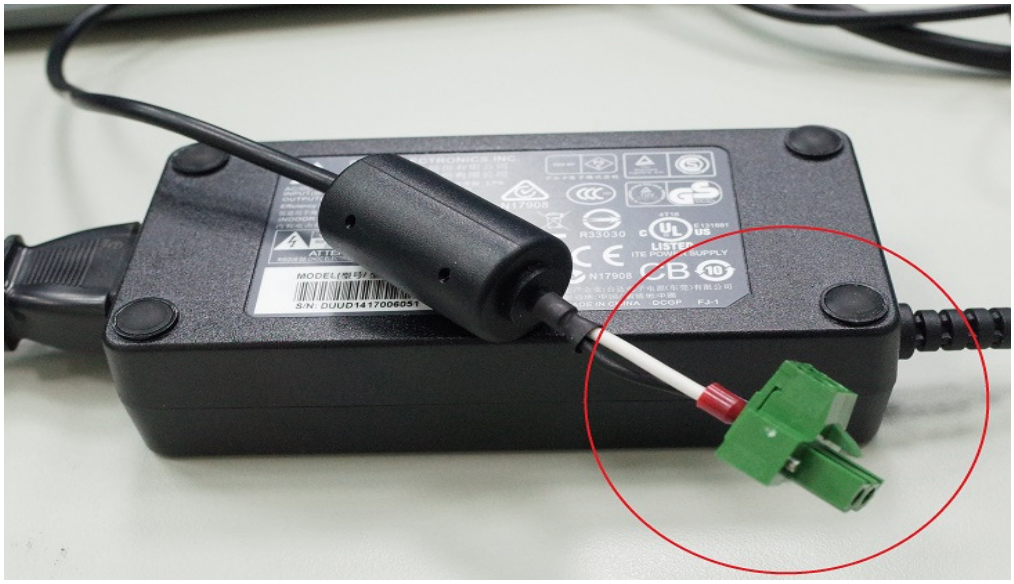
## 3.1 Installation Procedures:

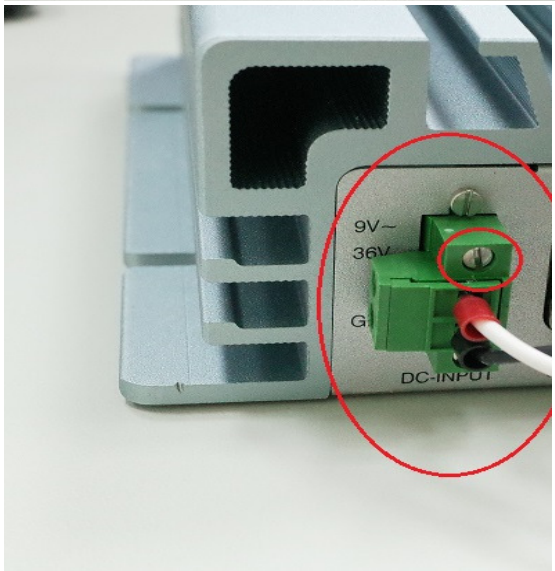
**1. Connecting Power Cord**

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.





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**2.Connecting Keyboard and Mouse**

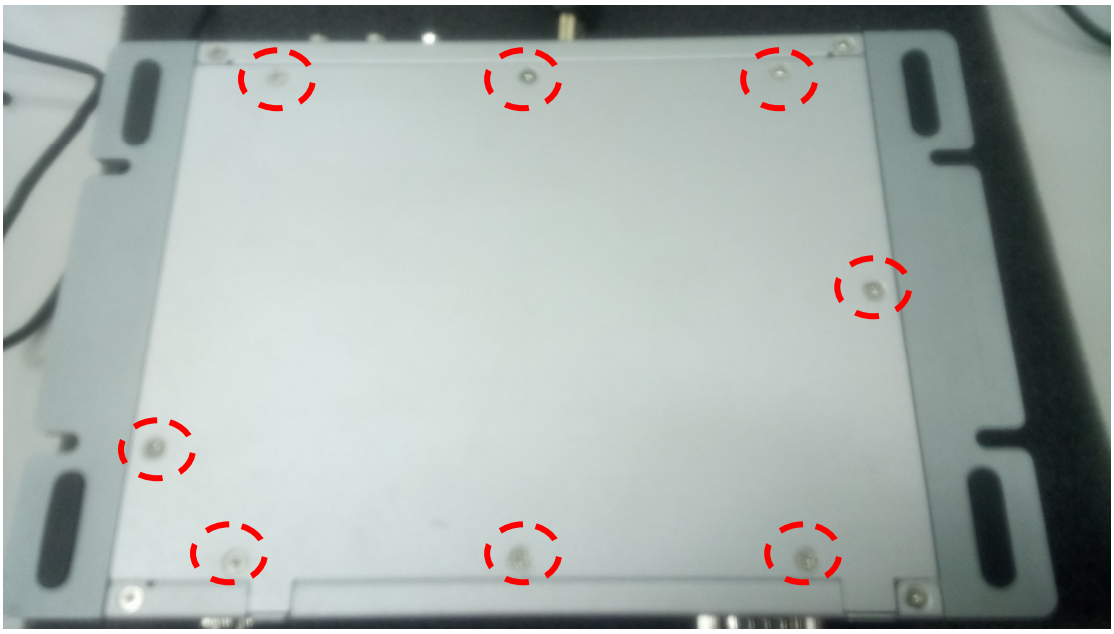
Connect the mouse and keyboard to the USB connector of BPC-3040.

**3. Switching on Power**

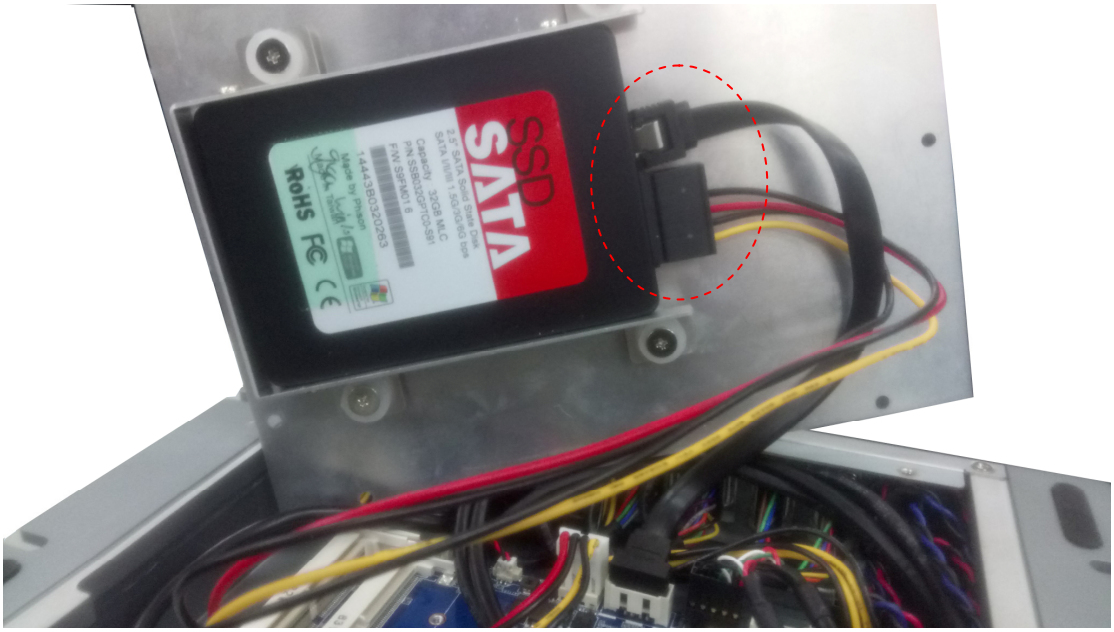
The power button is located at the right side on the front cover of BPC-3040.

## 3.2 Installing HDD/SSD:

1.Unfasten the 8screws on the chassis and open the bottom cover.



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



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3. Unfasten the 4 screws on the HDD/SSD bracket.

4.Installanother HDD/SSD and fasten all screws.



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# 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 ←key or → key to choose among the selections on the menu bar.**

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

**Use ↓ key or ↑ key to move cursor down or up to select items.**

**Use <Esc> key to exit current screen.**



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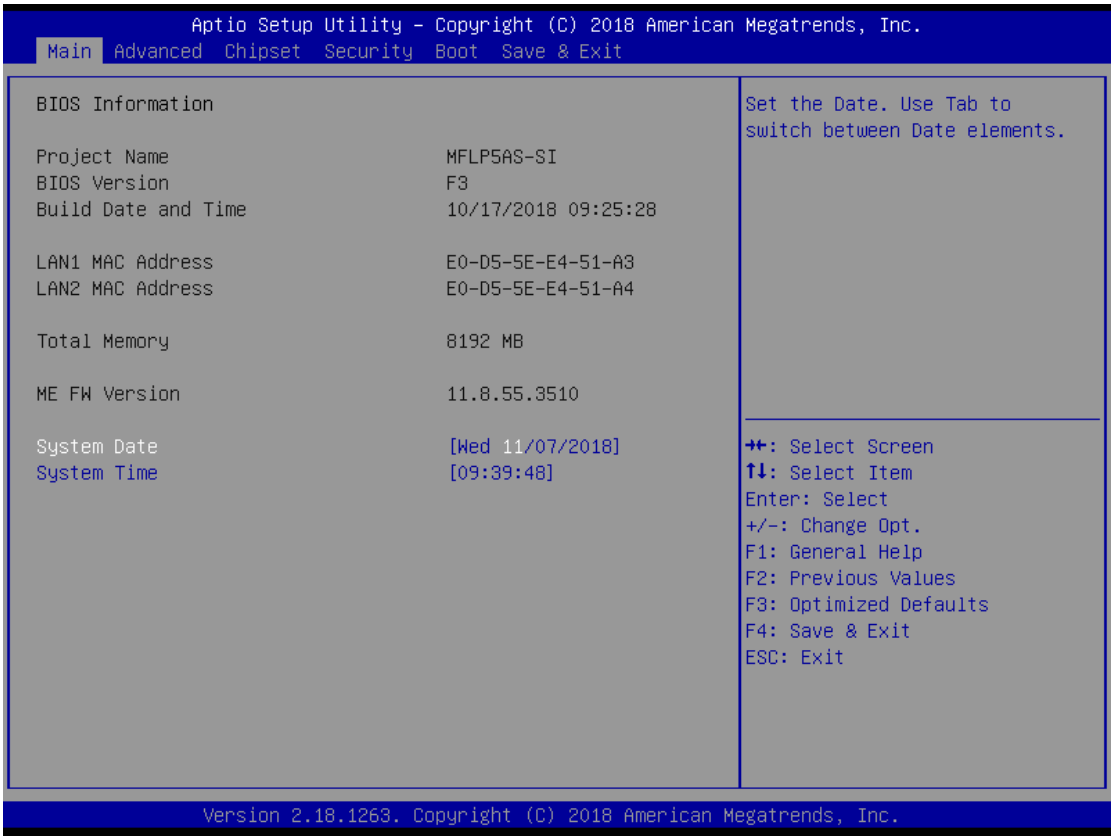
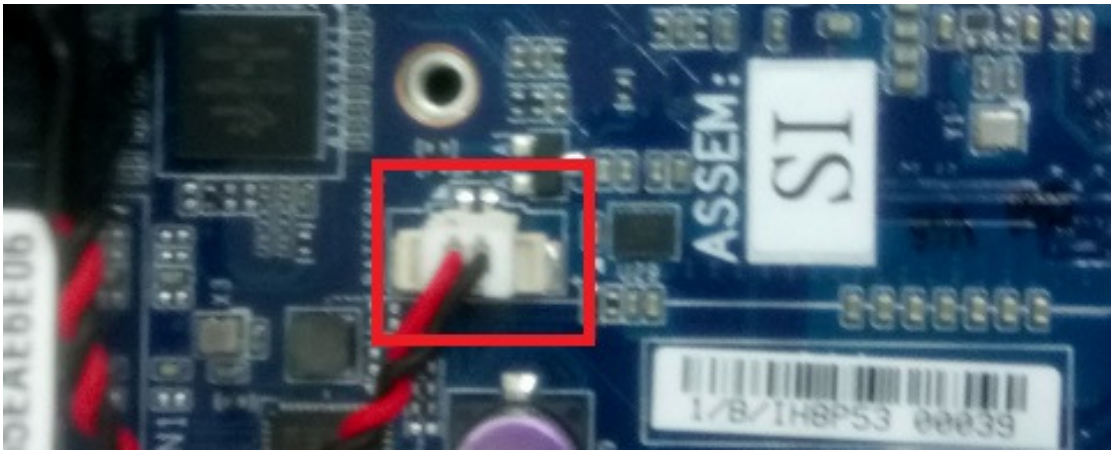
## 4.1 Main

This section (Main screen) displays the system overview.




**Note:**

**Remove the battery at the red frame, Short the two pins to clear CMOS**



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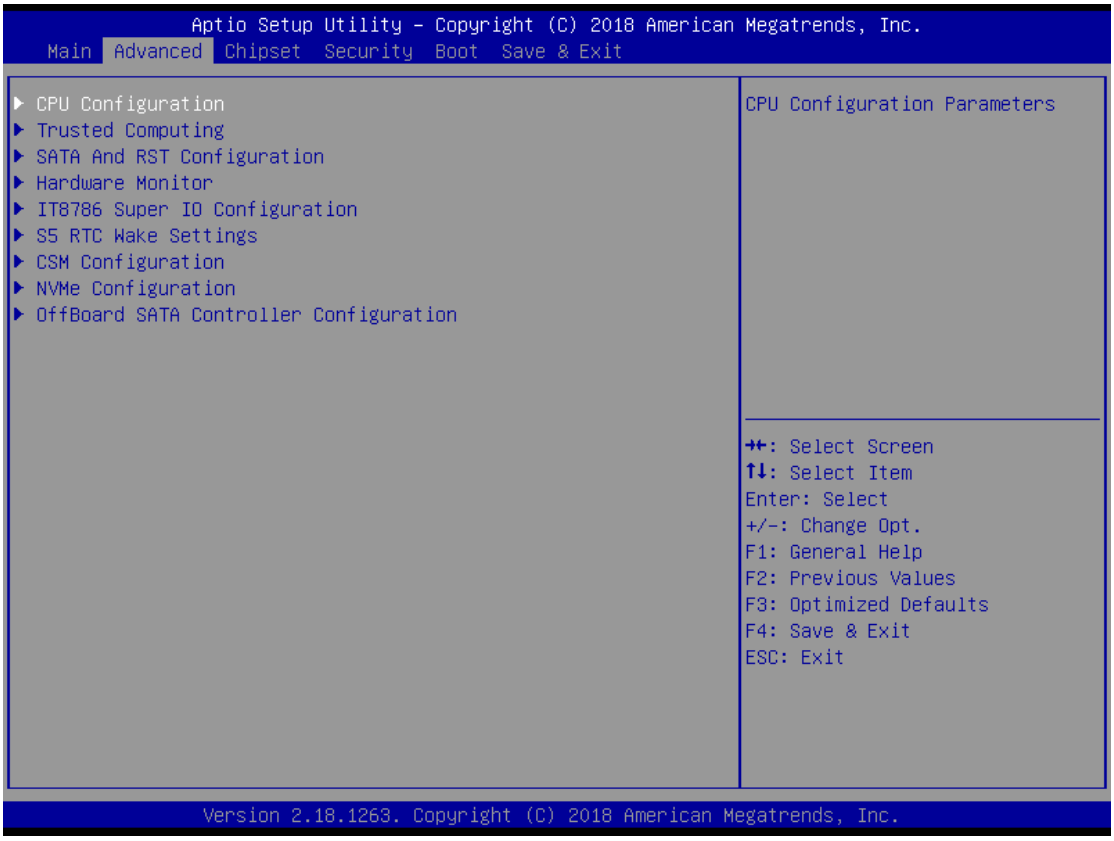
## 4.2 Advanced

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.



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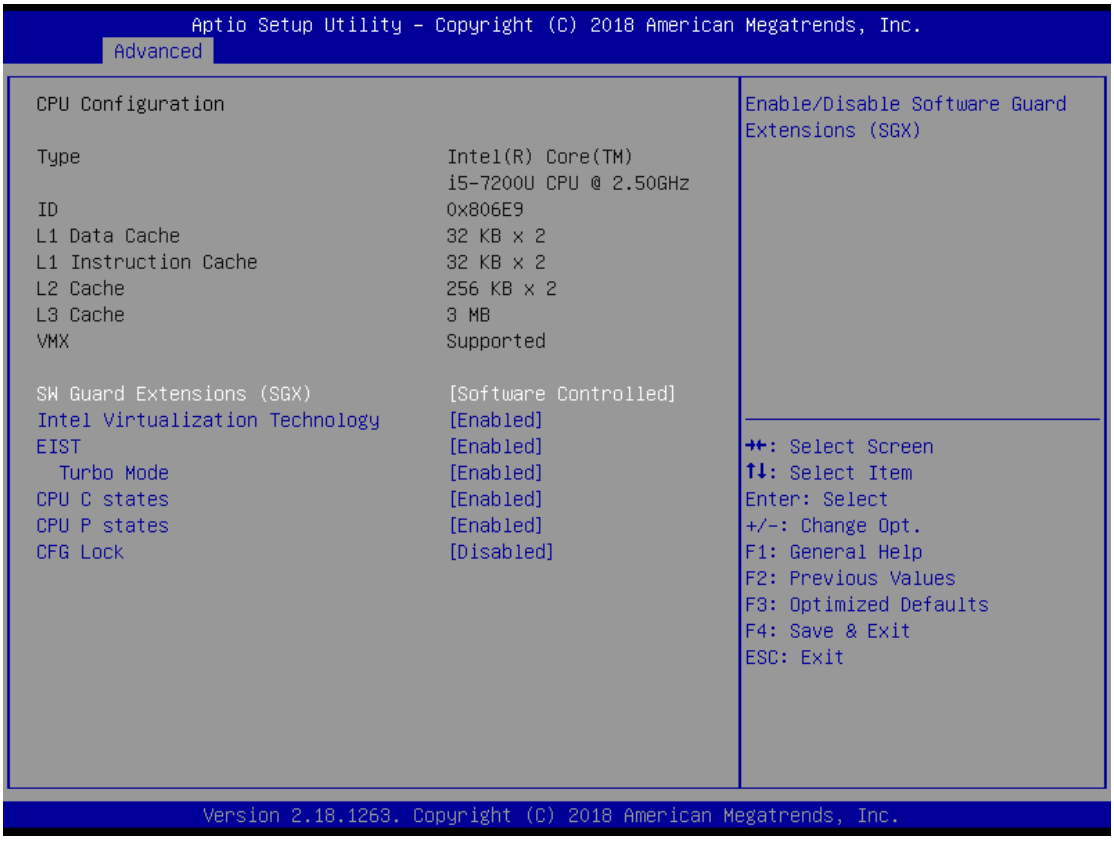
### 4.2.1 CPU Configuration




#### 4.2.1.1 SW Guard Extensions (SGX)

This item allows users to enable / disable or Software Controlled

This default value is [Software Controlled]

#### 4.2.1.2 Intel Virtualization Technology

This item allows users to enable or disable the Intel Virtualization Technology

#### 4.2.1.3 EIST.

This item allows users to enable or disable the EIST.

#### 4.2.1.3.1 Turbo Mode

This item allows users to enable or disable processor Turbo Mode.

#### 4.2.1.4 CPU C state

This item allows users to enable or disable the CPU C state

#### 4.2.1.5 CPU P state

This item allows users to enable or disable the CPU P state

#### 4.2.1.6 CFG Lock

This item allows users to enable or disable the CFG Lock



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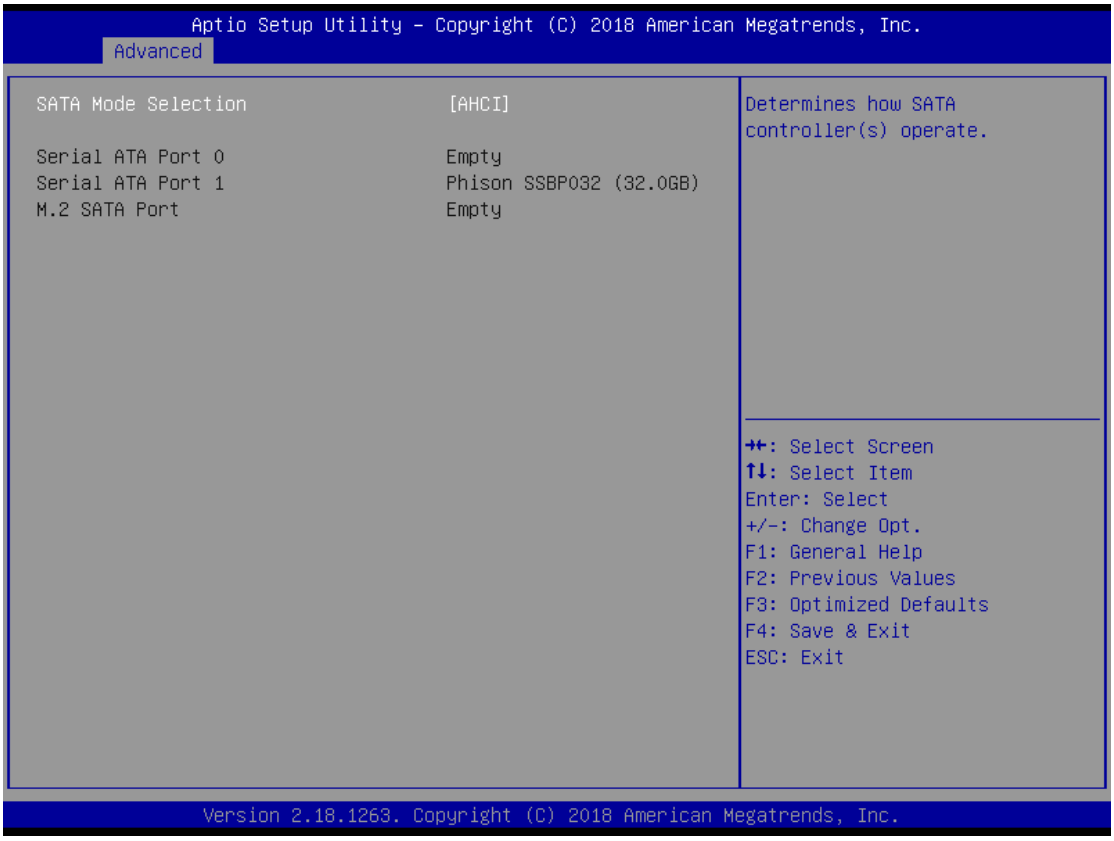
### 4.2.2 SATA and RST Configuration




#### 4.2.2.1 SATA Mode Selection

This item allows users to select AHCI or Intel RST Premium With Intel Optane System Acceleration the SATA Mode.



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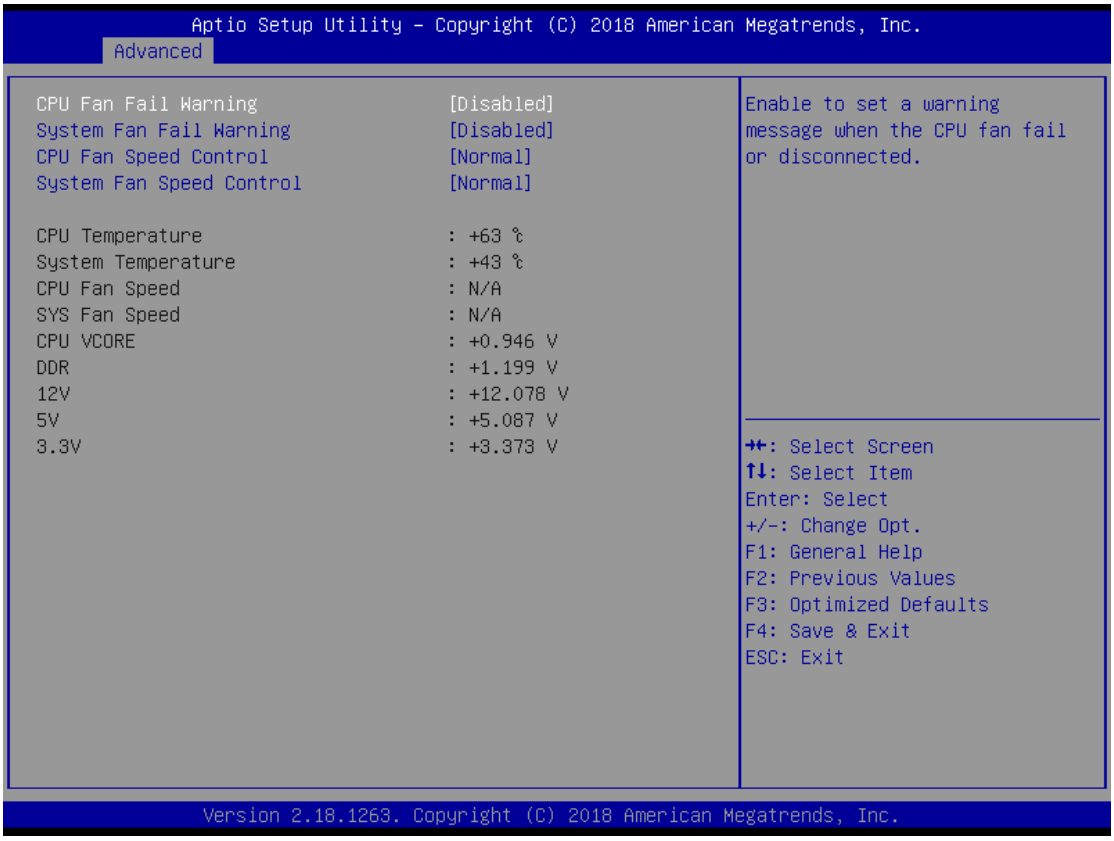
### 4.2.3 Hardware Monitor




#### 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 System Fan Fail Warning

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

#### 4.2.3.3 CPU Fan Speed Control

This item allows users to select 'Normal' or 'Full Speed' the CPU Fan Speed

#### 4.2.3.4 System Fan Speed Control

This item allows users to select 'Normal' or 'Full Speed' the System Fan Speed.



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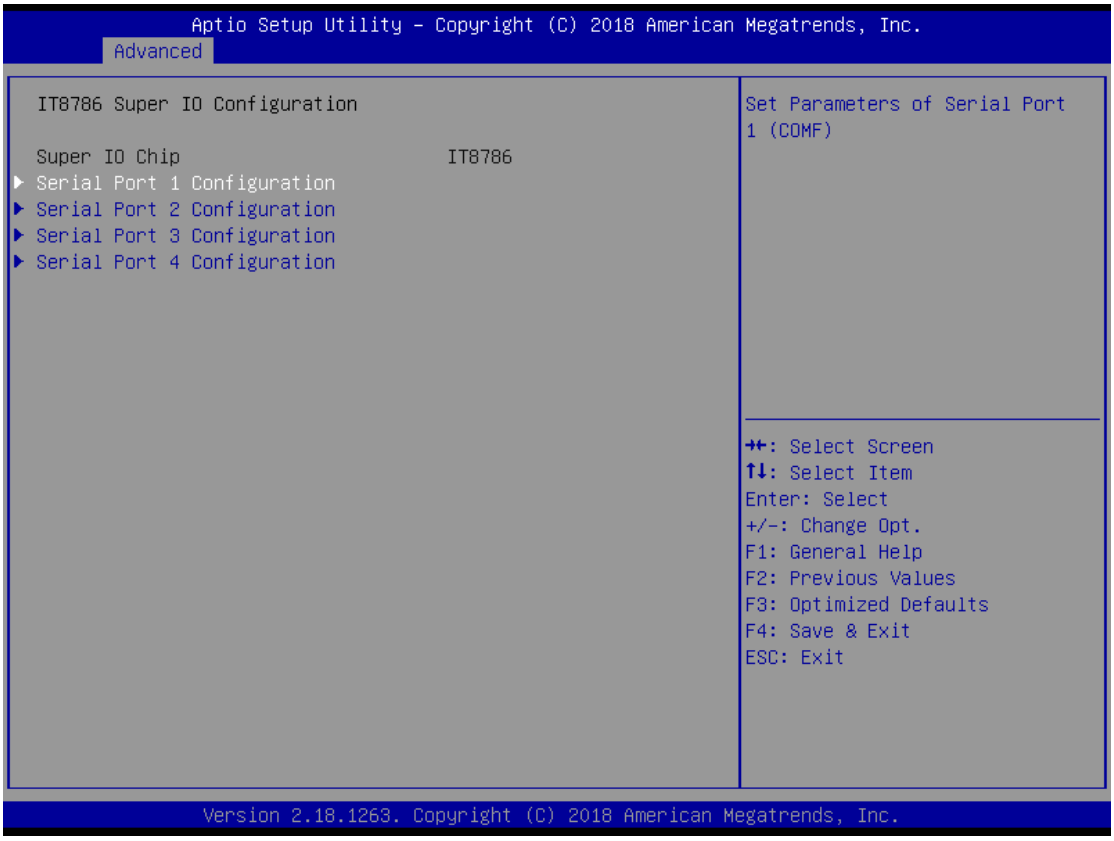
### 4.2.4. IT8786 Super IO configuration




#### 4.2.4.1 Serial Port 1 Configuration

4.2.4.1.1This item allows users to enable or disable the COM 1.

4.2.4.1.2This item allows users to select COM 1 mode 'RS232','RS485','RS485/422'.

#### 4.2.4.2 Serial Port 2 Configuration

This item allows users to enable or disable the COM 2

#### 4.2.4.3 Serial Port 3 Configuration

This item allows users to enable or disable the COM 3

#### 4.2.4.4 Serial Port 4 Configuration

This item allows users to enable or disable the COM 4



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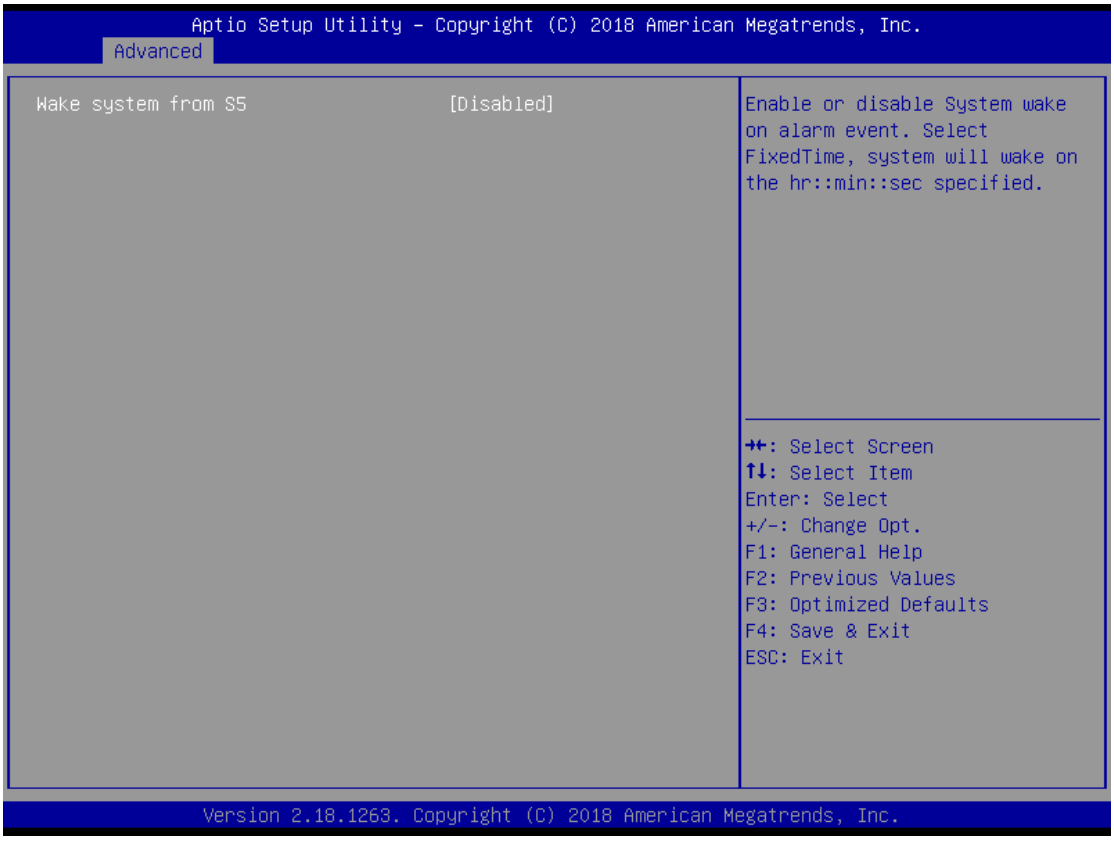
### 4.2.5 S5 RTC Wake settings




#### 4.2.5.1 Wake system from S5

This item allows users to enable or disable the Wake system from S5



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### 4.2.6 CSM Configuration

#### 4.2.6.1 CSM Support

This item allows users to enable or disable the CSM Support.

#### 4.2.6.2 LAN PXE OpROM

This item allows users to enable or disable the LAN PXE OpROM.

#### 4.2.6.3 LAN EFI driver

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

#### 4.2.6.4 Storage

This item allows users to select 'Legacy' or 'UEFI' mode.



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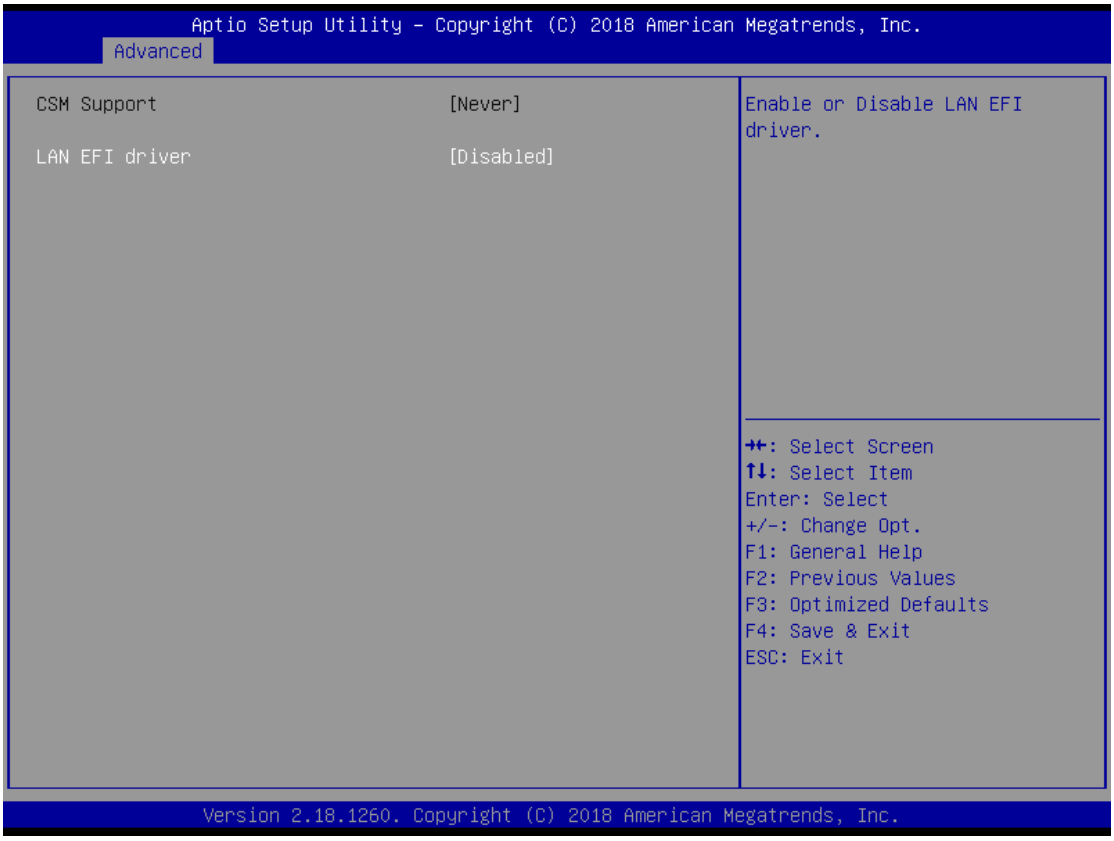
### 4.2.7 OS Selection




#### 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.



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## 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

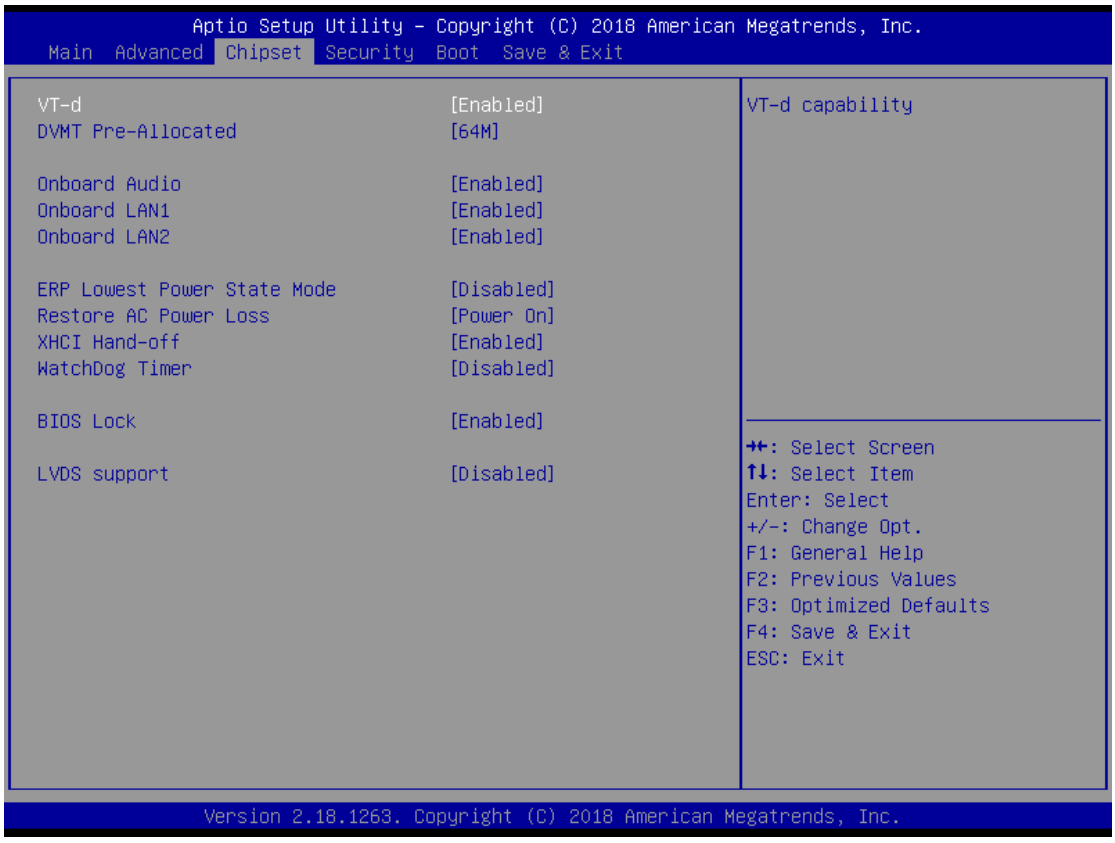
(7)Restore AC Power Loss

(8) XHCI Hand-off

(9) WatchDog Timer

(10) BIOS Lock

(11) LVDS support




### 4.3.1 VT-d

This item allows users to enabled or disabled the VT-d

This default value is [Enabled]



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### 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 XHCI Hand-off

This item allows users to enable or disabled the XHCI Hand-off.
The default value is [Enabled].

### 4.3.9 WatchDog Timer

This item allows users to set WatchDog Timer [15S],[30S],[45S],[60S] or [Disable]
The default value is [Disabled].

### 4.3.10 BIOS Lock

This item allows users to enable or disabled the BIOS Lock.
The default value is [Enabled].

### 4.3.11 LVDS support

This item allows users to enable or disabled the LVDS support
The default value is [disabled].



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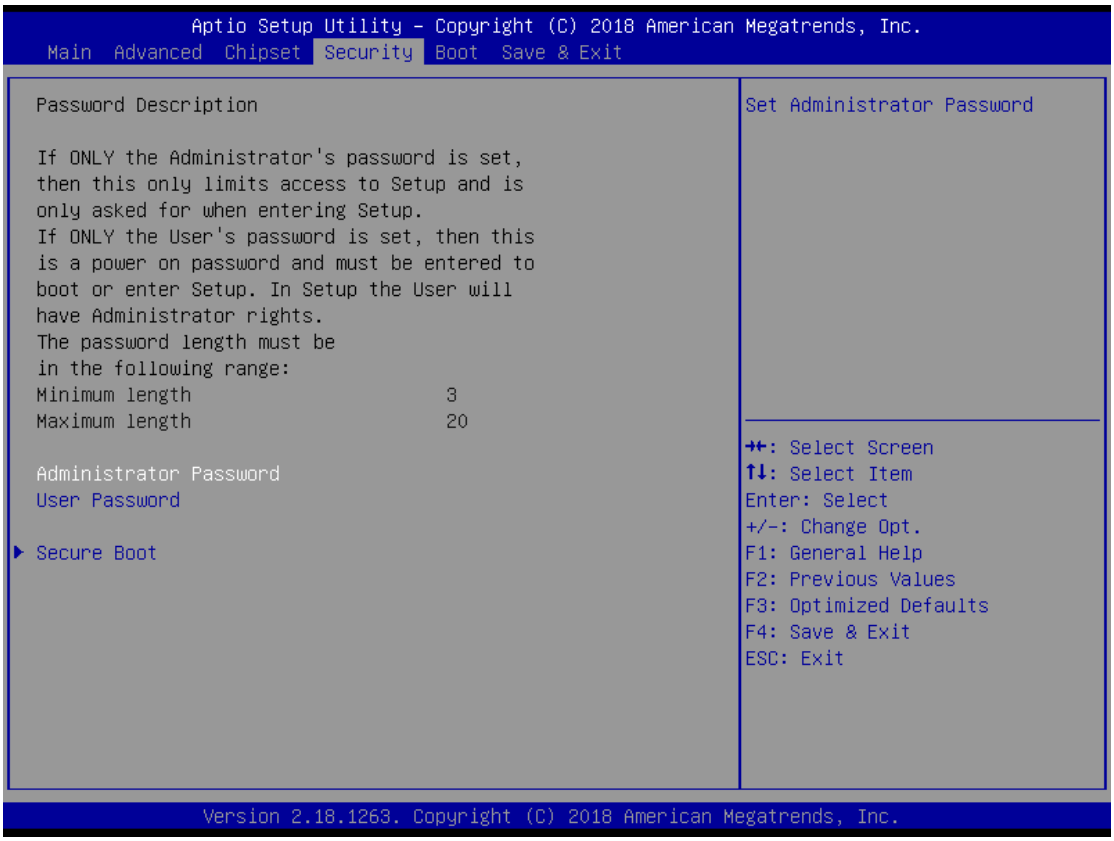
## 4.4 Security

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]



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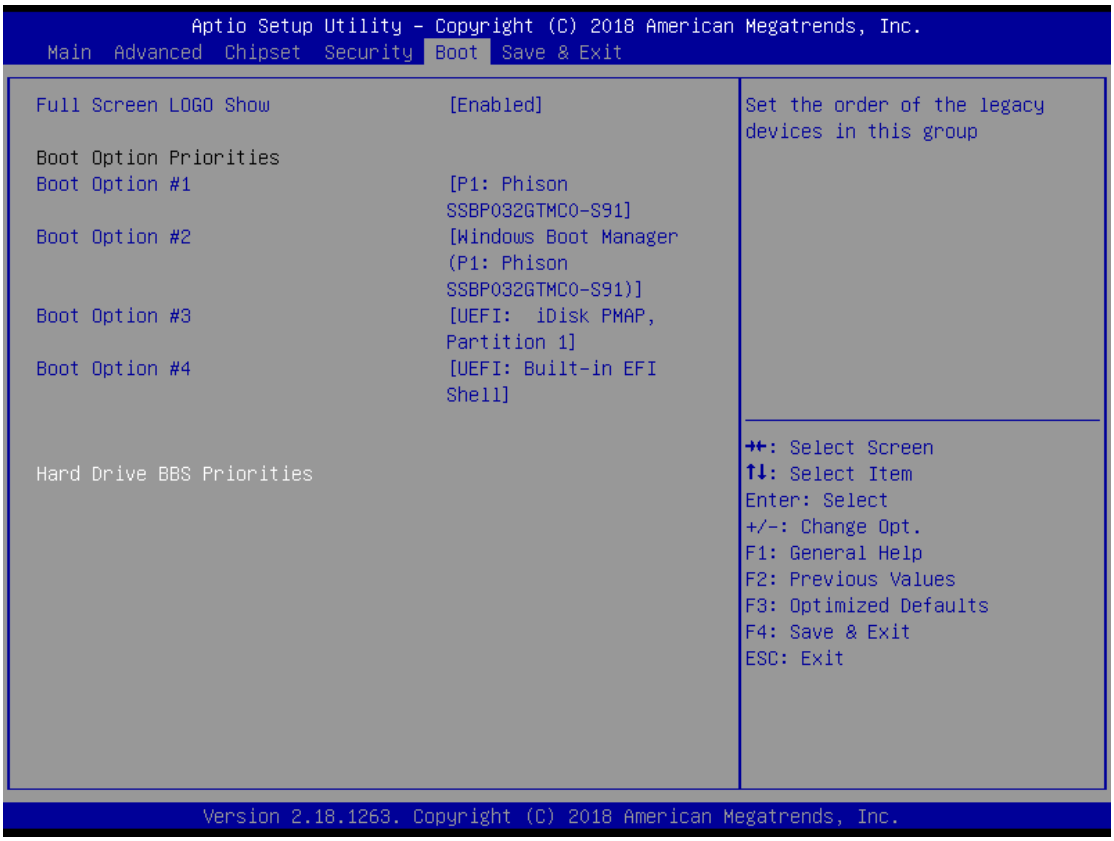
## 4.5 Boot

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~#N

This item allows users to set the system boot order.

### 4.5.3 Hard Drive BBS Priorities

This item allows users to set the order of the legacy devices in this group



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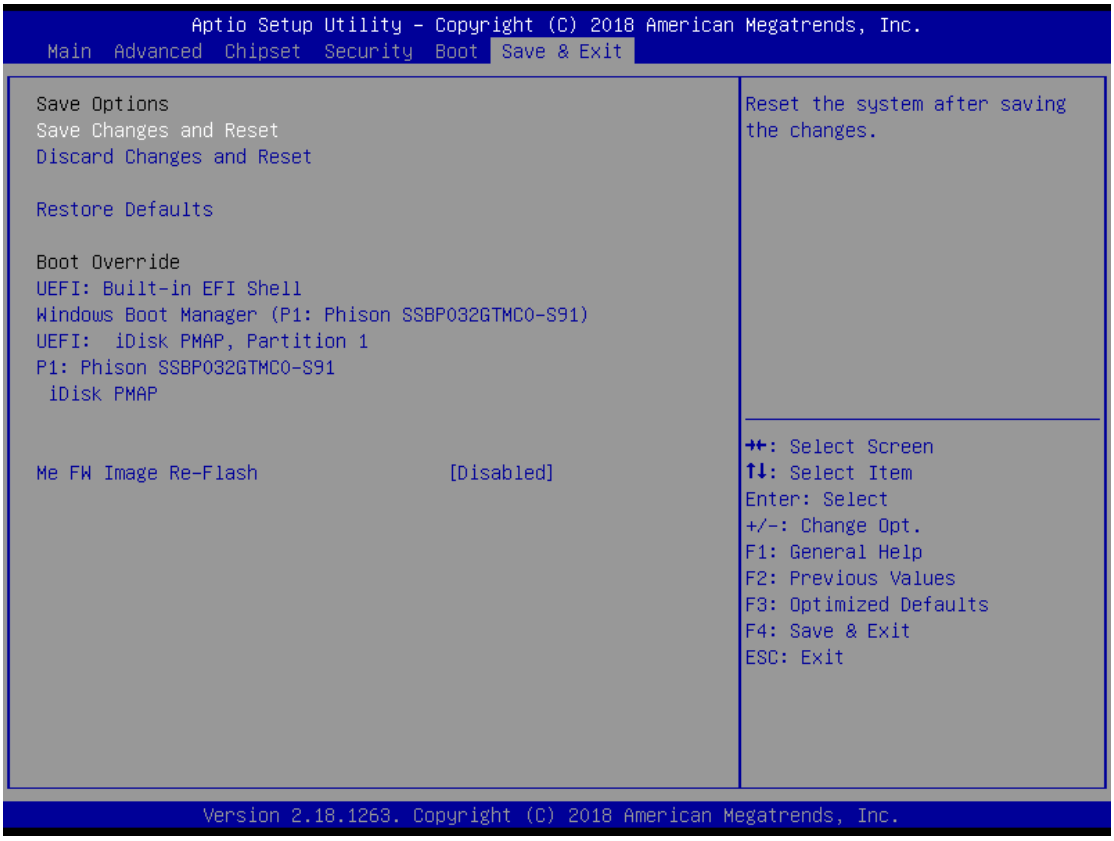
## 4.6 Exit




### 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 users select the boot device.

### 4.6.5 Me FW Image Re-Flash

This item allows users to enable or disabled the Me FW Image Re-Flash.



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## 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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