USER'S MANUAL

DSP300-318 Series

Digital Signage Player

User's Manual

![AXIOMTEK logo]

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Safety Precautions

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

1. The DSP300-318 does not come with an operating system which must be loaded first before installation of any software into the computer.

2. Be sure to ground yourself to prevent static charge when installing any internal components. Use a wrist grounding 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 DSP300-318 prior to making any installation. Be sure both the system and all external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the DSP300-318 is properly grounded.

4. Make sure the voltage of the power source is correct before connecting it to any power outlet.

5. Turn Off 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 equipment in an uncontrolled environment where the storage temperature is below -40℃ or above 80℃ as 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 discharge any static electricity on human body.

   ● When handling boards and components, wear a wrist grounding strap available from most electronic component stores.

Classifications

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

General Cleaning Tips

Please keep the following precautions in mind while understanding the details fully before and during any cleaning of the computer and any components within.

A piece of dry cloth is ideal to clean the device.
1. Be cautious of any tiny removable components when using a vacuum cleaner to absorb dirt on the floor.
2. Turn the system off before clean up the computer or any components within.
3. Avoid dropping any components inside the computer or getting circuit board damp or wet.
4. For cleaning, be cautious of all kinds of cleaning solvents or chemicals which may cause allergy to certain individuals.
5. Keep foods, drinks or cigarettes away from the computer.

Cleaning Tools:

Although many companies have created products to help improve the process of cleaning computer and peripherals, users can also use house hold items accordingly for cleaning. Listed below are items available for cleaning computer or computer peripherals.

Pay special attention to components requiring designated products for cleaning as mentioned below.

- 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, it is recommended to use a piece of cloth.
- Water or rubbing alcohol: A piece of cloth may be somewhat moistened with water or rubbing alcohol before being rubbed on the computer. Unknown solvents may be harmful to plastic parts.
- Absorb dust, dirt, hair, cigarette and other particles outside of a computer can be one of the best methods of cleaning a computer. Over time these items may restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are applicable to reach areas in keyboard, mouse and other areas.
- Foam swabs: If possible, it is better to use lint free swabs such as foam swabs.
  .

【Note】: *It is strongly recommended that customer should shut down the system before start to clean any single components.*

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 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.

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Table of Contents

SECTION 1
INTRODUCTION

This section contains general information and detailed specifications of the DSP300-318.Section 1 consist of the following sub-sections:

- General Descriptions
- System Specifications
- Dimensions
- I/O Outlets
- Packing List

1.1 General Descriptions

DSP300-318 is a fan-less digital signage player with Intel® Celeron® processor N3350 dual core or Intel® Pentium® processor N4200 quad core (formally codename: Apollo Lake) with low power consumption design. To fulfill digital signage, smart retails, and smart cities application needs, the entry-level embedded system supports Windows® 10 IoT and it can be wall-mounted and VESA mounted by optional requests.

The DSP300-318 comes with ultra-slim size, low power consumption and fundamental features. It is equipped with one 204-pin DDR3L-1600 SO-DIMM with up to 8GB memory capacity and supports UART, audio, USB 3.0 and USB 2.0 signals. The compact fan-less signage player is capable of two independent displays with 4K resolution through DisplayPort and HDMI ports. Furthermore, the DSP300-318 is offering 12 voltage DC power input and four antenna connectors for WIFI/3G and LTE.

Features

- Intel® Celeron® processor N3350 dual core, up to 2.4 GHz

  Intel® Pentium® processor N4200 quad core, up to 2.5 GHz

- 2 x DDR3L-1866 SO-DIMM max. up to 8GB

- 1 COM port, 4 USB ports and 2 GbE LANs

- 1 HDMI and 1 DP output for 4K UHD content

- 1 x M.2 M Key 2280 for storage

- 1 x M.2 E Key 2230 for WIFI/BT options

- 1 x M.2 B Key 3042 for 3G/LTE options

- Fanless, ultra-slim and compact design

- Suitable for digital signage and smart retail applications

Reliable and Stable Design
The signage player equipped with Intel® Celeron® N3350 or Intel® Pentium® N4200, ultra-slim size and basic functions. It is the best solution for smart retails and light industries.

Flexible Connectivity
It comes with basic interfaces including one RS-232 port, three USB 3.0 ports, one USB 2.0 port, one HDMI, one DP and two GbE LAN ports.

Embedded O.S. Supported
The DSP300-318 supports Windows® 10 IoT and Linux.

1.2 System Specifications

1.2.1 CPU

- **CPU**
  - Intel® Celeron® processor N3350 Dual Core, up to 2.4 GHz.
  - Intel® Pentium® processor N4200 Quad Core, up to 2.5 GHz.

- **Chipset**
  - SoC integrated

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

- **System Memory**
  - Two 204-pin DDR3L-1866 SO-DIMM sockets, up to 8 GB at the maximum.

1.2.2 I/O System

- **Display**
  - 1 x HDMI (HDMI 1.4b up to 3840 x 2160@30Hz)
  - 1 x DP (DP 1.2 up to 4096 x 2160@60Hz)

- **Ethernet**
  - 2 x 10/100/1000 Ethernet ports (i211AT)

- **USB Ports**
  - 1 x USB 2.0
  - 3 x USB 3.0

- **Serial Ports**
  - 1 x RS-232 (9-pin D-Sub male connector)

- **Expansion Interface**
  - 1 x M.2 E Key 2230 socket for WiFi/Bluetooth options
  - 1 x M.2 B Key 3042 socket for 3G/LTE options
  - 1 x M.2 M Key 2280 (SATA)

- **Storage**
  - 1 x M.2 M Key 2280 (SATA)
  - 1 x SIM slot

- **Audio**
  - HD audio compliant with Realtek ALC662
  - Support Line-out and MIC-in through 2 x audio jack.

- **Indicator**
  - 1 x Green LED as indicator for HDD active

- **Switch**
  - 1 x ATX PWR switch
  - 1 x Remote PWR switch
  - 1 x Reset switch

- **Antenna**
  - 4 x SMA type connector openings for antenna

1.2.3 System Specifications

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

- **Power Supply**
  - 12VDC /36W AC to DC adapter

- **Operation Temperature**
  - 0℃ ~+50℃ (32 ºF ~ 122ºF)

- **Humidity**
  - 10% ~ 90% (non-condensation)

- **Vibration Endurance**
  - 3Grm (5-500Hz, X, Y, Z directions)

- **Weight**
  - 0.90 kg (1.98 lb) without package
  - 1.57 kg (3.45 lb) with package

- **Dimension**
  - 200 mm (7.87") x 137.8 mm (5.43") x 20 mm (0.79")

1.2.4 Driver CD Contents

- **Ethernet**

- **Chipset**

- **Graphic**

- **USB 3.0**

- **Intel® ME**

- **User Manual**

- **Quick Manual**

【**Note**】: *All specifications and images are subject to change without notice.*

1.3 Dimensions

The following diagrams show dimensions and outlines of the DSP300-318.

1.3.1 System Dimensions

1.3.2 Wall-mount Bracket Dimensions

Instruction

Step 1: Screw the two pieces of wall-mount kits to the bottom plate of the device. Total four screws (metric 3 x 6) are required.

Step 2: Use the device, with wall mount plate attached, as a guide to mark the correct locations of the four screws.

Step 3: Insert a tapping-screw (thread diameter less than 4mm) head through middle of the keyhole-shaped aperture on the plate, and then slide the device downwards.
Tighten the screw head for added stability.

1.4 I/O Outlets

The following figures show I/O outlets on the DSP300-318.

Front View
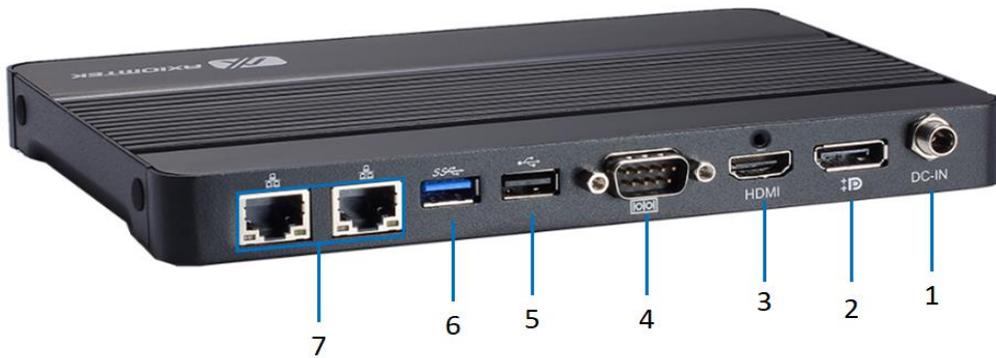
Rear View
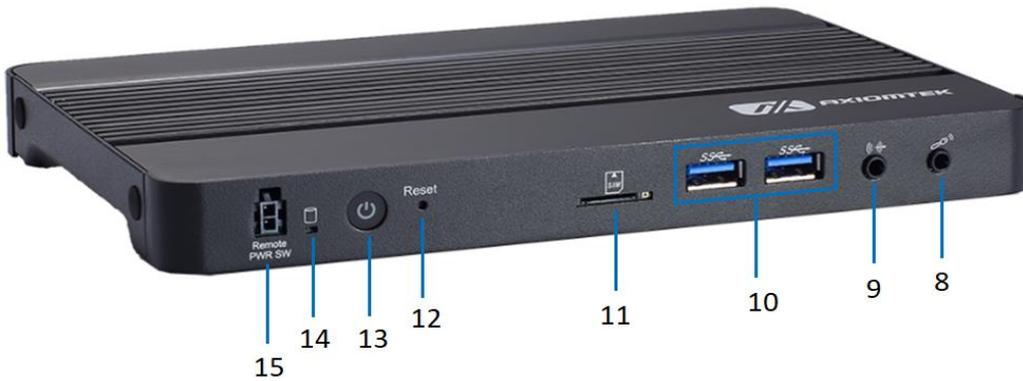
1	12VDC power input	9	Line-out
2	DP	10	USB 3.0
3	HDMI	11	SIM card
4	Serial Port	12	Reset switch
5	USB 2.0	13	Power switch
6	USB 3.0	14	HDD LED
7	GbE LAN ports	15	Remote power switch
8	MIC-in		

1.5 Packing List

The DSP300-318 comes with the following bundle package:

- **DSP300-318 System Unit x 1**
- **Quick Installation Guide x 1**
- **DVD x 1 (For Driver and Manual)**
- **Foot Pad x 4**
- **Screw Type AC 36W (12V/3A) Adaptor x 1**
- **US power cord x 1 or EU power cord x 1**
- **Wall-mount bracket x 2**
- **Optional DDR3L SO-DIMM Memory**
- **Optional Antenna**
- **Optional M.2 WiFi/BT module**
- **Optional M.2 2280 SSD**
- **Optional remote switch cable**

SECTION 2
HARDWARE INSTALLATION

The DSP300-318 is convenient for various hardware configurations such as DRAM, SSD (Solid State Drive) and M.2 modules. Section 2 contains guidelines for hardware installation.

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* To save your installation effort, we recommend purchasing all memory modules from Axiomtek, and we will have them fully installed in the system unit prior to delivery.

* Before assembly, please adjust screw torque force to 4.0~6.0 kgf-cm.

2.1 Installation of SO-DIMM Memory

Installation of Memory SODIMM1 Device

Step 1 Turn off the system and unplug the power cord.

Step 2 Turn the system upside down.

Step 3 Loosen all screws at the bottom / side / COM Port / DC power input.
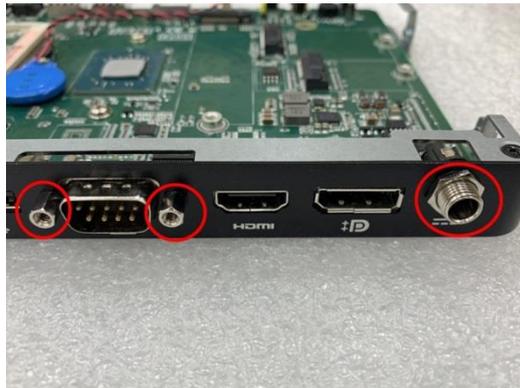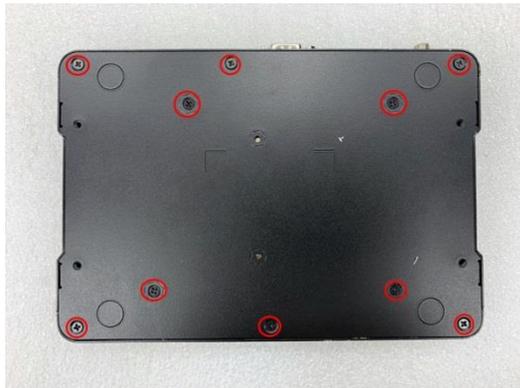
Step 4 Take off the top and side covers.

Step 5 Carefully remove the main board away from the back cover underneath, as instructed below:

CAUTION: **The main board contains delicate components and can be easily damaged during removal. To prevent damaging the main board and its components, follow the instructions below to remove the main board.**

     a. **Identify the positioning openings on the main board, as highlighted in the picture below. Also notice the positioning posts underneath that come through the openings from the back.**

     b. **Use both hands to hold the main board by the left and right sides.**
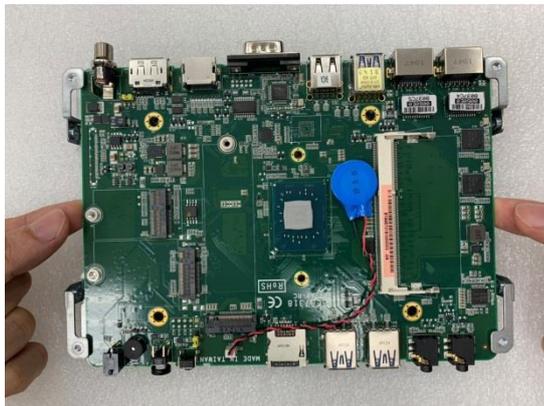
     c. **To prevent the positioning posts underneath from scratching the main board, gently lift the board vertically upwards, until all openings are completely separate from the posts underneath. Then slightly pull the main board backward, until the board's top left and right edges have left the back cover frame (as marked in the figure below).**
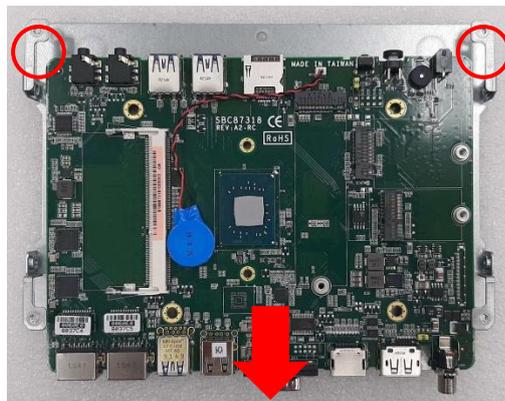
d. **Raise the front part of the main board by slightly pressing the bottom side down.**
e. **Remove the main board from the back cover by lifting the board upward**
    (as illustrated in the figure below).
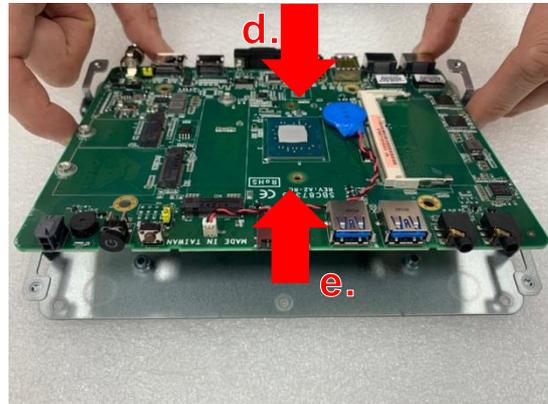
WARNING! **To prevent damaging the main board and its delicate components, DO NOT forcefully pull the main board forward or backward without lifting the board first.**

Step 6 **Flip the main board over and locate the DIMM socket on the back side of the board.**

Step 7 **Insert the gold colored contact of the memory module into the socket and press the socket's two end latches down to lock the module in place.**
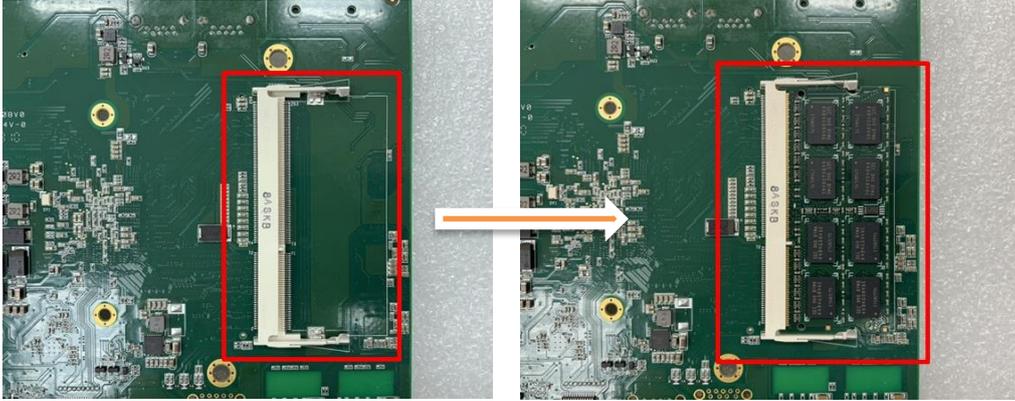
Step 8 **To put the main board back on top of the back cover:**

    a. **Aim the main board's positioning openings at the positioning posts on the back cover.**
    b. **Tilt the main board so that the bottom side is inserted first into the back cover.**
    c. **Place the entire main board down carefully by making the posts underneath go through their corresponding openings on the main board.**
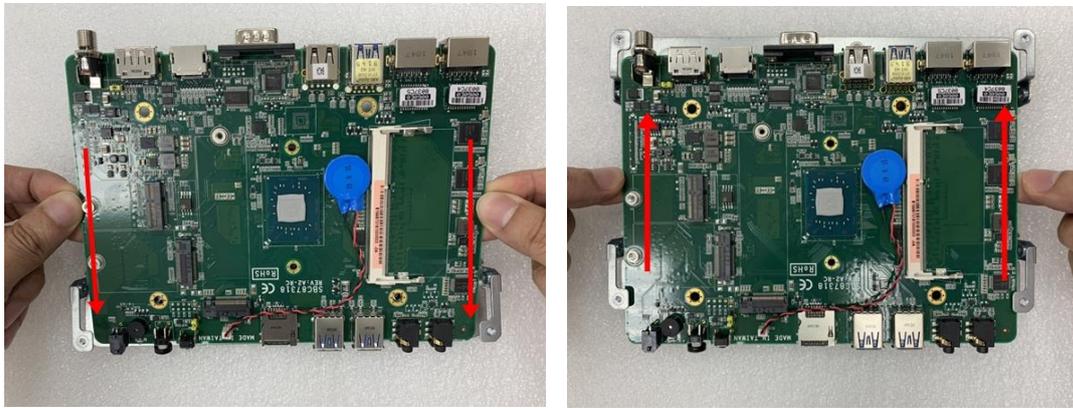
**Step 9** **Put the top and side covers back on, and follow the screw locking sequence to fasten all screws to complete installation.**
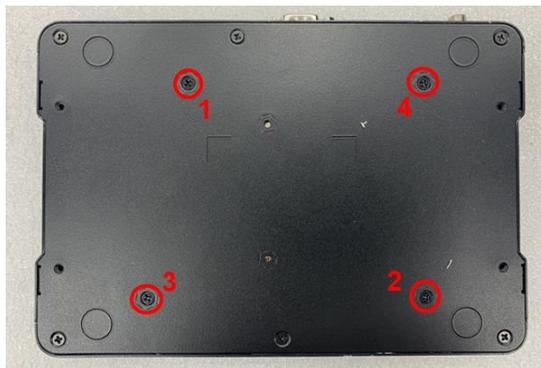
Installation of Memory DIMM1 Device

Step 1 **Turn off the system and unplug the power cord.**

Step 2 **Turn the system upside down to locate the screws at the bottom and then loosen all screws.**

Step 3 **Take off the top cover.**

Step 4 **Locate the DIMM socket on the main board.**

Step 5 **Insert the gold colored contact of the memory module into the socket and press the socket's two end latches down to lock the module in place.**
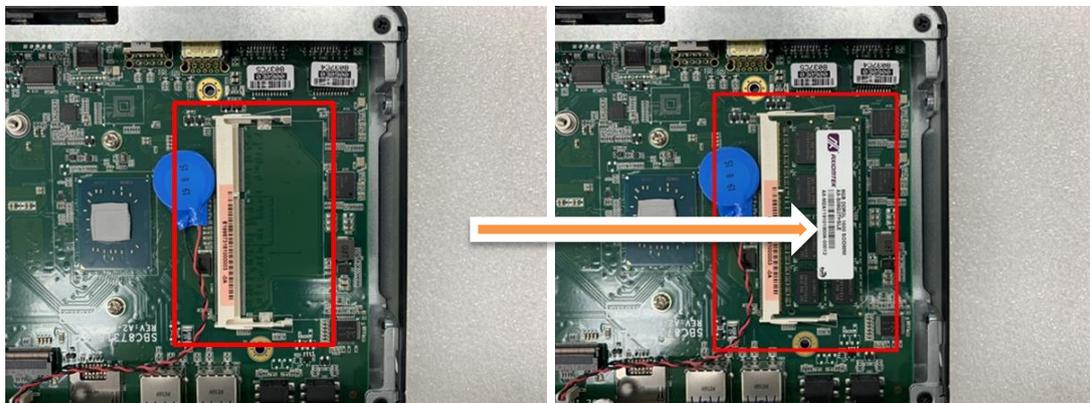
Step 6 **Put the top cover and fasten all screws back onto the system.**

2.2 Installation of M.2 SATA SSD

Step 1   **Turn off the system and unplug the power cord.**

Step 2   **Turn the system upside down to locate screws at the bottom and then loosen all screws.**
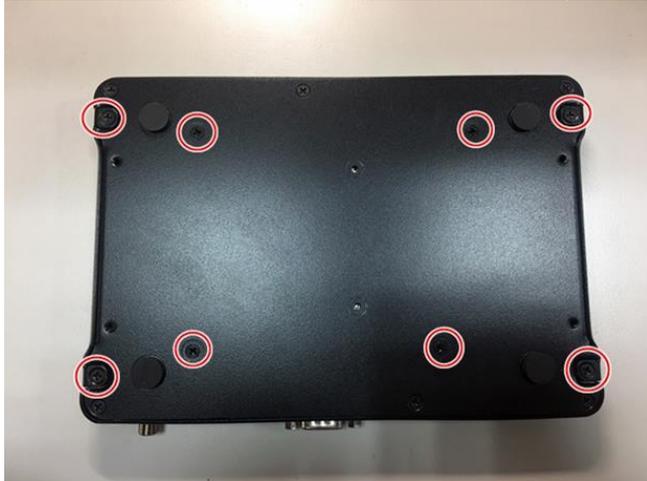
Step 3   **Open the TOP and SIDE cover.**

Step 4   **Located the M.2 socket on main board.**

Step 5   **Identify the M.2 slot, insert a M.2 SATA SSD module into the socket and then fasten a screw.**
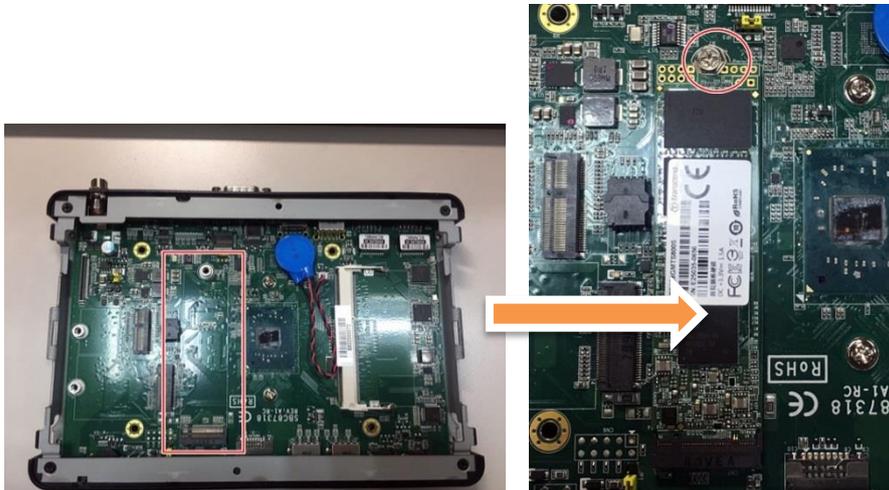
Step 6   **Put the TOP & SIDE cover and fasten eight screws back onto the system**

2.3 Installation of M.2 Key B 3G/LTE Module

Step 1   **Turn off the system and unplug the power cord.**

Step 2   **Turn the system upside down to locate screws at the bottom and then loosen all screws.**
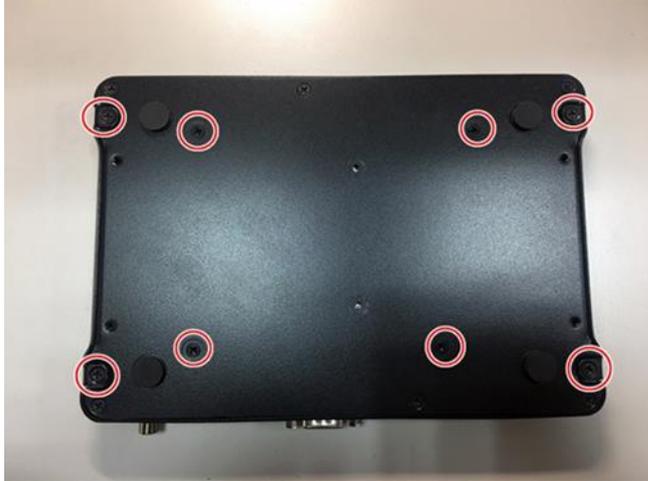
Step 3   **Open the TOP and SIDE cover.**

Step 4   **Located the M.2 Key B for 3G/LTE socket on main board.**

Step 5   **Insert a M.2 Key B 3G/LTE module into the socket and then fasten a screw.**
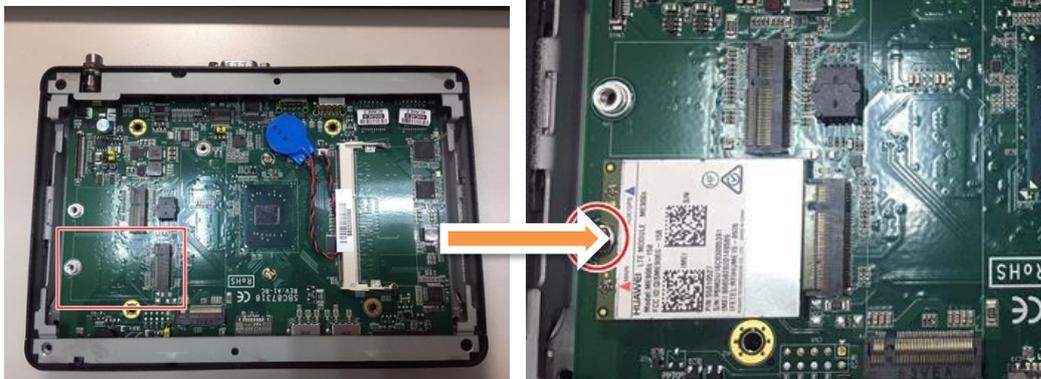
Step 6   **Put the TOP & SIDE cover and fasten eight screws back onto the system**

2.4 Installation of M.2 Key E WiFi/BT Module

Step 1   **Turn off the system and unplug the power cord.**

Step 2   **Turn the system upside down to locate screws at the bottom and then loosen all screws.**
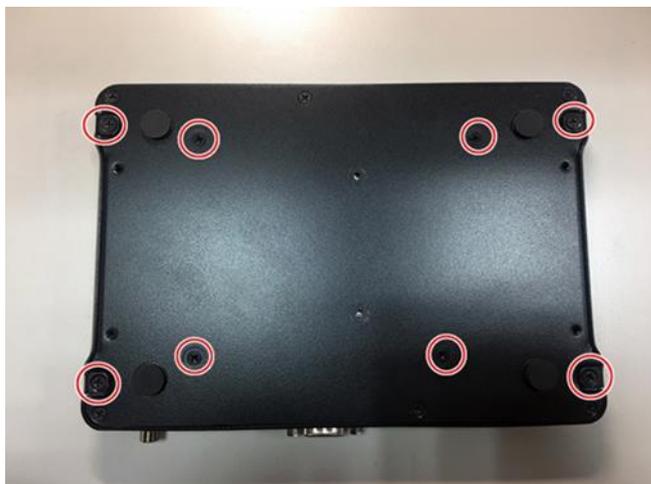
Step 3   **Open the TOP and SIDE cover.**

Step 4   **Located the M.2 Key E 2230 socket on main board.**

Step 5   **Insert a M.2 Key E 2230 WiFi/BT module into the socket and then fasten a screw.**
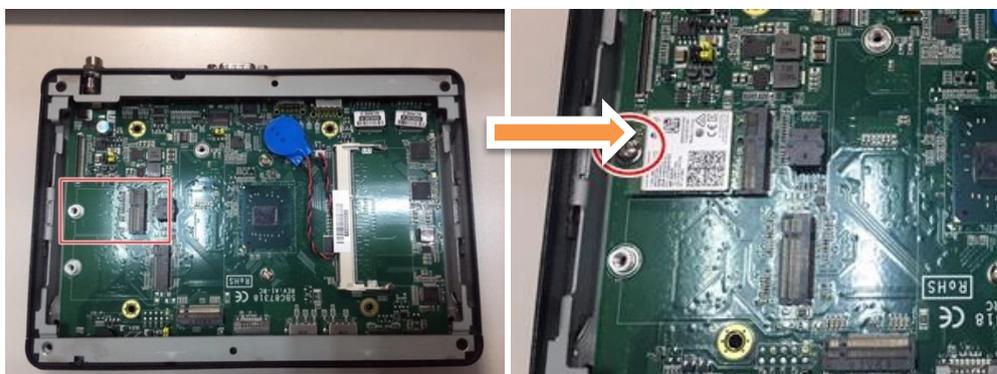
Step 6   **Put the TOP & SIDE cover and fasten eight screws back onto the system**

SECTION 3
JUMPER & CONNECTOR SETTINGS

Proper jumper settings configure the DSP300-318 to meet various application needs. Hereby all jumpers settings along with their default settings are listed for devices onboard.

3.1   Locations of Jumpers & Connectors

SBC87318 Top View
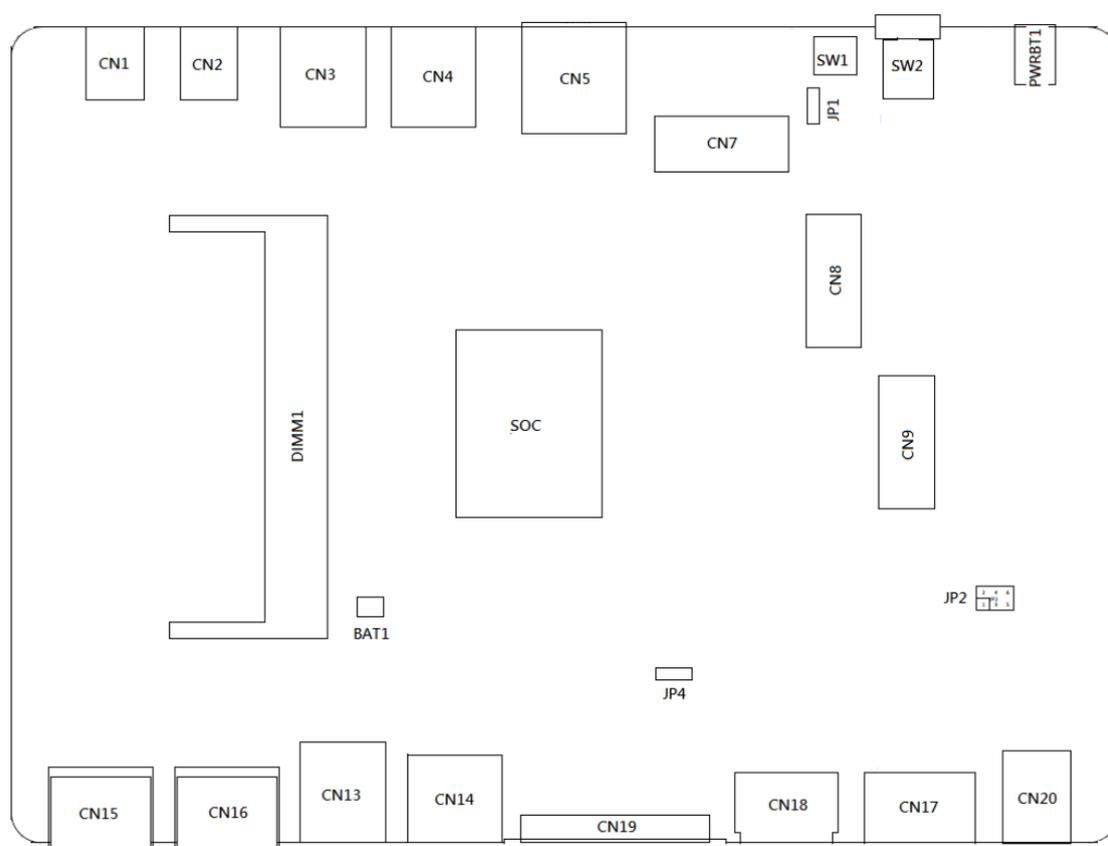
SBC87312 Bottom View

SDIMM1
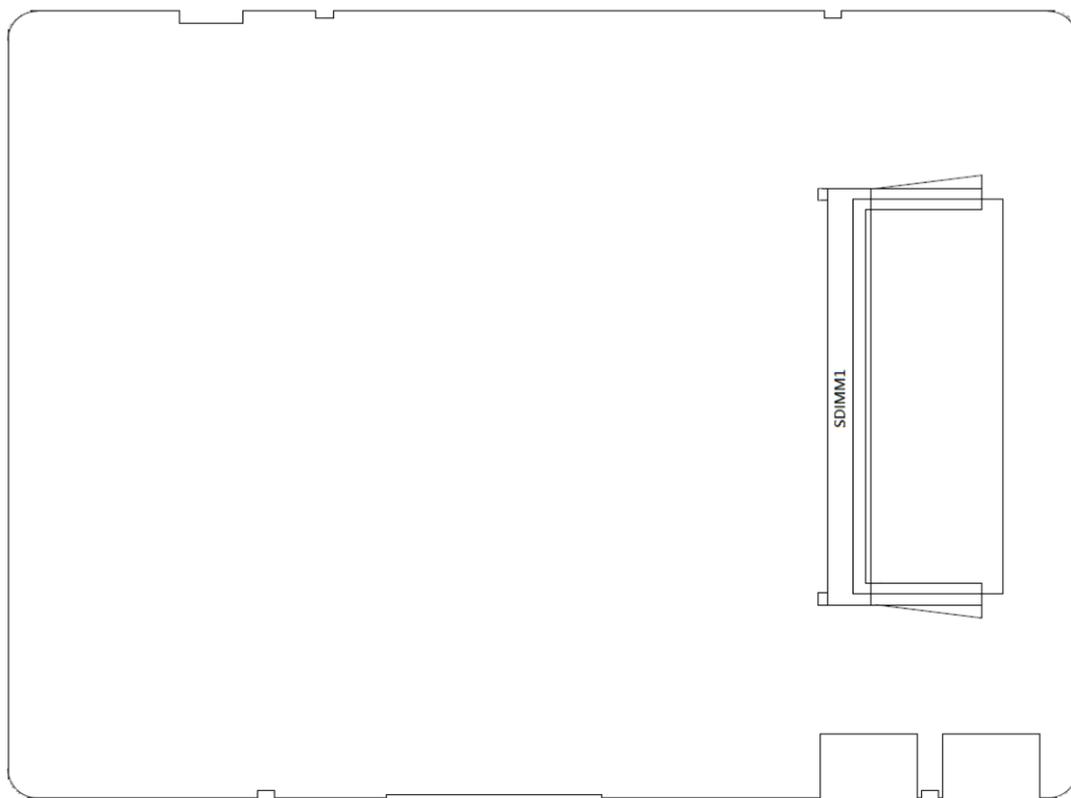
【Note】: *It is strongly recommended that any unmentioned jumper settings should not be modified without instructions by Axiomtek FAEs. Any modifications without instructions might cause system failure.*

3.2 Summary of Jumper Settings

Proper jumper settings configure the DSP300-318 to meet various application purposes. A table of all jumpers and their default settings is listed below.

Jumper	Description	Setting
JP1	Auto Power On Default: Enable	1-2 Disable
		2-3 Enable (Default)
JP4	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Normal (Default)
		2-3 Clear CMOS

【Note】: How to setup Jumpers

That a cap on a jumper is to "close" the jumper, whereas that offs a jumper is to "open" the jumper.
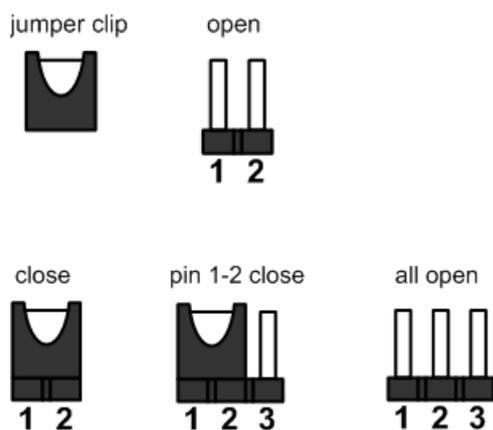
【Note】: *Once the default jumper or switch setting needs to be changed, please do it under power-off condition.*

3.2.1 Auto Power On (JP1)

If the pin 1_2 of JP1 is shorted, it is necessary to manually press soft power button to power on the system. If the pin 2_3 of JP1 is shorted, the system will be automatically power on without pressing soft power button.

Functions	Settings
Auto Power On: Disabled	1-2 close
Auto Power On: Enabled (Default)	2-3 close

3.2.2 Restore BIOS Optimal Defaults (JP4)

To restore BIOS optimal defaults, please put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2.

Functions	Settings
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close

3.3 Connectors

Signals go to the other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows connectors on the hardware.

Connector	Description	Sections
CN20	DC Power Jack	3.3.1
CN19	COM1 DB9 Connector	3.3.2
CN18	HDMI Connector	3.3.3
C15/16	Ethernet Port 1 and 2	3.3.4
SW2	ATX Power On/Off Button	3.3.5
SW1	Reset Button	3.3.6
PWRBT1	Remote Power Switch Connector	3.3.7
CN14	USB 2.0 Port	3.3.8
CN3/4/13	USB 3.0 Port	3.3.9
CN17	DP Port	3.3.10
CN2	Audio Jack(Line Out)	3.3.11
CN1	Audio Jack(MIC In)	3.3.12
CN8	M.2 B Key Socket	3.3.13
CN5	SIM Card Slot	3.3.14
CN7	M.2 M Key Socket	3.3.15
CN9	M.2 E Key Socket	3.3.16

3.3.1   DC Power Jack Connector (screw type) (CN20)

The system supports 12V DC-in connector for system power input. The CN20 is a DC jack with screw. Firmly insert at least 36W adapter into this connector. Loose connection may cause system instability and make sure all components/devices are properly installed before connecting

3.3.2   COM1 DB9 Connector (CN19)

The system has one serial port. COM1 is RS-232 port.

Pins	Signals
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
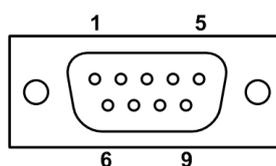
3.3.3 HDMI Connector (CN18)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which is capable of transmitting high-definition video and high-resolution audio over a single cable.

Pins	Signals	Pins	Signals
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	N.C.	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		
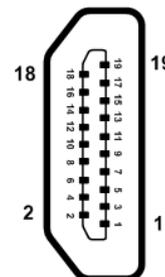
3.3.4 Ethernet Ports (CN15 and CN16)

The system has two RJ-45 connectors: CN15 and CN16. Ethernet connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end (phone jack) to a 1000/100/10-Base-T hub.

Pins	1000 Base-T	100/10 Base-T	Descriptions
L1	BI_DA+	TX+	Bidirectional or Transmit Data+
L2	BI_DA-	TX-	Bidirectional or Transmit Data-
L3	BI_DB+	RX+	Bidirectional or Receive Data+
L4	BI_DC+	N.C.	Bidirectional or Not Connected
L5	BI_DC-	N.C.	Bidirectional or Not Connected
L6	BI_DB-	RX-	Bidirectional or Receive Data-
L7	BI_DD+	N.C.	Bidirectional or Not Connected
L8	BI_DD-	N.C.	Bidirectional or Not Connected
A	Active Link LED (Yellow) Off: No link Blinking: Data activity detected		
B	Speed LED 1000: Orange 100: Green 10: OFF		
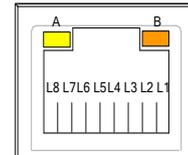
3.3.5 ATX Power On/Off button (SW2)

The ATX power button is on the I/O side. It can allow users to control DSP300-318 power on/off.

Functions	Descriptions
On	Turn on/off system
Off	Keep system status

3.3.6   Reset button (SW1)

The Reset button can allow users to reset DSP300-318 during system abnormal situation.

Functions	Descriptions
On	Reset system
Off	Keep system status

Reset

3.3.7   Remote Power Switch Connector (PWRBT1)

One 2-pin connector output for remote power on/off switch. The matching connector housing is Molex 43025-0200 micro-fit 3.0 receptacle housing.

Functions	Descriptions
Short(1-2)	Turn on/off system
Open	Keep system status
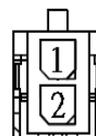
3.3.8   USB 2.0 Port (CN14)

The CN14 is a Universal Serial Bus (compliant with USB 2.0 (480Mbps)) connector on the rear I/O. It is commonly used for installing USB peripherals such as keyboard, mouse, scanner, etc.

CN14

Pins	Signals
1	USB VCC (+5V_SBY)
2	USB #4_D-
3	USB #4_D+
4	GND

3.3.9 USB 3.0 Port (CN3/CN4/CN13)

The Universal Serial Bus (compliant with USB 3.0 (5Gb/s)) connector on the rear I/O is for installing USB peripherals such as keyboard, mouse, scanner, etc.

Pins	Signals
1	USB_VCC (+5V_SBY)
2	USB #0_D-
3	USB #0_D+
4	GND
5	SSRX0-
6	SSRX0+
7	GND
8	SSTX0-
9	SSTX0+

CN13
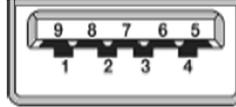
Pins	Signals
1	USB_VCC (+5V_SBY)
2	USB #3_D-
3	USB #3_D+
4	GND
5	SSRX3-
6	SSRX3+
7	GND
8	SSTX3-
9	SSTX3+

CN3
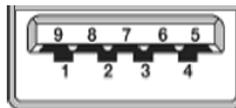
Pins	Signals
1	USB_VCC (+5V_SBY)
2	USB #2_D-
3	USB #2_D+
4	GND
5	SSRX2-
6	SSRX2+
7	GND
8	SSTX2-
9	SSTX2+

CN4
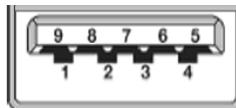
3.3.10 DisplayPort Connector (CN17)

The DP is a digital display interface which is capable of transmitting high-definition video.

Pins	Signals
1	DPB_LANE0
2	GND
3	DPB_LANE0#
4	DPB_LANE1
5	GND
6	DPB_LANE1#
7	DPB_LANE2
8	GND
9	DPB_LANE2#
10	DPB_LANE3
11	GND
12	DPB_LANE3#
13	Detect Pin
14	GND
15	DPB_AUX
16	GND
17	DPB_AUX#
18	DPB_HPDE
19	GND
20	+3.3V
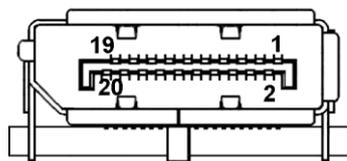
3.3.11   Audio Jack Line-out Connector (CN2)

The DSP300-318 provides one HD audio jack Line_out connector.

Pins	Signals
1	GND
2	LINEOUT_L
3	LINEOUT_R
10	NC
11	NC
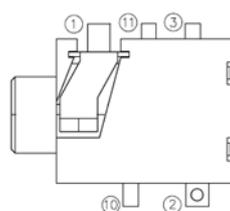
3.3.12 Audio Jack MIC-in Connector (CN1)

The DSP300-318 provides one HD audio jack MIC_in connector.

Pins	Signals
1	GND
2	MIC_L
3	MIC_R
10	NC
11	NC
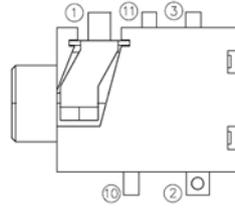
3.3.13 M.2 B Key Connector (CN8)

The DSP300-318 has one M.2 B Key 3042 socket.

Pins	Signals	Pins	Signals
1	CONFIG_3	2	+3.3V
3	GND	4	+3.3V
5	GND	6	FULL_CARD_POWER_OFF
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	GPIO_9/DAS/DSS#(I/O)/LED1#
11	GND	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	GPIO_5(I/O)
21	CONFIG_0	22	GPIO_6(I/O)
23	GPIO_11	24	GPIO_7(I/O)
25	DPR	26	GPIO_10(I/O)
27	GND	28	GPIO_8(I/O)
29	PERn1/USB3.0-Rx-/SSIC-RxN	30	UIM-RESET
31	PERp1/USB3.0-Rx+/SSIC-RxP	32	UIM-CLK
33	GND	34	UIM-DATA
35	PETn1/USB3.0-Tx-/SSIC-TxN	36	UIM-PWR
37	PETp1/USB3.0-Tx+/SSIC-TxP	38	DEVSLP
39	GND	40	GPIO_0(I/O)
41	PERn0/SATA-B+	42	GPIO_1(I/O)
43	PERp0/SATA-B-	44	GPIO_2(I/O)
45	GND	46	GPIO_3(I/O)
47	PETn0/SATA-A-	48	GPIO_4(I/O)
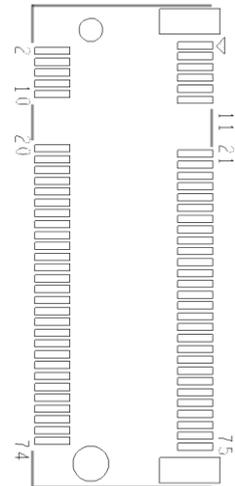
Pins	Signals	Pins	Signals
49	PETp0/SATA-A+	50	PERST#
51	GND	52	CLKREQ#
53	REFCLKN	54	PEWAKE#
55	REFCLKP	56	N/C_56
57	GND	58	N/C_58
59	ANTCTL0	60	COEX3
61	ANTCTL1	62	COEX2
63	ANTCTL2	64	COEX1
65	ANTCTL3	66	SIM DETECT
67	RESET#	68	SUSCLK(32kHz)
69	CONFIG_1	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	CONFIG_2		

3.3.14 SIM Card slot (CN5)

This system has CN5 socket for inserting SIM Card. In order to work properly, the SIM Card must be used together with 3G/LTE module which is inserted to CN8. It is mainly used in 3G/LTE wireless network application.

Pins	Signals
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC
9	SIM_DETECT
10	NC
11	NC
12	GND
13	GND
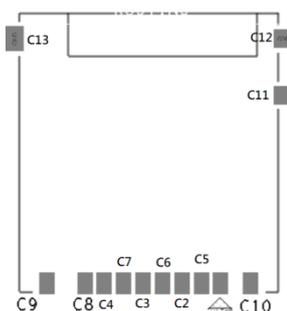
3.3.15   M.2 M KEY Connector (CN7)

This system has one M.2 M key socket for inserting M.2 2280 SATA SSD module.

Pins	Signals	Pins	Signals
1	GND	2	+3.3V
3	GND	4	+3.3V
5	NC	6	NC
7	NC	8	NC
9	GND	10	LED1#
11	NC	12	+3.3V
13	NC	14	+3.3V
15	GND	16	+3.3V
17	NC	18	+3.3V
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	NC
31	NC	32	NC
33	GND	34	NC
35	NC	36	NC
37	NC	38	DEVSLP
39	GND	40	NC
41	SATA2_RXP	42	NC
43	SATA2_RXN	44	NC
45	GND	46	NC
47	SATA2_TXN	48	NC
49	SATA2_TXP	50	PERST#
51	GND	52	NC
53	NC	54	PEWARK#
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	+3.3V
71	GND	72	+3.3V
73	GND	74	+3.3V
75	GND		
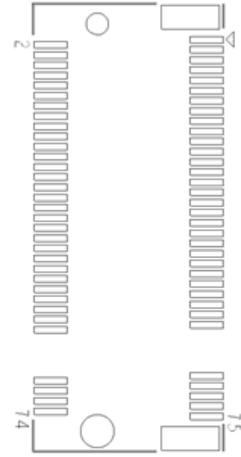
3.3.16 M.2 E KEY Connector (CN9)

The system has one M.2 E Key 2230 socket on the top side supporting PCI Express x1 and USB 2.0.

Pins	Signals	Pins	Signals
1	GND	2	+3.3V
3	USB_D+	4	+3.3V
5	USB_D-	6	LED1#(I)(OD)
7	GND	8	PCM_CLK/I2S SCK
9	SDIO CLK(O)(0/1.8V)	10	PCM_SYNC/I2S WS
11	SDIO CMD(IO)(0/1.8V)	12	PCM_IN/I2S SD_IN
13	SDIO DATA0(IO)(0/1.8V)	14	PCM_OUT/I2S SD_OUT
15	SDIO DATA1(IO)(0/1.8V)	16	LED2#(I)(OD)
17	SDIO DATA2(IO)(0/1.8V)	18	GND
19	SDIO DATA3(IO)(0/1.8V)	20	UART WAKE#(I)(0/3.3V)
21	SDIO WAKE#(I)(0/1.8V)	22	UART RXD(I)(0/1.8V)
23	SDIO RESET#(O)(0/1.8V)	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	UART_TXD(O)(0/1.8V)
33	GND	34	UART_CTS(I)(0/1.8V)
35	PETp0	36	UART_RTS(O)(0/1.8V)
37	PETn0	38	VENDOR DEFINED_38
39	GND	40	VENDOR DEFINED_40
41	PERp0	42	VENDOR DEFINED_42
43	PERn0	44	COEX3(IO)(0/1.8V)
45	GND	46	COEX2(IO)(0/1.8V)
47	REFCLKP0	48	COEX1(IO)(0/1.8V)
49	REFCLKN0	50	SUSCLK(32kHz)(O)(0/3.3V)
51	GND	52	PERST0#(I)(0/3.3V)
53	CLKREQ0#(IO)(0/3.3V)	54	W_DIS2#(I)(0/3.3V)
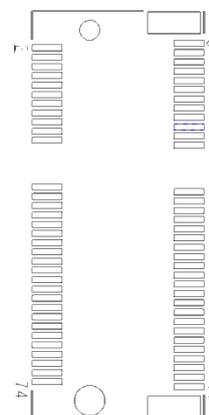
Pins	Signals	Pins	Signals
55	PEWAKE0#(IO) (0/3.3V)	56	W_DIS1#(I)(0/3.3V)
57	GND	58	I2C DATA(I0)(0/3.3V)
59	RSVD/PETp1	60	I2C CLK(I)(0/3.3V)
61	RSVD/PETn1	62	ALERT#(O)(0/3.3V)
63	GND	64	RSVD_64
65	RSVD/PERp1	66	UIM_SWP/PERST1#
67	RSVD/PERn1	68	UIM_PWR_SNK/CLKREQ 1#
69	GND	70	UIM_PWR_SRC/GPIO1/P EWAKE1#
71	RSVD/REFCLKP1	72	+3.3V
73	RSVD/REFCLKN1	74	+3.3V
75	GND		

SECTION 4
BIOS SETUP UTILITY

This section provides users with detailed descriptions in terms of how to set up basic system configurations through the 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 press the <Del> key, the main BIOS setup menu displays. Users can access to other setup screens, such as the Advanced and Chipset menus, from the main BIOS setup menu.

It is strongly recommended that users should avoid changing the chipset's defaults. Both AMI and system manufacturer have carefully set up these defaults that provide the best performance and reliability.

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>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

【Note】: *Some of the navigation keys differ from one screen to another.*

Hot Keys	Descriptions
→← Left/Right	The Left and Right <Arrow> keys allow users to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow users to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow users to change the field value of a particular setup item.
Tab	The <Tab> key allows users to select setup fields.
F1	The <F1> key allows users to display the General Help screen.
F2	The <F2> key allows users to Load Previous Values.
F3	The <F3> key allows users to Load Optimized Defaults.
F4	The <F4> key allows users to save any changes they made and exit the Setup. Press the <F4> key to save any changes.
Esc	The <Esc> key allows users to discard any changes they made and exit the Setup. Press the <Esc> key to exit the setup without saving any changes.
Enter	The <Enter> key allows users to display or change the setup option listed for a particular setup item. The <Enter> key can also allow users to display the setup sub- screens.

4.3 Main Menu

The Main Menu screen is the first screen users see when entering the setup utility. Users can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is also shown below.
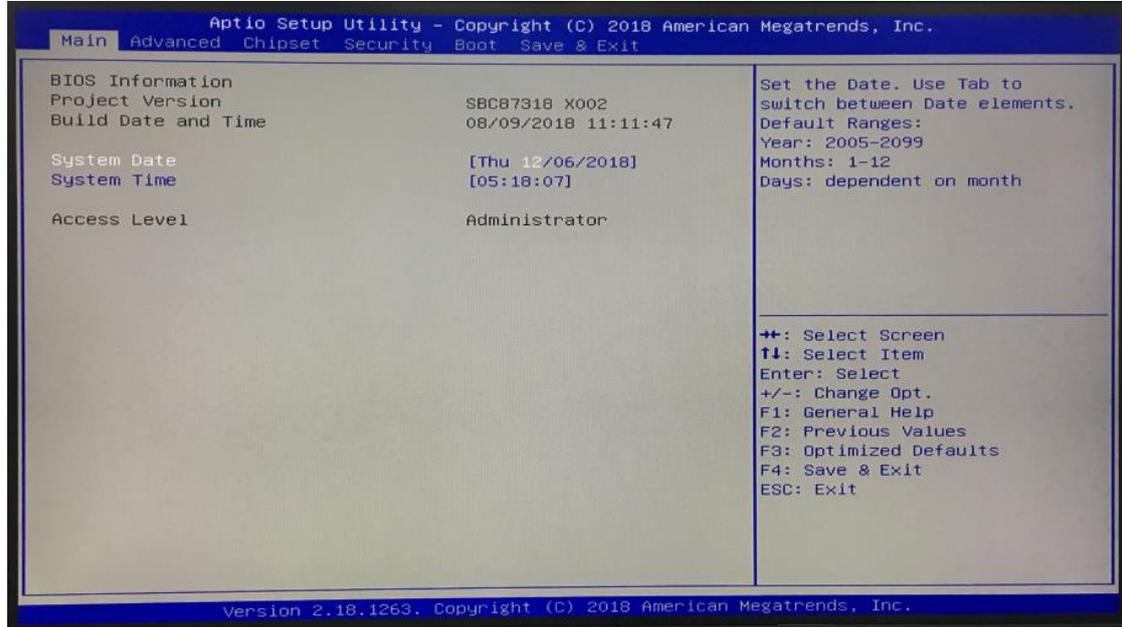
BIOS Information
Display the auto-detected BIOS information.

System Date/Time
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.

Access Level
Display the access level of current user.

4.4 Advanced Menu

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:

- ► ACPI Settings
- ► CPU Configurations
- ► F81803 Super IO Configurations
- ► Hardware Monitor
- ► SATA Configurations
- ► USB Configurations
- ► CSM Configurations
- ► S5 RTC Wake Settings

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

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
     Main  Advanced  Chipset  Security  Boot  Save & Exit

  ▶ ACPI Settings                                      Enable system to wake from S5
  ▶ CPU Configuration                                  using RTC alarm
  ▶ F81803 Super IO Configuration
  ▶ Hardware Monitor
  ▶ SATA Configuration
  ▶ USB Configuration
  ▶ CSM Configuration
  ▶ S5 RTC Wake Settings




                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```

ACPI Settings

Use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.

```
                 Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

   ACPI Settings                                                Select the highest ACPI sleep
                                                                state the system will enter
   ACPI Sleep State                    [S3 (Suspend to RAM)]    when the SUSPEND button is
                                                                pressed.




                                                                ─────────────────────────────
                                                                →←: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit




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```
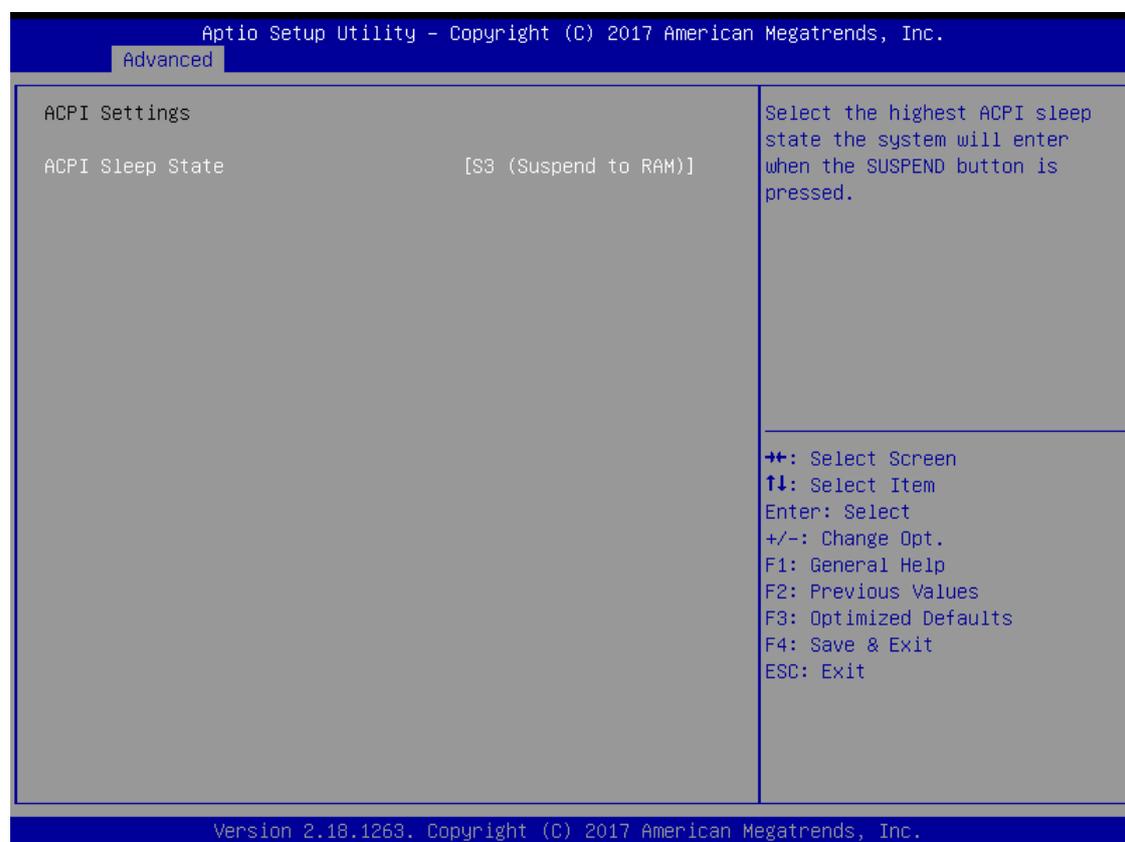
ACPI Sleep State

When the sleep button is pressed, the system will be in the ACPI sleep state.

The default is S3 (Suspend to RAM).

CPU Configurations

This screen shows the CPU version and its detailed information.

```
          Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
   Advanced

 CPU Configuration                                          When enabled, a VMM can
                                                            utilize the additional
 Intel(R) Celeron(R) CPU N3350 @ 1.10GHz                    hardware capabilities provided
 CPU Signature                  506C9                       by Vanderpool Technology
 Microcode Patch                20
 Max CPU Speed                  1100 MHz
 Min CPU Speed                  800 MHz
 Processor Cores                2
 Intel HT Technology            Not Supported
 Intel VT-x Technology          Supported
 64-bit                         Supported

 L1 Data Cache                  24 kB x 2
 L1 Code Cache                  32 kB x 2                   →←: Select Screen
 L2 Cache                       1024 kB x 1                 ↑↓: Select Item
 L3 Cache                       Not Present                 Enter: Select
                                                            +/-: Change Opt.
 Intel Virtualization Technology  [Enabled]                 F1: General Help
 Turbo Mode                       [Enabled]                 F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit




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```

Intel Virtualization Technology
It allows a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

Turbo Mode
System allows up to 2.4 GHz with turbo mode.

F81803 Super IO Configurations

Use this screen to select options for the F81803 Super IO Configurations, 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
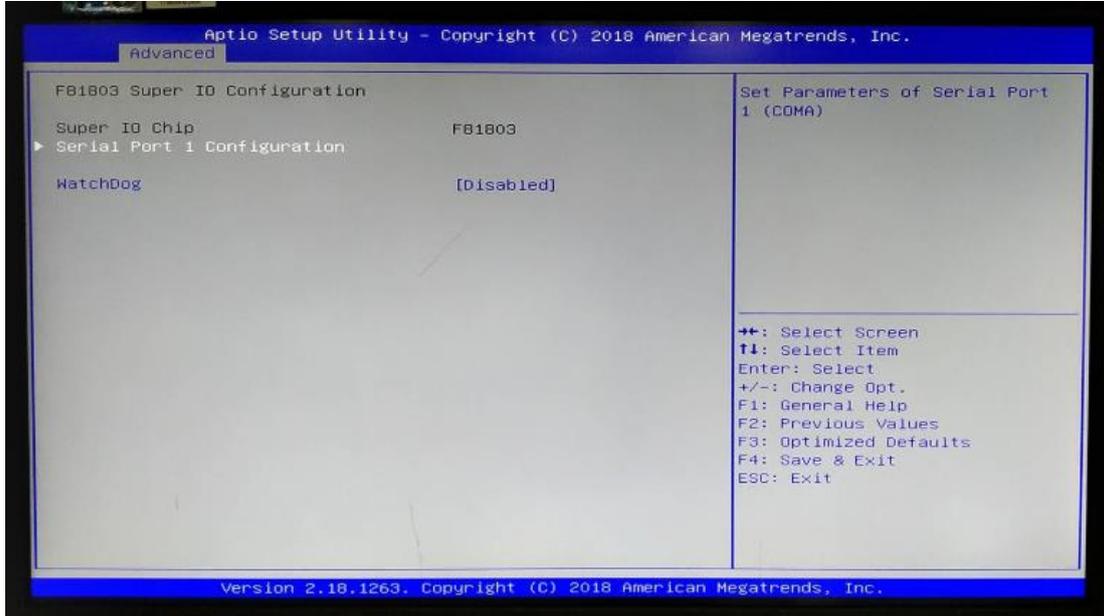
Serial Port 1 (COM1) Configuration

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

BIOS Setup Utility
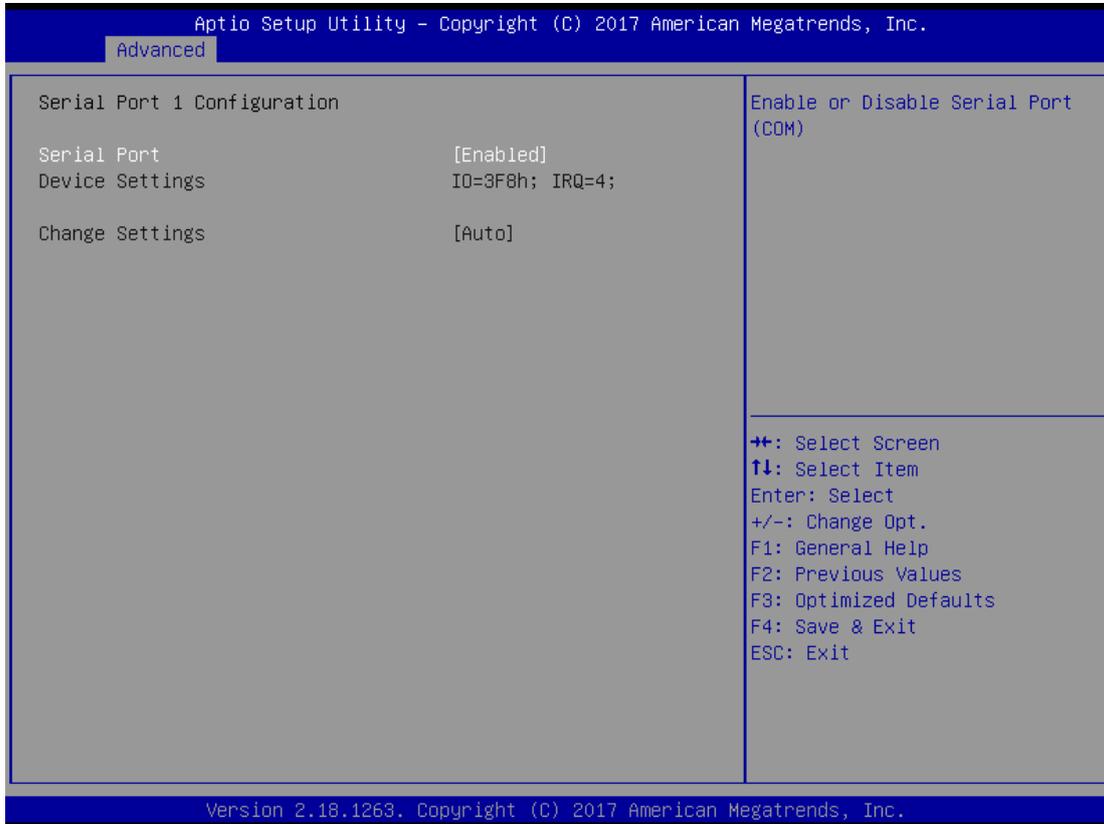
WatchDog

Use the items to set WatchDog parameters.
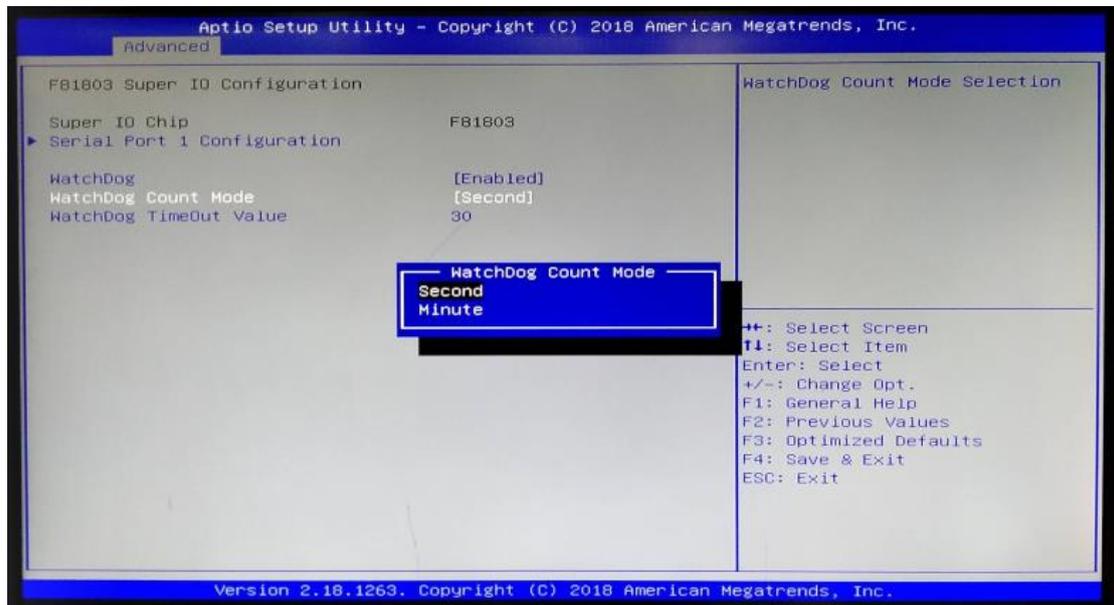
Hardware Monitor

This screen monitors hardware health status.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Advanced

   Hardware Monitor

   CPU Temperature                    : +45 ℃
   SYSTEM Temperature                 : +32 ℃
   VBAT                               : +2.992 V
   +5V                                : +5.000 V
   +3.3V                              : +3.312 V
   +3.3VSB                            : +3.344 V
   +5VSB                              : +5.040 V


                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit




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```

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

SATA Configurations

In this Configuration menu, you can see the currently installed hardware in the SATA port. During system boot up, the BIOS automatically detects the presence of SATA device.

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
            Advanced

    SATA Configuration                                          Enables or Disables the
                                                                Chipset SATA Controller.  The
     Chipset SATA                        [Enable]               Chipset SATA controller
    SATA Mode Selection                  [AHCI]                 supports the 2 black internal
                                                                SATA ports (up to 3Gb/s
      SATA Port 0                        [Not Installed]        supported per port).



                                                                ➜←: Select Screen
                                                                ↑↓: Select Item
                                                                Enter: Select
                                                                +/-: Change Opt.
                                                                F1: General Help
                                                                F2: Previous Values
                                                                F3: Optimized Defaults
                                                                F4: Save & Exit
                                                                ESC: Exit



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```

SATA Mode Selection

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

Serial ATA Port 0

It shows the device installed in connector SATA0.

 USB Configurations

This screen specifies USB settings.

```
              Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
       Advanced

   USB Configuration                                        Mass storage device emulation
                                                            type. 'AUTO' enumerates
   USB Module Version              17                       devices according to their
                                                            media format. Optical drives
   USB Controllers:                                         are emulated as 'CDROM',
        1 XHCI                                              drives with no media will be
   USB Devices:                                             emulated according to a drive
        1 Drive, 1 Keyboard                                 type.

   Mass Storage Devices:
   Generic Flash Disk 8.07        [Auto]

                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit

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```

USB Devices

Display all detected USB devices.

Mass Storage Devices

Mass storage device emulation type. Auto option enumerates devices according to their media format. Optical drives are emulated as CDROM; drives with no media will be emulated according to a drive type.

CSM (Compatibility Support Module) Configuration
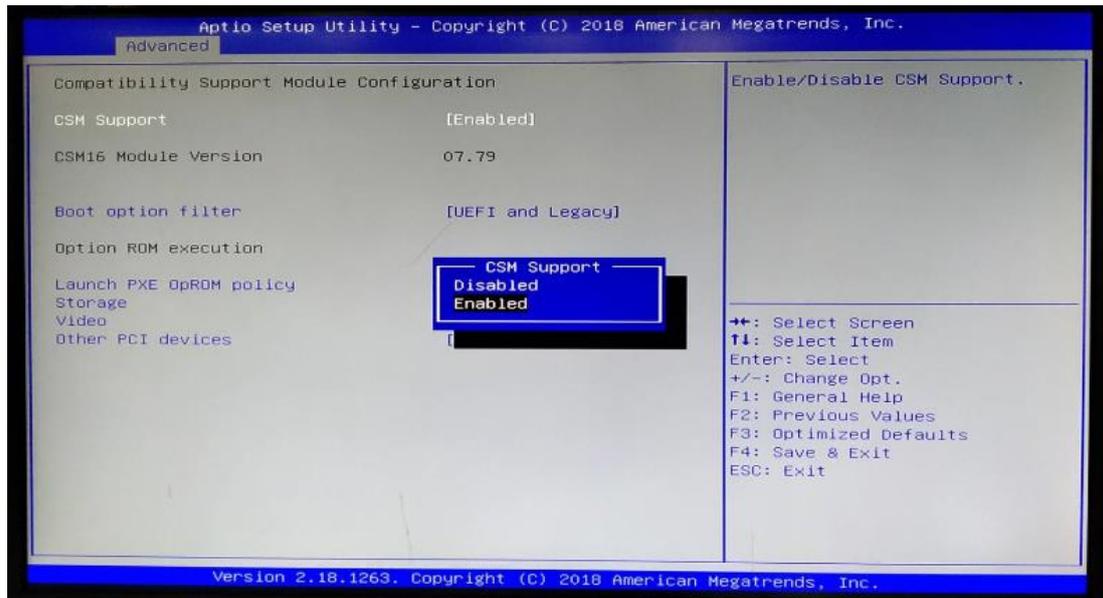
CSM Support
Enable or disable CSM support. The default setting is Enabled.

Boot optional filter
Controls the priority of Legacy and UEFI ROMs.

Launch PXE OpROM policy
Controls the execution of UEFI and Legacy PXE OpROM.

Storage
Controls the execution of UEFI and Legacy Storage OpROM.

Video
Controls the execution of UEFI and Legacy Video OpROM.

Other PCI Devices
Determines OpROM execution policy for devices other than network, storage or video.

S5 RTC Wake Settings
Enable or disable RTC Wake Settings support. The default setting is Disabled.

```
          Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
    Advanced

  Wake system from S5                    [Disabled]          Enable or disable System wake
                                                             on alarm event. Select
                                                             FixedTime, system will wake on
                                                             the hr::min::sec specified.
                                                             Select DynamicTime , System
                                                             will wake on the current time
                                                             + Increase minute(s)



                                                             ────────────────────────────
                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F3: Optimized Defaults
                                                             F4: Save & Exit
                                                             ESC: Exit



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```

4.5 Chipset Menu

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:

- ► North Bridge
- ► South Bridge

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

```
            Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
       Main   Advanced   Chipset   Security   Boot   Save & Exit

     ▶ North Bridge                                         North Bridge Parameters
     ▶ South Bridge




                                                            ↔: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



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```
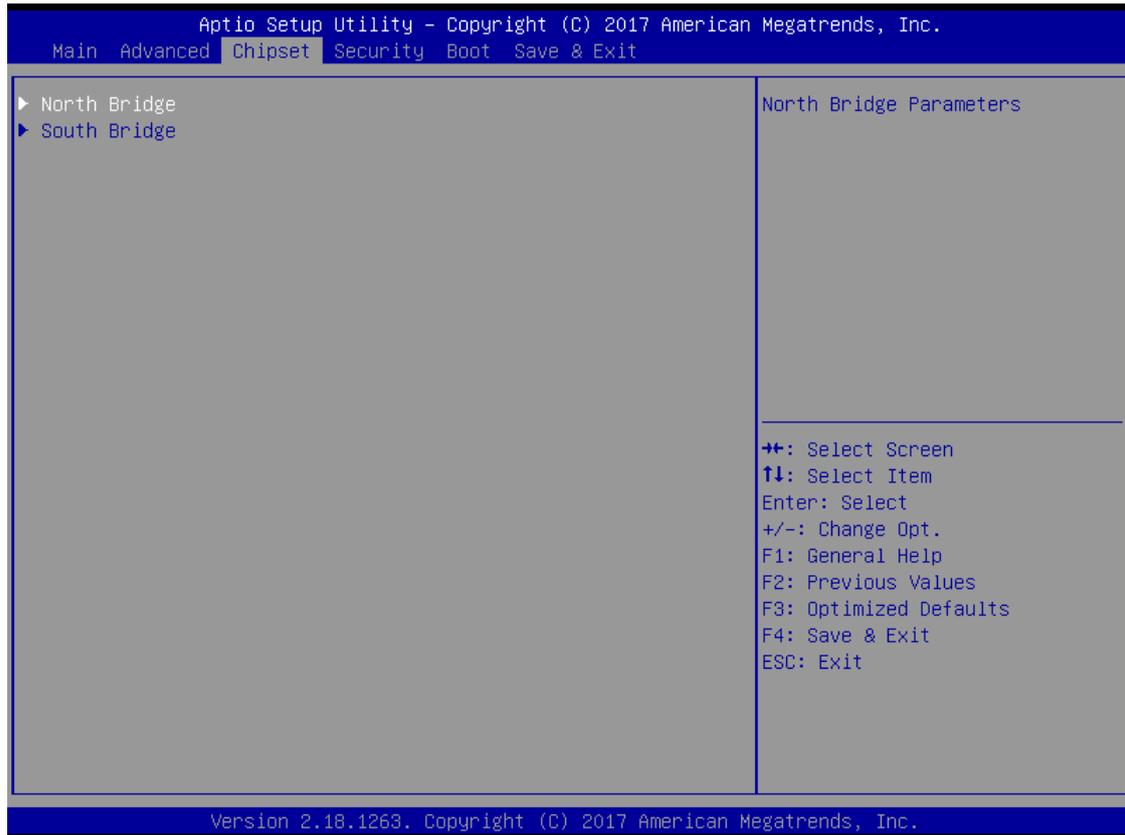
North Bridge

This screen allows users to configure parameters of North Bridge chipset.
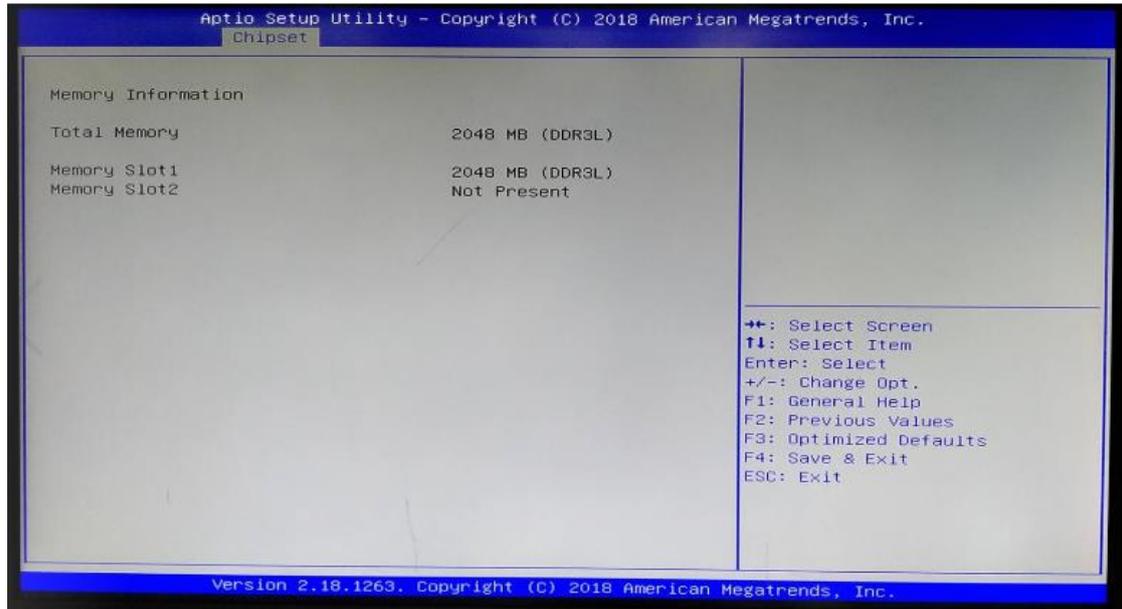
Memory Information
Display system memory information.

South Bridge
This screen shows the information of South Bridge chipset.

4.6 Security Menu

```
             Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
      Main  Advanced  Chipset  Security  Boot  Save & Exit

     Password Description                                    Set Setup Administrator
                                                            Password
     If ONLY the Administrator's password is set,
     then this only limits access to Setup and is
     only asked for when entering Setup.
     If ONLY the User's password is set, then this
     is a power on password and must be entered to
     boot or enter Setup. In Setup the User will
     have Administrator rights.
     The password length must be
     in the following range:
     Minimum length                    3
     Maximum length                   20                    →←: Select Screen
                                                            ↑↓: Select Item
     Setup Administrator Password                           Enter: Select
     User Password                                          +/-: 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.
```
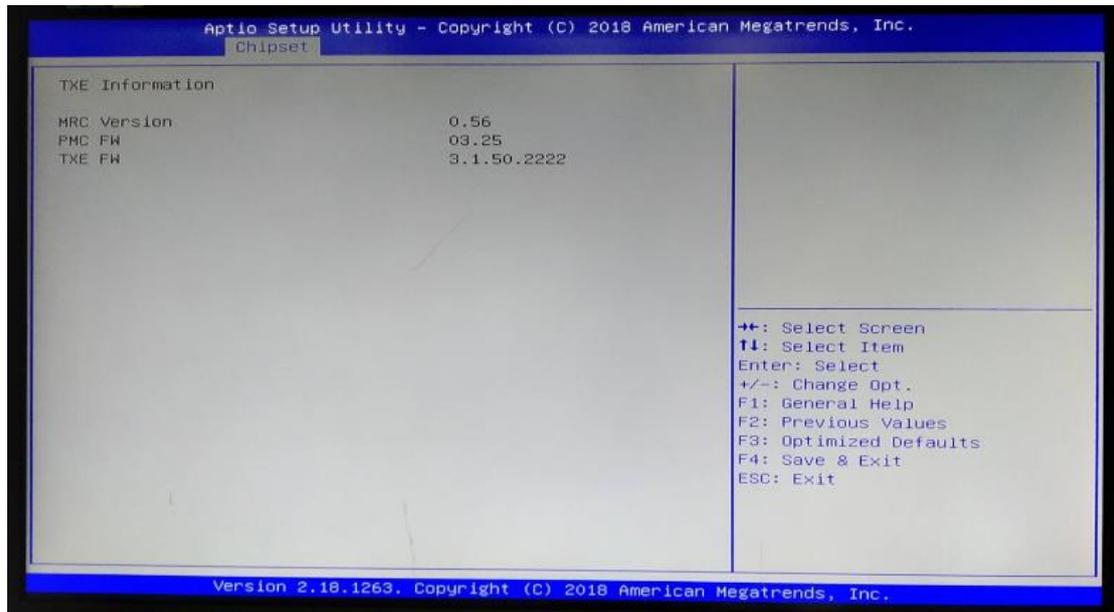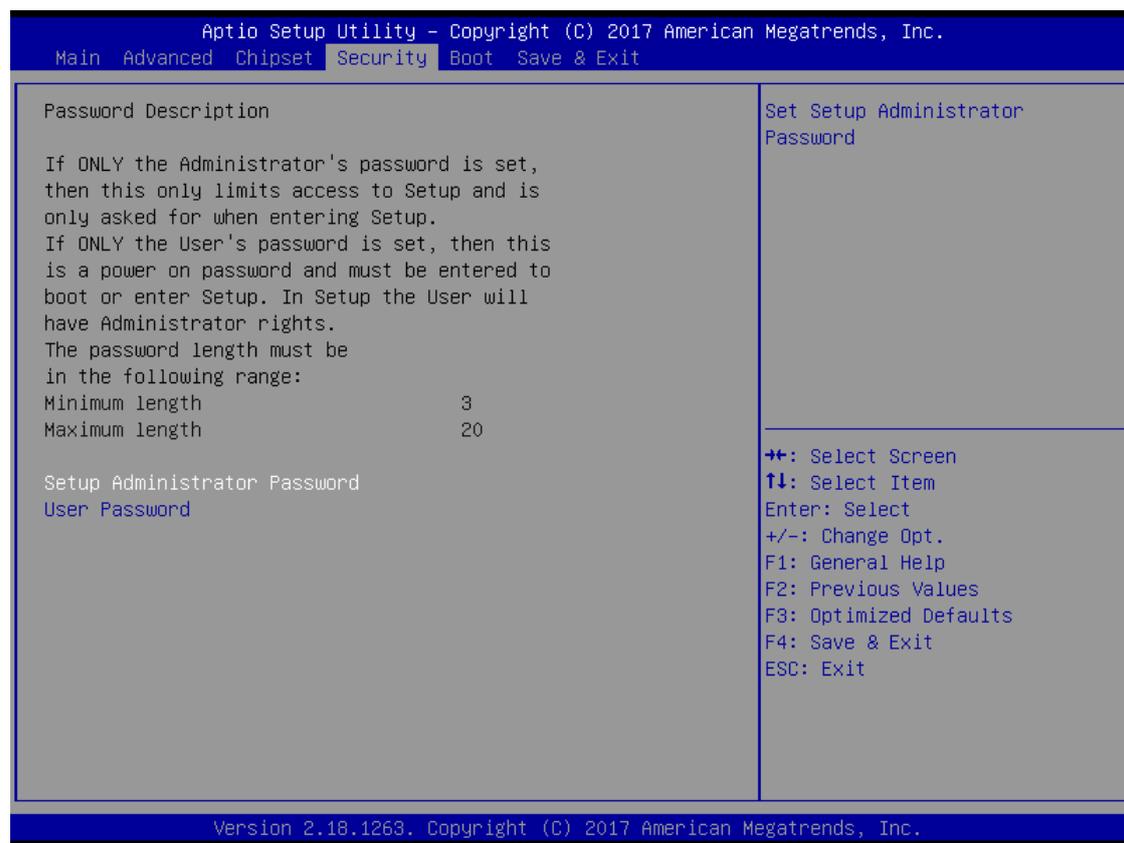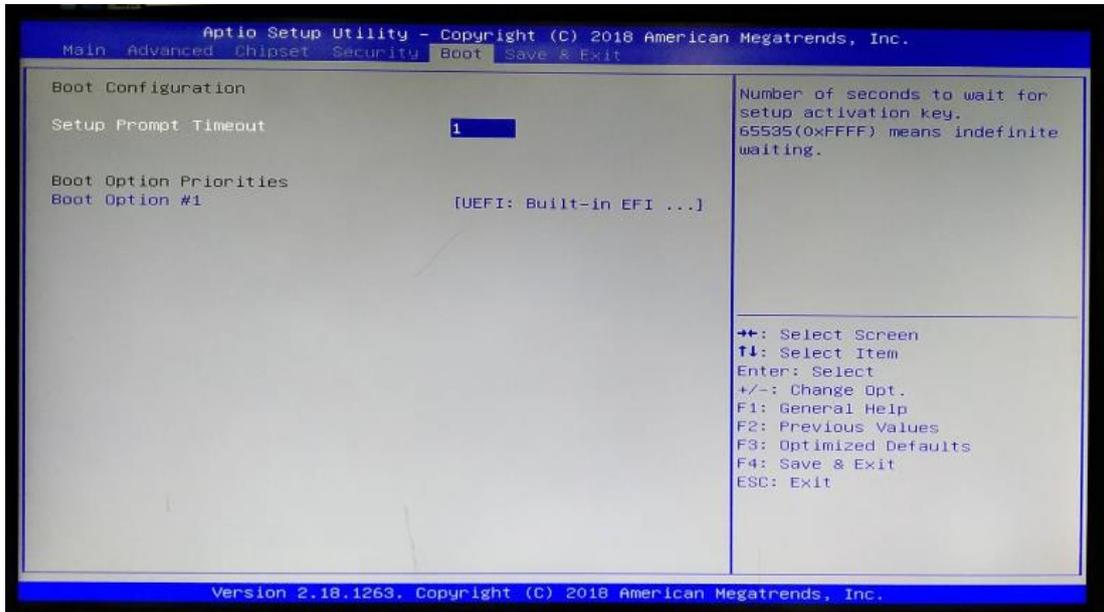
Administrator Password
This item indicates whether an administrator password has been set (installed or uninstalled).

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

Boot Menu

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.

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

4.7 Save & Exit Menu

The Save & Exit menu allows users to load system configurations with optimal or fail-safe default values.
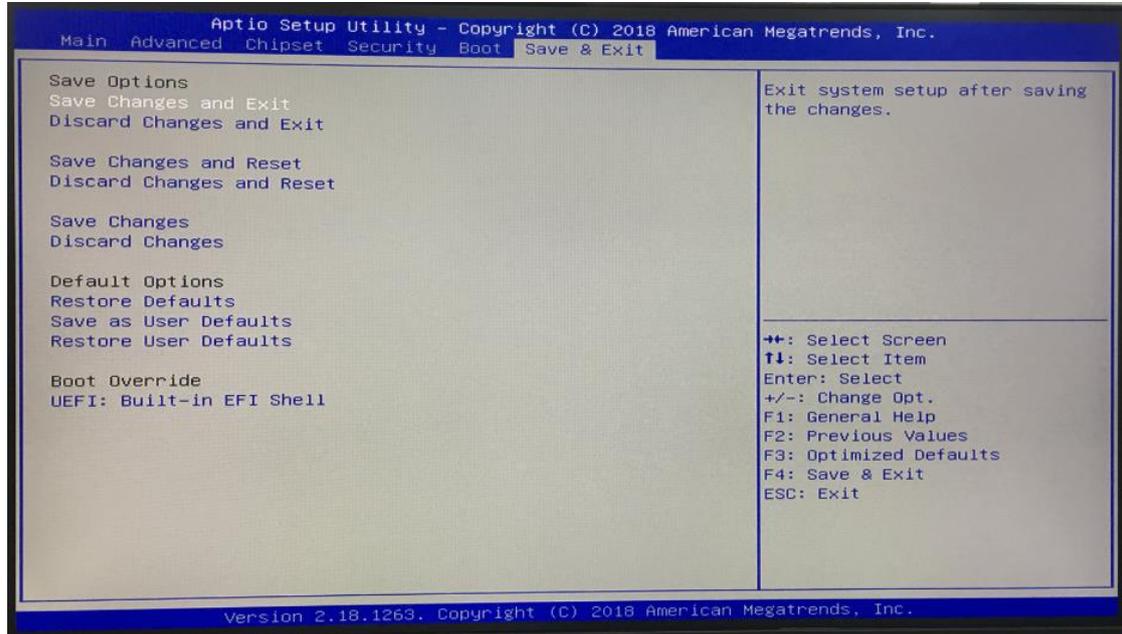
Save Changes and Exit
When users have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

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
When completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configurations 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
When completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

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

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

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

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

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

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APPENDIX A
WATCHDOG TIMER

About Watchdog Timer

Software stability is major issue in most applications. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solutions in this regard.

The watchdog timer is a counter that triggers a system to reset when it counts down to zero from a preset value. The software starts the counter with an initial value and must reset it periodically. If the counter ever reaches zero, it means the software has crashed, the system will reboot.

Sample Program

The following example enables configurations using debug tool.

Enable WDT

↓

Enable configuration:

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

                            O 2E 87

↓

Select logic device:

                            O 2E 07

                            O 2F 08

↓

WDT device enable:

                            O 2E 30

                            O 2F 01

↓

Set timer unit:

                            O 2E F0

                            O 2F 00 ; (00: Sec; 08:Minute)

↓

Set base timer:

                            O 2E F1

                            O 2F 0A; Set reset time (where 0A (hex) = 10sec)

Disable WDT

↓

Enable configuration:

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

                            O 2E 87

↓

Select logic device:

                            O 2E 07

                            O 2F 08

↓

WDT device disable:

                            O 2E 30

                            O 2F 00