CMI300-988
AMD Ryzen™ Mini-ITX System

User's Manual

Version 1.0

iBASE

iBASE

Copyright

Disclaimer

Trademarks

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.

FC

This product has been tested and found to comply with the limits for a Class B 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)

iBASE

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.
- Make sure you leave plenty of space around the device for ventilation.
- Use this product in environments with ambient temperatures 0˚C ~ 45˚C.

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.

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

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

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.

iBASE

Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Overall View
- Dimensions

iBASE

1.1 Introduction

The CMI300-988 comes with an AMD Ryzen™ Embedded V1807 APU processor that brings together the breakthrough performance of the pioneering AMD "Zen" CPU and "Vega" GPU architectures in a seamlessly-integrated SoC solution that sets a new standard in processing power for next-generation embedded designs. The CMI300-988 supports two DDR4 memory slots to fit up to 32GB of system memory and features useful I/O ports such as four serial ports, Gigabit LAN, USB 3.1 and audio jacks. Display interface provided include HDMI (2.0a) and DisplayPort (1.4).

1.2 Features

- Onboard AMD Ryzen™ Embedded V1807 APU
- 2 x DDR4 SO-DIMM, up to 32GB
- Display outputs for HDMI (2.0a) and DisplayPort (1.4)
- Four serial ports, GbE LAN, USB 3.1, and audio jacks
- 1 x Mini-PCIe socket, 1 x M.2 M2280
- Wall mount kit included
- Optional VESA mount kit

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.

- CMI300-988   x 1
- Wall mount kit (2 brackets)   x 1
- Screws for wall mount kit   x 4
- DVD Disk (including drivers and this user manual)   x 1
- Motherboard MI988 user's manual   x 1

1.4 Optional Accessories

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

- DC power jack
- Power adaptor and power cord (for DC power jack)
- WiFi cable kit (KIT-16)
- VESA mounting kit

iBASE

1.5 Specifications

Product Name	CMI300-988
Motherboard	MI988F
MB Form Factor	Mini-ITX Motherboard
System	
Operating System	• Windows 10 (64-bit) • Linux
APU	AMD Ryzen Embedded V1807B (V1000 Series)
System Speed	Up to 3.8GHz
Memory	2 x DDR4 SO-DIMM 4 GB, expandable to 32 GB
Storage	1 x 2.5" SSD
Super I/O	Nuvoton NCT6116D
Audio Codec	Built-in HD audio with Realtek ALC662
Network	2 x Intel® I211AT PCIe GbE
Power Supply	84W power adaptor
BIOS	AMI BIOS
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
Chassis	Matte black paint over galvanized sheet steel
Mounting	• Desktop mount • Wall mount • VESA mount (Optional)
Dimensions (W x H x D)	200 x 60 x 200 mm (7.87" x 2.36" x 7.87")
Weight	1.8 kg (3.97 lb)
RoHS	Yes
Certificate	CE / FCC Class A
I/O Ports	
DC Input	12V DC-in through a 3-pin terminal block (Option: a locking DC Jack)
LAN	2 x RJ45 GbE LAN
USB	4 x USB 3.1
Serial	**4 x COM ports:** • COM1 & COM2 RS-232/422/485 (configurable in BIOS) • COM3 & COM4 RS-232 ports

Display	• 1 x DisplayPort (1.4) • 1 x HDMI (2.0a)
Audio Jack	**3 audio jacks:** • 1 x Mic-In • 1 x Line-In • 1 x Line-Out
SATA	1 x SATA 3.0 connector
Expansion	• 1 x PCIe (x8) • 1 x Mini-PCIe • 1 x M.2 M2280 slot for SSD
Environment	
Temperature	• **Operating:** 0 ~ 45 °C (32 ~ 113 °F) • **Storage:** -20~ 80 °C (-4 ~ 176 °F)
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)
Vibration	• **Operating:** 0.25 Grms / 5 ~ 500 Hz • **Non-operating:** 1 Grms / 5 ~ 500Hz
Shock	• **Operating:** 20 g / 11 ms • **Non-operating:** 40 g / 11 ms

All specifications are subject to change without prior notice.

iBASE

1.6   Overall View

Oblique View

Rear View
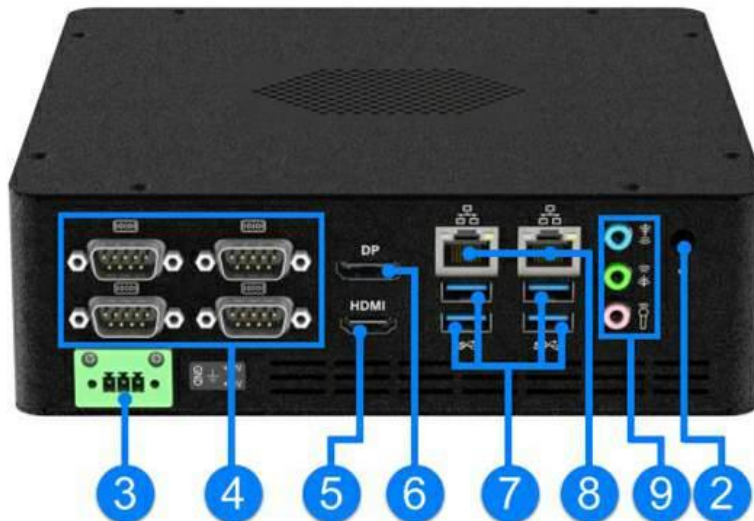
No.	Name	No.	Name
1	Power button	6	DisplayPort
2	Antenna holes	7	USB 3.1 ports
3	3-Pin DC-In power connector	8	GbE LAN ports
4	COM1 ~ COM4 ports (COM1 & COM2: RS-232/422/485; COM3 & COM4: RS-232)	9	Audio jacks (From top to bottom: Line-In, Line-Out, Mic-In)
5	HDMI port		

1.7 Dimensions

Unit: mm
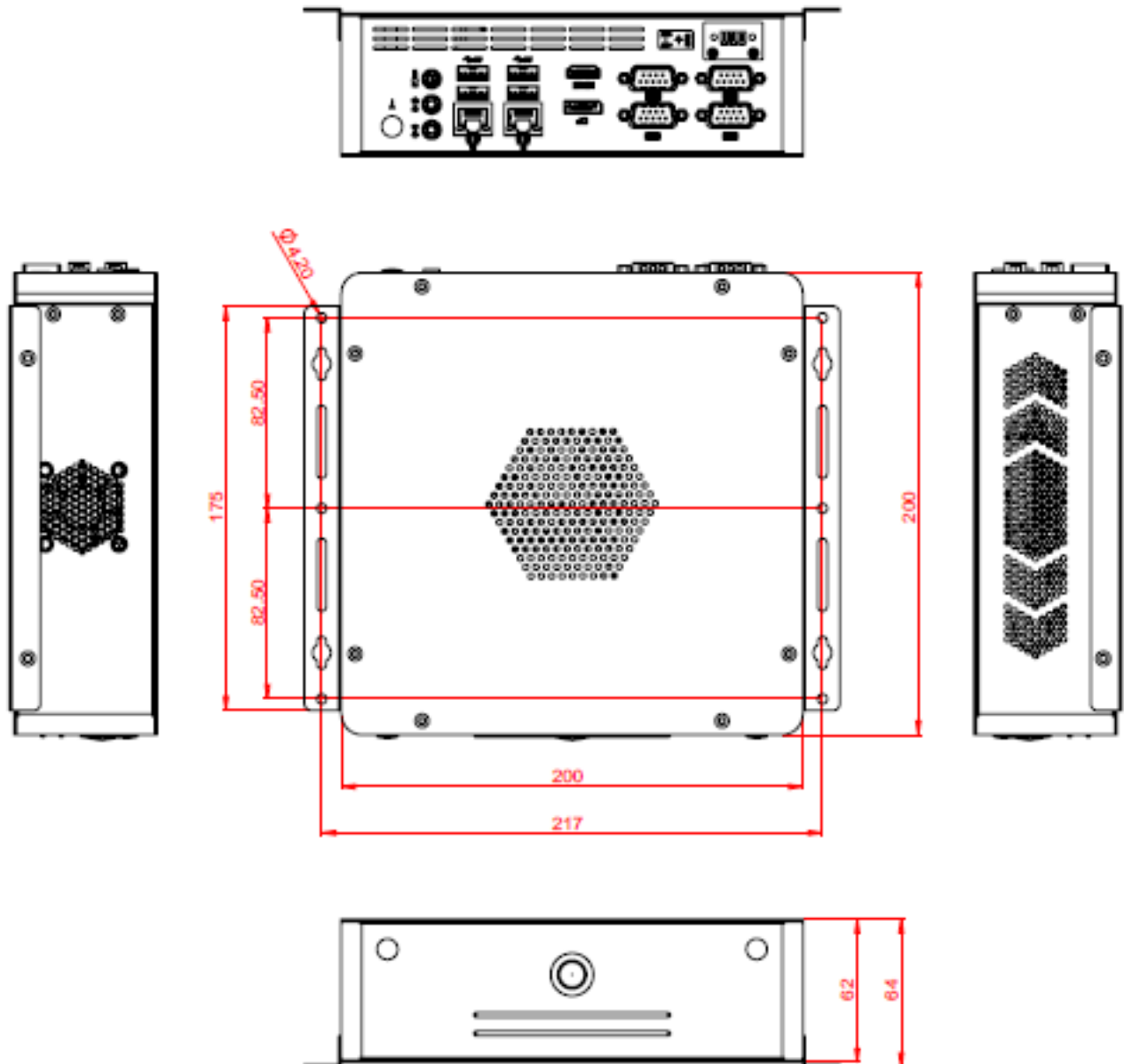
Chapter 2
Hardware Configuration

The information provided in this chapter includes:

- Installations
- Information and locations of connectors

2.1 Installations

Before installations, you need to turn your device upside down and remove the bottom chassis base by removing 8 screws as indicated below.
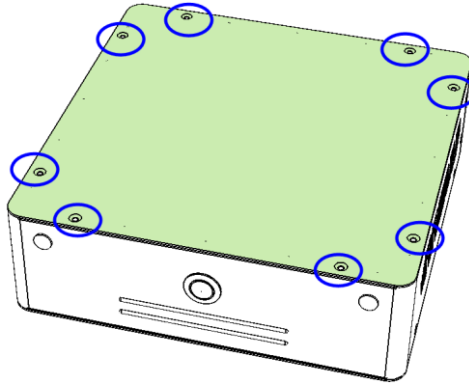
2.1.1 Memory Installation / Replacement

To install or replace a memory module, follow the instructions.

1. Locate the memory slots.
2. Align the key of your memory module with that on the memory slot and insert the module slantwise.
3. Gently push the module in an upright position until the clips of the slot click to hold the module in place when the module touches the bottom of the slot.
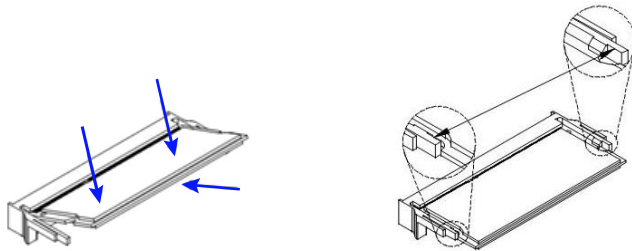
To remove the module, press the clips outwards with your thumb and index finger of both hands.

iBASE

2.1.2   SSD Installation / Replacement

1. Turn the system upside down. Remove 8 screws as indicated below and remove the bottom plate.
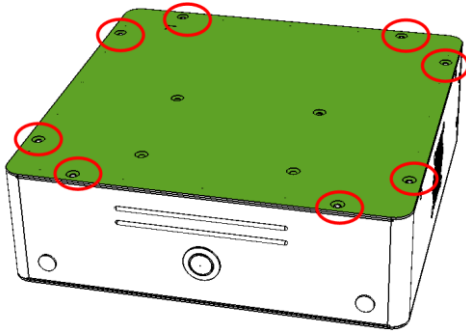
2. Unplug all the SATA cables if an SSD is pre-installed.

3. Remove 4 screws to free the SSD from the plate.
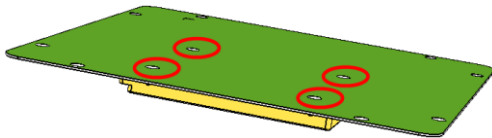
4. Attach a new SSD and tighten these screws to fix the SSD. Then connect the SATA cables.

5. Secure back the bottom plate along with the new SSD to the system.

2.1.3   M.2 Card Installation

If you need to use a M.2 card for expansion, follow the instructions below for installation after you remove the device chassis cover.

1. Align the key of the M.2 card to the M.2 interface, and insert the card slantwise.
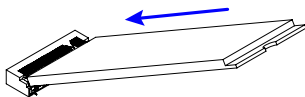
2. Push the M.2 card down, fix it onto the standoff with a screw.
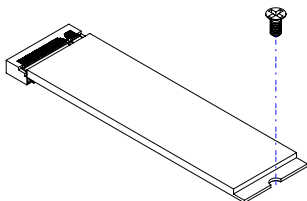
2.1.4   WiFi / 3G / 4G Antenna Installation

Thread the WiFi / 3G / 4G antenna extension cable through an antenna hole of the front I/O cover and fasten the antenna as shown below. Then apply adhesive to the edge of the hex nut behind the front I/O cover to prevent the extension cable from falling if the cable becomes loose.

1. Thread and fasten the hex nut and the washer. Then install the antenna.

2. Apply adhesive around here.
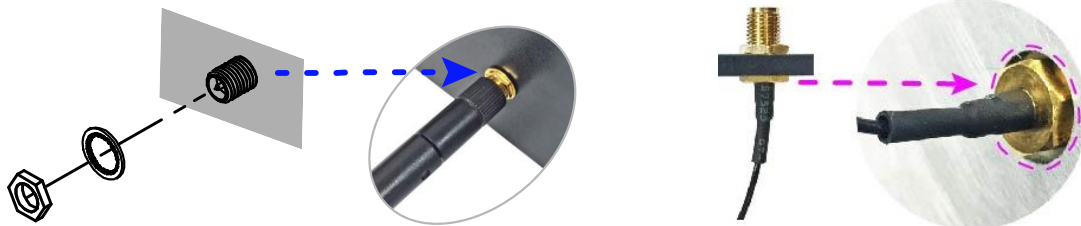
Info: The diameter of the nut is around 6.35 mm (0.25"-36UNC).

2.1.5   Mounting Installation

Requirements

Before mounting the system, ensure that you have enough room for the power adaptor and signal cable routing, and have good ventilation for the power adaptor. The method of mounting must be able to support weight of the product plus the weight of the suspending cables attached to the system.

Wall Mounting Installation

1. Attach the two mounting brackets and secure them with the supplied four screws as shown below.
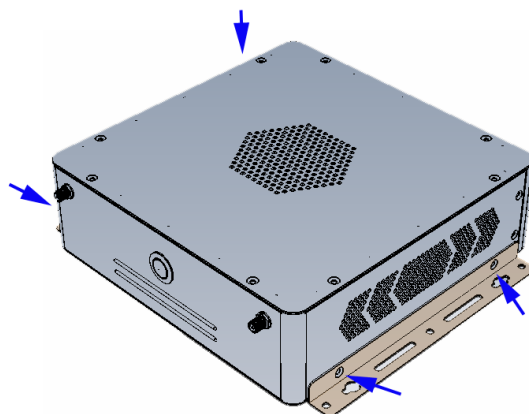
2. Then prepare at least four screws (M3, 6 mm) to mount the device on the wall.

iBASE

2.1.6　COM Ports & DC Power Connectors

- **COM1 & COM2 RS-232/422/485 Ports**
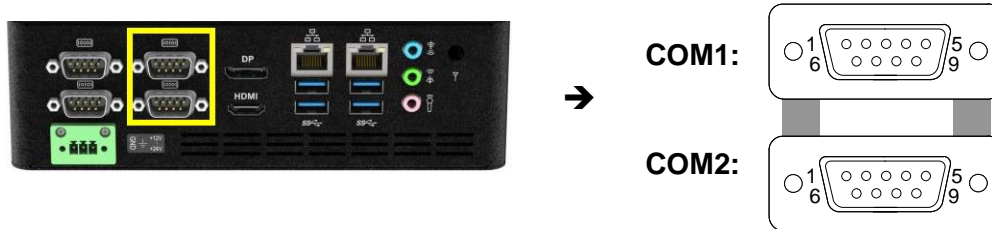
COM1 and COM2 ports are jumper-less and configurable in BIOS.

Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

Pin	Signal Name		
	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

- **COM3 & COM4 RS-232 Ports**
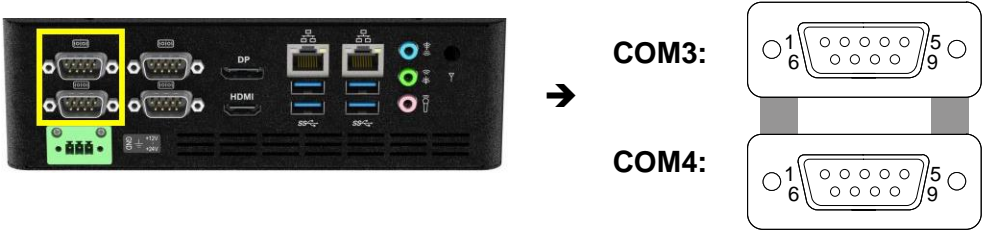
COM3:

COM4:

Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

- **DC Power Input Connector (terminal block)**

Pin	Assignment
1	Ground
2	Chassis Ground
3	+12V~24V

iBASE

2.2 Setting the Jumpers

Set up and configure your product 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.

Pin#   1   2   3
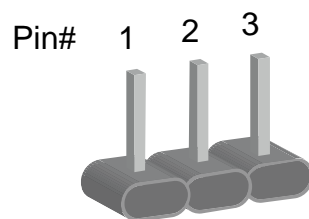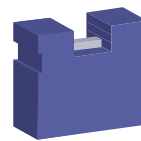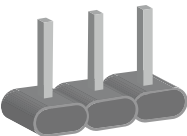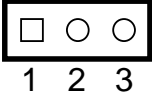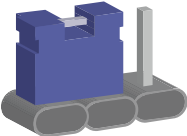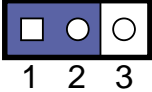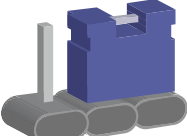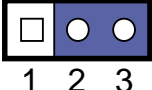
A 3-pin jumper   **A jumper cap**

Refer to the illustration below to set jumpers.

Pin	Jumper	Illustration
Open		□ ○ ○ 1 2 3
1-2 Closed		□ ○ ○ 1 2 3
2-3 Closed		□ ○ ○ 1 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: MI988

iBASE
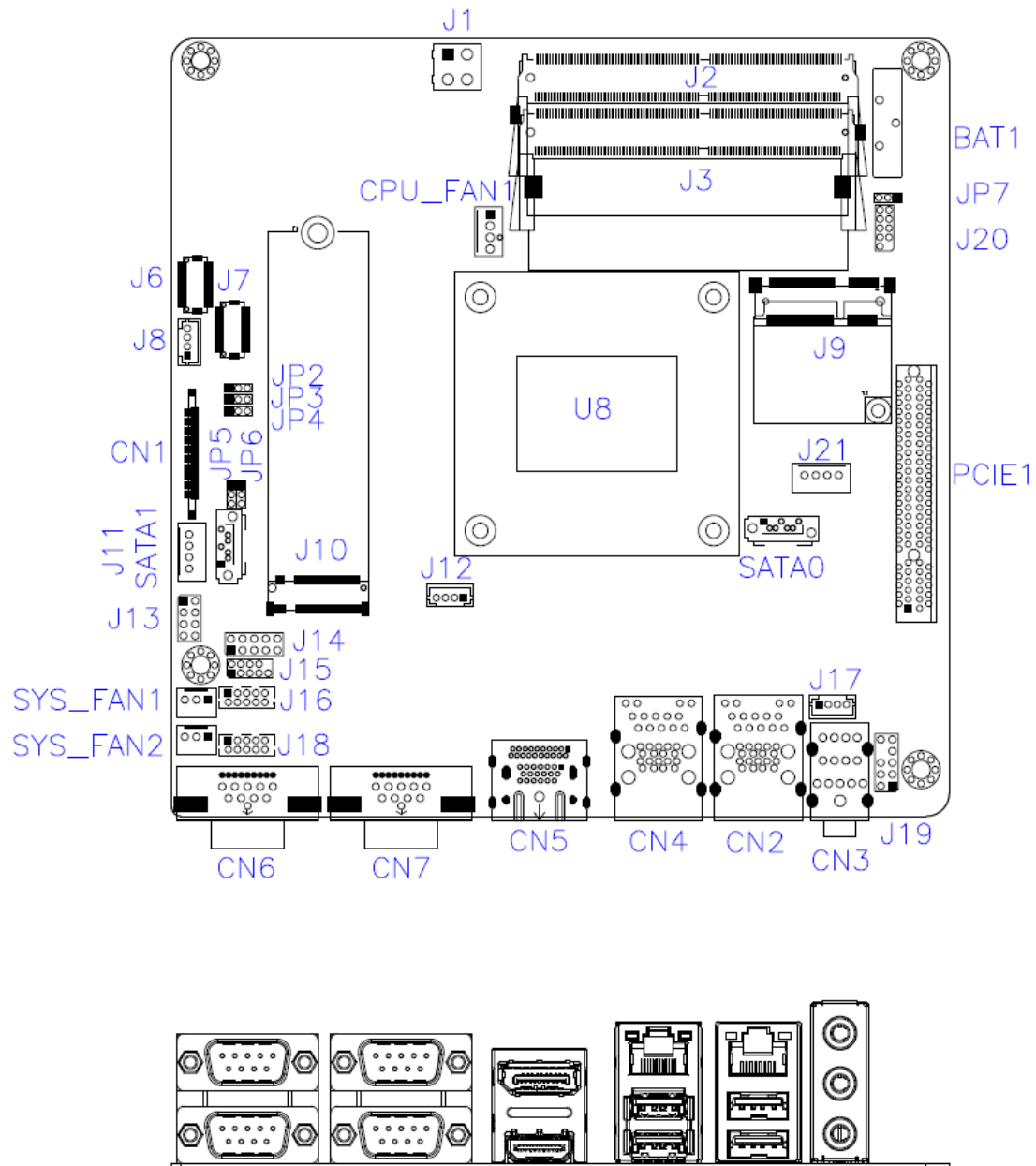
2.4 Jumpers Quick Reference

Function	Connector	Page
LCD panel power selection	JP2	16
LCD backlight level	JP3	17
PWM backlight control level	JP4	17
eDP panel power selection	JP5	18
eDP / LVDS selection	JP6	18
Clearing CMOS data	JP7	19

2.4.1 LVDS Panel Power Selection (JP2)
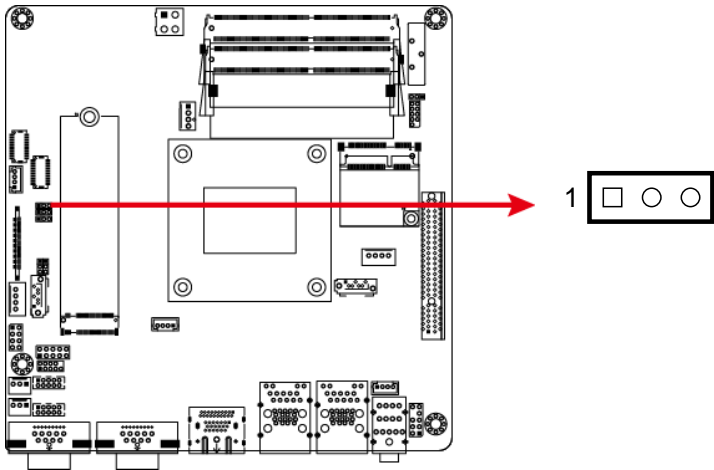
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

2.4.2   LVDS Backlight Level   (JP3)
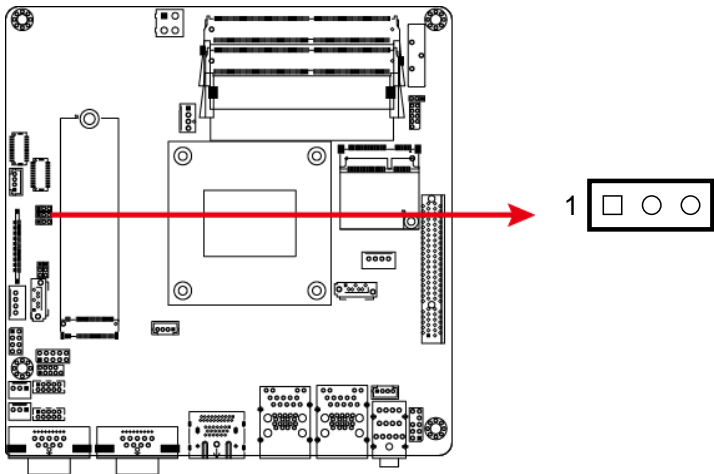
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

2.4.3   PWM Backlight Control Level   (JP4)

Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

iBASE
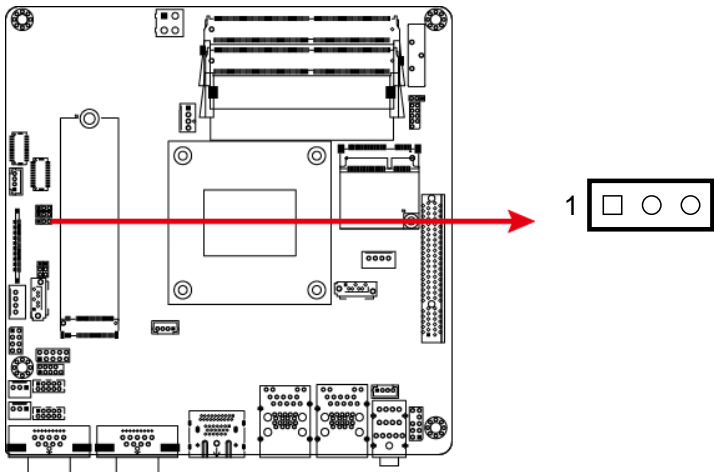
2.4.4 eDP Panel Power Selection (JP5)
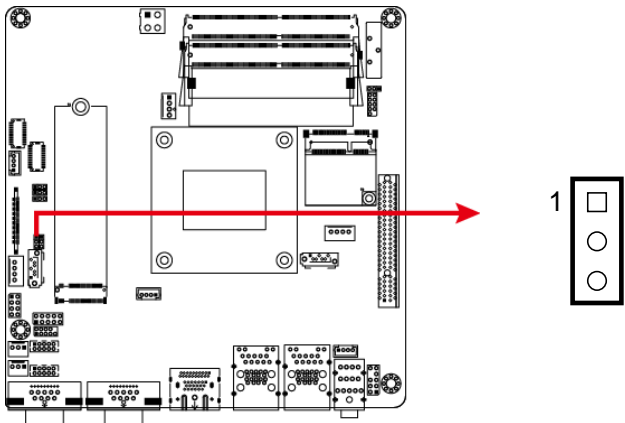
Function	Pin closed	Illustration
3.3V (default)	1-2	
5V	2-3	

2.4.5 eDP / LVDS Panel Selection (JP6)
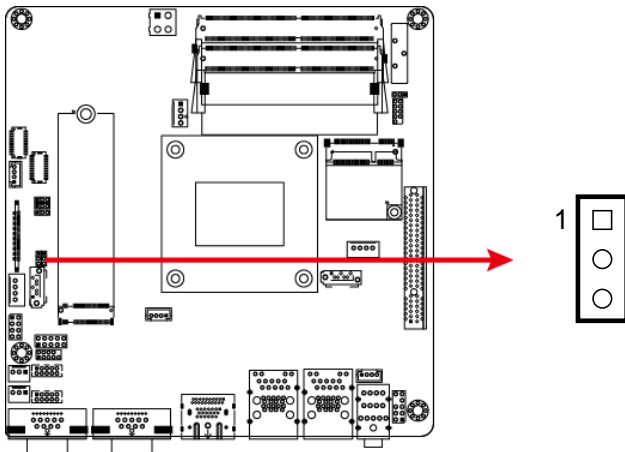
Function	Pin closed	Illustration
Auto Detection (default)	1-2	
LVDS Only	2-3	

2.4.6   Clearing CMOS Data   (JP7)
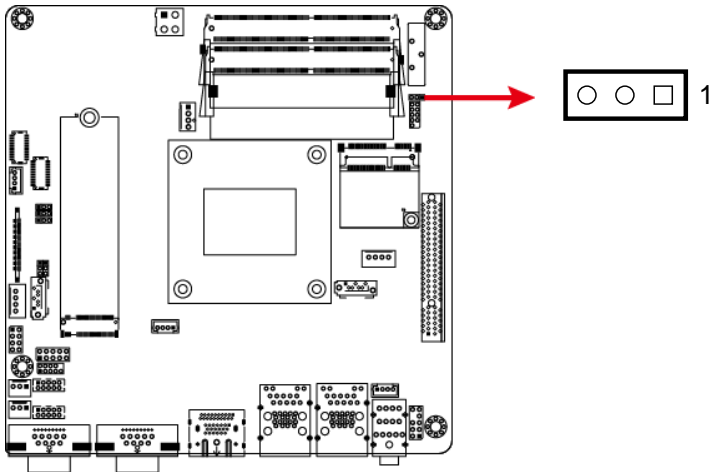
Function	Pin closed	Illustration	
Normal (default)	1-2		1
Clear CMOS	2-3		1

iBASE

2.5 Connectors Quick Reference

Function	Connector	Page
eDP Connector	CN1	21
COM5 & COM6 RS-232 Port	J18 (COM5), J16 (COM6)	22
DC-In Power Connector	J1	22
SATA Power Connector	J11, J21	23
LCD Backlight Connector	J8	23
LVDS Connector	J6 (Channel A), J7 (Channel B)	24
Front Panel Settings Connector	J13	25
Digital I/O Connector	J14	26
Speaker Connector	J17	26
Audio Connector	J19	27
Fan Power Connectors	CPU_FAN1, SYS_FAN1, SYS_FAN2	28
COM3 & COM4 RS-232 Ports [1]	CN6	--
COM1 & COM2 RS-232/422/485 Ports [1]	CN7	--
GbE LAN Port and Dual USB 3.1 Ports	CN2, CN4	--
DisplayPort & HDMI Port	CN5	--
DDR4 SO-DIMM Slot	J2, J3	--
Mini-PCIe Slot	J9	--
M.2 M2280 Slot	J10	--
SATA III Connector	SATA0, SATA1	--
PCIe (x8) Slot	PCIE1	--
RTC Lithium Button Cell Holder	BAT1	--
Factory Use Only	J12, J15, J20	--

[1]: Refer to *2.1.6 COM Ports & DC Power Connectors.*

2.5.1   eDP Connector   (CN1)

40

1
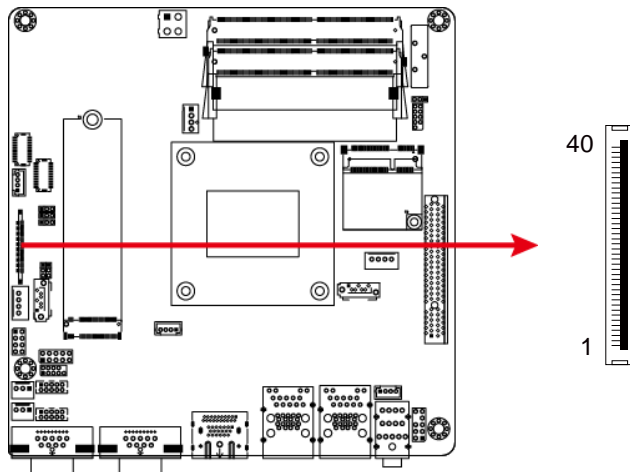
Pin	Assignment	Pin	Assignment
1	+3.3V (default) / +5V	21	TXN0
2	+3.3V (default) / +5V	22	TXP0
3	+3.3V (default) / +5V	23	Ground
4	+3.3V (default) / +5V	24	AUXP
5	+3.3V (default) / +5V	25	AUXN
6	Ground	26	NC
7	Ground	27	VCC3
8	Ground	28	VCC12
9	Ground	29	NC
10	HOT PLUG	30	Ground
11	Ground	31	VCC5
12	NC	32	NC
13	NC	33	Brightness
14	Ground	34	BKLT_EN
15	NC	35	VCC12
16	NC	36	VCC3
17	Ground	37	Ground
18	TXN1	38	SMB_CLK
19	TXP1	39	SMB_DATA
20	Ground	40	NC

iBASE

2.5.2 COM5 & COM6 RS-232 Ports (J18, J16)

J16
(COM6)

J18
(COM5)
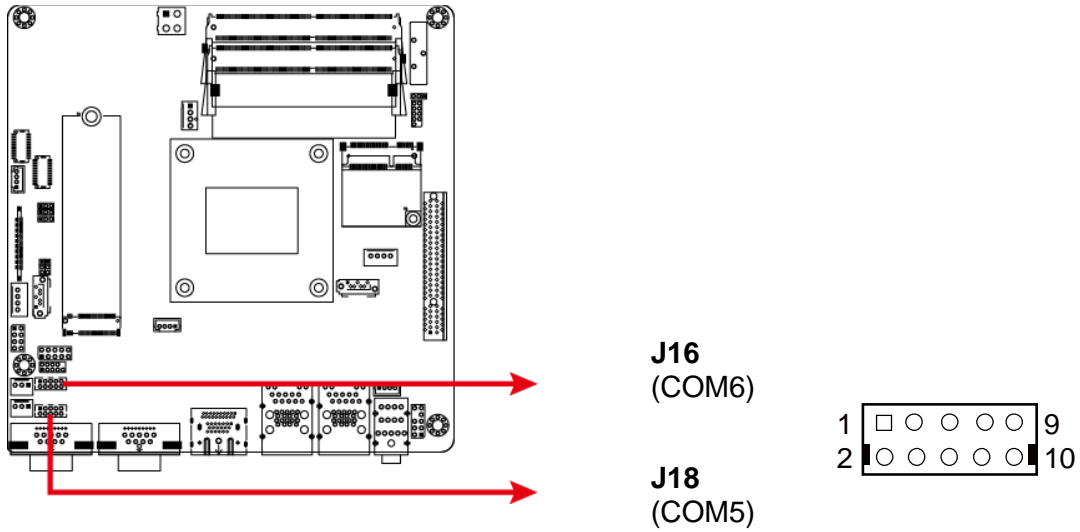
Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	2	RXD, Receive data
3	TXD, Transmit data	4	DTR, Data terminal ready
5	Ground	6	DSR, Data set ready
7	RTS, Request to send	8	CTS, Clear to send
9	RI, Ring indicator	10	Key

2.5.3 DC-In Power Connector (J1)
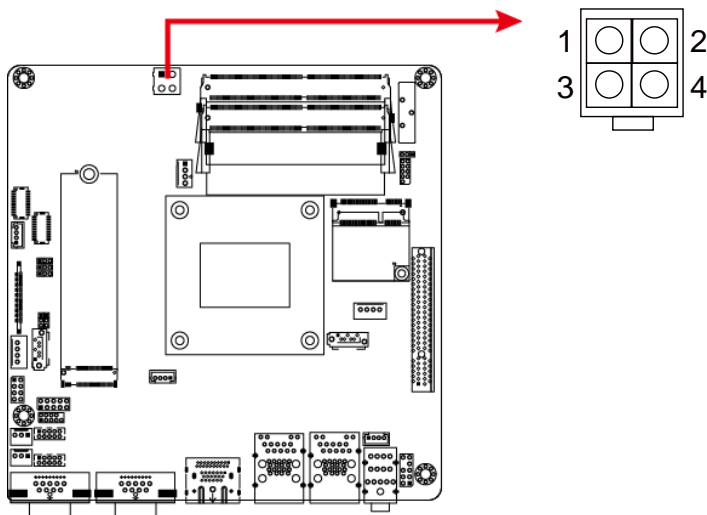
Pin	Assignment	Pin	Assignment
1	Ground	2	Ground
3	+12~+24V	4	+12~+24V

2.5.4 SATA Power Connector (J11, J21)

J21:

1 □ ○ ○ ○

J11:

○
○
○
□ 1
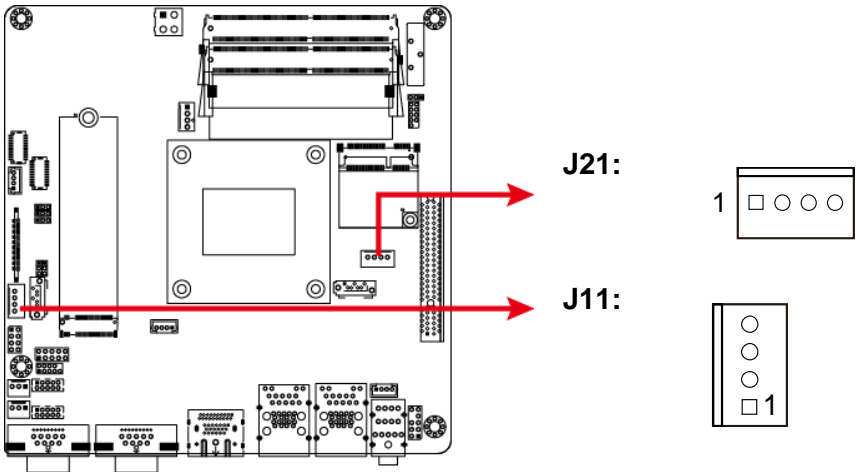
Pin	Assignment	Pin	Assignment
1	+5V	3	Ground
2	Ground	4	+12V

2.5.5 LCD Backlight Connector (J8)

1
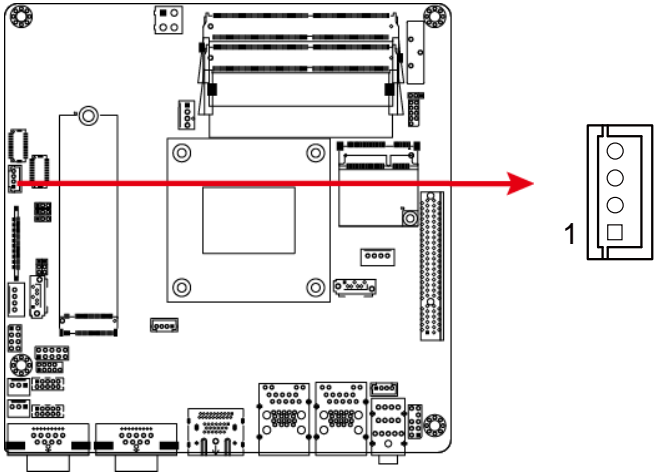
Pin	Assignment	Pin	Assignment
1	+12V	3	Brightness Control
2	Backlight Enable	4	Ground

iBASE

2.5.6   LVDS Connector   (J6, J7)

J6 (Channel A)

J7 (Channel B)
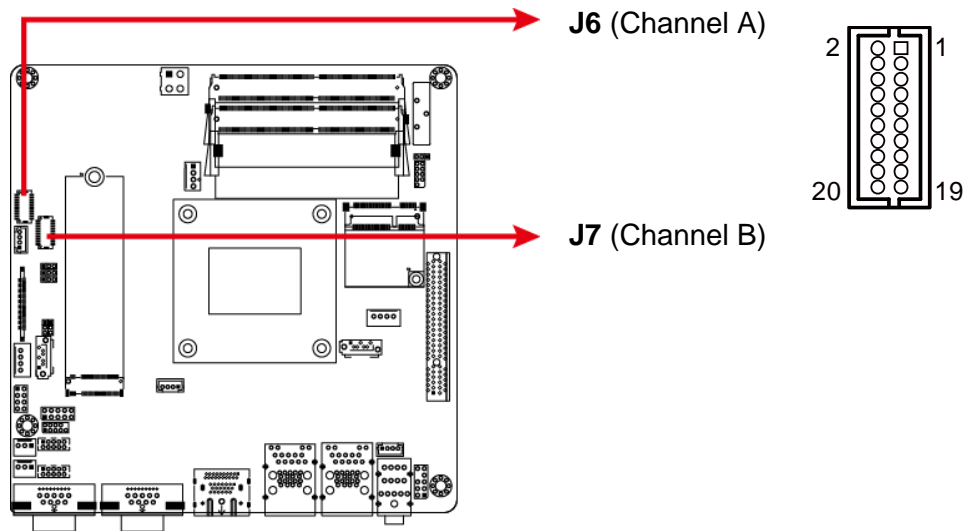
Pin	Assignment	Pin	Assignment
1	TX0+	2	TX0-
3	Ground	4	Ground
5	TX1+	6	TX1-
7	Ground	8	Ground
9	TX2+	10	TX2-
11	Ground	12	Ground
13	TXC+	14	TXC-
15	Ground	16	Ground
17	TX3+	18	TX3-
19	+3.3 / +5V	20	+3.3 / +5V

2.5.7   Front Panel Connector   (J13)
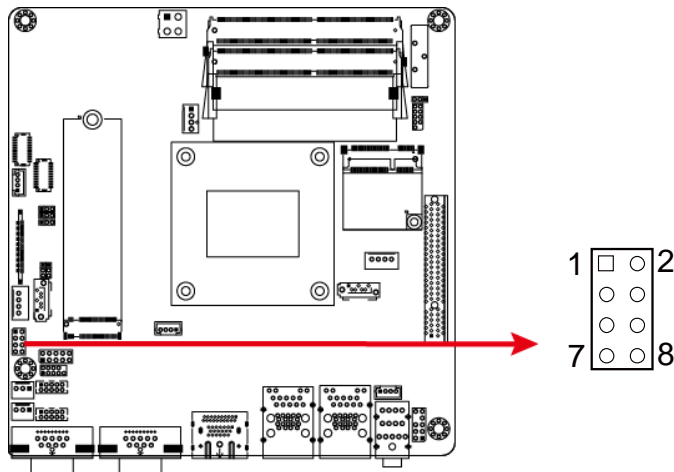
Pin	Assignment	Pin	Assignment
1	Power BTN-	2	Power BTN+
3	HDD LED+	4	HDD LED-
5	Reset BTN-	6	Reset BTN+
7	Power LED+	8	Power LED-

J13 is used to provide light indication of the computer activities and switches to change the computer status. It has the following functions.

- **ATX Power ON Switch (Pins 1 and 2)**

    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.

- **Hard Disk Drive LED Connector (Pins 3 and 4)**

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

- **Reset Switch (Pins 5 and 6)**

    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.

- **Power LED: Pins 7 and 8**

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

iBASE

2.5.8 Digital I/O Connector (J14)

(4-In, 4-Out)
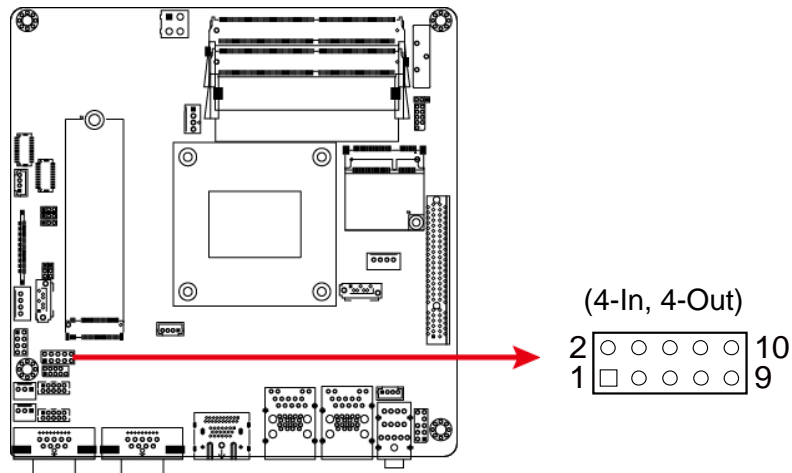
Pin	Assignment	Pin	Assignment
1	Ground	2	+5V
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.9 Speaker Connector (J17)
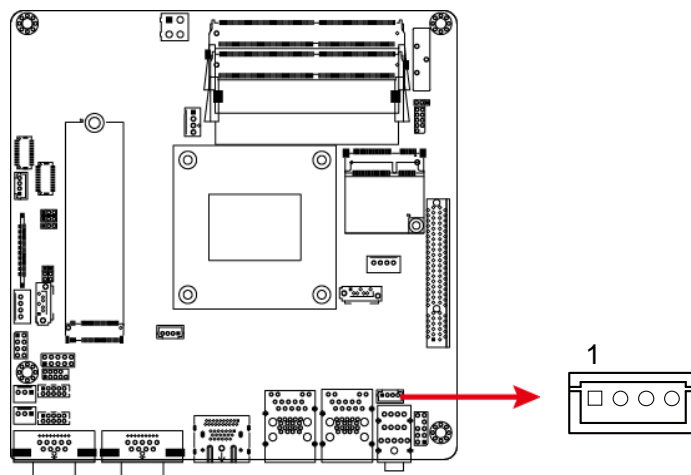
Pin	Assignment	Pin	Assignment
1	Speaker-R+	3	Speaker-L-
2	Speaker-R-	4	Speaker-L+

2.5.10   Audio Connector   (J19)
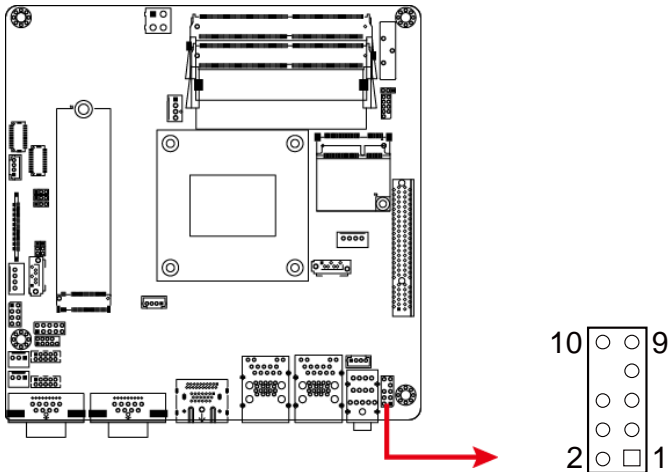
Pin	Assignment	Pin	Assignment
1	MIC IN_L	2	Ground
3	MIC IN_R	4	AUD_DETECT
5	LINE_IN_R	6	JD_MIC_IN
7	Sense	8	KEY
9	LINE_IN_L	10	JD_LINE_IN

iBASE

2.5.11 Fan Power Connectors   (CPU_FAN1 SYS_FAN1, SYS_FAN2)
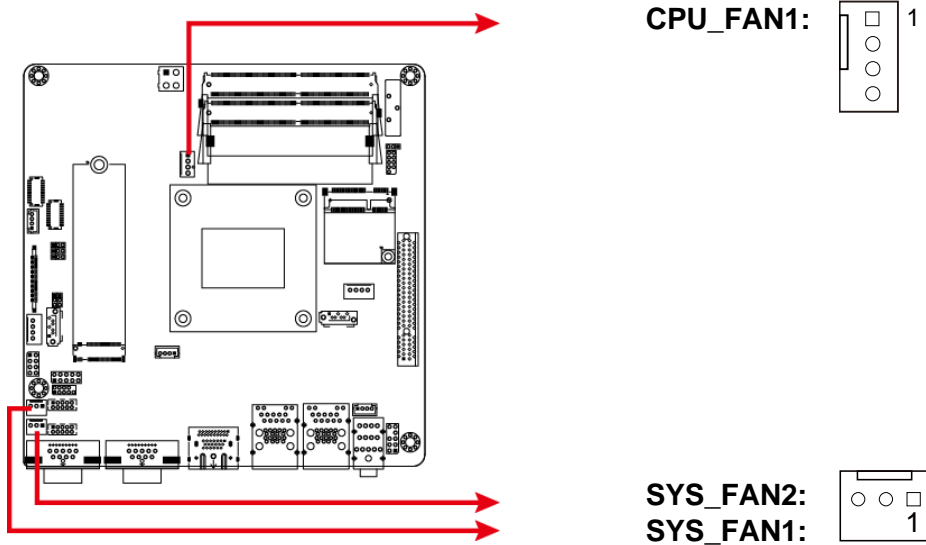
CPU_FAN1: CPU Fan Power Connector

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

SYS_FAN1 & SYS_FAN2: System Fan Power Connectors

Pin	Assignment
1	Ground
2	+12V
3	Rotation detection

Chapter 3
Driver Installation

The information provided in this chapter includes:

- AMD Ryzen™ V1000 Graphics Driver
- HD Audio Driver
- LAN Driver

iBASE

3.1 Introduction

This section describes the installation procedures for software drivers. The software drivers are in a disk enclosed with the product package. If you find anything missing, please contact the distributor where you have made the purchase.

3.2 AMD Ryzen™ V1000 Graphics Drivers

Follow the instructions below to complete the installation.

1. Insert the disk enclosed in the package with the board. Click **AMD** on the left pane and then **AMD Ryzen V1000 Drivers** on the right pane.

2. Click **AMD Ryzen V1000 Graphics Drivers Installation Utility**.

3. Read the software license agreement and click Accept and Install to proceed.
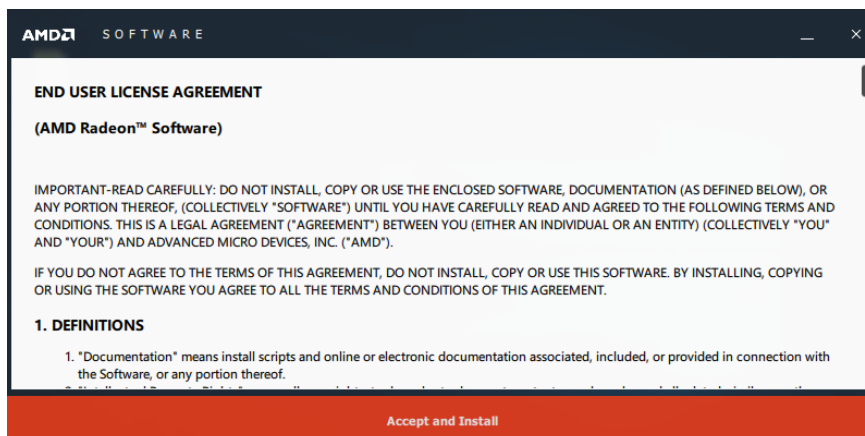
4. Choose and click on either Express Install or Custom Install..
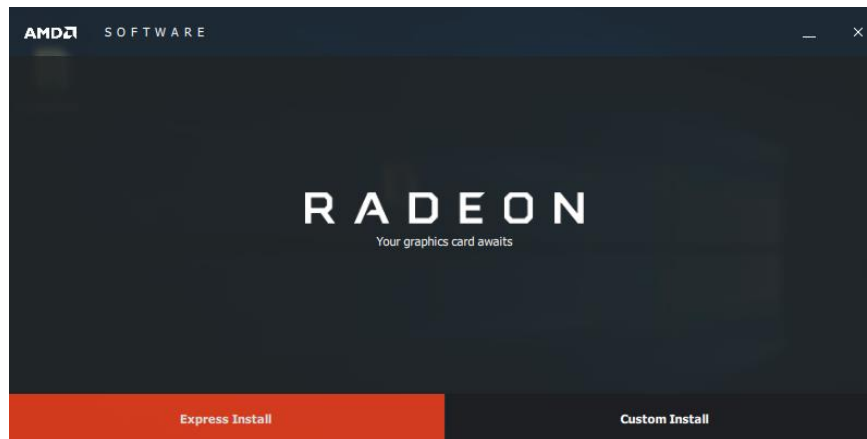
5. Click Install.
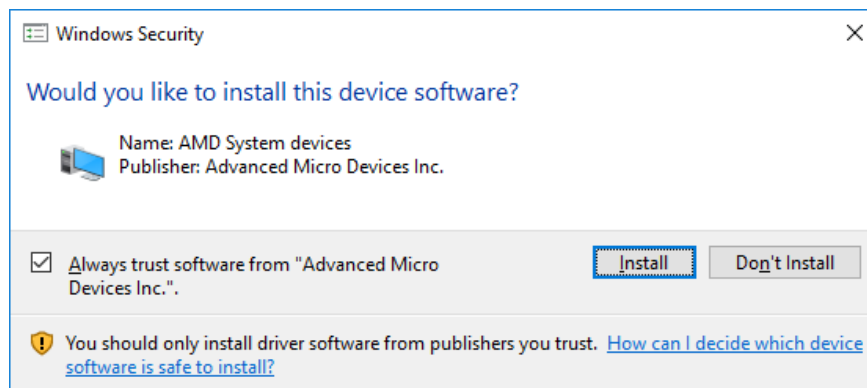
6. When the driver is completely installed, restart the computer for changes to take effect.

iBASE

3.3 HD Audio Driver Installation

1. Click **AMD** on the left pane and then **AMD Ryzen V1000 Drivers** on the right pane.
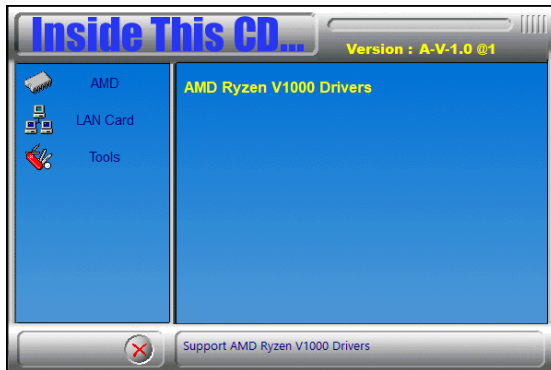
2. Click **Realtek High Definition Audio Driver**.
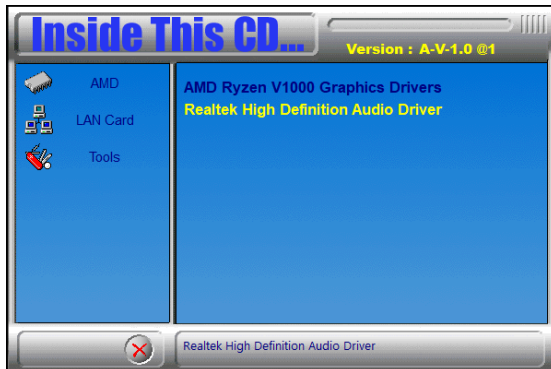
3. On the *Welcome* screen of the InstallShield Wizard, click **Next**.
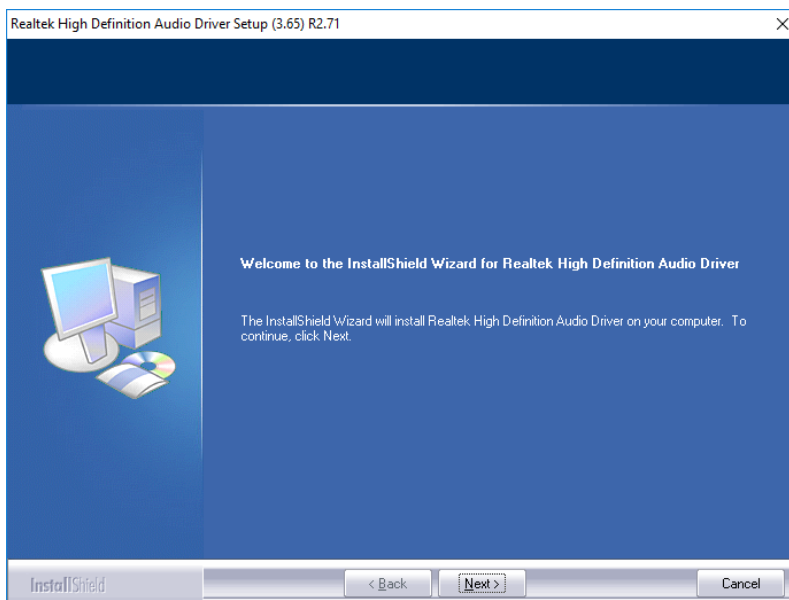
4. Click **Next** until the installation starts.

5. When the driver is completely installed, restart the computer for changes to take effect.

3.4   LAN Driver Installation

1. Click **LAN Card** on the left pane and then **Intel(R) LAN Controller Drivers** on the right pane.

2. Click **Intel(R) I21x Gigabit Network Drivers.**.
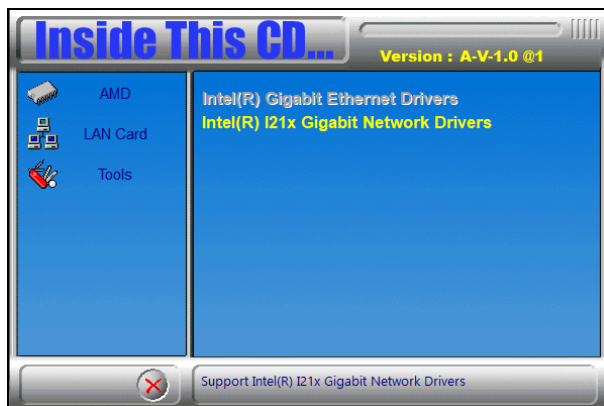
3. When the *Welcome* screen appears, click **Next**.

iBASE
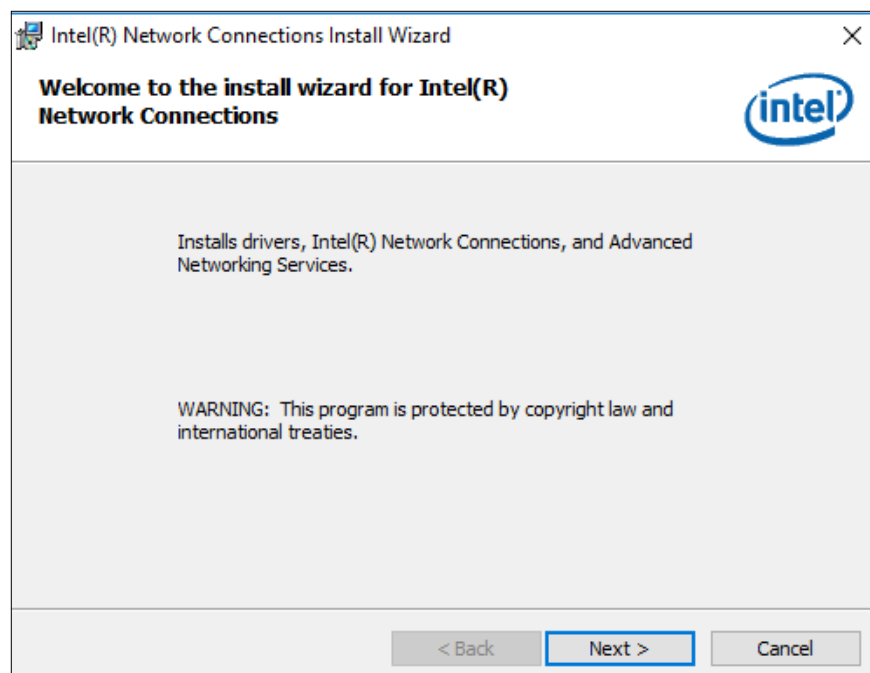
4. Accept the license agreement and click **Next**.
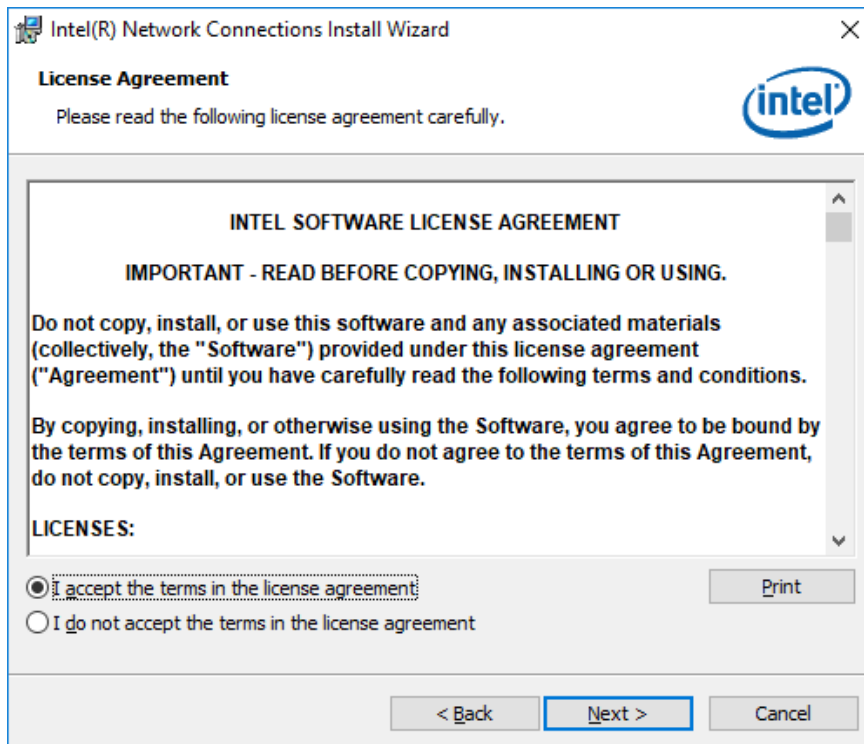
5. On the *Setup Options* screen, tick the checkbox to select the desired driver(s) for installation. Then click **Next** to continue.
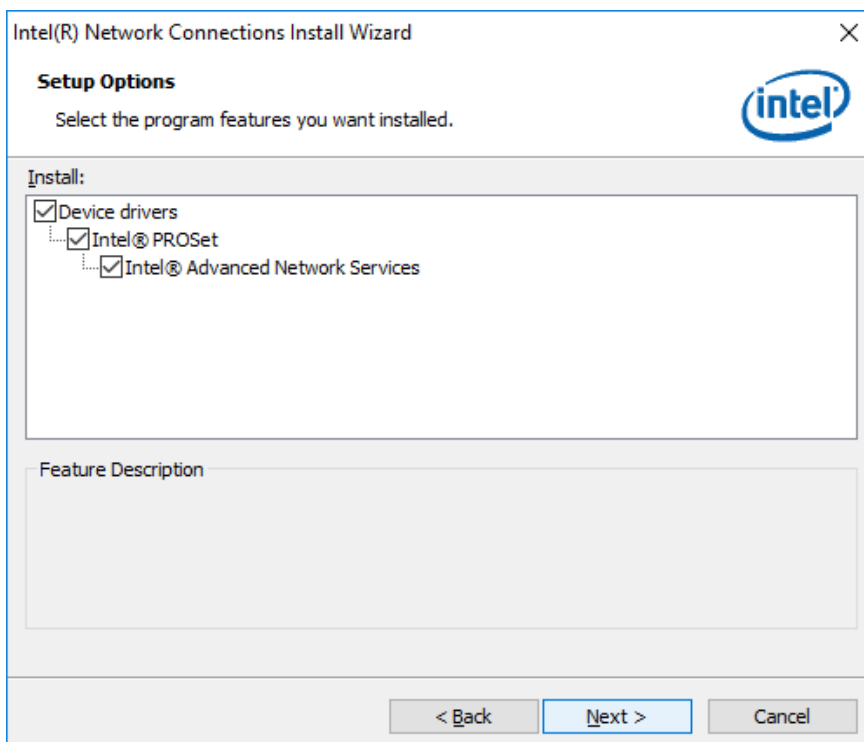
6. When the wizard is ready for installation, click **Install**.

7. When installation is complete, restart the computer for changes to take effect.

Chapter 4
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

iBASE

4.1   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.

4.2   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. You can also press <F7> to call the pop-up Boot menu immediately.

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.

4.3   Main Settings
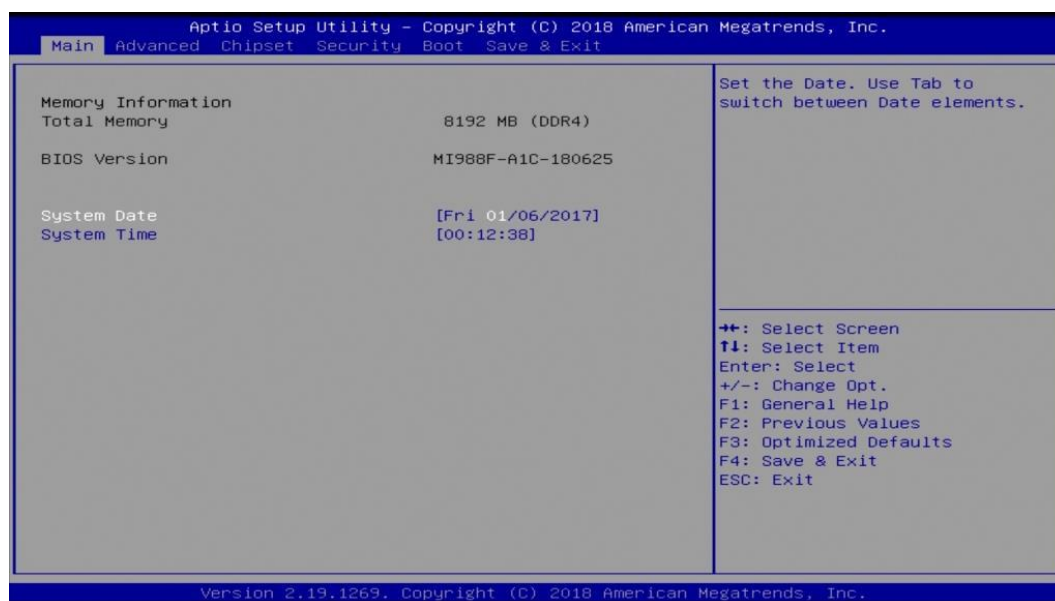
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

4.4   Advanced Settings

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

iBASE

4.4.1 ACPI Settings

```
            Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced

  ACPI Settings                                        Enables or Disables BIOS ACPI
                                                       Auto Configuration.
  Enable ACPI Auto Configuration      [Disabled]

  Enable Hibernation                  [Enabled]
  ACPI Sleep State                    [S3 (Suspend to RAM)]




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



            Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Setting	Description
Enable ACPI Auto Configuration	Enables / Disables BIOS ACPI auto configuration.
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state where the system will enter when the Suspend button is pressed.

4.4.2   IDE Configuration

```
            Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Advanced

 IDE Configuration

 SATA Port0                        Not Present
 SATA Port1                        Not Present

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

            Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```
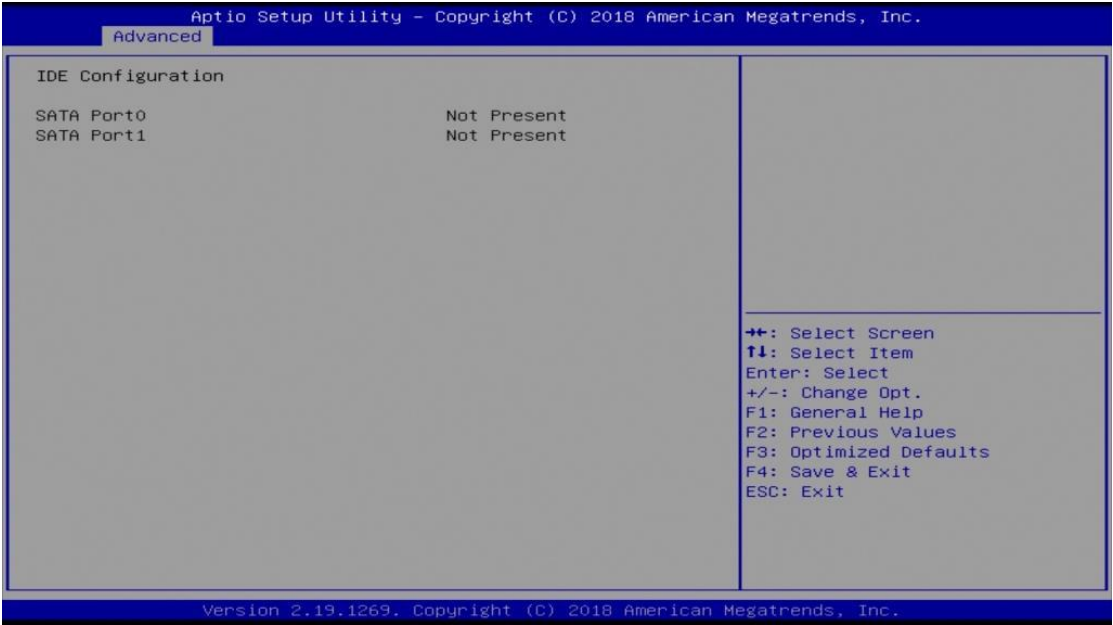
BIOS Setting	Description
SATA Ports	Detects the connection of SATA0 and SATA1.

4.4.3   eDP/LVDS Configuration

```
            Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Advanced

 eDP\LVDS Configuration

 eDP\LVDS Control                  [Disabled]

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

            Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```
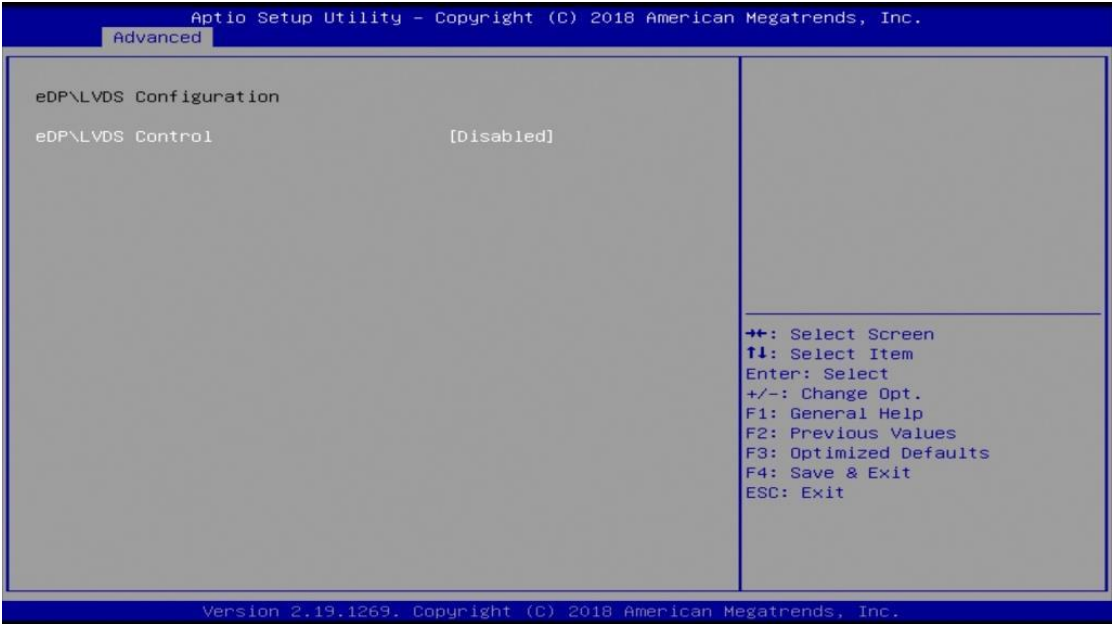
BIOS Setting	Description
eDP / LVDS Control	Enables / Disables the eDP or LVDS function.

iBASE

4.4.4 iSmart Controller

```
Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
Advanced

iSmart Controller

Power-On after Power failure        [Disable]
Temperature Guardian                [Disable]
Schedule Slot 1                     [None]
Schedule Slot 2                     [None]

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

Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Setting	Description
Power-On after Power failure	Enables / Disables the system to be turned on automatically after a power failure.
Temperature Guardian	Generate the reset signal when system hands up on POST.
Schedule Slots	Sets up the hour / minute / day for the power-on schedule for the system. Options: • None • Power On • Power On / Off **Important:** If you would like to set up a schedule between adjacent days, configure two schedule slots. For example, if setting up a schedule from Wednesday 5 p.m. to Thursday 2 a.m., configure two schedule slots. But if setting up a schedule from 3 p.m to 5 p.m. on Wednesday, configure only a schedule slot.

4.4.5   NCT6116D Super IO Configuration

```
            Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
   Advanced

   NCT6116D Super IO Configuration                                EuP/ErP control on S5
                                                                  [Keep standby power] Enable
   Super IO Chip                      NCT6116D                    all of the standby power and
   EuP/ErP standby power control(Eup)    [Keep standby power]     ignore EuP/ErP specification.
 ▶ Serial Port 1 Configuration                                    [Ethernet Only] Only provide
 ▶ Serial Port 2 Configuration                                    the standby power for ethernet
 ▶ Serial Port 3 Configuration                                    chip.
 ▶ Serial Port 4 Configuration                                    [No standby power]Shutdown all
 ▶ Serial Port 5 Configuration                                    of the standby power.
 ▶ Serial Port 6 Configuration


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



            Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Setting	Description
Eup / ErP Standby Power Control (EuP)	Eup/Erp Control on S5. Options are as below.
	Keep standby power: Enables all of the standby power and ignore Eup/ErP specification.
	Ethernet only: Only provides the standby power for the Ethernet chip.
	No standby power: Shut down all of the standby power.
Serial Ports Configuration	Sets parameters of Serial Ports.
	Enables / Disables the serial port and select an optimal setting for the Super IO device.

iBASE

4.4.5.1. Serial Port 1 ~ 6 Configuration
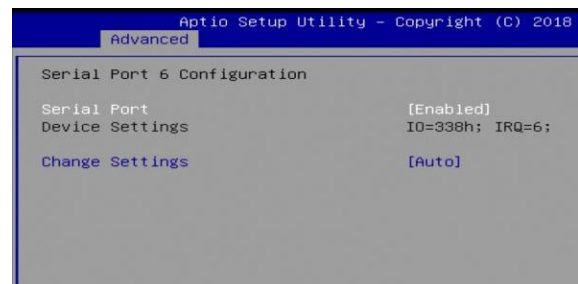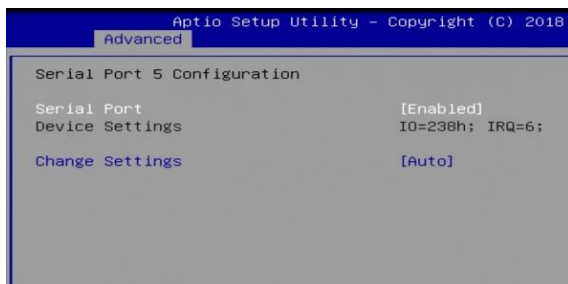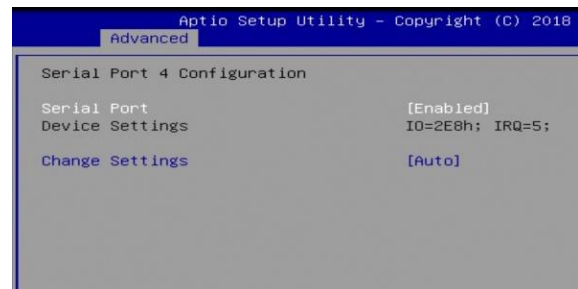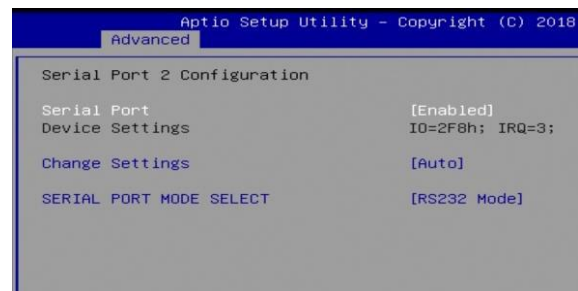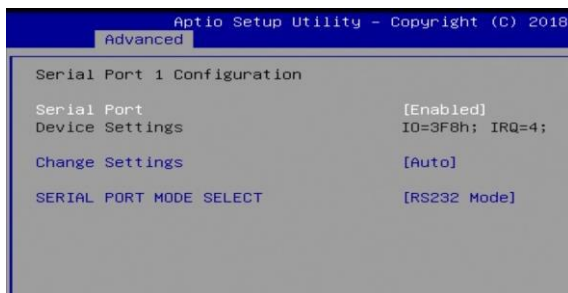
BIOS Setting	Description
Serial Ports	Enables / Disables the serial ports.

4.4.6 Hardware Monitor

```
            Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
  Advanced

  Pc Health Status                                        CPU Smart Fan Mode Select
  CPU Smart Fan Function              [Disabled]
  SYS Smart Fan1 Function             [Disabled]
  SYS Smart Fan2 Function             [Disabled]

  System temperature                 : +33 C
  CPU temperature                    : +33 C
  CPU Fan Speed                      : 7988 RPM
  SYS Fan1 Speed                     : 0 RPM
  SYS Fan2 Speed                     : 0 RPM
  +5V                                : +5.087 V
  +12V                               : +12.232 V
  Memory Voltage                     : +1.192 V
  CPUVCORE                           : +1.176 V         →←: Select Screen
  VCC3V                              : +3.328 V         ↑↓: Select Item
  VSB3V                              : +3.232 V         Enter: Select
                                                        +/-: Change Opt.
  CPU Shutdown Temperature           [Disabled]         F1: General Help
                                                        F2: Previous Values
                                                        F3: Optimized Defaults
                                                        F4: Save & Exit
                                                        ESC: Exit


            Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Setting	Description
CPU Smart Fan Function	Enables / Disables the CPU smart fan feature.
System Smart Fans Function	Enables / Disables the system smart fans feature.
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.
CPU Shutdown Temperature	Enables / Disables the CPU shutdown temperature function.

iBASE

4.4.7 CPU Configuration

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Advanced

 CPU Configuration                                           View Memory Information
                                                             related to Node 0
 ▶ Node 0 Information




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



          Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```
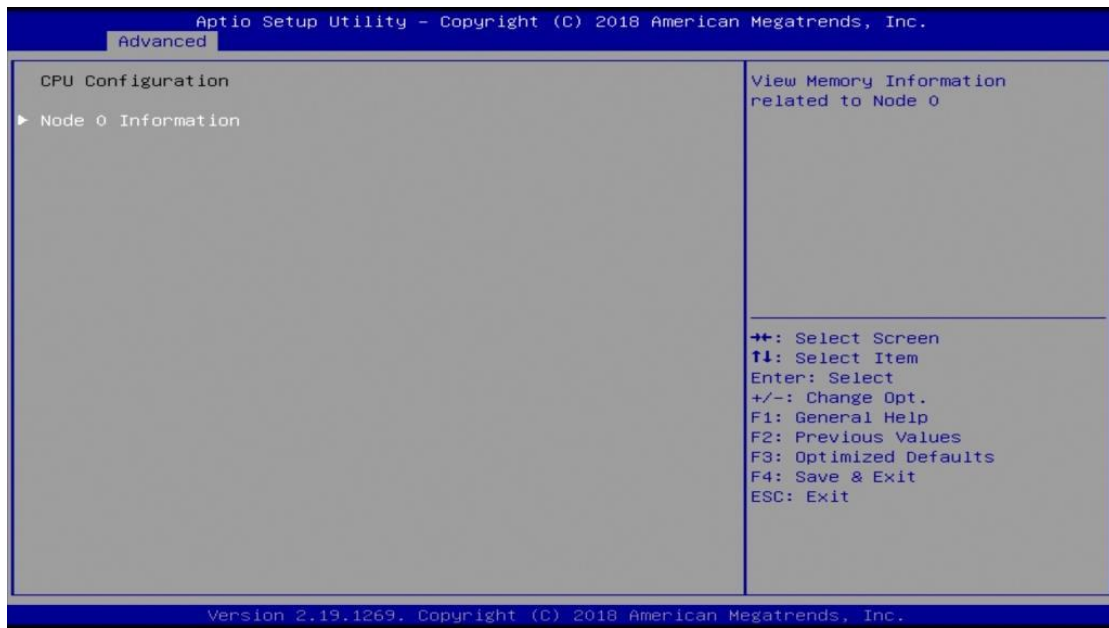
BIOS Setting	Description
Node 0 Information	Displays the memory information related to Node 0.

4.4.8 AMI Graphic Output Protocol Policy

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Advanced

 RAVEN                                                       Output Interface
 AMD GOP X64 Release Driver Rev.2.2.0.0.0.Feb  6 2018.18:2...
 Output Select                        [DFP2_DP]




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



          Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```
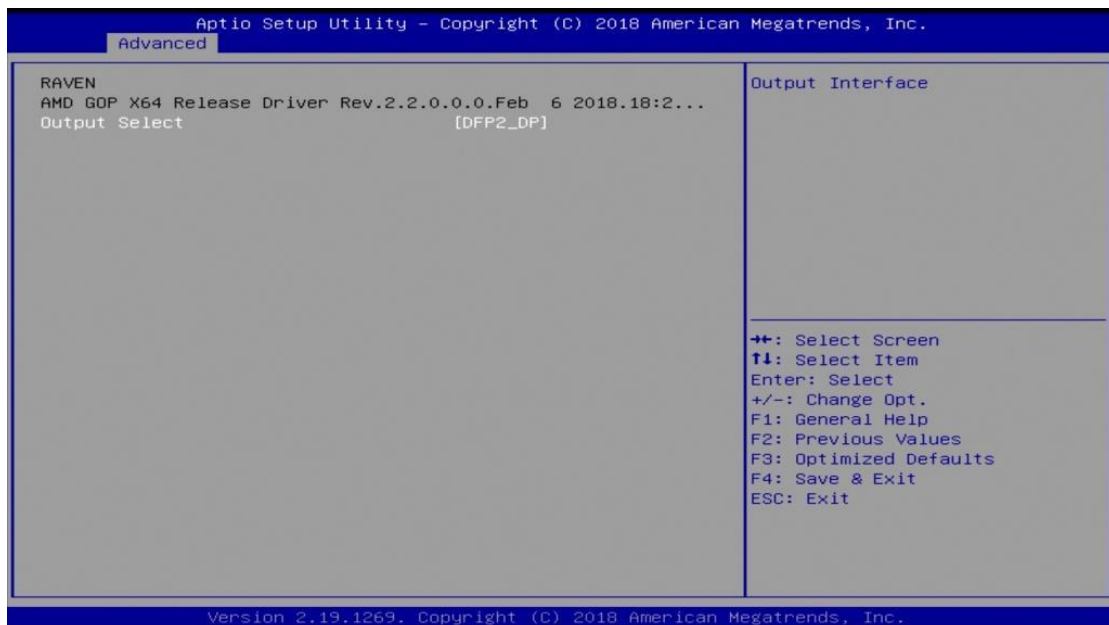
BIOS Setting	Description
Output Select	Allows you to select an output interface.

iBASE

4.4.9　Network Stack Configuration
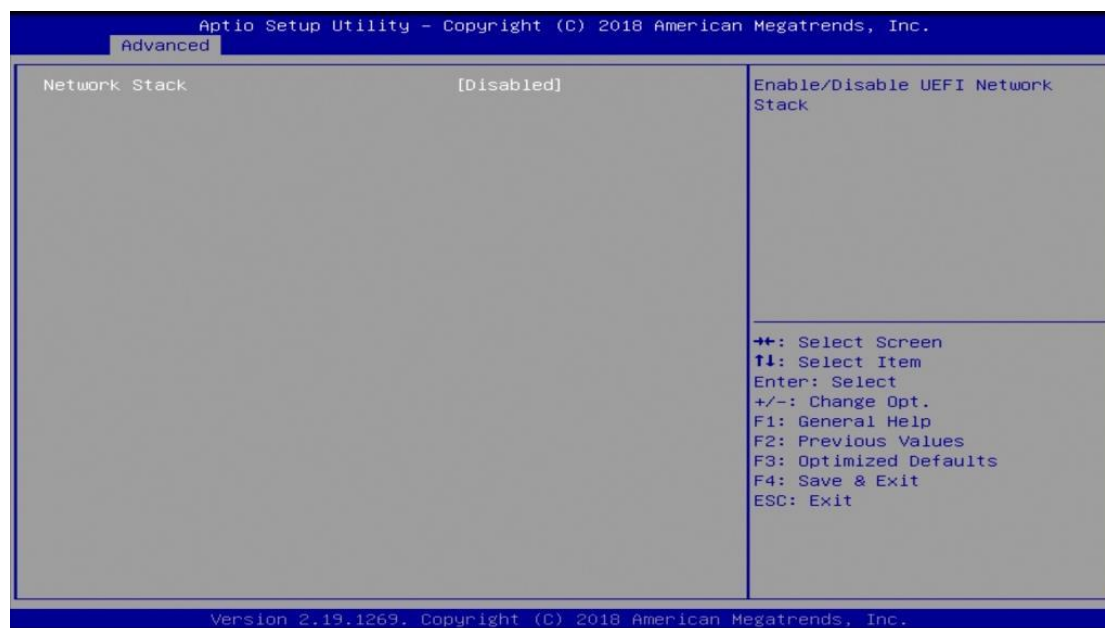
BIOS Setting	Description
Network Stack	Enables / Disables UEFI Network Stack.
IPv4 PXE Support	Enables / Disables IPv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.
IPv4 HTTP Support	Enables / Disables IPv4 HTTP Boot Support. If disabled, Ipv4 HTTP boot option will not be created.
IPv6 PXE Support	Enables / Disables IPv6 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created.
IPv6 HTTP Support	Enables / Disables IPv6 HTTP Boot Support. If disabled, Ipv4 HTTP boot option will not be created.
PXE boot wait time	Assigns a period of time to press ESC key to abort the PXE boot.
Media detect count	Assigns a number of times to check the presence of media.

iBASE

4.4.10 CSM Configuration

```
              Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Advanced

Compatibility Support Module Configuration                    Enable/Disable CSM Support.

CSM Support                           [Enabled]
Option ROM execution

Network                               [Do not launch]



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


              Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Setting	Description
CSM Support	Enables / Disables CSM support.
Network	Controls the execution of UEFI and Legacy PXE OpROM. Options: Do not launch / Legacy

4.4.11 NVMe Configuration

```
              Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Advanced

NVMe controller and Drive information

No NVME Device Found



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


              Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

iBASE

4.4.12   USB Configuration

```
          Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
       Advanced

   USB Configuration                                        Enables Legacy USB support.
                                                            AUTO option disables legacy
   USB Module Version               19                      support if no USB devices are
                                                            connected. DISABLE option will
   USB Controllers:                                         keep USB devices available
       2 XHCIs                                              only for EFI applications.
   USB Devices:
       1 Keyboard

   Legacy USB Support               [Enabled]
   XHCI Hand-off                    [Enabled]
   USB Mass Storage Driver Support  [Enabled]

   USB hardware delays and time-outs:
   USB transfer time-out            [20 sec]                →←: Select Screen
   Device reset time-out            [20 sec]                ↑↓: Select Item
   Device power-up delay            [Auto]                  Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit



          Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Setting	Description
Legacy USB Support	Enables 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 the support for USB mass storage driver.
USB Transfer time-out	The time-out value for control, bulk, and Interrupt transfers. Options: 1 sec / 5 sec / 10 sec / 20 sec
Device reset time-out	Seconds of delaying execution of start unit command to USB mass storage device. Options: 10 sec / 20 sec / 30 sec / 40 sec
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. Auto uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor. Options: Auto / Manual

iBASE

4.5   Chipset Settings

```
            Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
    Main   Advanced  Chipset  Security  Boot  Save & Exit

 ▶ South Bridge                                              South Bridge Parameters
```
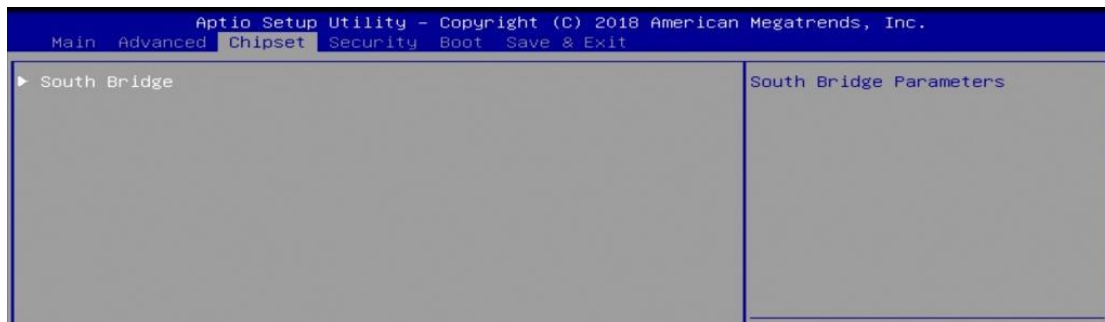
4.5.1 South Cluster Configuration

```
            Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                 Chipset

 ▶ SB USB Configuration                                      Options For SB USB
                                                             Configuration
```
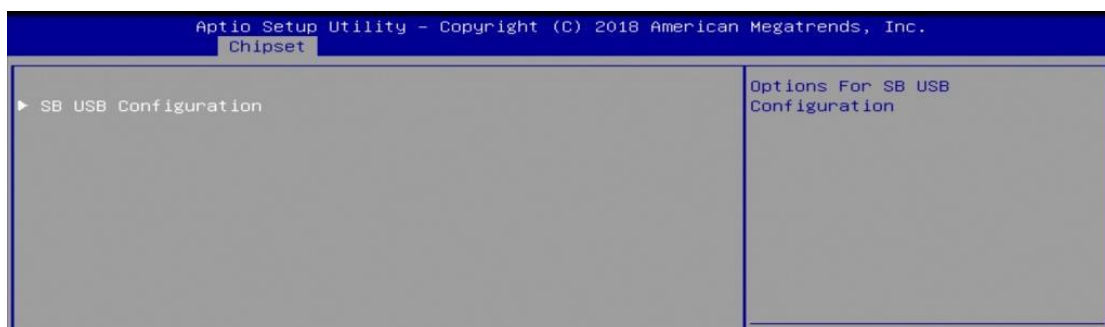
BIOS Setting	Description
SB USB Configuration	Options for SB USB Configuration.

4.5.1.1.   XHCI Ports

```
            Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                 Chipset

   XHCI0  Port  0                   [Enabled]              Enabled/Disabled XHCI0 Port
   XHCI0  Port  1                   [Enabled]              0(XHCI/EHCI)
   XHCI0  Port  2                   [Enabled]
   XHCI0  Port  3                   [Enabled]

   XHCI1  Port  0                   [Enabled]
   XHCI1  Port  1                   [Enabled]



                                                           →←: Select Screen
                                                           ↑↓: Select Item
```

BIOS Setting	Description
XHCI 0 & XHCI 1 Ports	Enables / Disables the XHCI0 & XHCI1 ports (XHCI/EMCI).

4.6   Security Settings

```
                Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
           Main  Advanced  Chipset  Security  Boot  Save & Exit

         Password Description                                Set Administrator Password

         If ONLY the Administrator's password is set,
         then this only limits access to Setup and is
         only asked for when entering Setup.
         If ONLY the User's password is set, then this
         is a power on password and must be entered to
         boot or enter Setup. In Setup the User will
         have Administrator rights.
         The password length must be
         in the following range:
         Minimum length                     3
         Maximum length                     20

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



                Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

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

4.7   Boot Settings

```
                Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
           Main  Advanced  Chipset  Security  Boot  Save & Exit

         Boot Configuration                                 Number of seconds to wait for
         Setup Prompt Timeout            1                  setup activation key.
         Bootup NumLock State            [Off]              65535(0xFFFF) means indefinite
         Quiet Boot                      [Disabled]         waiting.

         Boot mode select                [UEFI]

         FIXED BOOT ORDER Priorities
         Boot Option #1                  [Hard Disk]
         Boot Option #2                  [CD/DVD]
         Boot Option #3                  [SD]
         Boot Option #4                  [USB Hard Disk]
         Boot Option #5                  [USB CD/DVD]
         Boot Option #6                  [USB Key]          →←: Select Screen
         Boot Option #7                  [USB Floppy]       ↑↓: Select Item
         Boot Option #8                  [USB Lan]          Enter: Select
         Boot Option #9                  [Network]          +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit


                Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

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

4.8 Save & Exit Settings

```
            Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.
    Main  Advanced  Chipset  Security  Boot  Save & Exit

 Save Options                                          Exit system setup after saving
 Save Changes and Exit                                 the changes.
 Discard Changes and Exit

 Save Changes and Reset
 Discard Changes and Reset

 Save Changes
 Discard Changes

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



            Version 2.19.1269. Copyright (C) 2018 American Megatrends, Inc.
```

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

Appendix

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

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

iBASE

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
0x00000A30-0x00000A3F	Motherboard resources
0x00000A40-0x00000A4F	Motherboard resources
0x00000070-0x00000071	System CMOS/real time clock
0x0000D000-0x0000DFFF	PCI Express Root Port
0x0000D000-0x0000DFFF	AMD Radeon(TM) Vega 8 Graphics
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000238-0x0000023F	Communications Port (COM5)
0x00000338-0x0000033F	Communications Port (COM6)
0x00000020-0x00000021	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x00000000-0x000003AF	PCI Express Root Complex
0x00000000-0x000003AF	Direct memory access controller
0x000003E0-0x00000CF7	PCI Express Root Complex
0x000003B0-0x000003DF	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F000-0x0000FFFF	PCI Express Root Port
0x0000E000-0x0000EFFF	PCI Express Root Port
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

Address	Device Description
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
0x00000CD8-0x00000CDF	Motherboard resources
0x00000800-0x0000089F	Motherboard resources
0x00000B00-0x00000B0F	Motherboard resources
0x00000B20-0x00000B3F	Motherboard resources
0x00000900-0x0000090F	Motherboard resources
0x00000910-0x0000091F	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

iBASE

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 4294967292	PCI Express Root Port
IRQ 0	High precision event timer
IRQ 0	System timer
IRQ 8	High precision event timer
IRQ 7	AMD GPIO Controller
IRQ 4294967272	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967271	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967270	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967269	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967268	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967267	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967266	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967265	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 5	Communications Port (COM4)
IRQ 6	Communications Port (COM5)
IRQ 6	Communications Port (COM6)
IRQ 53	High Definition Audio Controller
IRQ 53	AMD Audio CoProcessor
IRQ 54	AMD High Definition Audio Controller
IRQ 54	Microsoft ACPI-Compliant System
IRQ 55	Microsoft ACPI-Compliant System
IRQ 55	AMD SFH KMDF I2C
IRQ 56 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967294	PCI Express Root Port

Level	Function
IRQ 4294967293	PCI Express Root Port
IRQ 4294967291	PCI Express Root Port
IRQ 4294967275	AMD Radeon(TM) Vega 8 Graphics
IRQ 4294967274	AMD Radeon(TM) Vega 8 Graphics
IRQ 4294967273	AMD Radeon(TM) Vega 8 Graphics
IRQ 4294967290	Standard SATA AHCI Controller
IRQ 4294967264	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967263	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967262	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967261	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967260	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967259	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967258	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967257	AMD USB 3.10 eXtensible Host Controller - 1.10 (Microsoft)
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection #5
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection #5
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection #5
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection #5
IRQ 4294967283	Intel(R) I211 Gigabit Network Connection #5
IRQ 4294967282	Intel(R) I211 Gigabit Network Connection #5
IRQ 4294967281	Intel(R) I211 Gigabit Network Connection #6
IRQ 4294967280	Intel(R) I211 Gigabit Network Connection #6
IRQ 4294967279	Intel(R) I211 Gigabit Network Connection #6
IRQ 4294967278	Intel(R) I211 Gigabit Network Connection #6
IRQ 4294967277	Intel(R) I211 Gigabit Network Connection #6
IRQ 4294967276	Intel(R) I211 Gigabit Network Connection #6
IRQ 4294967289	AMD PSP 10.0 Device
IRQ 4294967288	AMD PSP 10.0 Device

iBASE

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 NCT6116D.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 __NCT6116D_H
#define __NCT6116D_H                    1
//------------------------------------------------------------------------
#define     NCT6116D_INDEX_PORT        (NCT6116D_BASE)
#define     NCT6116D_DATA_PORT         (NCT6116D_BASE+1)
//------------------------------------------------------------------------
#define     NCT6116D_REG_LD            0x07
//------------------------------------------------------------------------
#define NCT6116D_UNLOCK                0x87
#define     NCT6116D_LOCK              0xAA
//------------------------------------------------------------------------
unsigned int Init_NCT6116D(void);
void Set_NCT6116D_LD( unsigned char);
void Set_NCT6116D_Reg( unsigned char, unsigned char);
unsigned char Get_NCT6116D_Reg( unsigned char);
//------------------------------------------------------------------------
#endif      //__NCT6116D_H
```

2. Sample Code: The file MAIN.CPP

```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 "NCT6116D.H"
//--------------------------------------------------------------------------
int main (void);

void WDTInitial(void);
void WDTEnable(unsigned char);
void WDTDisable(void);

//--------------------------------------------------------------------------
int main (void)
{
    char SIO;

    SIO = Init_NCT6116D();
    if (SIO == 0)
    {
        printf("Can not detect Nuvoton NCT6116D, program abort.\n");
        return(1);
    }

    WDTInitial();

    WDTEnable(10);

    WDTDisable();

    return 0;
}
//--------------------------------------------------------------------------
void WDTInitial(void)
{
    unsigned char bBuf;
    Set_NCT6116D_LD(0x08);                      //switch to logic device 8
    bBuf = Get_NCT6116D_Reg(0x30);
    bBuf &= (~0x01);
    Set_NCT6116D_Reg(0x30, bBuf);               //Enable WDTO
}
//--------------------------------------------------------------------------
void WDTEnable(unsigned char NewInterval)
{
```

iBASE

```
    unsigned char bBuf;


    Set_NCT6116D_LD(0x08);                          //switch to logic device 8
    Set_NCT6116D_Reg(0x30, 0x01);                   //enable timer


    bBuf = Get_NCT6116D_Reg(0xF0);
    bBuf &= (~0x08);
    Set_NCT6116D_Reg(0xF0, bBuf);                   //count mode is second


    Set_NCT6116D_Reg(0xF1, NewInterval);    //set timer
}
//-------------------------------------------------------------------------
void WDTDisable(void)
{
    Set_NCT6116D_LD(0x08);                          //switch to logic device 8
    Set_NCT6116D_Reg(0xF1, 0x00);                   //clear watchdog timer
    Set_NCT6116D_Reg(0x30, 0x00);                   //watchdog disabled
}
//-------------------------------------------------------------------------
```

3. Sample Code: The file NCT6116D.CPP

```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 "NCT6116D.H"
#include <dos.h>
//------------------------------------------------------------------------
unsigned int NCT6116D_BASE;
void Unlock_NCT6116D (void);
void Lock_NCT6116D (void);
//------------------------------------------------------------------------
unsigned int Init_NCT6116D(void)
{
      unsigned int result;
      unsigned char ucDid;

      NCT6116D_BASE = 0x4E;
      result = NCT6116D_BASE;

      ucDid = Get_NCT6116D_Reg(0x20);
      if (ucDid == 0xC4)                         //NCT6116D??
      {      goto Init_Finish; }

      NCT6116D_BASE = 0x2E;
      result = NCT6116D_BASE;

      ucDid = Get_NCT6116D_Reg(0x20);
      if (ucDid == 0xC4)                         //NCT6116D??
      {      goto Init_Finish; }

      NCT6116D_BASE = 0x00;
      result = NCT6116D_BASE;

Init_Finish:
      return (result);
}
//------------------------------------------------------------------------
void Unlock_NCT6116D (void)
{
      outportb(NCT6116D_INDEX_PORT, NCT6116D_UNLOCK);
      outportb(NCT6116D_INDEX_PORT, NCT6116D_UNLOCK);
}
//------------------------------------------------------------------------
void Lock_NCT6116D (void)
{
      outportb(NCT6116D_INDEX_PORT, NCT6116D_LOCK);
}
//------------------------------------------------------------------------
```

iBASE

```c
void Set_NCT6116D_LD( unsigned char LD)
{
    Unlock_NCT6116D();
    outportb(NCT6116D_INDEX_PORT, NCT6116D_REG_LD);
    outportb(NCT6116D_DATA_PORT, LD);
    Lock_NCT6116D();
}
//------------------------------------------------------------------------
void Set_NCT6116D_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_NCT6116D();
    outportb(NCT6116D_INDEX_PORT, REG);
    outportb(NCT6116D_DATA_PORT, DATA);
    Lock_NCT6116D();
}
//------------------------------------------------------------------------
unsigned char Get_NCT6116D_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_NCT6116D();
    outportb(NCT6116D_INDEX_PORT, REG);
    Result = inportb(NCT6116D_DATA_PORT);
    Lock_NCT6116D();
    return Result;
}
//------------------------------------------------------------------
```