# USER MANUAL

## SA-5800

Intel® 6th/7th Gen. Core™
i7/i5/i3 / Pentium® / Celeron®
Processor Book-Sized PC

**SA-5800 M1**

# *SA-5800*
# *Intel® 6th/7th Gen. Core ™ i7/i5/i3/ Pentimu® / Celeron® Processor Book-Sized PC*



**DISCLAIMER**
This user's manual is meant to assist users in installing and setting up the system. The information contained in this document is subject to change without any notice.

**CE NOTICE**
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## FCC NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void your authority to operate such equipment.

| | |
|---|---|
|  | **CAUTION:** Danger of explosion may occur when the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. |

| | |
|---|---|
|  | **WARNING:** Some internal parts of the system may have high electrical voltage. We strongly recommend that only qualified engineers are allowed to service and disassemble the system. If any damages should occur on the system and are caused by unauthorized servicing, it will not be covered by the product warranty. |

# Contents

# Revision History

The revision history of SA-5800 User Manual is described below:

| Version No. | Revision History | Page No. | Date |
|---|---|---|---|
| M1 | Initial Release | - | 2018/02 |

# 1 Introduction

This chapter provides the introduction for SA-5800 as well as the framework of the user manual.

The following topic is included:

- About This Manual

## 1.1 About This Manual

Thank you for purchasing our SA-5800 system. The SA-5800 provides faster processing speed, greater expandability and can handle more tasks than before. This manual is designed to assist you how to install and set up the whole system. It contains 5 chapters and 2 appendixes. Users can configure SA-5800 according to their own needs. This user manual is intended for service personnel with strong hardware background. It is not intended for general users.

The following section outlines the structure of this user manual.

***Chapter 1 Introduction***
This chapter provides the introduction for SA-5800 as well as the framework of the user manual.

***Chapter 2 Getting Started***
This chapter describes the package contents and outlines SA-5800 specifications. Read the safety reminders carefully on how to take care of SA-5800 motherboard properly.

***Chapter 3 System Configuration***
This chapter describes the locations and functions of the system motherboard components. You will learn how to properly configure the connectors and system configuration jumpers on the motherboard and configure the system to meet your own needs.

***Chapter 4 Software Utilities***
This chapter contains helpful information for proper installations of the Intel Chipset Software Installation Utility, Intel® Management Engine Components Installer, USB 3.0 eXtensible Host Controller Utility, Graphics Driver Utility, LAN Driver Utility, Sound Driver Utility and Hotfix Driver Utility.

***Chapter 5 BIOS Setup***
This chapter indicates you how to change the BIOS configurations.

***Appendix A System Diagrams***
This appendix provides the exploded diagrams and part numbers of the SA-5800.

***Appendix B Technical Summary***
This appendix provides the information about the allocation maps for SA-5800 system block diagram, system resources, Watchdog Timer Configuration and Flash BIOS Update.

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# 2 Getting Started

This chapter provides the information for SA-5800 system. It describes the package contents and outlines the motherboard specifications.

The following topics are included:

- Package List
- SA-5800 Specification
- Safety Precautions

**Experienced users can go to Chapter 3 System Configuration on page 3-1 for a quick start.**

## 2.1 Packing List

If you discover any of the items listed below are damaged or list, please contact your local distributor immediately.

| Item | Q'ty |
|---|---|
| SA-5800 | 1 |
| Quick Reference Guide | 1 |
| Manual / Driver DVD | 1 |

## 2.2 System Specifications

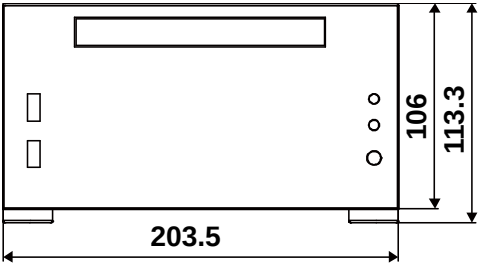
| | |
|---|---|
| **System** | |
| CPU Support | ➢ Intel® 6th / 7th Gen. Core™ i7/i5/i3/ Intel Pentium® / Celeron® processor (up to 35W) (LGA1151) |
| Chipset | ➢ Intel® H110 / Q170 |
| Memory Support | ➢ 2 x DDR4 SO-DIMM sockets (up to 32GB) |
| Power Supply | ➢ 3 pins terminal block DC In 12V |
| Expansion Slots | ➢ 1 x PCIe (x16) slot<br>➢ 1 x M.2 (2242-D2-M) |
| Drive Bay | ➢ 1 x 2.5" HDD / SSD (SATA 3.0) |
| TPM | ➢ 1 x TPM 2.0 module (on board for Q170 SKU) |
| Operating System | ➢ Win 10 IoT LTSB 2016 / Win 8.1 / Win 7 |
| System Weight | ➢ 4.2 kg |
| Dimensions (WxHxD) | ➢ 203 x 106 x 215mm |
| Certificate | ➢ FCC / CE |
| **I/O Ports** | |
| Display | ➢ 1 x VGA<br>➢ 1 x DP |
| USB | ➢ 4 x USB 3.0<br>➢ 2 x USB 2.0 |
| Audio | ➢ Line In, Line Out, Mic In |
| LAN | ➢ 2 x GbE LANs, Wake-on-LAN, PXE<br>➢ **LAN1:** Intel® I219 LM<br>➢ **LAN2:** Intel® I211 AT |
| Serial Ports | ➢ COM1 for RS-232/422/485 selectable by jumper<br>➢ COM2 for RS-232<br>➢ COM1/COM2 supports +5V / +12V / RI jumper selectable |
| DIO Port | ➢ 1 x DIO ( 8 in / 8 out) (optional) |
| **Environment** | |
| Operating Temperature | ➢ 0°C ~ 40°C (32°F~ 104°F) |
| Storage Temperature | ➢ -20°C ~ 80°C (-4°F~ 176°F) |
| Humidity | ➢ 5%~ 90% |

**Note:** Intel 7th generation CPU is NOT compatible with Win 7 / Win 8.1.

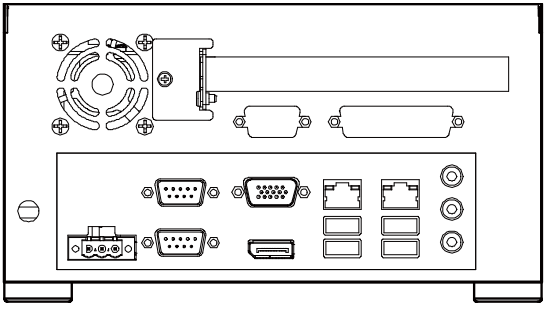
## 2.3 System Overview

Unit: mm

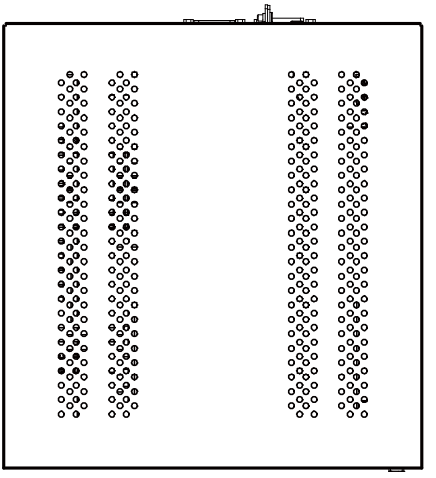
### 2.3.1 Front View



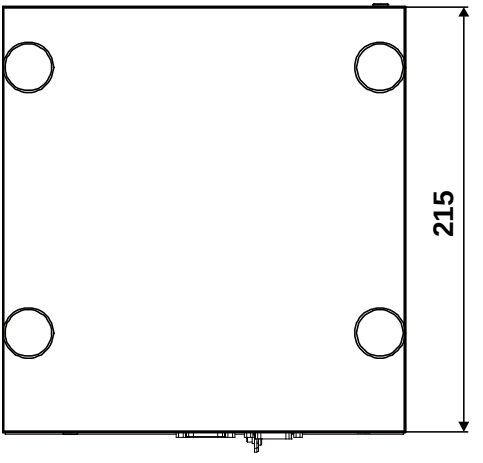

### 2.3.2 Rear View



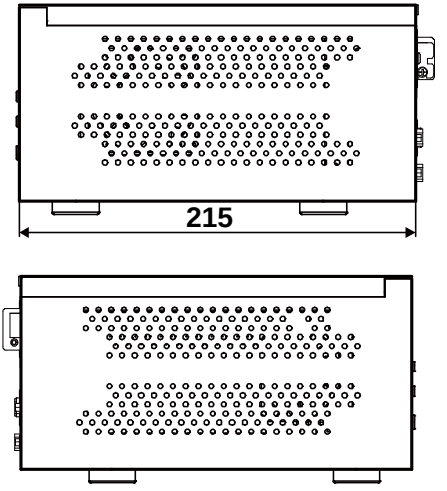
### 2.3.3 Top View



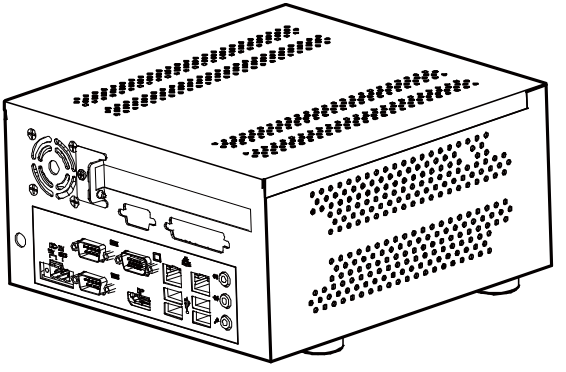
### 2.3.4 Bottom View



### 2.3.5 Side View




### 2.3.6 Quarter View



## 2.4 Safety Precautions

Before operating this system, read the following information carefully to protect your system from damages, and extend the life cycle of the system.

1. Check the Line Voltage
    - The operating voltage for power input should be 12V DC; otherwise, the system may be damaged.

2. Environmental Conditions
    - Place your SA-5800 on a sturdy, level surface. Be sure to allow enough space around the system to have easy access needs.
    - Avoid installing your SA-5800 system in extremely hot or cold places.
    - Avoid direct sunlight exposure for a long period of time (for example, in a closed car in summer time. Also avoid the system from any heating device.). Or do not use SA-5800 when it has been left outdoors in a cold winter day.
    - Avoid moving the system rapidly from a hot place to a cold place, and vice versa, because condensation may occur inside the system.
    - Protect your SA-5800 from strong vibrations which may cause hard disk failure.
    - Do not place the system too close to any radio-active device. Radio-active device may cause signal interference.
    - Always shut down the operating system before turning off the power.
3. Handling
    - Avoid placing heavy objects on the top of the system.
    - Do not turn the system upside down. This may cause the hard drive to malfunction.
    - Do not allow any objects to fall into this device.
    - If water or other liquid spills into the device, unplug the power cord immediately.
4. Good Care
    - When the outside case gets stained, remove the stains using neutral washing agent with a dry cloth.
    - Never use strong agents such as benzene and thinner to clean the surface of the case.
    - If heavy stains are present, moisten a cloth with diluted neutral washing agent or alcohol and then wipe thoroughly with a dry cloth.
    - If dust is accumulated on the case surface, remove it by using a special vacuum cleaner for computers.

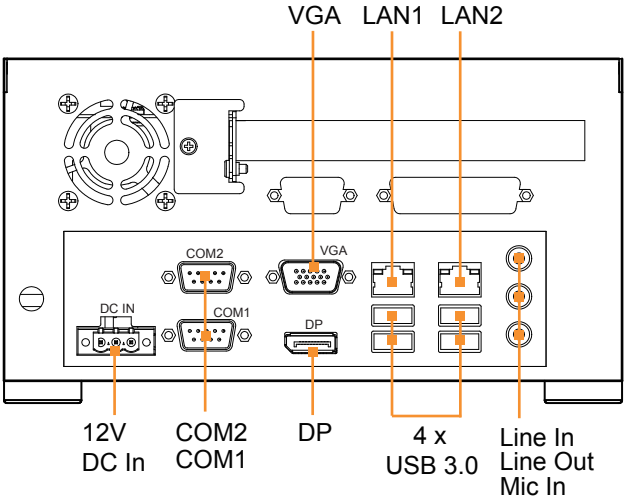
# 3 System Configuration

This chapter contains helpful information about the rear I/O ports diagram, and jumper & connector settings, and component locations for the main board.

The following topics are included:

- Rear I/O Ports Diagram
- Main Board Jumper Settings and Component Locations
- How to Set Jumpers
- Setting Main Board Connectors and Jumpers

## 3.1 Rear I/O Ports Diagram



## 3.2 JUMPER & CONNECTOR QUICK REFERENCE TABLE

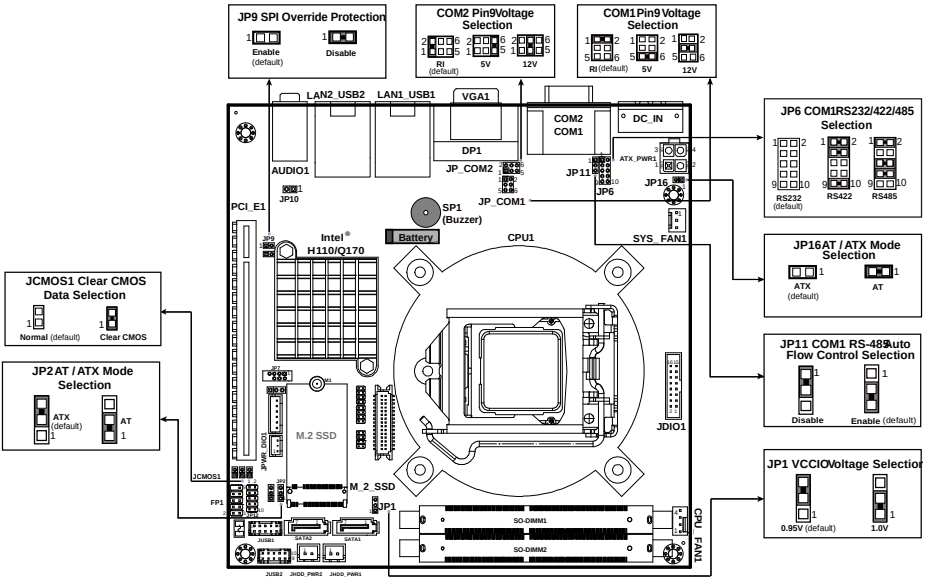
| JUMPER Description | NAME |
|---|---|
| Clear CMOS Data Selection | JCMOS1 |
| COM1 Pin9 RI/5V/12V Selection | JP_COM1 |
| COM2 Pin9 RI/5V/12V Selection | JP_COM2 |
| VCCIO Voltage Selection | JP1 |
| AT / ATX Mode Selection | JP2 & JP16 |
| COM1 RS-232/422/485 Selection | JP6 |
| SPI Override Protection Selection | JP9 |
| COM1 RS-485 Auto Flow Selection | JP11 |

| CONNECTOR Description | NAME |
|---|---|
| Dual COM Ports | COM1, COM2 |
| 2 x LAN Ports and 4 x USB 3.0 Ports | LAN1_USB1, LAN2_USB2 |
| Internal USB 2.0 Connectors | JUSB1, JUSB2 |
| VGA Port | VGA1 |
| DisplayPort (DP) | DP1 |
| DC IN 3 Pins Terminal Block (12V) | DC_IN |
| HD Audio Connector | AUDIO1 |
| Digital Input / Output Connector | JDIO1 |
| Front Panel Connector | FP1 |
| System Fan Connector | SYS_FAN1 |
| CPU Fan Connector | CPU_FAN1 |
| M.2 SSD Connector | M_2_SSD |
| PCI Express Slot (PCIe (x16)) | PCI_E1 |
| SATA 3.0 Connectors | SATA1, SATA2 |
| HDD Power Connectors | JHDD_PWR1, JHDD_PWR2 |
| ATX Power Input Connector | ATX_PWR1 |

| CONNECTOR Description | NAME |
|---|---|
| Case Open Detection Connector (option) | JP10 |
| Low Pin Count (LPC) Connector | JP12 |
| DIO Port Power Connector | JPWR_DIO1 |
| DDR4 SO-DIMM memory socket 1 | SO-DIMM1 |
| DDR4 SO-DIMM memory socket 2 | SO-DIMM2 |

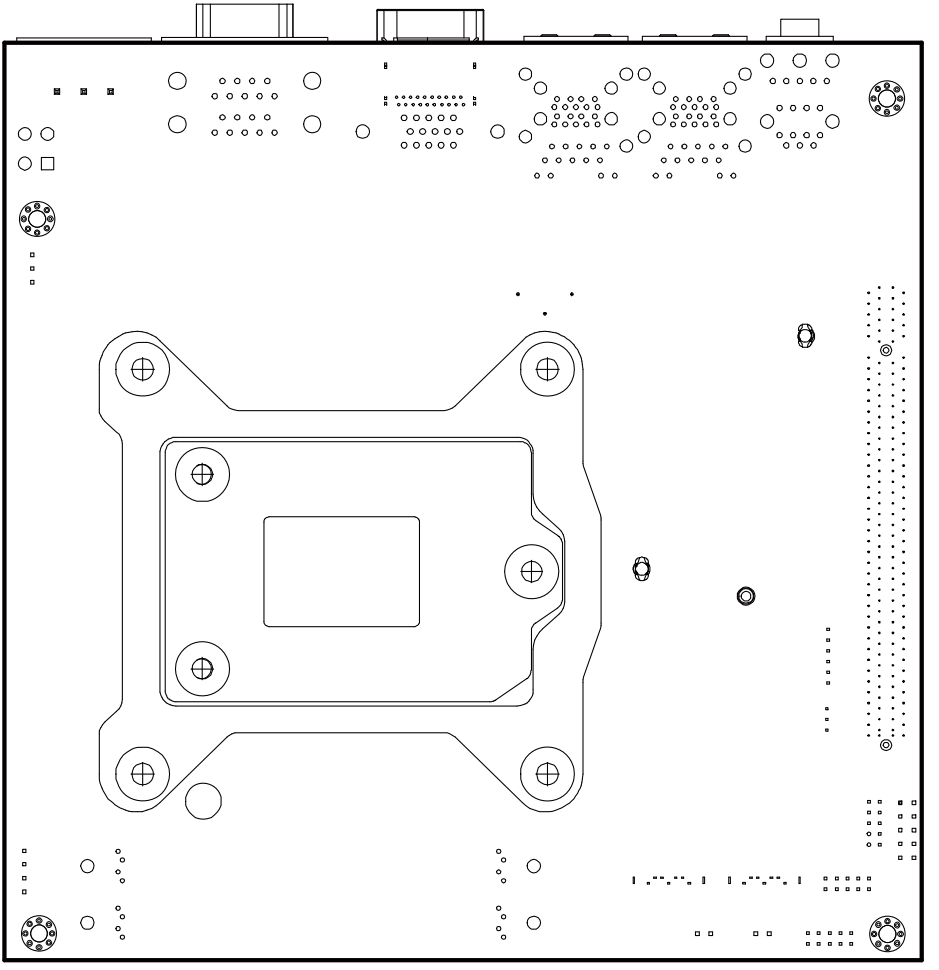
## 3.3 COMPONENT LOCATIONS

### 3.3.1 Top View and Jumper Settings of SA-5800




| | |
|---|---|
|  | **WARNING:** Always disconnect the power cord when you are working with connectors and jumpers on the main board. Make sure both the system and peripheral devices are turned OFF as sudden surge of power could damage sensitive components. Make sure SA-5800 is properly grounded. |
|  | **CAUTION:** Observe precautions while handling electrostatic sensitive components. Make sure to ground yourself to prevent static charge while you are working on the connectors and jumpers. Use a grounding wrist strap and place all electronic components in any static-shielded devices. |
|  | **CAUTION:** Always touch the motherboard components by the edges. Never touch components such as a processor by its pins. Take special cares while you are holding electronic circuit boards by the edges only. Do not touch the main board components. |

### 3.3.2 Bottom View of SA-5800

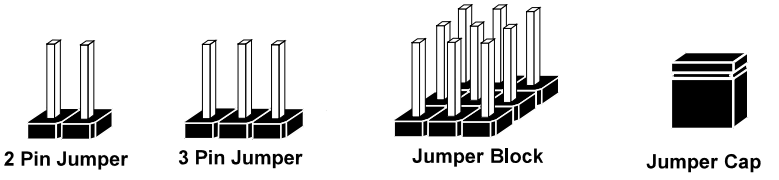


## 3.4 HOW TO SET JUMPERS

You can configure your board by setting jumpers. Jumper is consists of two or three metal pins with a plastic base mounted on the card, and by using a small plastic "cap", Also known as the jumper cap (with a metal contact inside), you are able to connect the pins. So you can set-up your hardware configuration by "open" or "close" pins.

The jumper can be combined into sets that called jumper blocks. When the jumpers are all in the block, you have to put them together to set up the hardware configuration. The figure below shows how this looks like.

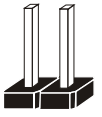
## JUMPERS AND CAPS



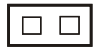

If a jumper has three pins (for examples, labelled PIN1, PIN2, and PIN3), you can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below shows what the manual diagrams look and what they represent.

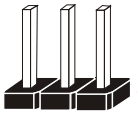
## Jumper Diagrams

**Jumper Cap looks like this**



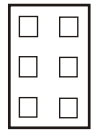
**2 pin Jumper looks like this**





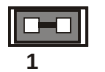
**3 pin Jumper looks like this**

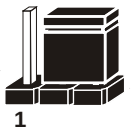
**Jumper Block looks like this**



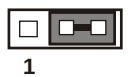
## Jumper Settings


**2 pin Jumper close(enabled) Looks like this**



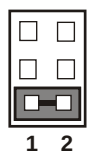




**3 pin Jumper 2-3 pin close(enabled) Looks like this**





**Jumper Block 1-2 pin close(enabled) Looks like this**

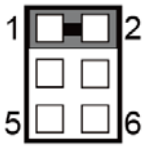
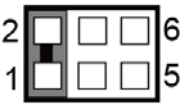
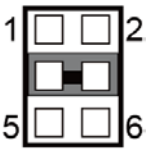
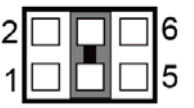
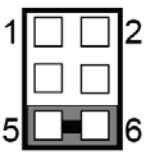
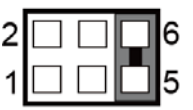


## 3.5 Setting Connectors and Jumpers

### 3.5.1 COM1, COM2 Port Pin9 Definition Selection Guide

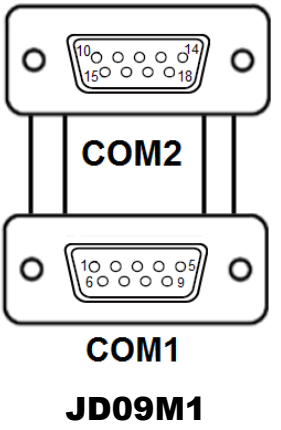
**Jumper Location: JP_COM1 & JP_COM2**

**Description:** COM1, COM2 Port pin9 RI/+5V/+12V Selection

| SELECTION | JUMPER SETTING | JUMPER ILLUSTRATION | |
|---|---|---|---|
| | | JP_COM1 | JP_COM2 |
| **RI** | ***1-2 (Default Setting)*** |  **JP_COM1** |  **JP_COM2** |
| 12V | 3-4 |  **JP_COM1** |  **JP_COM2** |
| 5V | 5-6 |  **JP_COM1** |  **JP_COM2** |

### 3.5.2 Dual COM Ports

COM1(RS-232/422/485) Connector Pin Assignment:




| PIN | ASSIGNMENT | | |
|---|---|---|---|
| | RS-232 | RS-422 | RS-485 |
| 1 | DCD# | TX- | RS-485- |
| 2 | RX | TX+ | RS-485+ |
| 3 | TX | RX+ | NC |
| 4 | DTR# | RX- | NC |
| 5 | GND | GND | GND |
| 6 | DSR# | NC | NC |
| 7 | RTS# | NC | NC |
| 8 | CTS# | NC | NC |
| 9 | RI# | NC | NC |

**Notes:**

1. COM1 is selectable as RS-232, RS-422, RS-485 by JP6.
2. Default setting is RS-232. Please see "**COM1 RS-232/422/485 Selection"** section for details.
3. COM1 Pin 9 is selectable for RI, +5V or +12V by jumper setting. Default setting is RI. Please see "**COM1, COM2 Port Pin9 Definition Selection Guide**" section for selection details.

COM2(RS-232) co-lay with COM1 port and is stacked over COM1 port
COM2 Connector Pin Assignment:

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 10 | DCD# | 15 | DSR# |
| 11 | RX | 16 | RTS# |
| 12 | TX | 17 | CTS# |
| 13 | DTR# | 18 | RI# |
| 14 | GND | - | - |

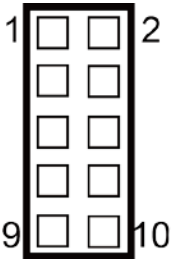
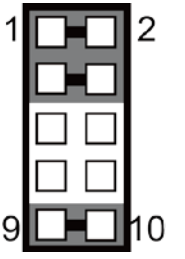
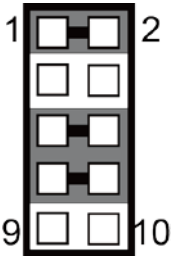
**Note:**

1. COM2 Pin 9 is selectable for RI, +5V or +12V by jumper setting. Default setting is RI. Please see "**COM1, COM2 Port Pin9 Definition Selection Guide**" section for selection details.

### 3.5.3 COM1 RS-232/422/485 Selection

**Jumper Location: JP6**

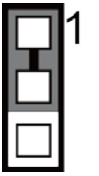
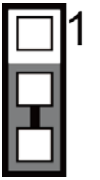
**Description:** COM1 RS-232/422/485 Selection

| SELECTION | JUMPER SETTINGS | JUMPER ILLUSTRATION |
|---|---|---|
| **RS-232** | ***Open*** ***(Default Setting)*** |   **JP6** |
| RS-422 | 1-2, 3-4, 9-10 |   **JP6** |
| RS-485 | 1-2, 5-6, 7-8 |   **JP6** |

### 3.5.4 COM1 RS-485 Auto Flow Selection

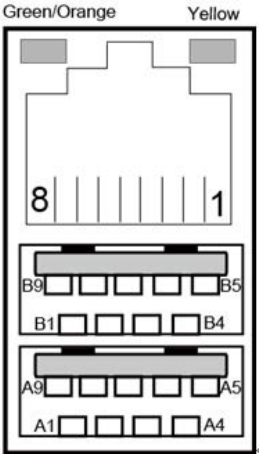
**Jumper Location: JP11**

**Description:** COM1 RS-485 Auto Flow Selection

| SELECTION | JUMPER SETTINGS | JUMPER ILLUSTRATION |
|---|---|---|
| Disable | 1-2 |  **JP11** |
| **Enable** | ***2-3*** ***(Default Setting)*** |  **JP11** |

### 3.5.5 LAN and USB 3.0 Ports

**Port Location: LAN1_USB1** (rear I/O)
**Description:** LAN1 & Dual USB 3.0 Ports




**LAN1_USB1**

**LAN1 signals:**

| PIN | ASSIGNMENT |
|---|---|
| 1 | MDI_0P |
| 2 | MDI_0N |
| 3 | MDI_1P |
| 4 | MDI_2P |
| 5 | MDI_2N |
| 6 | MDI_1N |
| 7 | MDI_3P |
| 8 | MDI_3N |

**LAN LED Indicator**:

**Left Side LED**

| | |
|---|---|
| Green Color On | 10/100Mbps LAN Speed Indicator |
| Orange Color On | Giga LAN Speed Indicator |
| Off | No LAN switch/hub connected |

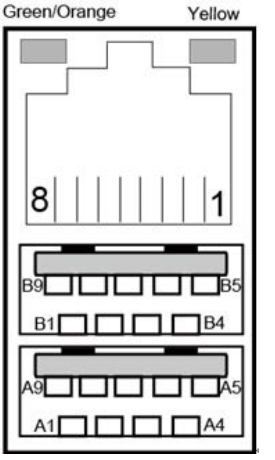
**Right Side LED**

| | |
|---|---|
| Yellow Color Blinking | LAN Message Active |
| Off | No LAN Message Active |

**USB 3.0 signals:**

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| A1 | +5V | B1 | +5V |
| A2 | USBP1N | B2 | USBP2N |
| A3 | USBP1P | B3 | USBP2P |
| A4 | GND | B4 | GND |
| A5 | RX1_DN | B5 | RX2_DN |
| A6 | RX1_DP | B6 | RX2_DP |
| A7 | GND | B7 | GND |
| A8 | TX1_DN | B8 | TX2_DN |
| A9 | TX1_DP | B9 | TX2_DP |

**Port Location: LAN2_USB2** (rear I/O)
**Description:** LAN2 Port & Dual USB 3.0 Ports




**LAN2_USB2**

**LAN2 signals:**

| PIN | ASSIGNMENT |
|---|---|
| 1 | MDI_0P |
| 2 | MDI_0N |
| 3 | MDI_1P |
| 4 | MDI_2P |
| 5 | MDI_2N |
| 6 | MDI_1N |
| 7 | MDI_3P |
| 8 | MDI_3N |

**LAN LED Indicator**:
**Left Side LED**

| | |
|---|---|
| Green Color On | 10/100Mbps LAN Speed Indicator |
| Orange Color On | Giga LAN Speed Indicator |
| Off | No LAN switch/hub connected |

**Right Side LED**

| | |
|---|---|
| Yellow Color Blinking | LAN Message Active |
| Off | No LAN Message Active |

**USB 3.0 signals:**

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| A1 | +5V | B1 | +5V |
| A2 | USBP3N | B2 | USBP4N |
| A3 | USBP3P | B3 | USBP4P |
| A4 | GND | B4 | GND |
| A5 | RX3_DN | B5 | RX4_DN |
| A6 | RX3_DP | B6 | RX4_DP |
| A7 | GND | B7 | GND |
| A8 | TX3_DN | B8 | TX4_DN |
| A9 | TX3_DP | B9 | TX4_DP |

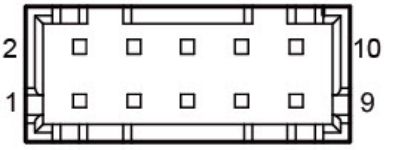
### 3.5.6 Internal USB 2.0 Connectors

**Connector Location: JUSB1**

**Description:** Internal USB 2.0 Connector

**USB 2.0 connector signals:**

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | +5V | 2 | +5V |
| 3 | USB2_P5_DN | 4 | USB2_P6_DN |
| 5 | USB2_P5_DP | 6 | USB2_P6_DP |
| 7 | GND | 8 | GND |
| 9 | NC | 10 | GND |



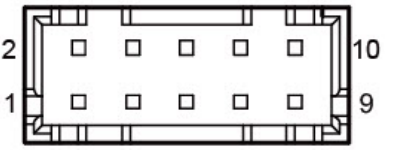

**JUSB1**

**Connector Location: JUSB2**

**Description:** Internal USB 2.0 Connector

**USB 2.0 connector signals:**

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | +5V | 2 | +5V |
| 3 | USB2_P7_DN | 4 | USB2_P8_DN |
| 5 | USB2_P7_DP | 6 | USB2_P8_DP |
| 7 | GND | 8 | GND |
| 9 | NC | 10 | GND |

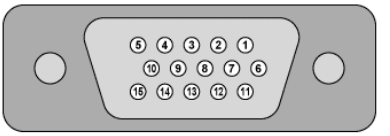



**JUSB2**

### 3.5.7 VGA Port

**Port Location: VGA1** (rear I/O)
**Description:** VGA (Video Graphics Array) Connector, D-Sub 15-pin (rear I/O)
The pin assignments are as follows:

| PIN | ASSIGNMENT |
|---|---|
| 1 | RED |
| 2 | GREEN |
| 3 | BLUE |
| 4 | NC |
| 5 | GND |
| 6 | NC |
| 7 | GND |
| 8 | GND |
| 9 | +5V |
| 10 | GND |
| 11 | NC |
| 12 | VGA_DDCDATA |
| 13 | HSYNC |
| 14 | VSYNC |
| 15 | VGA_DDC_CLK |



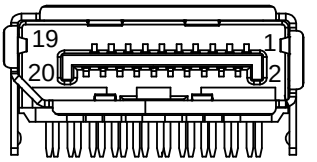

**VGA1**

### 3.5.8 DisplayPort (DP) Connector

**Port Location: DP1** (rear I/O)

**Description:** DisplayPort Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | DP_DATA0+ | 2 | GND |
| 3 | DP_DATA0- | 4 | DP_DATA1+ |
| 5 | GND | 6 | DP_DATA1- |
| 7 | DP_ DATA2+ | 8 | GND |
| 9 | DP_ DATA2- | 10 | DP_DATA3+ |
| 11 | GND | 12 | DP_DATA3- |
| 13 | DP_AUX_ENJ | 14 | GND |
| 15 | DP_ AUX+ | 16 | GND |
| 17 | DP_ AUX- | 18 | HPD |
| 19 | GND | 20 | DP_VCC3_3 |



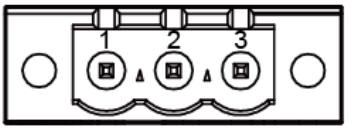

**DP1**

### 3.5.9 DC IN 3 Pins Terminal Block (12V)

**Port Location: DC_IN** (rear I/O)

**Description:** DC IN 3 Pins Terminal Block (12V)

| PIN | ASSIGNMENT |
|---|---|
| 1 | +12V |
| 2 | +12V |
| 3 | GND |




**DC_IN**

### 3.5.10 HD Audio Connector

**Port Location: AUDIO1** (rear I/O)
**Description:** HD Audio Connector for Line In/Line Out/Mic In.

**Line In:**

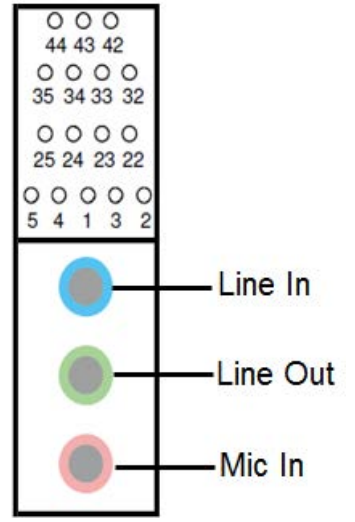
| PIN | ASSIGNMENT |
|---|---|
| 42 | NC |
| 43 | NC |
| 44 | NC |
| 32 | HD_LINE-IN-L |
| 33 | GND |
| 34 | GND |
| 35 | HD_LINE-IN-R |

**Line Out:**

| PIN | ASSIGNMENT |
|---|---|
| 22 | LINE-OUT-L |
| 23 | GND |
| 24 | GND |
| 25 | LINE-OUT-R |

**Mic In:**

| PIN | ASSIGNMENT |
|---|---|
| 2 | HD_MIC1-L_L |
| 3 | GND |
| 1 | GND |
| 4 | GND |
| 5 | HD_MIC1-R_L |



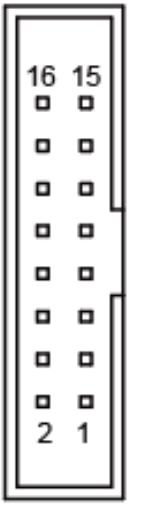

**AUDIO1**

### 3.5.11 Digital Input / Output Connector

**Connector Location: JDIO1**

**Description:** Digital Input / Output Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | DIN_0 | 2 | DOUT_0 |
| 3 | DIN_1 | 4 | DOUT_1 |
| 5 | DIN_2 | 6 | DOUT_2 |
| 7 | DIN_3 | 8 | DOUT_3 |
| 9 | DIN_4 | 10 | DOUT_4 |
| 11 | DIN_5 | 12 | DOUT_5 |
| 13 | DIN_6 | 14 | DOUT_6 |
| 15 | DIN_7 | 16 | DOUT_7 |



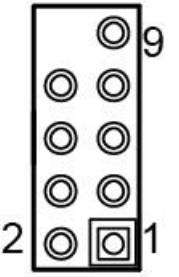

**JDIO1**

### 3.5.12 Front Panel Connector

**Connector Location: FP1**

**Description:** Front Panel Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | HDD+ | 2 | PWR+ |
| 3 | HDD- | 4 | PWR- |
| 5 | GND | 6 | Power Button |
| 7 | Reset Button | 8 | GND |
| 9 | +5V | - | - |

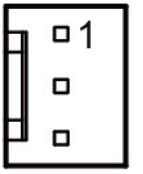



**FP1**

### 3.5.13 System Fan Connector

**Connector Location: SYS_FAN1**
**Description:** System Fan Connector
System Fan Connector signals:

| PIN | ASSIGNMENT |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | NC |

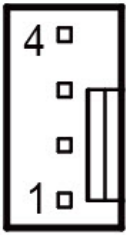



**SYS_FAN1**

### 3.5.14 CPU Fan Connector

**Connector Location: CPU_FAN1**
**Description:** CPU Fan Connector
CPU Fan Connector signals:

| PIN | ASSIGNMENT |
|---|---|
| 1 | GND |
| 2 | +12V |
| 3 | TAC |
| 4 | CTL |




**CPU_FAN1**

**Notes:**
1. CPU Fan speed mode can be set by BIOS.
2. Default BIOS setting is “Auto Duty-Cycle Mode”. Please see **Chapter 5** for more details.

### 3.5.15 M.2 SSD Connector

**Connector Location: M_2_SSD**

**Description:** M.2 SSD Connector

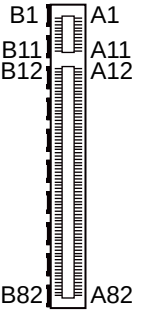
M.2 SSD Connector signals:

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | GND | 2 | +3.3V |
| 3 | GND | 4 | +3.3V |
| 5 | NC | 6 | NC |
| 7 | NC | 8 | NC |
| 9 | NC | 10 | NC |
| 11 | NC | 12 | NC |
| 13 | NC | 14 | NC |
| 15 | NC | 16 | NC |
| 17 | NC | 18 | NC |
| 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 | NC |
| 39 | GND | 40 | NC |
| 41 | SATA_RX_P | 42 | NC |
| 43 | SATA_RX_N | 44 | NC |
| 45 | GND | 46 | NC |
| 47 | SATA_TX_N | 48 | NC |
| 49 | SATA_TX_P | 50 | NC |
| 51 | GND | 52 | NC |
| 53 | NC | 54 | NC |
| 55 | NC | 56 | NC |
| 57 | GND | 58 | NC |
| 59 | KEY | 60 | KEY |
| 61 | KEY | 62 | KEY |
| 63 | KEY | 64 | KEY |
| 65 | KEY | 66 | KEY |
| 67 | NC | 68 | NC |
| 69 | GND | 70 | +3.3V |
| 71 | GND | 72 | +3.3V |
| 73 | GND | 74 | +3.3V |
| 75 | GND | - | - |


**M_2_SSD**

### 3.5.16 PCI Express Slot

**Connector Location: PCI_E1** (PCIE x16)
**Description:** PCI Express Slot



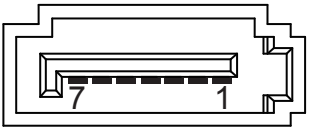

**PCI_E1**

| PIN | ASSIGNMENT | PIN | ASSIGNMENT | PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|---|---|---|---|
| B2 | + 12V | B1 | + 12V | A2 | + 12V | A1 | PRSNT#1 |
| B4 | GND | B3 | + 12V | A4 | GND | A3 | + 12V |
| B6 | SMB_DATA | B5 | SMB_CLK | A6 | NC | A5 | NC |
| B8 | + 3.3V | B7 | GND | A8 | NC | A7 | NC |
| B10 | + 3.3V_AUX | B9 | NC | A10 | + 3.3V | A9 | + 3.3V |
| - | - | B11 | WAKE# | - | - | A11 | PERST# |
| B12 | RSVD | B13 | GND | A12 | GND | A13 | REFCLK+ |
| B14 | HSOP0 | B15 | HSON0 | A14 | REFCLK- | A15 | GND |
| B16 | GND | B17 | PRSNT#2 | A16 | HSIP0 | A17 | HSIN0 |
| B18 | GND | B19 | HSOP1 | A18 | GND | A19 | RSVD |
| B20 | HSON1 | B21 | GND | A20 | GND | A21 | HSIP1 |
| B22 | GND | B23 | HSOP2 | A22 | HSIN1 | A23 | GND |
| B24 | HSON2 | B25 | GND | A24 | GND | A25 | HSIP2 |
| B26 | GND | B27 | HSOP3 | A26 | HSIN2 | A27 | GND |
| B28 | HSON3 | B29 | GND | A28 | GND | A29 | HSIP3 |
| B30 | RSVD | B31 | PRSNT#2 | A30 | HSIN3 | A31 | GND |
| B32 | GND | B33 | HSOP4 | A32 | RSVD | A33 | RSVD |
| B34 | HSON4 | B35 | GND | A34 | GND | A35 | HSIP4 |
| B36 | GND | B37 | HSOP5 | A36 | HSIN4 | A37 | GND |
| B38 | HSON5 | B39 | GND | A38 | GND | A39 | HSIP5 |
| B40 | GND | B41 | HSOP6 | A40 | HSIN5 | A41 | GND |
| B42 | HSON6 | B43 | GND | A42 | GND | A43 | HSIP6 |
| B44 | GND | B45 | HSOP7 | A44 | HSIN6 | A45 | GND |
| B46 | HSON7 | B47 | GND | A46 | GND | A47 | HSIP7 |
| B48 | PRSNT#2 | B49 | GND | A48 | HSIN7 | A49 | GND |
| B50 | HSOP8 | B51 | HSON8 | A50 | RSVD | A51 | GND |
| B52 | GND | B53 | GND | A52 | HSIP8 | A53 | HSIN8 |
| B54 | HSOP9 | B55 | HSON9 | A54 | GND | A55 | GND |
| B56 | GND | B57 | GND | A56 | HSIP9 | A57 | HSIN9 |

| PIN | ASSIGNMENT | PIN | ASSIGNMENT | PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|---|---|---|---|
| B58 | HSOP10 | B59 | HSON10 | A58 | GND | A59 | GND |
| B60 | GND | B61 | GND | A60 | HSIP10 | A61 | HSIN10 |
| B62 | HSOP11 | B63 | HSON11 | A62 | GND | A63 | GND |
| B64 | GND | B65 | GND | A64 | HSIP11 | A65 | HSIN11 |
| B66 | HSOP12 | B67 | HSON12 | A66 | GND | A67 | GND |
| B68 | GND | B69 | GND | A68 | HSIP12 | A69 | HSIN12 |
| B70 | HSOP13 | B71 | HSON13 | A70 | GND | A71 | GND |
| B72 | GND | B73 | GND | A72 | HSIP13 | A73 | HSIN13 |
| B74 | HSOP14 | B75 | HSON14 | A74 | GND | A75 | GND |
| B76 | GND | B77 | GND | A76 | HSIP14 | A77 | HSIN14 |
| B78 | HSOP15 | B79 | HSON15 | A78 | GND | A79 | GND |
| B80 | GND | B81 | PRSNT#2 | A80 | HSIP15 | A81 | HSIN15 |
| B82 | RSVD | - | - | A82 | GND | - | - |

### 3.5.17 SATA 3.0 Connectors

**Connector Location: SATA1/SATA2**
**Description:** Serial ATA (SATA) 6GB/s Connectors




**SATA1 / SATA2**

**Serial ATA 6GB/s Connector (SATA1/SATA2) signals:**

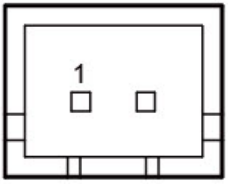
| PIN | ASSIGNMENT |
|---|---|
| 1 | GND |
| 2 | TXPC |
| 3 | TXNC |
| 4 | GND |
| 5 | RXNC |
| 6 | RXPC |
| 7 | GND |

### 3.5.18 HDD Power Connectors

**Connector Location: JHDD_PWR1, JHDD_PWR2**

**Description:** HDD Power Connector 1, HDD Power Connector 2

| PIN | ASSIGNMENT |
|---|---|
| 1 | +5V |
| 2 | GND |



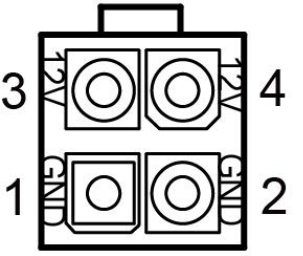

**JHDD_PWR1/**
**JHDD_PWR2**

### 3.5.19 ATX Power Input Connector

**Connector Location: ATX_PWR1**

**Description:** ATX Power Input Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | GND | 3 | +12V |
| 2 | GND | 4 | +12V |

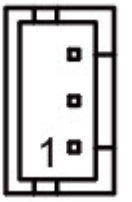



**ATX_PWR1**

### 3.5.20 DIO Port Power Connector

**Connector Location: JPWR_DIO1**
**Description:** DIO Port Power Connector

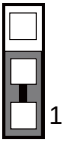
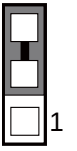
| PIN | ASSIGNMENT |
|---|---|
| 1 | +5V |
| 2 | GND |
| 3 | +12V |



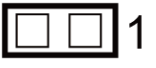

**JPWR_DIO1**

### 3.5.21 AT / ATX Mode Selection

**Jumper Location: JP2**
**Description:** AT / ATX Mode Selection

| SELECTION | JUMPTER SETTING | JUMPER ILLUSTRATION |
|---|---|---|
| AT | 1-2 |  **JP2** |
| **ATX** | ***2-3*** ***(Default Setting)*** |  **JP2** |

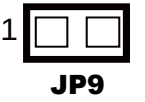
**Jumper Location: JP16**
**Description:** AT / ATX Mode Selection

| SELECTION | JUMPTER SETTING | JUMPER ILLUSTRATION |
|---|---|---|
| AT | Closed |  **JP16** |
| **ATX** | ***Open*** ***(Default Setting)*** |  **JP16** |

### 3.5.22 SPI Override Protection Selection

**Jumper Location: JP9**

**Description:** SPI Override Protection Selection

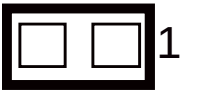
| SELECTION | JUMPER SETTING | JUMPER ILLUSTRATION |
|---|---|---|
| **Enable** | ***Open (Default Setting)*** |  **JP9** |
| Disable | Close |  **JP9** |

### 3.5.23 Case Open Detection Connector (option)

**Connector Location: JP10**

**Description:** Case Open Detection Connector

| PIN | ASSIGNMENT |
|---|---|
| 1 | Caseopen+ |
| 2 | Caseopen- |




**JP10**

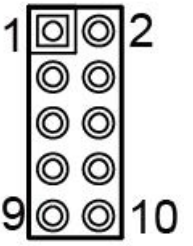
**(option)**

### 3.5.24 Low Pin Count (LPC) Connector

**Connector Location: JP12**

**Description:** Low Pin Count (LPC) Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|---|---|---|---|
| 1 | CLK | 2 | GND |
| 3 | FRAME# | 4 | GND |
| 5 | PLTRST# | 6 | LPC_AD0 |
| 7 | LPC_AD3 | 8 | LPC_AD2 |
| 9 | +3.3V | 10 | LPC_AD1 |

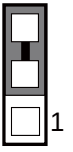
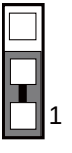



**JP12**

### 3.5.25 VCCIO Voltage Selection

**Jumper Location: JP1**

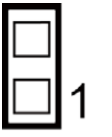
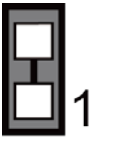
**Description:** VCCIO Voltage Selection

| SELECTION | JUMPER SETTING | JUMPER ILLUSTRATION |
|---|---|---|
| **0.95V** | ***2-3 (Default Setting)*** |   **JP1** |
| 1.0V | 1-2 |   **JP1** |

### 3.5.26 Clear CMOS Data Selection

**Jumper Location: JCMOS1**
**Description:** Clear CMOS Data Selection

**Step 1.** Remove the main power of the PC.
**Step 2.** Close **JCMOS1** (pins 1-2) for 6 seconds by a cap.
**Step 3.** Remove the cap which is just used on **JCMOS1** (1-2), so that **JCMOS1** returns to "OPEN".
**Step 4.** Power on the PC and the PC will then auto-reboot for once in order to set SoC's register.
**Step 5.** Done!

| SELECTION | JUMPER SETTINGS | JUMPER ILLUSTRATION |
|---|---|---|
| **Normal** | ***Open*** ***(Default Setting)*** |   **JCMOS1** |
| Clear CMOS Data | Close |   **JCMOS1** |

**Note:** Please make sure the main power is off before you clear CMOS.

# 4 Software Utilities

This chapter provides the detailed information that guides users to install driver utilities for the system. The following topics are included:

- Installing Intel® Chipset Software Installation Utility
- Installing Intel® Management Engine Components Installer
- Installing USB 3.0 eXtensible Host Controller Utility
- Installing LAN Driver Utility
- Installing Graphics Driver Utility
- Installing Sound Driver Utility
- Installing Microsoft Hotfix kb3211320 and kb3213986 Driver Utility

## 4.1 Introduction

Enclosed with the SA-5800 Series package is our driver utilities contained in a DVD-ROM disk. Refer to the following table for driver locations:

| Filename (Assume that DVD-ROM drive is D :) | Purpose | OS | | | |
|---|---|---|---|---|---|
| | | Shell | Win7 | Win8.1 | Win10 |
| D:\Driver\Flash BIOS | For BIOS update utility | ✓ | X | X | X |
| D:\ SA-5800_V1.0\Driver\ Platform\Chipset | Intel® Chipset Device Software installer | X | ✓ | ✓ | ✓ |
| D:\SA-5800_V1.0\Driver\ Platform\Graphics\GFX_win32 _15.45.20.4727 (32bit)<br><br>D:\SA-5800_V1.0\Driver\Platfor m\Graphics\GFX_win64_15.45. 20.4727 (64bit) | Intel HD Graphics Family For VGA driver installation | X | ✓ | ✓ | ✓ |
| D:\SA-5800_V1.0\Driver\ Platform\Sound | Realtek ALC888S-VD2-GR HD Audio codec System Software | X | ✓ | ✓ | ✓ |
| D:\SA-5800_V1.0\Driver\ Platform\ME\Microsoft .NET Framework4.5 (for Win7) | Microsoft .NET Framework4.5 | X | ✓ | X | X |
| D:\SA-5800_V1.0\Driver\ Platform\ME\ ME_Consumer_11.8.50.3399 (H110)<br><br>D:\SA-5800_V1.0\Driver\ Platform\ME\ ME_Corporate_11.8.50.3399 (Q170) | Intel(R) Management Engine Components installer | X | ✓ | ✓ | ✓ |
| D:\ SA-5800_V1.0\Driver\ Platform\LAN | Intel I219-LM & Intel I211-AT For LAN Driver installation | X | ✓ | ✓ | ✓ |
| D:\ SA-5800_V1.0\Driver\ Platform\USB3\Windows 7 32-bit.64-bit\Intel(R)_USB_3.0_ eXtensible_Host_Controller_ Driver_4.0.0.36 | Intel(R) USB 3.0 eXtensible Host Controller | X | ✓ | X | X |

| Filename (Assume that DVD-ROM drive is D :) | Purpose | OS | | | |
|---|---|---|---|---|---|
| | | Shell | Win7 | Win8.1 | Win10 |
| D:\SA-5800_V1.0\Driver\ Platform\KMDF\Win7 (32bit)<br><br>D:\SA-5800_V1.0\Driver\ Platform\KMDF\Win7 (64bit) | Kernel-Mode Driver Framework | X | ✓ | X | X |
| D:\SA-5800_V1.0\Driver\ Platform\Hotfix (for Win 8.1 and Win 10) | Microsoft Hotfix kb3211320 and kb3213986 for Windows10 critical security update | X | X | ✓ | ✓ |

**X : Not support**

**✓: Support**

**Note:** Install the driver utilities immediately after the OS installation is completed.

## 4.2 Installing Intel® Chipset Software Installation Utility

### Introduction

The Intel® Chipset Software Installation Utility installs the Windows *.INF files to the target system. These files outline to the operating system how to configure the Intel chipset components in order to ensure that the following functions work properly:

- Core PCI and ISAPNP Services
- PCIe Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

### Intel® Chipset Software Installation Utility

The utility pack is to be installed only for Windows® 7/8.1/10 series, and it should be installed immediately after the OS installation is finished. Please follow the steps below:

1. Connect the USB DVD-ROM device to SA-5800 and insert the driver disk.
2. Enter the Chipset folder where the Chipset driver is located (depending on your OS platform).
3. Click **SetupChipset.exe** file for driver installation.
4. Follow the on-screen instructions to install the driver.
5. Once the installation is completed, shut down the system and restart SA-5800 for the changes to take effect.

## 4.3 Intel® Management Engine Components Installer Installation

For Windows 7 32/64bit only. Pre-install Microsoft's Kernel-Mode Driver Framework (KMDF) version 1.11 before you install the Intel® Management Engine Components Installer (ME) in order to avoid errors in Device Manager.

**Installation Instructions for Kernel-Mode Driver Framework (KMDF)**

To install the Kernel-Mode Driver Framework (KMDF), follow the steps below:

1. Insert the driver disk into a DVD-ROM device.
2. **(For Windows 7 32/64bit only)**
   Enter the **KMDF > Win7(32/64bit)** folder where the installation driver file is located.
3. **(For Windows 7 32/64bit only)**
   Click the **kmdf-1.11-Win-6.1-x86 / kmdf-1.11-Win-6.1-x64** file for driver installation.

**Installation Instructions for Intel® Management Engine Components Installer**

1. Connect the USB DVD-ROM device to SA-5800 and insert the driver disk.
2. Enter the **ME** folder where the driver is located.
3. Enter **ME_Consumer_11.8.50.3399(H110)** folder for H110 SKU or **ME_Corporate_11.8.50.3399(Q170)** folder for Q170 SKU.
4. Click **SetupME.exe** file for ME driver installation.

***5*** Follow the on-screen instructions to complete the installation.

***6*** Once the installation is completed, shut down the system and restart SA-5800 for the changes to take effect.

## 4.4 Intel® USB 3.0 eXtensible Host Controller Utility

Intel® USB 3.0 eXtensible Host Controller Driver supports the following Intel® Chipsets/Processors:

- Intel® 8 Series/C220 series Chipset Family
- Intel® 4th Generation Core™ Processors
- Intel® C610 series Chipset Family
- Intel® 9 Series Chipset Family
- Intel® Pentium® Processor or Intel® Celeron® Processor N- & J-Series
- Intel® 5th generation Intel® Core™ Processors
- Intel® Core™ M Processor
- Intel® 6th generation Intel® Core™ processors
- Intel® 100 Series Chipset Family

To install the utility, follow the steps below:

***1*** Insert the driver disk into a DVD-ROM device.

***2*** (For Windows 7 32/64bit only) Go to the directory where the driver is located.

***3*** Run the application with the administrative privilege.

## 4.5 Installing Graphics Driver Utility

The graphics interface embedded in SA-5800 can support a wide range of display types. You can have dual displays via VGA and DP interfaces and make the system work simultaneously.

To install the Graphics driver utility, follow the steps below:

1. Connect the USB DVD-ROM device to SA-5800 and insert the driver disk.
2. Enter the **Graphics** folder where the driver is located (depending on your OS platform).
3. Click the **Setup.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart SA-5800 for the changes to take effect.

## 4.6 Installing LAN Driver Utility

Enhanced with LAN function, SA-5800 supports various network adapters. To install the LAN Driver, follow the steps below:

1. Connect the USB DVD-ROM device to SA-5800 and insert the driver disk.
2. Enter the **LAN** folder where the driver is located (depending on your OS platform).
3. Click **Autorun.exe** file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart SA-5800 for the changes to take effect.

**For more details on the installation procedure, refer to the Readme.txt file that you can find on LAN Driver Utility.**

## 4.7 Installing Sound Driver Utility

The sound function enhanced in this system is fully compatible with Windows® 7/8.1/10 series.

To install the Sound Driver, follow the steps below:

1. Connect the USB DVD-ROM device to SA-5800 and insert the driver disk.
2. Open the **Sound** folder where the driver is located.
3. Click the Sound driver file for driver installation.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart SA-5800 for the changes to take effect.

## 4.8 Installing Microsoft Hotfix kb3211320 and kb3213986 Driver Utility

To install the Hotfix driver utility, follow the steps below:

1. Connect the USB DVD-ROM device to SA-5800 and insert the driver disk.
2. Enter the **Hotfix** folder where the driver is located.
3. Click the **windows10.0-kb3211320-x64** and **windows10.0-kb3213986-x64** files for critical security update.
4. Follow the on-screen instructions to complete the installation.
5. Once the installation is completed, shut down the system and restart SA-5800 for the changes to take effect.

# 5 BIOS SETUP

This chapter guides users how to configure the basic system configurations via the BIOS Setup Utilities. The information of the system configuration is saved in battery-backed CMOS RAM and BIOS NVRAM so that the Setup information is retained when the system is powered off. The BIOS Setup Utilities consist of the following menu items:

- Accessing Setup Utilities
- Main Menu
- Advanced Menu
- Chipset Menu
- Boot Menu
- Security Menu
- Save & Exit Menu

## 5.1 Introduction

The SA-5800 uses an AMI (American Megatrends Incorporated) Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the built-in BIOS setup program, Power-On Self-Test (POST), PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

Aptio is AMI's BIOS firmware based on the UEFI (Unified Extensible Firmware Interface) specifications and the Intel Platform Innovation Framework for EFI. The UEFI specification defines an interface between the operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These elements have combined to provide a standard environment for booting the operating system and running pre-boot applications.

The diagram below shows the Extensible Firmware Interface's location in the software stack.

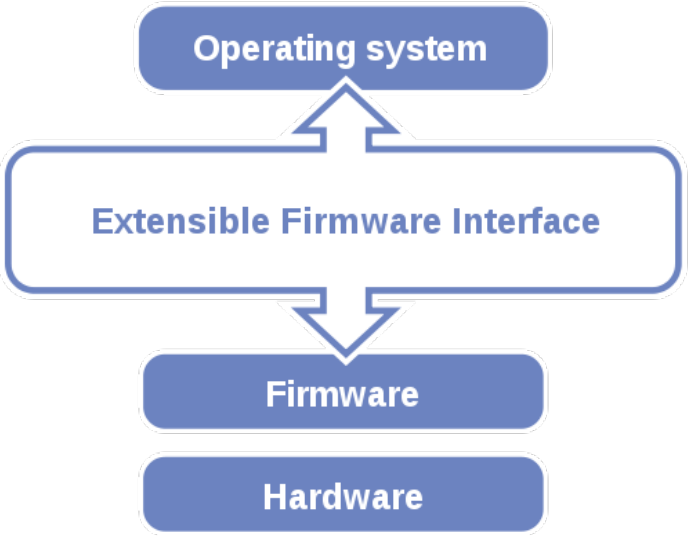



Figure 5-1. Extensible Firmware Interface Diagram

EFI BIOS provides an user interface that allows you to modify hardware configuration, e.g. change the system date and time, enable/disable a system component, determine bootable device priority, set up personal password, etc., which is convenient for engineers to perform modifications and customize the computer

system and allows technicians to troubleshoot the occurred errors when the hardware is faulty.

The BIOS setup menu allows users to view and modify the BIOS settings for the computer. After the system is powered on, users can access the BIOS setup menu by pressing <Del> or <Esc> immediately while the POST message is running before the operating system is loading.

## 5.2 Accessing Setup Utility

After the system is powered on, BIOS will enter the Power-On Self-Test (POST) routines and the POST message will be displayed:


Figure 5-2. POST Screen with AMI Logo

Press **<Del>** or **<Esc>** to access the Setup Utility program and the **Main** menu of the Aptio Setup Utility will appear on the screen as below:


**BIOS Setup Menu Initialization Screen**

You may move the cursor by <↑> and <↓> keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear on the right side of the screen.

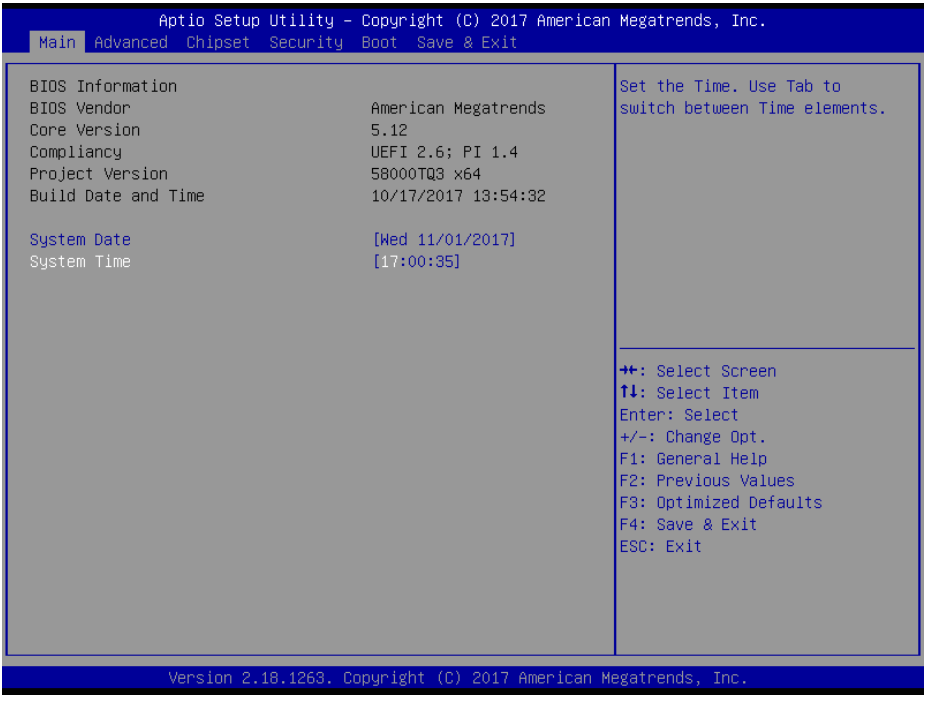
The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup menu.

| BIOS Setup Navigation Key | Description |
|---|---|
| <←> and <→> | Select a different menu screen (move the cursor from the selected menu to the left or right). |
| <↑> and <↓> | Select a different item (move the cursor from the selected item upwards or downwards) |
| <Enter> | Execute the command or select the sub-menu. |
| <F2> | Load the previous configuration values. |
| <F3> | Load the default configuration values. |
| <F4> | Save the current values and exit the BIOS setup menu. |
| <Esc> | Close the sub-menu.<br>Trigger the confirmation to exit BIOS setup menu. |

## 5.3 Main

Menu Path *Main*

The **Main** menu allows you to view the BIOS Information, change the system date and time, and view the user access privilege level. Use tab to switch between date elements. Use <↑> or <↓> arrow keys to highlight the item and enter the value you want in each item. This screen also displays the BIOS version (project) and BIOS Build Date and Time.




**Main Screen**

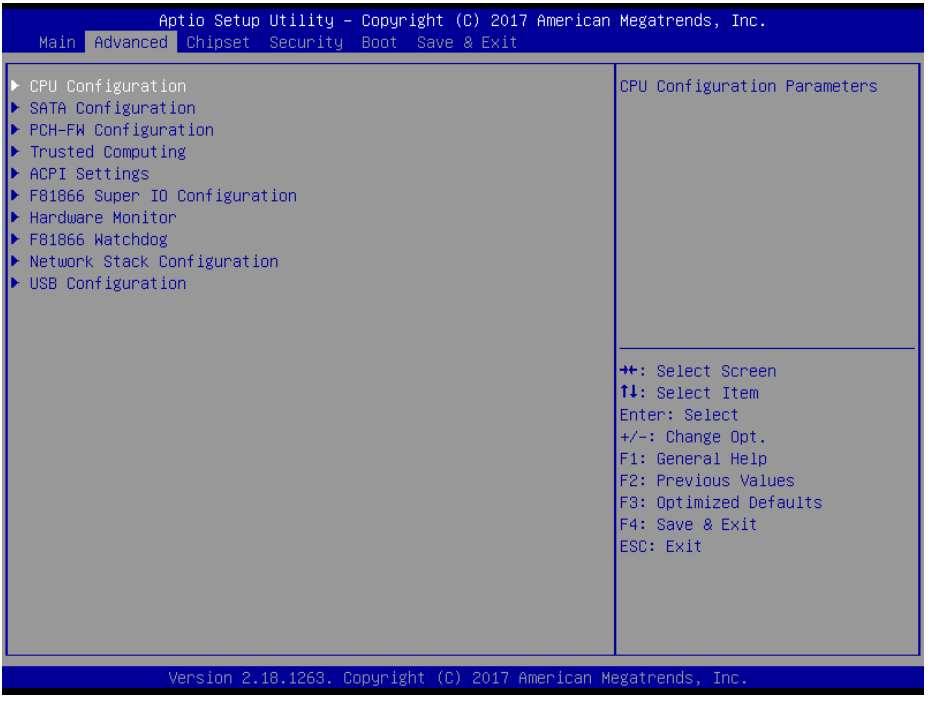
| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| BIOS Vendor | No changeable options | Displays the name of the BIOS vendor. |
| Core Version | No changeable options | Displays the current BIOS core version. |
| Compliancy | No changeable options | Displays the current UEFI version. |
| Project Version | No changeable options | Displays the version of the BIOS currently installed on the platform. |
| Build Date and Time | No changeable options | Displays the date that the current BIOS version is built. |
| System Date | Month, day, year | Sets the system date. The format is [Day Month/ Date/ Year]. Users can directly |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| | | enter values or use <+> or <-> arrow keys to increase/decrease it. The "Day" is automatically changed. |
| System Time | Hour, minute, second | Sets the system time. The format is [Hour: Minute: Second]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it. |

## 5.4 Advanced

Menu Path *Advanced*

This menu provides advanced configurations such as such as CPU Configuration, SATA Configuration, PCH-FW Configuration, Trusted Computing, ACPI Settings, F81866 Super IO Configuration, Hardware Monitor, F81866 Watchdog, Network Stack Configuration and USB Configuration.




**Advanced Menu Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| CPU Configuration | Sub-Menu | CPU Configuration Parameters. |
| SATA Configuration | Sub-Menu | SATA Device Options Settings. |
| PCH-FW Configuration | Sub-Menu | Management Engine Technology Parameters. |
| Trusted Computing | Sub-Menu | Trusted Computing Settings. |
| ACPI Settings | Sub-Menu | System ACPI Parameters. |
| F81866 Super IO Configuration | Sub-Menu | System Super IO Chip Parameters |
| Hardware Monitor | Sub-Menu | Monitor hardware status |
| F81866 Watchdog | Sub-Menu | F81866 Watchdog Parameters. |
| Network Stack Configuration | Sub-Menu | Network Stack Settings |
| USB Configuration | Sub-Menu | USB Configuration Parameters. |

## 5.4.1 Advanced – CPU Configuration

Menu Path *Advanced > CPU Configuration*

The **CPU Configuration** provides advanced CPU settings and some information about CPU.


**CPU Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Type | No changeable options | Displays CPU type. |
| ID | No changeable options | Displays CPU ID number. |
| Speed | No changeable options | Displays the CPU speed. |
| L1 Data Cache | No changeable options | Displays L1 Data Cache size. |
| L1 Instruction Cache | No changeable options | Displays L1 Instruction Cache size. |
| L2 Cache | No changeable options | Displays L2 Cache size. |
| L3 Cache | No changeable options | Displays L3 Cache size. |
| L4 Cache | No changeable options | Displays L4 Cache size. |
| VMX | No changeable options | CPU VMX hardware support for virtual machines. |
| SMX/TXT | No changeable options | Reports if Intel Secure Mode Extensions Technology (SMX) /Trusted Execution Technology (TXT) is supported by the processor. |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Intel Virtualization Technology | - Disabled<br>- Enabled | When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. Previously codenamed "Vanderpool", **VT-x** represents Intel's technology for virtualization on the x86 platform. |
| Hyper-Threading | - Disabled<br>- Enabled | When disabled, only one thread per enabled core is enabled. Hyper Threading is Intel's term for its simultaneous multithreading implementation in their CPUs. Enable this function will improve parallelization of computation performed on PC microprocessor. For each processor core that is physically present, the operating system addresses two virtual processors, and shares the workload between them when possible. |

## 5.4.2 Advanced – SATA Configuration

Menu Path *Advanced > SATA Configuration*

The **SATA Configuration** allows users to enable / disable the SATA controller as well as the operational mode after the SATA controller is enabled. The following screen indicates the functions available when the SATA hard drive is set to work in AHCI mode.

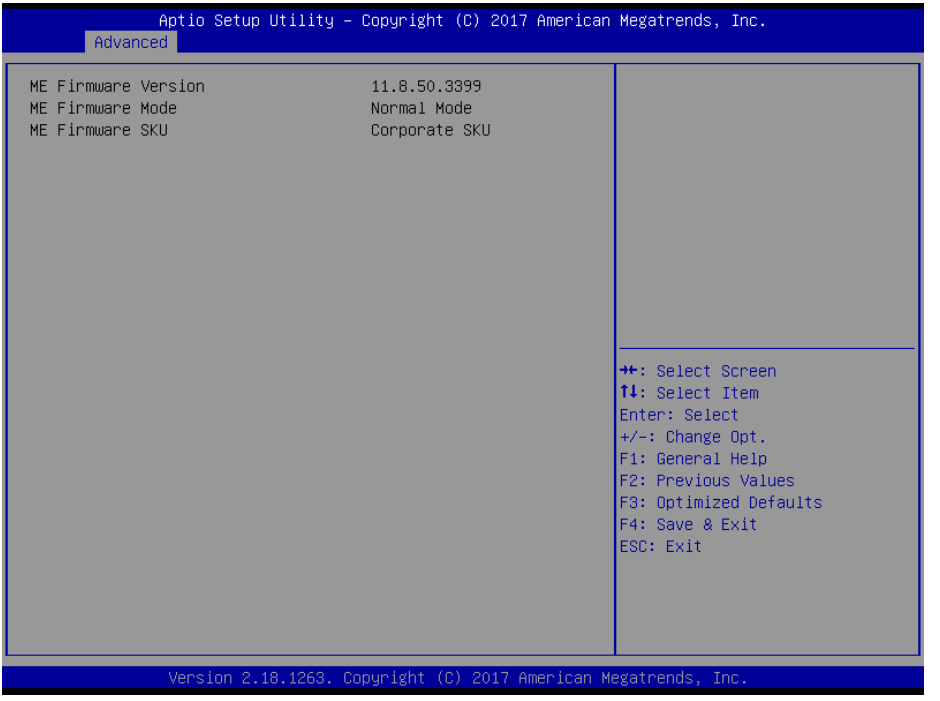

**SATA Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| SATA Controller(s) | - Disabled<br>- Enabled | Enables or Disables the on-chip SATA Device. Default: Enabled. |
| SATA Mode Selection | - AHCI<br>- RAID | Determines how SATA controller(s) operate. |
| Serial ATA Port 1 – 2, M.2 Slot | No changeable options | Displays the SATA device's name. |
| Software Preserve | No changeable options | Displays if Software Preserve support. |
| Port 1 - 2 | - Disabled<br>- Enabled | Enables or Disables SATA Port Device. |
| Hot Plug | - Disabled<br>- Enabled | Enables or Disables SATA Port Device HotPlug function. |

## 5.4.3 Advanced – PCH-FW Configuration

Menu Path *Advanced > PCH-FW Configuration*

The **PCH-FW** allows users to view the information about ME (Management Engine) firmware information, such as ME firmware version, firmware mode and firmware SKU.

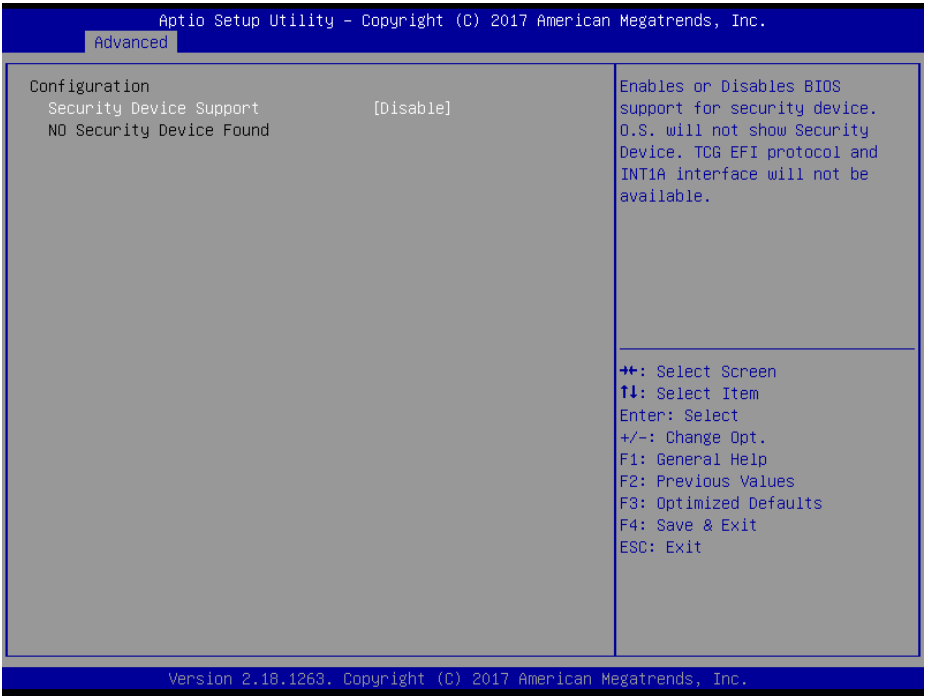



**PCH-FW Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| ME Firmware Version | No changeable options | Displays the ME Firmware Version. |
| ME Firmware Mode | No changeable options | Displays the ME Firmware Mode. |
| ME Firmware SKU | No changeable options | Displays the ME Firmware SKU. |

## 5.4.4 Advanced – Trusted Computing

Menu Path *Advanced > Trusted Computing*




**Trusted Computing Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Security Device Support | - Enable<br>- Disable | Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |

## 5.4.5 Advanced – ACPI Settings

Menu Path *Advanced > ACPI Settings*

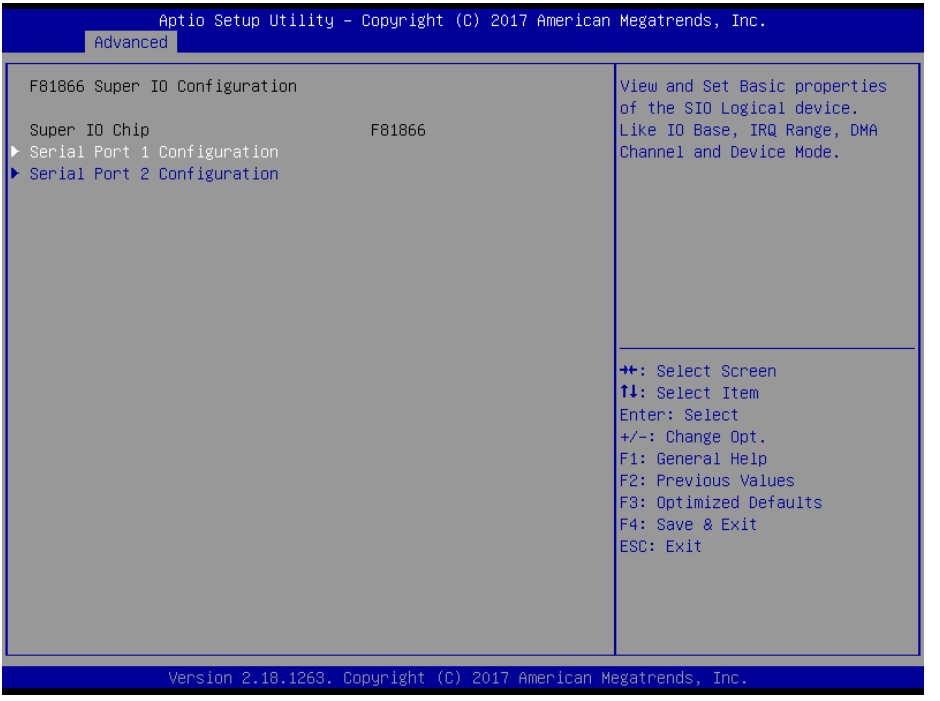
The **ACPI Settings** allows users to configure relevant ACPI (Advanced Configuration and Power Management Interface) settings, such as Enable/Disable Hibernation, ACPI sleep state, lock legacy resources and S3 Video Repost.


**ACPI Settings Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Enable Hibernation | - Disabled<br>- Enabled | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS. |
| ACPI Sleep State | - Suspend Disabled<br>- S3 (Suspend to RAM) | Selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. |
| Lock Legacy Resources | - Disabled<br>- Enabled | Enables or Disables Lock of Legacy Resources. |
| S3 Video Repost | - Disabled<br>- Enabled | Enables or Disables S3 Video Repost. |

## 5.4.6 Advanced – F81866 Super IO Configuration

Menu Path *Advanced > F81866 Super IO Configuration*

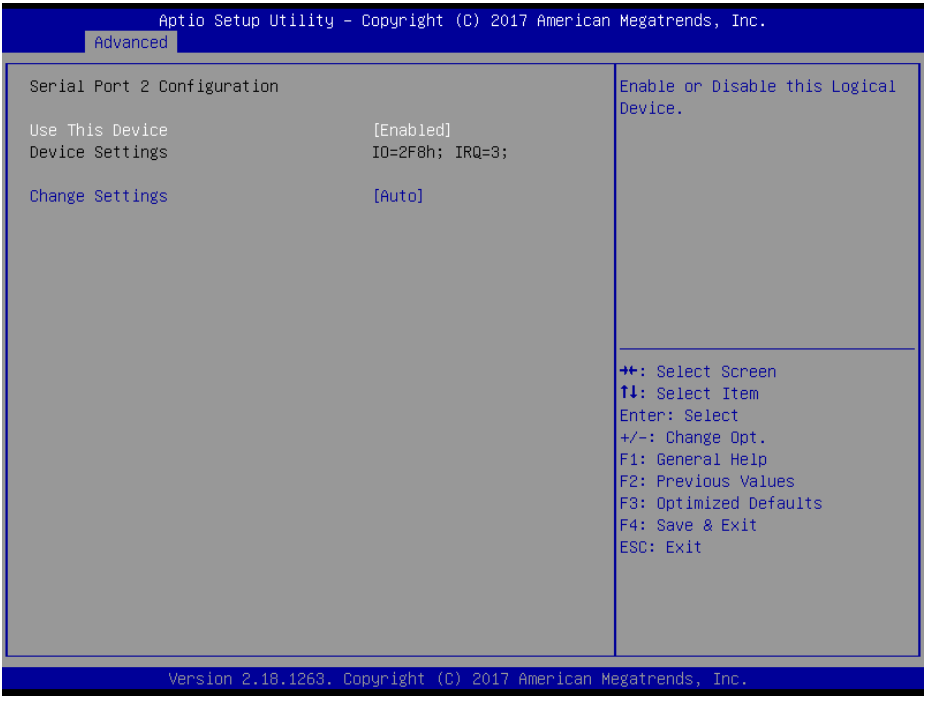



**F81866 Super IO Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Serial Port 1 Configuration | Sub-menu | Sets the parameters of Serial Port 1 (COMA). |
| Serial Port 2 Configuration | Sub-menu | Sets the parameters of Serial Port 2 (COMB). |


**Serial Port 1 Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Use This Device | - Disabled<br>- Enabled | Enables or Disables Serial Port 1. |
| Device Settings | No changeable options | Displays the current settings of Serial Port 1. |
| Change Settings | - Auto<br>- IO=3F8h; IRQ=4;<br>- IO=3F8h; IRQ=3,4,5,6,7,10,11;<br>- IO=2F8h; IRQ=3,4,5,6,7,10,11;<br>- IO=3E8h; IRQ=3,4,5,6,7,10,11;<br>- IO=2E8h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource settings for Serial Port 1. |



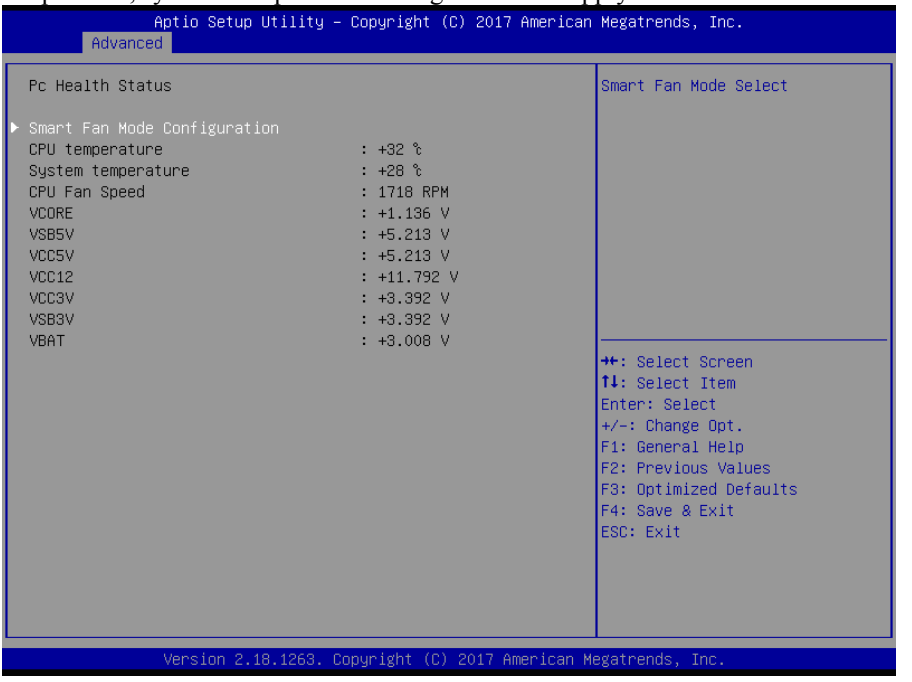

**Serial Port 2 Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Use This Device | - Disabled<br>- Enabled | Enables or Disables Serial Port 2. |
| Device Settings | No changeable options | Displays the current settings of Serial Port 2. |
| Change Settings | - Auto<br>- IO=2F8h; IRQ=3;<br>- IO=3F8h; IRQ=3,4,5,6,7,10,11;<br>- IO=2F8h; IRQ=3,4,5,6,7,10,11;<br>- IO=3E8h; IRQ=3,4,5,6,7,10,11;<br>- IO=2E8h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource for Serial Port 2. |

## 5.4.7 Advanced – Hardware Monitor

Menu Path *Advanced > Hardware Monitor*

The **Hardware Monitor** allows users to configure Smart Fan Mode for CPU fan, monitor the health and status of the system such as CPU temperature, system temperature, system fan speed and voltage levels in supply.



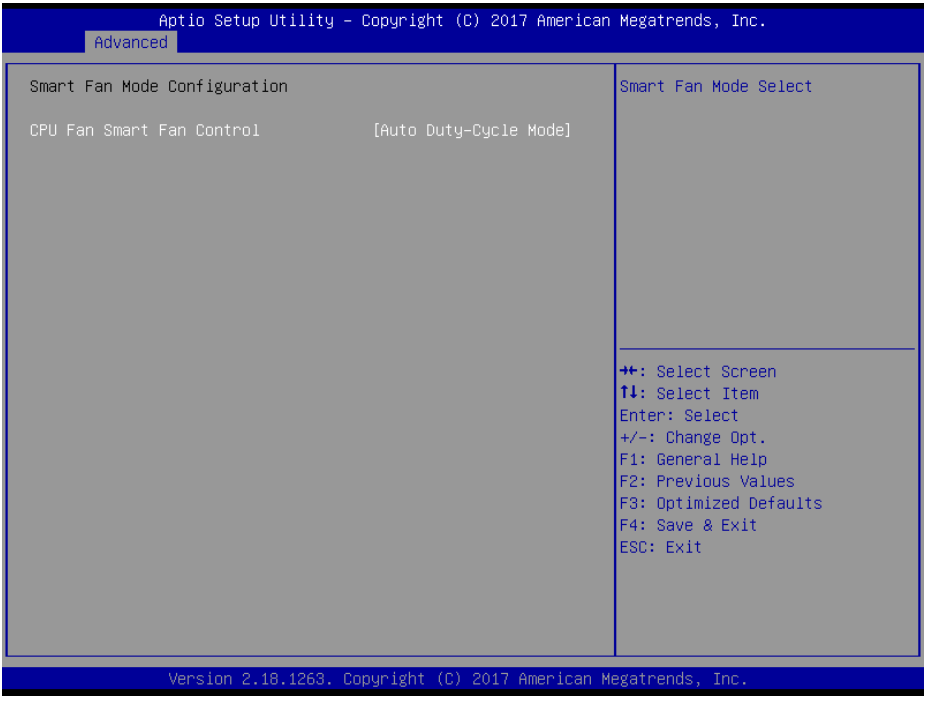

**Hardware Monitor Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Smart Fan Mode Configuration | Sub-Menu | Smart Fan Mode Selection. |
| CPU temperature | No changeable options | Displays the processor's temperature. |
| System temperature | No changeable options | Displays the system's temperature. |
| CPU Fan Speed | No changeable options | Displays CPU Fan speed |
| VCORE | No changeable options | Displays the voltage level of VCORE in supply. |
| VSB5V | No changeable options | Displays the voltage level of VSB5V in supply. |
| VCC5V | No changeable options | Displays the voltage level of VCC5V in supply. |
| VCC12 | No changeable options | Displays the voltage level of VCC12 in supply. |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| VCC3V | No changeable options | Displays the voltage level of VCC3V in supply. |
| VSB3V | No changeable options | Displays the voltage level of VSB3V in supply. |
| VBAT | No changeable options | Displays the voltage level of VBAT in supply. |

## Smart Fan Mode Configuration

Menu Path *Advanced > Hardware Monitor > Smart Fan Mode Configuration*



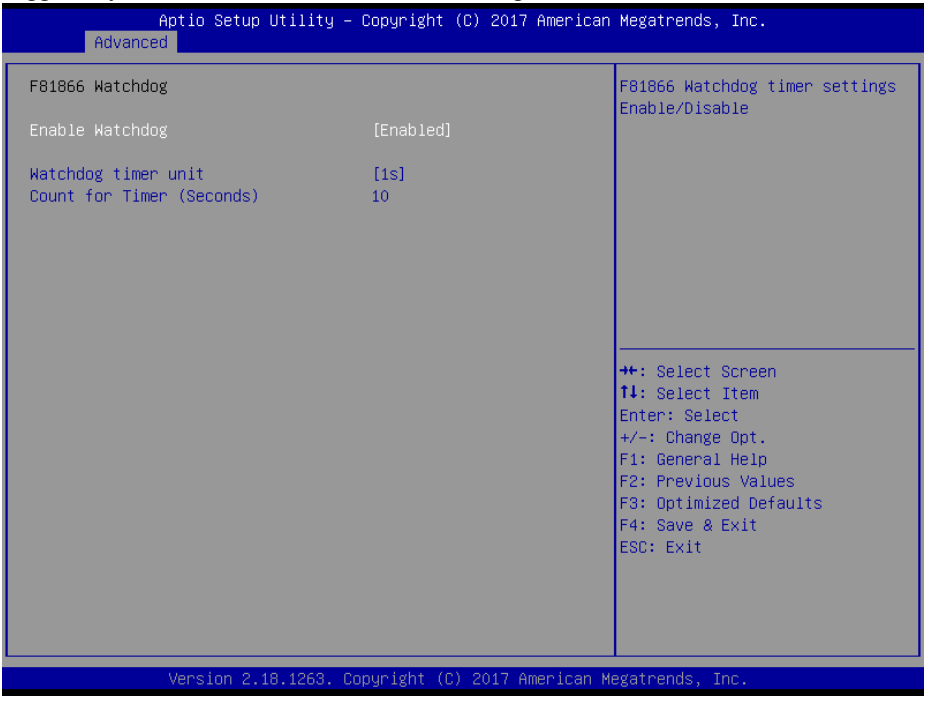

**Smart Fan Mode Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| CPU Fan Smart Fan Control | - Manual Duty Mode<br>- Auto Duty-Cycle Mode | Smart Fan Mode selection for CPU Fan. |
| Manual Duty Mode | Numeric (from 1 to 100) | Manual mode fan control. Users can write expected duty cycle (PWM fan type) from 1 to 100. |

## 5.4.8 Advanced – F81866 Watchdog

Menu Path *Advanced > F81866 Watchdog*

If the system hangs or fails to respond, enable the F81866 watchdog function to trigger a system reset via the 255-level watchdog timer.




**F81866 Watchdog Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Enable Watchdog | - Disabled (default)<br>- Enabled | Enables/Disables F81866 Watchdog timer settings. |
| Watchdog timer unit | - 1s<br>- 60s | Watchdog timer unit. |
| Count for Timer (Seconds) | Numeric<br>(from 10 to 255) | The number of count for Timer. |

## 5.4.9 Advanced – Network Stack Configuration

Menu Path *Advanced > Network Stack Configuration*

The **Network Stack Configuration** allows users to enable/disable UEFI Network Stack, IPv4/IPv6 PXE (Pre-Boot eXecution Environment) support and configure PXE boot wait time and detects the media presence.

PXE allows a workstation to boot from a server on a network prior to booting the operating system on the local hard drive. A PXE-enabled workstation connects its NIC to the LAN via a jumper, which keeps the workstation connected to the network even when the power is turned off.


**Network Stack Configuration Screen**

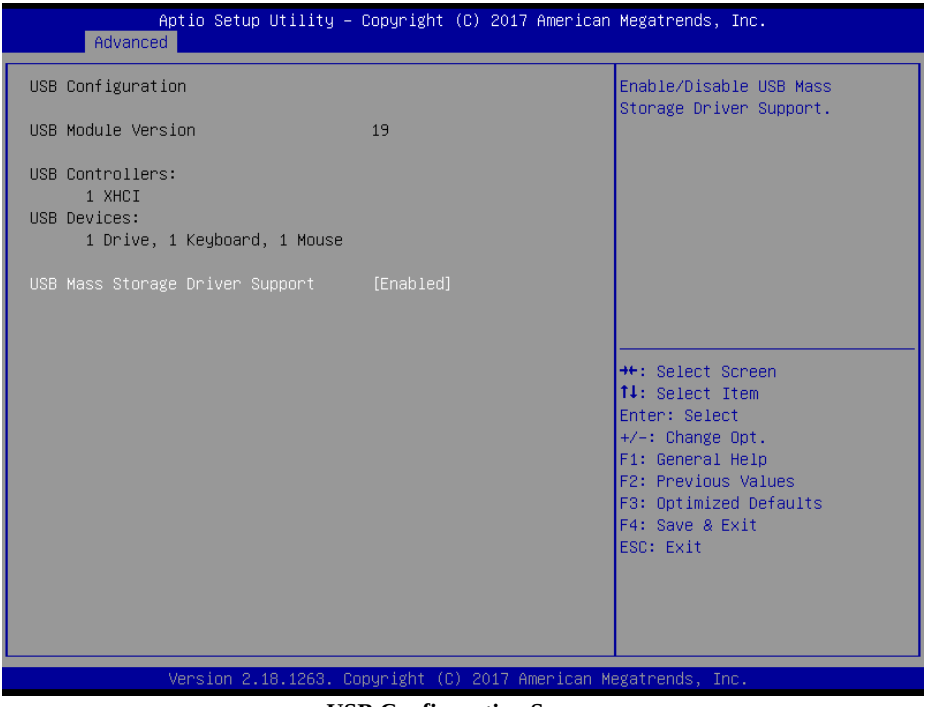
| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Network Stack | - Disabled<br>- Enabled | Enables or Disables UEFI Network Stack. |
| Ipv4 PXE Support | - Disabled<br>- Enabled | Enables Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created. |
| Ipv6 PXE Support | - Disabled<br>- Enabled | Enables Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created. |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| PXE boot wait time | Numeric (from 0 to 5) | Number of seconds to wait for PXE boot to abort after the Esc key is pressed. |
| Media detect count | Numeric (from 1 to 50) | Number of times that the media presence will be checked. |

## 5.4.10 Advanced – USB Configuration

Menu Path *Advanced > USB Configuration*

The **USB Configuration** allows users to enable/disable USB mass storage driver support.



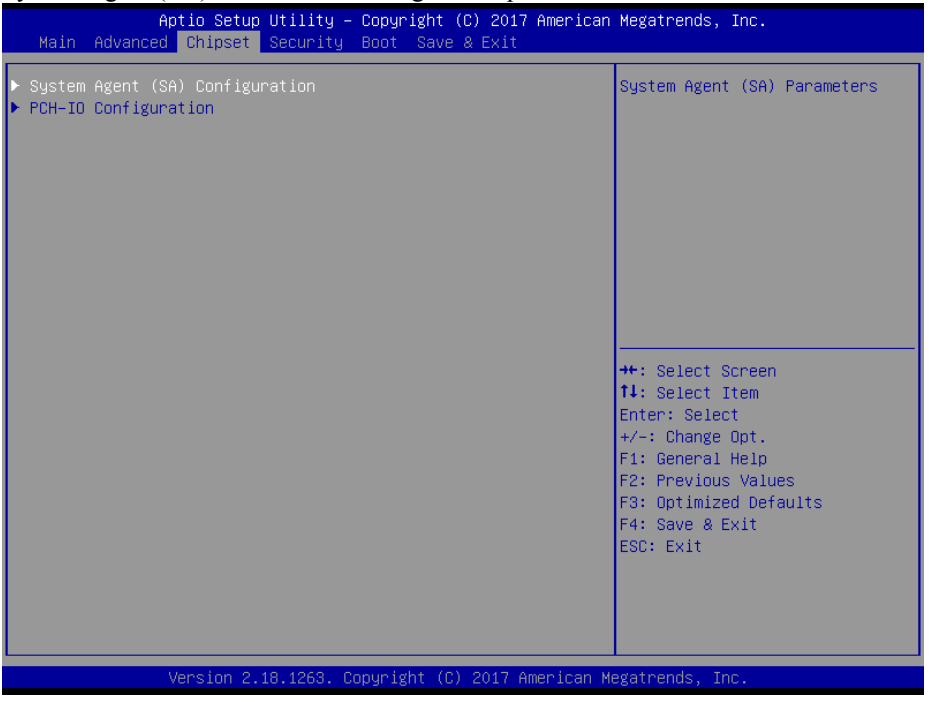

**USB Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| USB Mass Storage Driver Support | - Disabled<br>- Enabled | Enables/Disables USB Mass Storage Driver Support. |

## 5.5 Chipset

Menu Path *Chipset*

This menu allows users to configure advanced Chipset settings such as such as System Agent (SA) and PCH-IO configuration parameters.



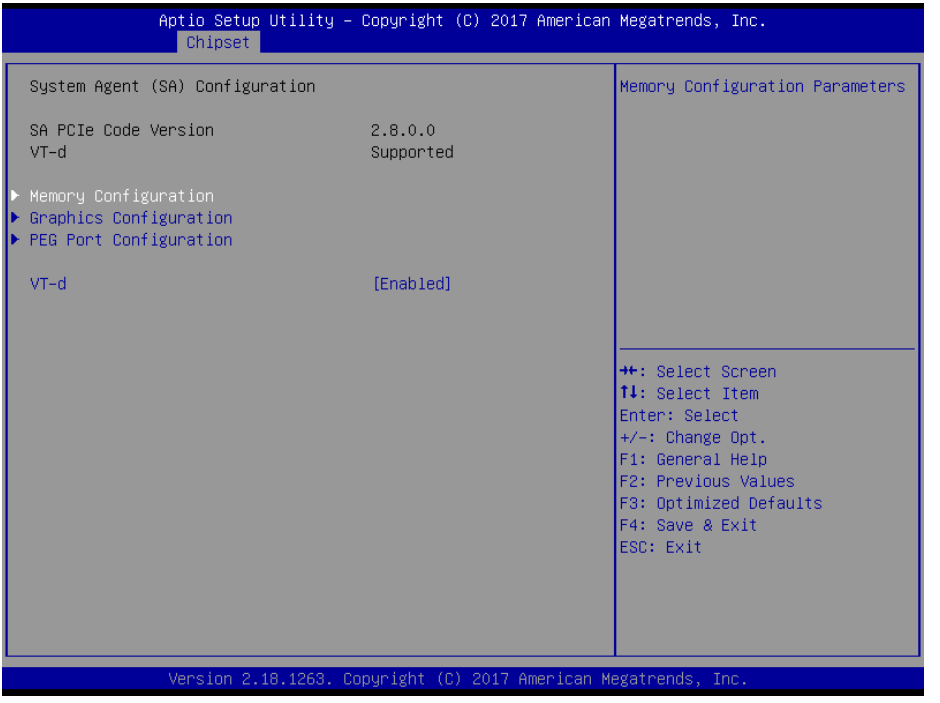

**Chipset Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| System Agent (SA) Configuration | Sub-menu | System Agent (SA) Parameters. |
| PCH-IO Configuration | Sub-menu | PCH Parameters. |

## 5.5.1 Chipset – System Agent (SA) Configuration

Menu Path *Chipset > System Agent (SA) Configuration*

The **System Agent Configuration** allows users to display DRAM information on the platform as well as configure graphics and PEG Port settings, and enable/disable VT-d function.




**System Agent (SA) Configuration Screen**

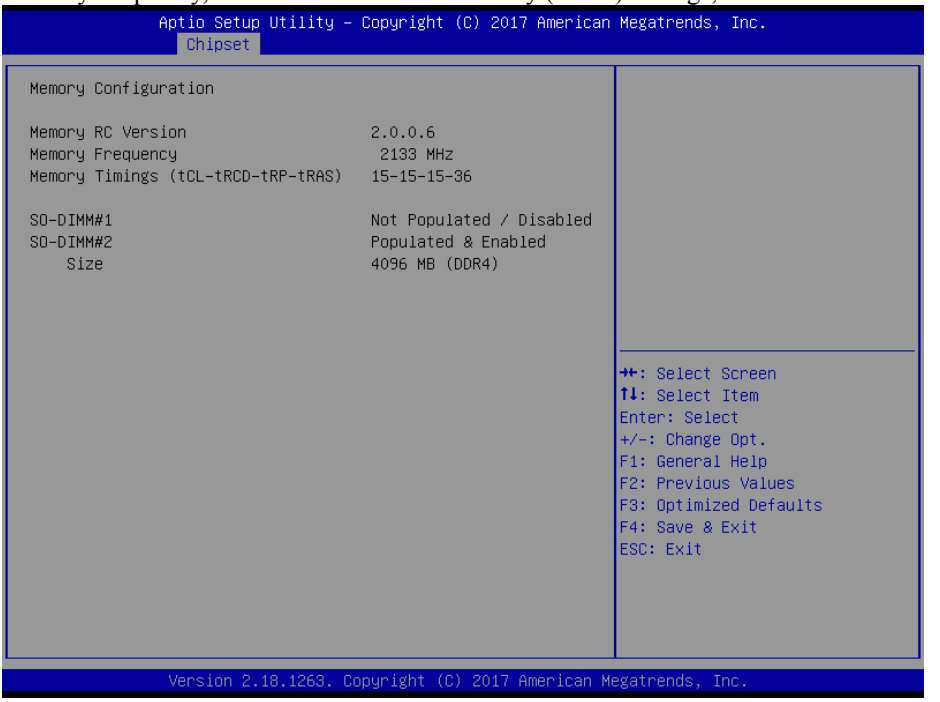
| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| SA PCIe Code Version | No changeable options | Displays the SA PCIe Code Version. |
| VT-d | No changeable options | Indicates whether Intel's VT-d (Virtualization Technology for Directed I/O) capability is supported. ***VT-d*** extends Intel's Virtualization Technology (VT) roadmap by providing hardware assists for virtualization solution, and helps end users improve security and reliability of the systems and also improves performance of I/O devices in virtualized environment. |
| Memory Configuration | Sub-menu | Displays the DRAM information on |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| | | the platform. |
| Graphics Configuration | Sub-menu | Configures Graphics Settings. |
| PEG Port Configuration | Sub-menu | PEG (PCI Express Graphics) Port Configuration. |
| VT-d | - Disabled<br>- Enabled | Enables or Disables VT-d function. |

## Chipset – SA Configuration – Memory Configuration

Menu Path *Chipset > System Agent (SA) Configuration > Memory Configuration*

The **Memory Configuration** allows users to check for the information about the memory frequency, total DRAM size and memory (RAM) timings, etc.



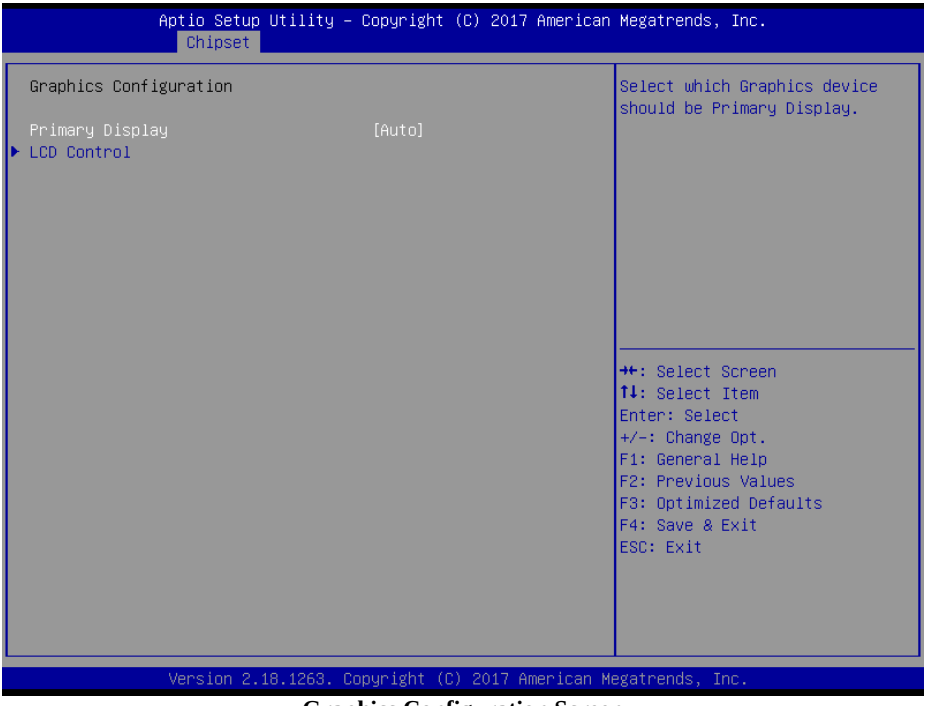

**Memory Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Memory RC Version | No changeable options | Displays the Memory RC Version. |
| Memory Frequency | No changeable options | Displays the Frequency of Memory. |
| Memory Timings | No changeable options | Displays the Memory (RAM) timings |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| (tCL-tRCD-tRP-tRAS) | | and latency.<br>• **CAS Latency (tCL)** - This is the most important memory timing. CAS stands for Column Address Strobe. If a row has already been selected, it tells us how many clock cycles we'll have to wait for a result (after sending a column address to the RAM controller).<br>• **Row Address (RAS) to Column Address (CAS) Delay (tRCD)** - Once we send the memory controller a row address, we'll have to wait this many cycles before accessing one of the row's columns. So, if a row hasn't been selected, this means we'll have to wait tRCD + tCL cycles to get our result from the RAM.<br>• **Row Precharge Time (tRP)** - If we already have a row selected, we'll have to wait this number of cycles before selecting a different row. This means it will take tRP + tRCD + tCL cycles to access the data in a different row.<br>• **Row Active Time (tRAS)** - This is the minimum number of cycles that a row has to be active for to ensure we'll have enough time to access the information that's in it. This usually needs to be greater than or equal to the sum of the previous three latencies (tRAS = tCL + tRCD + tRP). |
| SO-DIMM#1 | No changeable options | Displays if SO-DIMM#1 socket is populated/enabled or not. |
| SO-DIMM#2 | No changeable options | Displays if SO-DIMM#2 socket is populated/enabled or not. |
| Size | No changeable options | Displays the total memory size. |

## Chipset – System Agent (SA) Configuration – Graphics Configuration

Menu Path *Chipset > System Agent (SA) Configuration > Graphics Configuration*

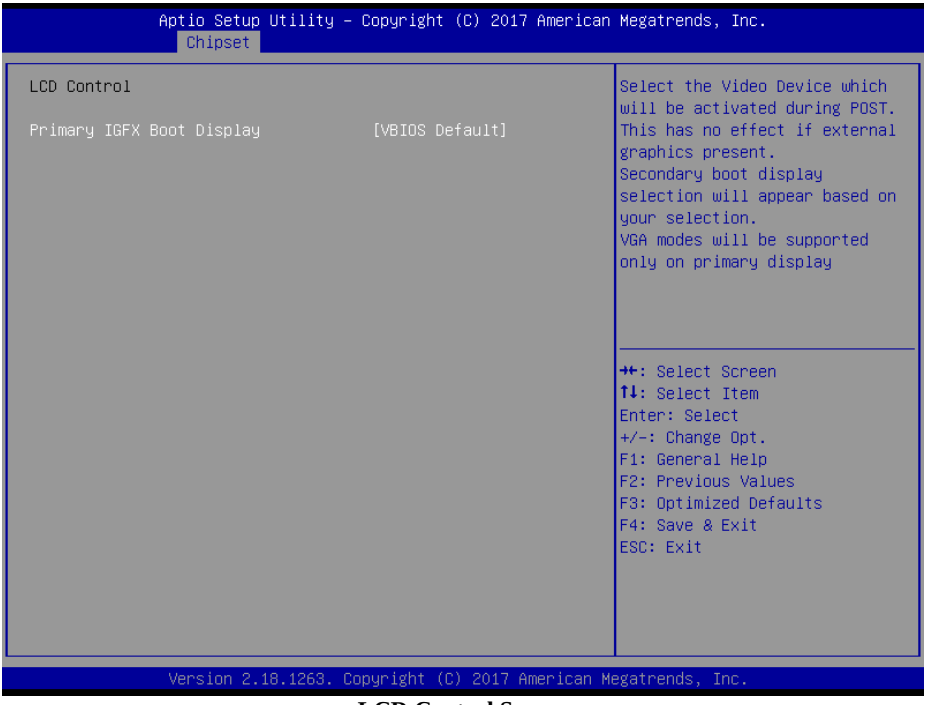



**Graphics Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Primary Display | - Auto<br>- IGFX | Selects which Graphics device should be Primary Display. |
| LCD Control | Sub-menu | LCD Control sub-menu. |

| Menu Path | *Chipset > System Agent (SA) Configuration > Graphics Configuration > LCD Control* |
|---|---|

The **LCD Control** allows users to select the primary display device.

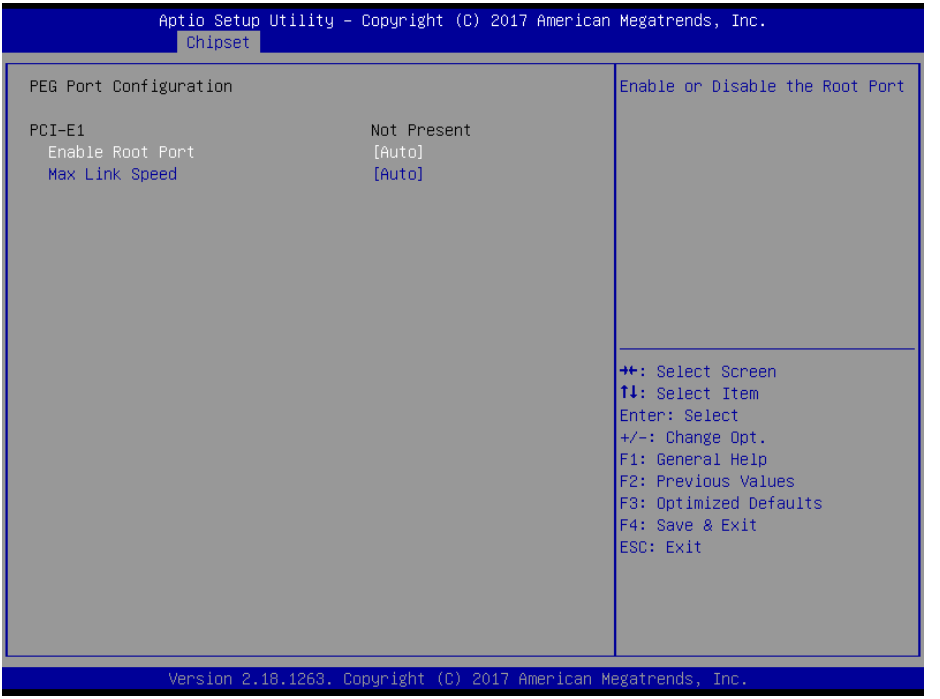



**LCD Control Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Primary IGFX Boot Display | - VBIOS Default<br>- VGA<br>- LVDS<br>- DisplayPort | Selects Primary Display Device |

## Chipset –System Agent (SA) Configuration – PEG Port Configuration

Menu Path *Chipset > System Agent (SA) Configuration > PEG Port Configuration*



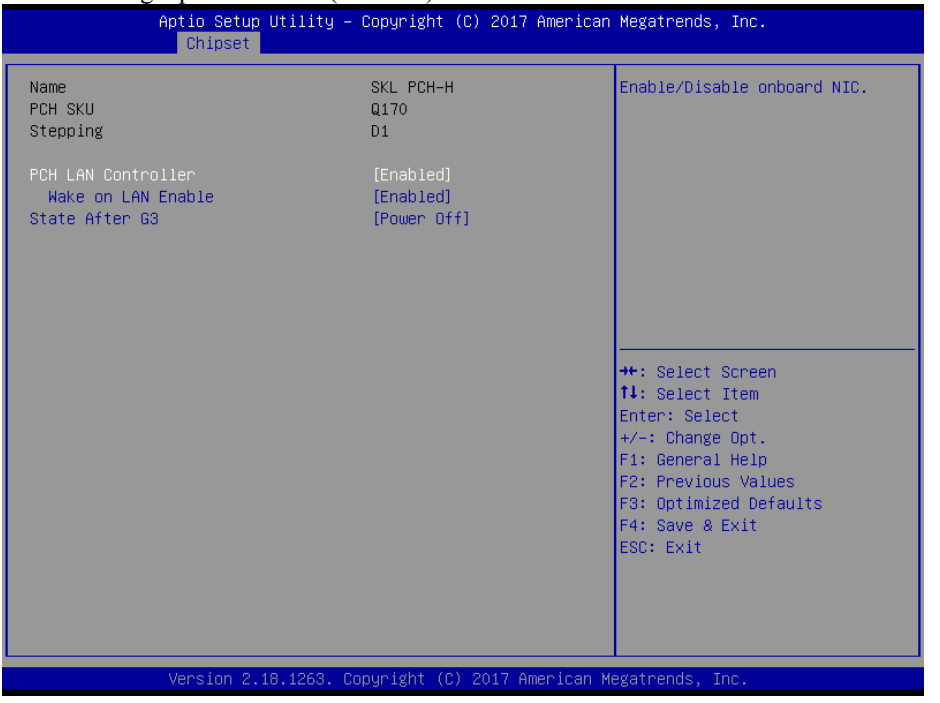

**PEG Port Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| PCI-E1 | No changeable options | Displays PCI-E1 Link and speed information. |
| Enable Root Port | - Disabled<br>- Enabled<br>- Auto | Enables or Disables the Root Port. |
| Max Link Speed | - Auto<br>- Gen1<br>- Gen2<br>- Gen3 | Configures PCI-E1 maximum speed. |

## 5.5.2 Chipset – PCH-IO Configuration

Menu Path *Chipset > PCH-IO Configuration*

The **PCH-IO** Configuration allows users to enable/disable PCH LAN Controller and Wake-On-LAN function and determine the power on/off state that the system will go into following a power failure (G3 state).




**PCH-IO Configuration Screen**

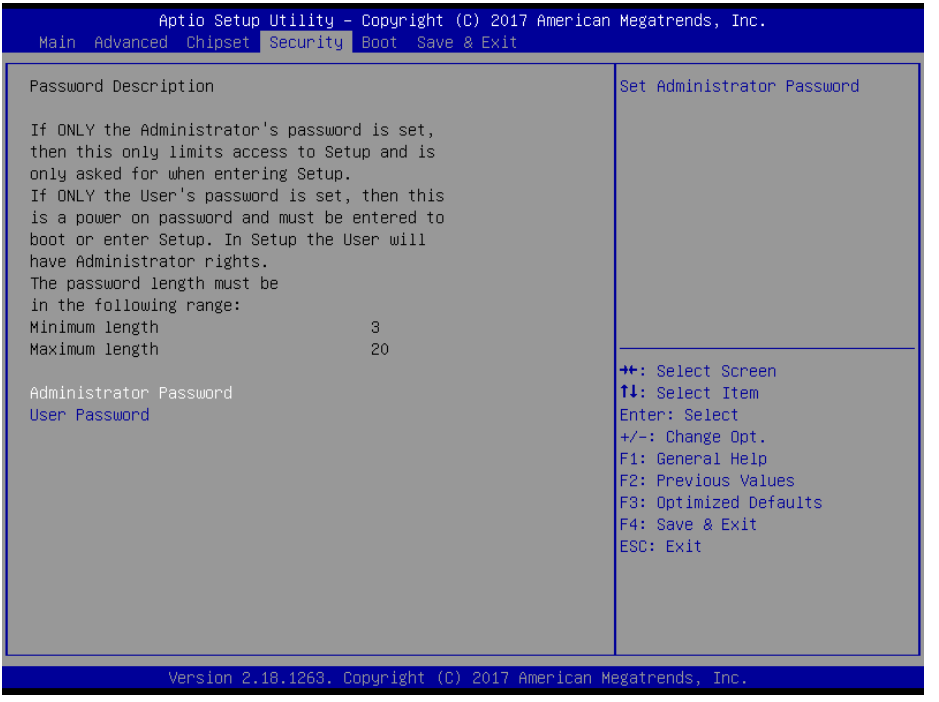
| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Name | No changeable options | Displays the Intel PCH Name. |
| PCH SKU | No changeable options | Displays the Intel PCH SKU. |
| Stepping | No changeable options | Displays the Intel PCH Stepping. |
| PCH LAN Controller | - Disabled<br>- Enabled | Enables or Disables onboard NIC. |
| Wake on LAN Enable | - Disabled<br>- Enabled | Enables or Disables integrated LAN to wake up the system. Default: Enabled. |
| State After G3 | - Power On<br>- Power Off | Specifies the Power On/Off state that the system will go into when the power is re-applied following a power failure (G3 state). |

## 5.6 Security

Menu Path *Security*

From the **Security** menu, you are allowed to create, change or clear the administrator password. You will be asked to enter the configured administrator password before you can access the Setup Utility.

By setting an administrator password, you will prevent other users from changing your BIOS settings. You can configure an Administrator password and then configure a user password. An administrator has much more privileges over the settings in the Setup utility than a user. Heed that a user password does not provide access to most of the features in the Setup utility.




**Security Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Administrator Password | Password can be 3-20 alphanumeric characters. | Specifies the administrator password. |
| User Password | Password can be 3-20 alphanumeric characters. | Specifies the user password. |

**Create an Administrator or User Password**

1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Enter the password you want to create. A password can be 3-20 alphanumeric characters. After you have configured the password, press <Enter> to confirm.
3. Type the new password again and press <Enter>.

**Change an Administrator or User Password**

1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the Administrator Password or User Password that you want to change. A password can be 3-20 alphanumeric characters. After you have changed the password, press <Enter> to confirm.
3. Type the changed password again and press <Enter>.

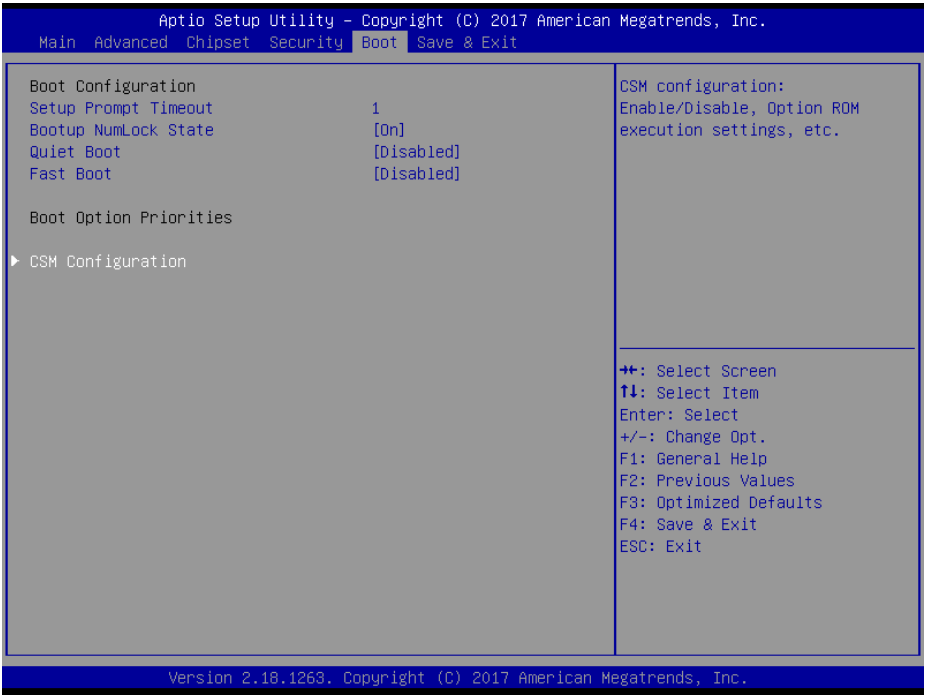
**Remove an Administrator or User Password**

1. Select the **Administrator Password** / **User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the configured Administrator Password or User Password that you want to delete. Leave the dialog box blank and press <Enter>.
3. Press <Enter> again when the password confirmation box appears.

## 5.7 Boot

Menu Path *Boot*

This menu provides control items for system boot configuration such as setting setup prompt timeout, specifying the NumLock sate after the system is powered on, enabling/disabling quiet boot and fast boot, changing the boot order from the available bootable device(s), and setting CSM (Compatibility Support Module) configuration parameters to support legacy BIOS operation systems, various bootable devices and add-on devices for achieving better compatibility.




**Boot Screen**

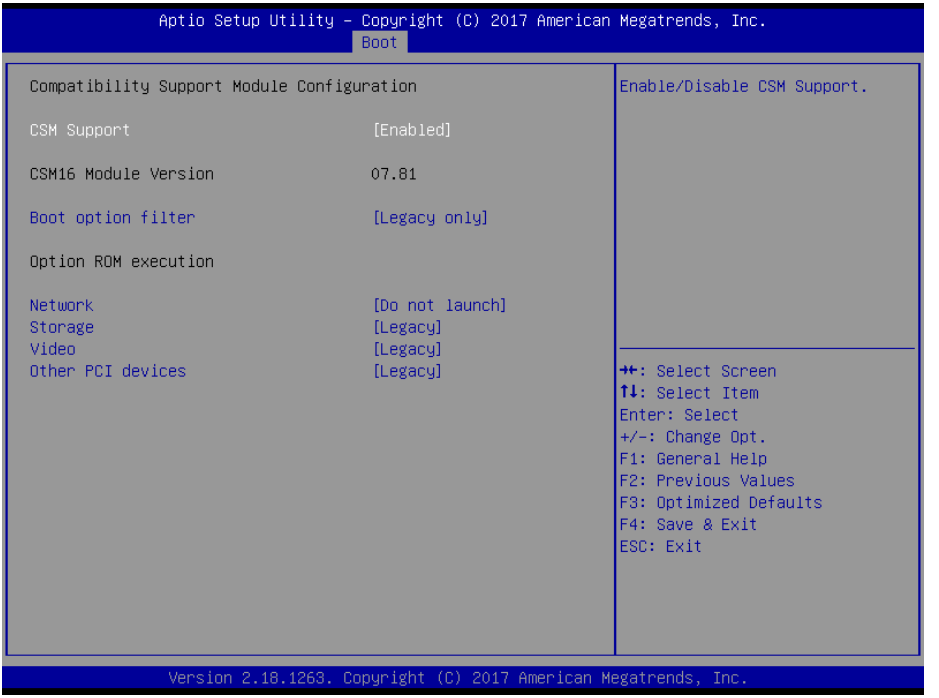
| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Setup Prompt Timeout | Numeric (from 1 to 65535) | Number of seconds to wait for setup activation key. |
| Bootup NumLock State | - On<br>- Off | Selects the NumLock sate after the system is powered on.<br>• **On:** Enables the NumLock function automatically after the system is powered on.<br>• **Off:** Disables the NumLock function after the system is powered on. |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Quiet Boot | - Disabled<br>- Enabled | Enables or Disables Quiet Boot options. When this option is set to "Disabled", BIOS will display normal POST messages. |
| Fast Boot | - Disabled<br>- Enabled | Enables or Disables Fast Boot options. |
| Boot Option #1~#n | - [Drive(s)]<br>- Disabled | Allows users to set the system boot order. Note that in the menu displayed, you will only see the device with the highest priority for a specific boot device type. |
| CSM Configuration | Sub-Menu | CSM configuration: Enable/Disable, Option ROM execution settings, etc. |

## 5.7.1 Boot – CSM Configuration

Menu Path *Boot > CSM Configuration*

The **CSM Configuration** provides advanced CSM (Compatibility Support Module) configurations such as Enable/Disable CSM Support, configure Option ROM execution, boot option filter, etc.




**CSM Configuration Screen**

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| CSM Support | - Disabled<br>- Enabled | Enables or Disables CSM Support. |
| CSM16 Module Version | No changeable options | Displays the CSM 16 Module version. |
| Boot option filter | - UEFI and Legacy<br>- Legacy only<br>- UEFI only | This option controls Legacy/UEFI ROMs priority. |
| Network | - Do not launch<br>- UEFI<br>- Legacy | Controls the execution of UEFI and Legacy PXE OpROM. |

| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Storage | - Do not launch<br>- UEFI<br>- Legacy | Controls the execution of UEFI and Legacy Storage OpROM. |
| Video | - Do not launch<br>- UEFI<br>- Legacy | Controls the execution of UEFI and Legacy Video OpROM. |
| Other PCI devices | - Do not launch<br>- UEFI<br>- Legacy | Determines OpROM execution policy for devices other than Network, Storage or Video. |

## 5.8 Save & Exit

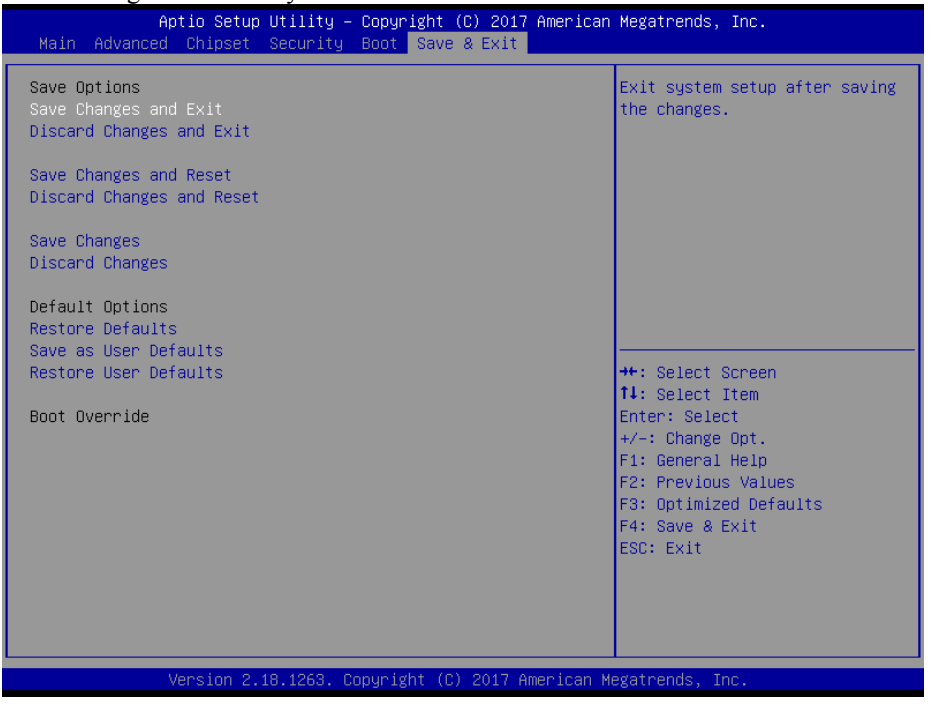
| Menu Path | *Save & Exit* |
|---|---|

The **Save & Exit** allows users to save or discard changed BIOS settings as well as load factory default settings.

**Save Changed BIOS Settings**
To save and validate the changed BIOS settings, select **Save Changes** from the **Save & Exit** menu, or you can select **Save Changes and Exit** (or press **F4**) to validate the changes and then exit the system. Select **Save Changes and Reset** to validate the changed BIOS settings and then restart the system

**Discard Changed BIOS Settings**
To cancel the BIOS settings you have previously configured, select **Discard Changes and Exit** from this menu, or simply press **Esc** to exit the BIOS setup. You can also select **Discard Changes and Reset** to discard any changes you have made and restore the factory BIOS defaults.

**Load User Defaults**
You may simply press **F3** at any time to load the **Optimized Values** which resets all BIOS settings to the factory defaults.




**Save & Exit Screen**

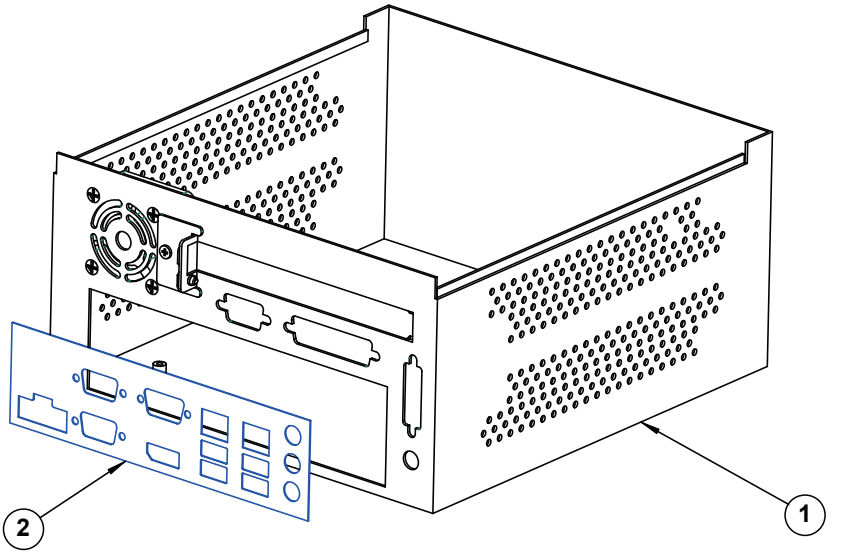
| BIOS Setting | Options | Description/Purpose |
|---|---|---|
| Save Changes and Exit | No changeable options | Exits the system and saves the changes in NVRAM. |
| Discard Changes and Exit | No changeable options | Exits the system without saving any changes configured in BIOS settings. |
| Save Changes and Reset | No changeable options | Saves the changes in NVRAM and resets the system. |
| Discard Changes and Reset | No changeable options | Resets the system without saving any changes configured in BIOS settings. |
| Save Changes | No changeable options | Saves the changes done so far to any of the setup options. |
| Discard Changes | No changeable options | Discards the changes done so far to any of the setup options. |
| Restore Defaults | No changeable options | Loads the optimized defaults for BIOS settings. |
| Save as User Defaults | No changeable options | Saves the changes done so far as User Defaults. |
| Restore User Defaults | No changeable options | Restores the User Defaults to all the BIOS settings. |
| Boot Override | - [Drive(s)] | Forces to boot from selected [drive(s)]. |

# Appendix A System Diagrams

This appendix includes the exploded diagrams of the system and the parts list as well as the part numbers of the SA-5800 system.

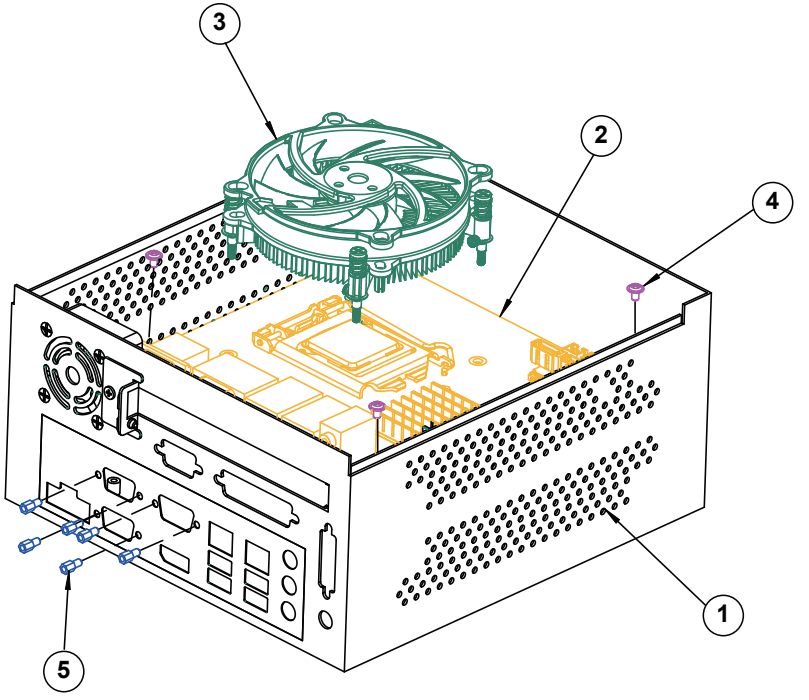
- SA-5800 I/O Shield Assembly Exploded Diagram
- SA-5800 Mother Board and Cooler Exploded Diagram
- SA-5800 Riser Card Assembly Exploded Diagram
- SA-5800 HDD / SSD Assembly Exploded Diagram
- SA-5800 Top Cover Assembly Exploded Diagram

## SA-5800 I/O Shield Assembly Exploded Diagram



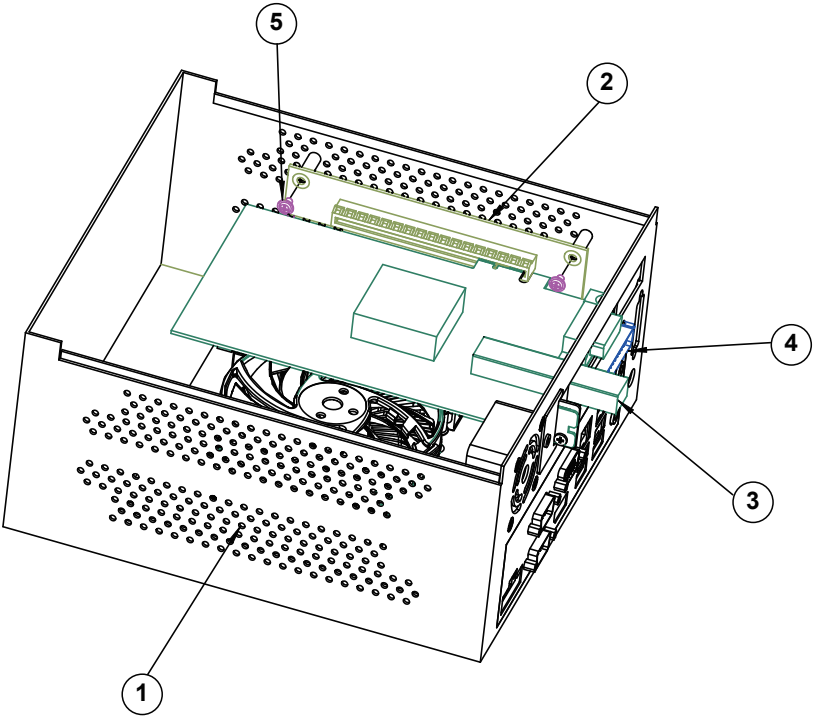

| No. | Component Name | Part No. | Q'ty |
|---|---|---|---|
| 1 | SA-5800 Chassis Box | 52-901-01000221 | 1 |
| 2 | SA-5800 IO Shield | 80-010-07001428 | 1 |

## SA-5800 Mother Board and Cooler Exploded Diagram



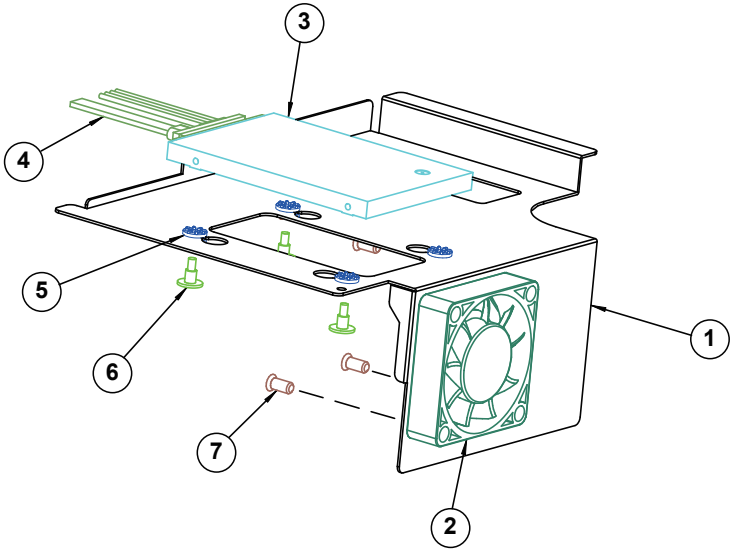

| No. | Component Name | Part No. | Q'ty |
|---|---|---|---|
| 1 | Chassis Box Module | 52-901-01000221 | 1 |
| 2 | PCBA of SB-5800 | Depends on SKU | 1 |
| 3 | SA-5800 CPU Heat Sink & Fan | 21-003-17575004 | 1 |
| 4 | Round Washer Head Screw | 22-242-30005311 | 4 |
| 5 | HEX CU BOSS | 22-692-40048051 | 6 |

## SA-5800 Riser Card Assembly Exploded Diagram



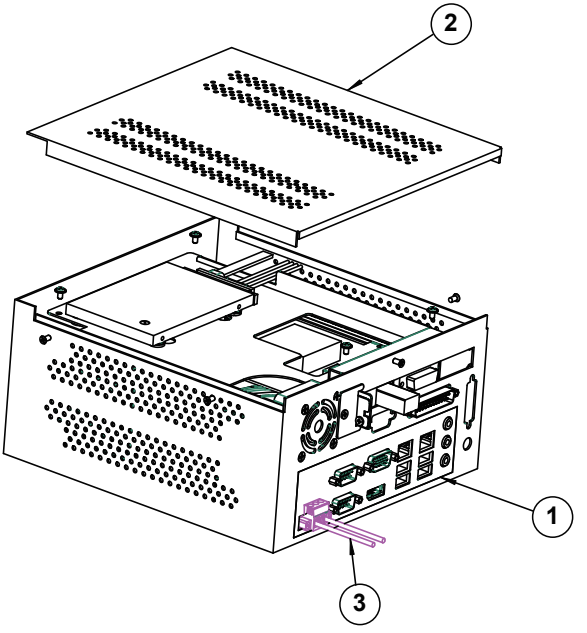

| No. | Component Name | Part No. | Q'ty |
|---|---|---|---|
| 1 | Chassis Box Module | 52-901-01000221 | 1 |
| 2 | Riser Card for SA-5800 | SR-5800R2-00N | 1 |
| 3 | Add-On PCIe Board | Supplied by Customer | 1 |
| 4 | SA-5800 DIO Cable | 27-071-42806031 | 1 |
| 5 | Round Washer Head Screw | 22-242-30005311 | 2 |

## SA-5800 HDD / SSD Assembly Exploded Diagram




| No. | Component Name | Part No. | Q'ty |
|---|---|---|---|
| 1 | Chassis Box | 52-901-01000221 | 1 |
| 2 | SA-5800 System Fan (L=80mm) | 21-004-06015076 | 1 |
| 3 | HDD | SEE ORDER | 1 |
| 4 | SATA HDD & Power Cable | 27-008-42804081 | 1 |
| 5 | Rubber Washer (Blue) | 23-680-39580963 | 4 |
| 6 | Fillister Head Screw | 82-272-30005013 | 4 |
| 7 | Flat Head Screw | 22-112-50010011 | 4 |

## SA-5800 Top Cover Assembly Exploded Diagram




| No. | Component Name | Part No. | Q'ty |
|---|---|---|---|
| 1 | SA-5800 System | 52-901-01000221 | 1 |
| 2 | Chassis Box Top Cover | 52-901-01000221 | 1 |
| 3 | DC-in Cable | 27-012-42803111 | 1 |

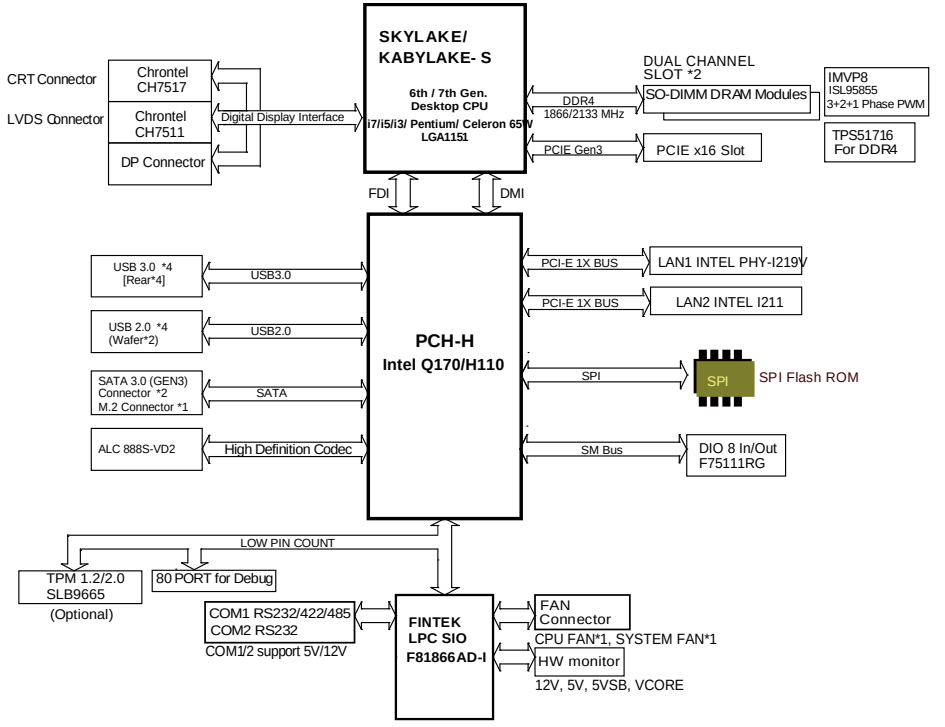
# Appendix B Technical Summary

This appendix will give you a brief introduction of the allocation maps for SA-5800 resources.

The following topics are included:

- SA-5800 Block Diagram
- Interrupt Map
- I/O Map
- Memory Map
- Configuring WatchDog Timer
- Flash BIOS Update

# System Block Diagram



## Interrupt Map

| IRQ | ASSIGNMENT |
|---|---|
| IRQ 0 | System timer |
| IRQ 3 | Communications Port (COM2) |
| IRQ 4 | Communications Port (COM1) |
| IRQ 8 | System CMOS/real time clock |
| IRQ 11 | Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123 |
| IRQ 11 | Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131 |
| IRQ 13 | Numeric data processor |
| IRQ 14 | Motherboard resources |
| IRQ 16 | High Definition Audio Controller |
| IRQ 19 | Intel(R) Active Management Technology - SOL (COM3) |
| IRQ 54 | Microsoft ACPI-Compliant System |
| IRQ 55 | Microsoft ACPI-Compliant System |
| IRQ 56 | Microsoft ACPI-Compliant System |
| IRQ 57 | Microsoft ACPI-Compliant System |
| IRQ 58 | Microsoft ACPI-Compliant System |
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| IRQ | ASSIGNMENT |
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| IRQ 83 | Microsoft ACPI-Compliant System |
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| IRQ | ASSIGNMENT |
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| IRQ 126 | Microsoft ACPI-Compliant System |
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| IRQ | ASSIGNMENT |
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| IRQ | ASSIGNMENT |
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| IRQ | ASSIGNMENT |
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| IRQ 478 | Microsoft ACPI-Compliant System |
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| IRQ 510 | Microsoft ACPI-Compliant System |
| IRQ 511 | Microsoft ACPI-Compliant System |
| IRQ 4294967283 | Intel(R) Management Engine Interface |
| IRQ 4294967290 | Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft) |
| IRQ 4294967291 | Intel(R) HD Graphics 630 |
| IRQ 4294967289 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967288 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967287 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967286 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967285 | Intel(R) I211 Gigabit Network Connection |

| IRQ | ASSIGNMENT |
|---|---|
| IRQ 4294967284 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967292 | Intel(R) Ethernet Connection (2) I219-LM |
| IRQ 4294967293 | Standard SATA AHCI Controller |
| IRQ 4294967294 | Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115 |

**Note:** These resource information were gathered using Windows 10 (the IRQ could be assigned differently depending on OS).

## I/O MAP

| I/O | ASSIGNMENT |
|---|---|
| 0x00000A00-0x00000A0F | Motherboard resources |
| 0x00000A10-0x00000A1F | Motherboard resources |
| 0x00000A20-0x00000A2F | Motherboard resources |
| 0x0000002E-0x0000002F | Motherboard resources |
| 0x0000004E-0x0000004F | Motherboard resources |
| 0x00000061-0x00000061 | Motherboard resources |
| 0x00000063-0x00000063 | Motherboard resources |
| 0x00000065-0x00000065 | Motherboard resources |
| 0x00000067-0x00000067 | Motherboard resources |
| 0x00000070-0x00000070 | Motherboard resources |
| 0x00000070-0x00000070 | System CMOS/real time clock |
| 0x00000080-0x00000080 | Motherboard resources |
| 0x00000092-0x00000092 | Motherboard resources |
| 0x000000B2-0x000000B3 | Motherboard resources |
| 0x00000680-0x0000069F | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x0000FFFF-0x0000FFFF | Motherboard resources |
| 0x00001800-0x000018FE | Motherboard resources |
| 0x0000164E-0x0000164F | Motherboard resources |
| 0x00000020-0x00000021 | Programmable interrupt controller |
| 0x00000024-0x00000025 | Programmable interrupt controller |
| 0x00000028-0x00000029 | Programmable interrupt controller |
| 0x0000002C-0x0000002D | Programmable interrupt controller |
| 0x00000030-0x00000031 | Programmable interrupt controller |
| 0x00000034-0x00000035 | Programmable interrupt controller |
| 0x00000038-0x00000039 | Programmable interrupt controller |
| 0x0000003C-0x0000003D | Programmable interrupt controller |
| 0x000000A0-0x000000A1 | Programmable interrupt controller |
| 0x000000A4-0x000000A5 | Programmable interrupt controller |
| 0x000000A8-0x000000A9 | Programmable interrupt controller |
| 0x000000AC-0x000000AD | Programmable interrupt controller |
| 0x000000B0-0x000000B1 | Programmable interrupt controller |
| 0x000000B4-0x000000B5 | Programmable interrupt controller |
| 0x000000B8-0x000000B9 | Programmable interrupt controller |
| 0x000000BC-0x000000BD | Programmable interrupt controller |
| 0x000004D0-0x000004D1 | Programmable interrupt controller |
| 0x0000F000-0x0000F03F | Intel(R) HD Graphics 630 |
| 0x000003B0-0x000003BB | Intel(R) HD Graphics 630 |
| 0x000003C0-0x000003DF | Intel(R) HD Graphics 630 |

| I/O | ASSIGNMENT |
|---|---|
| 0x00000800-0x0000087F | Motherboard resources |
| 0x0000E000-0x0000EFFF | Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115 |
| 0x000000F0-0x000000F0 | Numeric data processor |
| 0x0000F090-0x0000F097 | Standard SATA AHCI Controller |
| 0x0000F080-0x0000F083 | Standard SATA AHCI Controller |
| 0x0000F060-0x0000F07F | Standard SATA AHCI Controller |
| 0x000003F8-0x000003FF | Communications Port (COM1) |
| 0x000002F8-0x000002FF | Communications Port (COM2) |
| 0x00000040-0x00000043 | System timer |
| 0x00000050-0x00000053 | System timer |
| 0x00001854-0x00001857 | Motherboard resources |
| 0x00000000-0x00000CF7 | PCI Express Root Complex |
| 0x00000D00-0x0000FFFF | PCI Express Root Complex |
| 0x0000F0A0-0x0000F0A7 | Intel(R) Active Management Technology - SOL (COM3) |
| 0x0000FF00-0x0000FFFE | Motherboard resources |
| 0x0000F040-0x0000F05F | Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123 |

## Memory Map

| MEMORY MAP | ASSIGNMENT |
|---|---|
| 0xFED10000-0xFED17FFF | Motherboard resources |
| 0xFED18000-0xFED18FFF | Motherboard resources |
| 0xFED19000-0xFED19FFF | Motherboard resources |
| 0xE0000000-0xEFFFFFFF | Motherboard resources |
| 0xFED20000-0xFED3FFFF | Motherboard resources |
| 0xFED90000-0xFED93FFF | Motherboard resources |
| 0xFED45000-0xFED8FFFF | Motherboard resources |
| 0xFF000000-0xFFFFFFFF | Motherboard resources |
| 0xFF000000-0xFFFFFFFF | Legacy device |
| 0xFEE00000-0xFEEFFFFF | Motherboard resources |
| 0xDFFE0000-0xDFFFFFFF | Motherboard resources |
| 0xFDAF0000-0xFDAFFFFF | Motherboard resources |
| 0xFDAE0000-0xFDAEFFFF | Motherboard resources |
| 0xFDAC0000-0xFDACFFFF | Motherboard resources |
| 0xDE000000-0xDEFFFFFF | Intel(R) HD Graphics 630 |
| 0xC0000000-0xCFFFFFFF | Intel(R) HD Graphics 630 |
| 0xA0000-0xBFFFF | Intel(R) HD Graphics 630 |
| 0xA0000-0xBFFFF | PCI Express Root Complex |
| 0xDF000000-0xDF01FFFF | Intel(R) I211 Gigabit Network Connection |
| 0xDF000000-0xDF01FFFF | Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115 |
| 0xDF020000-0xDF023FFF | Intel(R) I211 Gigabit Network Connection |
| 0xDF100000-0xDF11FFFF | Intel(R) Ethernet Connection (2) I219-LM |
| 0xFED00000-0xFED003FF | High precision event timer |
| 0xDF148000-0xDF149FFF | Standard SATA AHCI Controller |
| 0xDF14C000-0xDF14C0FF | Standard SATA AHCI Controller |
| 0xDF14B000-0xDF14B7FF | Standard SATA AHCI Controller |
| 0xFD000000-0xFDABFFFF | Motherboard resources |
| 0xFD000000-0xFDABFFFF | PCI Express Root Complex |
| 0xFDAD0000-0xFDADFFFF | Motherboard resources |
| 0xFDB00000-0xFDFFFFFF | Motherboard resources |
| 0xFE000000-0xFE01FFFF | Motherboard resources |
| 0xFE036000-0xFE03BFFF | Motherboard resources |
| 0xFE03D000-0xFE3FFFFF | Motherboard resources |
| 0xFE410000-0xFE7FFFFF | Motherboard resources |
| 0xDF144000-0xDF147FFF | Intel(R) 100 Series/C230 Series Chipset Family PMC - A121 |
| 0x90000000-0xDFFFFFFF | PCI Express Root Complex |
| 0xDF14D000-0xDF14DFFF | Intel(R) Active Management Technology - SOL (COM3) |

| MEMORY MAP | ASSIGNMENT |
|---|---|
| 0xFED40000-0xFED44FFF | Trusted Platform Module 2.0 |
| 0xFE40F000-0xFE40FFFF | Intel(R) Management Engine Interface |
| 0xDF130000-0xDF13FFFF | Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft) |
| 0xDF14A000-0xDF14A0FF | Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123 |
| 0xDF14F000-0xDF14FFFF | Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131 |
| 0xDF140000-0xDF143FFF | High Definition Audio Controller |
| 0xDF120000-0xDF12FFFF | High Definition Audio Controller |

## Configuring WatchDog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. User must first assign the address of register by writing address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

### Configuration Sequence

To program F81866 configuration registers, the following configuration sequence must be followed:

**(1) Enter the extended function mode**

To place the chip into the Extended Function Mode, two successive writes of 0x87 must be applied to Extended Function Enable Registers (EFERs, i.e. 2Eh or 4Eh).

**(2) Configure the configuration registers**

The chip selects the Logical Device and activates the desired Logical Devices through Extended Function Index Register (EFIR) and Extended Function Data Register (EFDR). The EFIR is located at the same address as the EFER, and the EFDR is located at address (EFIR+1). First, write the Logical Device Number (i.e. 0x07) to the EFIR and then write the number of the desired Logical Device to the EFDR. If accessing the Chip (Global) Control Registers, this step is not required. Secondly, write the address of the desired configuration register within the Logical Device to the EFIR and then write (or read) the desired configuration register through the EFDR.

**(3) Exit the extended function mode**

To exit the Extended Function Mode, writing 0xAA to the EFER is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

## Code example for watch dog timer

Enable watchdog timer and set timeout interval to 30 seconds.

```
; ------------------------ Enter to extended function mode -----------------------------
mov     dx,     2eh
mov     al,     87h
out     dx,     al
out     dx,     al
; ---------------------- Select Logical Device 7 of watchdog timer ---------------------
mov     al,     07h
out     dx,     al
inc     dx
mov     al,     07h
out     dx,     al
;-------------------------------Enable Watch dog feature ----------------------------
mov     al,     030h
out     dx,     al
inc     dx
mov     al,     01h
out     dx,     al
;------------------------------- Enable Watch PME-----------------------------------------
dec     dx
mov     al,     0FAh
out     dx,     al
inc     dx
in      al,     dx
and     al,     51h
out     dx,     al
; ------------------------ Set timeout interval to 30 ---------------------------------------
dec     dx
mov     al,     0F6h
out     dx,     al
inc     dx
mov     al,     1Eh
out     dx,     al
;-------------------Set second as counting unit and start counting ---------------------
dec     dx
mov     al,     0F5h
out     dx,     al
inc     dx
in      al,     dx
and     al,     30h
out     dx,     al
;-------------------------------Exit the extended function mode ------------------------
dec     dx
mov     al,     0AAh
out     dx,     al
```

## Flash BIOS Update

### I. Prerequisites

***1*** Prepare a USB storage device which can save the required files for BIOS update.

***2*** Download and save the BIOS file (e.g. 58000TQ3.bin) to the storage device.

***3*** Copy AMI flash utility – AFUEFIx64.exe (v5.09.01) into the storage device.

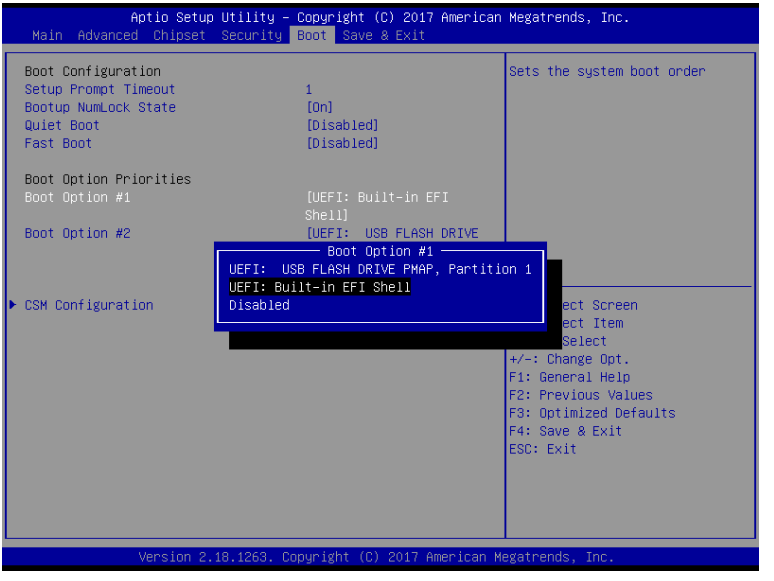
***4*** Make sure the target system can first boot to the EFI shell environment.

(1) Connect the USB storage device.

(2) Turn on the computer and press **<ESC>** or **<DEL>** during boot to enter BIOS Setup.

(3) Select **[Boot]** menu and set **[UEFI: Built-in EFI Shell]** to be the 1st boot device.

(4) Press **<F4>** key to save the configuration and restart the system to boot into EFI Shell environment.



## II. AFUEFIx64 Command for System BIOS Update

AFUEFIx64.efi is the AMI firmware update utility; the command line is shown as below:

**AFUEFIx64 <ROM File Name> [option1] [option2]….**

Users can type "AFUEFIx64 /?" to view the definition of each control option. The recommended options for BIOS ROM update include the following parameters:

**/P**: Program main BIOS image.

**/B**: Program Boot Block.

**/N**: Program NVRAM.

**/X**: Don't check ROM ID.

## III. BIOS Update Procedure

***1*** Boot into EFI Shell, change to the path where you put BIOS image and AFUEFIx64.

```
Shell> fs0:
fs0:\> cd afuefix64
```

***2*** Type "**AFUEFIx64 5800xxxx.bin /p /b /n /x"** and press enter to start the flash procedure. (xxxx means the BIOS revision part, e.g. 0PQ1…)

***3*** During the update procedure, you will see the BIOS update process status and its percentage. Beware! Do not turn off the system power or reset your computer if the whole procedure is not completed yet, or the BIOS ROM may be crashed and the system will be unable to boot up next time.

***4*** After the BIOS update procedure is completed, the following messages will display:

```
fs0:\afuefix64> afuefix64 58000TQ3.bin /p /b /n /x
 +--------------------------------------------------------------------------+
 |                    AMI Firmware Update Utility  v5.09.01.1317             |
 |   Copyright (C) 2016 American Megatrands Inc. All Rights Reserved.       |
 +--------------------------------------------------------------------------+
 Reading flash ..... done
 - ME Data Size Checking . ok
 - FFS checksums ..... ok
 - Check RomLayout ..... Ok.
 Erasing Boot Block ..... done
 Updating Boot Block ..... done
 Verifying Boot Block ..... done
 Erasing Main Block ..... done
 Updating Main Block ..... done
 Verifying Main Block ..... done
 Erasing NVRAM Block ..... done
 Updating NVRAM Block ..... done
 Verifying NVRAM Block ..... done

 fs0:\afuefix64> _
```

***5*** Restart the system and boot up with the new BIOS configurations.

***6*** The BIOS Update is completed after the system is restarted.

*7* Reboot the system and verify if the BIOS version shown on the initialization screen has been updated.