



***AXIOMTEK***

## **IC0500-518 Series**

**Modular Robust Din-rail Fanless  
Embedded System**

**User's Manual**



## **Disclaimers**

This manual has been carefully checked and believed to contain accurate information. Axiomtek Co., Ltd. assumes no responsibility for any infringements of patents or any third party's rights, and any liability arising from such use.

Axiomtek does not warrant or assume any legal liability or responsibility for the accuracy, completeness or usefulness of any information in this document. Axiomtek does not make any commitment to update the information in this manual.

Axiomtek reserves the right to change or revise this document and/or product at any time without notice.

No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of Axiomtek Co., Ltd.

**©Copyright 2019 Axiomtek Co., Ltd.**

**All Rights Reserved**

**May 2019, Version A2**

**Printed in Taiwan**

## Safety Precautions

Before getting started, please read the following important safety precautions.

1. The ICO500-518 does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
  2. Be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
  3. Disconnect the power cord from the ICO500-518 before making any installation. Be sure both the system and the external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the ICO500-518 is properly grounded.
  4. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
  5. Turn OFF the system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
  6. Do not leave this equipment in an uncontrolled environment where the storage temperature is below  $-45^{\circ}\text{C}$  or above  $85^{\circ}\text{C}$ . It may damage the equipment.
  7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
    - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help to discharge any static electricity on your body.
    - When handling boards and components, wear a grounding wrist strap, available from most electronic component stores.
  8. Warning:

Replacing the battery with an incorrect type can result in an explosion risk. Dispose of used batteries according to the instructions.
  9. Caution:

Do not touch the surface of the unit, which can become quite hot during operation.

Restricted access area: The equipment should only be installed in a restricted access area.
  10. This product is intended to be supplied by a Listed Power Adapter or DC power source; output meets SELV, rated 12-48Vdc, minimum 4.01-1.01A, Tma = 25 degree C, and the altitude of operation = 5000m. Supports minimum 2.05A Tma = 25 degree C, and the altitude of operation = 5000m.
- If you need further assistance while purchasing the power source, please contact the manufacturer for further information.

## **Classification**

1. Degree of protection against electric shock: not classified
2. Degree of protection against the ingress of water: IP40
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
4. Mode of operation: Continuous
5. Type of protection against electric shock: Class I equipment

## **General Cleaning Tips**

You may need the following precautions before you begin to clean the computer. When you clean any single part or component for the computer, please read and understand the details below fully.

When you need to clean the device, please rub it with a piece of dry cloth.

1. Be cautious of the tiny removable components when you use a vacuum cleaner to absorb the dirt on the floor.
2. Turn the system off before you start to clean up the component or computer.
3. Never drop the components inside the computer or get circuit board damp or wet.
4. Be cautious of all kinds of cleaning solvents or chemicals when you use them for the sake of cleaning. Some individuals may be allergic to the ingredients.
5. Try not to put any food, drink or cigarette around the computer.

## Cleaning Tools

Although many companies have created products to help improve the process of cleaning your computer and peripherals users can also use household items to clean their computers and peripherals. Below is a listing of items you may need or want to use while cleaning your computer or computer peripherals.

Keep in mind that some components in your computer may only be cleaned using a product designed for cleaning components of the same types. Please read the instructions that come with a cleaning product to avoid misuse.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, we still recommend you to rub it with a piece of cloth.
- Water or rubbing alcohol: You may moisten a piece of cloth a bit with some water or rubbing alcohol and rub it on the computer. Unknown solvents may be harmful to the plastics parts.
- Vacuum cleaner: Vacuuming the dust, dirt, hair, cigarette particles, and other particles out of a computer can be one of the best methods of cleaning a computer. Over time these items can restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas in your keyboard, mouse, and other locations.
- Foam swabs: Whenever possible it is better to use lint free swabs such as foam swabs.



**Note:** *We strongly recommended that you should shut down the system before you start to clean any single components.*

### **Please follow the steps below:**

1. Close all application programs;
2. Close operating software;
3. Turn off power;
4. Remove all device;
5. Pull out power cable.

## **Scrap Computer Recycling**

Please inform the nearest Axiomtek distributor as soon as possible for suitable solutions in case computers require maintenance or repair; or for recycling in case computers are out of order or no longer in use.

## **Trademarks Acknowledgments**

Axiomtek is a trademark of Axiomtek Co., Ltd. IBM, PC/AT, PS/2, VGA are trademarks of International Business Machines Corporation.

Intel<sup>®</sup> Core™ and Celeron<sup>®</sup> processors are registered trademarks of Intel Corporation.

MS-DOS, Microsoft C and QuickBASIC are trademarks of Microsoft Corporation.

VIA is a trademark of VIA Technologies, Inc.

SST is a trademark of Silicon Storage Technology, Inc.

UMC is a trademark of United Microelectronics Corporation. Other brand names and trademarks are the properties and registered brands of their respective owners.

# Table of Contents

---

Safety Precautions .....	iii
Classification.....	iv
General Cleaning Tips .....	iv
Scrap Computer Recycling .....	vi
<b>CHAPTER 1 INTRODUCTION .....</b>	<b>1</b>
<b>1.1 General Description .....</b>	<b>1</b>
<b>1.2 System Specifications .....</b>	<b>2</b>
1.2.1 CPU .....	2
1.2.2 BIOS .....	2
1.2.3 System Memory .....	2
1.2.4 Display .....	3
1.2.5 Ethernet Ports .....	3
1.2.6 Storages.....	4
1.2.7 Wireless .....	5
1.2.8 USB .....	6
1.2.9 COM Port .....	6
1.2.10 DIO .....	6
1.2.11 LED.....	6
1.2.12 Power& Reset Button.....	7
1.2.13 Power.....	7
1.2.14 WatchDog Timer (WDT) .....	7
1.2.15 Restore BIOS Optimal Defaults (CLEAR CMOS).....	7
1.2.16 Operation Temperature.....	7
1.2.17 Storage Temperature .....	7
1.2.18 Humidity .....	7
1.2.19 Weight.....	7
1.2.20 Dimensions .....	8
1.2.21 System I/O Outlets.....	8
1.2.22 Check list.....	8
1.2.23 System Power consumption .....	8
1.3 Dimensions .....	9
1.4 I/O Outlets.....	10
<b>CHAPTER 2 HARDWARE INSTALLATION .....</b>	<b>13</b>
2.1 Installing the Memory & Wireless Module .....	13
2.2 Installing the Hard Disk Drive, CFast & SIM Card .....	15
2.3 Installing the Module Card .....	16
2.4 Installing the Antenna.....	16
2.5 Installing the DIN-rail Mounting Kit.....	17
2.6 Installing the Wall Mounting Kit .....	18
<b>CHAPTER 3 AMI UEFI BIOS UTILITY.....</b>	<b>19</b>
3.1 Entering Setup .....	19
3.2 The Main Menu .....	20
3.3 Advanced Features .....	21
3.4 Chipset Feature.....	42
3.5 Security.....	44
3.6 Boot Type .....	45
3.7 Save & Exit .....	46
<b>APPENDIX A WATCHDOG TIMER .....</b>	<b>49</b>

<b>About Watchdog Timer .....</b>	<b>49</b>
<b>How to Use Watchdog Timer .....</b>	<b>49</b>
<b>APPENDIX B POWER BUTTON SETTING FOR WINDOWS.....</b>	<b>51</b>
<b>APPENDIX C DIGITAL I/O .....</b>	<b>55</b>

# CHAPTER 1

## INTRODUCTION

This chapter contains general information and detailed specifications of the ICO500-518. The Chapter 1 includes the following sections:

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

### 1.1 General Description

The fanless embedded system ICO500-518 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 ICO500-518 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 ICO500-518 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 ICO500-518 provides programmers with a friendly environment for developing application software at a lower cost.

The ICO500-518 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<sup>®</sup>
- Linux 64bit

## 1.2 System Specifications

### 1.2.1 CPU

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

### 1.2.2 BIOS

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

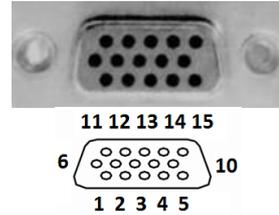
### 1.2.3 System Memory

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

### 1.2.4 Display

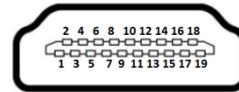
- A 15-pin D-Sub connector as VGA connector

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

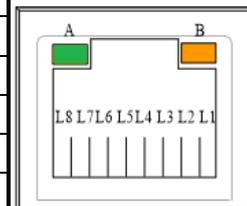
Pin	Signal	Pin	Signal
1	TMDS data 2+	11	TMDS clock shield
2	TMDS data 2 shield	12	TMDS clock-
3	TMDS data 2-	13	CEC
4	TMDS data 1+	14	No connected
5	TMDS data 1 shield	15	DDC clock
6	TMDS data 1-	16	DDC data
7	TMDS data 0+	17	Ground
8	TMDS data 0 shield	18	+5V power
9	TMDS data 0-	19	Hot plug detect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

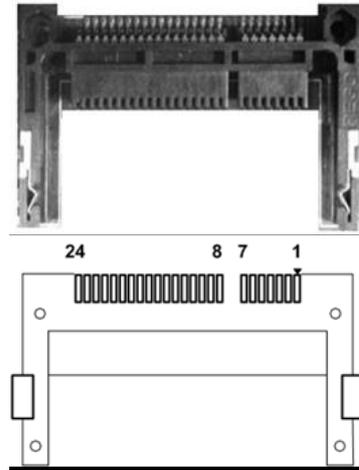
Pin	Description	10/100Base-T	1000Base-T
1	Transmit Data+ or Bidirectional	TX+	BI_DA+
2	Transmit Data- or Bidirectional	TX-	BI_DA-
3	Receive Data+ or Bidirectional	RX+	BI_DB+
4	Not Connected or Bidirectional	N.C.	BI_DC+
5	Not Connected or Bidirectional	N.C.	BI_DC-
6	Receive Data- or Bidirectional	RX-	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

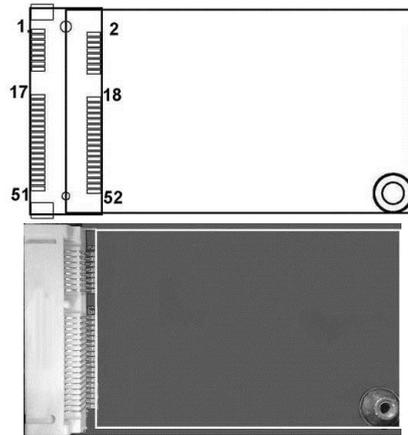
Pin	Signal	Pin	Signal
1	GND	13	N.C
2	SATA_TX+	14	GND
3	SATA_TX-	15	N.C
4	GND	16	N.C
5	SATA_RX-	17	N.C
6	SATA_RX+	18	N.C
7	GND	19	N.C
8	N.C	20	+3.3VS
9	GND	21	+3.3VS
10	N.C	22	GND
11	N.C	23	GND
12	N.C	24	N.C



**1.2.7 Wireless**

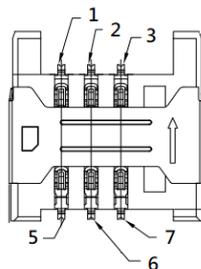
- 1 x Full size Mini Card socket supports a module with USB and PCIe and SIM Interface (Socket 1).
- 1 x Full size Mini Card socket supports a module with USB and PCIe Interface (Socket 2).

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

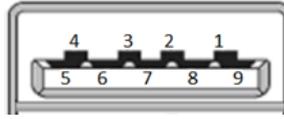
Pin	Signal
1	SIM_PWR
2	SIM_RESET
3	SIM_CLK
5	GND
6	SIM_VPP
7	SIM_DATA



**1.2.8 USB**

- 4 x USB3.0

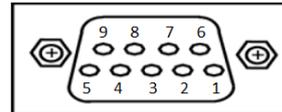
Pin	Signal	Pin	Signal
1	USB_VCC	6	SSRX2+
2	USB_Data2-	7	GND
3	USB_Data2+	8	SSTX2-
4	GND	9	SSTX2+
5	SSRX2-		



**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.

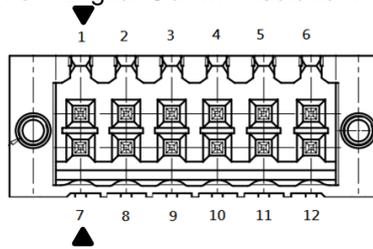
Pin	RS-232	RS-422	RS-485
1	DCD, Data carrier detect	TX-	Data-
2	RXD, Receive data	TX+	Data+
3	TXD, Transmit data	RX+	NC
4	DTR, Data terminal ready	RX-	NC
5	GND, ground	GND	GND
6	DSR, Data set ready	NC	NC
7	RTS, Request to send	NC	NC
8	CTS, Clear to send	NC	NC
9	RI, Ring indicator	NC	NC
10	NC	NC	NC



**1.2.10 DIO**

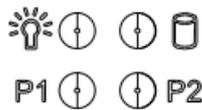
- 1 Terminal Block port supports 4 Digital In & 4 Digital Out with Isolation.

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**

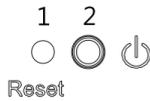
LED Indicator	Description
PWR/ Green	Power on
SSD/ Yellow	SSD activity
P1/ Green	Programmable
P2/ Green	Programmable



**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

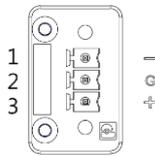


Note: Refer to APPENDIX B for instructions on Power button settings for Windows.

**1.2.13 Power**

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

Pin	Signal
1	-
2	G
3	+

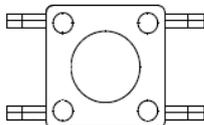


**1.2.14 WatchDog Timer (WDT)**

- 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

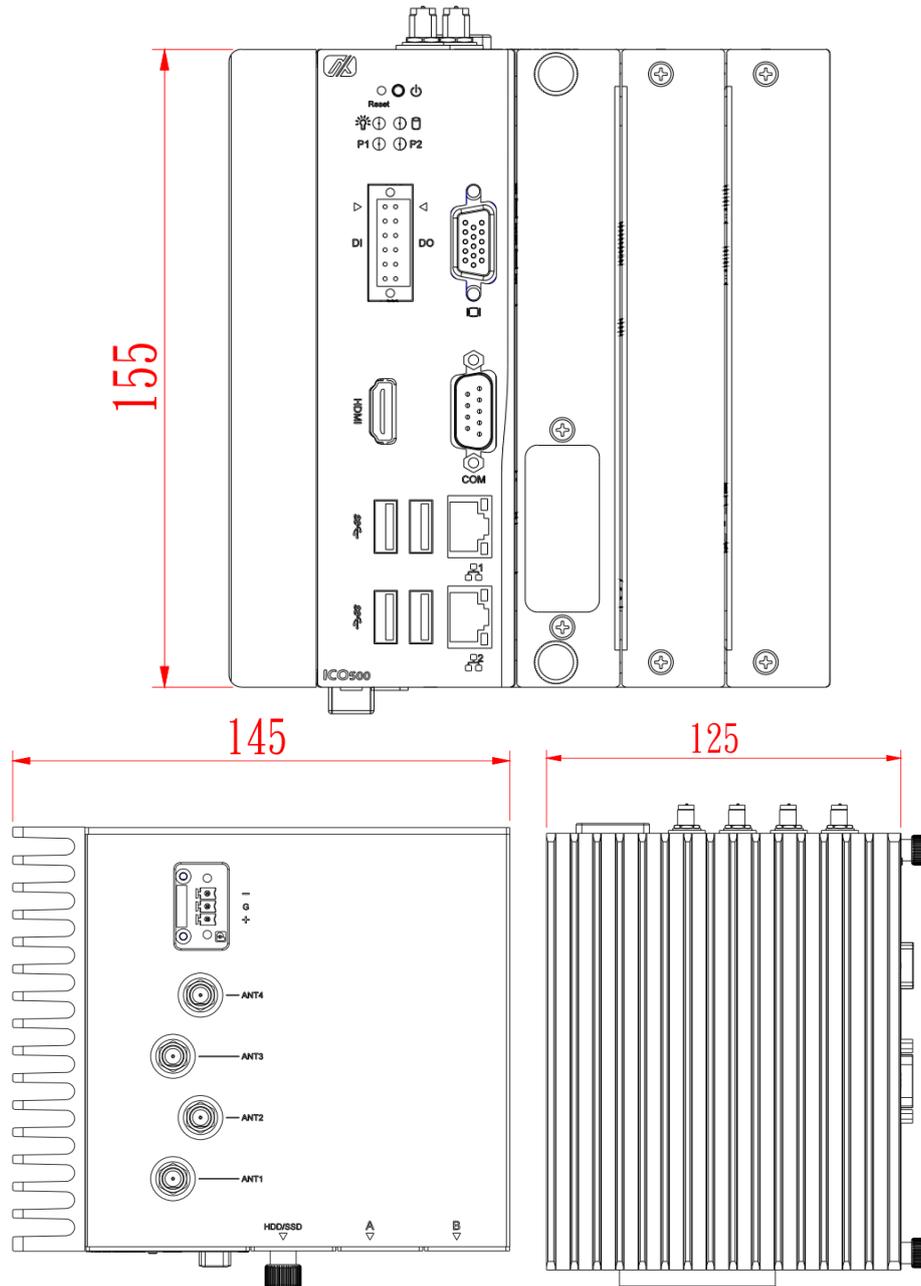
- ICO500-518 System Unit x 1
- DVD x 1 (for Driver)
- Din-rail Kit x 2
- Terminal block(3x1pin) of Power x1
- Terminal block(6x2pin) of DIO x1
- DDR Thermal Pad x 1
- SSD Tray x 1
- Shock pad x 4
- Screws for 2.5" SATA SSD x 4
- Screws(M3\*6L) for 2.5" SATA SSD Tray x 4
- Screws(M2\*5L) for Mini Card x2
- PLASTIC WASHER WS x4
- PLASTIC WASHER TW x4

### 1.2.23 System Power consumption

- 12-48VDC, 4.01-1.01A

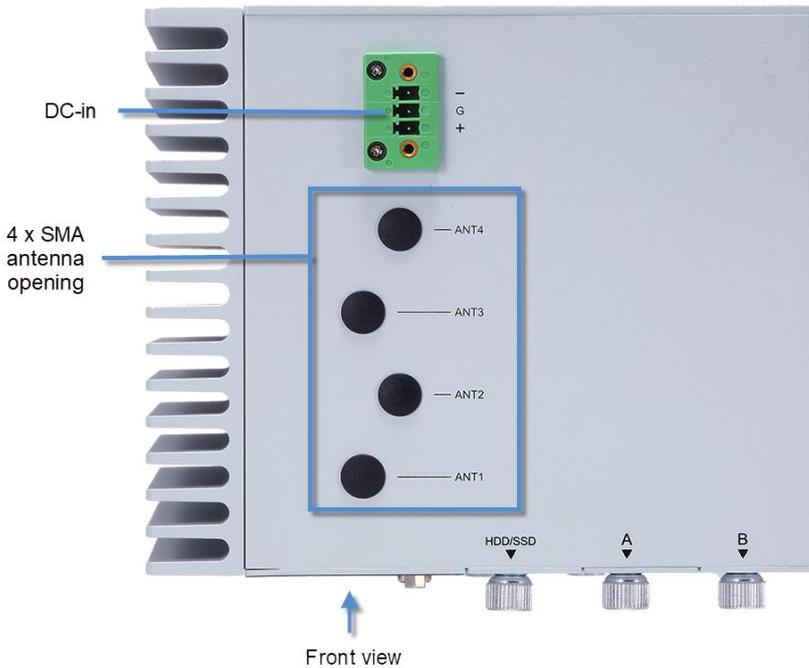
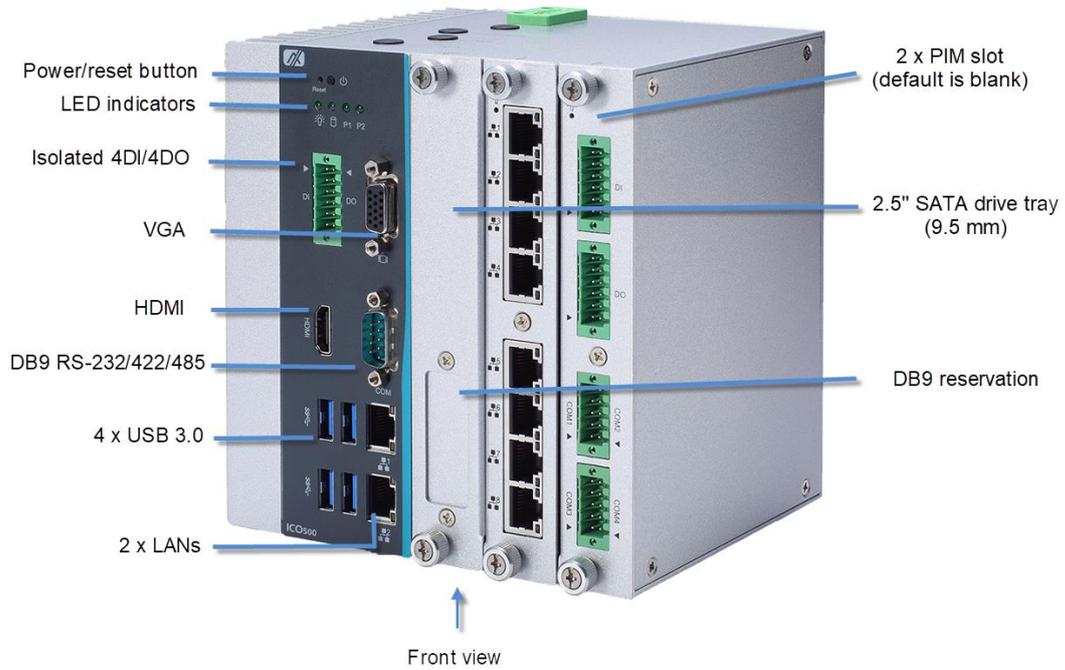
### 1.3 Dimensions

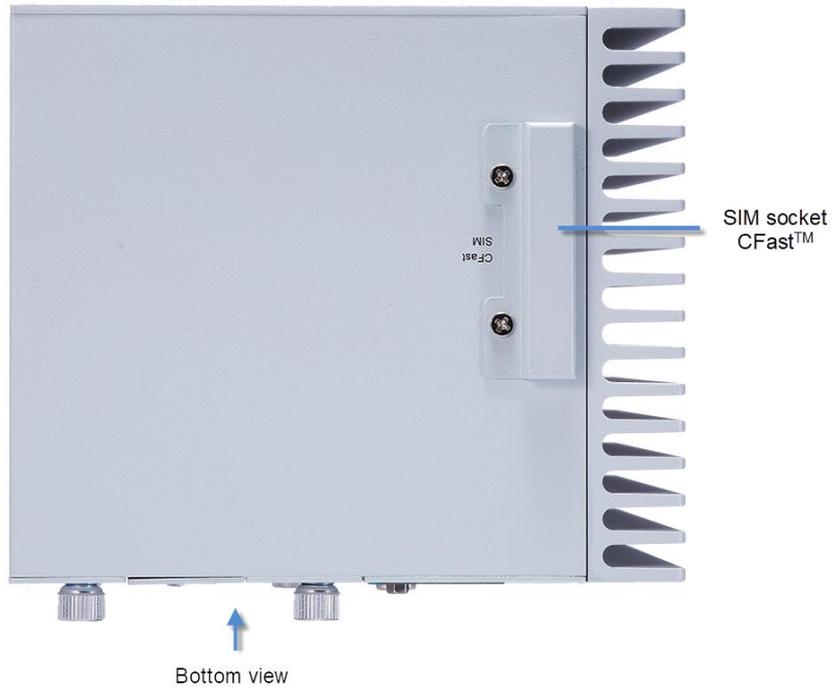
The following diagrams show you the dimensions and outlines of the ICO500-518.



### 1.4 I/O Outlets

The following figures show you I/O outlets on the front view, top view and bottom view of the ICO500-518.





**This page is intentionally left blank.**

## CHAPTER 2 HARDWARE INSTALLATION

The ICO500-518 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.

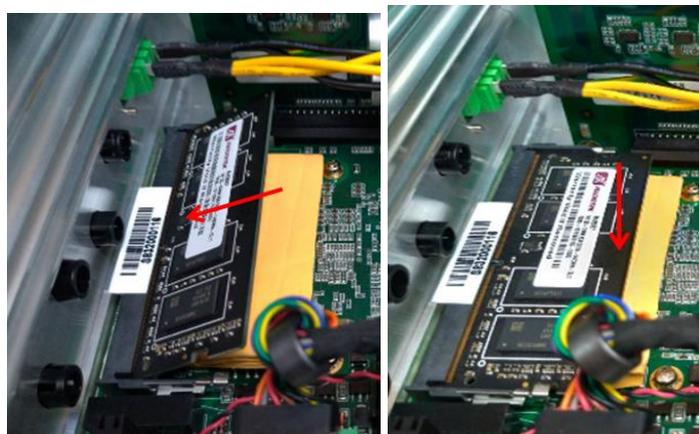
### 2.1 Installing the Memory & Wireless Module

**Step 1** Turn off the system.

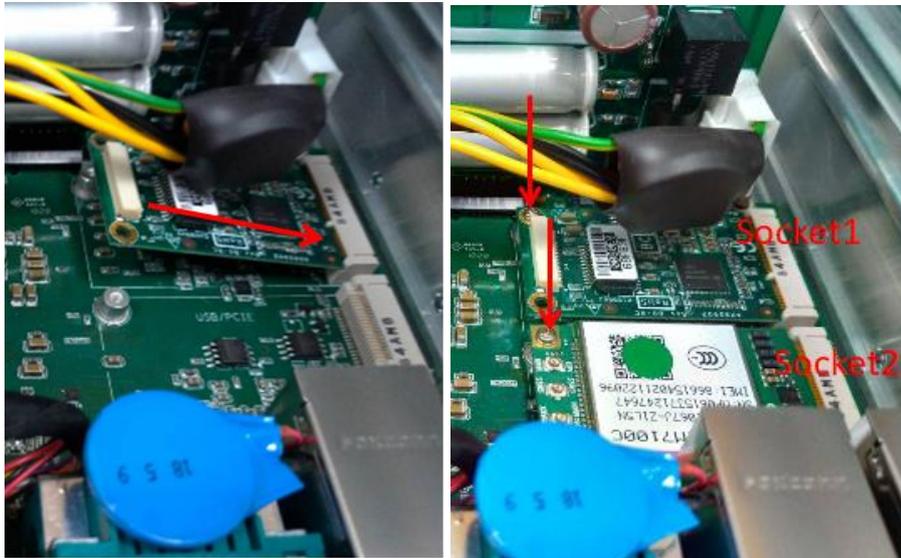
**Step 2** Loosen all cover screws and remove the cover from the system.



**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.

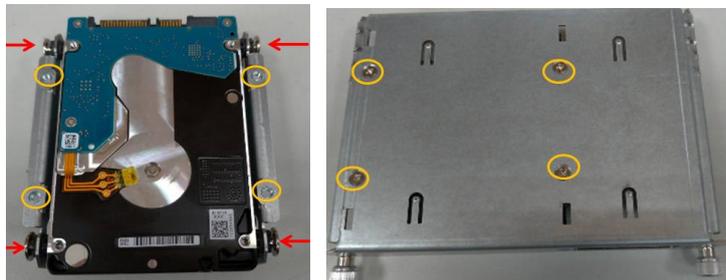
## 2.2 Installing the Hard Disk Drive, CFast & SIM Card

**Step 1** Turn off the system.

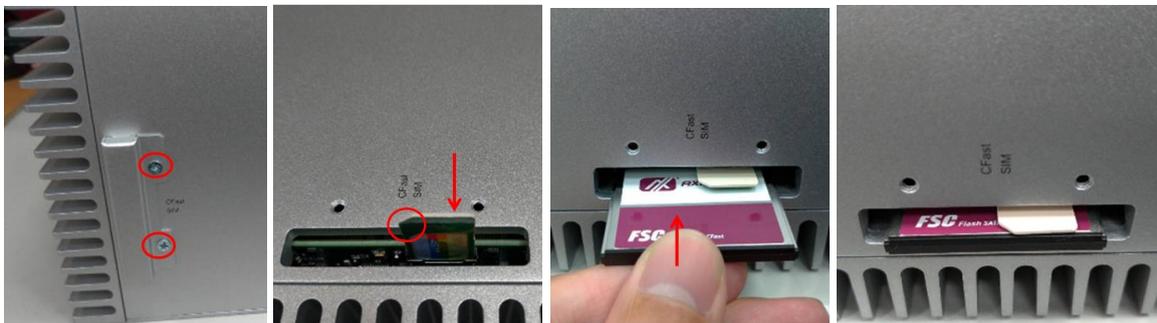
**Step 2** Loosen the screw as shown below, and pull out the SSD tray from the system.



**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.



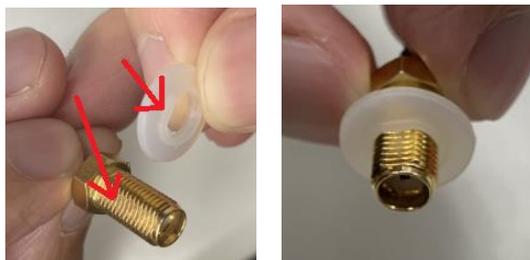
**Step 3** Install the module card as shown below, and fasten the screws firmly to finish the installation.



## 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.

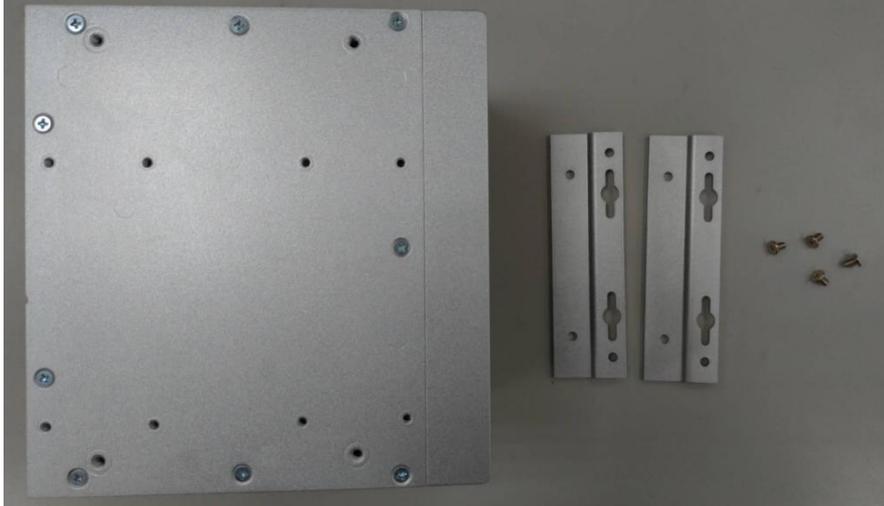


**Step 2** Assemble the bracket to the system and fasten screws tight.

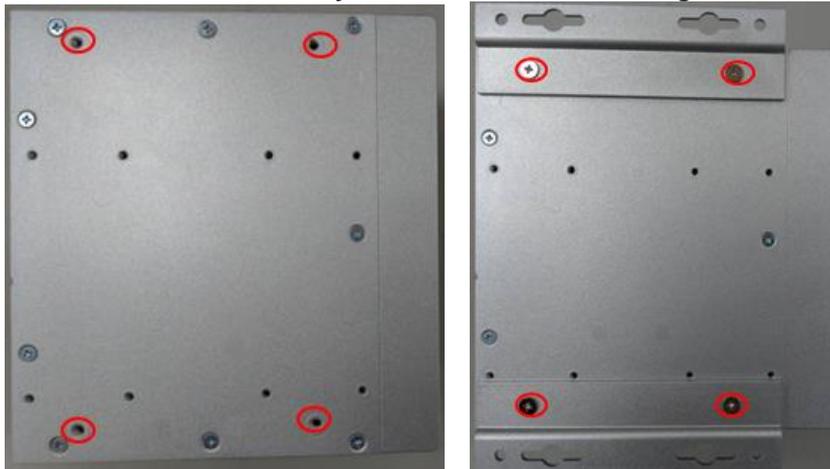


## 2.6 Installing the Wall Mounting Kit

**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.

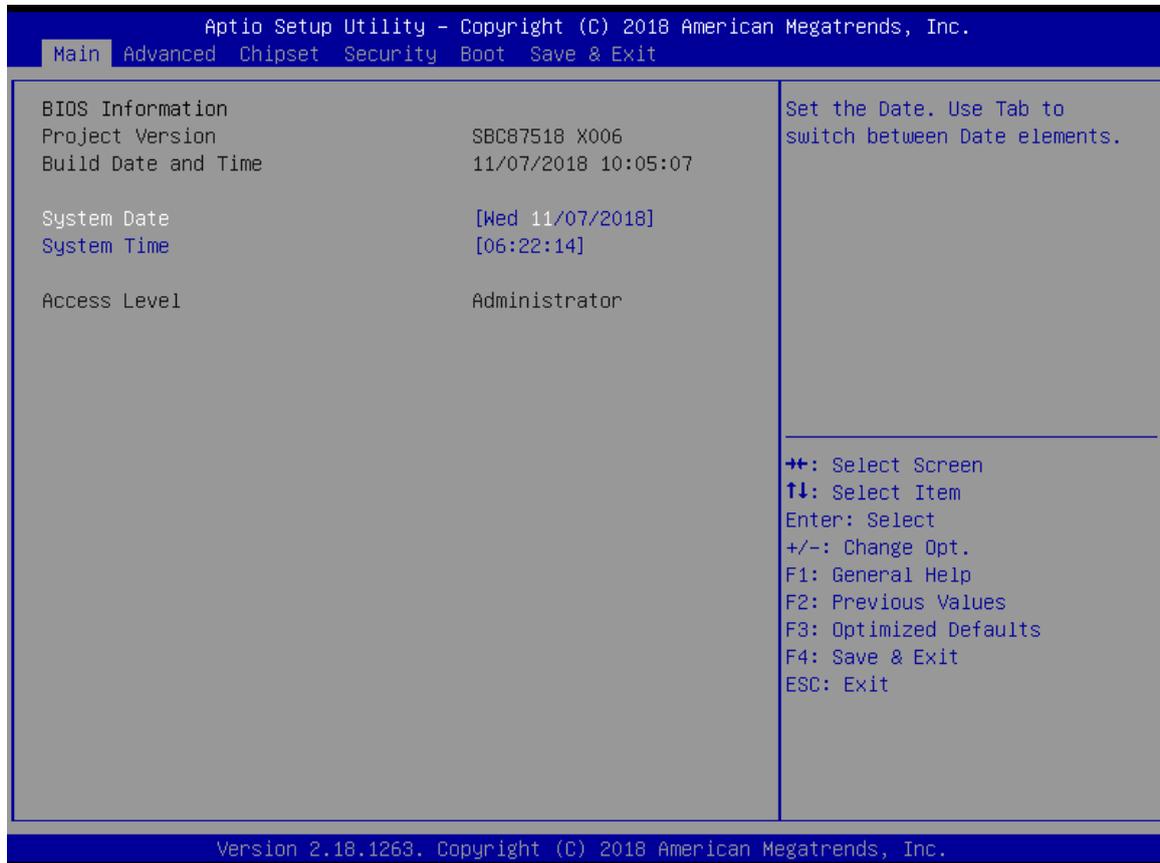
### 3.1 Entering Setup

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:

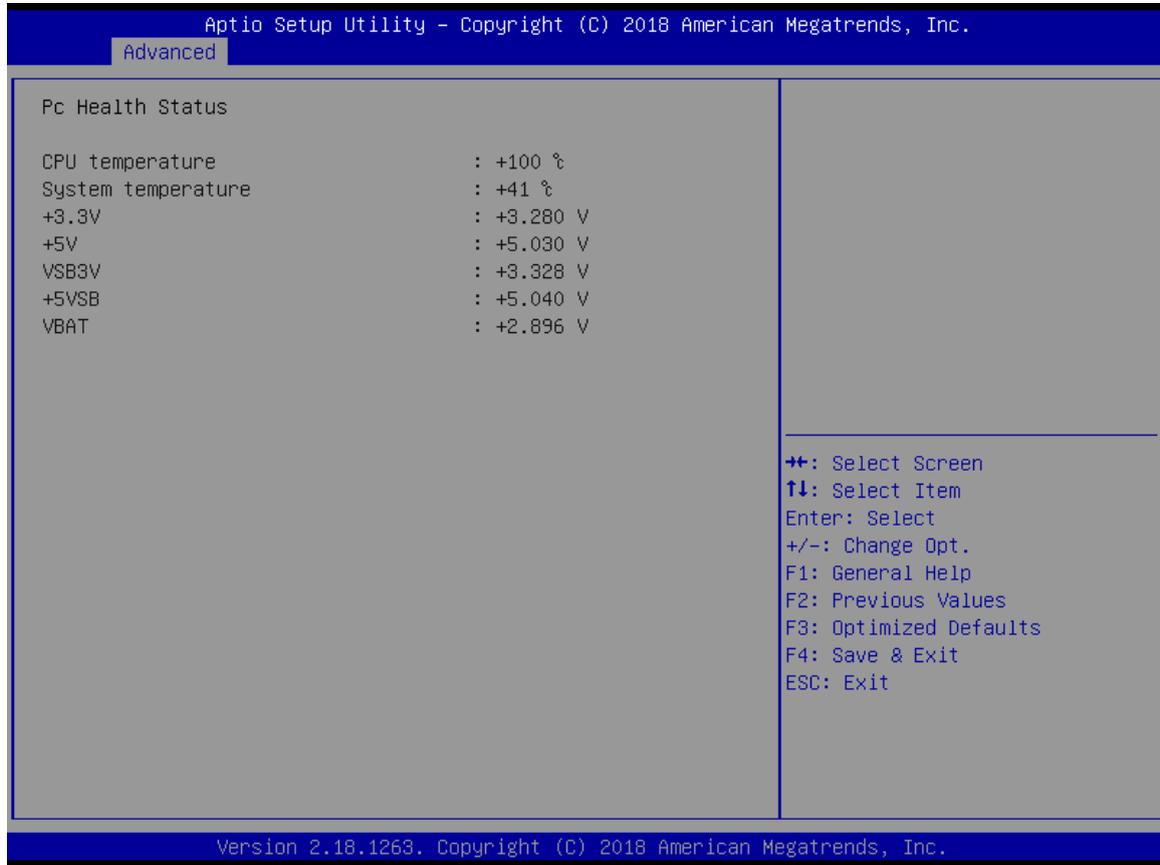
- ▶ Hardware Monitor
- ▶ F81803 Super IO Configuration
- ▶ CPU configuration
- ▶ SATA Configurations
- ▶ PCH-FW Configuration
- ▶ S5 RTC Wake Setting
- ▶ Utility Configuration
- ▶ Device Configuration

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).

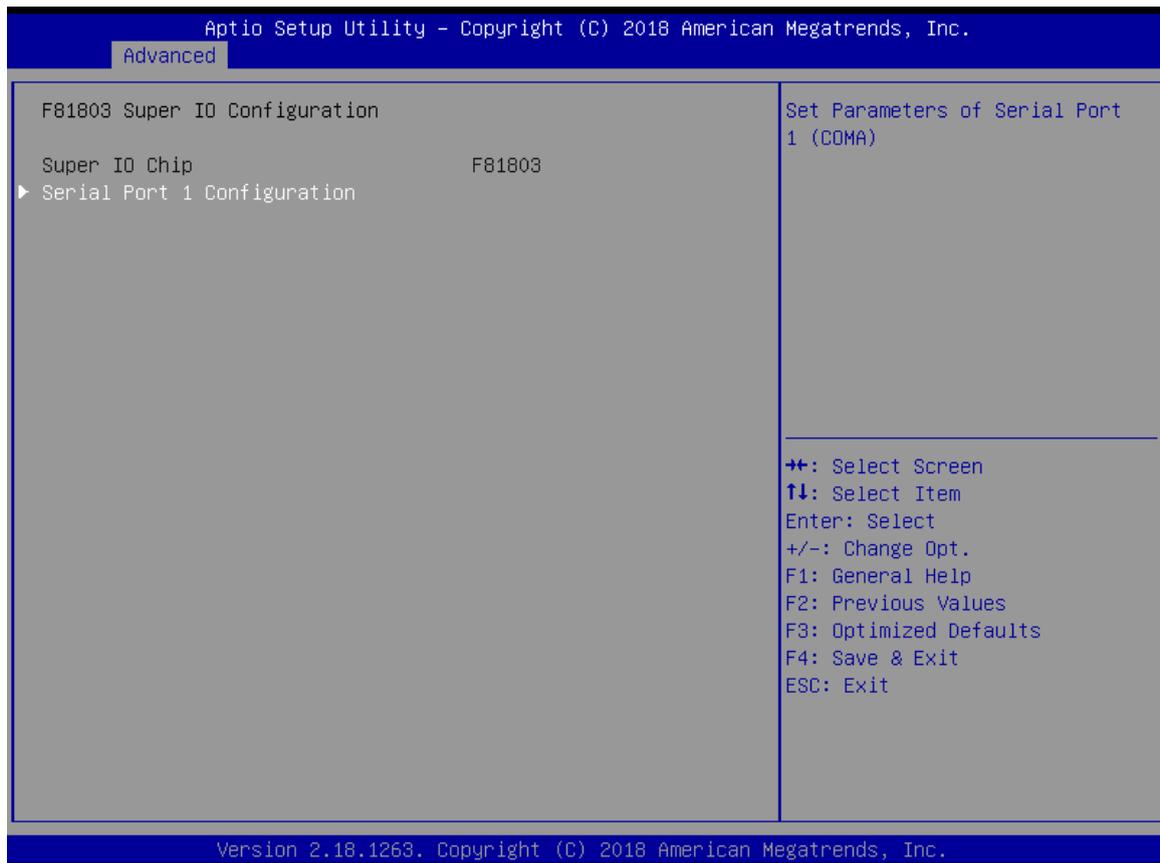


- **F81803 Super IO Configuration**

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.

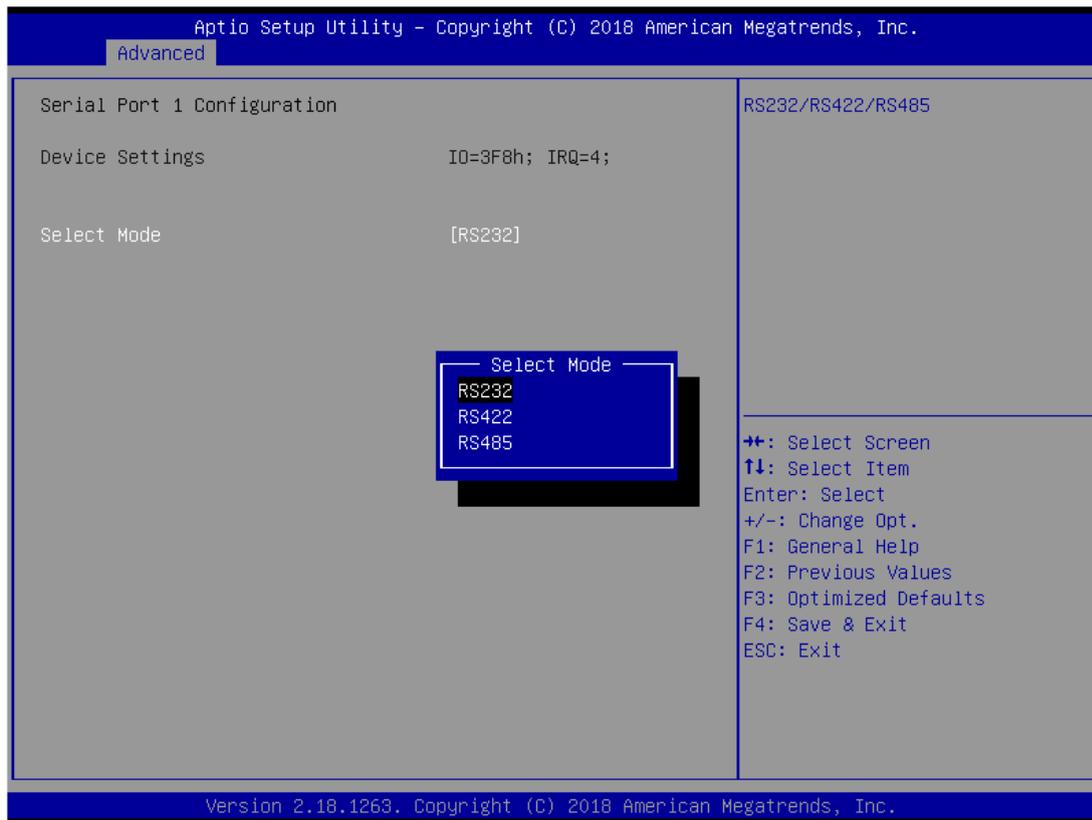
You can change the setting by selecting the value you want in each COM port type. The system supports RS422 & RS485 mode.



### Serial Port 1 Configuration

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

#### Serial Port 1

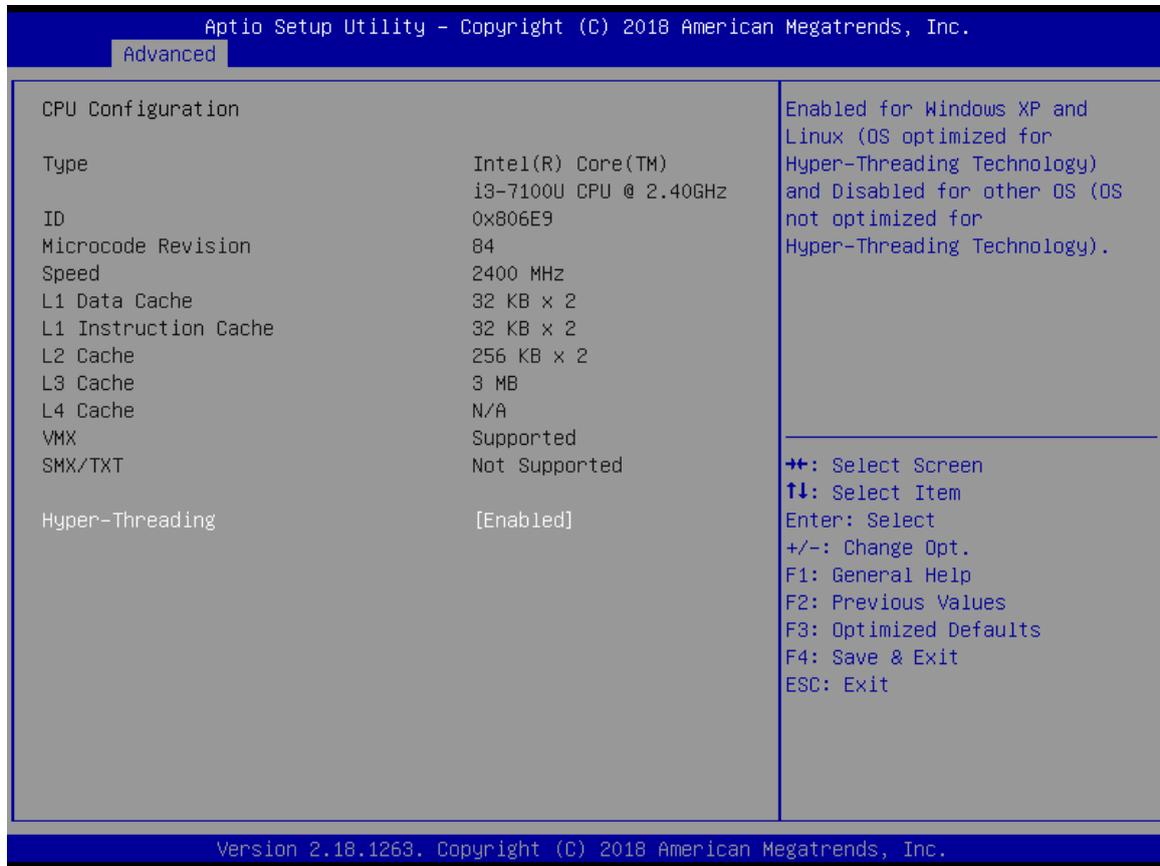


**Select Mode**

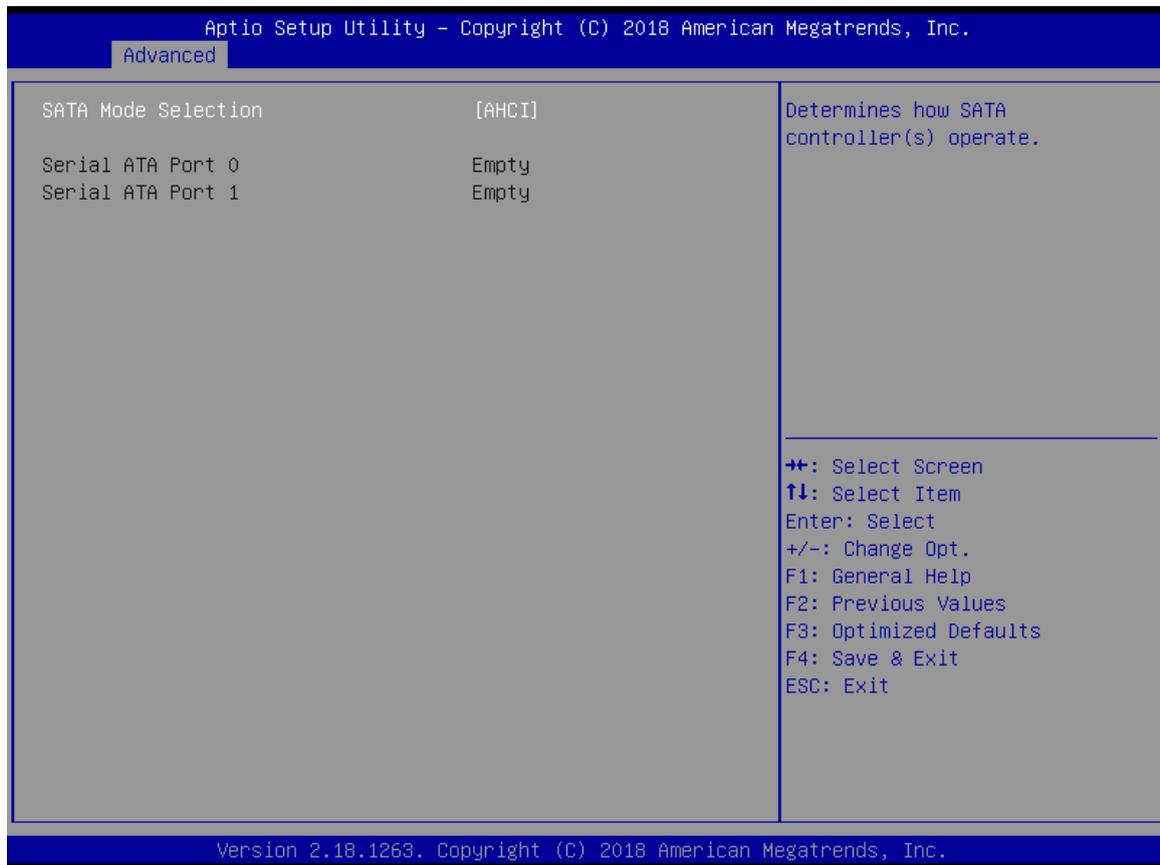
Use this option to set RS-232/RS-422/RS-485 mode.

- **CPU Configuration**

This screen shows the CPU version and its detailed information.



- **SATA Configuration**



**SATA Mode Selection**

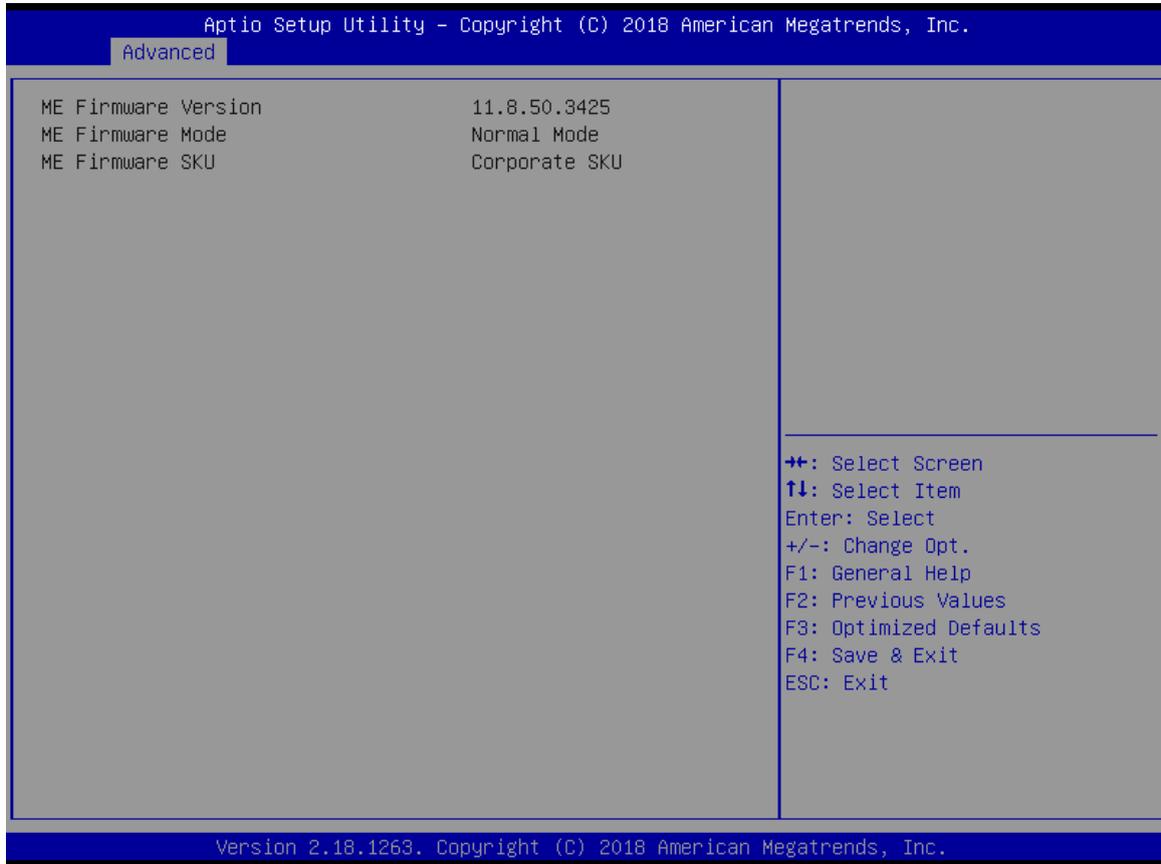
AHCI (Advanced Host Controller Interface) mode is how SATA controller(s) operate.

**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

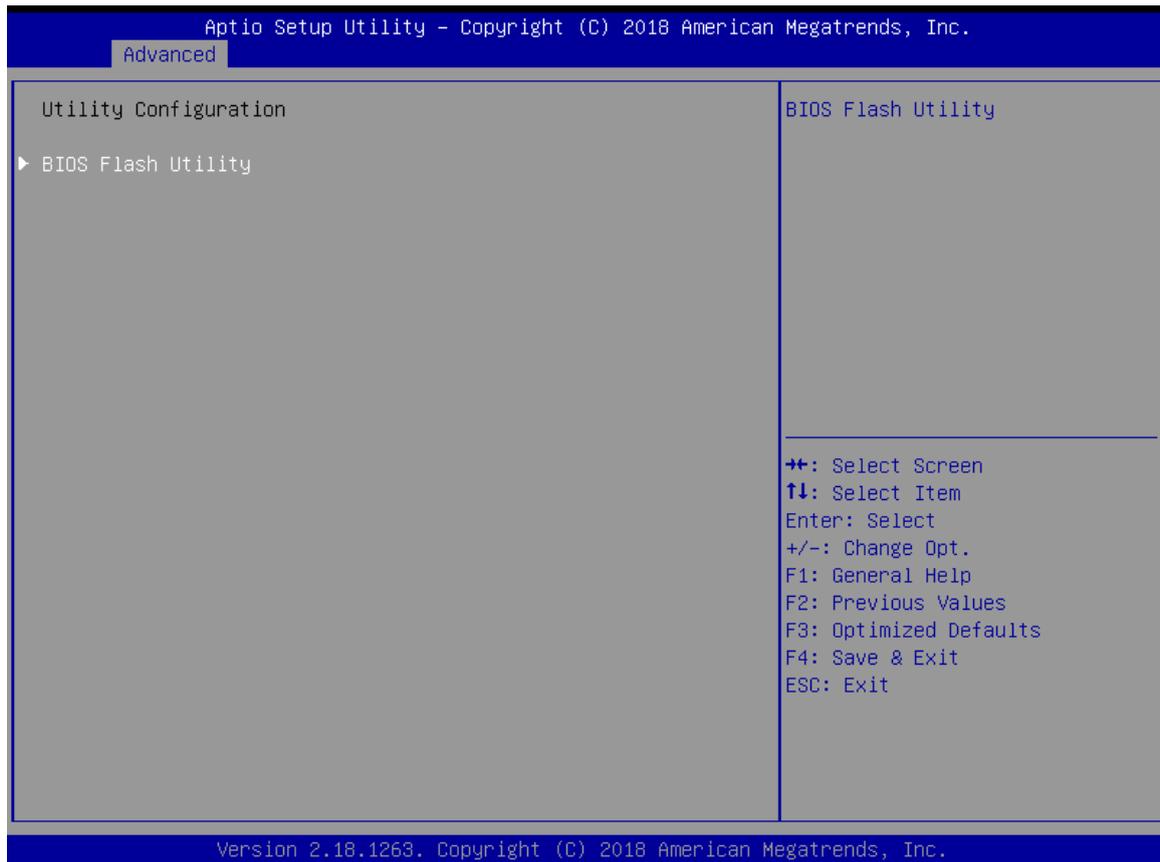
<p>S5 RTC Wake Settings [Enable]</p> <p>Wake up hour 0</p> <p>Wake up minute 0</p> <p>Wake up second 0</p>	<p>Enable or disable System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime, System will wake on the current time + Increase minute(s)</p> <hr/> <p>                     ++: Select Screen                      ↑↓: Select Item                      Enter: Select                      +/-: Change Opt.                      F1: General Help                      F2: Previous Values                      F3: Optimized Defaults                      F4: Save &amp; Exit                      ESC: Exit                 </p>
--	--

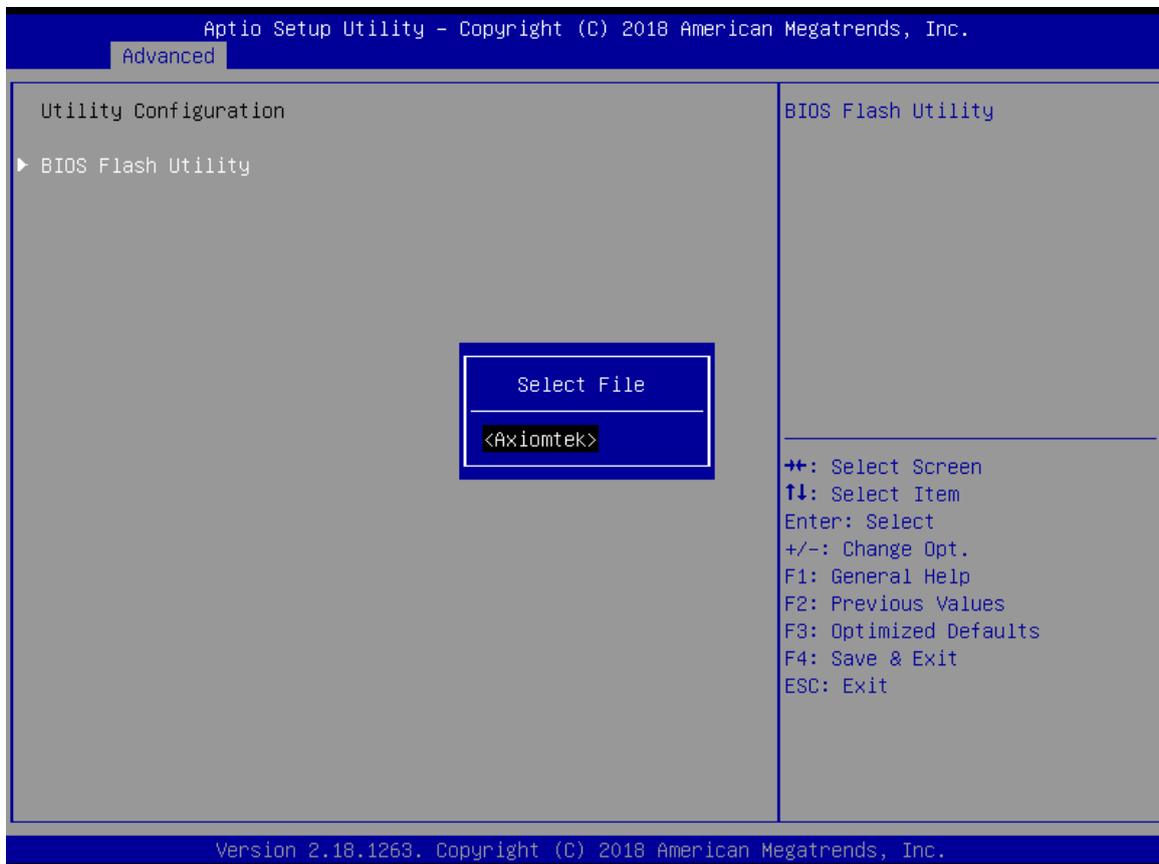
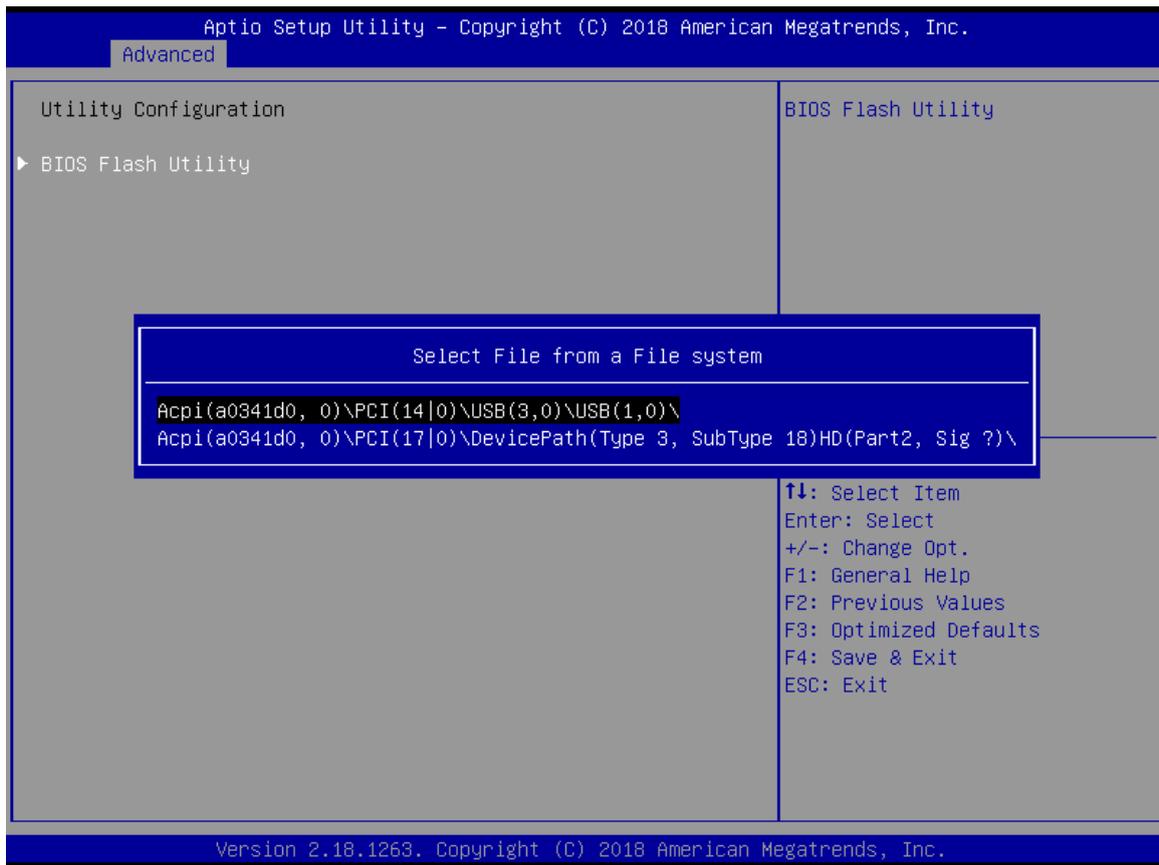
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.

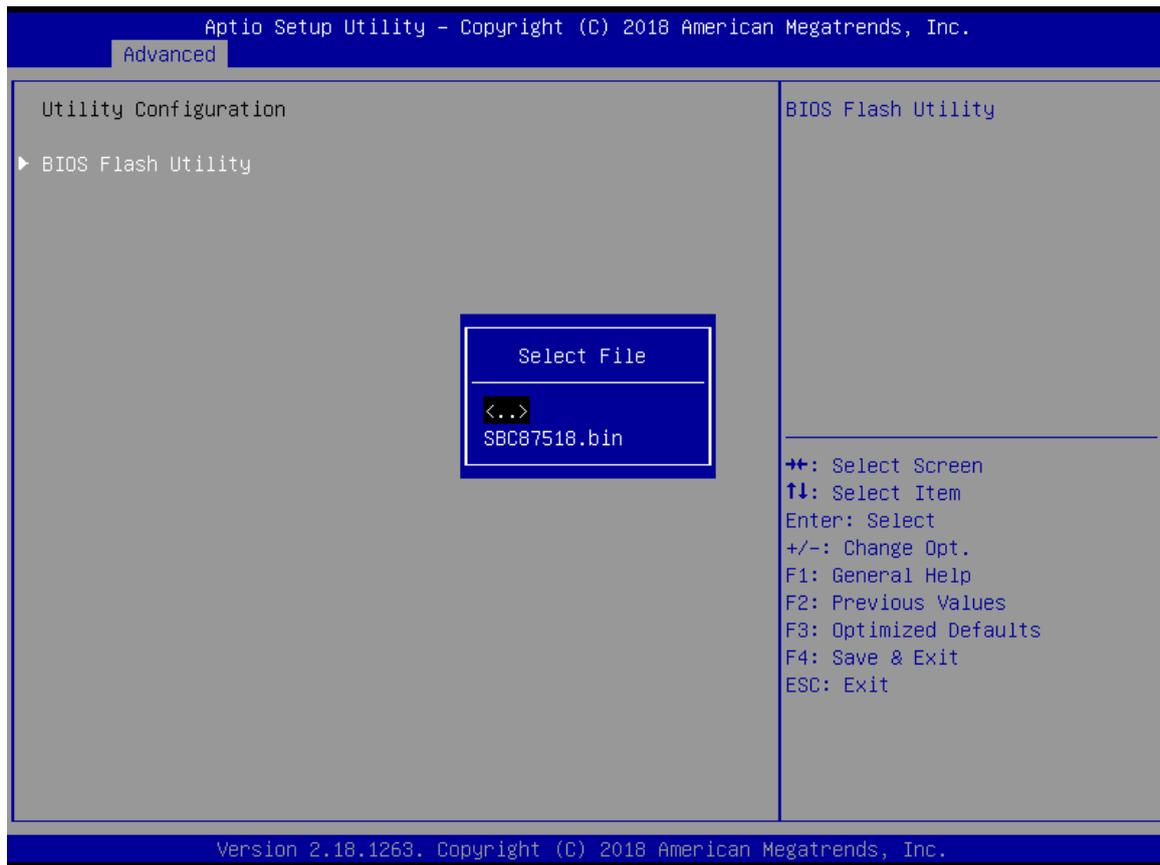
- **Utility Configuration**

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 Axiomtek on the root of USB storage (Ex: X:\Axiomtek).
2. Copy the BIOS file to the Axiomtek folder (Ex: X:\Axiomtek\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".



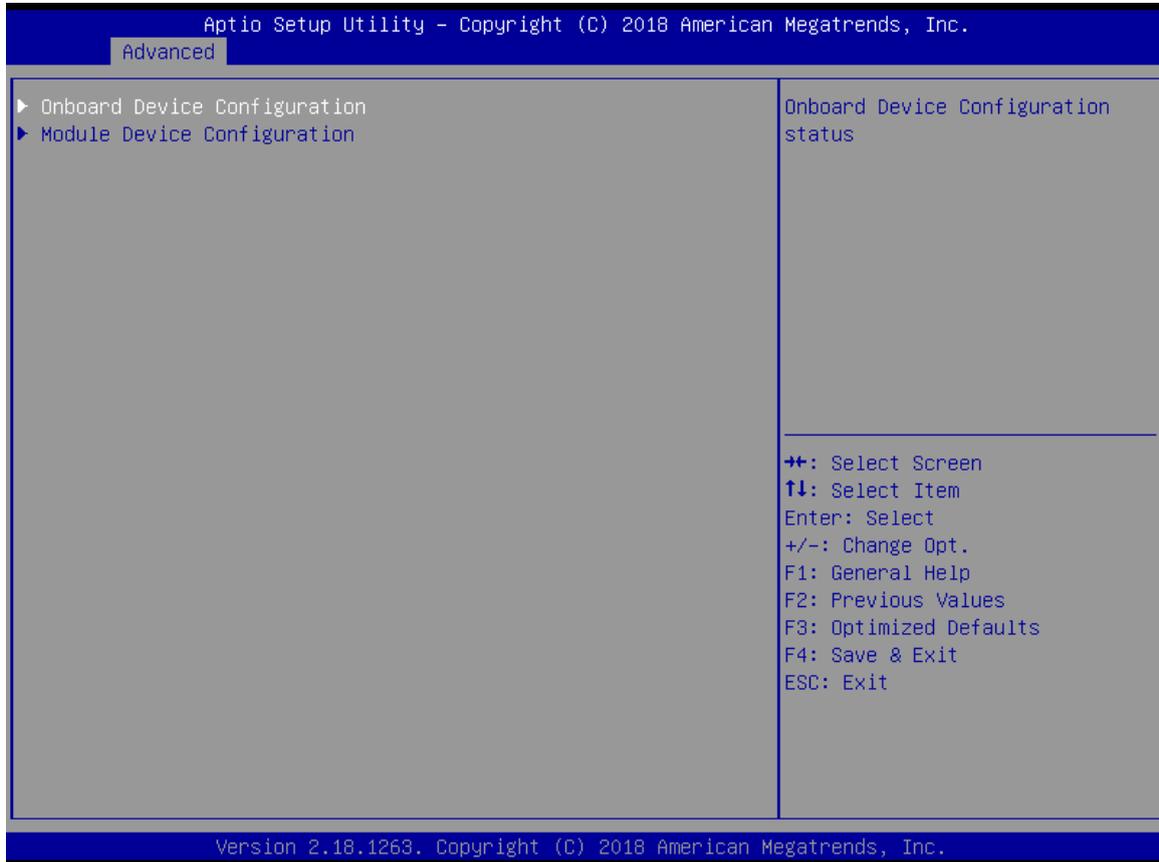




- **Device Configuration**

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

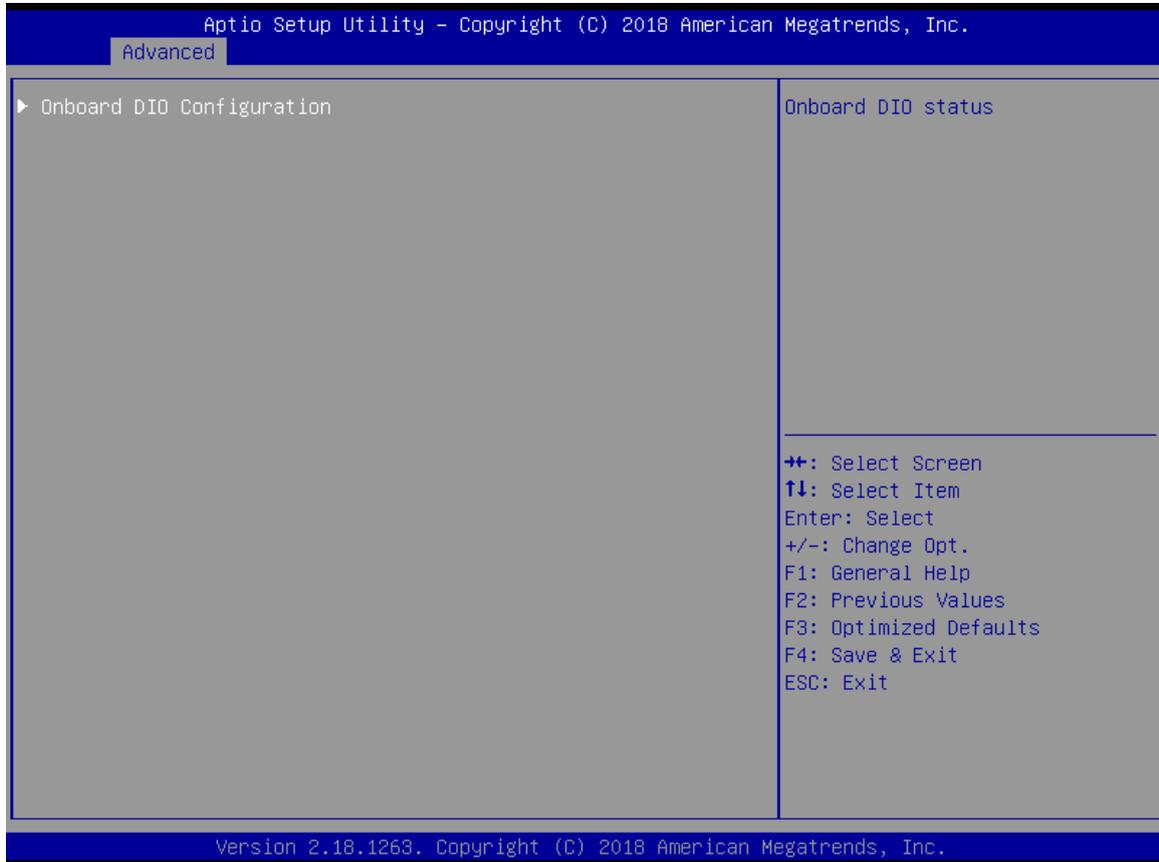
The Module Device Configuration menu would dynamically appear when a module device is plugged into the slot. When no module is plugged in, the screen would only show Onboard Device Configuration.

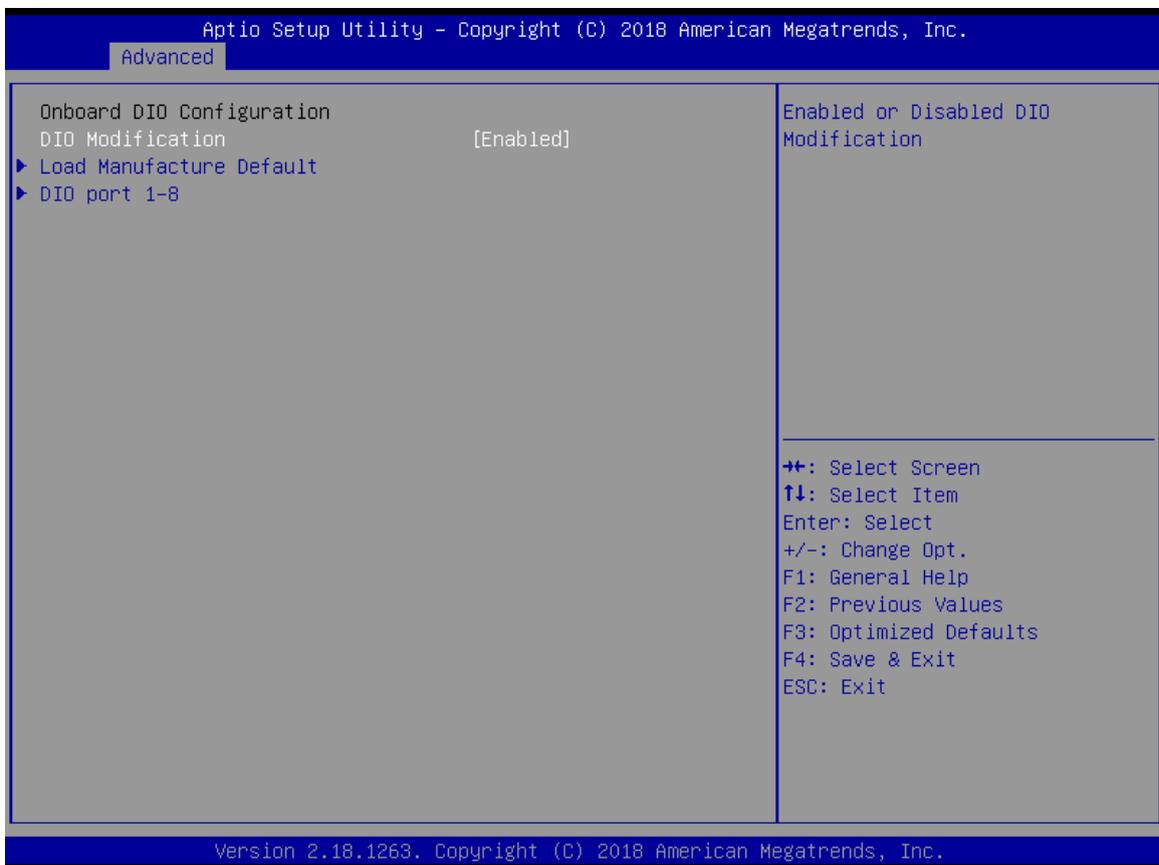
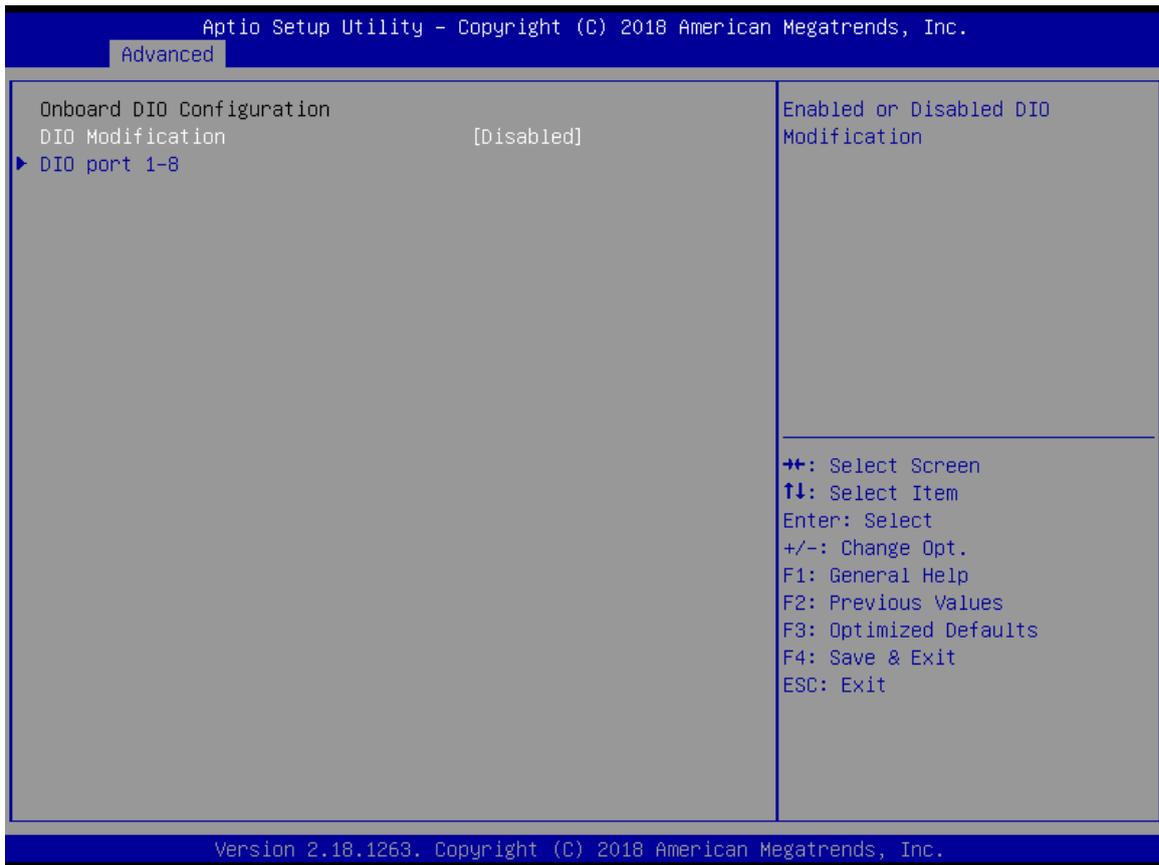


## Onboard DIO Configuration

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

		High/Low Setting
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	++: Select Screen
Input/Output Setting	[Input]	↑↓: Select Item
6. Input/Output Status	In & High	Enter: Select
Input/Output Setting	[Input]	+/-: Change Opt.
7. Input/Output Status	In & High	F1: General Help
Input/Output Setting	[Input]	F2: Previous Values
8. Input/Output Status	In & High	F3: Optimized Defaults
Input/Output Setting	[Input]	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	

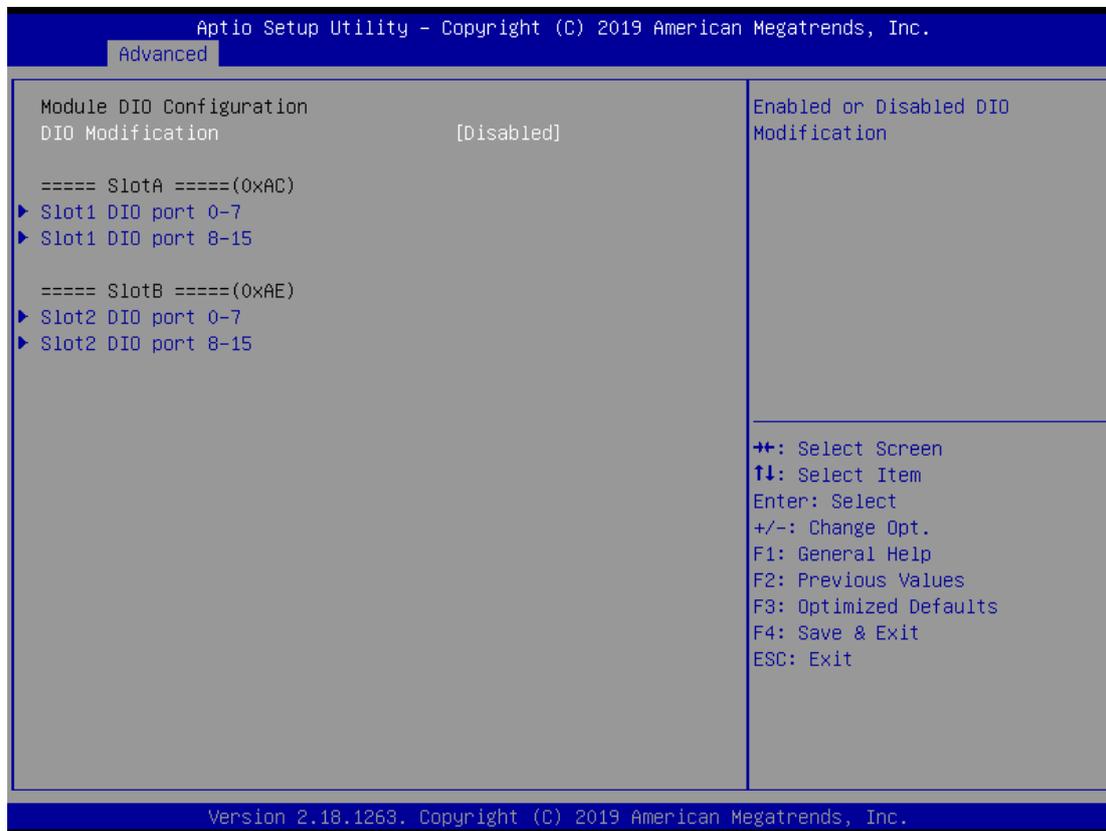
---

++: 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

<p>DIO status</p> <table style="width: 100%; border-collapse: collapse;"> <tr><td style="width: 30%;">08.Input/Output Status</td><td style="width: 30%;">In &amp; High</td></tr> <tr><td>09.Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>10.Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>11.Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>12.Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>13.Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>14.Input/Output Status</td><td>In &amp; High</td></tr> <tr><td>15.Input/Output Status</td><td>In &amp; High</td></tr> </table>	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	<hr style="border: 0; border-top: 1px solid black; margin-bottom: 10px;"/> <p>             ++: Select Screen              ↑↓: Select Item              Enter: Select              +/-: Change Opt.              F1: General Help              F2: Previous Values              F3: Optimized Defaults              F4: Save &amp; Exit              ESC: Exit         </p>
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																

Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.

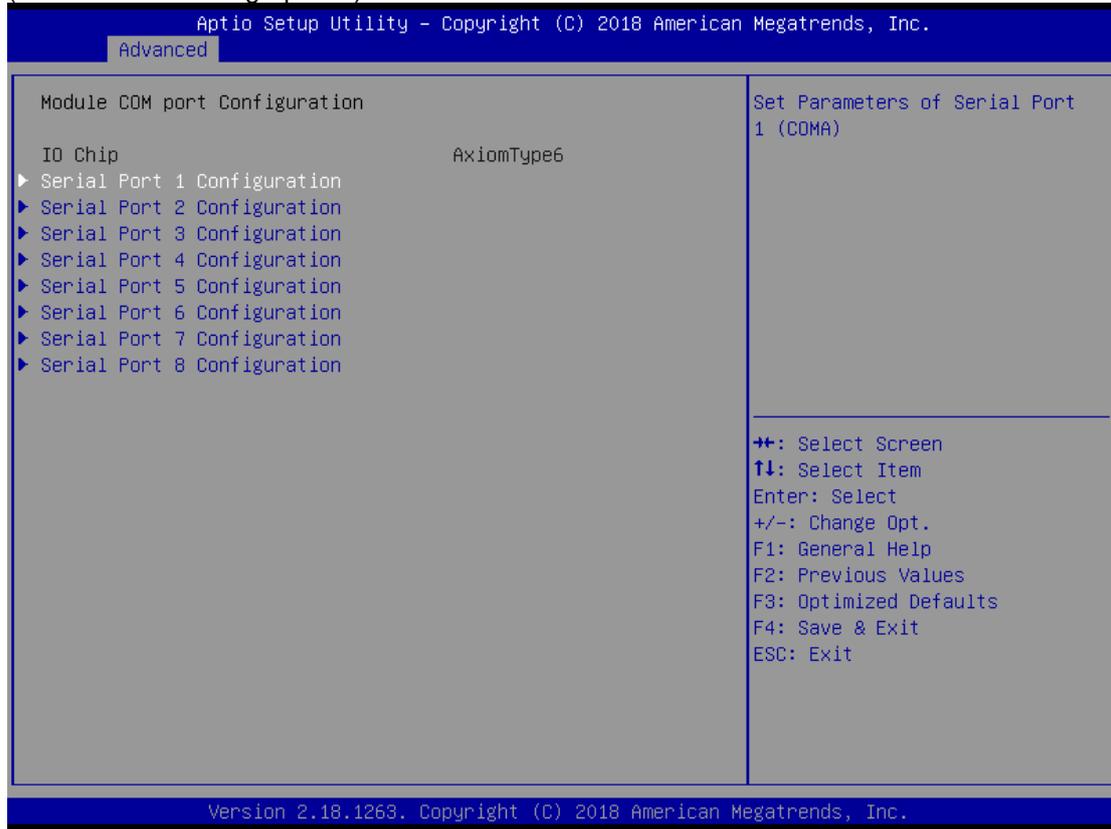
### Module COM port Configuration

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

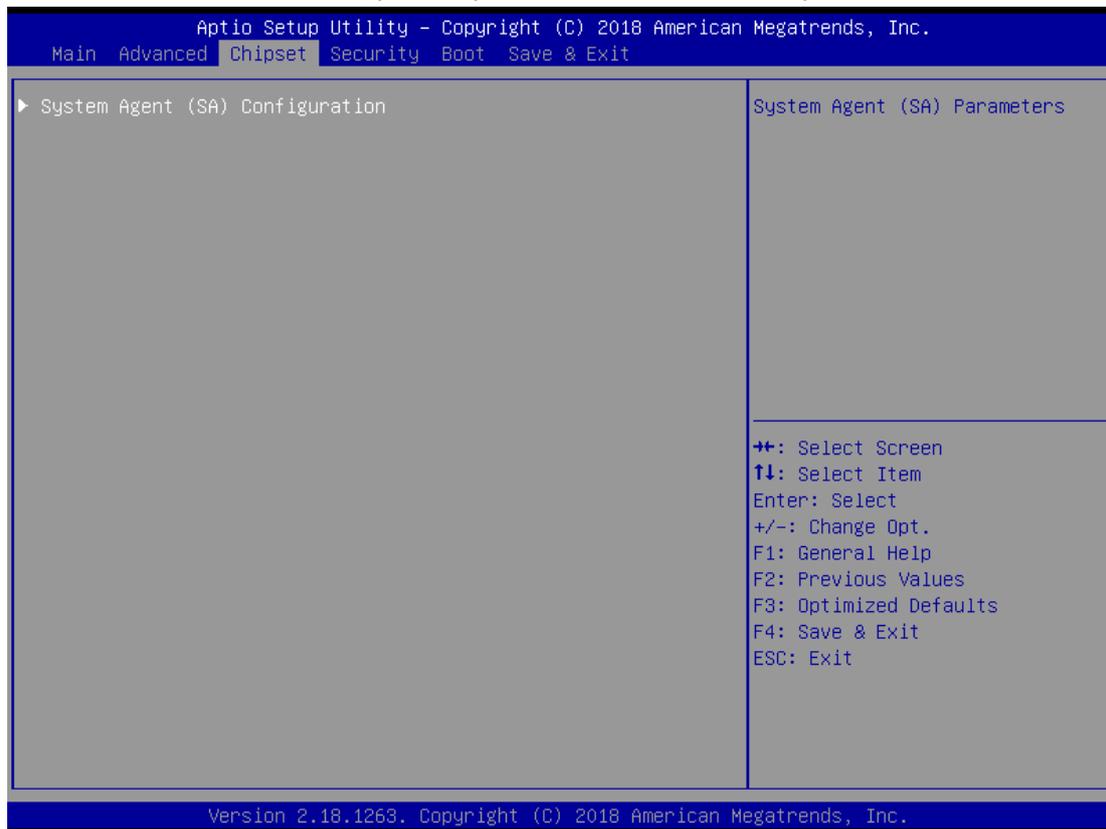
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.

### 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:

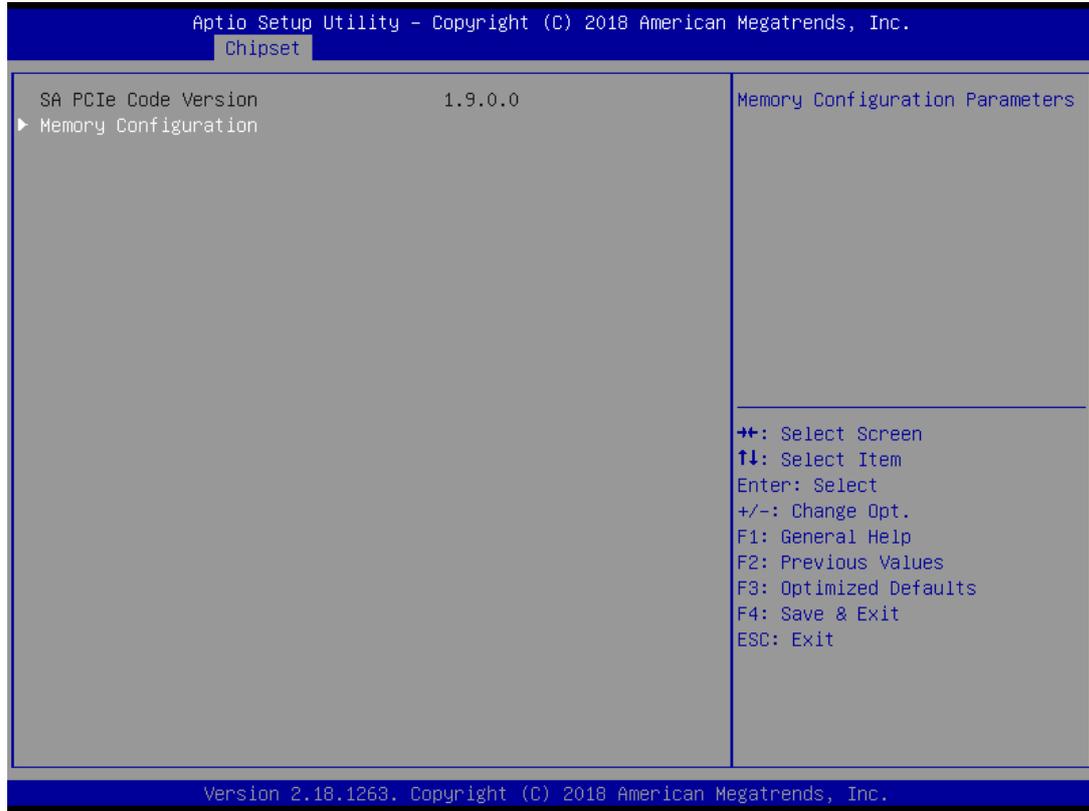
- ▶ System Agent (SA) Configuration

For items marked with “▶”, please press <Enter> for more options.



● **Memory Configuration**

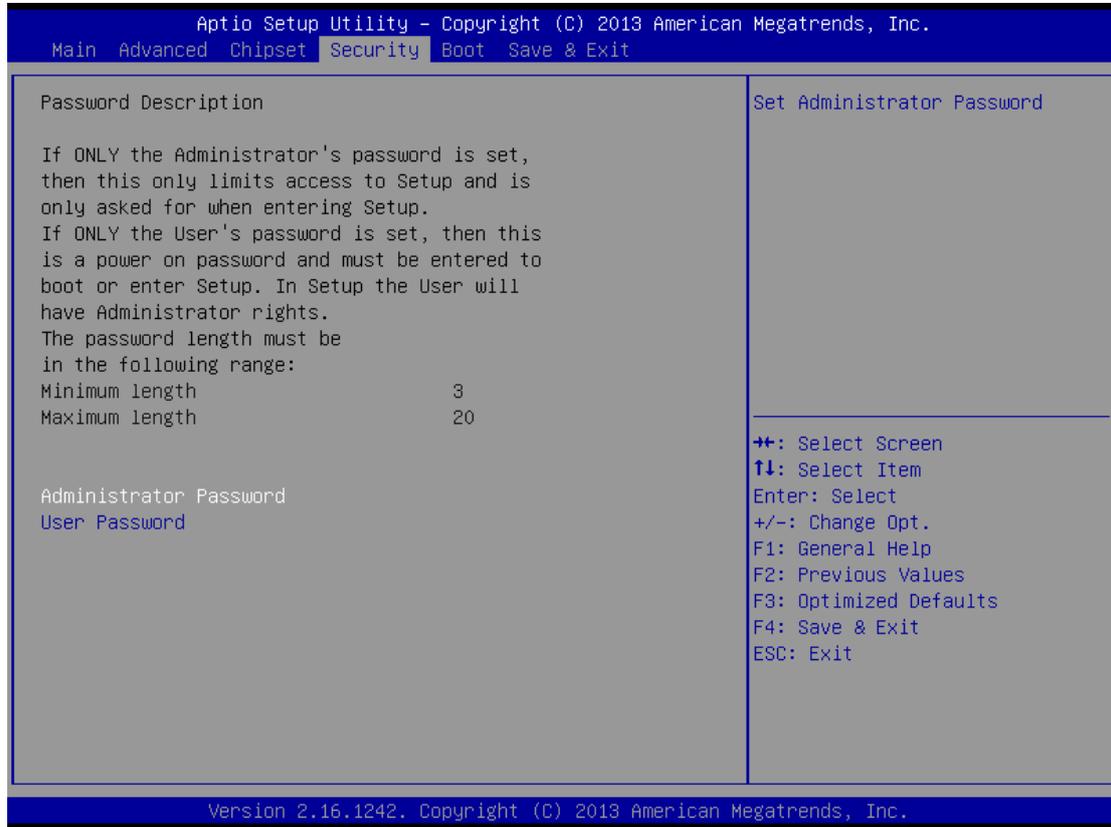
This screen shows the system memory information.



### 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

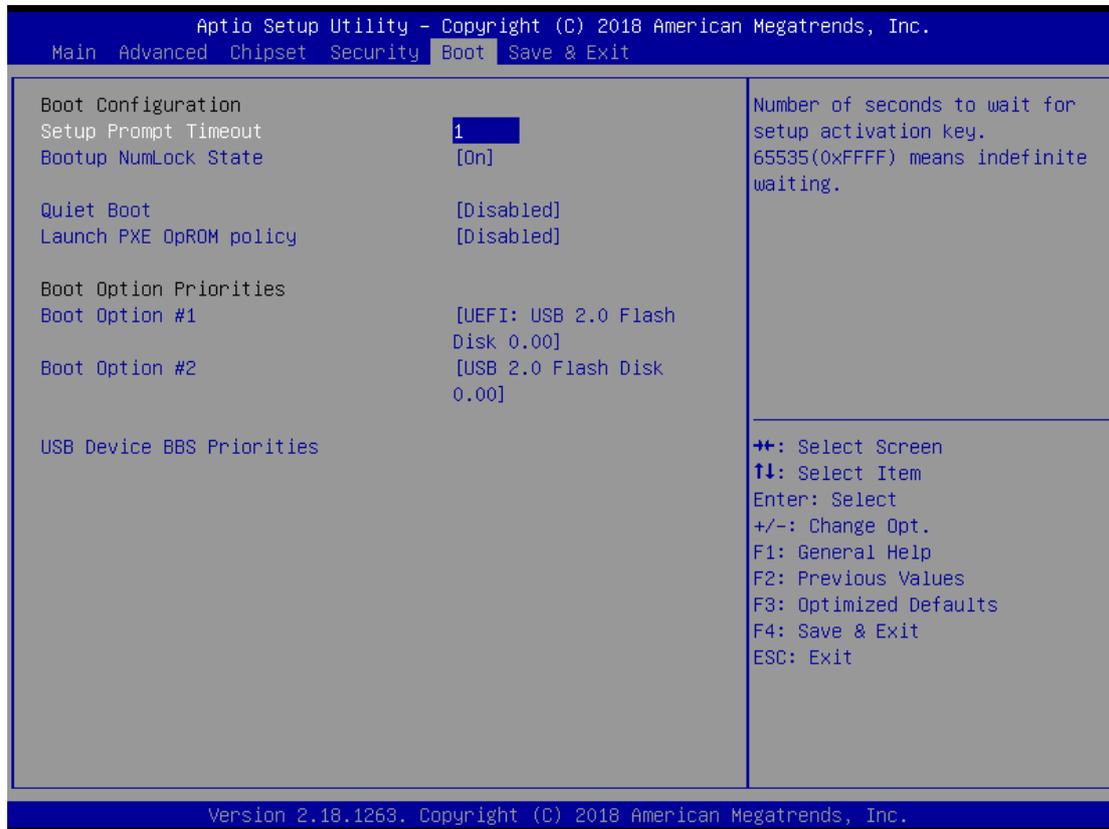
This item indicates whether a user password has been set (installed or uninstalled).



**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

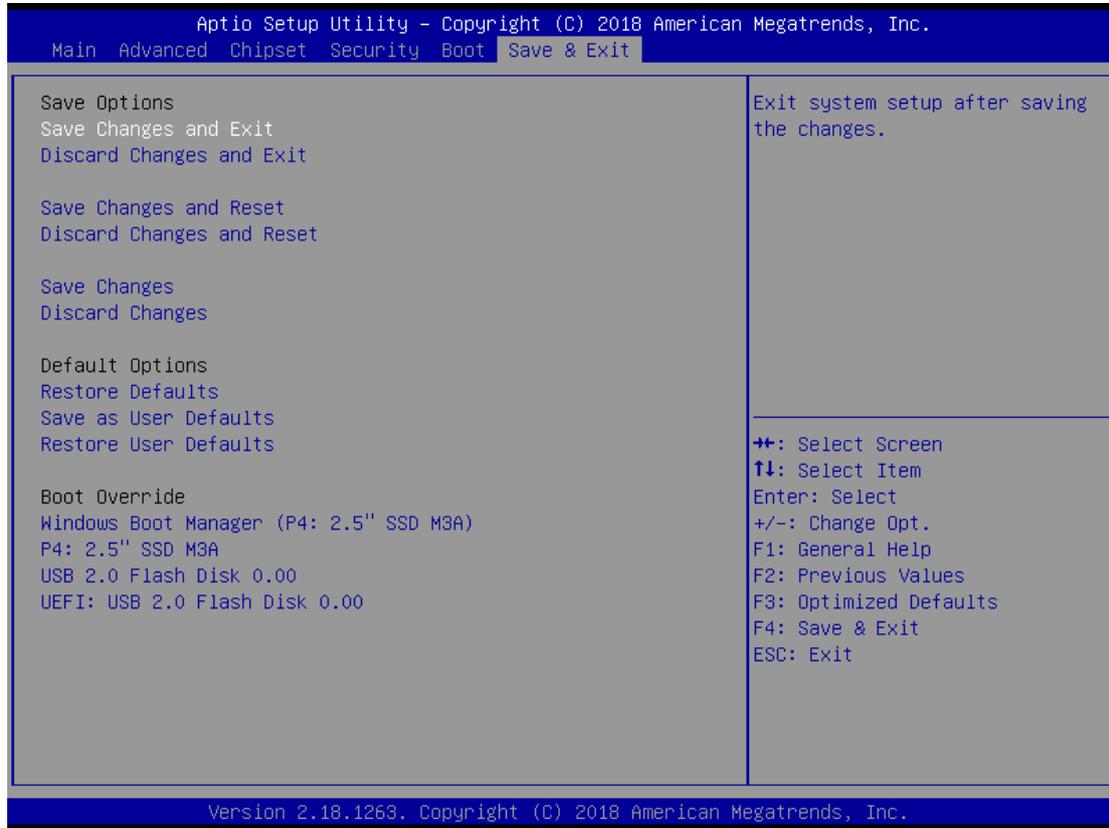
Use this item to select the power-on state for the keyboard NumLock.

#### 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.

**This page is intentionally left blank.**

## 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

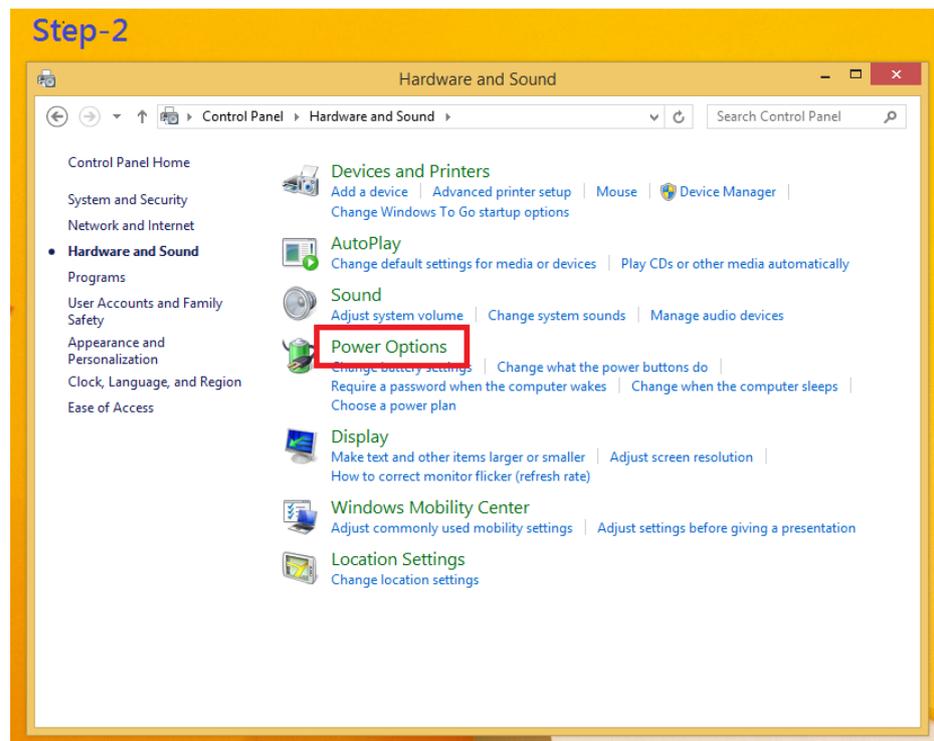
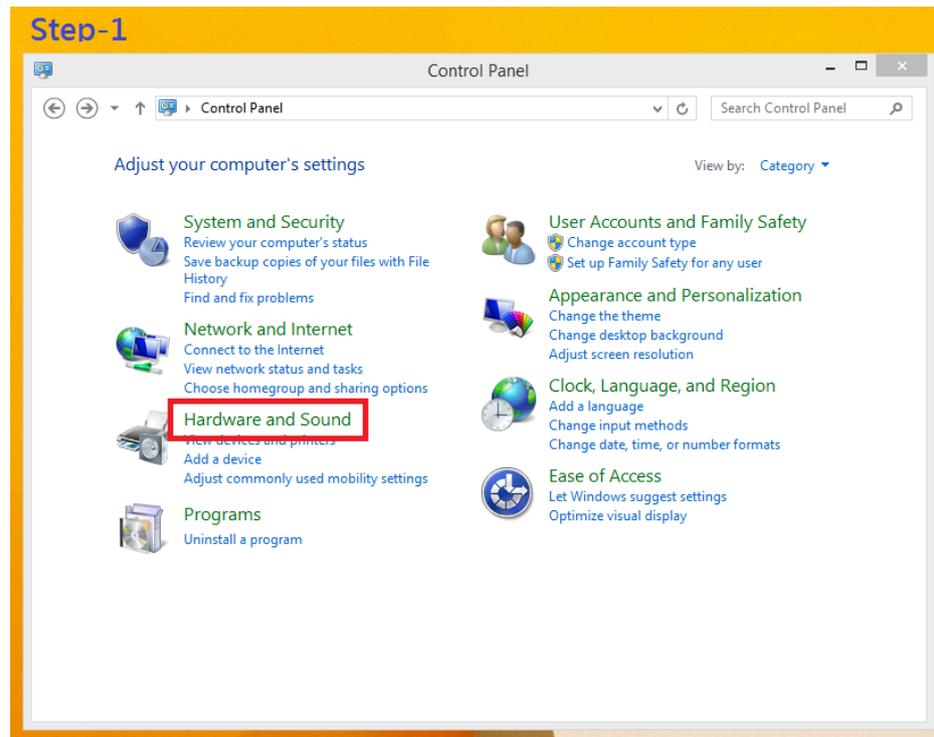
The following example shows how to enable configuration using a debug tool.

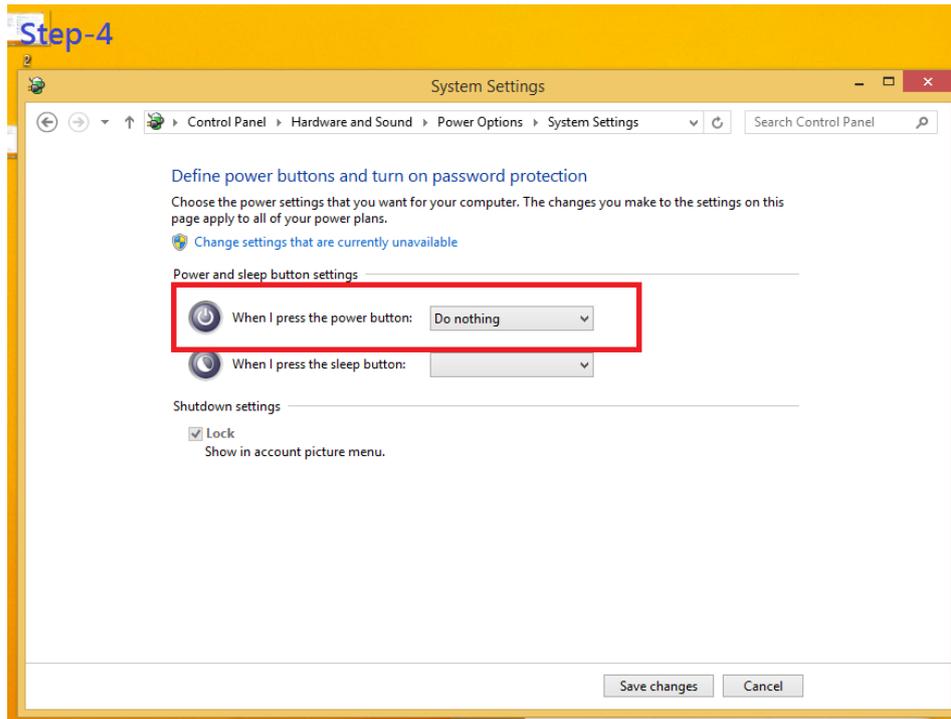
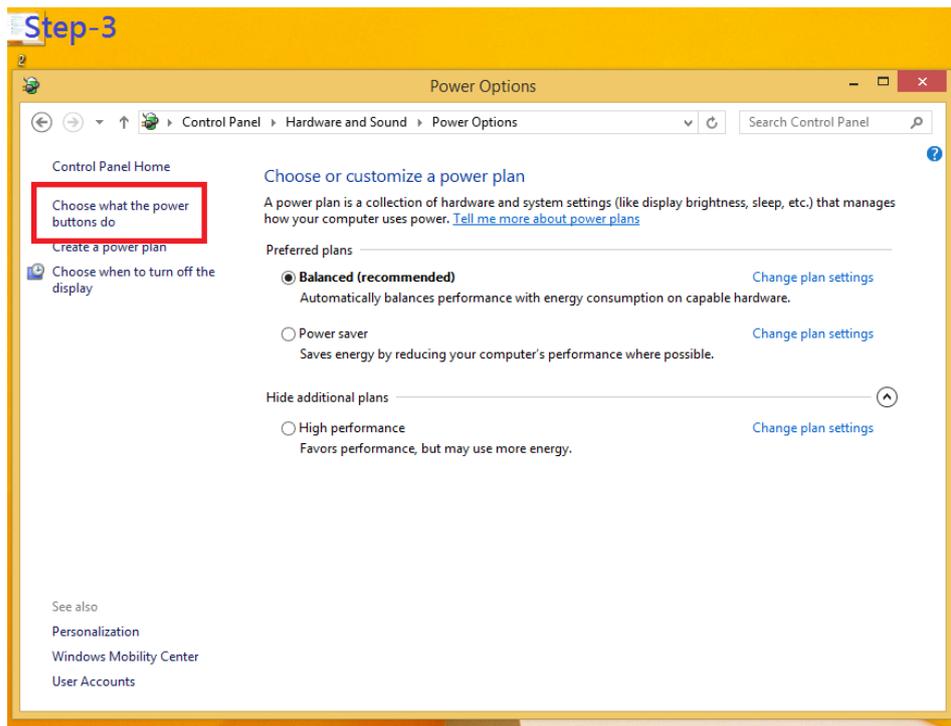
Step	Description	Sample code	Note
1	Enter configuration mode	O 2E 87	Un-lock super I/O
		O 2E 87	
2	Select logic device	O 2E 07	Select logic register
		O 2F 07	Switch to WDT device
3	Set timer value	O 2E F6	Select logic register
		O 2F 05	Timer value 0~255 (Sec/Min) (Ex: 5)
4	Clear WDT status (optional)	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)

**This page is intentionally left blank.**

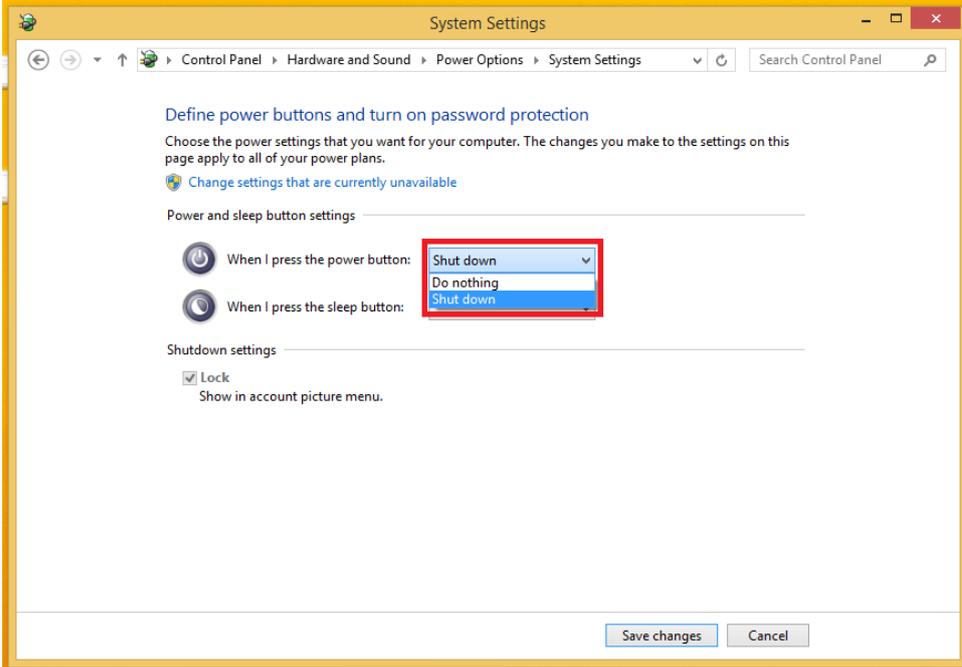
# APPENDIX B POWER BUTTON SETTING FOR WINDOWS

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

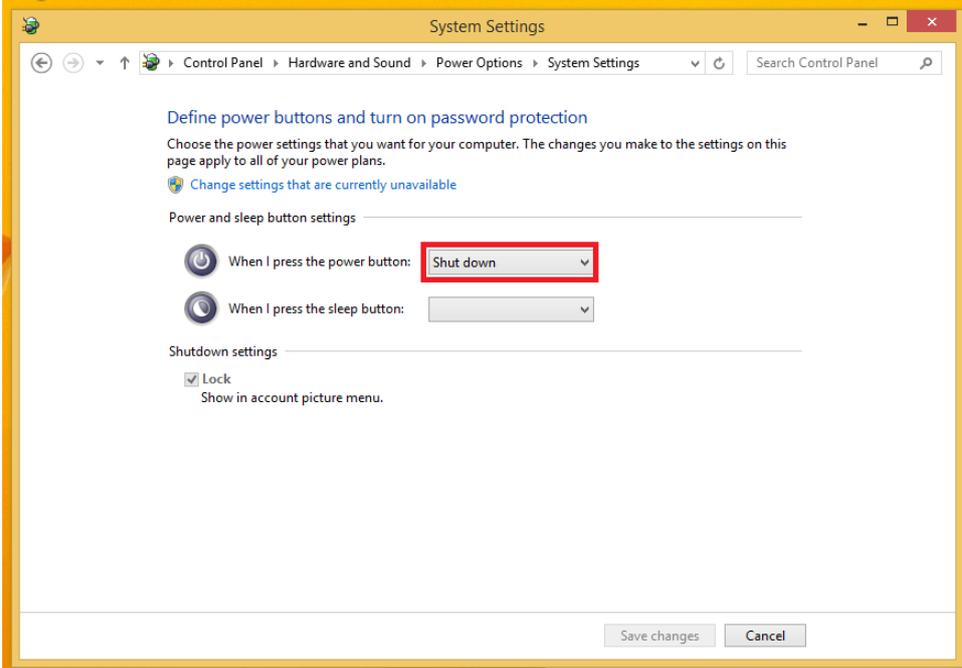




### Step-5



### Step-6



**This page is intentionally left blank.**

## 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	

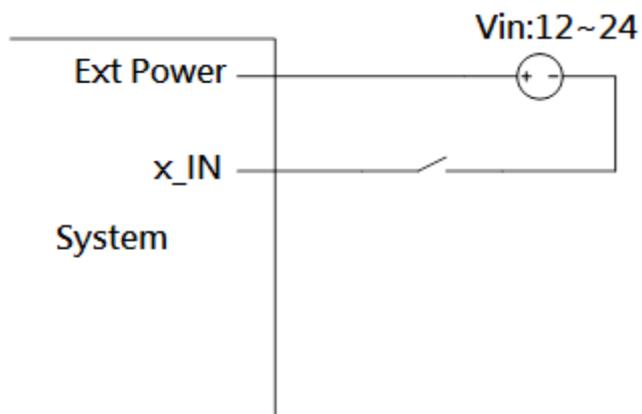
**Table 5. Register 1 - Output Port register bit description**

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*	

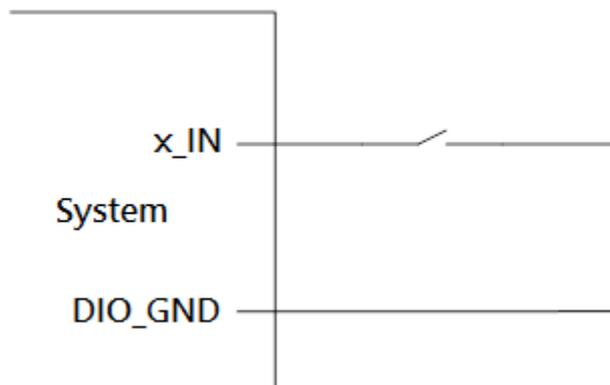
## Digital Input Wiring

### Dry Contact (1):



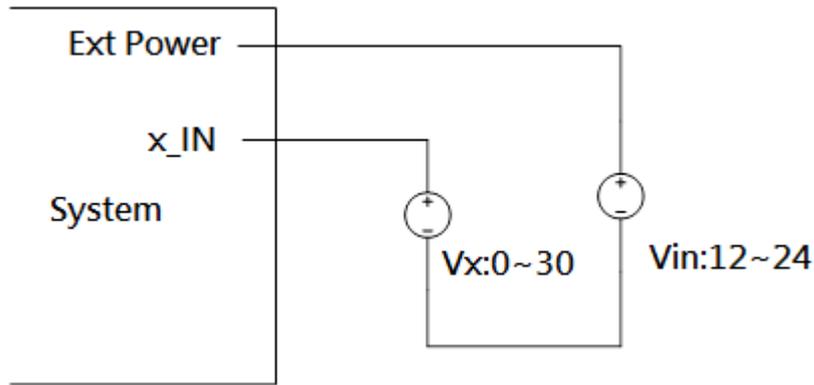
With external power.

### Dry Contact (2):

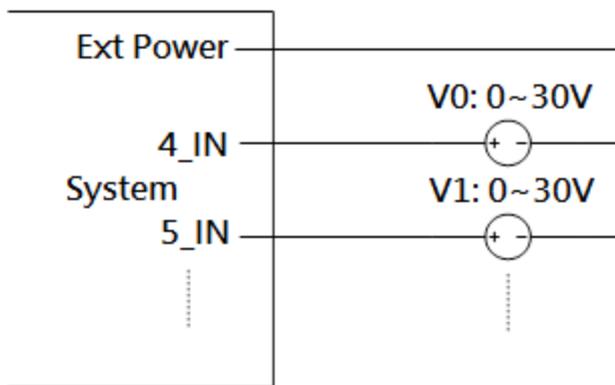


Without external power.

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

