

MBN806

Networking Motherboards

With AMD EPYC™ Embedded 3000 Series

User's Manual

Version 1.0
(Nov. 2018)



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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

Do not 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.
- **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 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.

Table of Contents

Compliance.....	iii
Important Safety Information	iv
WARNING	iv
CAUTION	v
Warranty Policy.....	v
Technical Support & Services	v
Chapter 1 General Information.....	1
1.1 Introduction	2
1.2 Features.....	3
1.3 Packing List	3
1.4 Optional Accessories	3
1.5 Specifications.....	4
1.6 Overview.....	5
1.7 Dimensions	6
Chapter 2 Hardware Configuration	7
2.1 Installation / Replacement.....	8
2.1.1 Memory Installation / Replacement.....	8
2.1.2 IPMI Module Installation / Replacement.....	9
2.2 Setting the Jumper	10
2.3 Jumper & Connector Locations on Motherboard	11
2.4 Jumper Quick Reference	12
2.5 Connectors Quick Reference	14
Chapter 3 BIOS Setup.....	23
3.1 Introduction	24
3.2 BIOS Setup.....	24
3.3 Main Settings	25
3.4 Advanced Settings	26
3.4.1 Trusted Computing	27
3.4.2 NCT5523D Super IO Configuration	28
3.4.3 NCT7904D HW Monitor	31

3.4.4	Serial Port Console Configuration.....	32
3.4.5	CPU Configuration.....	35
3.4.6	NVMe Configuration	35
3.4.7	USB Configuration.....	36
3.4.8	PCIe Slot Configuration.....	37
3.4.9	LAN Bypass Configuration.....	38
3.5	Security Settings	39
3.6	Boot Settings.....	40
3.7	Save & Exit Settings.....	41
3.8	Event Logs.....	42
3.8.1	Change SMBIOS Event Log Settings	43
3.8.2	View SMBIOS Event Log Settings	44
3.9	Server Management.....	45
3.9.1	System Event Log	46
3.9.2	BMC Network Configuration	47
Appendix		48
A.	I/O Port Address Map.....	49
B.	Interrupt Request Lines (IRQ)	52
C.	Watchdog Timer Configuration.....	53
D.	Onboard Connector Types	58

Chapter 1

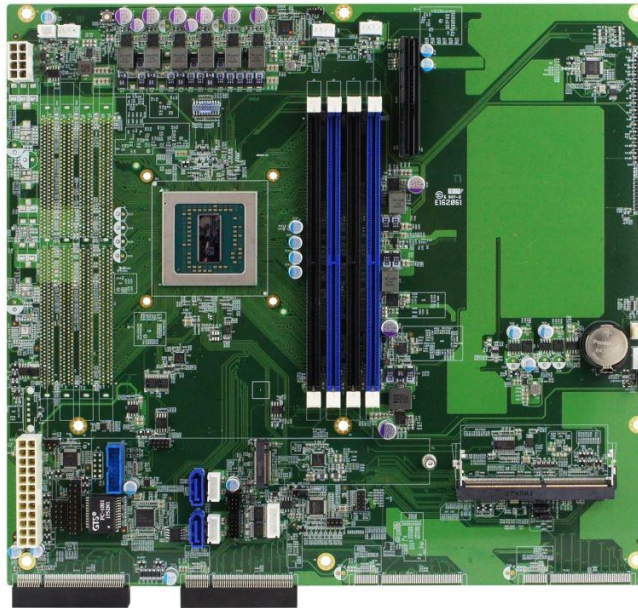
General Information

The information provided in this chapter includes:

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

1.1 Introduction

MBN806 is designed with the AMD EPYC™ Embedded 3201 processor and it can provide high performance and high integrity without a chipset. It 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

1.2 Features

- AMD EPYC™ Embedded 3201 processor
- 4 x DDR4 DIMM up to 2667 MHz; max. 64 GB UDIMM (ECC or non-ECC) or 128 GB RDIMM
- 2 x network modules via the edge PCIe (x8) slots with up to 16 GbE ports
- Optional 2 x hot-swappable 2.5" drive bays
- Optional IPMI 2.0 module
- 1 x M.2 M2280 slot and 1 x PCIe (x8) expansion slot

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.

- MBN806

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)

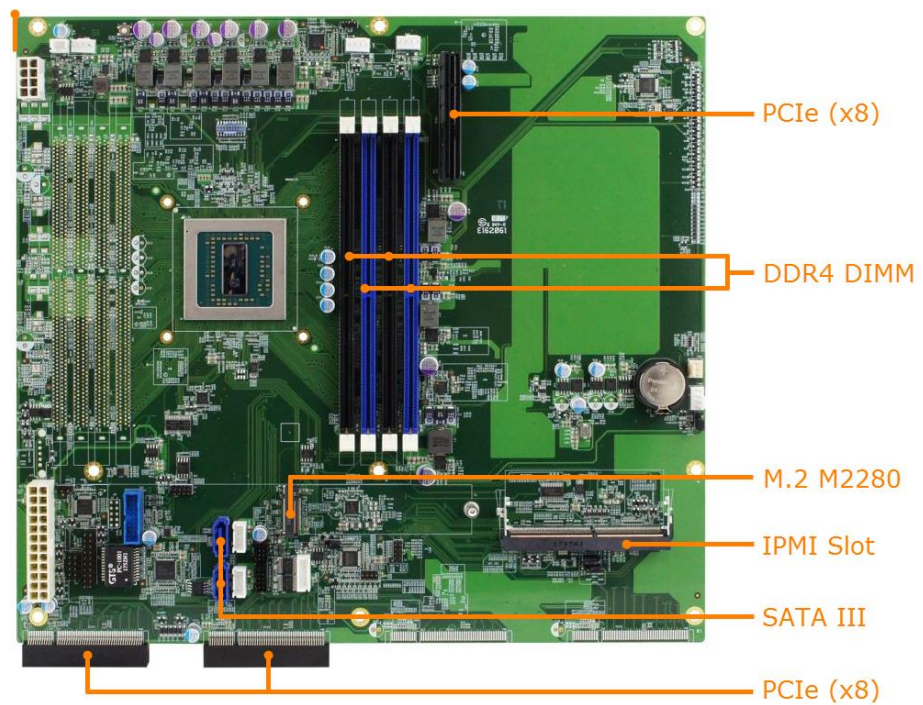
1.5 Specifications

Product Name	MBN806
Operating System	- Linux Ubuntu 16.04 / 17.04 / 17.10 - Linux Kernel 4.9
CPU	AMD EPYC™ Embedded 3201 processor
Memory	4 x DDR4 DIMM up to 2667 MHz; max. 64 GB UDIMM (ECC or non-ECC) or 128 GB RDIMM
Storage	2 x 2.5" SATA drive bay
Ethernet	Onboard: 1 x Intel® I210AT GbE controller NIC slot: depending on the IBN module SKU
Bypass	Via IBN module SKU
Super I/O	Nuvoton NCT5523D
IPMI	IPMI module compliant with IPMI 2.0 (Optional)
BIOS	AMI BIOS
Watchdog	Watchdog Timer 256 segments, 0, 1, 2...255 sec/min
Dimensions (W x H x D)	280 x 306 mm (11.02" x 12.04")
Weight	0.55 kg (1.21 lb)
Certificate	CE / FCC Class A
I/O Ports (via IDN806)	
Console	1 x Console port
Management Port (MGMT)	1 x MGMT port (shared with IPMI NC-SI port)
USB	2 x USB 2.0
LED Indicator	3 x LED indicators for power, HDD and Status
GPIO	1 x User self-defined GPIO button
Expansion Slot	1 x onboard M.2 M2280 slot 1 x onboard PCIe (x8) 2 x PCIe (x8) on the edge, for IBN modules
Environment	
Temperature	Operating: 0 ~ 60 °C (32 ~ 140 °F) Storage: -20~ 80 °C (-4 ~ 176 °F)
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)

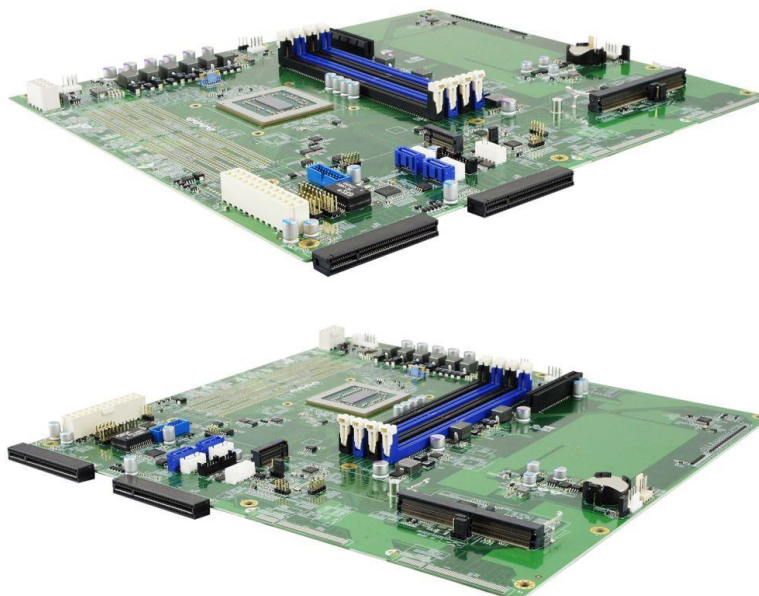
All specifications are subject to change without prior notice.

1.6 Overview

Top View

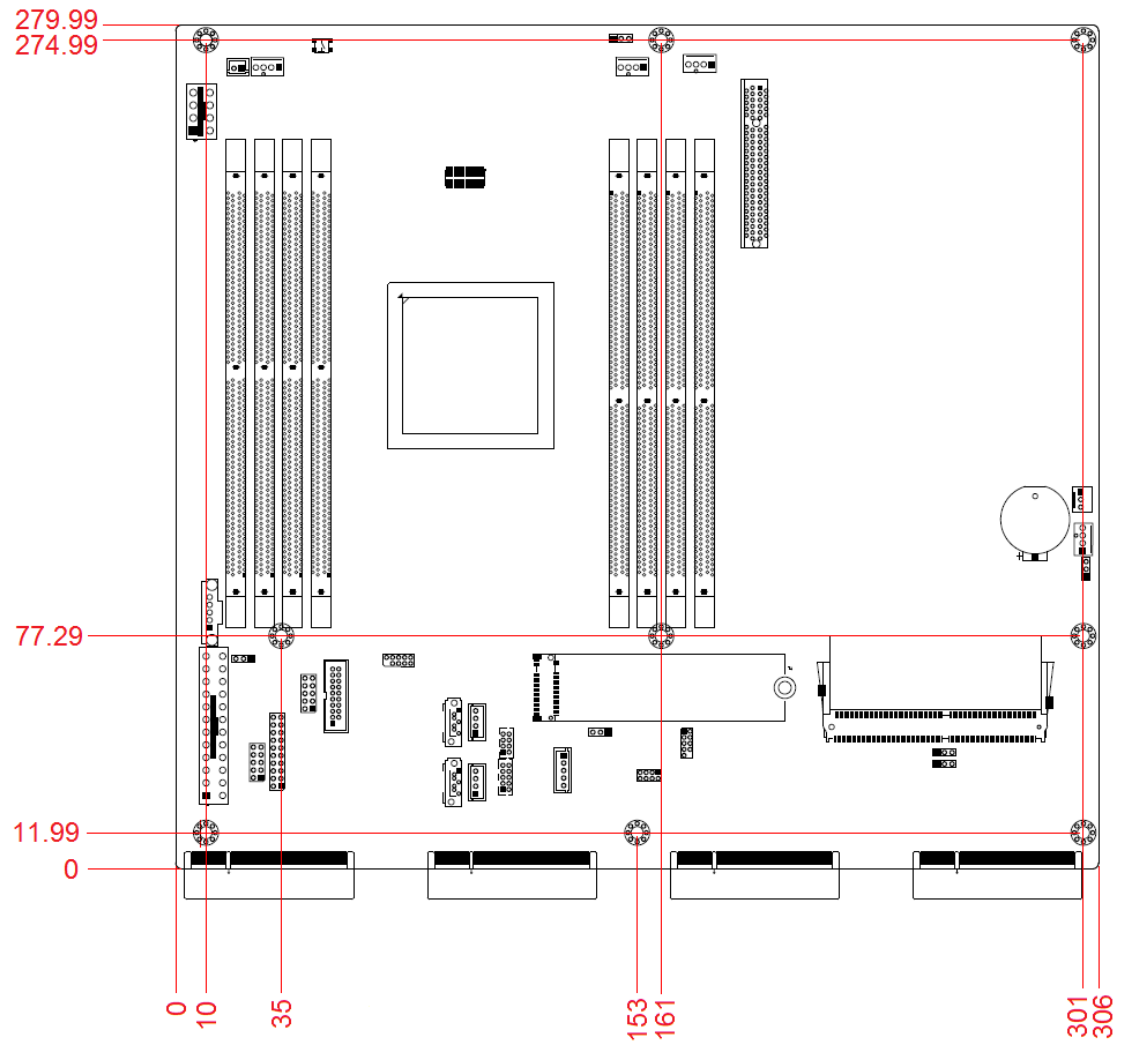


Oblique View



1.7 Dimensions

Unit: mm



Chapter 2

Hardware Configuration

The information provided in this chapter includes:

- Installation / Replacement
- Information and locations of connectors

2.1 Installation / Replacement

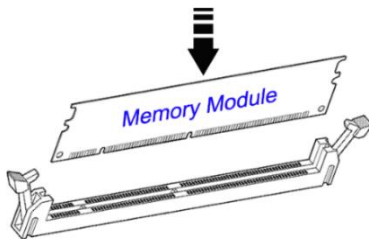
2.1.1 Memory Installation / Replacement

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

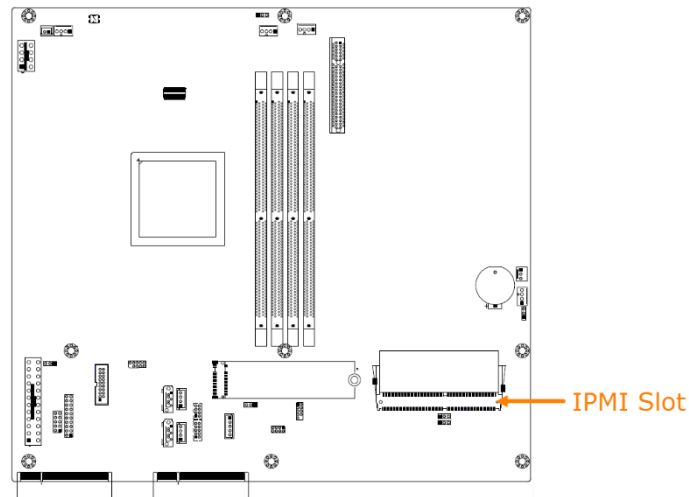


To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

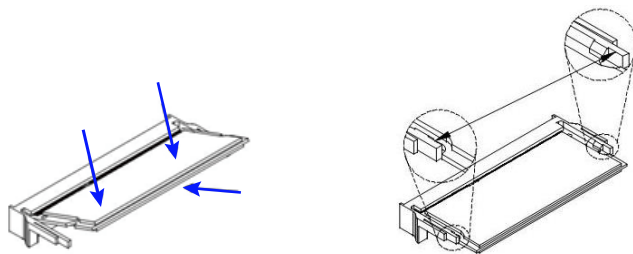
2.1.2 IPMI Module Installation / Replacement

If you need to install an IPMI module, follow the instructions below.

Note: IPMI module is optional for purchase.



1. Locate the IPMI slot and align the key of the module with that on the slot.
2. Insert the module slantwise and gently push the module straight down until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

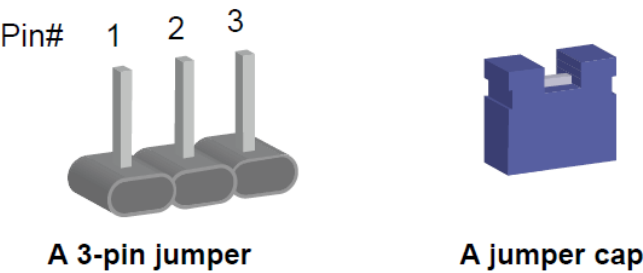


To remove the module, press the clips outwards with your thumb and index finger of both hands.

2.2 Setting the Jumper

Set up and configure your system 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.

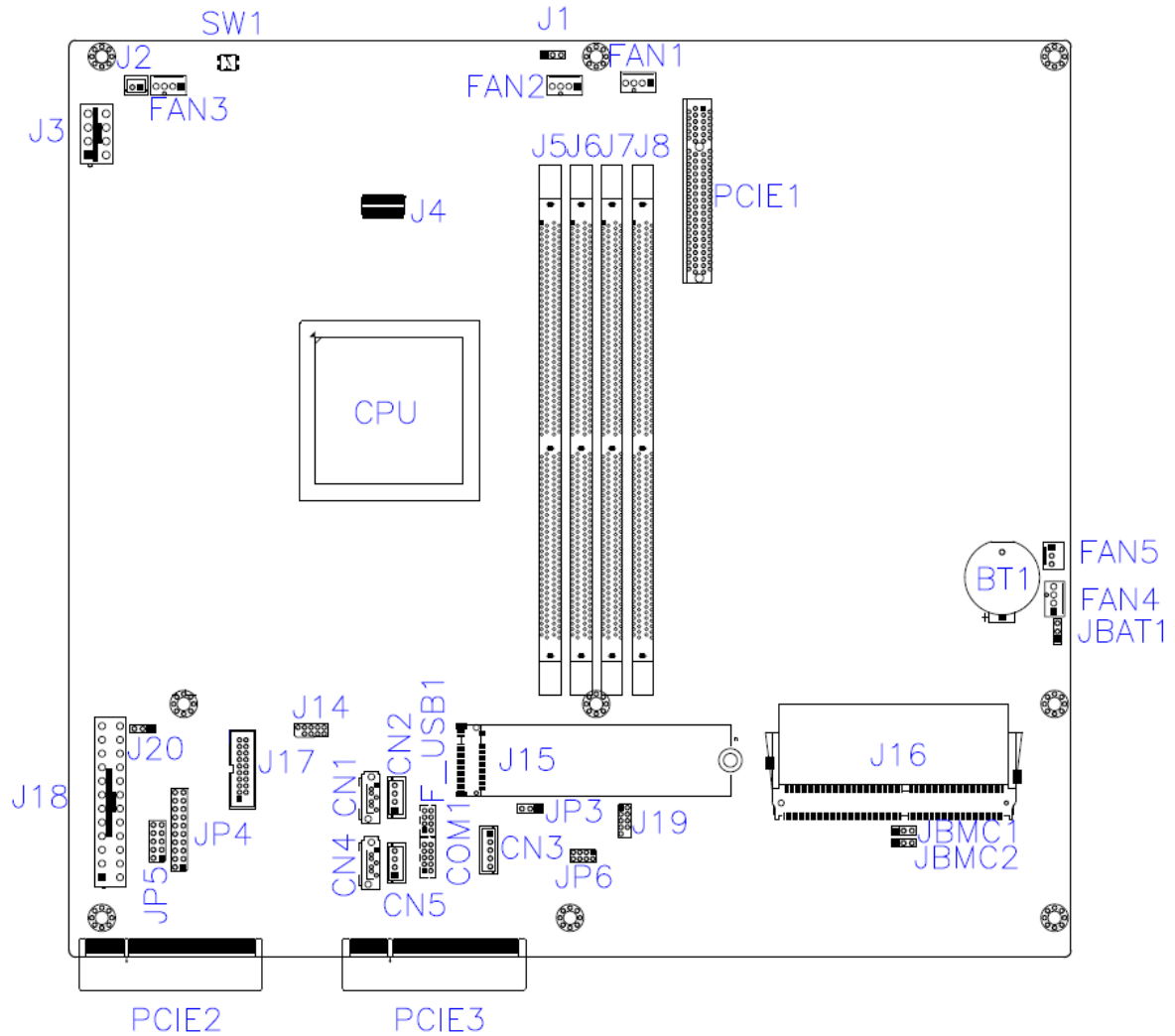
Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		

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

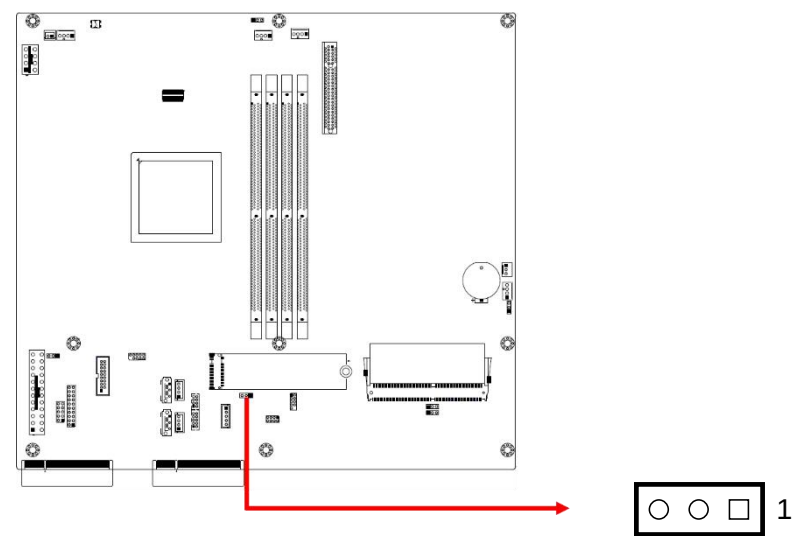
Motherboard: MBN806



2.4 Jumper Quick Reference

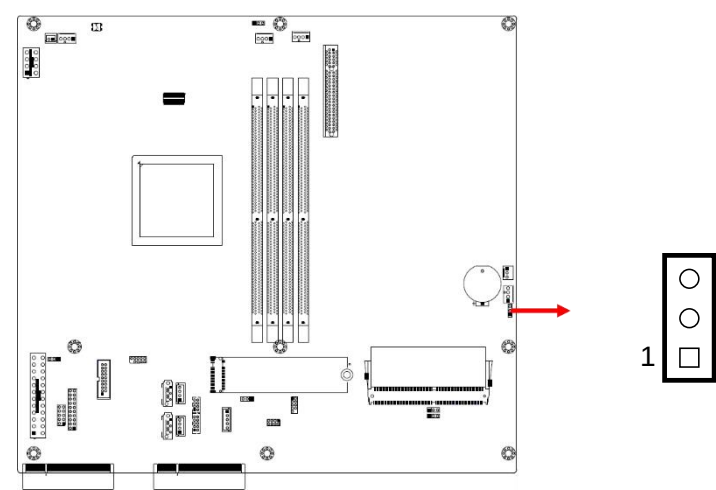
Function	Connector Name	Page
AT & ATX Mode	JP3	12
Clearing CMOS Data	JBAT1	13
Factory Use Only	JBMC1, JBMC2	--

2.4.1 AT & ATX Mode (JP3)



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

2.4.2 Clearing CMOS Data (JBAT1)

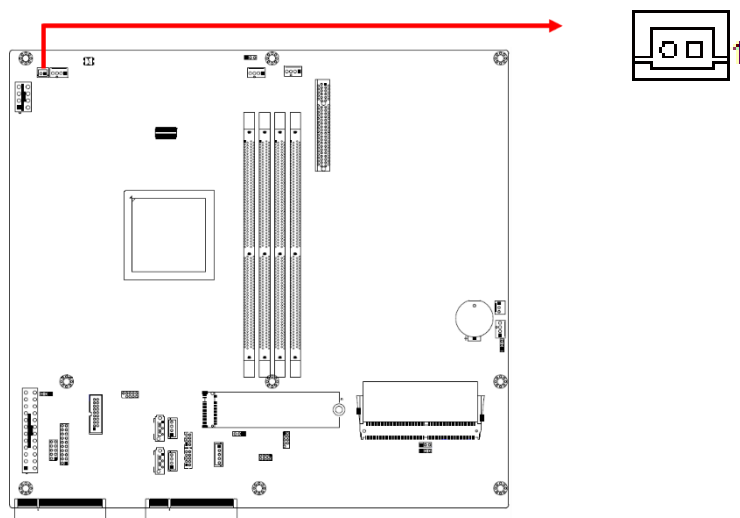


Function	Pin closed	Illustration
Normal (Default)	1-2	1
Clearing CMOS	2-3	1

2.5 Connectors Quick Reference

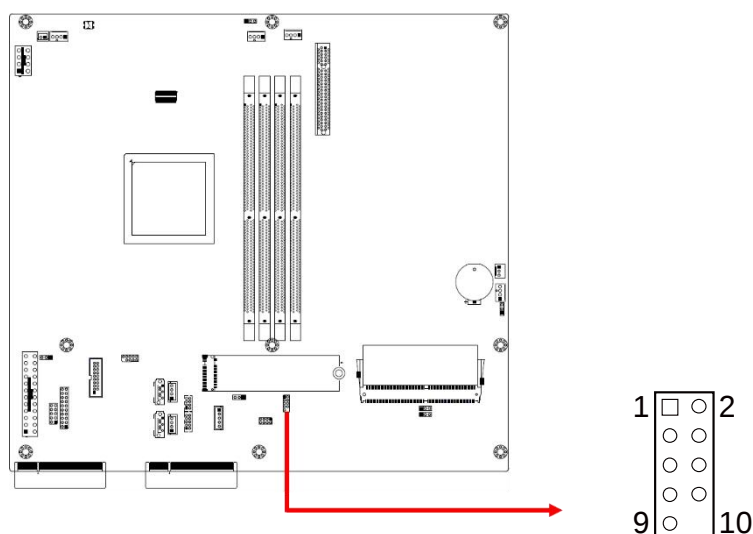
Function	Connector Name	Page
External Power Switch Connector	J2	15
LPC Port	J19	15
System Function Connector	JP5	16
Digital I/O Connector	JP6	16
External SATA Power Connector	CN2, CN5	17
LCM Connector	CN3	17
Fan Connector	PWM: FAN1, FAN2, FAN3, FAN4 Normal: FAN5	18
Front I/O Connector	JP4	19
UI5B 2.0 Connector	F_USB1	20
Console Connector	COM1	20
ATX Power Connector	J3, J18	21
USB 3.0 Port	J17	22
IPMI Connector	J16	--
M.2 M2280 Slot	J15	--
DDR4 UDIMM/RDIMM/LRDIMM Slot	J5, J6, J7, J8	--
SATA III Port	CN1, CN4	--
PCIe (x8) Slot	Standard: PCIE1 For IBN Card only: PCIE2, PCIE3	--
Factory Use Only	J14,	--

2.5.1 External Power Switch Connector (J2)



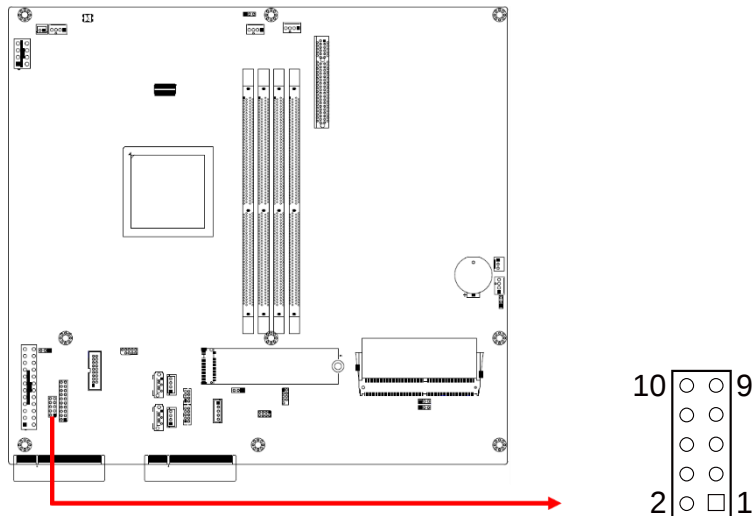
Pin	Signal Name	Pin	Signal Name
1	ATX_PSON#_EN	2	GND

2.5.2 LPC Port (J19)



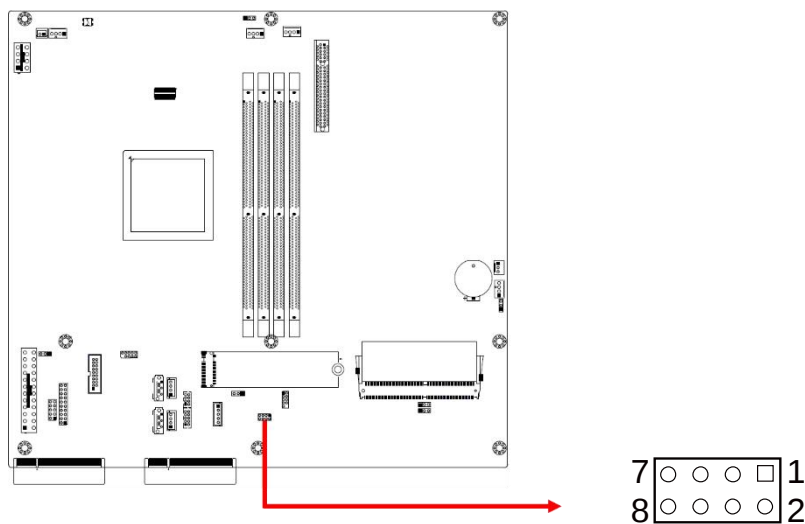
Pin	Signal Name	Pin	Signal Name
1	LPC_LAD_0	2	LPC_RST_L
3	LPC_LAD_1	4	LPC_LFRAME#
5	LPC_LAD_2	6	VCC3_3
7	LPC_LAD_3	8	GND
9	LPC24MB_BF_LAD		

2.5.3 System Function Connector (JP5)



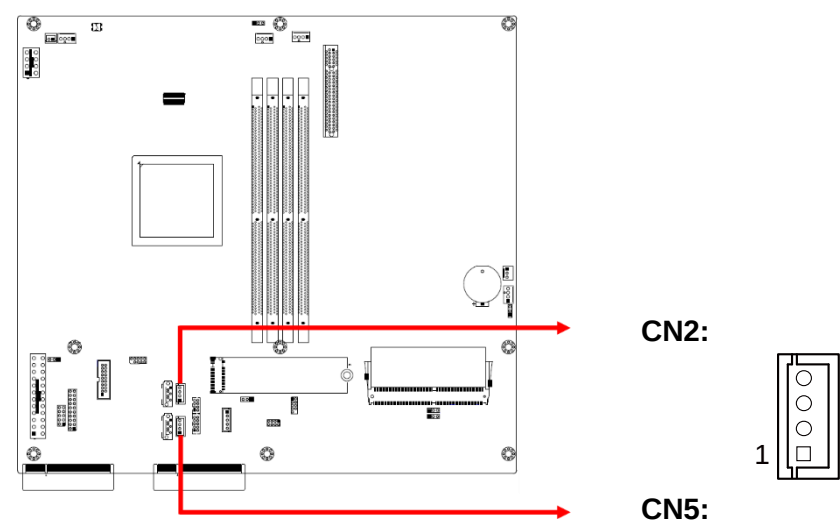
Pin	Signal Name	Pin	Signal Name
1	ATXPWR_BTN#	2	GND
3	FRST_OUT	4	GND
5	VCC5	6	GND
7	VCC3_3	8	-HDD_LED
9	NC	10	NC

2.5.4 Digital I/O Connector (JP6)



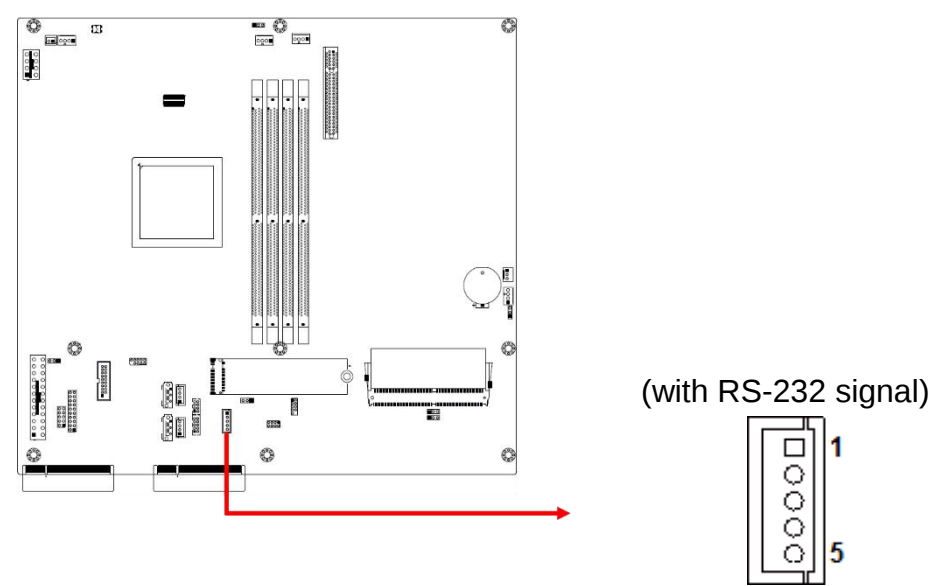
Pin	Signal Name	Pin	Signal Name
1	GND	2	VCC5
3	INT0_SIOGP22	4	INT0_SIOGP25
5	INT0_SIOGP23	6	INT0_SIOGP26
7	INT0_SIOGP24	8	INT0_SIOGP27

2.5.5 External SATA Power Connector (CN2, CN5)



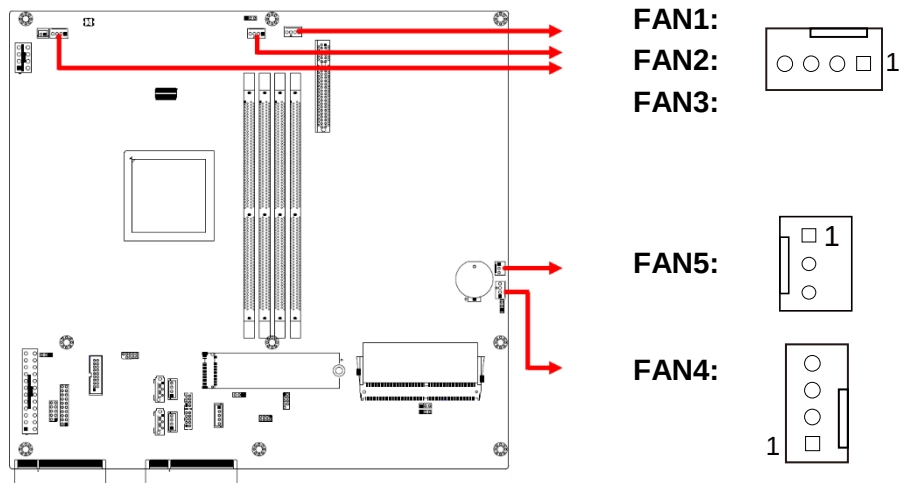
Pin	Signal Name	Pin	Signal Name
1	VCC5	3	GND
2	GND	4	VCC12

2.5.6 LCM Connector (CN3)



Pin	Signal Name	Pin	Signal Name
1	LCM_RD1	3	GND
2	LCM_TD1	4	VCC5

2.5.7 Fan Connector (FAN1, FAN2, FAN3, FAN4, FAN5)



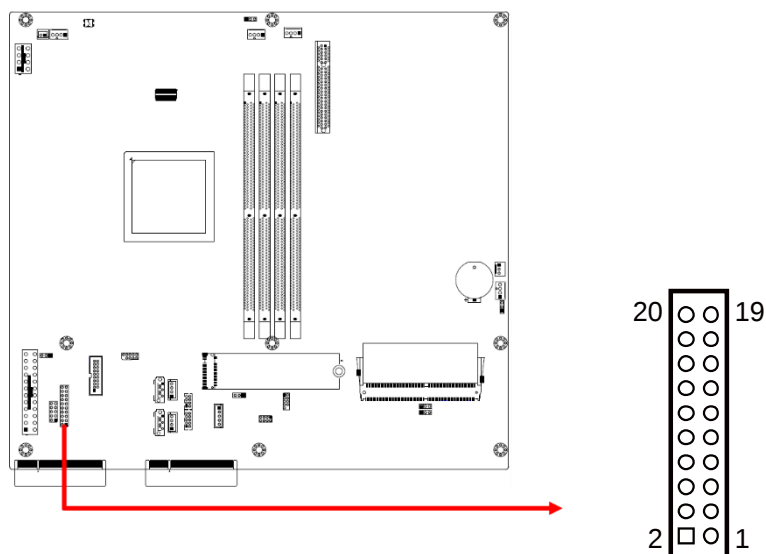
FAN1, FAN2, FAN3, FAN4: PWM fan connectors

Pin	Signal Name	Pin	Signal Name
1	GND	3	FAN_TACH
2	VCC12	4	FAN_PWM

FAN5: Normal fan connector

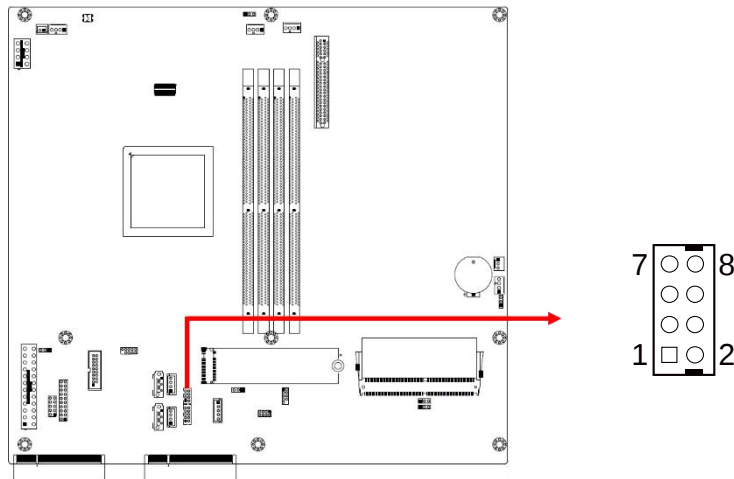
Pin	Signal Name	Pin	Signal Name
1	GND	3	FAN_TACH
2	VCC12		

2.5.8 Front I/O Connector (JP4)



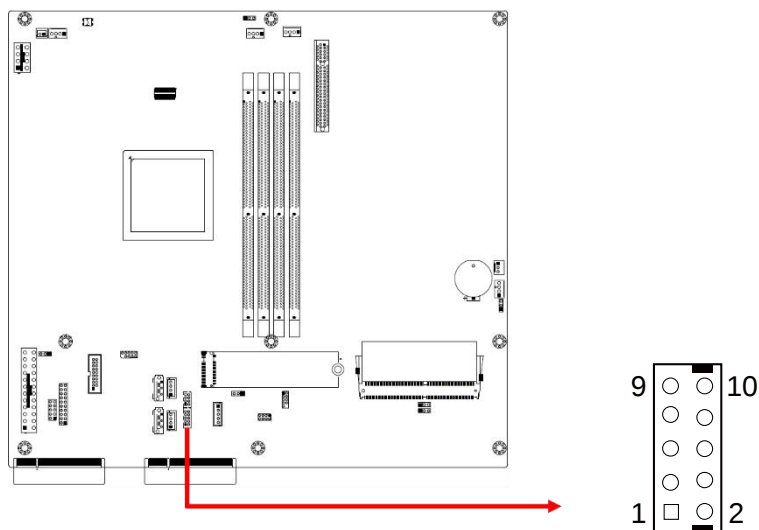
Pin	Signal Name	Pin	Signal Name
1	GPIO_BTN#	2	RJ45-MDI8_P0
3	NC	4	RJ45-MDI8_N0
5	VAUX33_LAN8	6	RJ45-MDI8_P1
7	GND	8	RJ45-MDI8_N1
9	LAN8_LED2	10	RJ45-MDI8_P2
11	LAN8_LED0	12	RJ45-MDI8_N2
13	LAN8_LED1	14	RJ45-MDI8_P3
15	SATA_LED#	16	RJ45-MDI8_N3
17	LED_SIOGP20	18	VCC5
19	LED_SIOGP21	20	GND

2.5.9 USB 2.0 Connector (F_USB1)



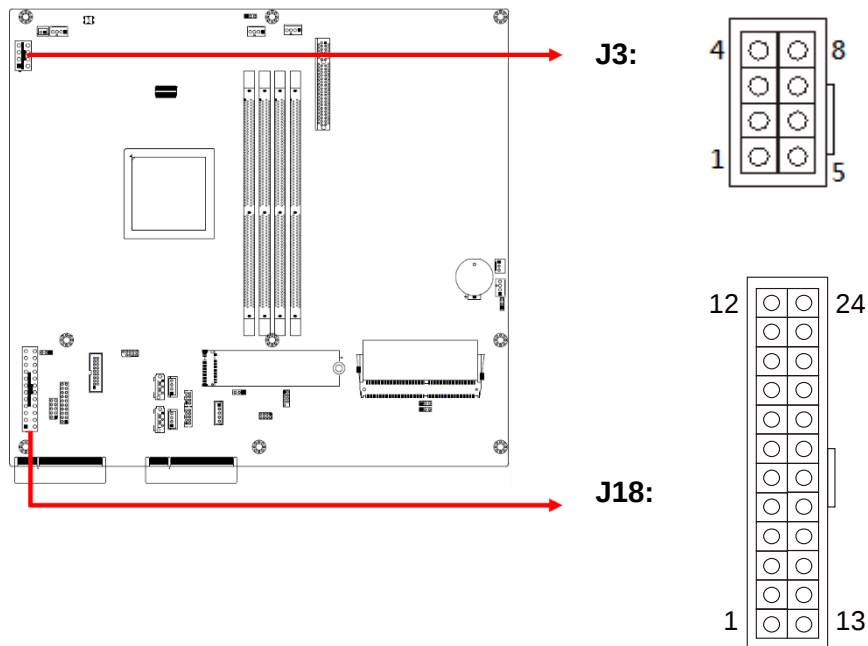
Pin	Signal Name	Pin	Signal Name
1	HUB_FUSEVCC1	2	GND
3	USB_PE_DP2_L	4	USB_PE_DP1_L
5	USB_PE_DM2_L	6	USB_PE_DM1_L
7	GND	8	HUB_FUSEVCC1

2.5.10 Console Connector (COM1)



Pin	Signal Name	Pin	Signal Name
1	232_DCD1#	2	232_RD1
3	232_TD1	4	232_DTR1#
5	GND	6	232_DSR1#
7	232_RTS1#	8	232_CTS1#
9	232_RI1#	10	NC

2.5.11 ATX Power Connector (J3, J18)



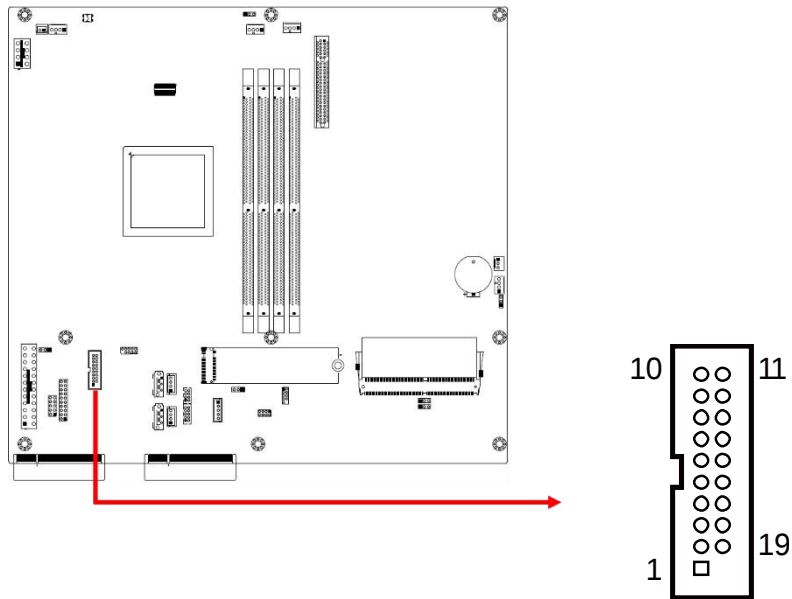
J3:

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

J18:

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

2.5.12 USB 3.0 Connector (J17)



Pin	Signal Name	Pin	Signal Name
1	USB3.0_VCC_B	11	USB20_L_P4
2	USB3_CRX_R_DTX_N3	12	USB20_L_N4
3	USB3_CRX_R_DTX_P3	13	Ground
4	Ground	14	USB3_CTX_R_DRX_P4
5	USB3_CTX_R_DRX_N3	15	USB3_CTX_R_DRX_N4
6	USB3_CTX_R_DRX_P3	16	Ground
7	Ground	17	USB3_CRX_R_DTX_P4
8	USB20_L_N3	18	USB3_CRX_R_DTX_N4
9	USB20_L_P3	19	USB3.0_VCC_B
10	--		

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 key immediately allows you to enter the Setup utility. If you are a little bit late pressing the 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
```

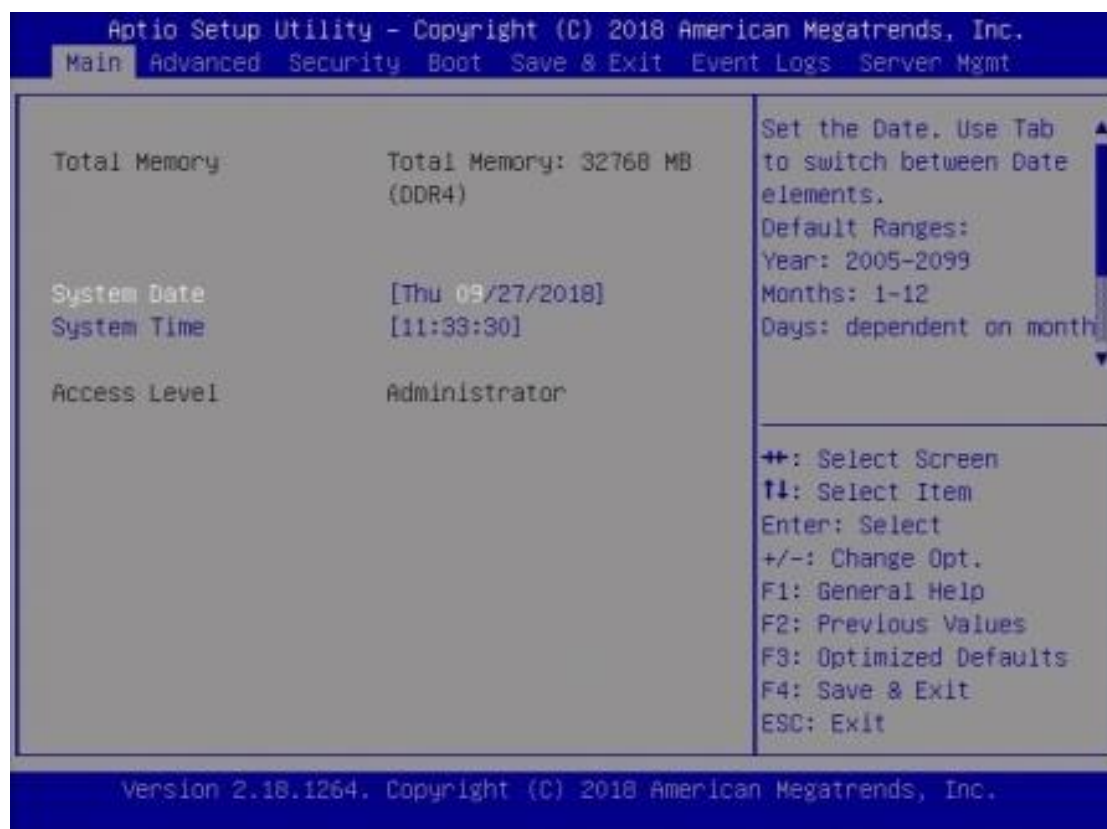
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

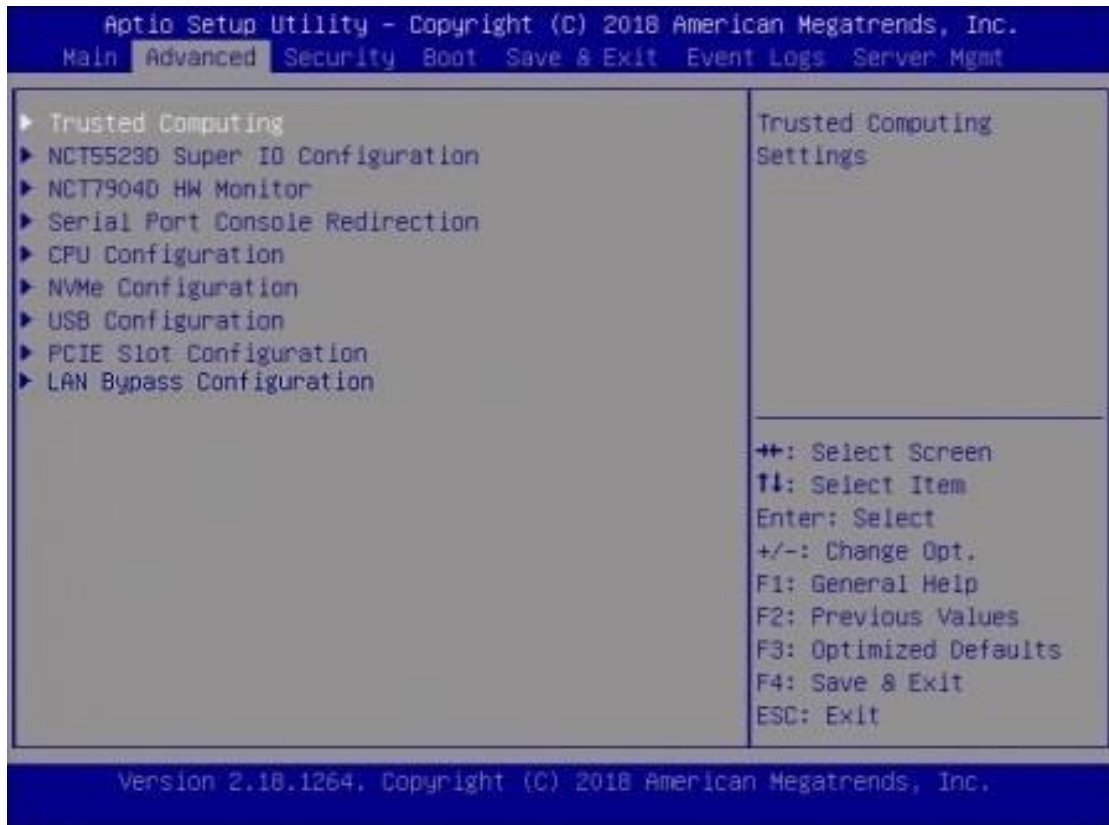
3.3 Main Settings



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



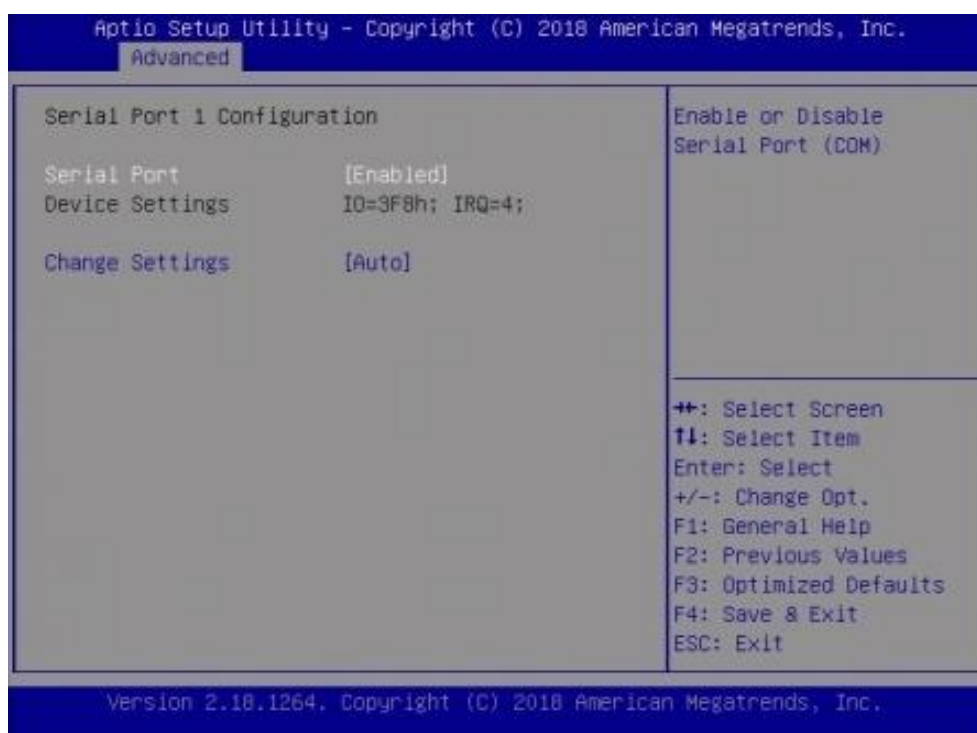
BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. The operating system will not show the security device. TCG EFI protocol and INT1A interface will not be available.

3.4.2 NCT5523D Super IO Configuration



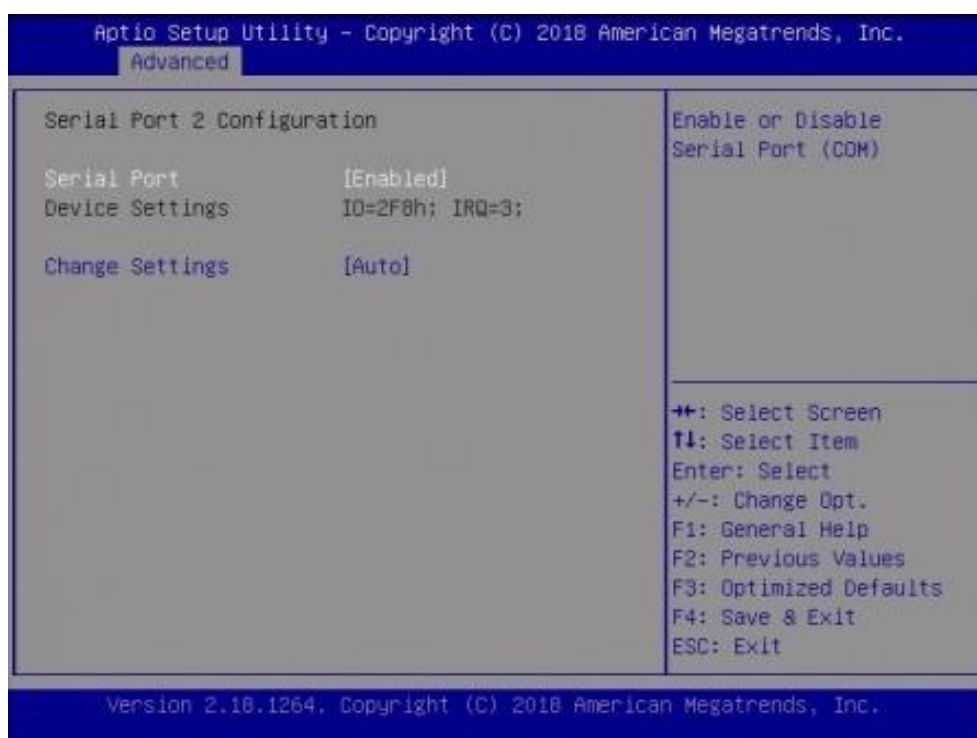
BIOS Setting	Description
Serial Ports Configuration	Sets Parameters of Serial Ports. You can enable / disable the serial port and select an optimal settings for the Super IO device.
Restore AC Power Loss	Select AC power state when power is re-applied after a power failure. Options: Power Off, Power On, Last State

3.4.2.1. Serial Port 1 Configuration



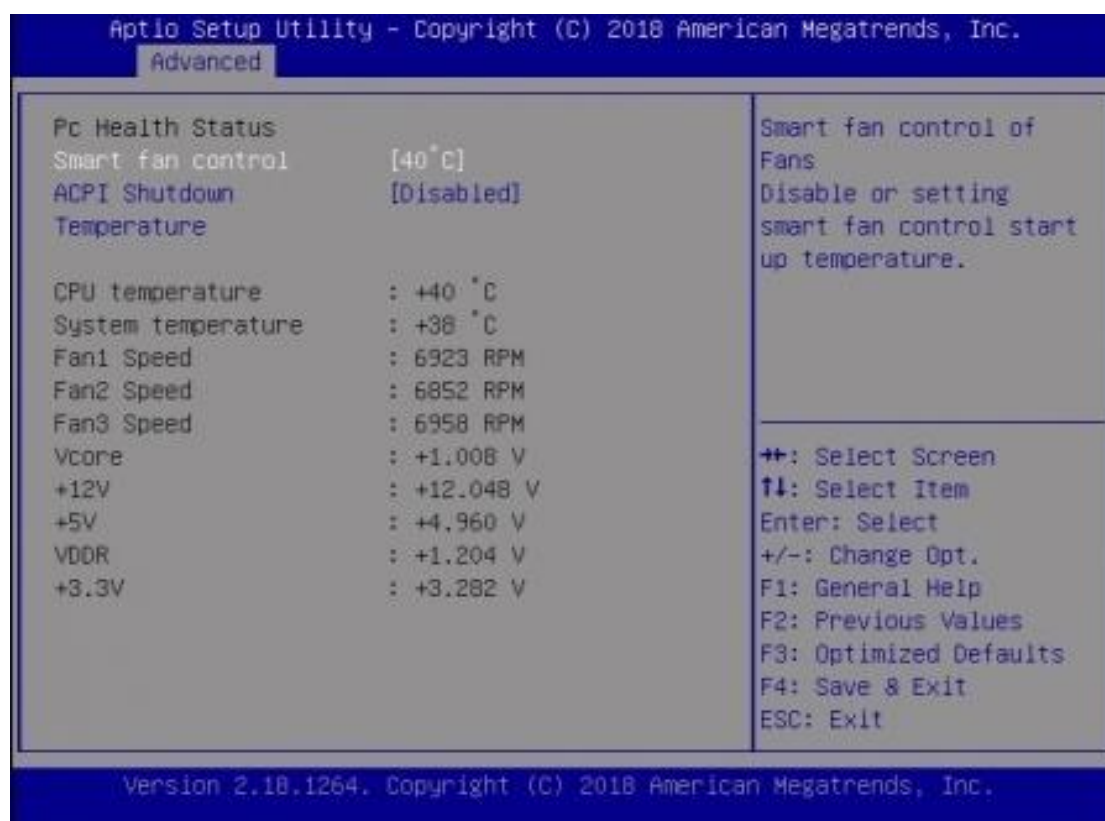
BIOS Setting	Description
Serial Port	Sets parameters of Serial Ports (COM).
Change Settings	Selects an optimal settings for Super I/O device.

3.4.2.2. Serial Port 2 Configuration



BIOS Setting	Description
Serial Port	Sets parameters of Serial Ports (COM).
Change Settings	Selects an optimal settings for Super I/O device.

3.4.3 NCT7904D HW Monitor



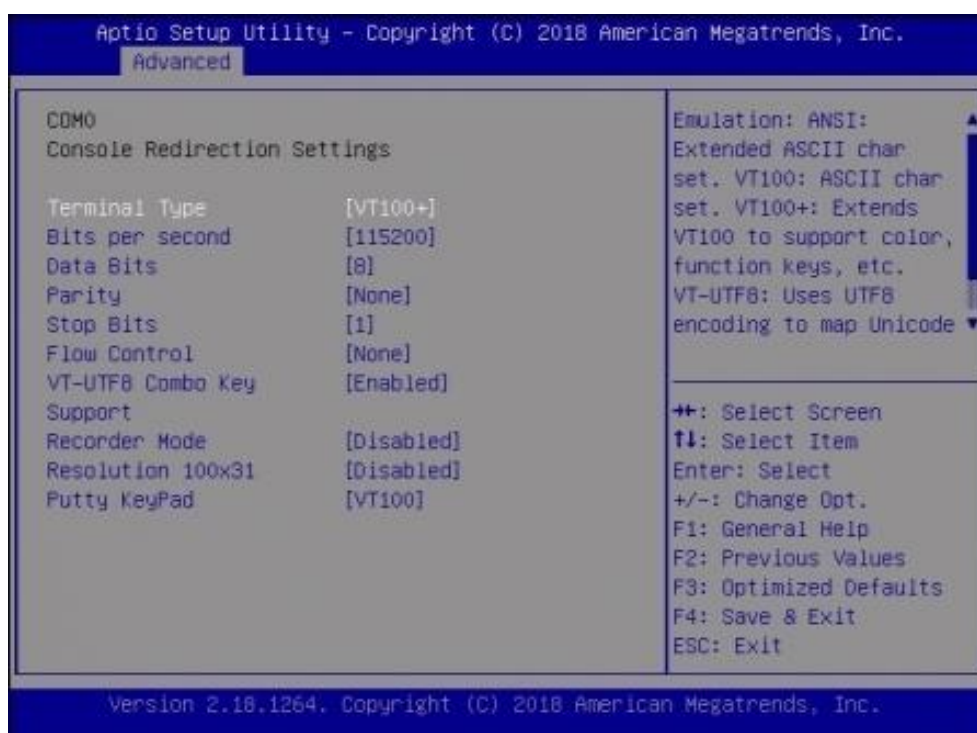
BIOS Setting	Description
Smart Fan Control	This field enables or disables the smart fan control Options: Disabled (default), 50°C, 60°C, 70°C, 80°C
ACPI Shutdown Temperature	Options: Disabled, 70°C, 75°C, 80°C, 85°C, 90 °C, 95°C
Temperatures / Voltages / Fan Speed	These fields are the parameters of the 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 Serial Port Console Configuration



BIOS Setting	Description
Console Redirection	Enables / Disables Console Redirection.
Console Redirection 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. Sets parameters of Console Redirection.

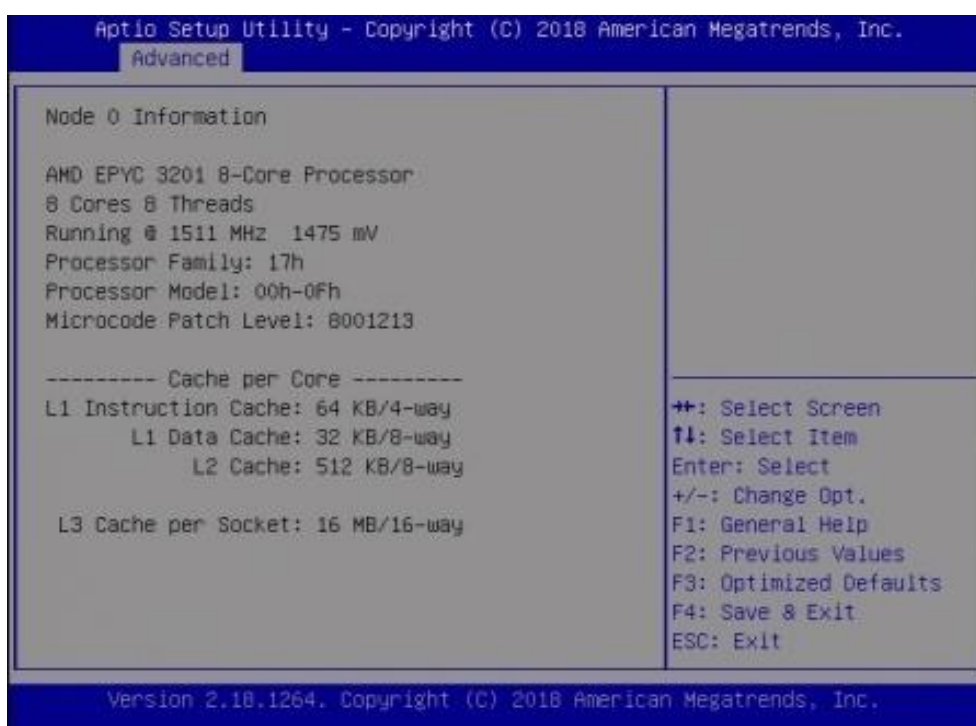
3.4.4.1. Console Redirection Settings



BIOS Setting	Description
Terminal Type	Emulation: ANSI: Extended ASCII charset. VT100: ASCII charset. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode.
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	Options: 7, 8
Parity	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Options: None, Even, Odd, Mark, Space
Stop Bits	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Options: 1, 2

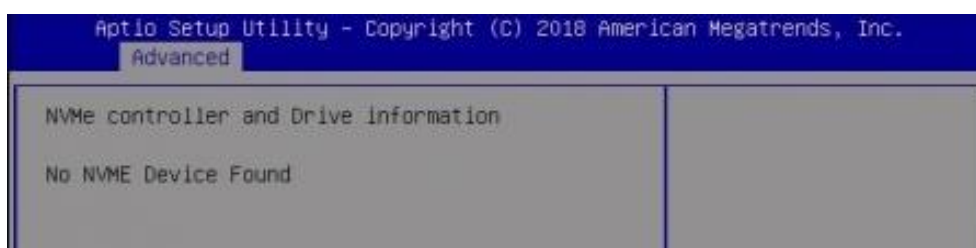
BIOS Setting	Description
Flow Control	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a “stop” signal can be sent to stop the data flow. Options: None, Hardware RTS/CTS
VT-VTF8 Combo Key Support	Enables / Disables VT-UTFB combination key support for ANSI/VT100 terminals.
Recorder Mode	With this mode enabled, only text will be sent. This is to capture terminal data.
Resolution 100x31	Enables / Disables extended terminal resolution.
Putty Key pad	Select FunctionKey and keyPad on Putty. Options: VT100, LINUX, XTERMR6, SC0, ESCN, VT400

3.4.5 CPU Configuration

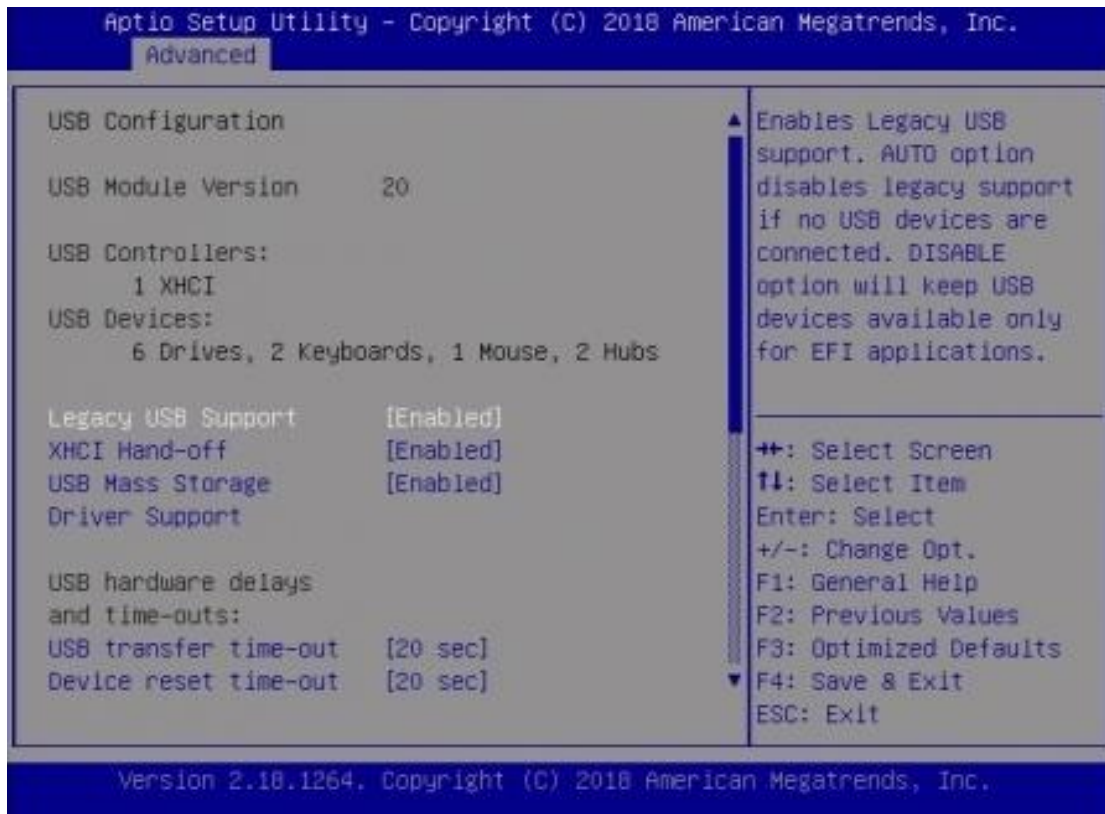


BIOS Setting	Description
Node 0 Information	View memory information related to node 0.

3.4.6 NVMe Configuration



3.4.7 USB Configuration



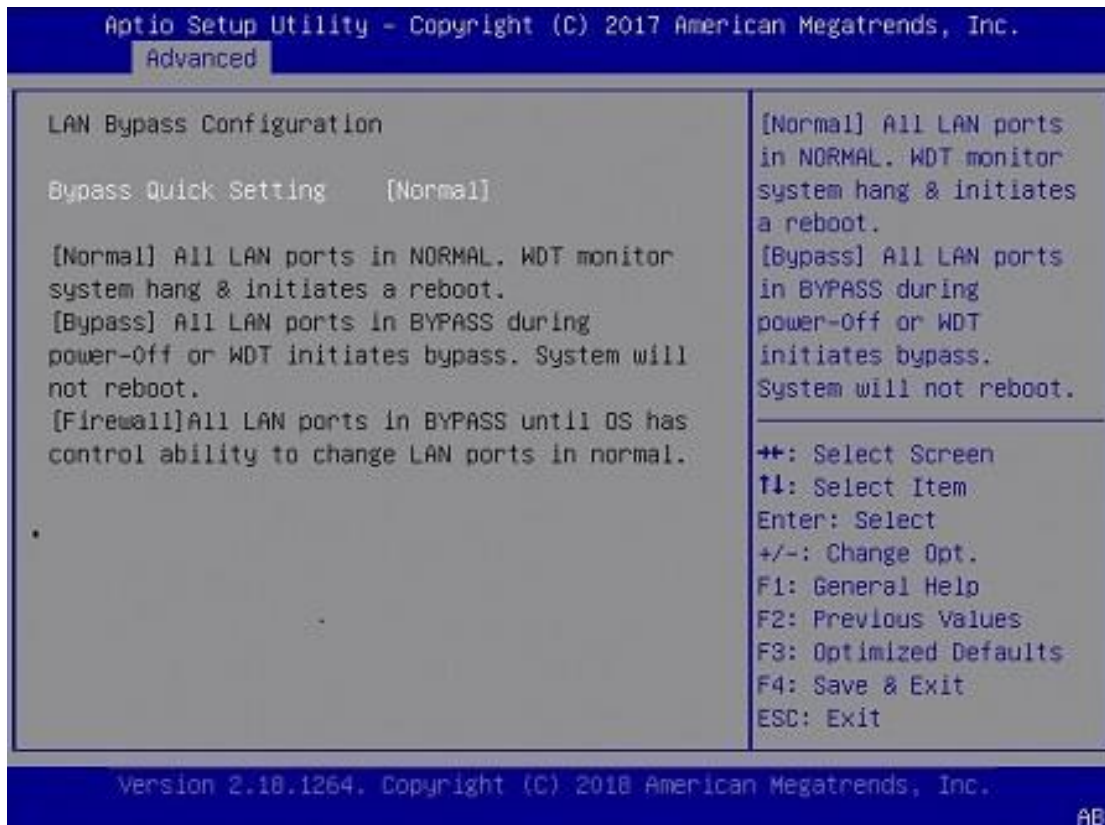
BIOS Setting	Description
Legacy USB Support	Enables / Disables Legacy USB support. Auto disables legacy support if there is no USB device connected. Disable keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables USB mass storage driver support.
USB Transfer time-out	Sets the time-out value 1, 5, 10 or 20 sec(s) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Sets the seconds (10, 20, 30, 40 secs) of delaying execution of start unit command to USB mass storage device.

3.4.8 PCIe Slot Configuration



BIOS Setting	Description
PCIe Slot A / B	Configures the PCIe slot as x8 or x4/x4

3.4.9 LAN Bypass Configuration



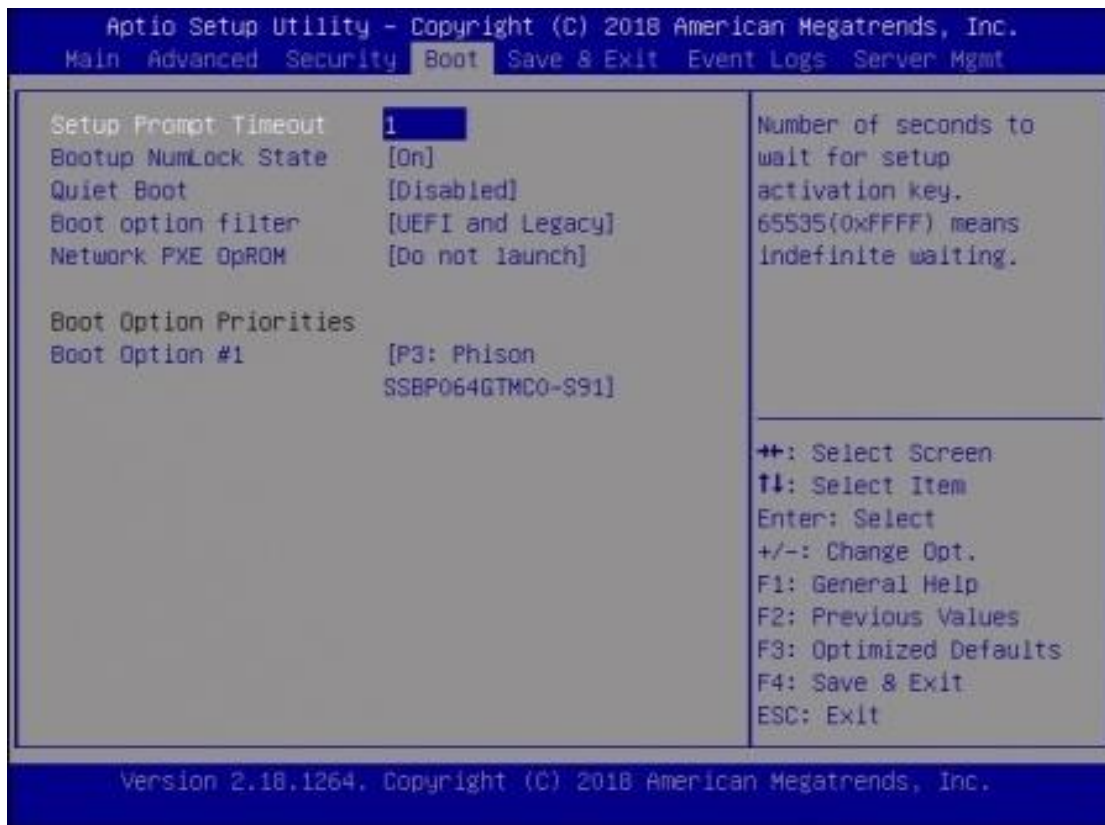
BIOS Setting	Description
Bypass Quick Setting	- Normal Mode: All LAN ports in normal mode. WDT monitor system hang & initiates a reboot. - Bypass Mode: All LAN ports with bypass function in Bypass mode during power-off or WDT initiates bypass. System will not reboot. - Firewall Mode: All LAN ports in bypass until OS has control ability to change LAN ports in normal. - Custom Mode: All LAN ports can be configured independently.

3.5 Security Settings



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

3.6 Boot Settings



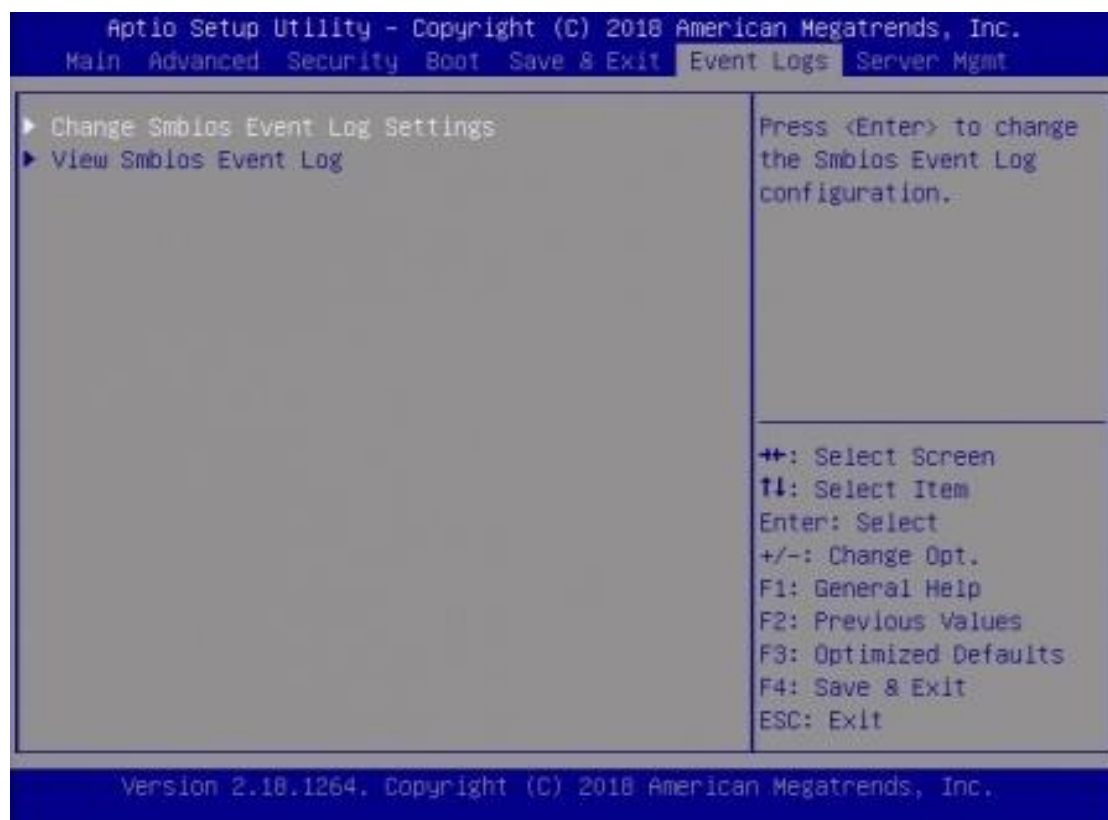
BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Boot Option Filter	This option controls Legacy/UEFI ROMs priority. Options: UEFI and Legacy, Legacy only, UEFI only
Network PXE OpROM	Controls the execution of UEFI and Legacy PXE OpROM. Options: Do not launch, UEFI, Legacy
Boot Option Priorities	Sets the system boot order.

3.7 Save & Exit Settings



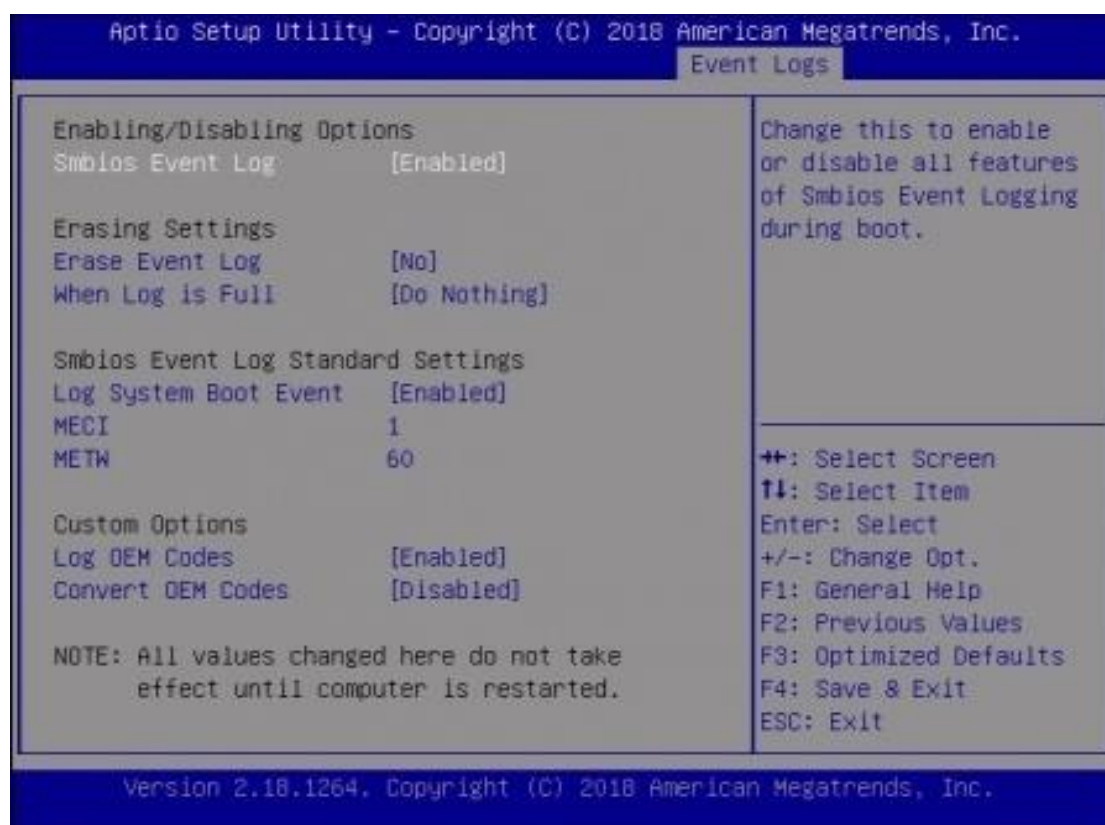
BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Restore Defaults	Restores / Loads defaults values for all the setup options.

3.8 Event Logs



BIOS Setting	Description
Change SMBIOS Event Log Settings	Press Enter to change the SMBIOS event log configuration.
View SMBIOS Event Log	

3.8.1 Change SMBIOS Event Log Settings



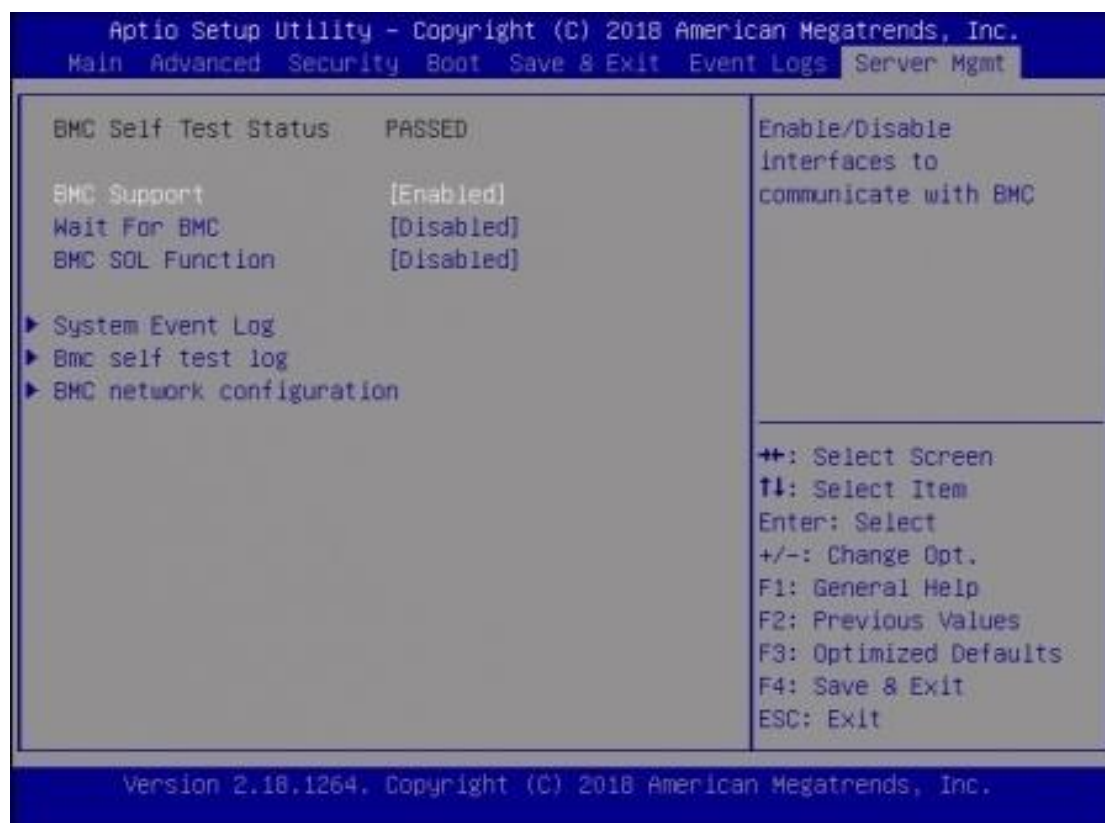
BIOS Setting	Description
SMBIOS Event Log	Change this to enable or disable all features of SMBIOS event logging during boot.
Erase Event Log	Choose options for erasing SMBIOS event log. Erasing is done prior to any logging activation during reset. Options: No, Yes next reset, Yes every reset
When Log is Full	Choose options for reactions to a full SMBIOS event log. Options: Do nothing, Erase immediately
Log System Boot Event	Enables / Disables logging of system boot event.
MECI	Multiple event count increment: The number of occurrences of a duplicate event that must pass before the multiple-event counter of log entry is updated.
METW	Multiple event time window: The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

BIOS Setting	Description
Log OEM Codes	Enables / Disables the logging of EFI status codes as OEM codes (if not already converted to legacy).
Convert OEM Codes	Enables / Disables the converting of EFI status codes to standard SMBIOS types (not all may be translated.).

3.8.2 View SMBIOS Event Log Settings

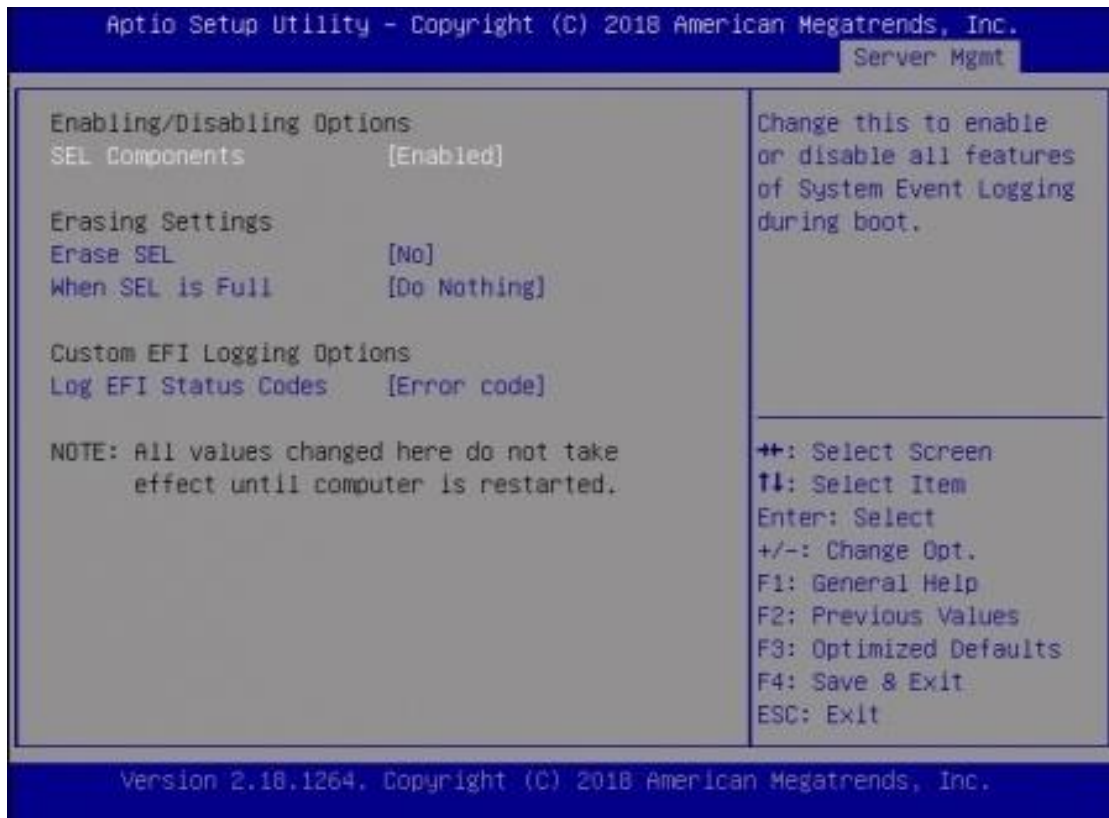
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.				
Event Logs				
DATE	TIME	ERROR CODE	SEVERITY	DESCRIPTION
				Log Area Reset
01/01/18	00:00:00	Smbios 0x16	N/A	
01/01/18	00:00:00	Smbios 0x17	N/A	
01/01/18	00:00:00	EFI 0300000A	Minor	
01/01/18	02:29:11	Smbios 0x17	N/A	
01/01/18	02:29:22	Smbios 0x17	N/A	
09/27/18	10:30:24	Smbios 0x17	N/A	
09/27/18	10:32:45	Smbios 0x17	N/A	
09/27/18	11:22:16	Smbios 0x17	N/A	
				++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.18.1264. Copyright (C) 2018 American Megatrends, Inc.				

3.9 Server Management



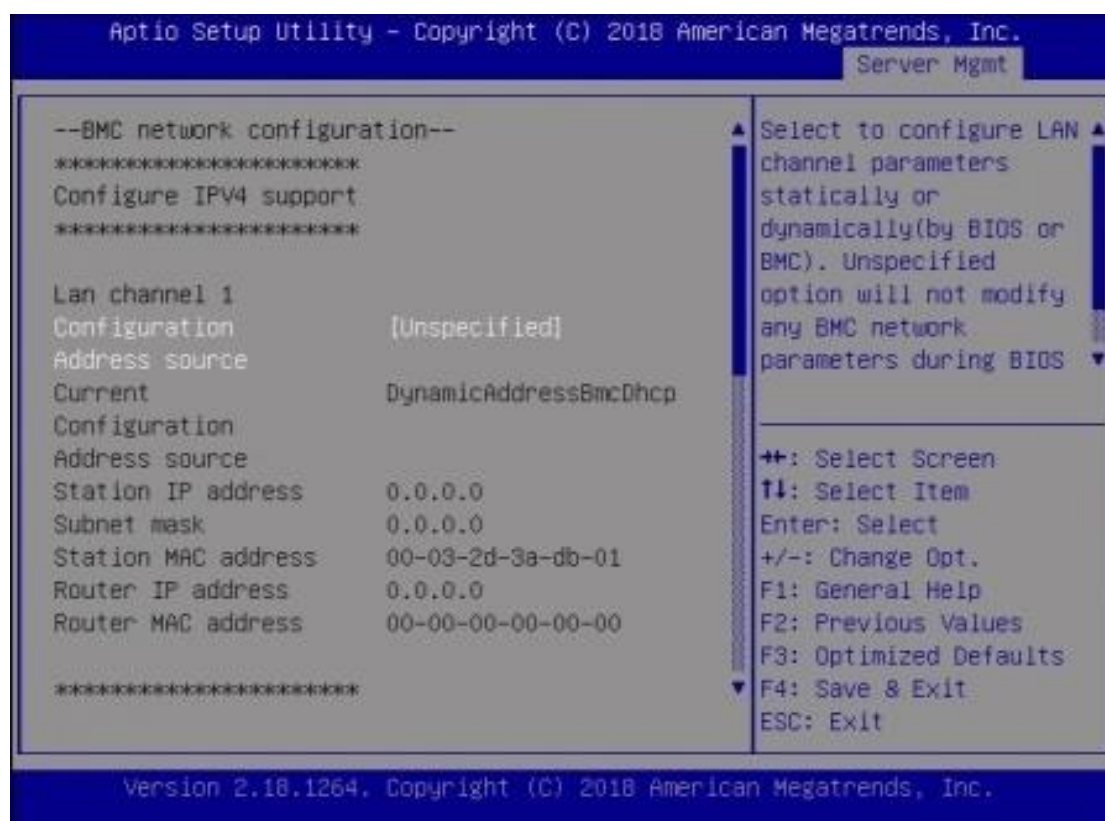
BIOS Setting	Description
BMC Support	Enables / Disables interfaces to communicate with BMC.
Wait For BMC	Wait For BMC reponse for specified time out.
BMC SOL Function	Enables / Disables BMC SOL function. Enable: will inactive and clear IRQ and IObase of UART1. Disable: keep original IRQ, IObase and active UART1
System Event Log	Allows you to configure the settings for system event log.
BMC self test log	Allows you to configure when to erase the log.
BMC Network Configuration	Configures BMC network parameters.

3.9.1 System Event Log



BIOS Setting	Description
SEL Components	Enables / Disables all features of system event logging during boot.
Erase SEL	Allows you to choose options for erasing SEL. Options: No, Yes on next reset, Yes on every reset
When SEL is Full	Allows you to choose options for reactions to a full SEL. Options: Do nothing, Erase immediately
Log EFI Status Codes	Disables the logging of EFI status codes or log only error code or only progress code or both. Options: Disabled, Both, Error code, Progress code

3.9.2 BMC Network Configuration



BIOS Setting	Description
Configuration Address Source	Configures LAN channel parameters statically or dynamically (by BIOS or BMC). Options: Unspecified, Static, DynamicBmcDhcp, DynamicBmcNonDhcp

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
0x00000070-0x00000071	System CMOS/real time clock
0x000003F8-0x000003FF	Communications Port (COM1)
0x000003F8-0x000003FF	PCI Express Root Complex
0x000002F8-0x000002FF	Communications Port (COM2)
0x000002F8-0x000002FF	PCI Express Root Complex
0x00000020-0x00000021	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x0000C000-0x0000C01F	Ethernet Controller
0x0000C000-0x0000C01F	PCI Express Root Port
0x00000000-0x000002E7	PCI Express Root Complex
0x00000000-0x000002E7	Direct memory access controller
0x00000300-0x000003AF	PCI Express Root Complex
0x000002E8-0x000002EF	PCI Express Root Complex
0x000003E8-0x000003EF	PCI Express Root Complex
0x00000400-0x00000CF7	PCI Express Root Complex
0x00000400-0x00000CF7	PCI Express Root Complex
0x000003B0-0x000003DF	PCI Express Root Complex
0x000003B0-0x000003DF	PCI Express to PCI/PCI-X Bridge
0x000003B0-0x000003DF	Microsoft Basic Display Adapter
0x000003B0-0x000003DF	PCI Express Root Port
0x0000B000-0x0000BFFF	PCI Express to PCI/PCI-X Bridge
0x0000B000-0x0000BFFF	Microsoft Basic Display Adapter
0x0000B000-0x0000BFFF	PCI Express Root Port
0x000003C0-0x000003DF	PCI Express to PCI/PCI-X Bridge

Address	Device Description
0x000003C0-0x000003DF	Microsoft Basic Display Adapter
0x000003C0-0x000003DF	PCI Express Root Port
0x00000CA2-0x00000CA2	Microsoft Generic IPMI Compliant Device
0x00000CA3-0x00000CA3	Microsoft Generic IPMI Compliant Device
0x00000040-0x00000043	System timer
0x00000010-0x0000001F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x0000006F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources
0x00000090-0x0000009F	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources
0x000000B1-0x000000B1	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x0000040B-0x0000040B	Motherboard resources
0x000004D6-0x000004D6	Motherboard resources
0x00000C00-0x00000C01	Motherboard resources
0x00000C14-0x00000C14	Motherboard resources
0x00000C50-0x00000C51	Motherboard resources
0x00000C52-0x00000C52	Motherboard resources
0x00000C6C-0x00000C6C	Motherboard resources
0x00000C6F-0x00000C6F	Motherboard resources
0x00000CD0-0x00000CD1	Motherboard resources
0x00000CD2-0x00000CD3	Motherboard resources
0x00000CD4-0x00000CD5	Motherboard resources
0x00000CD6-0x00000CD7	Motherboard resources

Address	Device Description
0x00000CD8-0x00000CDF	Motherboard resources
0x00000800-0x0000089F	Motherboard resources
0x00000B00-0x00000B0F	Motherboard resources
0x00000B20-0x00000B3F	Motherboard resources
0x00000900-0x0000090F	Motherboard resources
0x00000910-0x0000091F	Motherboard resources
0x0000FE00-0x0000FEFE	Motherboard resources
0x00000061-0x00000061	System speaker
0x00000081-0x00000083	Direct memory access controller
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 4294967286	Standard SATA AHCI Controller
IRQ 7	AMD GPIO Controller
IRQ 4294967291	PCI Express Root Port
IRQ 4294967292	PCI Express Root Port
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 11	Ethernet Controller
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 0	System timer
IRQ 4294967294	PCI Express Root Port
IRQ 4294967293	PCI Express Root Port
IRQ 4294967290	PCI Express Root Port
IRQ 4294967289	PCI Express Root Port
IRQ 4294967288	PCI Express Root Port
IRQ 4294967287	PCI Express Root Port
IRQ 5	PCI Encryption/Decryption Controller
IRQ 4294967285	AMD PSP 3.0 Device
IRQ 4294967284	AMD PSP 3.0 Device
IRQ 43	High Definition Audio Controller
IRQ 4294967283	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967282	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967281	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967280	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967279	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967278	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967277	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967276	AMD USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)

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

```
//-----  
//  
// 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;
}
//-----

```

D. Onboard Connector Types

Function	Connector Name	Onboard Type	Compatible Mating Type for Reference
External Power Switch Connector	J2	JST B2B-XH-A	JST XHP-2
LPC Port	J19	E-call 0196-01-2001009	Dupont 10P 2 mm-pitch (female)
System Function Connector	JP5	E-call 0126-01-203-100	Dupont 10P 2.54 mm-pitch (female)
Digital I/O Connector	JP6	JAE FI-TD44SB-E	JAE FI-D44C2-E
External SATA Power Connector	CN2, CN5	JST B4B-XH-A	JST XHP-4
LCM Connector	CN3	JST B5B-XH-A	JST XHP-5
Fan Connector	FAN1, FAN2, FAN3, FAN4	Molex 47053-1000	Molex 47054-1000
	FAN5	Molex 22-27-2031	Molex 22-01-2031
Front I/O Connector	JP4	E-call 0126-01-203-200	Dupont 20P 2.54 mm-pitch (female)
UI5B 2.0 Connector	F_USB1	HRS DF11-8DP-2DSA	HRS DF11-8DS-2C
Console Connector	COM1	HRS DF11-10DP-2DSA	HRS DF11-10DS-2C
ATX Power Connector	J3, J18	Molex 39-28-8080	Molex 39-01-2080
USB 3.0 Port	J17	PINREX 52X-40-20GU52	Dupont 20P 2 mm-pitch (female)