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CHAPTER 1
INTRODUCTION

This chapter contains general information and detailed specifications of the A/B/C/E. The main different between these models are I/O of 2 DB9 connectors:

- with 2 serial ports
- : with 1 serial port and 1 DIO port
- : with 1 serial port and 1 CAN port
- -: with 1 CAN port and 1 DIO port

The Chapter 1 includes the following sections:

- General Description
- System Specification
- Dimensions
- I/O Outlets

1.1 General Description

-A/B/C/E Din-rail fanless embedded system is suitable for communications control and protocol converter applications in critical environments. Built for harsh working environments, -A/B/C/E features an extra-low power consumption Intel® Celeron® N3350(1.5GHz/4-cores) processor supporting an industrial temperature range of-40℃ to +70℃. Its front accessible I/O cabling is very convenient for wiring and maintenance. -A/B/C/E offers an HDMI output, making it particularly well-suited for communication control, SCADA and industrial automation. Its compact size with Din-rail mounting allows for easy installation into the control cabinet. Pre-installed with Linux®, Windows 10 and Windows® 11, A/B/C/E provides programmers with a friendly environment for developing application software at a lower cost.

A/B/C/E has a robust industrial-grade design and adopts the advanced cooling system. Besides, it supports the mSATA and makes it especially suitable for field control & monitoring system solution for the following markets:

Utility Industries (Water, Energy, Chemical Plant, Mining, etc.)

Public Transportation Industries (Traffic/ Highway Control, Train/Bus Control, etc.)

Homeland Security (Weather Monitoring/Alarm System, etc.)

Features

- Fanless design
- Wide temperature operation of -40℃–+70℃
- Supports 2 10/100/1000 Base-T Ethernets with Magnetic Isolated Protection
- COM Port supports RS-232/422/485 or console mode
- CAN Port supports SocketCAN and J1939
- 8-bit programmable DIO
- 2 USB 2.0 Ports

- Wide range 12–24V DC-in with terminal block
- Din-rail mounting
- Wall mounting (optional)
- Passed CE, FCC, UL, UKCA certification

- **O.S. Supported**

  -A/B/C/E supports Windows® 10, Windows® 11 and Linux package. For storage device, -A/B/C/E supports one mSATA.

1.2 System Specifications

1.2.1 CPU

- Onboard Intel ® Celeron® N3350 (2-core, 1.1 GHz) 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

- An HDMI connector supports up to 1920x1200@60Hz

1.2.5 Ethernet Ports

- LAN Chip: Intel Ethernet Controller

  Intel I210-IT (wide temperature)
- Two RJ-45 connectors that support 10/100/1000 Base-T Ethernet with 1.5KV magnetic isolated protection

1.2.6 Storages

- 1 x mSATA.
- 1 x eMMC (optional)

.

1.2.7 USB

- 2 USB 2.0 Ports
- USB Pin Assignment:

USB 2.0

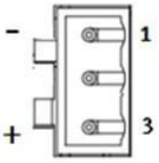
Pin	Signal USB2.0 Port 1	Pin	Signal USB2.0 Port 2
1	VCC	1	VCC
2	D0-	2	D1-
3	D0+	3	D1+
4	GND	4	GND

1.2.8 Power

- Power Input

- DC Terminal block: Wide-range 12 - 24V. OVP and Reverse protection.

Pin	Signal
1	-
2	NC
3	+

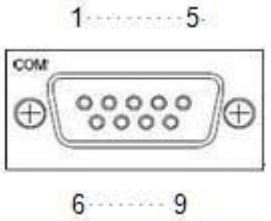


1.2.9 COM - -C

- Front side DB9 supports RS-232/422/485 which can be selected by BIOS.
- Supports Auto Flow Control in RS485 mode.
- Serial Port Pin Assignment: (DB9 Male) as below
- Supports High-Speed Mode 115.2 Kbps, up to 1.5

MbpsCOM1

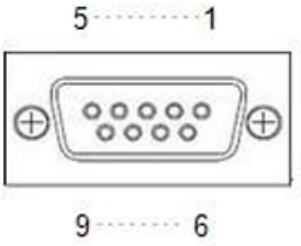
Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	--
4	DTR	RX-	--
5	GND	GND	GND
6	DSR	--	--
7	RTS	--	--
8	CTS	--	--
9	RI	--	--



1.2.10 -B -E

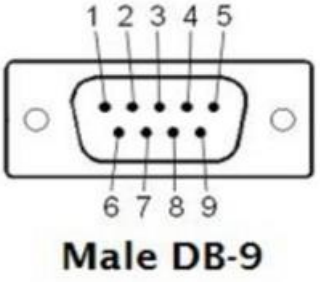
- Bottom side DB9 female connector supports 8 bits TTL level programmable digital input/output
- The voltage of TTL is 5V
- The programming is as follow:
  - I/O sink current is 8~10mA
  - Input/Output can be programmed

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



1.2.11 CANbus -C -E

Pin	Definition
1	NC
2	CAN-L
3	NC
4	CN
5	GND
6	NC
7	CAN-H
8	NC
9	NC

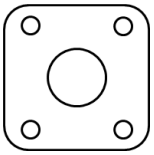


1.2.12 Watchdog Timer (WDT)

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

1.2.13 Restore BIOS Optimal Defaults (SW1)

- Pressing the tact switch (SW 1) 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	Indicates the storage status and it will be flashing when storageis active.	Orange
PWR	Indicates the Power status. When the DC input is acceptable, the LED will be ON.	Green

1.2.15 Operation Temperature

- Wide temperature -40℃ ~ +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

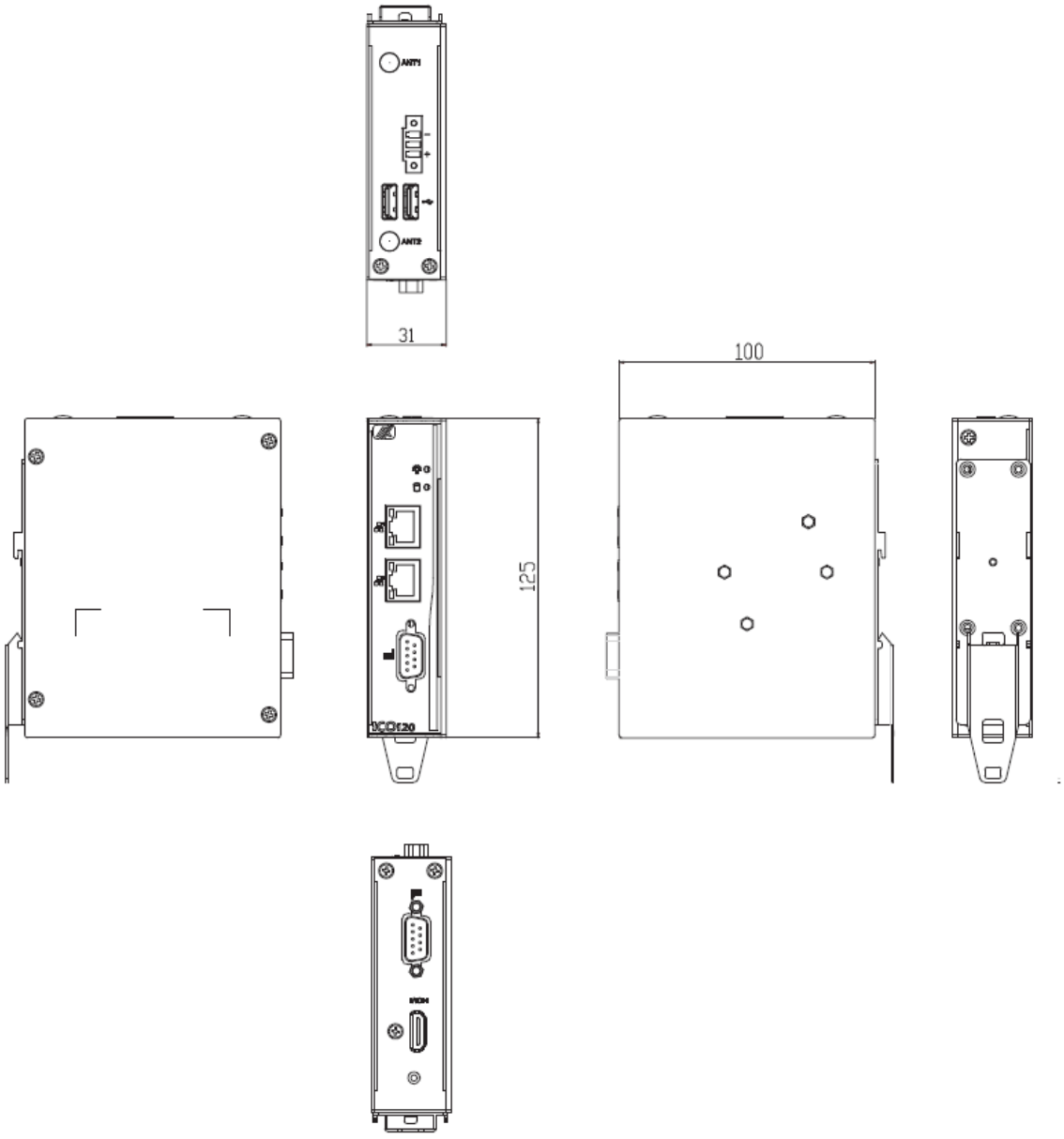
- 31mm (1.22") (W) x100mm (3.93") (D) x125mm (4.92") (H)

1.2.20 System I/O Outlets

- Two 9-pin D-Sub connectors:
  - -A: COM1 (male connector), COM2 (male connector)
  - -B: COM1 (male connector), DIO (female connector)
  - -C: COM1 (male connector), CANbus1 (male connector)
  - -C: CANbus1 (male connector) , DIO (female connector)
- One female connector for HDMI.
- Two 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.

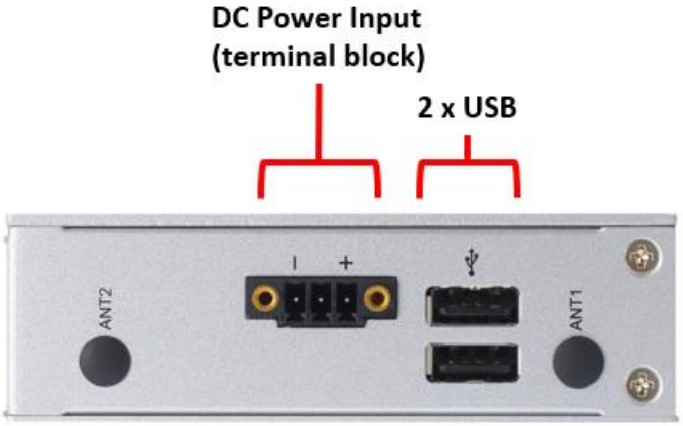
1.3 Dimensions

The following diagrams show you the dimensions and outlines of the -A/B/C/E.

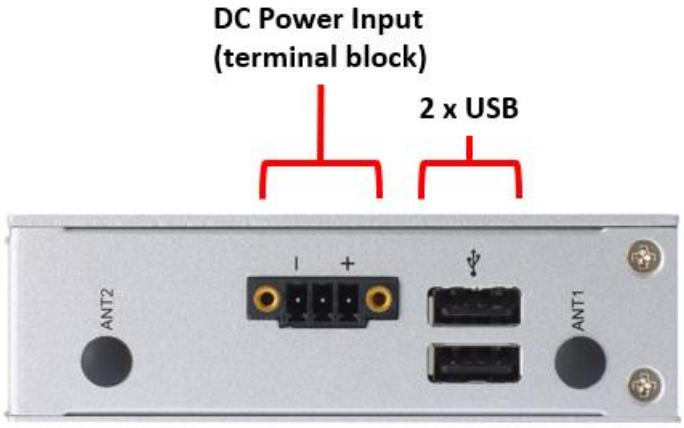


1.4 I/O Outlets

The following figures show you I/O outlets from the front view and top view of the -A/B/C/E.



The following figures show you I/O outlets from the bottom view of the - A/B/C/E.



CHAPTER 2
HARDWARE INSTALLATION

The -A/B/C/E is convenient for your various hardware configurations, such as Memory Module and mSATA.Chapter 2 will show you how to install the hardware. It includes:

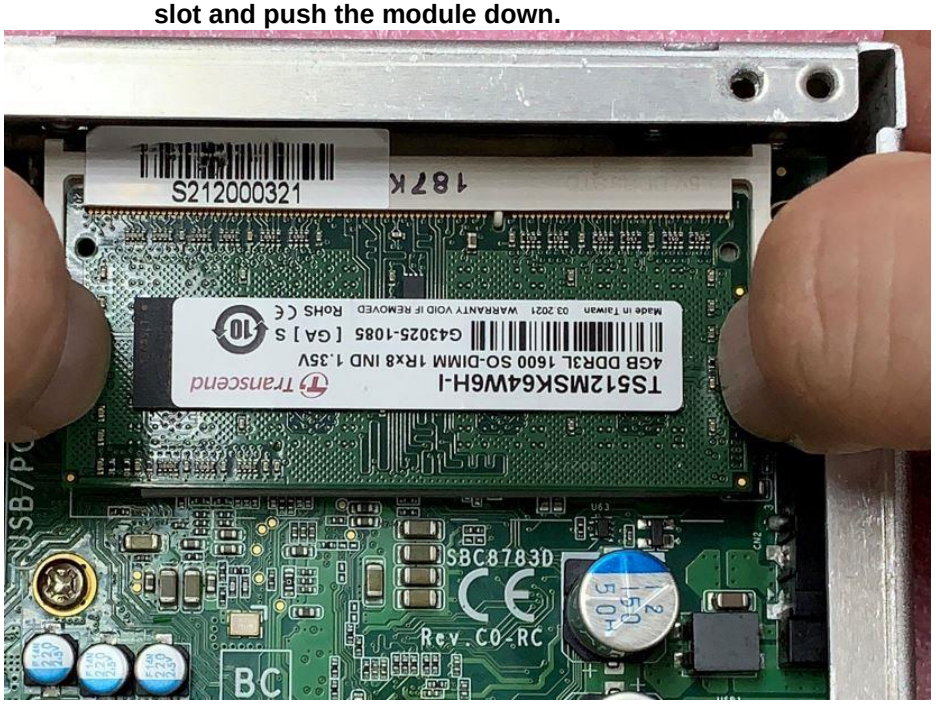
2.1 Installing the Memory Module

Step 1 Turn off the system.

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

Step 3 Put the thermal pad on the memory module to improve the cooling effect.

Step 4 Use two fingers to hold the memory module and insert the gold figure into the slot and push the module down.



Step 5 The memory module is locked by two latches on the sides. We strongly recommend using "LDC737" silicone on both sides of the memory forbetteranti-vibration.

Step 6 Put the cover back to the system andtighten the screws then close the chassis.

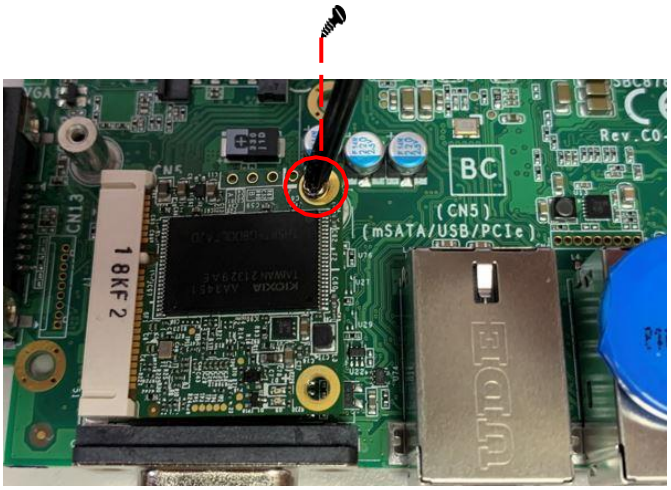
2.2 Installing the mSATA

Step 1 Turn off the system.

Step 2 Loosen all the 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 Tighten the screw tightly.

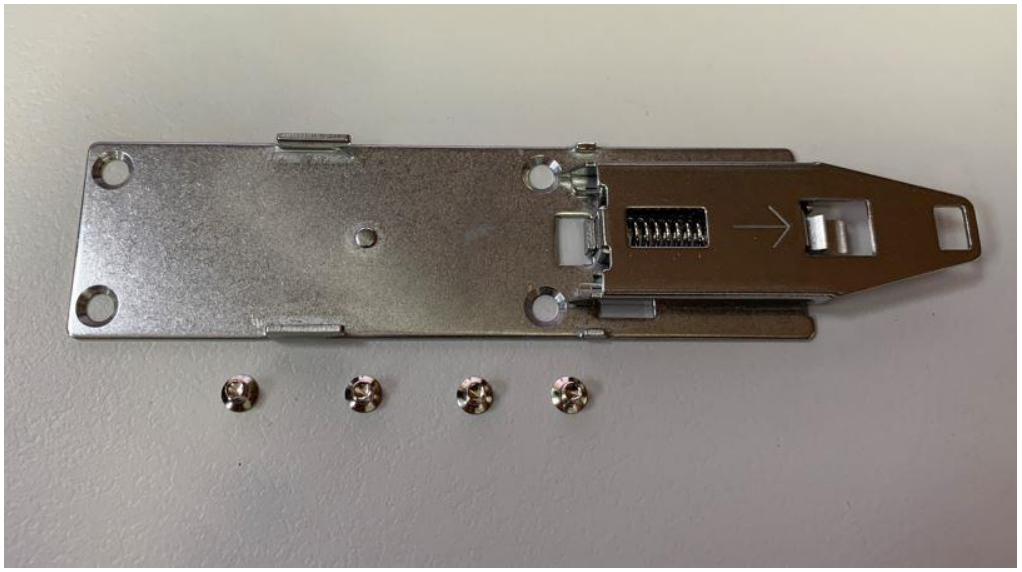


Step 5 Put the cover back to the system and tighten the screws then close the chassis.

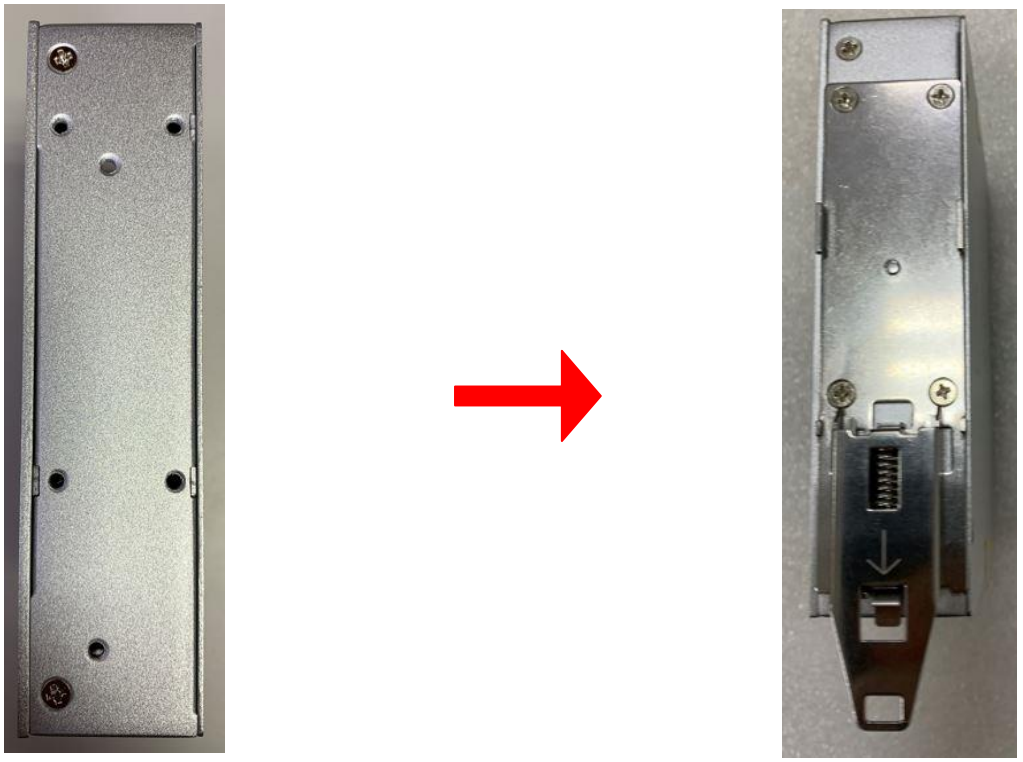
2.3 Installing Din-rail Mounting

The -A/B/C/E provides Din-rail Mount as below:

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



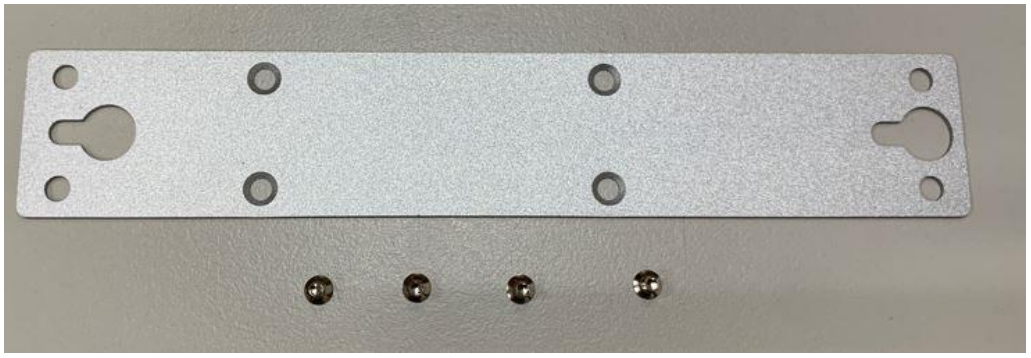
Step 2 Assemble the bracket to the system and tighten the screws.



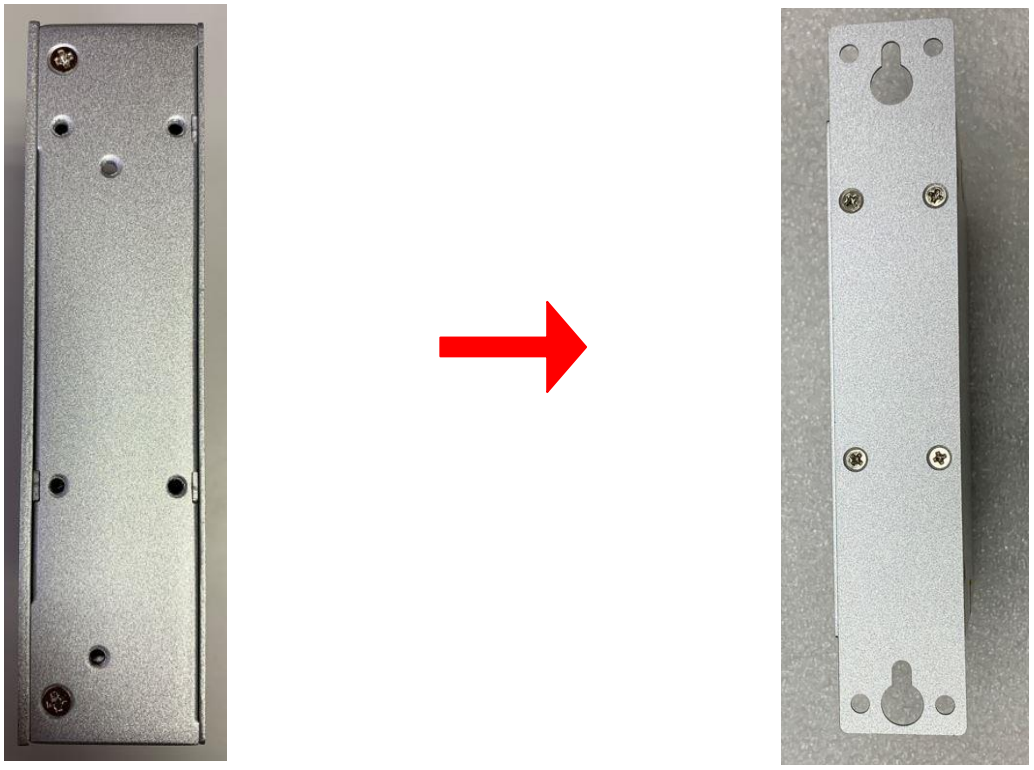
2.4 Installing Wall Mounting (optional)

The -A/B/C/E provides Wall Mounting that customers can install as below:

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



Step 2 Assemble the bracket to the system and tighten the screws.



CHAPTER 3
AMI UEFI BIOS UTILITY

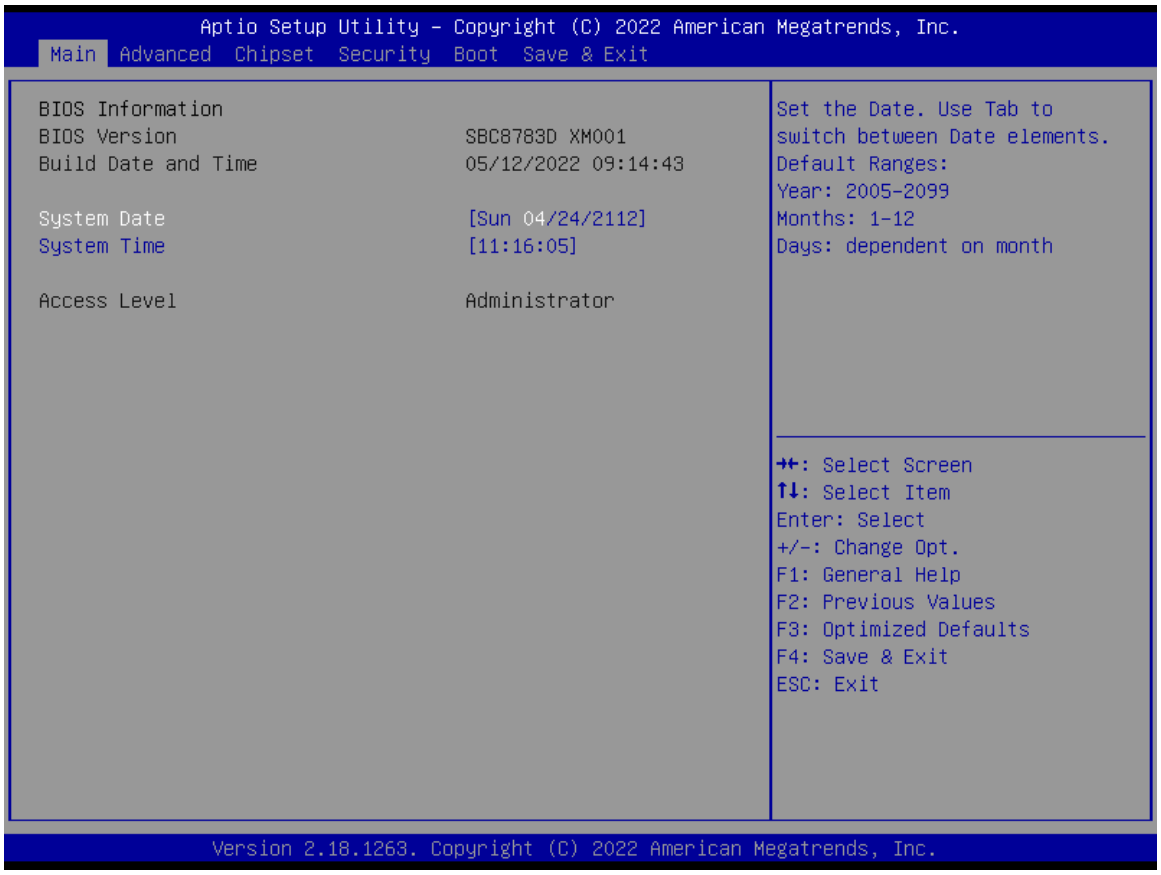
The AMI UEFI BIOS provides users with a built-in Setup program to modify basic system configuration. All configured parameters are stored in a flash-backed-up to save the Setup information whenever the power is turned off.

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



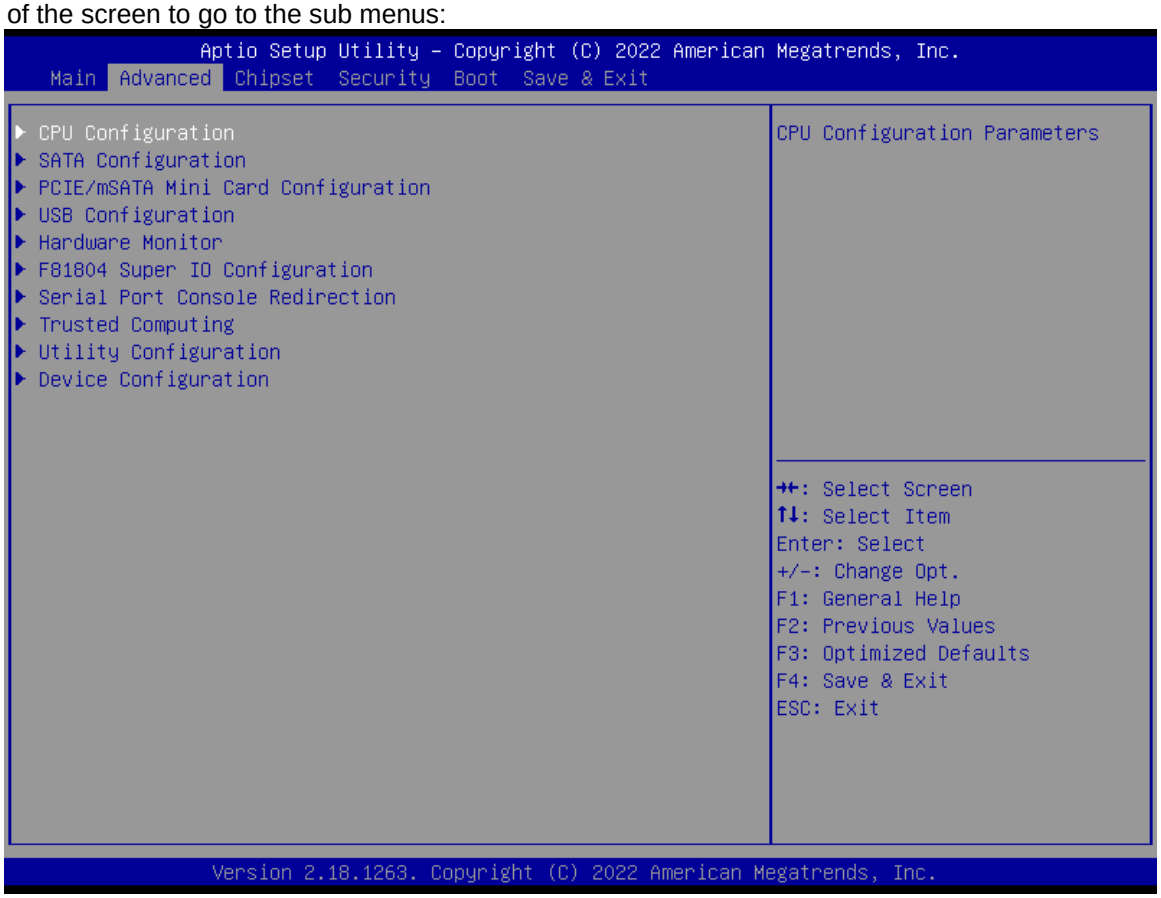
Once you enter the AMI BIOS Aptio Setup Utility, the Main Menu appears on the screen. In the Main Menu, there are several Setup functions and a couple of Exit options for your selection. Use Select Screen Keys (or Move Keys) to select the Setup Page you intend to configure then press <Enter> to accept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

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

System Time
This item shows the 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

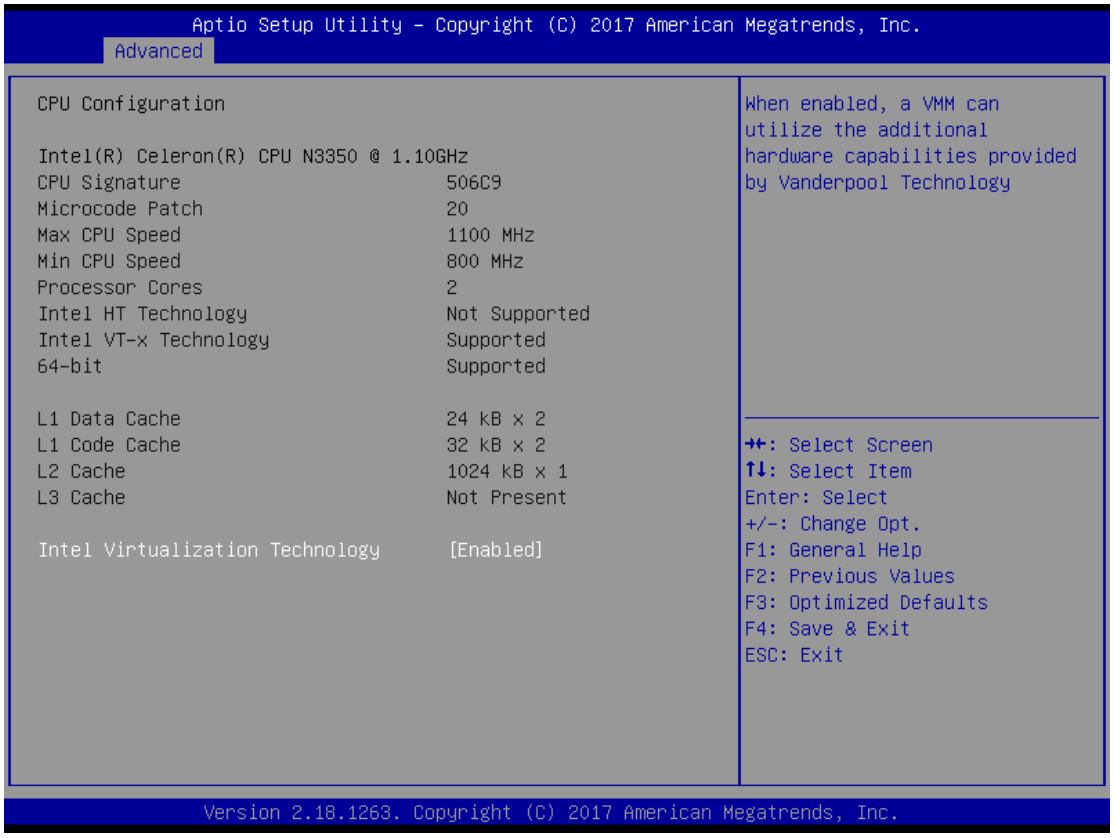
This Advanced section allows users to configure and improve your system, or to set up some system features according to your preference. You can select any of the items in the left frame of the screen to go to the sub menus:



CPU Configuration

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

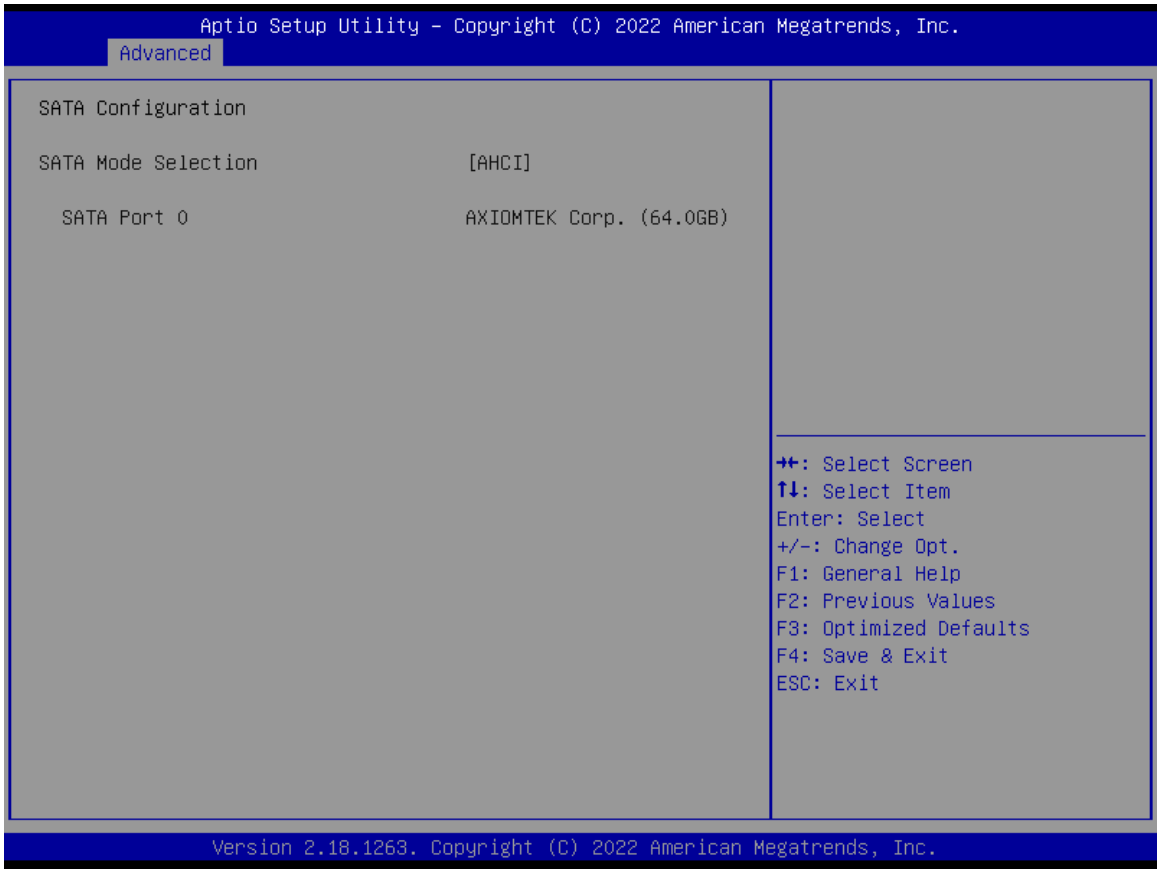
(Please refer to the graphics below.)



SATA Configuration

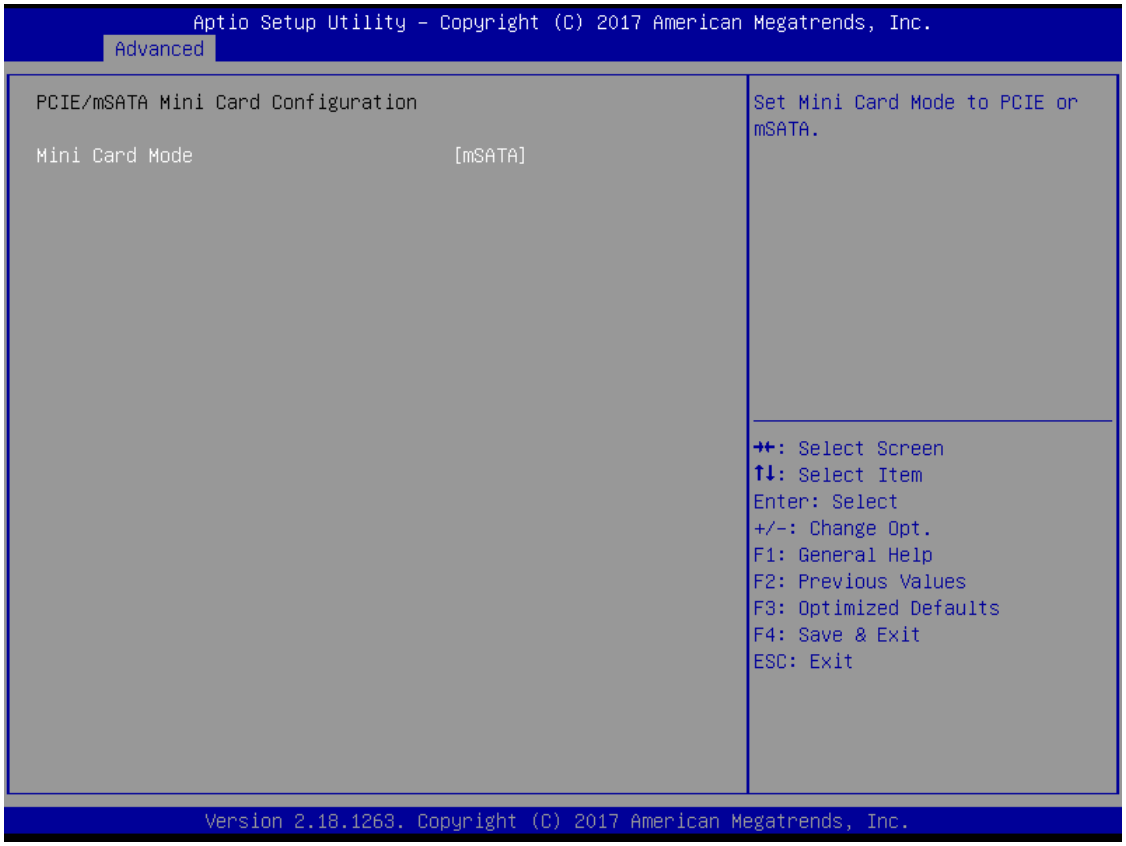
Scroll to this item and press <Enter> to view the SATA Configuration information.

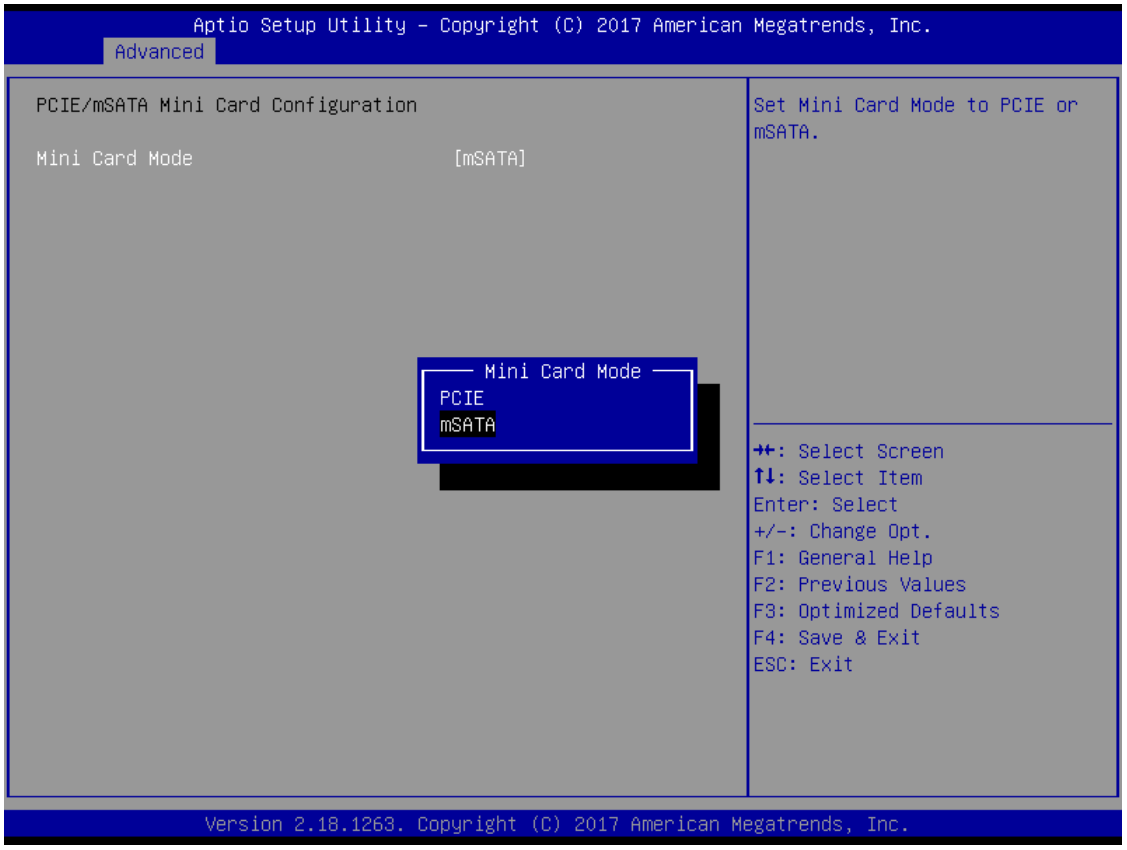
(Please refer to the graphics below.)



PCIe/mSATA Mini Card Configuration

You can choose the PCIe or mSATA modein thein BIOS menu.

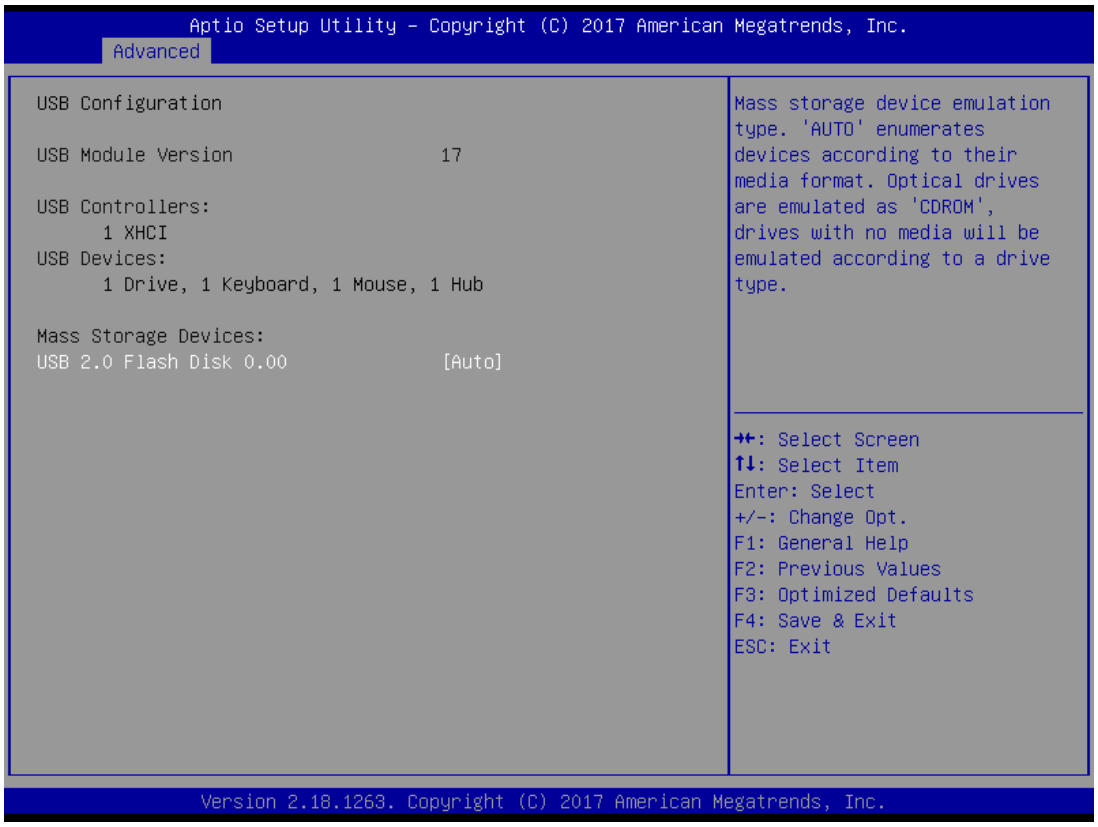



Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
PCIE/mSATA Mini Card Configuration
Mini Card Mode [mSATA]
Mini Card Mode
PCIE
mSATA
Set Mini Card Mode to PCIE or mSATA.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.

USB Configuration

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

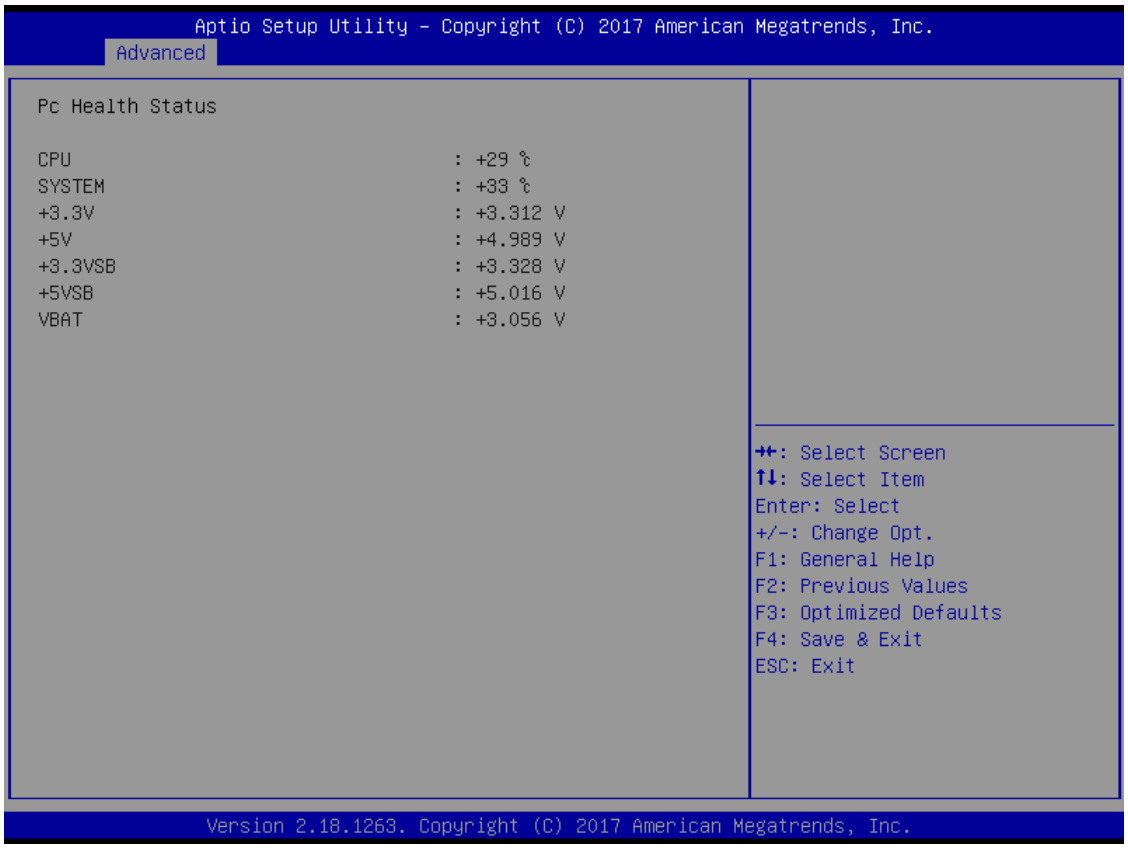
(Please refer to the graphics below.)



H/W Monitor

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

(Please refer to the graphics below.)



F81804 Super IO Configuration

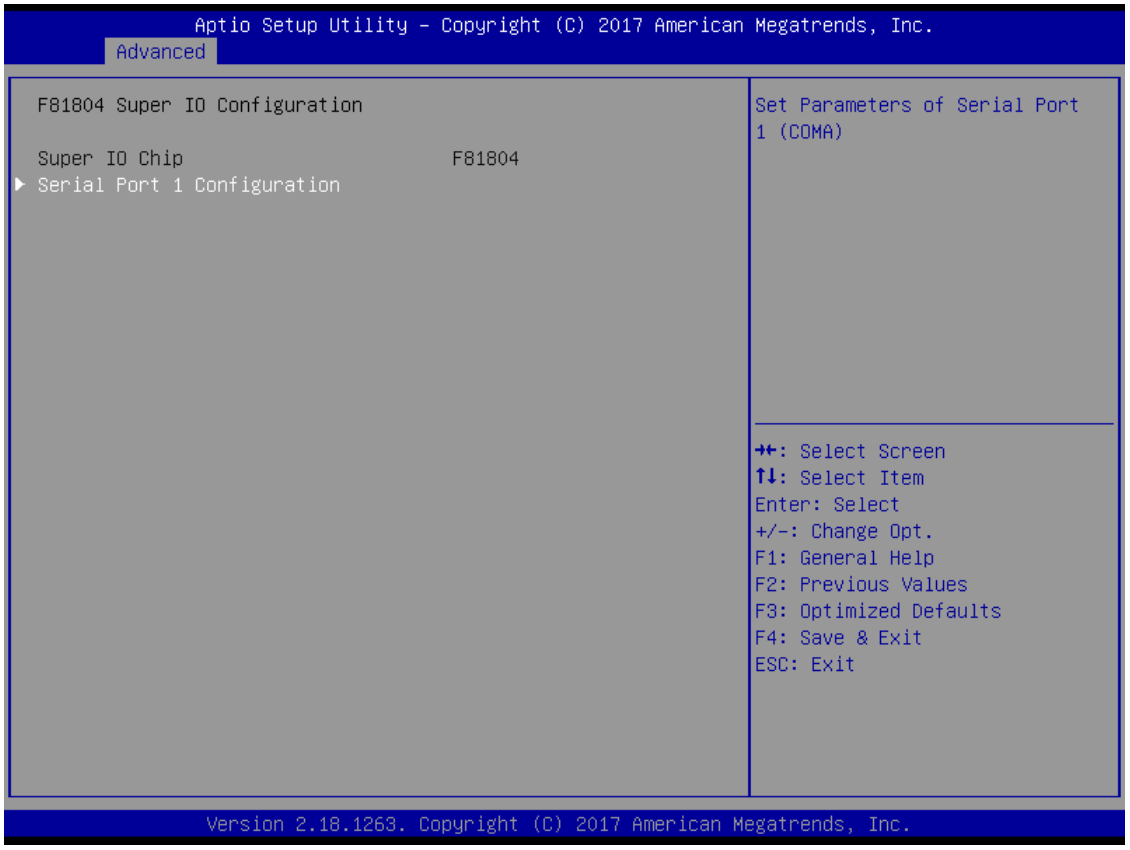
The default setting for the Serial Port is RS232.

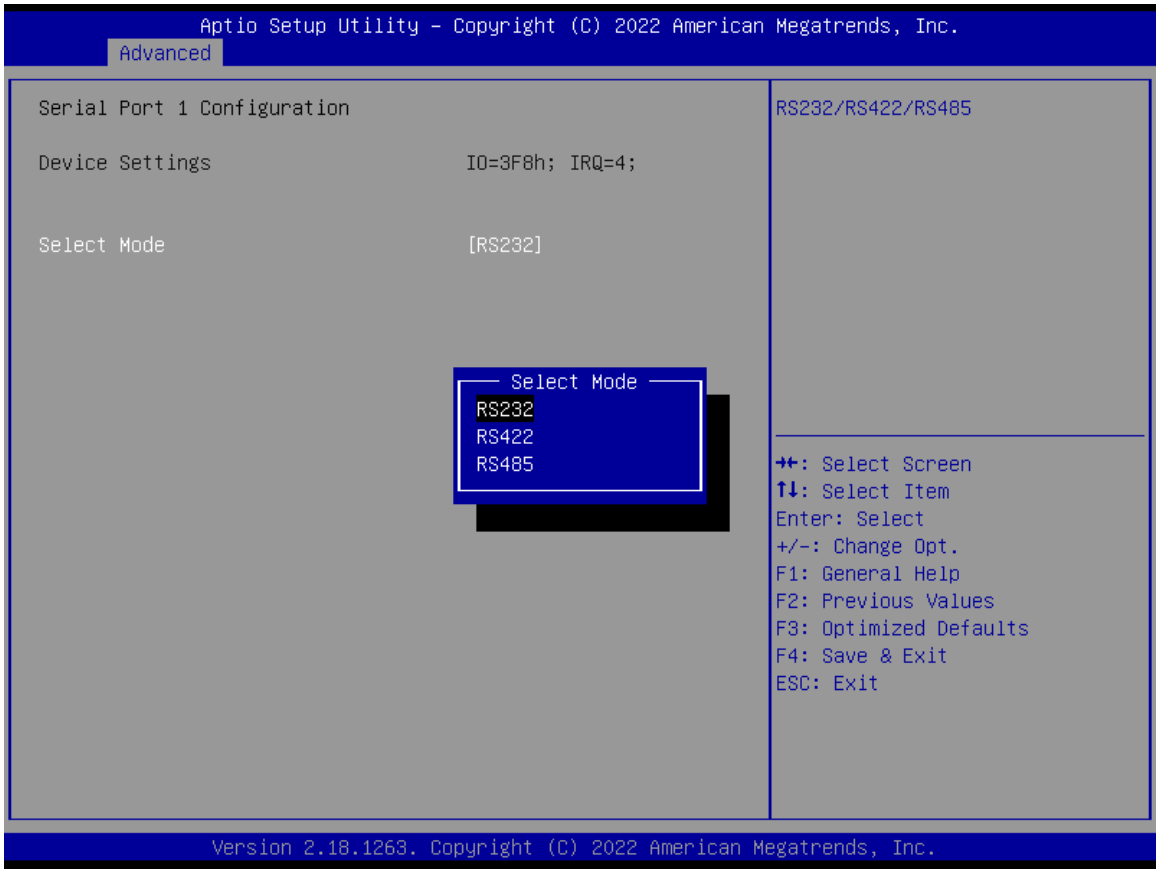
You can change the setting by selecting the value you want in each COM Port Type. The COM supports RS422 & RS485 mode and high-speed mode.

You can enable High-speed mode==in the BIOS menu. Com Port

speed supports up to 1.5 Mbps.

(Please refer to the graphics below.)

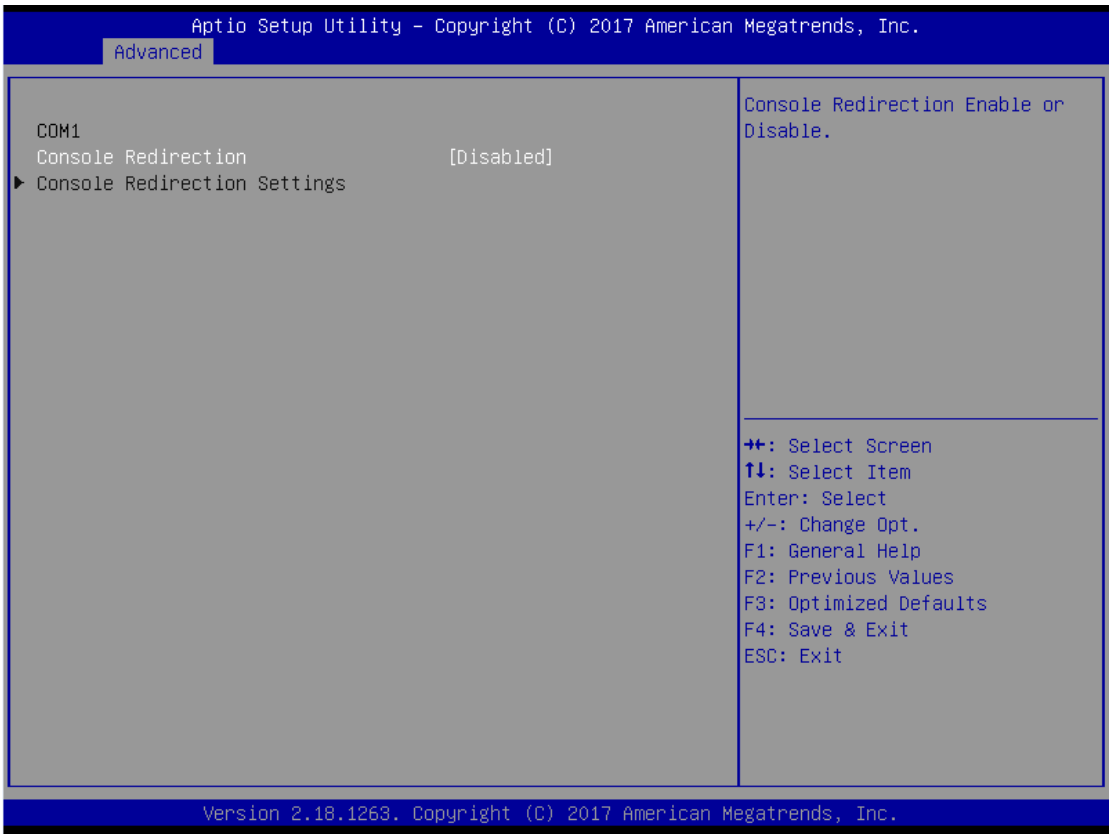



Aptio Setup Utility – Copyright (C) 2022 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
Device Settings
IO=3F8h; IRQ=4;
Select Mode
[RS232]
Select Mode
RS232
RS422
RS485
RS232/RS422/RS485
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2022 American Megatrends, Inc.

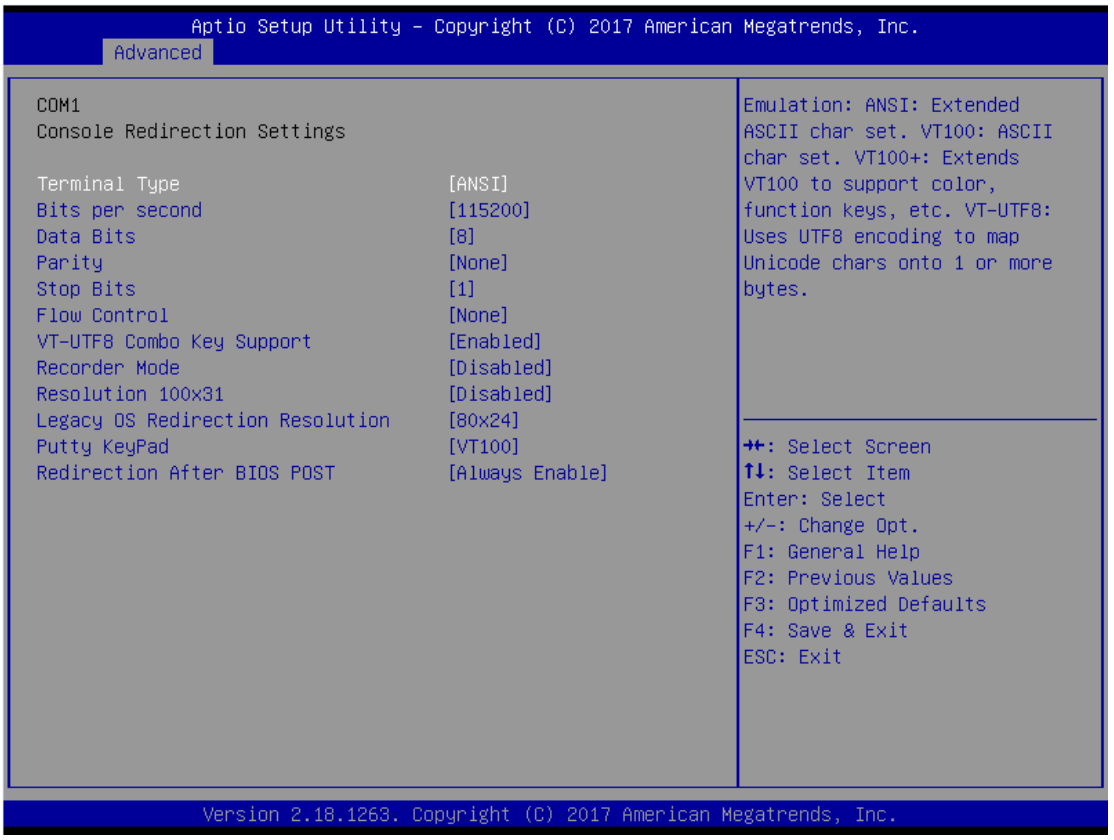
Serial Port Console Redirection

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

(Please refer to the graphics below.)



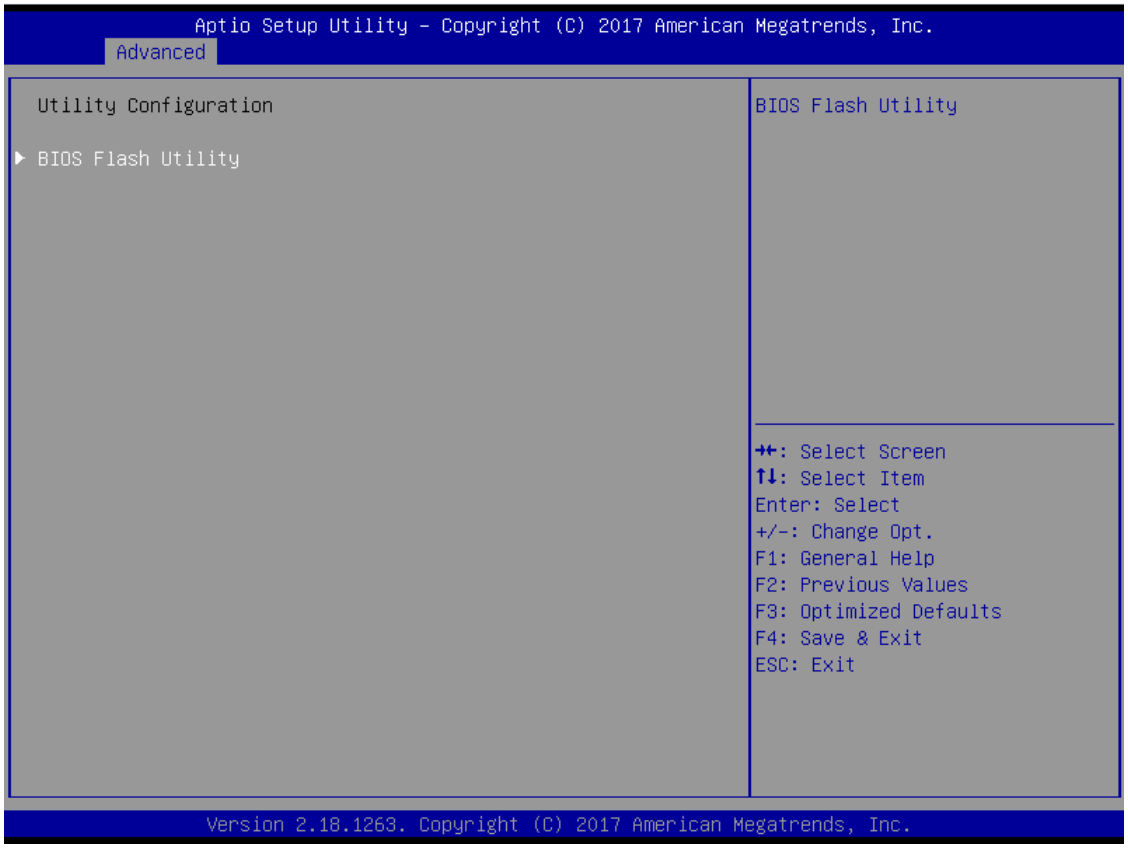
And you can further change the setting by selecting or setting the value you want in each function as the following pictures.

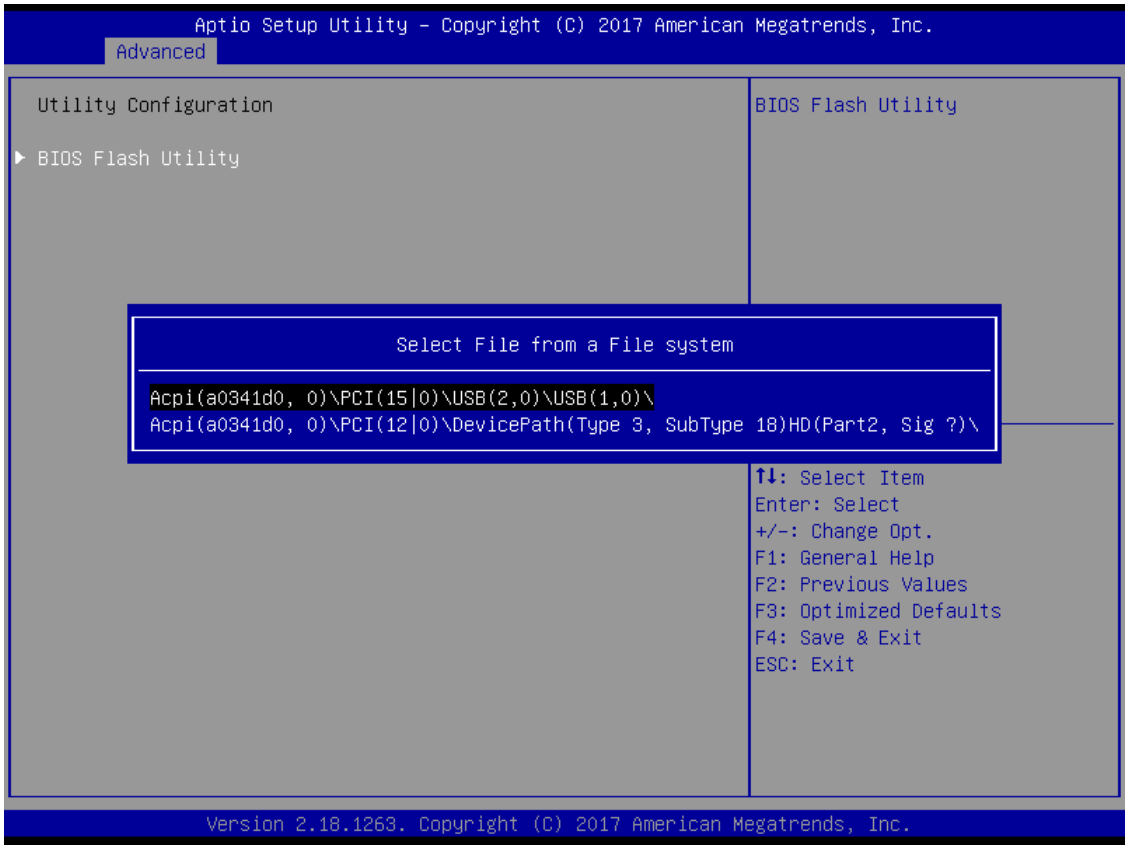


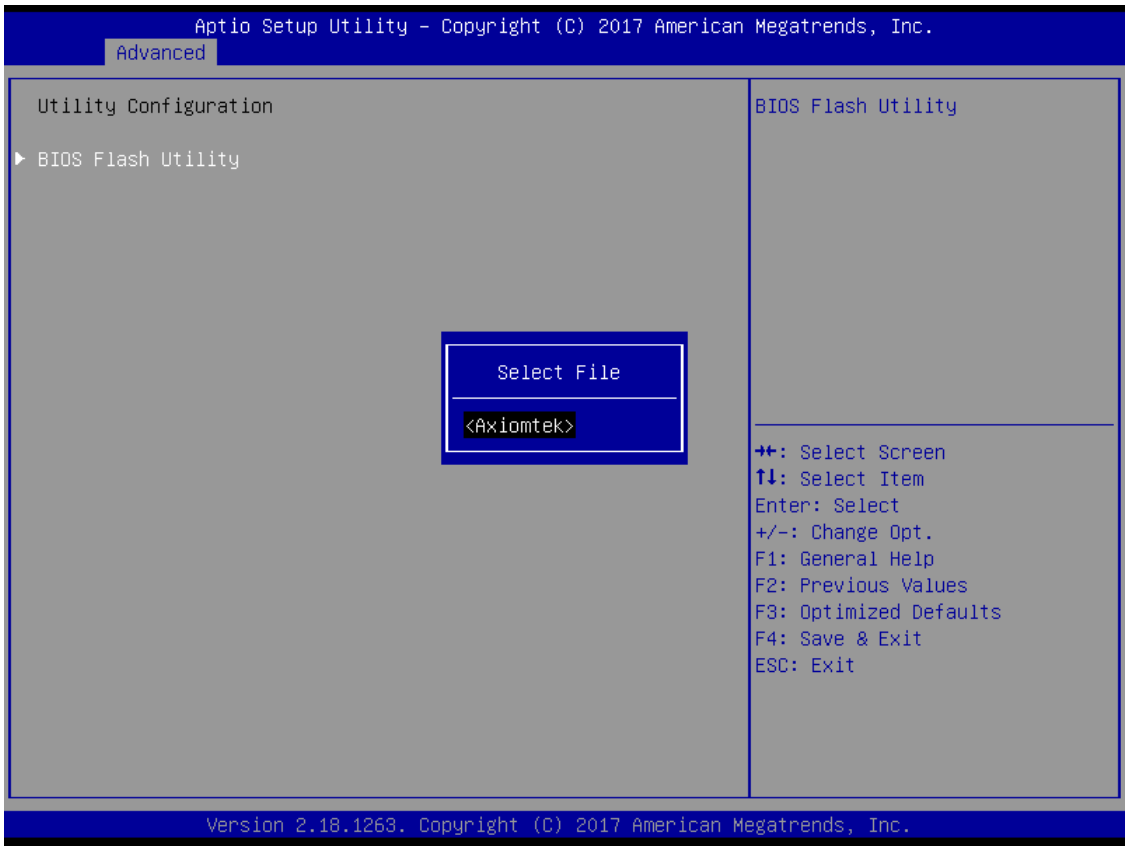
Utility Configuration

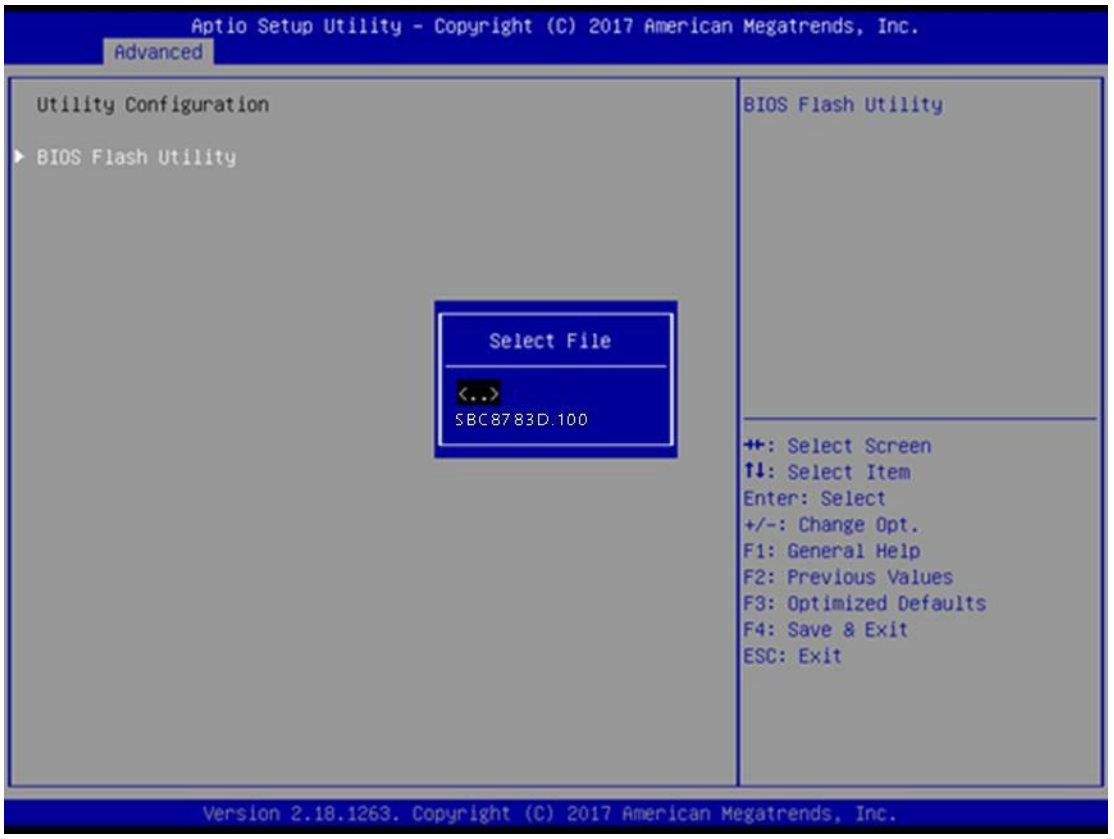
BIOS flash utility is a tool for flash BIOS on setup menu, follow the step to flash BIOS.

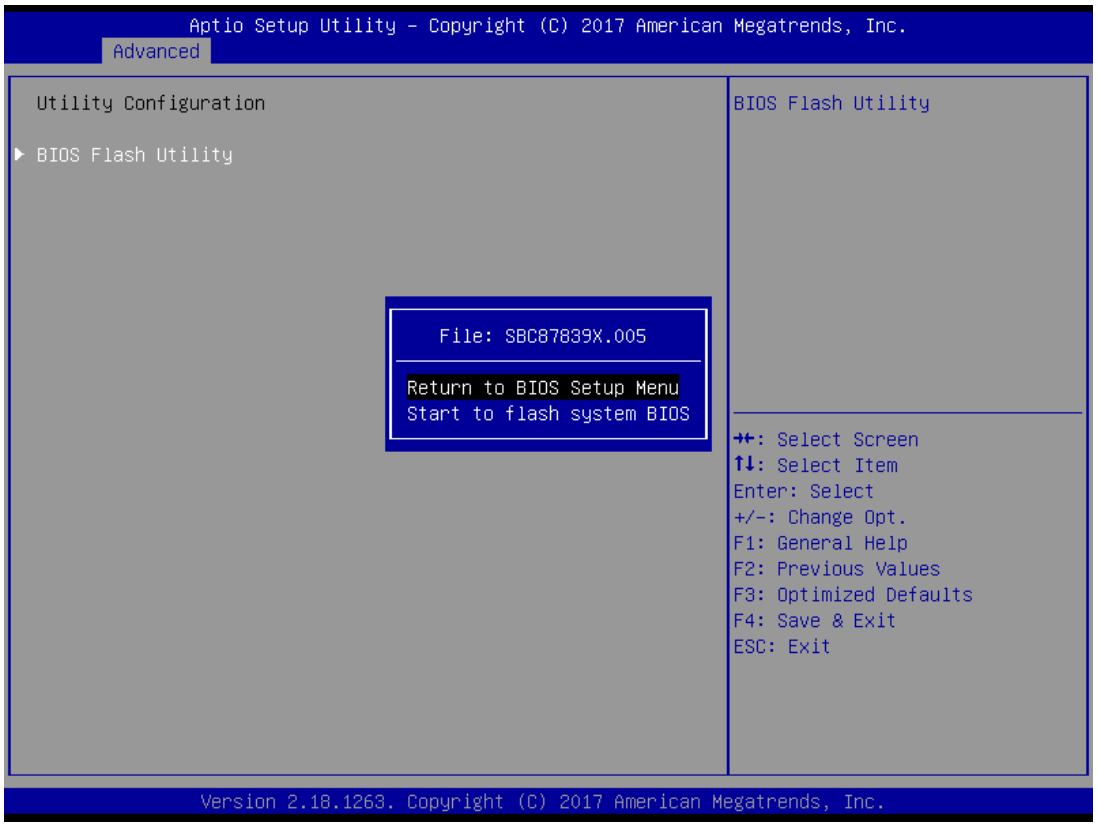
1. Create a folder and rename it to on the root of USB storage (Ex: X:\
2. Copy the BIOS file to the folder (Ex: X:\ \SBC8783D.100) (Note: BIOS file name must contain the word SBC8783D)
3. Enter the BIOS flash utility and locate the BIOS file
4. Select "Start flash system BIOS"



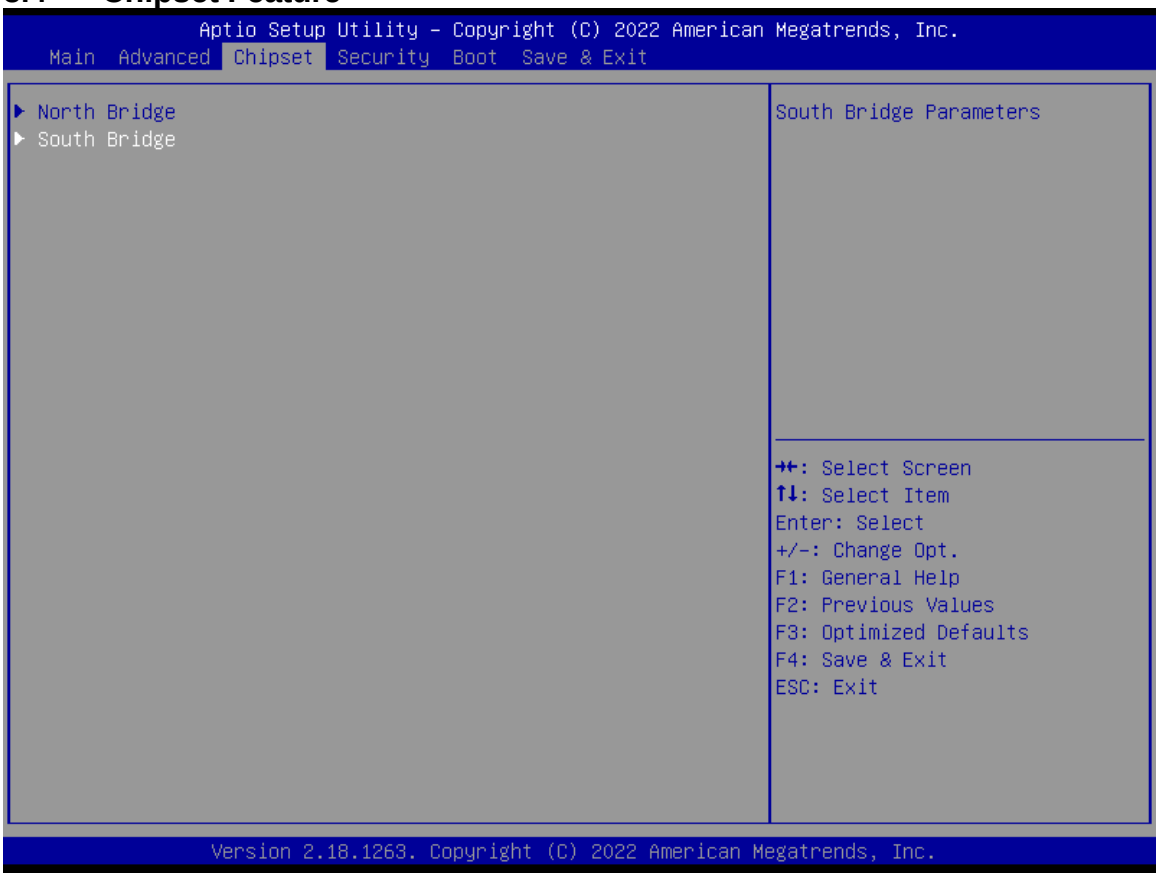

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File from a File system
Acpi(a0341d0, 0)\PCI(15|0)\USB(2,0)\USB(1,0)\
Acpi(a0341d0, 0)\PCI(12|0)\DevicePath(Type 3, SubType 18)HD(Part2, Sig ?)\
↑↓: Select Item
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.

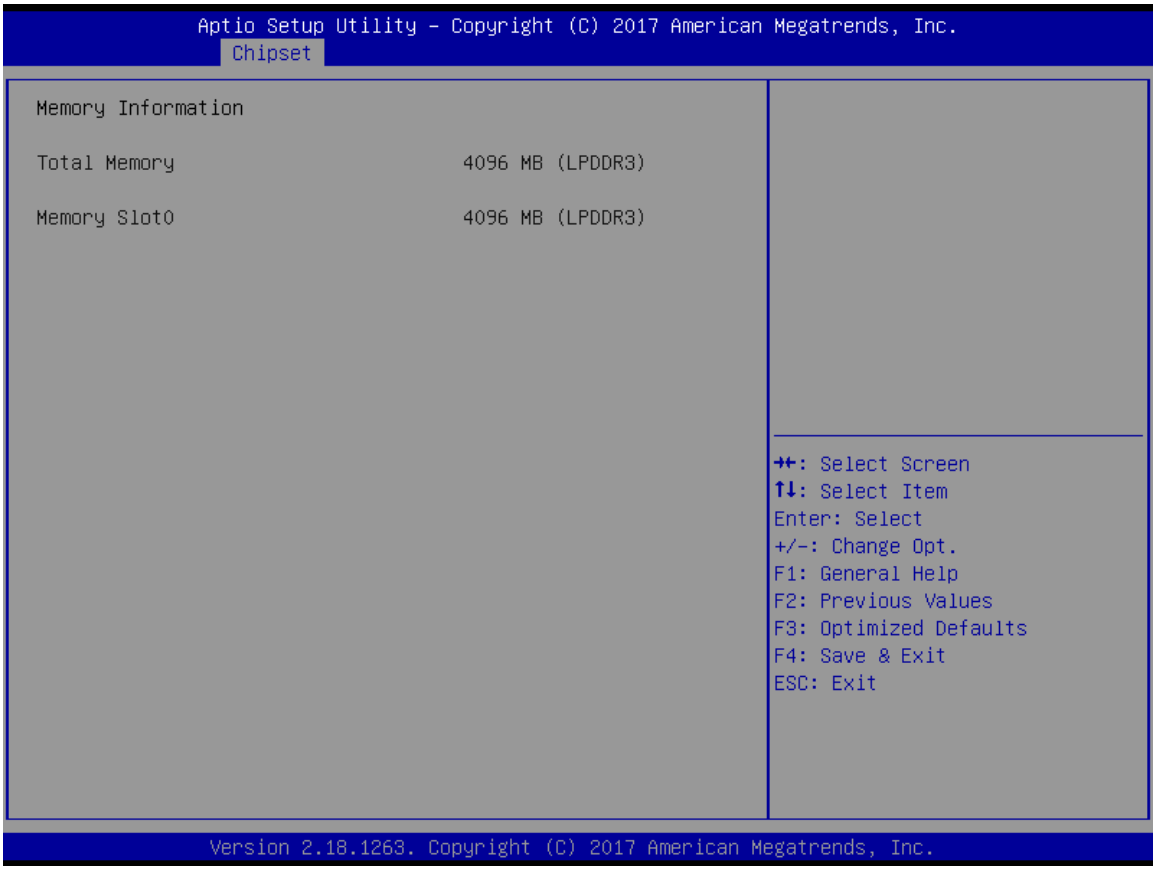

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File
<Axiomtek>
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: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

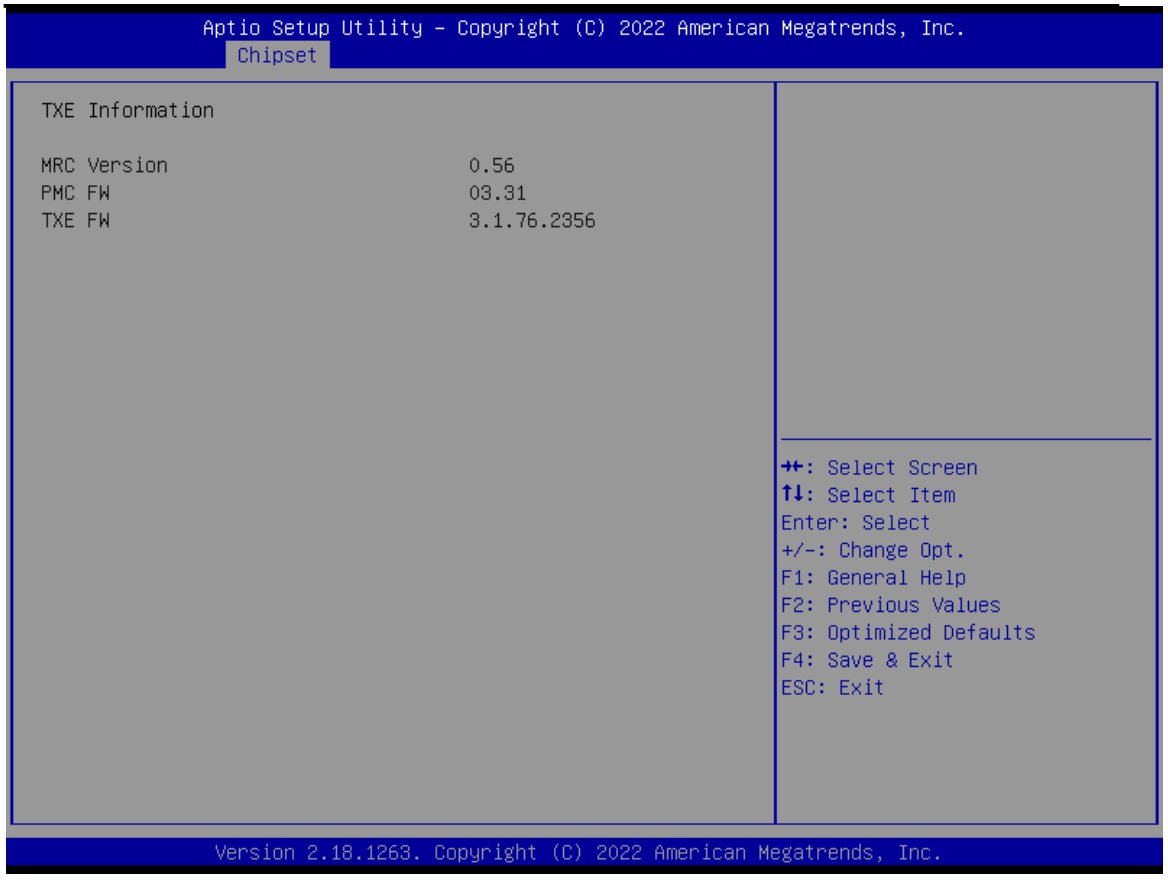

Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File
<..>
SBC8783D.100
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & 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
→←: 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






Aptio Setup Utility – Copyright (C) 2022 American Megatrends, Inc.
Chipset
TXE Information
MRC Version 0.56
PMC FW 03.31
TXE FW 3.1.76.2356
→←: 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) 2022 American Megatrends, Inc.

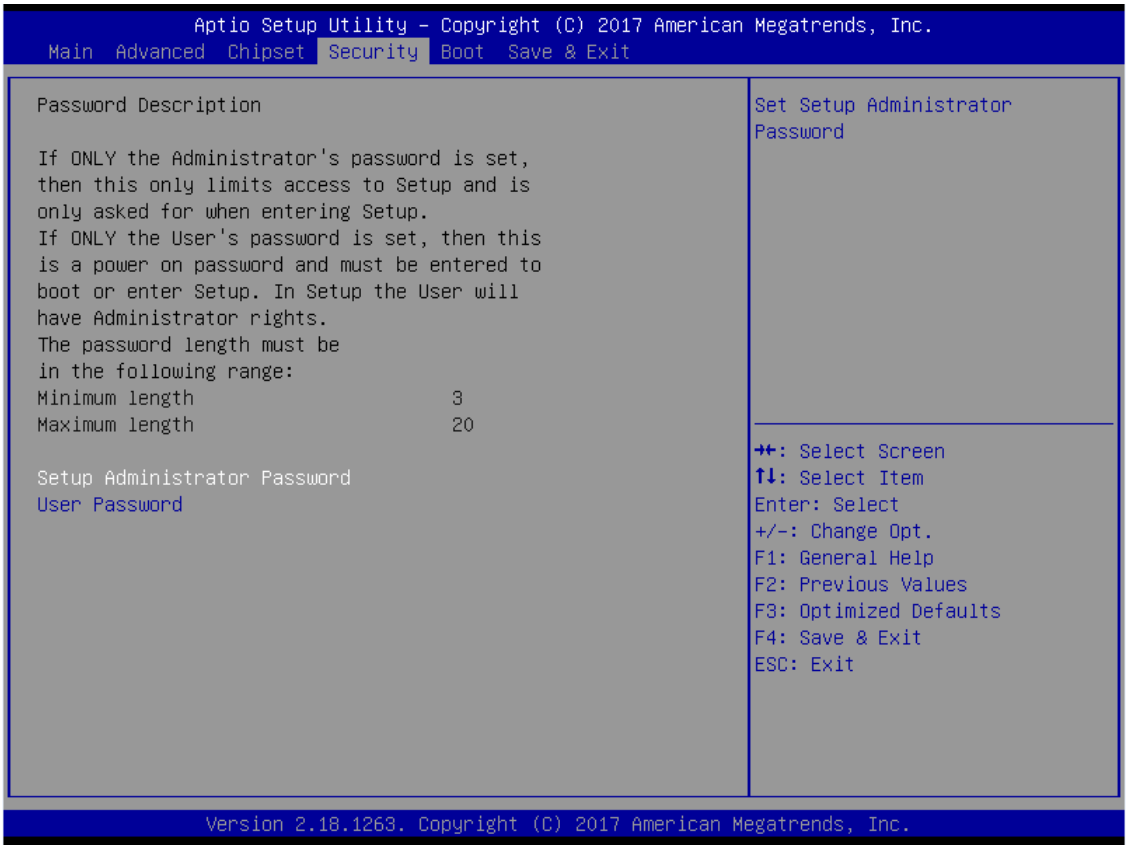
3.5 Security

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 the User Password.

(Please refer to the graphics below.)



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.

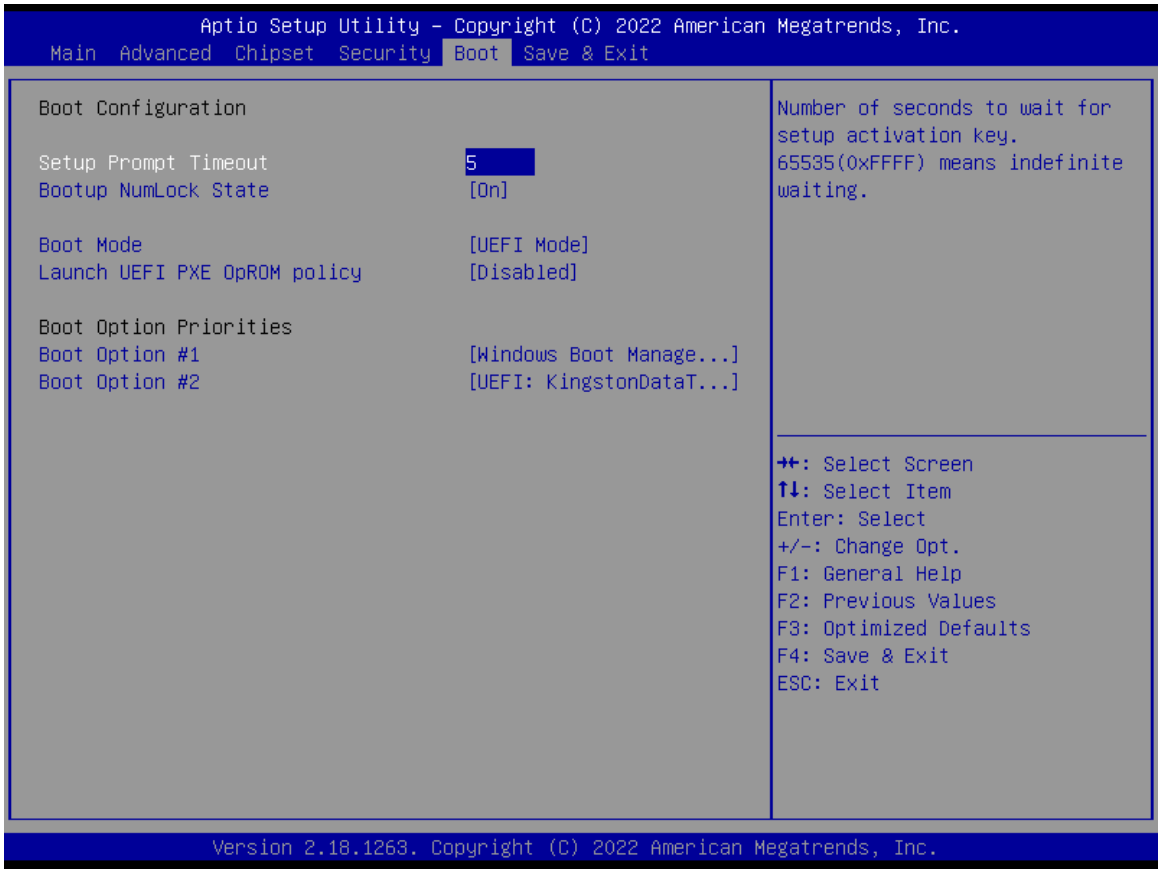
3.6 Boot Mode

Boot has UEFI,Legacy,Compatible mode for selection.

The default setting boot mode is [UEFI Mode]

The default setting Launch UEFI PXE OpROM policy is [Disable]

(Please refer to the graphics below.)



When select Compatible Mode

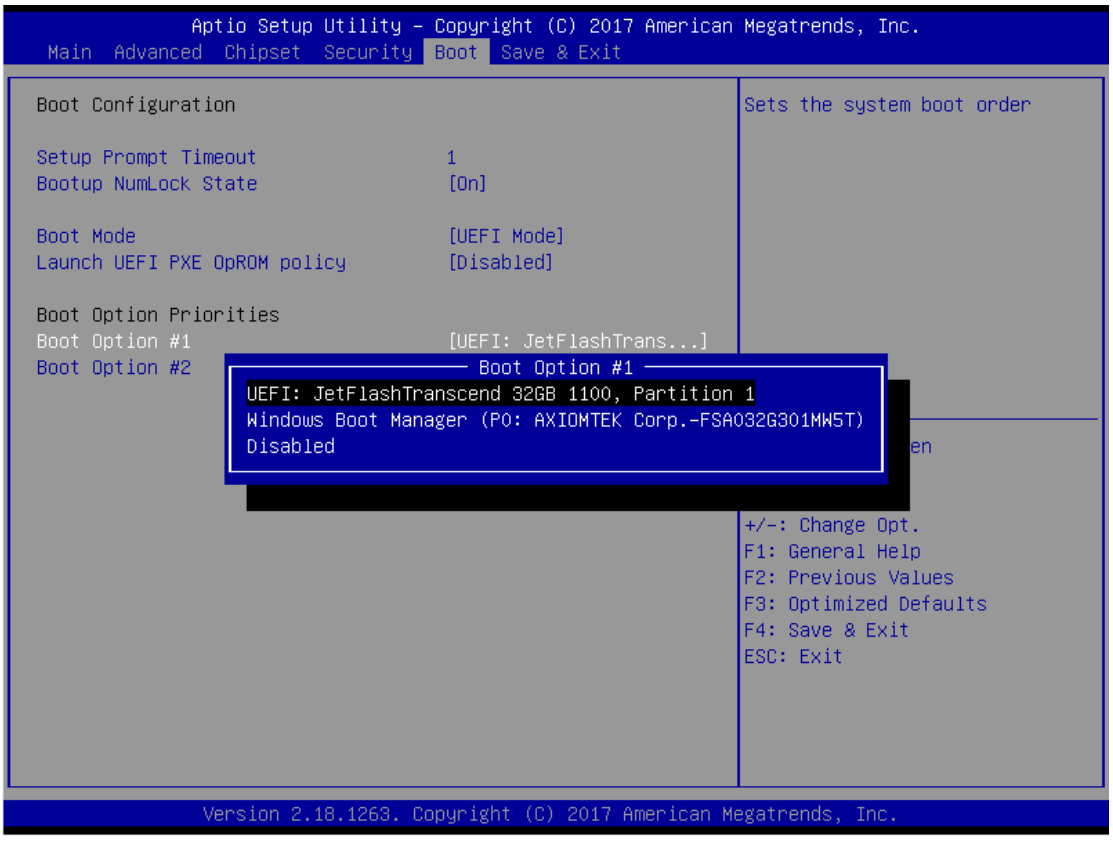
Compatible Mode: When use PCIe to SATA device, option ROM can use this Mode setting.

The default setting PXE OpROM is [Disable]

The default setting Video OpROM is [UEFI]

The default setting Video OpROM is [UEFI]

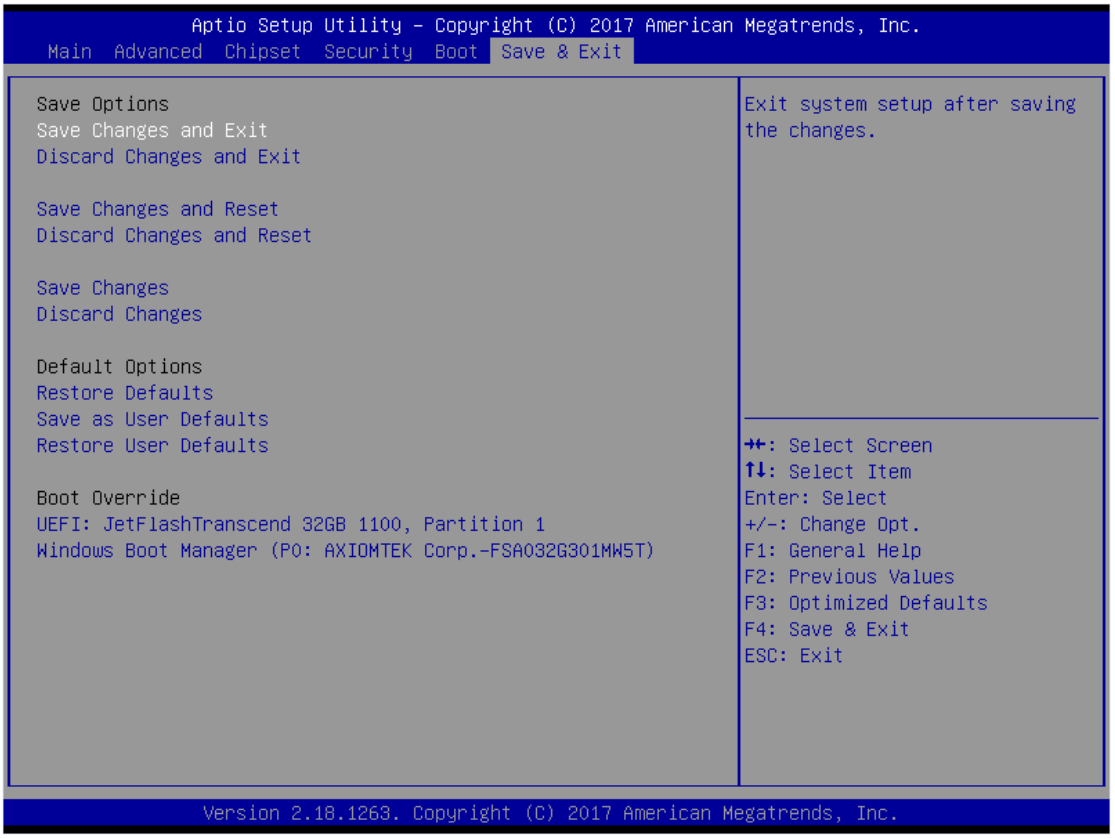
The Boot Option Priorities can select by Boot Option #1, #2…, If the user is using a USB Device. (Please refer to the graphics below.)



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 to the graphics below.)



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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 ; Select logic register

O 2F 07 ; Switch to WDT device

▼

Set timer value:

O 2E F6 ; Select logic register

O 2F 05 ; Timer value 0~255 (Sec/Min) (Ex: 5)

▼

Clear WDT status (optional):

O 2E F5 ;

O 2F 40

▼

Set base timer:

O 2E F5

O 2F M ; M = 28h (Minute)

M = 20h (Second)