

# **FWA9400**

## **2U Rackmount Network Appliance**

### **User's Manual**

Version 1.0  
(Nov. 2017)



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## Compliance

### CE

This product has passed CE tests for environmental specifications and limits. This product is in accordance with the directives of the Union European (EU). If users modify and/or install other devices in this equipment, the CE conformity declaration may no longer apply.

### FCC

This product has been tested and found to comply with the limits for a Class A device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

### WEEE



This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

### Green IBASE



This product is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

## Important Safety Information

Carefully read the precautions before using the device.

### Environmental conditions:

- Lay the device horizontally on a stable and solid surface in case the device may fall, causing serious damage.
- Slots and openings on the chassis are for ventilation. Do not block or cover these openings. Make sure you leave plenty of space around the device for ventilation. NEVER INSERT OBJECTS OF ANY KIND INTO THE VENTILATION OPENINGS.
- Use this product in environments at ambient temperatures 0°C ~ 40°.
- DO NOT LEAVE THIS DEVICE IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20°C OR ABOVE 70°C. This could damage the device. The device must be used in a controlled environment.

### Care for your IBASE products:

- Before cleaning the device, turn it off and unplug all cables such as power in case a small amount of electrical current may still flow.
- Use neutral cleaning agents or diluted alcohol to clean the device chassis with a cloth. Then wipe the chassis with a dry cloth.
- Vacuum the dust with a computer vacuum cleaner to prevent the air vent or slots from being clogged.



## WARNING

### Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on your device.
- Do not place heavy objects on the top of the device.
- Operate this device from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your distributor or local power company.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure that the total ampere rating of the product plugged into the extension cord does not exceed its limits.
- When handling processor chips or memory modules, avoid touching their pins or gold fingers. Put modules or peripherals back into antistatic bags when they are not in use or not installed in the chassis.

### Avoid Disassembly

You are not suggested to disassemble, repair or make any modification to the device. Disassembly, modification, or any attempt at repair could generate hazards and cause damage to the device, even bodily injury or property damage, and will void any warranty.



## CAUTION

Danger of explosion if internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions. Under no circumstances should the Lithium battery cell be shorted; otherwise the battery cell may heat up or cause potential burn hazards.

## Warranty Policy

- **IBASE standard products:**
  - 24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.
- **3<sup>rd</sup>-party parts:**
  - 12-month (1-year) warranty from delivery for the 3<sup>rd</sup>-party parts that are not manufactured by IBASE, such as CPU, memory, HDD, power adapter, panel and touchscreen.
- \* PRODUCTS, HOWEVER, THAT FAILS DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

## Technical Support & Services

1. Visit the IBASE website at [www.ibase.com.tw](http://www.ibase.com.tw) to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.
  - Product model name
  - Product serial number
  - Detailed description of the problem
  - The error messages in text or in screenshots if there is any
  - The arrangement of the peripherals
  - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, you can download the RMA form at <http://www.ibase.com.tw/english/Supports/RMAService/>. Fill out the form and contact your distributor or sales representative.

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# Chapter 1

## General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Overview
- Dimensions



## 1.1 Introduction

FWA9400 series are specifically designed for the network security and management market. There are plenty of applications adopting network security or network management as listed below.



Network Security Applications:

- Firewall
- Unified Threat Management (UTM)
- Virtual Private Network (VPN)
- Proxy Server
- Caching Server

Network Management Applications:

- Load balancing
- Quality of Service
- Remote Access Service

The FWA networking appliance product line covers the spectrum from offering platforms designed for:

- SOHO
- SMB
- Enterprise

Each product is designed to address the distinctive requirements of its respective market segment from cost effective entry-level solutions to high throughput and performance-bound systems for the enterprise level.

## 1.2 Features

- 2U rackmount platform designed with Intel® Xeon® E5-2600 V4 / V3 dual processors
- 16 x DDR4 RDIMM or LRDIMM, expandable up to 512 GB
- 6 or 8 x network modules with up to 48 or 64 GbE ports
- Optional IPMI 2.0 module to output through VGA port
- 1 x PCIe (x8) expansion slot
- 800W redundant power supply

## 1.3 Packing List

Your FWA9400 package should include the items listed below. If any of the items below is missing, contact the distributor or the dealer from whom you purchased the product.

- |                                 |      |
|---------------------------------|------|
| • FWA9400                       | x 1  |
| • 800W Redundant Power Supply   | x 1  |
| • Power Cord                    | x 2  |
| • Rack Mount Bracket            | x 2  |
| • Screws for Rack Mount Bracket | x 12 |

## 1.4 Optional Accessories

IBASE provide optional accessories as follows. Please contact us or your dealer if you need any.

- Console Cable (160 cm, PK1-51)
- IPMI Module (IDN100)
- VGA Cable (40 cm, VGA21A) for IDN100
- NIC Module:
  - IBN-R420BN (Intel® 1x i350-AM4, 4 x RJ45 GbE, Non-Bypass)
  - IBN-R420BU (Intel® 1x i350-AM4, 4 x RJ45 GbE, 2 Bypass Segment)
  - IBN-R840N (Intel® 2x i350-AM4, 8 x RJ45 GbE, Non-Bypass)
  - IBN-R840U (Intel® 2x i350-AM4, 8 x RJ45 GbE, 4 Bypass Segment)
  - IBN-S400 (Intel® 1x i350-AM4, 4 SFP GbE, Non-Bypass)
  - IBN-S800 (Intel® 2x i350-AM4, 8 SFP GbE, Non-Bypass)

## 1.5 Specifications

Product Name	FWA9400-SHD	FWA9400-NIC
<b>System</b>		
<b>Motherboard</b>	MB979	
<b>Operating System</b>	<ul style="list-style-type: none"> <li>Windows Server 2012</li> <li>Linux Ubuntu 14.04.3</li> </ul>	
<b>CPU</b>	Intel® Xeon® E5-2600 V4 / V3, dual processor	
<b>Chipset</b>	Intel® C612 PCH	
<b>Memory</b>	16 x DDR4 RDIMM or LRDIMM, expandable to 512 GB	
<b>Storage</b>	<ul style="list-style-type: none"> <li>2 x 3.5" hot-swappable HDD</li> <li>1 x SATA III CFast</li> </ul>	<ul style="list-style-type: none"> <li>2 x 2.5" or 1 x 3.5" internal HDD</li> <li>1 x SATA III CFast</li> </ul>
<b>Network</b>	2 x Intel® I210AT GbE controller	
<b>Super I/O</b>	Nuvoton NCT5523D	
<b>Graphics</b>	IDN100 module (Optional)	
<b>IPMI</b>	IPMI module compliant with IPMI 2.0 (Optional)	
<b>Power Supply</b>	Full range 800W 1+1 redundant power supply	
<b>Power Requirement</b>	100 ~ 240V AC	
<b>BIOS</b>	AMI BIOS	
<b>Watchdog</b>	Watchdog Timer 256 segments, 0, 1, 2...255 sec/min	
<b>Chassis</b>	Aluminum & steel, black	
<b>Dimensions (W x H x D)</b>	437 x 88 x 580 mm (17.20" x 3.46" x 22.83")	
<b>Weight</b>	20 kg (44.1 lb)	
<b>Certificate</b>	CE / FCC Class A	
<b>Front I/O Ports</b>		
<b>Console</b>	1 x Console port	
<b>Management Port (MGMT)</b>	2 x MGMT ports (MGMT2 is shared with IPMI NC-SI port)	
<b>Traffic LAN Port</b>	48 x RJ45 GbE LAN ports (6 x network module slots)	64 x RJ45 GbE LAN ports (8 x network module slots)
<b>USB</b>	2 x USB 2.0	
<b>HDD</b>	2 x 3.5" hot-swappable HDD drive bay	N/A

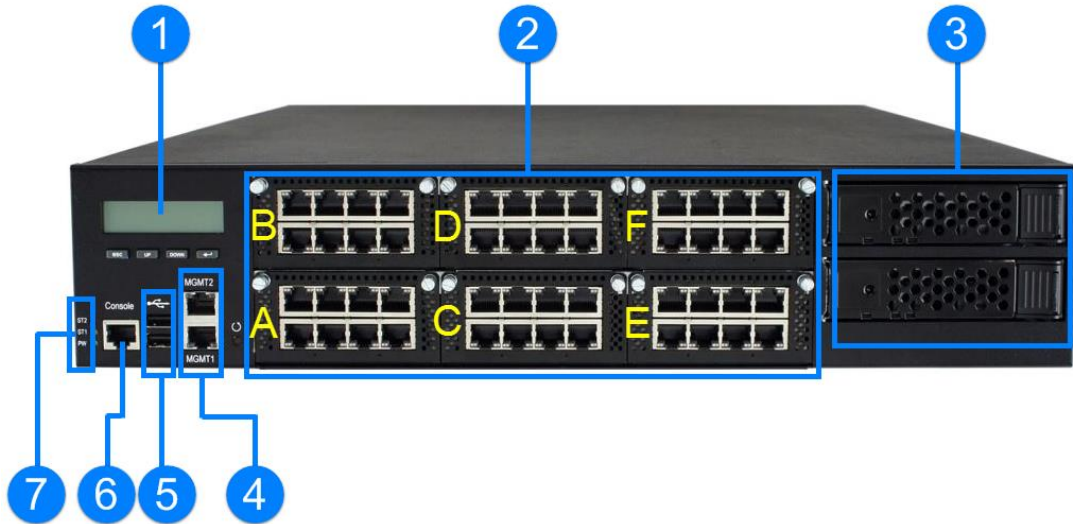
<b>Product Name</b>	<b>FWA9400-SHD</b>	<b>FWA9400-NIC</b>
<b>Rear I/O Ports</b>		
<b>AC Inlet</b>	2 x 100 ~ 240V AC Inlet	
<b>CFast</b>	1 x SATA III CFast slot	
<b>Display</b>	1 x VGA port (based on the optional IPMI module)	
<b>Fan</b>	4 x swappable system fan modules	
<b>Power</b>	2 x hot-swappable power supply modules	
<b>Expansion</b>	1 x PCIe (x8) slot	
<b>Environment</b>		
<b>Temperature</b>	<ul style="list-style-type: none"> <li>• <b>Operating:</b> 0 ~ 40 °C (32 ~ 104 °F)</li> <li>• <b>Storage:</b> -20~ 70 °C (-4 ~ 158 °F)</li> </ul>	
<b>Relative Humidity</b>	5 ~ 90% at 45 °C (non-condensing)	
<b>Vibration Protection</b>	<ul style="list-style-type: none"> <li>• <b>Operating:</b> 0.25 Grms / 3 ~ 500 Hz (Z-axis)</li> <li>• <b>Non-operating:</b> 1.0 Grms / 3 ~ 500Hz (Z-axis)</li> </ul>	
<b>Shock Protection</b>	Half-sinewave 50G Z-axis	

All specifications are subject to change without prior notice.

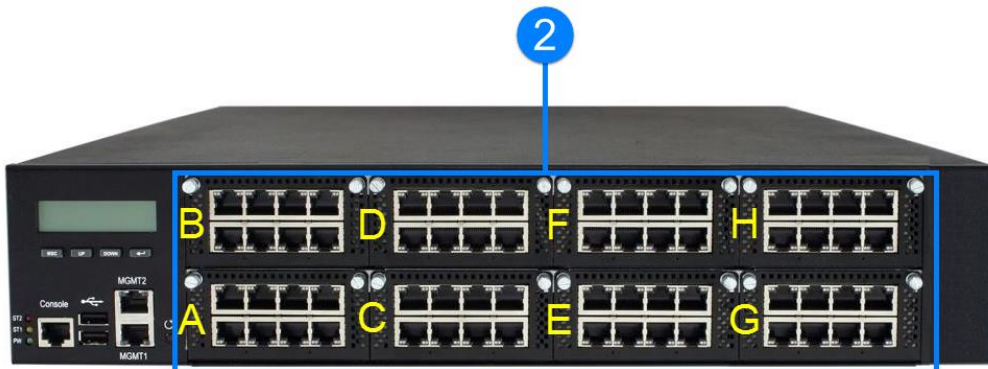
## 1.6 Overview

### Front View

- FWA9400-SHD



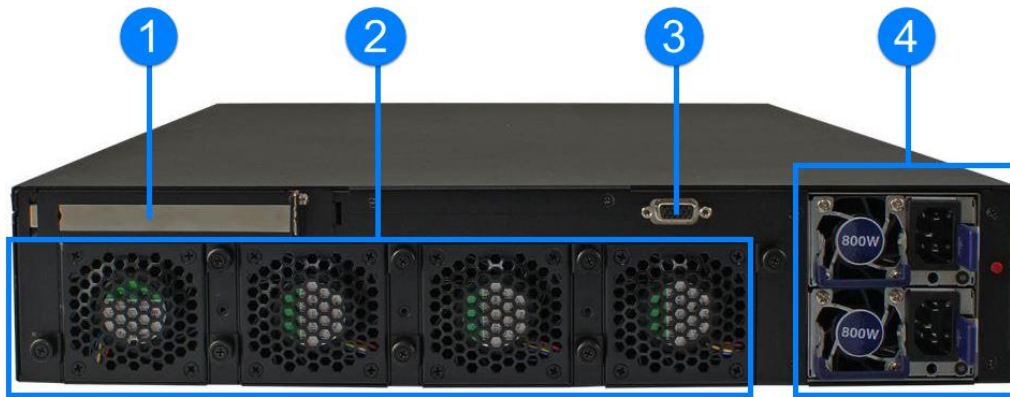
- FWA9400-NIC



FWA9400-SHD and FWA9400-NIC are different in items 2 and 3.

No.	Name	No.	Name
1	LCM Display with 5 buttons	5	USB 2.0 Ports
2	Network Module Slots: <ul style="list-style-type: none"> <li>• <b>FWA9400-SHD</b>: Slots A ~ F</li> <li>• <b>FWA9400-NIC</b>: Slots A ~ H</li> </ul>	6	Console Port
3	3.5" Hot-swappable HDD Bay (for FWA9400-SHD only)	7	LED Indicators (from top to bottom: Status2, Status1, Power LED)
4	Management Ports		

**Rear View**



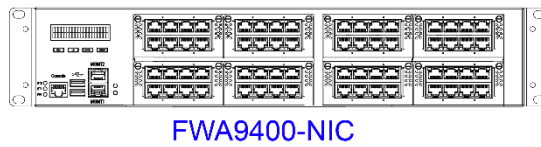
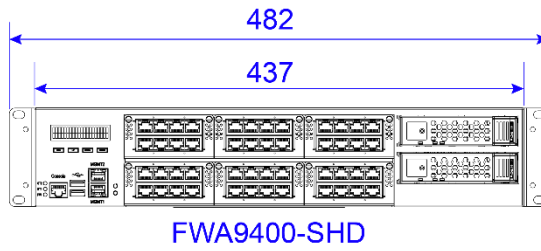
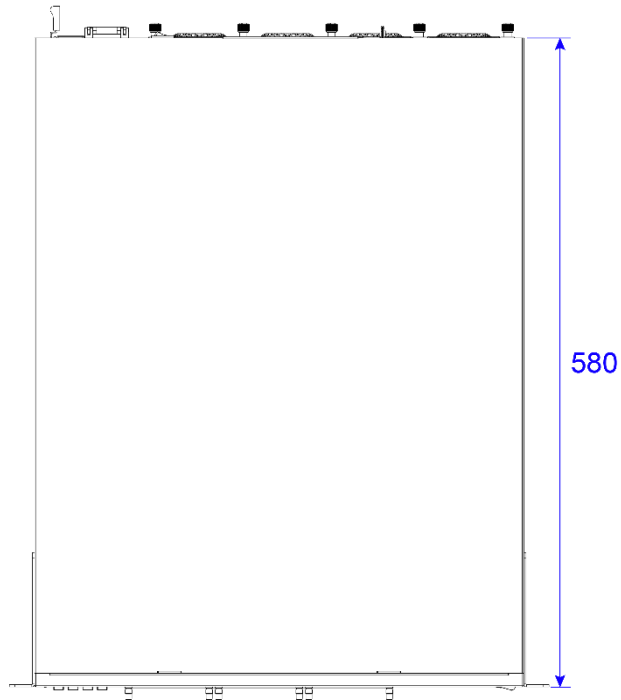
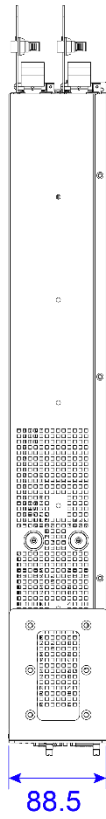
No.	Name	No.	Name
1	PCIe Card Slot	3	VGA Port (via the optional IPMI module)
2	System Fan Module	4	Redundant Power Supply

**Oblique View**



## 1.7 Dimensions

Unit: mm



## Chapter 2

# Hardware Configuration

The information provided in this chapter includes:

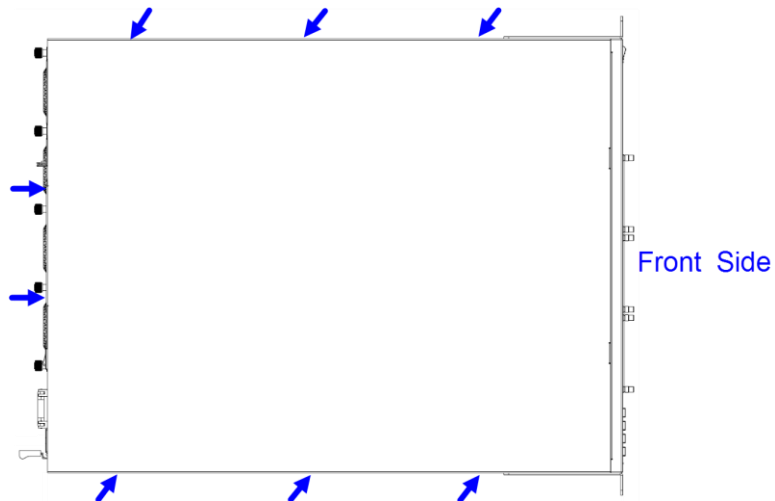
- Essential installations before you begin
- Information and locations of connectors



## 2.1 Essential Installations Before You Begin

For the network modules, HDD (only available for FWA9400-SHD), or the fan modules installations, you can directly install without disassemble the device.

For the memory, CFast, PCIe cards or IPMI module, you need to disassemble the device cover before installations by removing 8 screws as shown below to pull out the lid.



---

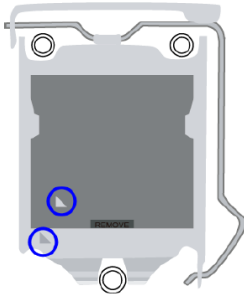
**Note:** The device as shown above is FWA9400-SHD, taken as an illustration example.

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## 2.1.1 CPU Installation / Replacement

Follow the instructions below to install or replace the CPU if necessary.

1. Take away the fan duct. Then remove the CPU heatsink.
2. Unlock the CPU socket by pressing the lever sideways, then lift up the lever and the metal lid.
3. Position the CPU above the socket such that the CPU corner aligns with the gold triangle matching the socket corner with a small triangle.



4. Carefully insert the CPU into the socket and push down the lever to secure the CPU.

Then you can install the CPU cooler and fan duct back.

---

**Note:** Ensure that the CPU heatsink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause your system to hang or be unstable

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## 2.1.2 Network Module Installation / Removal

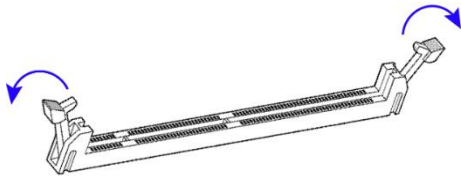
Release two screws of a network module and pull it out carefully as shown below for replacement and installation.



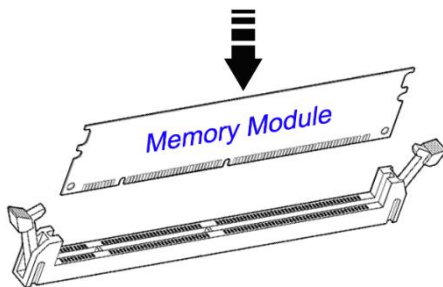
## 2.1.3 Memory Installation

If you need to install or replace a memory module, follow the instructions below for installation after you disassemble the device cover.

1. Press the ejector tab of the memory slot down and outwards with your fingertips.



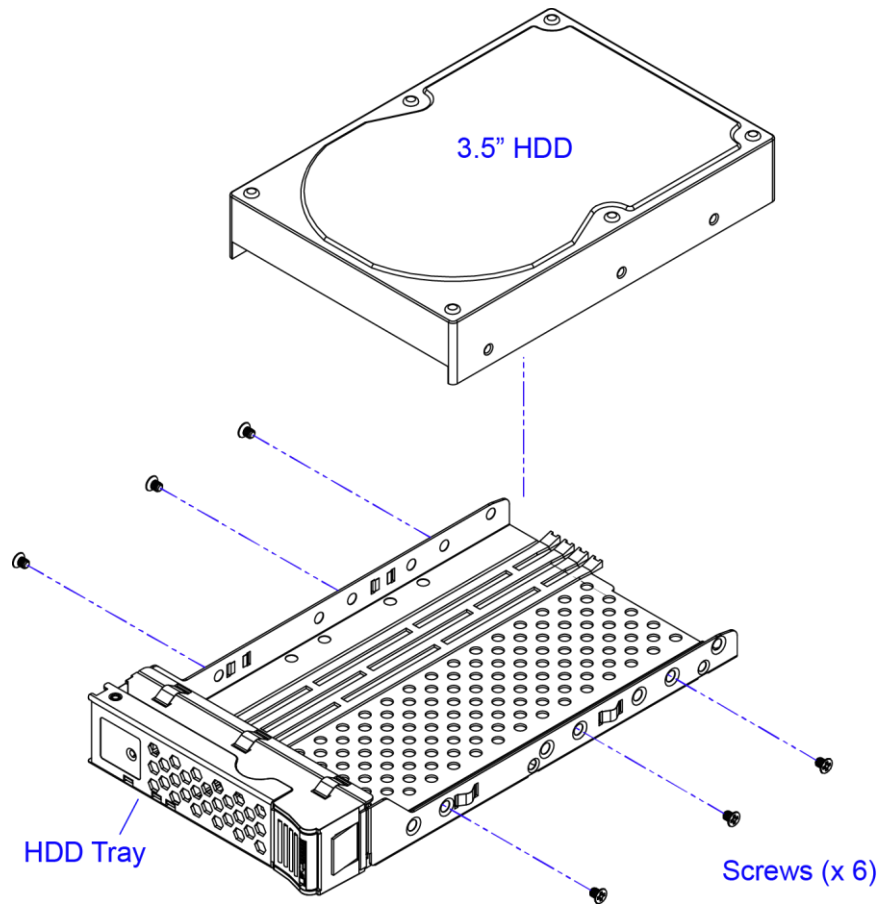
2. Hold the memory module and align the key of the module with that on the memory slot.
3. Gently push the module in an upright position until the ejector tabs of the memory slot close to hold the module in place when the module touches the bottom of the slot.



To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

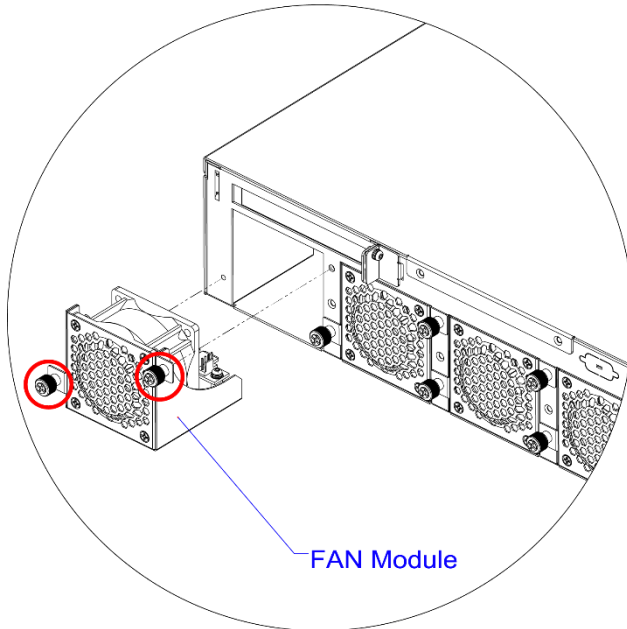
## 2.1.4 HDD Installation

Remove 6 screws on the side (or 4 screws on the bottom) of the HDD tray, attach your HDD and tighten the screws.

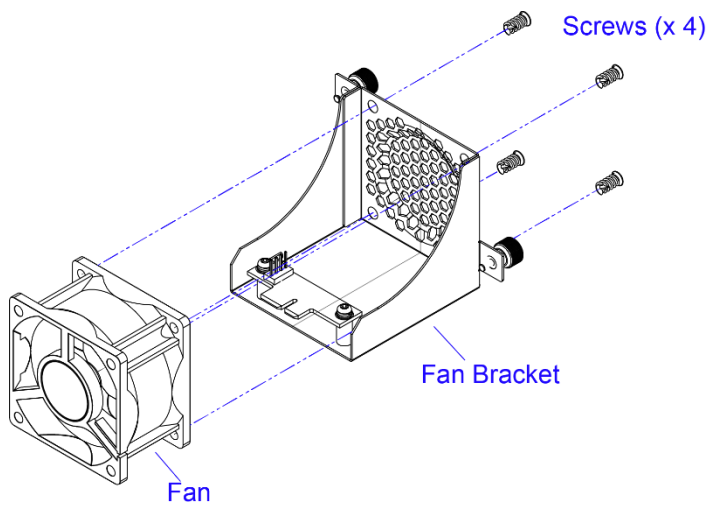


## 2.1.5 Fan Module Installation

1. Release the indicated 2 screws below to take out the fan module from the device.



2. Remove 4 screws on the rear side of the fan module, take out the fan, replace with a new one, and tighten these screws.

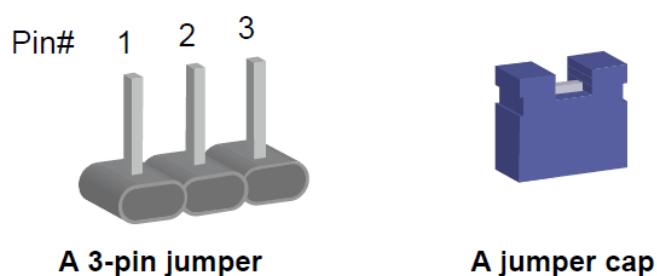


3. Put the fan module back to the device and fasten it by tightening the 2 screws mentioned in the step 1.

## 2.2 Setting the Jumper

Set up and configure your FWA9400 by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.



Refer to the illustration below to set jumpers.

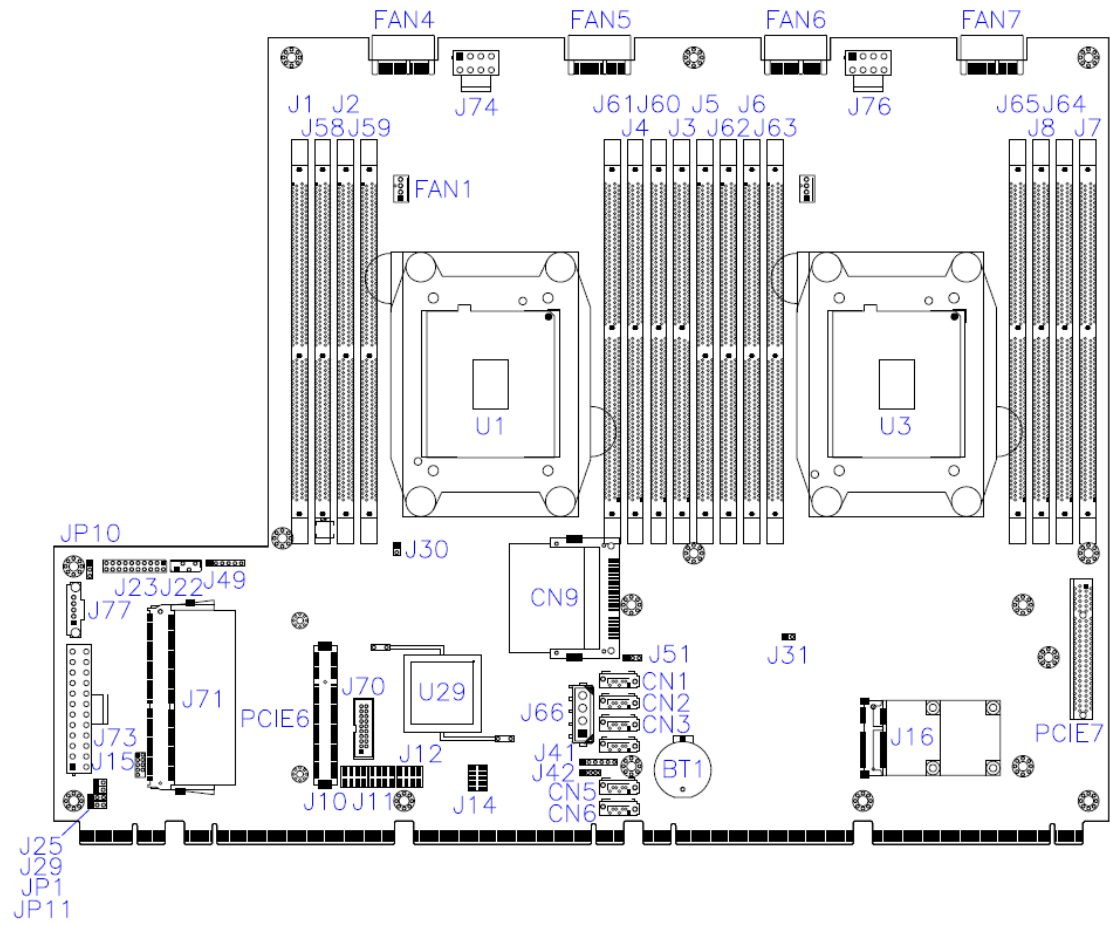
Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

### 2.3 Jumper & Connector Locations on Motherboard

Motherboard: MBD979

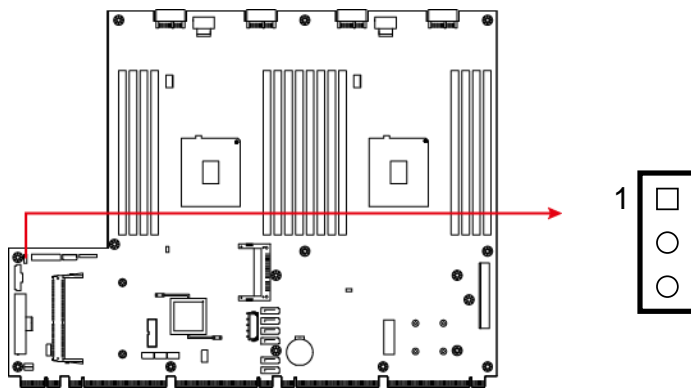


**MB979 - top**

## 2.4 Jumper Quick Reference

Function	Connector Name	Page
ATX & AT Mode	JP10	17
Clearing CMOS Data	JP1	18
Flash Descriptor	JP11	18

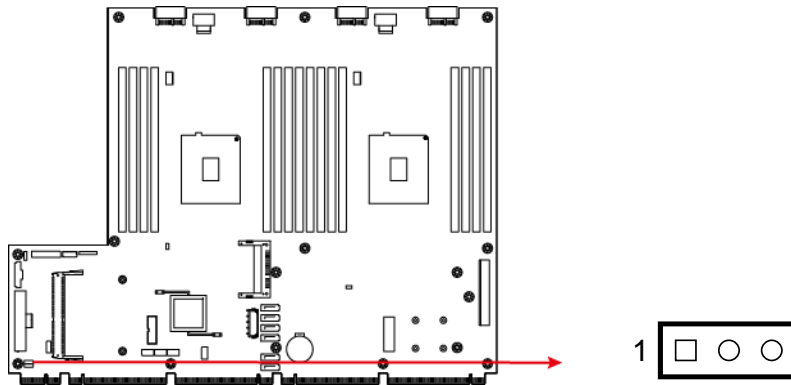
### 2.4.1 ATX & AT Mode (JP10)



Function	Pin closed	Illustration
AT Mode (Default)	1-2	1
ATX Mode	2-3	1

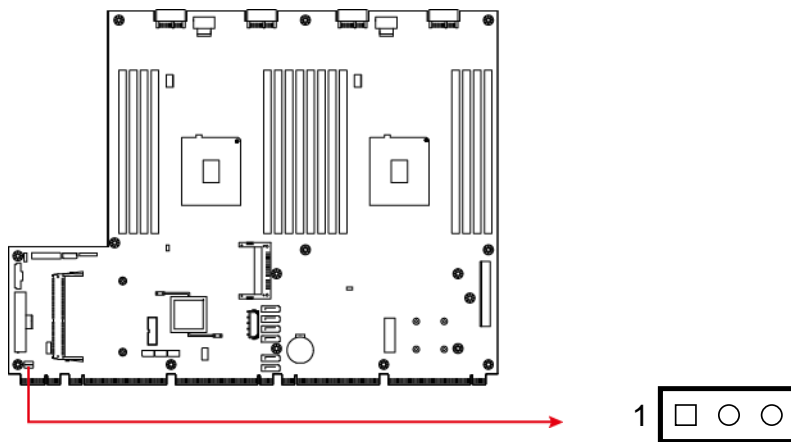


## 2.4.2 Clearing CMOS Data (JP1)



Function	Pin closed	Illustration
Normal (Default)	1-2	1
Clearing CMOS	2-3	1

## 2.4.3 Flash Descriptor (JP11)

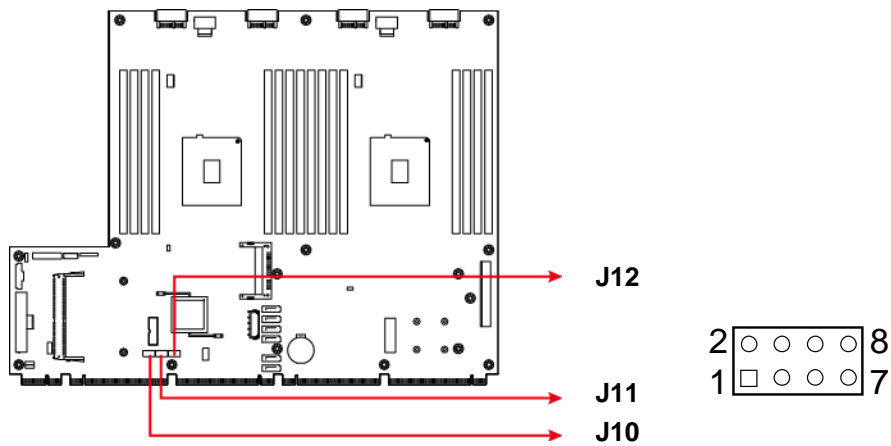


Function	Pin closed	Illustration
No Security Override (Default)	1-2	1
Security Override	2-3	1

## 2.5 Connectors Quick Reference

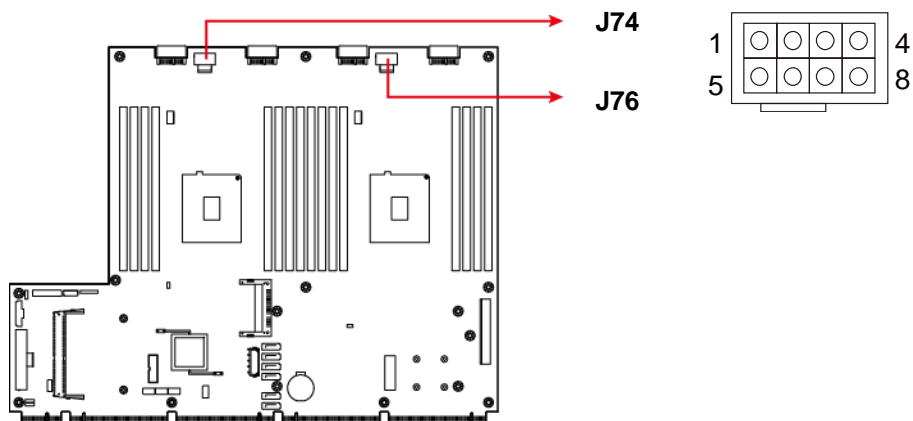
Function	Connector Name	Page
USB 2.0 Header	J10, J11, J12	20
ATX 12V Power Connector	J74, J76	20
ATX 24-pin Power Connector	J73	21
Fan Power Connector	FAN1, FAN2	22
System Function Connector	J23	22
PCIe (x1) slots for Fan Modules	FAN4, FAN5, FAN6, FAN7	--
SATA 3.0 Port	CN1, CN2, CN3, CN4, CN5, CN6	--
Golden Finger for IP336	PCIE1, PCIE2, PCIE3, PCIE4	--
Golden Finger for IP337	PCIE1, PCIE2, PCIE3, PCIE4, PCIE5	--
PCIe (x8) Slot	PCIE7	--
CFast Slot	CN9	--
Mini-PCIe Slot	J16	--
IPMI Connector	J22	--
USB 3.0 Header	J70	--
DDR4 Slot	Channel A: J1, J58 Channel B: J2, J59 Channel C: J3, J60 Channel D: J4, J61 Channel E: J5, J62 Channel F: J6, J63 Channel G: J7, J64 Channel H: J8, J65	--
Factory Use Only	J14, J15, J30, J31, J49	--

## 2.5.1 USB 2.0 Header (J10, J11, J12)



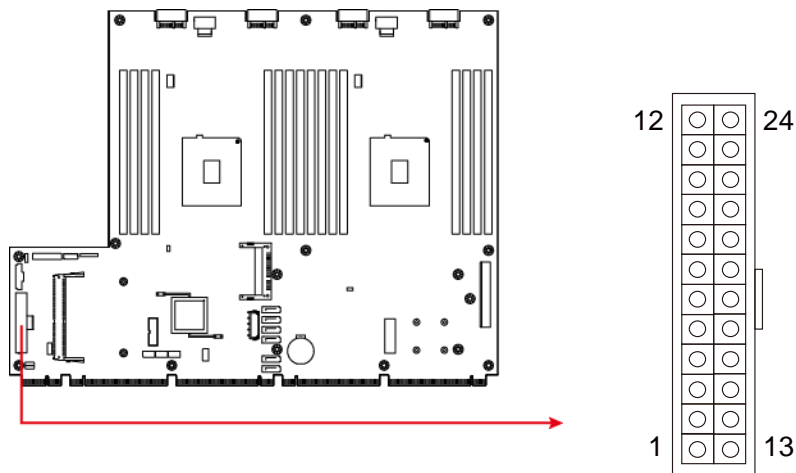
Pin	Assignment	Pin	Assignment
1	VCC	2	Ground
3	USB1-	4	USB2+
5	USB1+	6	USB2-
7	Ground	8	VCC

## 2.5.2 ATX 12V Power Connector (J74, J76)



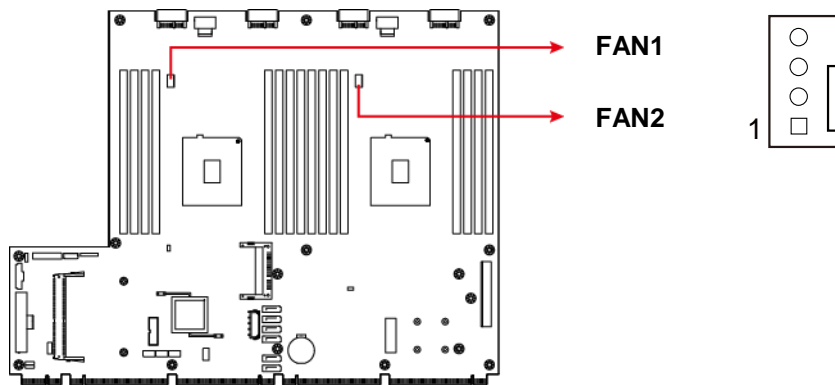
Pin	Assignment	Pin	Assignment
1	Ground	5	+12V
2	Ground	6	+12V
3	Ground	7	+12V
4	Ground	8	+12V

### 2.5.3 ATX 24-pin Power Connector (J73)



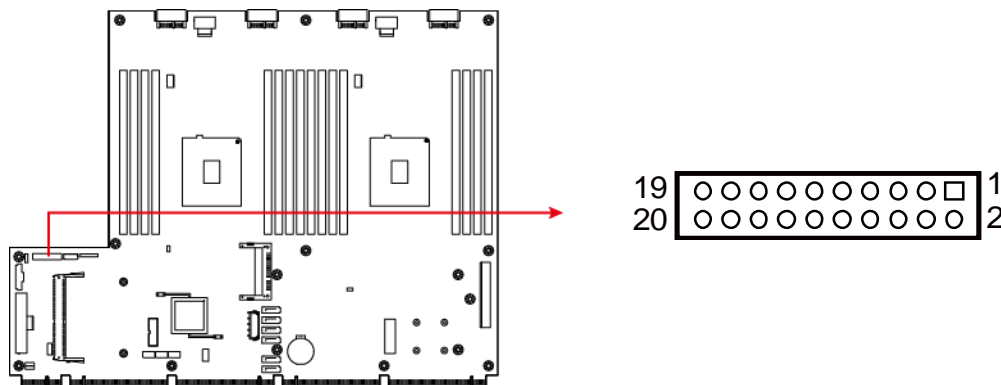
Pin	Assignment	Pin	Assignment
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	Ground	15	Ground
4	+5V	16	PS-ON
5	Ground	17	Ground
6	+5V	18	Ground
7	Ground	19	Ground
8	Power good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	Ground

**2.5.4 Fan Power Connector (FAN1, FAN2)**



Pin	Assignment	Pin	Assignment
1	Ground	3	Rotation detection
2	+12V	4	Control

**2.5.5 System Function Connector (J23)**



Pin	Assignment	Pin	Assignment
1	Power LED+	2	Speaker+
3	NC	4	NC
5	Power LED- (GND)	6	Speaker- (GND)
7	NC	8	VCC5
9	GND	10	NC
11	GND	12	NC
13	GND	14	ATXPWR_BTN#
15	NC	16	NC
17	GND	18	FRST_OUT
19	HDD LED+	20	HDD LED-

## Chapter 3

# BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

## 3.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

## 3.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

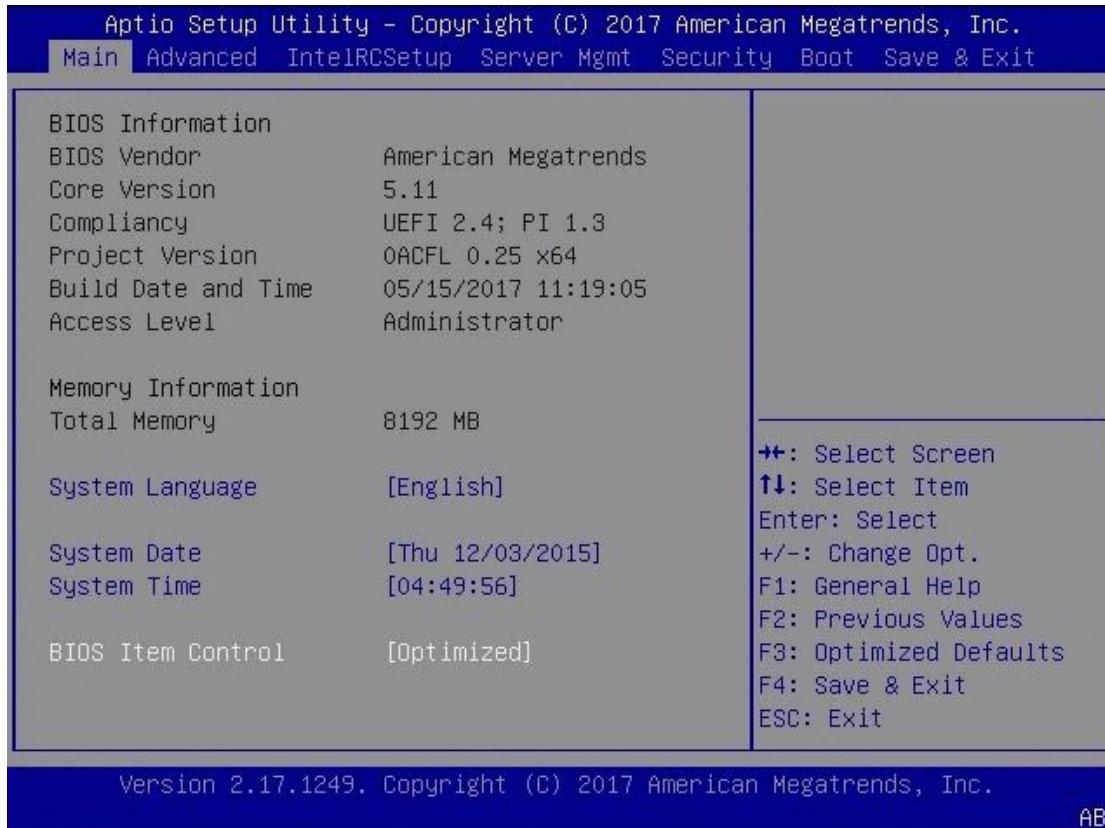
---

**Warning:** It is strongly recommended that you avoid making any changes to the chipset defaults.

These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

---

### 3.3 Main Settings

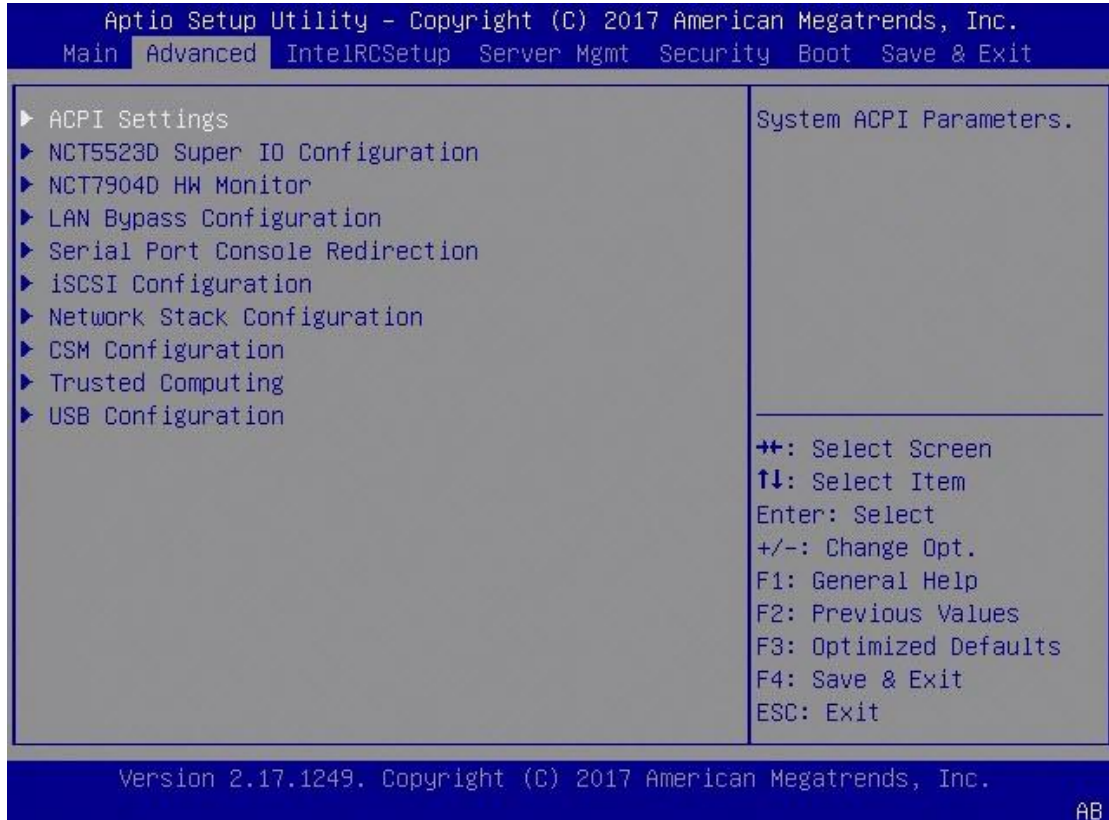


BIOS Setting	Description
System Language	Choose the system default language.
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

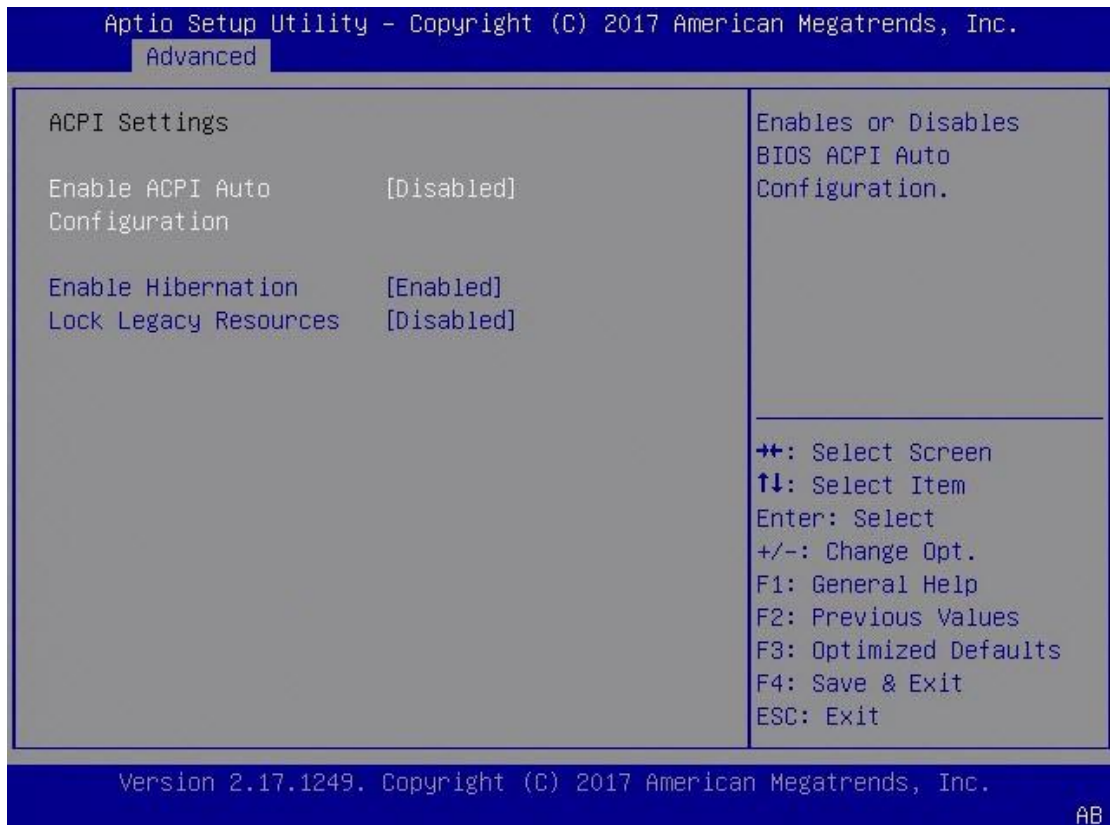


## 3.4 Advanced Settings

This section allows you to configure, improve your system and allows you to set up some system features according to your preference.

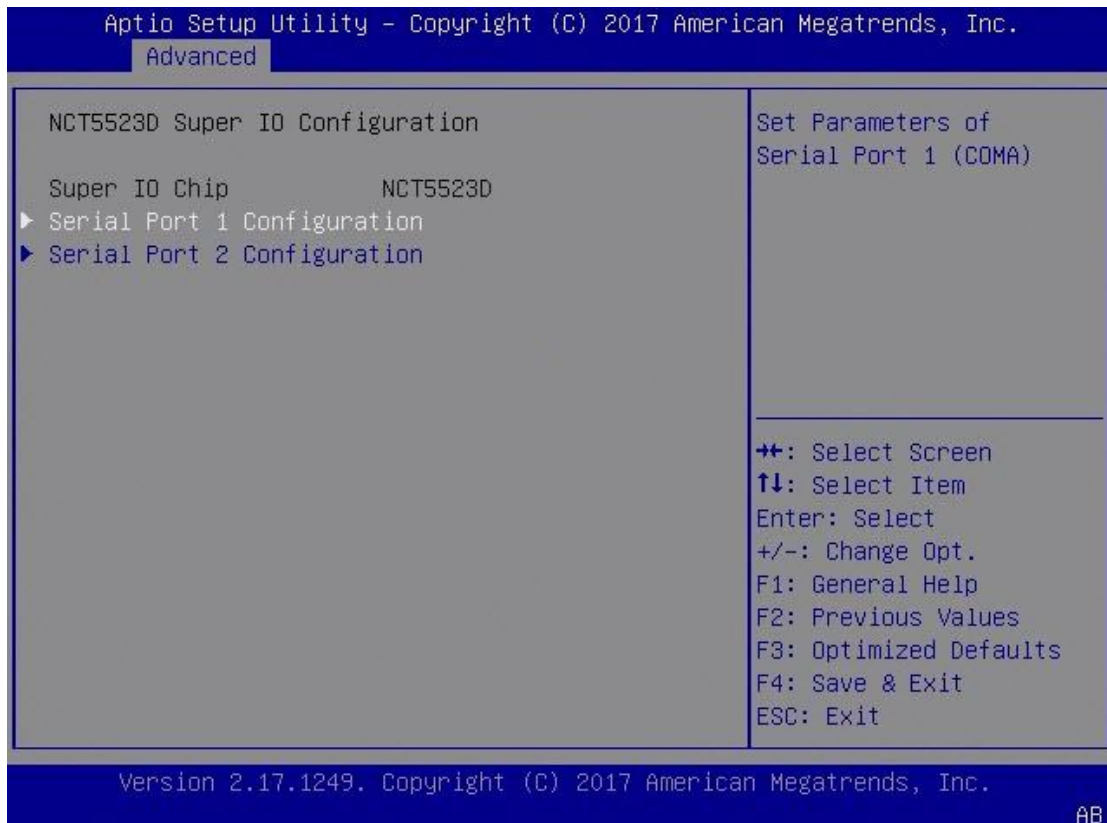


### 3.4.1 ACPI Settings



BIOS Setting	Description
Enable ACPI Auto Configuration	Enables / Disables BIOS ACPI auto configuration.
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
Lock Legacy Resources	Enables / Disables Lock of Legacy Resources.

### 3.4.2 NCT5523D Super IO Configuration



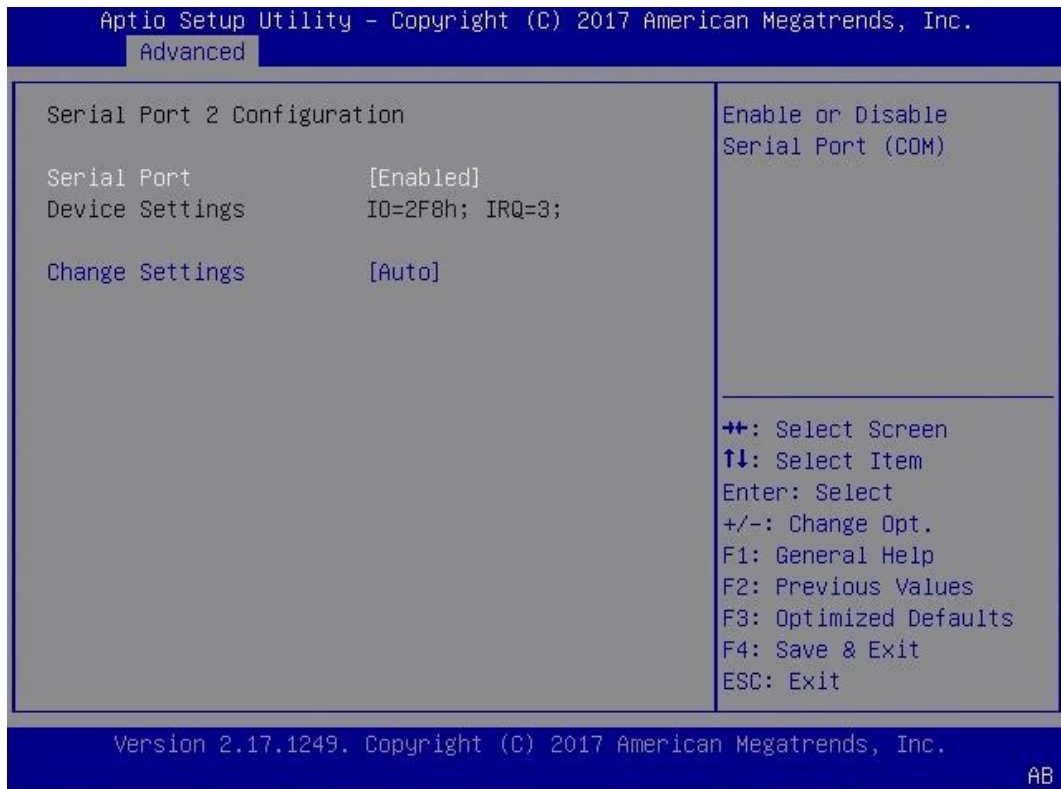
BIOS Setting	Description
Serial Ports Configuration	Sets Parameters of Serial Ports. You can enable / disable the serial port and select an optimal settings for the Super IO device.

### 3.4.2.1. Serial Port 1 Configuration



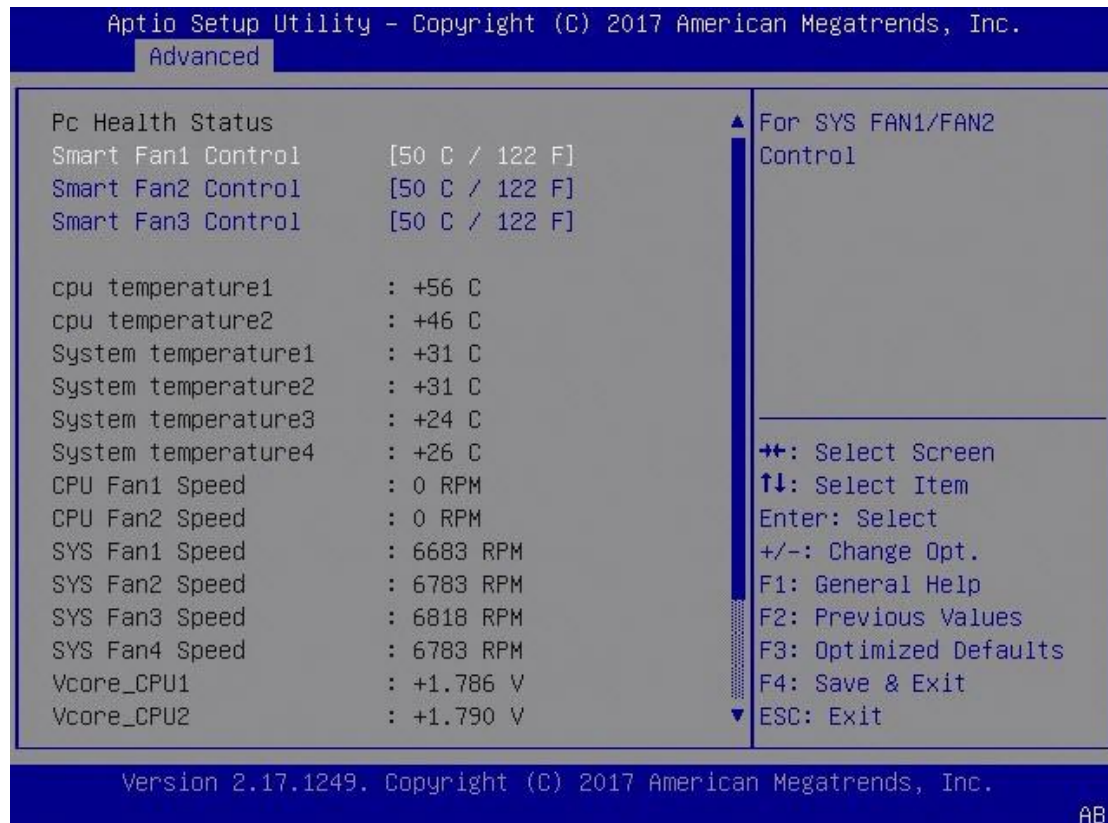
BIOS Setting	Description
Serial Port	Sets parameters of Serial Ports (COMA).
Change Settings	<p>Selects an optimal settings for Super I/O device.</p> <p>Options:</p> <ul style="list-style-type: none"> <li>• Auto</li> <li>• IO = 3F8h; IRQ = 4</li> <li>• IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> <li>• IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> <li>• IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> <li>• IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> </ul>

**3.4.2.2. Serial Port 2 Configuration**



BIOS Setting	Description
Serial Port	Sets parameters of Serial Ports (COMA).
Change Settings	Selects an optimal settings for Super I/O device. Options: <ul style="list-style-type: none"> <li>• Auto</li> <li>• IO = 2F8h; IRQ = 3</li> <li>• IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> <li>• IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> <li>• IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> <li>• IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12</li> </ul>

### 3.4.3 NCT7904D HW Monitor



BIOS Setting	Description
Smart Fan Control	This field enables or disables the smart fan control  Options: Disabled (default), 50°C, 60°C, 70°C, 80°C
Temperatures / Voltages / Fan Speed	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only as monitored by the system and showing the PC health status

### 3.4.4 LAN Bypass Configuration

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

Advanced

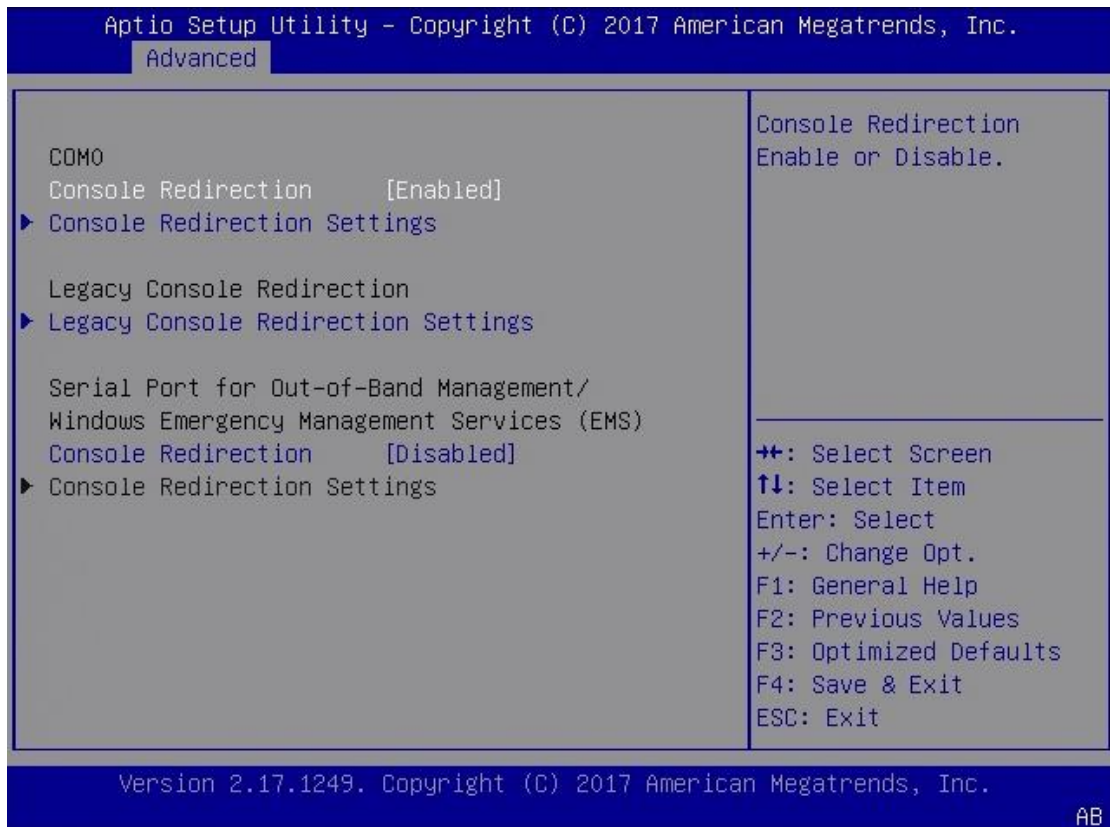
<p>LAN Bypass Configuration</p> <p>Bypass Quick Setting [Normal]</p> <p>[Normal] All LAN ports in NORMAL. WDT monitor system hang &amp; initiates a reboot.          [Bypass] All LAN ports in BYPASS during power-Off or WDT initiates bypass. System will not reboot.          [Firewall]All LAN ports in BYPASS until OS has control ability to change LAN ports in normal.</p>	<p>[Normal] All LAN ports in NORMAL. WDT monitor system hang &amp; initiates a reboot.          [Bypass] All LAN ports in BYPASS during power-Off or WDT initiates bypass. System will not reboot.</p> <hr/> <p>             ++: Select Screen              ↑↓: Select Item              Enter: Select              +/-: Change Opt.              F1: General Help              F2: Previous Values              F3: Optimized Defaults              F4: Save &amp; Exit              ESC: Exit         </p>
--	--

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AB

BIOS Setting	Description
Byoass Quick Setting	<ul style="list-style-type: none"> <li>• Normal Mode: All LAN ports in normal mode. WDT monitor system hang &amp; initiates a reboot.</li> <li>• Bypass Mode: All LAN ports with bypass function in Bypass mode during power-off or WDT initiates bypass. System will not reboot.</li> <li>• Custom Mode: All LAN ports can be configured independently.</li> </ul>
Watchdog Reset Signal	<ul style="list-style-type: none"> <li>• Disabled: System won't reset and LAN bypass no functon when watchdog time out.</li> <li>• Restart: WDT triggers system restart.</li> <li>• LanBypass: WDT triggers LanBypass.</li> </ul>

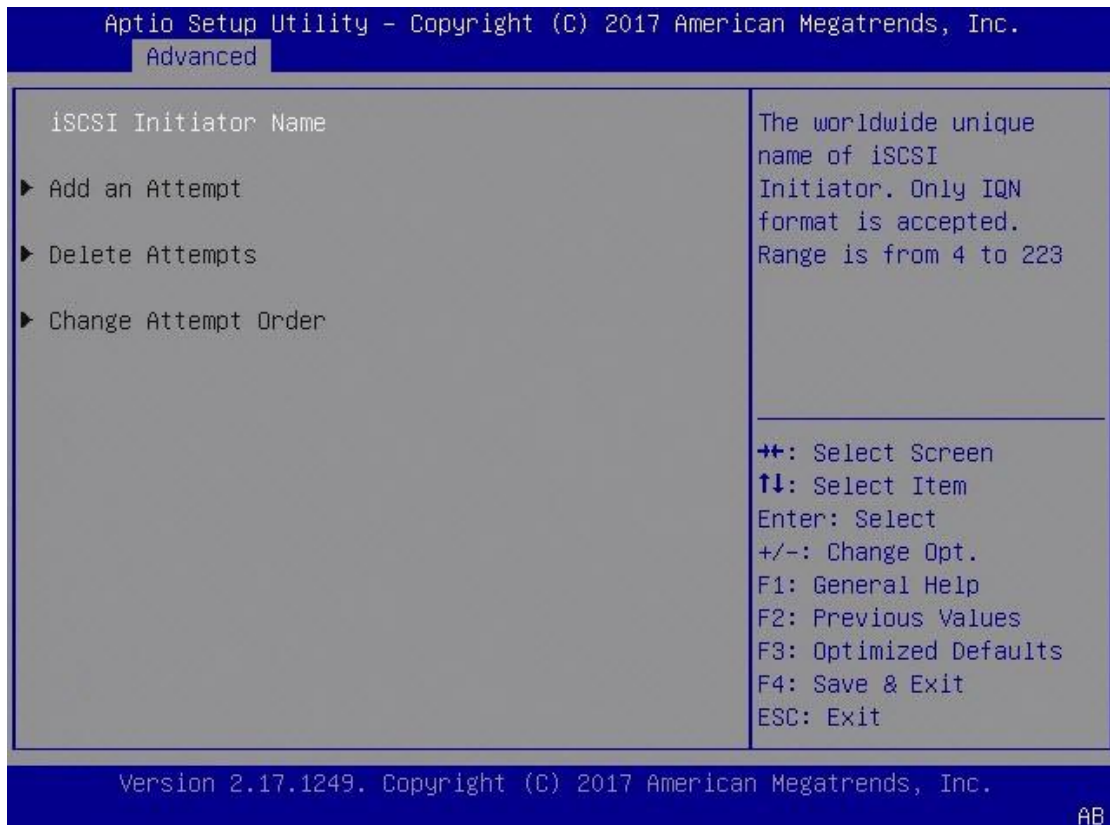
### 3.4.5 Serial Port Console Configuration



BIOS Setting	Description
Console Redirection	Enables / Disables Console Redirection.
Console Redirection Settings	Sets parameters of Console Redirection.
Legacy Serial Redirection Port	Selects a COM port to display redirection of Legacy OS and Legacy OPROM Messages.

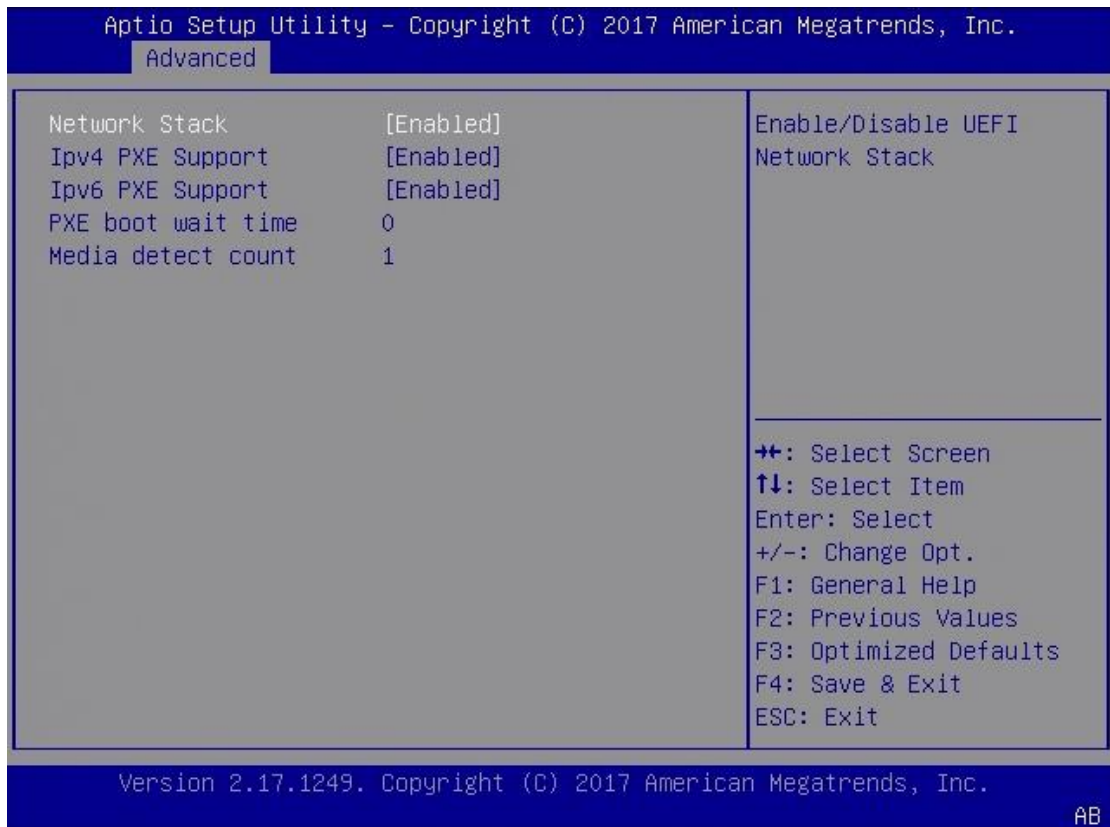


### 3.4.6 iSCSI Configuration



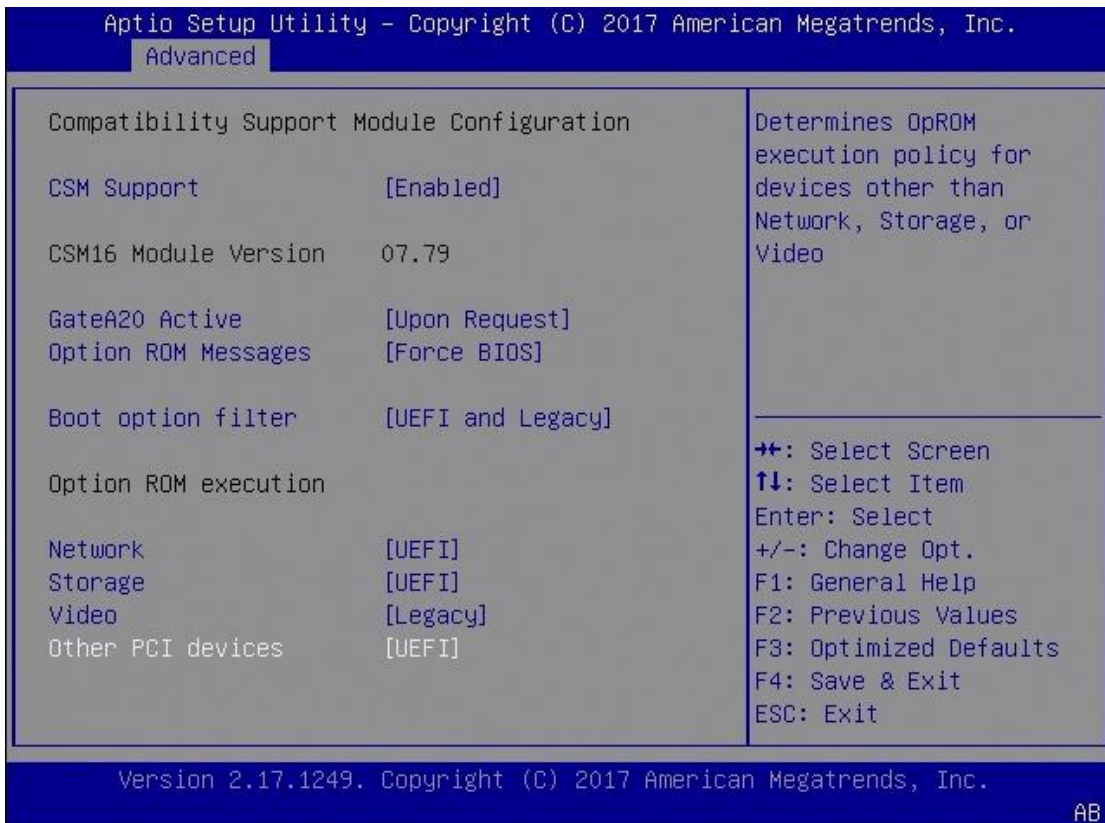
BIOS Setting	Description
iSCS Initiator Name	The worldwide unique name of iSCSI initoator.Only IQN format is accepted. Range is from 4 to 223.

### 3.4.7 Network Stack Configuration



BIOS Setting	Description
Network Stack	Enables / Disables UEFI Network Stack.
IPv4 PXE Support	Enables the support for IPv4 PXE Boot. If this is disabled, IPv4 PXE boot option will not be created.
IPv6 PXE Support	Enables the support for IPv6 PXE Boot. If this is disabled, IPv6 PXE boot option will not be created.

### 3.4.8 CSM Configuration



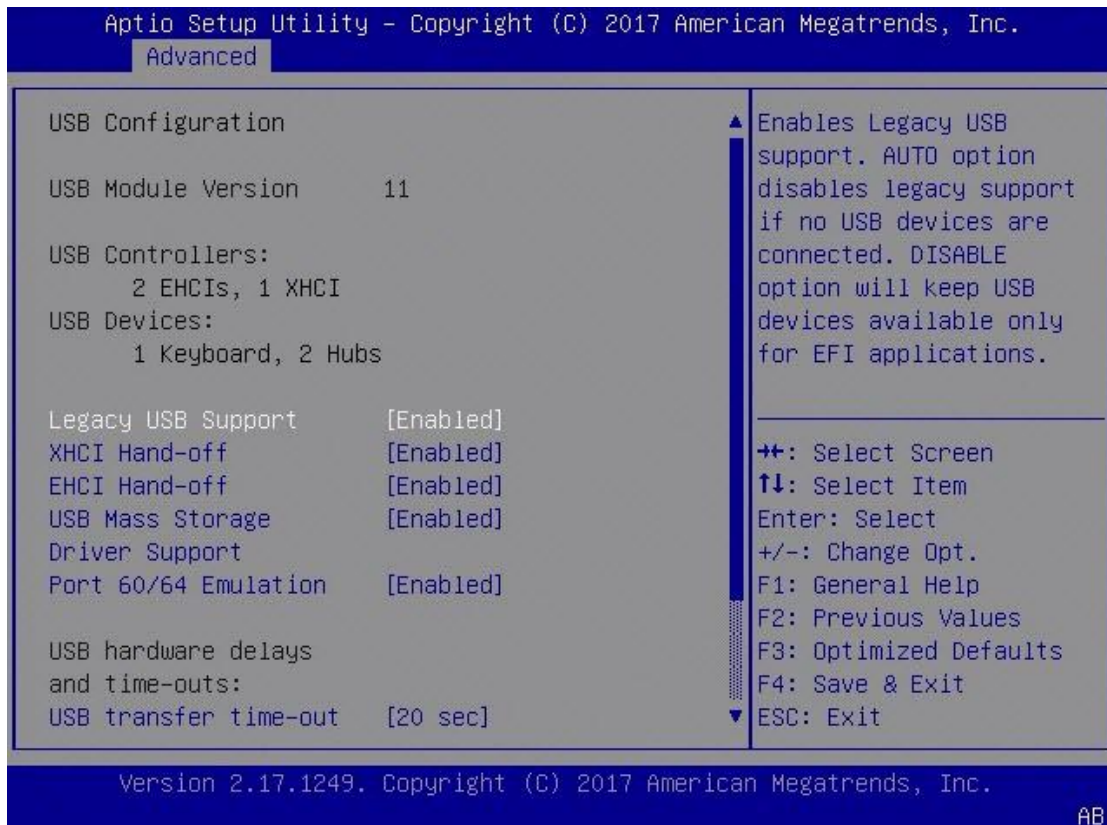
BIOS Setting	Description
CSM Support	Enables / Disables CSM support.
GateA20 Active	<ul style="list-style-type: none"> <li>The option <b>Upon Request</b> disables GA20 when using BIOS services.</li> <li>The option <b>Always</b> cannot disable GA20, but is useful when any RT code is executed above 1 MB.</li> </ul>
Option ROM Messages	Sets a display mode, Force BIOS or Keep Current, for Option ROM.
Boot option filter	Controls the priority of Legacy and UEFI.
Network	Controls the execution of UEFI and Legacy PXE OpROM.
Storage	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI devices	Determines OpROM execution policy for devices other than network, storage or video.

### 3.4.9 Trusted Computing



BIOS Setting	Description
Security Device	Enables / Disables BIOS support for security device.

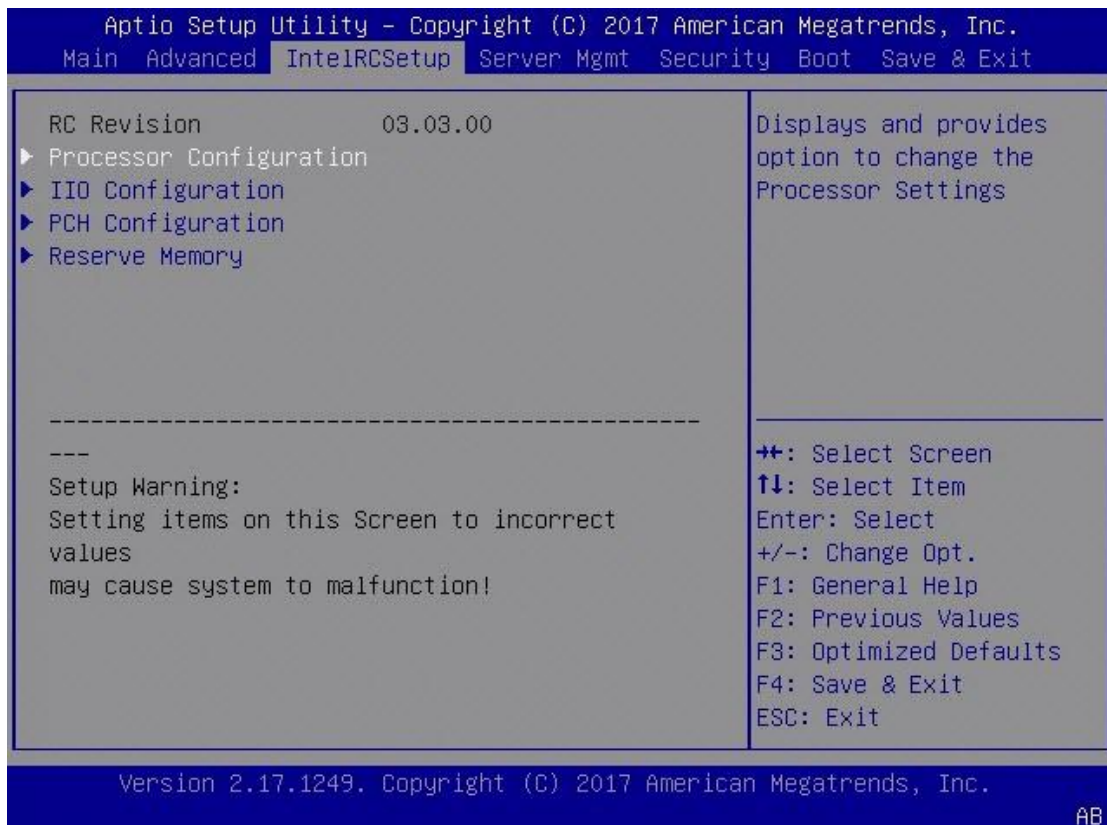
### 3.4.10 USB Configuration



BIOS Setting	Description
Legacy USB Support	Enables / Disables Legacy USB support. <ul style="list-style-type: none"> <li>• <b>Auto</b> disables legacy support if there is no USB device connected.</li> <li>• <b>Disable</b> keeps USB devices available only for EFI applications.</li> </ul>
XHCI Hand-off	This is a workaround for OSeS without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
EHCI Hand-off	This is a workaround for OSeS without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.
USB Mass Storage Driver Support	Enables / Disables USB mass storage driver support.
Port 60/64 Emulation	Enables / Disables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSeS.
USB Transfer time-out	Sets the time-out value 1, 5, 10 or 20 sec(s) for Control, Bulk, and Interrupt transfers.

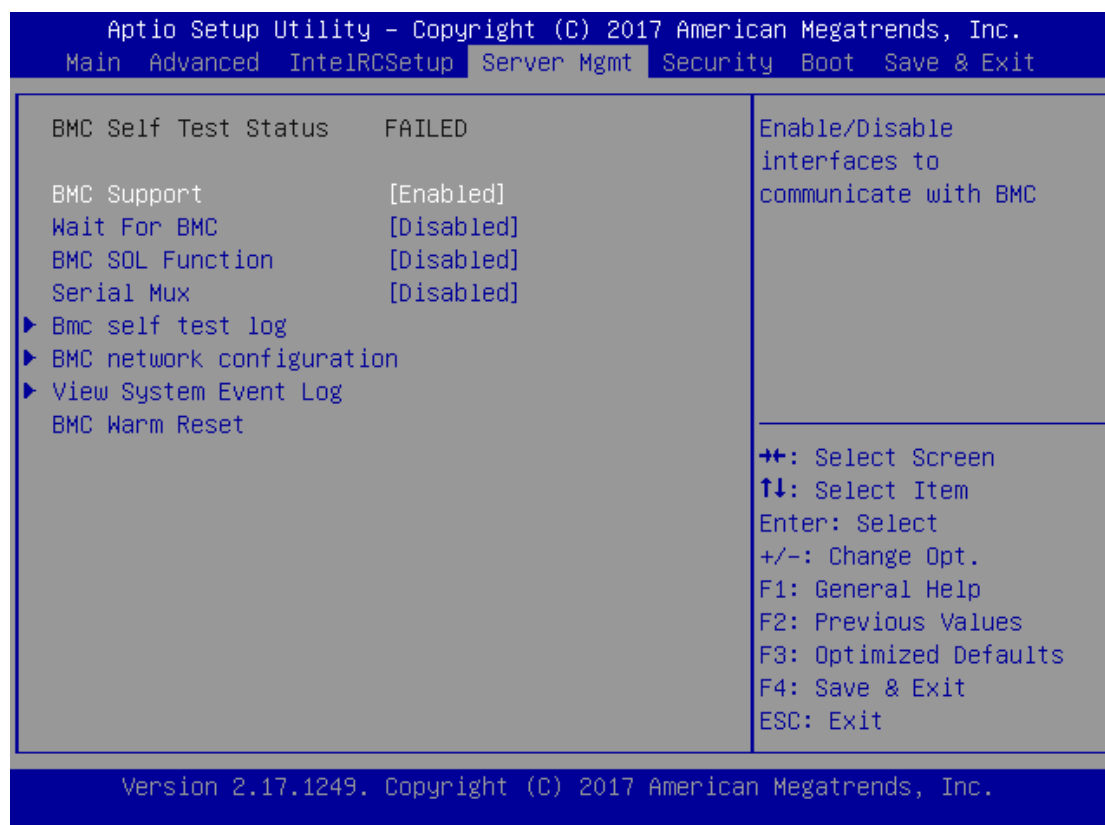
BIOS Setting	Description
Device reset time-out	Sets the seconds (10, 20, 30, 40 secs) of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. <b>Auto</b> uses default value. For a Root port, it is 100 ms. For a Hub port, the delay is taken from Hub descriptor.

### 3.5 IntelRCSetup



BIOS Setting	Description
Processor Configuration	Displays and provides option to change the processor settings.
IIO Configuration	Displays and provides option to change the IIO settings.
PCH Configuration	Displays and provides option to change the PCH settings.
Reserve Memory	Displays and provides option to change the memory settings.

### 3.6 Server Management



BIOS Setting	Description
BMC Support	Enables / Disables interfaces to communicate with BMC.
Wait For BMC	Wait For BMC reponse for specified time out.
BMC SOL Function	Enables / Disables BMC SOL function. <b>Enable:</b> will inactive and clear IRQ and IObase of UART1. <b>Disable:</b> keep original IRQ, IObase and active UART1
Serial Mux	Enables / Disables serial muz configuration.
BMC Self Test Log	Logs the report returned by BMC self test command.
BMC Network Configuration	Configure BMC network parameters.
View System Event Log	Press <Enter> to view the system event log records.
BMC Warm Reset	Press <Enter> to do warm reset BMC.

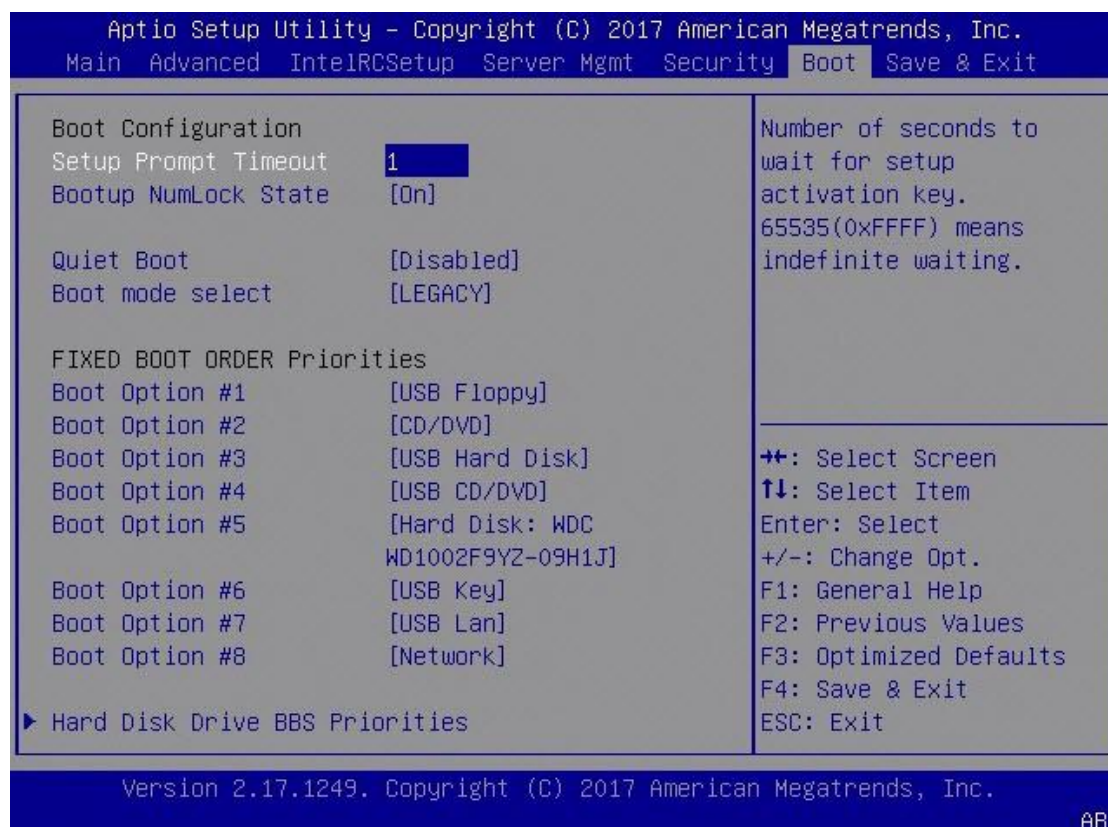


### 3.7 Security Settings



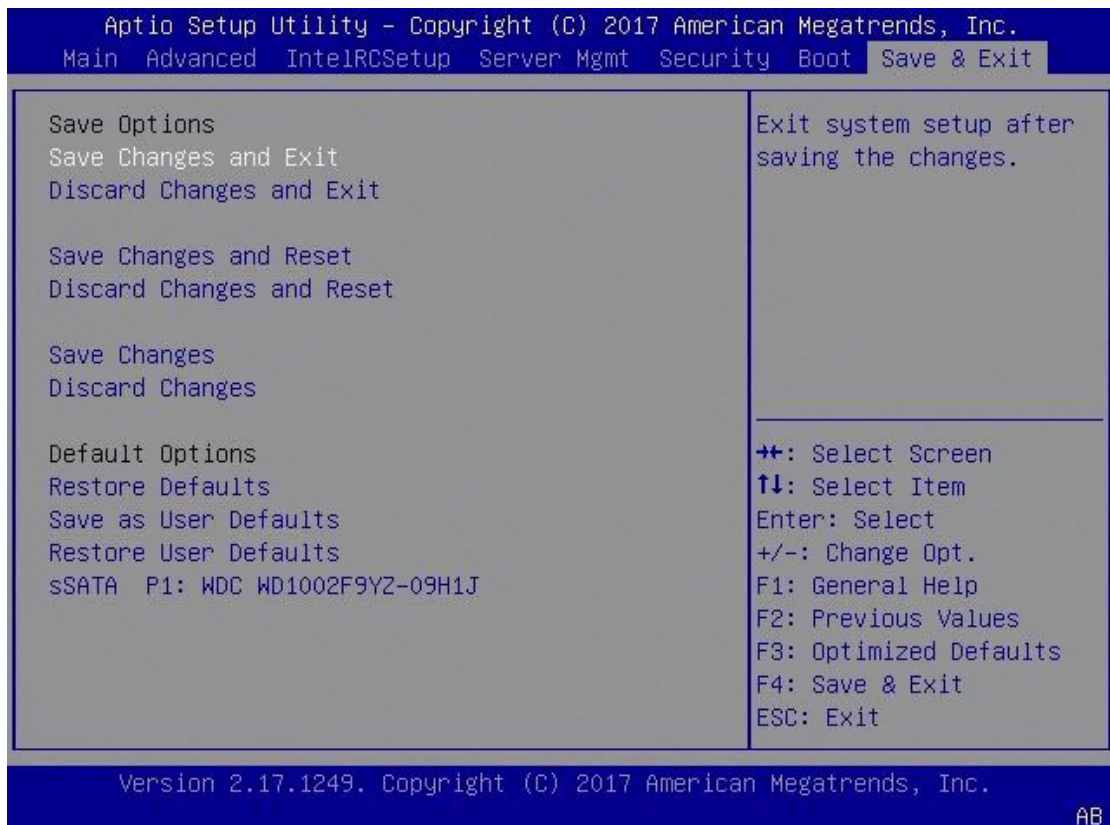
BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.

### 3.8 Boot Settings



BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Boot Mode Select	Selects a Boot mode, Legacy / UEFI.
Boot Option Priorities	Sets the system boot order priorities for hard disk, CD/DVD, USB, Network.

## 3.9 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.
Save as User Defaults	Saves the changes done so far as user defaults.
Restore User Defaults	Restores the user defaults to all the setup options.

## Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

- I/O Port Address Map
- Interrupt Request Lines (IRQ)
- Watchdog Timer Configuration

## A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0x00004000-0x00004FFF	PCI standard PCI Express to PCI/PCI-X Bridge
0x00004000-0x00004FFF	Intel(R) C610 series/X99 chipset PCI Express Root Port #3 - 8D14
0x00004000-0x00004FFF	ASPEED Graphics Family(WDDM)
0x000003B0-0x000003BB	PCI standard PCI Express to PCI/PCI-X Bridge
0x000003B0-0x000003BB	Intel(R) C610 series/X99 chipset PCI Express Root Port #3 - 8D14
0x000003B0-0x000003BB	ASPEED Graphics Family(WDDM)
0x000003C0-0x000003DF	PCI standard PCI Express to PCI/PCI-X Bridge
0x000003C0-0x000003DF	Intel(R) C610 series/X99 chipset PCI Express Root Port #3 - 8D14
0x000003C0-0x000003DF	ASPEED Graphics Family(WDDM)
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x000000F0-0x000000F0	Numeric data processor
0x000070B0-0x000070B7	Standard SATA AHCI Controller
0x000070A0-0x000070A3	Standard SATA AHCI Controller
0x00007090-0x00007097	Standard SATA AHCI Controller
0x00007080-0x00007083	Standard SATA AHCI Controller
0x00007000-0x0000701F	Standard SATA AHCI Controller
0x00000061-0x00000061	System speaker
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer

Address	Device Description
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000000-0x00000CF7	Direct memory access controller
0x00001000-0x00007FFF	PCI Express Root Complex
0x00006000-0x00006FFF	Intel(R) C610 series/X99 chipset PCI Express Root Port #1 - 8D10
0x00008000-0x0000FFFF	PCI Express Root Complex
0x00000580-0x0000059F	Intel(R) C610 series/X99 chipset SMBus Controller - 8D22
0x00000580-0x0000059F	Motherboard resources
0x00000CA2-0x00000CA2	Microsoft Generic IPMI Compliant Device
0x00000CA3-0x00000CA3	Microsoft Generic IPMI Compliant Device
0x00000500-0x0000057F	Motherboard resources
0x00000400-0x0000047F	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x00000010-0x0000001F	Motherboard resources
0x00000072-0x00000073	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x00000600-0x0000061F	Motherboard resources
0x00000880-0x00000883	Motherboard resources
0x00000800-0x0000081F	Motherboard resources
0x00005000-0x00005FFF	Intel(R) C610 series/X99 chipset PCI Express Root Port #2 - 8D12
0x00000070-0x00000071	System CMOS/real time clock
0x00000074-0x00000077	System CMOS/real time clock
0x00000020-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000081-0x00000083	Direct memory access controller

<b>Address</b>	<b>Device Description</b>
0x00000087-0x00000087	Direct memory access controller
0x00000089-0x0000008B	Direct memory access controller
0x0000008F-0x0000008F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller

## B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
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) C610 series/X99 chipset SMBus Controller - 8D22
IRQ 13	Numeric data processor
IRQ 16	Standard SATA AHCI Controller
IRQ 16	ASPEED Graphics Family(WDDM)
IRQ 18	Intel(R) C610 series/X99 chipset USB Enhanced Host Controller #1 - 8D26
IRQ 18	Intel(R) C610 series/X99 chipset USB Enhanced Host Controller #2 - 8D2D
IRQ 81 ~ IRQ 191	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967221	Intel(R) USB 3.0 eXtensible Host Controller - 0100 (Microsoft)
IRQ 4294967222 ~ IRQ 4294967245	Intel(R) I210 Gigabit Network Connection
IRQ 4294967246 ~ IRQ 4294967269	Intel(R) I210 Gigabit Network Connection #2
IRQ 4294967270	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 0 - 6F01
IRQ 4294967271	PCI standard PCI Express to PCI/PCI-X Bridge
IRQ 4294967272	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F0A
IRQ 4294967273	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F09
IRQ 4294967274	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F08
IRQ 4294967275	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F07



Level	Function
IRQ 4294967276	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F06
IRQ 4294967277	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F05
IRQ 4294967278	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F04
IRQ 4294967279	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 1 - 6F03
IRQ 4294967280	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 1 - 6F02
IRQ 4294967281	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F0B
IRQ 4294967282	Intel(R) C610 series/X99 chipset PCI Express Root Port #3 - 8D14
IRQ 4294967283	Intel(R) C610 series/X99 chipset PCI Express Root Port #2 - 8D12
IRQ 4294967284	Intel(R) C610 series/X99 chipset PCI Express Root Port #1 - 8D10
IRQ 4294967285	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F0B
IRQ 4294967286	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F0A
IRQ 4294967287	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F09
IRQ 4294967288	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 3 - 6F08
IRQ 4294967289	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F07
IRQ 4294967290	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F06
IRQ 4294967291	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F05
IRQ 4294967292	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 2 - 6F04
IRQ 4294967293	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 1 - 6F03
IRQ 4294967294	Intel(R) Xeon(R) E7 v4/Xeon(R) E5 v4/Xeon(R) E3 v4/Xeon(R) D PCI Express Root Port 1 - 6F02

## C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for the use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

### 1. Sample Code: The file NCT5523D.H

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A
// PARTICULAR
// PURPOSE.
//
//-----
#ifndef __NCT5523D_H
#define __NCT5523D_H                1
//-----
#define NCT5523D_INDEX_PORT      (NCT5523D_BASE)
#define NCT5523D_DATA_PORT      (NCT5523D_BASE+1)
//-----
#define NCT5523D_REG_LD          0x07
//-----
#define NCT5523D_UNLOCK          0x87
#define NCT5523D_LOCK            0xAA
//-----
unsigned int Init_NCT5523D(void);
void Set_NCT5523D_LD( unsigned char);
void Set_NCT5523D_Reg( unsigned char, unsigned char);
unsigned char Get_NCT5523D_Reg( unsigned char);
//-----
#endif    //__NCT5523D_H
```

## 2. Sample Code: The file MAIN.CPP

```
//-----  
//  
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY  
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE  
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A  
// PARTICULAR  
// PURPOSE.  
//  
//-----  
#include <dos.h>  
#include <conio.h>  
#include <stdio.h>  
#include <stdlib.h>  
#include "NCT5523D.H"  
//-----  
int main (void);  
  
void WDTInitial(void);  
void WDTEnable(unsigned char);  
void WDTDisable(void);  
  
//-----  
int main (void)  
{  
    char SIO;  
  
    SIO = Init_NCT5523D();  
    if (SIO == 0)  
    {  
        printf("Can not detect Nuvoton NCT5523D, program abort.\n");  
        return(1);  
    }  
  
    WDTInitial();  
  
    WDTEnable(10);  
  
    WDTDisable();  
  
    return 0;  
}  
//-----  
void WDTInitial(void)  
{  
    unsigned char bBuf;  
    Set_NCT5523D_LD(0x08);                //switch to logic device 8  
    bBuf = Get_NCT5523D_Reg(0x30);  
    bBuf &= (~0x01);  
    Set_NCT5523D_Reg(0x30, bBuf);        //Enable WDTO  
}  
//-----
```

```
void WDTEnable(unsigned char NewInterval)
{
    unsigned char bBuf;

    Set_NCT5523D_LD(0x08);           //switch to logic device 8
    Set_NCT5523D_Reg(0x30, 0x01);   //enable timer

    bBuf = Get_NCT5523D_Reg(0xF0);
    bBuf &= (~0x08);
    Set_NCT5523D_Reg(0xF0, bBuf);   //count mode is second

    Set_NCT5523D_Reg(0xF1, NewInterval); //set timer
}
//-----
void WDTDisable(void)
{
    Set_NCT5523D_LD(0x08);           //switch to logic device 8
    Set_NCT5523D_Reg(0xF1, 0x00);   //clear watchdog timer
    Set_NCT5523D_Reg(0x30, 0x00);   //watchdog disabled
}
//-----
```

### 3. Sample Code: The file NCT5523D.CPP

```
//-----  
//  
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// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE  
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A  
// PARTICULAR  
// PURPOSE.  
//  
//-----  
#include "NCT5523D.H"  
#include <dos.h>  
//-----  
unsigned int NCT5523D_BASE;  
void Unlock_NCT5523D (void);  
void Lock_NCT5523D (void);  
//-----  
unsigned int Init_NCT5523D(void)  
{  
    unsigned int result;  
    unsigned char ucDid;  
  
    NCT5523D_BASE = 0x4E;  
    result = NCT5523D_BASE;  
  
    ucDid = Get_NCT5523D_Reg(0x20);  
    if (ucDid == 0xC4)                //NCT5523D??  
    {    goto Init_Finish; }  
  
    NCT5523D_BASE = 0x2E;  
    result = NCT5523D_BASE;  
  
    ucDid = Get_NCT5523D_Reg(0x20);  
    if (ucDid == 0xC4)                //NCT5523D??  
    {    goto Init_Finish; }  
  
    NCT5523D_BASE = 0x00;  
    result = NCT5523D_BASE;  
  
Init_Finish:  
    return (result);  
}  
//-----  
void Unlock_NCT5523D (void)  
{  
    outportb(NCT5523D_INDEX_PORT, NCT5523D_UNLOCK);  
    outportb(NCT5523D_INDEX_PORT, NCT5523D_UNLOCK);  
}  
//-----
```

```
void Lock_NCT5523D (void)
{
    outportb(NCT5523D_INDEX_PORT, NCT5523D_LOCK);
}
//-----
void Set_NCT5523D_LD( unsigned char LD)
{
    Unlock_NCT5523D();
    outportb(NCT5523D_INDEX_PORT, NCT5523D_REG_LD);
    outportb(NCT5523D_DATA_PORT, LD);
    Lock_NCT5523D();
}
//-----
void Set_NCT5523D_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_NCT5523D();
    outportb(NCT5523D_INDEX_PORT, REG);
    outportb(NCT5523D_DATA_PORT, DATA);
    Lock_NCT5523D();
}
//-----
unsigned char Get_NCT5523D_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_NCT5523D();
    outportb(NCT5523D_INDEX_PORT, REG);
    Result = inportb(NCT5523D_DATA_PORT);
    Lock_NCT5523D();
    return Result;
}
//-----
```