Table of Contents

CHAPTER 1
INTRODUCTION

1.1 General Description

- **Features**
  - Fanless design
  - Wide temperature operation of -20℃– +70℃
  - Supports 1 10/100/1000 Base-T Ethernets with Magnetic Isolated Protection
  - 2 COM Ports support RS-232/422/485
  - 2 USB 2.0 Ports
  - 1 Wireless (USB and PCIe Interface)
  - Support one mSATA
  - Wide range 12–24V DC-in with terminal block
  - 8 bits programmable TTL level digital input/output ports.
  - Din-rail mounting
  - Wall mounting (optional)
  - Passed CE with FCC testing

- **O.S. Supported**

  supports Windows® 10 and Linux package. For storage device, supports one mSATA.

1.2 System Specifications

1.2.1 CPU

- Onboard Intel ® ATOM™ E3930 (1.3 GHz/2-core) processor .

1.2.2 BIOS

- AMI (American Megatrends Inc.) UEFI (Unified Extensible Firmware Interface) BIOS.

1.2.3 System Memory

- One DDR3L 204-pin SO-DIMM (1.35V) slot.
- Supports 1600MHz max. up to 8GB.

1.2.4 Display

- A slim type 15-pin D-Sub connector as VGA connector.

1.2.5 Ethernet Ports

- LAN Chip : Intel Ethernet Controller I211.
- One RJ-45 connector, support 10/100/1000 Base-T Ethernet with 1.5KV magnetic isolated protection

1.2.6 Storages

- 1 x mSATA.

1.2.7 Wireless

- 1 x Full size Mini Card slot supports Module with USB and PCIe Interface.
- 1 x SIM Card Socket.
- 2 x Antenna holes.

1.2.8 USB

- 2 USB 2.0 Ports
- USB Pin Define :

USB 2.0

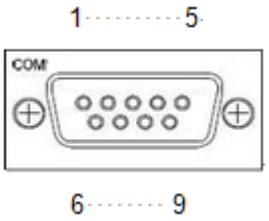
Pin	Signal USB2.0 Port 1	Pin	Signal USB2.0 Port 2
1	VCC	1	VCC
2	D0-	2	D1-
3	D0+	3	D1+
4	GND	4	GND

1.2.9 COM

- 2 ports DB9 support RS-232/422/485 which can be selected by BIOS.
- Supports Auto Flow Control in RS485 mode.
- Serial Port Pin Define: (DB9 Male) as below

COM1~2

Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	--
4	DTR	RX-	--
5	GND	GND	GND
6	DSR	--	--
7	RTS	--	--
8	CTS	--	--
9	RI	--	--



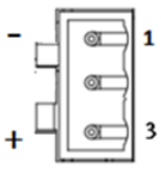
1.2.10 Power

- Power Input

- DC Terminal block : Wide-range 12 - 24V.

  OVP and Reverse protection.

Pin	Signal
1	-
2	NC
3	+

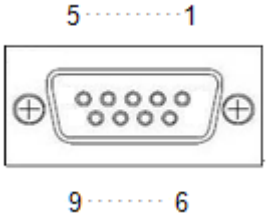


1.2.11 DIO

- One DB9 female connector supports 8 bits TTL level programmable digital input/output
- The voltage of TTL is 5V
- The programming is as follow:

- I/O sink current is 8~10mA
- Input/Output can be programmed

Pin	Signal
1	DIO0
2	DIO1
3	DIO2
4	DIO3
5	DIO4
6	DIO5
7	DIO6
8	DIO7
9	GND

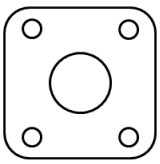


1.2.12 WatchDog Timer (WDT)

- 1~255 seconds or minutes; up to 255 levels.

1.2.13 Restore BIOS Optimal Defaults (SW1)

- Press the tact switch (SW1) can restore BIOS optimal defaults.



1.2.14 System LED

- There are showed the LED's indicators and functional descriptions.

LED Name	Description	Color
ACT	Indicate the storge status and it's flashing when storge access.	Orange
PWR	Indicate the Power status. When the DC input is acceptable, the LED will ON.	Green

1.2.15 Operation Temperature

- -20℃ ~ +70℃

1.2.16 Storage Temperature

- -40℃ ~ +85℃

1.2.17 Humidity

- 10% ~ 95% (non-condensation)

1.2.18 Weight

- 0.3 kg

1.2.19 Dimensions

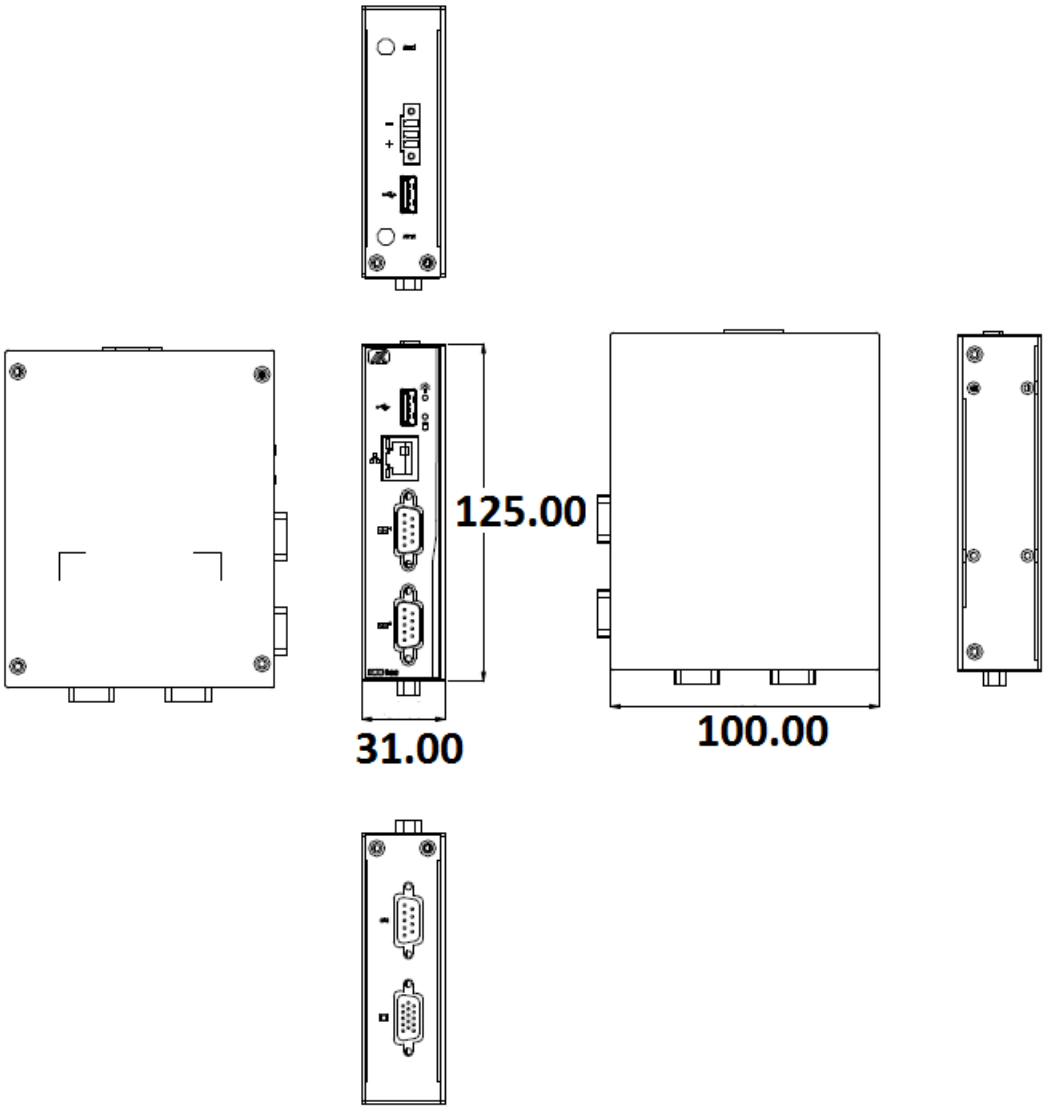
- 31mm(1.22") (W) x100mm(3.93") (D) x125mm(4.92") (H)

1.2.20 System I/O Outlets

- Two 9-pin D-Sub male connectors, COM1~COM2.
- One 15-pin D-Sub female connector for VGA.
- One 10/100/1000 Base-T RJ-45 with 1.5KV magnetic isolated protection.
- Two USB 2.0 Ports
- One DC Power Input with terminal block.
- One 9-pin D-Sub Female connectors for DIO.
- Two Antenna holes.

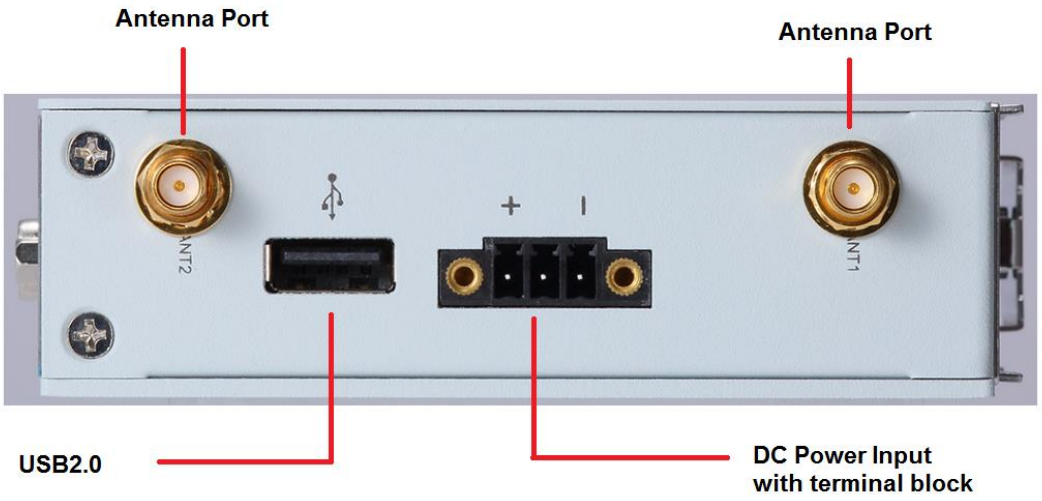
1.3 Dimensions

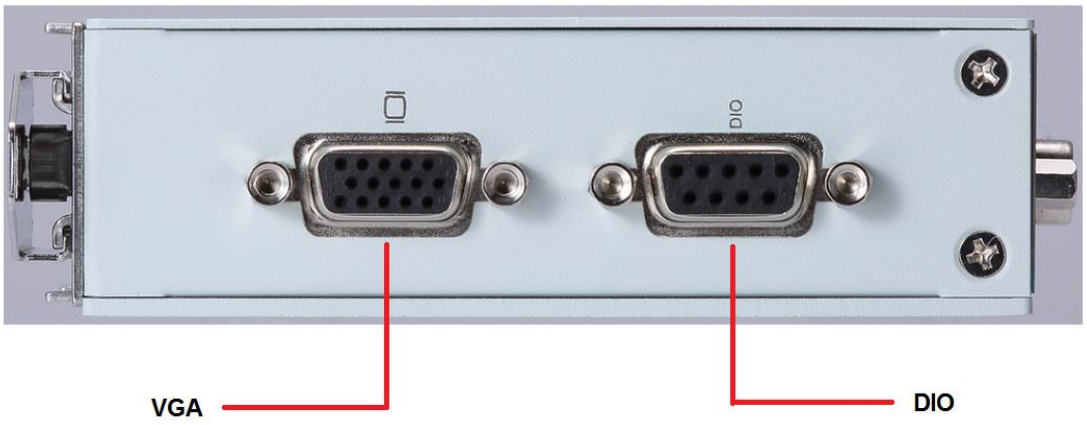
The following diagrams show you dimensions and outlines of .



1.4 I/O Outlets

The following figures show you I/O outlets on front view and top view




VGA
DIO

CHAPTER 2
HARDWARE INSTALLATION

is convenient for your various hardware configurations, such as Memory Module and mSATA. The chapter 2 will show you how to install the hardware. It includes:

2.1 Installing the Memory Module

Step 1 Turn off the system.

Step 2 Loosen all screws of the cover and remove the cover from the system.

Step 3 Use two fingers to hold the memory module, and insert the gold figure into the slot and push the module down.

Step 4 **The memory module is locked by two latches on the sides. We strongly recommend using "LDC737" silicone on the two sides of the memory for good ability of vibration.**

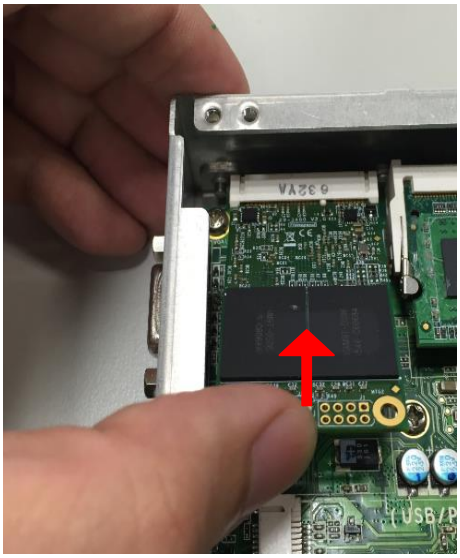
Step 5 **Put the cover back to the system, and fasten screws tight close the chassis.**

2.2 Installing the mSATA

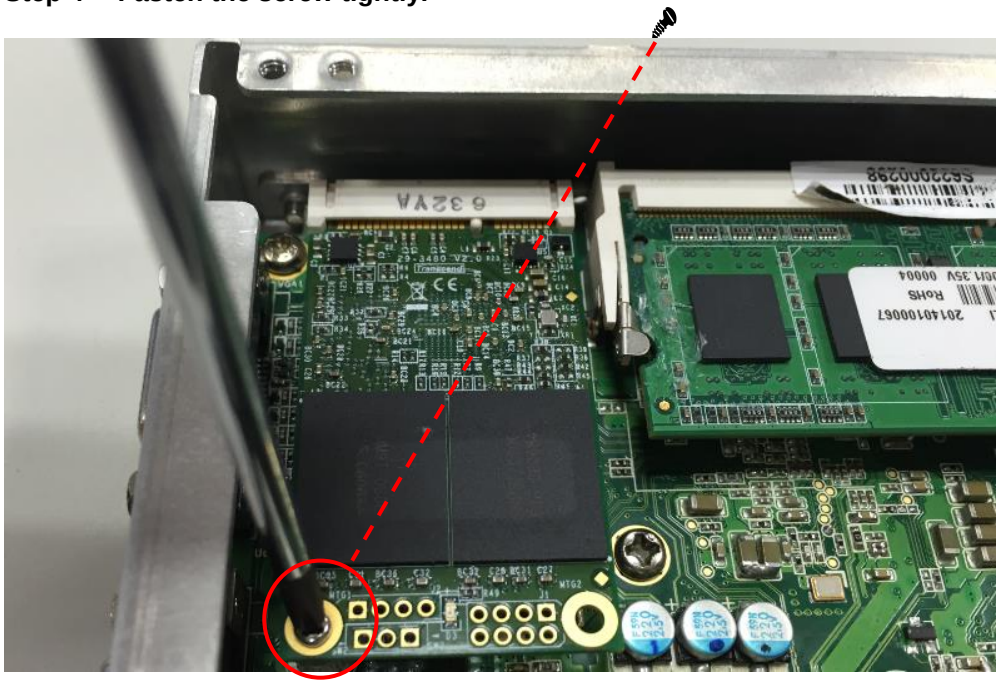
Step 1 Turn off the system.

Step 2 Loosen all screws of the cover and remove the cover from the system.

Step 3 Insert the mSATA into the slot which marking with “mSATA / USB / PCIe ”.



Step 4 Fasten the screw tightly.



Step 5 Put the cover back to the system, and fasten screws tight close the chassis.

2.3 Installing Wireless Module

Step 1 Turn off the system.

Step 2 Loosen all screws of the cover and remove the cover from the system.

Step3. Follwing (Figure 3-1) push the SIM slot back to unlock SIM slot, inserting the SIM card and put it back(Figure 3-2), and lock the SIM slot(Figure 3-3).

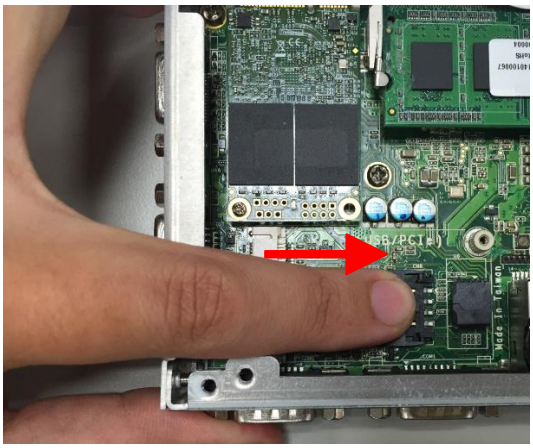


Figure 3-1

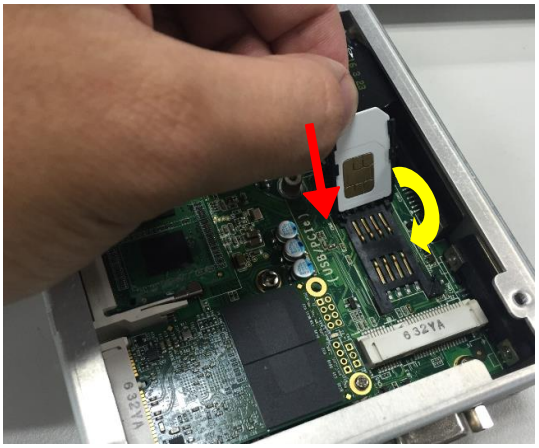
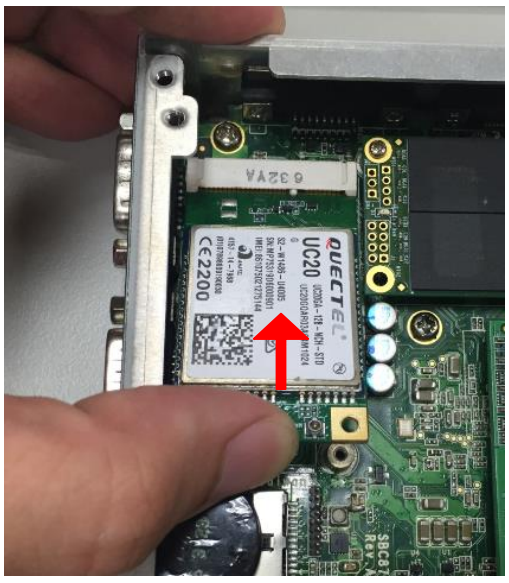


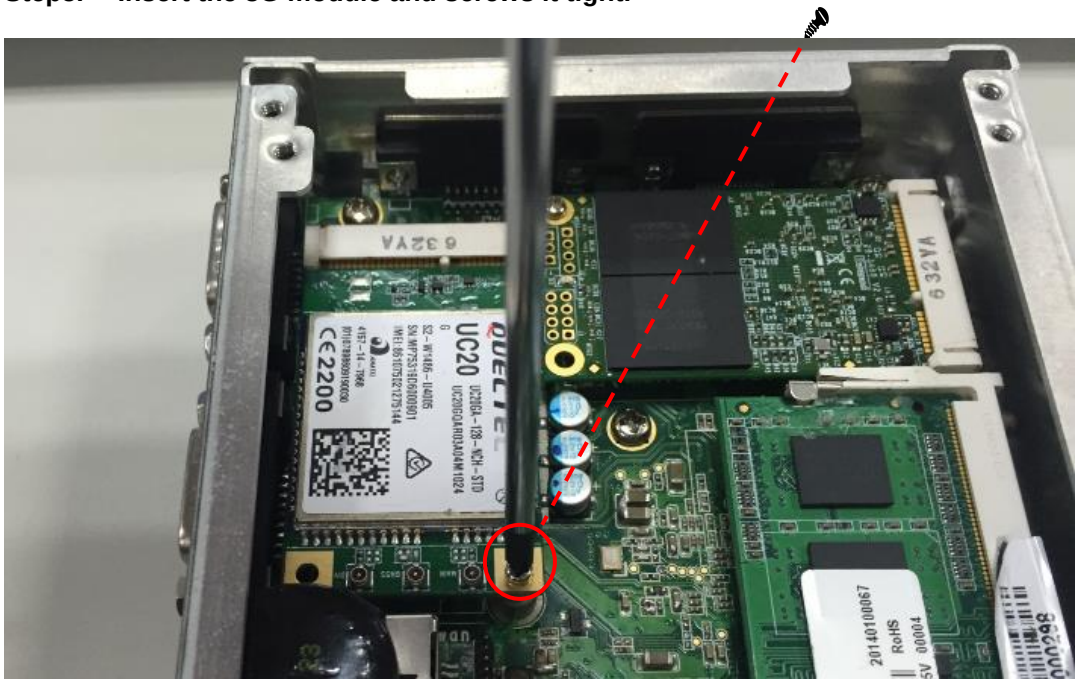
Figure 3-2

Figure 3-3

Step4. Insert the wireless module into the slot which marking with “USB / PCIe ”.



Step5. Insert the 3G module and screws it tight.



Step6. Removing the plug cover from the chassis.

Step7. Connect the RF cable to the connector of 3G module which remarking "MAIN".

Step8. **Taking out the parts from the 3G kit package (Figure 8-1) and make the RF cable through the antenna hole (Figure 8-2). Finally,screw it tight(Figure 8-3).**

Figure 8-1

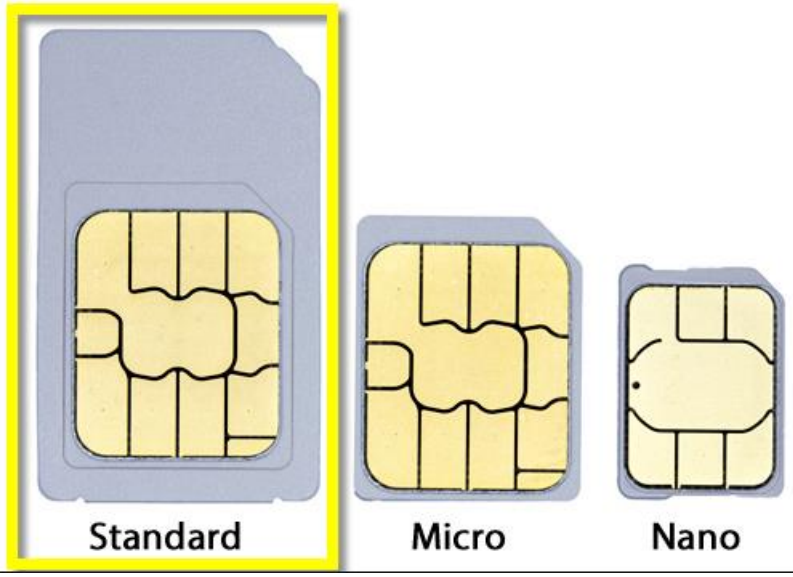
Figure 8-2

Figure 8-3

Step9. **Screwing the RF antenna tight .**

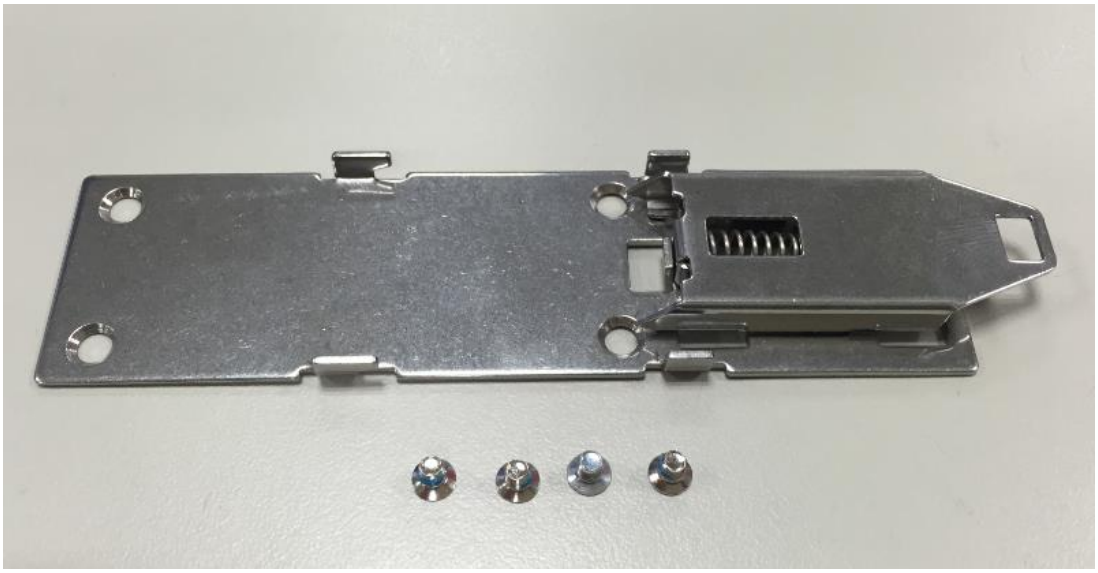
Step10. Put the cover back to the system, and fasten screws tight close the chassis.

Note: SIM Card only can use the standard size as the following pictures.

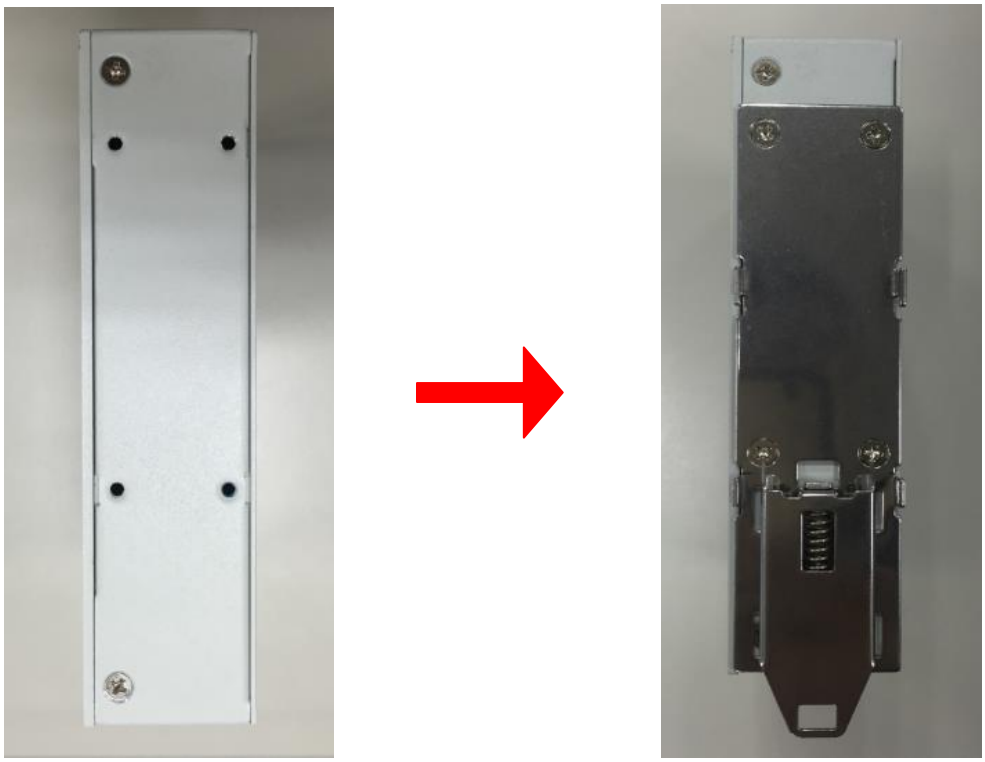


2.4 Installing Din-rail Mounting

Step 1 Prepare Din-rail Mount assembling components (screws and bracket) ready.



Step 2 Assembly the bracket to the system and fasten screws tight.

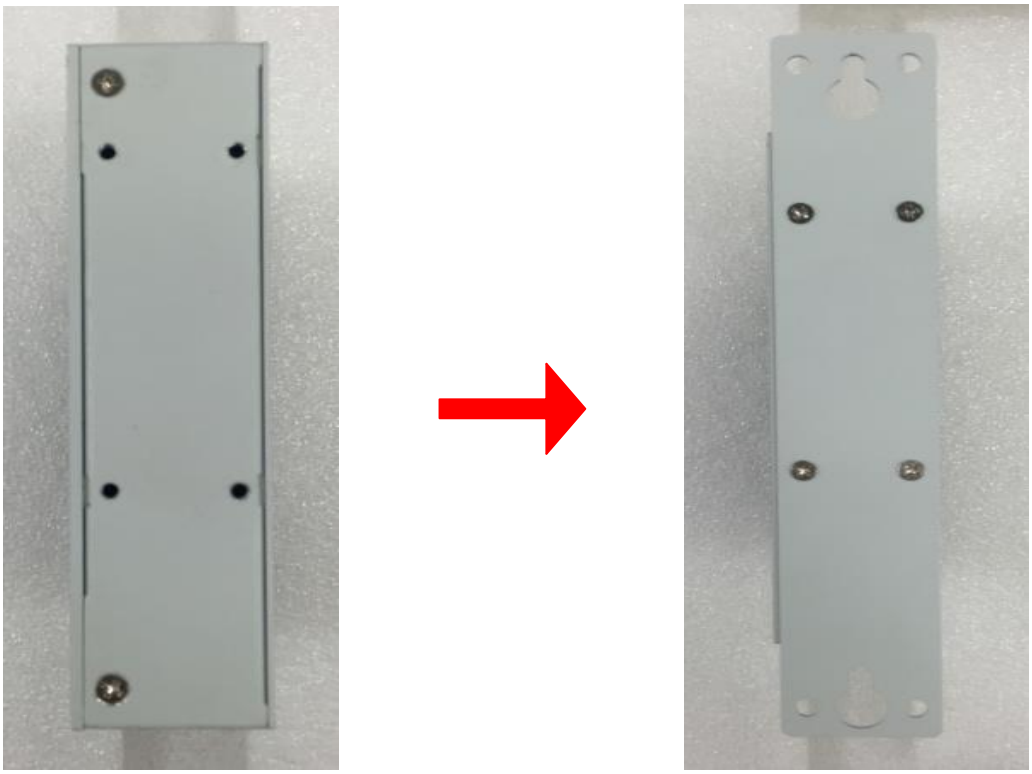


2.5 Installing Wall Mounting (optional)

provides Wall Mounting that customers can install as below:

Step 1 Prepare Wall Mount assembling components (screws and bracket) ready.

Step 2 Assembly the bracket to the system, and fasten screws tight.



CHAPTER 3
AMI UEFI BIOS UTILITY

The AMI UEFI BIOS provides users with a built-in Setup program to modify basic system configuration. All configured parameters are stored in a flash-backed-up to save the Setup information whenever the power is turned off.

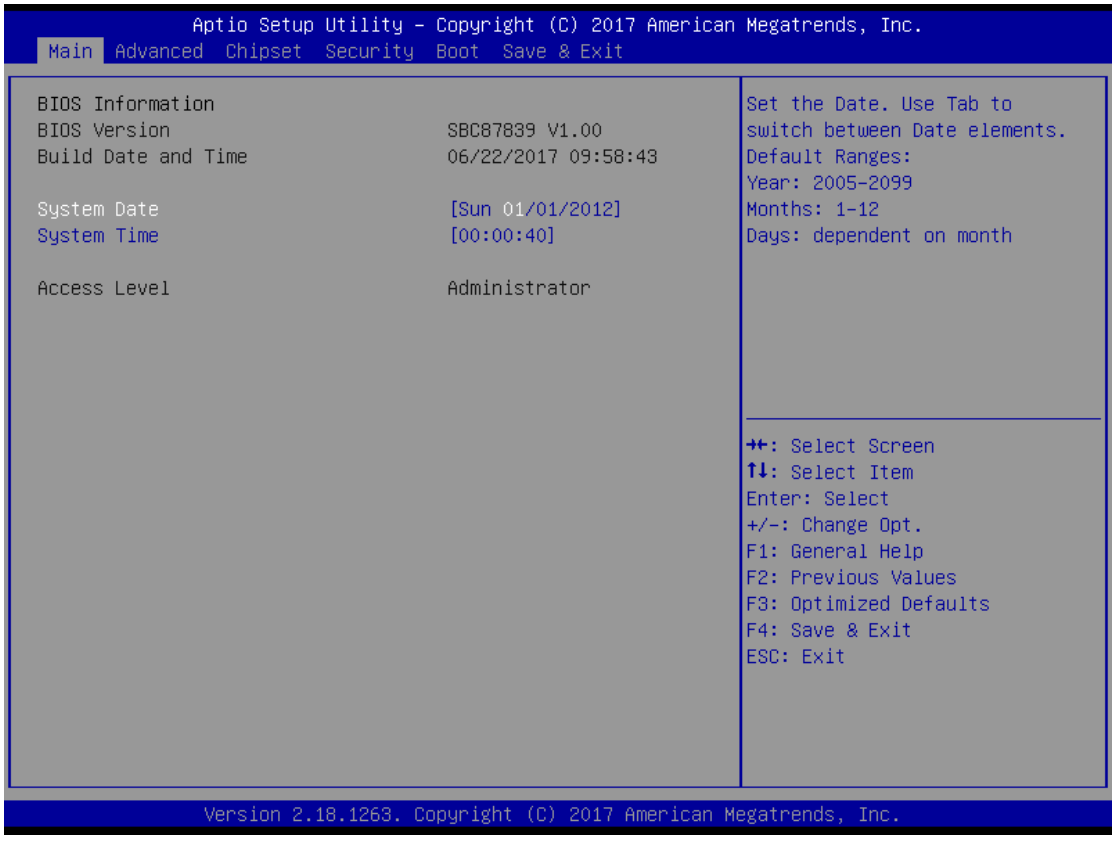
3.1 Entering Setup

To enter the setup screens, follow the steps below:

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

3.2 The Main Menu

Once you enter the AMI BIOS Aptio Setup Utility, the Main Menu appears on the screen. In the Main Menu, there are several Setup functions and a couple of Exit options for your selection. Use Select Screen Keys (or Move Keys) to select the Setup Page you intend to configure then press <Enter> to accept or enter its sub-menu.



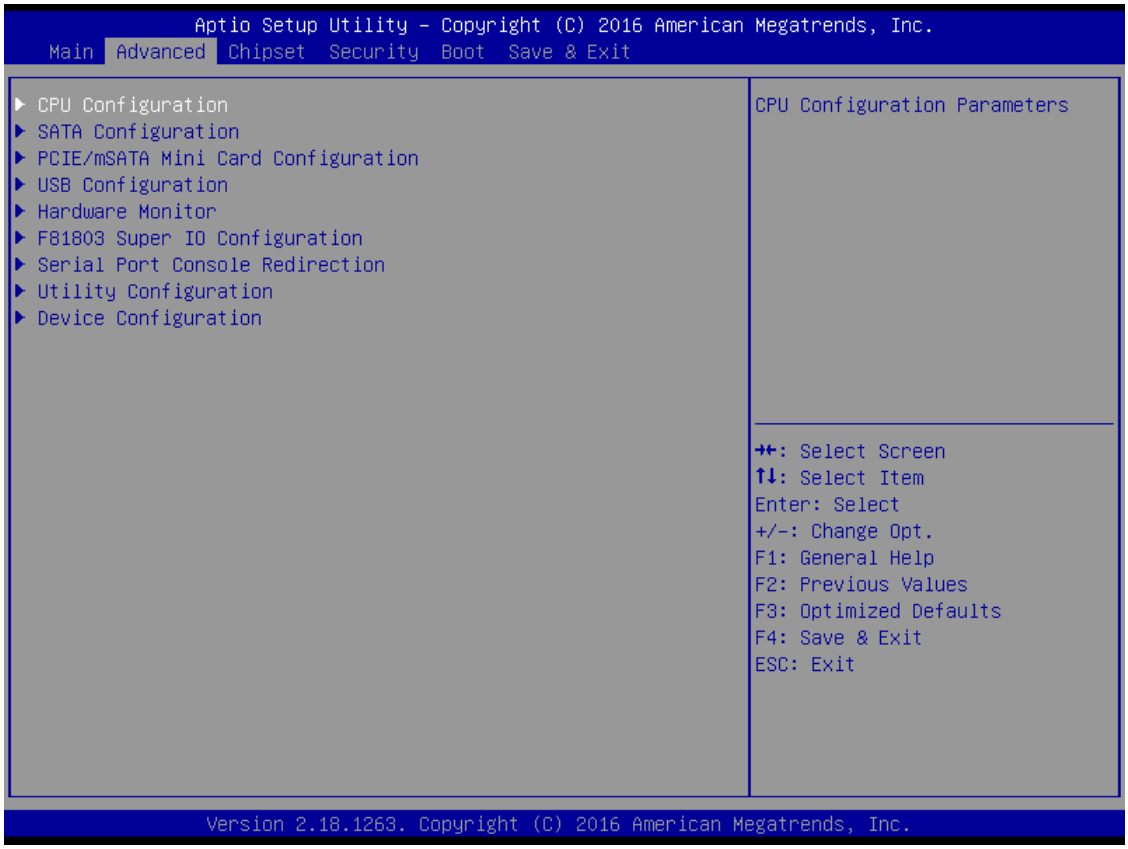
System Date
The date format is <day> <month> <date> <year>.

System Time
This item shows current time of your system with the format <hour> <minute> <second>. The

time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

3.3 Advanced Features

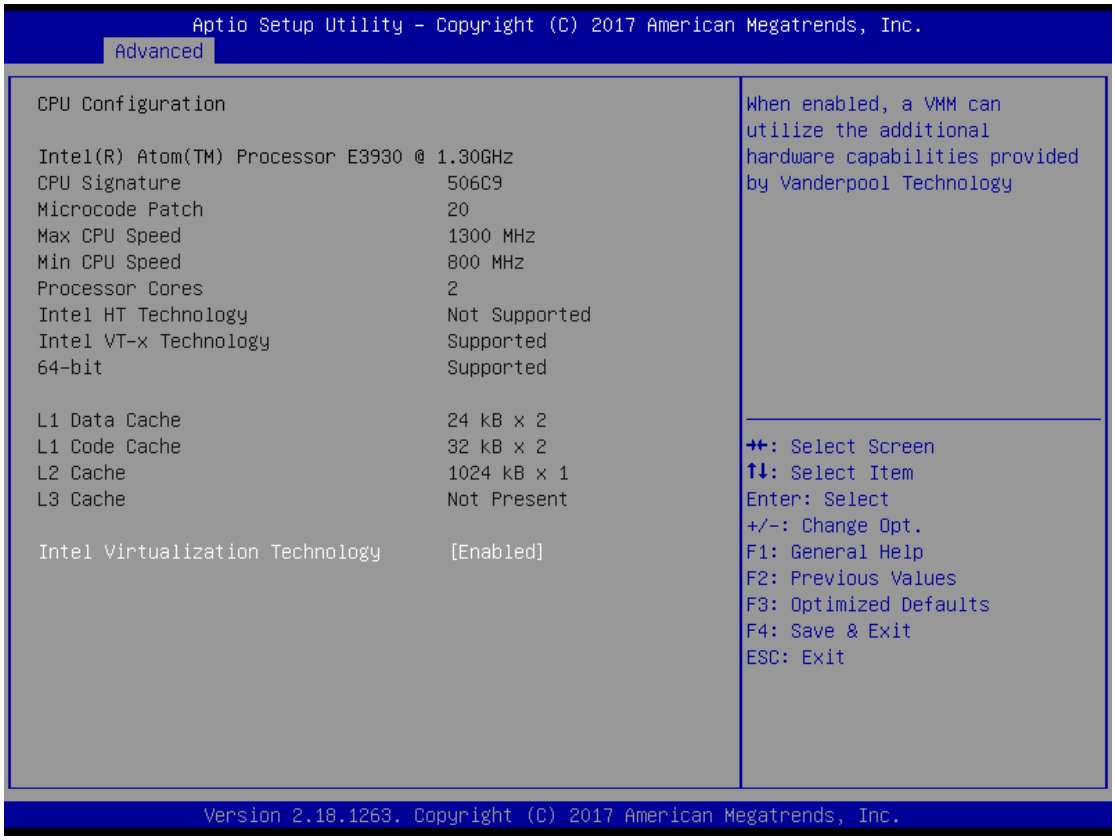
This Advanced section allows users to configure and improve your system, to set up some system features according to your preference. You can select any of the items in the left frame of the screen to go to the sub menus:



- **CPU Configuration**

Scroll to this item and press <Enter> to view the CPU Configuration informations.

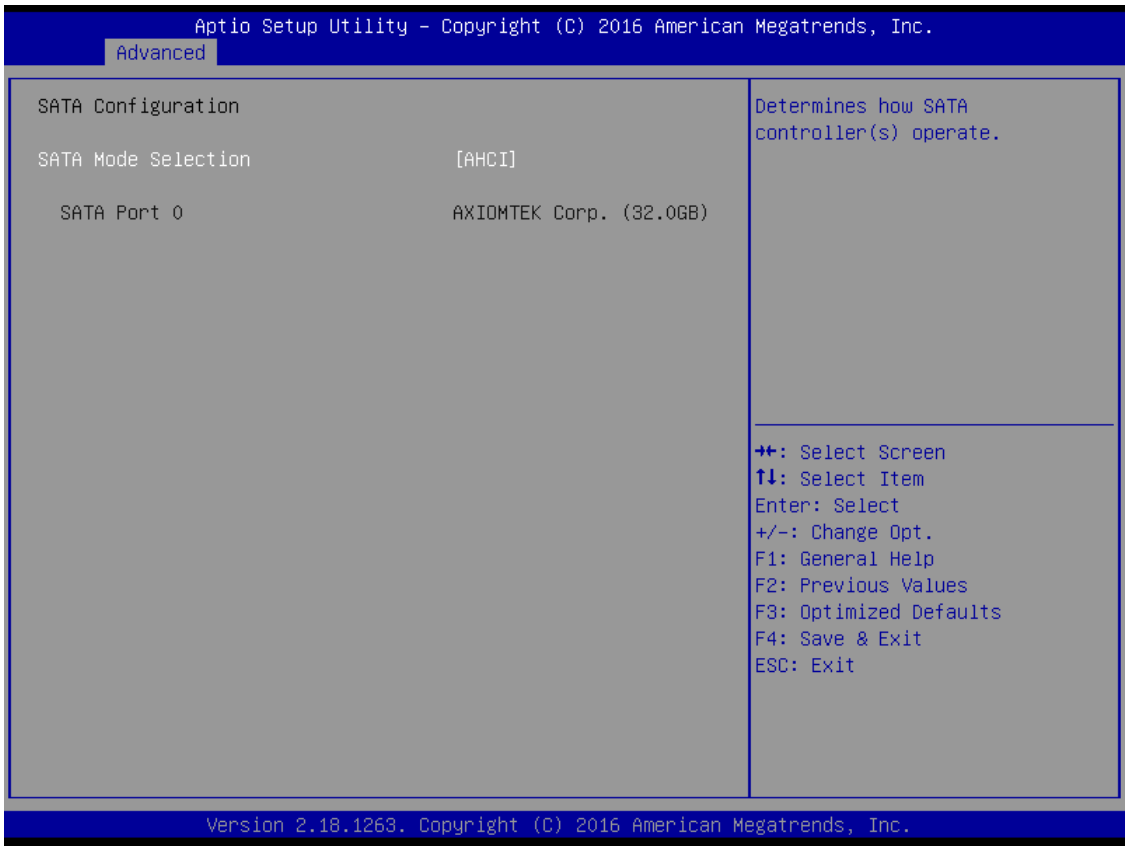
(Please refer below graphics.)

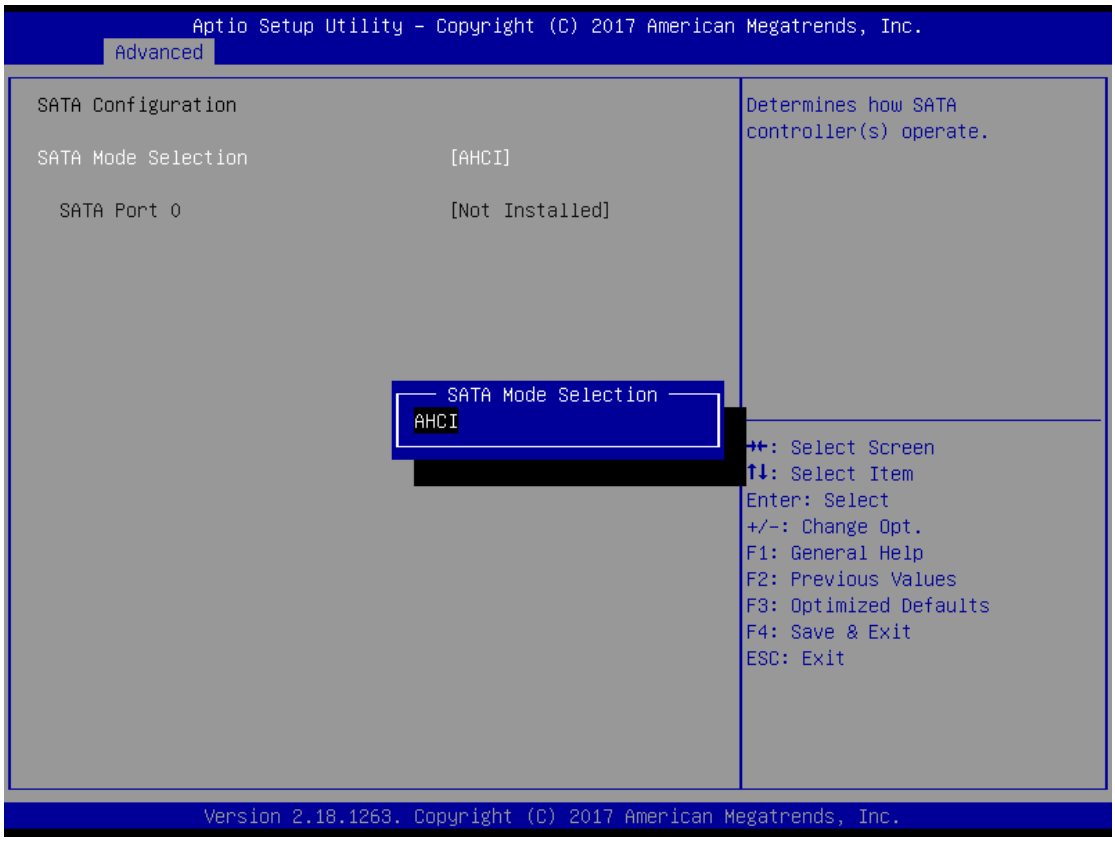


- **SATA Configuration**

Scroll to this item and press <Enter> to view the SATA Configuration informations.

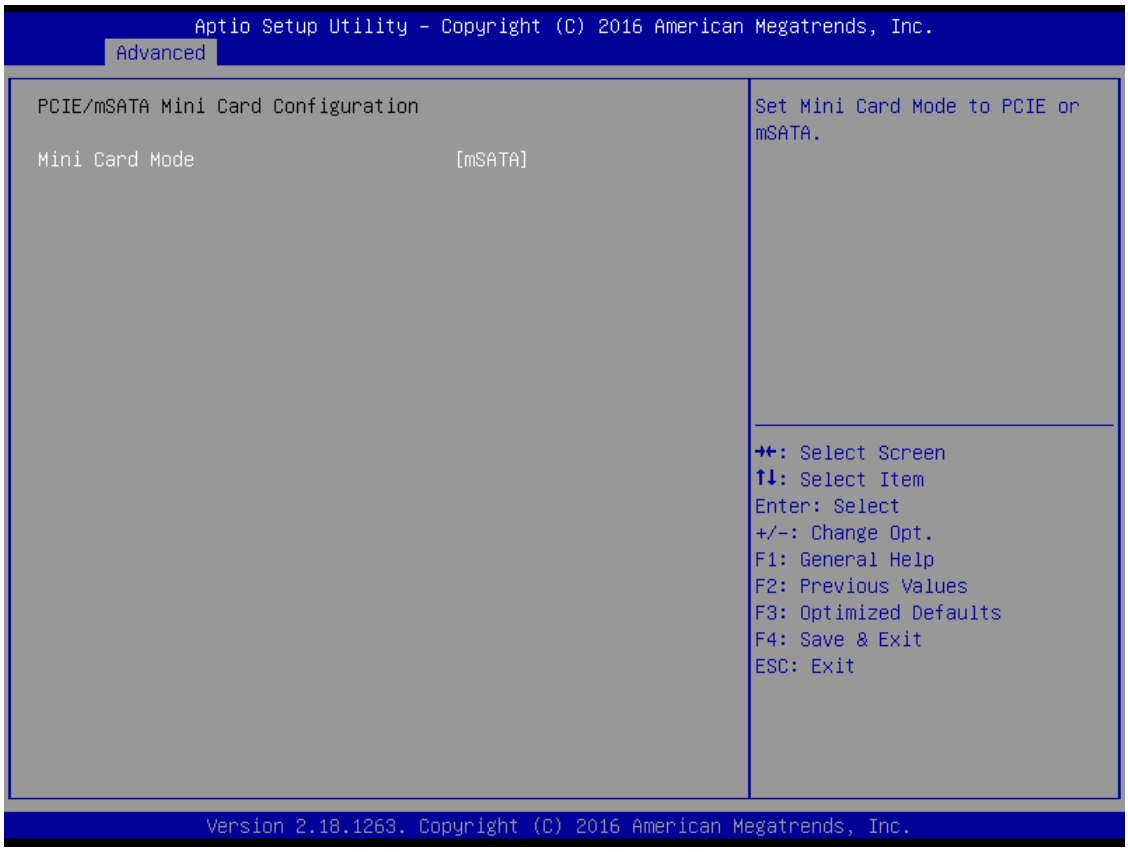
(Please refer below graphics.)

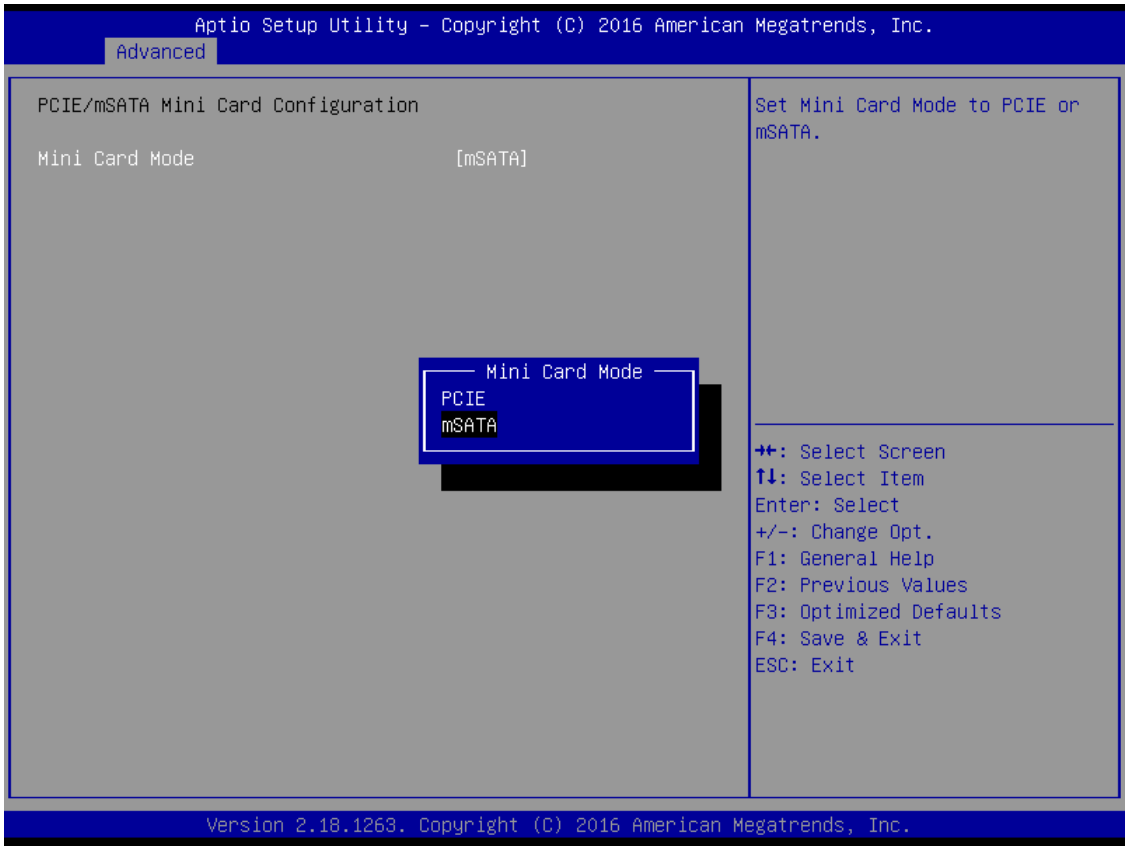



Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
SATA Configuration
SATA Mode Selection [AHCI]
SATA Port 0 [Not Installed]
Determines how SATA controller(s) operate.
SATA Mode Selection
AHCI
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.

- **PCIe/mSATA Mini Card Configuration**

You can choose the PCIe or mSATA function, it can be select by BIOS menu.

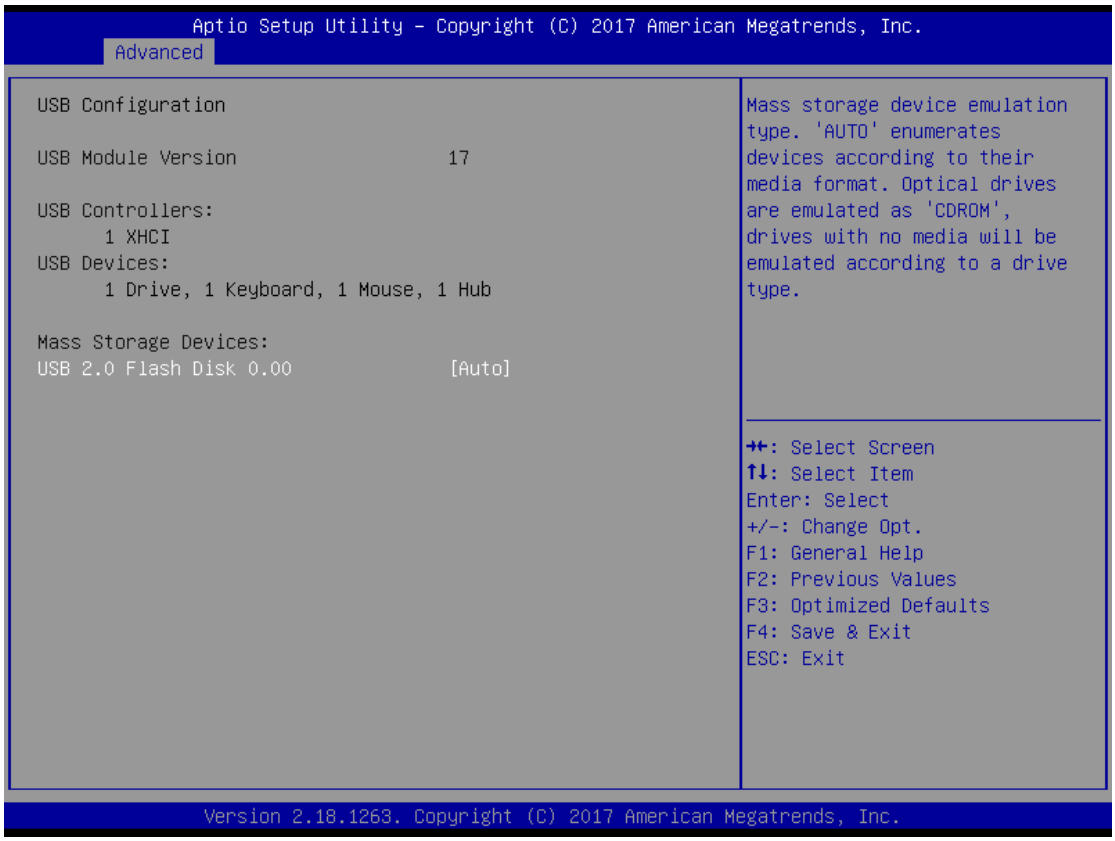



Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Advanced
PCIE/mSATA Mini Card Configuration
Mini Card Mode [mSATA]
Mini Card Mode
PCIE
mSATA
Set Mini Card Mode to PCIE or mSATA.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.

- **USB Configuration**

Scroll to this item and press <Enter> to view the USB Configuration informations.

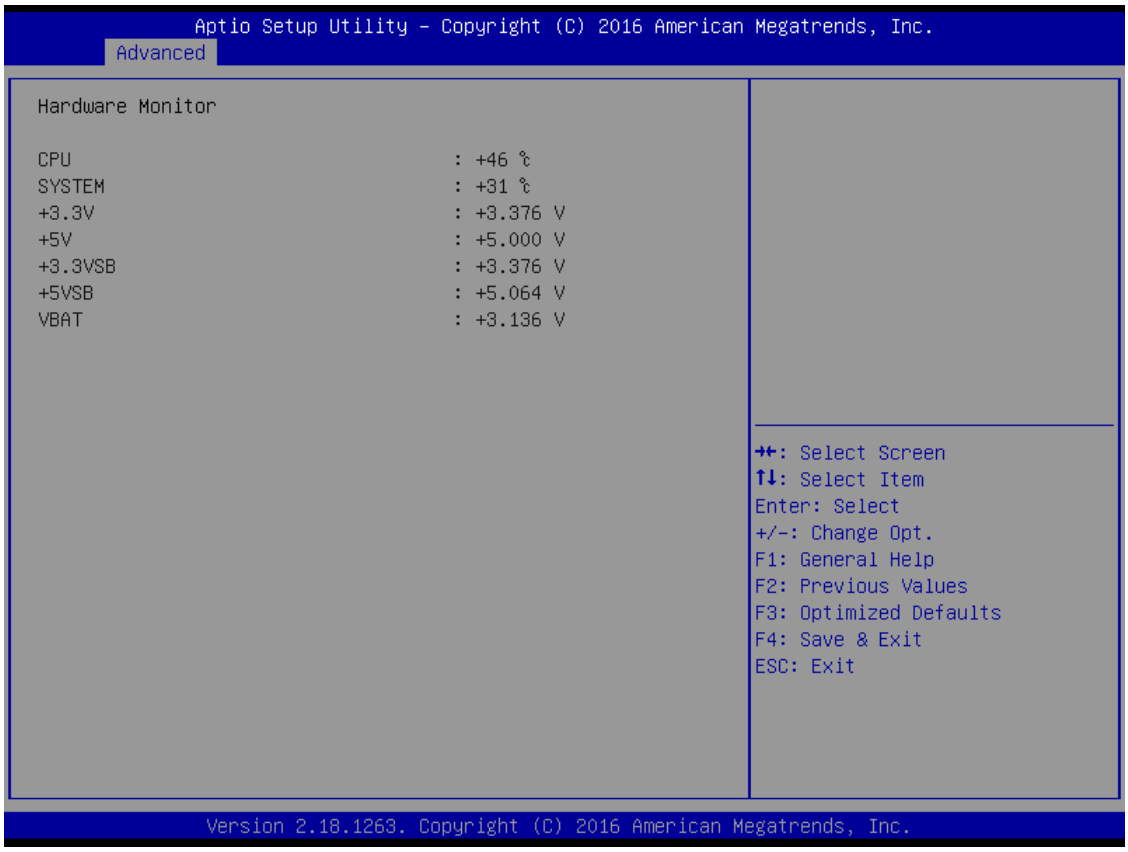
(Please refer below graphics.)



- **H/W Monitor**

Scroll to this item and press <Enter> to view the monitor hardware status.

(Please refer below graphics.)



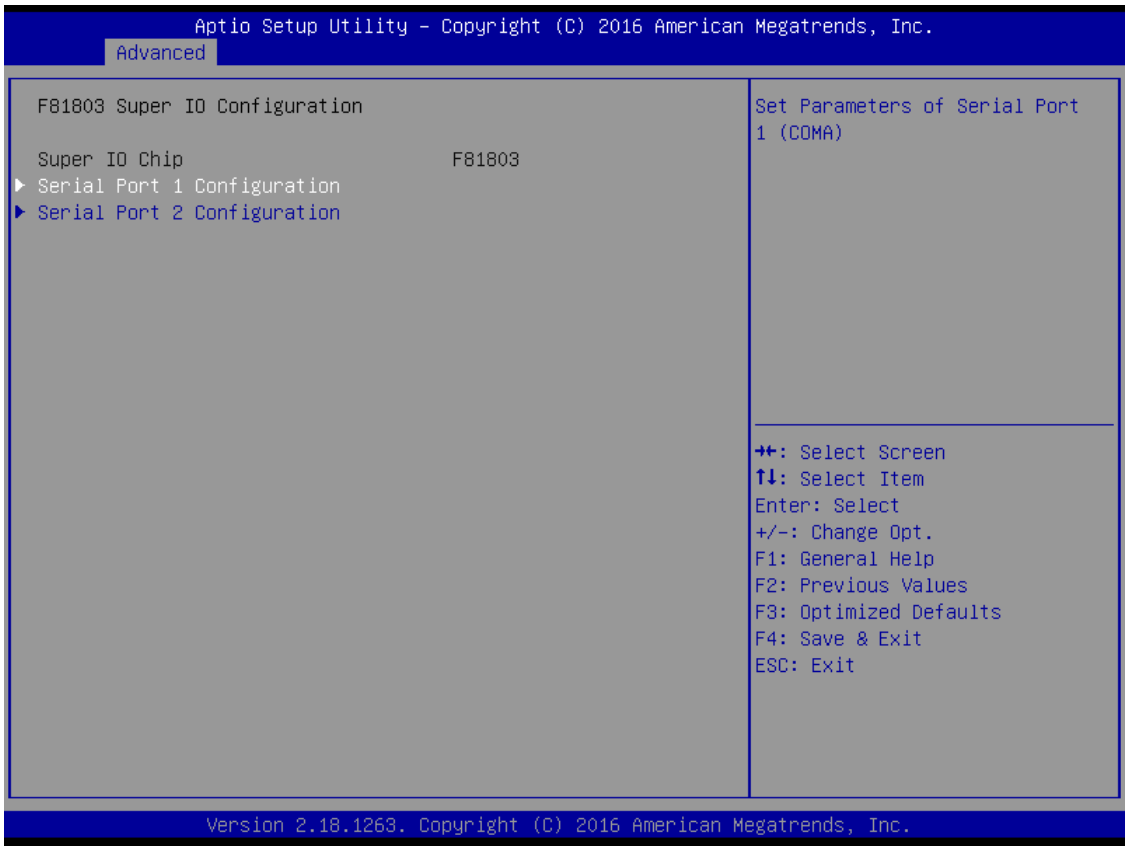
- **F81803 Super IO Configuration**

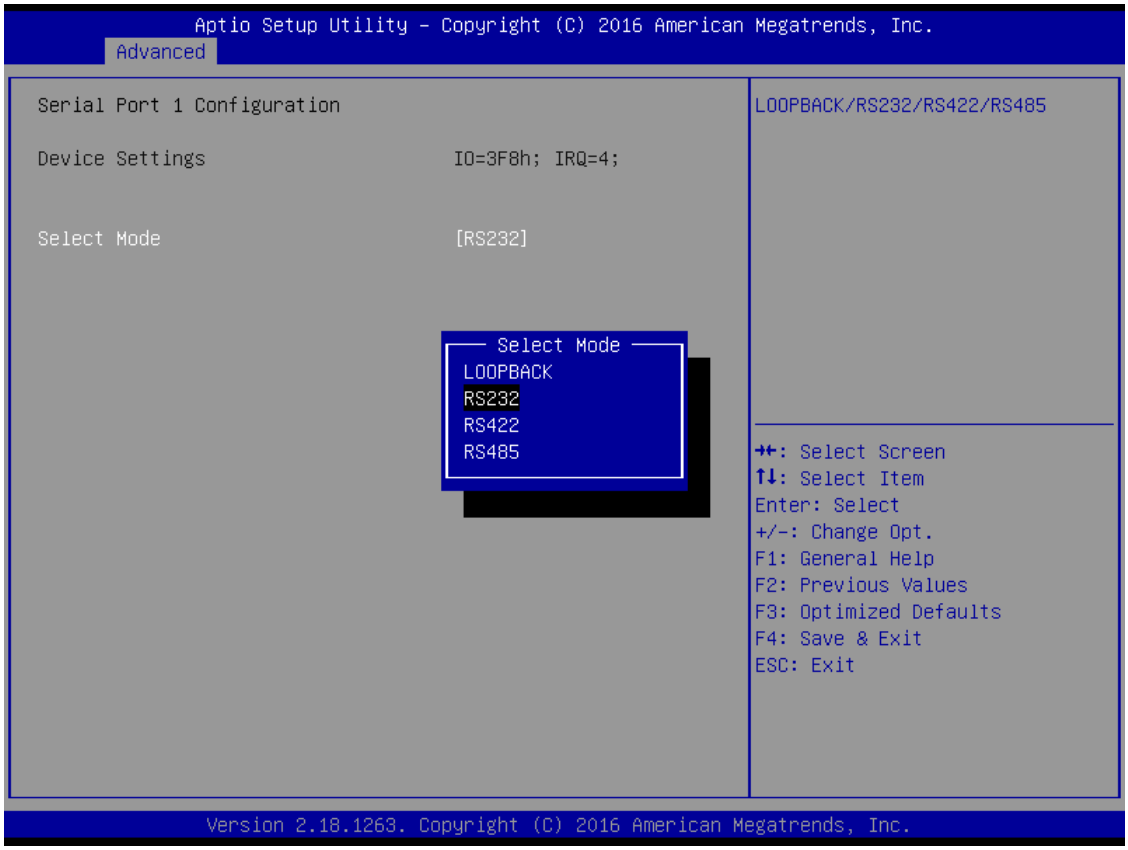
The default setting for all Serial Ports are RS232.

You can change the setting by selecting the value you want in each COM Port Type.

Supports RS422 & RS485 mode.

(Please refer below graphics.)



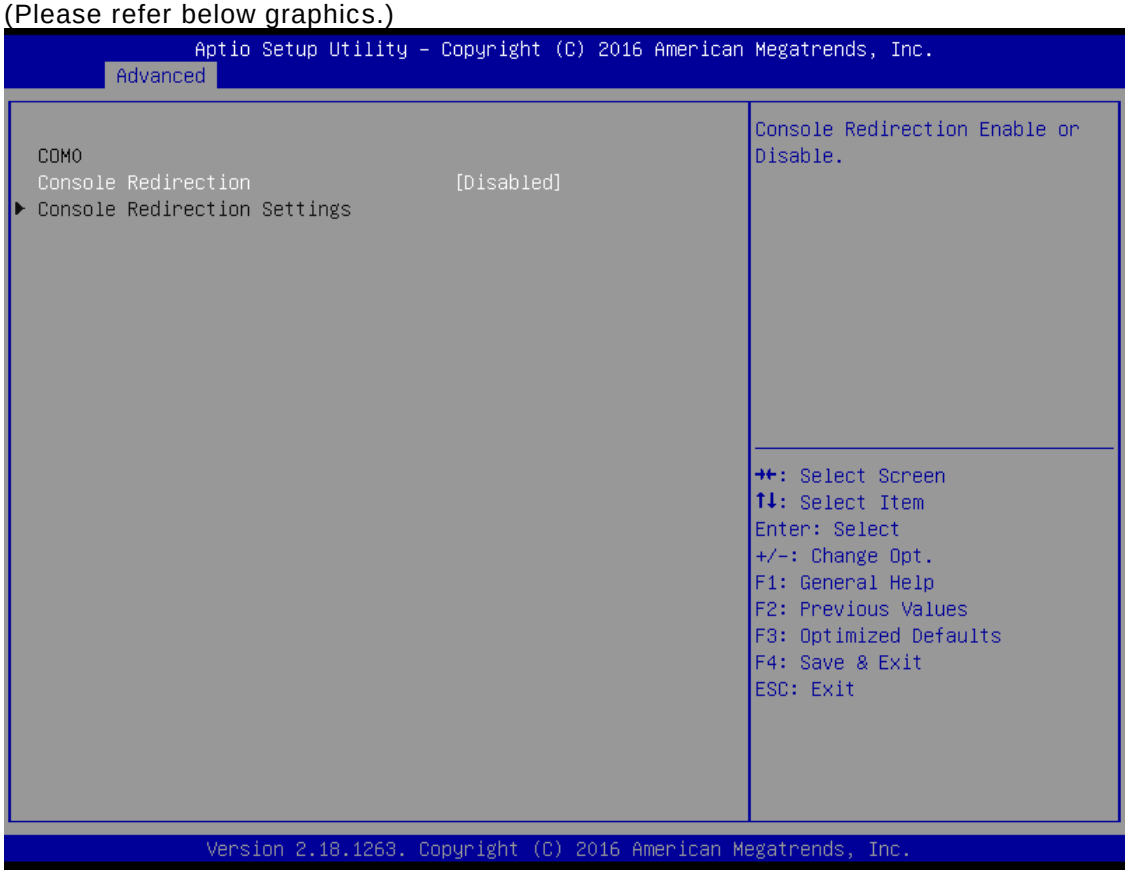

Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
Device Settings
IO=3F8h; IRQ=4;
Select Mode
[RS232]
Select Mode
LOOPBACK
RS232
RS422
RS485
LOOPBACK/RS232/RS422/RS485
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.

- **Serial Port Console Redirection**

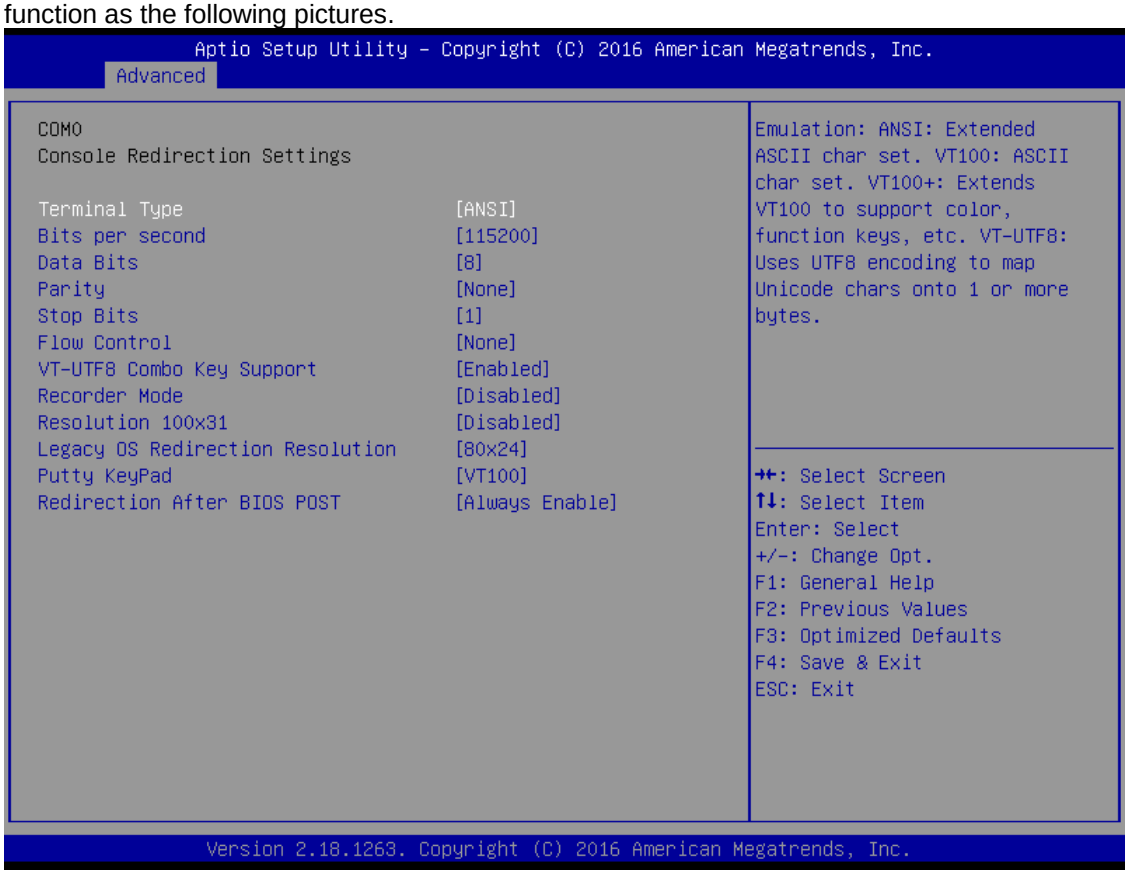
Only COM1 has the console redirection function.

The default setting for the console redirection function is [Disabled]

(Please refer below graphics.)



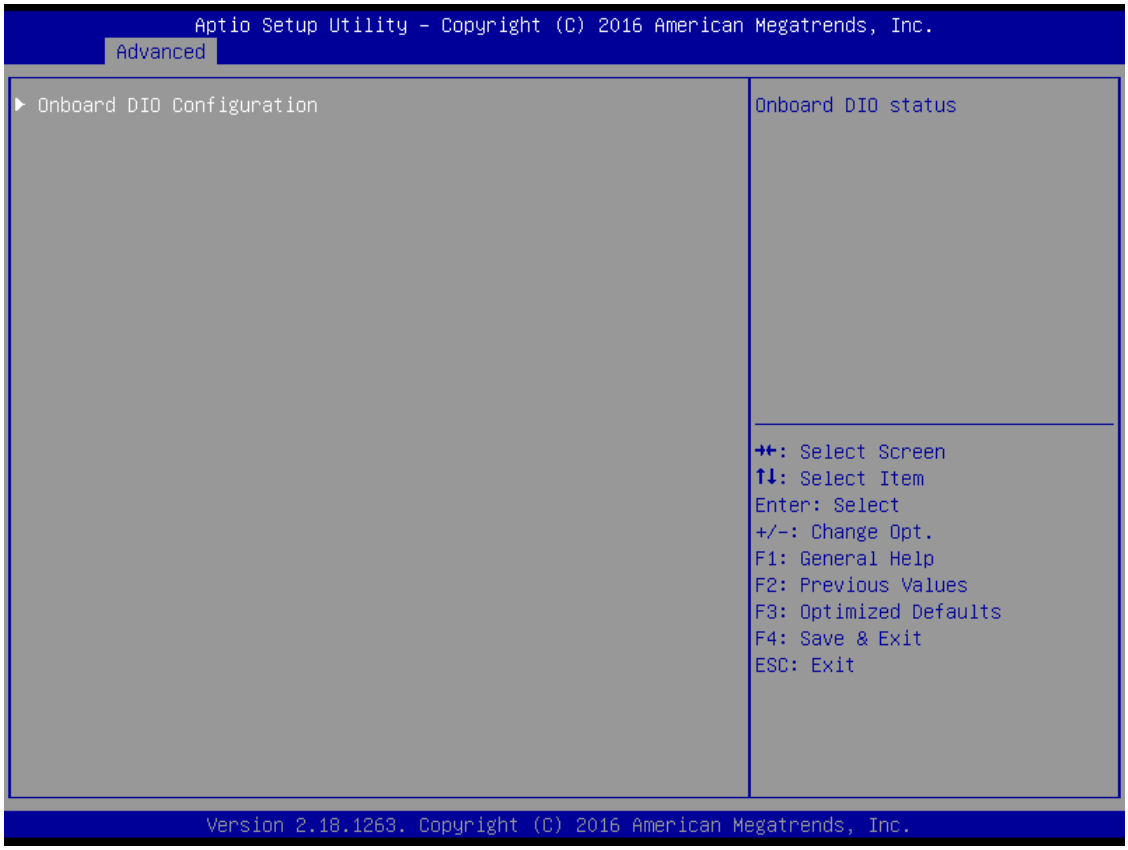
And you can further change the setting by selecting or setting the value you want in each function as the following pictures.

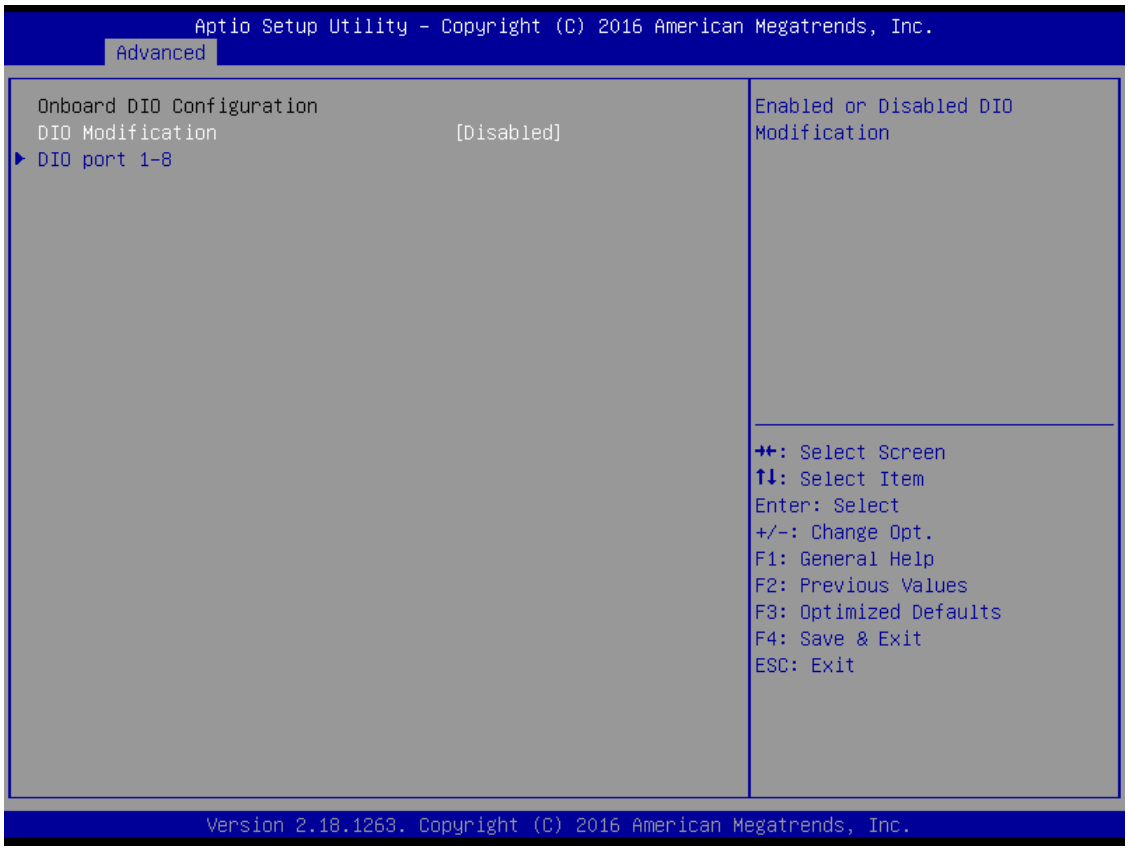


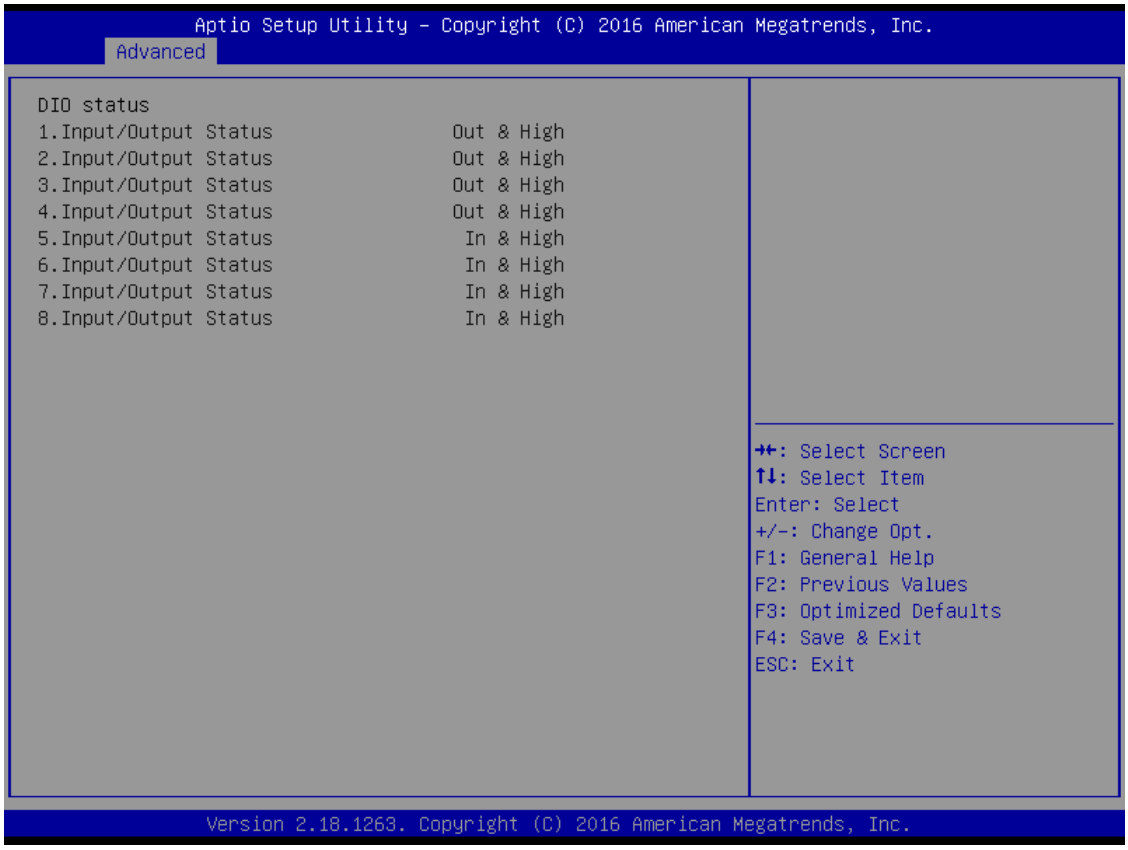
- **DIO Configuration**

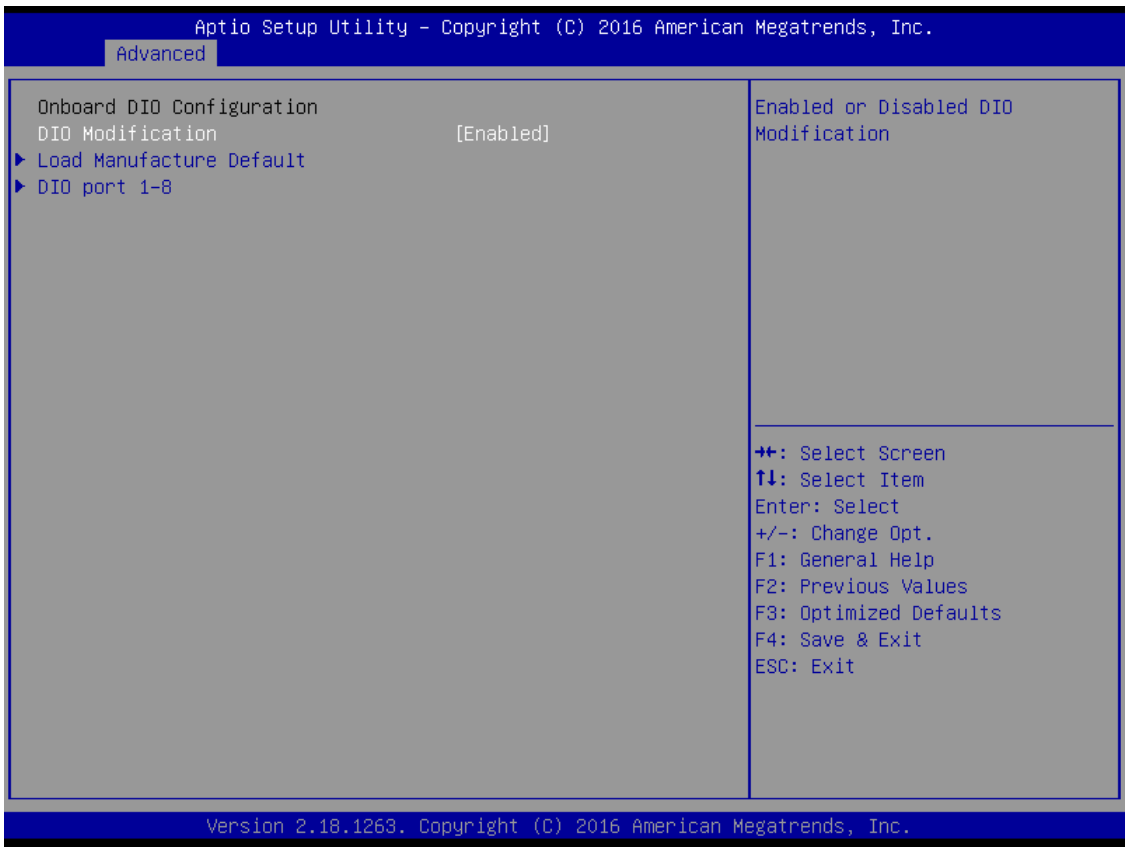
The DIO Modifacation default setting is “disable”.

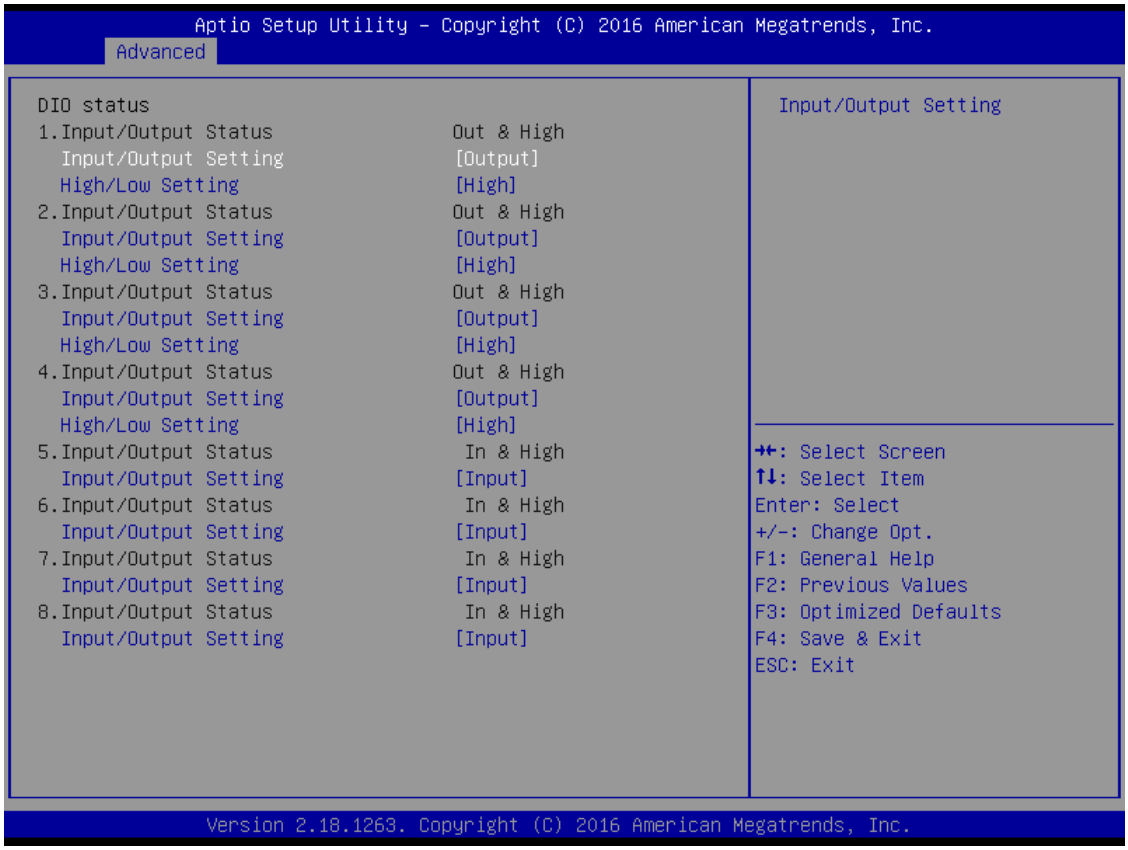
If the setting is changed for “enable”, you can load manufacture default and program DIO setting.
(Please refer below graphics.)


Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Advanced
Onboard DIO Configuration
Onboard DIO status
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Advanced
Onboard DIO Configuration
DIO Modification [Disabled]
DIO port 1-8
Enabled or Disabled DIO Modification
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Advanced
DIO status
1.Input/Output Status Out & High
2.Input/Output Status Out & High
3.Input/Output Status Out & High
4.Input/Output Status Out & High
5.Input/Output Status In & High
6.Input/Output Status In & High
7.Input/Output Status In & High
8.Input/Output Status In & High
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Advanced
Onboard DIO Configuration
DIO Modification [Enabled]
Load Manufacture Default
DIO port 1-8
Enabled or Disabled DIO Modification
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.

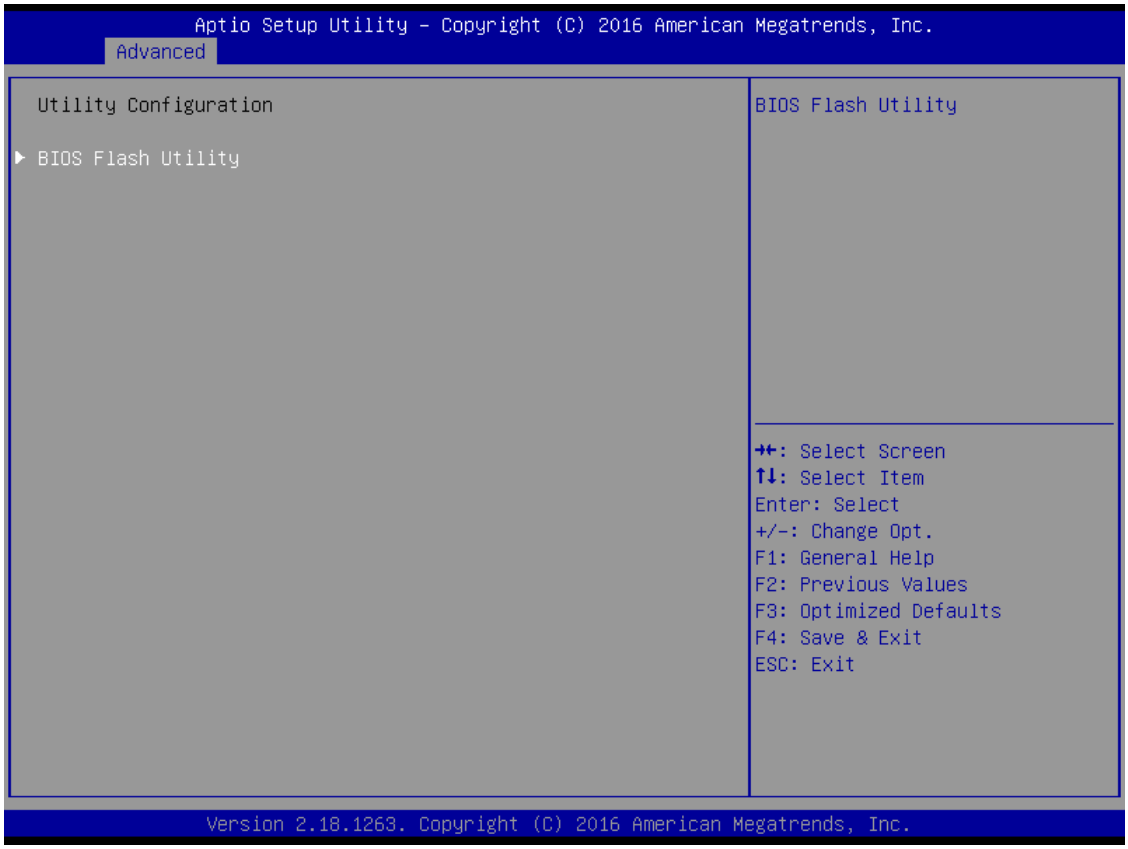

Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Advanced
DIO status
1.Input/Output Status Out & High
Input/Output Setting [Output]
High/Low Setting [High]
2.Input/Output Status Out & High
Input/Output Setting [Output]
High/Low Setting [High]
3.Input/Output Status Out & High
Input/Output Setting [Output]
High/Low Setting [High]
4.Input/Output Status Out & High
Input/Output Setting [Output]
High/Low Setting [High]
5.Input/Output Status In & High
Input/Output Setting [Input]
6.Input/Output Status In & High
Input/Output Setting [Input]
7.Input/Output Status In & High
Input/Output Setting [Input]
8.Input/Output Status In & High
Input/Output Setting [Input]
Input/Output Setting
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.

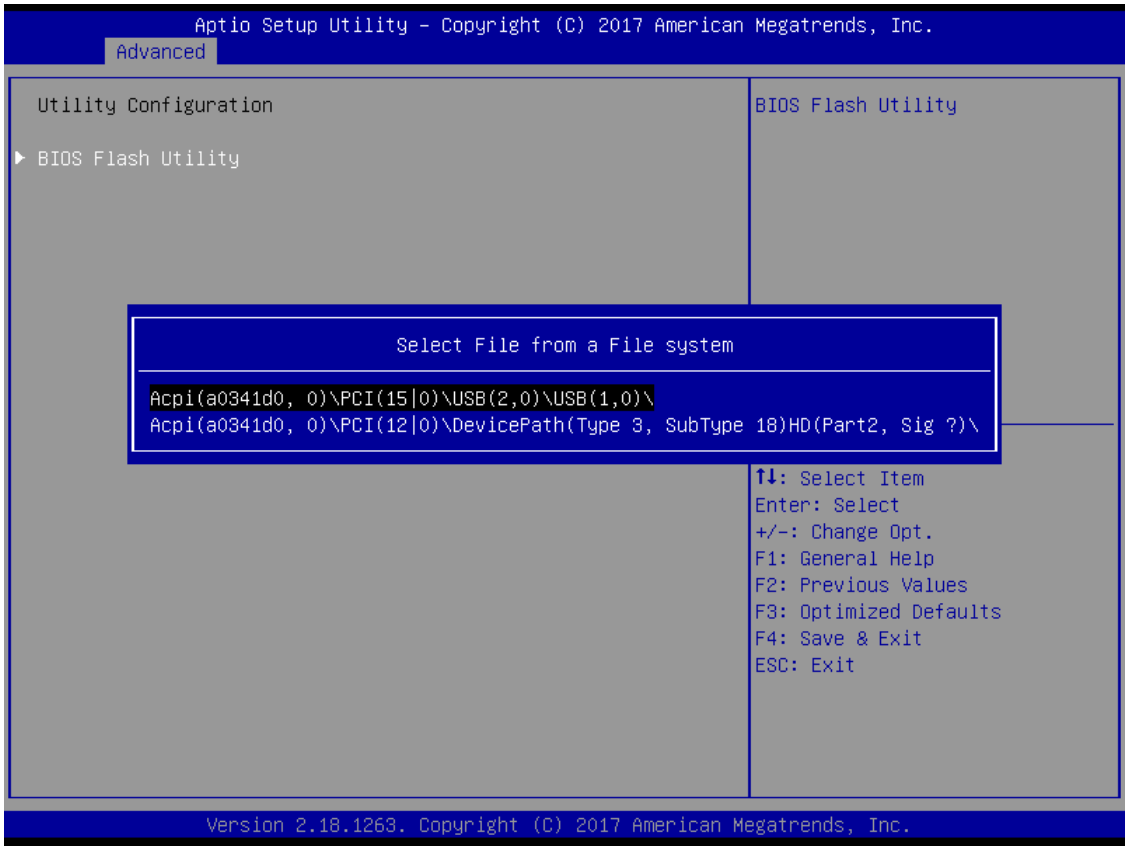
- Utility Configuration

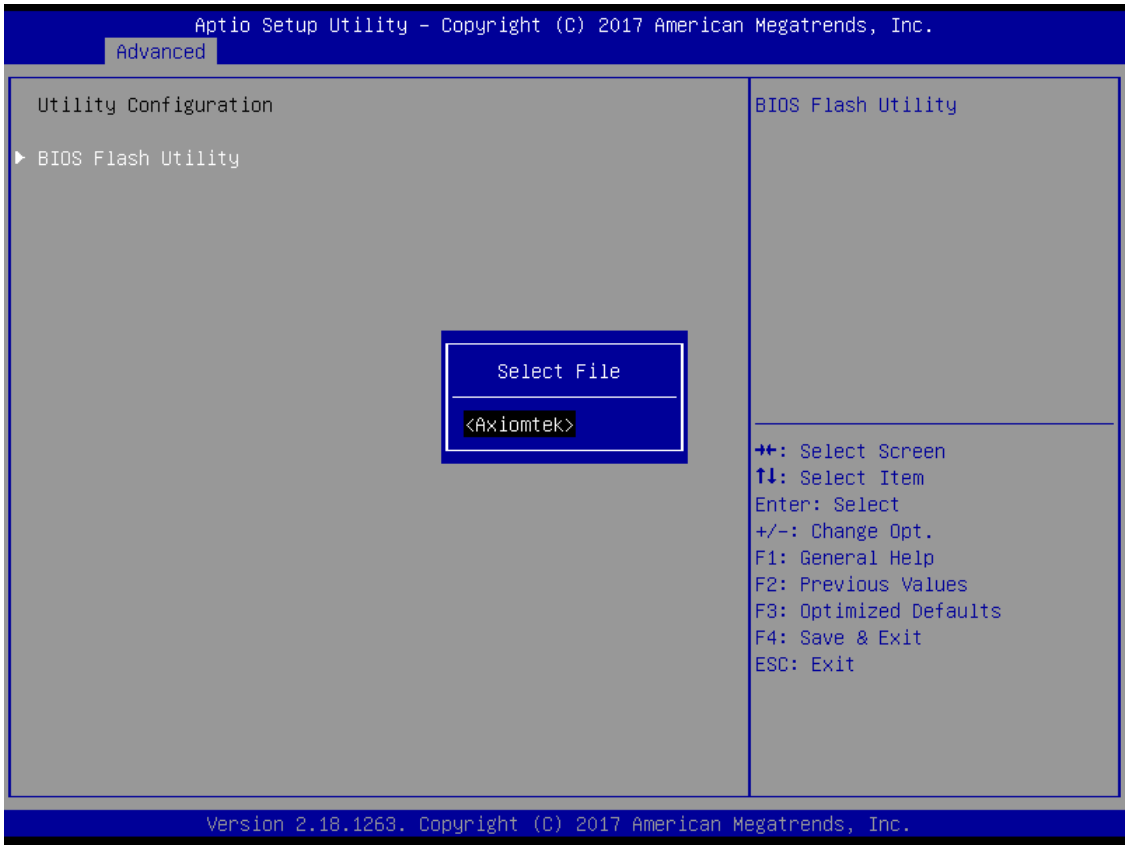
BIOS flash utility is a tool for flash BIOS on setup menu, follow the step to flash BIOS.

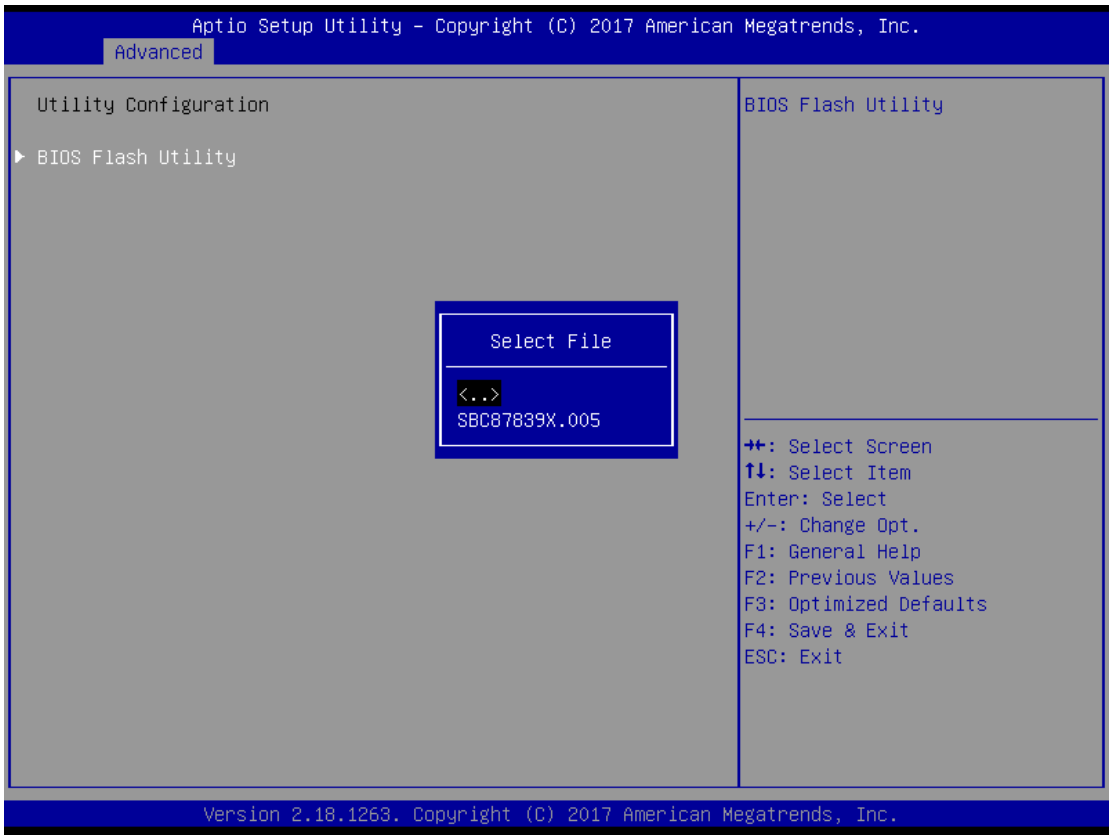
1. Create a folder and rename to x on the root of USB storage (Ex: X:\x)
2. Copy BIOS file to the x folder (Ex: X: \x \SBC87839V.100)

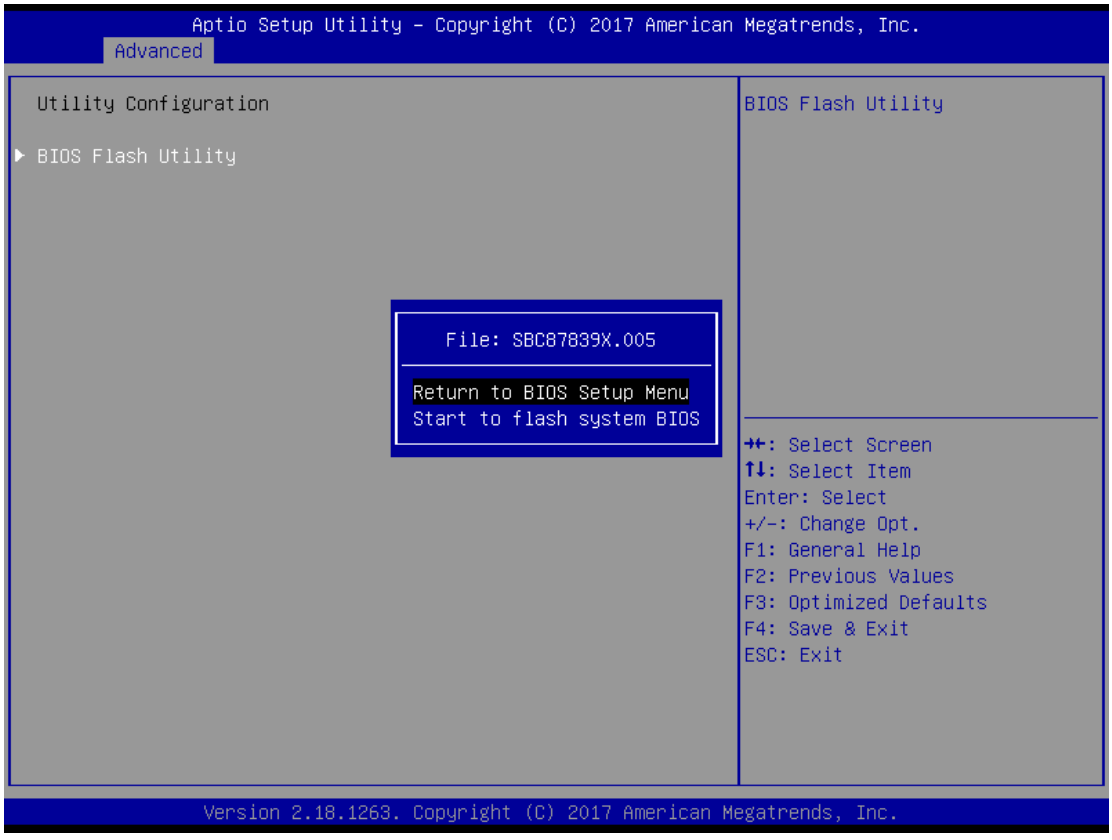
   (Note : BIOS file nemae must contain the word SBC87839)
3. Emter the BIOS flash utility and locate the BIOS file
4. Push “Start flash system BIOS”



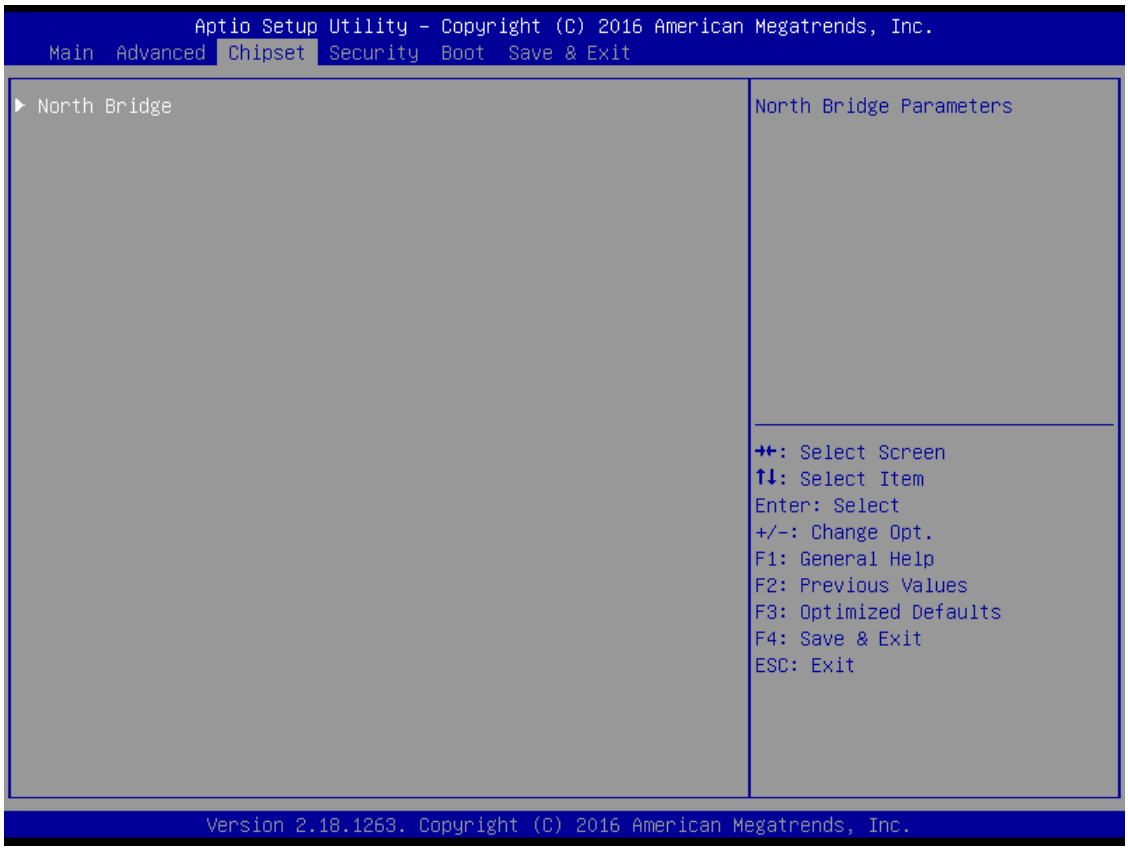

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File from a File system
Acpi(a0341d0, 0)\PCI(15|0)\USB(2,0)\USB(1,0)\
Acpi(a0341d0, 0)\PCI(12|0)\DevicePath(Type 3, SubType 18)HD(Part2, Sig ?)\
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.

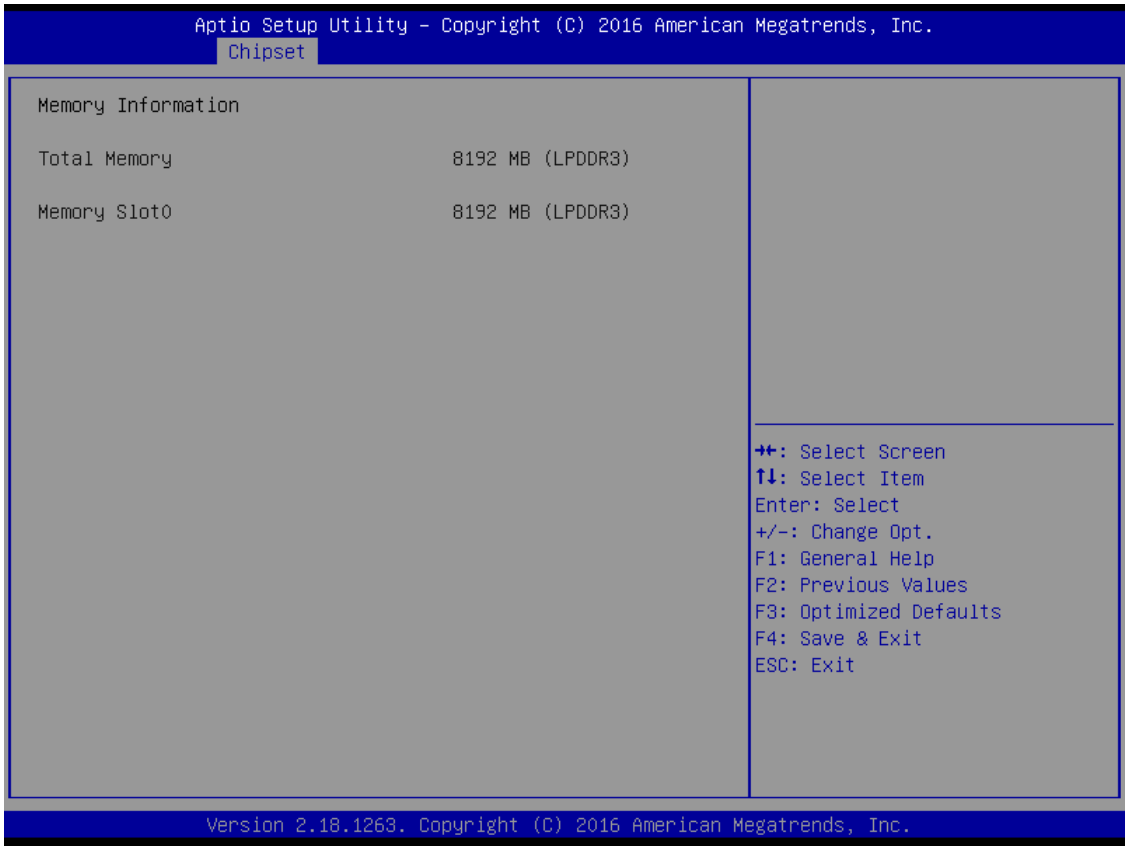

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File
<Axiomtek>
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File
<..>
SBC87839X.005
BIOS Flash Utility
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
File: SBC87839X.005
Return to BIOS Setup Menu
Start to flash system BIOS
BIOS Flash Utility
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.

3.4 Chipset Feature





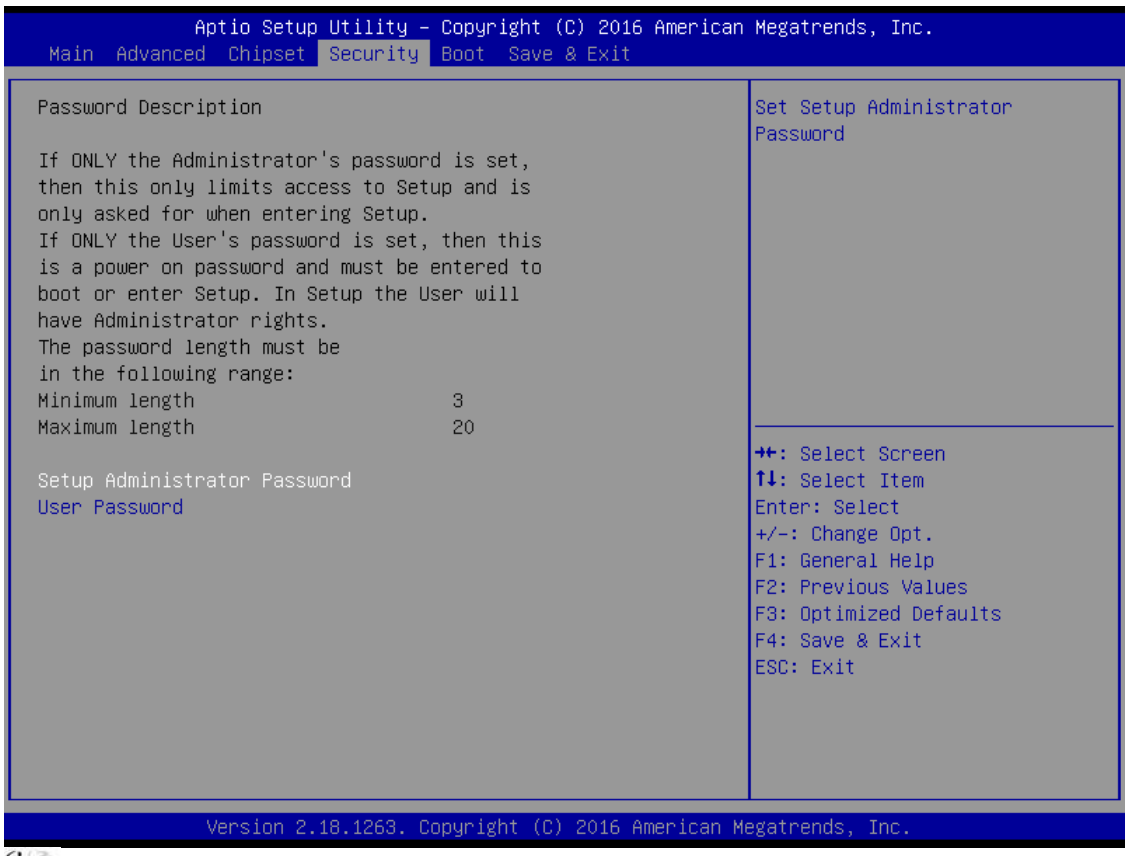
3.5 Security

The default setting for Administrator Password is “Not setting passwords”.

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

You can set the password for both Administrator Password and User Password.

(Please refer below graphics.)

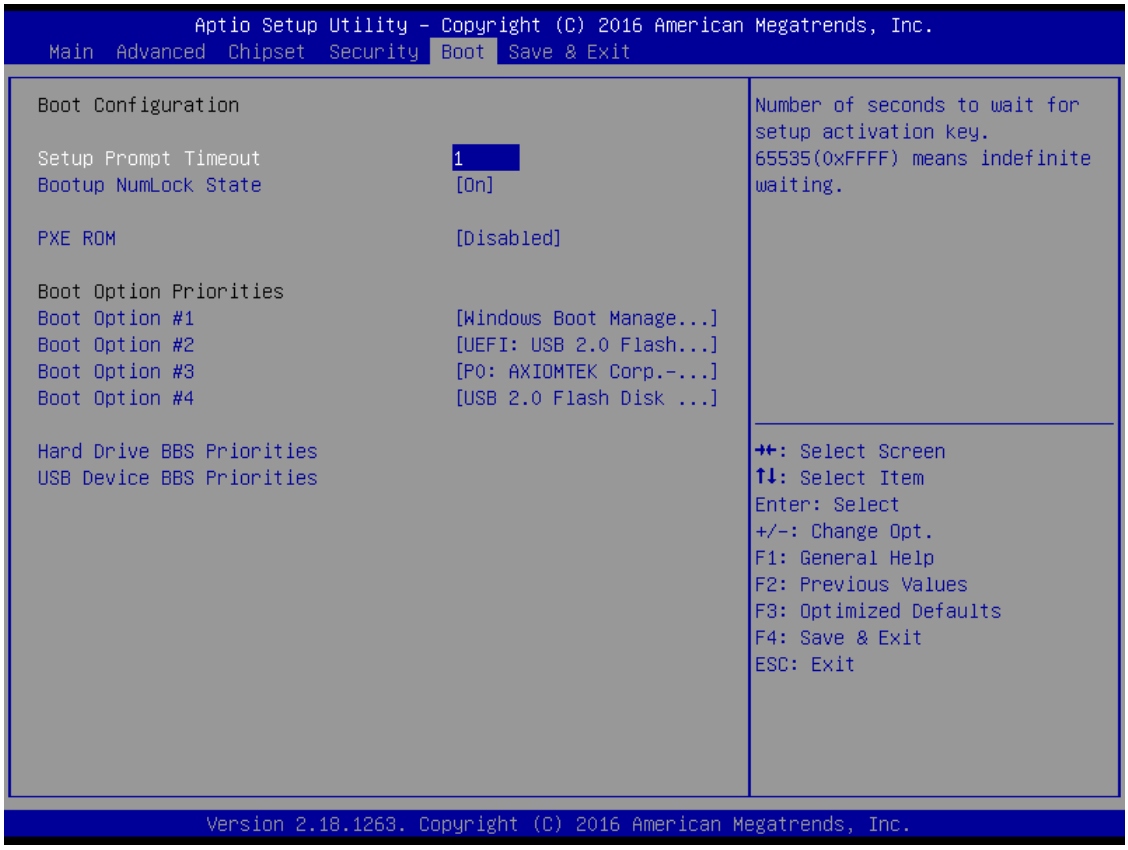


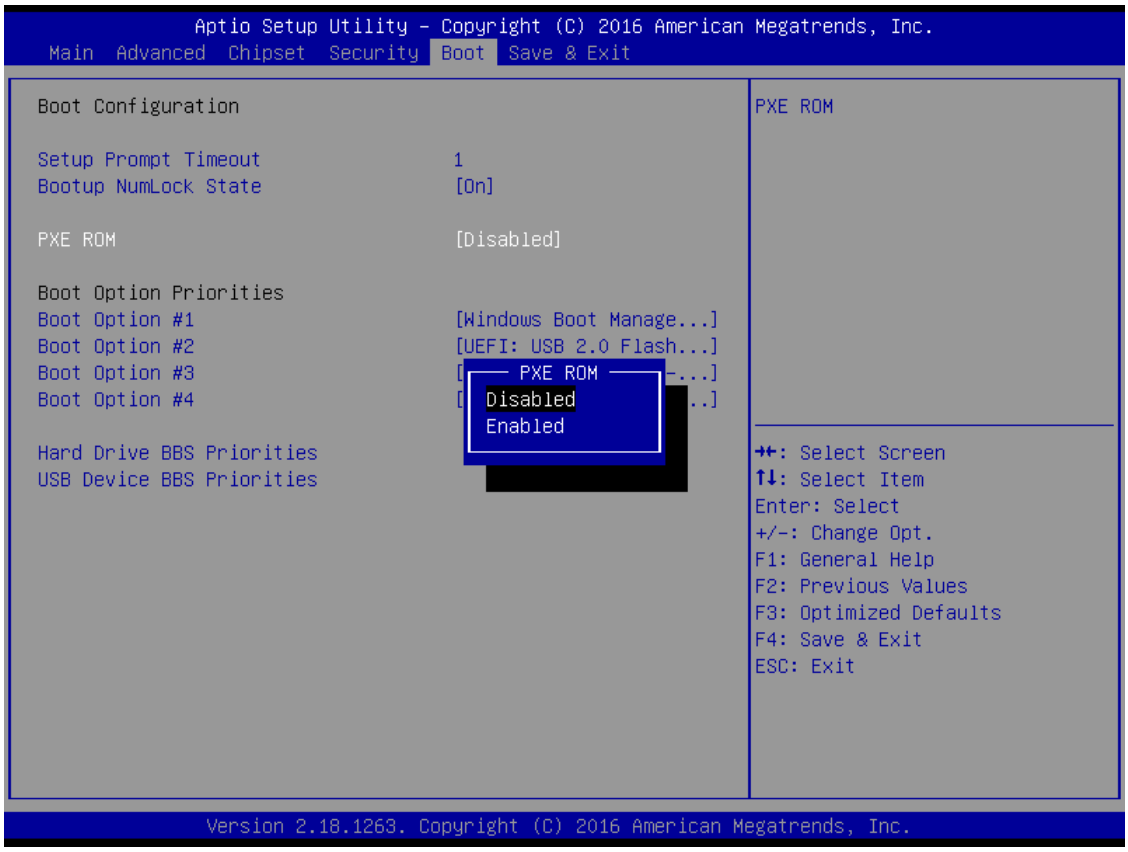
Note: The BIOS default has no password, when user created the password, please remember the password number, if users forget password the RMA is the only solution.

3.6 Boot Type

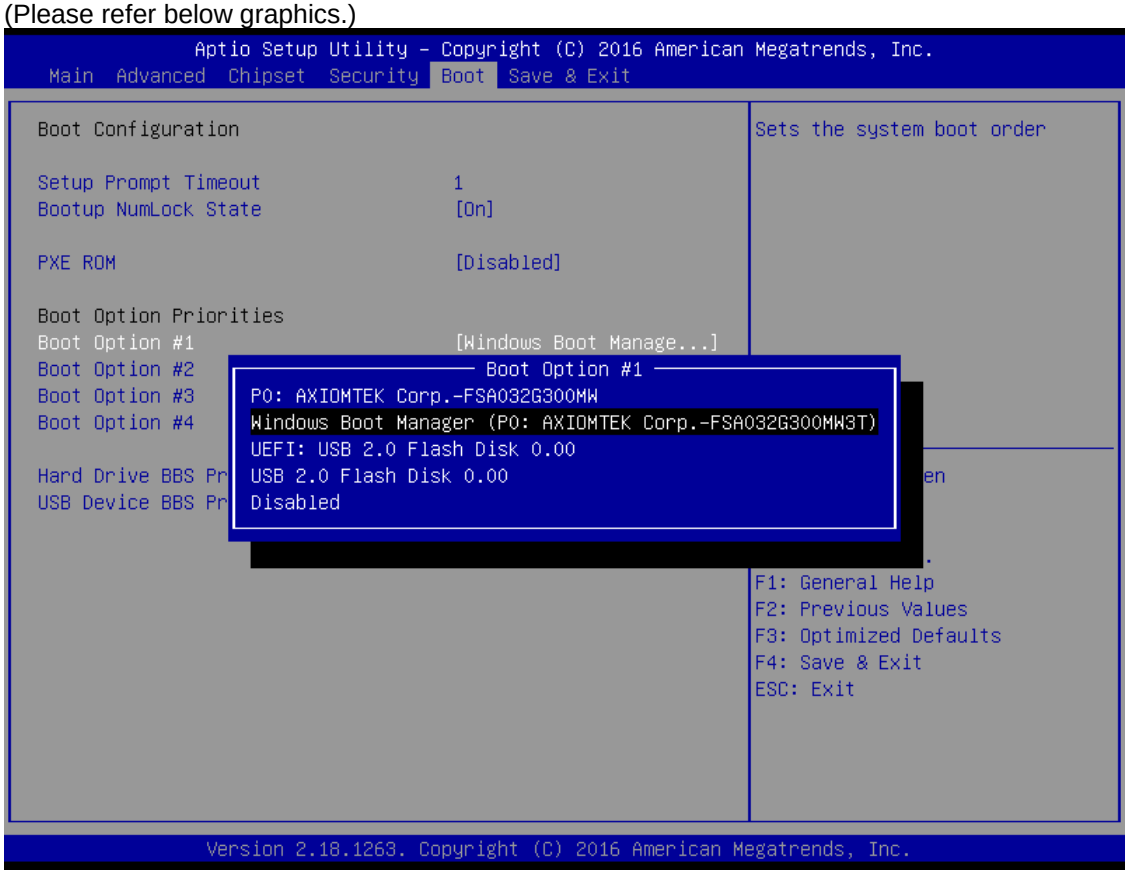
The default setting boot from onboard LAN PxE Rom is [Disabled]

(Please refer below graphics.)




Aptio Setup Utility – Copyright (C) 2016 American Megatrends, Inc.
Main Advanced Chipset Security Boot Save & Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
PXE ROM [Disabled]
Boot Option Priorities
Boot Option #1 [Windows Boot Manage...]
Boot Option #2 [UEFI: USB 2.0 Flash...]
Boot Option #3
Boot Option #4
Hard Drive BBS Priorities
USB Device BBS Priorities
PXE ROM
Disabled
Enabled
PXE ROM
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2016 American Megatrends, Inc.

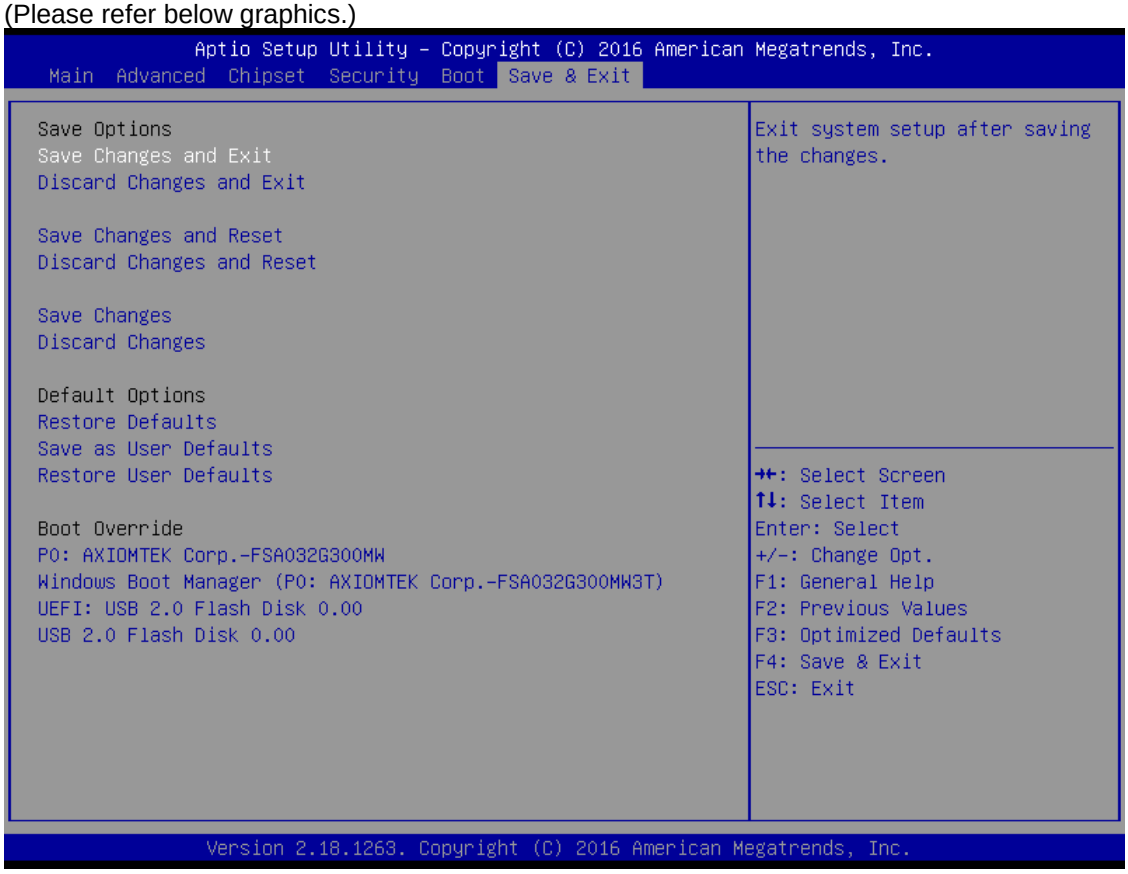
The Boot Option Priorities can select by Boot Option #1, #2…, If user is using a USB Device. (Please refer below graphics.)



3.7 Save & Exit

This section allows you to determine whether or not to accept your modifications. Type “Y” to quit the setup utility and save all changes. Type “N” to bring you back to the Previous Setup utility.

(Please refer below graphics.)



APPENDIX A
WATCHDOG TIMER

About Watchdog Timer

After the system stops working for a while, it can be auto-reset by the watchdog timer. The integrated watchdog timer can be set up in the system reset mode by program.

How to Use Watchdog Timer

The following example enables configuration using debug tool.

Enable WDT

↓

Enable configuration:

O 2E 87 ; Un-lock super I/O

O 2E 87

↓

Select logic device:

O 2E 07

O 2F 07

↓

WDT device enable:

O 2E 30

O 2F 01

↓

Activate WDT:

O 2E F0

O 2F 80

↓

Set base timer:

O 2E F6

O 2F M ; **M** = time value

00h~FFh: Time-out disable~ Time-out occurs after 255 seconds when **N**=71h.

↓

Set Second or Minute :

O 2E F5

O 2F N ; **N**=71h or 79h

N=71h, the time base is set to second.

N=79h, the time base is set to minute.