Table of Contents

CHAPTER 1
INTRODUCTION

This chapter contains general information and detailed specifications of the . The Chapter 1 includes the following sections:

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

1.1 General Description

The fanless embedded system is an industrial-grade gateway with a robust hardware design, an ideal solution for communications control and protocol converter applications in harsh environments. Designed for operation in strict conditions, the - adopts a low power consumption Intel Kaby Lake-U i7/ i5/ i3/ Celeron processor, supporting industrial operating temperature range from -40°C to +70°C. The offers a wide selection of I/O functions, including 4 x USB, 1 x VGA, 1 x HDMI,1 x COM port, 2 x LAN ,1 x DIO and 2 x modular I/O design. Its compact size makes it suitable for DIN rail or wall mount, allowing users to easily put it into a control cabinet. Compatible with Windows®10, the provides programmers with a friendly environment for developing application software at a lower cost.

The adopts an advanced cooling system and supports the CFast and 2.5" SATA drive, making it a perfect field control & monitoring system solution for the following markets:

- Utility industries (water; energy; chemical plant; mining…)
- Public transportation industries (traffic/ highway control; train/bus control…)
- Homeland security (weather monitoring/alarm system…)

- **Features**
  - Fanless design
  - Wide temperature operation of -40°C - +70°C
  - Supports 2 RJ-45 Gb Ethernet ports
  - Supports dual display, 1 VGA and 1 HDMI
  - 1 COM port supporting RS-232/422/485
  - 2 Mini Card sockets for Wireless connection (USB and PCIe Interface) and 1 external SIM slot for 3G/4G connection.
  - Supports one 2.5" SATA SSD and one CFast with external access
  - Wide range 12–48V DC-in with terminal block
  - Isolated 4DI/ 4DO
  - 4 USB3.0
  - 4 LED indicators (power, SSD,2x programmable)
  - I/O window for mini card expansion
  - Din-rail mounting
  - Wall mounting (optional)
  - Passed CE with FCC testing
  - Passed EN 50121-4 certification (railway application)
  - 2 expansion I/O slots for I/O modules

- **Embedded O.S. Supported**
  - Windows® 10 64bit
  - Linux 64bit

1.2 System Specifications

1.2.1 CPU

- Onboard Intel® Core™ i7-7600U processor (2.8GHz)
- Onboard Intel® Core™ i5-7300U processor (2.6GHz)
- Onboard Intel® Core™ i3-7100U processor (2.8GHz)
- Onboard Intel® Celeron-3965U processor (2.2GHz)

1.2.2 BIOS

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

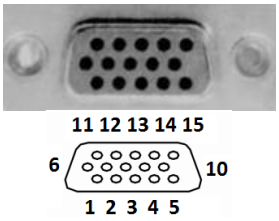
1.2.3 System Memory

- 1x DDR4 SO-DIMM socket
- Supports 2133 MHz up to 16GB

1.2.4 Display

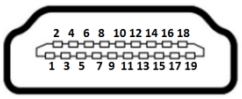
- A 15-pin D-Sub connector as VGA connector

Pin	Signal	Pin	Signal	Pin	Signal
1	Red	2	Green	3	Blue
4	N.C.	5	GND	6	GND
7	GND	8	GND	9	VCC
10	GND	11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync	15	DDC CLK



- 1x HDMI

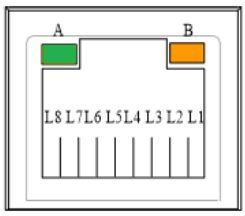
Pin	Signal	Pin	Signal
1	TMDS data 2+	11	TMDS clock shield
2	TMDS data 2 shield	12	TMDS clock-
3	TMDS data 2-	13	CEC
4	TMDS data 1+	14	No connected
5	TMDS data 1 shield	15	DDC clock
6	TMDS data 1-	16	DDC data
7	TMDS data 0+	17	Ground
8	TMDS data 0 shield	18	+5V power
9	TMDS data 0-	19	Hot plug detect
10	TMDS clock+		



1.2.5 Ethernet Ports

- LAN Chip: Intel Ethernet Controller I210.
- The board has dual RJ-45 connectors, supporting 10/100/1000 Base-T with 1.5KV magnetic isolated protection.

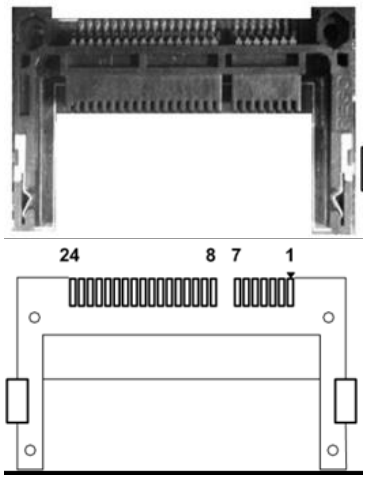
Pin	Description	10/100Base-T	1000Base-T
1	Transmit Data+ or Bidirectional	TX+	BI_DA+
2	Transmit Data- or Bidirectional	TX-	BI_DA-
3	Receive Data+ or Bidirectional	RX+	BI_DB+
4	Not Connected or Bidirectional	N.C.	BI_DC+
5	Not Connected or Bidirectional	N.C.	BI_DC-
6	Receive Data- or Bidirectional	RX-	BI_DB-
7	Not Connected or Bidirectional	N.C.	BI_DD+
8	Not Connected or Bidirectional	N.C.	BI_DD-
A	Speed LED	OFF/Green	Orange
B	Activity Link LED	OFF: No Link Blinking: Data activity detected (Yellow)	



1.2.6 Storages

- 1 x 2.5" External SATA drive bay
- 1 x SATA CFast

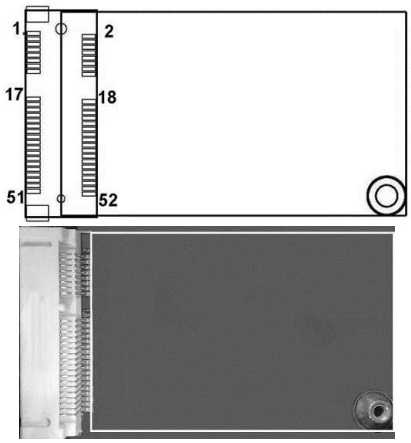
Pin	Signal	Pin	Signal
1	GND	13	N.C
2	SATA_TX+	14	GND
3	SATA_TX-	15	N.C
4	GND	16	N.C
5	SATA_RX-	17	N.C
6	SATA_RX+	18	N.C
7	GND	19	N.C
8	N.C	20	+3.3VS
9	GND	21	+3.3VS
10	N.C	22	GND
11	N.C	23	GND
12	N.C	24	N.C



1.2.7 Wireless

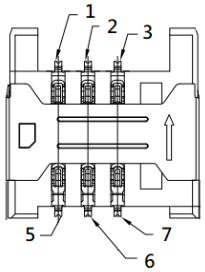
- 1 x Full size Mini Card socket supports a module with USB and PCIe and SIM Interface (Socket 1).
- 1 x Full size Mini Card socket supports a module with USB and PCIe Interface (Socket 2).

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	N.C.	4	GND
5	N.C.	6	+1.5V
7	CLKREQ#	8	SIM_PWR / N.C.
9	GND	10	SIM_DATA / N.C.
11	REFCLK-	12	SIM_CLK / N.C.
13	REFCLK+	14	SIM_REST / N.C.
15	GND	16	SIM_VPP / N.C.
17	N.C.	18	GND
19	N.C.	20	+3.3VSB
21	GND	22	PERST#
23	PE_RXN	24	+3.3VSB
25	PE_RXP	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN	32	SMB_DATA
33	PE_TXP	34	GND
35	GND	36	USB_D3-
37	GND	38	USB_D3+
39	+3.3VSB	40	GND
41	+3.3VSB	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	N.C.	46	LED_WPAN#
47	N.C.	48	+1.5V
49	N.C.	50	GND
51	N.C.	52	+3.3VSB



- 1 x External SIM Card slot (for PCI Express Mini Card socket 1)
- 4 x Antenna holes

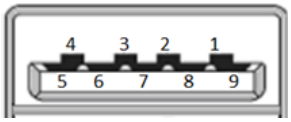
Pin	Signal
1	SIM_PWR
2	SIM_RESET
3	SIM_CLK
5	GND
6	SIM_VPP
7	SIM_DATA



1.2.8 USB

- 4 x USB3.0

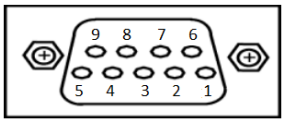
Pin	Signal	Pin	Signal
1	USB_VCC	6	SSRX2+
2	USB_Data2-	7	GND
3	USB_Data2+	8	SSTX2-
4	GND	9	SSTX2+
5	SSRX2-		



1.2.9 COM Port

- 1 DB9 port supports RS-232/422/485 which can be selected by BIOS.
- Supports Auto Flow Control in RS485 mode.

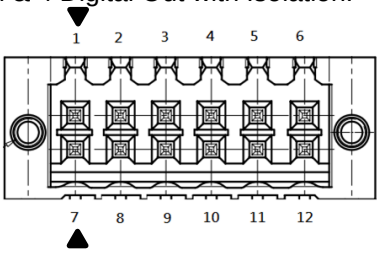
Pin	RS-232	RS-422	RS-485
1	DCD, Data carrier detect	TX-	Data-
2	RXD, Receive data	TX+	Data+
3	TXD, Transmit data	RX+	NC
4	DTR, Data terminal ready	RX-	NC
5	GND, ground	GND	GND
6	DSR, Data set ready	NC	NC
7	RTS, Request to send	NC	NC
8	CTS, Clear to send	NC	NC
9	RI, Ring indicator	NC	NC
10	NC	NC	NC



1.2.10 DIO

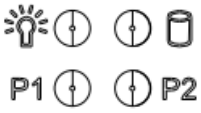
- 1 Terminal Block port supports 4 Digital In & 4 Digital Out with Isolation.

Pin	Signal	Pin	Signal
1	COM+	7	Ext Power
2	0_OUT	8	4_IN
3	1_OUT	9	5_IN
4	2_OUT	10	6_IN
5	3_OUT	11	7_IN
6	COM-	12	DIO_GND



1.2.11 LED

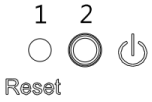
LED Indicator	Description
PWR/ Green	Power on
SSD/ Yellow	SSD activity
P1/ Green	Programmable
P2/ Green	Programmable



1.2.12 Power& Reset Button

- AT auto power on
- Power button settings for software must be set up first.

Pin	Description
1	Reset Button
2	Power Button

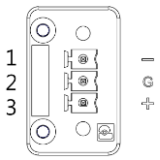


Note: Refer to APPENDIX B for instructions on Power button settings for Windows.

1.2.13 Power

- Wide-range 12 - 48V DC power input with terminal block.
- OVP and Reverse protection.

Pin	Signal
1	-
2	G
3	+

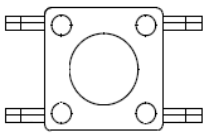


1.2.14 WatchDog Timer (WDT)

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

1.2.15 Restore BIOS Optimal Defaults (CLEAR CMOS)

- Push the CMOS Button on the mother board for a few seconds. Doing this procedure can restore BIOS optimal defaults.



1.2.16 Operation Temperature

- -40°C to +70°C (-40°F to +158°F) with 2 x PIM modules (exclude PIM700)
- -40°C to +60°C (-40°F to +140°F) with 1 x PIM700, 1 x PIM module (exclude PIM700)
- -40°C to +50°C (-40°F to +122°F) with 2 x PIM700

1.2.17 Storage Temperature

- -40.0°C ~ +85.0°C

1.2.18 Humidity

- 10% ~ 95% (non-condensation)

1.2.19 Weight

- 2.11 kg

1.2.20 Dimensions

- 145mm(5.7") (W) x125mm(4.92") (D) x155mm(6.1") (H)

1.2.21 System I/O Outlets

- One HDMI connector display.
- One 15-pin D-Sub female connector for VGA.
- One 9-pin D-Sub male connector for COM.
- Two 10/100/1000 base-T RJ-45 connectors with 1.5KV magnetic isolated protection.
- Four USB 3.0 connectors.
- One 2x6-pin terminal block connectors for DIO.
- One DC power input with 3-pin terminal block.
- Four antenna holes.
- One external CFast slot.
- One external SIM slot.

1.2.22 Check list

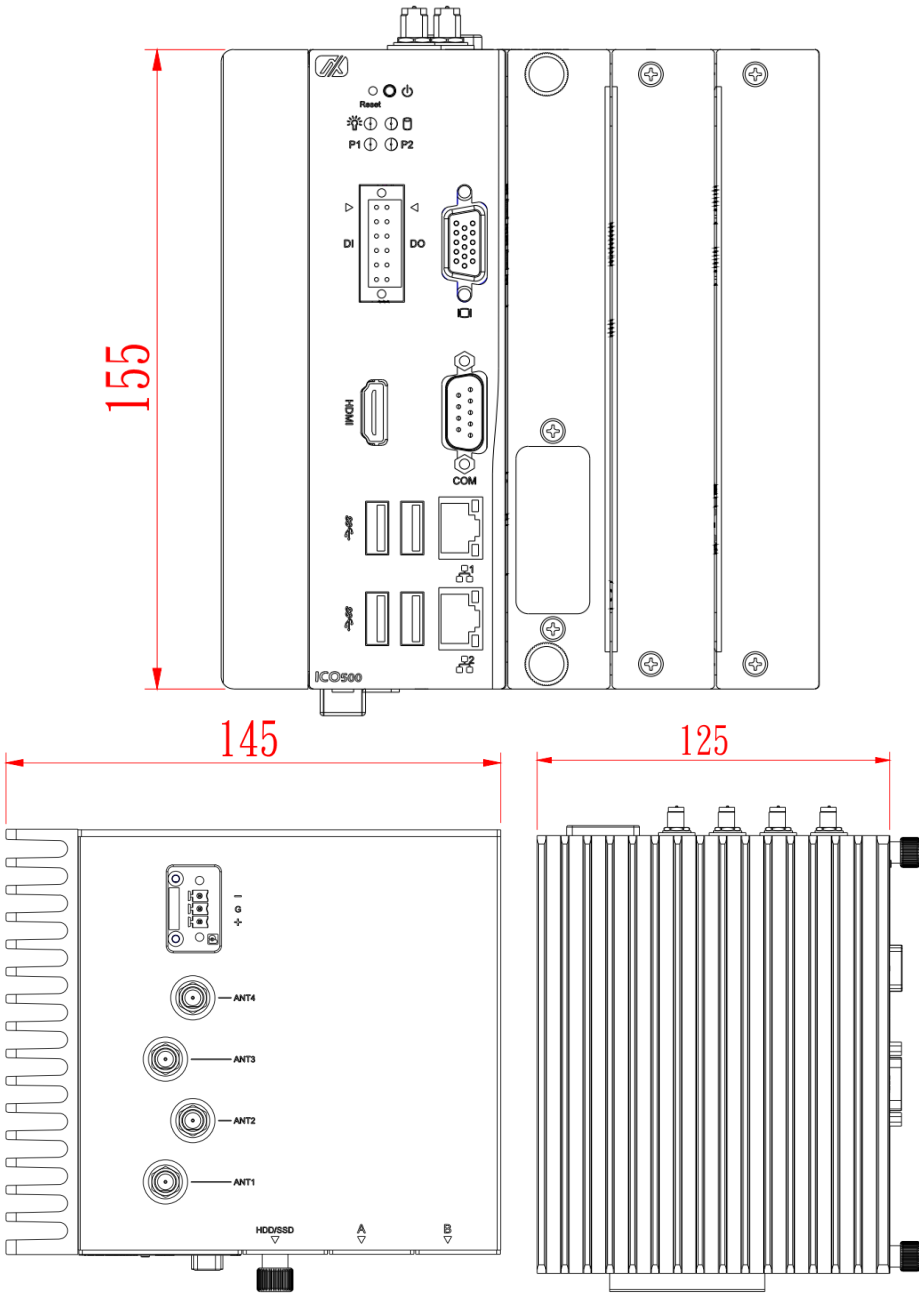
- DVD x 1 (for Driver)
- Din-rail Kit x 2
- Terminal block(3x1pin) of Power x1
- Terminal block(6x2pin) of DIO x1
- DDR Thermal Pad x 1
- SSD Tray x 1
- Shock pad x 4
- Screws for 2.5" SATA SSD x 4
- Screws(M3*6L) for 2.5" SATA SSD Tray x 4
- Screws(M2*5L) for Mini Card x2
- PLASTIC WASHER WS x4
- PLASTIC WASHER TW x4

1.2.23 System Power consumption

- 12-48VDC, 4.01-1.01A

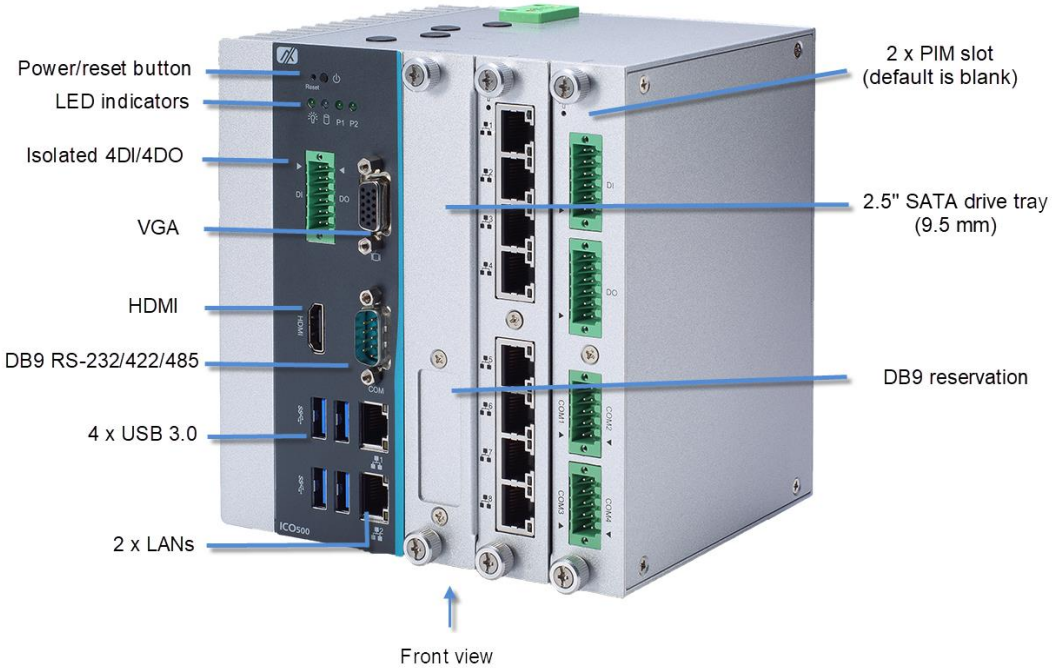
1.3 Dimensions

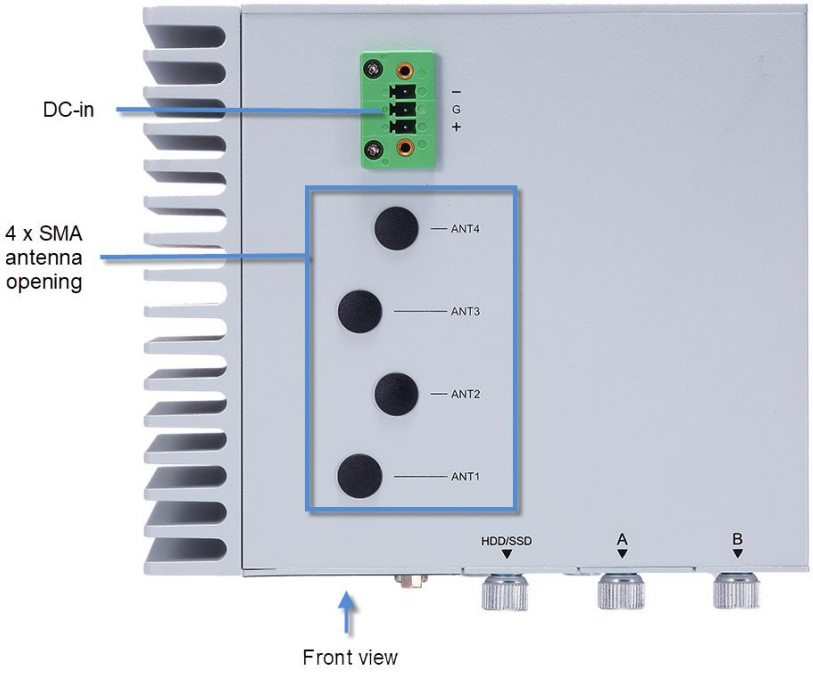
The following diagrams show you the dimensions and outlines of the

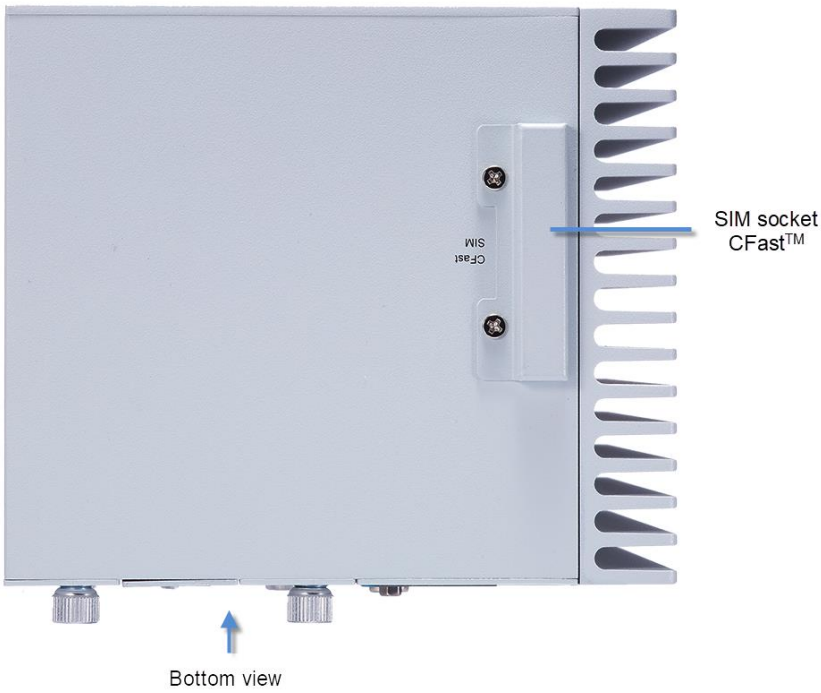


1.4 I/O Outlets

The following figures show you I/O outlets on the front view, top view and bottom view of the






SIM socket
CFast™
Bottom view

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CHAPTER 2
HARDWARE INSTALLATION

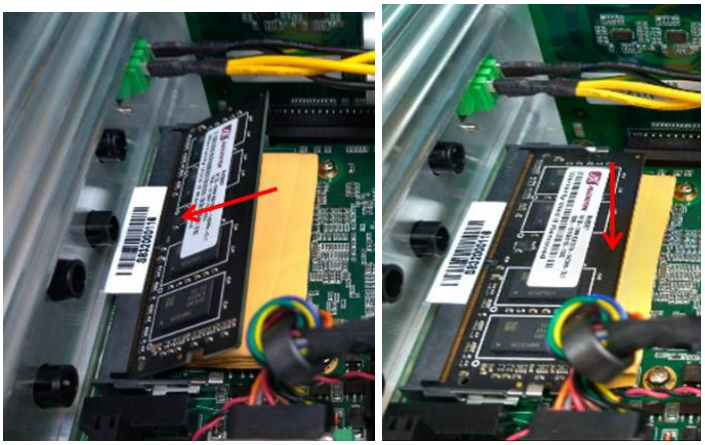
The is flexible for your different hardware configurations, such as the memory module, hard disk drive, mini card and I/O module. Chapter 2 will show you how to install the hardware.

2.1 Installing the Memory & Wireless Module

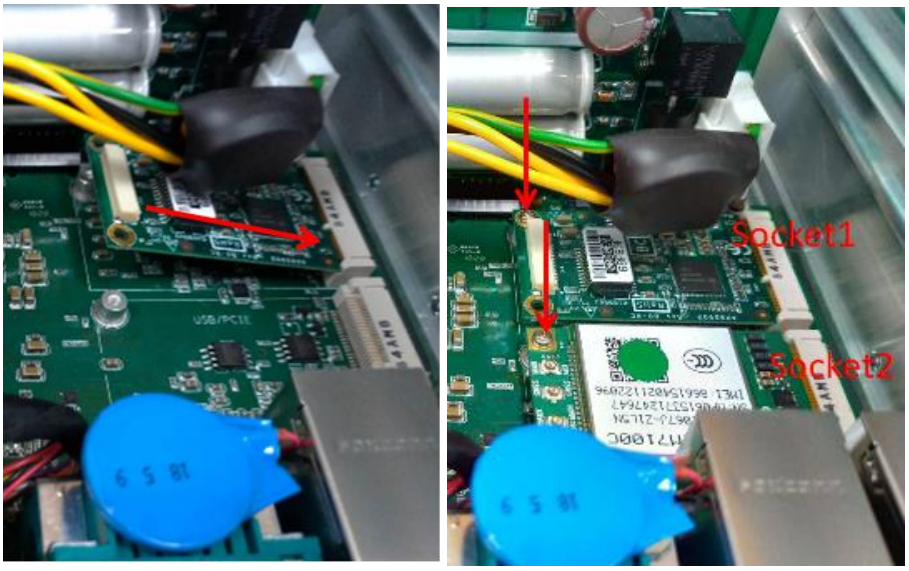
Step 1 Turn off the system.

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

Step 3 Put the thermal pad on the SO-DIMM socket. Then insert the module's gold finger into the socket and push the module down to finish the memory installation.



Step 4 **Insert the PCIe Card into the socket and fasten screws. (Note: For the mini card with SIM function, the PCIe card should be inserted into Socket1)**



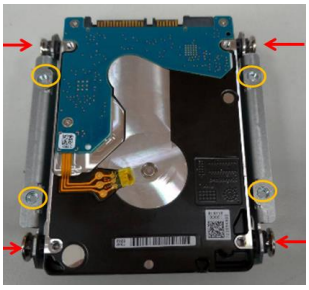
Step 5 **Put the cover back onto the system, and fasten all screws tightly to close the chassis.**

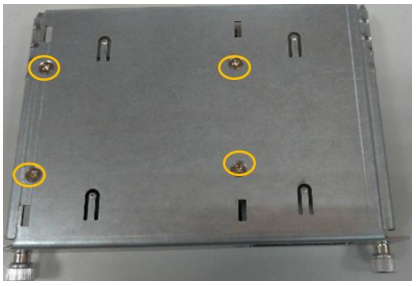
2.2 Installing the Hard Disk Drive, CFast & SIM Card

Step 1 Turn off the system.

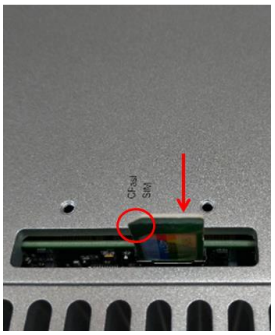
Step 2 Loosen the screw as shown below, and pull out the SSD tray from the system.

Step 3 Fasten the SSD screws (marked by the red arrows below) to fix the SSD. Then screw the SSD firmly to the tray (marked by the yellow circles) and install the tray back to the system.





Step 4 Loosen the screws to open the CFast door and install the SIM and CFast card, as illustrated below. Then lock the CFast door back to the system.



2.3 Installing the Module Card

Step 1 Turn off the system.

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

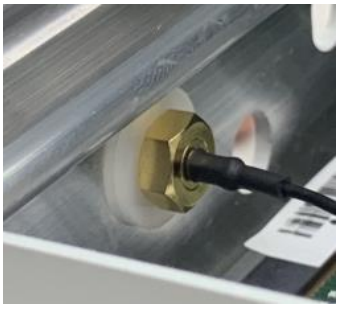
Step 3 Install the module card as shown below, and fasten the screws firmly to finish the installation.

2.4 Installing the Antenna

Step 1 Remove the black plastic antenna plug cover.

Step 2 Make the RF cable through the hole of the RF gasket.

Step 3 Install the antenna on the system as shown below.



Step 4 Hold the other side and screw the antenna.

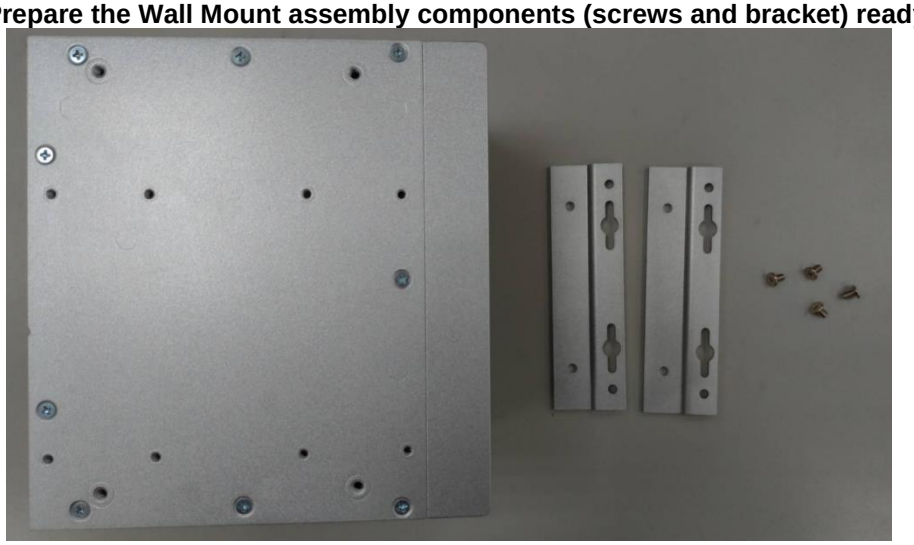
2.5 Installing the DIN-rail Mounting Kit

Step 1 Prepare the DIN-rail Mount assembly components (screws and bracket) ready.

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

2.6 Installing the Wall Mounting Kit

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



Step 2 Assemble 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.

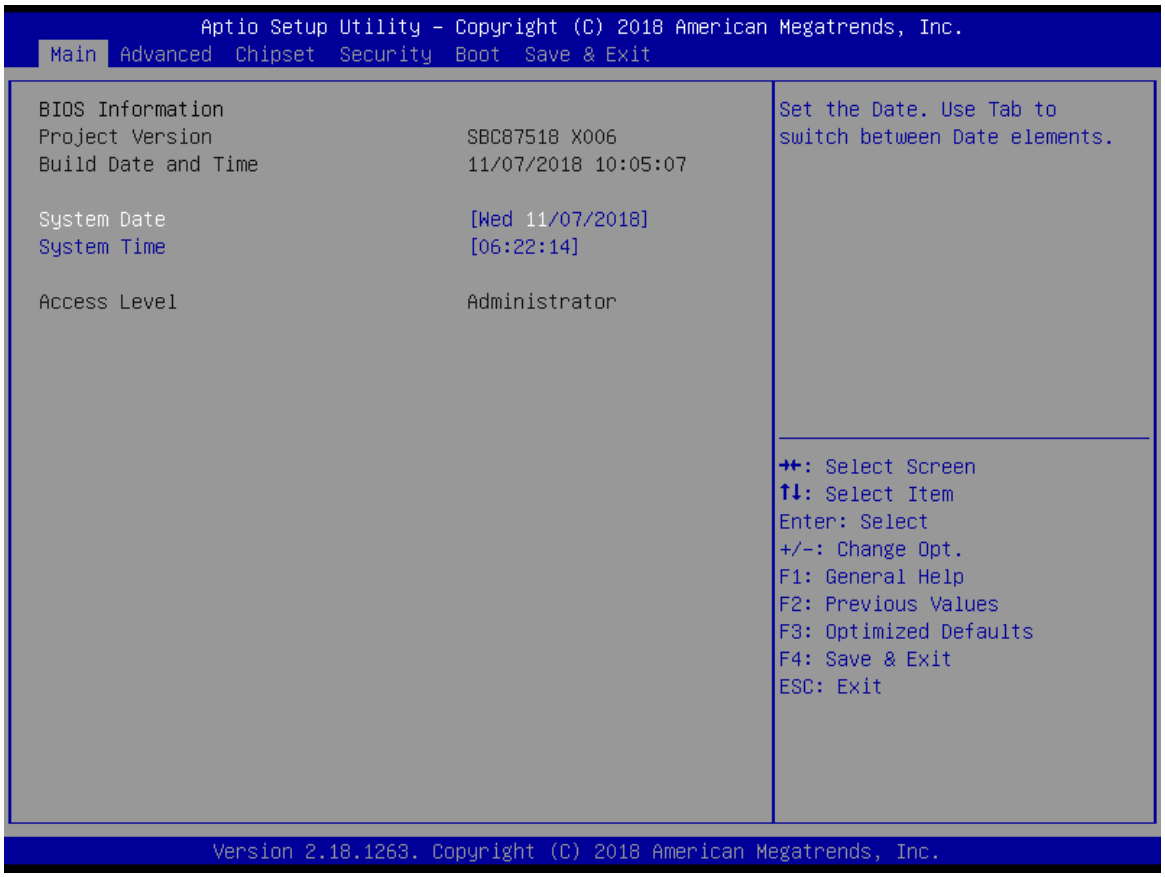
3.1 Entering Setup

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 and then press <Enter> to accept or enter its sub-menu.



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

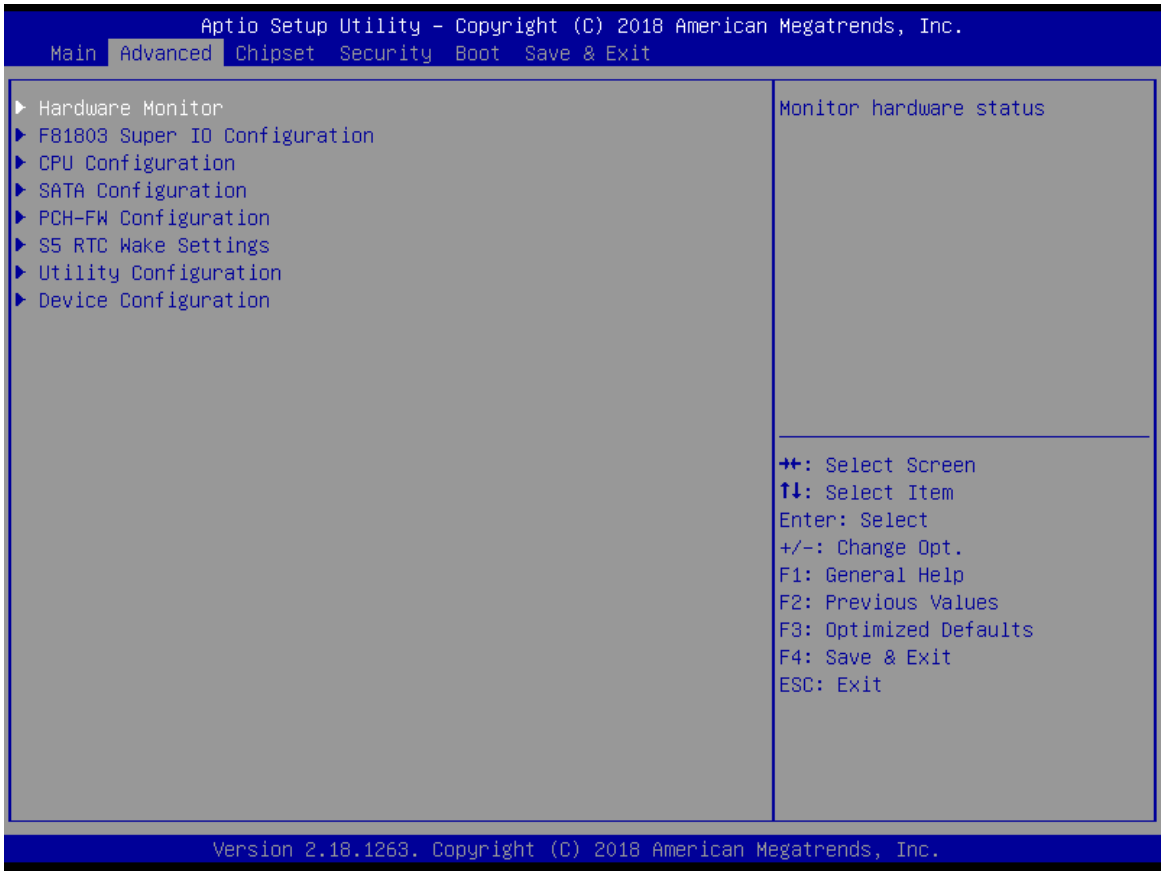
System Time
This item shows current time of your system with the format <hour> <minute> <second>. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

3.3 Advanced Features

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

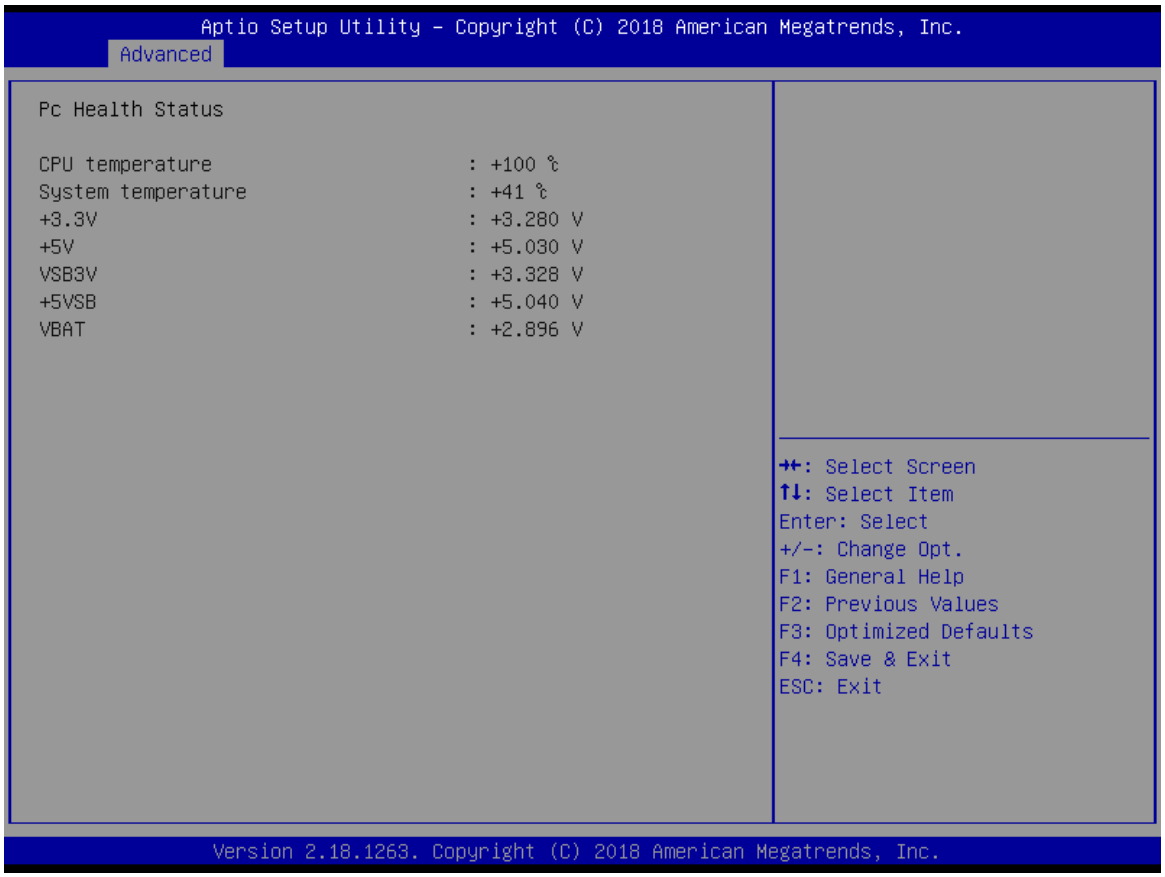
- ► Hardware Monitor
- ► F81803 Super IO Configuration
- ► CPU configuration
- ► SATA Configurations
- ► PCH-FW Configuration
- ► S5 RTC Wake Setting
- ► Utility Configuration
- ► Device Configuration

For items marked with "►", please press <Enter> for more options.



- **Hardware Monitor**

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

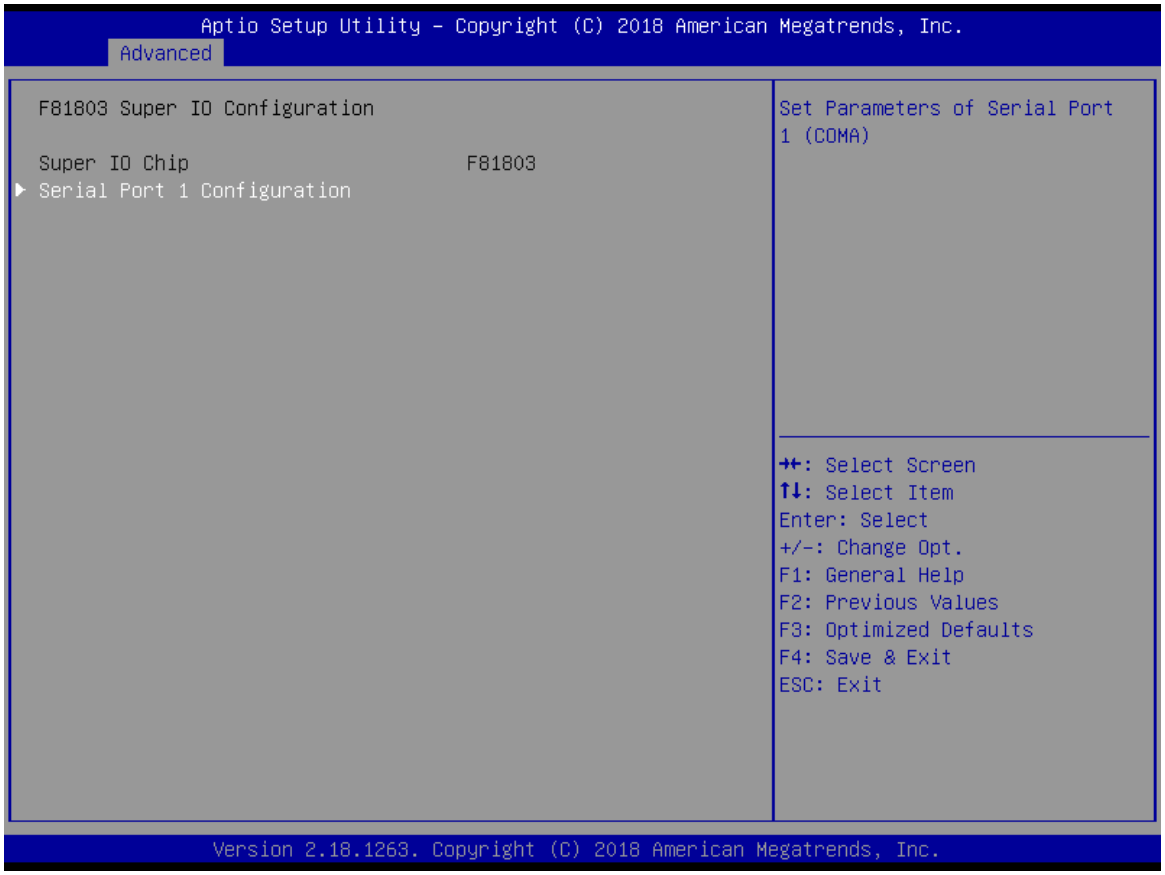


- **F81803 Super IO Configuration**

Use this screen to select options for the F81803 Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options

The default setting for all Serial Ports is RS232.

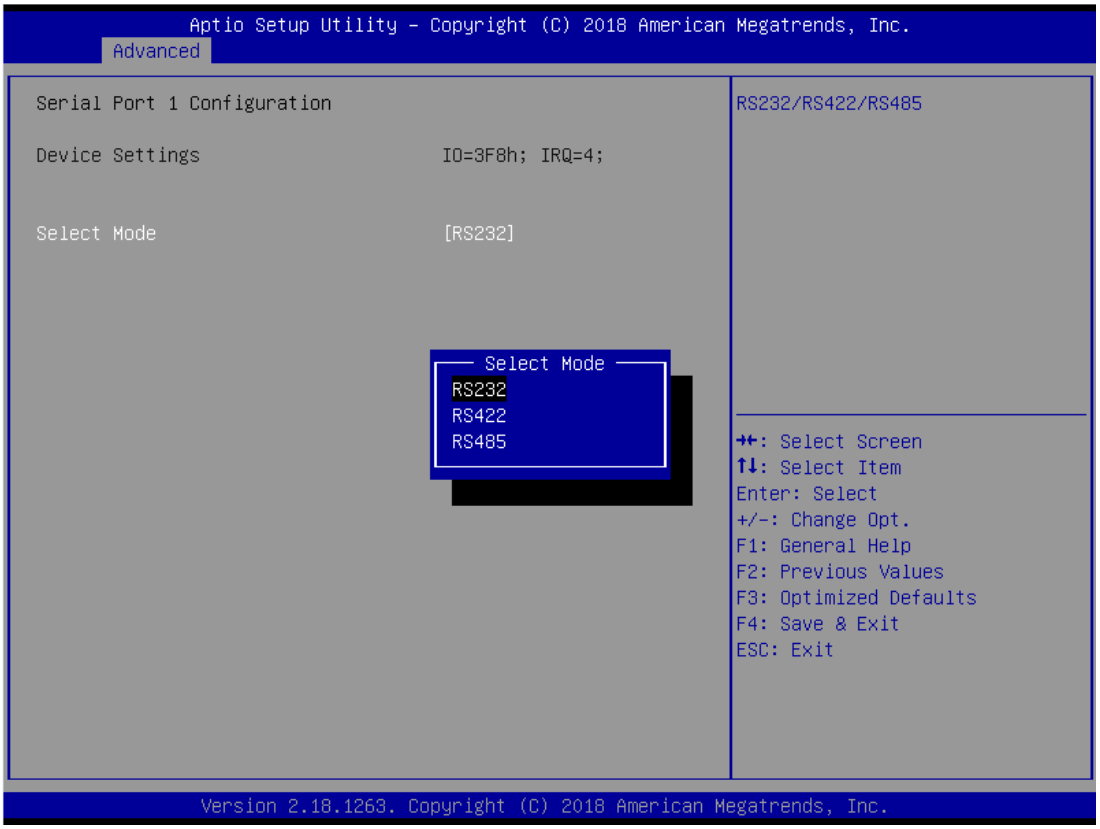
You can change the setting by selecting the value you want in each COM port type. The system supports RS422 & RS485 mode.



Serial Port 1 Configuration

Use these items to set parameters related to serial port 1.

Serial Port 1

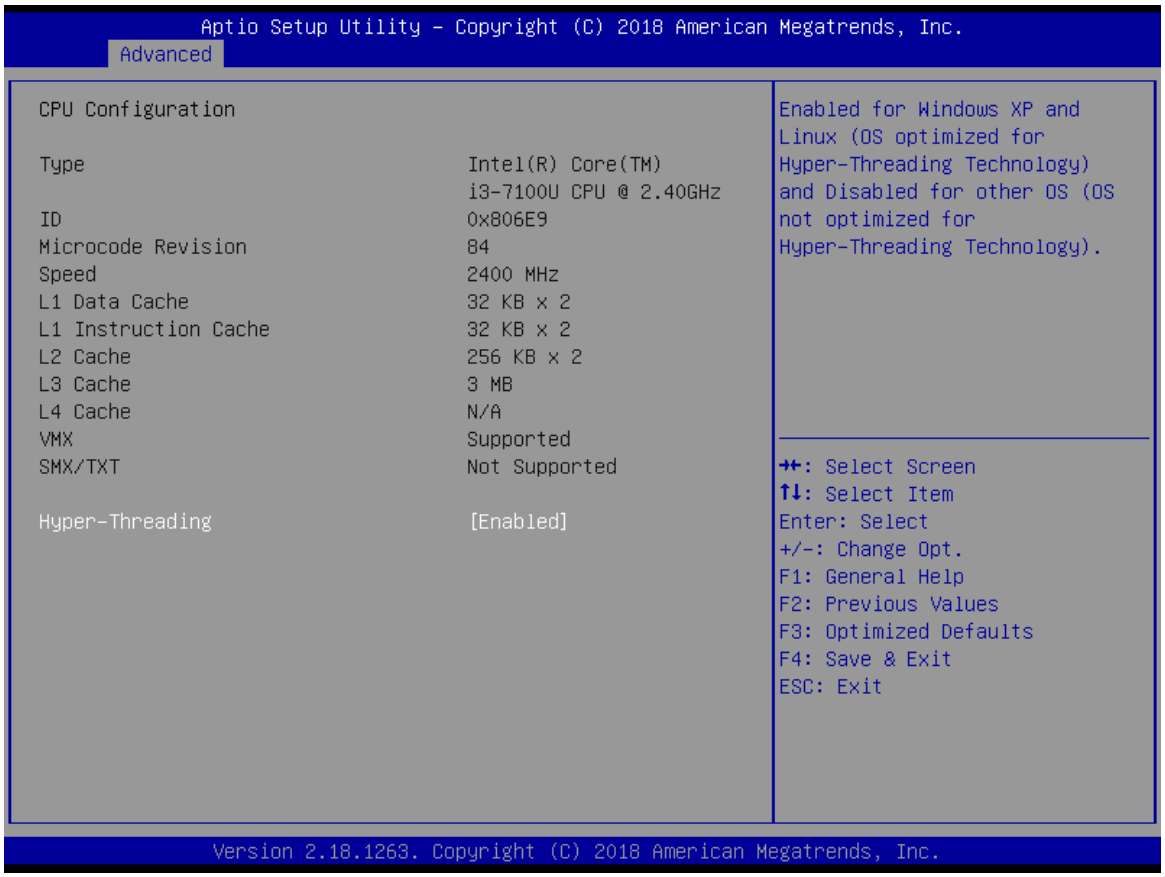


Select Mode

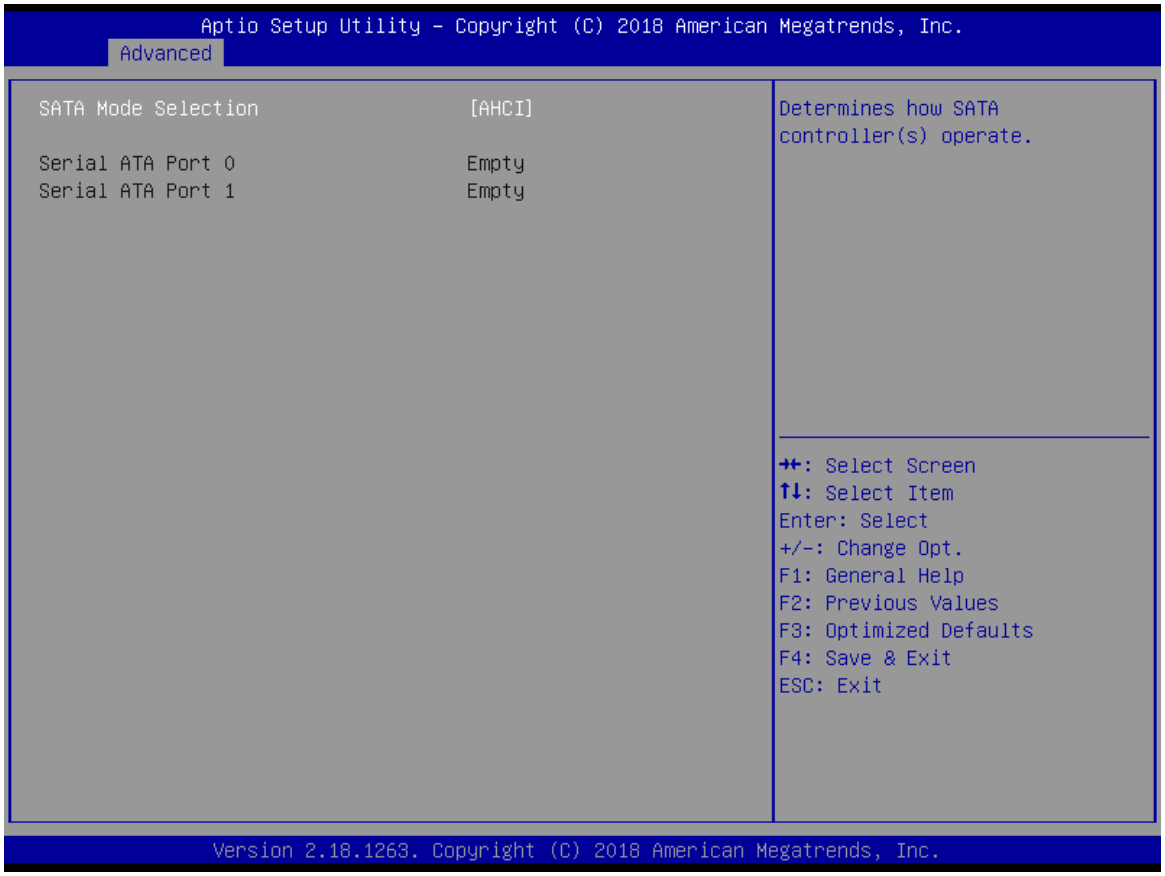
Use this option to set RS-232/RS-422/RS-485 mode.

- **CPU Configuration**

This screen shows the CPU version and its detailed information.



- **SATA Configuration**



SATA Mode Selection

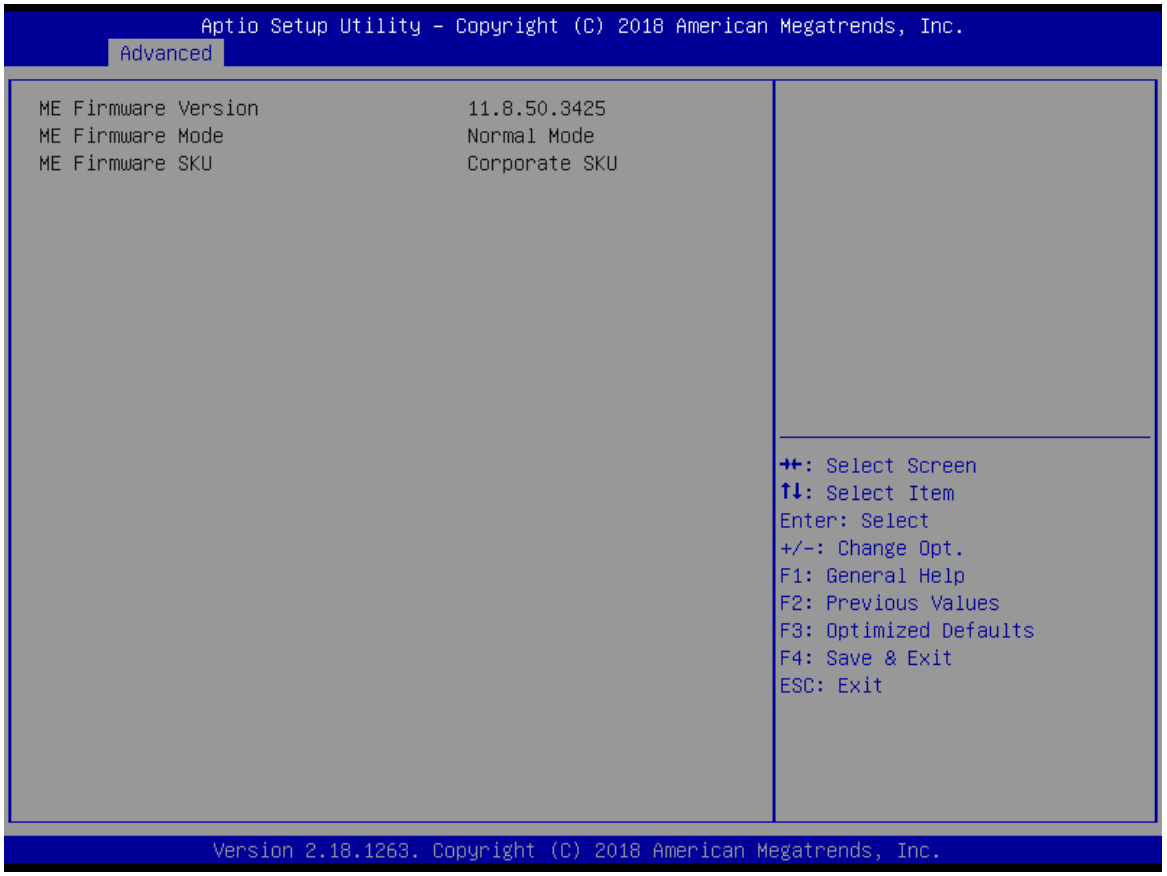
AHCI (Advanced Host Controller Interface) mode is how SATA controller(s) operate.

Serial ATA Port 0~1

It shows the device installed in connector SATA0~1.

- **PCH-FW Configuration**

This screen shows ME Firmware information.

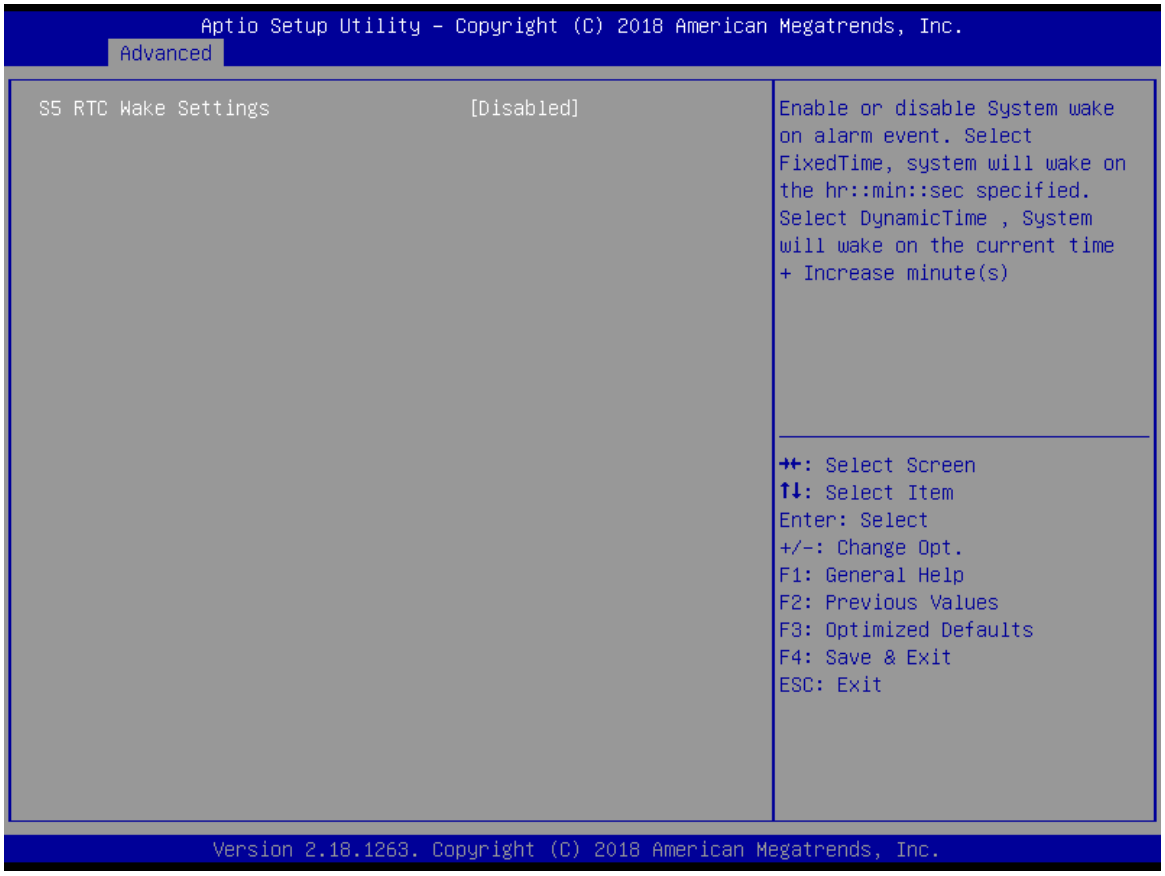


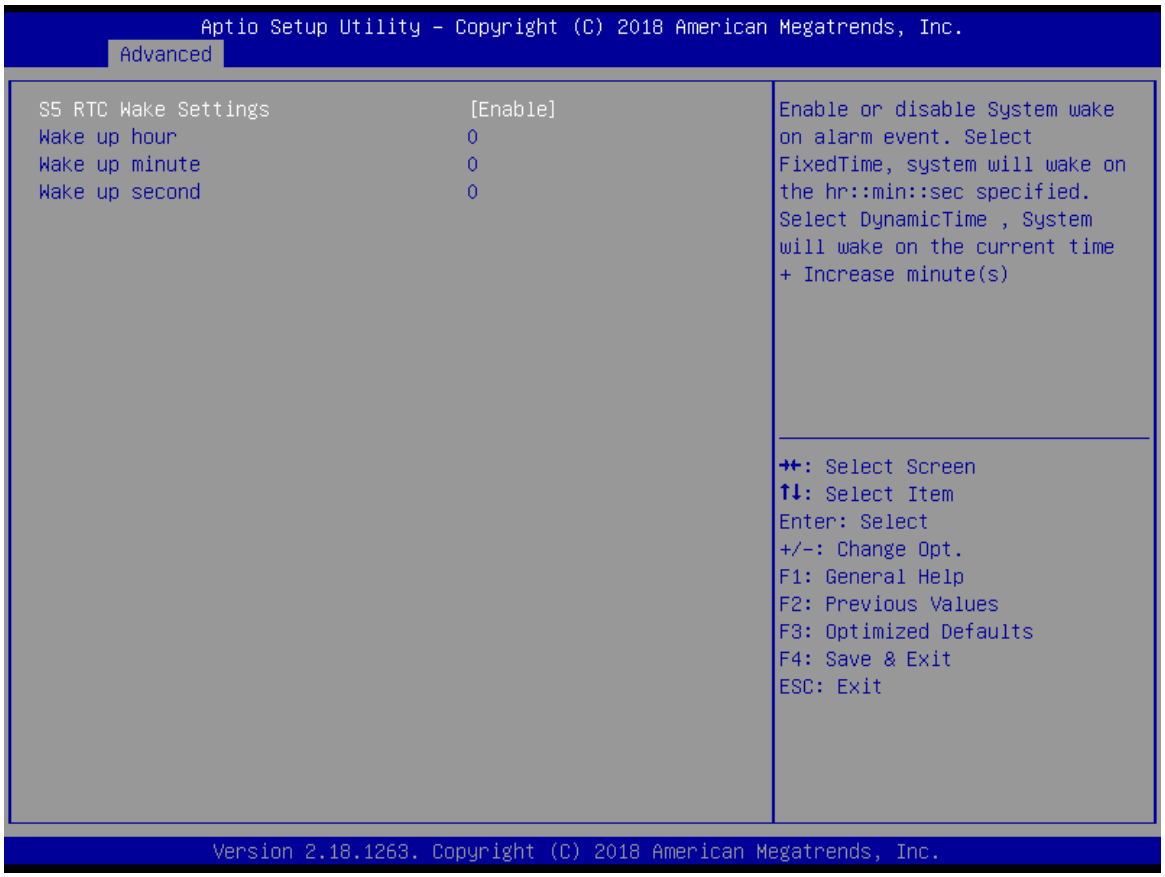
S5 RTC Wake Setting

The default setting is on.

If the setting is on, the system will wake at a fixed time specified in this option and boot up automatically.

(Please refer below graphics.)

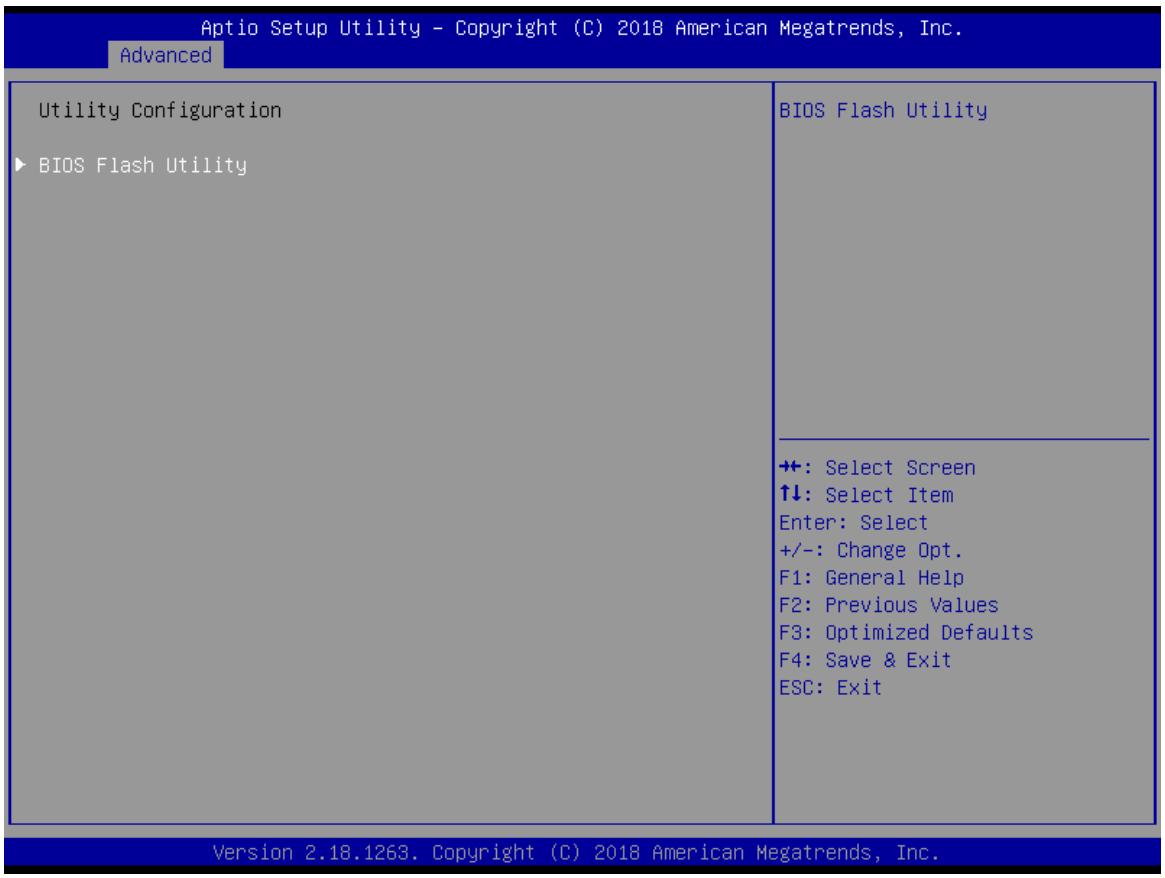


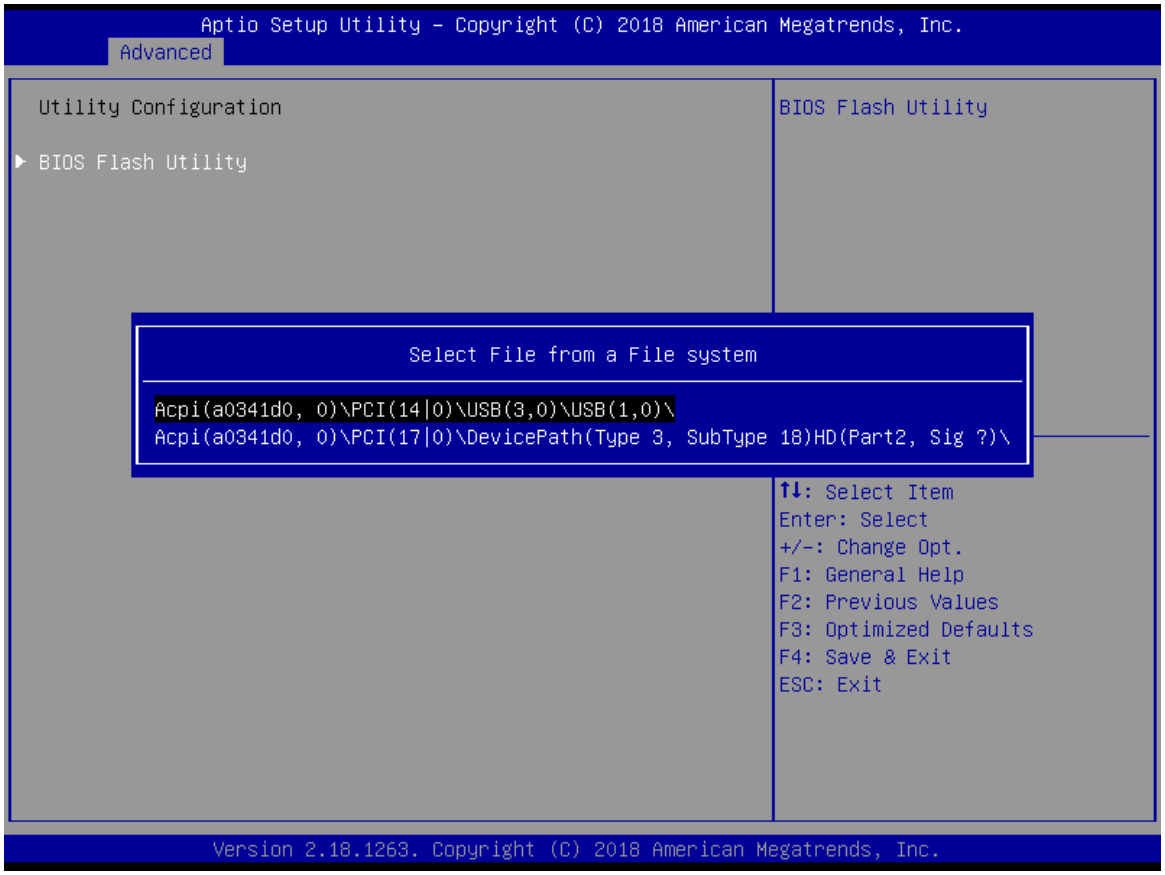

Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
S5 RTC Wake Settings
[Enable]
Wake up hour
0
Wake up minute
0
Wake up second
0
Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime , System will wake on the current time + Increase minute(s)
→←: 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) 2018 American Megatrends, Inc.

- **Utility Configuration**

BIOS flash utility is a tool for flashing BIOS on setup menu. Follow the steps 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:\ \SBC87518X.005).
   (Note : The BIOS file name must contain the word SBC87518)
3. Enter the BIOS flash utility and locate the BIOS file.
4. Push "Start to flash system BIOS".




Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File from a File system
Acpi(a0341d0, 0)\PCI(14|0)\USB(3,0)\USB(1,0)\
Acpi(a0341d0, 0)\PCI(17|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
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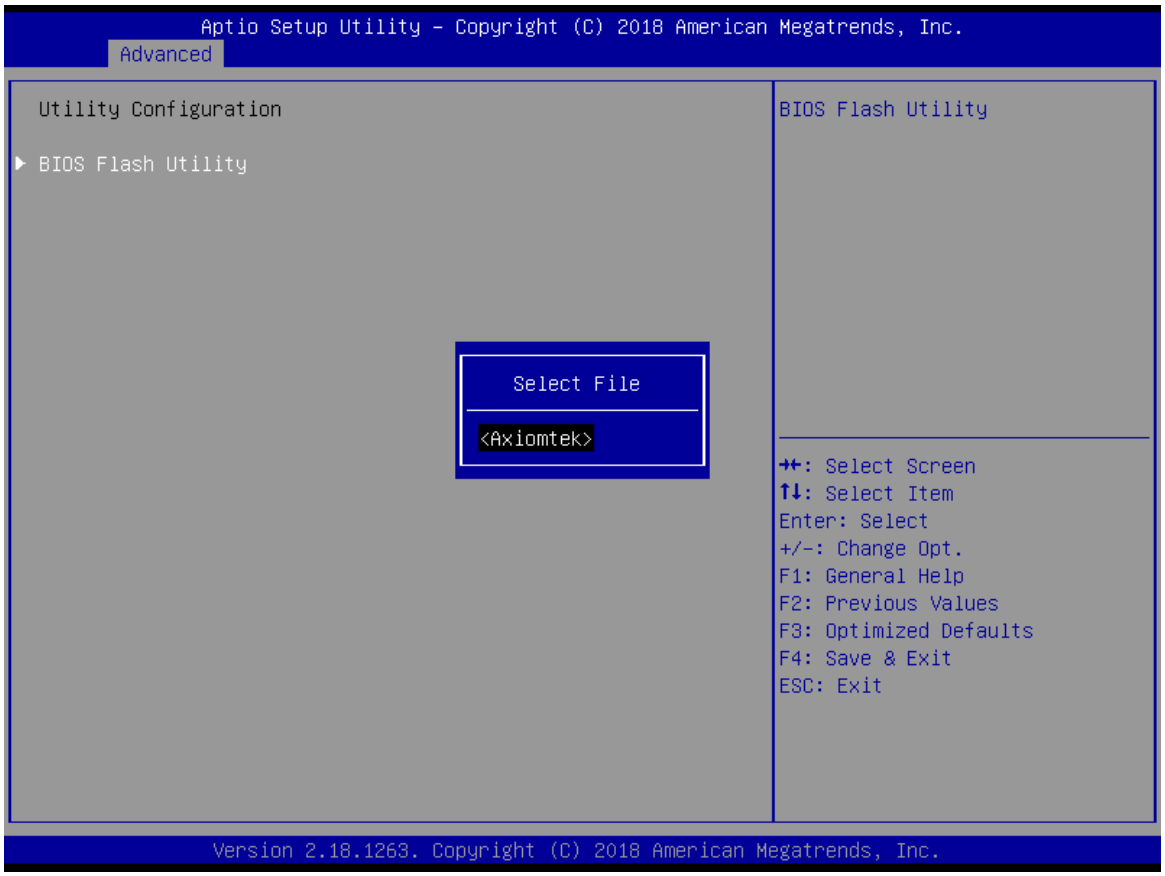
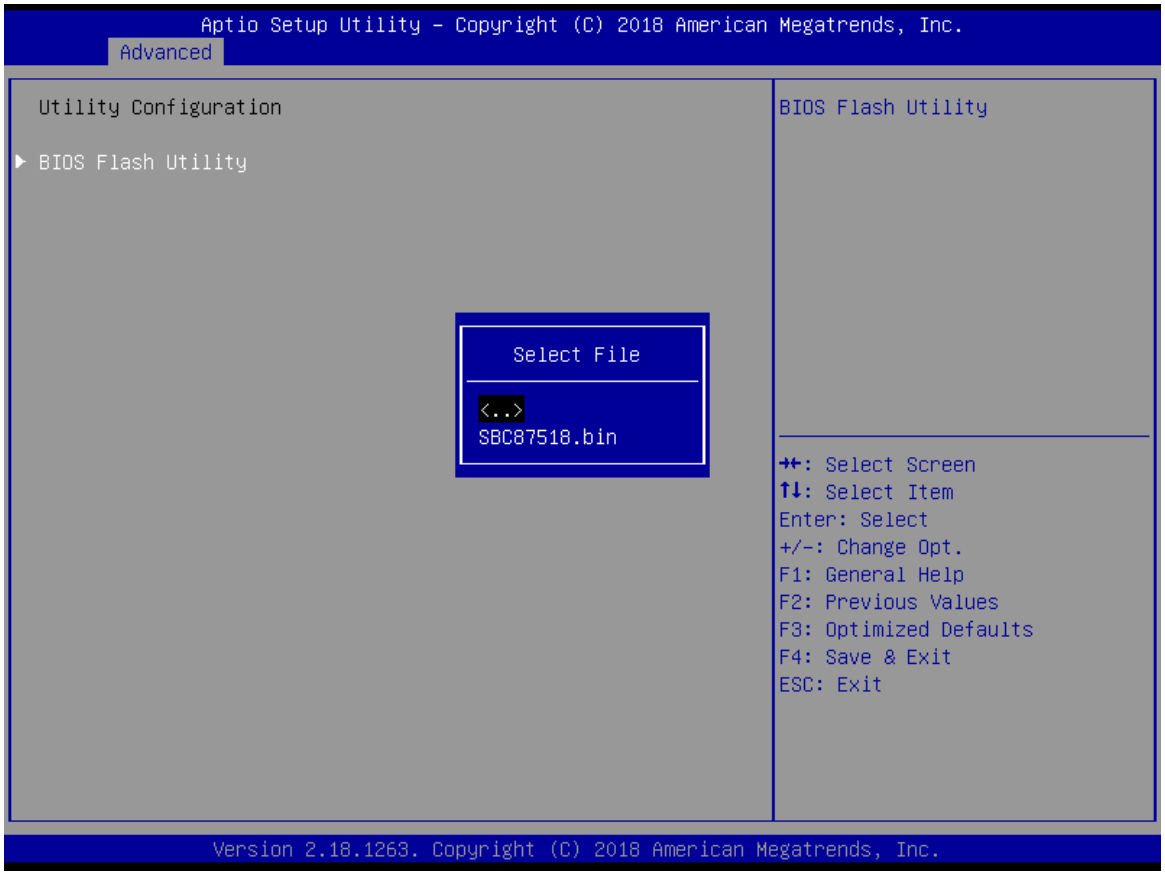

Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File
<Axiomtek>
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
Utility Configuration
BIOS Flash Utility
BIOS Flash Utility
Select File
<..>
SBC87518.bin
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
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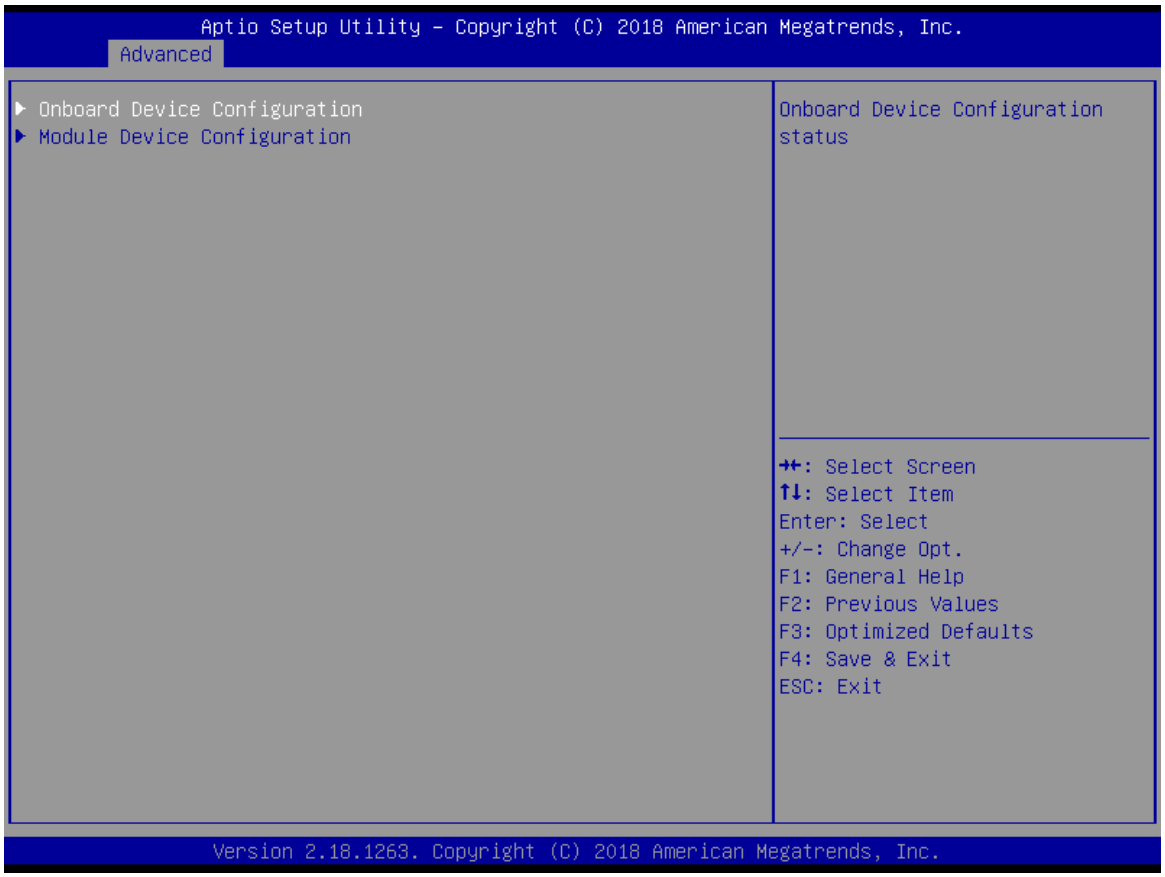
- **Device Configuration**

Device configuration divides into two parts: one part is onboard device; the other is module device.

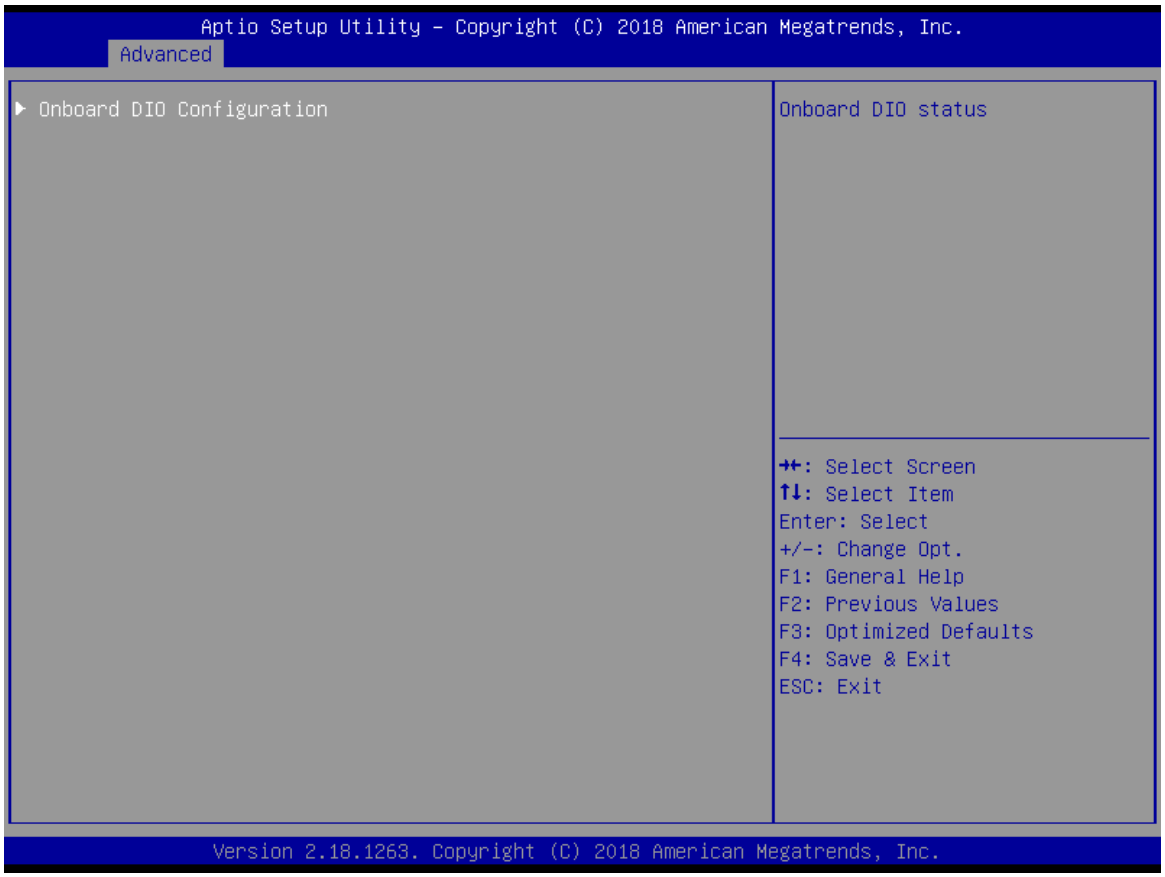
The Module Device Configuration menu would dynamically appear when a module device is plugged into the slot. When no module is plugged in, the screen would only show Onboard Device Configuration.

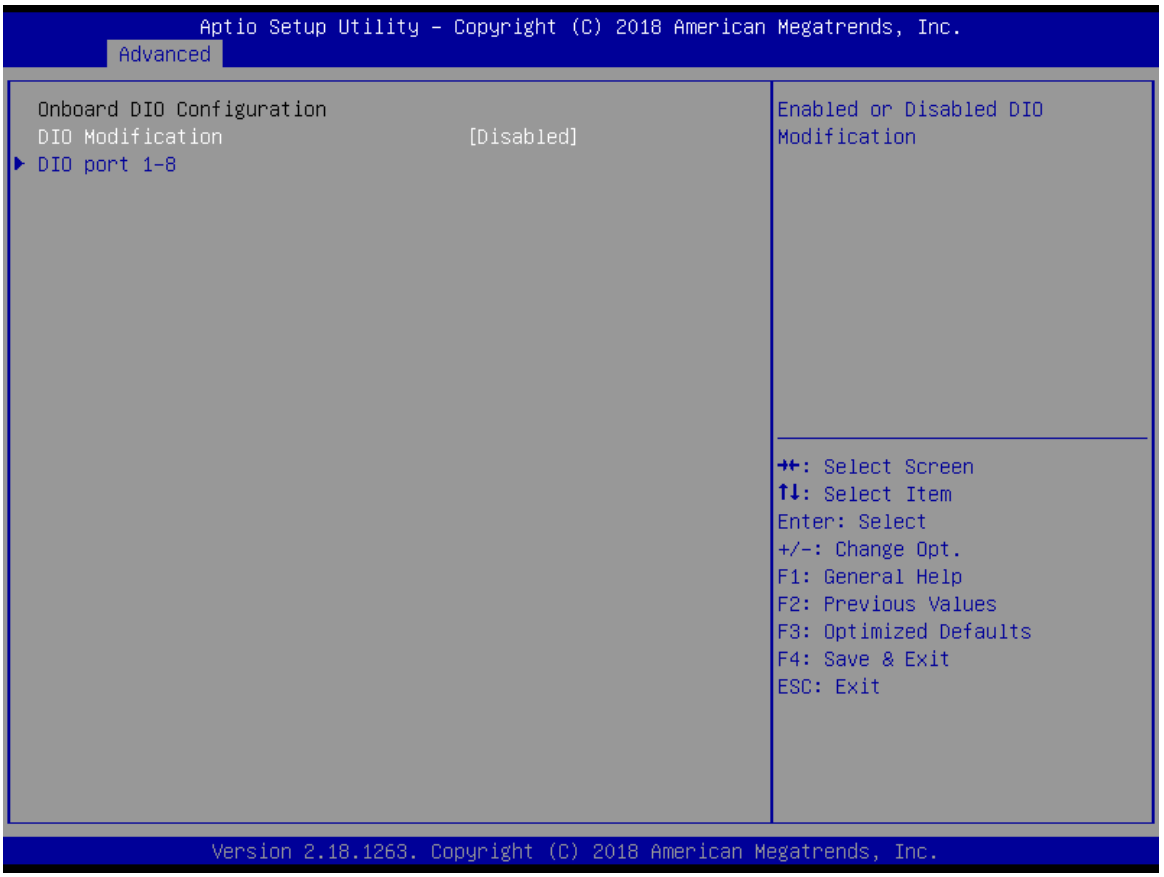


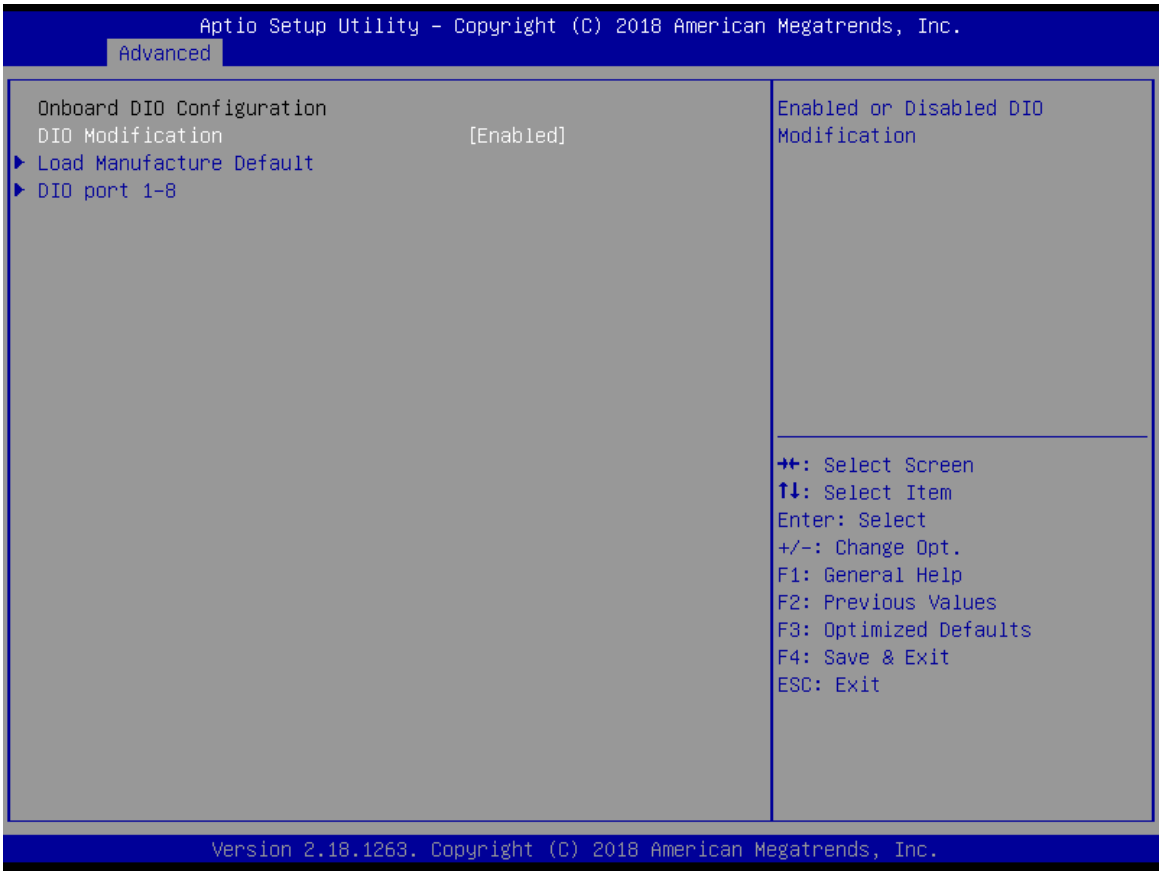
Onboard DIO Configuration

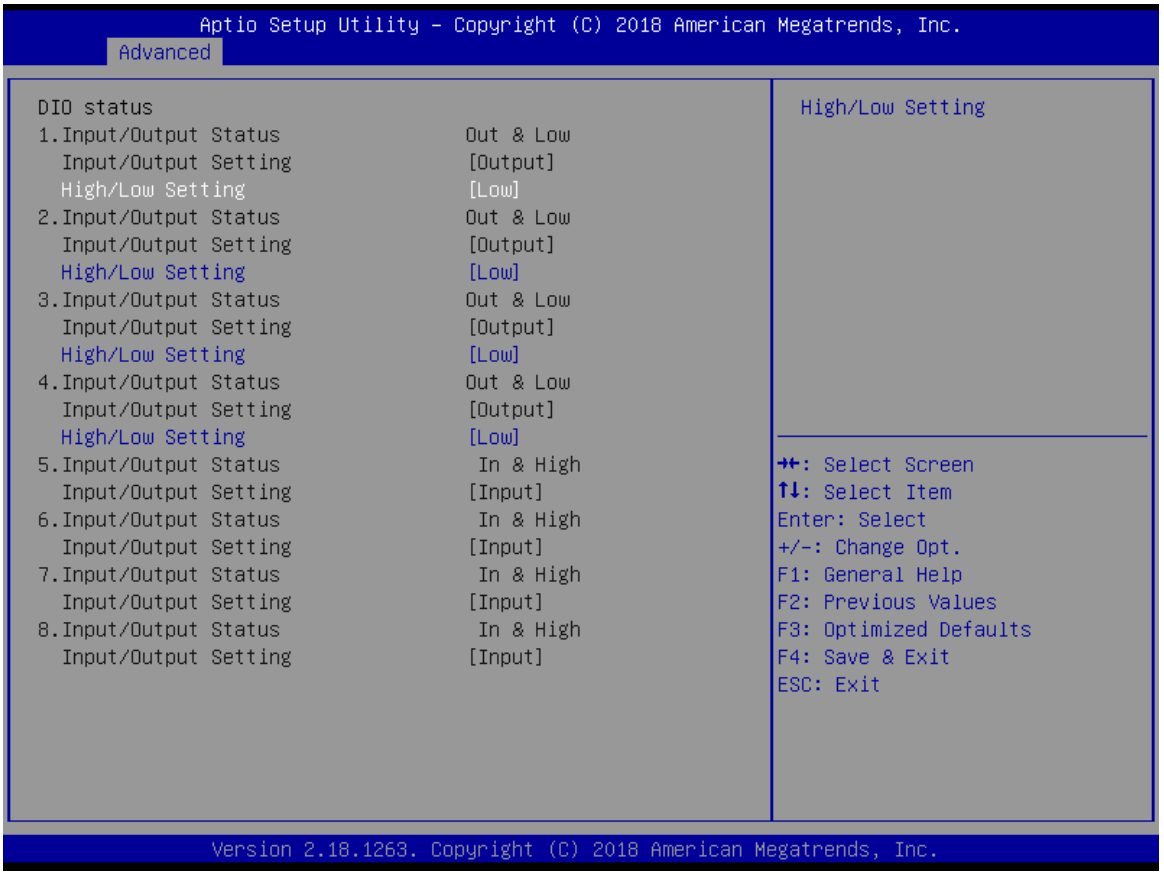
In the onboard DIO configuration, the screen displays DIO information and set I/O.

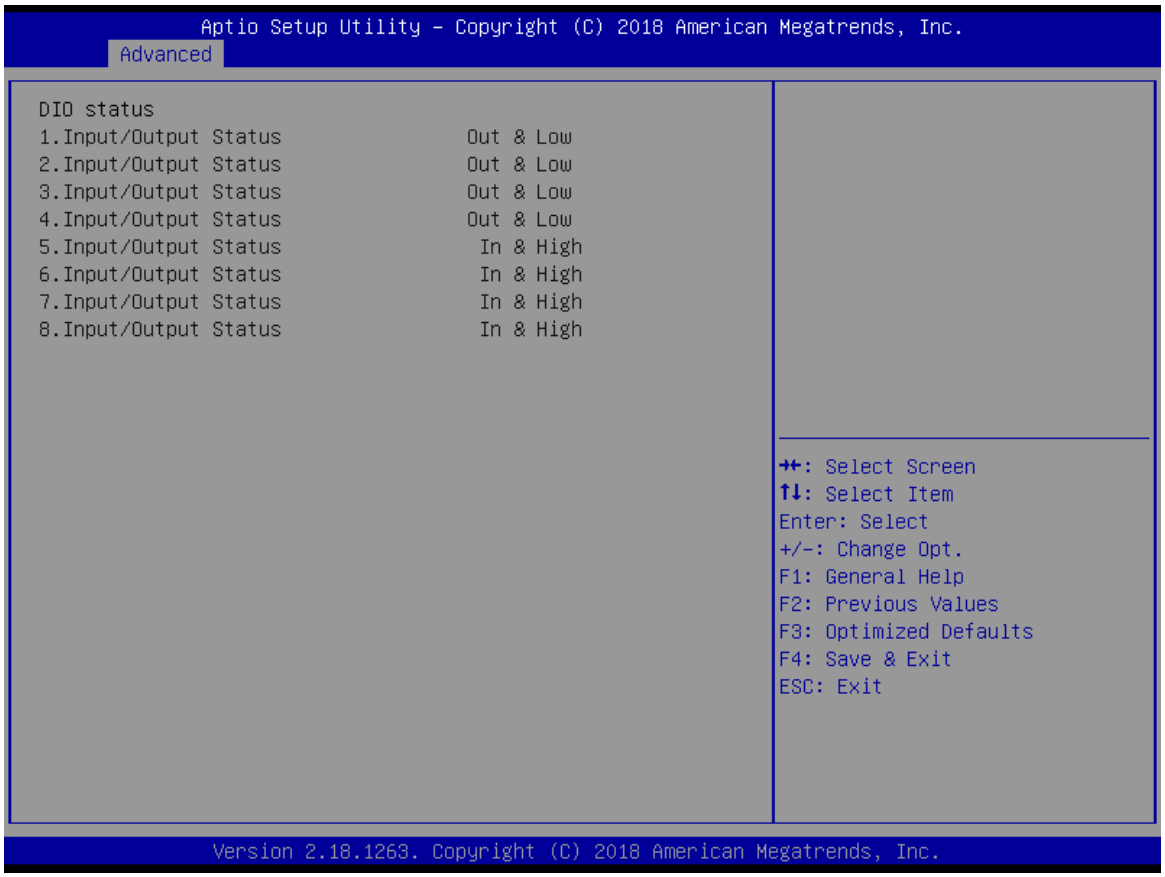
(Please refer below graphics.)




Aptio Setup Utility – Copyright (C) 2018 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) 2018 American Megatrends, Inc.

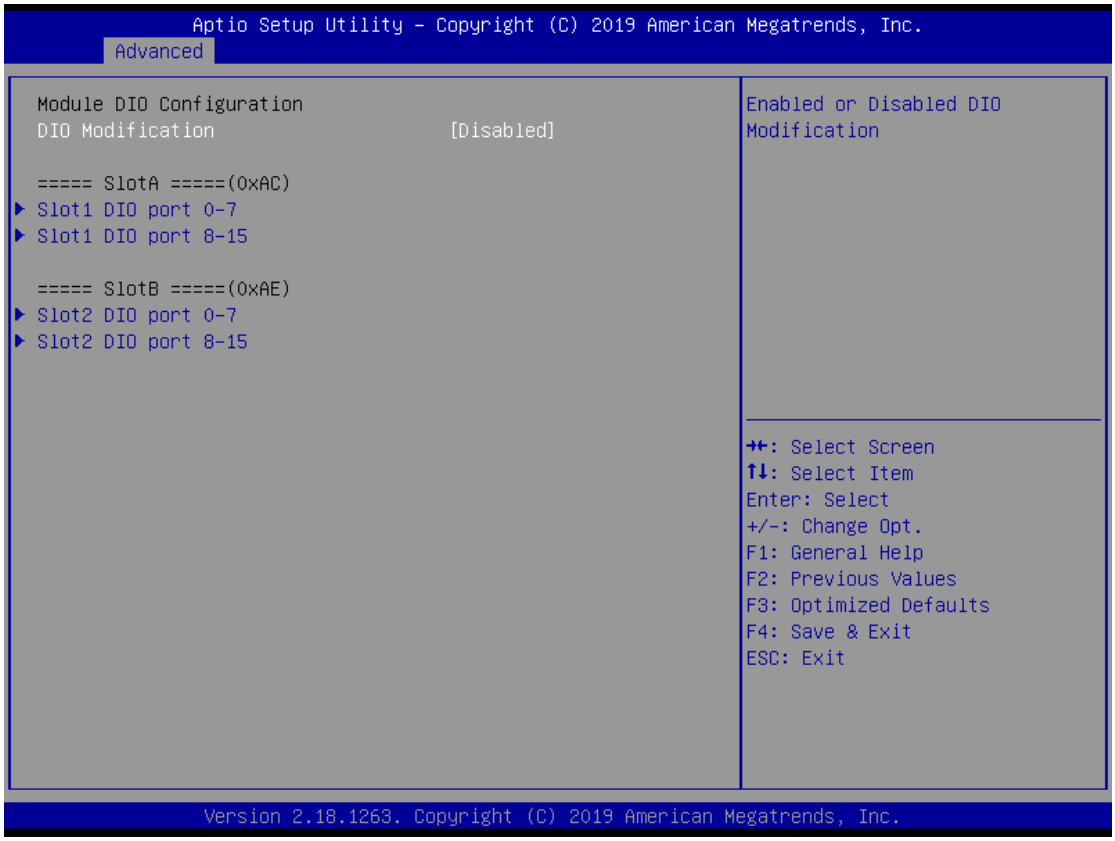

Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
Onboard DIO Configuration
DIO Modification [Enabled]
Load Manufacture Default
DIO port 1-8
Enabled or Disabled DIO Modification
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.

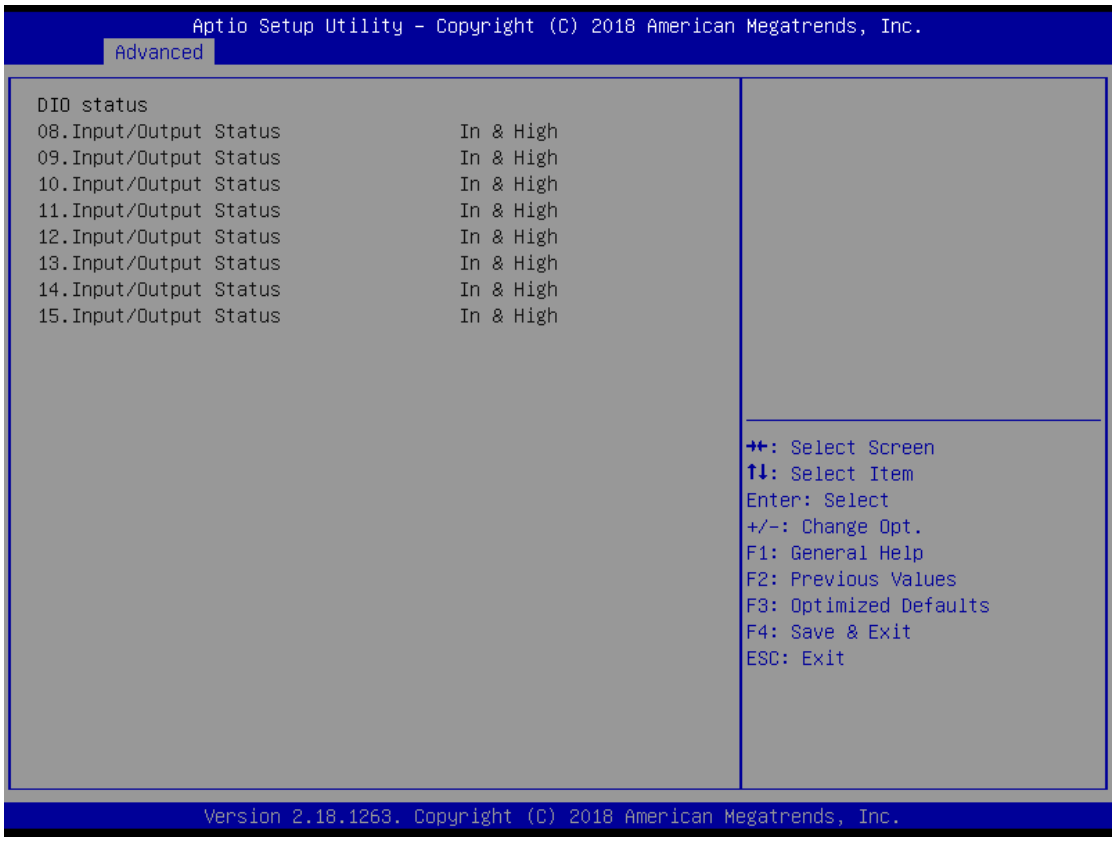

Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
DIO status
1.Input/Output Status Out & Low
Input/Output Setting [Output]
High/Low Setting [Low]
2.Input/Output Status Out & Low
Input/Output Setting [Output]
High/Low Setting [Low]
3.Input/Output Status Out & Low
Input/Output Setting [Output]
High/Low Setting [Low]
4.Input/Output Status Out & Low
Input/Output Setting [Output]
High/Low Setting [Low]
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]
High/Low 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) 2018 American Megatrends, Inc.


Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
DIO status
1.Input/Output Status Out & Low
2.Input/Output Status Out & Low
3.Input/Output Status Out & Low
4.Input/Output Status Out & Low
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) 2018 American Megatrends, Inc.

Module DIO Configuration

When the module has DIO functions, the module DIO configuration menu would show and display DIO information and set I/O.
(Please refer below graphics.)




Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
DIO status
08.Input/Output Status In & High
09.Input/Output Status In & High
10.Input/Output Status In & High
11.Input/Output Status In & High
12.Input/Output Status In & High
13.Input/Output Status In & High
14.Input/Output Status In & High
15.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
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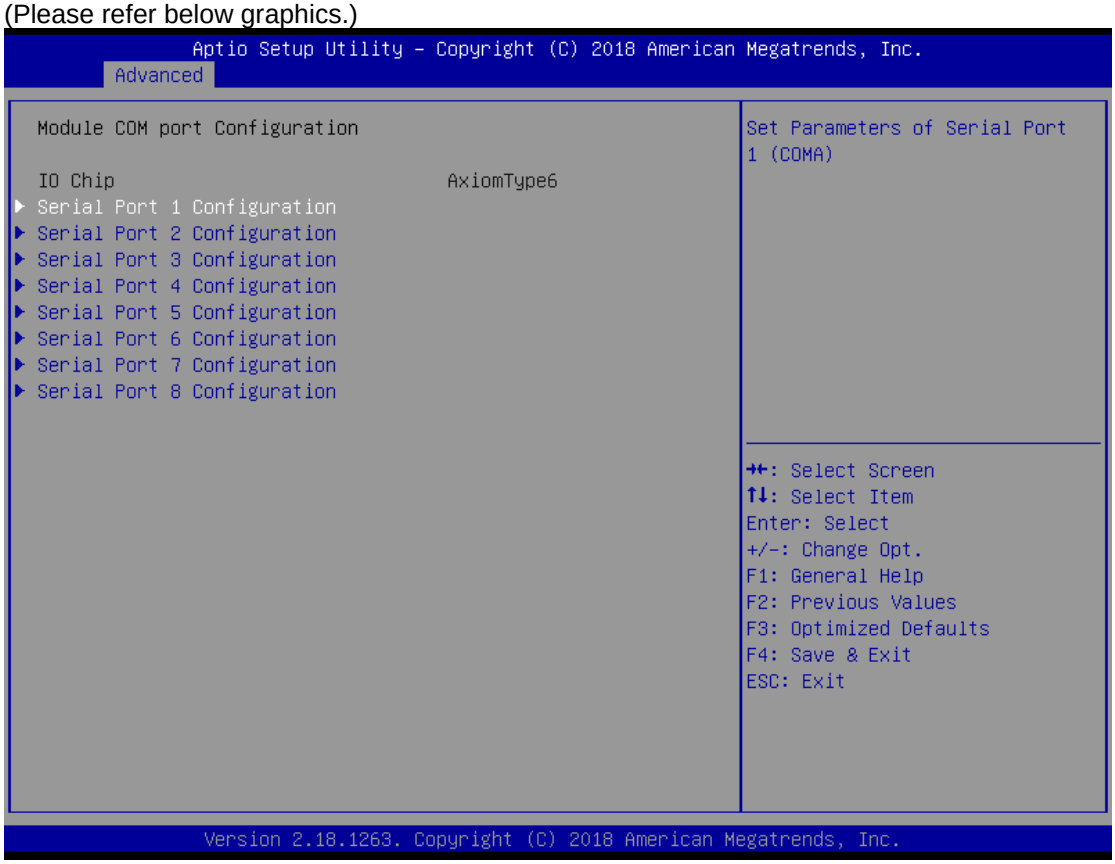
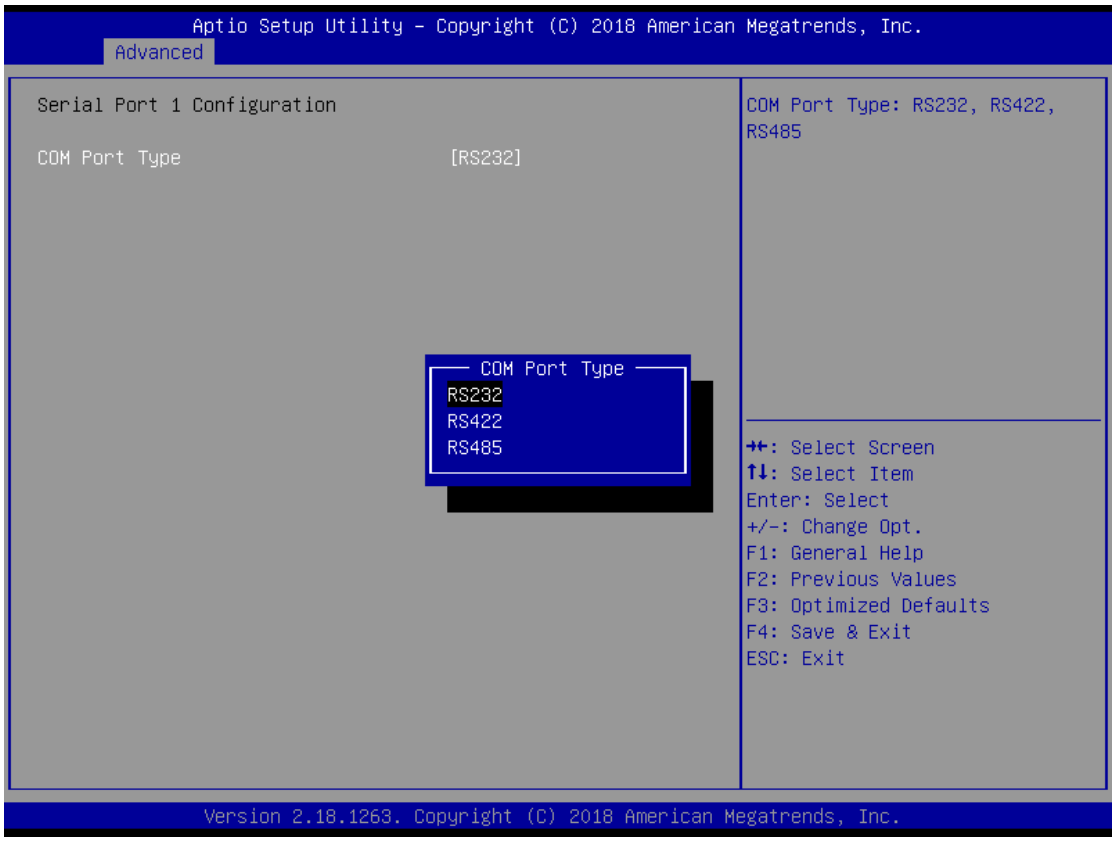
Module COM port Configuration

When the module have COM port functions, the module COM configuration menu would show.

The default setting for all Serial Ports is RS232.

You can change the setting by selecting the value you want in each COM port type. The system supports RS422 & RS485 mode and high speed mode.
(Please refer below graphics.)



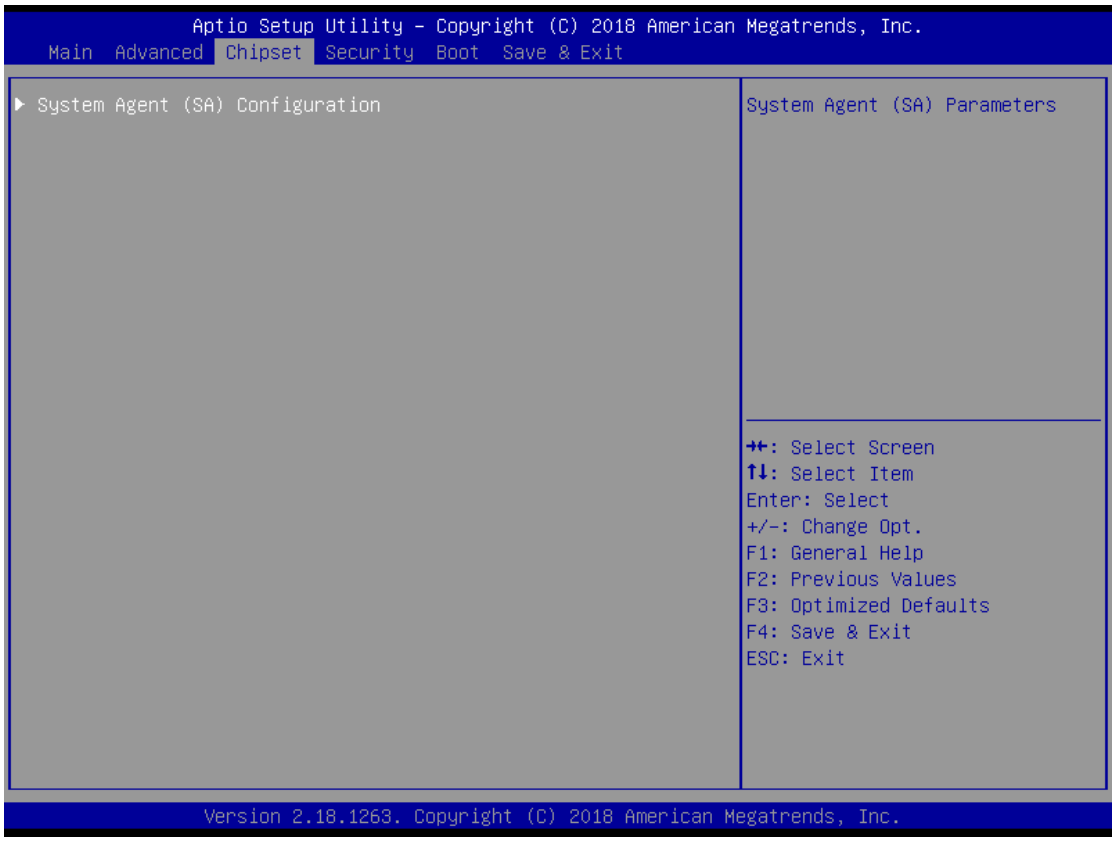

Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
Advanced
Serial Port 1 Configuration
COM Port Type [RS232]
COM Port Type: RS232, RS422, RS485
COM Port Type
RS232
RS422
RS485
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.

3.4 Chipset Feature

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

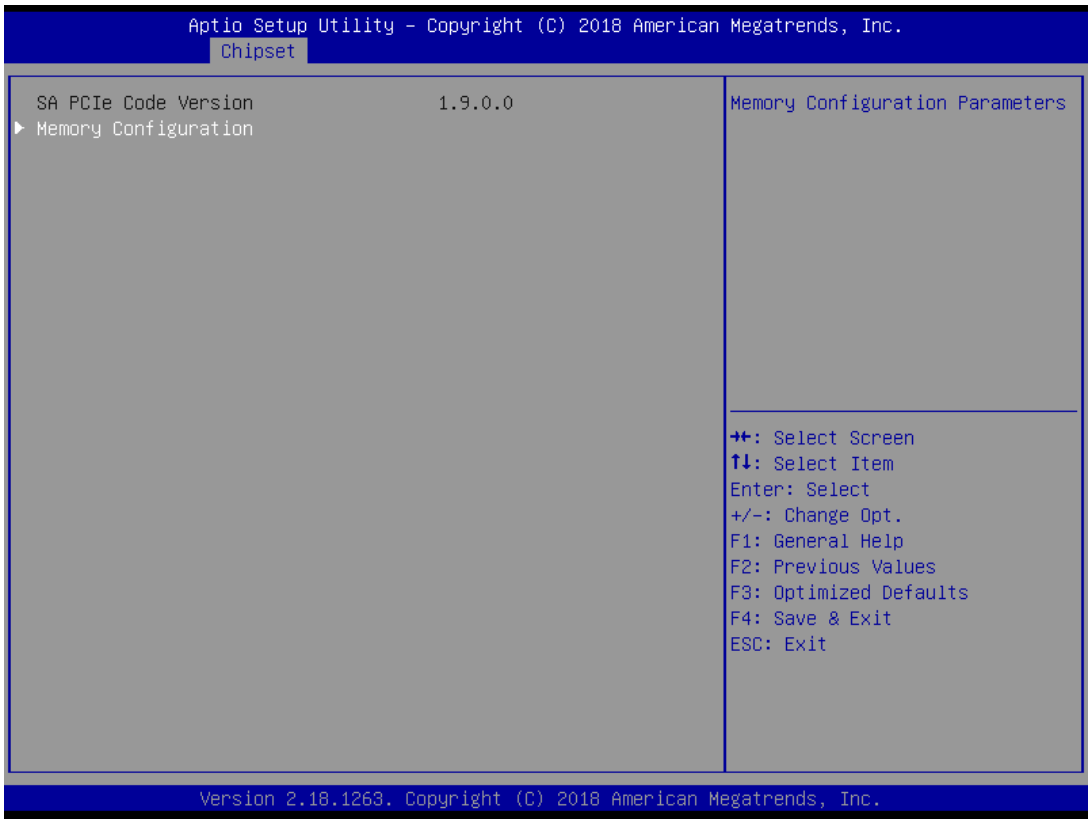
- ► System Agent (SA) Configuration

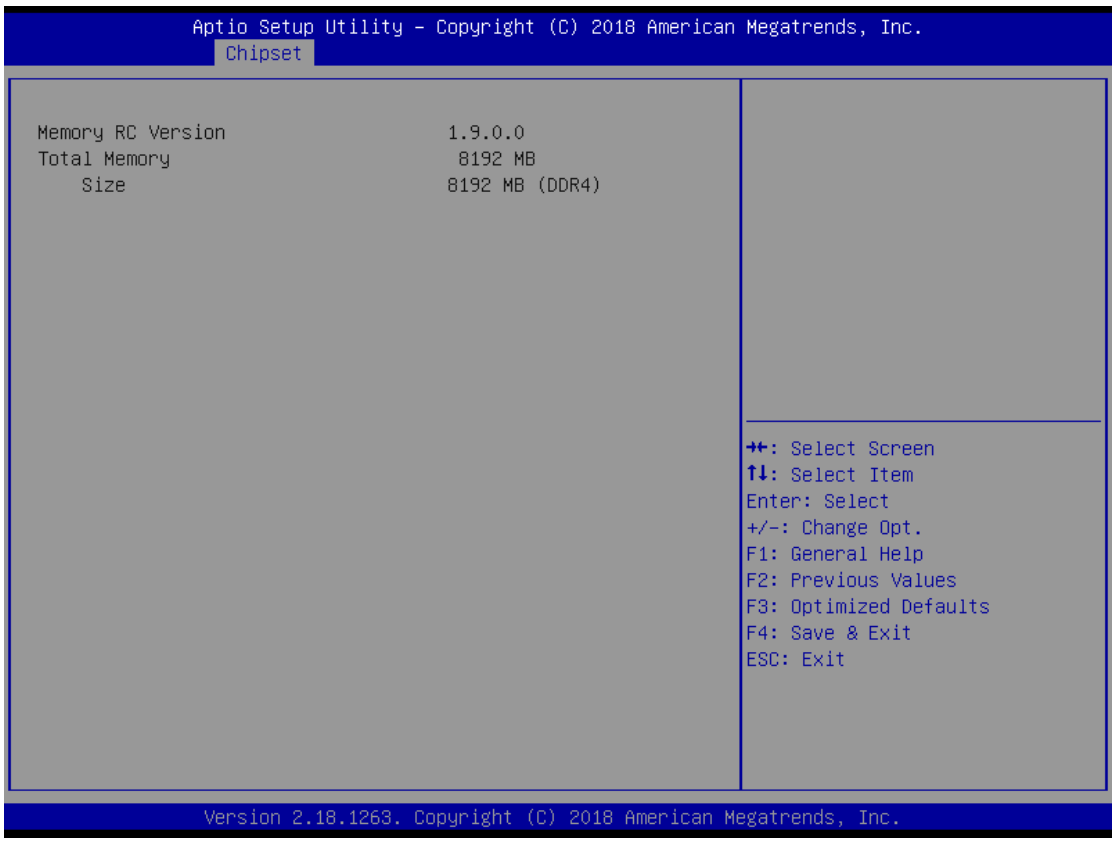
For items marked with "►", please press <Enter> for more options.



- **Memory Configuration**

This screen shows the system memory information.

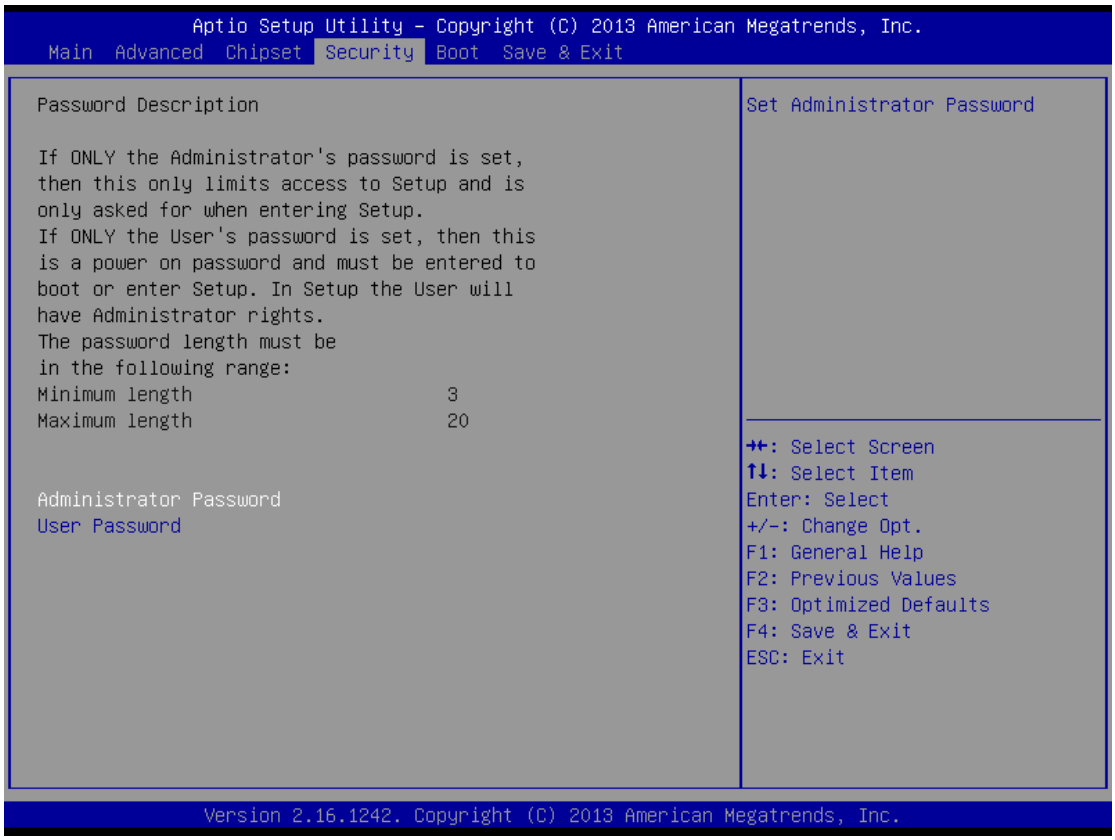




3.5 Security

The Security menu allows users to set an administrator password and a user password to enhance system security. No password is set in the default setting.

(Please refer below graphics.)



Administrator Password

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

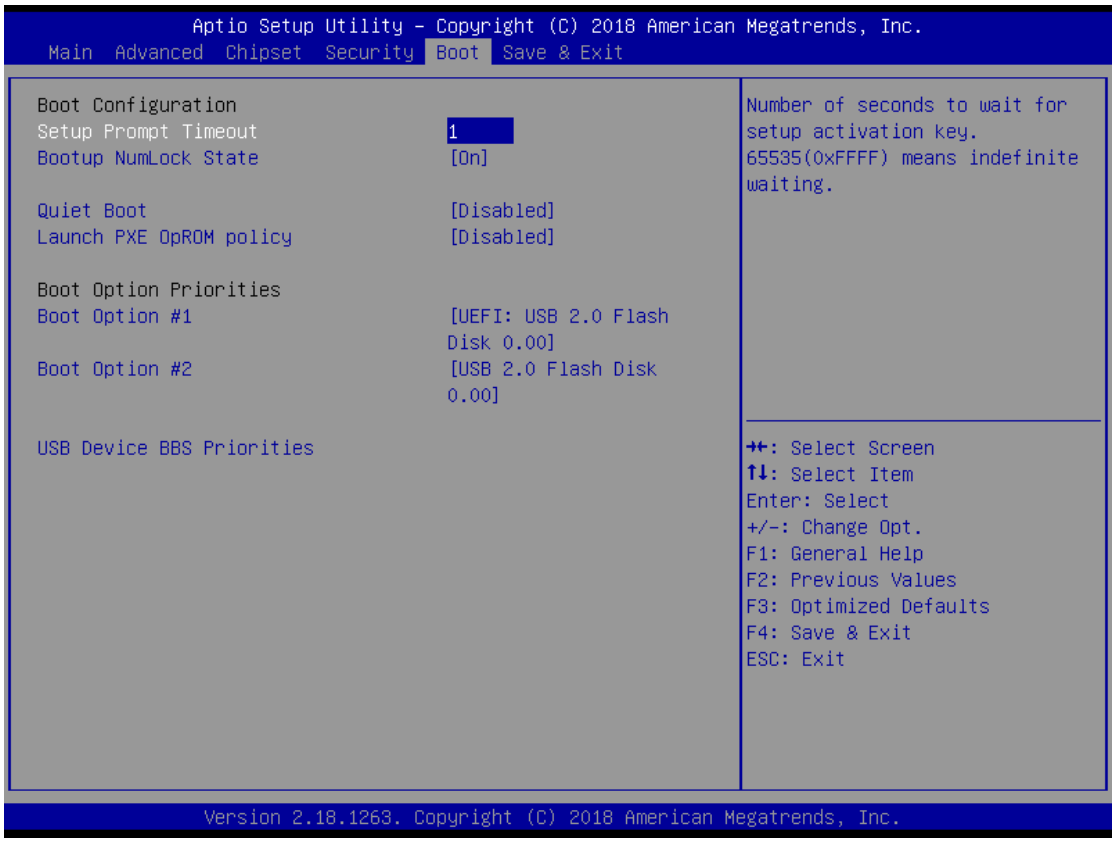
User Password

This item indicates whether a user password has been set (installed or uninstalled).

Note: The BIOS default has no password. The user must remember the password after creating it. If the user forgets the password the RMA is the only solution.

3.6 Boot Type

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



Setup Prompt Timeout

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

Bootup NumLock State

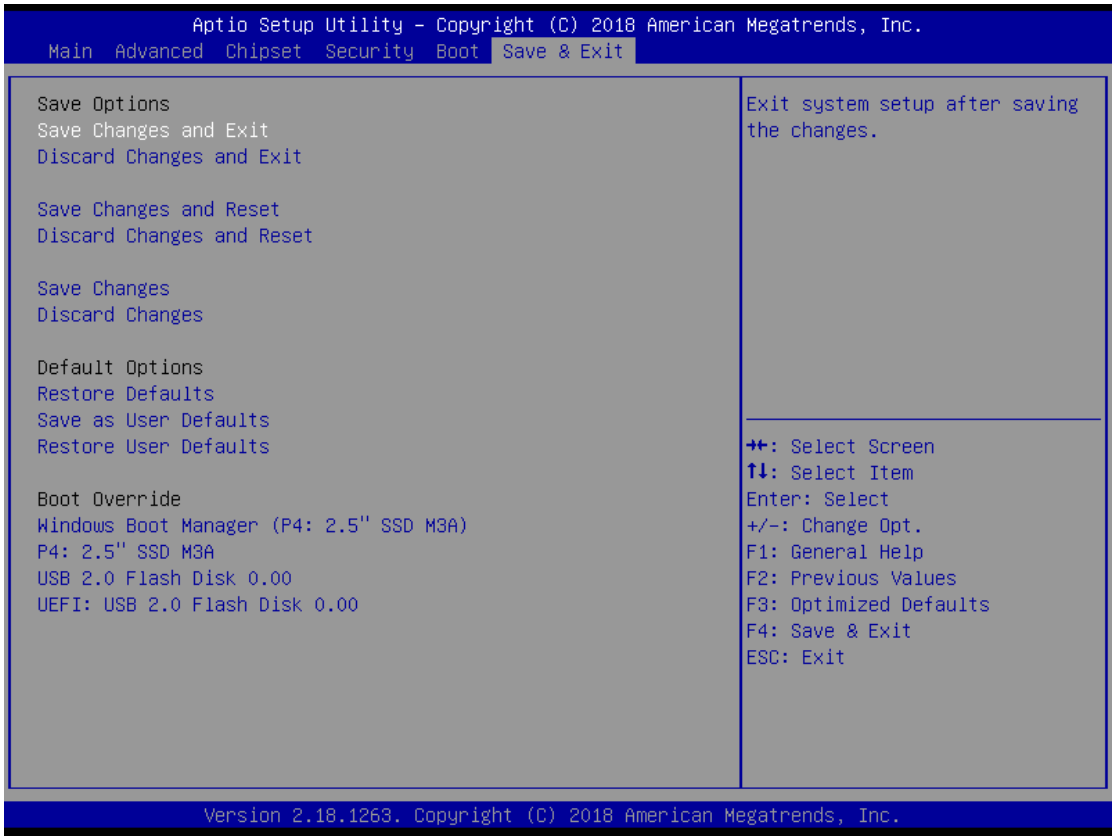
Use this item to select the power-on state for the keyboard NumLock.

Boot Option Priorities

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

3.7 Save & Exit

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



Save Changes and Exit

When users have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configurations and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

Save Changes and Reset

After completing the system configuration changes, select this option to leave Setup and reboot the computer so the new system configurations will take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

Discard Changes and Reset

Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

Save Changes

After completing the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

Discard Changes

Select this option to quit Setup without making any permanent changes to the system configurations. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

Restore Defaults

It automatically sets all Setup options to a complete set of default settings when users select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

Save as User Defaults

Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

Restore User Defaults

It automatically sets all Setup options to a complete set of User Defaults when users select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

Boot Override

Select a drive to immediately boot that device regardless of the current boot order.

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APPENDIX A
WATCHDOG TIMER

About Watchdog Timer

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 a program.

How to Use Watchdog Timer

The following example shows how to enable configuration using a debug tool.

Step	Description	Sample code	Note
1	Enter configuration mode	O 2E 87	Un-lock super I/O
		O 2E 87	
2	Select logic device	O 2E 07	Select logic register
		O 2F 07	Switch to WDT device
3	Set timer value	O 2E F6	Select logic register
		O 2F 05	Timer value 0~255 (Sec/Min) (Ex: 5)
4	Clear WDT status (optional)	O 2E F5	Select logic register
		O 2F 40	
5	Set time unit and start WDT	O 2E F5	Select logic register
		O 2F M	M = 28h (Minute) ,
			M = 20h (Second)

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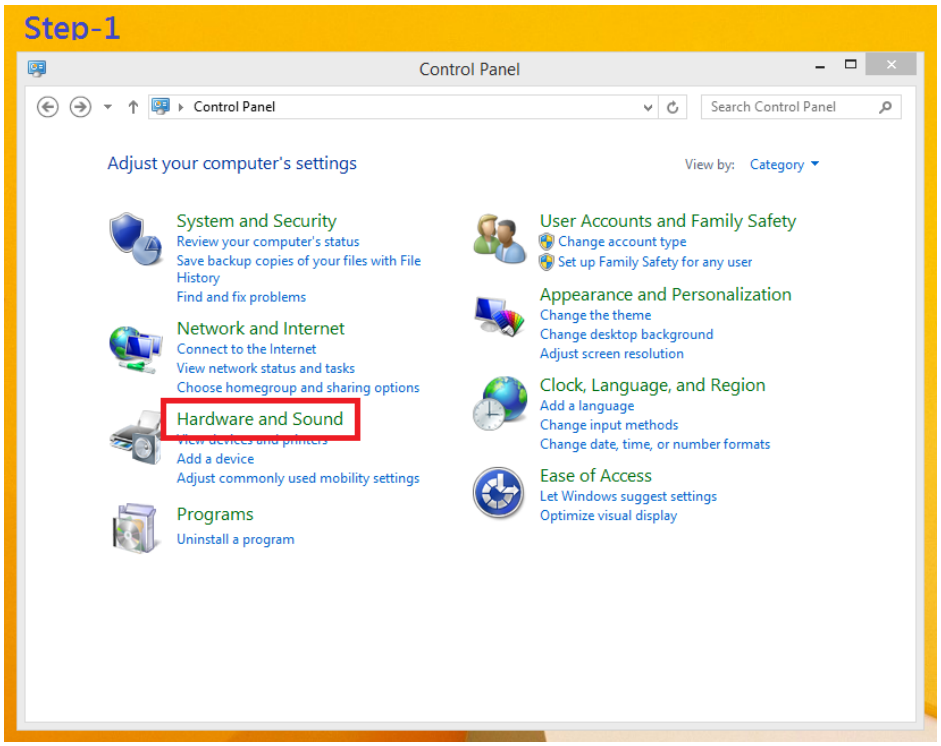
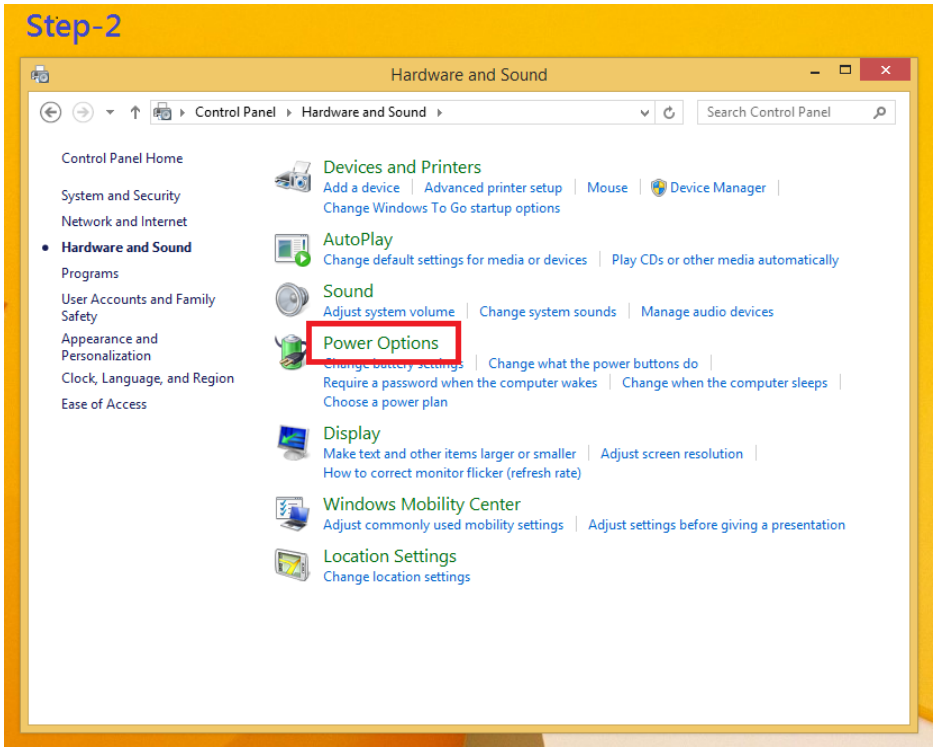
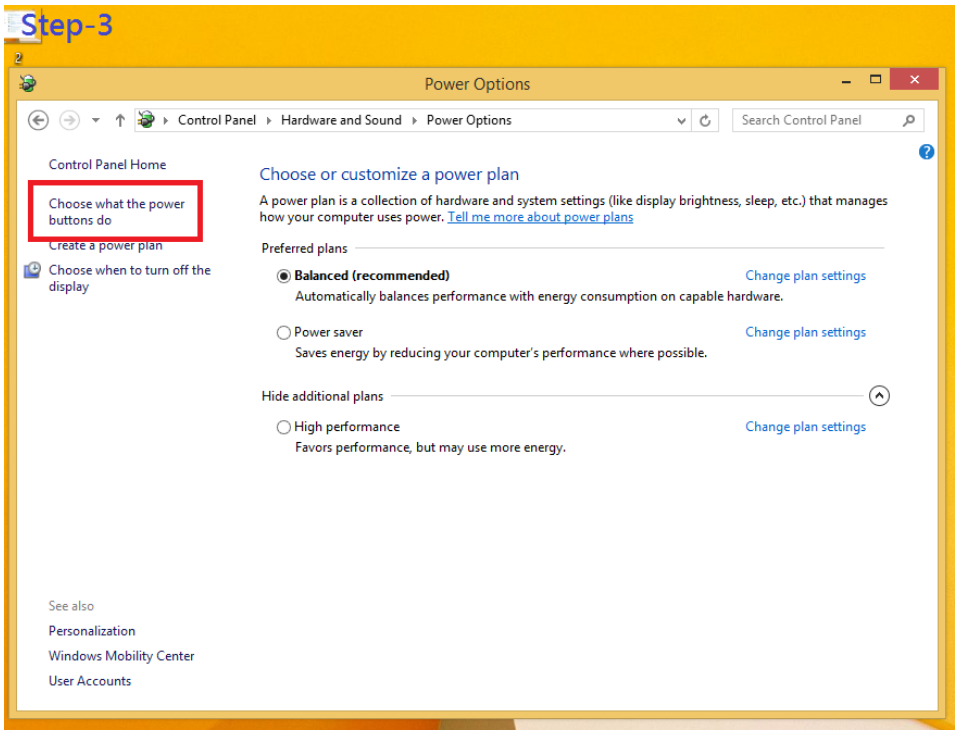
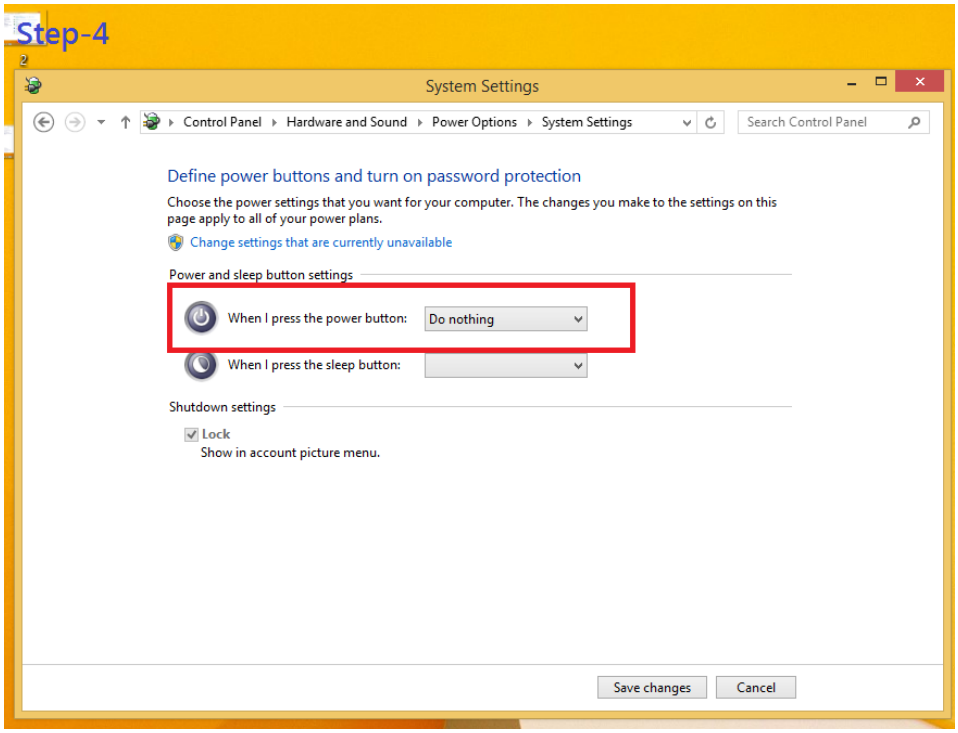
APPENDIX B
POWER BUTTON SETTING FOR WINDOWS

To change how the power button operates, go to the console of the PC and then follow below figures to complete the setting.

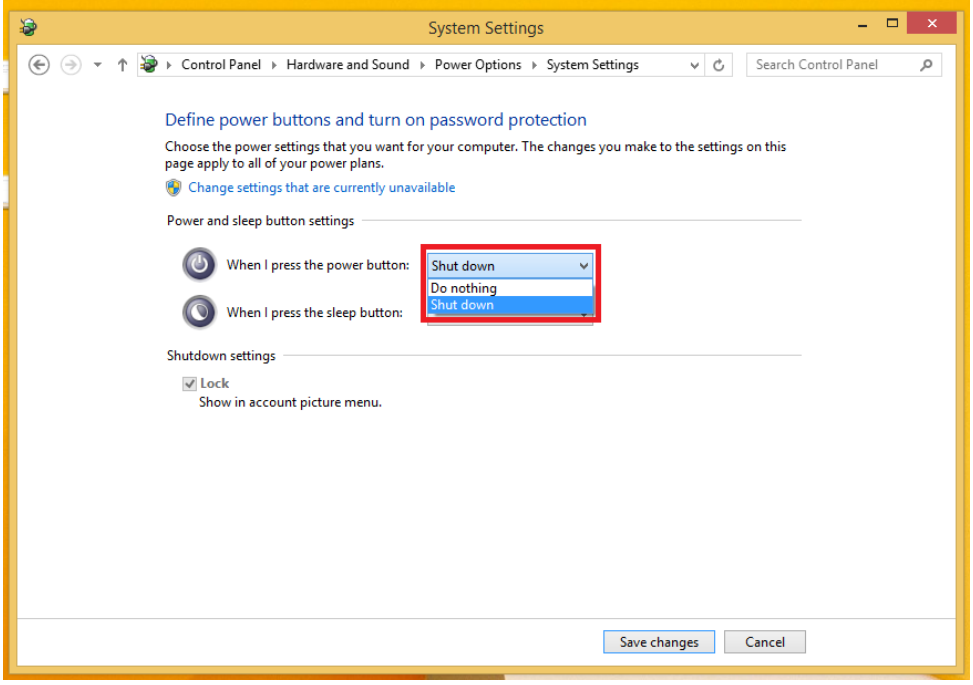




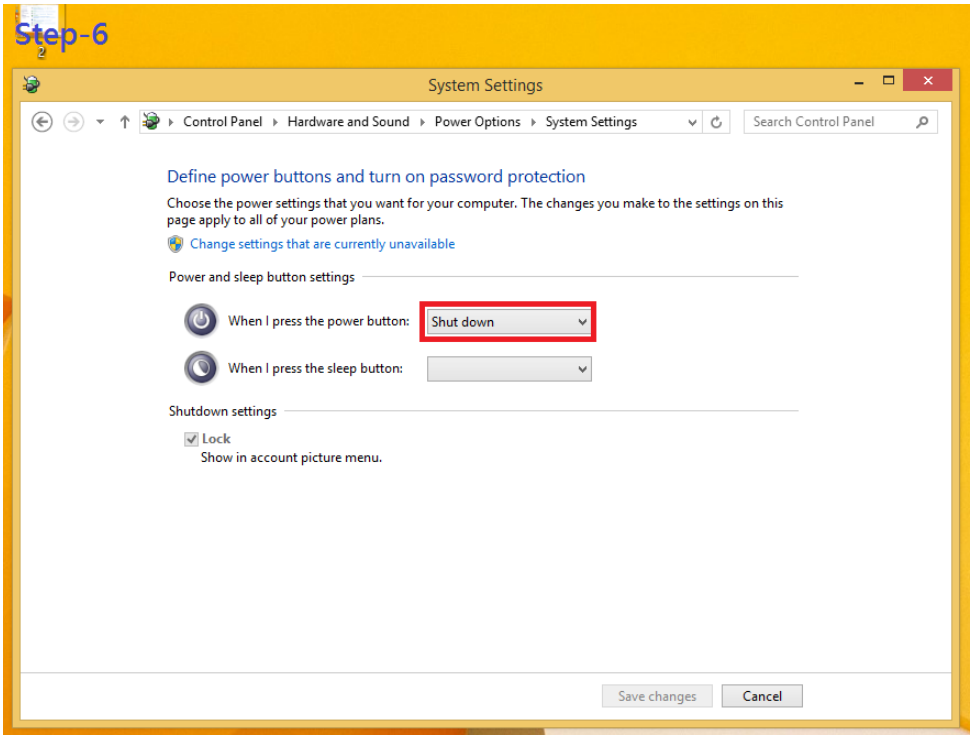

Step-3
Power Options
Control Panel ▸ Hardware and Sound ▸ Power Options
Search Control Panel
Control Panel Home
Choose what the power buttons do
Create a power plan
Choose when to turn off the display
Choose or customize a power plan
A power plan is a collection of hardware and system settings (like display brightness, sleep, etc.) that manages how your computer uses power. Tell me more about power plans
Preferred plans
Balanced (recommended)
Change plan settings
Automatically balances performance with energy consumption on capable hardware.
Power saver
Change plan settings
Saves energy by reducing your computer's performance where possible.
Hide additional plans
High performance
Change plan settings
Favors performance, but may use more energy.
See also
Personalization
Windows Mobility Center
User Accounts


Step-4
System Settings
Control Panel ▸ Hardware and Sound ▸ Power Options ▸ System Settings
Search Control Panel
Define power buttons and turn on password protection
Choose the power settings that you want for your computer. The changes you make to the settings on this page apply to all of your power plans.
Change settings that are currently unavailable
Power and sleep button settings
When I press the power button:
Do nothing
When I press the sleep button:
Shutdown settings
Lock
Show in account picture menu.
Save changes
Cancel

Step-5


System Settings
Control Panel ▸ Hardware and Sound ▸ Power Options ▸ System Settings
Search Control Panel
Define power buttons and turn on password protection
Choose the power settings that you want for your computer. The changes you make to the settings on this page apply to all of your power plans.
Change settings that are currently unavailable
Power and sleep button settings
When I press the power button:
Shut down
Do nothing
Shut down
When I press the sleep button:
Shutdown settings
Lock
Show in account picture menu.
Save changes
Cancel

Step-6


System Settings
Control Panel ▸ Hardware and Sound ▸ Power Options ▸ System Settings
Search Control Panel
Define power buttons and turn on password protection
Choose the power settings that you want for your computer. The changes you make to the settings on this page apply to all of your power plans.
Change settings that are currently unavailable
Power and sleep button settings
When I press the power button:
Shut down
When I press the sleep button:
Shutdown settings
Lock
Show in account picture menu.
Save changes
Cancel

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APPENDIX C
DIGITAL I/O

Digital Input:

Ext Power Input Voltage: 30Vdc Max.
Digital Input channels: 4, sink/source type
Digital Input voltage: 0 to 30VDC
Input level for dry contacts:
Logic level 0: close
Logic level 1: open
Input level for wet contacts:
Logic level 1: +/-3VDC max.
Logic level 0: +/- 10VDC min. to +/-30VDC max. (source to digital input)

Digital output:

COM+ Power Input Voltage: 30Vdc Max. On-state voltage:12~ 24VDC nominal
Output channels: 4, sink type,
Output current: 200mA max. per channel

Digital I/O Software Programming

- I2C to GPIO PCA9554PW GPIO Group0[3:0] is Output, Group0[7:4] is Input.
- I2C address: 0100010x.
- Registers:

Table 3. Command byte

Command	Protocol	Function
0	read byte	Input Port register
1	read/write byte	Output Port register

Table 4. Register 0 - Input Port register bit description

Bit	Symbol	Access	Value	Description
7	I7	read only	X	determined by externally applied logic level
6	I6	read only	X	
5	I5	read only	X	
4	I4	read only	X	
3	I3	read only	X	
2	I2	read only	X	
1	I1	read only	X	
0	I0	read only	X	

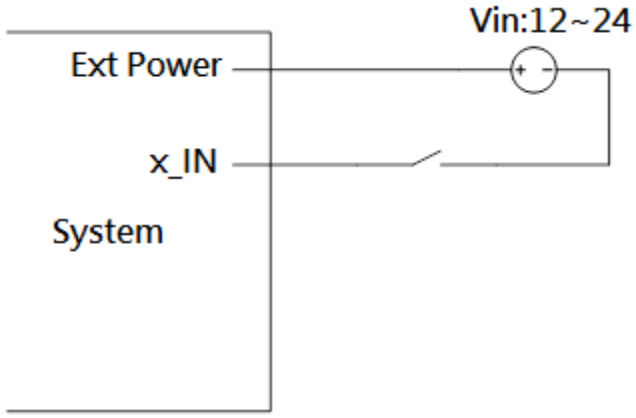
Table 5. Register 1 - Output Port register bit description

*Legend: * default value.*

Bit	Symbol	Access	Value	Description
7	O7	R	1*	reflects outgoing logic levels of pins defined as outputs by Register 3
6	O6	R	1*	
5	O5	R	1*	
4	O4	R	1*	
3	O3	R	1*	
2	O2	R	1*	
1	O1	R	1*	
0	O0	R	1*	

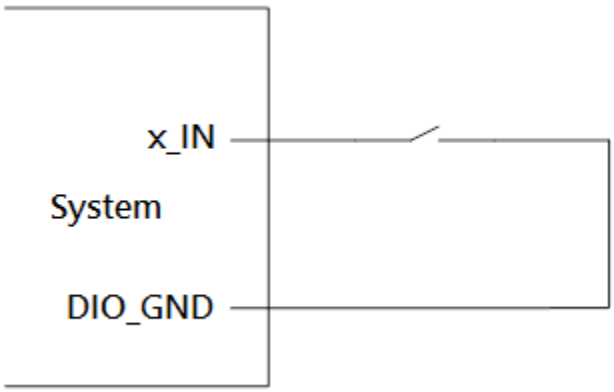
Digital Input Wiring

Dry Contact (1):



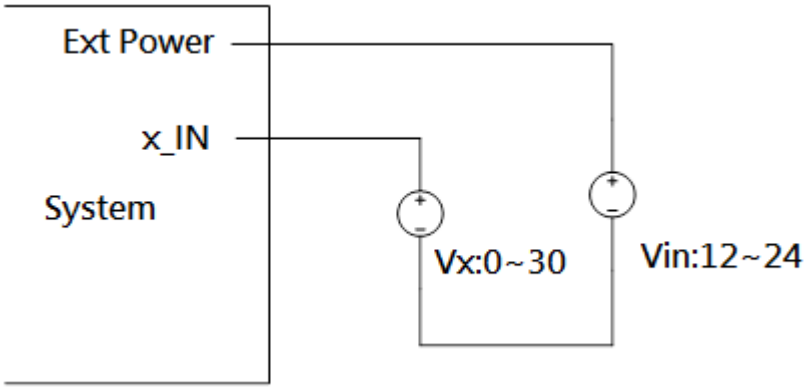
With external power.

Dry Contact (2):

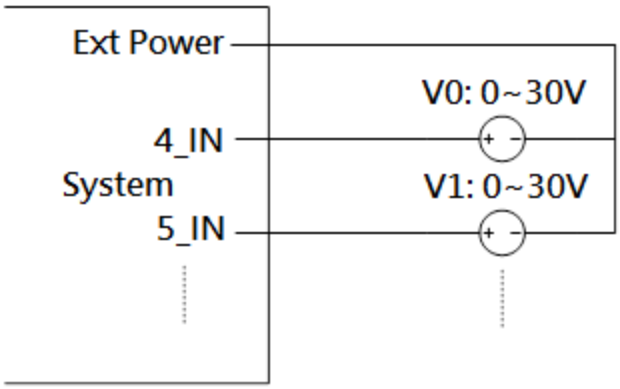


Without external power.

Wet Contact (1):



Wet Contact (2):



Digital Output Wiring

DO drive high: x_OUT equal to COM-(up to 200mA)

DO drive low: High impedance