IOPS-602

Open Pluggable Specification Digital Signage Player

User's Manual

Version 1.0
(May 2018)

iBASE

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Trademarks

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Compliance

CE

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

FC

This product has been tested and found to comply with the limits for a Class 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 complies with the current RoHS directives restricting the use of the following substances in concentrations not to exceed 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

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

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Important Safety Information

Carefully read the following safety information before using this device.

Setting up your system:

- Put the device horizontally on a stable and solid surface.
- Do not use this product near water or any heated source.
- Leave plenty of space around the device and do not block the ventilation openings. Never drop or insert any objects of any kind into the openings.
- Use this product in environments with ambient temperatures between 0˚C and 45˚C.

Care during use:

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

Product Disassembly

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

CAUTION

Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries by observing local regulations.

Warranty Policy

- **IBASE standard products:**

  24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

  12-month (1-year) warranty from delivery for 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adaptor, display panel and touch screen.

* PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you encounter any technical problems and require assistance from your distributor or sales representative, please prepare and send the following information:

   - Product model name
   - Product serial number
   - Detailed description of the problem
   - Error messages in text or screenshots if any
   - The arrangement of the peripherals
   - Software used (such as OS and application software)

3. If repair service is required, please download the RMA form at http://www.ibase.com.tw/english/Supports/RMAService/.
   Fill out the form and contact your distributor or sales representative.

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Table of Contents

Chapter 1
General Information

The information provided in this chapter includes:

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

1.1 Introduction

The IOPS-602 is a slot-in digital signage player compliant with OPS (Open Pluggable Specification). It is powered by Intel® 7th Generation processors and features outstanding performance and HDMI high definition video playback. It supports large format OPS displays and monitors, and allows cableless deployment and easy maintenance.

1.2 Features

- Supports 7th Gen. Intel® Core™ U-series processors
- Intel® HD graphics engine
- iAMT compliance for remote management
- 2 x DDR4-2133 SO-DIMM, dual-channel, expandable to 32 GB
- HDMI 1.4b display output
- Audio jacks for line-out and mic-in
- 1 x RJ45 for GbE LAN, 1 x RJ50 for RS-232 serial port, 4 x USB 3.0 ports
- 1 x M.2 E2230 for Wi-Fi or Bluetooth options

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 have purchased the product. Drivers and this user manual are downloadable from our website.

- IOPS-602 OPS Digital Signage Player

1.4 Optional Accessories

IBASE provides optional accessories as listed below. Please contact us or your dealer if you would like to order any item.

- IOPS-DK1-SYS docking kit with two screws
- Power adapter & power cord

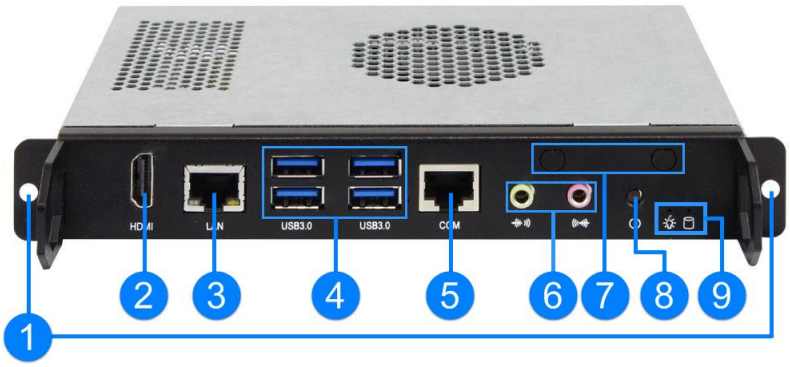
1.5 Specifications

Product	IOPS-602
System	
Mainboard	OPS602
Operating System	• Windows 10 (64-bit) • Linux Ubuntu
CPU	Intel® 7th Gen. Core™ U-series processor BGA1356
Chipset	Integrated
Memory	2 x DDR4-2133 SO-DIMM, Dual channel, Max. 32 GB
Graphics	Integrated graphics
Network Controller	Intel® I219LM LAN PHY for Intel® i7/i5 processor Intel® I219V LAN PHY for Intel® i3 processor
Super I/O	Fintek F81846AD
Storage	1 x M.2 M2280 slot for SATA SSD
Power Requirement	12V ~ 19V DC-in (Intel® OPS standard)
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min
Chassis	SGCC, black & gray
Mounting	OPS standard bracket
Dimensions (W x H x D)	200 x 30 x 119 mm (7.87” x 1.18” x 4.69”)
Net Weight	0.9 kg (1.98 lb)
Compliance	CE, FCC class B
I/O Ports	
HDMI	1 x HDMI 1.4b
LAN	1 x GbE RJ45 LAN port
Serial	1 x RJ50 for COM1 RS-232 port
USB	4 x USB 3.0
Audio Jack	• 1 x Line-Out • 1 x Mic-In
Power Jack	1 x DC-in power jack
Expansion	1 x M.2 E2230 for WiFi or BT options
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	SSD: 5 grms / 5~500Hz / random operation

All specifications are subject to change without prior notice.

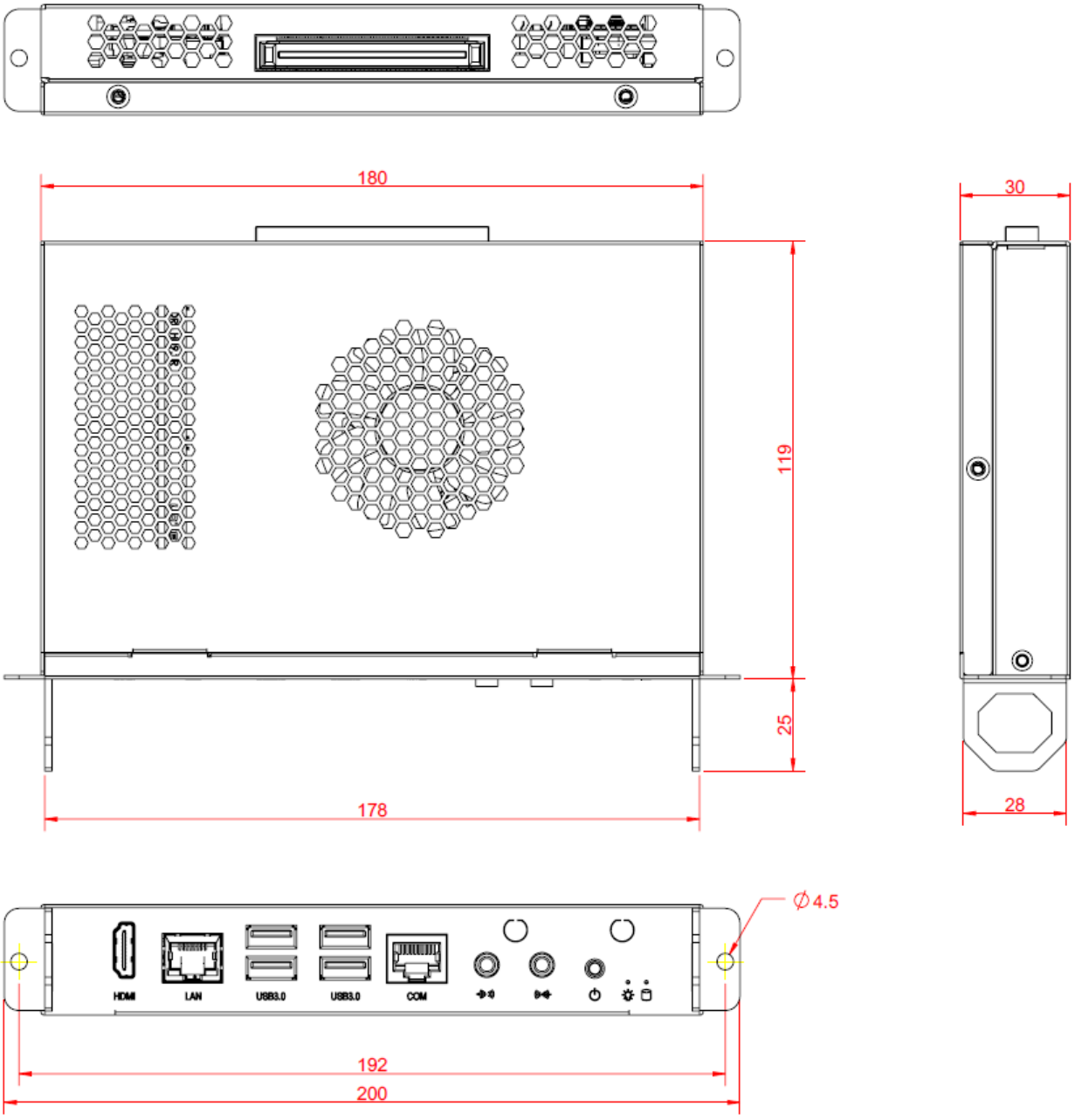
1.6 Overview



No.	Name	No.	Name
1	Screw Holes (for the optional docking kit)	6	Audio Jacks (From left to right: Line-Out, Mic-In)
2	HDMI Port	7	Antenna Holes
3	GbE LAN Port	8	Power Button
4	USB 3.0	9	LED Indicators (From left to right: for power, for HDD)
5	RJ50 COM RS-232 Port		

1.7 Dimensions

Unit: mm



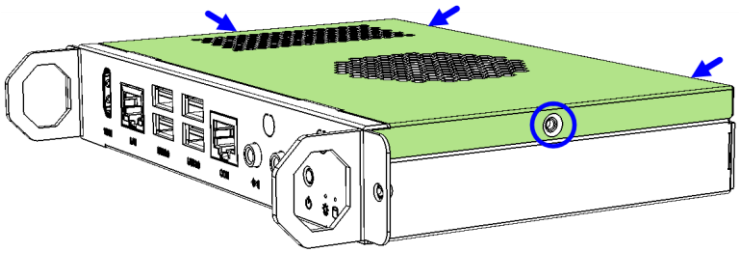
Chapter 2
Hardware Configuration

This section contains general information about:

- Installations
- Jumper and connectors

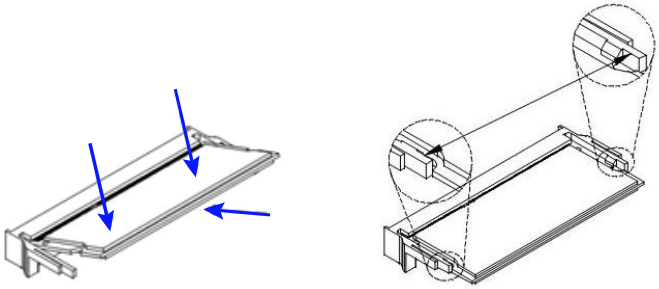
2.1 Installations

Before installing any card or module into the device, remove the screws shown in the picture below to pull out the cover.



2.1.1 Memory Module Installation

To install or replace the memory modules, locate the memory slot on the board and perform the following steps:

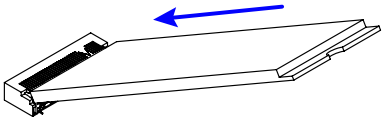


1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

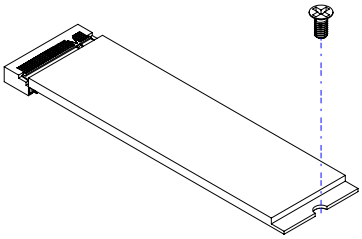
To remove a module, use your fingers to press the clips outwards until the module pops up. Grab the module gently and pull it out of the slot.

2.1.2 M.2 Cards Installation

1. Align the bus connector of the M.2 card with that of the M.2 slot, and insert the card slantwise.



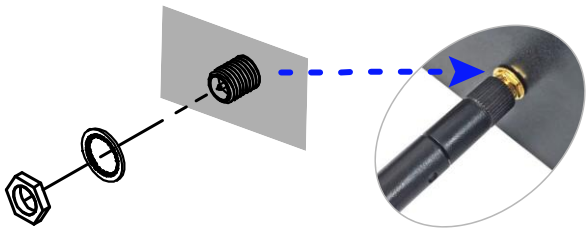
2. Push the M.2 card downwards as shown in the picture below , and fix it with a screw.

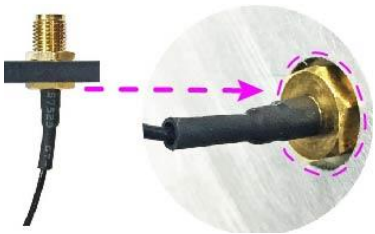


2.1.3 WiFi / 3G / 4G Antenna Installation

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

1. 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).

2.2 Pin Assignment for COM RS-232 Port

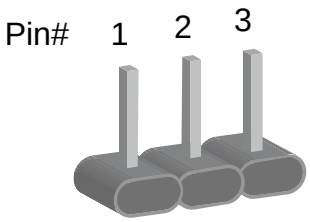
Pin	Signal Name	Pin	Signal Name
1	DSR (Data set ready)	6	DCD (Data carrier detect)
2	Ground	7	DTR (Data terminal ready)
3	Ground	8	CTS (Clear to send)
4	TX (Transmit)	9	RTS (Request to send)
5	RX (Receive)	10	RI (Ring indicator)

2.3 Setting the Jumpers

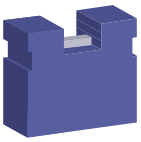
Configure your device by using jumpers to enable the features that you need based on your applications. Contact your supplier if you have doubts about the best configuration for your use.

2.3.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a base mounted on the circuit board. Jumper caps are placed (or removed) on the pins to enable or disable functions or features. If a jumper has 3 pins, you can connect Pin 1 with Pin 2 or Pin 2 with Pin 3 by shorting the jumper.

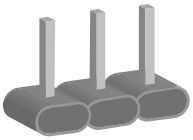
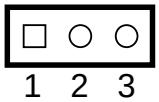
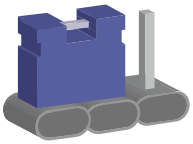
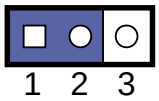
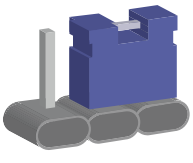
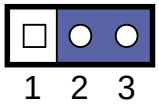


A 3-pin jumper



A jumper cap

Refer to the illustration below to set jumpers.

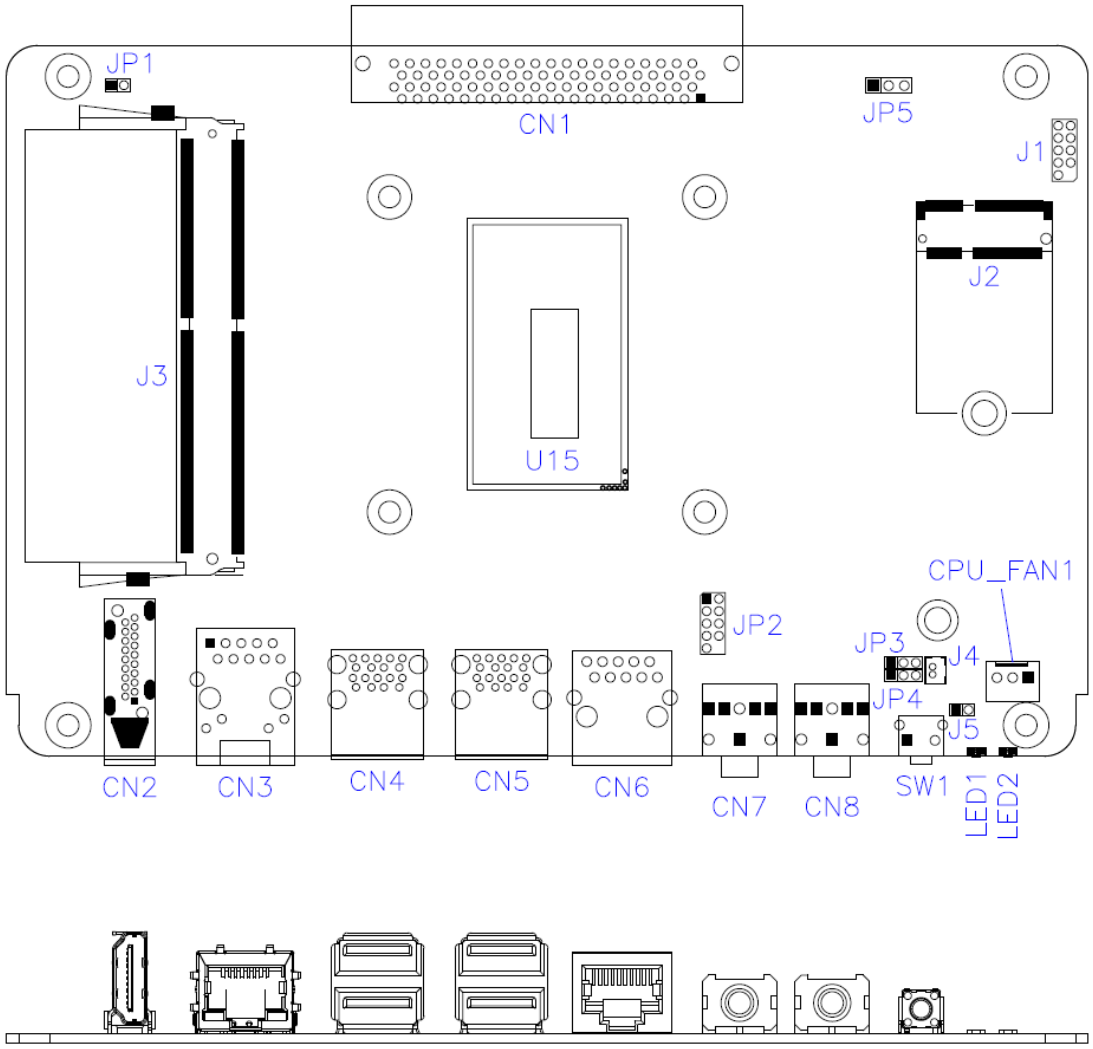
Pin closed	Oblique view	Illustration
Open		
1-2		
2-3		

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

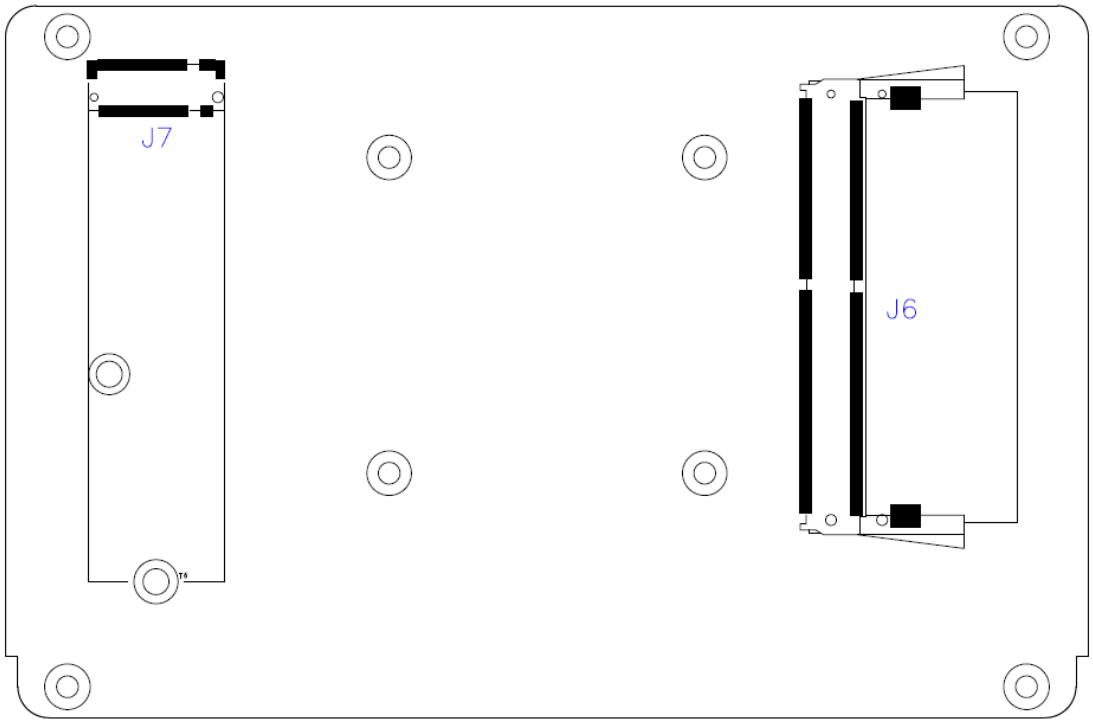
When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

2.4 Jumper & Connector Locations on Motherboard

Motherboard: OPS602



OPS602 – top view



OPS602 – bottom view

2.5 Jumper & Connectors Quick Reference

Jumper:

Function	Connector Name	Page
Clearing CMOS Data	JP3	14
Clearing ME Register	JP4	14
Factory Use Only	JP1, JP5	--

Connectors:

Function	Connector Name	Page
CPU Fan Power Connector	CPU_FAN1	15
Battery Connector	J4	15
Power Button	SW1	--
OPS Connector	CN1	--
HDMI Port	CN2	--
GbE LAN Port	CN3	--
Dual USB 3.0 Port	CN4, CN5	--
COM RS-232 Port [1]	CN6	--
Audio Jack	CN7, CN8	--
DDR4 SO-DIMM Slot	J3, J6	--
M.2 E2230 Slot	J2	--
M.2 M2280 Slot	J7	--
LED Indicator	LED1 (for power), LED2 (for HDD)	--
Factory Use Only	JP2, J1, J5	--

[1]: Refer to *2.2 Pin Assignment for COM RS-232 Port*.

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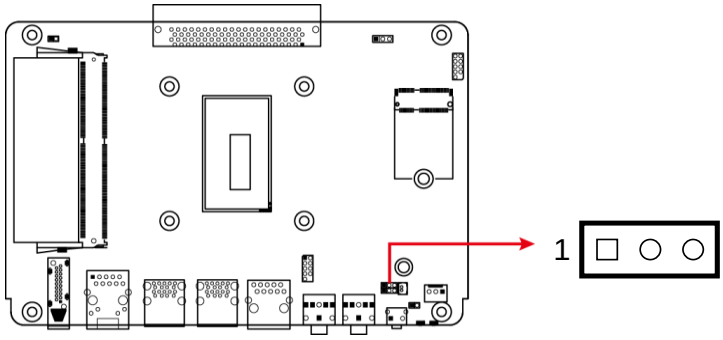
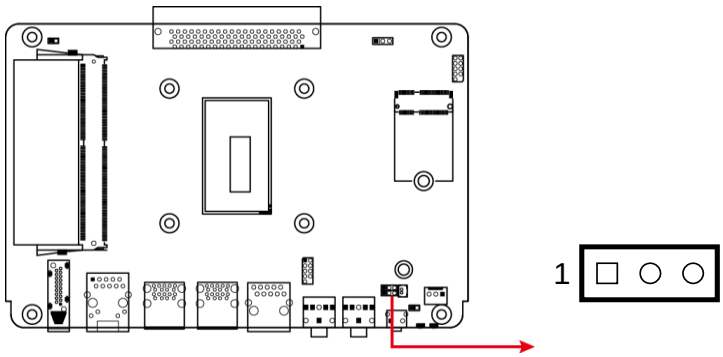
2.5.1 Clearing CMOS Data (JP3)



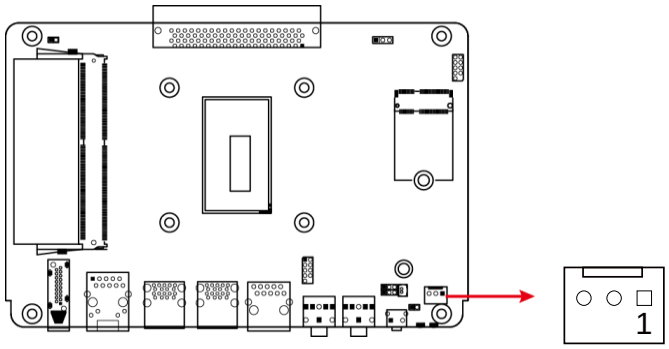
Function	Pin closed	Illustration
Normal (default)	1-2	1
Clear CMOS	2-3	1

2.5.2 Clearing ME Register (JP4)



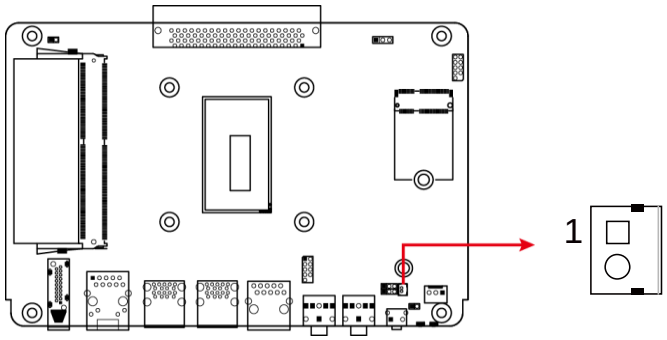
Function	Pin closed	Illustration
Normal (default)	1-2	1
Clear CMOS	2-3	1

2.5.3 CPU Fan Power Connector (CPU_FAN1)



Pin	Signal Name	Pin	Signal Name
1	Ground	3	Rotation detection
2	+12V		

2.5.4 Battery Connector (J4)



Pin	Signal Name	Pin	Signal Name
1	Power	2	Ground

Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- Intel® HD Graphics Drivers
- HD Audio Drivers
- LAN Network Drivers
- Intel® Management Engine Components Drivers

3.1 Introduction

This section describes the installation procedures for software drivers. The software drivers are available on IBASE website www.ibase.com.tw. Register as a member on our website to download all the necessary drivers.

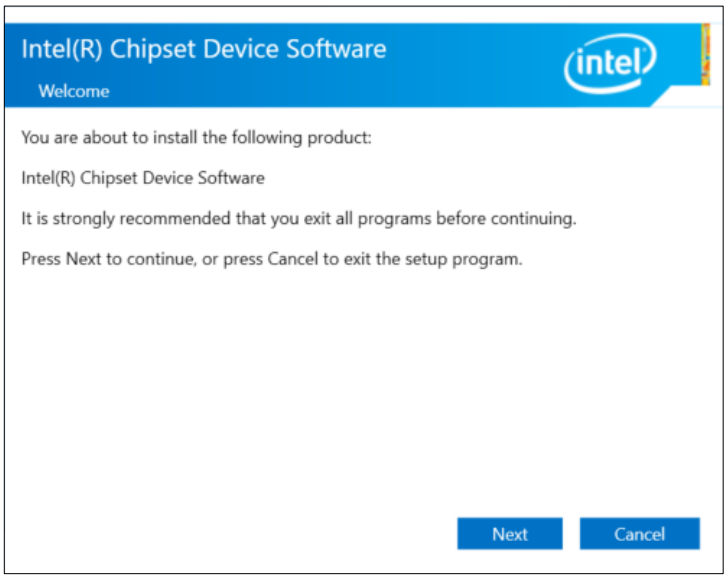
Note: After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.

3.2 Intel® Chipset Software Installation Utility

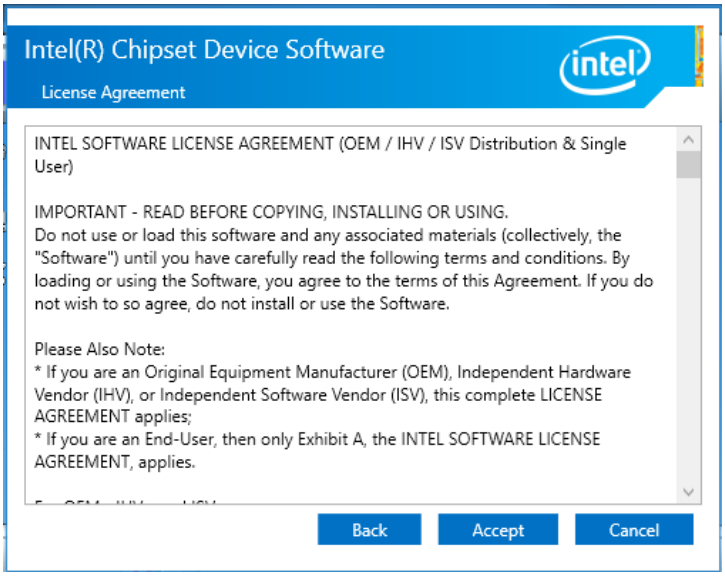
The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for the chipset components. Follow the instructions below to complete the installation.

1. Run the **Setup.exe** file.

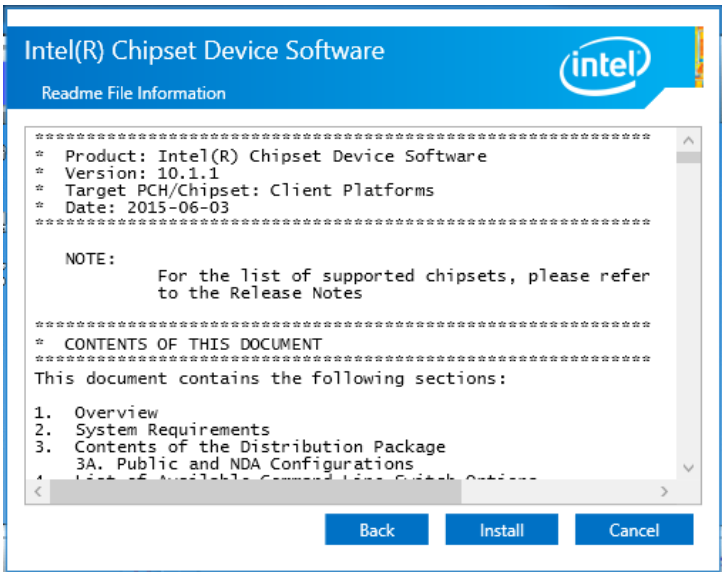
2. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.



3. Accept the license agreement and proceed with the installation process.



4. On the *Readme File Information* screen, click **Install**.

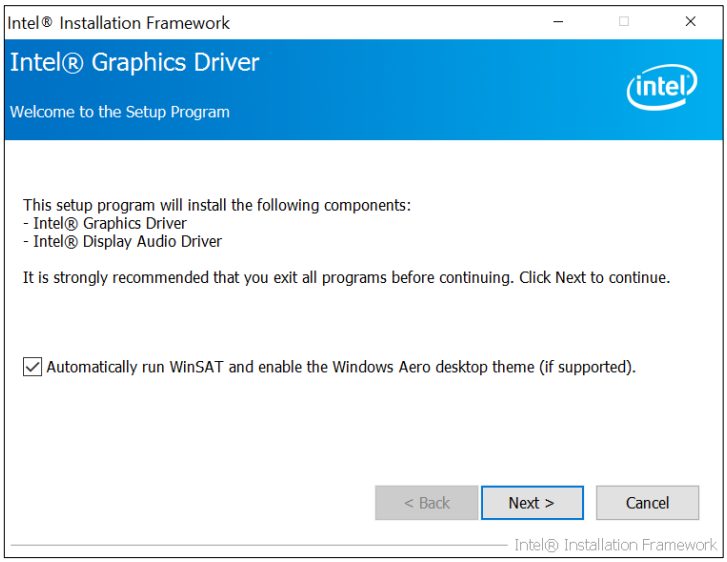


5. Installation is now complete. Restart the system for changes to take effect.

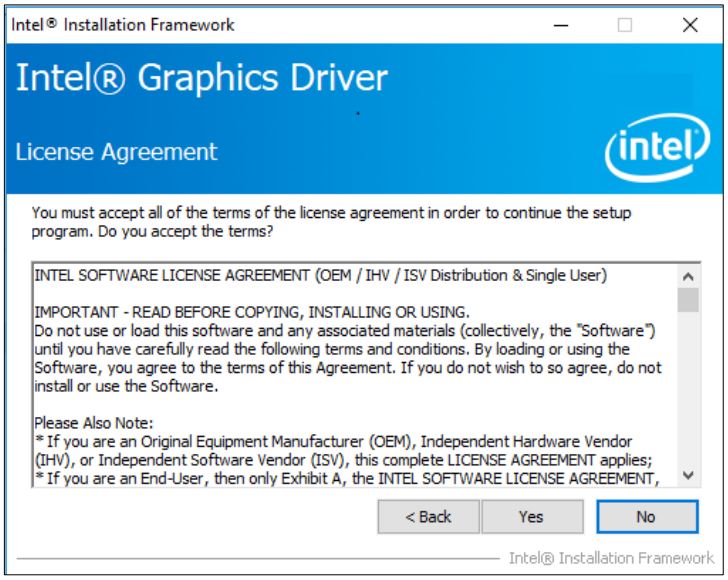
3.3 Intel® Graphics Driver Installation

1. Run the **Setup.exe** file.

2. When the *Welcome* screen appears, click **Next** to continue.



3. Click **Yes** to agree with the license agreement and continue the installation.

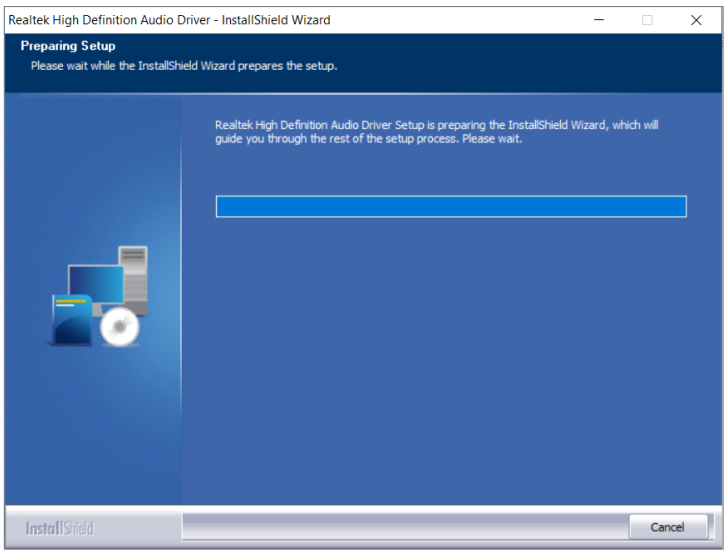


4. On the *Readme File Information* and *Setup Progress* screen, click **Next** until the installation starts.

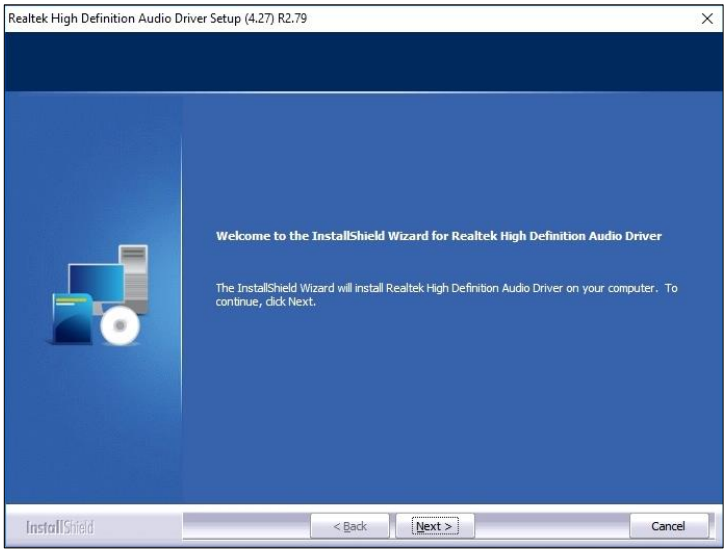
5. Installation is now complete. Restart the system for changes to take effect.

3.4 HD Audio Driver Installation

1. Run the **Setup.exe** file for the installation wizard to start.



2. On the *Welcome* screen of the InstallShield Wizard, click **Next** to start installing the audio driver on your system.

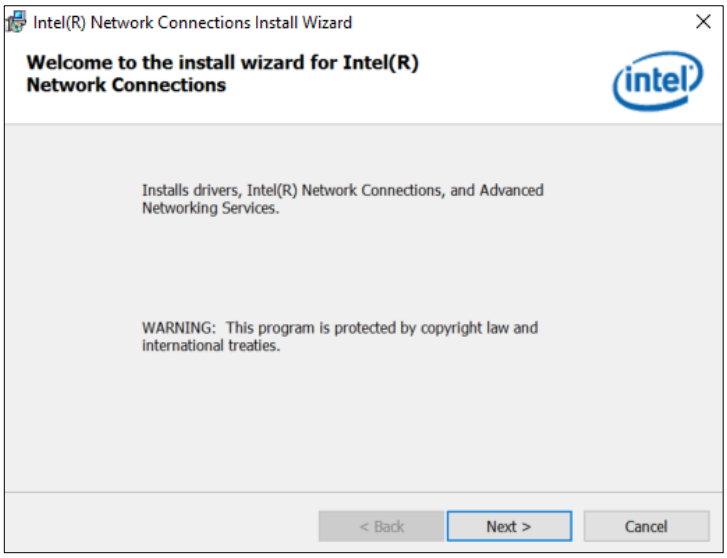


3. Installation is now complete. Restart the system for changes to take effect.

3.5 LAN Driver Installation

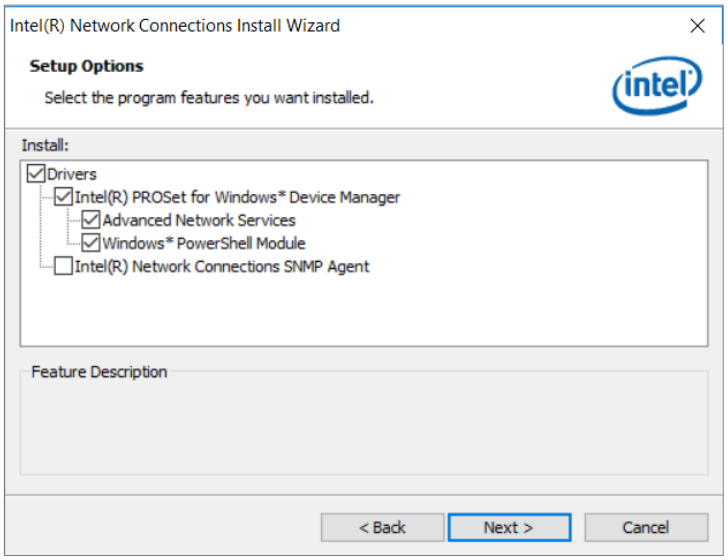
1. Run the **Setup.exe** file.

2. On the *Welcome* screen of the InstallShield Wizard, click **Next** to continue.



3. Accept the license agreement and click **Next**.

4. On the *Setup Options* screen, tick the checkbox to select the desired driver(s) and click **Next**.

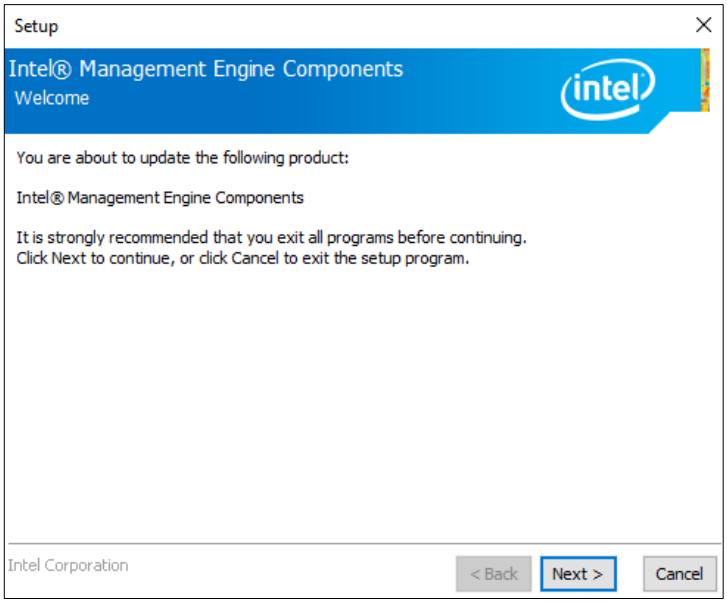


5. Click **Install**.
6. Installation is now complete. Restart the system for changes to take effect.

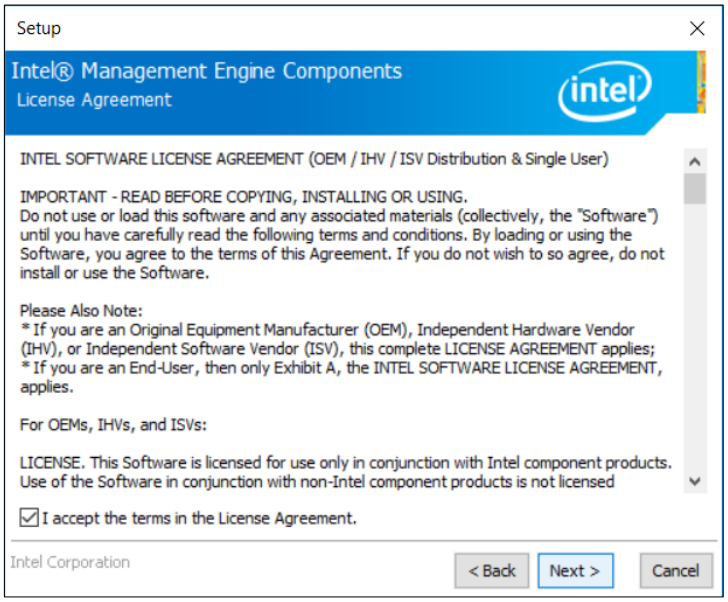
3.6 Intel® Management Engine Components Drivers Installation

1. Run the **Setup.exe** file.

2. When the *Welcome* screen appears, click **Next**.



3. Accept the license agreement and click **Next**.



4. Assign a desired destination folder and click **Next** for installation.
5. Installation is now complete. Restart the system 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

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.

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
```

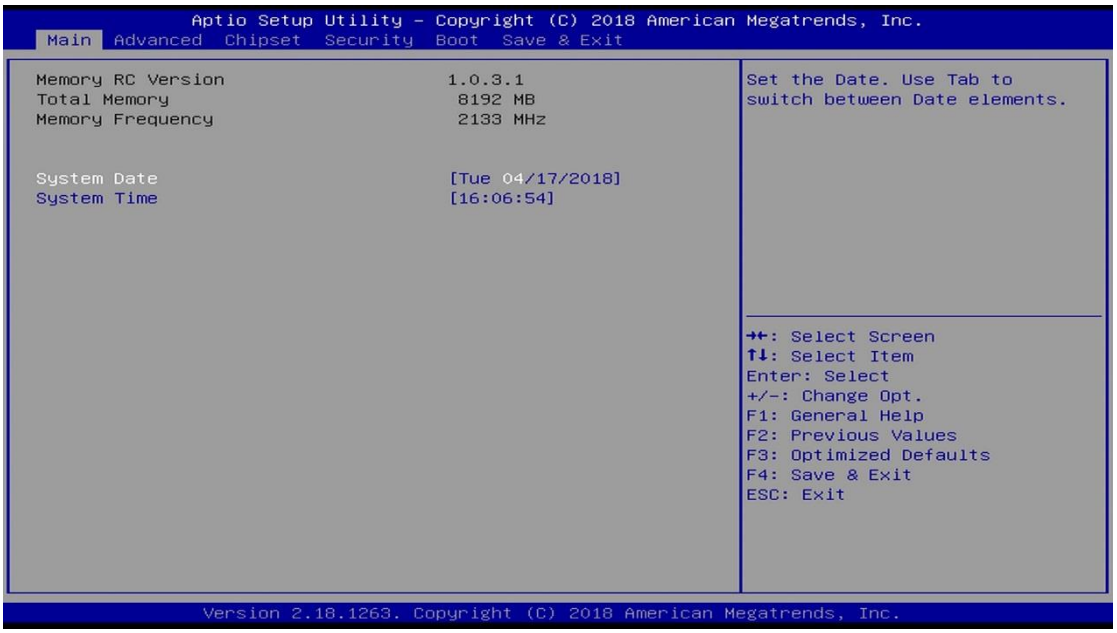
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

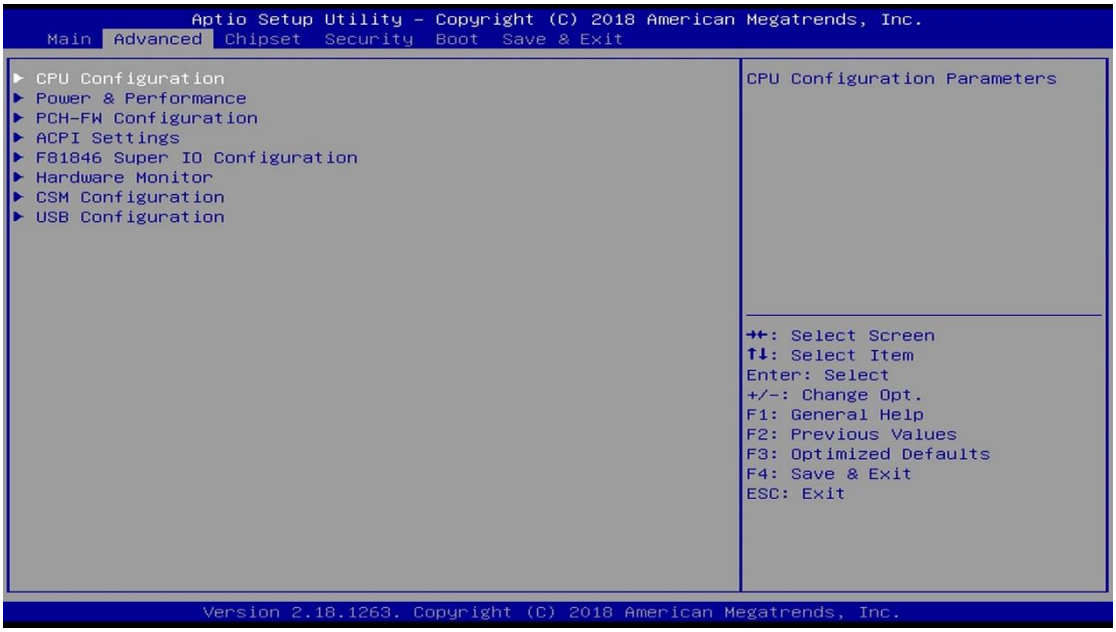
4.3 Main Settings



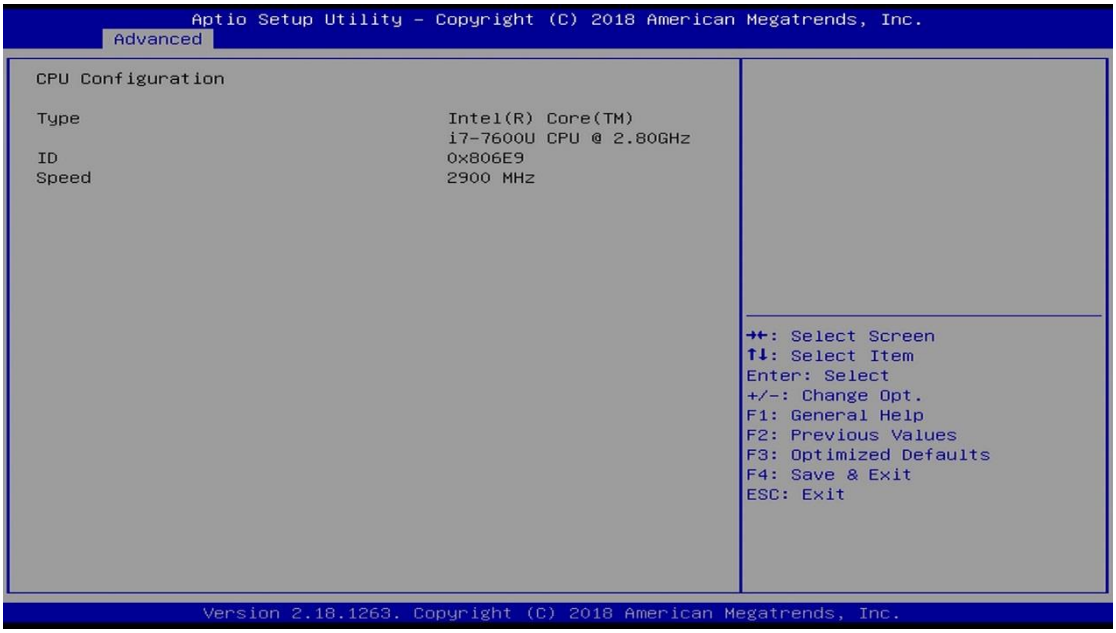
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

4.4 Advanced Settings

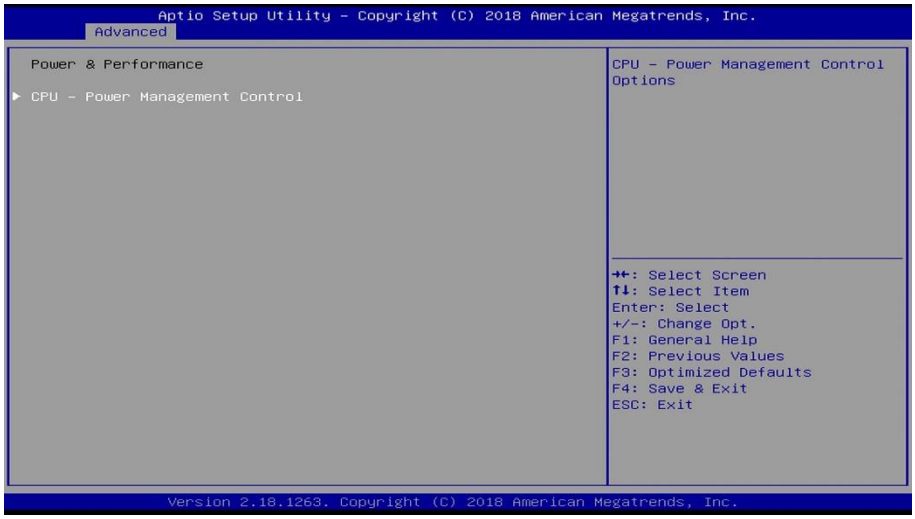
This section allows you to configure, improve your system and allows you to set up some system features according to your preference.



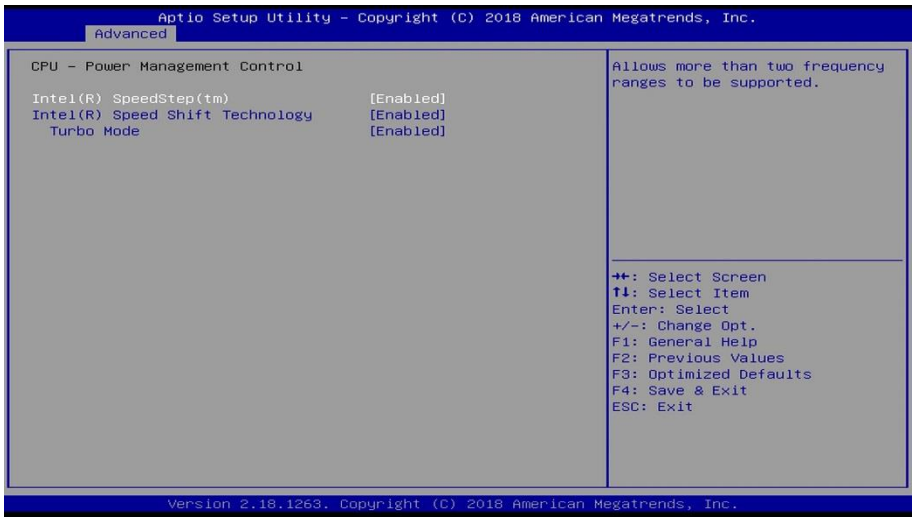
4.4.1 CPU Configuration



4.4.2 Power & Performance

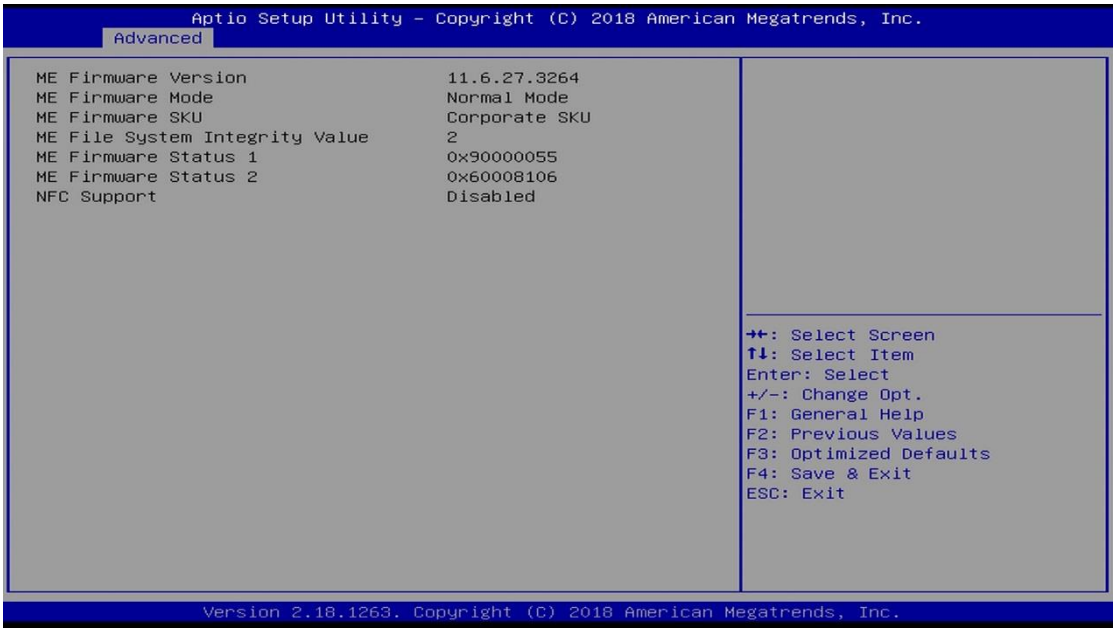


BIOS Setting	Description
CPU - Power Management Control	Shows CPU power management control options.

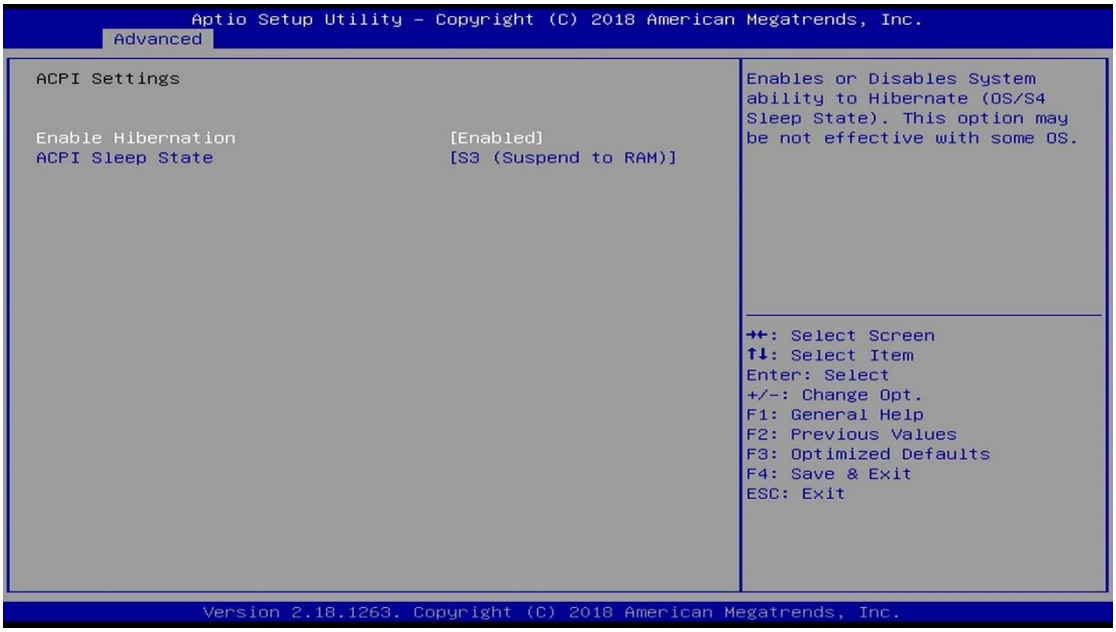


BIOS Setting	Description
Intel(R) SpeedStep(tm)	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Enables / Disables Intel® Speed Shift Technology support. Enabling this function will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enables / Disables processor Turbo Mode (EMTTM should be enabled too). AUTO means enabled, unless max. turbo ratio is bigger than 16 – SKL A0 W/A.

4.4.3 PCH-FW Configuration

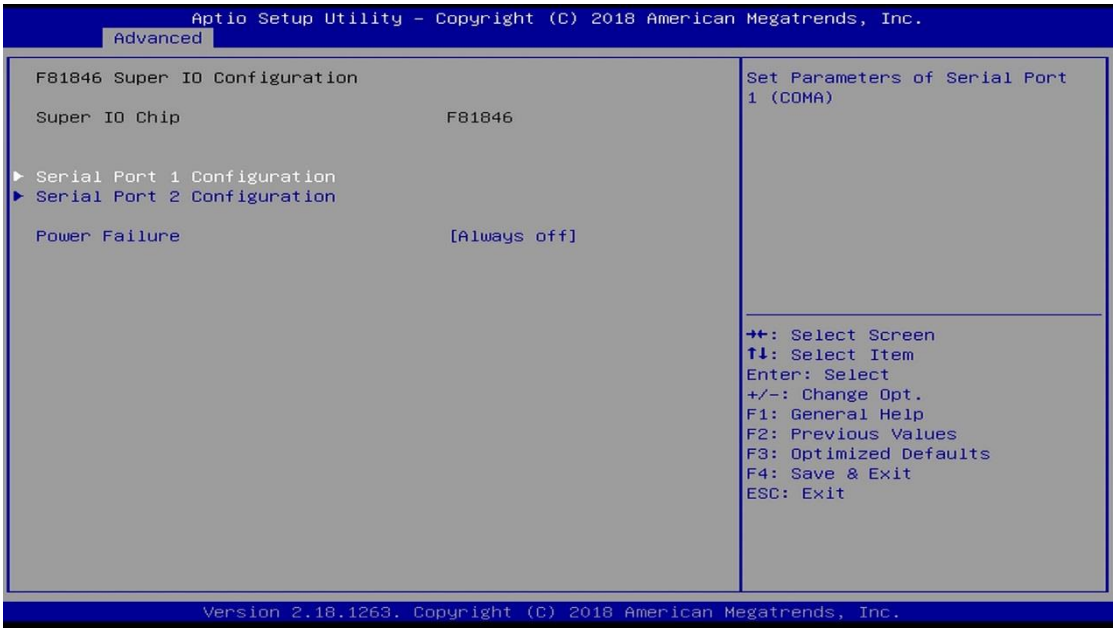


4.4.4 ACPI Setting



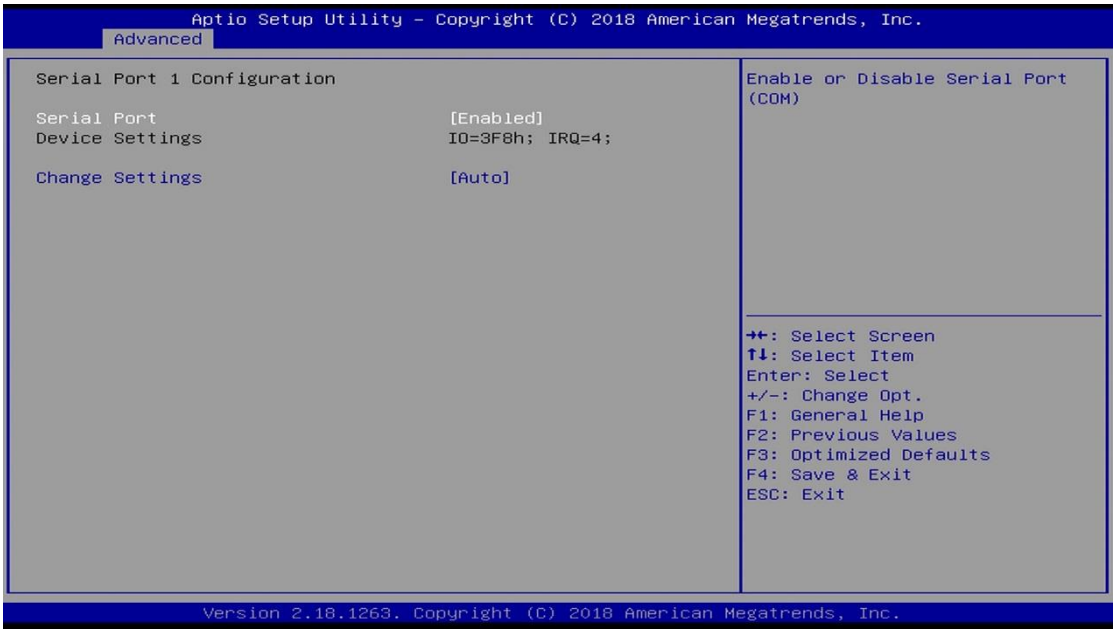
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Selects an ACPI sleep state (Suspend Disabled or S3) where the system will enter when the Suspend button is pressed.

4.4.5 F81846 Super IO Configuration



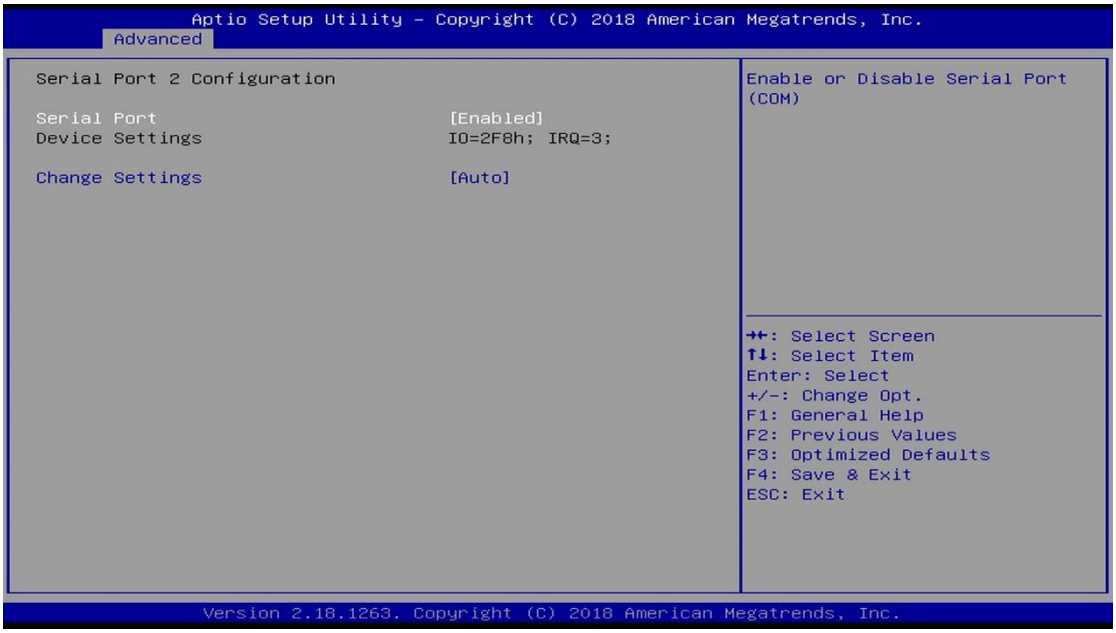
BIOS Setting	Description
Serial Port Configuration	Sets parameters of Serial Ports (COMA). Enables / Disables the serial port and select an optimal setting for the Super IO device.
Power Failure	Set parameters of Serial Port 1 (COMA).

4.4.5.1. Serial Port 1 Configuration



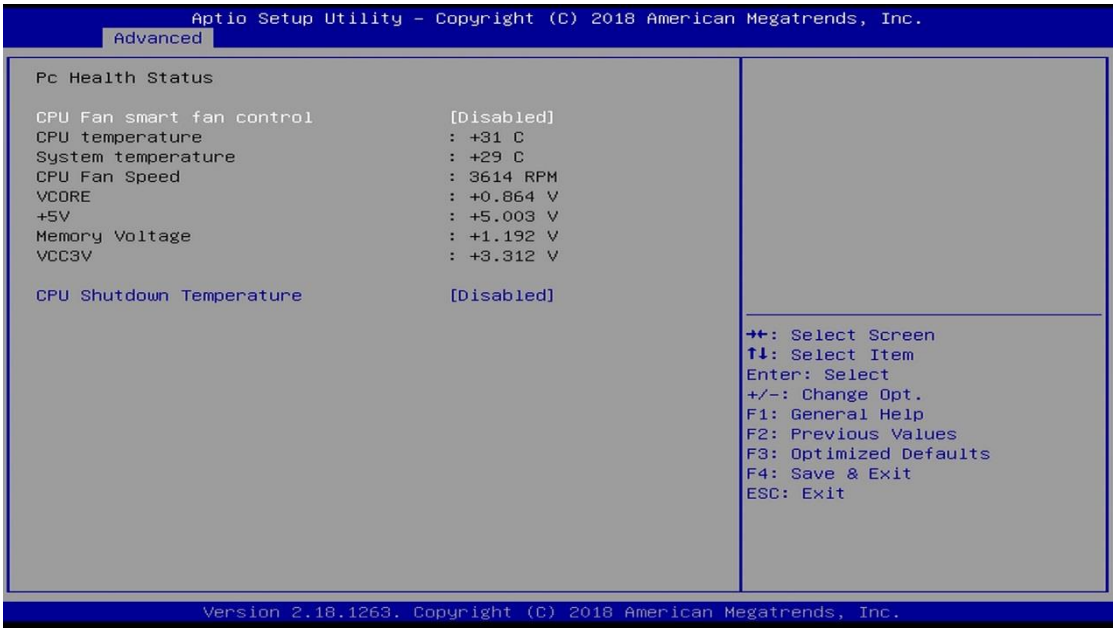
BIOS Setting	Description
Serial Port	Sets parameters of Serial Ports (COMA).
Change Settings	Selects an optimal settings for Super IO device. Options: • Auto • IO = 3F8h; IRQ = 4 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12

4.4.5.2. Serial Port 2 Configuration



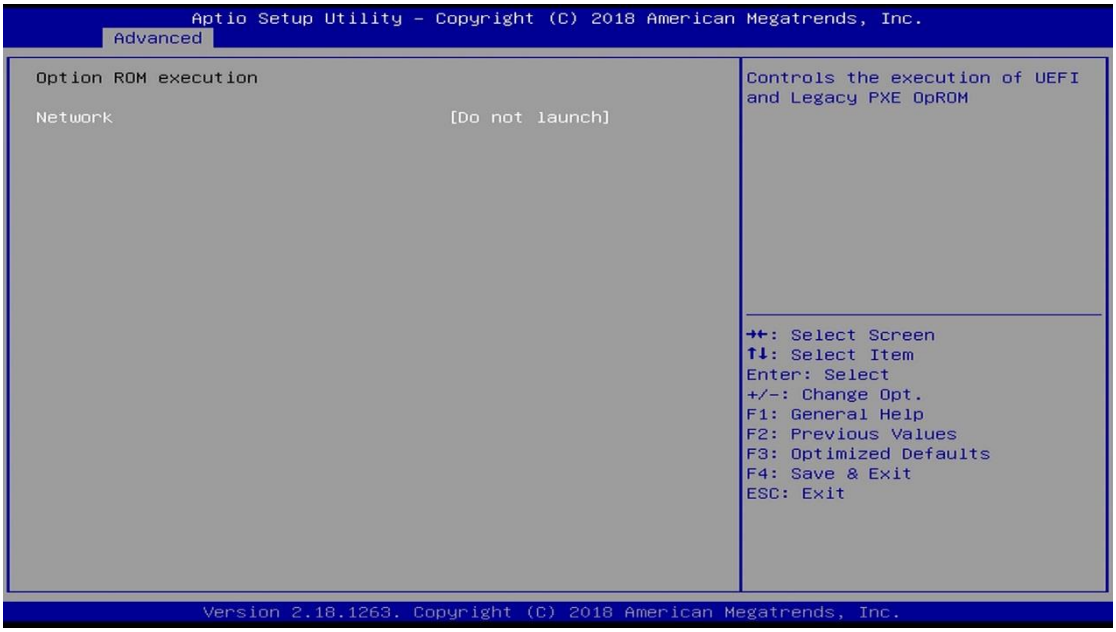
BIOS Setting	Description
Serial Port	Sets parameters of Serial Ports (COMA).
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 2F8h; IRQ = 3 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12

4.4.6 Hardware Monitor



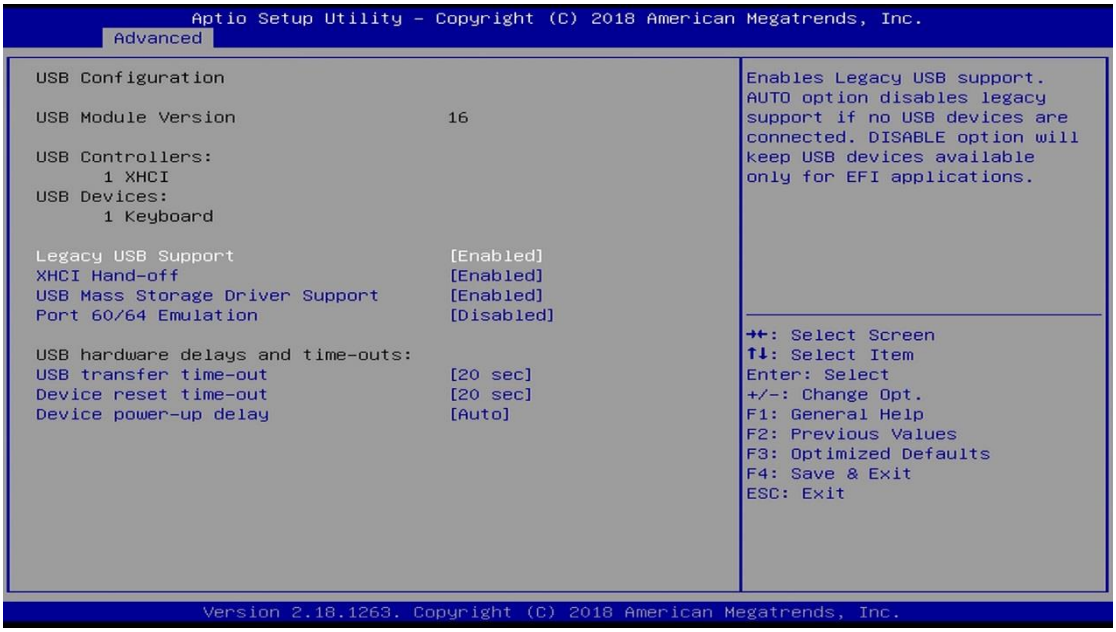
BIOS Setting	Description
CPU Fan Smart Fan Control	Selects the smart fan mode. Options: Disabled, 50°C, 60°C, 70°C, 80°C
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.
CPUShutdown Temperature	This field enables or disables the Shutdown Temperature Options: Disabled, 70°C, 75°C, 80°C, 85°C, 90°C, 95°C

4.4.7 CSM Configuration



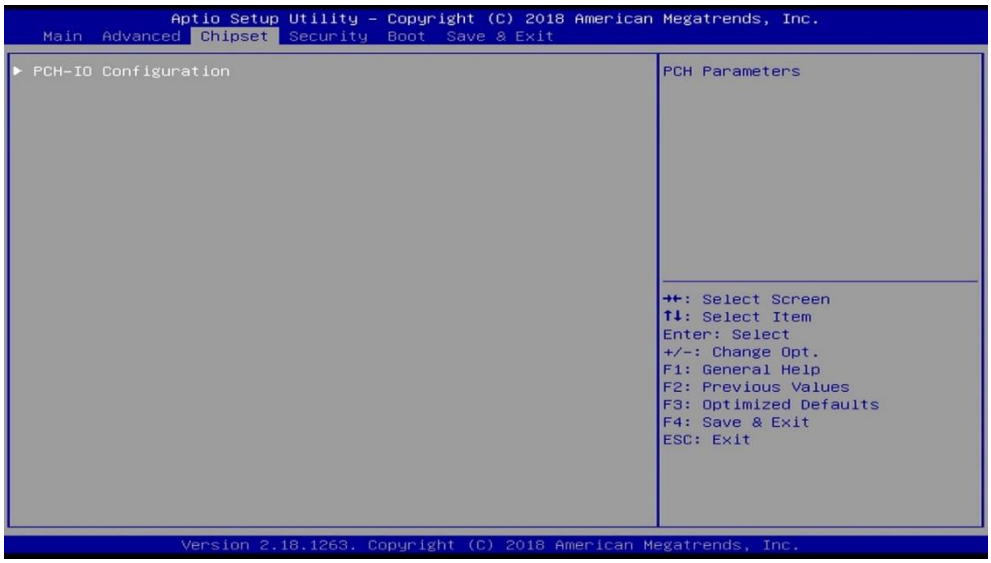
BIOS Setting	Description
Network	Controls the execution of UEFI and Legacy PXE OpROM. Options: Do not launch, Legacy

4.4.8 USB Configuration



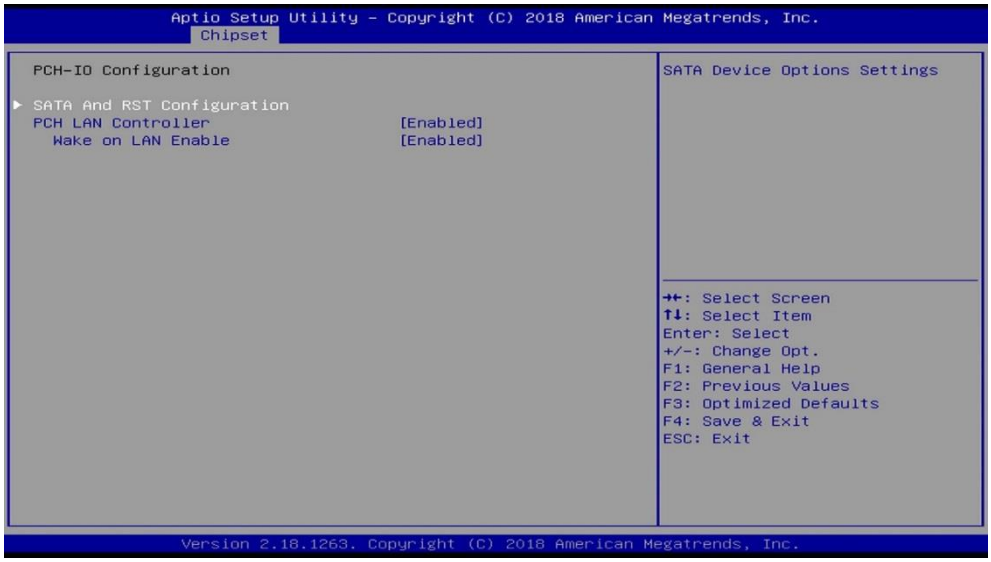
BIOS Setting	Description
Legacy USB SUpport	• **Enable:** Enables Ledacy USB Support. • **Auto:** Disables legacy support if no USB devices are connected. • **Disable:** Keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI / EHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
Port 60/64 Emulation	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB Transfer time-out	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	Seconds of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. “Auto” uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor.

4.5 Chipset Settings



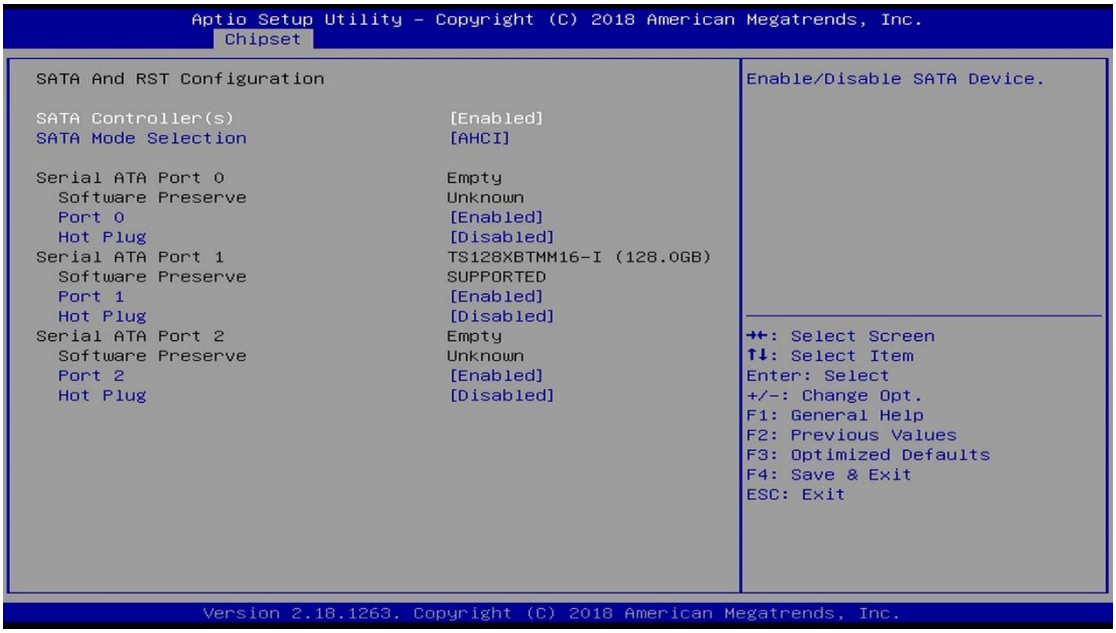
BIOS Setting	Description
PCH-IO Configuration	Shows PCH parameters

4.5.1 PCH-IO Configuration



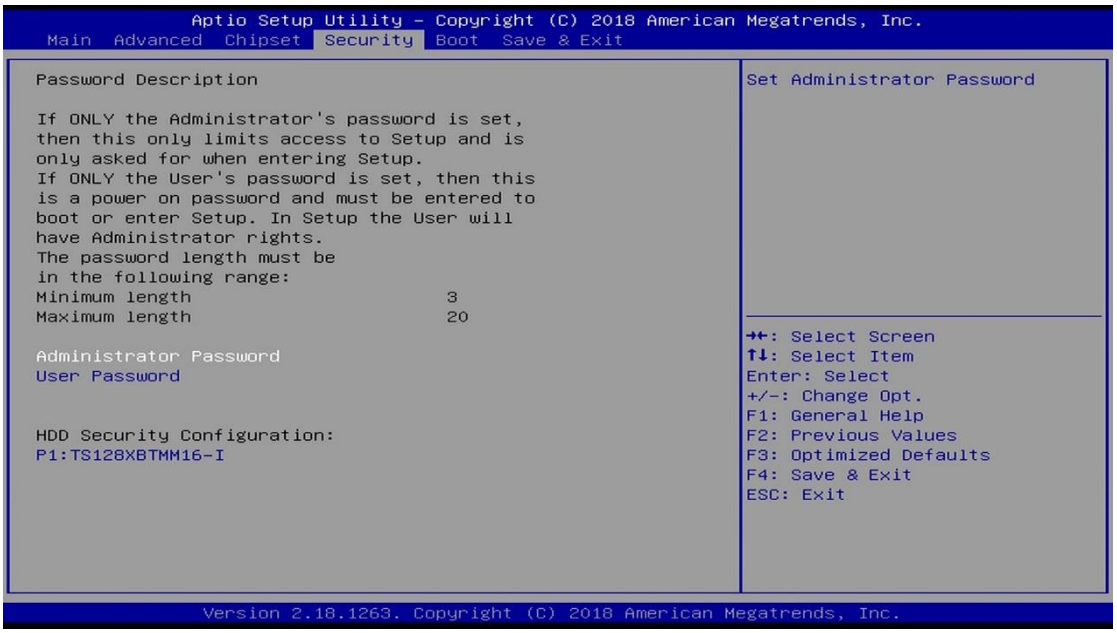
BIOS Setting	Description
SATA and RST Configuration	Shows SATA device options settings.
PCH LAN Controller	Enables / Disables onboard NIC.
Wake on LAN Enable	Enables / Disables integrated LAN to wake to system.

4.5.1.1. SATA and RST Configuration



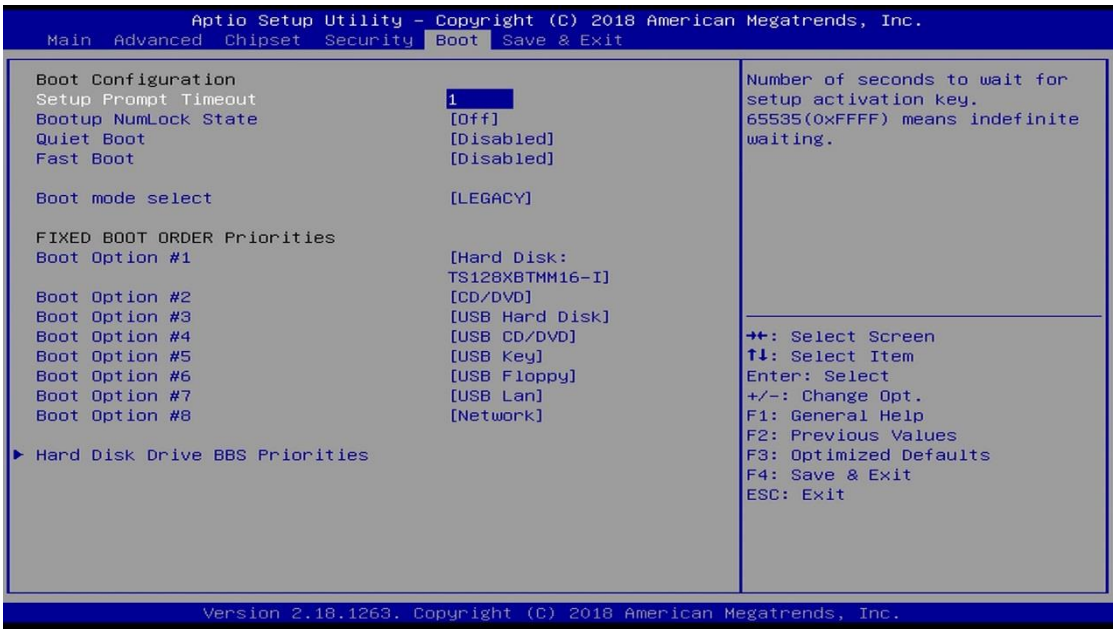
BIOS Setting	Description
SATA Controller(s)	Enables / Disables SATA devices.
SATA Mode Selection	Determines how the SATA controller(s) operate. Options: AHCI Mode, Intel RST Premium
Serial ATA Ports	Enables / Disables Serial Ports.
Hot Plug	Designates this port as Hot Pluggable.

4.6 Security Settings



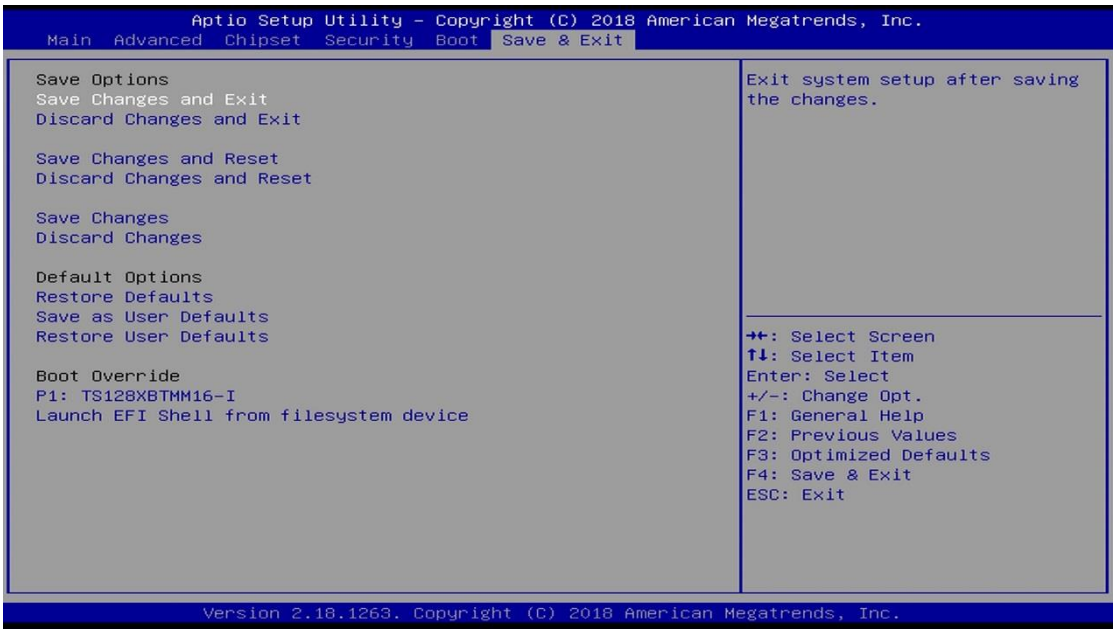
BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.

4.7 Boot Settings



BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Fast Boot	Enables / Disables boot with initialization of a minimal set of devices required to launch the active boot option. There no effect for BBS boot options.
Boot Mode Select	Selects a Boot mode.
Boot Option Priorities	Sets the system boot order priorities for hard disk, CD/DVD, USB, Network.

4.8 Save & Exit Settings



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

Appendix

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

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

A. I/O Port Address Map

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

Address	Device Description
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2) * COM2 comes from the optional docking kit.
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM3)
0x00000000-0x00000CF7	PCI Express Root Complex

Address	Device Description
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F000-0x0000F03F	Intel(R) HD Graphics 620
0x000003B0-0x000003BB	Intel(R) HD Graphics 620
0x000003C0-0x000003DF	Intel(R) HD Graphics 620
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00001854-0x00001857	Motherboard resources
0x0000F040-0x0000F05F	Mobile 6th/7th Generation Intel(R) Processor Family I/O SMBUS - 9D23
0x0000FF00-0x0000FFFE	Motherboard resources
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x0000F090-0x0000F097	Standard SATA AHCI Controller
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F060-0x0000F07F	Standard SATA AHCI Controller

B. Interrupt Request Lines (IRQ)

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

Level	Function
IRQ 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2) * COM2 comes from the optional docking kit.
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 8	System CMOS/real time clock
IRQ 11	PCI Device
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131
IRQ 12	Microsoft PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 14	Motherboard resources
IRQ 16	High Definition Audio Controller
IRQ 17	Qualcomm Atheros AR946x Wireless Network Adapter
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967289	Intel(R) Management Engine Interface
IRQ 4294967290	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967291	Intel(R) HD Graphics 530
IRQ 4294967292	Intel(R) Ethernet Connection (2) I219-V
IRQ 4294967293	Standard SATA AHCI Controller
IRQ 4294967294	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115

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.

Sample Code:

```
//---------------------------------------------------------------------------
//
// 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 "F81846.H"
//---------------------------------------------------------------------------
int main (int argc, char *argv[]); void EnableWDT(int);
void DisableWDT(void);
//---------------------------------------------------------------------------
int main (int argc, char *argv[])
{
unsigned char bBuf; unsigned char bTime; char **endptr;

char SIO;
printf("Fintek 81846 watch dog program\n"); SIO = Init_F81846();
if (SIO == 0)
{
printf("Can not detect Fintek 81846, program abort.\n"); return(1);
}//if (SIO == 0)

if (argc != 2)
{
printf(" Parameter incorrect!!\n"); return (1);
}

bTime = strtol (argv[1], endptr, 10);
printf("System will reset after %d seconds\n", bTime);

if (bTime)
{       EnableWDT(bTime);    } else
{       DisableWDT();   } return 0;
}
```

```
//-------------------------------------------------------------------------
void EnableWDT(int interval)
{
unsigned char bBuf;

bBuf = Get_F81846_Reg(0x2B); bBuf &= (~0x20);
Set_F81846_Reg(0x2B, bBuf);   //Enable WDTO

Set_F81846_LD(0x07);      //switch to logic device 7
Set_F81846_Reg(0x30, 0x01);   //enable timer

bBuf = Get_F81846_Reg(0xF5); bBuf &= (~0x0F);
bBuf |= 0x52;
Set_F81846_Reg(0xF5, bBuf);           //count mode is second  Set_F81846_Reg(0xF6,
interval);    //set timer
bBuf = Get_F81846_Reg(0xFA); bBuf |= 0x01;
Set_F81846_Reg(0xFA, bBuf);   //enable WDTO output

bBuf = Get_F81846_Reg(0xF5); bBuf |= 0x20;
Set_F81846_Reg(0xF5, bBuf);   //start counting
}
//-------------------------------------------------------------------------
void DisableWDT(void)
{
unsigned char bBuf;
Set_F81846_LD(0x07);      //switch to logic device 7  bBuf = Get_F81846_Reg(0xFA);
bBuf &= ~0x01;
Set_F81846_Reg(0xFA, bBuf);   //disable WDTO output

bBuf = Get_F81846_Reg(0xF5); bBuf &= ~0x20;
bBuf |= 0x40;
Set_F81846_Reg(0xF5, bBuf);   //disable WDT
}
//-------------------------------------------------------------------------
```

```
//---------------------------------------------------------------------------
//
// 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 "F81846.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int F81846_BASE; void Unlock_F81846 (void); void Lock_F81846 (void);
//---------------------------------------------------------------------------
unsigned int Init_F81846(void)
{
unsigned int result; unsigned char ucDid;

F81846_BASE = 0x4E;
result = F81846_BASE;

ucDid = Get_F81846_Reg(0x20);
if (ucDid == 0x07)      //Fintek 81846
{       goto Init_Finish; }

F81846_BASE = 0x2E;
result = F81846_BASE;

ucDid = Get_F81846_Reg(0x20);
if (ucDid == 0x07)      //Fintek 81846
{       goto Init_Finish; }

F81846_BASE = 0x00;
result = F81846_BASE;

Init_Finish:
return (result);
}
//---------------------------------------------------------------------------
void Unlock_F81846 (void)
{
outportb(F81846_INDEX_PORT, F81846_UNLOCK); outportb(F81846_INDEX_PORT,
F81846_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81846 (void)
{
outportb(F81846_INDEX_PORT, F81846_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81846_LD( unsigned char LD)
{
Unlock_F81846();
outportb(F81846_INDEX_PORT, F81846_REG_LD);
outportb(F81846_DATA_PORT, LD);  Lock_F81846();
```

```
}
//---------------------------------------------------------------------------
void Set_F81846_Reg( unsigned char REG, unsigned char DATA)
{
Unlock_F81846(); outportb(F81846_INDEX_PORT, REG); outportb(F81846_DATA_PORT,
DATA); Lock_F81846();
}
//---------------------------------------------------------------------------
unsigned char Get_F81846_Reg(unsigned char REG)
{
unsigned char Result; Unlock_F81846();
outportb(F81846_INDEX_PORT, REG); Result = inportb(F81846_DATA_PORT);
Lock_F81846();
return Result;
}
//---------------------------------------------------------------------------
```

```
//---------------------------------------------------------------------------
//
// 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       F81846_H
#define        F81846_H     1
//---------------------------------------------------------------------------
#defineF81846_INDEX_PORT   (F81846_BASE)
#defineF81846_DATA_PORT    (F81846_BASE+1)
//---------------------------------------------------------------------------
#defineF81846_REG_LD   0x07
//---------------------------------------------------------------------------
#define F81846_UNLOCK  0x87
#defineF81846_LOCK       0xAA
//---------------------------------------------------------------------------
unsigned int Init_F81846(void);
void Set_F81846_LD( unsigned char);
void Set_F81846_Reg( unsigned char, unsigned char); unsigned char
Get_F81846_Reg( unsigned char);
//---------------------------------------------------------------------------
#endif //      F81846_H
```