

User's Manual

Rugged Embedded Computer

7/6th Generation Intel® Core™ i3 / i5 / i7 (Kaby Lake-S/ Skylake-S)

High Performance, Modular and Expandable Rugged Embedded Computer

DS-1100 Series



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Preface

Revision

Revision	Description	Date
1.00	New Release	2016/11/18
1.10	Add E-Mark Certified / ICD-100 Isolated COM Pin Definition	2017/3/22
1.20	Add 2.5 pin definitions of CMI-M12LAN104 and CMI-M12POE104	2017/6/16
1.30	Modify 2.3 Connector / Jumper / Switch Definition	2017/7/25
2.00	Advancing DS-1100 Series to Revision R20	2018/9/17
2.10	Correction Made	2018/11/20
2.20	Correction Made	2019/08/13
2.30	Update the Supporting Capacity of Memory to the latest	2019/11/08
2.31	Correction Made	2019/11/21

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Acknowledgement

Cincoze is a registered trademark of Cincoze Co., Ltd. All registered trademarks and product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

Disclaimer

This manual is intended to be used as a practical and informative guide only and is subject to change without notice. It does not represent a commitment on the part of Cincoze. This product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

Declaration of Conformity



FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



CE

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



E-Mark

The "E" mark is based on ECE regulations issued by the Economic Commission for Europe. It is an organizational part of the UN and the members are EU countries and many others. Therefore, the acceptance of approved components is much broader, especially in the eastern part of Europe. It is necessary to confirm whether a particular country has accepted (signed) the application of an ECE-regulation; as the application it is not mandatory for the countries.

Product Warranty Statement

Warranty

Cincoze products are warranted by Cincoze Co., Ltd. to be free from defect in materials and workmanship for 2 years from the date of purchase by the original purchaser.

During the warranty period, we shall, at our option, either repair or replace any product that proves to be defective under normal operation.

Defects, malfunctions, or failures of the warranted product caused by damage resulting from natural disasters (such as by lightning, flood, earthquake, etc.), environmental and atmospheric disturbances, other external forces such as power line disturbances, plugging the board in under power, or incorrect cabling, and damage caused by misuse, abuse, and unauthorized alteration or repair, and the product in question is either software, or an expendable item (such as a fuse, battery, etc.), are not warranted.

RMA

Before sending your product in, you will need to fill in Cincoze RMA Request Form and obtain a RMA number from us. Our staff is available at any time to provide you with the most friendly and immediate service.

■ RMA Instruction

- Customers must fill in Cincoze Return Merchandise Authorization (RMA) Request Form and obtain a RMA number prior to returning a defective product to Cincoze for service.
- Customers must collect all the information about the problems encountered and note anything abnormal and describe the problems on the "Cincoze Service Form" for the RMA number apply process.
- Charges may be incurred for certain repairs. Cincoze will charge for repairs to products whose warranty period has expired. Cincoze will also charge for repairs to products if the damage resulted from acts of God, environmental or atmospheric disturbances, or other external forces through misuse, abuse, or unauthorized alteration or repair. If charges will be incurred for a repair, Cincoze lists all charges, and will wait for customer's approval before performing the repair.
- Customers agree to insure the product or assume the risk of loss or damage during transit, to prepay shipping charges, and to use the original shipping container or equivalent.
- Customers can be send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the system. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, Cincoze is not responsible for the devices/parts.
- Repaired items will be shipped along with a "Repair Report" detailing the findings and actions taken.

Limitation of Liability

Cincoze' liability arising out of the manufacture, sale, or supplying of the product and its use, whether based on warranty, contract, negligence, product liability, or otherwise, shall not exceed the original selling price of the product. The remedies provided herein are the customer's sole and exclusive remedies. In no event shall Cincoze be liable for direct, indirect, special or consequential damages whether based on contract of any other legal theory.

Technical Support and Assistance

1. Visit the Cincoze website at www.cincoze.com where you can find the latest information about the product.
2. Contact your distributor or our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Conventions Used in this Manual



WARNING

This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.



CAUTION

This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.



NOTE

This indication provides additional information to complete a task easily.

Safety Precautions

Before installing and using this device, please note the following precautions:

1. Read these safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Disconnect this equipment from any AC outlet before cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Use a power cord that has been approved for using with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.

If one of the following situations arises, get the equipment checked by service personnel:

- The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
14. **CAUTION:** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

Package Contents

Before installation, please ensure all the items listed in the following table are included in the package.

Item	Description	Q'ty
1	Embedded System	1
2	Utility DVD Driver	1
3	Heat Sink Pack	1
4	Screw Pack	1
5	Wall Mounting Kit	1
6	Power Terminal Block Connector	1
7	Remote Power On/Off Terminal Block Connector	2
8	Fan Terminal Block Connector	1
9	DVI-I to VGA Adaptor	1

Note: Notify your sales representative if any of the above items are missing or damaged.

Ordering Information

Model No.	Product Description
DS-1100-R20	7/6th Generation Intel Core Series Processors, High Performance, Expandable and Modular Rugged Embedded Computer
DS-1101-R20	7/6th Generation Intel Core Series Processors, High Performance, Expandable and Modular Rugged Embedded Computer with 1x PCI/PCIe Expansion Slot
DS-1102-R20	7/6th Generation Intel Core Series Processors, High Performance, Expandable and Modular Rugged Embedded Computer with 2x PCI/PCIe Expansion Slots

Optional Modules & Accessories

Model No.	Description
CFM-IGN101	CFM Module with Power Ignition Sensing Control Function, Selectable 12V/24V (43 x 36 mm)
CMI-CD100/FB22	CMI Module with 4x RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1102 Front Bezel
CMI-ICD100/FB22	CMI Module with 4x Electrical Isolated RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1102 Front Bezel
CMI-LAN104/UB0612	CMI Module with 4x Intel GbE LAN, RJ45 Port, 1x Universal Bracket with 4x RJ45 Cutout for DS-1100 Series
CMI-PoE104/UB0612	CMI Module with 4x PoE+, Intel GbE LAN, RJ45 Port, Individual Port 25.5W, 1x Universal Bracket with 4x RJ45 Cutout for DS-1100 Series
CMI-M12LAN104/UB0610	CMI Module with M12 Connector, 4x Intel GbE LAN, 1x Universal Bracket with 4x M12 Cutout for DS-1100 Series
CMI-M12PoE104/UB0610	CMI Module with M12 Connector, 4x PoE+, Intel GbE LAN, Individual Port 25.5W, 1x Universal Bracket with 4x M12 Cutout for DS-1100 Series
FAN-EX101	External Fan with 4pin Terminal Block Plug, Mounting Bracket, Support smart fan
FAN-UB100	Exhaling Fan with 4pin Connector, Universal Bracket
FAN-UB101	Inhaling Fan with 4pin Connector, Universal Bracket
MEC-LAN-M002-30/UB0311	Mini-PCIe Module with 2x LAN Ports, 2x 30cm cable, 1x Universal Bracket with 2x RJ45 Cutout for DS / P1000 Series
MEC-USB-M002-30/UB0314	Mini-PCIe Module with 2x USB 3.0 Ports, 1x 30cm cable, 1x Universal Bracket with 2x USB Cutout for DS / P1000 Series
MEC-COM-M212/UB0303	Mini-PCIe Module with 2x COM Ports, 1x Standard DB9 Cable, 2x Universal Brackets each with 1x DB9 Cutout for DS / P1000 Series
PAH-101	Power Adapter Holder for GST120A24 (200 x 78 x 46 mm)
PAH-201	Power Adapter Holder for GST220A24 (243 x 95 x 57 mm)
GST120A24-CIN	Adapter AC/DC 24V 5A 120W with 3pin Terminal Block Plug 5.0mm Pitch, with TUBES, Level VI
GST220A24-CIN	Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch, with TUBES, Level VI
RC-E16-01	Riser Card with 1x PCIe16 (For DS-1101 only)
RC-PI-01	Riser Card with 1x PCI Slot (For DS-1101 only)
RC-E16E1-01	Riser Card with 1x PCIe16, 1x PCIe1 Slots (For DS-1102 only)
RC-E8E8-01	Riser Card with 2x PCIe8 Slots (For DS-1102 only)
RC-E16PI-01	Riser Card with 1x PCIe16, 1x PCI Slots (For DS-1102 only)
RC-PIPI-01	Riser Card with 2x PCI Slots (For DS-1102 only)



Chapter 1

Product Introductions

1.1 Overview

Cincoze DS-1100 Series is a high-performance fanless embedded computer powered by 7/6th generation Intel® Core™ platform supporting a wide range of desktop CPUs (socket-type, LGA1151), and accommodates two DDR4 sockets up to 32 GB which allows DS-1100 Series to fulfill all kinds of high-end computing requirements. DS-1100 Series provides powerful functionalities such as rich I/Os, Power over Serial, Electrical Isolated Serial Ports, Optical Isolated Digital I/O, multiple LAN, Power over Ethernet, M12 connectors, RAID 0/1, Power Ignition Sensing and Instant Reboot. Thanks to Cincoze's CMI & CFM Technology, it allows you to configure DS-1100 Series according to your specific needs with ready-to-use modules. DS-1100 Series also supports maximum 2 PCI/PCIe expansion slots with different combination of interfaces for expanding all kinds of application add-on cards. DS-1100 Series is truly a rugged computing system with features of wide operating temperature (-40°C to 70°C), wide range DC power input (from 9V to 48V), high tolerance of shock and vibration, high-standard industrial protections and the integrated SuperCap for battery-free operation. DS-1100 Series is suitable to deploy in a harsh environment and for critical applications, and it is totally maintenance-free.

1.2 Highlights

High Performance

- Supports Intel® 7/6th Generation Processors (65W/35W)
- Performance Enhanced by Intel® 14 nm Technology
- Intel® HD Graphics Supports Triple Independent Display Resolution Up to 4K
- Intel® Q170 Chipset Brings More High-speed I/Os



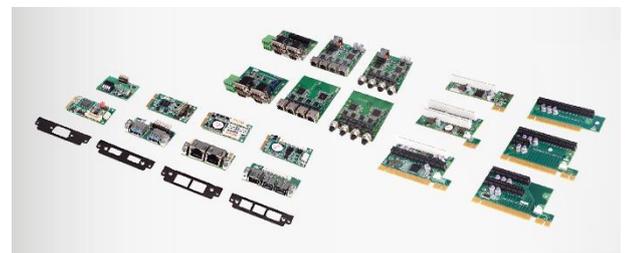
Powerful Functionalities

- Rich I/Os
- Power over Serial
- Electrical Isolated Serial Port
- Optical Isolated Digital I/O
- Power Ignition Sensing
- Multiple LAN
- Power over Ethernet
- RAID 0/1
- Instant Reboot
- M12 Connectors



Fully Modular and Expandable

- CMI (Combined Multiple I/O) Technology for I/O expansion
- CFM (Control Function Module) Technology for Adding Power Ignition Sensing Function
- Mini-PCIe Modules and Dedicated I/O Brackets Are Available
- PCI/PCIe Slot with Different Combination of Interfaces



1.3 Product Pictures



1.4 Key Features

- Supports Intel® 7/6th-Gen Intel® Core™ i3 / i5 / i7 Socket-type CPU (LGA1151)
- 2x DDR4 SO-DIMM Socket, 2,133MHz, Supports Up to 32 GB
- Triple Independent Display (1x DVI-I, 2x DP)
- 2x 2.5" SATA HDD/SSD bay (Gen3), Supports RAID 0/1
- PCI/PCIe Slot with Different Combination of Interfaces (For DS-1101 & DS-1102 only)
- 2x CMI Interfaces with 6 Types of Optional Modules for I/O Expansion
- 1x CFM Interface for Adding Optional Power Ignition Sensing (IGN) Module
- Supports 3x Full-size Mini-PCIe Slot for Wireless & I/O Expansion
- Wide Operating Temperature (-40°C to 70°C)
- EN50155 / EN50121-3-2 Certified for Railway Application
- E-Mark (E13, No.10R-0514229) Certified

1.5 Hardware Specification

System

Processor

- 7th Generation Intel® CPU (Kaby Lake-S)
 - Intel® Core™ i7-7700T Processor (8M Cache, up to 3.80 GHz, 35W TDP)
 - Intel® Core™ i5-7500T Processor (6M Cache, up to 3.30 GHz, 35W TDP)
 - Intel® Core™ i3-7101TE Processor (3M Cache, 3.40 GHz, 35W TDP)
 - Intel® Celeron® G3930TE Processor (2M Cache, 2.70 GHz, 35W TDP)
 - Intel® Core™ i7-7700 Processor (8M Cache, up to 4.20 GHz, 65W TDP)
 - Intel® Core™ i5-7500 Processor (6M Cache, up to 3.80 GHz, 65W TDP)
 - Intel® Celeron® G3930E Processor (2M Cache, 2.90 GHz, 54W TDP)
- 6th Generation Intel® CPU (Skylake-S)
 - Intel® Core™ i7-6700TE Processor (8M Cache, up to 3.40 GHz, 35W TDP)
 - Intel® Core™ i5-6500TE Processor (6M Cache, up to 3.30 GHz, 35W TDP)
 - Intel® Core™ i3-6100TE Processor (4M Cache, 2.70 GHz, 35W TDP)
 - Intel® Pentium® Processor G4400TE (3M Cache, 2.40 GHz, 35W TDP)
 - Intel® Celeron® Processor G3900TE (2M Cache, 2.30 GHz, 35W TDP)
 - Intel® Core™ i7-6700 Processor (8M Cache, up to 4.00 GHz, 65W TDP)
 - Intel® Core™ i5-6500 Processor (6M Cache, up to 3.60 GHz, 65W TDP)
 - Intel® Core™ i3-6100 Processor (3M Cache, 3.70 GHz, 51W TDP)
 - Intel® Pentium® Processor G4400 (3M Cache, 3.30 GHz, 54W TDP)
 - Intel® Celeron® Processor G3900 (2M Cache, 2.80 GHz, 51W TDP)

Chipset

Intel® Q170

BIOS

AMI 16Mbit SPI BIOS

Memory

- 2x DDR4 260-pin SO-DIMM socket, support up to 64 GB (2133/2400 MHz, un-buffered and non-ECC type)

Graphics

- Intel® HD Graphics supports triple independent display (1x DVI-I, 2x DP)

Audio

- Realtek® ALC888-GR
- High Definition Audio

I/O Interface

- 1x DVI-I Connector, Resolution 1920 x 1080
- 2x DisplayPort Connector, Resolution 3840 x 2160
- 2x GbE LAN (Support WoL, Teaming, Jumbo Frame and PXE), RJ45
 - GbE1: Intel I219-LM
 - GbE2: Intel I210-IT
- 2x RS-232/422/485 with Auto Flow Control Support 5V/12V, DB9
- 6x USB 3.0, Type-A
- 2x USB 2.0, Type-A
- 1x Line-out & 1x Mic-in, Phone Jack 3.5mm
- 1x ATX Power On/Off Switch
- 1x AT/ATX Mode Switch
- 1x Clear CMOS Switch
- 1x Remote Power On/Off Connector, 2-Pin Terminal Block
- 1x Remote Reset Connector, 2-Pin Terminal Block
- 1x External FAN Connector, 4-Pin Terminal Block

Storage

- 2x 2.5" SATA HDD/SSD Bay, Support RAID 0/1 (Gen3)
- 3x mSATA (shared by Mini-PCIe socket) (Gen3)

Power Requirement

- Support AT/ATX Power Type
- Power Input Voltage 9~48VDC
- One 3-Pin Terminal Block Connector
- Power Adapter AC/DC 24V/5A 120W or 24V/9.2A 220W (Optional)

Expansion

- Support CFM (Control Function Module) Technology
 - CFM IGN Module
- Support CMI (Combined Multiple I/O) Technology
 - 4x RJ45 GbE LAN Module
 - 4x M12 GbE LAN Module
 - 4x RJ45 GbE PoE+ Module
 - 4x M12 GbE PoE+ Module
 - 4x RS-232/422/485 + 8x Optical Isolated DIO Module
 - 4x Isolated RS-232/422/485 + 8x Optical Isolated DIO Module
- 1x PCI/PCIe Expansion slots (for DS-1101 only)
 - Optional Riser Card: • 1x PCIe16 • 1x PCI
- 2x PCI/PCIe Expansion slots (for DS-1102 only)
 - Optional Riser Card: • 1x PCIe16+1x PCIe1 • 2x PCIe8
 - Optional Riser Card: • 1x PCIe16+1x PCIe1 • 2x PCI
- Support maximum dimension of add-on card (H x L):111.15mm x 235mm
- 3x Full-size Mini-PCIe Sockets
- 1x SIM Socket

Other Function

- Support Instant Reboot Technology (0.2 sec)
- SuperCap Integrated for CMOS Battery Maintenance-free Operation
- Watchdog Timer: Software Programmable Supports 256 Levels System Reset
- Power Ignition Sensing (IGN) Function (with optional CFM module)
 - 12V/24V Selectable

Physical

- Dimension (WxDxH): 227 x 261 x 128 mm
- Weight: 4.70 kg
- Extruded Aluminum with Heavy Duty Metal
- Support Wall Mounting
- Unibody Chassis
- Fanless Design
- Jumper-less Design

Protection

- Reverse Power Input Protection
- Over Voltage Protection: 58V
- Over Current Protection: 15A
- ESD Protection: +/-15kV (air), +/-8kV (contact)
- Surge Protection: 3.84 kV (impedance 12 ohm 1.2/50us waveform)

Operating System

- 7th Generation Intel® CPU (Kaby Lake-S): Windows® 10
- 6th Generation Intel® CPU (Skylake-S): Windows® 10/ 8.1/ 7
- Linux : Supports by project

Environment

- Operating Temperature:
 - 7th Generation Intel® CPU (Kaby Lake-S)
 - 35W TDP CPU: -40°C to 50°C
 - 51W~65W TDP CPU: -40°C to 45°C
 - 6th Generation Intel® CPU (Skylake-S)
 - 35W TDP CPU: -40°C to 70°C
 - 51~65W TDP CPU: -40°C to 50°C
- (With extended temperature peripherals; Ambient with air flow; According to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14)
- Storage Temperature: -40°C to 85°C
- Relative Humidity: 70°C @ 95% RH (Non-condensing)
- EMC: CE, FCC Class A
- Railway: EN50155, EN50121-3-2
- In-Vehicle: E-Mark (E13, No.10R-0514229) Certified

1.6 System I/O

1.3.1 Front

ATX power on/off switch

Press to power-on or power-off the system

AT/ATX Mode Select Switch

Used to select AT or ATX power mode

Power LED

Indicates the power status of the system

Temperature LED

Indicates the temperature of the system

HDD LED

Indicates the status of the hard drive

Digital I/O LED

Indicates the working status of digital input/ output

Ethernet LED

Indicates the status of the LAN ports

USB 3.0 Port

Used to connect USB 3.0/2.0/1.1 device

USB 2.0 Port

Used to connect USB 2.0/1.1 device

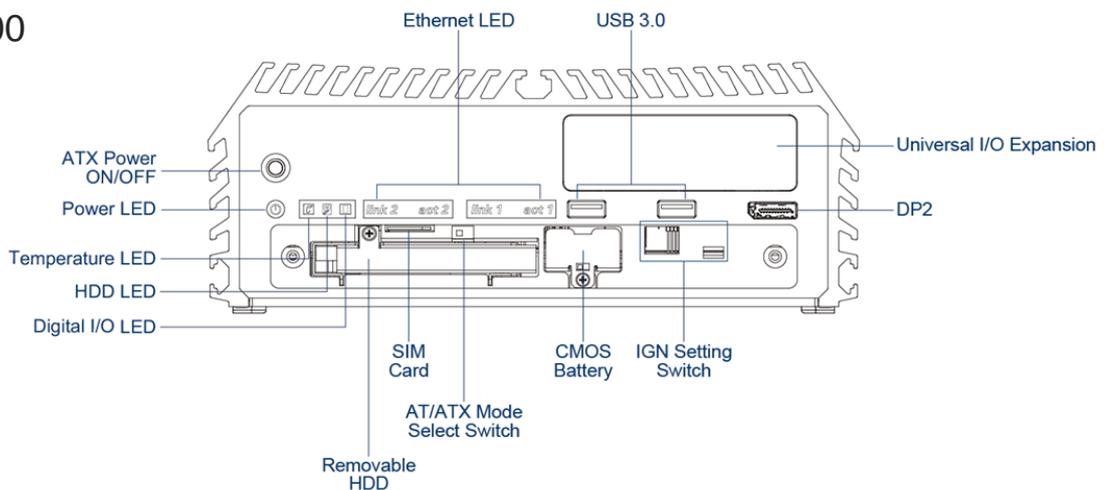
DisplayPort

Used to connect the system with DisplayPort monitor

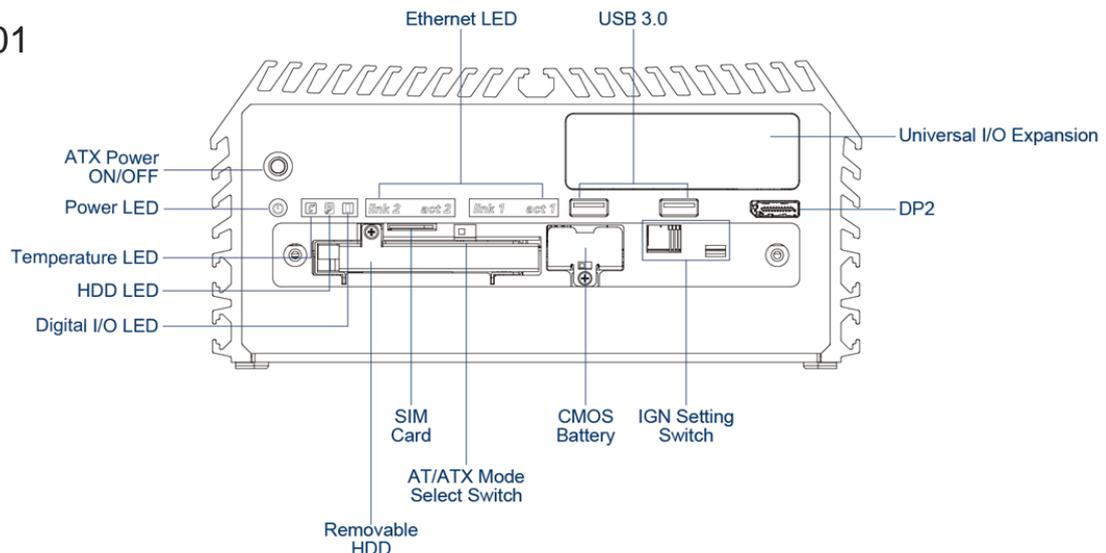
SIM card, CMOS Battery, and 2.5" Removable HDD Bay

Used to insert a SIM card, CMOS battery, and 2.5" HDD

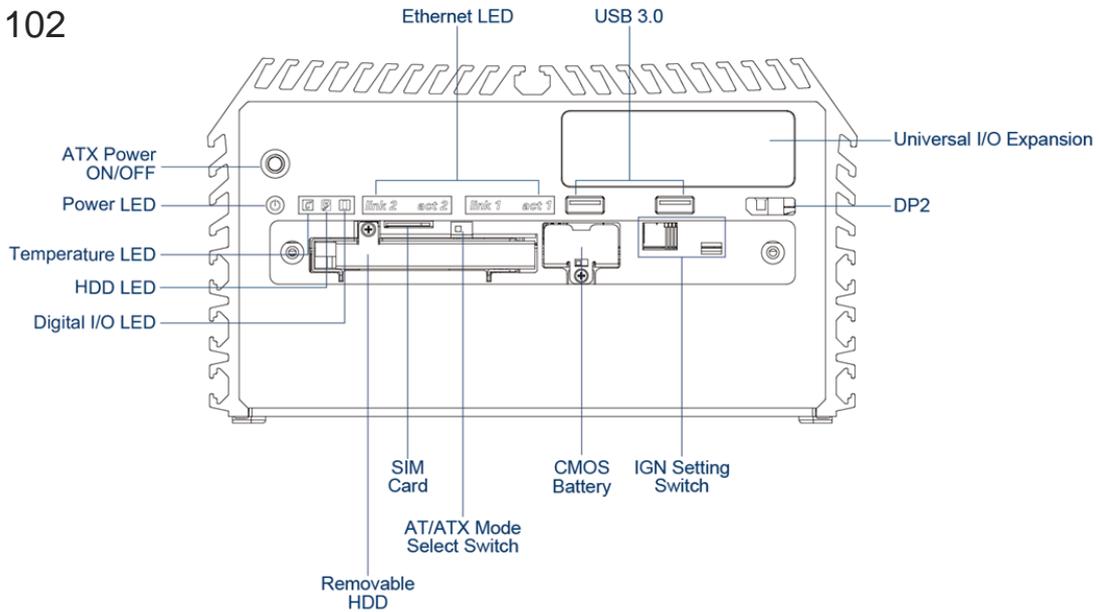
DS-1100



DS-1101



DS-1102



1.3.2 Rear

DC IN Terminal Block

Used to plug a DC power input with terminal block

External Fan Terminal Block

Used to plug a external fan with terminal block

DVI-I Port

Used to connect a DVI monitor or connect optional split cable for dual display mode

PS/2 Port

Used to connect the PS/2 device

LAN Port

Used to connect the system to a local area network

DisplayPort

Used to connect the system with DisplayPort Monitor

USB 3.0 Port

Used to connect USB 3.0/2.0/1.1 device

USB 2.0 Port

Used to connect USB 2.0/1.1 device

Antenna Hole

Used to install an antenna jack

COM Port

COM 1 ~ COM 2 support RS232/422/485 serial device

Mic-in

Used to connect a microphone

Line-out

Used to connect a speaker

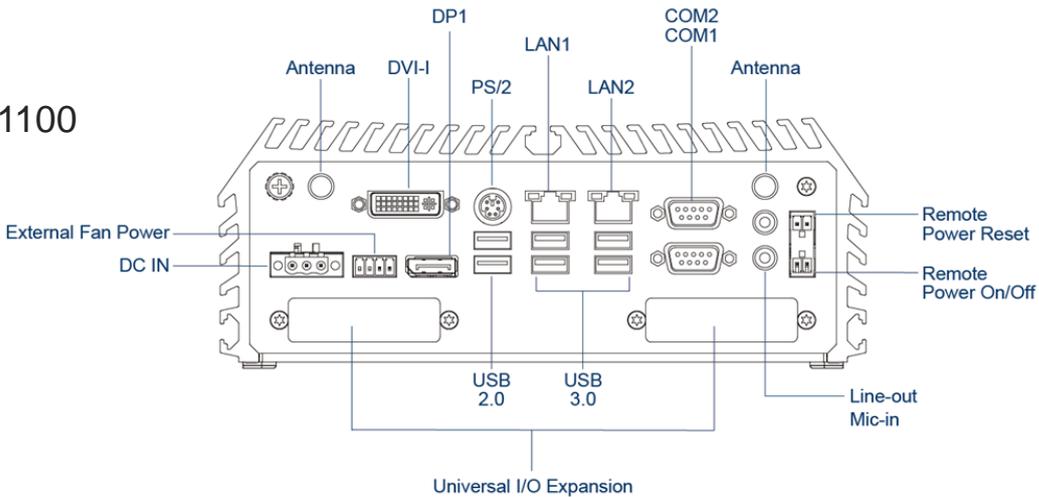
Remote Power on/off and Remote Power Reset Terminal Block

Used to plug a remote power on/off and remote power reset with terminal block

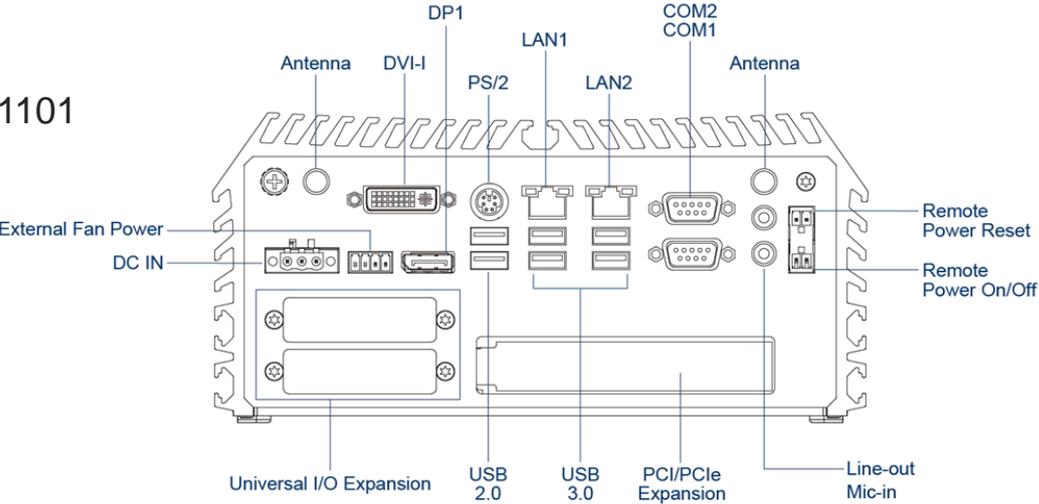
Universal I/O Bracket

Used to customized I/O output

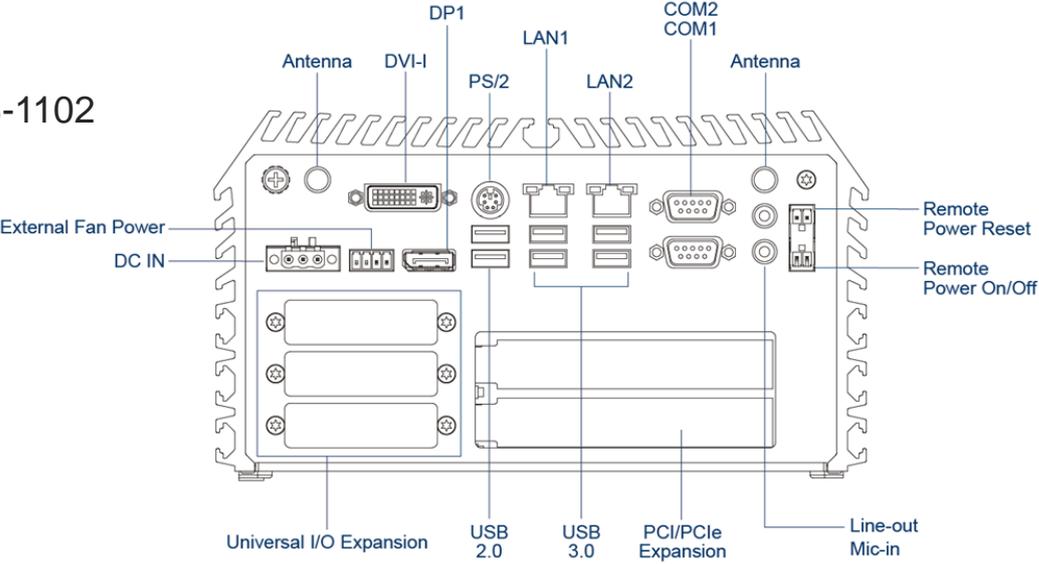
DS-1100



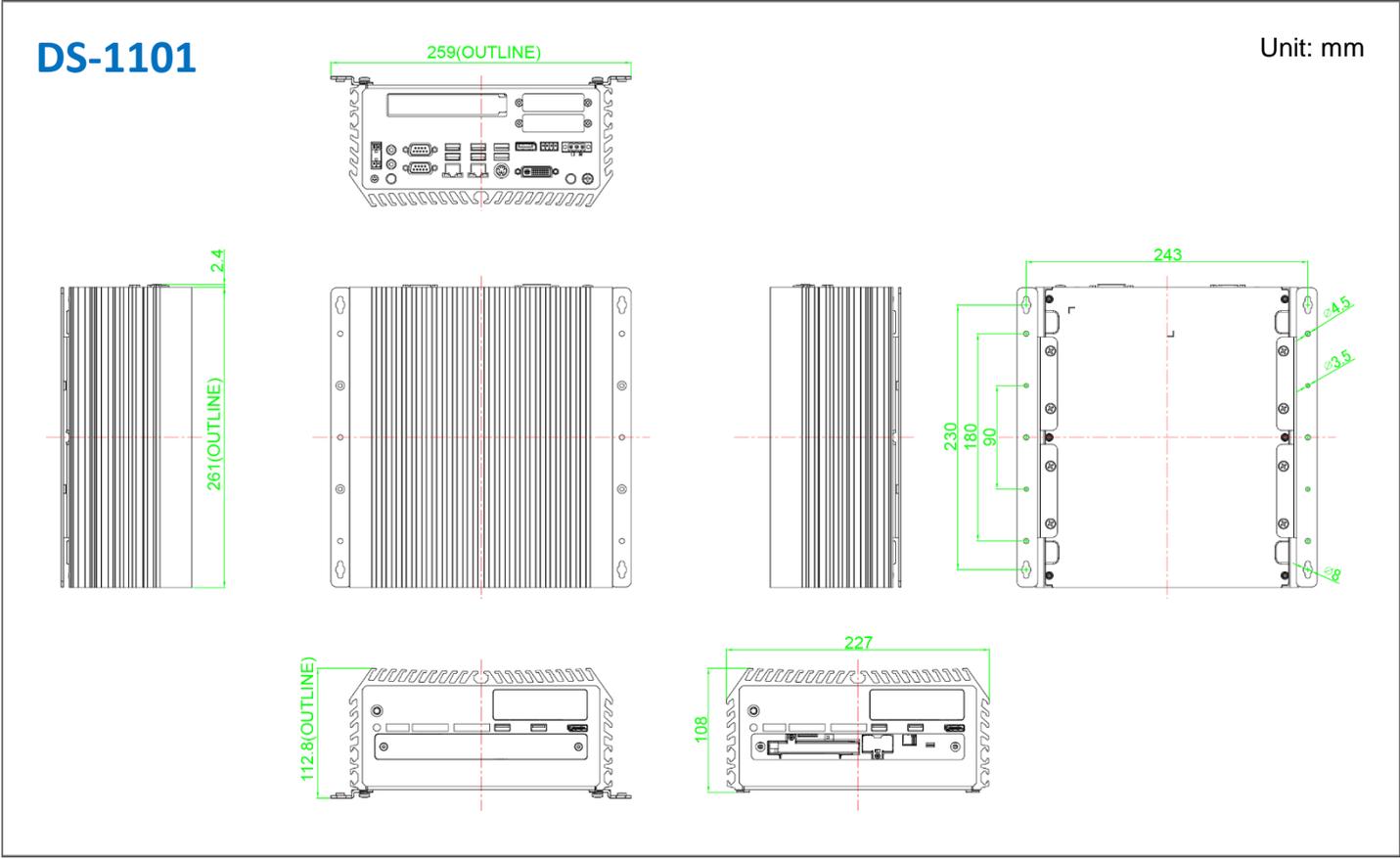
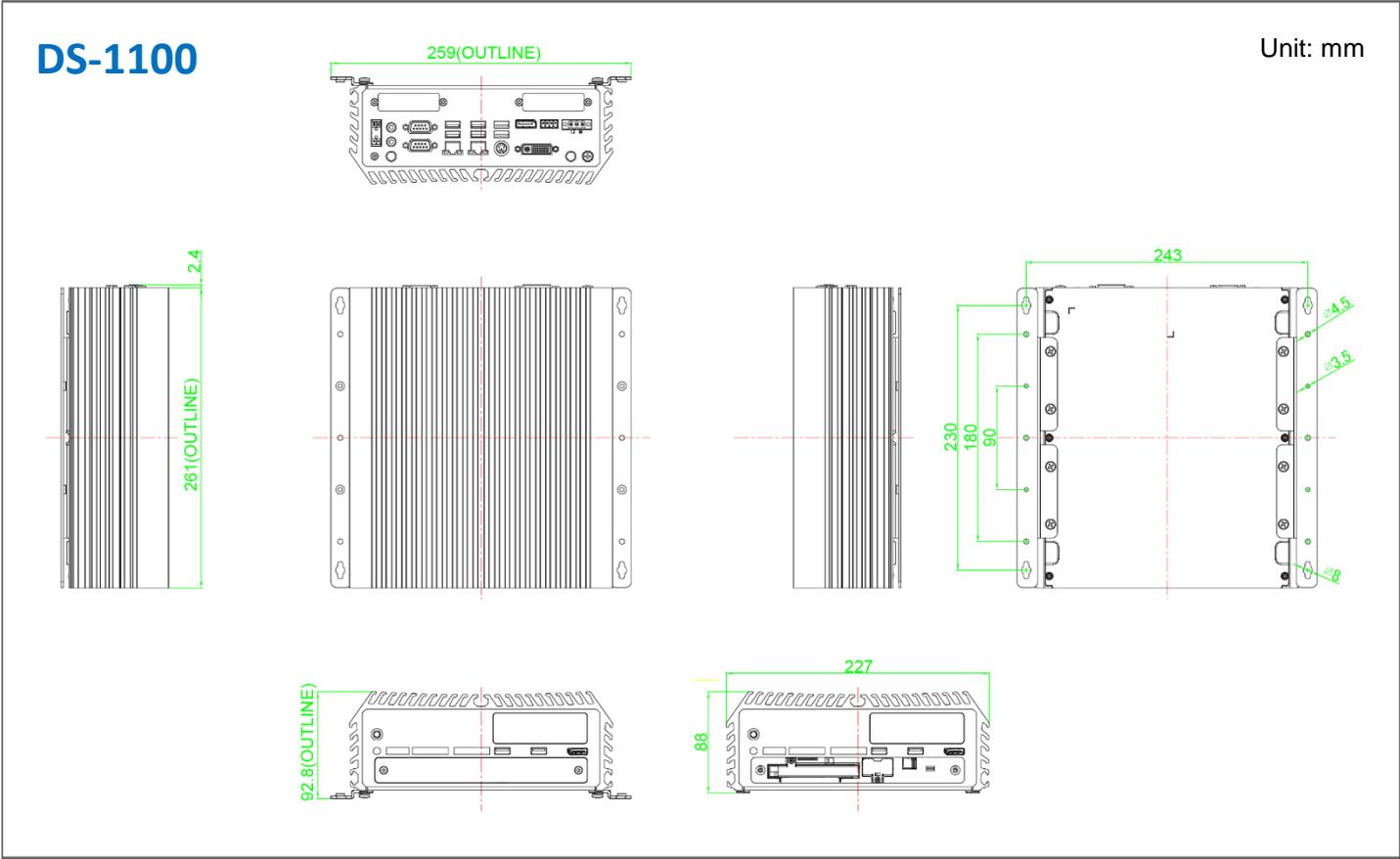
DS-1101



DS-1102

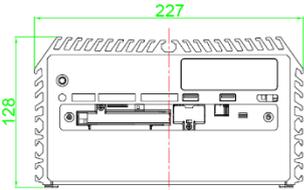
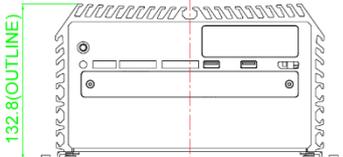
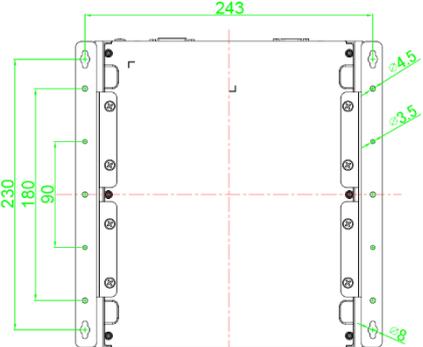
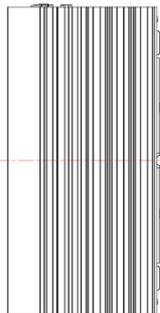
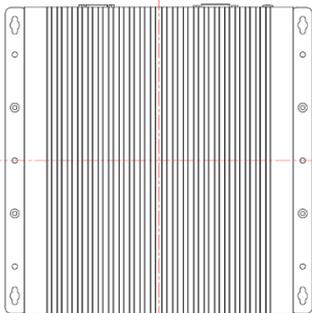
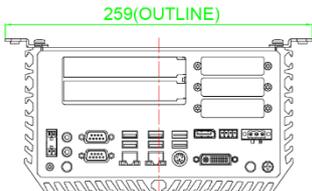
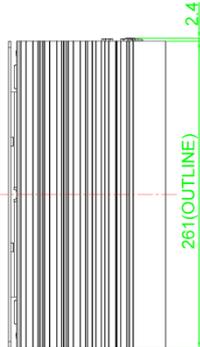


1.7 Mechanical Dimension



DS-1102

Unit: mm





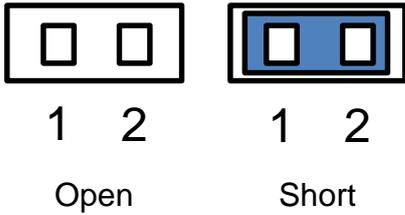
Chapter 2

Pin Definitions and Settings

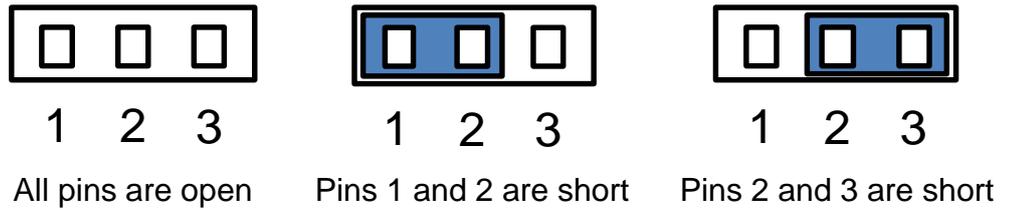
2.1 Settings

When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is **short**. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is **open**. Refer to below for examples of the 2-pin and 3-pin jumpers when they are short (on) and open (off).

Two-Pin Jumpers

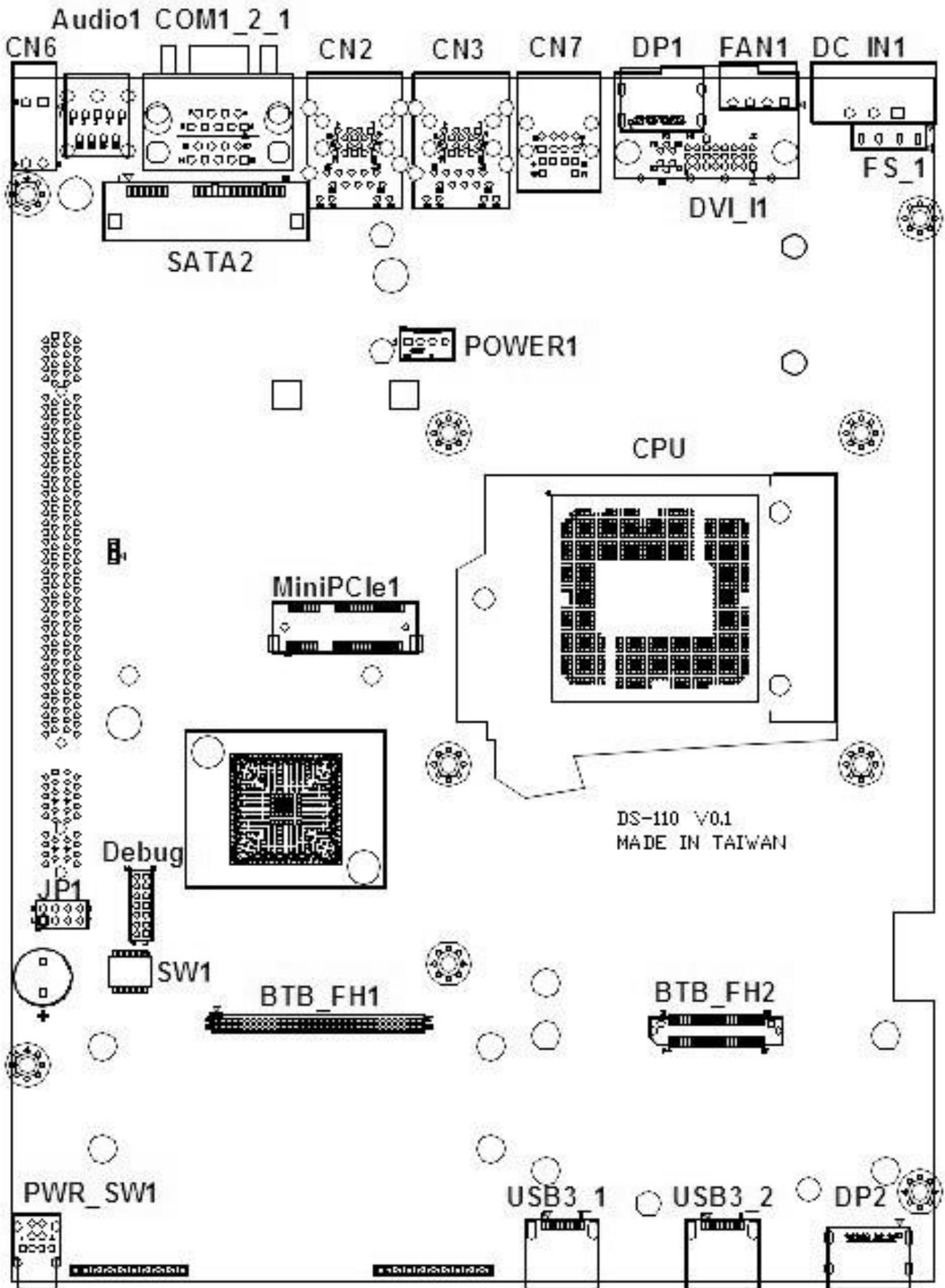


Three-Pin Jumpers

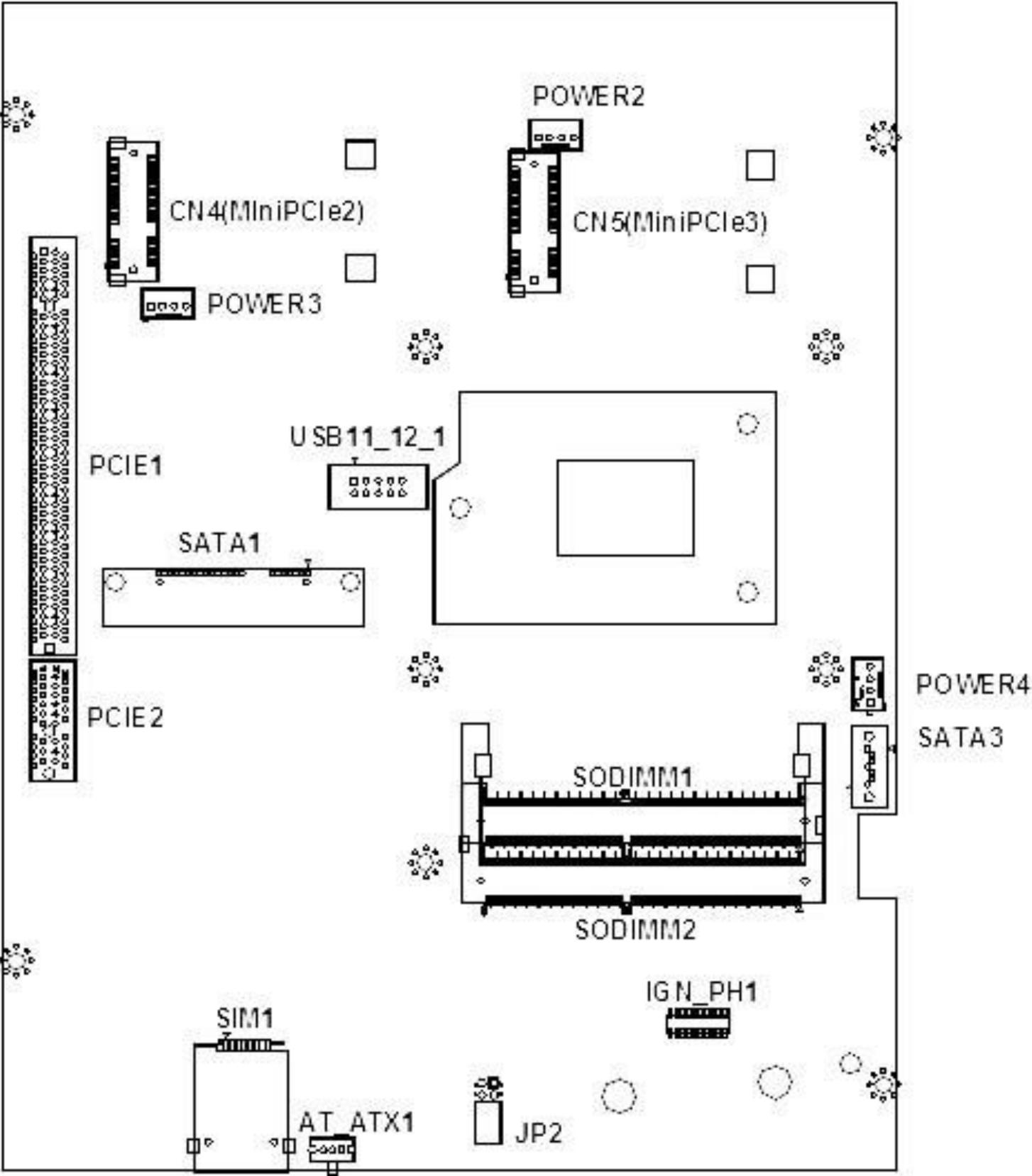


2.2 Location of the Connectors, Jumpers and Switches

2.2.1 Top View



2.2.2 Bottom View



2.3 Connector / Jumper / Switch Definition

List of Connector / Jumper / Switch

Connector Location	Definition
SW1	RTC/SATA DOM/COM1/COM2 Power Select
JP2	RTC Battery board to board connector
AT_ATX1	AT/ATX Power Mode Switch
LED1	System LED Connector
BTB_FH1	DIO+COM Port Board to Board Connector
BTB_FH2	PSE LAN Port Board to Board Connector
IGN_PH1	IGN Board to Board Connector
PWR_SW1	Power Switch
FS1	Input Fuse 15A
DC_IN1	3-pin DC 9~48V Power Input with Power Ignition Connector
FAN1	External PWM Fan Connector
DP1	DisplayPort Connector
DP2	DisplayPort Connector
DVI_I1	DVI-I Connector
CN7	PS/2 and USB2.0 Ports
CN2	LAN1 and USB3.0 Ports
CN3	LAN2 and USB3.0 Ports
COM1_2_1	COM1/COM2 RS232/RS422/RS485 Connector
AUDIO1	Audio Jack/MIC_IN/LINE_OUT
CN6	Remote Power on/off , Remote Reset Switch
USB3_1 , USB3_2	USB 3.0 Ports
SIM1	SIM Card Socket
SATA0,1	22 Pin SATA Connector
SATA3	SATA Dom Connector
Power 1~4	Power Connector
MINIPCIE1	Mini PCI-Express Socket + mSATA + 3G Module
CN4,5	Mini PCI-Express / mSATA Socket
USB11_12_1	Internal USB 2.0 Ports
PCIE1	PCI-Express x16 Socket
PCIE2	PCI-Express x1 Socket
SODIMM1,2	DDR4 SODIMM Socket

2.4 Definition of Switches

AT_ATX1: AT / ATX Power Mode Switch

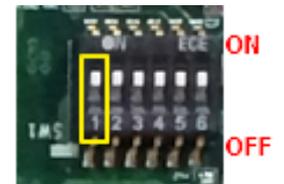
Pin	Definition
1-2 (Left)	AT Power Mode
2-3 (Right)	ATX Power Mode (Default)



SW1 Pin Defined: RTC / SATA DOM / COM1 / COM2 Power Select

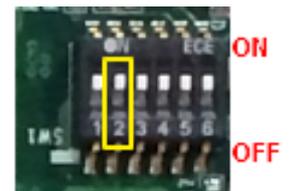
Super CAP Function Setting: Pin Define SW1 Switch

Switch mode	Function	ON	OFF
1	Super CAP	Enable (Default)	Disable



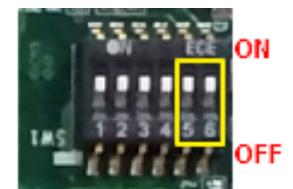
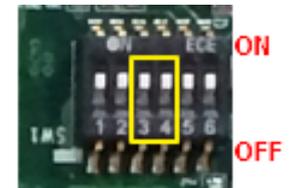
SATA DOM Function Setting : Pin Define SW1 Switch

Switch mode	Function	ON	OFF
2	SATA DOM	Disable (Default)	Enable



COM1/2 Voltage Function Setting : Pin Define SW1 Switch

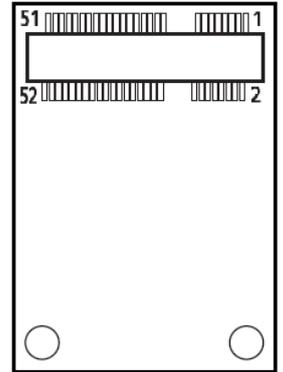
Switch mode	Function		ON	OFF
3-4	COM1	0V(RI)	ON/ON (Default)	
		5V	ON/OFF	
		12V	OFF/OFF	
5-6	COM2	0V(RI)	ON/ON (Default)	
		5V	ON/OFF	
		12V	OFF/OFF	



2.5 Definition of Connectors

CN8: Mini PCI-Express Socket (Support mSATA and SIM Card to Link feature)

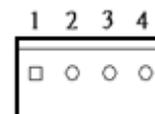
Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NA	37	RESERVED
2	3.3V	20	3.3V	38	USB_D+
3	NA	21	GND	39	RESERVED
4	GND	22	PERST#	40	GND
5	NA	23	PERN/SATARP	41	3.3V
6	1.5V	24	+3.3VAUX	42	NA
7	CLKREQ#	25	PERP/SATARN	43	GND
8	RESERVED	26	GND	44	NA
9	GND	27	GND	45	NA
10	SIM_DATA	28	+1.5V	46	NA
11	REFCLK-	29	GND	47	NA
12	SIM_CLK	30	SMB_CLK	48	+1.5V
13	REFCLK+	31	PETN/SATATN	49	NA
14	SIM_Reset	32	SMB_DATA	50	GND
15	GND	33	PETP/SATATP	51	NA
16	SIM_VPP	34	GND	52	+3.3V
17	NA	35	GND		
18	GND	36	USB_D-		



POWER1, POWER2, POWER3, POWER4: Power Connector

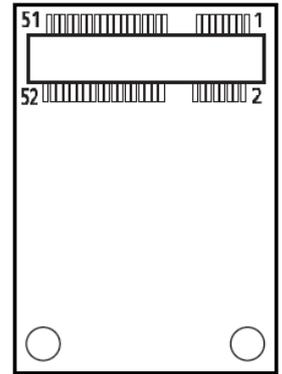
Connector Type: 1X4-pin Wafer, 2.54mm pitch

Pin	Definition
1	+5V
2	GND
3	GND
4	+12V



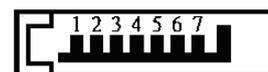
CN4/CN5: Mini PCI-Express Socket (Support mSATA feature)

Pin	Definition	Pin	Definition	Pin	Definition
1	WAKE#	19	NA	37	GND
2	3.3V	20	3.3V	38	USB_D+
3	NA	21	GND	39	3.3V
4	GND	22	PERST#	40	GND
5	NA	23	PERN/SATARP	41	3.3V
6	1.5V	24	+3.3VAUX	42	NA
7	NA	25	PERP/SATARN	43	GND
8	NA	26	GND	44	NA
9	GND	27	GND	45	NA
10	NA	28	+1.5V	46	NA
11	REFCLK-	29	GND	47	NA
12	NA	30	SMB_CLK	48	+1.5V
13	REFCLK+	31	PETN/SATATN	49	NA
14	NA	32	SMB_DATA	50	GND
15	GND	33	PETP/SATATP	51	NA
16	NA	34	GND	52	+3.3V
17	NA	35	GND		
18	GND	36	USB_D-		



SATA5: SATA Connector(SATA DOM)

Pin	Definition	Pin	Definition
1	GND	5	RX2-
2	TX2+	6	RX2+
3	TX2-	7	NC/+5V
4	GND		





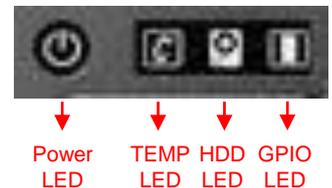
CLR_CMOS1: Clear BIOS Switch

Pin	Definition
1-2 (Left)	Normal Status (Default)
2-3 (Right)	Clear BIOS



LED PH1: PWR / TEMP / HDD / GPIO LED Status

LED B1	Status	LED Color
Power LED	Power ON	Green
	Standby	Blinking Green and Blue
HDD LED	HDD Read/Write	Blinking Yellow
TEMP LED	System Temp $\leq 65^{\circ}\text{C}$	Colorless
	$65^{\circ}\text{C} < \text{System Temp} \leq 70^{\circ}\text{C}$	Blue
	$70^{\circ}\text{C} < \text{System Temp} \leq 75^{\circ}\text{C}$	Red
	$75^{\circ}\text{C} < \text{System Temp}$	Blinking Red



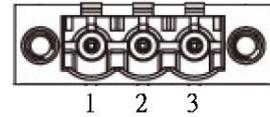
LAN LED Status Defines

Act LED Status	Definition	Link LED Status	Definition
Blinking Yellow	Data Activity	Steady Green	1Gbps Network Link
Off	No Activity	Steady Orange	100Mbps Network Link
		Off	10Mbps Network Link

DC_IN1: DC Power Input Connector (+9~48V)

Connector Type: Terminal Block 1X3 3-pin, 5.0mm pitch

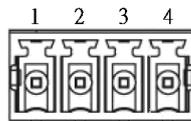
Pin	Definition
1	+9~48VIN
2	Ignition (IGN)
3	GND



FAN1: External PWM Fan Connector

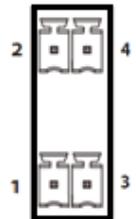
Connector Type: Terminal Block 1X3 3-pin, 3.5mm pitch

Pin	Definition
1	GND
2	+12V
3	SENSE
4	Control



CN6: Remote Power On/Off, Reset Switch

Pin	Definition
2	RESET_SW
4	GND



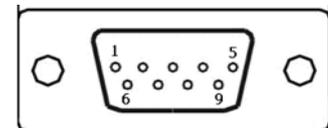
CN6: Power On/Off, SW Switch

Pin	Definition
1	PWR_SW
3	GND

COM1_2_1: RS232 / RS422 / RS485 Connector

Connector Type: 9-pin D-Sub

COM1/COM2			
DB9 Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD	TX-	DATA-
2	RXD	TX+	DATA+
3	TXD	RX+	
4	DTR	RX-	
5	GND		
6	DSR		
7	RTS		
8	CTS		
9	RI		



Optional Low Speed CMI Module (CMI-CD100)

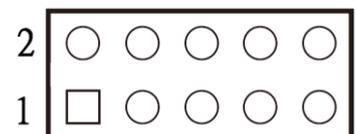
Model No.	Description
CMI-CD100/FB20	CMI Module with 4x RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1100 Front Bezel
CMI-CD100/FB21	CMI Module with 4x RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1101 Front Bezel
CMI-CD100/FB22	CMI Module with 4x RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1102 Front Bezel



COM34_SEL1: COM3 / COM4 with Power Select

Connector Type: 2X5 10-pin Header, 2.54mm pitch

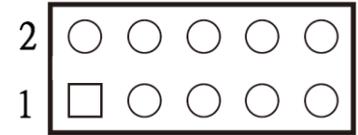
COM3		COM4	
Pin	Definition	Pin	Definition
1-3 On	+5V	2-4 On	+5V
3-5 On	+12V	4-6 On	+12V
7-9 On (Default)	RI3	8-10 On (Default)	RI4



COM56_SEL1: COM5 / COM6 with Power Select

Connector Type: 2X5 10-pin Header, 2.54mm pitch

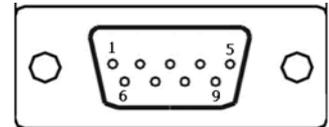
COM5		COM6	
Pin	Definition	Pin	Definition
1-3 On	+5V	2-4 On	+5V
3-5 On	+12V	4-6 On	+12V
7-9 On (Default)	RI5	8-10 On (Default)	RI6



DTB-COM: RS232 / RS422 / RS485 Connector

Connector Type: 9-pin D-Sub

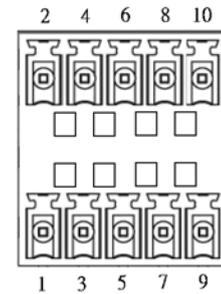
COM3/COM4/COM5/COM6			
DB9 Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1	DCD	TX-	DATA-
2	RXD	TX+	DATA+
3	TXD	RX+	
4	DTR	RX-	
5	GND		
6	DSR		
7	RTS		
8	CTS		
9	RI		



DIO1: Digital Input / Output Connector

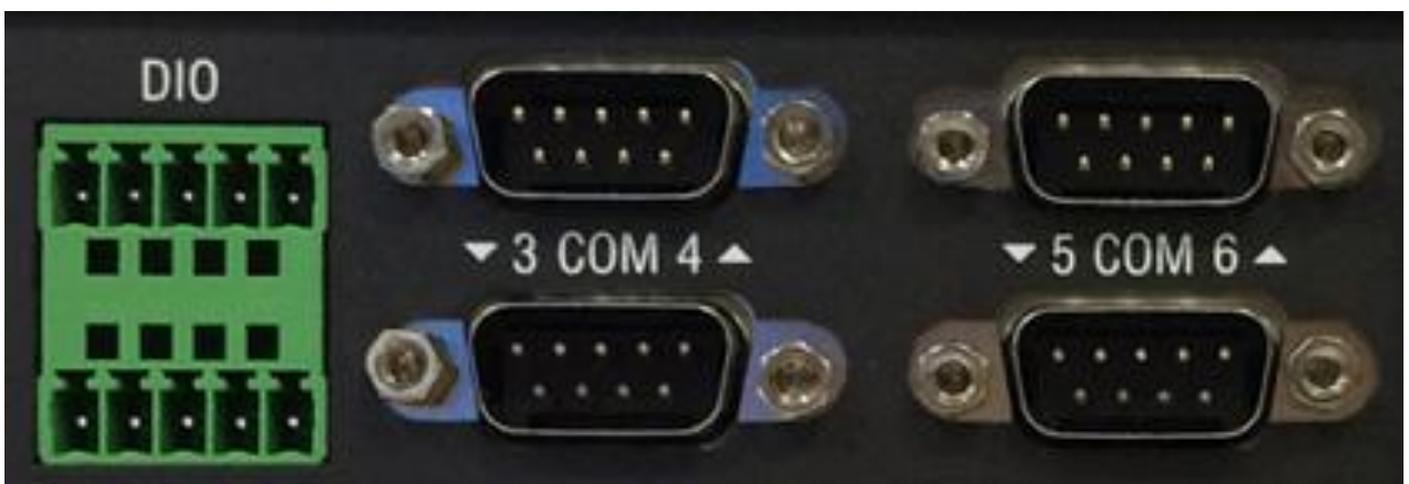
Connector Type: Terminal Block 2X5 10-pin, 3.5mm pitch

Pin	Definition	Pin	Definition
1	DI1	2	DO1
3	DI2	4	DO2
5	DI3	6	DO3
7	DI4	8	DO4
9	DC INPUT	10	GND



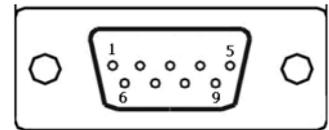
Optional Low Speed CMI Module (CMI-ICD100)

Model No.	Description
CMI-ICD100/FB20	CMI Module with 4x Electrical Isolated RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1100 Front Bezel
CMI-ICD100/FB21	CMI Module with 4x Electrical Isolated RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1101 Front Bezel
CMI-ICD100/FB22	CMI Module with 4x Electrical Isolated RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1102 Front Bezel



DTB-COM: RS232 / RS422 / RS485 Connector

Connector Type: 9-pin D-Sub



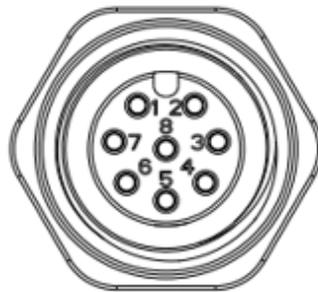
COM3/COM4/COM5/COM6			
DB9 Pin	RS232 Definition	RS422 / 485 Full Duplex Definition	RS485 Half Duplex Definition
1		TX-	DATA-
2	RXD	TX+	DATA+
3	TXD	RX+	
4		RX-	
5	Isolated GND		
6			
7	RTS		
8	CTS		
9			

Note: COM3/4/5/6 are isolated COM, each pin5 (GND) is independent.

Optional High Speed CMI Module (CMI-M12LAN104 / CMI-M12POE104)

Model No.	Description
CMI-M12LAN104/UB0710	CMI Module with M12 Connector, 4x Intel GbE LAN, 1x Universal Bracket
CMI-M12PoE104/UB0710	CMI Module with M12 Connector, 4x PoE+, Intel GbE LAN, Individual Port 25.5W, 1x Universal Bracket

CMI-M12LAN104 Connector

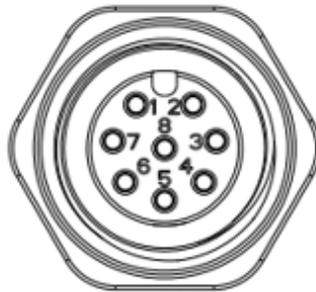


CMI-M12 LAN Module Pin Definitions

Connector Type: M12 A coded 8pin connector

Pin	Definition	Pin	Definition
1	2_LAN1_0+	2	2_LAN1_0-
3	2_LAN1_1+	4	2_LAN1_2+
5	2_LAN1_2-	6	2_LAN1_1-
7	2_LAN1_3+	8	2_LAN1_3-

CMI-M12 POE 114 Connector



CMI-M12 PoE Module Pin Definitions

Connector Type: M12 A coded 8pin connector
 POE type: Midspan (B-Type)

Pin	Definition	Pin	Definition
1	2_LAN1_0+	2	2_LAN1_0-
3	2_LAN1_1+	4	2_LAN1_2+(Power PIN)
5	2_LAN1_2-(Power PIN)	6	2_LAN1_1-
7	2_LAN1_3+(Power PIN)	8	2_LAN1_3-(Power PIN)

Optional CFM-IGN Power Ignition Module

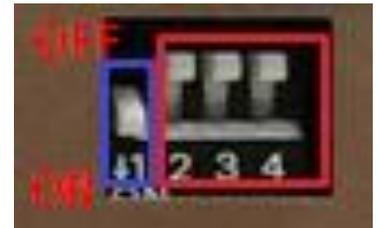
Model No.	Description
CFM-IGN101	CFM Module with Power Ignition Sensing Control Function, 12V/24V Selectable (43 x 36 mm)

Power Ignition Setting

Connector Location	Definition
SW2	Ignition Function Setting
24V_12V_1	24V/ 12V Power Switching for Ignition Board

SW2: Set shutdown delay timer when ACC is turned off

Pin 1	Pin 2	Pin 3	Pin 4	Definition
OFF / ON	ON	ON	ON	0 second
	ON	ON	OFF	1 minute
	ON	OFF	ON	5 minutes
	ON	OFF	OFF	10 minutes
	OFF	ON	ON	30 minutes
	OFF	ON	OFF	1 hour
	OFF	OFF	ON	2 hours
	OFF	OFF	OFF	Reserved (0 second)



12V_24V_1: 12V / 24V Car Battery Switch

Pin	Definition
1-2	24V Car Battery Input
2-3	12V Car Battery Input





Chapter 3

System Setup

3.1 Disassembling the System for Installation



WARNING

In order to prevent electric shock or system damage, before removing the chassis cover, must turn off power and disconnect the unit from power source.

1. Turn over the unit to have the bottom side face up, unscrew the 6 screws of bottom cover and place them aside for later use.



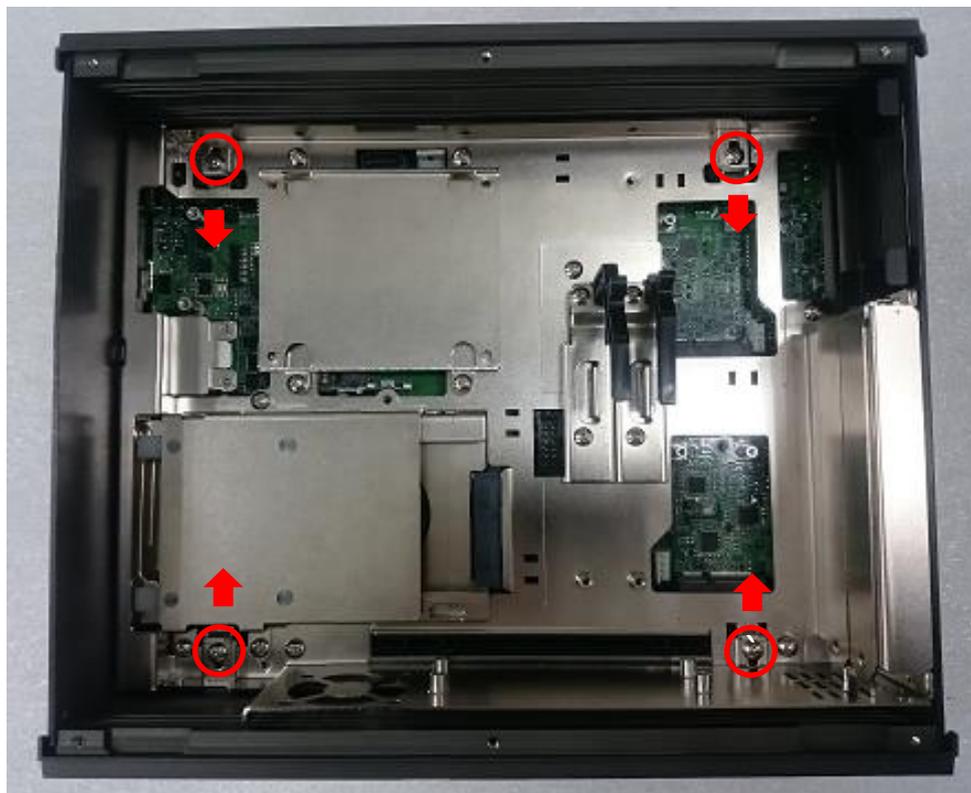
2. Remove the bottom cover from the chassis.



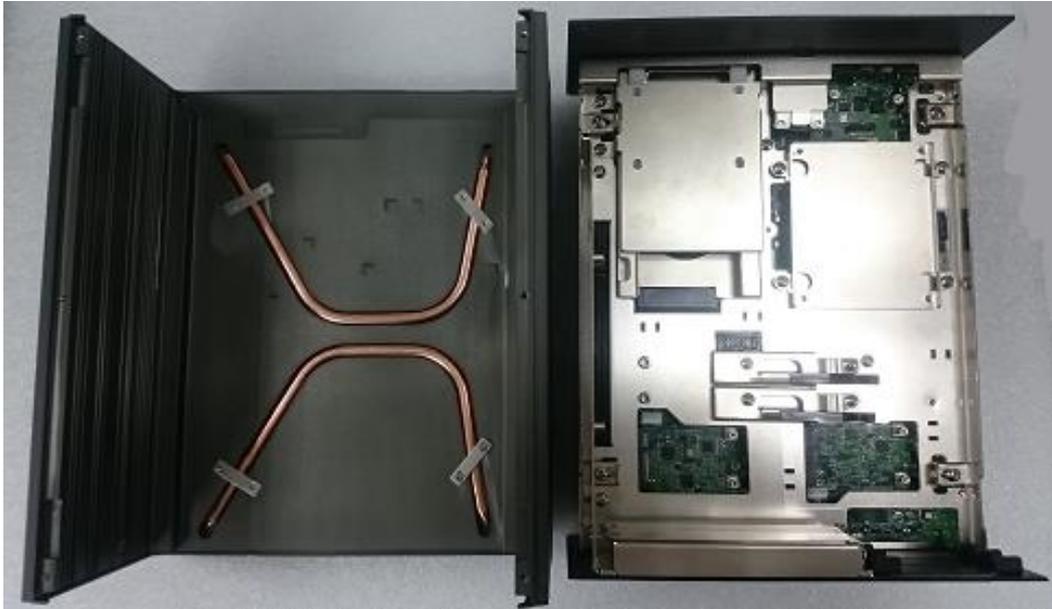
3. Unscrew the 2 screws at rear panel as marked on photo and place them aside for later use.



4. Loosen the 4 screws. Pull out 4 latches as marked on photo.



5. Lift up the unit vertically by holding the front and rear panel.



6. Turn over the body of the unit and place it gently.



3.2 Installing the CPU

1. Locate the CPU socket , remove the protection cover on it.



2. Press the CPU socket lever and pull it aside away from the socket to unlock it. Pull back the lever to open the socket.



3. Align the notches on CPU with the alignment post on socket.

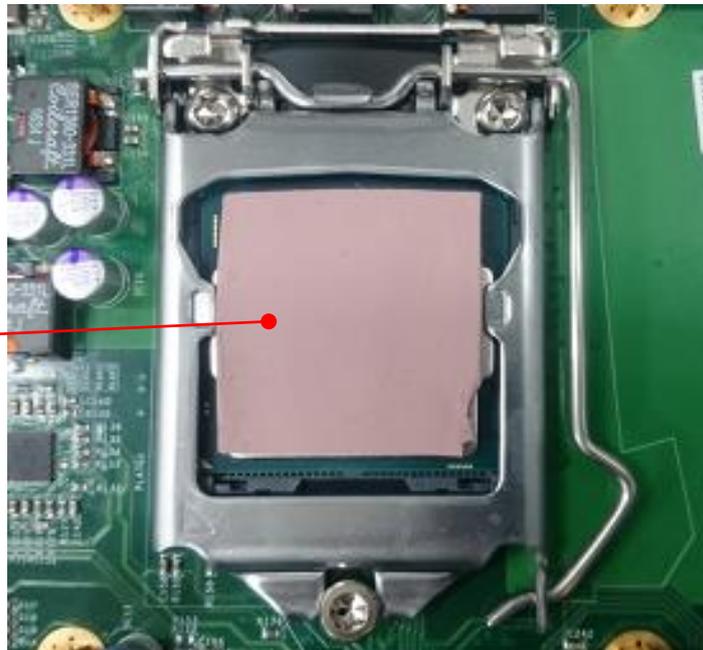


4. The notches of socket provide the space for fingers while lowering the CPU, hold the CPU by the edges toward the notches and insert the CPU gently.

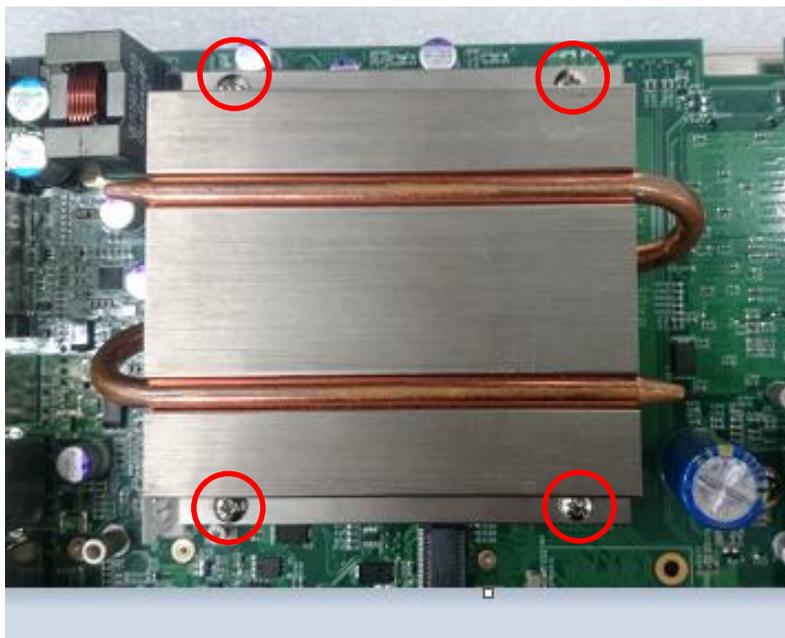


5. Place the thermal pad on the CPU heat spreader. Press down the socket lever to lock the CPU.

Thermal pad



6. Align mounting holes of heat sink with the nut studs and fasten the heat sink with provided 4 screws.

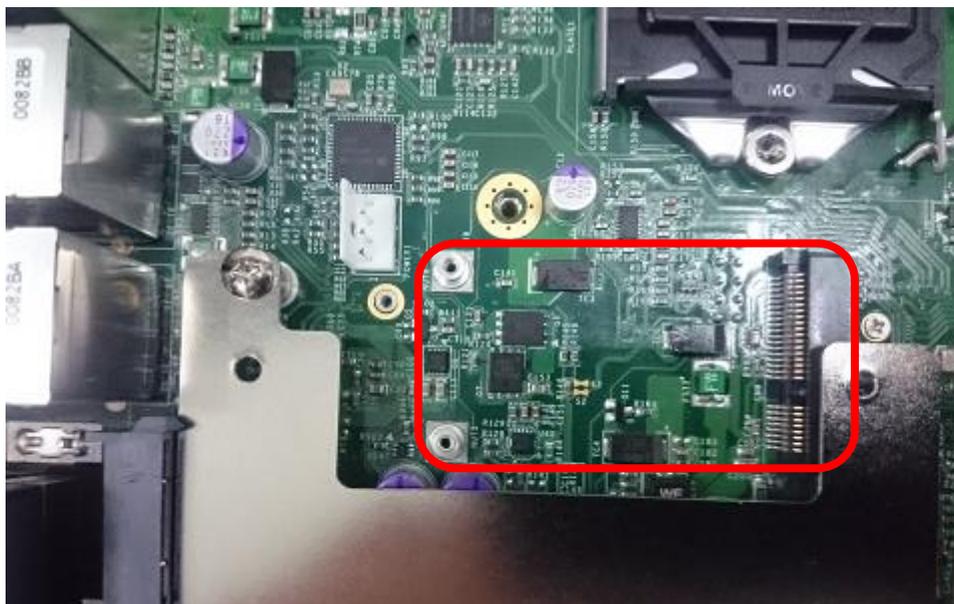


7. Place thermal pad on the top of CPU heatsink in order to provide a seamless contact with the body of chassis to create a efficient heat dissipation.



3.3 Installing a Mini-PCle/mSATA Card on Top Side (Applicable for full or half size card)

1. Locate the Mini PCIe slot on top side of system.



- Use provided two screws fasten the half size module and adapter bracket together as shown in Fig (a) below.



(a) Half Size Mini-PCIe Card



(b) Full Size Mini-PCIe Card

- Tilt the Mini PCIe module at a 45 degree angle and insert it to the slot until the gold-pated connector of module contacted firmly with the slot.



- Press down the module and fasten two screws to secure the module.



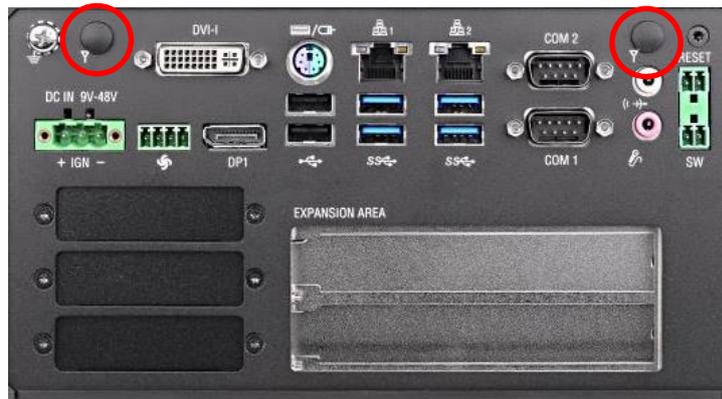
3.4 Installing Antennas



CAUTION

Please installing a Mini PCIe Wireless Lan Card on top side before you put on washer and fasten the nut with antenna jack.

1. Remove the antenna hole covers at rear panel.



2. Have antenna jack penetrate through the hole.



3. Put on washer and fasten the nut with antenna jack.



4. Assemble the antenna and antenna jack together.



5. Attach the RF connector at another end of cable onto the module.

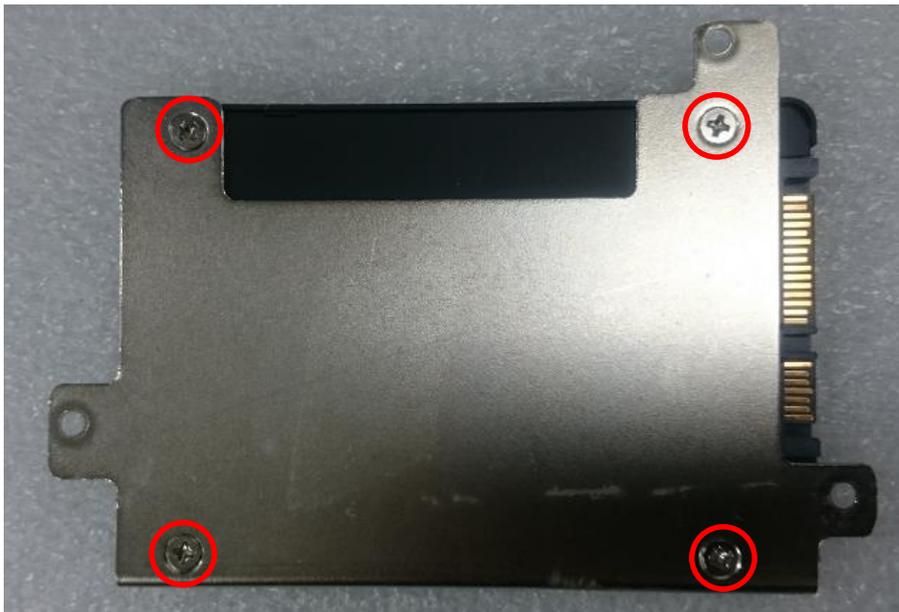


3.5 Installing a SATA Hard Drive on Top Side

1. Unscrew the 3 screws on HDD bracket and remove the bracket.



2. Make the PCB side of the HDD face up, place the HDD bracket on it. Ensure the direction of bracket is correct and use 4 provided screws to assemble HDD and HDD bracket together.



3. Turn over the HDD bracket. Connect the HDD bracket to the SATA connector and fasten the 3 screws .



3.6 Installing a Low Speed CMI Module

The applicable low speed CMI modules for DS1100 series are listed in the following table.

Model No.	Description
CMI-CD100/FB20	CMI Module with 4x RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1100 Front Bezel
CMI-CD100/FB21	CMI Module with 4x RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1101 Front Bezel
CMI-CD100/FB22	CMI Module with 4x RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1102 Front Bezel
CMI-ICD100/FB20	CMI Module with 4x Electrical Isolated RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1100 Front Bezel
CMI-ICD100/FB21	CMI Module with 4x Electrical Isolated RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1101 Front Bezel
CMI-ICD100/FB22	CMI Module with 4x Electrical Isolated RS-232/422/485 Serial Ports, 8x Optical Isolated DIO (4 in/4 out), 1x DS-1102 Front Bezel

Note: The photo example used in this section is illustrated CMI-ICD100/FB22 module.

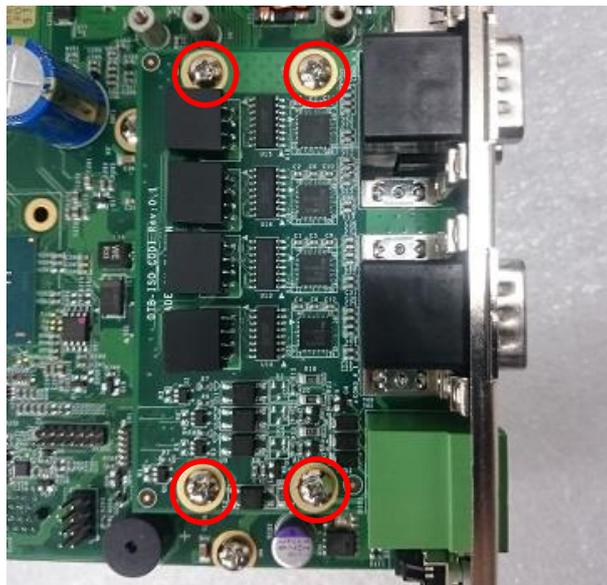
1. Loosen the 2 hex nuts from back side of front bezel. Remove the front bezel.



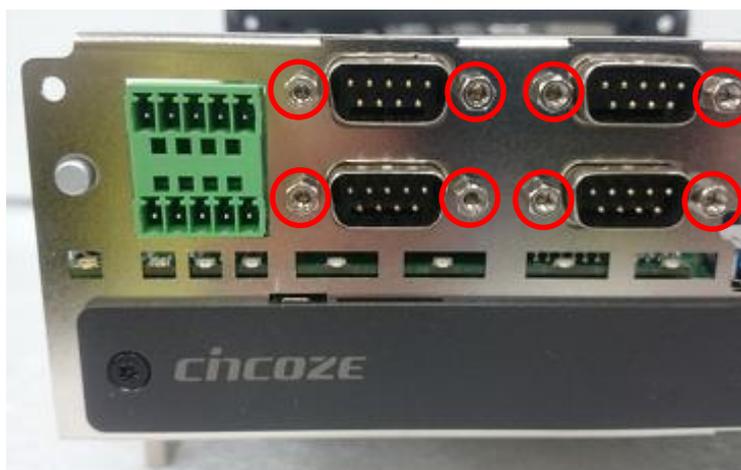
2. Locate the connector of CMI-module on top side of system.



3. Insert the CMI module carefully into the CMI connector on main board.
Fix it with 4 screws.



4. Fasten the 8 D-Sub jack screws as marked on photo.



5. Exchange with the front bezel of low speed CMI module as illustrated.



front bezel for CMI-COM module



6. Fasten the 2 hex nuts from the back side of front bezel.



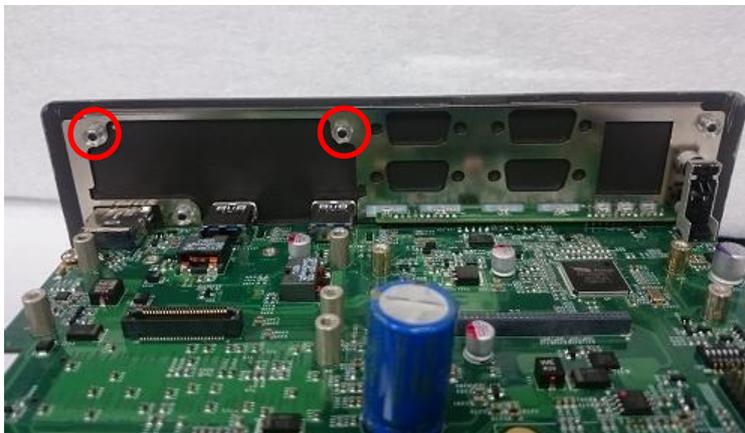
3.8 Installing a High Speed CMI Module

The applicable high speed CMI modules for DS1100 series are listed in the following table.

Model No.	Description
CMI-LAN104/UB0612	CMI Module with 4x Intel GbE LAN, RJ45 Port, 1x Universal Bracket (67 x 15 mm)
CMI-PoE104/UB0612	CMI Module with 4x PoE+, Intel GbE LAN, RJ45 Port, Individual Port 25.5W, 1x Universal Bracket (67 x 15 mm)
CMI-M12LAN104/UB0610	CMI Module with M12 Connector, 4x Intel GbE LAN, 1x Universal Bracket (67 x 15 mm)
CMI-M12PoE104/UB0610	CMI Module with M12 Connector, 4x PoE+, Intel GbE LAN, Individual Port 25.5W, 1x Universal Bracket (67 x 15 mm)

Note: The photo example in this section is illustrated by CMI-M12PoE104/UB0610 module.

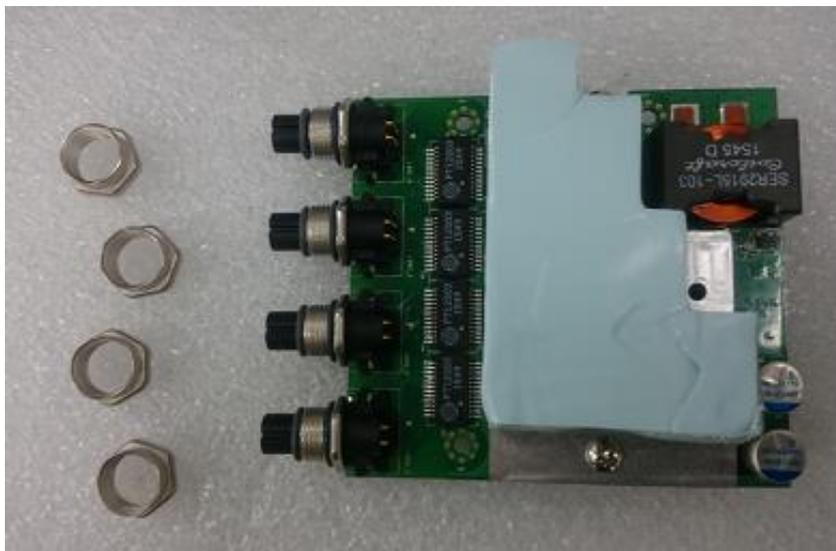
1. Loosen the 2 hex nuts from back side of front bezel. Remove the front bezel.



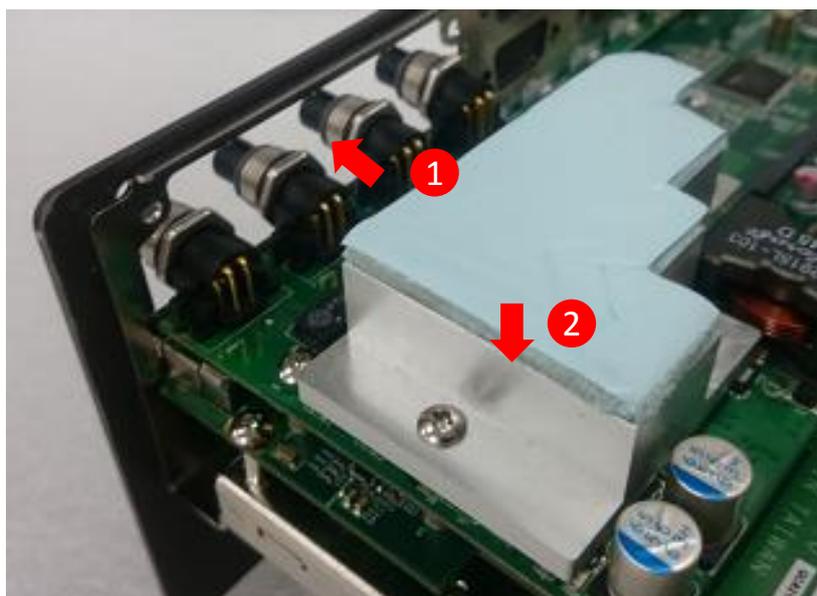
2. Locate the connector of CMI module on top side of system.



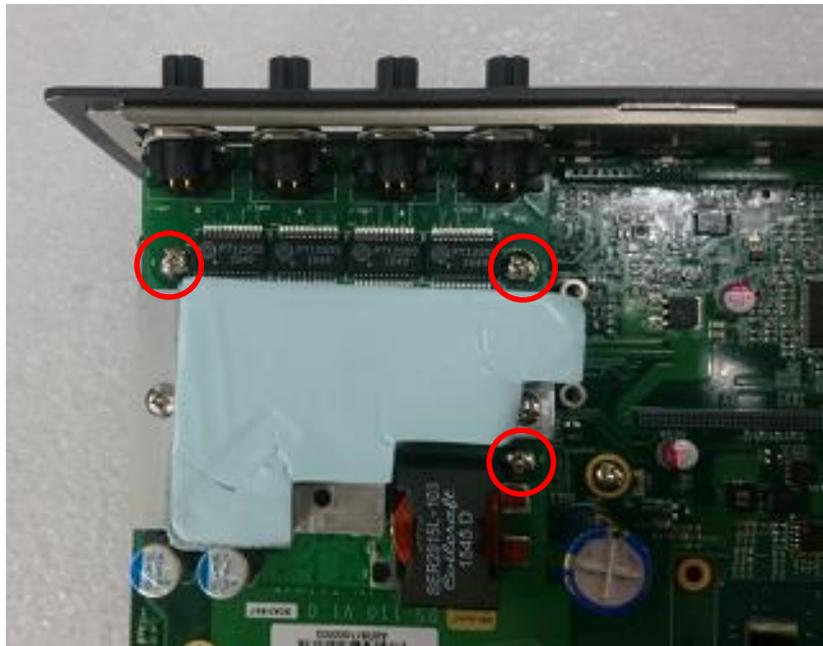
3. Remove the 4 ring nuts from M12 jack before attempting to install the module.



4. (1) Penetrate M12 jack of the module through the I/O hole. (2) Insert the LAN module carefully into the CMI connector on main board as illustrated.



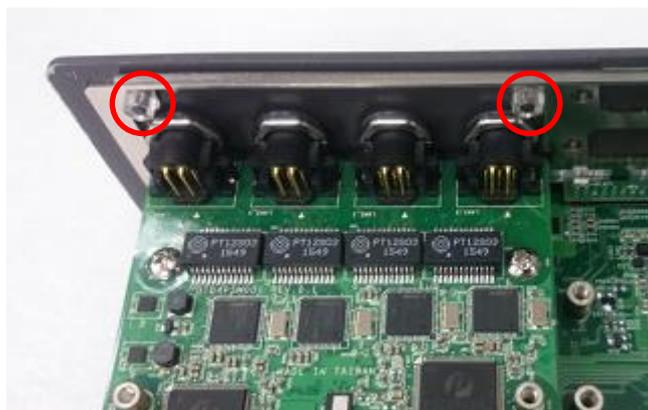
5. Fasten 3 screws to fix the module.



6. Attach the M12 I/O bracket, and fasten 2 hex nuts from the back side of the bracket.



M12 I/O bracket



7. Fasten the 4 ring nuts onto M12 jacks.



3.8 Installing a Mini-PCle /mSATA Card at Bottom Side (Applicable for full or half size card)

1. Turn over the body of the unit. Locate Mini-PCle (mSATA) slots at the bottom.



2. Tilt the Mini-PCle module at a 45 degree angle and insert it to the slot until the gold-pated connector of module contacted firmly with the slot.

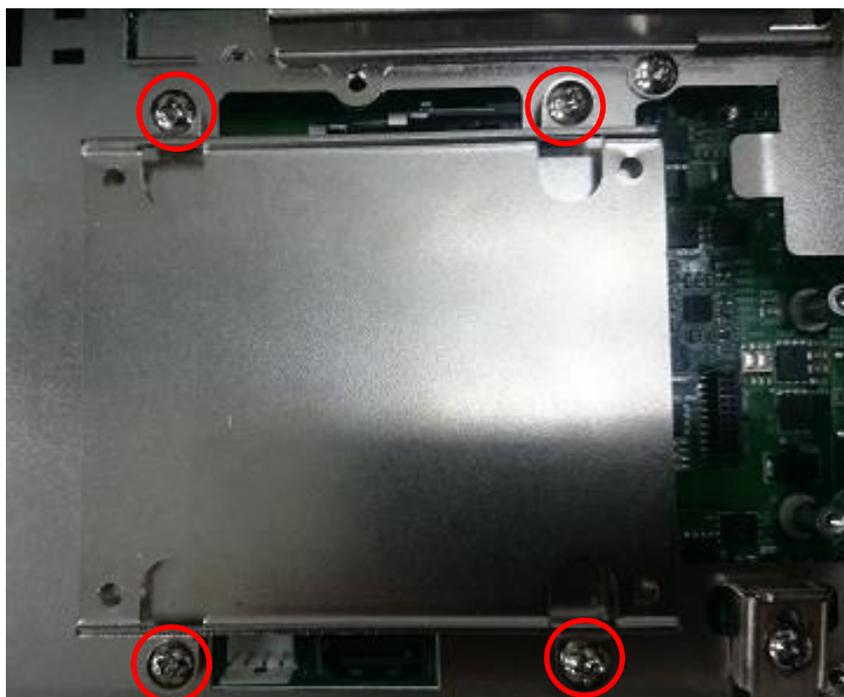


3. Press down the module and use previous two screws to fix the module.

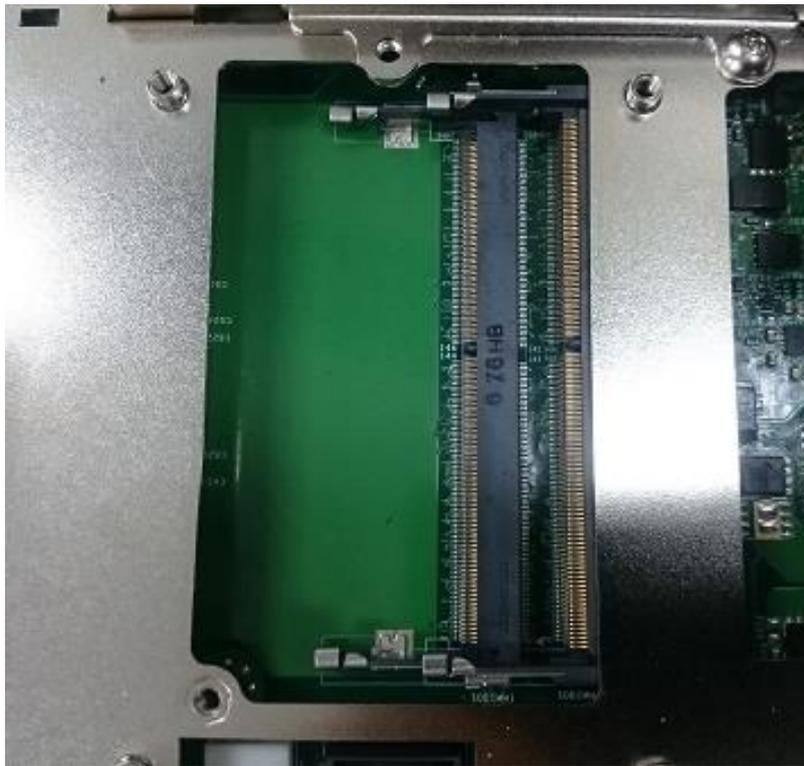


3.9 Installing SO-DIMM Memory

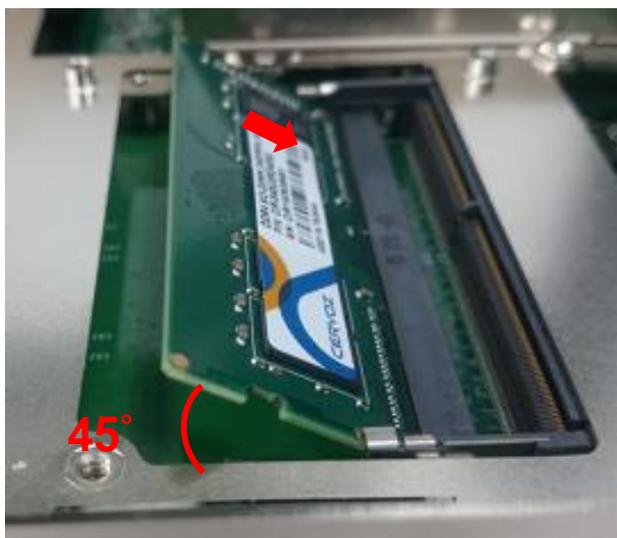
1. Locate the SO-DIMM sockets at the bottom side of system. Unscrews the 4 screws and remove the bracket.



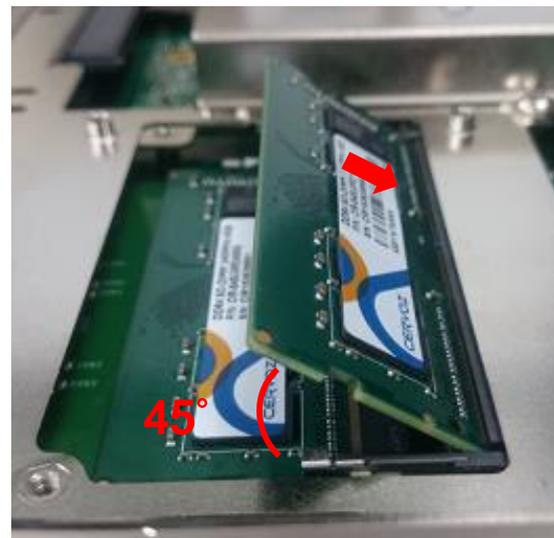
2. Locate two SO-DIMM sockets at the bottom.



3. Tilt the SO-DIMM module at a 45 degree angle and insert it to SO-DIMM socket until the gold-pated connector of module contacted firmly with the socket.



Lower socket

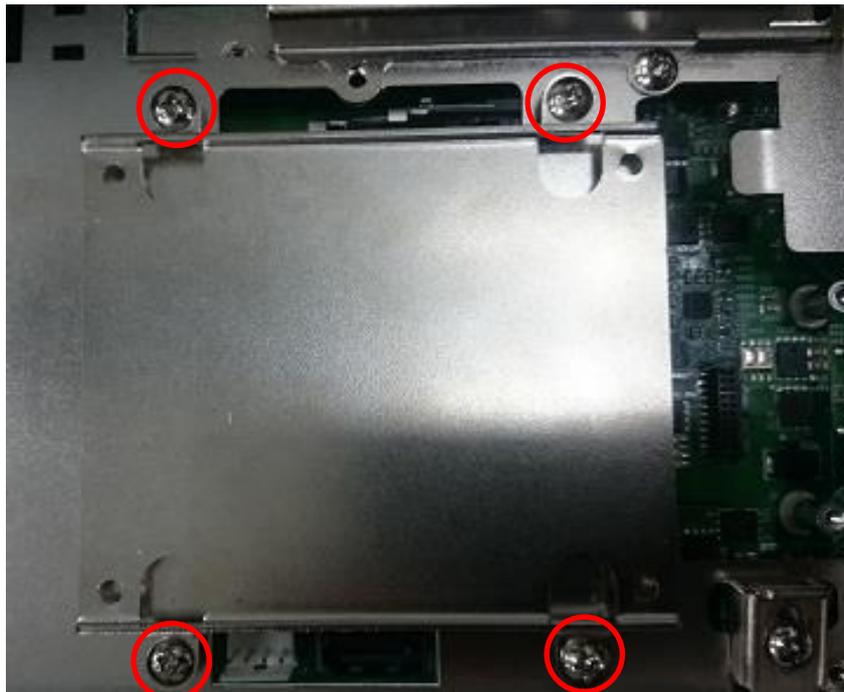


Upper socket

4. Press the modules down until it's fixed firmly by the two locking latches on the sides.



5. Put the cover back and fix the cover with 4 screws.

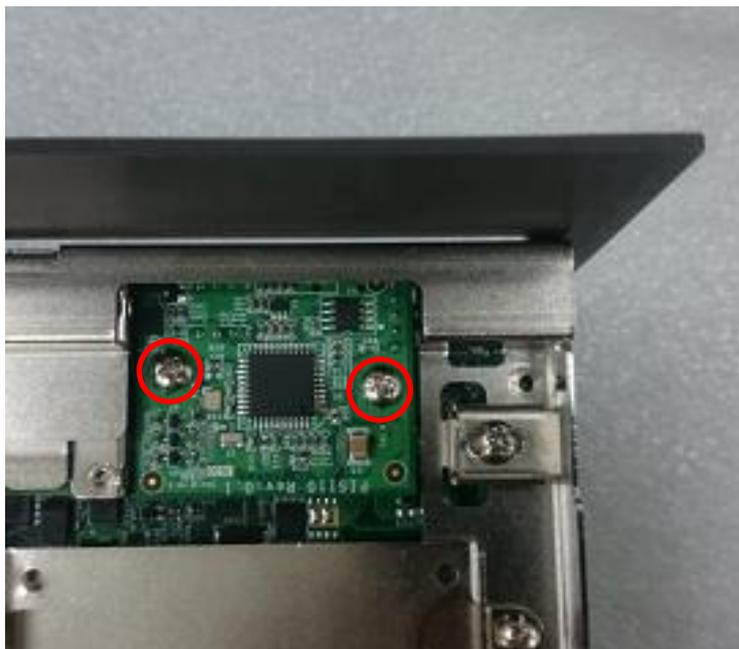


3.10 Installing a CFM-IGN Power Ignition Module

1. Locate power ignition connector on main board.



2. Insert the power ignition module carefully into the connector on main board. Fasten 2 screws to fix it.



3.11 Installing the Internal FAN (For DS-1102 only)

1. Unscrew 6 screws to remove 3 I/O brackets from rear panel.



2. Attach the FAN from back side of rear panel. Fasten 4 screws to fix it.



3. Connect the FAN power cable to the power connector on main board.as marked on photo.



3.12 Installing a PCI/PCIe Add-on Card (For DS-1101 and DS-1102 only)

The applicable riser cards for DS-1100 series are listed in the following table.

Model No.	Description
RC-E16-01	Riser Card 1 x PCIe16
RC-PI-01	Riser Card 1 x PCI
RC-E16E1-01	Riser Card 1 x PCIe16, 1 x PCIe1
RC-E8E8-01	Riser Card 2 x PCIe8
RC-E16PI-01	Riser Card 1 x PCIe16, 1 x PCI
RC-PIPI-01	Riser Card 2 x PCI

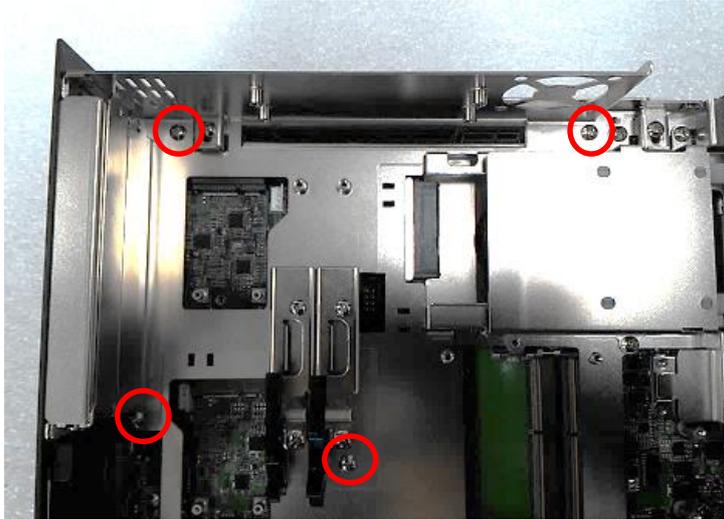
Note: The photo example in this section is illustrated by RC-E16PI-01 module.

1. Prepare a Riser Card intended for installation.

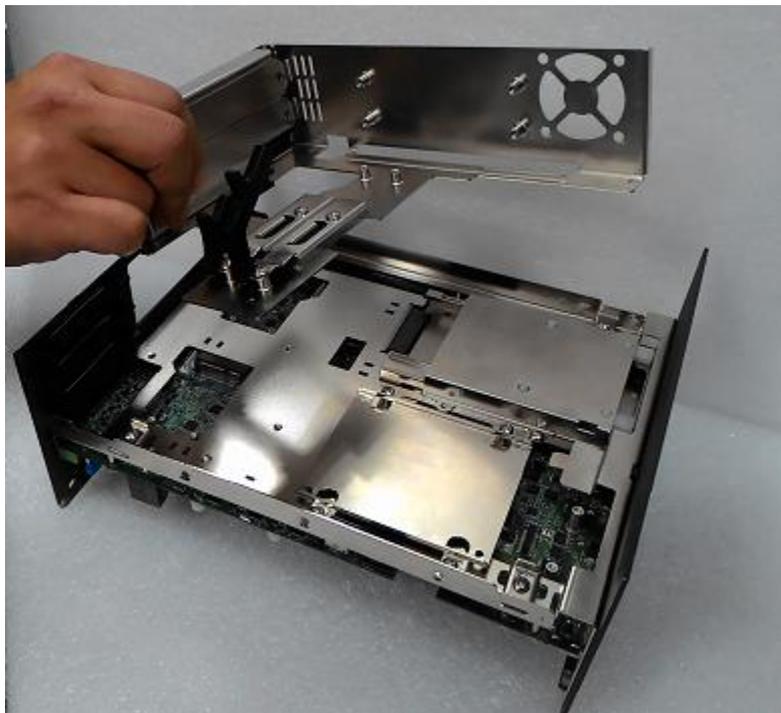


Riser Card RC-E16PI-01

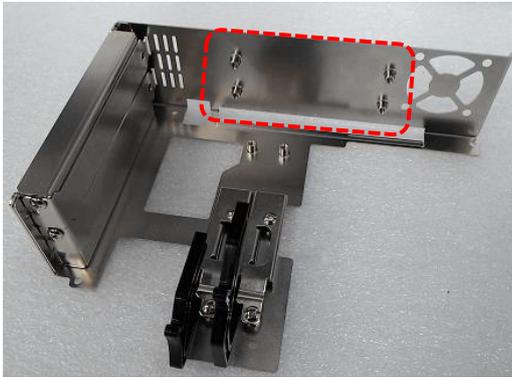
1. Unscrew the 4 screws to remove the extension bracket.



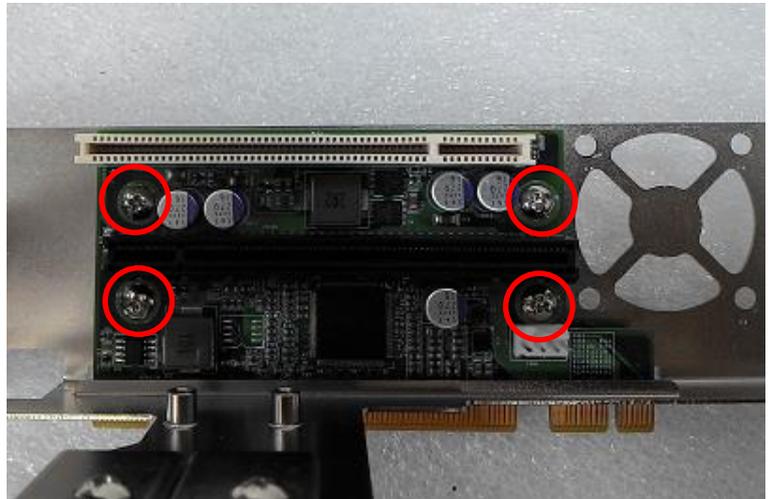
2. Remove the extension bracket from the system.



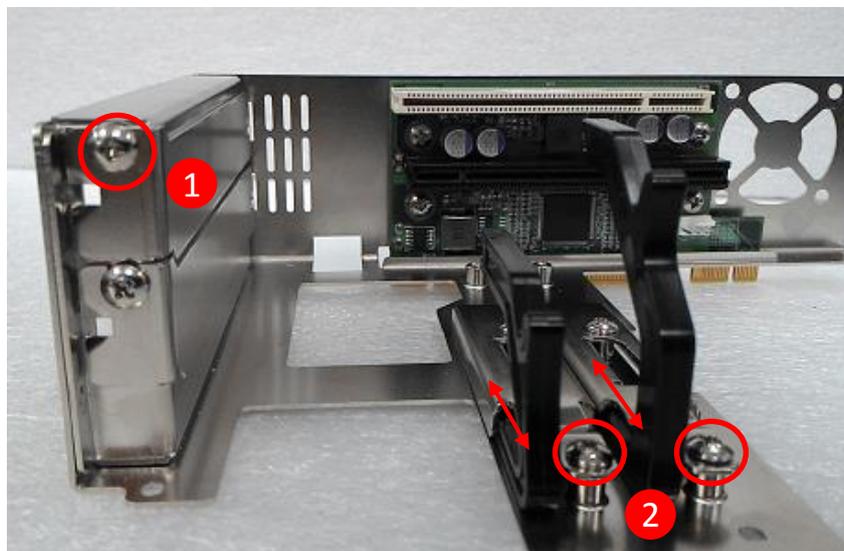
3. Assemble the riser card with extension bracket together and fasten with the 4 screws.



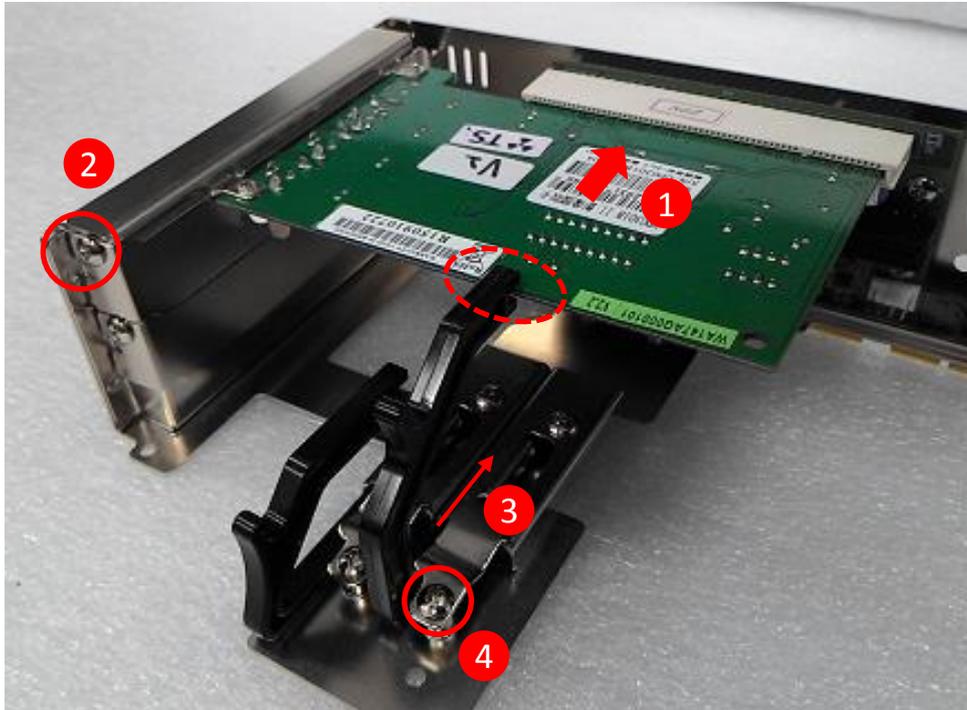
Extension Bracket



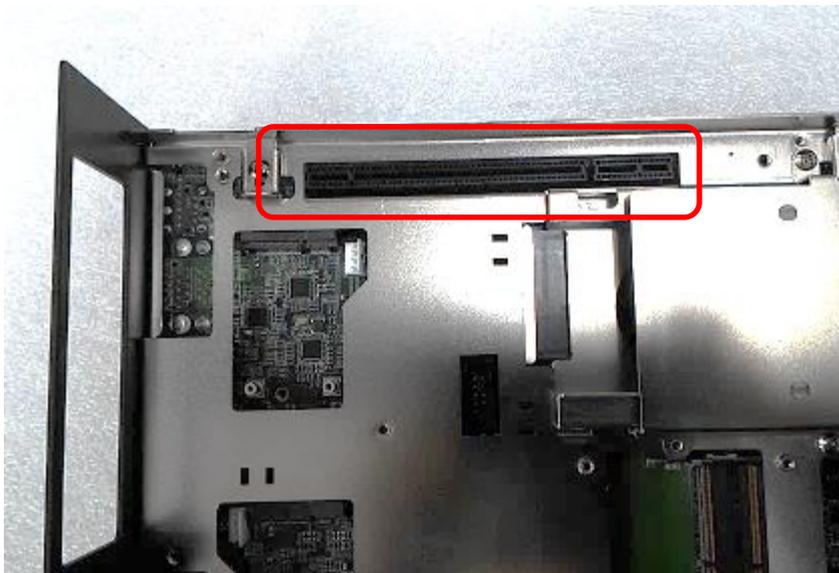
4. (1) Loosen the screw to remove I/O bracket. (2) Loosen the 2 screws halfway to allow the card retainer to be adjustable.



5. (1) Insert a PCI(e) add-on card to the slot. (2) Fasten the screw to secure it (3) Push the card retainer forward to against the edge of the add-on card. (4) Tighten the screw to fix the card retainer.



6. Locate the riser card slot on bottom side of system.

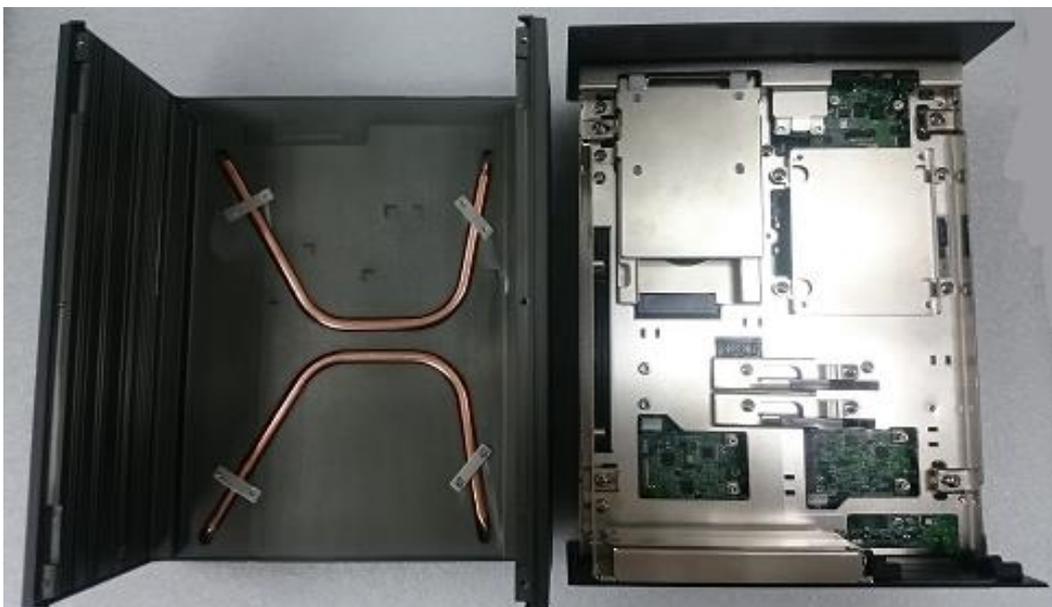


7. Install the module assembled in step 4 into the riser card slot, and fasten the 4 screws to secure it.

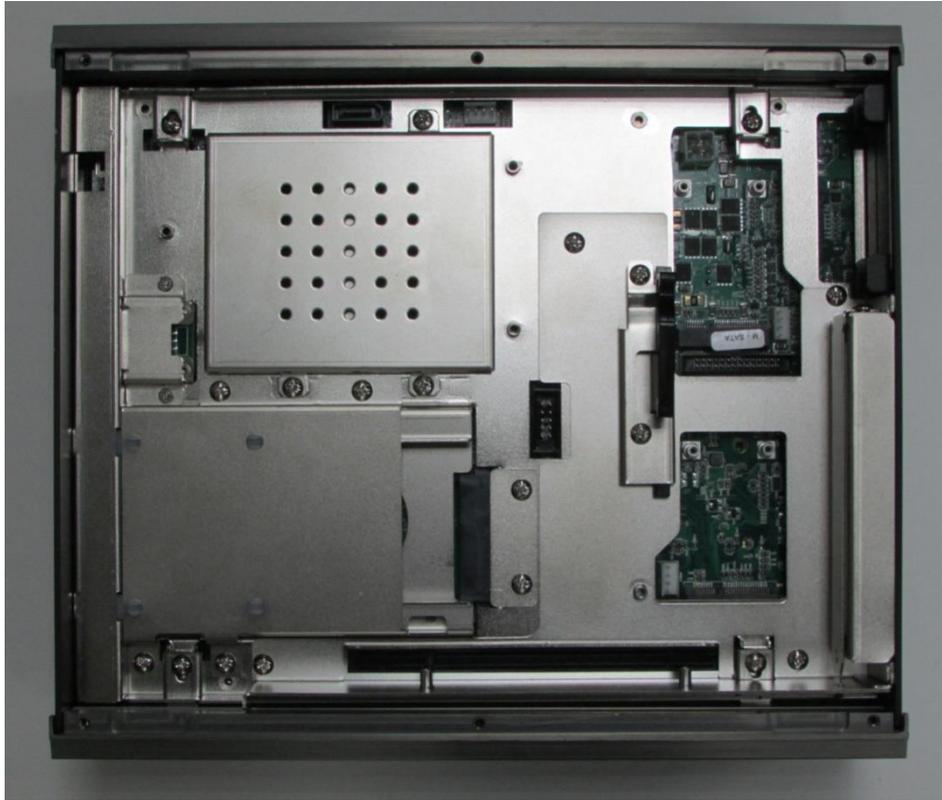


3.13 Assembling the System

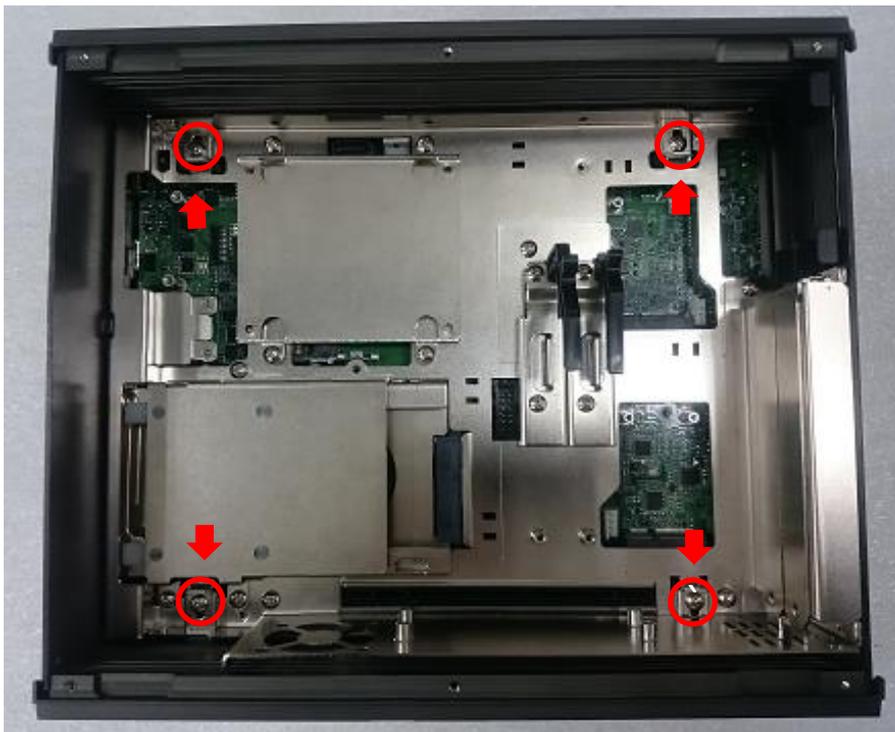
1. Make sure the notch on chassis and the front bezel of body are at the same side.



- Lift up the body of unit. Make sure that both front and rear panels are in the chassis grooves and assemble the body on to chassis firmly.



- Push into the 4 latches as indicated and fasten the 4 screws.



4. Fasten the 2 screws at rear panel.



5. Be sure to align the grooves with front and ear panels. Put the cover back on and fasten the 6 screws to fix the cover.

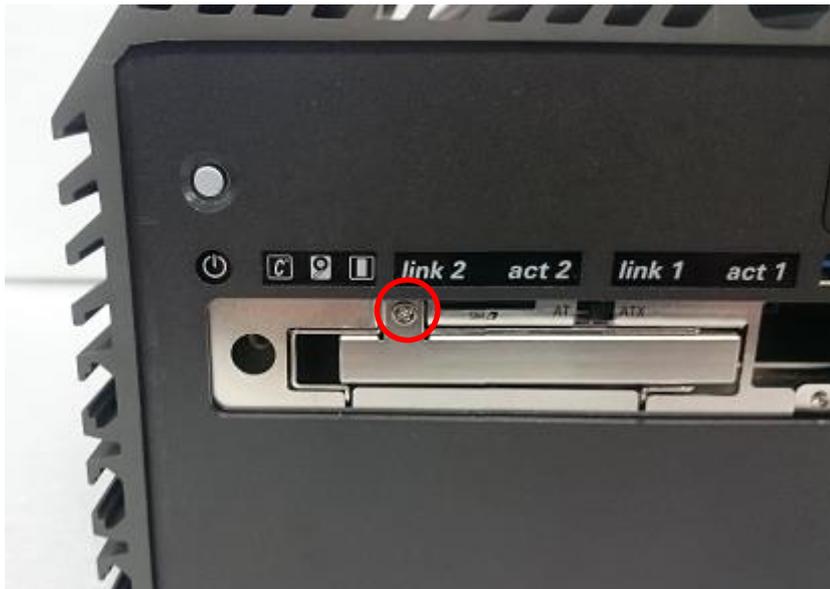


3.14 Installing a SATA Hard Drive at Front Side

1. Loosen the screws in order to remove the front expansion plate.



2. Locate the removable HDD bay and loosen the screw.



3. Move the rotating arm out and pull the HDD bracket out.



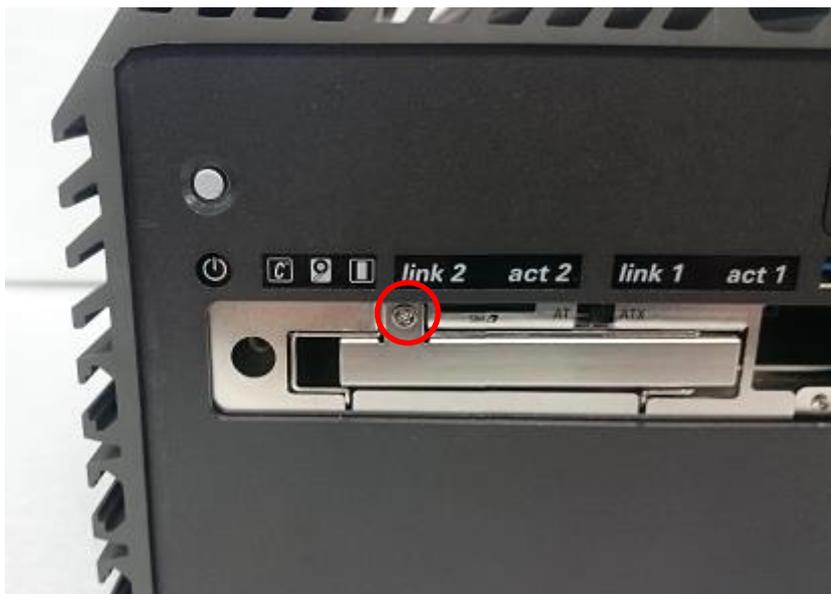
4. Make the PCB side of the HDD face up, place the HDD bracket into it. Ensure the direction of bracket is correct and use 4 provided screws to assemble HDD and HDD bracket together.



- Align the HDD bracket with the entrance of HDD bay. Holding the rotating arm and insert the HDD bracket until the connector of HDD contact the SATA connector firmly.



- Place the rotating arm back and fasten the screw.



3.15 Installing a SIM Card

1. Locate SIM card slot on top of HDD bay.



2. Insert the SIM card according to the icon instruction aside.



3.16 Installing the CMOS Battery

1. Locate the removable CMOS Battery and loosen the screw.



2. Pull out the CMOS battery bracket with assistance of a tweezer.



3. Insert a CMOS battery in the battery slot.



4. Insert the battery bracket firmly and fasten the screw.



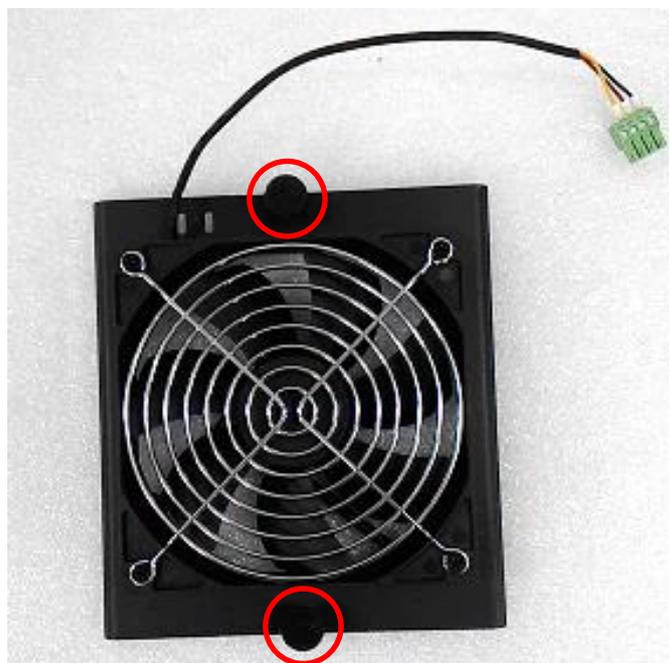
3.17 Fasten the Cover

1. Fasten the cover by using the two screws.

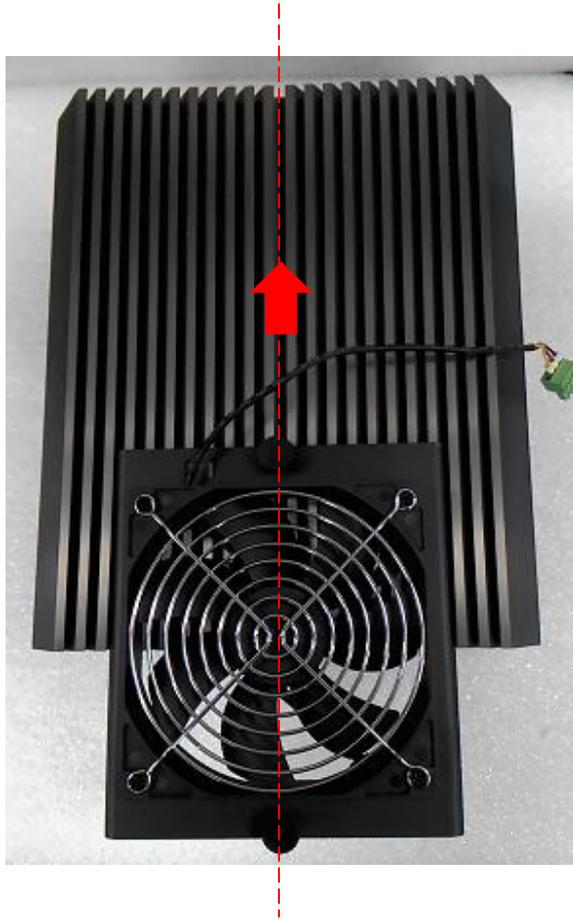


3.18 Install an External Fan

1. Prepare an external fan. Loosen the 2 screws halfway on mounting frame before attempting to install it.



- Slide the FAN into the middle groove of chassis as illustrated. Tighten the 2 screws to fix it onto chassis.



- Move the fan to the center of chassis. Tighten the 2 screws marked on photo to secure it.



4. Connect the FAN cable to external fan power connector at rear panel.

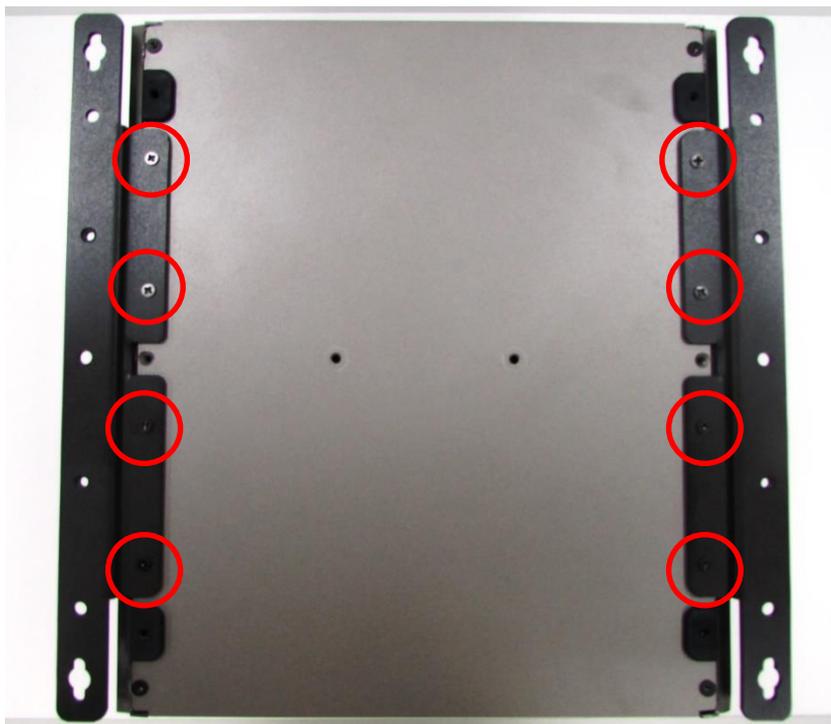


3.19 Wall Mount Brackets

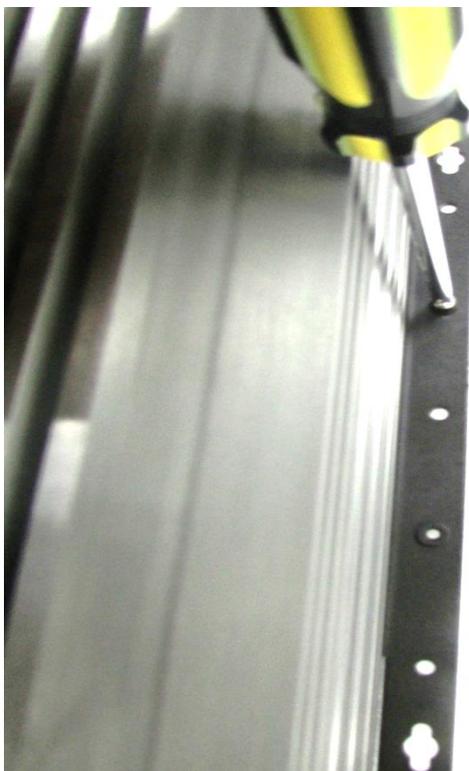
DS-1100 series offers wall mount that customers can install system on the wall in convenient and economical ways.



1. The mounting holes are at the bottom of system. Use provided 8 screws to fasten the bracket with each side of system together.



2. Fasten the screws through the bracket mounting hole to mount system on the wall.





Chapter 4

BIOS Setup

4.1 BIOS Introduction

The BIOS (Basic Input/Output System) is a program located on a Flash Memory on the motherboard. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization.

BIOS Setup

Power on the computer and by pressing immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing <Ctrl>, <Alt> and <Delete> keys.

Control Keys	
<←> <→>	Move to select screen
<↑> <↓>	Move to select item
<Esc>	Quit the BIOS Setup
<Enter>	Select item
<Page Up/+>	Increases the numeric value or makes changes
<Page Down/->	Decreases the numeric value or makes changes
<Tab>	Select setup fields
<F1>	General help
<F2>	Previous value
<F3>	Load Optimized defaults
<F10>	Save configuration and Exit

Main Menu

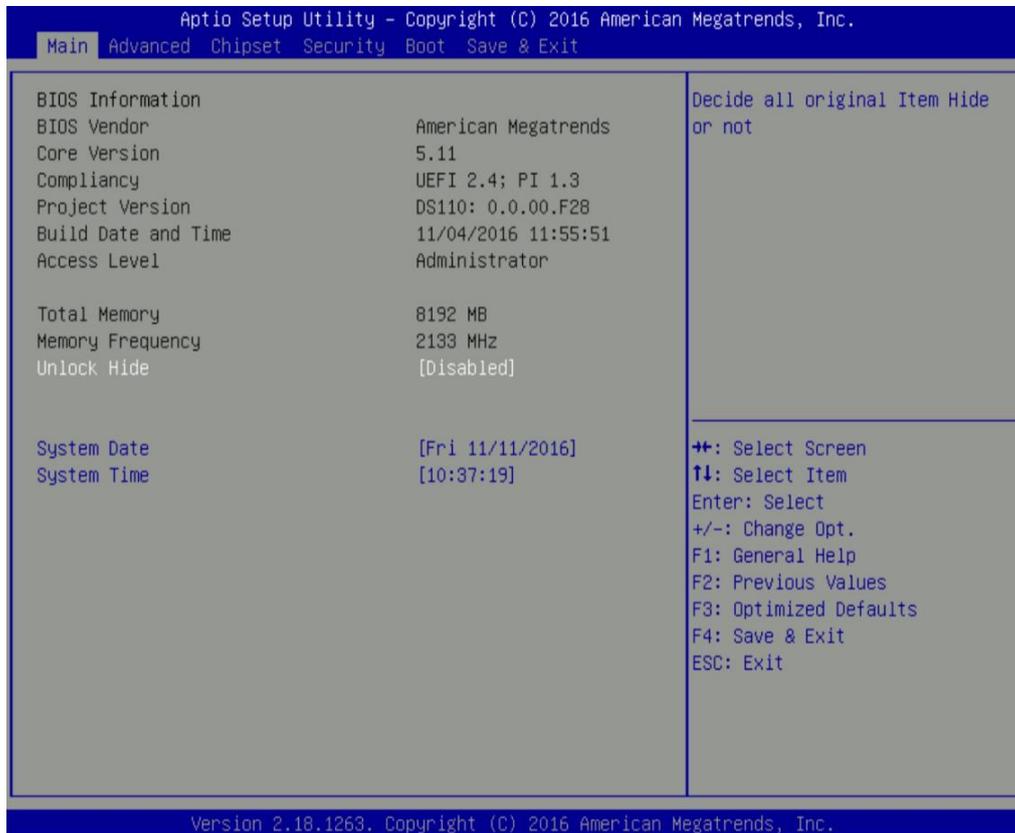
The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.

4.2 Main Setup

Press to enter BIOS CMOS Setup Utility, the Main Menu (as shown below) will appear on the screen. Use arrow keys to move among the items and press <Enter> to accept or enter a sub-menu.



4.2.1 Unlock Hide [Disabled]

Enables or disables display detailed system hardware information.

4.2.2 System Date

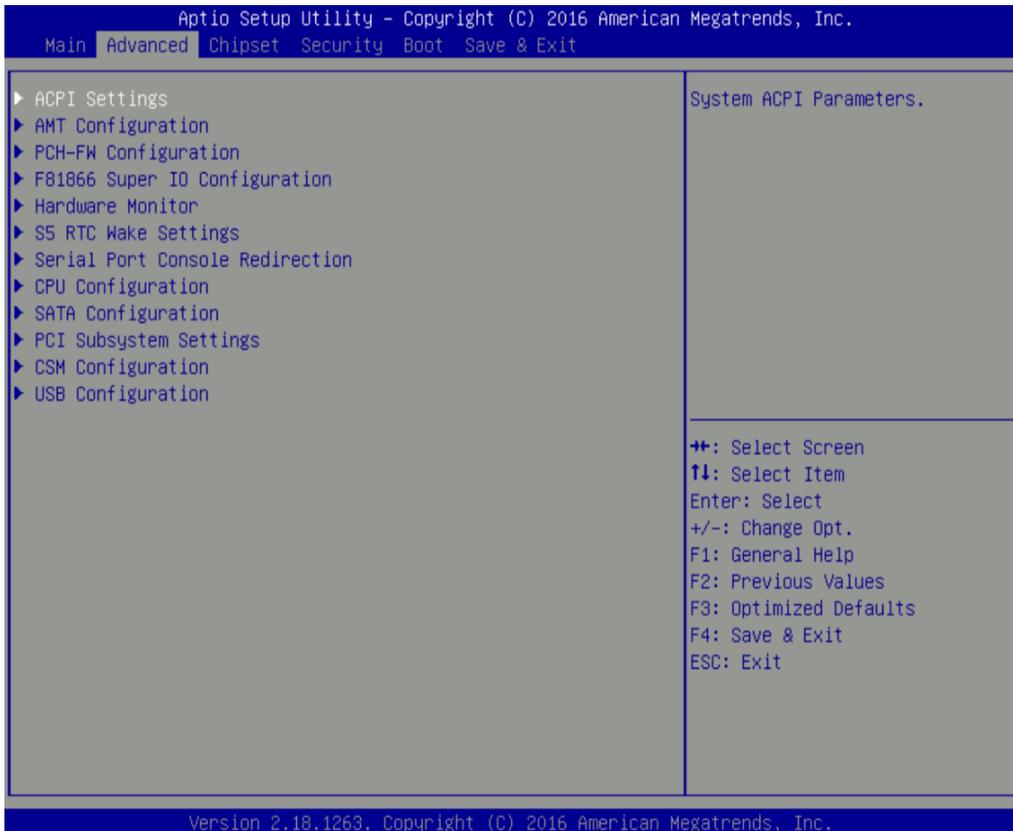
Set the date. Please use <Tab> to switch between date elements.

4.2.3 System Time

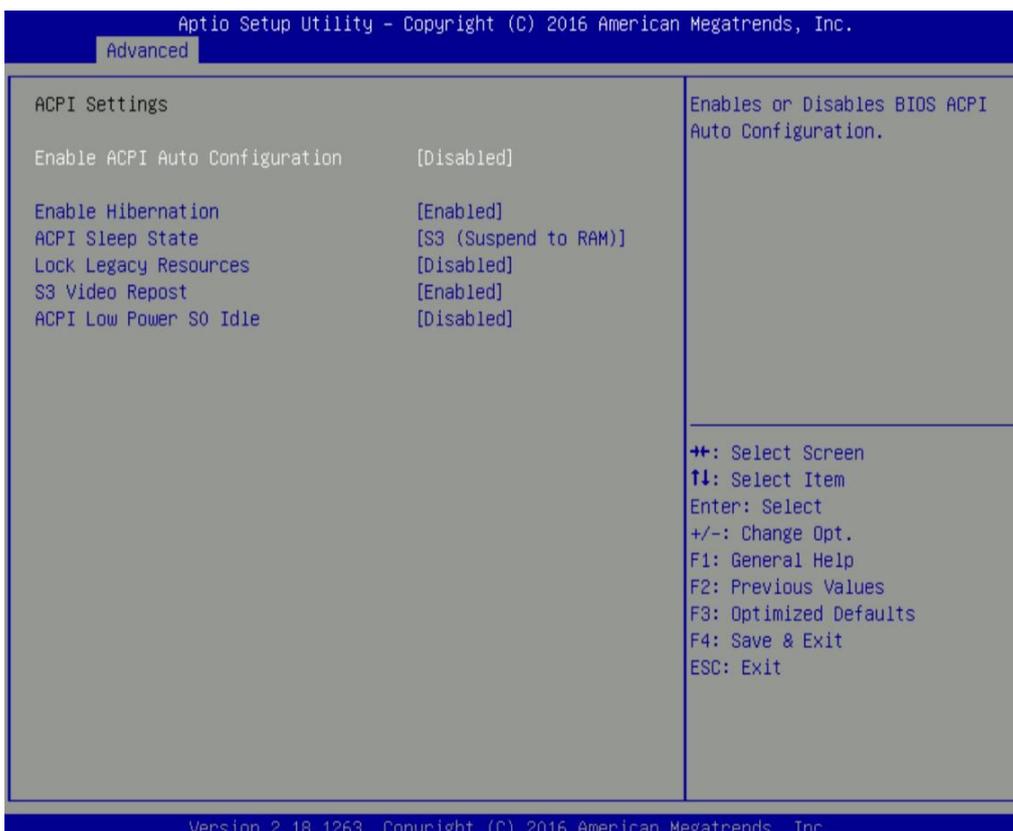
Set the time. Please use <Tab> to switch between time elements.

4.3 Advanced Setup

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



4.3.1 ACPI Settings



■ Enable ACPI Auto Configuration [Disabled]

Enables or disables BIOS Advanced Configuration Power Interface® (ACPI) auto configuration.

■ Enable Hibernation [Enabled]

Enables or disables system ability to hibernate state (OS/S4 state). This option may not be effective with some OS.

■ ACPI Sleep State [S3 (Suspend to RAM)]

Allows users to select the highest Advanced Configuration Power Interface® (ACPI) sleep state that system will enter when suspend button is pressed.

[Suspend Disabled]: Disables entering suspend state.

[S3 (suspend to RAM)]: Enables suspend to RAM state.

■ Lock Legacy Resources [Disabled]

Enables or disables Lock Legacy Resources.

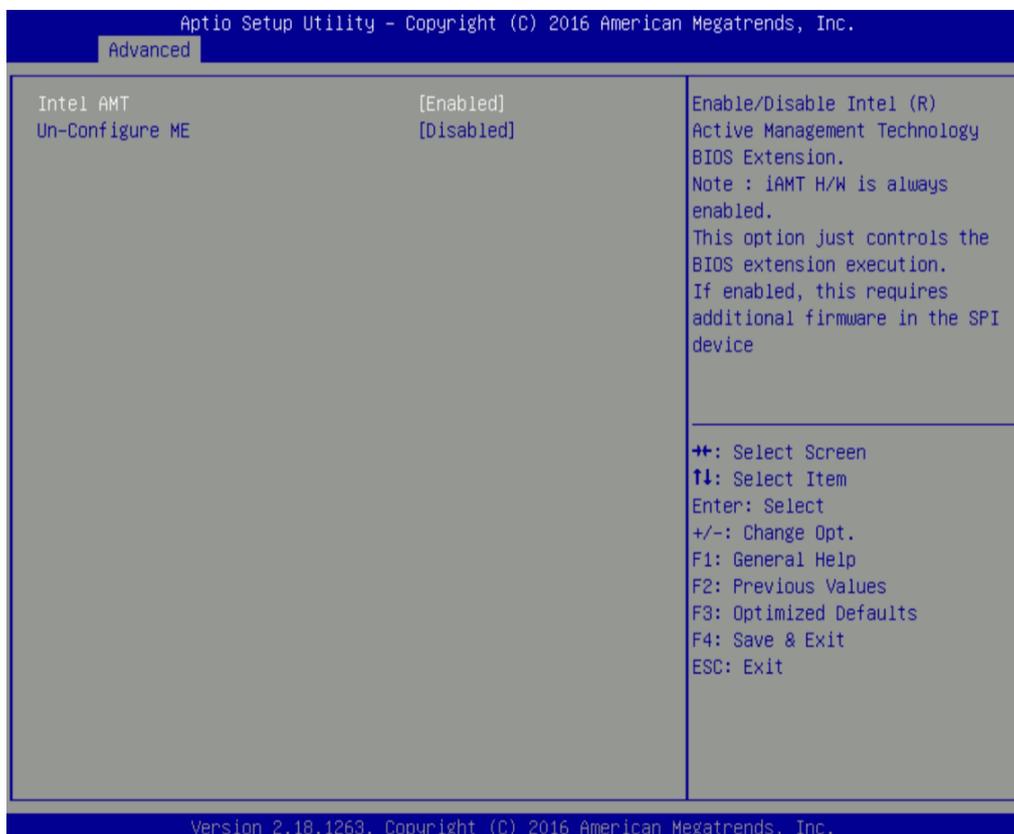
■ S3 Video Repost [Enabled]

Enable or disable S3 Video Repost.

■ ACPI Low Power S0 Idle [Disabled]

Enables or disables ACPI Low Power S0 idle support.

4.3.2 AMT Configuration



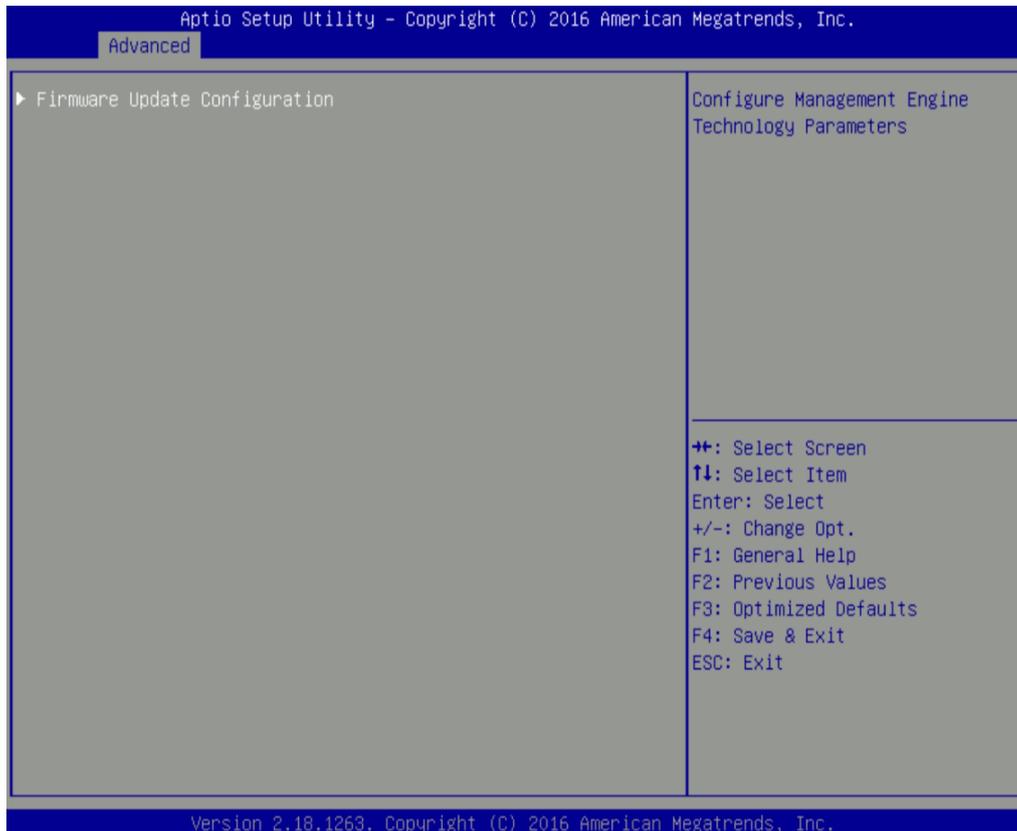
■ Intel AMT [Enabled]

Enables or disables Intel® Active Management Technology BIOS Extension.

■ Un-Configure ME [Disabled]

Enables or disables Un-Configure-Management Engine(ME) without password.

4.3.3 PCH-FW Configuration



■ Firmware Update Configuration

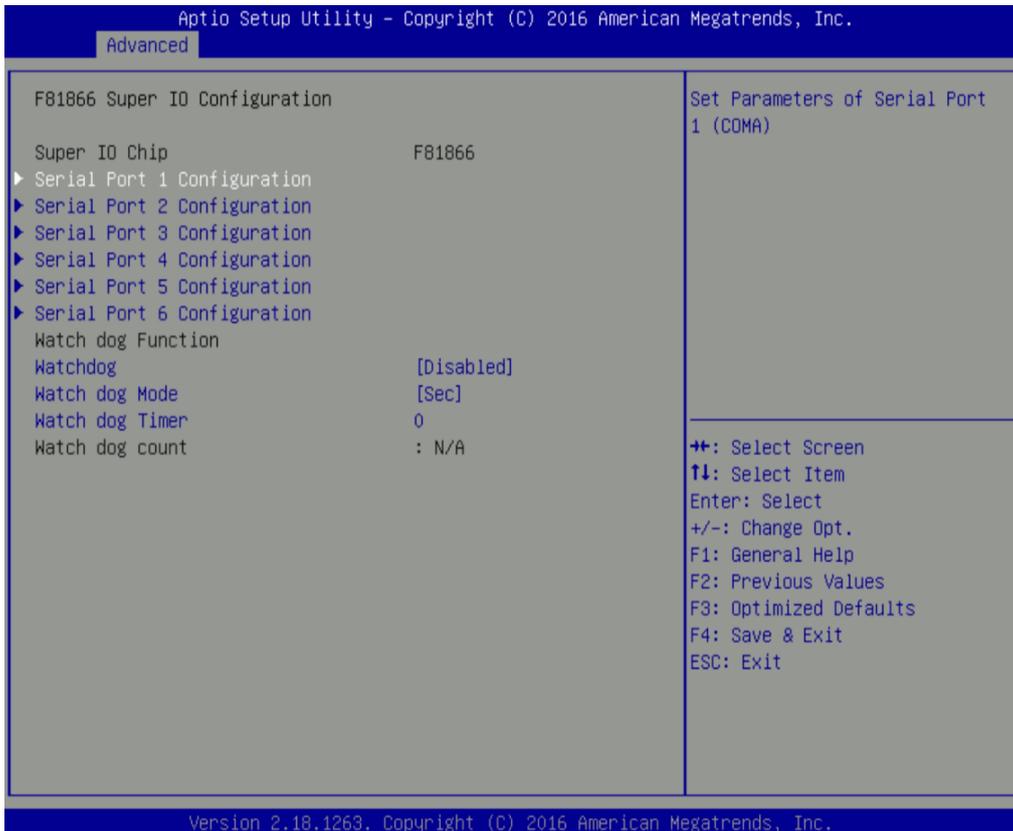
Configure Management Engine Parameters

Me FW Image Re-Flash [Disabled]

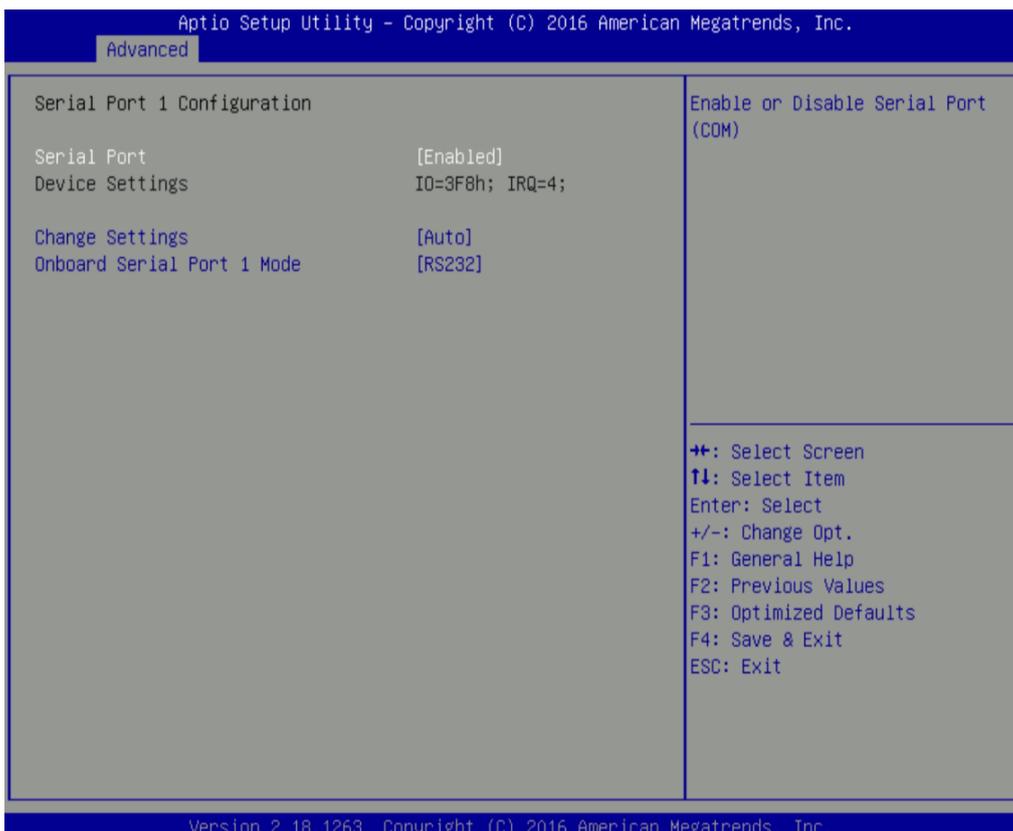
Enables or disables Me FW Image Re-Flash function.

4.3.4 F81866 Super IO Configuration

Set Parameters of Serial Ports. User can Enable/Disable the serial port and Select an optimal settings for the Super IO Device



■ Serial Port 1~6 Configuration.



❑ Serial Port [Enabled]

Enables or disables serial port.

❑ Change Settings [Auto]

Allows users to change the address & IRQ settings of the specified serial port.

❑ Onboard Serial Port 1~6 Mode [RS232]

Allows users to select Serial Port Mode.

Configuration options: [RS232] [RS422/RS485 Full Duplex] [RS485 Half Duplex]

Watch Dog Function

You can setup the system watch-dog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watch dog polls it.

■ Watch Dog [Disabled]

Enables or disables watch dog function.

■ Watch Dog Mode [Sec]

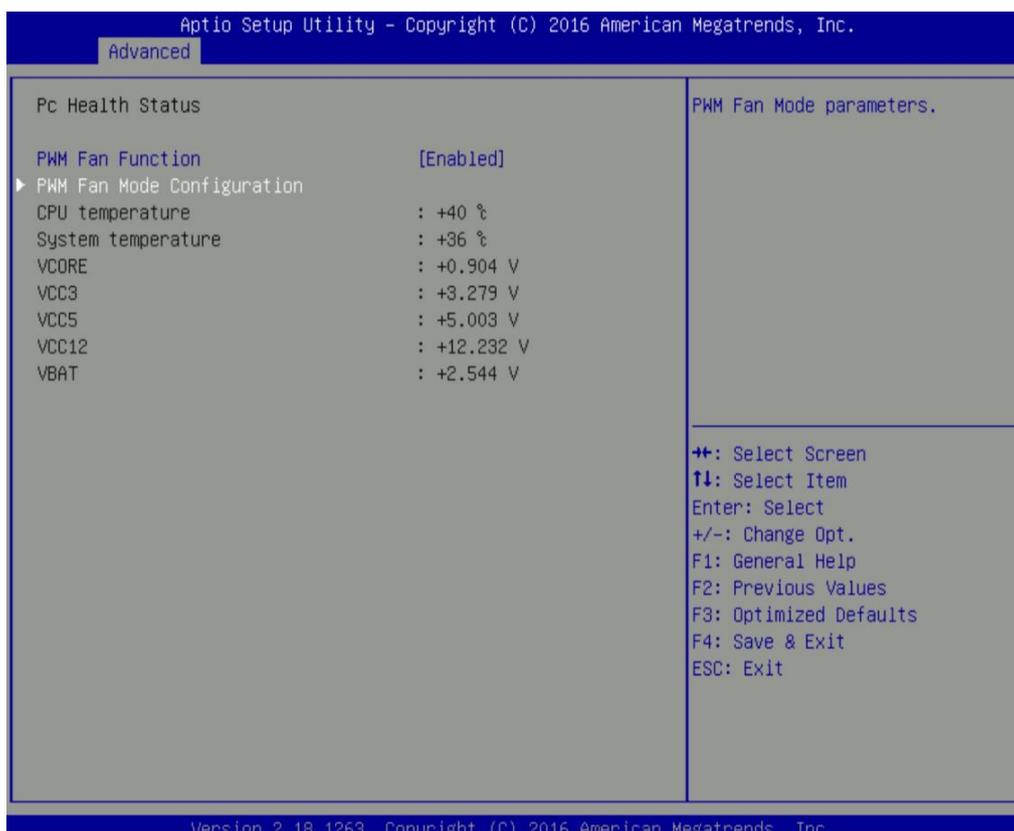
Changes the Watch dog mode. Select <Sec> or <Min> mode.

■ Watch Dog Timer [0]

User can set a value in the range of 0 to 255.

4.3.5 Hardware Monitor

These items display the current status of all monitored hardware devices/components such as voltages, temperatures and all fans' speeds.



PC Health Status

■ PWM Fan Function [Disabled]

Enables or disables PWM Fan function.

■ PWM Fan Mode Configuration

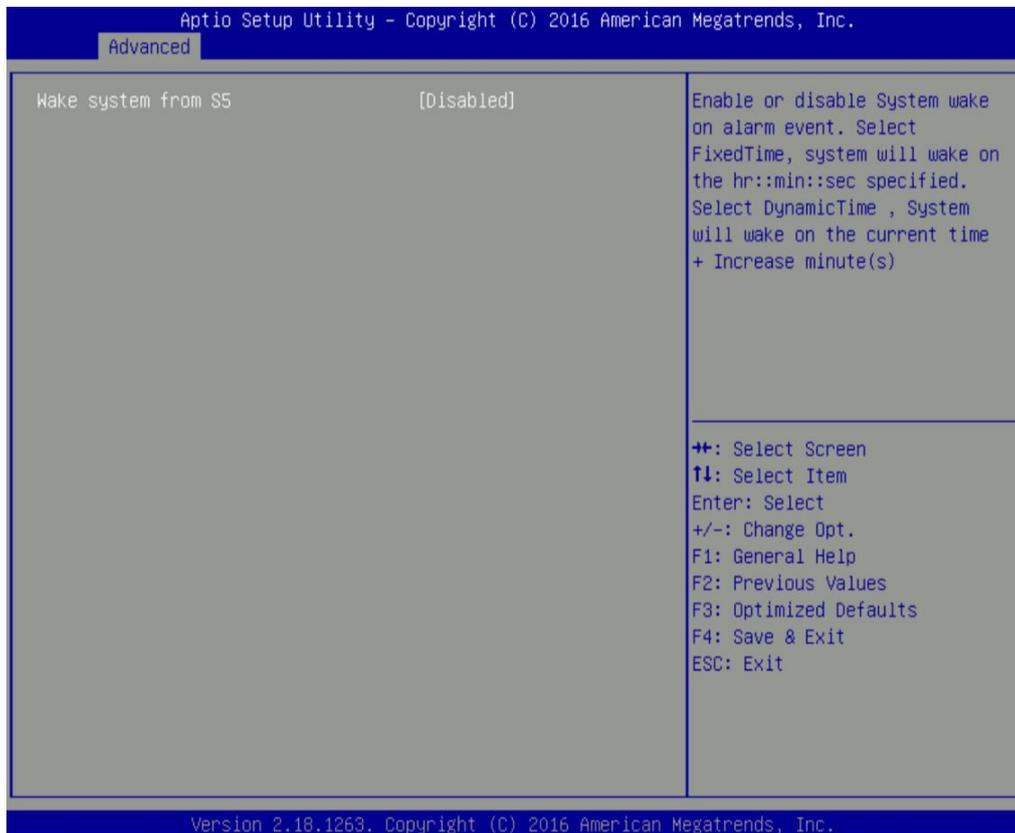
PWM Fan1 Duty [60%]

This item allows users to change duty cycle value of PWM Fan1.

PWM Fan2 Duty [60%]

This item allows users to change duty cycle value of PWM Fan2.

4.3.6 S5 RTC Wake Settings



■ Wake system from S5 [Disabled]

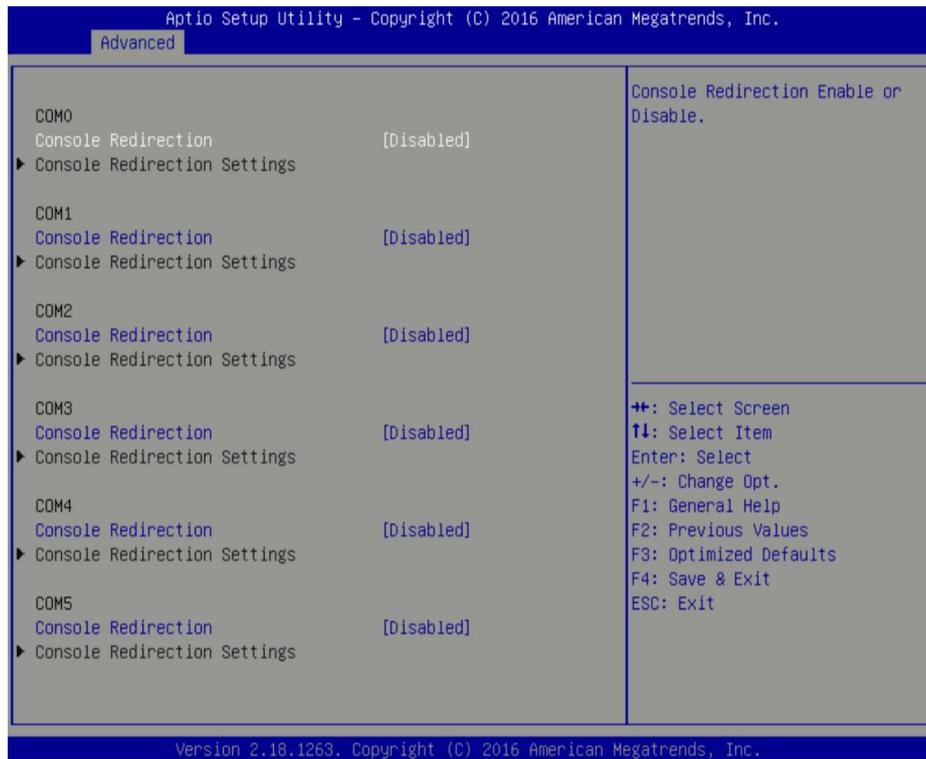
Enables or disables wake system from S5 (soft-off state).

[Disabled]: Disables this function.

[Fixed Time]: Sets a specified time (HH:MM:SS) to wake system from S5.

[Dynamic Time]: Sets a increase minute(s) from current time to wake system from S5.

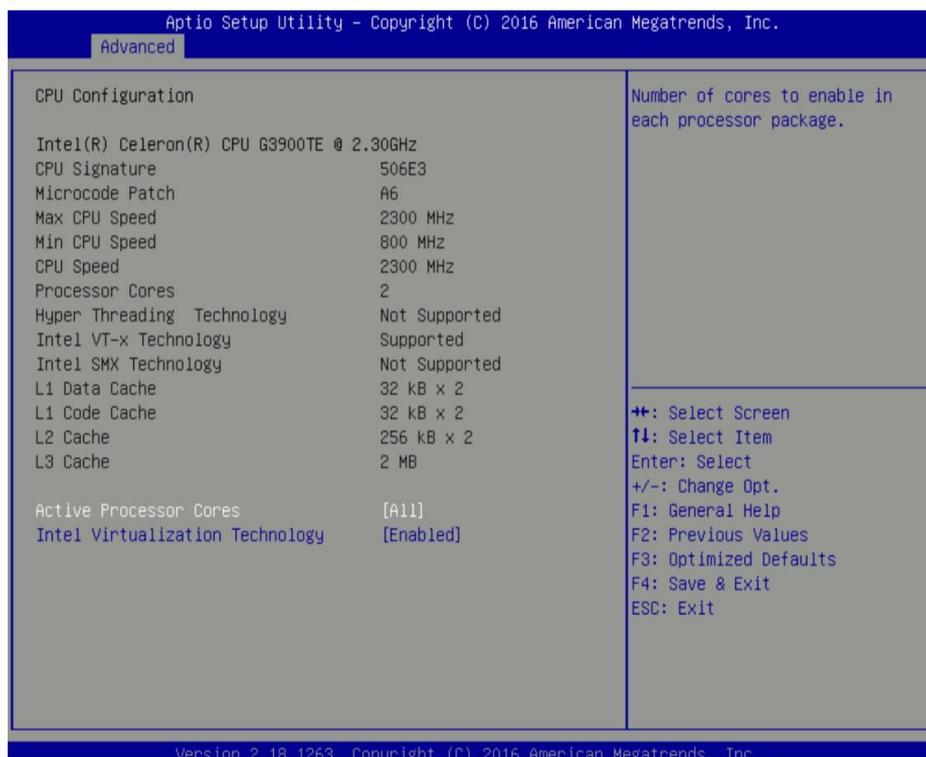
4.3.7 Serial Port Console Redirection



■ **Console Redirection [Disabled]**

These items allow users to enable or disable COM0, COM1, COM2, COM3, COM4, COM5 console redirection function.

4.3.8 CPU Configuration



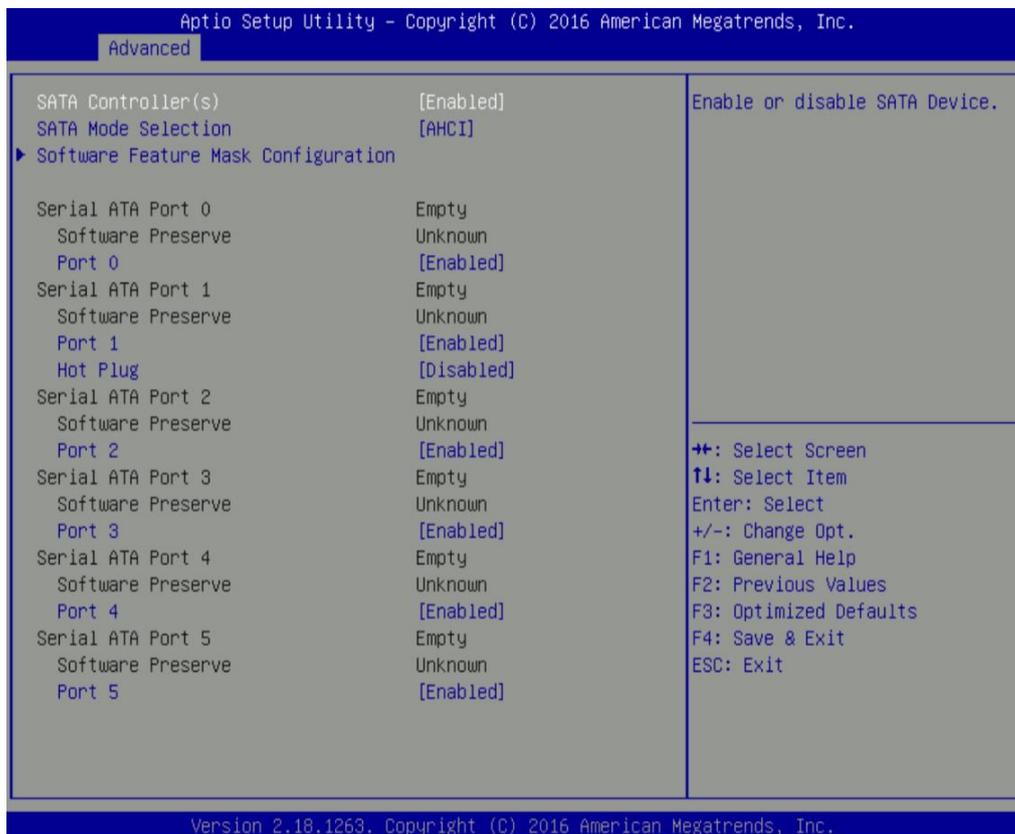
■ Active Process Cores [All]

Allows you to choose the number of active processor cores.
Configuration options: [All] [1].

■ Intel® Virtualization Technology [Enabled]

Enables or disables Intel® Virtualization Technology, which will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple virtual systems..

4.3.9 SATA Configuration



■ SATA Controller(s) [Enabled]

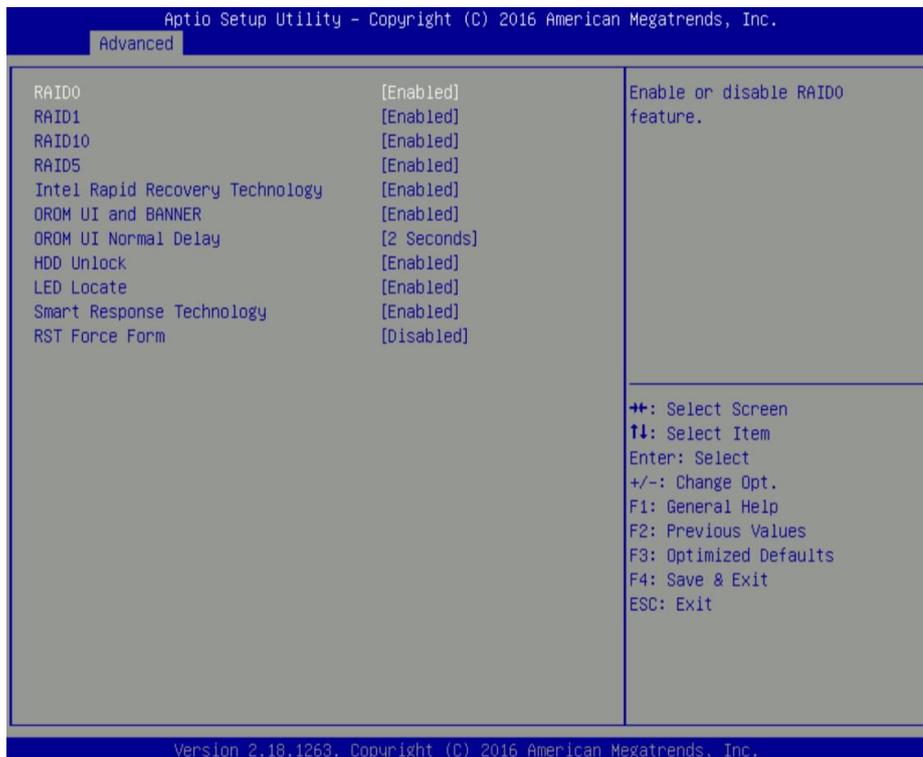
Enables or disables SATA device.

■ SATA Mode Selection [AHCI]

Allows you to select which mode SATA controller will operate.
Configuration options: [AHCI], [RAID]

■ Software Feature Mask Configuration

RAID option ROM (OROM) / Intel® Rapid Storage Technology(RST) driver will refer to the software feature configuration to enable or disable the storage features.



■ Software Feature Mask Configuration

RAID option ROM (OROM) / Intel® Rapid Storage Technology(RST) driver will refer to the software feature configuration to enable or disable the storage features.

- RAID0 [Enabled]**
Enables or disables RAID0 function.
- RAID1 [Enabled]**
Enables or disables RAID1 function.
- RAID10 [Enabled]**
Enables or disables RAID10 function.
- RAID5 [Enabled]**
Enables or disables RAID5 function.
- Intel Rapid Recovery Technology [Enabled]**
Enables or disables Intel® Rapid Recovery Technology.
- OROM UI and BANNER [Enabled]**
Enables or disables OROM (Option ROM) UI and BANNER.
- OROM UI Normal Delay [2 Seconds]**
Enables or disables OROM UI Normal Delay time in seconds.
Configuration options: [2 Seconds].[4 Seconds] [6 Seconds] [8 Seconds]
- HDD Unlock [Enabled]**
Enables or disables HDD Unlock.
- LED Locate [Enabled]**
Enables or disables LED Locate.
- Smart Response Technology [Enabled]**
Enables or disables Smart Response Technology.
- RST Force Form [Disabled]**
Enables or disables RST(Intel® Storage Technology) Force Form.

■ **Serial ATA Port 0**

Port 0 [Enabled]

Enables or disables SATA Port 0.

■ **Serial ATA Port 1**

Port 1 [Enabled]

Enables or disables SATA Port 1.

Hot Plug [Disabled]

Enables or disables Hot Plug support for port1.

■ **Serial ATA Port 2**

Port 2 [Enabled]

Enables or disables SATA Port 2.

■ **Serial ATA Port 3**

Port 3 [Enabled]

Enables or disables SATA Port 3.

■ **Serial ATA Port 4**

Port 4 [Enabled]

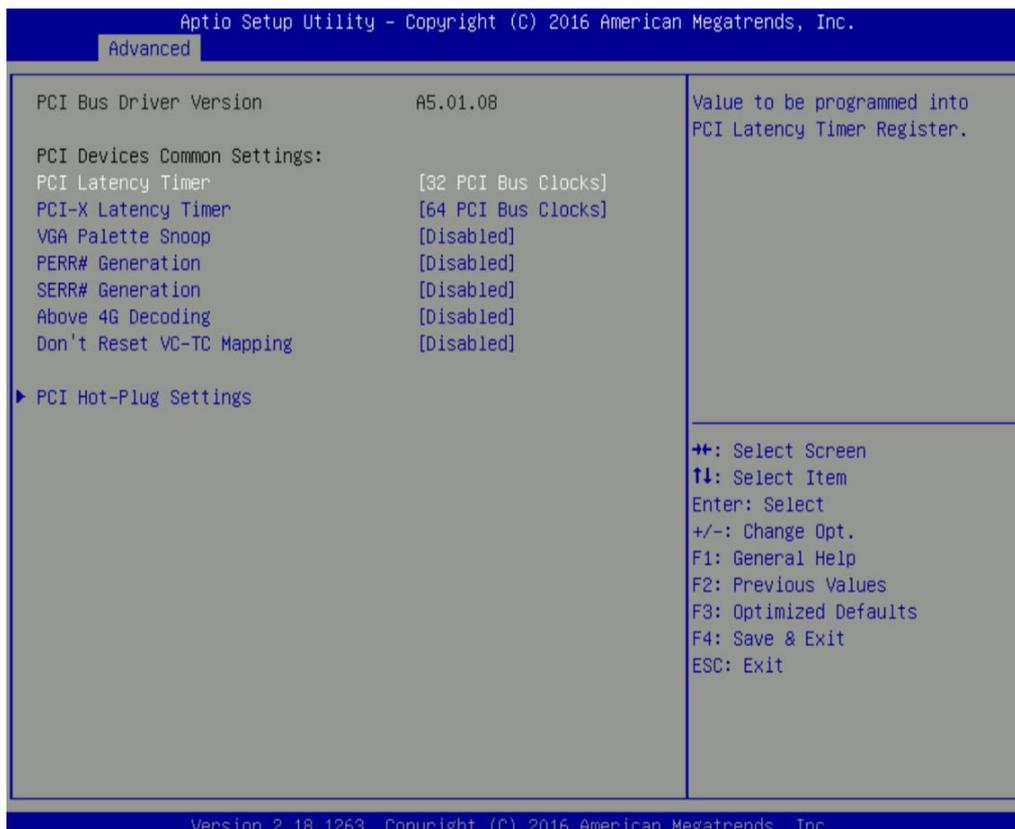
Enables or disables SATA Port 4.

■ **Serial ATA Port 5**

Port 5 [Enabled]

Enables or disables SATA Port 5.

4.3.10 PCI Subsystem Settings



■ **PCI Latency Timer [32 PCI Bus Clocks]**

Allows you to set the value to be programmed into PCI latency Timer Register. Configuration options: [32][64][96][128][160][192][224][248] PCI Bus Clocks.

■ **PCI-X Latency Timer [64 PCI Bus Clocks]**

Allows you to set the value to be programmed into PCI latency Timer Register. Configuration options: [32][64][96][128][160][192][224][248] PCI Bus Clocks

■ **VGA Palette Snoop [Disabled]**

Enables or disables VGA palette registers snooping.

■ **PERR# Generation [Disabled]**

Enables or disables PCI device to generate PERR#.

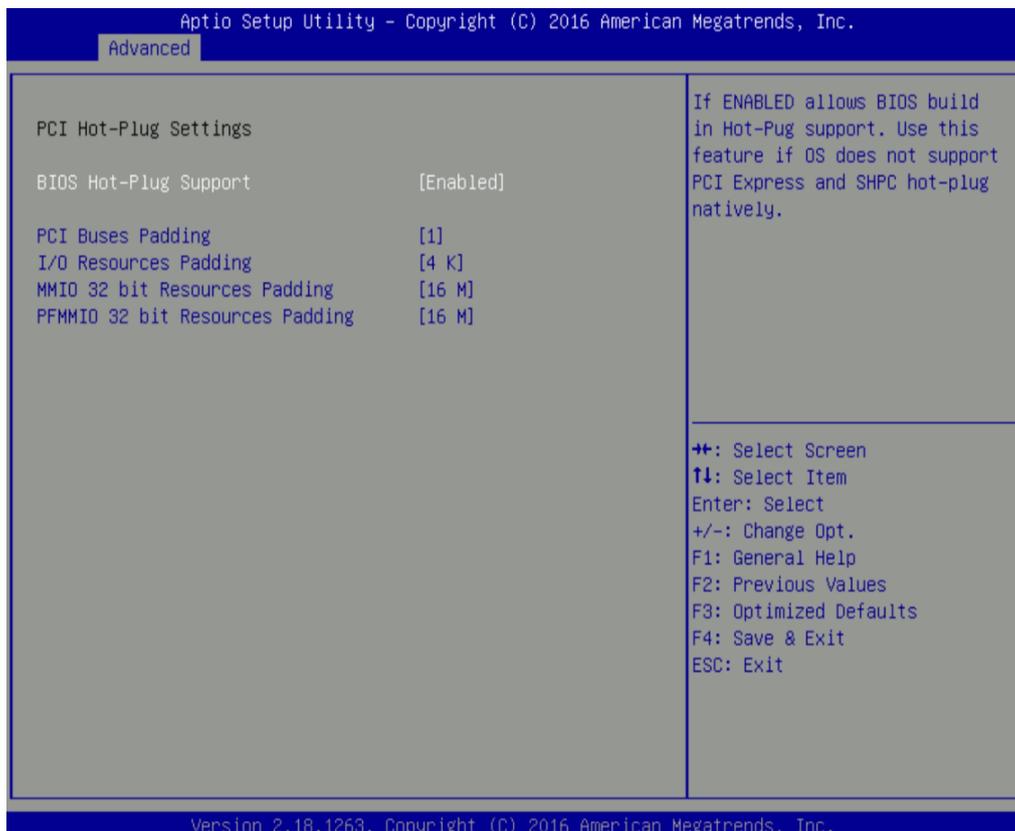
■ **Above 4G Decoding [Disabled]**

Enables or disables 64bit capable devices to be decoded in above 4G address space.

■ **Don't Reset VC-TC Mapping [Disabled]**

Enables or disables software can reset traffic class mapping through virtual channels if system has virtual channels.

■ **PCI Hot-Plug Settings**



■ BIOS Hot-Plug Support [Disabled]

Enables or disables BIOS build in Hot-Plug support. Use this feature if OS does not support PCI Express and SHPC hot-plug natively.

■ PCI Buses Padding [1]

Allows users to set PCI Buses Padding.
Configuration options; [Disabled] [1] [2] [3] [4] [5]

■ I/O Resources Padding [4K]

Allows users to set I/O Resources Padding.
Configuration options; [Disabled] [4K] [8K] [16K] [32K]

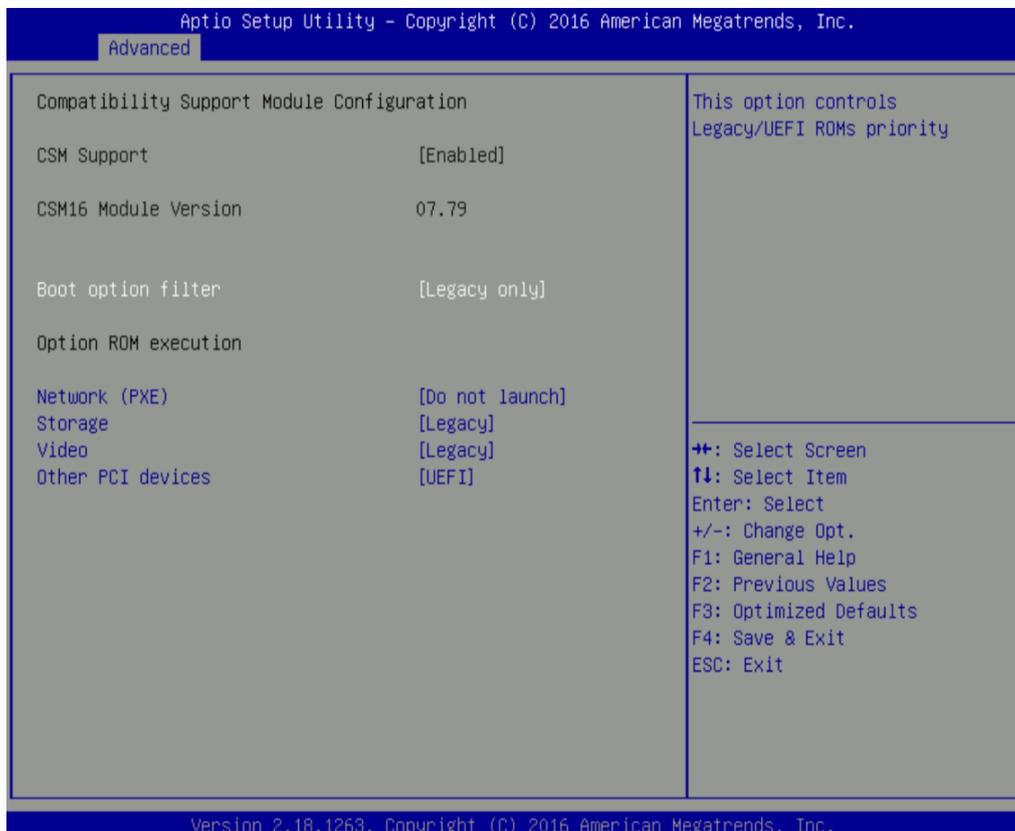
■ MMIO 32 bit Resources Padding [16M]

Allows users to set I/O Resources Padding.
Configuration options; [Disabled] [1M] [2M] [4M] [8M] [16M] [32M] [64M] [128M]

■ PFMMIO 32 bit Resources Padding [16M]

Allows users to set I/O Resources Padding.
Configuration options; [Disabled] [1M] [2M] [4M] [8M] [16M] [32M] [64M] [128M]

4.3.11 CSM Configuration



Compatibility Support Module Configuration

This option controls legacy/UEFI ROMs priority

■ Boot option filter [Legacy only]

Allows you to select which type of operating system to boot.

[UEFI and Legacy]: Allows booting from operating systems that support legacy option ROM or UEFI option ROM.

[Legacy only]: Allows booting from operating systems that only support legacy option ROM.

[UEFI only]: Allows booting from operating systems that only support UEFI option ROM.

This item is configurable only when CSM Support is set to Enabled.

■ Network PXE [Do not launch]

Controls the execution of UEFI and Legacy PXE (Network Preboot eXecution Environment) option ROM.

[Do not launch]: Disables option ROM execution.

[UEFI]: Enables UEFI option ROM only.

[Legacy]: Enables legacy option ROM only.

■ Storage [Legacy]

Controls the execution of UEFI and Legacy Storage option ROM.

[Do not launch]: Disables option ROM execution.

[UEFI]: Enables UEFI option ROM only.

[Legacy]: Enables legacy option ROM only.

■ Video [Legacy]

Controls the execution of UEFI and Legacy Video option ROM.

[Do not launch]: Disables option ROM execution.

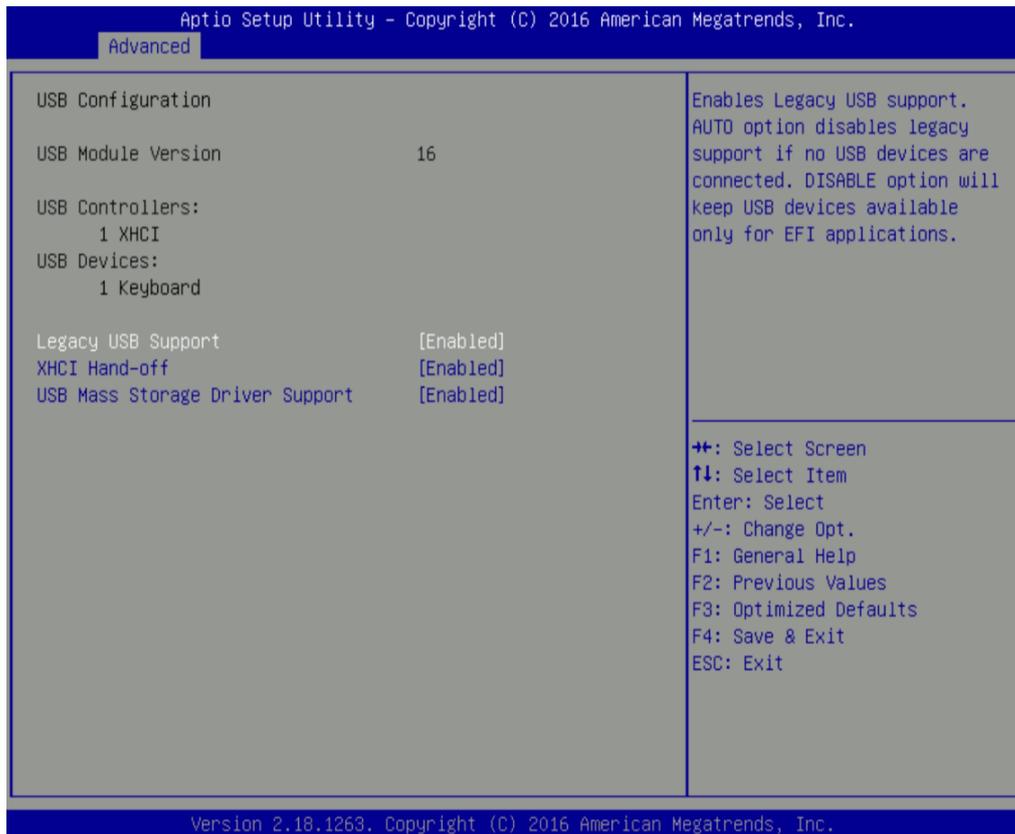
[UEFI]: Enables UEFI option ROM only.

[Legacy]: Enables legacy option ROM only.

■ Other PCI devices [UEFI]

Allows users to determine option ROM execution policy for device other than network, storage, or video.

4.3.12 USB Configuration



■ Legacy USB Support [Enabled]

This item allows users to enable or disable legacy USB support. When set to [Auto], legacy USB support will be disabled automatically if no USB devices are connected.

■ XHCI Hand-off [Enabled]

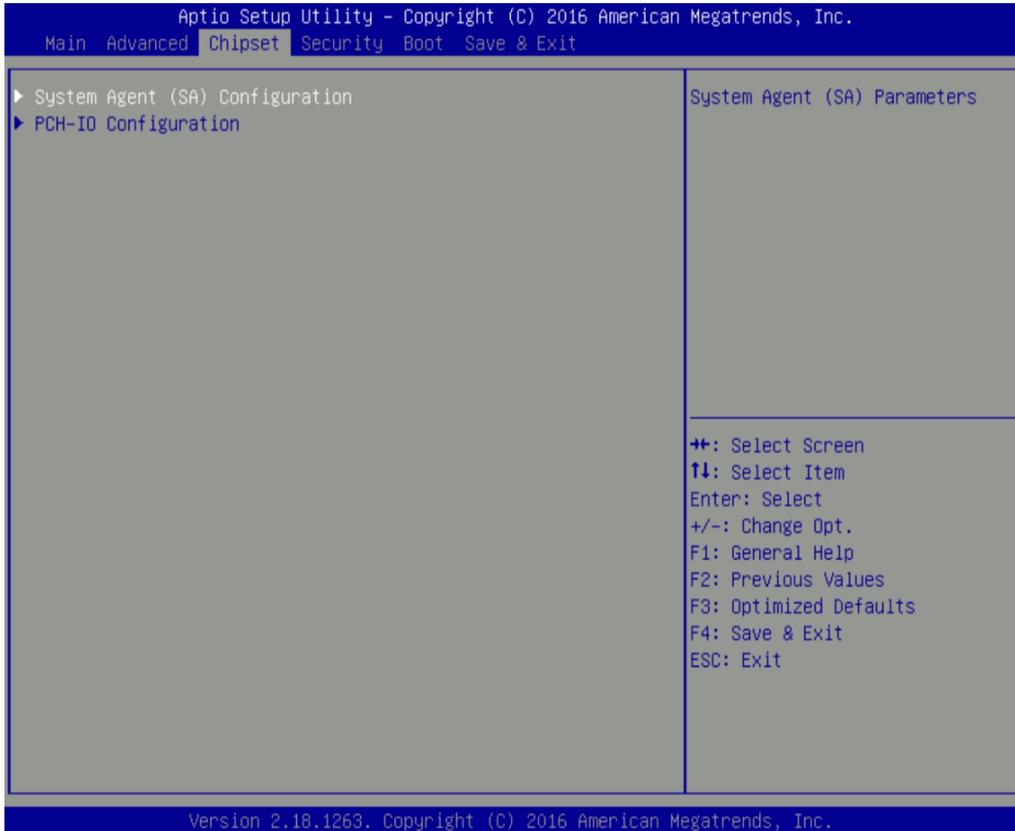
Enables or disables XHCI (USB3.0) hand-off function. Use this feature as a workaround for operating systems without XHCI hand-off support.

■ USB Mass Storage Driver Support [Enabled]

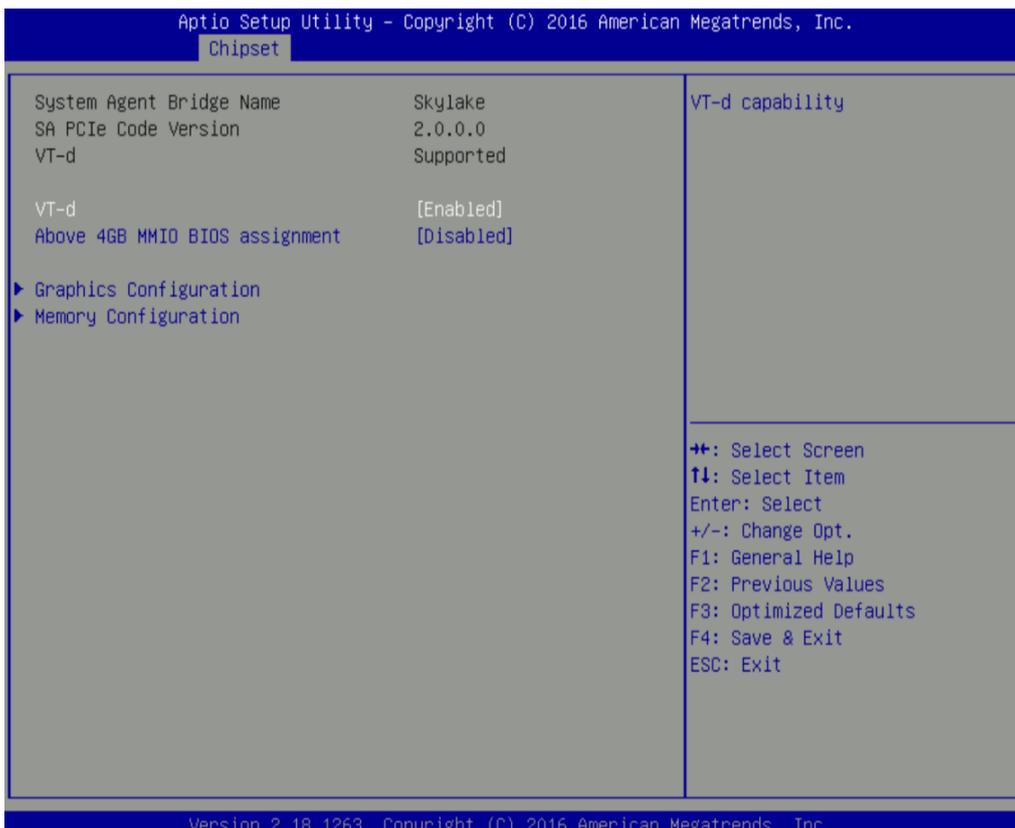
Enables or disables USB mass storage driver support.

4.4 Chipset Setup

This section allows you to configure chipset related settings according to user's preference.



4.4.1 System Agent (SA) Configuration



■ VT-d [Enabled]

Enables or disables Intel® Virtualization Technology for Directed I/O (VT-d) capability.

■ Above 4GB MMIO BIOS assignment [Disabled]

Enables or disables Above 4GB Memory Mapped IO BIOS assignment. This is disabled automatically when Aperture Size is set to 2048MB.

■ Graphics Configuration

□ Primary Display [Auto]

Allows users to select which graphics device should be primary display or select SG for switchable graphics.

Configuration options: [Auto] [IGFX] [PEG] [PCIE]

□ Internal Graphics [Auto]

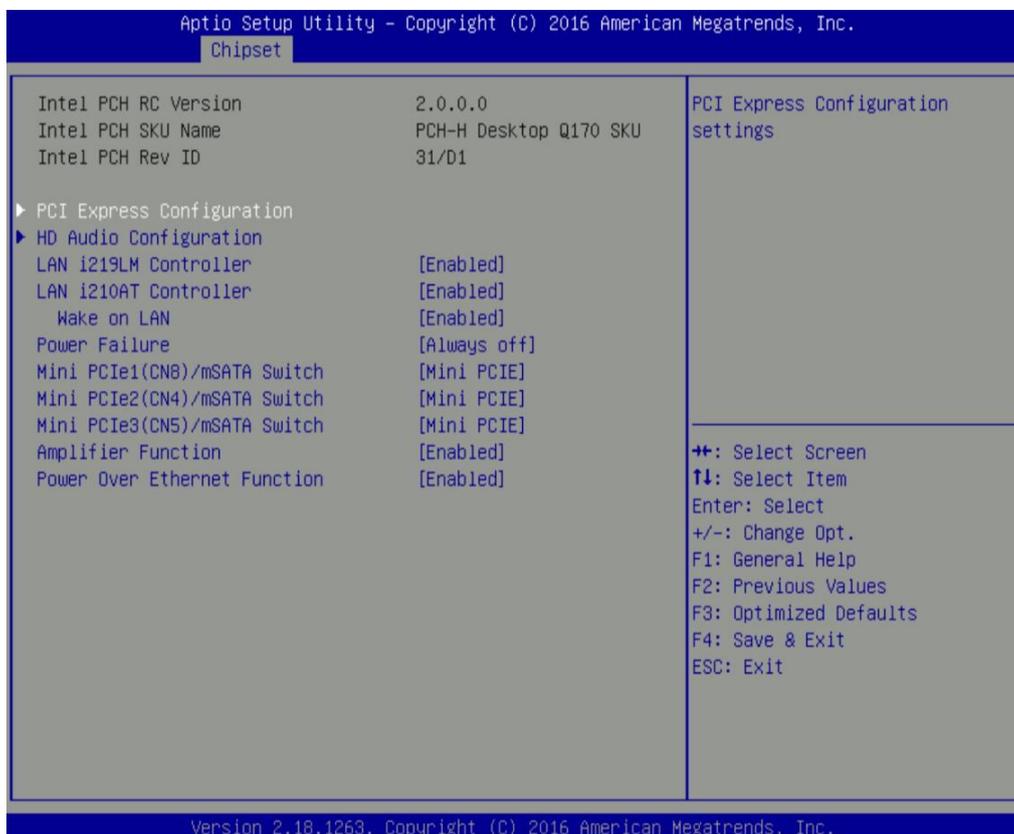
Allows users to enable or disable Internal Graphics.

Configuration options: [Auto] [Disabled] [Enabled]

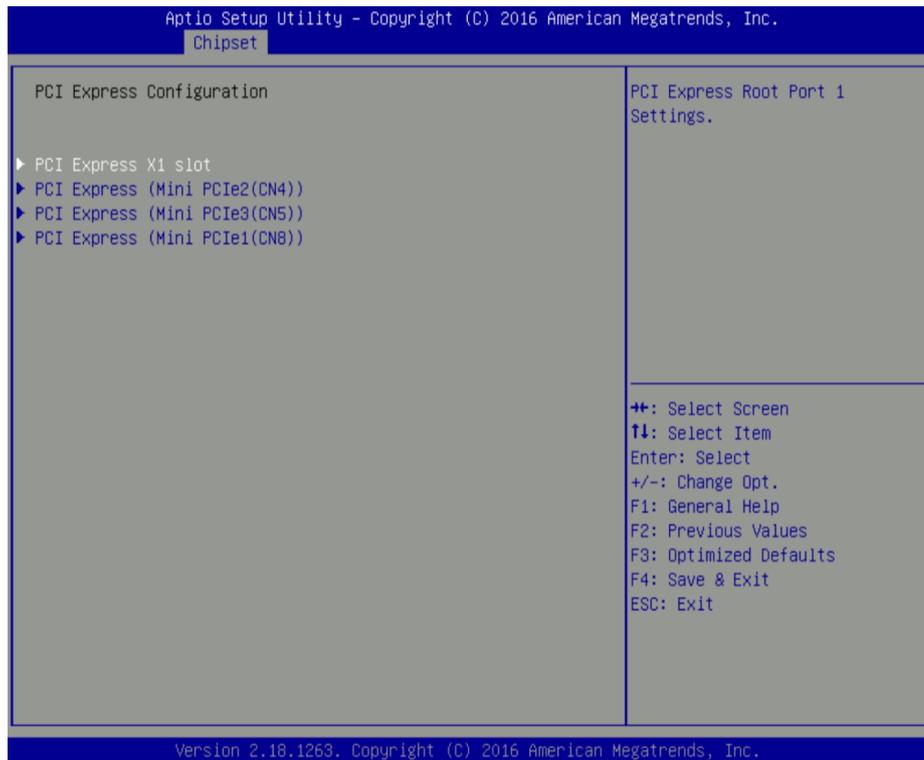
■ Memory Configuration

This item displays detailed memory information in the system.

4.4.2 PCH-IO Configuration



■ PCI Express Configuration



PCI Express x1 Slot

PCI Express Root Port 1 [Enabled]

Enables or disables PCI Express Root Port 1.

PCIeSpeed [Auto]

Allows you to select PCI Express port speed.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3].

PCI Express (Mini PCIe2(CN4))

PCI Express Root Port 2 [Enabled]

Enables or disables PCI Express Root Port 2.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3].

PCI Express (Mini PCIe2(CN5))

PCI Express Root Port 3 [Enabled]

Enables or disables PCI Express Root Port 3.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3].

PCI Express (Mini PCIe2(CN8))

PCI Express Root Port 4 [Enabled]

Enables or disables PCI Express Root Port 4.

Configuration options: [Auto] [Gen1] [Gen2] [Gen3].

■ HD Audio Configuration

HD Audio [Auto]

Control detection of the HD-Audio device.

Configuration options: [Disabled]:[Enabled] [Auto]

■ LAN i219LM Controller [Enabled]

Enables or disables i219LM LAN Controller.

■ LAN i210AT Controller [Enabled]

Enables or disables i210AT LAN Controller.

■ Wake on LAN [Enabled]

Enables or disables integrated LAN Wake On LAN function.

■ Power Failure [Always off]

Allows you to specify what power state system will enter when power is resumed after a power failure.

[Always on]: Enters to power on state.

[Always off]: Enters to power off state.

[Keep last state]: Enters to the last power state before a power failure.

■ Mini PCIe1(CN8)/mSATA Switch [Min PCIE]

Allows you to switch to Mini PCIe or mSATA interface for CN8 slot.

■ Mini PCIe2(CN4)/mSATA Switch [Min PCIE]

Allows you to switch to Mini PCIe or mSATA interface for CN4 slot.

■ Mini PCIe3(CN5)/mSATA Switch [Min PCIE]

Allows you to switch to Mini PCIe or mSATA interface for CN5 slot.

■ Amplifier Function [Enabled]

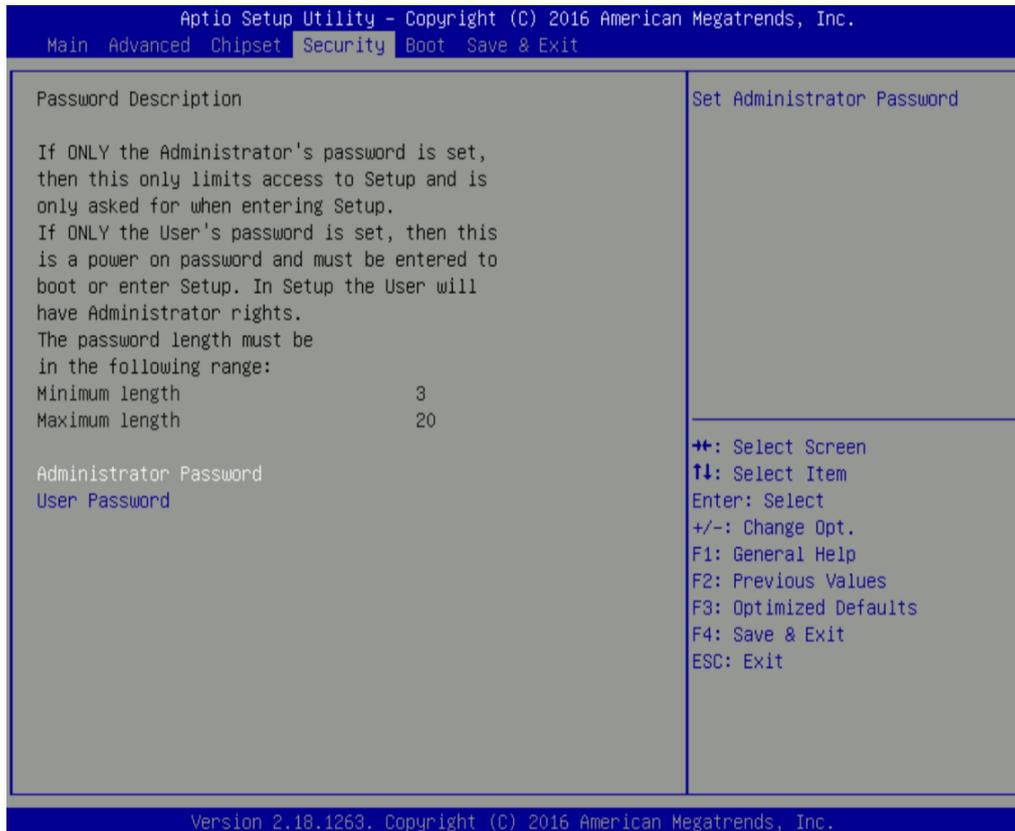
Enables or disables Amplifier Function.

■ Power Over Ethernet Function [Enabled]

Enables or disables Power Over Ethernet Function.

4.5 Security Setup

This section allows users to configure BIOS security settings.



4.5.1 Administrator Password

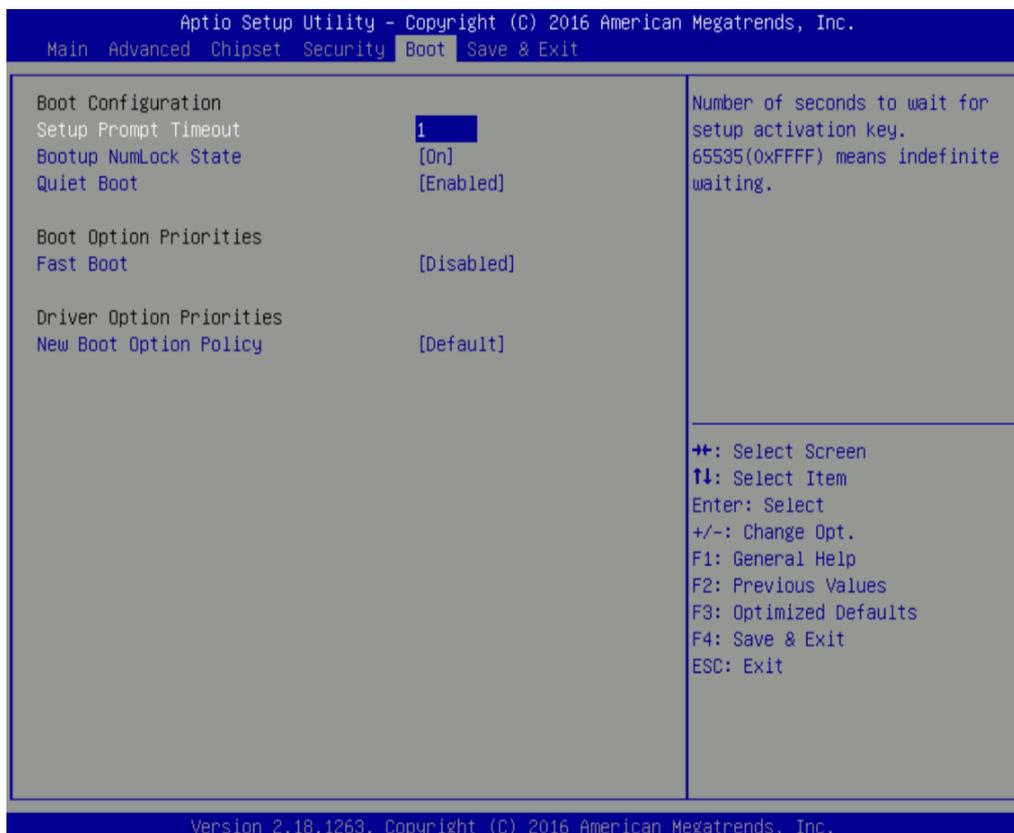
Allows you to set Administrator Password to control access to the BIOS Setup utility.

4.5.2 User Password

Allows you to set User Password to control access to the system at boot and to the BIOS Setup utility.

4.6 Boot Setup

This section allows you to configure Boot settings.



4.6.1 Setup Prompt Timeout [1]

Use this item to set number of seconds (1..65535) to wait for setup activation key.

4.6.2 Bootup NumLock State [On]

Allows you to set NumLock key to <On> of <Off> state when system boots up.

4.6.3 Quiet Boot [Enabled]

Allows you to enable or disable Quiet Boot function.

4.6.4 Fast Boot [Disabled]

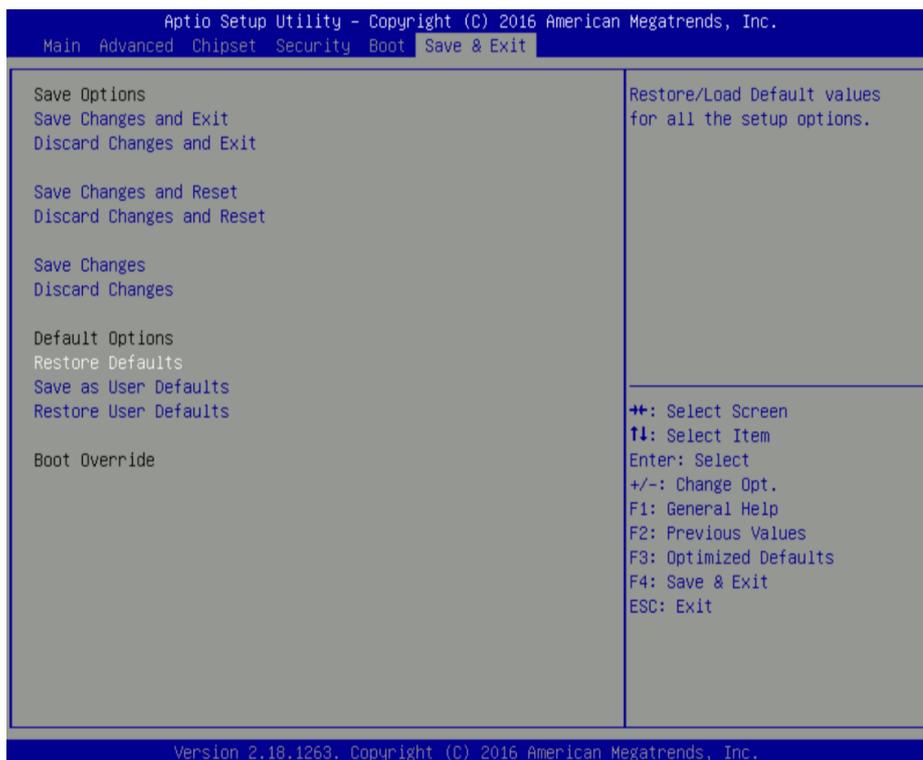
Allows you to enable or disable Fast Boot function. If enabled, system boots with initialization of a minimal set of devices required to launch active boot option.

4.6.5 New Boot Option Policy [Default]

Allows you to change New Boot Option Policy.

Configuration options: [Default] [Place First] [Place Last].

4.7 Save & Exit



4.7.1 Save Changes and Exit

This item allows you to exit system setup after saving changes.

4.7.2 Discard Changes and Exit

This item allows you to exit system setup without saving changes.

4.7.3 Save Changes and Reset

This item allows you to reset the system after saving changes.

4.7.4 Discard Changes and Reset

This item allows you to reset system setup without saving any changes.

4.7.5 Save Changes

This item allows you to save changes done so far to any of the setup options.

4.7.6 Discard Changes

This item allows you to discard changes done so far to any of the setup options.

4.7.7 Restore Defaults

This item allows you to restore/ load default values for all the setup options.

4.7.8 Save as User Defaults

This item allows you to save the changes done so far as user defaults.

4.7.9 Restore User Defaults

This item allows you to restore the user defaults to all the setup options.



Chapter 5

Product Application

(For CMI-CD, CMI-ICD only)

This chapter describes the DIO applications for CMI-CD, CMI-ICD only.

5.1 Digital I/O (DIO) Application

This section describes DIO application of the product. The content and application development are better understood and implemented by well experienced professionals or developers.

5.1.1 Digital I/O Programming Guide

5.1.1.1 Pins for Digital I/O

Item	Standard
GPIO74 (Pin107)	DI
GPIO75 (Pin108)	
GPIO76 (Pin109)	
GPIO77 (Pin110)	
GPIO80 (Pin111)	DO
GPIO81 (Pin112)	
GPIO82 (Pin113)	
GPIO83 (Pin114)	

5.1.1.2 Programming Guide

To program the F81866A configuration registers, the following configuration procedures must be followed in sequence:

- (1) Enter the Extended Function Mode
- (2) Configure the configuration registers
- (3) Exit the Extended Function Mode

The configuration register is used to control the behavior of the corresponding devices. To configure the register, using the index port to select the index and then writing data port to alter the parameters. The default index port and data port are 0x4E and 0x4F, respectively. To enable configuration, the entry key 0x87 must be written to the index port. To disable configuration, write exit entry key 0xAA to the index port. Following is an example to enable configuration and disable configuration by using debug.

- ```
-o 4e 87
-o 4e 87 (enable configuration)
-o 4e aa (disable configuration)
```

### 5.1.1.3 Relative Registers

To program the F81866A configuration registers, the following configuration procedures.

**Logic Device Number Register (LDN) — Index 07h**

| Bit | Name | R/W | Reset   | Default | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----|------|-----|---------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7-0 | LDN  | R/W | LRESET# | 00h     | 00h: Select FDC device configuration registers.<br>03h: Select Parallel Port device configuration registers.<br>04h: Select Hardware Monitor device configuration registers.<br>05h: Select KBC device configuration registers.<br>06h: Select GPIO device configuration registers.<br>07h: Select WDT device configuration registers.<br>0Ah: Select PME, ACPI and ERP device configuration registers.<br>10h: Select UART1 device configuration registers.<br>11h: Select UART2 device configuration registers.<br>12h: Select UART3 device configuration registers.<br>13h: Select UART4 device configuration registers.<br>14h: Select UART5 device configuration registers.<br>15h: Select UART6 device configuration registers.<br>Otherwise: Reserved. |

**7.7.11.1GPIO7 Output Enable Register — Index 80h**

| Bit | Name      | R/W | Reset   | Default | Description                                                 |
|-----|-----------|-----|---------|---------|-------------------------------------------------------------|
| 7   | GPIO77_OE | R/W | LRESET# | 0       | 0: GPIO77 is in input mode.<br>1: GPIO77 is in output mode. |
| 6   | GPIO76_OE | R/W | LRESET# | 0       | 0: GPIO76 is in input mode.<br>1: GPIO75 is in output mode. |
| 5   | GPIO75_OE | R/W | LRESET# | 0       | 0: GPIO75 is in input mode.<br>1: GPIO75 is in output mode. |
| 4   | GPIO74_OE | R/W | LRESET# | 0       | 0: GPIO74 is in input mode.<br>1: GPIO74 is in output mode. |

**7.7.11.3GPIO7 Pin Status Register — Index 82h (This byte could be also read by base address + 3)**

| Bit | Name      | R/W | Reset | Default | Description                     |
|-----|-----------|-----|-------|---------|---------------------------------|
| 7   | GPIO77_IN | R   | -     | -       | The pin status of GPIO77/STB#.  |
| 6   | GPIO76_IN | R   | -     | -       | The pin status of GPIO76/AFD#.  |
| 5   | GPIO75_IN | R   | -     | -       | The pin status of GPIO75/ERR#.  |
| 4   | GPIO74_IN | R   | -     | -       | The pin status of GPIO74/INIT#. |

**7.7.12.1GPIO8 Output Enable Register — Index 88h**

|   |           |     |         |   |                                                             |
|---|-----------|-----|---------|---|-------------------------------------------------------------|
| 3 | GPIO83_OE | R/W | LRESET# | 1 | 0: GPIO83 is in input mode.<br>1: GPIO83 is in output mode. |
| 2 | GPIO82_OE | R/W | LRESET# | 1 | 0: GPIO82 is in input mode.<br>1: GPIO82 is in output mode. |
| 1 | GPIO81_OE | R/W | LRESET# | 1 | 0: GPIO81 is in input mode.<br>1: GPIO81 is in output mode. |
| 0 | GPIO80_OE | R/W | LRESET# | 1 | 0: GPIO80 is in input mode.<br>1: GPIO80 is in output mode. |

7.7.12.2 GPIO8 Output Data Register — Index 89h (This byte could be also written by base address + 2)

|   |            |     |         |   |                                                                                      |
|---|------------|-----|---------|---|--------------------------------------------------------------------------------------|
| 3 | GPIO83_VAL | R/W | LRESET# | 1 | 0: GPIO83 outputs 0 when in output mode.<br>1: GPIO83 outputs 1 when in output mode. |
| 2 | GPIO82_VAL | R/W | LRESET# | 1 | 0: GPIO82 outputs 0 when in output mode.<br>1: GPIO82 outputs 1 when in output mode. |
| 1 | GPIO81_VAL | R/W | LRESET# | 1 | 0: GPIO81 outputs 0 when in output mode.<br>1: GPIO81 outputs 1 when in output mode. |
| 0 | GPIO80_VAL | R/W | LRESET# | 1 | 0: GPIO80 outputs 0 when in output mode.<br>1: GPIO80 outputs 1 when in output mode. |

### 5.1.1.4 Sample Code in C Language

#### 5.1.1.4.1 Control of GP74 to GP77 (DI1 ~ DI4)

```
#define AddrPort 0x4E
```

```
#define DataPort 0x4F
```

<Enter the Extended Function Mode>

```
WriteByte(AddrPort, 0x87)
```

```
WriteByte(AddrPort, 0x87) //Must write twice to entering Extended mode
```

<Select Logic Device>

```
WriteByte(AddrPort, 0x07)
```

```
WriteByte(dataPort, 0x06)
```

```
//Select logic device 06h
```

<Input Mode Selection> //Set GP74 to GP77 input Mode

```
WriteByte(AddrPort, 0x80) // Select configuration register 80h
```

```
WriteByte(DataPort, 0x0X)
```

```
//Set (bit 4~7) = 0 to select GP 74~77 as Input mode.
```

<input Value>

```
WriteByte(AddrPort, 0x82) // Select configuration register 82h
```

```
ReadByte(DataPort, Value) // Read bit 4~7(0xFx)= GP74 ~77 as High.
```

<Leave the Extended Function Mode>

```
WriteByte(AddrPort, 0xAA)
```

#### 5.1.1.4.2 Control of GP80 to GP83 (DO1 ~ DO4)

```
#define AddrPort 0x4E
#define DataPort 0x4F

<Enter the Extended Function Mode>
WriteByte(AddrPort, 0x87)
WriteByte(AddrPort, 0x87) //Must write twice to entering Extended mode

<Select Logic Device>
WriteByte(AddrPort, 0x07)
WriteByte(DataPort, 0x06)
// Select logic device 06h

<Output Mode Selection> //Set GP80 to GP83 output Mode
WriteByte(AddrPort, 0x88) // Select configuration register 88h
WriteByte(DataPort, (0xFF))
//Set (bit 0~3) = 1 to select GP 80 ~83 as Output mode.

<Output Value>
WriteByte(AddrPort, 0x89) // Select configuration register 89h
WriteByte(DataPort, Value) // Set bit 0~3=(0/1) to output GP 80~83 as Low or High

<Leave the Extended Function Mode>
WriteByte(AddrPort, 0xAA)
```

#### 5.1.1.5 Change base address

```
<Enter the Extended Function Mode>
WriteByte(AddrPort, 0x87)
WriteByte(AddrPort, 0x87) //Must write twice to entering Extended mode

<Select Logic Device>
WriteByte(AddrPort, 0x07)
WriteByte(dataPort, 0x06)
//Select logic device 06h

WriteByte(AddrPort, 0x60) // Select configuration register 60h (High Byte address)
WriteByte(DataPort, (0x0A))

WriteByte(AddrPort, 0x61) // Select configuration register 61h (Low Byte address)
WriteByte(DataPort, (0x00))

<Leave the Extended Function Mode>
WriteByte(AddrPort, 0xAA)
```

Cincoze default DIO Port base address is set to 0x0A00h

### 5.1.1.6 DATA Bit Table (DIO)

7	6	5	4	3	2	1	0	bit
0	0	0	1	-	-	-	-	value
1				X				/h

= DI1  
(Base address +3) (0xA03)

7	6	5	4	3	2	1	0	bit
0	0	1	0	-	-	-	-	value
2				X				/h

= DI2  
(Base address +3) (0xA03)

7	6	5	4	3	2	1	0	bit
0	1	0	0	-	-	-	-	value
4				X				/h

= DI3  
(Base address +3) (0xA03)

7	6	5	4	3	2	1	0	bit
1	0	0	0	-	-	-	-	value
8				X				/h

= DI4  
(Base address +3) (0xA03)

7	6	5	4	3	2	1	0	bit
-	-	-	-	0	0	0	1	value
X				1				/h

= DO1  
(Base address +2) (0xA02)

7	6	5	4	3	2	1	0	bit
-	-	-	-	0	0	1	0	value
X				2				/h

= DO2  
(Base address +2) (0xA02)

7	6	5	4	3	2	1	0	bit
-	-	-	-	0	1	0	0	value
X				4				/h

= DO3  
(Base address +2) (0xA02)

7	6	5	4	3	2	1	0	bit
-	-	-	-	1	0	0	0	value
X				8				/h

= DO4  
(Base address +2) (0xA02)

### 5.1.1.7 DIO I/O Port Address (Default Address 0xA00)

DI4	DI3	DI2	DI1	DO4	DO3	DO2	DO1	Pin Definition
7	6	5	4	3	2	1	0	Data Bits
DI				DO				DIO
0xA03				0xA02				I/O Port address

## 5.2 CMI-CD, CMI-ICD Digital I/O (DIO) Hardware Specification

- XCOM+ / 2XCOM+ : Isolated power in V+
- XCOM- / 2XCOM- : Isolated power in V-
- Isolated power in DC voltage : 9~30V
  
- 8x Digital Input (Source Type)
  
- Input Signal Voltage Level
  - Signal Logic 0 : XCOM+ = 9V,  $\text{Signal Low} - \underline{V-} < 1\text{V}$   
 $\text{XCOM+} > 9\text{V}, \underline{V+} - \text{Signal Low} > 8\text{V}$
  - Signal Logic 1 :  $> \underline{\text{XCOM+}} - \underline{3\text{V}}$
  
- Input Driving Sink Current :
  - Minimal : 1 mA
  - Normal : 5 mA
  
- 8x Digital Output (Open Drain)
  - DO Signal have to pull up resistor to XCOM+ for external device, the resistance will affect the pull up current
  - Signal High Level : Pull up resistor to XCOM+
  - Signal Low Level : = XCOM-
  - Sink Current: 1A (Max)

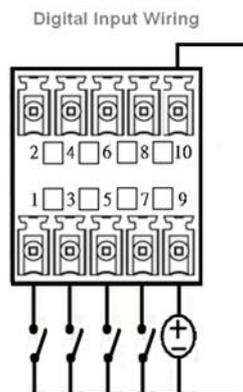
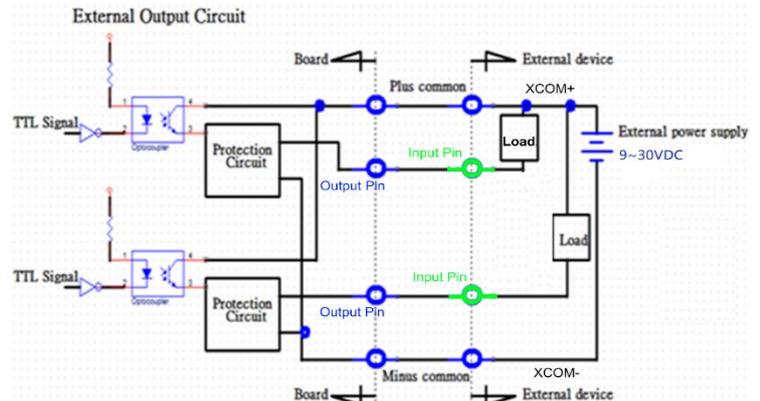
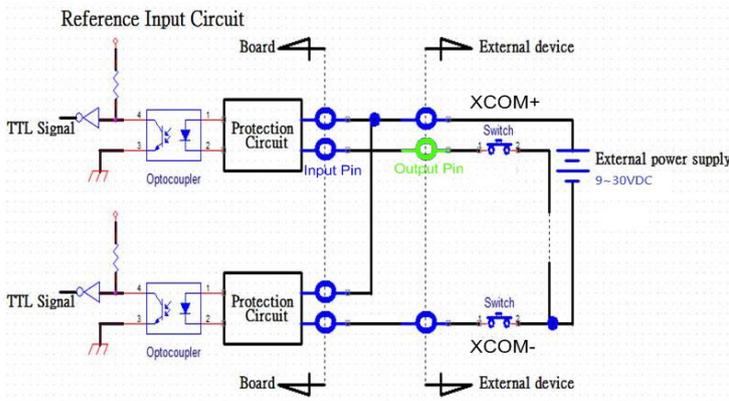
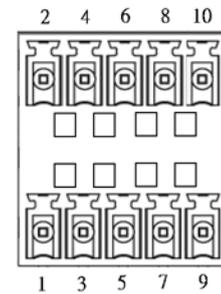
## 5.2.1 CMI-CD, CMI-ICD Connector Definition



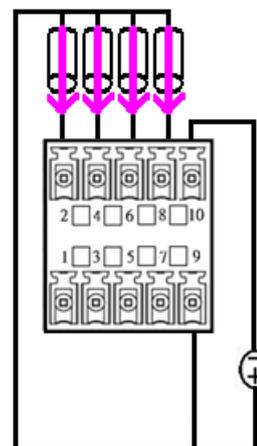
### DIO1: Digital Input / Output Connector

Connector Type: Terminal Block 2X5 10-pin, 3.5mm pitch

Pin	Definition	Pin	Definition
1	DI1	2	DO1
3	DI2	4	DO2
5	DI3	6	DO3
7	DI4	8	DO4
9	DC INPUT	10	GND



### Digital Output Wiring





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