AMS300
AMS301
AMS302
Compact Expandable Fanless System

User's Manual

Version 1.0
(Oct. 2017)

iBASE

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Copyright

Disclaimer

Trademarks

Compliance

C E

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

AMS300 has been tested and found to comply with the limits for a Class B device, and AMS301 & AMS302 comply with those for a Class A device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

WEEE

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

Green IBASE

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

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

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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 -10°C ~ 50°C.
- DO NOT LEAVE THIS DEVICE IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20°C OR ABOVE 80°C. This could damage the device. The device must be used in a controlled environment.

Care for your IBASE products:

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

 WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on your device.
- Do not place heavy objects on the top of the device.
- Operate this device from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your distributor or local power company.
- Ensure that you apply correctly the power supply voltage.
- 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

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

⚠️ **CAUTION**

Danger of explosion if internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

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, storage device, 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.

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Chapter 1
General Information

The information provided in this chapter includes:

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

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1.1   Introduction

The AMS300 / AMS301 / AMS302 is a product series of IBASE embedded computing system, applicable to thin clients, smart industrial automation or controller, and retail equipment. It is a compact and fanless design with an Intel® 7th / 6th Gen. Core™ i7 / i5 / i3 desktop processor. This product series also features iSmart that allows the device capable of auto-scheduling for general applications and gives energy savings on power. It is able to be operated at the ambient operating temperature ranging from -10 ~ 50 °C, and even from
-20 ~ 80 °C for storage.

Photo of AMS300

1.2   Features

- Compact fanless system supports IBASE MB300 customized board
- Onboard Intel® 7th / 6th Gen. Core™ i7 / i5 / i3 processors
- Two independent display outputs
- Flexible expansion slot system
- Removable SSD drive bay with RAID 0/1 supported
- Optional 2 MB MRAM module
- Over / Under / Reverse voltage protection
- Wall mount and DIN rail mount compatibility
- iSmart, iAMT 11.6
- 1 x mini-PCIe for AMS300 / 301 / 302
- 2 x PCIe (x8 & x4) for AMS302 only
- Fieldbus module expansion for AMS301 only

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.

AMS300

- AMS300   x 1
- Terminal Block for DC-In Power Adapter (3 pins)   x 1
- Terminal Block for Remote Power Button (2 pins)   x 1
- Wall Mount Kit   x 1
- Round Head Screw (for Wall Mount Kit)   x 4

- Disk (including drivers and this user manual)   x 1

AMS301

- AMS301   x 1
- Terminal Block for DC-In Power Adapter (3 pins)   x 1
- Terminal Block for Remote Power Button (2 pins)   x 1
- Wall Mount Kit   x 1
- Round Head Screw (for Wall Mount Kit)   x 6

- Disk (including drivers and this user manual)   x 1

AMS302

- AMS302   x 1
- Terminal Block for DC-In Power Adapter (3 pins)   x 1
- Terminal Block for Remote Power Button (2 pins)   x 1
- Wall Mount Kit   x 1
- Round Head Screw (for Wall Mount Kit)   x 6

- Disk (including drivers and this user manual)   x 1

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1.4 Optional Accessories

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

- DC-In Power Adapter
- Power Cord
- WiFi Antenna Kit
- Side Mount Bracket
- DIN Rail Bracket
- Cable kit for 2nd SSD Assembly (including 4 screws, and a SATA cable)
- Bracket for fieldbus module (for AMS301 only)

(Profinet module)   (Profibus module)

1.5 Specifications

Product Name	AMS300	AMS301	AMS302
System			
Motherboard	MB300		
Operating System	• Windows10 (64-bit) / 7 (32-bit & 64-bit) • Linux Ubuntu / Fedora		
CPU	Intel® 7th / 6th Gen. Core™ i7 / i5 / i3 Desktop Processor TDP = 35W		
CPU Speed	Up to 3.4 GHz		
Chipset	Intel® Q170		
Memory	2 x DDR4-2133 SO-DIMM 4GB, expandable to 32 GB (Non-ECC)		
Storage	• 2.5" SSD (1 slot) • mSATA (1 slot)	• 2.5" SSD (2 slots) • mSATA (1 slot)	• 2.5" SSD (2 slot) • mSATA (1 slot)
Super I/O	Fintek F81846AD-I		
Audio Codec	Realtek ALC662		
Network	• Intel® I219LM GbE PHY • Intel® I211AT GbE		
Power Supply	DC-In 24V (3-pin terminal block)		
BIOS	AMI BIOS		
Watchdog	Watchdog Timer 256 segments, 0, 1, 2…255 sec/min		
iSmart	Yes		
iAMT	11.6		
Chassis	Aluminum & steel, silver		
Mounting	• Desktop mount / Wall mount (wall mount kit included) • DIN rail mount (optional)		
Dimensions (W x H x D)	275 x 75 x 140 mm (10.83" x 2.95" x 5.51")	275 x 113 x 140 mm (10.83" x 4.45" x 5.51")	
Weight	2.7 kg (lb)	3.1 kg (lb)	3.3 kg (lb)
Certificate	CE / LVD / FCC Class B		
I/O Ports			
Remote Power Button	2-pin terminal block for the external, remote power button		

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Product Name	AMS300	AMS301	AMS302
DC Input	24V DC-in through a 3-pin terminal block		
LAN	2 x RJ45 GbE LAN		
USB	• 4 x USB 3.0 • 2 x USB 2.0		
Serial	**2 x COM ports:** • COM1: RS-232/422/485, selectable from BIOS • COM2: RS-232 only		
Digital I/O	4-In & 4-Out (Optional)		
Display	• 1 x DVI-I • 2 x DisplayPort		
Audio Jack	1 x Line-Out		
SSD	1 x 2.5" SSD bay	2 x 2.5" SSD bay	2 x 2.5" SSD bay
SATA	2 x SATA III connector		
Expansion	• 1 x Mini-PCIe (full-size)	• 4 x Mini-PCIe (full-size, 1 on board, 3 from PCIe riser card)	• 1 x Mini-PCIe (full-size) • 1 x PCIe (x8) • 1 x PCIe (x4)
Environment			
Temperature	• **Operating:** -10 ~ 60 °C (14 ~ 140 °F) with air flow -10 ~ 50 °C (14 ~ 122 °F) • **Storage:** -20~ 80 °C (-4 ~ 176 °F)		
Relative Humidity	5 ~ 90% at 45 °C (non-condensing)		
Vibration Protection	Shinewave tests: • **Operating:** 0.25 Grms / 5 ~ 500 Hz • **Non-operating:** 1 Grms / 5 ~ 500Hz		
Shock Protection	• **Operating:** 20 g / 11 ms • **Non-operating:** 40 g / 11 ms		

All specifications are subject to change without prior notice.

1.6 Overview – AMS300

Front View
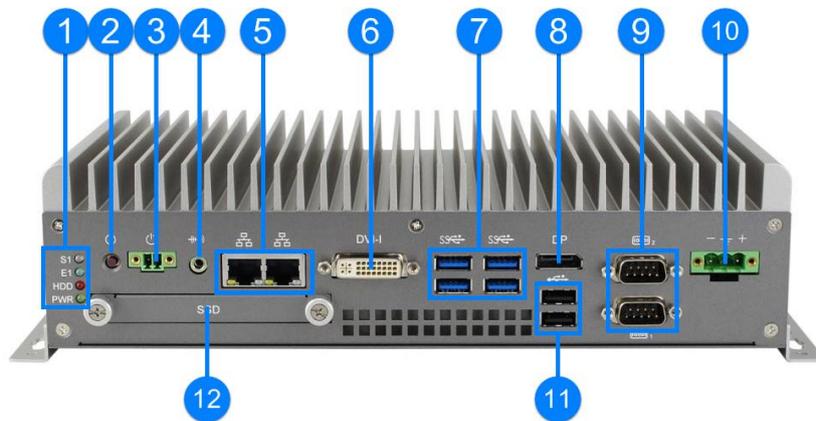
Rear View
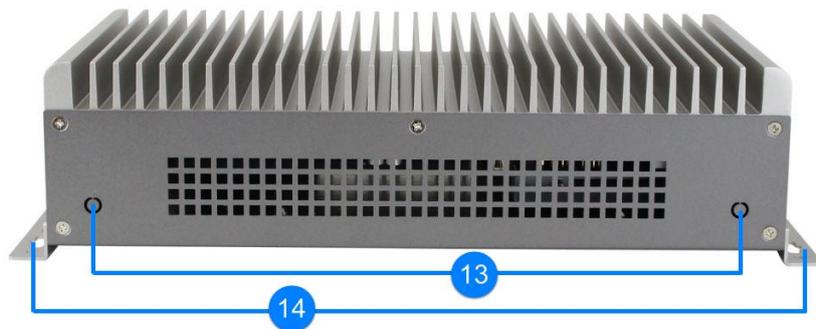
No.	Name	No.	Name
1	LED Indicator (from top to bottom: S1*, E1*, SSD, Power)	8	DisplayPort
2	Power Button	9	COM Ports (COM1 RS-232/422/485, COM2 RS-232)
3	Terminal Block for Remote Power Button (2 pins)	10	DC-In Power Connector (3 pins)
4	Audio Jack for Line-Out	11	USB 2.0 Ports
5	GbE LAN Ports	12	SSD Drive Bay
6	DVI-I Port	13	Antenna Holes
7	USB 3.0 Ports	14	Wall Mount Kit

* The LED indicators S1 (for status) and E1 (for errors) are configurable by users.

⚠️ Be cautious of the hot surface when using the device.

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Wall Mount

DIN Rail Mount

Side Mount

1.7 Overview – AMS301

Front View

Rear View

No.	Name	No.	Name
1	LED Indicator (from top to bottom: S1*, E1*, SSD, Power)	9	COM Ports (COM1 RS-232/422/485, COM2 RS-232)
2	Power Button	10	DC-In Power Connector (3 pins)
3	Terminal Block for Remote Power Button (2 pins)	11	USB 2.0 Ports
4	Audio Jack for Line-Out	12	Fieldbus Module Doors
5	GbE LAN Ports	13	SSD Drive Bay
6	DVI-I Port	14	Antenna Holes
7	USB 3.0 Ports	15	Wall Mount Kit
8	DisplayPort		

* The LED indicators S1 (for status) and E1 (for errors) are configurable by users.

⚠ Be cautious of the hot surface when using the device.

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Wall Mount

DIN Rail Mount

Side Mount

1.8 Overview – AMS302

Front View

Rear View

No.	Name	No.	Name
1	LED Indicator (from top to bottom: S1*, E1*, SSD, Power)	9	COM Ports (COM1 RS-232/422/485, COM2 RS-232)
2	Power Button	10	DC-In Power Connector (3 pins)
3	Terminal Block for Remote Power Button (2 pins)	11	USB 2.0 Ports
4	Audio Jack for Line-Out	12	SSD Drive Bay
5	GbE LAN Ports	13	Expansion Card Cable Organizer
6	DVI-I Port	14	Antenna Holes
7	USB 3.0 Ports	15	Wall Mount Kit
8	DisplayPort		

* The LED indicators S1 (for status) and E1 (for errors) are configurable by users.

⚠ Be cautious of the hot surface when using the device.

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Wall Mount

DIN Rail Mount

Side Mount

1.9 Dimensions – AMS300

Unit: mm

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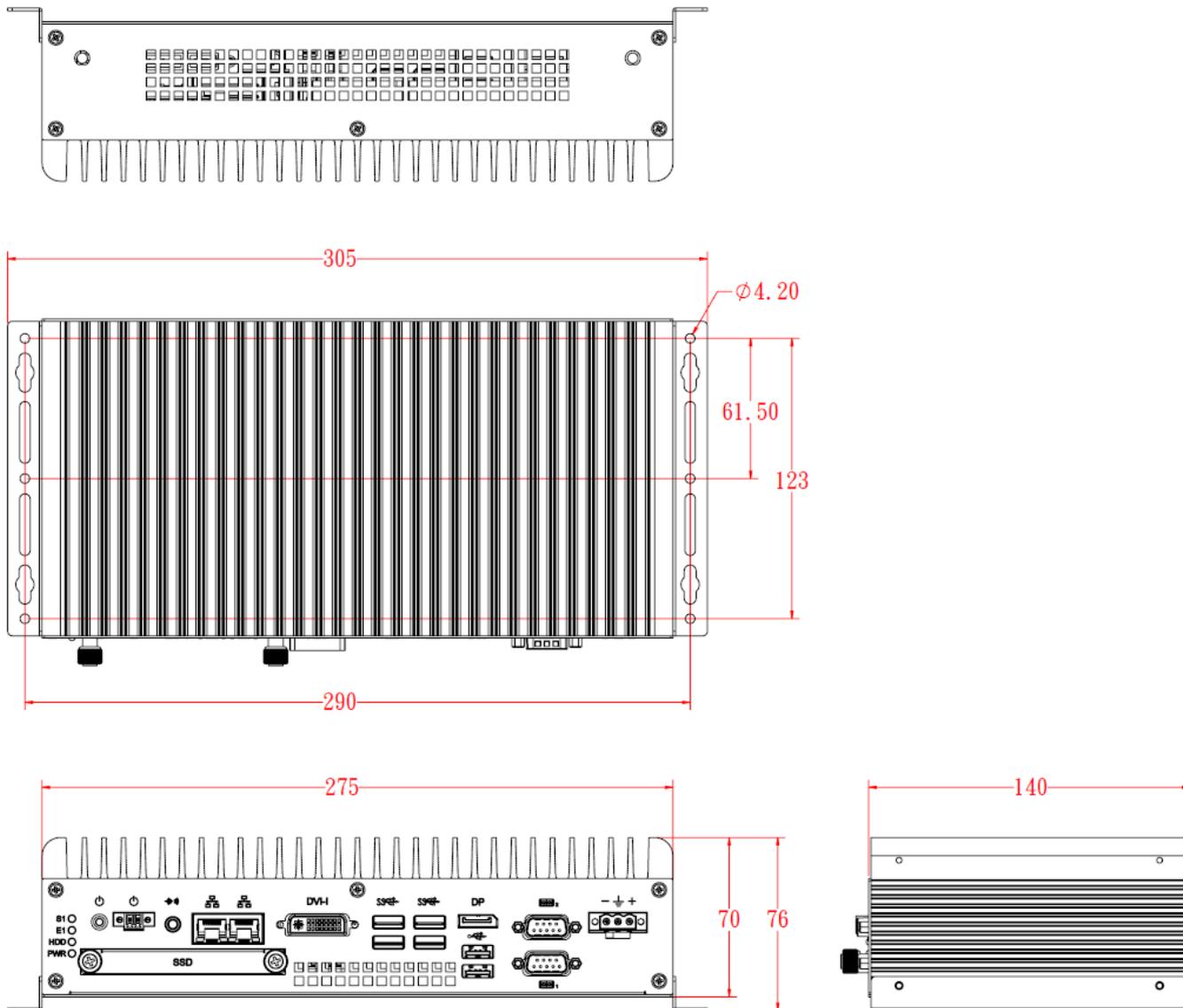
1.10 Dimensions – AMS301

Unit: mm
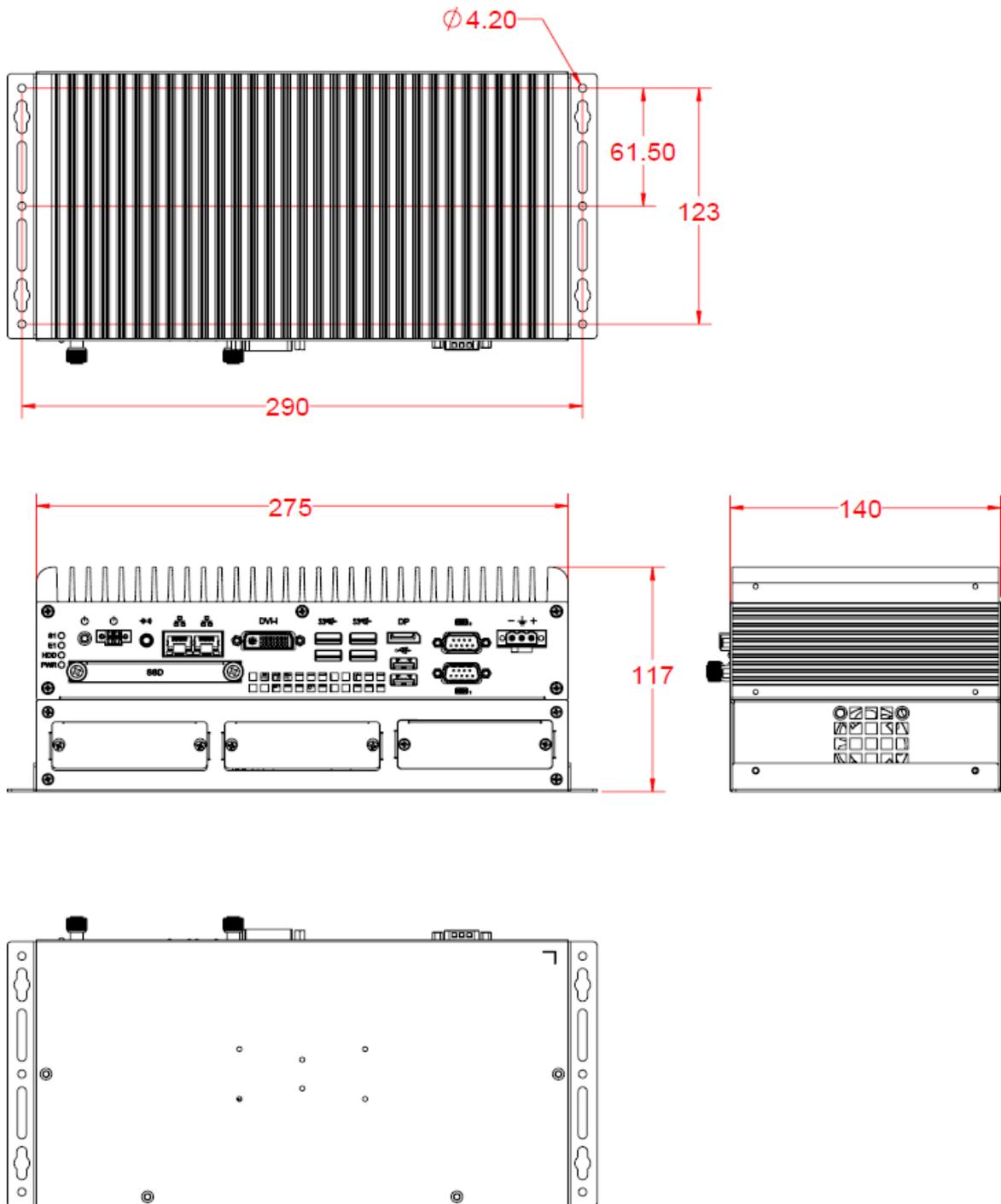
1.11 Dimensions – AMS302

Unit: mm
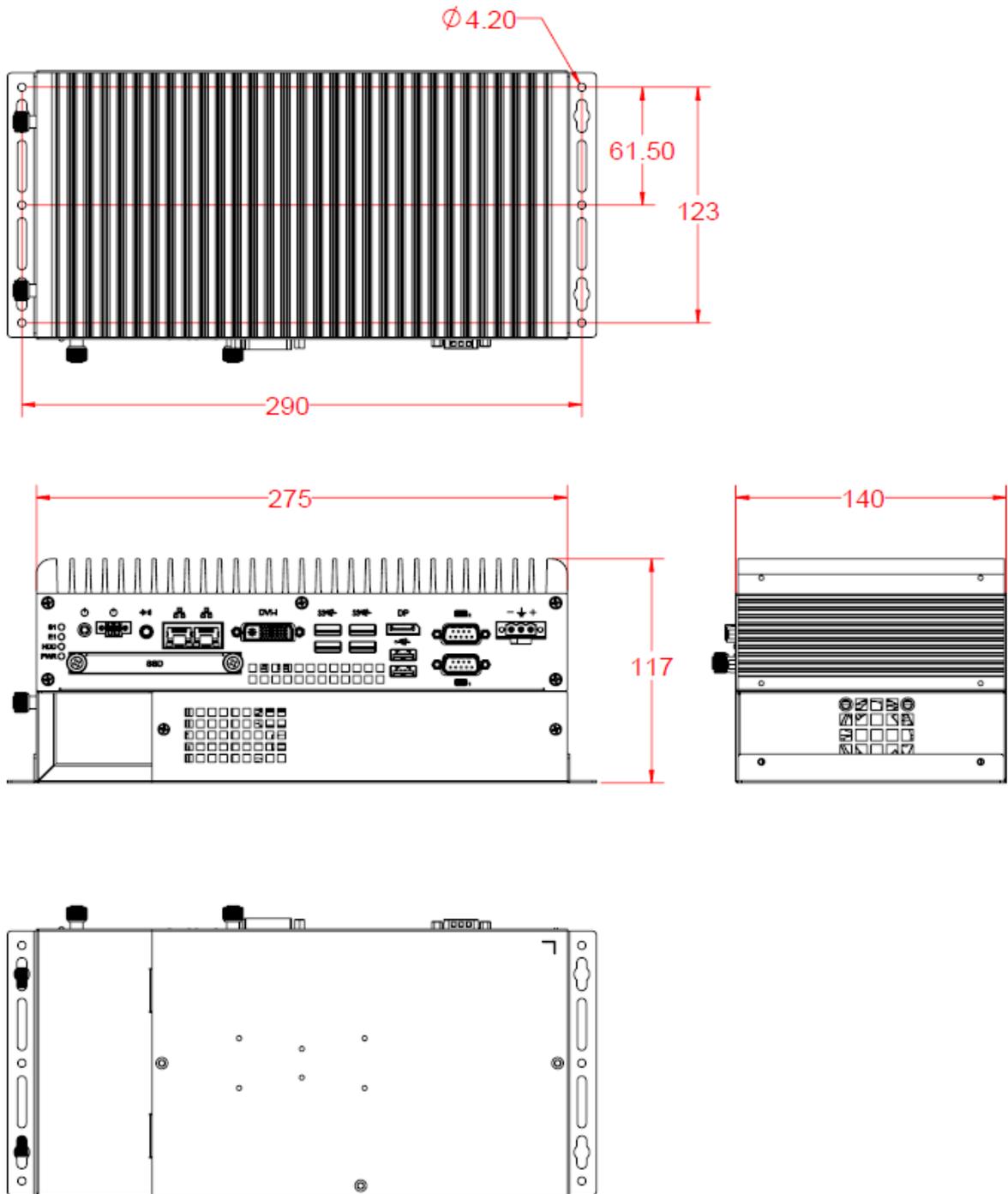
Chapter 2
Hardware Configuration

The information provided in this chapter includes:

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

2.1   Essential Installations Before You Begin

You need to disassemble the device bottom cover for the installation / replacement of memory module cards CPU, and fieldbus modules and expansion cards except for the 1st SSD. After installation. After installations, secure the device bottom cover back.

Note:

1. Fieldbus modules are only applicable for AMS301.

2. Expansion cards are only applicable for AMS302.

AMS300:   Release 5 screws on the rear side of the device and 5 screws on the bottom.
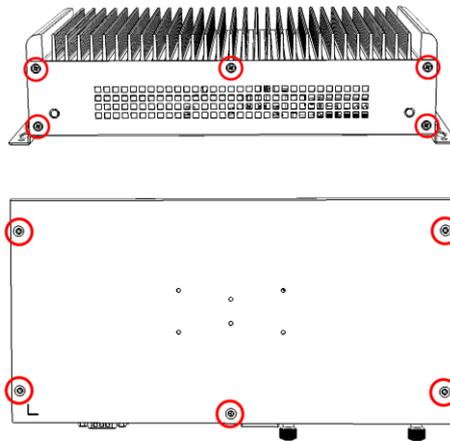
AMS301:   Release 4 screws on the front side of the device and 4 screws on the bottom.

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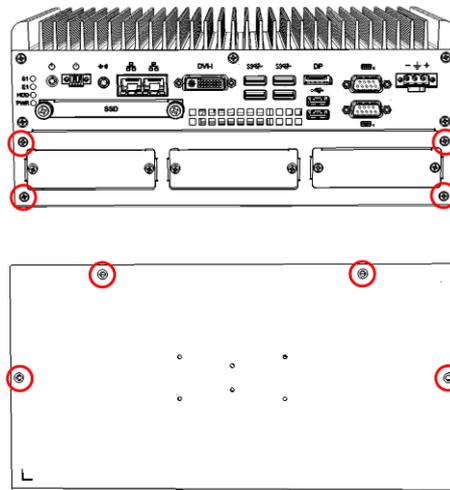
AMS302: Release 2 screws on the lower front side of the device and 3 screws on the bottom.
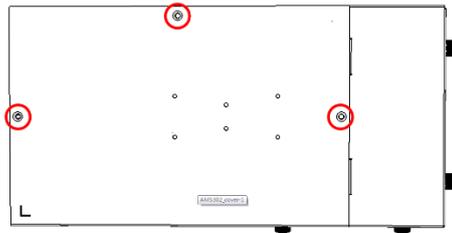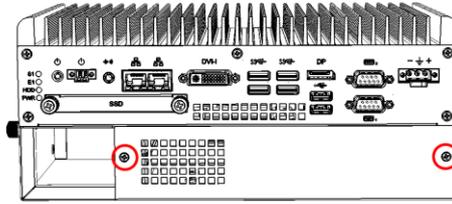
2.1.1 Memory Installation / Replacement

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

1. Locate the memory slots in your device.

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

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

4. Gently push the module in an upright position until the ejector tabs of the memory slot close to hold the module in place when the module touches the bottom of the slot.
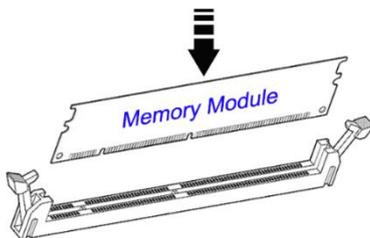
To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

2.1.2   SSD Installation

To install or replace the SSD, follow the instructions below for installation. This is illustrated by the example of AMS300.

1st SSD:

1. Release 2 screws to pull out the SSD tray.
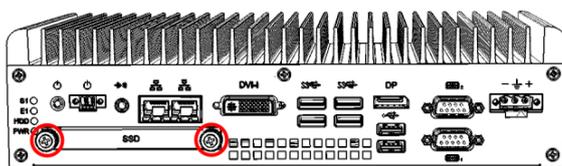
2. Put your 2.5" SSD into the tray and secure it with the supplied 4 screws
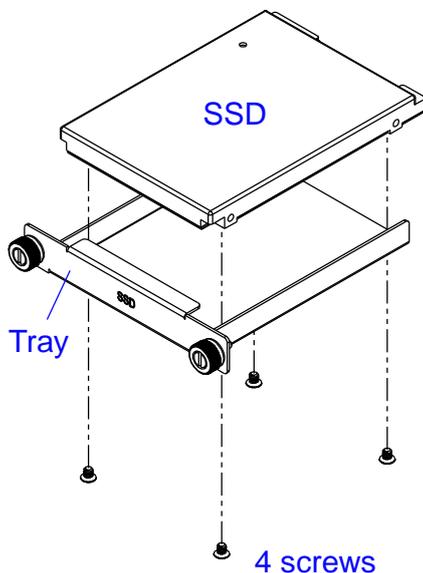
3. Put and secure the tray back to the device.

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2nd SSD:

1. Release 2 screws to pull out the SSD tray.
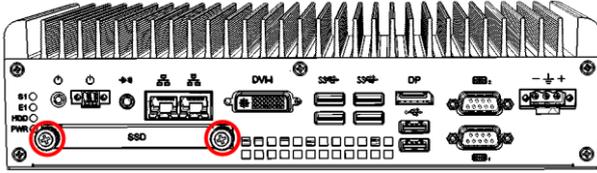
2. Disassemble the device bottom cover as mentioned in the section 2.1 and release 4 screws below to take out the bracket.
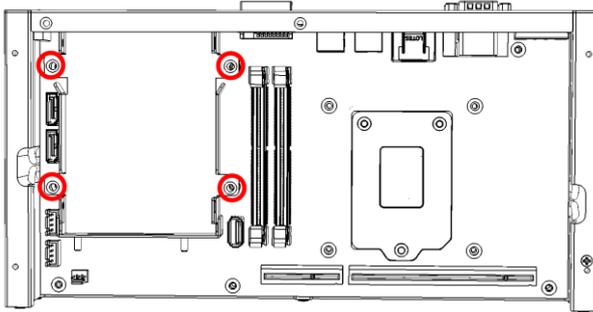
3. Install the 2nd SSD onto the bracket, secure it with 4 screws as pointed by arrows below.
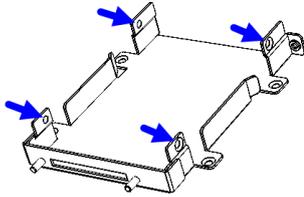
4. Then secure the bracket and put the tray back to the device.
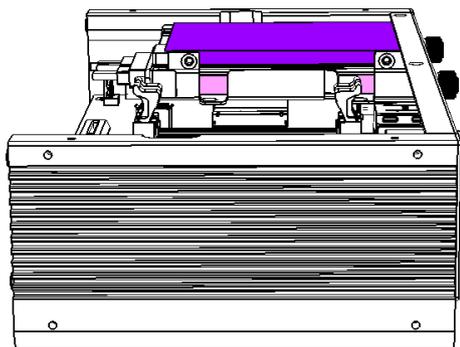
The 2nd HDD/SSD
The 1st HDD/SSD

Note: The screws and cables for the 2nd SSD can be optionally purchased from IBASE.

2.1.3   Mini-PCIe Network Cards Installation

After disassembling the bottom cover, follow the instructions

AMS300 / AMS301:

1. Remove the SSD tray by releasing two screws below.

2. Then release the 4 screws below to take out the bracket.
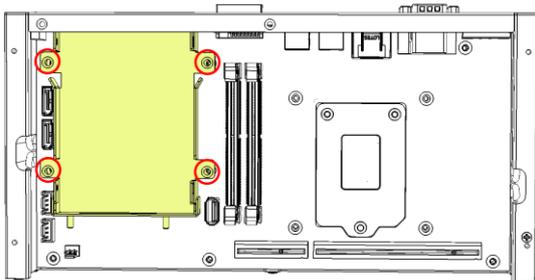
AMS302:

1. Remove the SSD tray by releasing 2 screws below.

2. Disassemble the expansion bracket by releasing the 8 screws below.
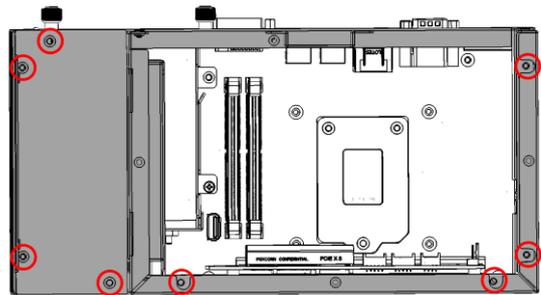
Then release the 4 screws below to take out the bracket.
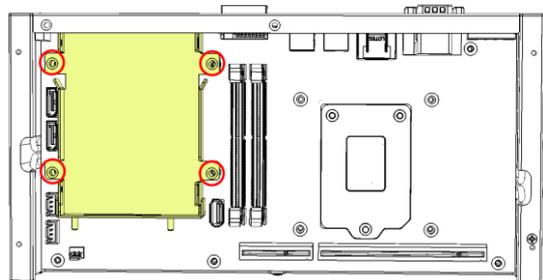
3. Locate the mini-PCIe slot, align the key of the mini-PCIe card to the interface, and insert the card slantwise.
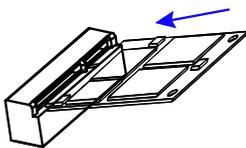
4. Push the mini-PCIe card down, fix it with the supplied 2 flat head screws for full-sized card and with one screw for half-sized card.

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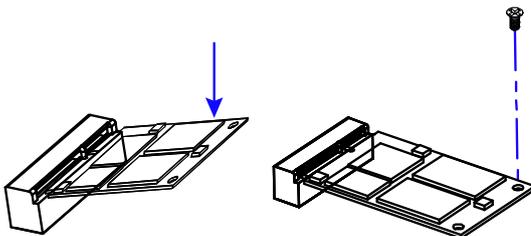
2.1.4 WiFi / 3G / 4G Antenna Installation

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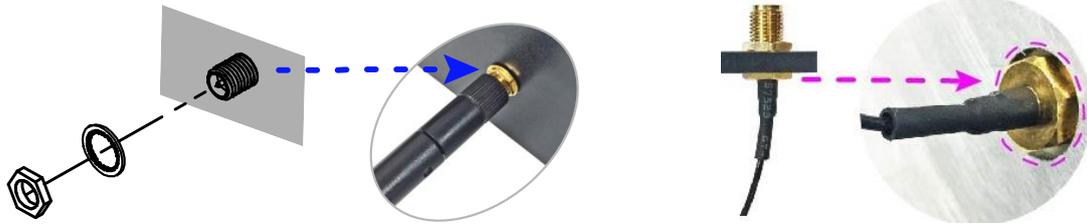
Info: The diameter of the nut is around 6.35 mm (0.25"-36UNC).

2.1.5   Expansion Card Installation

Note: Only AMS302 supports expansion card slots.

1. After disassembling the device bottom cover, loosen two screws below to remove the cable organizer.
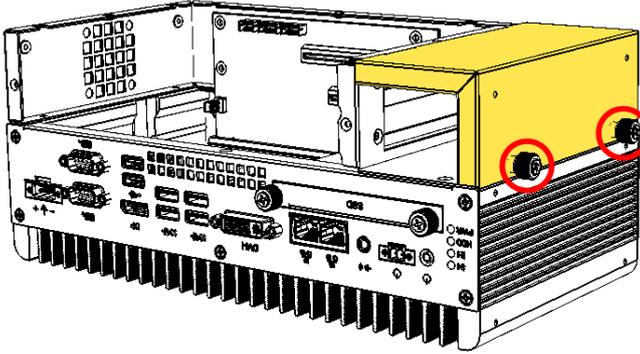
2. Remove the expansion slot fillers by releasing the two screws below.
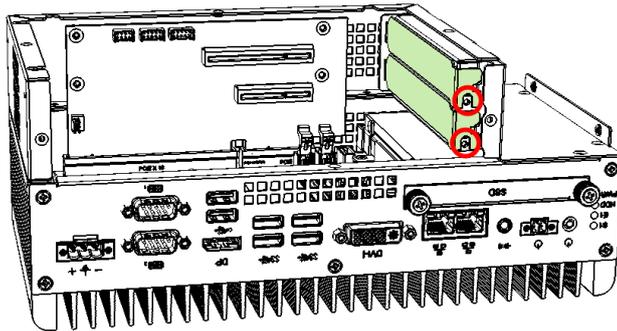
3. Install the expansion cards and fix with the screws mentioned in step 2. Then secure the cable organizer back.

4. Then secure the device bottom cover back, The rubber inside the bottom cover firmly fixes the expansion cards and prevents the cards from coming off the PCIe slots.

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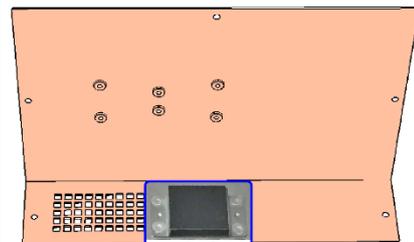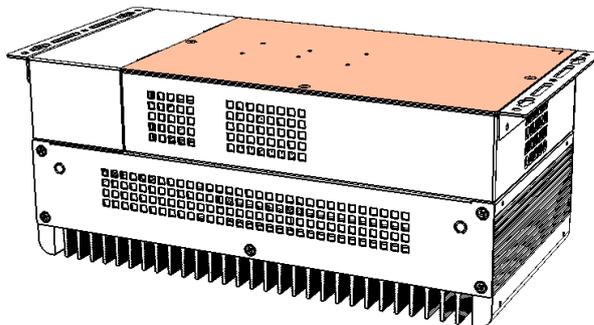
2.1.6 Mounting Installation

Note: Before mounting the system on wall, ensure that you are following all applicable building and electric codes.

Requirements

When mounting, ensure that you have enough room for power and signal cable routing, and have good ventilation for power adapter. The method of mounting must be able to support weight of the device plus the suspension weight of all the cables to be attached to the system. Use the following methods for mounting your system:

Selecting the Location

Plan the mounting location thoroughly. Locations such as walkway areas, hallways, and crowded areas are not recommended. Mount the product to a flat, sturdy, structurally sound column or wall surface.

The best mounting surface is a standard countertop, cabinet, table, or other structure that is minimally the width and length of the product. This will reduce the risk that someone may accidentally wall into and damage the product. Local laws governing the safety of individuals might require this type of consideration.

Selecting the type of wall construction

1. Mounting on a hollow wall

   - **Wood surface**
     Use construction-grade wood and the recommended minimum thickness is 38 x 25.4 mm (1.5" x 10").

     Note: This method provides the most reliable attachment for the product with little risk that the product may come loose or require ongoing maintenance.

   - **Drywall**
     Drywall over wood studs is acceptable.

2. Mounting on a solid concrete or brick wall with flat and smooth surface

You can install the device on plastic (LCD monitor), wood, drywall surface over studs, or a solid concrete or metal plane directly. The types of fasteners required are dependent on the type of wall construction.

Fasteners are not supplied in the product package. You will need to prepare the fasteners. Choose fasteners that are rated either **Medium Duty** or **Heavy Duty**. To assure proper fastener selection and installation, follow the fastener manufacturer's recommendations.

2.1.6.1. Wall-Mounting Installation

This is illustrated by the example of AMS300.

1. Attach the mounting brackets to your product, and secure with the supplied 4 screws.

2. Prepare at least 4 screws (M3) to install the device on wall .

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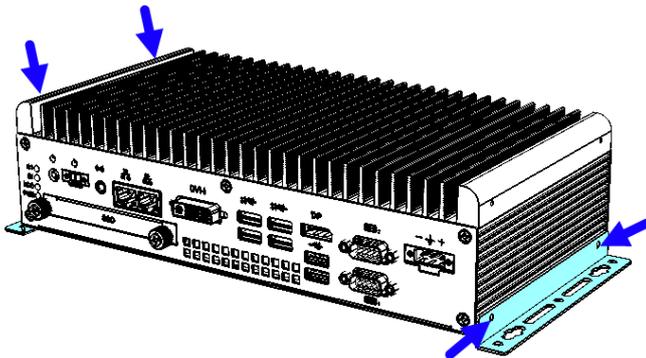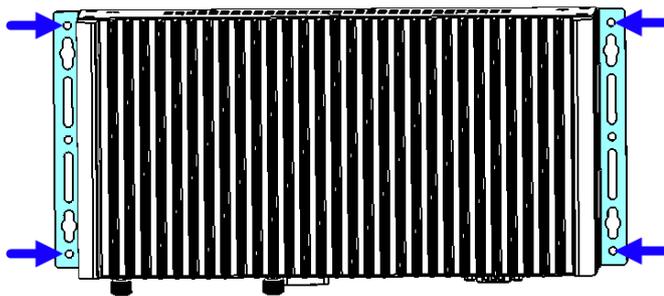
2.1.6.2. Side-Mounting Installation (Optional)

This is illustrated by the example of AMS301.

1. Attach the mounting bracket to your product, and secure with the supplied 4 screws.
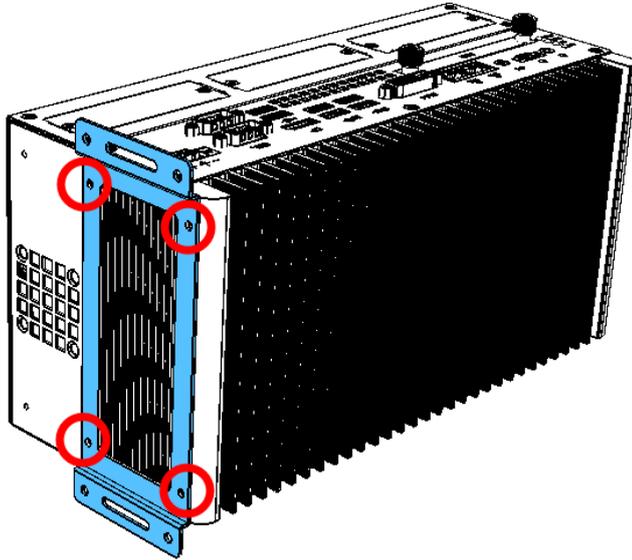
2. Prepare at least 4 screws (M3) to install the device on wall .
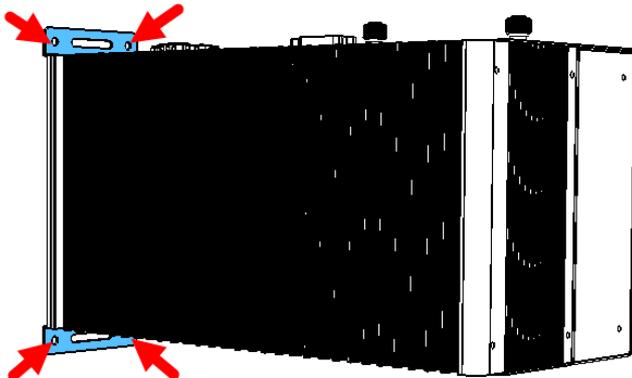
2.1.6.3.   DIN Rail Mounting Installation (Optional)

This is illustrated by the example of AMS301.

1. Attach the DIN rail mounting bracket to your product, and secure with the supplied screws.

    Secure with 2 screws for a general bracket.
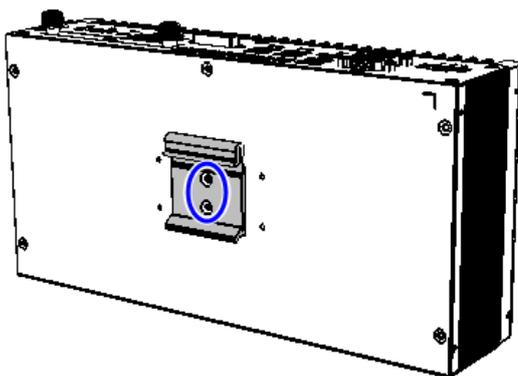
    Secure with 4 screws for a rotatable bracket.
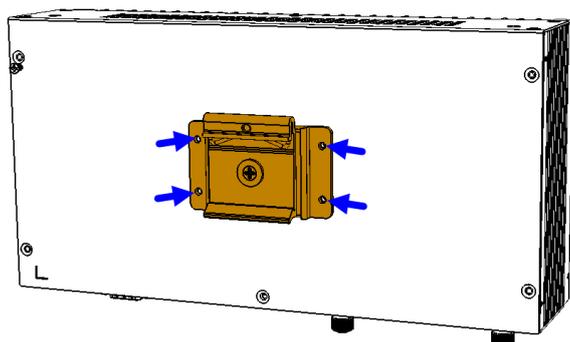
2. Hook the DIN rail mounting bracket over the top of the DIN rail, and then press the lower section of the bracket towards the DIN rail to clip the bracket onto it.

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2.1.7 Pinout for COM Ports, DC-In & Power Button Connectors

- **COM1 RS232/422/485 Port**
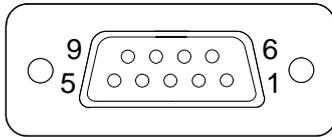
COM1 port is jumper-less and configurable in BIOS.

Pin	Assigment	Pin	Assigment
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	Assignment		
	RS-232	**RS-422**	**RS-485**
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	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

- **COM2 RS-232 Port**
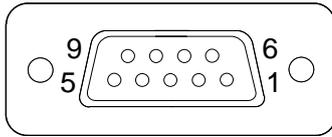
COM5 and COM6 are both available for AMS301 and AMS302 only.
For AMS300, you can externally use COM5 and COM6 by connecting them from the motherboard.

Pin	Assigment	Pin	Assigment
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-In Power Connector (3-pin terminal block)**
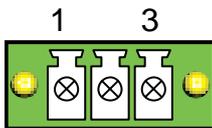
Pin	Assigment	Pin	Assigment
1	24V	3	Power Ground
2	Case Ground		

- **Remote Control Connector (2-pin terminal block)**
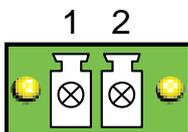
Pin	Assigment	Pin	Assigment
1	Power BTN	2	Ground

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2.2 Setting the Jumpers

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

2.2.1 How to Set Jumpers

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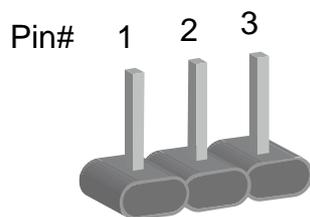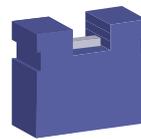
A 3-pin jumper   **A jumper cap**

Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Schematic illustration in the manual
Open		
1-2		
2-3		
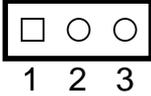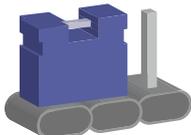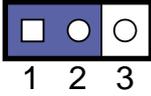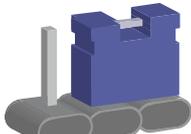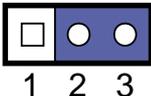
When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

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

2.3 Jumper & Connector Locations on Motherboard

Motherboard: MB300

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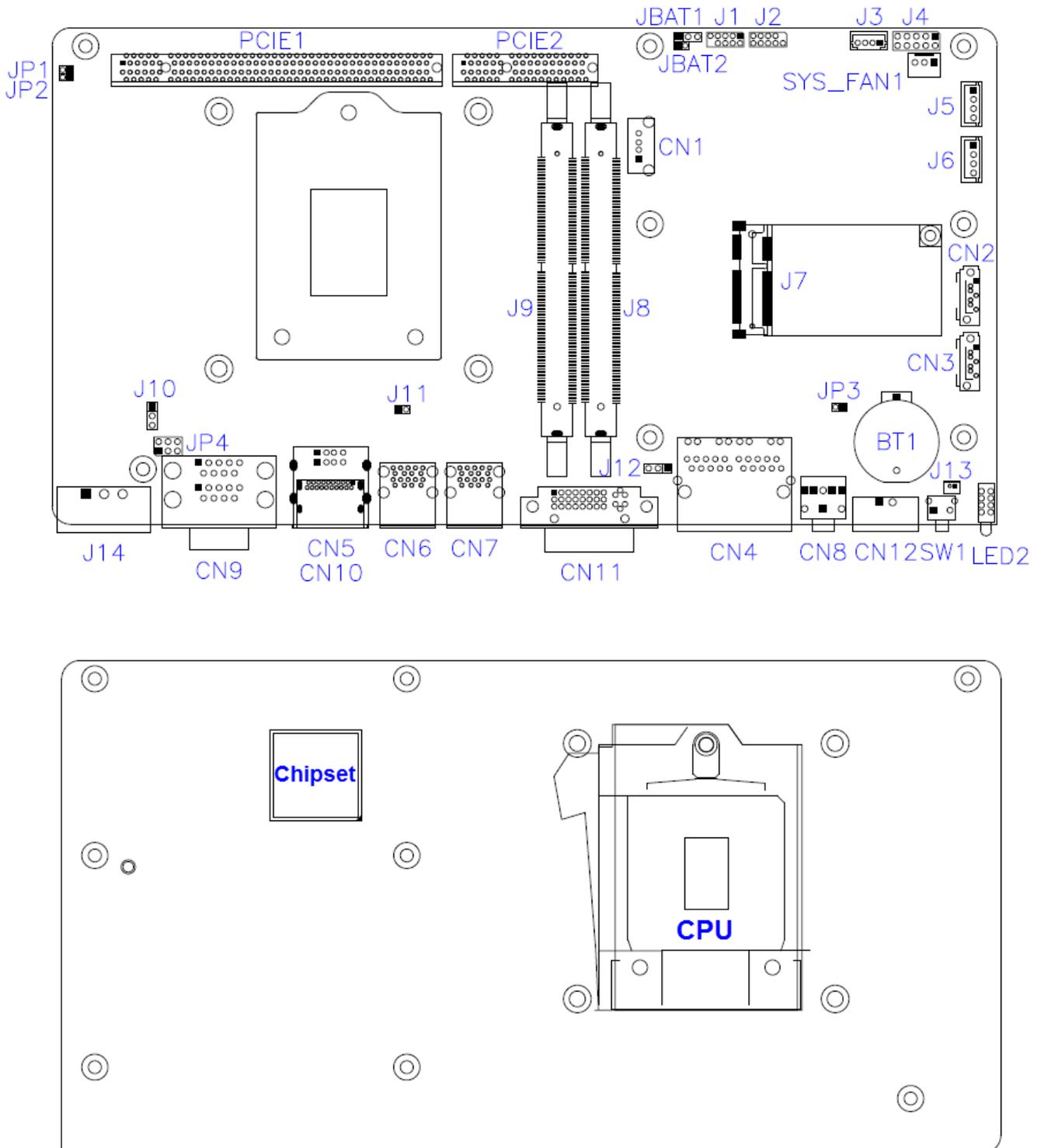
2.4　Jumpers Quick Reference

Function	Connector Name	Page
CMOS Data Clearance	JBAT1	32
RTC Content Clearance	JBAT2	33
CPU dGfx Bifurcation Selection	JP1, JP2	34
COM2 RS-232 Power Selection	JP4	35
Factory Use Only	JP3	--

2.4.1　CMOS Data Clearance　(JBAT1)
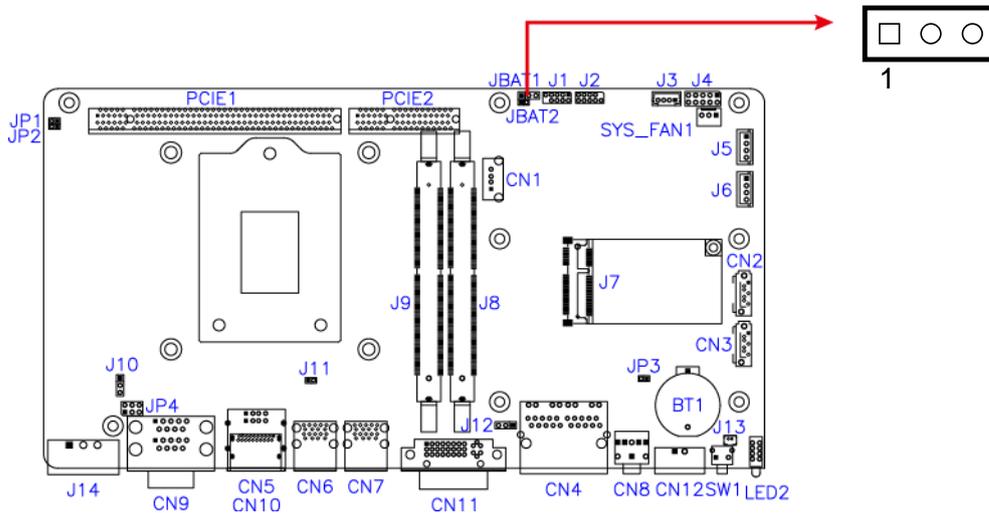
Function	Pin closed	Illustration
Normal (default)	1-2	
Clear CMOS	2-3	
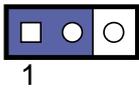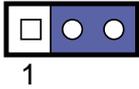
2.4.2 RTC Content Clearance (JBAT2)
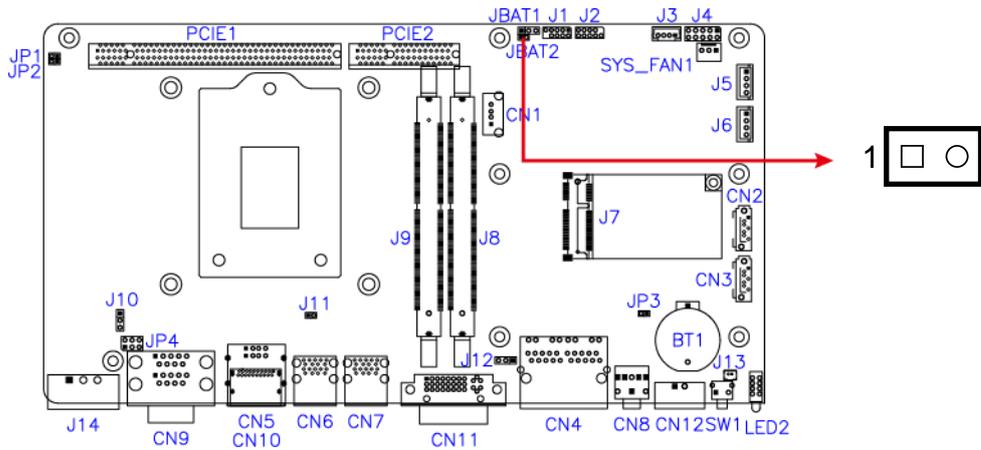
Function	Pin closed	Illustration
Normal (default)	Open	1 □ ○
Clear RTC	Close	1 ■ ●

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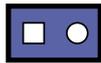
2.4.3   CPU dGfx Bifurcation Selection   (JP1, JP2)
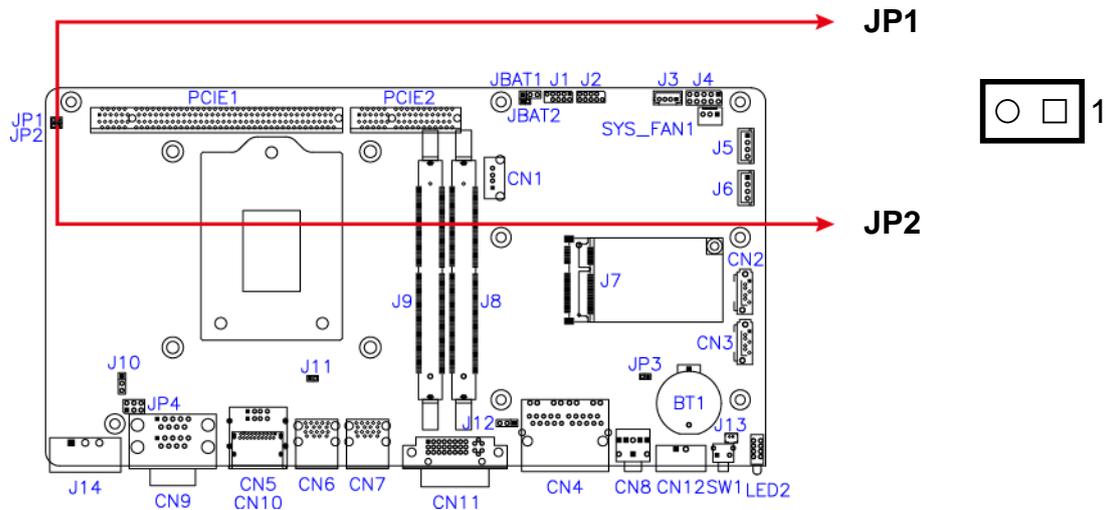
Function	Pin closed	Illustration
1 x PCIe (x16) (default)	**JP1:** Open	⊙ □ 1
	JP2: Open	⊙ □ 1
2 x PCIe (x8)	**JP1:** Close	⊙ □ 1
	JP2: Open	⊙ □ 1
RSVD	**JP1:** Open	⊙ □ 1
	JP2: Close	⊙ □ 1
1 x PCIe (x8), 1 x PCIe (x4), 1 x PCIe (x4)	**JP1:** Close	⊙ □ 1
	JP2: Close	⊙ □ 1

2.4.4   COM2 RS-232 Power Selection   (JP4)
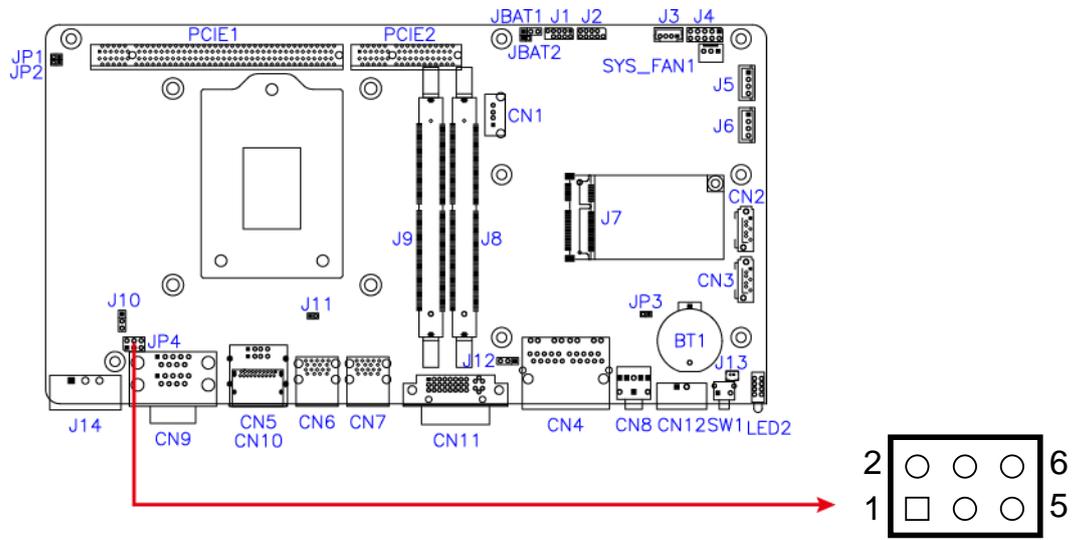
Function	Pin closed	Illustration
12V	1-3	
RI (default)	3-4	
5V	3-5	

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2.5 Connectors Quick Reference

Function	Connector Name	Page
SATA SDD Power Connector	J5, J6	37
Digital Connector	J4	37
System Fan Power Connector	SYS_FAN1	38
COM1 & COM2 Serial Ports [1]	CN9	--
Power Remote Control Connector [2]	CN12	--
DC-In Power Connector [3]	J14	--
DVI-I Port	CN11	--
USB 2.0 Port	CN1, CN5	--
USB 3.0 Port	CN6, CN7	--
DisplayPort	CN10	--
GbE LAN Ports	CN4	--
HD Audio Line-Out	CN8	--
SATA Connector	CN2, CN3	--
Power Button	SW1	--
Mini-PCIe (x1) Slot	J7	--
LED Indicators	LED2	--
PCIe (x16) Slot	PCIE1	--
PCIe (x4) Slot	PCIE2	--
Factory Use Only	J1, J2,	--

[1], [2], [3] : Refer to *2.1.7 Pinout for COM Ports, DC-In & Power Button Connectors.*

2.5.1 SATA Power Connector (J5, J6)
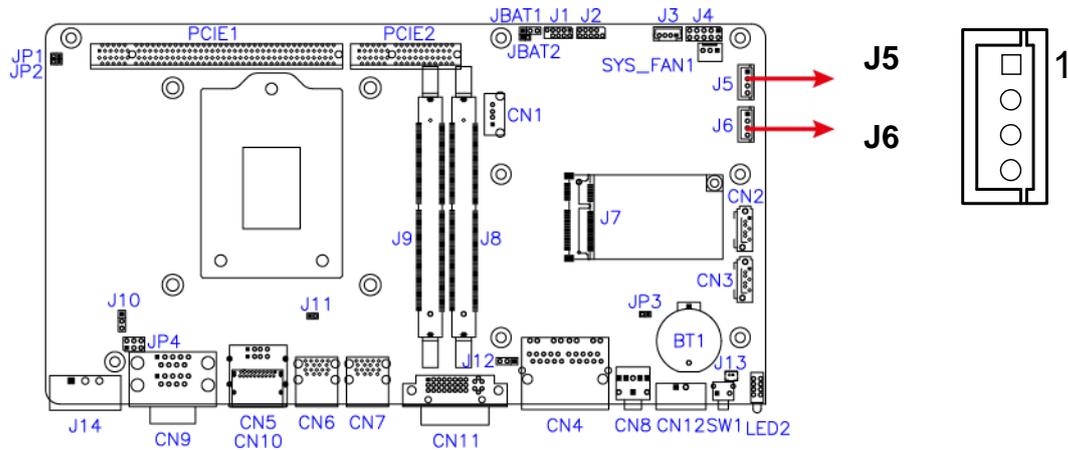
Pin	Assignment	Pin	Assignment
1	5V	3	Ground
2	Ground	4	12V

2.5.2 Digital Connector (J4)
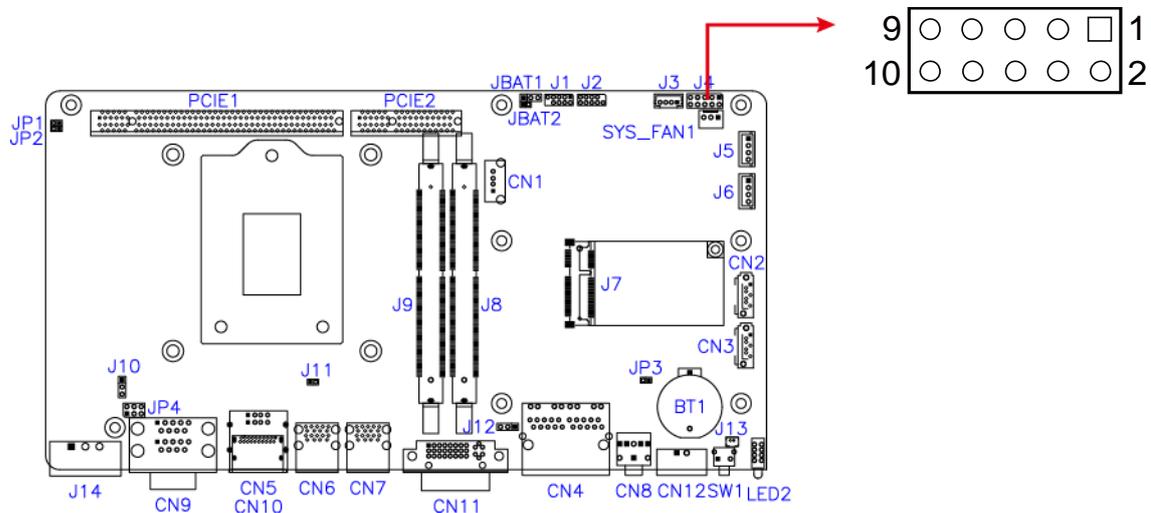
Pin	Assignment	Pin	Assignment
1	Ground	2	VCC5
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

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2.5.3 System Fan Power Connector (SYS_FAN1)
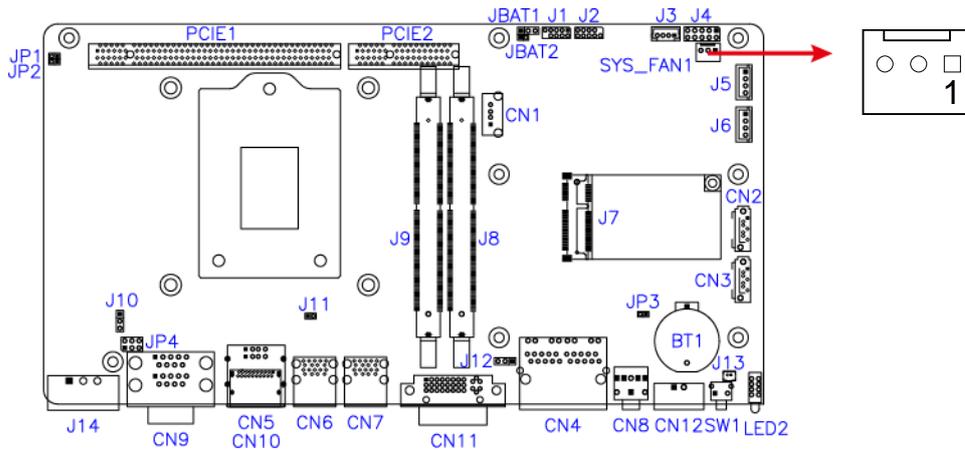
Pin	Assignment	Pin	Assignment
1	Ground	3	Rotation detection
2	12V		

Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility

- HD Audio Driver Installation

- LAN Driver Installation

- Intel® Management Engine Driver Installation

- USB 3.1 Driver Installation

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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 made the purchase.

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. Insert the disk enclosed in the package. Click **Intel** and then **Intel(R) Skylake-U/Kabylake-U Chipset Drivers**.
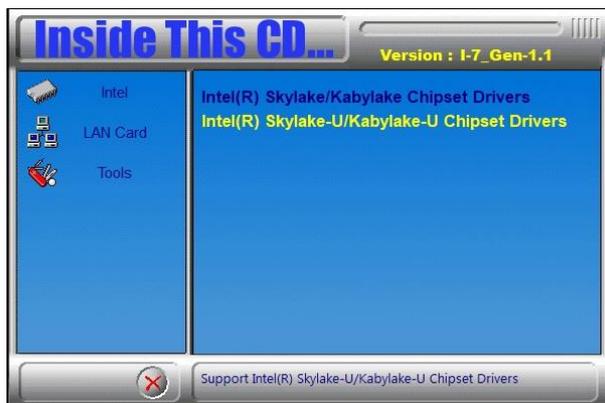
2. Click **Intel(R) Chipset Software Installation Utility**.

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

4. Accept the software license agreement and proceed with the installation process.

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5. On the *Readme File Information* screen, click **Install** and then **Next** for installation.
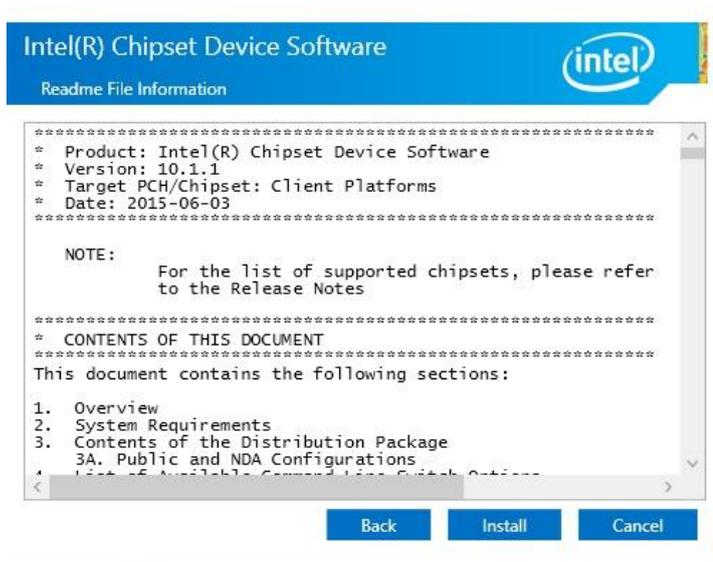
6. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.3   Graphics Driver Installation

1. Click **Intel** and then **Intel(R) Skylake-U/Kabylake-U Chipset Drivers**.

2. Click **Intel(R) HD Graphics Driver**.
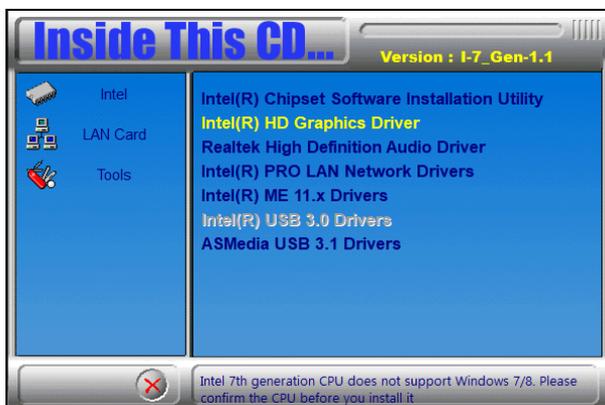
3. When the *Welcome* screen appears, click **Next** to continue.
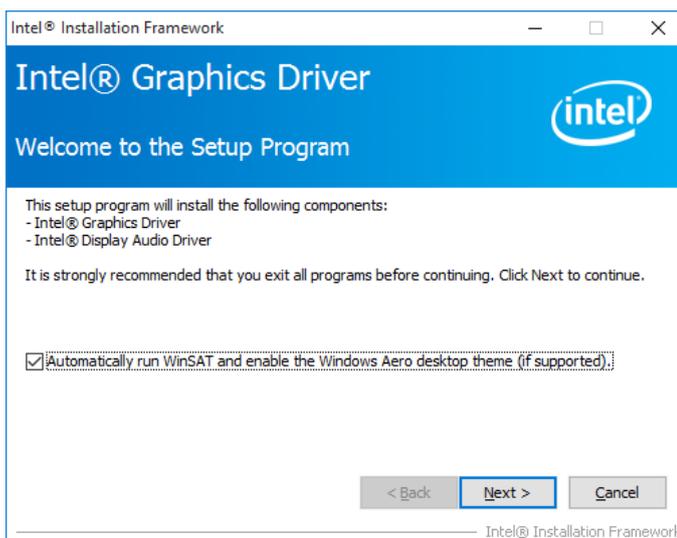
4. Click **Yes** to agree with the license agreement and continue the installation.
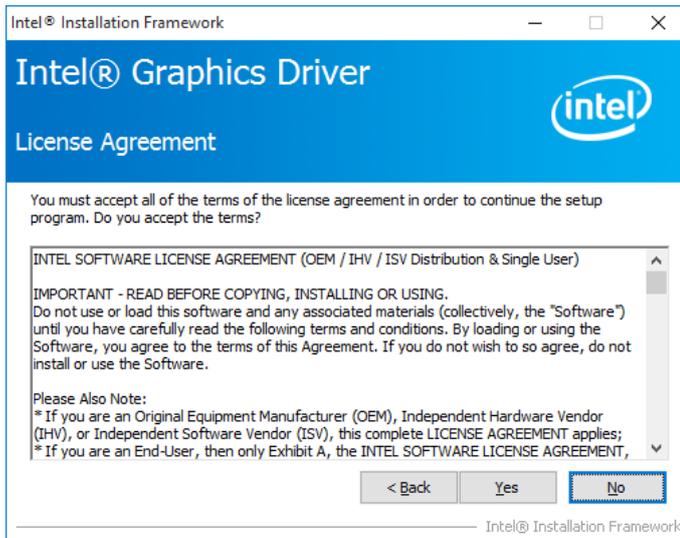
5. Read the *Readme File Information* and then click **Next**.
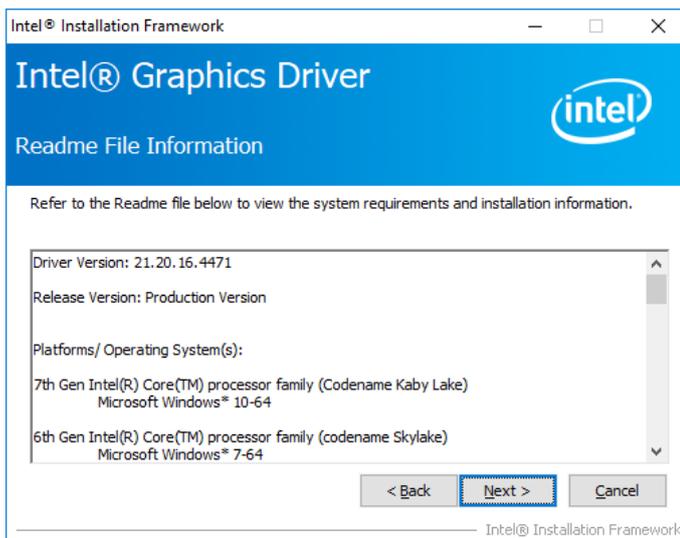
6. Choose a destination folder for installation.

7. The driver has been completely installed. Click **Finish** and restart the computer for changes to take effect.

3.4 HD Audio Driver Installation

1. Insert the disk enclosed in the package. Click **Intel** and then **Intel(R) Skylake-U/Kabylake-U Chipset Drivers**.
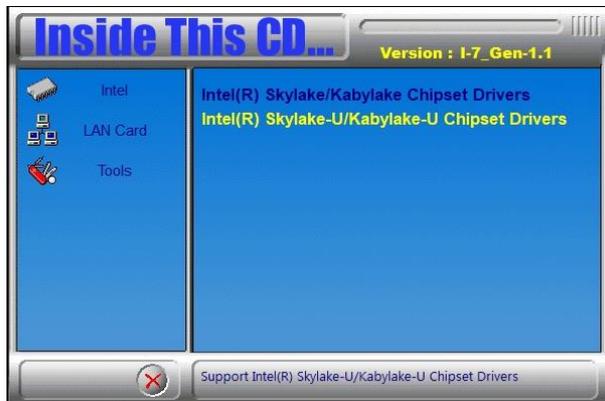
2. Click **Realtek High Definition Audio Driver**.

3. On the *Welcome* screen of the InstallShield Wizard, click **Next** for installation.
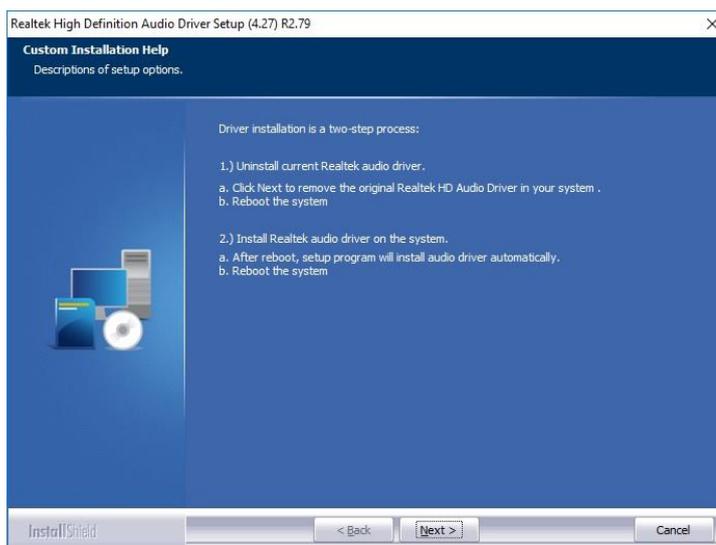
4. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

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3.5 LAN Driver Installation

1. Click **LAN Card** and then **Intel(R) Skylake-U/Kabylake-U Chipset Drivers**

2. Click **Intel(R) PRO LAN Network Drivers.**.

3. When the *Welcome* screen appears, click **Next** to continue.
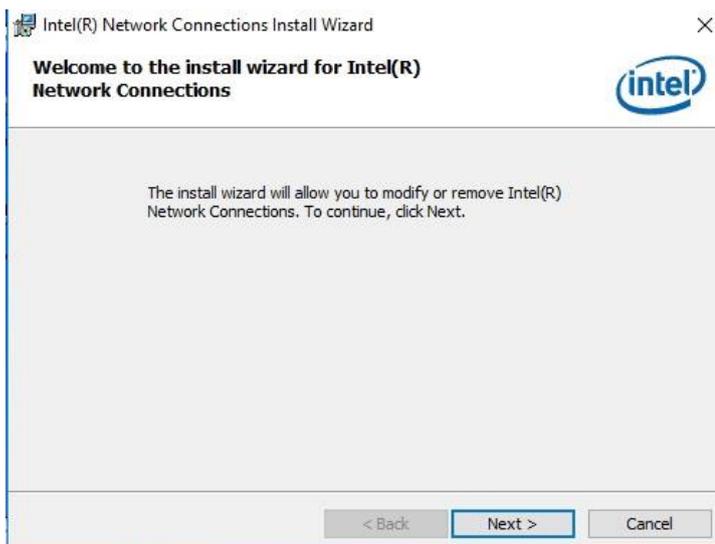
4. Accept the license agreement and click **Next** to continue.

5. Tick the checkbox for **Drivers** to select the related drivers and click **Next**.
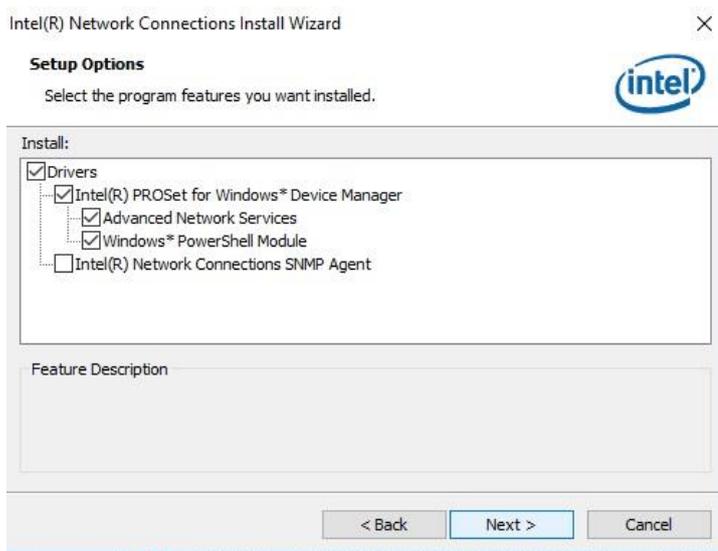
6. When the wizard is ready for installation, click **Install**.

7. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

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3.6 Intel® Management Engine Driver Installation

1. Click **Intel** and then **Intel(R) Skylake-U/Kabylake-U Chipset Drivers**.

2. Click **Intel(R) ME 11.x Drivers**.

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

4. Accept the licence agreement and click **Next** to continue.

5. The driver has been completely installed. You are suggested to restart the computer for changes to take effect.

3.7 USB 3.1 Driver Installation

1. Click **Intel** and then **Intel(R) Skylake-U/Kabylake-U Chipset Drivers**.

2. Click **ASMedia USB 3.1 Drivers**.

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

4. Accept the licence agreement and click **Next** to continue.

5. The driver has been completely installed. You are suggested to 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
- Book Settings
- Save & Exit

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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

```
           Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
   Main  Advanced  Chipset  Security  Boot  Save & Exit

   Memory RC Version                1.5.0.0                   Set the Date. Use Tab to
   Total Memory                     8192 MB                   switch between Date elements.
   Memory Frequency                 2133 MHz


   System Date                      [Fri 08/11/2017]
   System Time                      [16:26:29]




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



           Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

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.

```
                Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.
          Main  Advanced  Chipset  Security  Boot  Save & Exit

        ▶ CPU Configuration                                   CPU Configuration Parameters
        ▶ Power & Performance
        ▶ PCH-FW Configuration
        ▶ ACPI Settings
        ▶ iSmart Controller
        ▶ F81846 Super IO Configuration
        ▶ F81846 Hardware Monitor
        ▶ CSM Configuration
        ▶ USB Configuration

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

                Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Setting	Description
CPU Configuration	Displays CPU configuration parameters.
Power & Performance	Shows power and performance options.
PCH-FW Configuration	Configures management engine technology parameters.
ACPI Settings	Displays system ACPI parameters.
iSmart Controller	Sets up schedules for power management.
F81846 Super IO Configuration	Displays super IO chip parameters.
F81846 Hardware Monitor	Shows super IO monitor hardware status.
CSM Configuration	Enables / Disables option ROM execution settings, etc.
USB Configuration	Displays USB configuration parameters.

4.4.1   CPU Configuration

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

   CPU Configuration                                    When enabled, a VMM can
                                                        utilize the additional
   Type                        Intel(R) Core(TM)        hardware capabilities provided
                               i7-7700T CPU @ 2.90GHz   by Vanderpool Technology.
   ID                          0x906E9
   Speed                       2900 MHz
   VMX                         Supported
   SMX/TXT                     Supported

   Intel (VMX) Virtualization  [Enabled]
   Technology
   Active Processor Cores      [All]
   AES                         [Enabled]             →←: Select Screen
   Intel Trusted Execution Technology  [Disabled]   ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit

            Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Setting	Description
Intel (VMX) Virtualization Technology	Enables / Disables a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	Number of cores to enable in each processor package. Options: All, 1, 2, 3
AES	Enables / Disables AES (Advanced Encryption Standard).
Intel Trusted Execution Technology	Enables / Disables unilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology. Changes require a full power cycle to take effect.

4.4.2 Power & Performance

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

    CPU - Power Management Control                        Allows more than two frequency
                                                          ranges to be supported.
    Intel(R) SpeedStep(tm)              [Enabled]
    Intel(R) Speed Shift Technology     [Enabled]
      Turbo Mode                        [Enabled]




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



            Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

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

4.4.3 PCH-FW Configuration

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

  ME Firmware Version              11.6.27.3264           When Disabled ME will be put
  ME Firmware Mode                 Normal Mode            into ME Temporarily Disabled
  ME Firmware SKU                  Corporate SKU          Mode.
  ME File System Integrity Value   2
  ME Firmware Status 1             0x90000255
  ME Firmware Status 2             0x8610811E
  NFC Support                      Disabled

  ME State                         [Enabled]
  Manageability Features State     [Enabled]
  AMT BIOS Features                [Enabled]
▶ AMT Configuration
  Comms Hub Support                [Disabled]
  JHI Support                      [Disabled]             ▶+: Select Screen
  Core Bios Done Message           [Enabled]              ↑↓: Select Item
                                                          Enter: Select
▶ Firmware Update Configuration                           +/-: Change Opt.
▶ PTT Configuration                                       F1: General Help
▶ ME Debug Configuration                                  F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit




           Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Setting	Description
AMT BIOS Features	When disabled AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup.
	Note: This option does not disable manageability features in FW.

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4.4.4   ACPI Settings

```
              Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
    Advanced

  ACPI Settings                                               Enables or Disables System
                                                              ability to Hibernate (OS/S4
  Enable Hibernation                   [Enabled]              Sleep State). This option may
  ACPI Sleep State                     [S3 (Suspend to RAM)]  not be effective with some
                                                              operating systems.



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



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```

BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Selects a ACPI sleep state for the system to enter. Options: Suspend Disabled, S3 (Suspend to RAM)

4.4.5 iSmart Controller

```
             Aptio Setup Utility - Copyright (C) 2017 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

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```

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 Slot 1 / 2	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.

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4.4.6 F81846 Super IO Configuration

```
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        Advanced

       F81846 Super IO Configuration                              Set Parameters of Serial Port
                                                                  1 (COMA)
       Super IO Chip                        F81846


    ▶ Serial Port 1 Configuration
    ▶ Serial Port 2 Configuration
    ▶ Serial Port 3 Configuration
    ▶ Serial Port 4 Configuration


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



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```

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

4.4.6.1. Serial Port 1 Configuration

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

  Serial Port 1 Configuration                                 Enable or Disable Serial Port
                                                              (COM)
  Serial Port                          [Enabled]
  Device Settings                      IO=3F8h; IRQ=4;

  Change Settings                      [Auto]

  F81846 SERIAL PORT1 MODE SELECT      [RS232 Mode]
  RS422/RS485 Termination              [Disabled]


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



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```

BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 3F8h; IRQ = 4 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12
F81846 Serial Port1 Mode Select	F81846 serial port 1 loop back / RS232 / RS422 / RS485 model select.
RS422/RS485 Termination	Enables / Disables RS422/RS485 termination.

4.4.6.2.   Serial Port 2 Configuration

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

  Serial Port 2 Configuration                              Enable or Disable Serial Port
                                                           (COM)
  Serial Port                          [Enabled]
  Device Settings                      IO=2F8h; IRQ=3;

  Change Settings                      [Auto]




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




        Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 2F8h; 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

4.4.6.3.   Serial Port 3 Configuration

```
           Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
      Advanced

Serial Port 3 Configuration                                    Enable or Disable Serial Port
                                                               (COM)
Serial Port                           [Enabled]
Device Settings                       IO=3E8h; IRQ=5;

Change Settings                       [Auto]




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




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```

BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 3E8h; IRQ = 7 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12

4.4.6.4. Serial Port 4 Configuration

```
        Aptio Setup Utility – Copyright (C) 2017 American Megatrends, Inc.
   Advanced

 Serial Port 4 Configuration                             Enable or Disable Serial Port
                                                         (COM)
 Serial Port                       [Enabled]
 Device Settings                   IO=2E8h; IRQ=7;

 Change Settings                   [Auto]



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



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```

BIOS Setting	Description
Serial Port	Enables / Disables serial port (COM).
Change Settings	Selects an optimal settings for Super I/O device. Options: • Auto • IO = 2E8h; IRQ = 7 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E0h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12

4.4.7   F81846 Hardware Monitor

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

  Pc Health Status

  SYS_FAN1 smart fan control      [Disabled]
  SYS_R_FAN1 smart fan control    [Disabled]
  CPU temperature                 : +30 C
  System temperature              : +31 C
  SYS_FAN1                        : 0 RPM
  SYS_R_FAN1                      : 0 RPM
  VCORE                           : +0.928 V
  +5V                             : +5.171 V
  +12V                            : +12.144 V
  Memory Voltage                  : +1.192 V

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


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```

BIOS Setting	Description
SYS_FAN1 Smart Fan Control	Controls the system fan temperature by setting up a threashold temperature. Options: Disabled (default),. 50 °C, 60 °C, 70 °C, 80 °C
SYS_R_FAN1 Smart Fan Control	Controls the system fan temperature by setting up a threashold temperature. Options: Disabled (default),. 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 as monitored by the system and showing the PC health status
CPU Shutdown Temperature	This field enables or disables the Shutdown Temperature Options: Disabled (default),. 70 °C, 75 °C, 80 °C, 85 °C, 90 °C, 95 °C

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4.4.8   CSM Configuration

```
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  Advanced

  Option ROM execution                                  Controls the execution of UEFI
                                                        and Legacy PXE OpROM
  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



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```
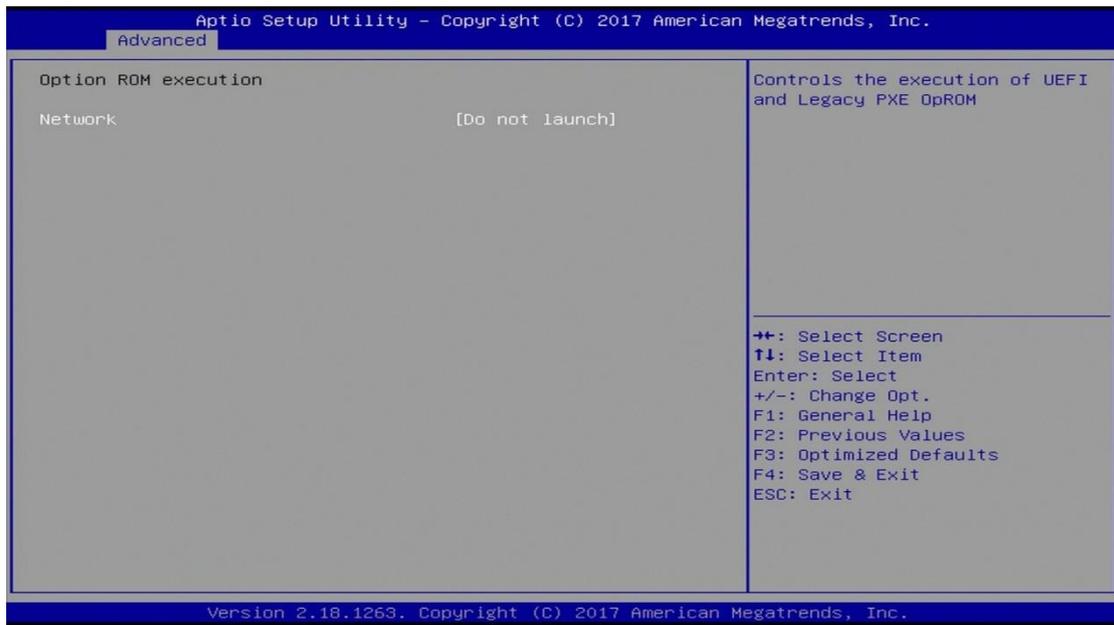
BIOS Setting	Description
Network	Controls the execution of UEFI and Legacy PXE OpROM.

4.4.9 USB Configuration

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

  USB Configuration                                    Enables Legacy USB support.
                                                       AUTO option disables legacy
  USB Module Version              17                   support if no USB devices are
                                                       connected. DISABLE option will
  USB Controllers:                                     keep USB devices available
      1 XHCI                                           only for EFI applications.
  USB Devices:
      1 Keyboard

  Legacy USB Support              [Enabled]
  XHCI Hand-off                   [Enabled]
  USB Mass Storage Driver Support [Enabled]
  Port 60/64 Emulation            [Disabled]
                                                       ←→: Select Screen
  USB hardware delays and time-outs:                   ↑↓: Select Item
  USB transfer time-out           [20 sec]             Enter: Select
  Device reset time-out           [20 sec]             +/-: Change Opt.
  Device power-up delay           [Auto]               F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit



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```

BIOS Setting	Description
Legacy USB Support	Enables / Disables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disable** keeps USB devices available only for EFI applications.
XHCI Hand-pff	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables USB mass storage driver support.
Port 60/64 Emulation	Enables / Disables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB Transfer time-out	Sets the time-out value 1, 5, 10 or 20 sec(s) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Sets the seconds (10, 20, 30, 40 secs) of delaying execution of start unit command to USB mass storage device.

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BIOS Setting	Description
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 100 ms. For a Hub port, the delay is taken from Hub descriptor.

4.5 Chipset Settings

```
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            Chipset

 System Agent (SA) Configuration                              VT-d capability

 SA PCIe Code Version             1.5.0.0
 VT-d                             Supported

 VT-d                             [Enabled]


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



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```
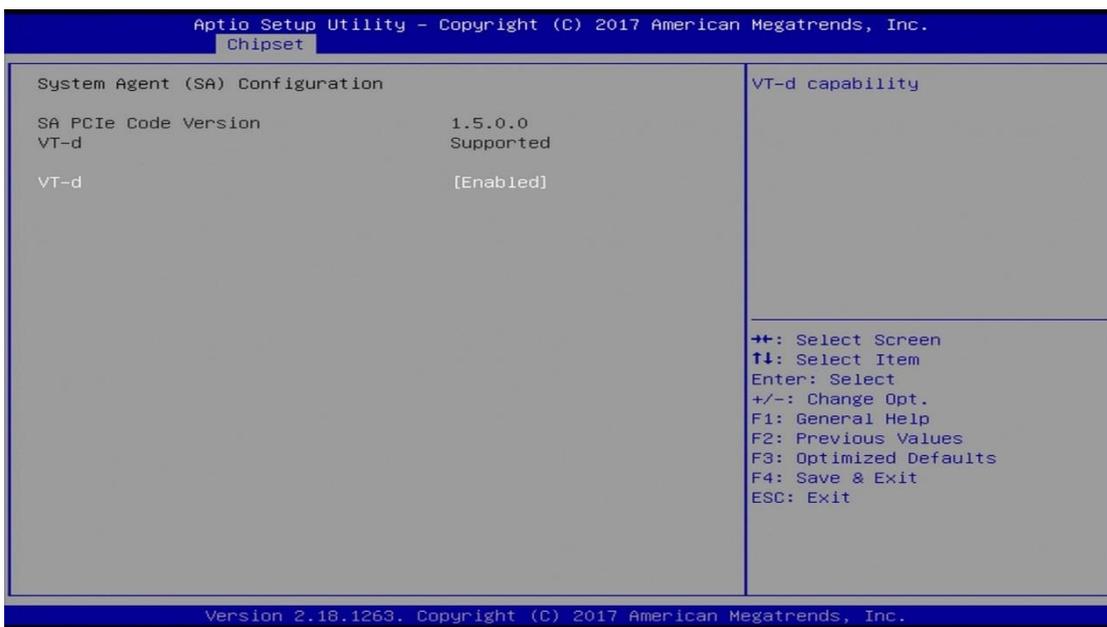
BIOS Setting	Description
System Agent (SA) Configuration	System Agent (SA) parameters
VT-d	Enables / Disables VT-d capability.

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4.5.1　PCH-IO Configuration

```
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          Chipset

  PCH-IO Configuration                                        SATA Device Options Settings

▶ SATA And RST Configuration
  PCH LAN Controller                   [Enabled]
     Wake on LAN Enable                [Disabled]




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



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```

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

4.5.1.1. SATA and RST Configuration

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

SATA And RST Configuration                                      Enable/Disable SATA Device.

SATA Controller(s)                [Enabled]
SATA Mode Selection               [AHCI]

Serial ATA Port 0                 Empty
  Port 0                          [Enabled]
Serial ATA Port 1                 TS64GSSD370I   (64.0GB)
  Port 1                          [Enabled]
Serial ATA Port 2                 Empty
  Port 2                          [Enabled]

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

           Version 2.18.1263. Copyright (C) 2017 American Megatrends, Inc.
```

BIOS Setting	Description
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Determines how SATA controller(s) works. AHCI Mode or Intel RST Premium.
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.

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4.6 Security Settings

```
                Aptio Setup Utility - Copyright (C) 2017 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                    ┌──Create New Password──┐
   Maximum length                    │ _                     │       →←: Select Screen
                                      └───────────────────────┘       ↑↓: Select Item
   Administrator Password                                             Enter: Select
   User Password                                                      +/-: Change Opt.
                                                                      F1: General Help
                                                                      F2: Previous Values
   HDD Security Configuration:                                        F3: Optimized Defaults
   P1:TS64GSSD370I                                                    F4: Save & Exit
                                                                      ESC: Exit

                Version 2.18.1263. Copyright (C) 2017 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
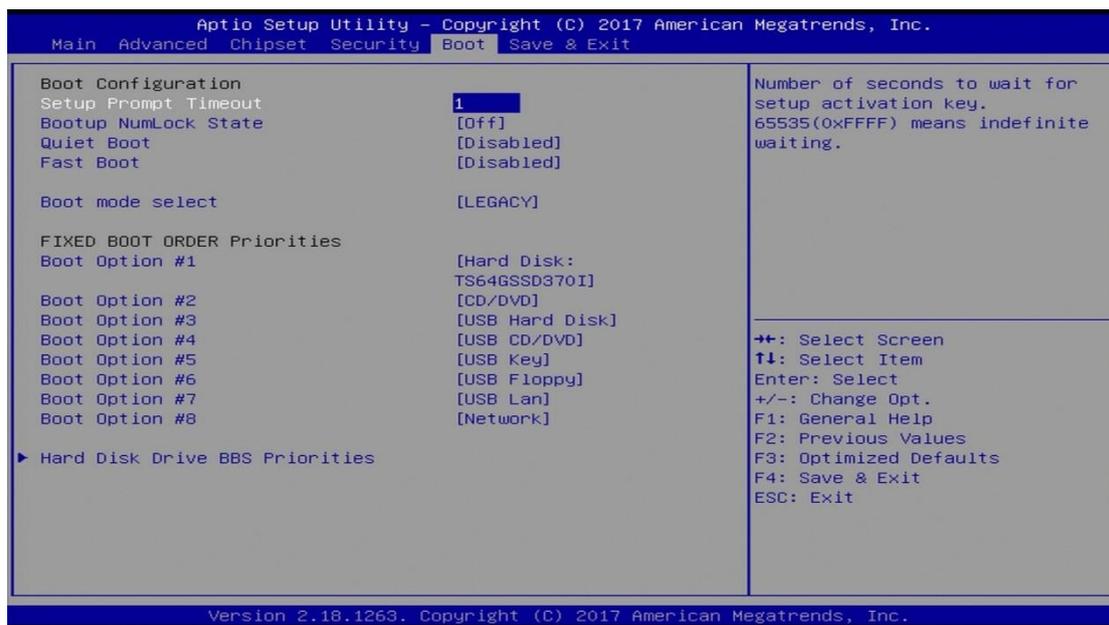
BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Fast Boot	Enables / Disables boot with initialization of a minimal set of devices required to launch the active boot option. Has no effect for BBS boot options.
Boot mode select	Selects a Boot mode, Legacy / UEFI.
Boot Option Priorities	Sets the system boot order priorities for hard disk, CD/DVD, USB, Network.

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4.8   Save & Exit Settings

```
          Aptio Setup Utility – Copyright (C) 2017 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              ┌──── Save & Exit Setup ────┐
                               │                           │
  Default Options              │  Save configuration and exit?
  Restore Defaults             │                           │
  Save as User Defaults        │                           │→: Select Screen
  Restore User Defaults        │      Yes        No        │↓: Select Item
                               └───────────────────────────┘nter: Select
  Boot Override                                        /–: Change Opt.
  P1: TS64GSSD370I                                     F1: General Help
  Launch EFI Shell from filesystem device              F2: Previous Values
                                                       F3: Optimized Defaults
                                                       F4: Save & Exit
                                                       ESC: Exit


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```

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

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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
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

Address	Device Description
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
0x00000800-0x0000087F	Motherboard resources
0x0000E000-0x0000EFFF	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115
0x000000F0-0x000000F0	Numeric data processor
0x0000F090-0x0000F097	Standard SATA AHCI Controller
0x0000F080-0x0000F083	Standard SATA AHCI Controller
0x0000F060-0x0000F07F	Standard SATA AHCI Controller
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x00001854-0x00001857	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM5)
0x0000F000-0x0000F03F	Intel(R) HD Graphics 630
0x000003B0-0x000003BB	Intel(R) HD Graphics 630
0x000003C0-0x000003DF	Intel(R) HD Graphics 630
0x0000FF00-0x0000FFFE	Motherboard resources

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Address	Device Description
0x0000F040-0x0000F05F	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard

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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)
IRQ 4	Communications Port (COM1)
IRQ 5	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 8	System CMOS/real time clock
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 19	Intel(R) Active Management Technology - SOL (COM5)
IRQ 54 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967283	Intel(R) Management Engine Interface
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection
IRQ 4294967288	Intel(R) I211 Gigabit Network Connection
IRQ 4294967289	Intel(R) I211 Gigabit Network Connection
IRQ 4294967290	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 4294967291	Intel(R) HD Graphics 630
IRQ 4294967292	Intel(R) Ethernet Connection (2) I219-LM

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Level	Function
IRQ 4294967293	Standard SATA AHCI Controller
IRQ 4294967294	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115

Appendix

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 "F81866.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 81866 watch dog program\n");
    SIO = Init_F81866();
    if (SIO == 0)
    {
        printf("Can not detect Fintek 81866, 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_F81866_Reg(0x2B);
        bBuf &= (~0x20);
        Set_F81866_Reg(0x2B, bBuf);             //Enable WDTO

        Set_F81866_LD(0x07);                    //switch to logic device 7
        Set_F81866_Reg(0x30, 0x01);             //enable timer

        bBuf = Get_F81866_Reg(0xF5);
        bBuf &= (~0x0F);
        bBuf |= 0x52;
        Set_F81866_Reg(0xF5, bBuf);             //count mode is second
        Set_F81866_Reg(0xF6, interval);         //set timer
        bBuf = Get_F81866_Reg(0xFA);
        bBuf |= 0x01;
        Set_F81866_Reg(0xFA, bBuf);             //enable WDTO output

        bBuf = Get_F81866_Reg(0xF5);
        bBuf |= 0x20;
        Set_F81866_Reg(0xF5, bBuf);             //start counting
}
//---------------------------------------------------------------------------
void DisableWDT(void)
{
        unsigned char bBuf;
        Set_F81866_LD(0x07);                    //switch to logic device 7
        bBuf = Get_F81866_Reg(0xFA);
        bBuf &= ~0x01;
        Set_F81866_Reg(0xFA, bBuf);             //disable WDTO output

        bBuf = Get_F81866_Reg(0xF5);
        bBuf &= ~0x20;
        bBuf |= 0x40;
        Set_F81866_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 "F81866.H"
#include <dos.h>
//------------------------------------------------------------------------
unsigned int F81866_BASE; void Unlock_F81866 (void); void Lock_F81866 (void);
//------------------------------------------------------------------------
unsigned int Init_F81866(void)
{
      unsigned int result;
      unsigned char ucDid;

      F81866_BASE = 0x4E;
      result = F81866_BASE;

      ucDid = Get_F81866_Reg(0x20);
      if (ucDid == 0x07)                          //Fintek 81866
      {      goto Init_Finish; }

      F81866_BASE = 0x2E;
      result = F81866_BASE;

      ucDid = Get_F81866_Reg(0x20);
      if (ucDid == 0x07)                          //Fintek 81866
      {      goto Init_Finish; }

      F81866_BASE = 0x00;
      result = F81866_BASE;

Init_Finish:
      return (result);
}
//------------------------------------------------------------------------
void Unlock_F81866 (void)
{
      outportb(F81866_INDEX_PORT, F81866_UNLOCK);
      outportb(F81866_INDEX_PORT, F81866_UNLOCK);
}
//------------------------------------------------------------------------
void Lock_F81866 (void)
{
      outportb(F81866_INDEX_PORT, F81866_LOCK);
}
//------------------------------------------------------------------------
void Set_F81866_LD( unsigned char LD)
{
      Unlock_F81866();
```

```
        outportb(F81866_INDEX_PORT, F81866_REG_LD);
        outportb(F81866_DATA_PORT, LD); Lock_F81866();
}
//-------------------------------------------------------------------------
void Set_F81866_Reg( unsigned char REG, unsigned char DATA)
{
        Unlock_F81866();
        outportb(F81866_INDEX_PORT, REG);
        outportb(F81866_DATA_PORT, DATA);
        Lock_F81866();
}
//-------------------------------------------------------------------------
unsigned char Get_F81866_Reg(unsigned char REG)
{
        unsigned char Result;
        Unlock_F81866();
        outportb(F81866_INDEX_PORT, REG);
        Result = inportb(F81866_DATA_PORT);
        Lock_F81866();
        return Result;
}
//-------------------------------------------------------------------------




//-------------------------------------------------------------------------
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//
//-------------------------------------------------------------------------
#ifndef      F81866_H
#define      F81866_H     1
//-------------------------------------------------------------------------
#define    F81866_INDEX_PORT     (F81866_BASE)
#define    F81866_DATA_PORT      (F81866_BASE+1)
//-------------------------------------------------------------------------
#define    F81866_REG_LD     0x07
//-------------------------------------------------------------------------
#define F81866_UNLOCK 0x87
#define    F81866_LOCK  0xAA
//-------------------------------------------------------------------------
unsigned int Init_F81866(void);
void Set_F81866_LD( unsigned char);
void Set_F81866_Reg( unsigned char, unsigned char); unsigned char
Get_F81866_Reg( unsigned char);
//-------------------------------------------------------------------------
#endif //     F81866_H
```