



***AXIOMTEK***

## **tBOX300-510-FL Series**

**Embedded System**

**User's Manual**



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## Safety Precautions

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

1. User should not modify any unmentioned jumper setting without Axiomtek FAE's instruction. Any modification without instructions might damage the system.
2. The tBOX300-510-FL does not come equipped with an operating system. An operating system must be loaded first before installing any software into the computer.
3. 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.
4. Disconnect the power cord from the tBOX300-510-FL 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 tBOX300-510-FL is properly grounded.
5. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
6. Turn OFF the system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
7. Do not leave this equipment in an uncontrolled environment where the storage temperature is below -40°C or above 85°C. It may damage the equipment.
8. 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 a human body.
  - When handling boards and components, wear a grounding wrist strap, available from most electronic component stores.

## **Classification**

1. Degree of protection against electric shock: not classified
2. Degree of protection against the ingress of water: IP30
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

## **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 it 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 the same types of components. 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 using a piece of cloth to rub hardware parts.
- 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: Using a vacuum cleaner to suck 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 the 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 recommend that you should shut down the system before you start to clean any single component.**

Please follow the steps below:

1. Close all application programs.
2. Close operating software.
3. Turn off power switch.
4. Remove all devices.
5. Pull out the 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.

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## CHAPTER 1 INTRODUCTION

This chapter contains general information and detailed specifications of the tBOX300-510-FL. Chapter 1 includes the following sections:

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

### 1.1 General Description

The tBOX300-510-FL is an embedded system powered by the 7th Gen. Intel® Celeron - 3965U / Core™ i3-7100U / i5-7300U / i7-7600U processor (2.2 up to 2.8 GHz) onboard and supports Windows® 10 and Linux. It has been built for the most enduring operation with optimal fanless design and rich I/O, supports SO-DIMM up to 32GB and Marvell Hardware RAID 0/1/10, and includes a built-in Watchdog Timer to deliver enhanced system reliability.

#### ● Features

- 7th Generation Intel® Core™ i (15W) processor onboard
- Support SO-DIMM DDR4-2133 up to 32GB
- CE , FCC, IEC 60945, EN 50155 certified
- Fanless with operating temperature range of -25°C ~ +70°C with W.T. SSD, 0°C ~ +60°C with HDD, -25°C ~ +60°C with VAM701/703
- 1 COM Port RS-232/422/485.
- Supports USB 3.0 and SATA3
- 4x removable & lockable 2.5" SATA drive bays.
- 3x internal mini PCIe slot and 2x SIM socket
- Supports 1 Port 10/100/1000 Base-T Ethernet LAN connectors
- Complies with European standard for vehicle fire protection: PrCEN TS 45545-2

#### ● Reliable and Durable Design

- The tBOX300-510-FL adopts an advanced cooling system and supports mSATA, which makes it especially suitable for environments subject to vibration and the best solution for industrial automation, digital signage, and gaming applications.

#### ● Embedded O/S Supported

- The tBOX300-510-FL supports not only Windows® 10 but also embedded O/S such as Windows® 10 Embedded and Linux. For storage devices, the tBOX300-510-FL supports 4x 2.5" SATA drive bays and 1x mSATA slot.

## 1.2 System Specifications

### 1.2.1 CPU

- **CPU**
  - Onboard Intel® Core™ Celeron-3965U / Core™ i3-7100U / i5-7300U / i7-7600U processor (2.2 up to 2.8 GHz) processor (2M / 3M Cache 2.2GHz up to 2.8 GHz)
- **BIOS**
  - American Megatrends Inc. BIOS.
  - “Load Optimized Default” to back up customized settings in the BIOS flash chip to prevent CMOS battery fail.
- **System Memory**
  - DDR4 SO-DIMM socket up to DDR4-2133 Memory
- **Graphics**
  - Integrated Intel® HD Graphics 620 for DVI-I

### 1.2.2 System I/O

- **Front Side**
  - 1x DVI-I female connector
  - 2x Screw audio connectors (MIC-IN/LINE-OUT)
  - 1x RJ-45 10/100/1000 Mbps Ethernet
  - 4x USB 3.0
  - 1x DB9 serial console for RS232/422/485
  - 1x Remote power switch
  - 1x Reset button
- **Rear Side**
  - 1 x M12 or terminal block DC-in (optional)
  - 4x Antenna opening
  - 1 x PoE power supply input (optional)
  - 1 x modular IO slot (for value-added module)

### 1.2.3 System Specification

- **Watchdog Timer**
  - Reset supported; 255 levels, 1~255 sec.
- **Power Supply**
  - 24-110 VDC-in power supply
  - Power Rate:3A@24VDC; 0.65A@110VDC
  - Power Rate:6A@24VDC (W/ PSU)
- **Operation Temperature**
  - -25°C ~ +70°C (- 13°F ~ 158°F) with W.T. SSD
  - -25°C ~ +55°C (-13°F ~ +131°F) with HDD
  - -25°C ~ +60°C (- 13°F ~ 140°F) with VAM701/703

- **Storage Temperature**
  - -40°C ~ +85°C (- 40°F ~ 176°F)
- **Humidity**
  - 5% ~ 95% (non-condensation)
- **Vibration Endurance**
  - 3Grms w/ SSD (5 ~ 500Hz, X, Y, Z direction; random)
  - 1Grms w/ HDD (5 ~ 500Hz, X, Y, Z direction; random)
- **Weight**
  - 5.5 kg (12.1lb) without package
  - 6.8kg (14.96lb) with package
- **Dimensions**
  - 321mm(12.64")(W) x 210.2mm(8.28")(D) x 105.33mm(4.17")(H)



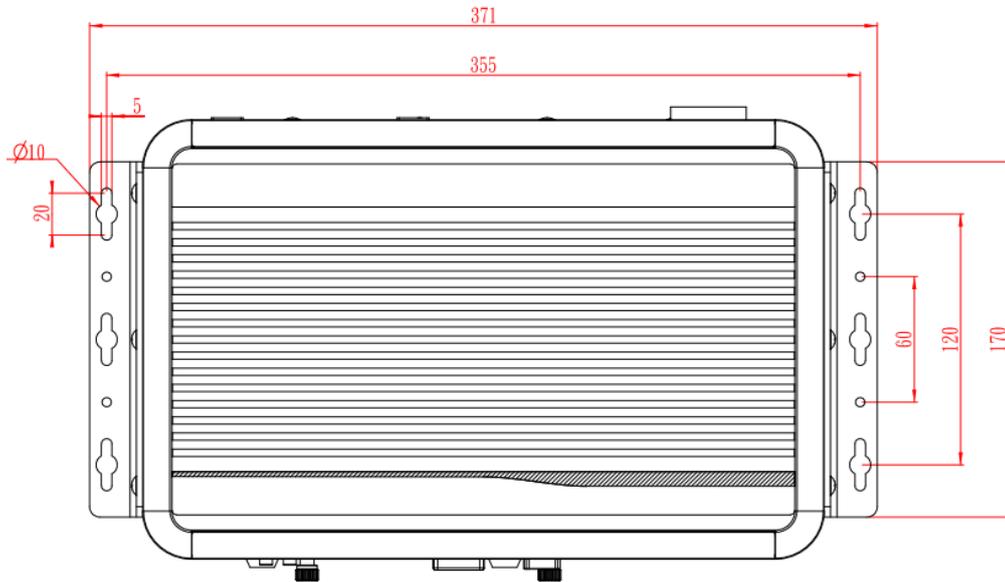
**NOTE: All specifications and images are subject to change without notice.**

#### 1.2.4 Driver CD Content

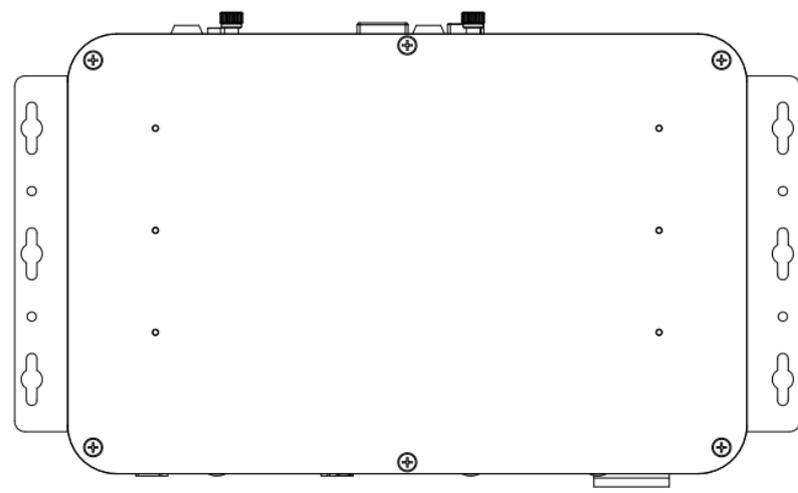
- **Chipset Driver**
- **Graphics Driver**
- **Audio Driver**
- **Ethernet Driver**
- **ME Driver**
- **RAID Driver**
- **RAID Manager Tool**
- **VAM Module Driver**

### 1.3 Dimensions

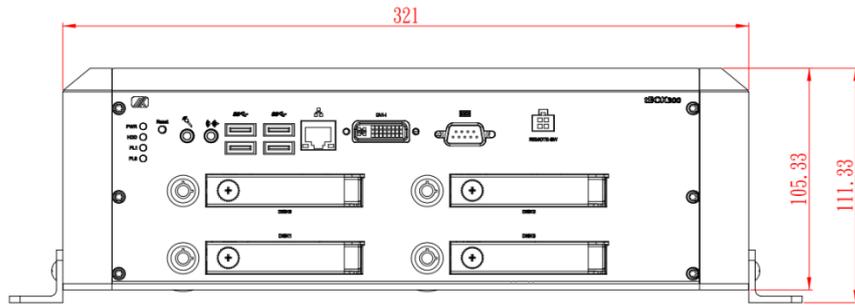
The following diagrams show the dimensions and outlines of the tBOX300-510-FL.



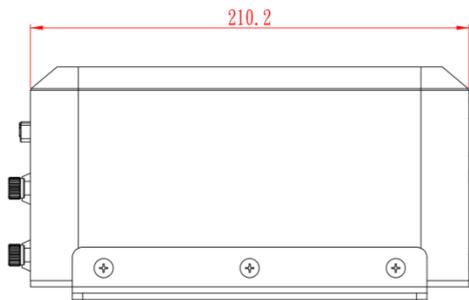
▲ Top View



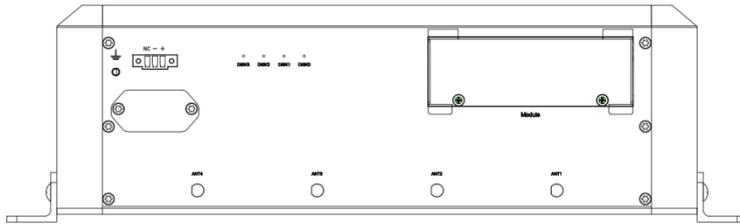
▲ Bottom View



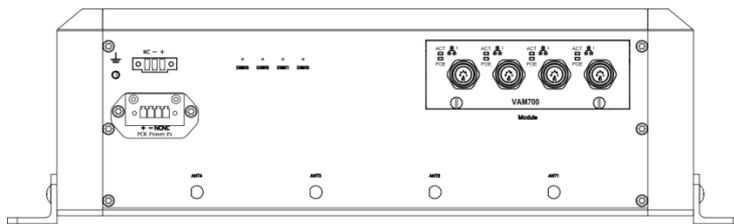
▲ Front View



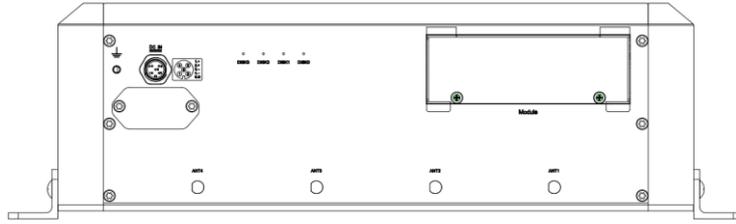
▲ Side View



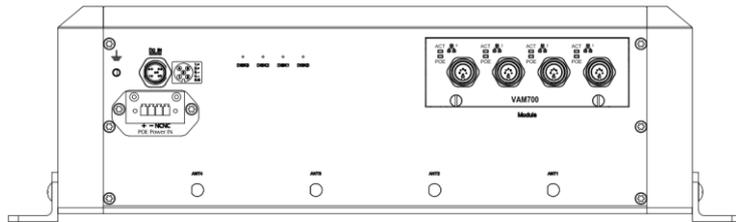
▲ Rear View: Terminal block DC-IN (w/o VAM)



▲ Rear View: Terminal block DC-IN (w/ VAM701)



▲ Rear View: M12 DC-IN (w/o VAM)



▲ Rear View: M12 DC-IN (w/ VAM701)

## 1.4 I/O Outlets

The following figures show the I/O outlets on the front and rear views of the tBOX300-510-FL.

### ● Front View



### ● Rear View



## 1.5 Packing List

The package bundled with your tBOX300-510-FL should contain the following items:

- tBOX300-510-FL system unit x 1
- tBOX300-510-FL Quick Installation Guide x 1
- DVD x 1 (for drivers )
- Screw pack x 1
- Foot pad x 4
- Wall-mount bracket x 2
- DRAM thermal pad x 4
- HDD Mylar x 8
- SATA drive key x 4
- Power terminal block or M12 power cable x 1 (optional)
- Remote switch cable x1 (optional)
- HDD/SSD/mSATA (optional)
- Express Mini Card module (optional)
- Wireless module x 1 (optional)
- Value-added module x 1 (optional)



**NOTE:** Please contact your local distributor if any of the above-mentioned items is missing or damaged. **DO NOT** apply power to the board if any component is damaged.

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## CHAPTER 2 HARDWARE INSTALLATION

The tBOX300-510-FL is designed for easy hardware configurations, such as the HDD (Hard Disk Drive), DRAM and mini PCIe card. Chapter 2 will show you how to install the hardware.

### 2.1 Installing the Swappable HDD/SSD & Value-added Module (VAM)

**Step 1** Attach a piece of Mylar on the back of an HDD/SSD as shown.



**Step 2** As shown in the picture, slide the HDD/SSD into the SATA tray. Insert screws into each side of the SATA drive through the corresponding holes.



**Step 3** Install the SATA drive into the slot and fasten the screw to lock the SATA drive to complete the installation.



- Step 4** Unscrew the rear side screws (x2) and then remove the value-added module slot cover.

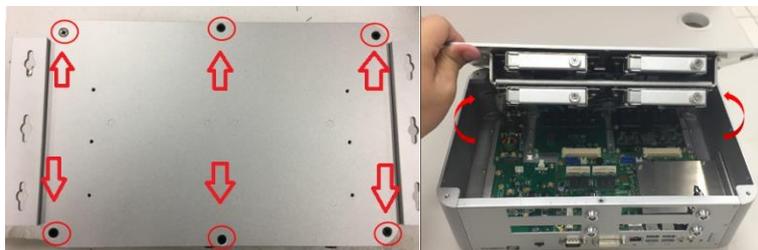


- Step 5** Insert the value-added module (VAM) as shown below. Make sure the module is on the track and slide the module fully into the slot. Secure the module by fastening the screws.



## 2.2 Installing the DDR module and Express Mini Card

- Step 1** Make sure system power is off and unplug the power cord.
- Step 2** Turn the tBOX300-510-FL upside down, loosen the cover screws and lift the bracket as shown.



- Step 3** Loosen the screws as shown below to remove the cover and put the thermal pad on the slot.



**Step 4** Install the DDR module with caution and put the thermal pad on the DDR module again. Then screw the DDR cover to finish the installation.



**For the Express Mini card:**

**Step 1** Slide a SIM or Mini card into their respective slot with caution.



**Step 2** Fasten the screws to complete the installation.



**For the value-added modules**

<b>Model name</b>	<b>Specification</b>	<b>Note</b>
VAM700	4 x M12 A-coded GbE	
VAM701	4 x M12 A-coded GbE (PoE/PoE+)	w/ external power supply unit (PSU)
VAM702	4 x RJ-45 GbE	
VAM703	4 x RJ-45 GbE (PoE/PoE+)	w/ external power supply unit (PSU)
VAM100	4 x 4-wire isolated RS-232/422/485	
VAM101	4 x isolated CANbus 2.0A/B	
VAM200	8-in/8-out isolated DIO	
VAM400	Video & Audio-in + 1x PCI Express Mini Card slot + 2x SIM card slot + 1x capture card	
VAM600	2x PCI Express Mini Card slot + 2x SIM card slot	

**For the external power supply unit**

<b>Model name</b>	<b>Spec</b>	<b>Note</b>
PSU120-259	Power supply output 53V	24VDC input only

## CHAPTER 3

### CONNECTOR AND JUMPER SETTINGS

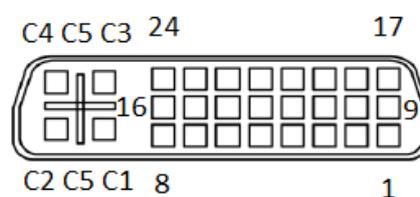
#### 3.1 Connectors

Connectors connect the CPU board with the other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected before your turn on the system.

##### 3.1.1 DVI Connector

###### DVI-I

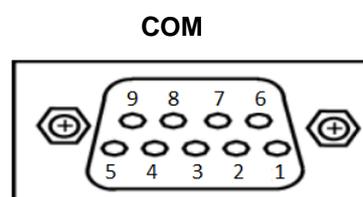
Pin	Signal	Pin	Signal
1	TMDS Data 2-	2	TMDS Data 2+
3	GND	4	CRT_SPD_Clock
5	CRT_SPD_Data	6	DVI_SPD_Clock
7	DVI_SPD_Data	8	Analog Vsync
9	TMDS Data 1-	10	TMDS Data 1+
11	GND	12	N.C
13	N.C.	14	+5V
15	GND	16	Hot Plug Detect
17	TMDS Data 0-	18	TMDS Data 0+
19	GND	20	N.C
21	N.C	22	GND
23	TMDS Clock+	24	TMDS Clock-
C1	Analog RED	C2	Analog Green
C3	Analog Blue	C4	Analog Hsync
C5	GND		



### 3.1.2 Serial Port Connector

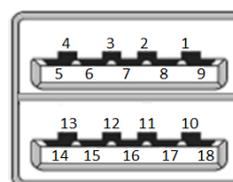
The COM1 port connector is a DB9 connector. The pin assignment of RS-232/RS-422/RS-485 is listed in the following table. If you need a COM port to support RS-422 or RS-485, please set it up in BIOS settings.

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, ground	GND, ground
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



### 3.1.3 USB3.0 Stack Ports

Pin	Signal USB Port 0	Pin	Signal USB Port 1
1	USB_VCC (+5V level standby power)	10	USB_VCC (+5V level standby power)
2	USB_Data2-	11	USB_Data3-
3	USB_Data2+	12	USB_Data3+
4	GND	13	GND
5	SSRX2-	14	SSRX3-
6	SSRX2+	15	SSRX3+
7	GND	16	GND
8	SSTX2-	17	SSTX3-
9	SSTX2+	18	SSTX3+



### 3.1.4 Front View LED Indicators

LED Indicator	Function
PWR/ Green	Power on
HDD/ Blue	HDD activity
PL1/ Green	Programmable
PL2/ Green	Programmable



### 3.1.5 Rear View LED Indicators

LED Indicator	Function
Orange	HDD ready
Flashing	Data access



### 3.1.6 DC Power Input Connector

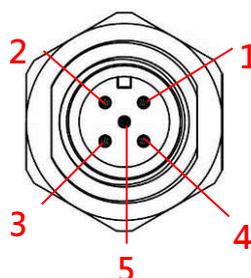
The DC-in connector has three pins as shown in the table below.

Pin	Marine/ Railway
1	NC
2	-
3	+



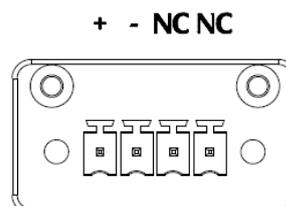
The DC-in power input connector is an M12 A-code Male 5Pin connector.

Pin	Signal
1	VCC
2	VCC
3	System GND
4	System GND
5	Chassis GND



The DC-in connector has four pins as shown in the table below (W/ PSU-120).

Pin	PoE Power
1	VCC
2	System GND
3	NC
4	NC

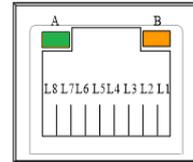


### 3.1.7 LAN Connector (LAN1~ LAN4)

The RJ-45 LAN connectors can support 10/100/1000Mbps.

#### Ethernet (optional)

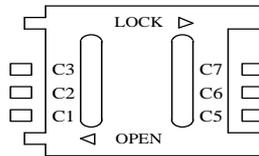
Pin	Description	10/100Base-T	1000Base-T
1	Transmit Data+ or Bidirectional	TX+	BI_DA+
2	Transmit Data- or Bidirectional	TX-	BI_DA-
3	Receive Data+ or Bidirectional	RX+	BI_DB+
4	Not Connected or Bidirectional	N.C.	BI_DC+
5	Not Connected or Bidirectional	N.C.	BI_DC-
6	Receive Data- or Bidirectional	RX-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



### 3.1.8 SIM Card Connector

The SIM Card slot is an ISO 7816 standard 6-pin connector used in conjunction with a PCI Express Mini Card.

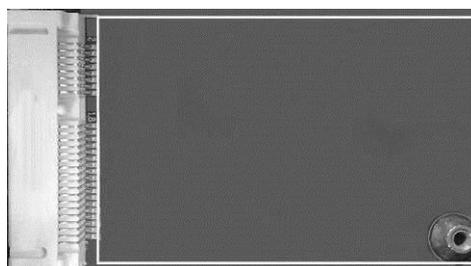
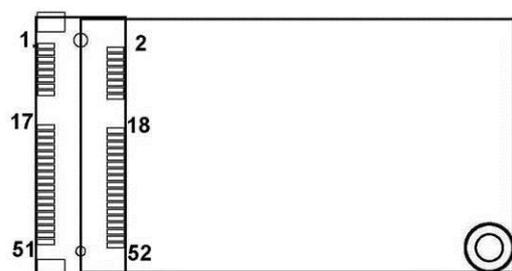
Pin	Signal
C1	SIM_PWR
C2	SIM_RESET
C3	SIM_CLK
C5	GND
C6	SIM_VPP
C7	SIM_DATA



### 3.1.9 PCI-Express Mini Card Connector

The PCI Express Mini Card connector supports 1x PCI Express lane and 2x USB 2.0 lanes. A PCI Express Mini Card can be applied to either PCI Express or USB 2.0. This friendly design of integrating USB 2.0 and PCI Express lanes into the same slot provides a convenient and low-cost solution for migration between the two interfaces.

Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	No use
9	GND	10	No use
11	REFCLK-	12	No use
13	REFCLK+	14	No use
15	GND	16	No use
17	No use	18	GND
19	No use	20	+3.3VSB
21	GND	22	PERST#
23	PE_RXN4	24	+3.3VSB
25	PE_RXP4	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN4	32	SMB_DATA
33	PE_TXP4	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	No use	46	LED_WPAN#
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



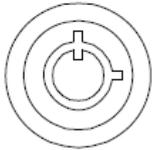
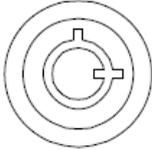
### 3.1.10 Antenna Opening

Profile opening is reserved for Wi-Fi/3G/4G antennas.



### 3.1.11 HDD Tray Locker

The HDD tray locker is used to lock and secure the swappable HDD/SSD bay.

Status	Diagram
Unlocked	
Locked	

### 3.1.12 Remote Switch Connector

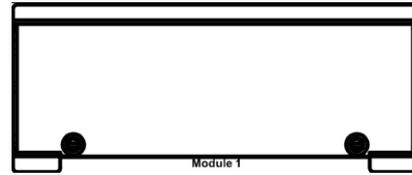
The remote switch is ideal for controlling a remote button which can act as an ATX power on/off button.

Pin	Signal	Description
1	NC	N/A
2	Switch Signal	Low Active. Acts as the PC's ATX switch when an external switch is installed (Pin 3 Active) <b>**The internal pull-up resistor is not connected to any power source.</b>
3	Ext. SW Sensor	Low Active. Detects whether an external power switch is installed or not. <b>** The internal pull-up resistor is not connected to any power source.</b>
4	GND	



### 3.1.13 Value-Added Module Specification

Module	Description
1,2	The system offers two expansion I/O module slots to support the functions of the value-added modules (VAM) listed in the table below. For detailed specifications, please refer to the quick manual of each individual module.



Item	Spec & Figure	Item	Spec & Figure
#1	VAM700/701: 4x M12 A-coded Gb Ethernet with PoE (optional) 	#2	VAM702/703: 4x RJ-45 Gb Ethernet with PoE (optional) 
#3	VAM100: 4x 4-wire isolated RS-232/422/485 	#4	VAM200: 8-in/8-out isolated DIO 
#5	VAM400: Video & Audio-in + mini PCIe capture card 	#6	VAM101: 4x isolated CANbus 2.0A/B 
#7	VAM600: Mini PCI Express + SIM 		

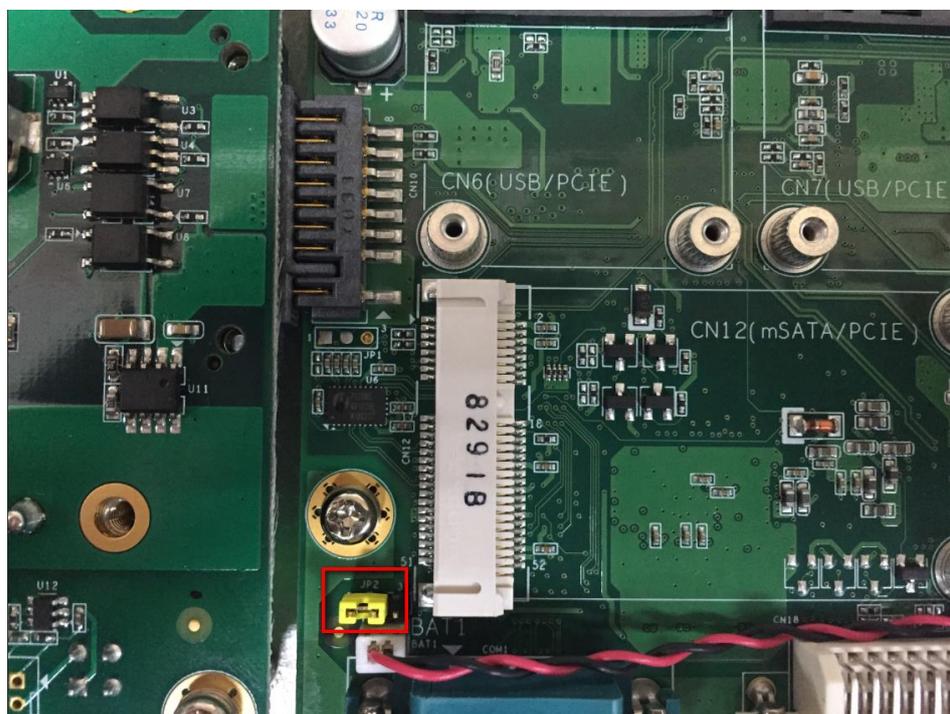
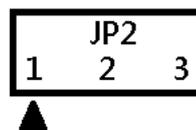
### 3.2 Jumper Settings

Proper jumper settings configure the tBOX300-510-FL to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

Description	Function	Jumper Setting
JP2	Normal(Default) Clear CMOS	Short 1-2 Short 2-3

The JP2 jumper is used to clear the CMOS memory if incorrect settings are made in the Setup Utility.

VDDM	Settings
Normal	Short 1-2 (Default)
Clear CMOS	Short 2-3



This figure marks the location of the JP2 jumper on the motherboard.

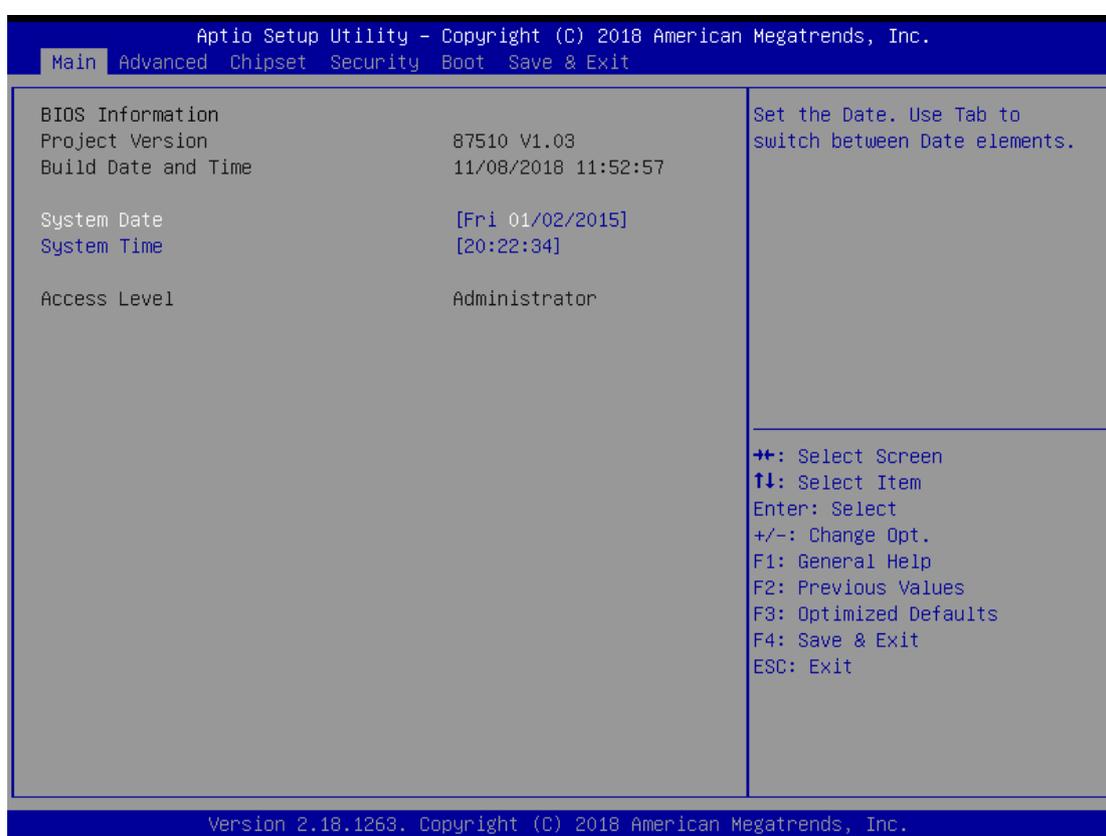
## CHAPTER 4 AMI BIOS SETUP UTILITY

This chapter provides detailed descriptions of how to set up basic system configuration through the AMI BIOS setup utility.

### 4.1 Starting

To enter the setup screens, follow the steps below:

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



## 4.2 Navigation Keys

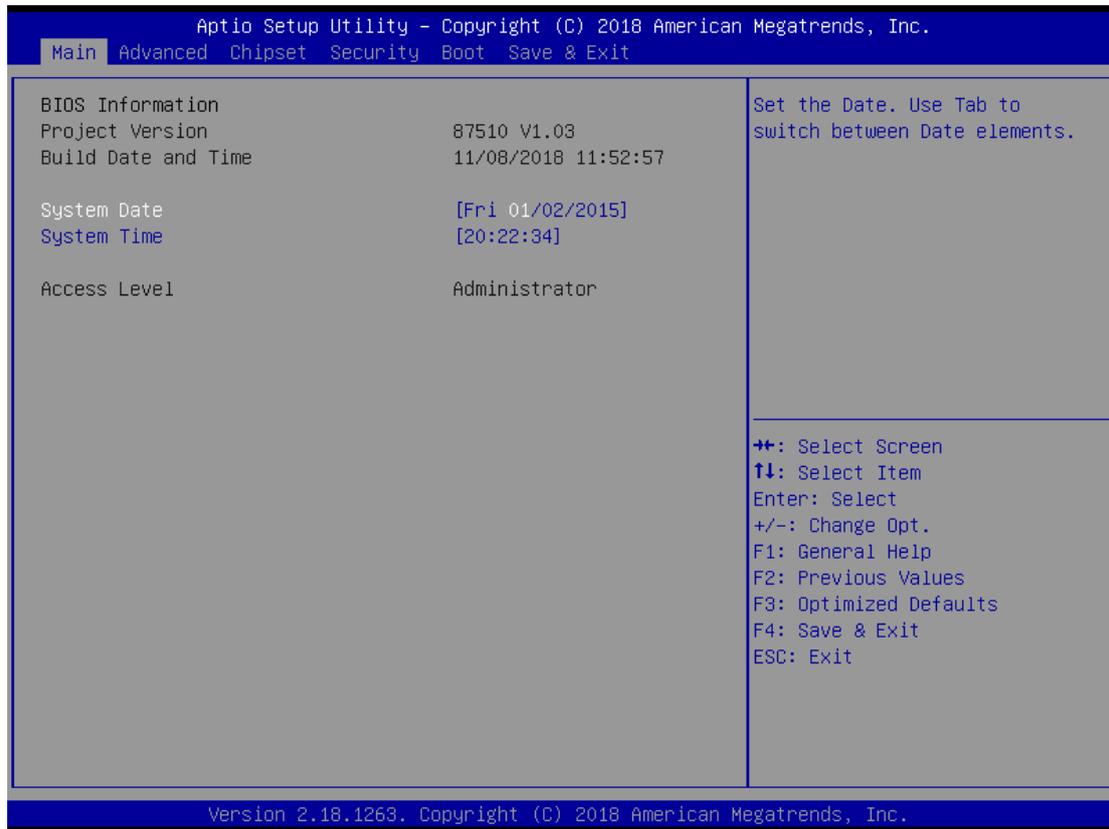
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.



**NOTE:** Some of the navigation keys may differ from one screen to another.

Hot Keys	Description
<b>← Left/Right</b>	The Left and Right <Arrow> keys allow you to select a setup screen.
<b>↑↓ Up/Down</b>	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
<b>+– Plus/Minus</b>	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
<b>Tab</b>	The <Tab> key allows you to select setup fields.
<b>F1</b>	The <F1> key allows you to display the General Help screen.
<b>F10</b>	The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> key to save your changes.
<b>Esc</b>	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
<b>Enter</b>	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

### 4.3 Main Menu



#### System Time/Date

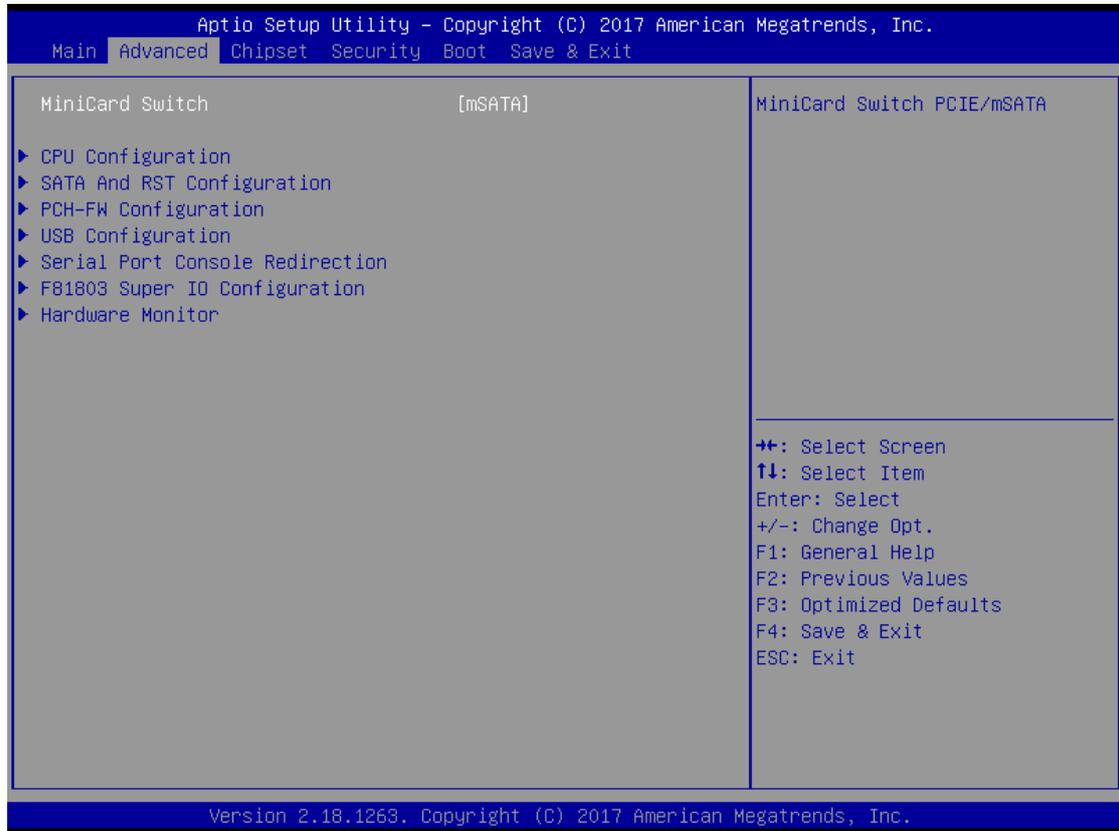
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

## 4.4 Advanced Menu

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

- ▶ MiniCard Switch
- ▶ CPU Configuration
- ▶ SATA And RST Configuration
- ▶ PCH-FW Configuration
- ▶ USB Configuration
- ▶ Serial Port Console Redirection
- ▶ F81803 Super IO Configuration
- ▶ Hardware Monitor

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



### Mini Card Switch

Select the PCIe / mSATA function.

## CPU Configuration

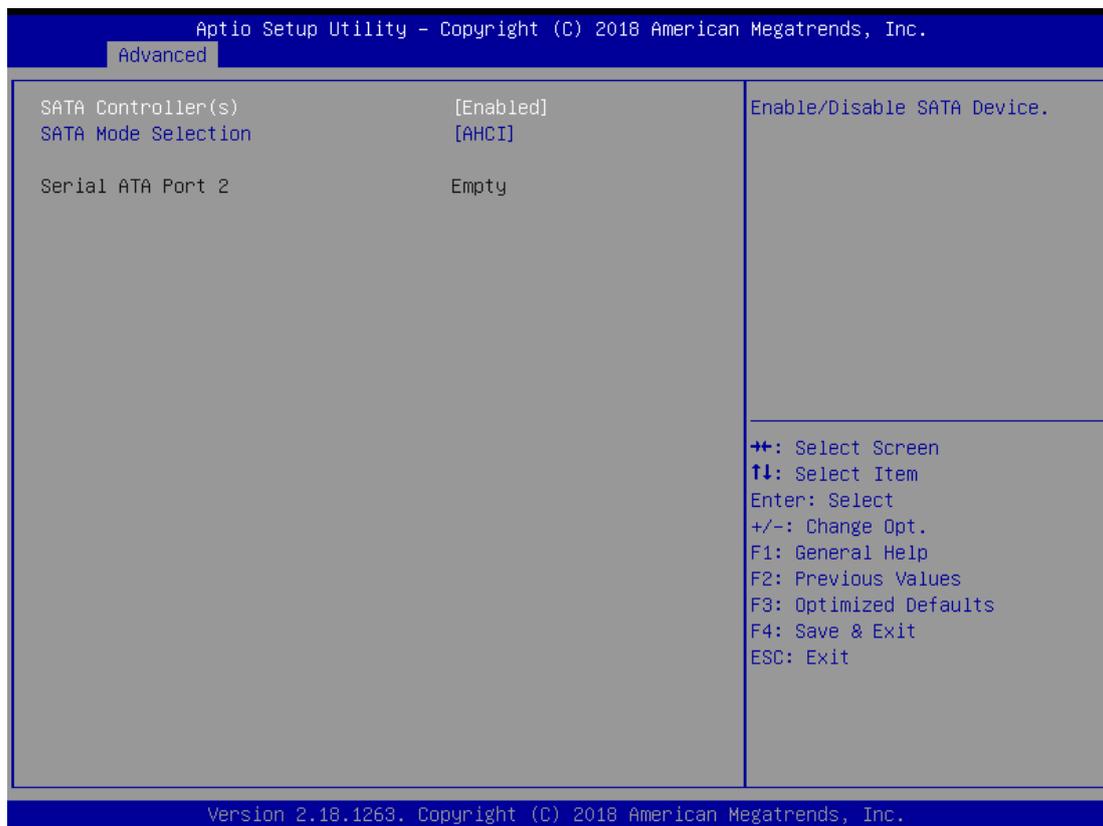
This screen shows the CPU configuration.

Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.		
Advanced		
CPU Configuration		Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).  ⇄: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Type	Intel(R) Core(TM) i7-7600U CPU @ 2.80GHz	
ID	0x806E9	
Speed	2900 MHz	
L1 Data Cache	32 KB x 2	
L1 Instruction Cache	32 KB x 2	
L2 Cache	256 KB x 2	
L3 Cache	4 MB	
L4 Cache	N/A	
VMX	Supported	
SMX/TXT	Supported	
Hyper-Threading	[Enabled]	
Intel (VMX) Virtualization Technology	[Enabled]	

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

## SATA Configuration

Set SATA configuration.



### SATA Controller(S)

Enable or disable the integrated SATA controllers (Default: Enabled).

### SATA Mode Selection

Choose the SATA operation mode. Determines SATA controllers operate AHCI or Intel RST Premium. (Default: AHCI)

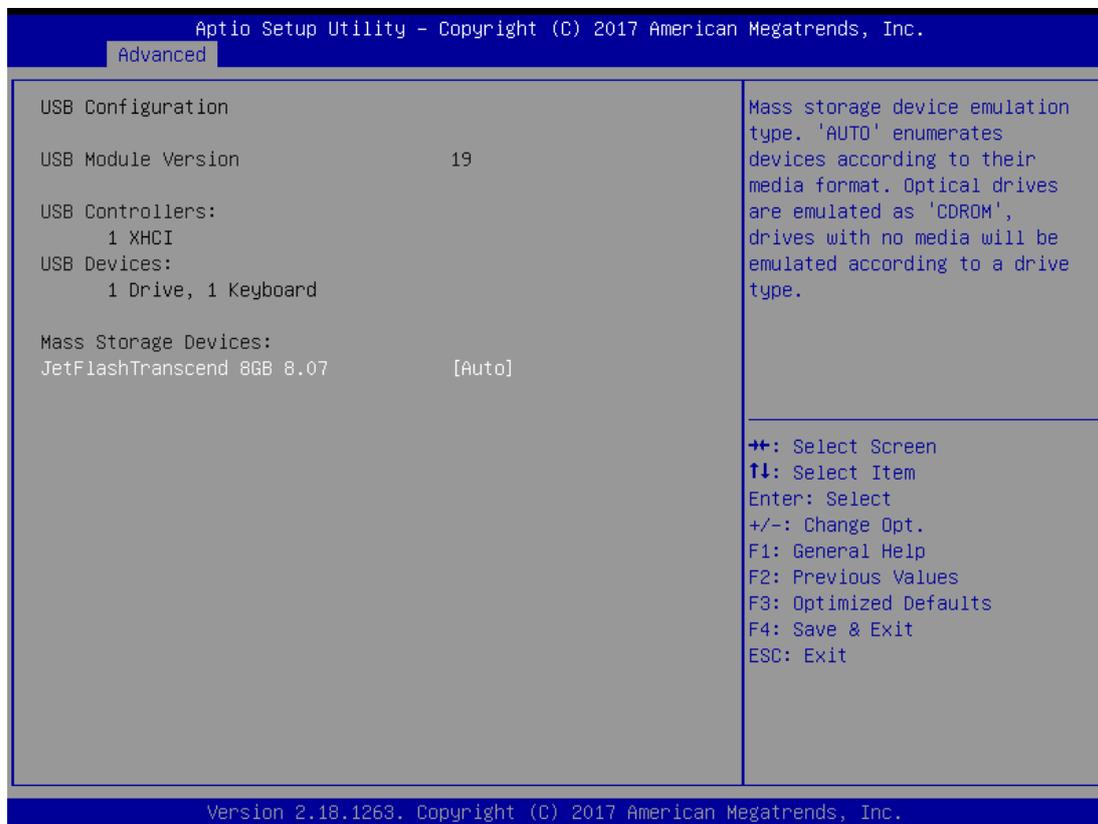
## PCH-FW Configuration

Configure Intel® Active Management Technology Parameters.  
Display ME firmware version and ME firmware SKU.



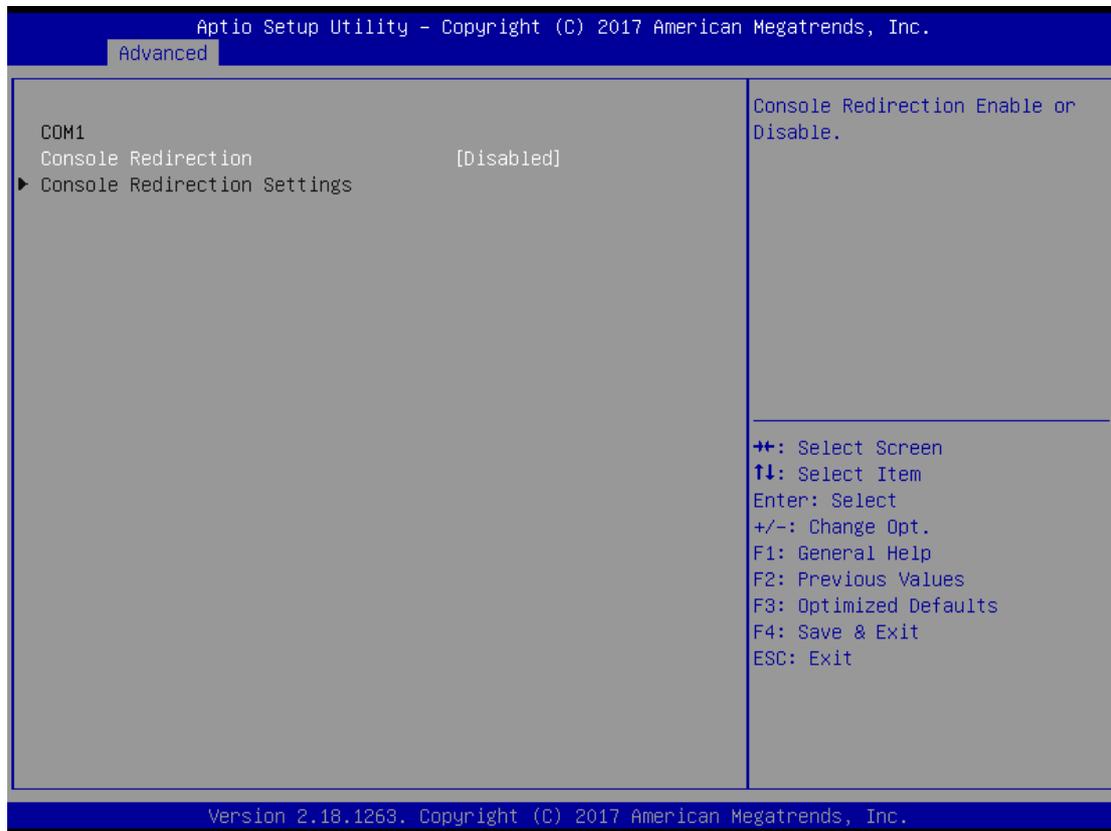
## USB Configuration

This screen shows the USB devices connected to the system.  
This is for supporting USB devices on legacy OS. The system will automatically detect any USB device connected to the computer and enable the USB legacy mode.



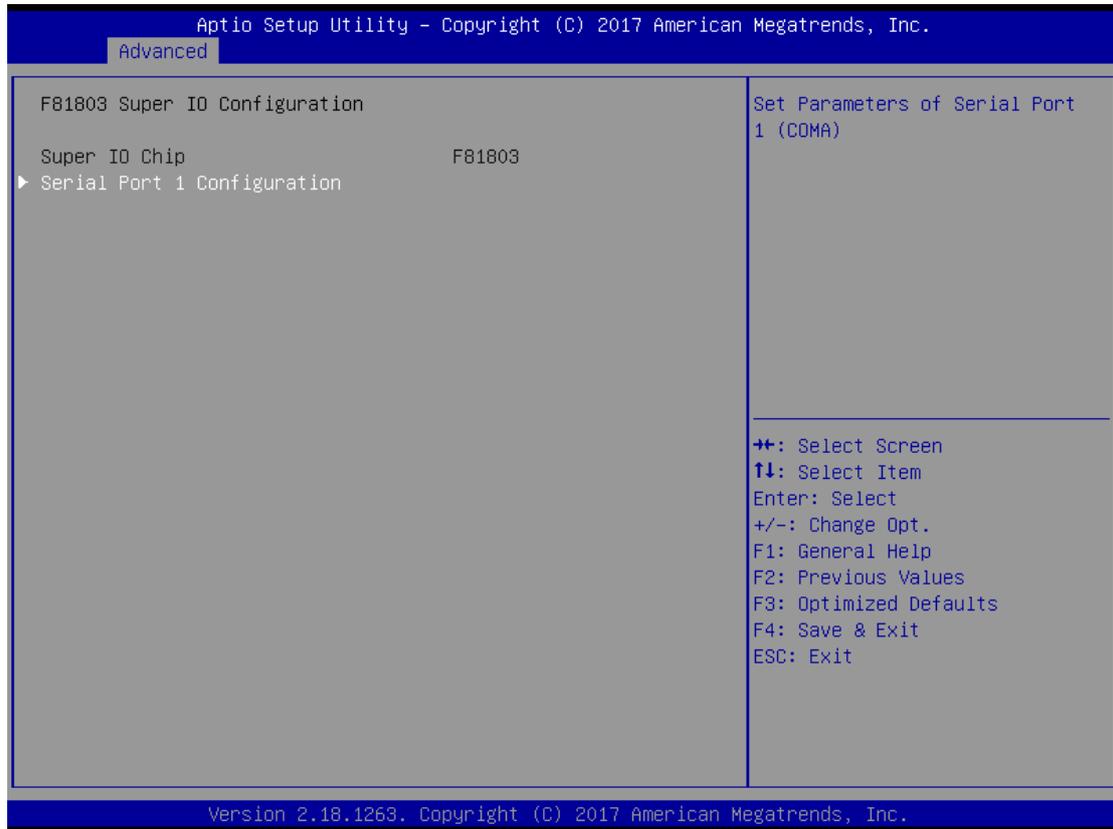
### Serial Port Console Redirection

The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.



## F81803 Super IO Configuration

Set up options for the Super IO configuration, and change the value of the selected option.



**Serial Port 1 configuration**

Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.	
Advanced	
Serial Port 1 Configuration	
Serial Port	[Enabled]
Device Settings	I0=3F8h; IRQ=4;
COM Port Type	[RS232]
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) 2017 American Megatrends, Inc.	

**Serial Port**

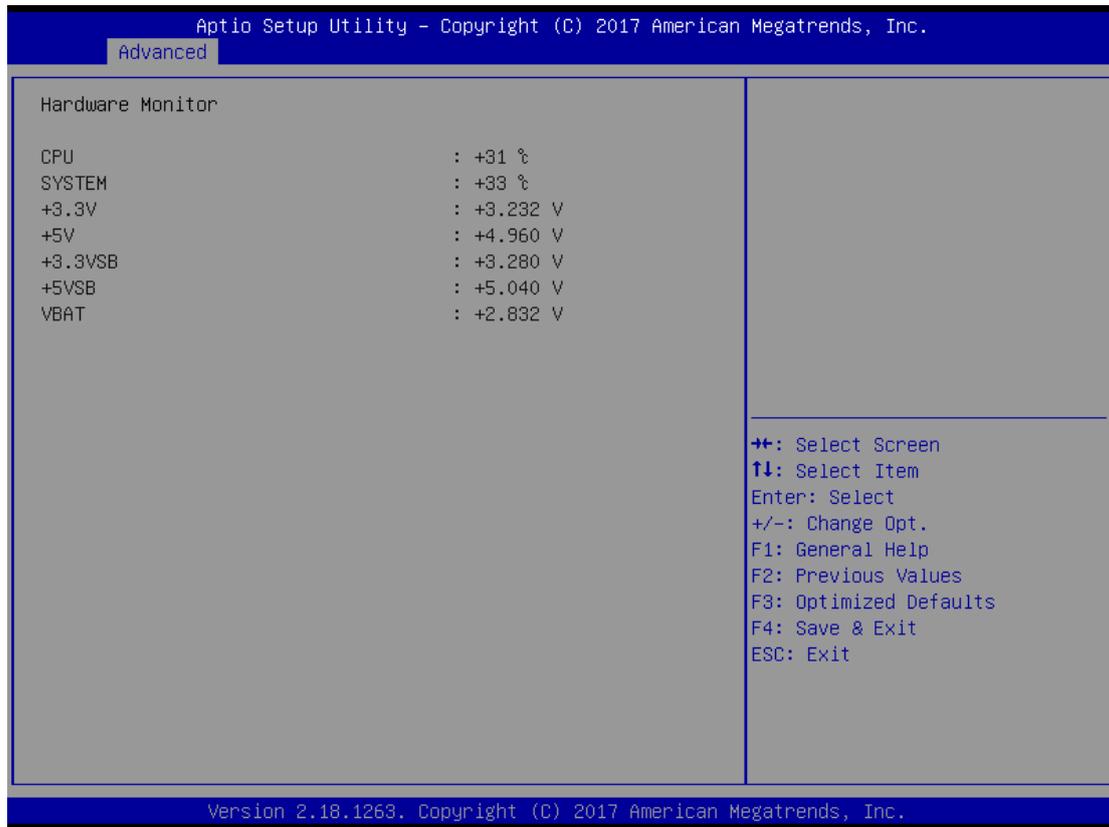
Enable/Disable a serial port.

**COM Port Type**

This option is used to select an RS-232/422/485 function.

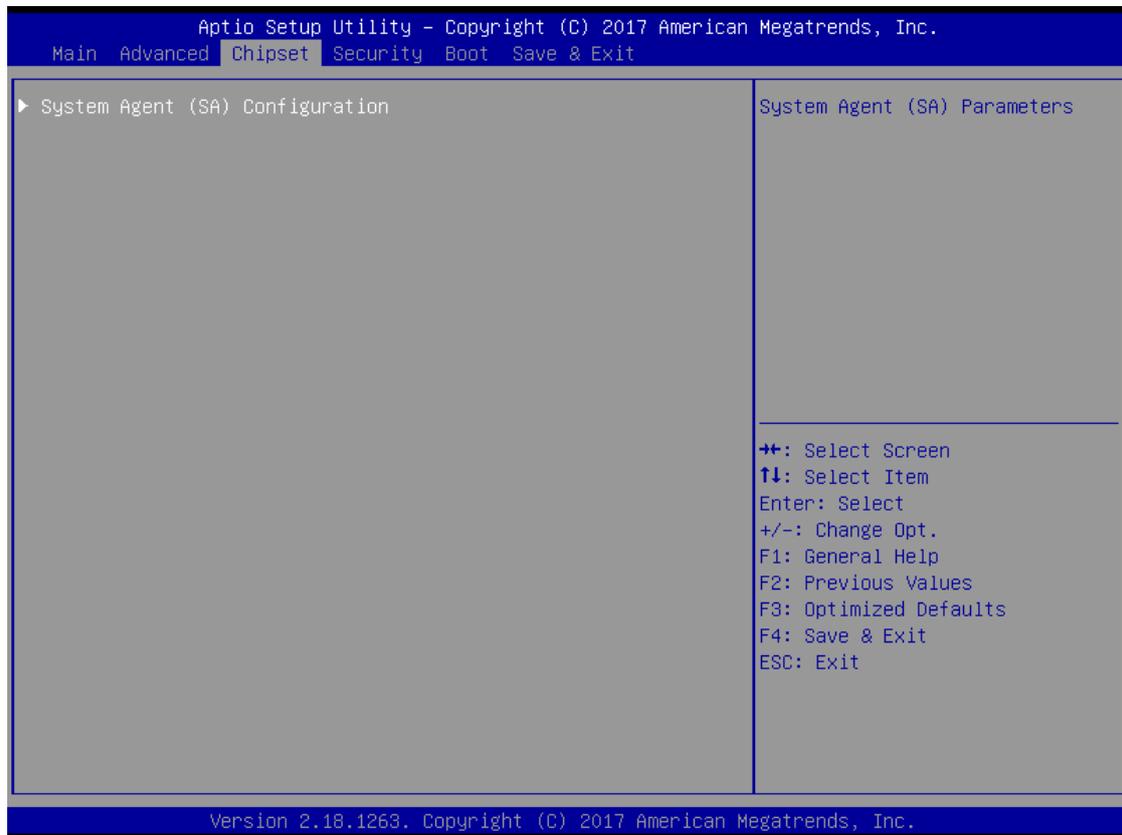
## Hardware Monitor

This screen shows the hardware health configuration.



## 4.5 Chipset Menu

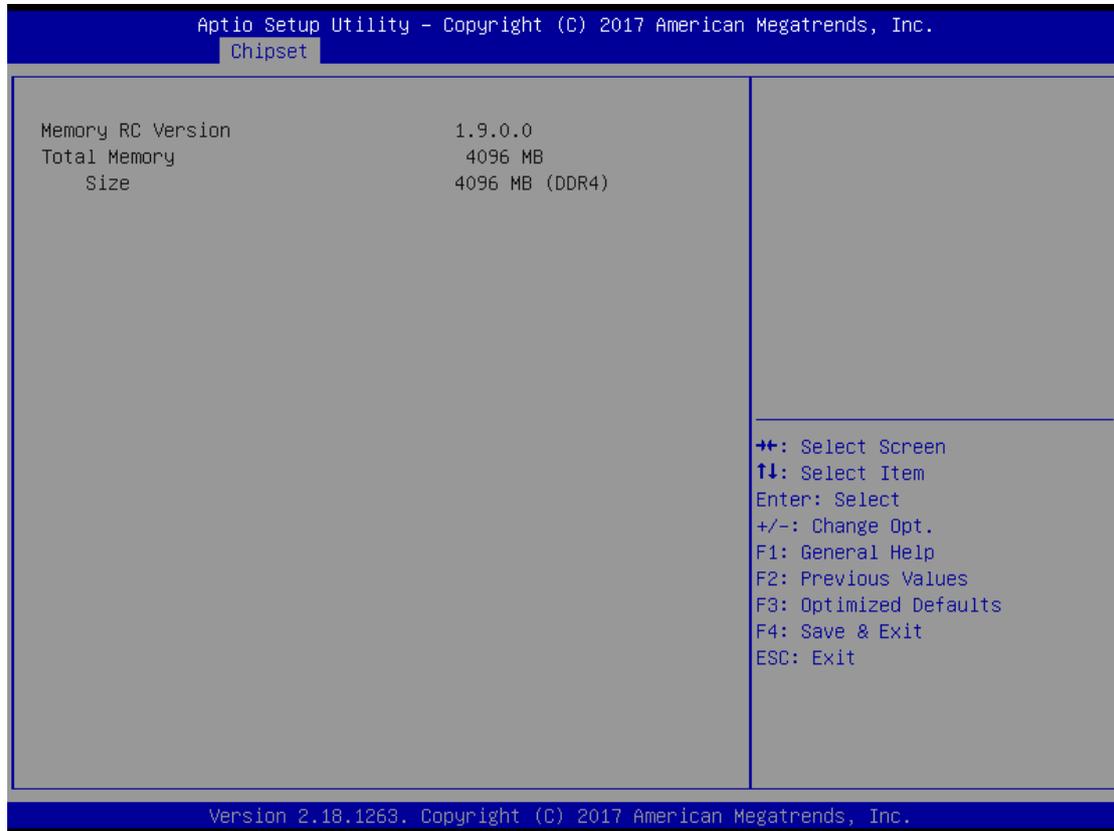
The Chipset menu allows users to change the advanced chipset settings.



## System Agent (SA) Configuration

### Memory Configuration

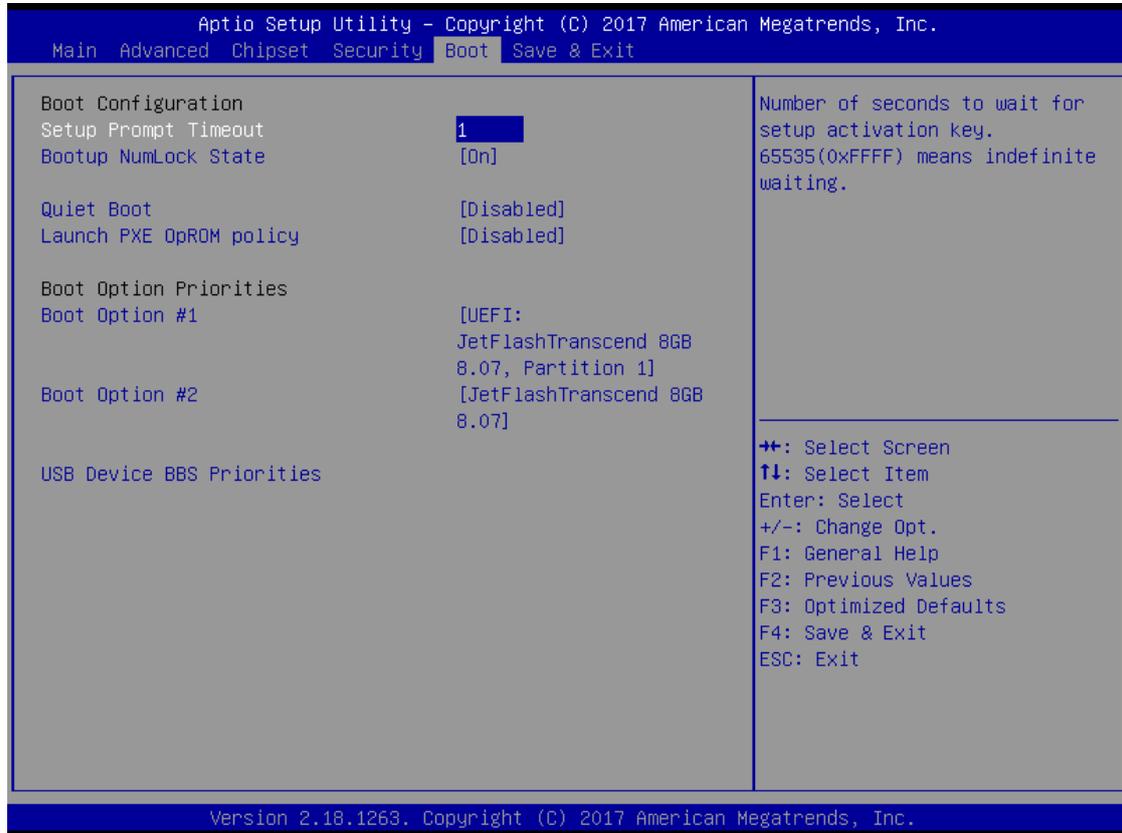
This screen shows the memory information.





## 4.7 Boot Menu

The Boot menu allows users to change boot options of the system. You can select any of the items in the left frame of the screen to go to the sub menus:



### Setup Prompt Timeout

Set the timeout length to wait before entering the Setup menu during system power-on.

### Bootup NumLock State

Use this item to select the power-on state for the NumLock. The default setting is on.

### Launch PXE OpROM policy

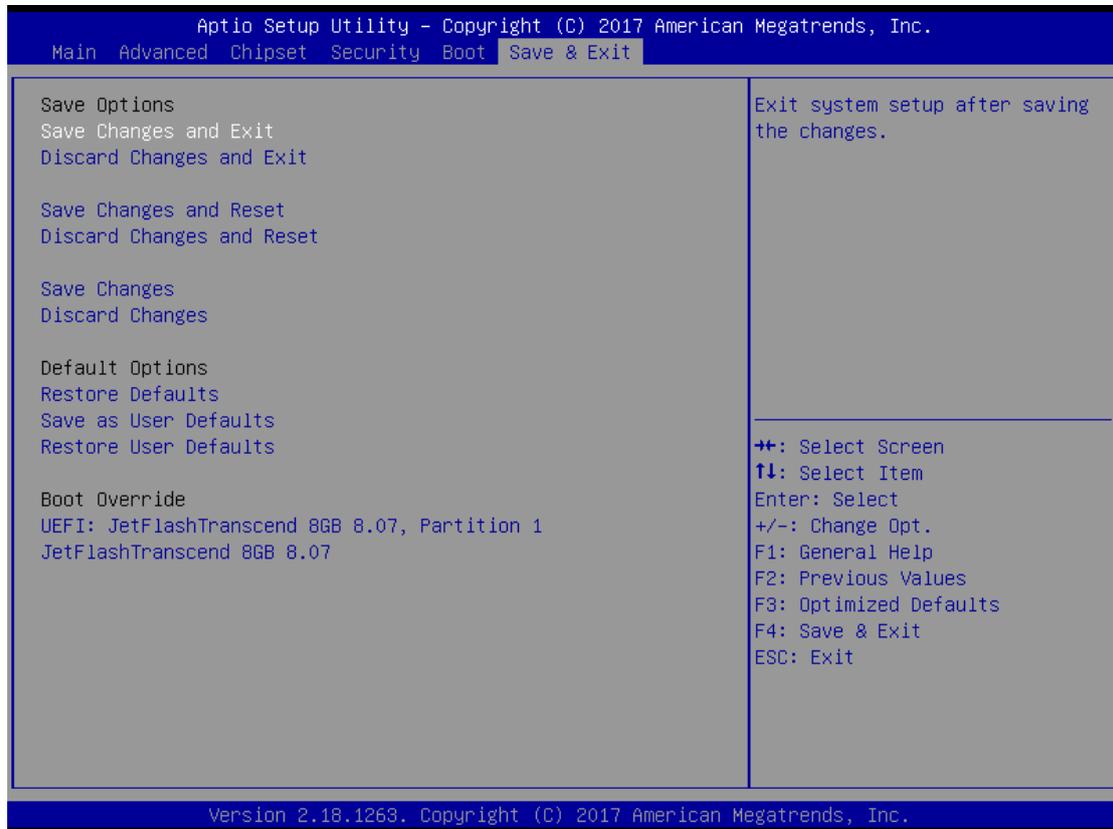
Controls the execution of UEFI and Legacy PXE OpROM.

### Boot Option Priorities

Use this option to specify the overall boot order from the available devices.

## 4.8 Save & Exit Menu

This option allows users to operate optimized settings, customized settings and restore default settings for system configuration.



### Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and continue start-up procedures, so the new system configuration parameters can take effect. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Ok to save changes and exit.

### Discard Changes and Exit

Select this option to quit Setup and continue start-up procedures without making any permanent changes to the system configuration. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Ok to discard changes and exit.

### Save Changes and Reset

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer, so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Ok to save changes and reset.

### Discard Changes and Reset

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

### **Save Changes**

This option allows you to save all the values and changes you set.

### **Discard Changes**

This option allows you to abandon all the values and changes you set.

### **Restore Defaults**

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

### **Save as User Defaults**

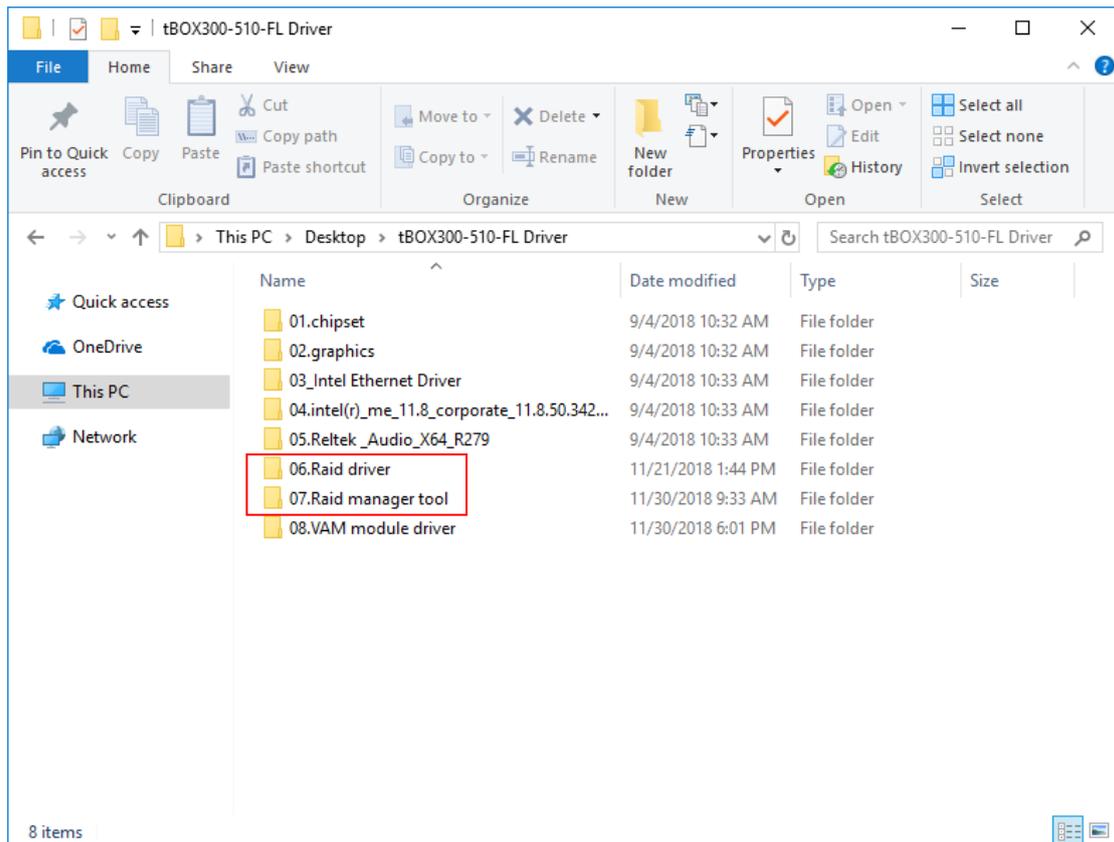
Select this option to save all current Setup options as user default settings. The User Defaults settings are designed for you to set up your own requests. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

### **Restore User Defaults**

It automatically sets all Setup options to a complete set of user default settings when you select this option. After selecting Save as User Defaults to save your own settings, you can restore all your Setup options by selecting Restore User Defaults. Select Restore User Defaults from the Save & Exit menu and press <Enter>. Select Ok to restore your user default settings.

## CHAPTER 5 RAID DRIVER AND TOOL INSTALLATION

This section will guide you to install the *Raid Manager Tool* software. Just follow the onscreen instructions step by step. Before you start, please be reminded to run the installer as administrator.

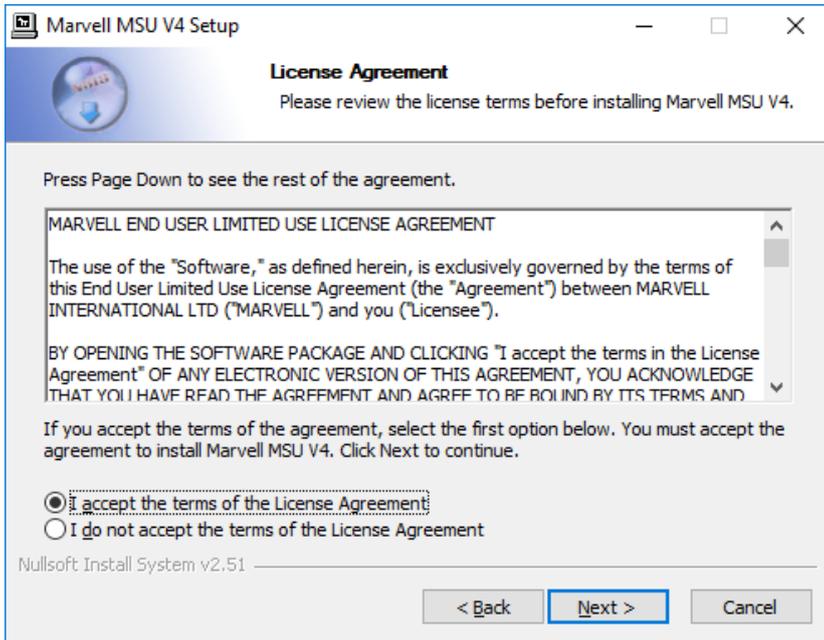


## 5.1 Installing RAID Driver

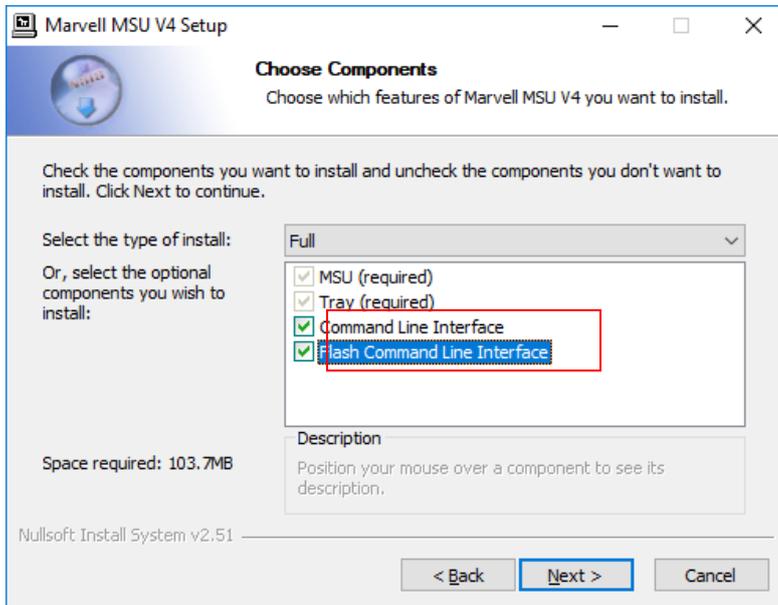
1. Open the "06.Raid driver" folder, double click "MSUSetup\_v4.1.0.2031" and click "Next" to continue.



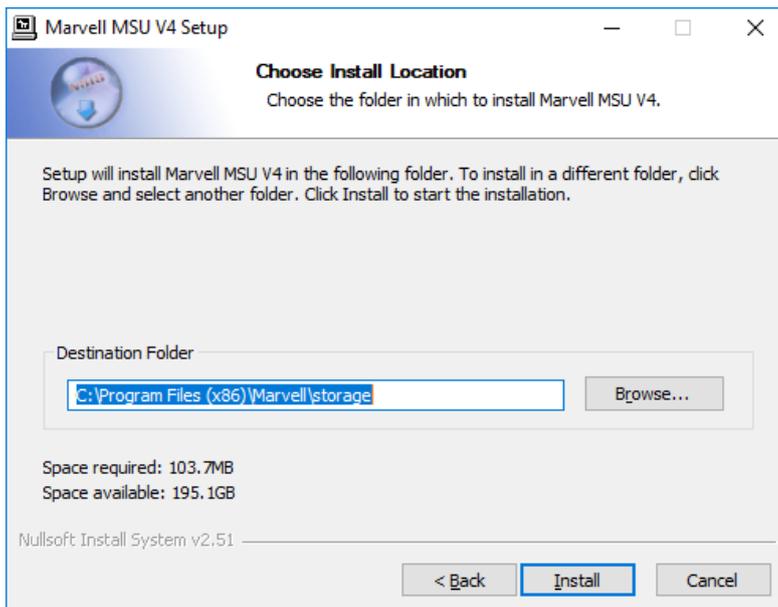
2. Select "I accept the terms of the License Agreement" and click "Next" to continue.



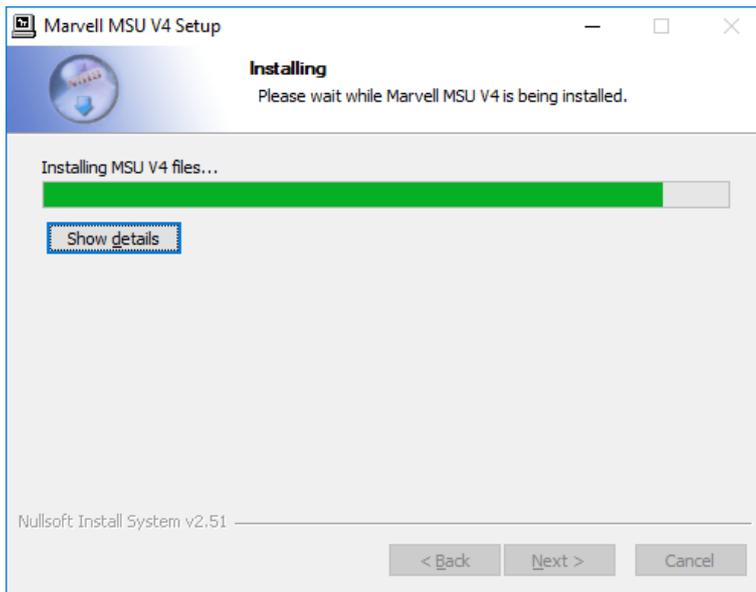
3. Select "Command Line Interface" and "Flash Command Line Interface". Click "Next" to continue.



4. Confirm the installation location on your computer and click "Install" to start installation.



5. Please wait when you see the following screen.

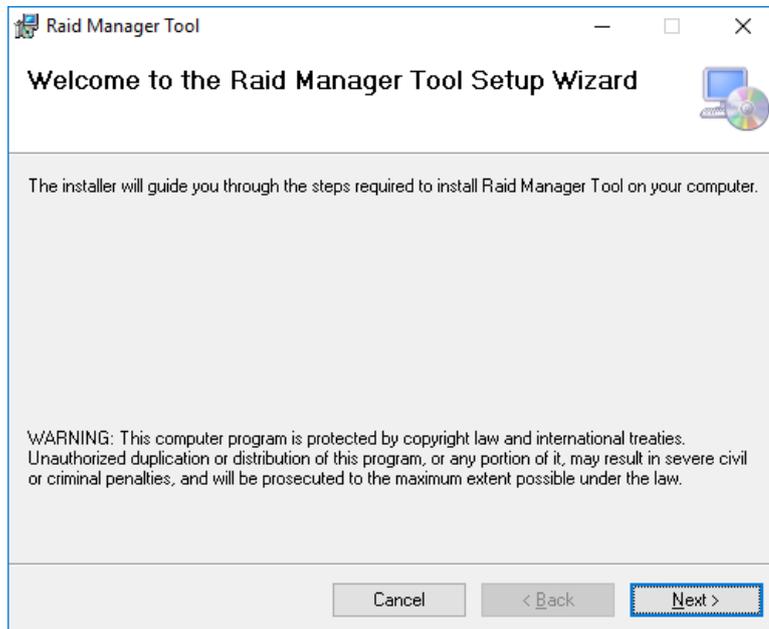


6. When installation is completed, click "Finish" to exit.

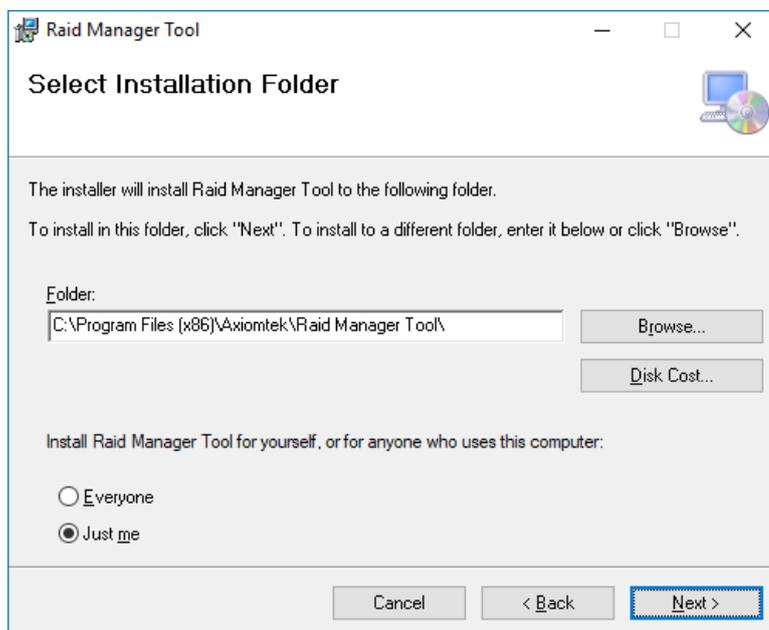


## 5.2 Installing RAID Manager Tool

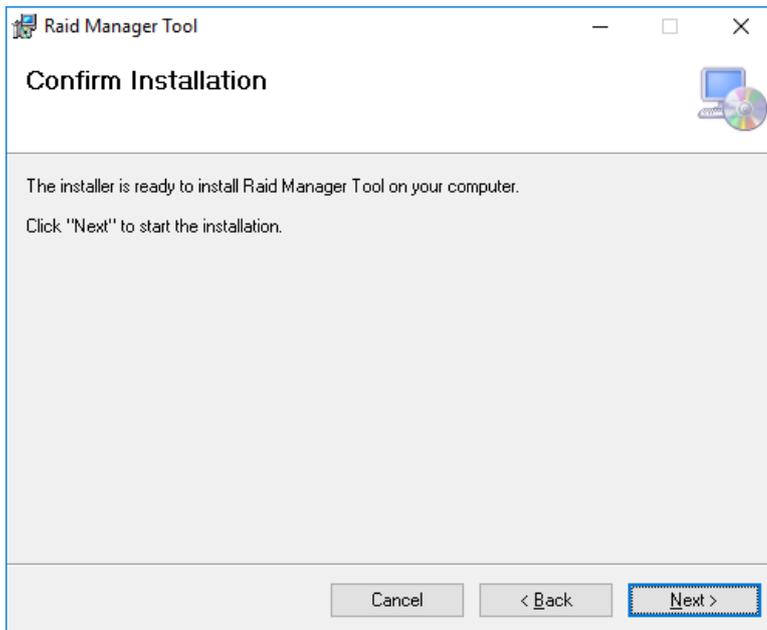
1. Open the "07.Raid manager tool" folder, double click "Setup.exe" and click "Next" to continue.



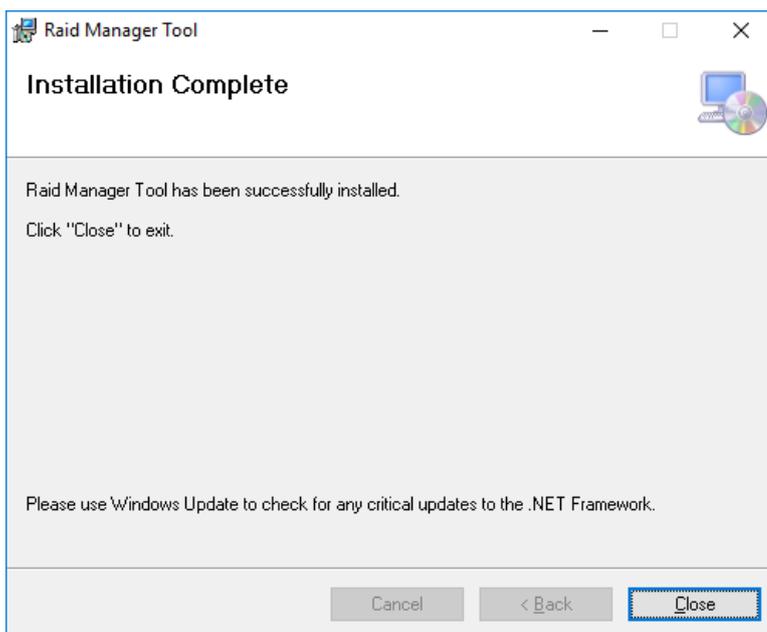
2. Confirm the installation location on your computer and select the user type. Click "Next" to continue.



3. Click "Next" to start installation.



4. After installation is completed, please reboot your system to activate the software.



## CHAPTER 6 USING RAID MANAGER TOOL

### 6.1 Overview

This section describes how to control raid functions by using *Raid Manager Tool*.

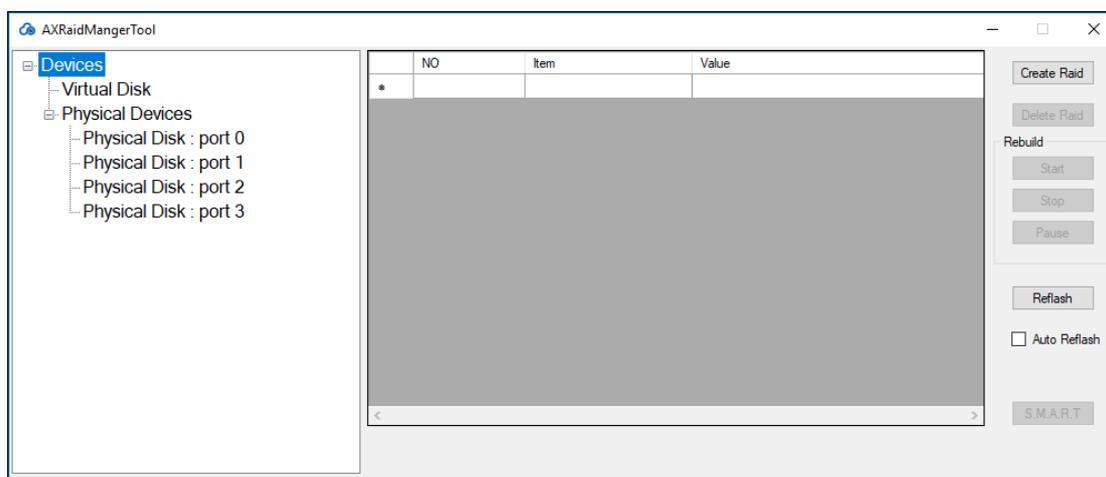


**NOTE:** For better operating experience, we strongly recommend that you use **RAID Manager Tool**, instead of **MarvellTray**.

Open *Raid Manager Tool* by clicking its desktop shortcut.

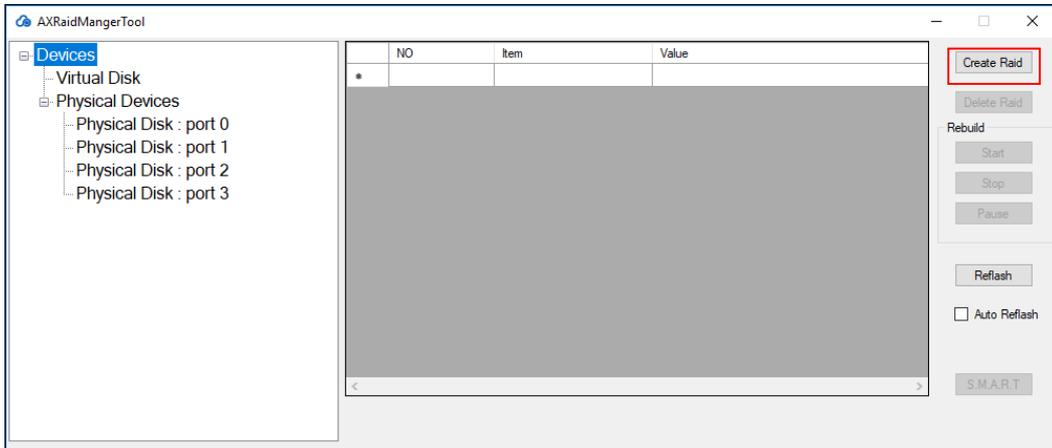


Then the first page appears.

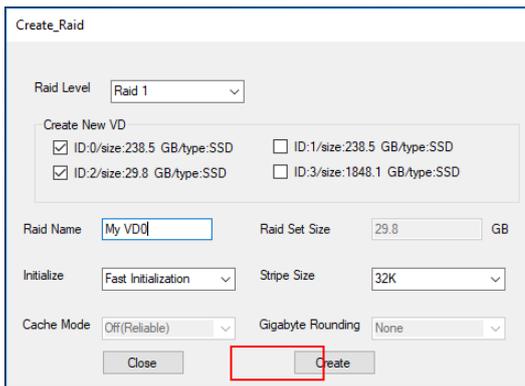


## 6.2 Creating RAID

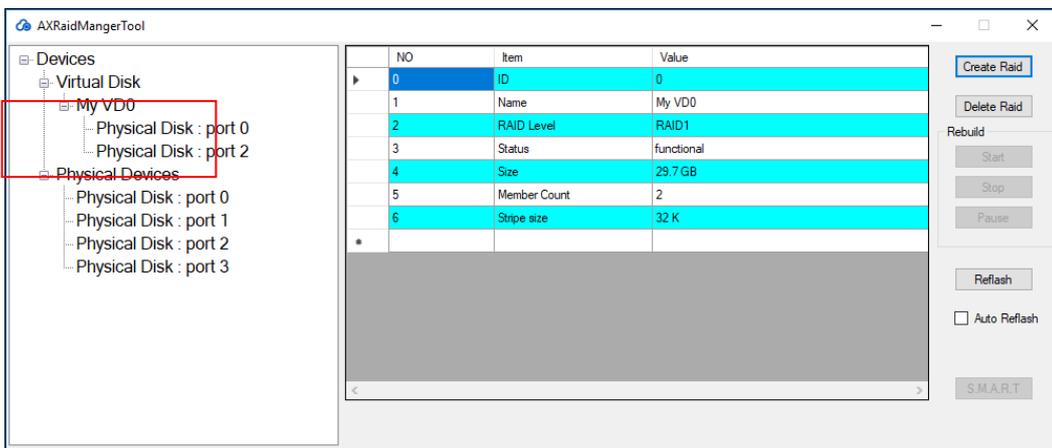
1. Click "Create Raid".



2. Click the HDDs that you want to create RAID. Select the RAID level (supporting RAID 0/1/10) and key in the RAID name. Click "Create".



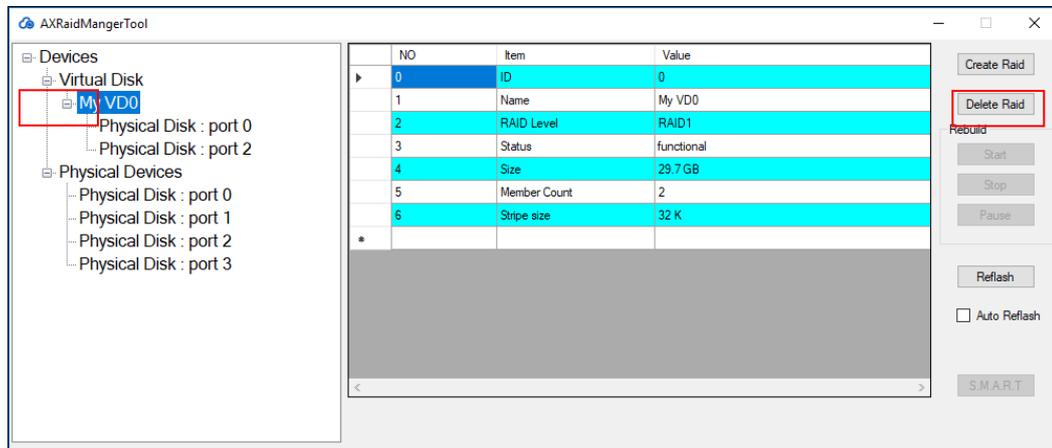
3. RAID function is created successfully.



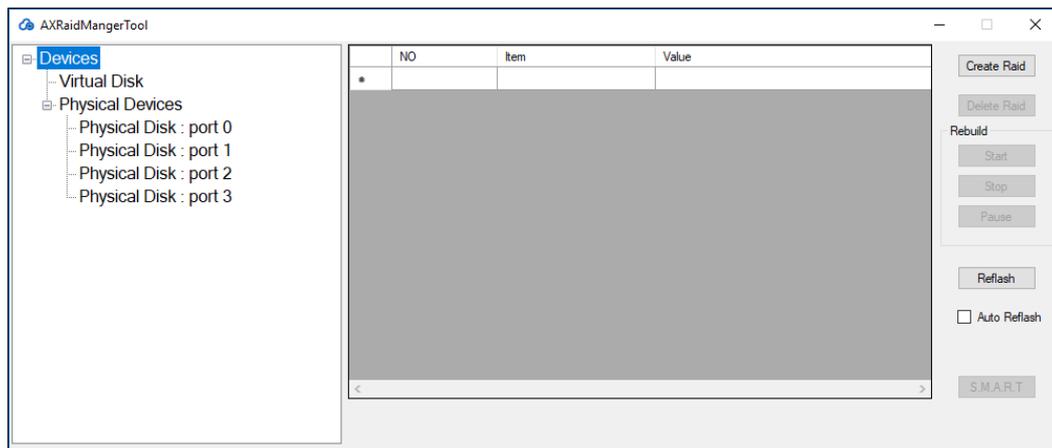
**NOTE:** Go to Windows build-in tool Disk Management to initialize this new virtual disk before using it.

## 6.3 Deleting RAID

1. Select "Virtual Disk/My VDX"(X is 1 or 0) and Click "Delete Raid".

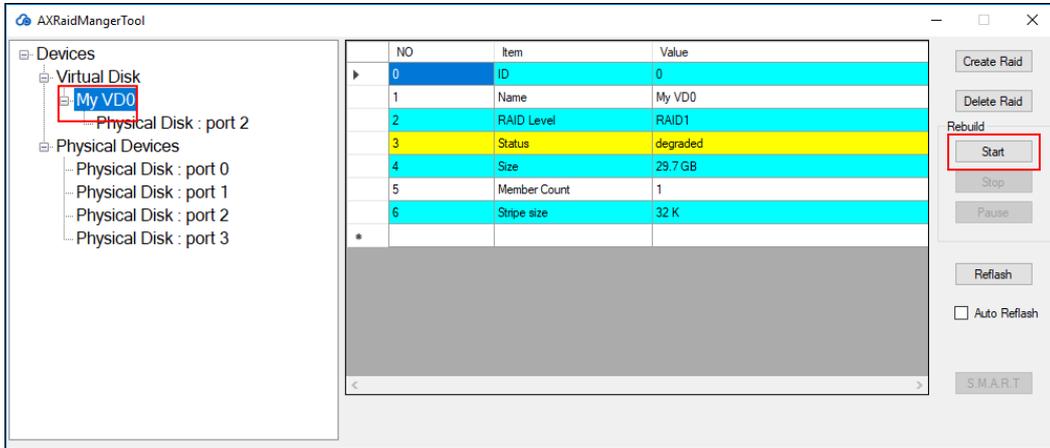


2. RAID function is deleted successfully.

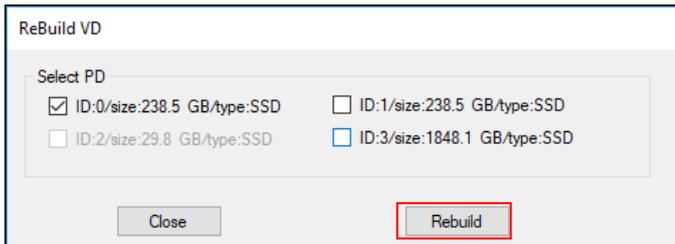


## 6.4 RAID Rebuilding

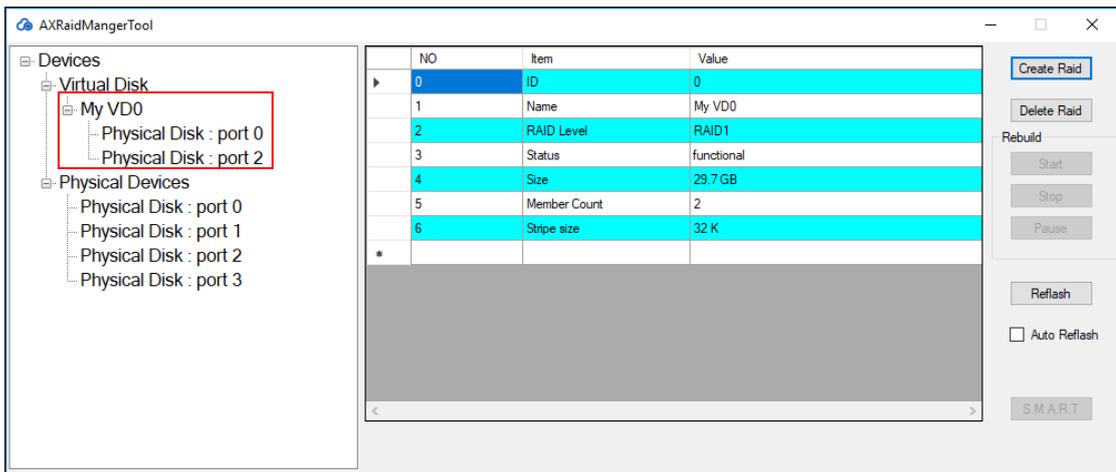
1. Auto Rebuilding: Insert a new hard drive and RAID will be rebuilt automatically.
2. Manual Rebuilding:
  - A. Select "Virtual Disk/My VDX"(X is 1 or 0) you want to rebuild and click "Start"



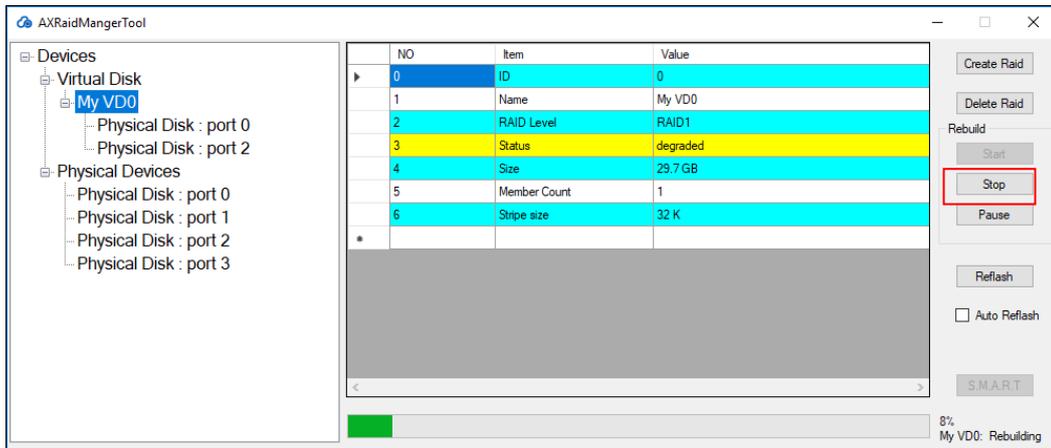
- B. Click on the HDD that you want to rebuild and click "Rebuild".



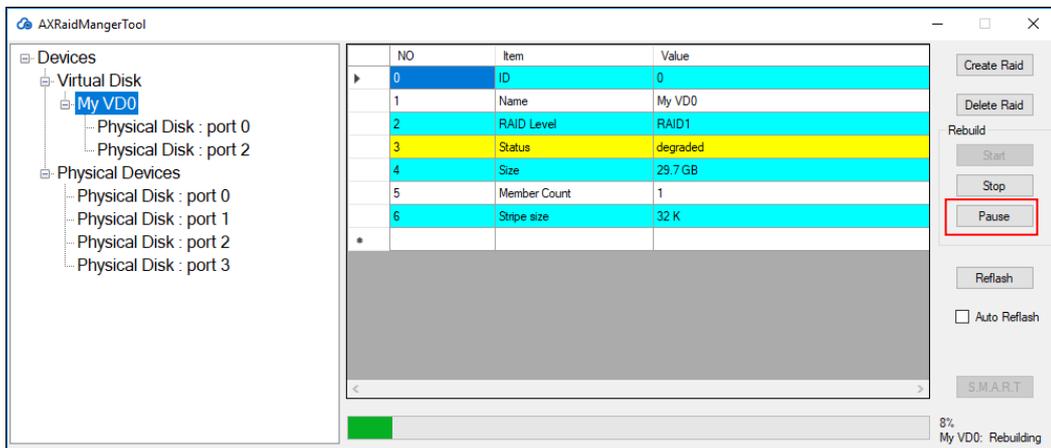
- C. RAID function is rebuilt successfully.



3. Other functions for Rebuilding:
- A. You can click "Stop" if you need to stop Rebuild.



- B. You can click "Pause" if you need to pause Rebuild.



## **6.5 Marvell BIOS Utility**

Press Ctrl+M to enter the Marvell BIOS utility to configure a RAID array if you need to control RAID function before booting the operating system. Marvell BIOS Utility shares the same RAID functions below as *RAID Manager Tool*:

- A. Create RAID
- B. Delete RAID
- C. RAID Rebuilding

## APPENDIX A WATCHDOG TIMER

### What is Watchdog Timer?

The integrated Watchdog Timer can be set up by programming. There are 1~255 levels available. The Watchdog Timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software that starts the Watchdog Timer with an initial value must reset the timer periodically. If the Watchdog Timer ever reaches zero which means the software has crashed, the system will reboot.

### How to Use the Watchdog Timer

(The following is an example of enabling configuration using a debug tool.)

#### Enable WDT

↓

Enable configuration:

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

O 2E 87

↓

Select logic device:

O 2E 07

O 2F 07

↓

WDT device enable:

O 2E 30

O 2F 01

↓

Activate WDT:

O 2E F0

O 2F 80

↓

Set base timer:

O 2E F6

O 2F M ; M = time value

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

Set Second or Minute :

O 2E F5

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

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

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

### Sample of Watchdog application

Assume that program A must be kept running for a specified period of time:

1. Initialize the Watchdog Timer with a countdown time value bigger than the running time of program A.
2. If program A has no problems when its running time has passed, it will disable or reset the Watchdog Timer before its countdown time has reached zero.
3. If program A is running and experiencing any problem that causes the system to stop working, the Watchdog Timer will automatically reboot the system when countdown time has reached zero.

Refer to the below flowchart of editing program A.

