FWA8506

1U Rackmount
Enterprise Network Appliance

User's Manual

Version 1.0
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iBASE

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Compliance

CE

The product described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

FC

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 complies with the current RoHS directives restricting the use of the following substances in concentrations not to exceed 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 following safety information before using the device.

Setting up your system:

- Put the device horizontally on a stable and solid surface.
- Do not use this product near water or any heated source.
- Leave plenty of space around the device and do not block the ventilation openings. Never drop or insert any objects of any kind into the openings.
- Use this product in environments with ambient temperatures between 0˚C and 40˚C.

Care during use:

- Do not place heavy objects on the top of the device.
- Make sure to connect the correct voltage to the device. Failure to supply the correct voltage could damage the unit.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure the total ampere rating of all devices plugged into the extension cord does not cord's ampere rating.
- Do not spill water or any other liquids on your device.
- Always unplug the power cord from the wall outlet before cleaning the device.
- Only use neutral cleaning agents to clean the device.
- Vacuum dust and particles from the vents by using a computer vacuum cleaner.

Product Disassembly

Do not try to repair, disassemble, or make modifications to the device. Doing so will void the warranty and may result in damage to the product or personal injury.

CAUTION

There is a danger of explosion if the lithium-ion battery is replaced with an incorrect battery. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries by observing local regulations.

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.

- **3rd-party parts:**

  12-month (1-year) warranty from delivery for the 3rd-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 to find the latest information about the product.
2. If you encounter any technical problems and require assistance from your distributor or sales representative, please prepare and send the following information:

   - 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

FWA8506 series is 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

Photo of FWA8506

1.2 Features

- 1U rackmount platform designed with Intel® Atom® C3000 processor
- 2 x DDR4 DIMM 2400 MHz, expandable up to 32 GB for UDIMM (ECC / non-ECC) and up to 64 GB for RDIMM
- 6 x GbE LAN ports with 2 advanced LAN Bypass pairs
- 4 x 10 GbE SFP+ ports
- CF slot and PCIe (x8) expansion slot(s)

1.3 Packing List

Your product 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.

• FWA8506	x 1
• Power Cord	x 1
• Rackmount Bracket	x 2

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)
- Riser Card (IPN104)

1.5 Specifications

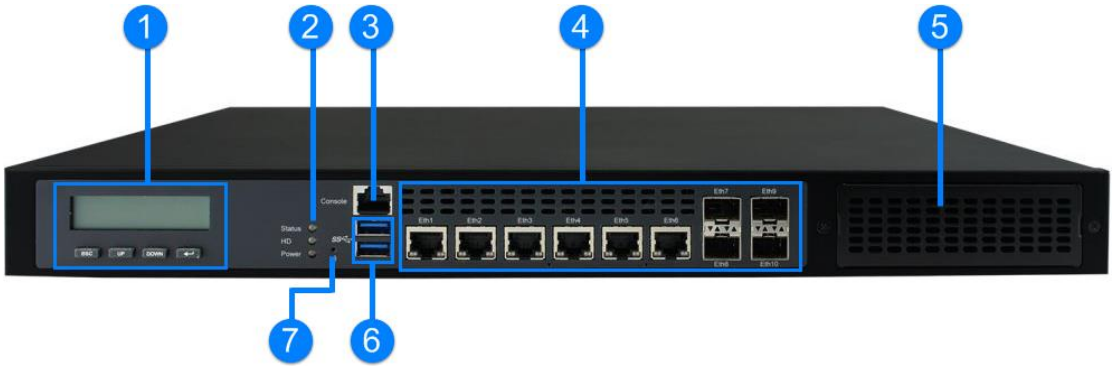
Product Name	FWA8506
System	
Motherboard	MBN802-8C40G
Operating System	• Windows 10 (64-bit) • Linux Ubuntu 16.04.3
CPU	Intel® Atom® C3758
Chipset	Integrated
Memory	• 2 x DDR4 UDIMM 400 MHz, expandable to 32 GB (ECC / non-ECC) • 2 x DDR4 RDIMM 2400 MHz, expandable to 64 GB
Storage	• Max. 2 x 2.5” HDD or SSD internal drive bay • On-board CF slot
Network	6 x Intel® I211AT GbE
Bypass	2 x segments (LAN3 / LAN4 & LAN5 / LAN6)
Super I/O	Nuvoton NCT5523D
IPMI	N/A
Power Supply	Full range 250W ATX power supply
BIOS	AMI BIOS
TPM	1.2
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
Chassis	Steel with textured black color paint
Dimensions (W x H x D)	438 x 44 x 340 mm (17.24” x 1.73” x 13.38”)
Weight	8 kg (17.64 lb)
Certificate	CE / FCC Class A
Front I/O Ports	
Console	1 x Console port
Traffic LAN Port	6 x RJ45 GbE LAN ports
USB	2 x USB 3.0
Rear I/O Ports	
Power Inlet	1 x AC inlet 100V ~ 240V, 47 ~ 63 Hz
CF	1 x CF slot
Fan	3 x system fan module

Expansion	1 x PCIe (x8) slot (4-lane)
Environment	
Temperature	• **Operating:** 0 ~ 40 °C (32 ~ 104 °F) • **Storage:** -20~ 70 °C (-4 ~ 158 °F)
Relative Humidity	5 ~ 90%
Vibration Protection	• **Operating:** 0.25 Grms / 3 ~ 500 Hz (Z-axis) • **Non-operating:** 1.0 Grms / 3 ~ 500Hz (Z-axis)
Shock Protection	Half-sinewave 50G Z-axis

All specifications are subject to change without prior notice.

1.6 Overview

Front View



No.	Name	No.	Name
1	LCM Display with 4 buttons	5	Reserved Area for HDD/SSD or expansion card
2	LED Indicators(from top to bottom: Status, HDD, Power)	6	USB 3.0 Ports
3	Console Port	7	User Self-defined Button (with GPI Signal)
4	GbE LAN Ports		

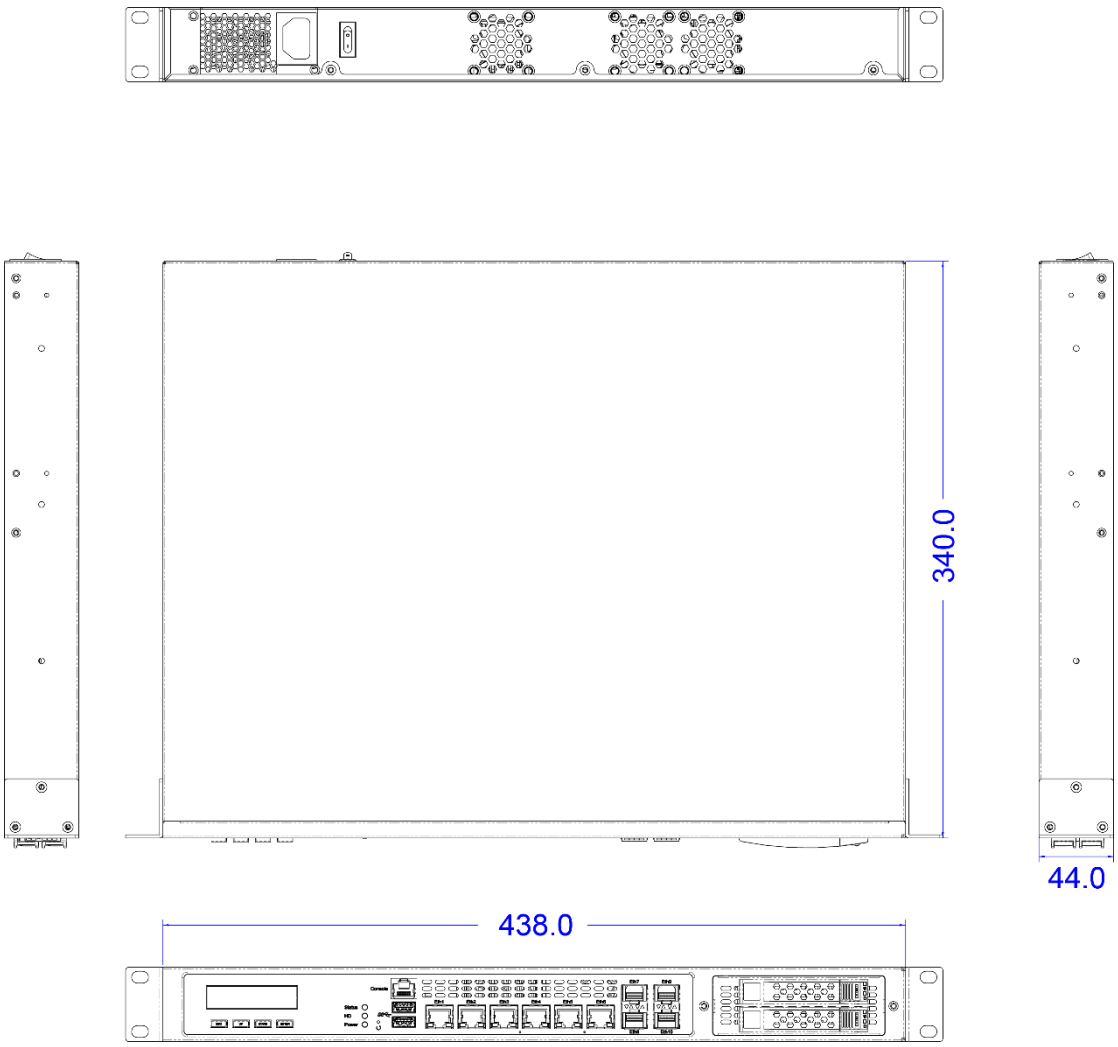
Oblique View

Rear View

No.	Name	No.	Name
1	System Fans	3	AC Power Inlet
2	Power Switch		

1.7 Dimensions

Unit: mm



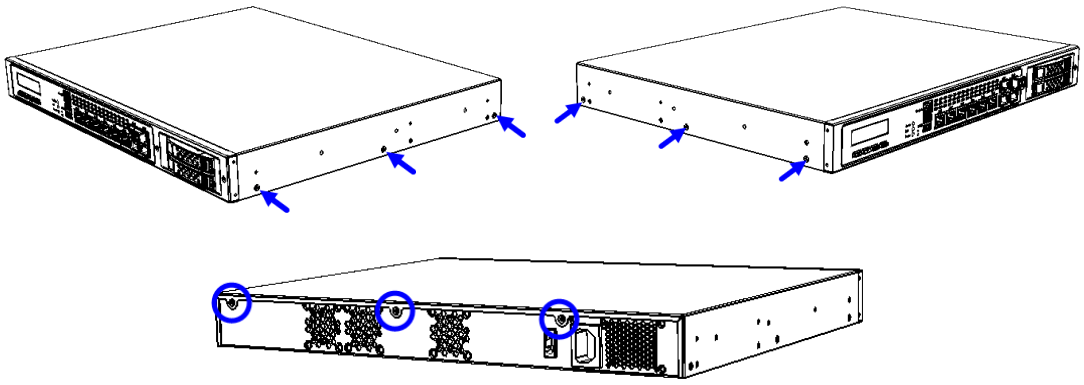
Chapter 2
Hardware Configuration

The information provided in this chapter includes:

- installations
- Information and locations of connectors

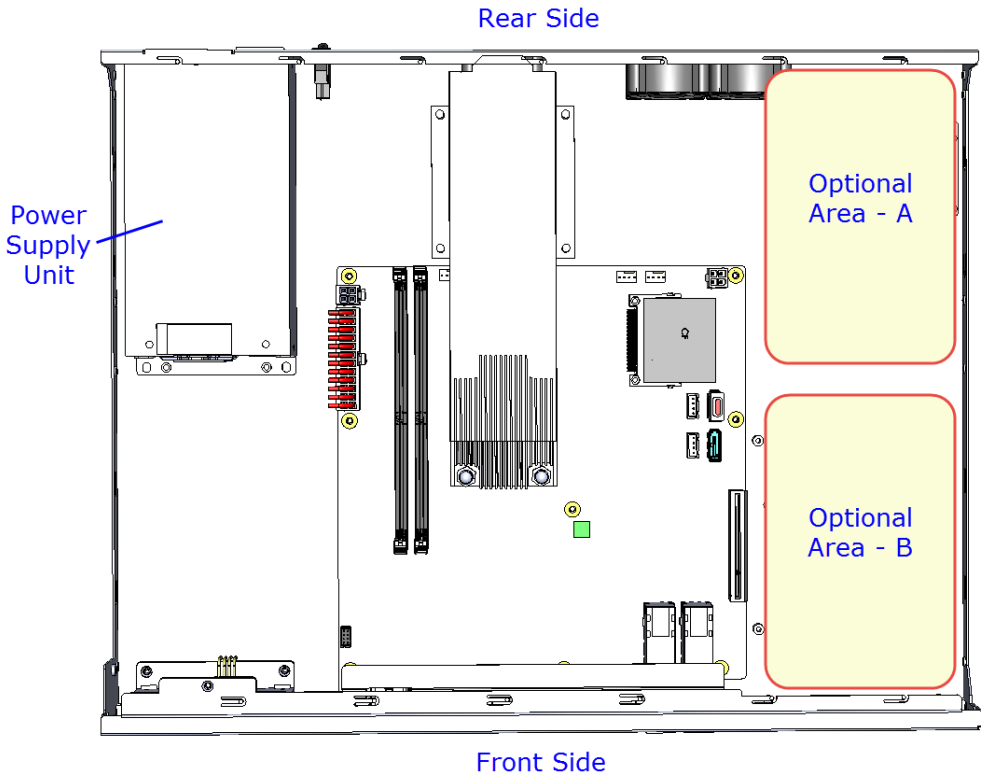
2.1 Installations

For installation or replacement of the memory modules, HDD/SSD, CF card and fans, you need to disassemble the device cover first by loosening 9 screws as indicated below.



Configuration inside the device:

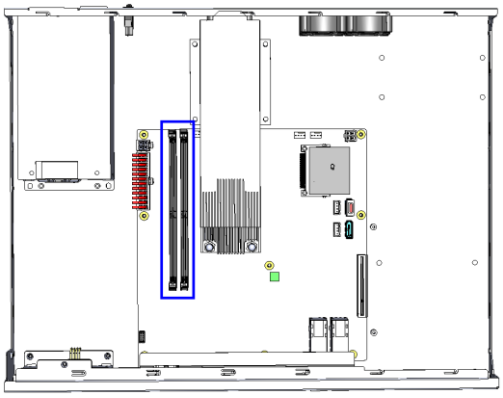
Area-A shown below can fit optional HDD/SSD and Area-B can fit one or two optional HDD/SSD or an expansion card .



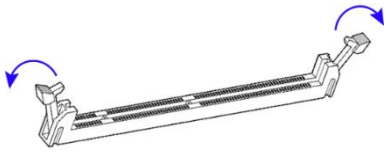
2.1.1 Memory Installation / Replacement

If you need to install or replace a memory module, follow the instructions below after you have removed the device cover.

1. Locate the memory slots in the device.

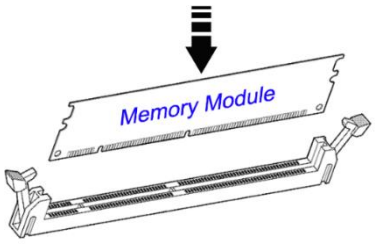


2. Press the ejector tab of the memory slot down and outwards with your fingertips.



3. Hold the memory module and align the key of the module with that on the memory slot.

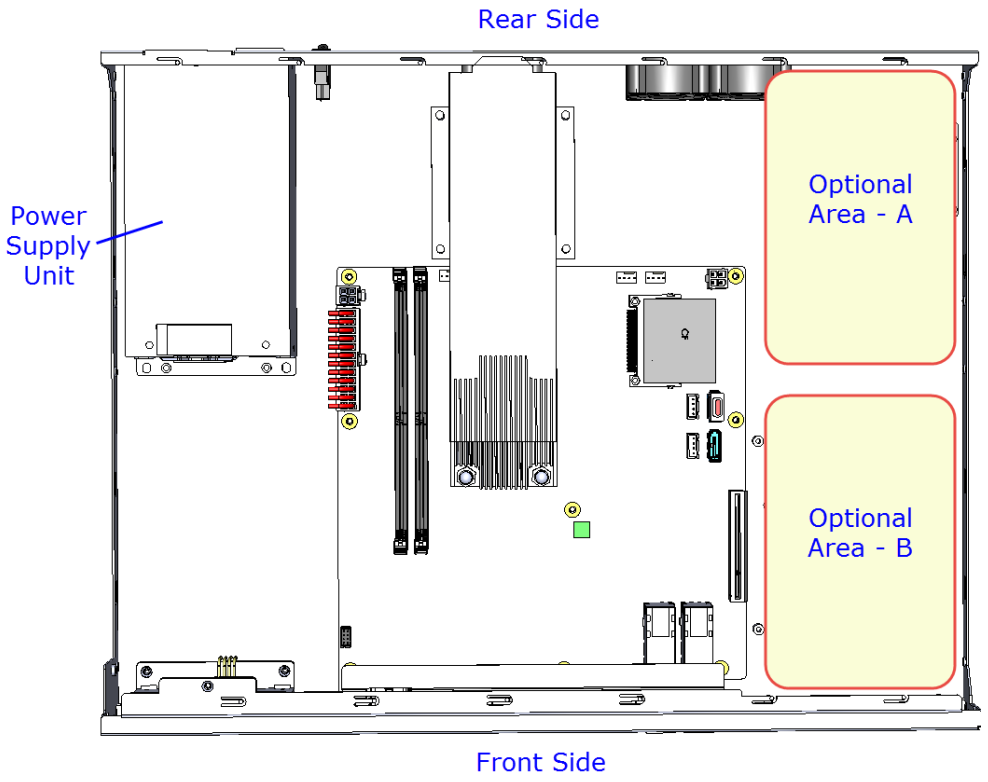
4. Gently push the module in an upright position until the ejector tabs of the memory slot close to hold the module in place when the module touches the bottom of the slot.



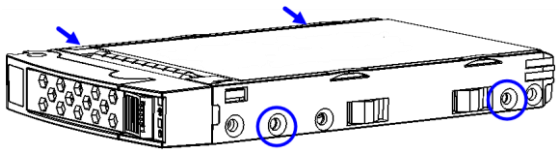
To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

2.1.2 HDD Installation / Replacement

After removing the device cover, notice Optional Area-A for 2.5” HDD/SSD and Optional Area-B for 2.5” HDD/SSD or expansion as shown below. If you need to install or replace an HDD/SDD or an expansion card, follow the instructions below.

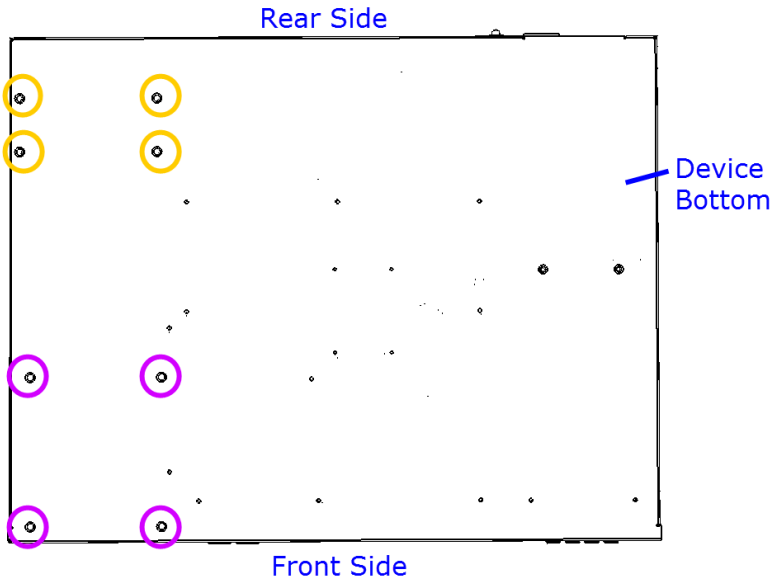


1. Remove 4 screws as indicated below for each HDD/SSD (8 screws for two HDD/SSD).



2. Install a new HDD/SDD onto the tray and fasten the 4 screws for each HDD/SDD.

3. Secure the tray with HDD from the bottom of the device as ilustrated below.



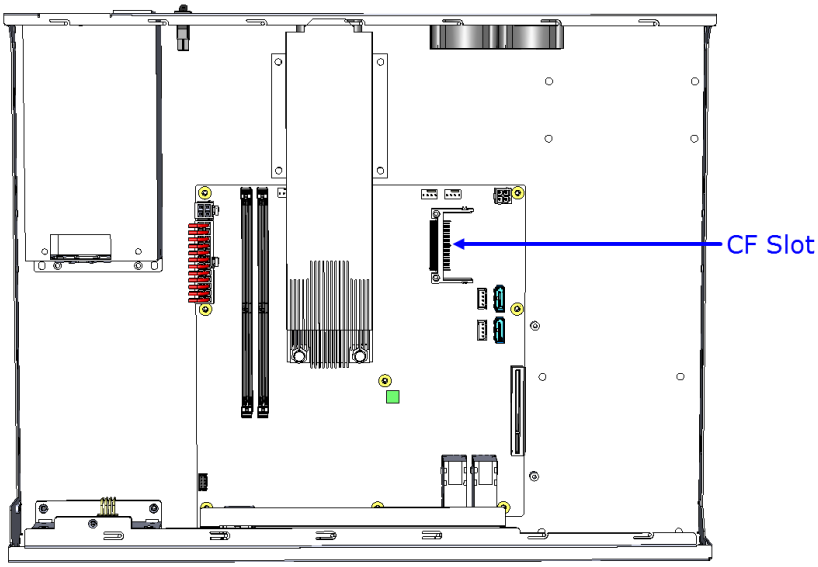
For 2.5" HDD/SSD

For 2.5" HDD/SSD & expansion card

2.1.3 CF Card Installation / Replacement

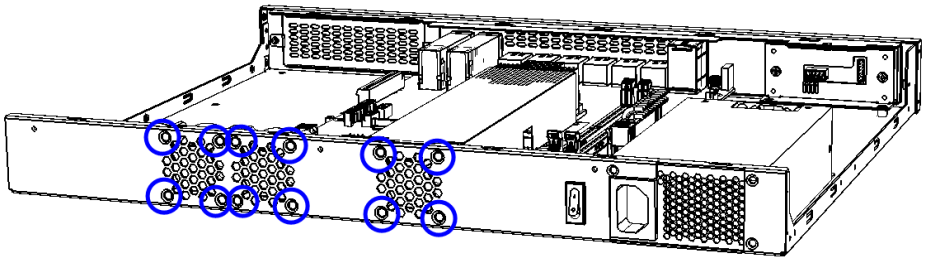
If you need to replace a CF card, remove the device cover firstly, locate the CF slot and Insert the CF card to the slot.

‘To remove the CF card, pull it out with your thumb and index finger directly.



2.1.4 Fan Module Installation / Replacement

If you need to replace a fan module, remove the device cover and the corresponding 4 screws of the fan module on the rear side as shown. Take out the fan, replace with a new one, and fasten the screws.

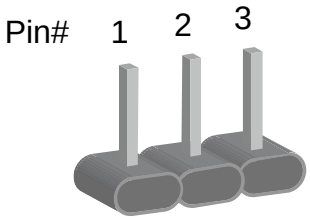


2.2 Setting the Jumpers

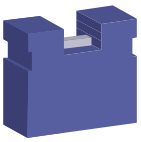
Set up and configure your device by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

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.

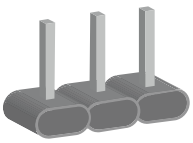
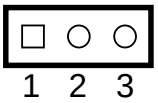
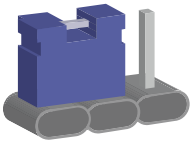
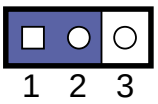
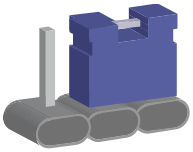
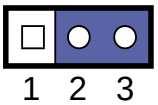


A 3-pin jumper



A jumper cap

Refer to the illustration below to set jumpers.

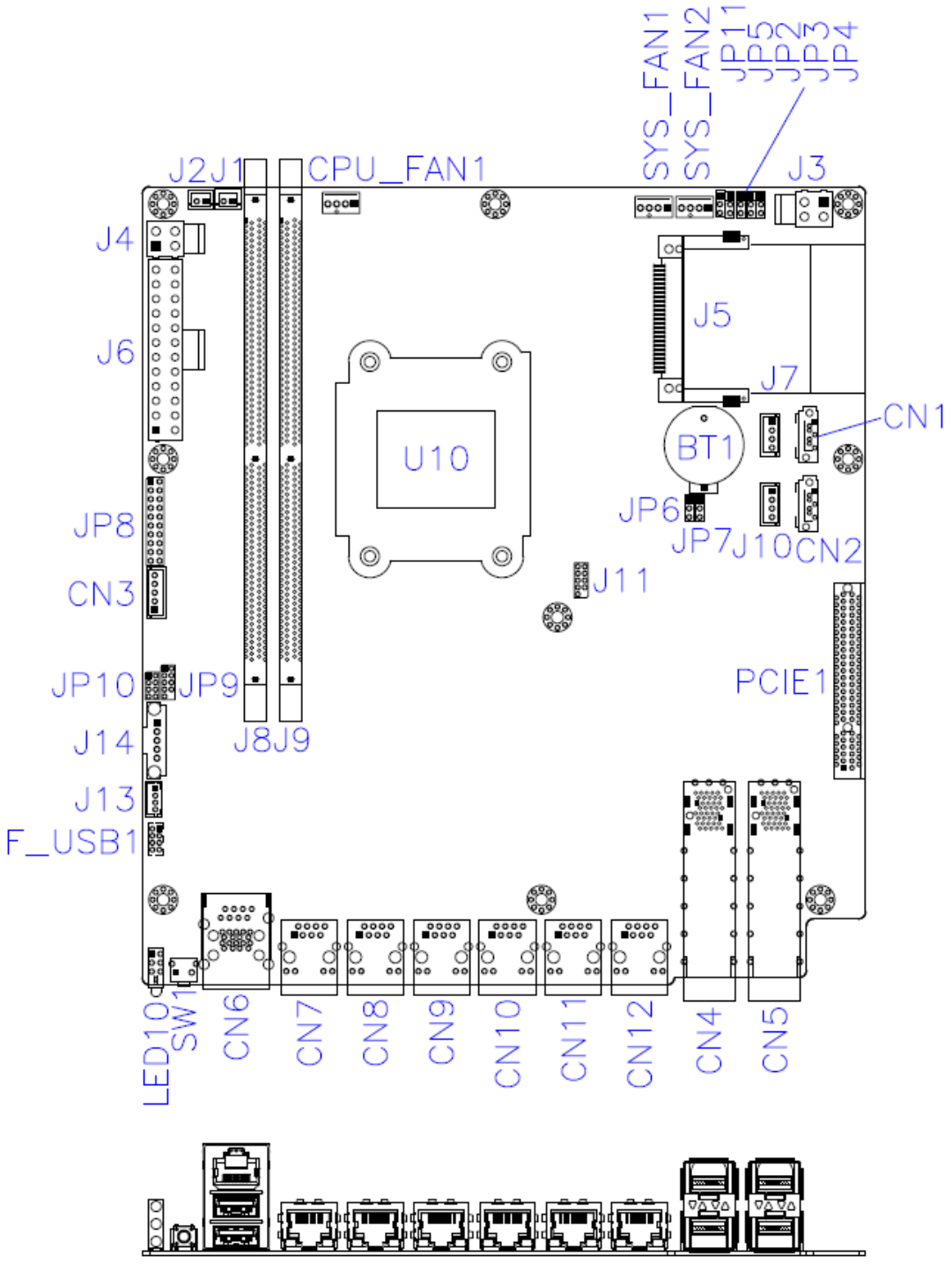
Pin closed	Oblique view	Jumper Settings
Open		
1-2		
2-3		

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

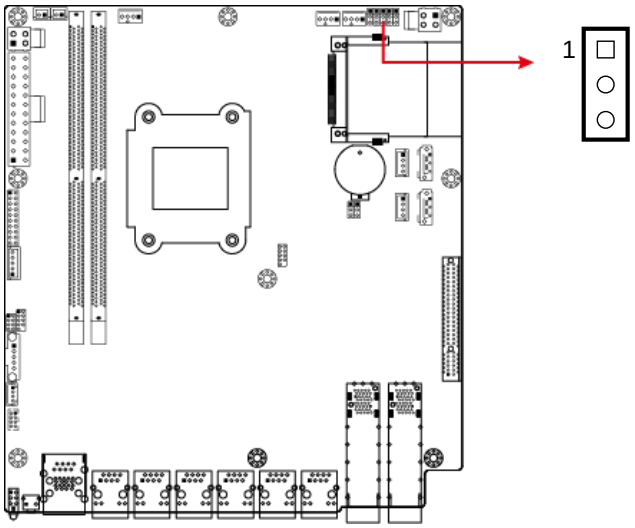
Motherboard: MBN802

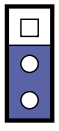


2.4 Jumpers Quick Reference

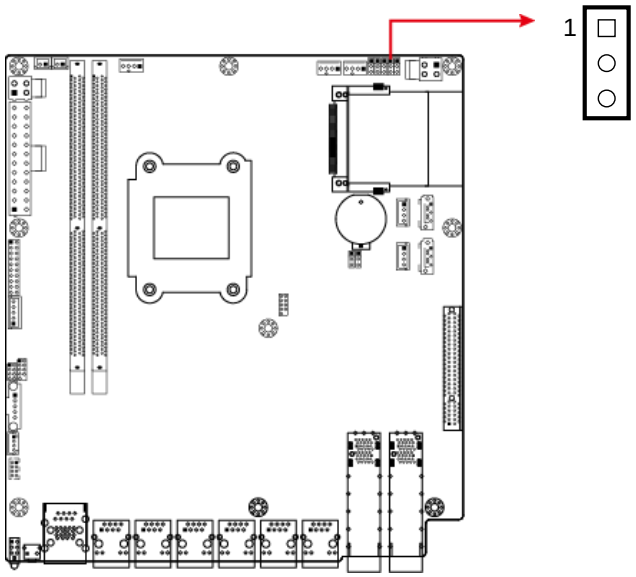
Function	Connector	Page
CPU SV Mode Selection	JP2	17
Clear CMOS Data	JP3	18
Clear RTC Data	JP5	19
AT & ATX Mode Selection	JP6	20
Factory Use Only	JP4, JP7, JP11	--

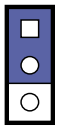
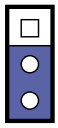
2.4.1 CPU SV Mode Selection (JP2)



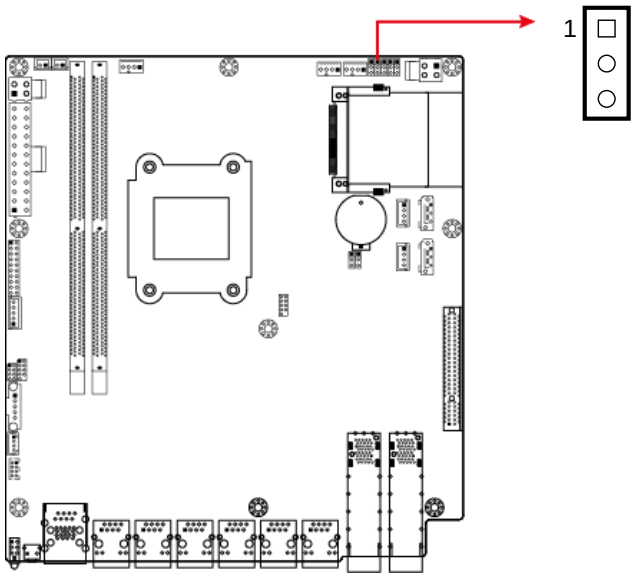
Function	Pin closed	Setting
CPU SV	1-2	
Normal (default)	2-3	

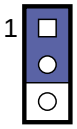
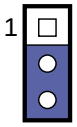
2.4.2 Clear CMOS Data (JP3)



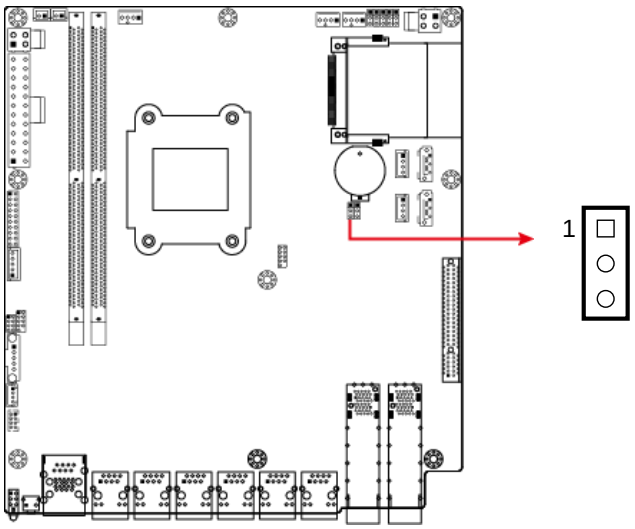
Function	Pin closed	Setting
Normal (default)	1-2	
Clear CMOS	2-3	

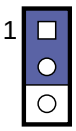
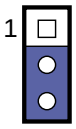
2.4.3 Clear RTC Data (JP5)



Function	Pin closed	Setting
Normal (default)	1-2	
Clear RTC	2-3	

2.4.4 AT & ATX Mode Selection (JP6)

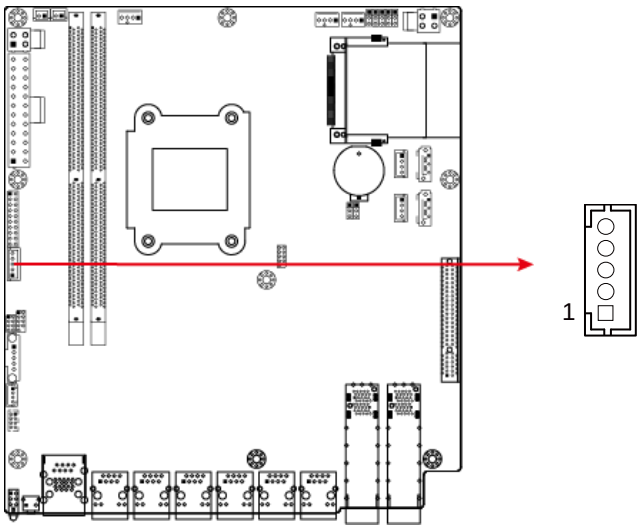


Function	Pin closed	Setting
AT (default)	1-2	
ATX	2-3	

2.5 Connectors Quick Reference

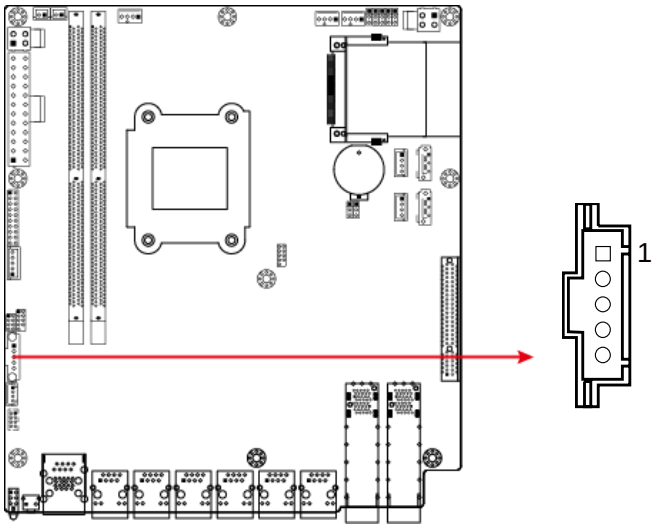
Function	Connector Name	Page
COM2 Port	CN3	22
PM Bus Connector	J14	22
SATA Power Connector	J7, J10	23
System Function Connector	JP8	23
Digital I/O Port	JP10	25
Fan Power Connector	CPU_FAN1, SYS_FAN1, SYS_FAN2	25
USB 2.0 Connector	F_USB1	--
AT / ATX Power Switch Connector	J1 (AT), J2 (ATX)	--
ATX 12V Output Connector	J3	--
ATX Power Connector	J4, J6	--
CF Card Slot	J5	--
SATA Port	CN1, CN2	--
GbE RJ45 LAN Port	CN7, CN12	--
10 GbE SFP+ Port	CN4, CN5	--
Console Port & USB 3.0 Ports	CN6	--
User Self-defined Button (with GPI Signal)	SW1	--
PCIe (x8) Connector	PCIE1	--
LED Indicators	LED10	--
Factory Use Only	J11, J13, JP9	--

2.5.1 COM2 Port (CN3)



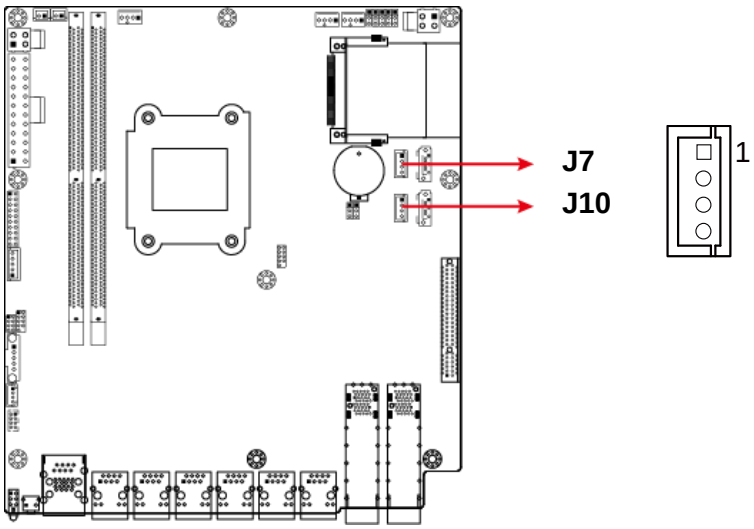
Pin	Assignment	Pin	Assignment
1	SIN	4	VCC5
2	SOUT	5	NC
3	Ground		

2.5.2 PM Bus Connector (J14)



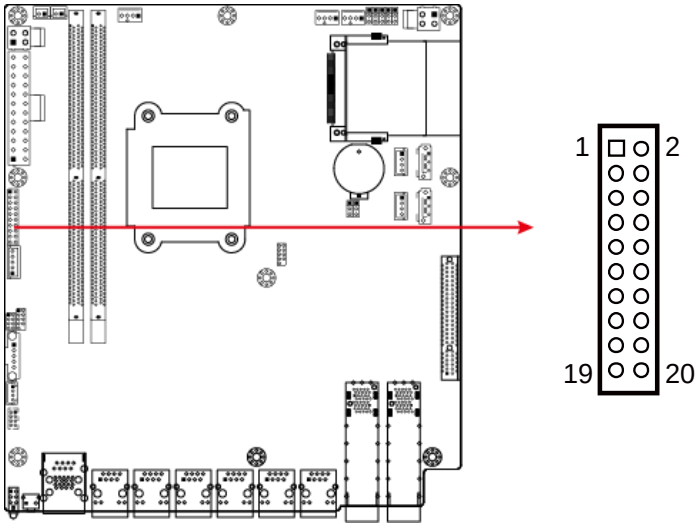
Pin	Assignment	Pin	Assignment
1	CLK	4	Ground
2	DATA	5	+3.3V
3	NC		

2.5.3 SATA Power Connector (J7, J10)



Pin	Assignment	Pin	Assignment
1	VCC5	3	Ground
2	Ground	4	VCC12

2.5.4 System Function Connector (JP8)



JP8 provides light indicators of the computer activities and status. It provides interfaces for the following functions:

- **Power LED (Pins 1, and 5)**

  This connector connects to the system power LED on control panel. This LED will light when the system turns on.

Pin	Assignment	Pin	Assignment
1	+5V	5	Ground

- **ATX Power ON Switch (Pins 13 and 14)**

  The 2 pins make an “ATX Power Supply On/Off Switch” for the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will power off the system.

Pin	Assignment	Pin	Assignment
13	Power_ON	14	Ground

- **Reset Switch (Pins 17 and 18)**

  The reset switch allows you to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

Pin	Assignment	Pin	Assignment
17	SYSRST#	18	Ground

- **Hard Disk Drive LED Connector (Pins 19 and 20)**

  This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

Pin	Assignment	Pin	Assignment
19	+3.3V	20	-HDD_LED

- **Bypass LED1 (Pins 9 and 10)**

  The two pins make an external LED connector light for LAN bypass.

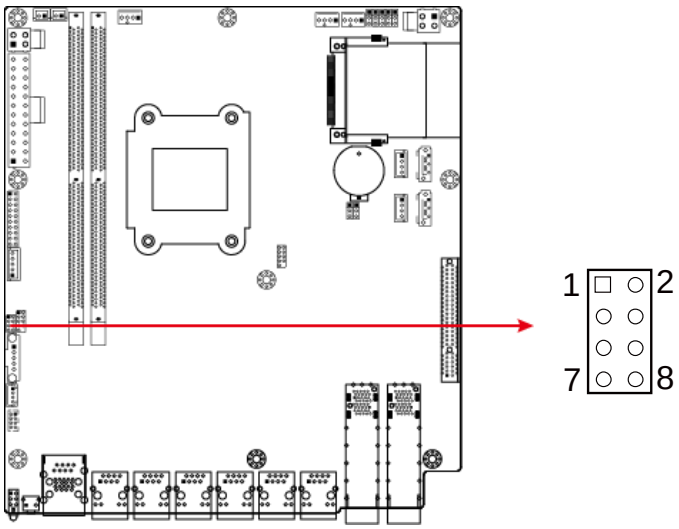
Pin	Assignment	Pin	Assignment
9	+5V	10	BYPASS0_LED-

- **Bypass LED2 (Pins 11 and 12)**

  The two pins make an external LED connector light for LAN bypass.

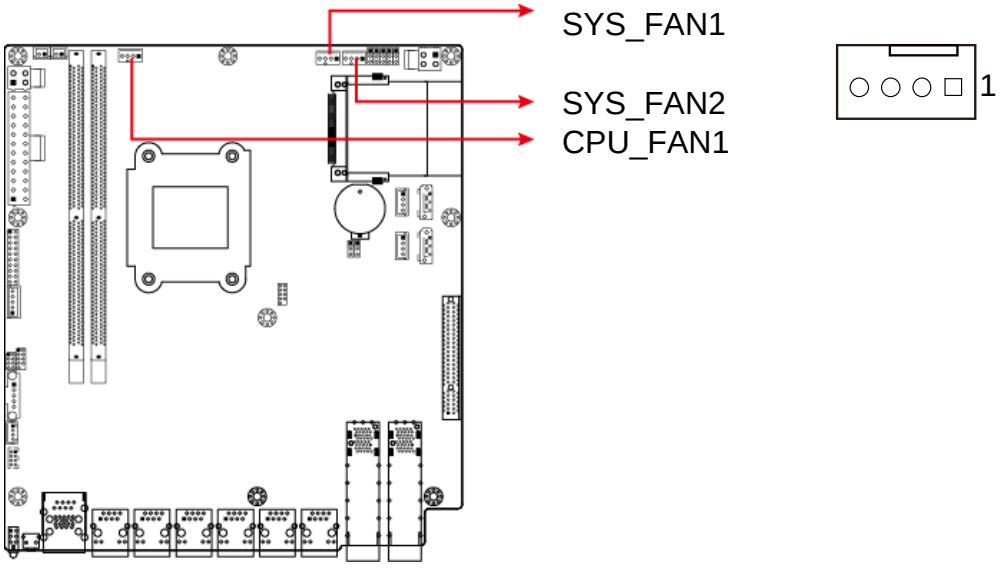
Pin	Assignment	Pin	Assignment
11	+5V	12	BYPASS1_LED-

2.5.5 Digital I/O Port (JP10)



Pin	Assignment	Pin	Assignment
1	Ground	2	VCC5
3	IN1	4	OUT1
5	IN2	6	OUT2
7	IN3	8	OUT3

2.5.6 Fan Power Connector (CPU_FAN1, SYS_FAN1, SYS_FAN2)



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

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
- Book 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
```

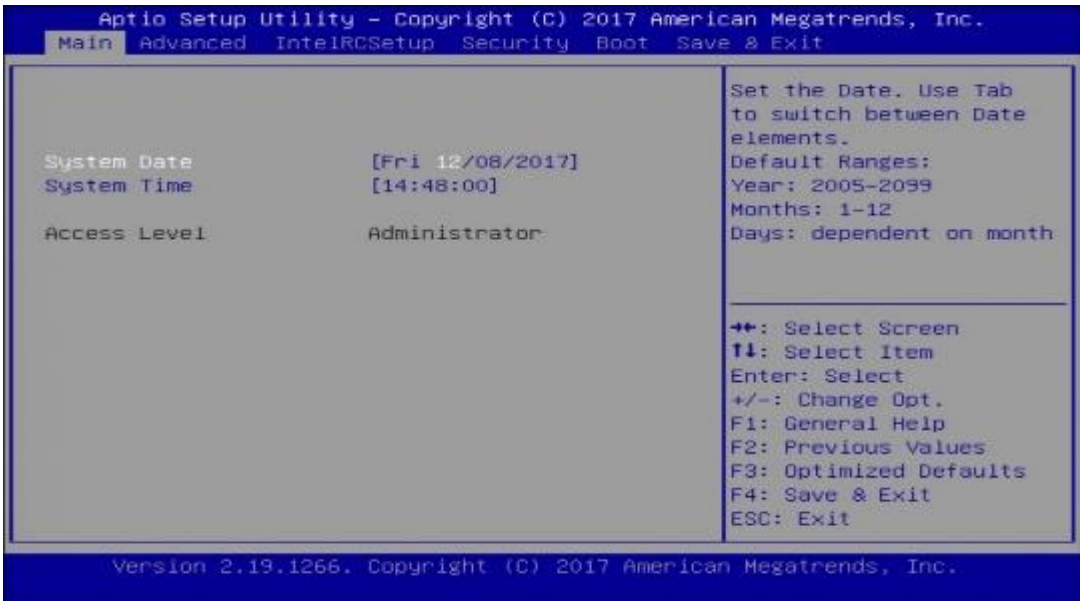
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

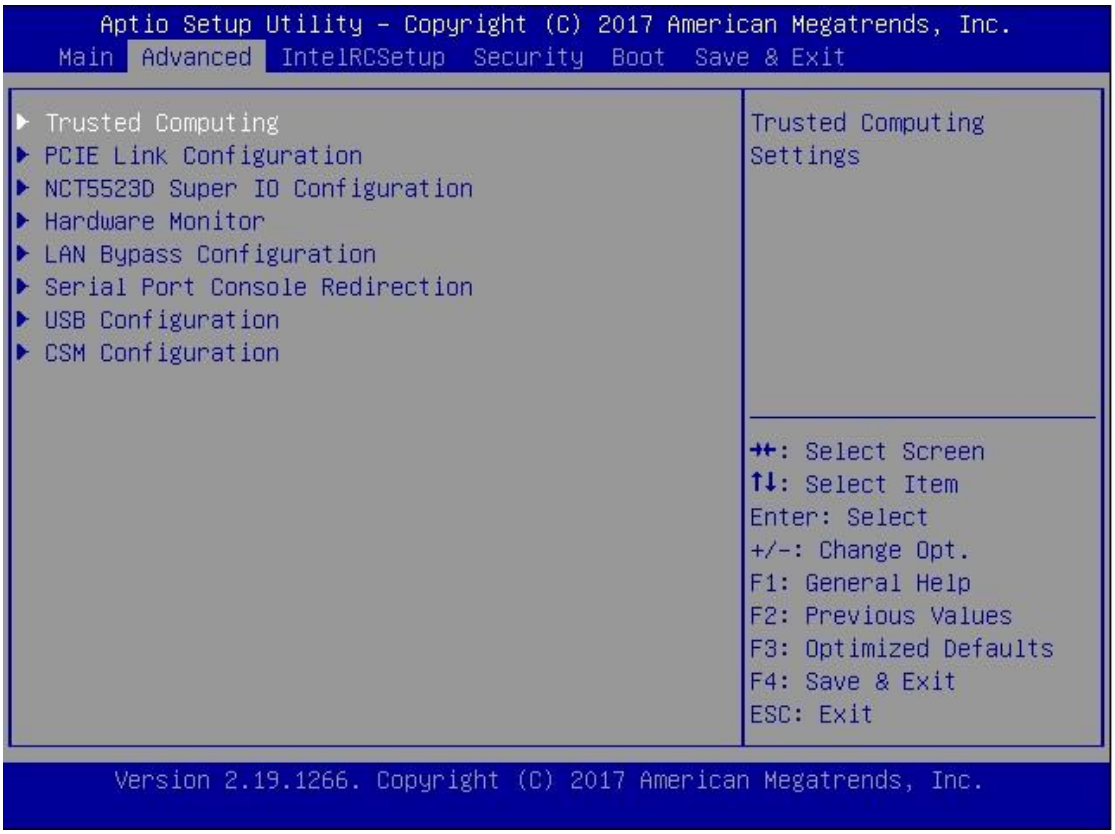
3.3 Main Settings



BIOS Setting	Description
System 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.



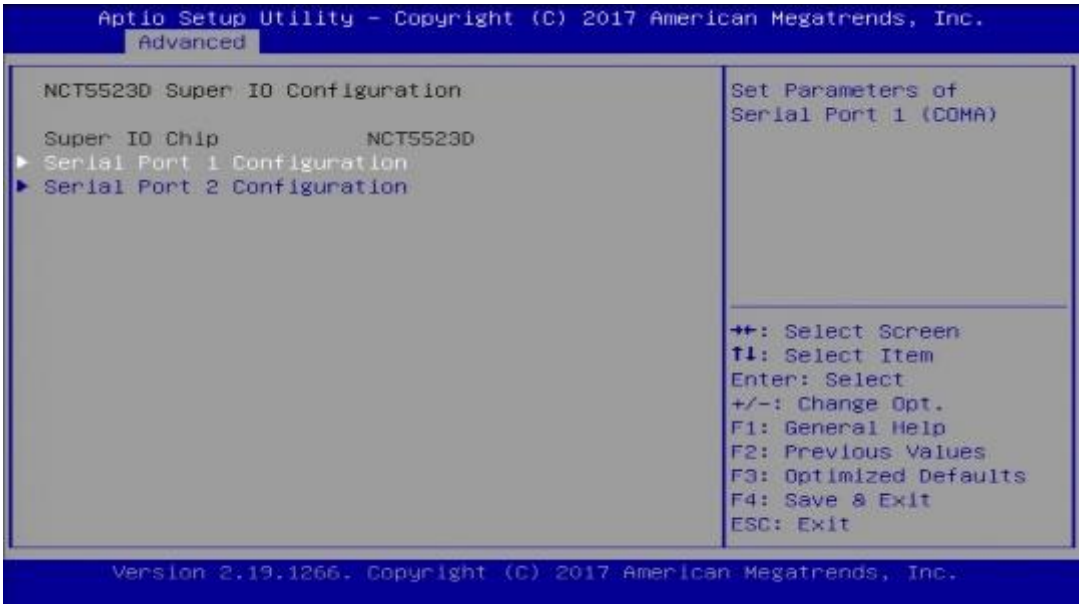
3.4.1 Trusted Computing

BIOS Setting	Description
Security Device Support	Enables / Disables TPM support. O.S. will not show TPM. Reset of platform is required.
TPM State	Enables / Disables the security device. **Note:** Your computer will reboot during restart in order to change state of the device.
Pending operation	Schedule an operation for the security device. **Note:** Your computer will reboot during restart in order to change the state of security device.

3.4.2 PCIE Link Configuration

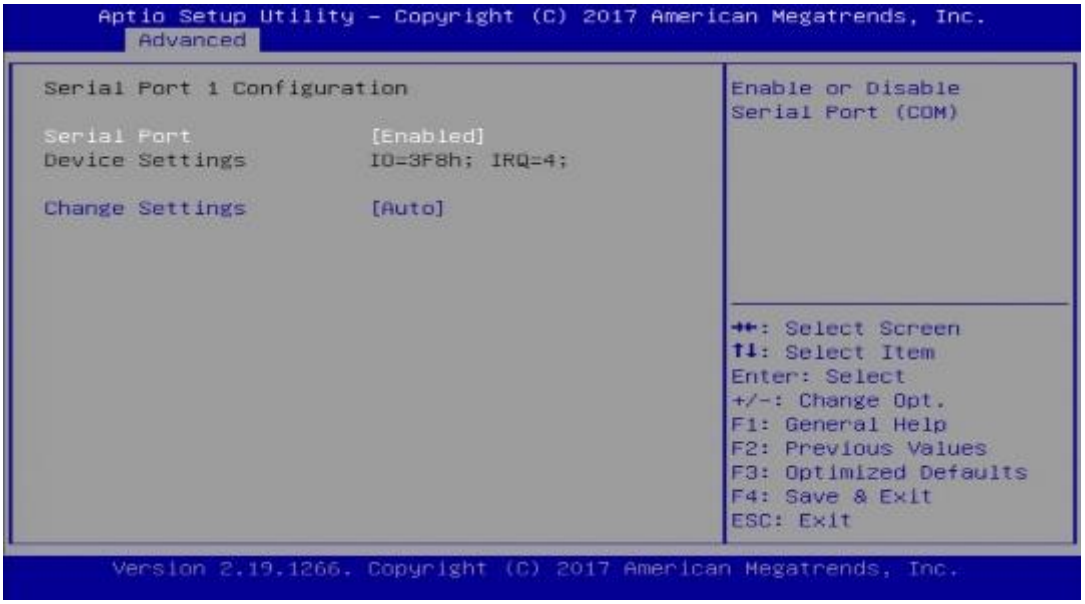
BIOS Setting	Description
PCIE x4 Link Speed	Select upper limit on link operational speed for PCI Express RootPort. Options: Auto, Gen1, Gen2, Gen3

3.4.3 NCT5523D Super IO Configuration



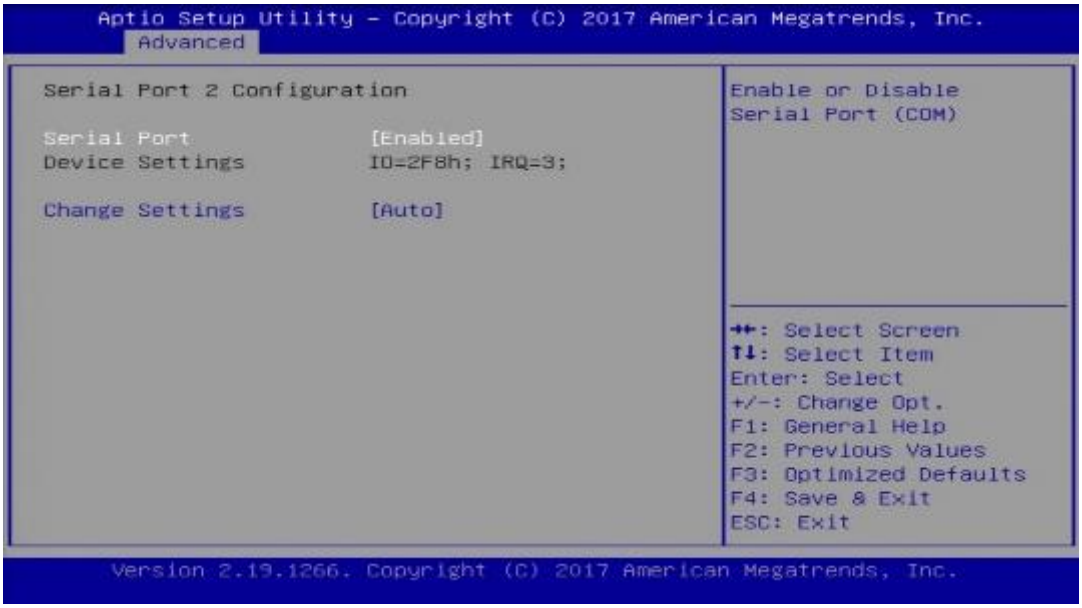
BIOS Setting	Description
Serial Port Configuration	Sets Parameters of Serial Ports. You can enable / disable the serial port and select an optimal settings for the Super IO device.

3.4.3.1. Serial Port 1 Configuration



BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=3F8h ; IRQ=4 • IO=3F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12

3.4.3.2. Serial Port 2 Configuration

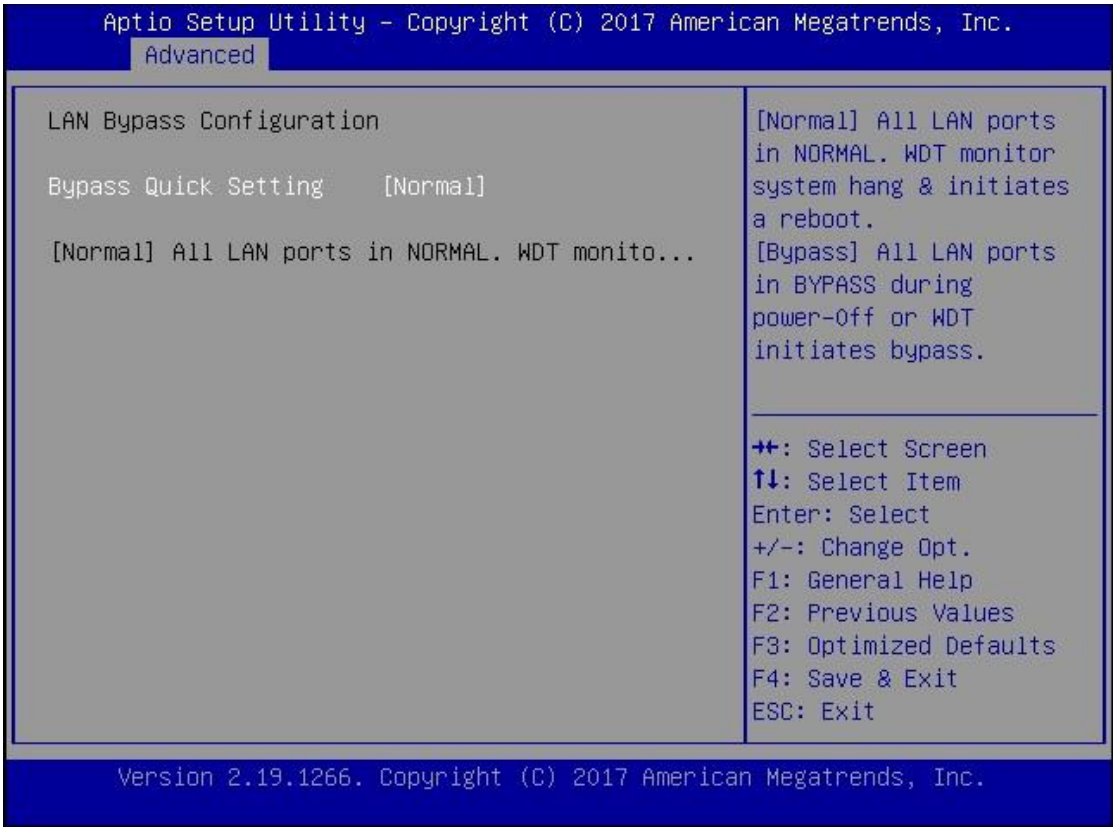


BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for the Super I/O device. Options: • Auto • IO=2F8h ; IRQ=3 • IO=3F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2F8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=3E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12 • IO=2E8h ; IRQ=3, 4, 5, 6, 7, 9. 10, 11, 12

3.4.4 Hardware Monitor

BIOS Setting	Description
Power Failure	Selects S0/S5 for ACPI state after a G3. Options: Power On, Power Off, Last State
ACPI Shutdown Temperature	This field enables or disables the Shutdown Temperature Options: Disabled,. 70°C, 75°C, 80°C, 85°C, 90°C, 95°C
CPU Smart Fan Control	Sets up or disable the fan control for start-up temperature. Options: Disabled, 40°C, 45°C, 50°C, 55°C, 60°C, 65°C, 70°C
Temperatures / Voltages	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

3.4.5 LAN Bypass Configuration

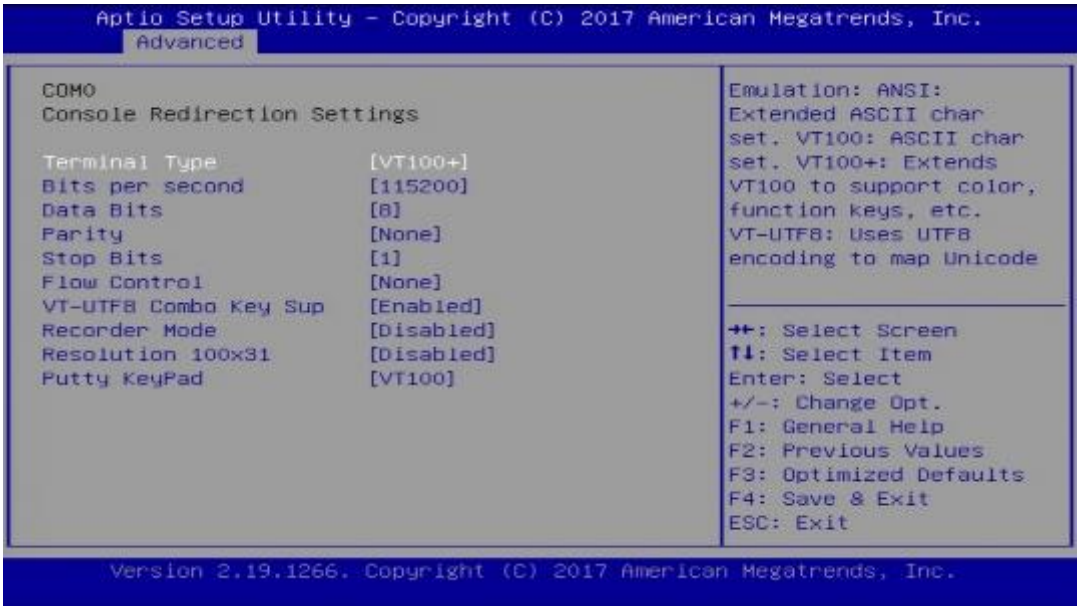


BIOS Setting	Description
Bypass Quick Setting	**Normal:** All LAN ports in Normal state. WDT mointor system hang & initiates a reboot. **Bypass:** All LAN ports in BYPASS during power-off or WDT initiates bypass.

3.4.6 Serial Port Console Redirection

BIOS Setting	Description
Console Redirection	Enables / Disables the Console Redirection.
Console Recirection Settings	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

3.4.7 Console Port Redirection Settings



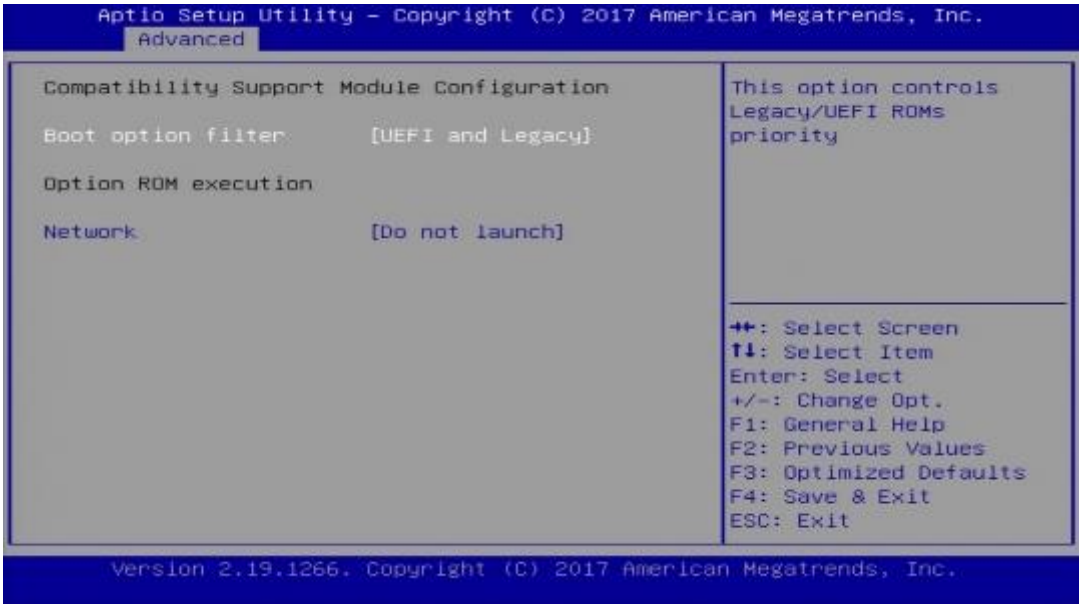
BIOS Setting	Description
Terminal Type	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode Options: VT100, VT100+, VT-UTF8, ANSI
Bits per second	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds. Options: 9600, 19200, 38400, 57600, 115200
Data Bits	Selects the data bits as 7 or 8.
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Options: None, Even, Odd, Mark, Space
Stop Bits	Stop bits indicates the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Options: 1, 2
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Options: None, Hardware RTS/CTS

BIOS Setting	Description
VT-UTF8 Combo Key support	Enables / Disables VT-UTF8 combination key support for ANSI/VT100 terminals.
Recorder Mode	With this mode enabled only text will be sent. This is to capture terminal data.
Resolution 100 x 31	Enables / Disables extended terminal resolution.
Putty KeyPad	Selects FunctionKey and KeyPad on Putty.

3.4.8 USB Configuration

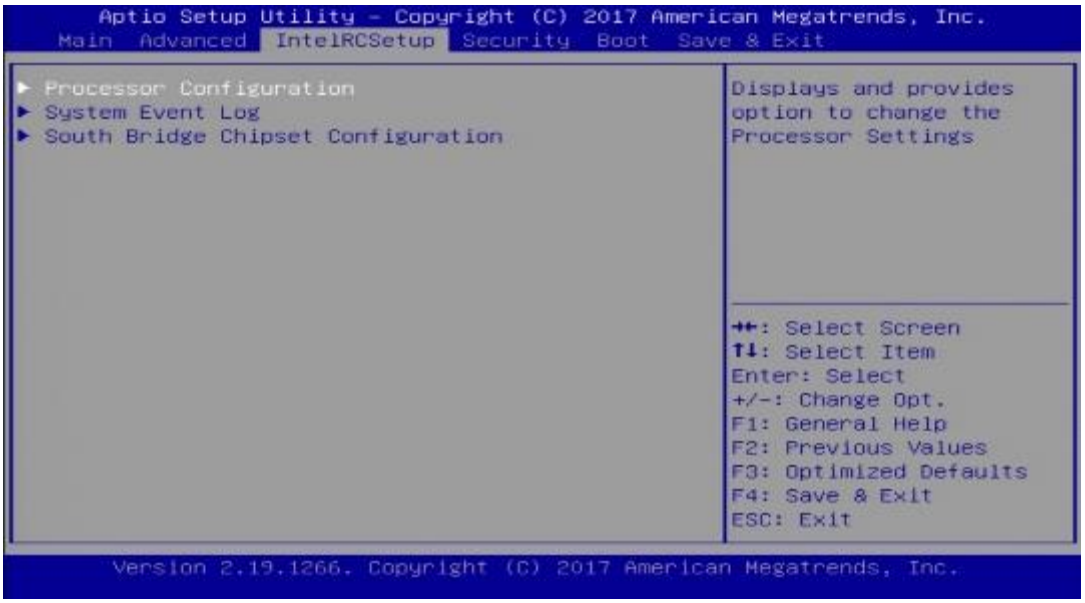
BIOS Setting	Description
Legacy USB Support	Enables / Disables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disable** keeps USB devices available only for EFI applications.

3.4.9 CSM Configuration

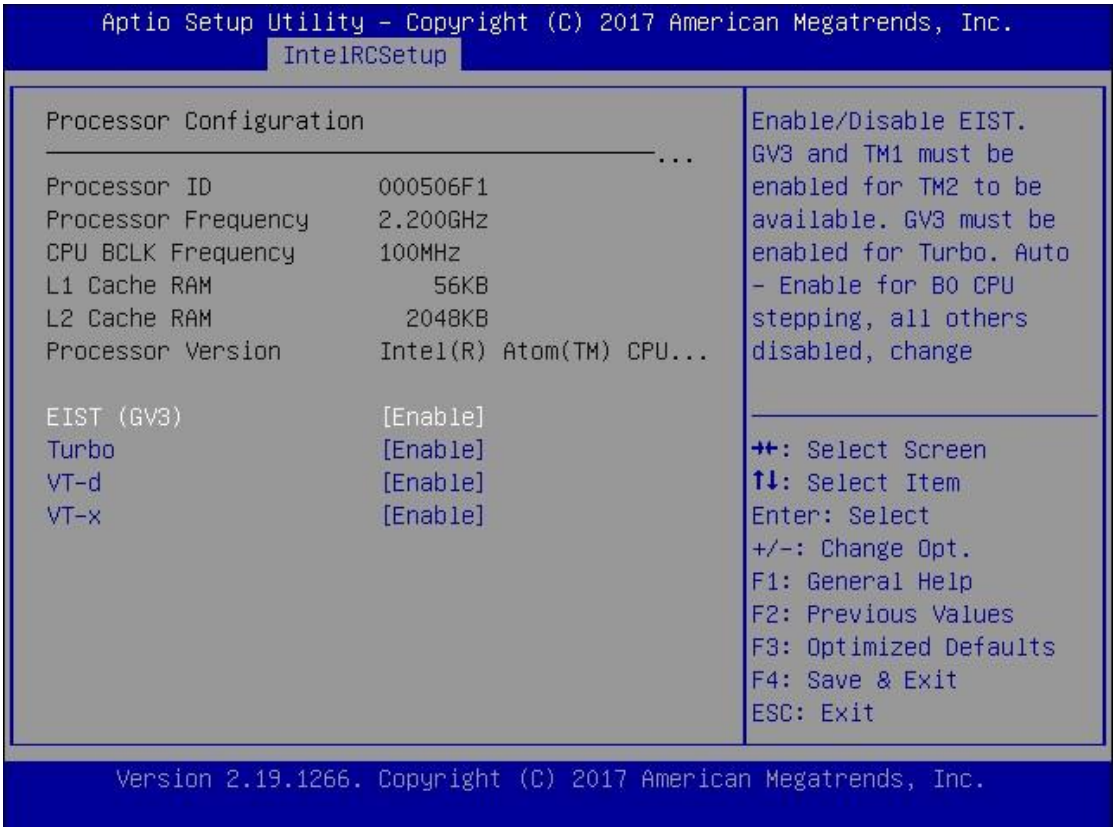


BIOS Setting	Description
Boot option filter	Controls Legacy/UEFI ROMs priority. Options: UEFI and Legacy, Legacy only, UEFI only
Network	Controls the execution of UEFI and Legacy PXE OpROM. Options: Do not launch, Legacy

3.5 Intel RC Setup

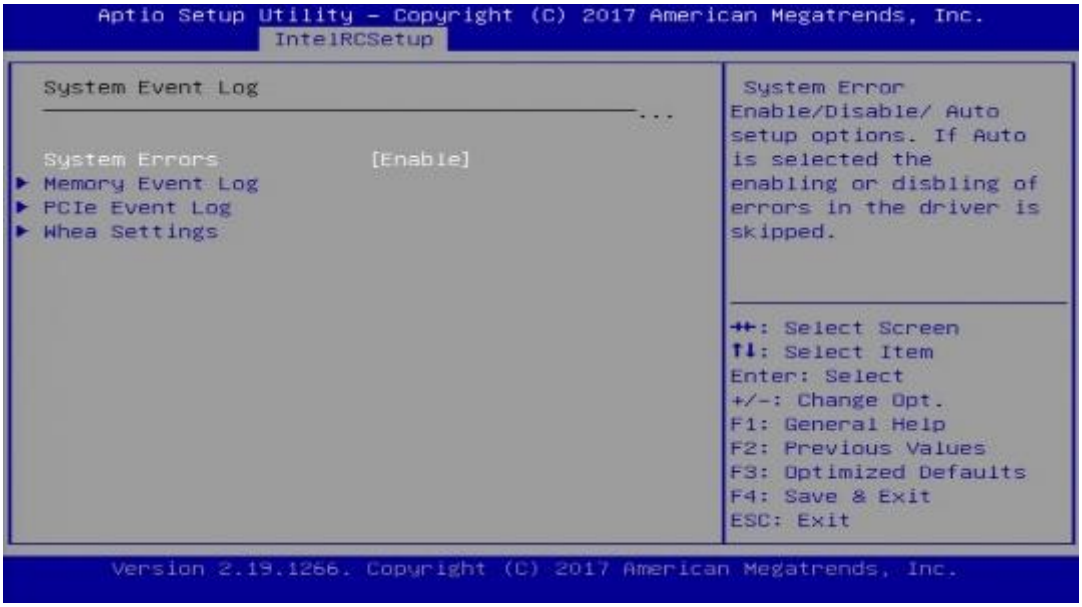


3.5.1 Processor Configuration



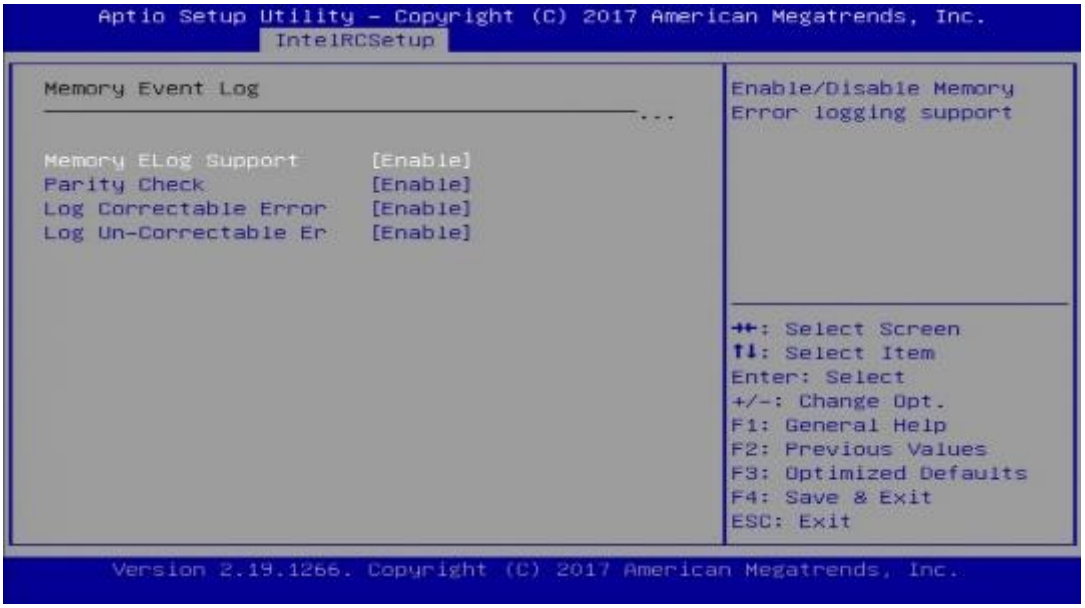
BIOS Setting	Description
EIST (GV3)	Enables / Disables EIST. GV3 and TM1 must be enabled for TM2 to be available. GV3 msut be available for Turbo.
Turbo	Enables / Disables CPU Turbo capability. This option only applies to EC2 and above.
VT-d	Enables / Disables VT-d.
VT-x	Enables / Disables VT-x.

3.5.2 System Event Log



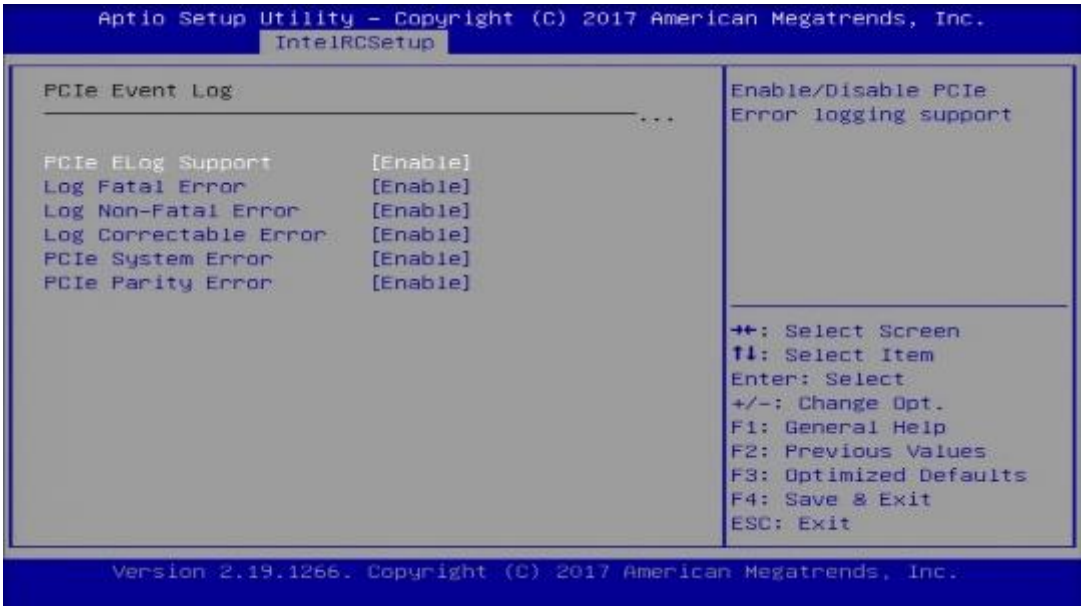
BIOS Setting	Description
System Errors	Enables / Disables / Automatically sets up options. If Auto is selected, the enabling or disabling of errorsin the driver is skipped.

3.5.2.1. Memory Event Log



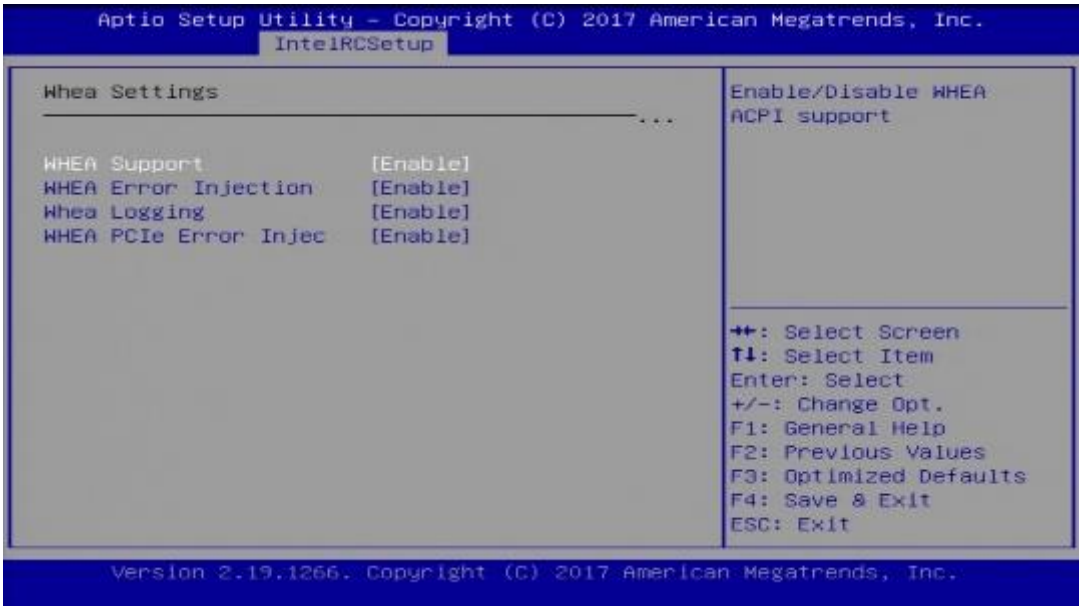
BIOS Setting	Description
Memory Elog Support	Enables Disables memory error logging support.
Parity Check	Enables / Disables parity check.
Log Correctable Error	Enables / Disables correctable memory error logging support.
Log Uncorrectable Error	Enables / Disables uncorrectable memory error logging support.

3.5.2.2. PCIe Event Log



BIOS Setting	Description
PCIe Elog Support	Enables / Disables PCIe error logging support.
Log Fatal Error	Send system event signal on fatal error.
Log Non-Fatal Error	Send system event signal on non-fatal error.
Log Correctable Error	Send system event signal on correctable error.
PCIe System Error	Enables / Disables system error reporting on all enumerated root ports, bridges and devices.
PCIe Parity Error	Enables / Disables parity error reporting on all enumerated root ports, bridges and devices.

3.5.2.3. WHEA Settings

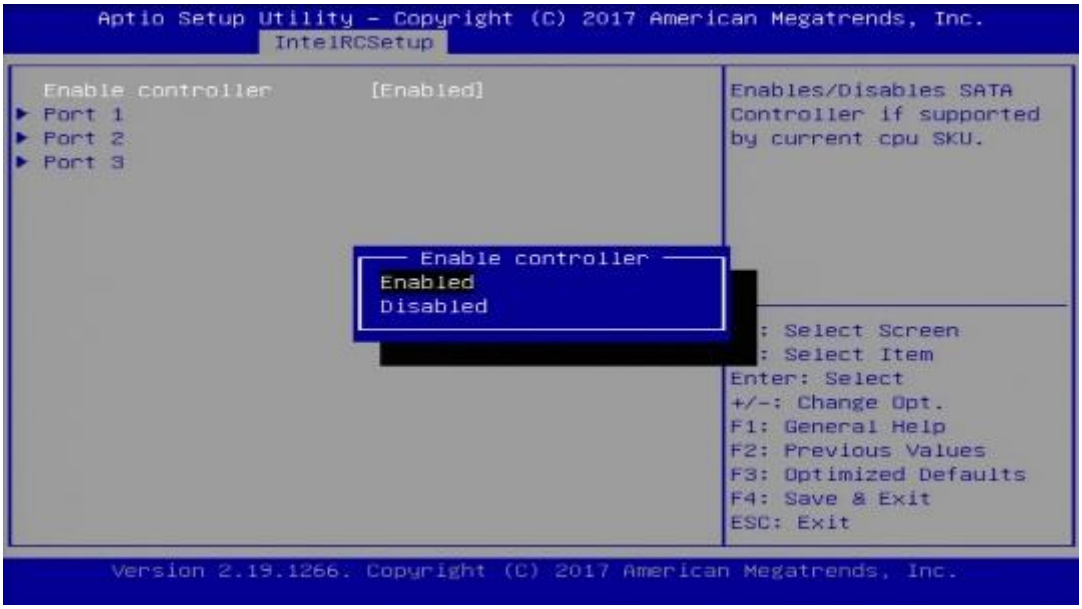


BIOS Setting	Description
WHEA Support	Enables / Disables WHEA ACPI support.
WHEA Error Injection	WHEA EINJ ACPI 5.0 allows you to set error type with address and vendor extensions.
WHEA Logging	Enables / Disables WHEA Logging of errors.
WHEA PCIe Error Injection	Enables / Disables WHEA PCIe error injection.

3.5.3 South Bridge Chipset Configuration

BIOS Setting	Description
SATA Configuration	Configures of SATA controller.
IQAT Configuration	Hides IQAT device from an OS.

3.5.3.1. SATA Configuration



BIOS Setting	Description
Enable Controller	Enables / Disables SATA Controller if supported by current CPU SKU.

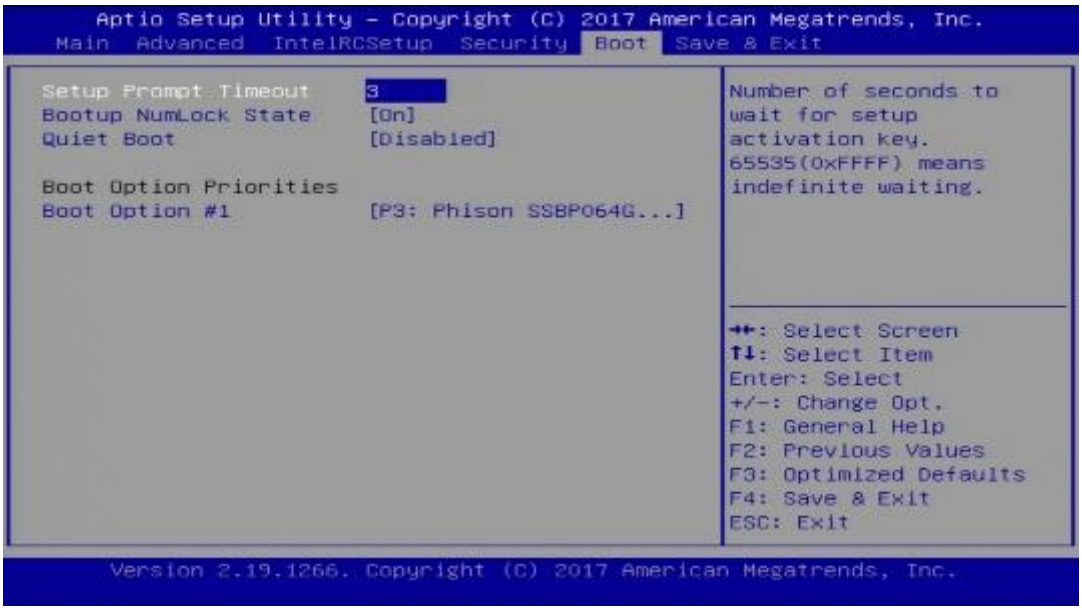
3.5.3.2. IQAT Configuration

BIOS Setting	Description
IQAT	Hides IQAT device from an OS.
Set IQAT FUSECTL	Enables / Disables the setting of IQAT FUSECTL register.
Set 64B MRR/MPL	Enables / Disables the setting of 64B MRR/MPL in IQAT DevCtl register.

3.6 Security Settings

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

3.7 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 Option Priorities	Sets the system boot order priorities for hard disk, CD/DVD, USB, Network.

3.8 Save & Exit Settings

BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Restore Defaults	Restores / Loads defaults values for 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
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A20-0x00000A2F	Motherboard resources
0x0000D000-0x0000D07F	NVIDIA GeForce GT 730
0x0000D000-0x0000D07F	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 0 - 19A4
0x000003B0-0x000003BB	NVIDIA GeForce GT 730
0x000003B0-0x000003BB	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 0 - 19A4
0x000003C0-0x000003DF	NVIDIA GeForce GT 730
0x000003C0-0x000003DF	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 0 - 19A4
0x00000062-0x00000062	Microsoft ACPI-Compliant Embedded Controller
0x00000066-0x00000066	Microsoft ACPI-Compliant Embedded Controller
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x00007000-0x00007FFF	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 7 - 19AB
0x0000E000-0x0000E01F	Intel(R) Atom(TM) processor C3000 product family Legacy SMBus - 19DF
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x0000B000-0x0000BFFF	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 3 - 19A7
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x00000070-0x00000077	System CMOS/real time clock
0x00000070-0x00000077	Motherboard resources

Address	Device Description
0x00009000-0x00009FFF	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 5 - 19A9
0x00008000-0x00008FFF	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 6 - 19AA
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x00000500-0x000005FE	Motherboard resources
0x0000C000-0x0000CFFF	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 2 - 19A6
0x0000E050-0x0000E057	Standard SATA AHCI Controller
0x0000E040-0x0000E043	Standard SATA AHCI Controller
0x0000E020-0x0000E03F	Standard SATA AHCI Controller
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

Address	Device Description
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
0x0000A000-0x0000AFFF	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 4 - 19A8

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) Atom(TM) processor C3000 product family Trace Hub - 19E2
IRQ 11	Intel(R) Atom(TM) processor C3000 product family Management Engine Interface - 19D3
IRQ 11	Intel(R) Atom(TM) processor C3000 product family Host SMBus - 19AC
IRQ 15	Intel(R) Atom(TM) processor C3000 product family Legacy SMBus - 19DF
IRQ 16	NVIDIA GeForce GT 730
IRQ 17	High Definition Audio Controller
IRQ 23	Intel(R) Atom(TM) processor C3000 product family RCEC - 19A2
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967096 ~ IRQ 4294967113	Intel(R) I211 Gigabit Network Connection #3
IRQ 4294967114 ~ IRQ 4294967131	Intel(R) I211 Gigabit Network Connection #5
IRQ 4294967132 ~ IRQ 4294967149	Intel(R) I211 Gigabit Network Connection #2
IRQ 4294967150 ~ IRQ 4294967167	Intel(R) I211 Gigabit Network Connection
IRQ 4294967168 ~ IRQ 4294967185	Intel(R) I211 Gigabit Network Connection #6
IRQ 4294967186 ~ IRQ 4294967203	Intel(R) I211 Gigabit Network Connection #4
IRQ 4294967204	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)

Level	Function
IRQ 4294967205 ~ IRQ 4294967222	Intel(R) Ethernet Connection X553 10 GbE SFP+ #7
IRQ 4294967223 ~ IRQ 4294967240	Intel(R) Ethernet Connection X553 10 GbE SFP+ #6
IRQ 4294967241 ~ IRQ 4294967258	Intel(R) Ethernet Connection X553 10 GbE SFP+ #8
IRQ 4294967259 ~ IRQ 4294967276	Intel(R) Ethernet Connection X553 10 GbE SFP+ #5
IRQ 4294967277 ~ IRQ 4294967284	Standard SATA AHCI Controller
IRQ 4294967285	Intel(R) Atom(TM) processor C3000 product family PCIe Network Root Port 1 - 19D2
IRQ 4294967286	Intel(R) Atom(TM) processor C3000 product family PCIe Network Root Port 0 - 19D1
IRQ 4294967287	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 7 - 19AB
IRQ 4294967288	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 6 - 19AA
IRQ 4294967289	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 5 - 19A9
IRQ 4294967290	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 4 - 19A8
IRQ 4294967291	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 3 - 19A7
IRQ 4294967292	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 2 - 19A6
IRQ 4294967293	Intel(R) Atom(TM) processor C3000 product family PCIe Root Port 0 - 19A4
IRQ 4294967294	PCI Express Root Port

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. WDT 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. WDT 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. WDT Sample Code: The file NCT5523D.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 "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;
}
//-----------------------------------------------------------------------
```