IVH-9204MX ICY USER Manual

Intel® Xeon®/Core™ i7/i5/i3 Fanless In-Vehicle Computing System
EN50155 & EN45545-2 Certified, X-coded M12 PoE⁺, 16V to 160V DC-in

Vecow

Record of Revision

Version	Date	Page	Description	Remark
0.10	2020/01/30	All	Preliminary Release	
1.00	2020/02/05		Official Release	
1.10	2020/02/12	All	Update	
1.20	2020/10/05	22, 31, 44	Update	
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1.40	2023/11/13	All	Update	

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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 it is not installed and used in accordance with the instruction manual, it 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 products described in this manual comply with all applicable 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.

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Order Information

Part Number	Description
IVH-9204MX ICYU	IVH-9200, 6 GigE LAN w/4 X-coded M12 PoE⁺, 6 SSD/HDD Tray, 8 USB 3.0, 4 COM, 3 SIM, 32 Isolated DIO, UPS supported
IVH-9204MX ICY	IVH-9200, 6 GigE LAN w/4 X-coded M12 PoE⁺, 6 SSD/HDD Tray, 8 USB 3.0, 4 COM, 3 SIM, 32 Isolated DIO
IVH-9204MX ICY4U	IVH-9200, 6 GigE LAN w/4 X-coded M12 PoE⁺, 4 SSD/HDD Tray, 8 USB 3.0, 4 COM, 3 SIM, 32 Isolated DIO, UPS supported
IVH-9204MX ICY4	IVH-9200, 6 GigE LAN w/4 X-coded M12 PoE⁺, 4 SSD/HDD Tray, 8 USB 3.0, 4 COM, 3 SIM, 32 Isolated DIO

CPU List

Part Number	Description
E3-1275 v6	7th Gen Intel® Xeon® E3-1275 v6 Processor (8M Cache, up to 4.20GHz, 80W)
E3-1275 v5	6th Gen Intel® Xeon® E3-1275 v5 Processor (8M Cache, up to 4.00GHz, 80W)
E3-1225 v5	6th Gen Intel® Xeon® E3-1225 v5 Processor (6M Cache, up to 3.70GHz, 80W)
E3-1268L v5	6th Gen Intel® Xeon® E3-1268L v5 Processor (8M Cache, up to 3.40GHz, 35W)
i7-7700	7th Gen Intel® Core™ i7-7700 Processor (8M Cache, up to 4.20GHz, 65W)
i7-7700T	7th Gen Intel® Core™ i7-7700T Processor (8M Cache, up to 3.80GHz, 35W)
i7-6700	6th Gen Intel® Core™ i7-6700 Processor (8M Cache, up to 4.00GHz)
i7-6700TE	6th Gen Intel® Core™ i7-6700TE Processor (8M Cache, up to 3.40GHz)
i5-7500	7th Gen Intel® Core™ i5-7500 Processor (6M Cache, up to 3.80GHz, 65W)
i5-7500T	7th Gen Intel® Core™ i5-7500T Processor (6M Cache, up to 3.30GHz, 35W)
i5-6500	6th Gen Intel® Core™ i5-6500 Processor (6M Cache, up to 3.60GHz)
i5-6500TE	6th Gen Intel® Core™ i5-6500TE Processor (6M Cache, up to 3.30GHz)
i3-7101E	7th Gen Intel® Core™ i3-7101E Processor (3M Cache, up to 3.90GHz, 65W)
i3-7101TE	7th Gen Intel® Core™ i3-7101TE Processor (3M Cache, up to 3.40GHz, 35W)
i3-6100	6th Gen Intel® Core™ i3-6100 Processor (3M Cache, 3.70GHz)
i3-6100TE	6th Gen Intel® Core™ i3-6100TE Processor (4M Cache, 2.70GHz)

Optional Accessories

Part Number	Description
DDR4 32G	Certified DDR4 32GB 2400/2133MHz RAM
DDR4 16G	Certified DDR4 16GB 2400/2133MHz RAM
DDR4 8G	Certified DDR4 8GB 2400/2133MHz RAM
DDR4 4G	Certified DDR4 4GB 2400/2133MHz RAM
PWA-280W-WT	280W, 24V, 85V AC to 264V AC Power Adapter with 3-pin Terminal Block, Wide Temperature -30°C to +70°C
PWA-160W-WT	160W, 24V, 85V AC to 264V AC Power Adaptor with 3-pin Terminal Block, Wide Temperature -30°C to +70°C
TMK2-20P-100	Terminal Block 20-pin to Terminal Block 20-pin Cable, 100cm
TMK2-20P-500	Terminal Block 20-pin to Terminal Block 20-pin Cable, 500cm
TMB-TMBK-20P	Terminal Board with One 20-pin Terminal Block Connector and DIN-Rail Mounting
4G Module	Mini PCIe 4G/GPS Module with Antenna
WiFi & Bluetooth	WiFi & Bluetooth Module with Antenna

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GENERAL INTRODUCTION

1.1 Overview

Vecow IVH-9204MX ICY Series is the most trusted and powerful rugged in-vehicle computing engine in the market. Flexible LGA1151 Socket supports workstation-grade Intel® Xeon®/Core™ i7/i5/i3 processor (Kaby Lake-S/Skylake-S) running with advanced Intel® C236 chipset and dual-channel DDR4 2400/2133 MHz ECC memory, up to 64GB capacity; Advanced Intel® HD Graphics 630 supporting DirectX 12, OpenGL 4.4 and OpenCL 2.0 API, onboard DVI-I, DVI-D and DisplayPort display interfaces for Ultra HD 4K resolution, IVH-9204MX ICY makes excellent CPU performance, power efficiency, and graphics performance possible; PCIe 3.0 (8GT/s), Multiple SATA III (6Gbps), USB 3.0 (5Gbps), PoE (1Gbps) LAN and multiple wireless connections make seamless high-speed data conveying possible. Vecow IVH-9204MX ICY Series Fanless Embedded System delivers outstanding system performance, power productivity and flexible manageability for performance-driven embedded computing applications.

Fully EN50155 certified, EN45545-2 fire protection, all-in-one and cable-less designs, fanless -40°C to 55°C extended operating temperature, 6 GigE LAN ports with 4 IEEE 802.3at (25.5W/48V) PoE⁺ and up to 4 X-coded M12 connections without additional power connections, 6 front-access 2.5" SSD/HDD trays flexible support 7mm to 15mm storage, up to 24TB capacity with RAID 0, 1, 5, 10 data protection, 3 external SIM card sockets for WiFi/4G/3G/LTE/GPRS/UMTS, 1 front-access CFast socket, 8 external USB 3.0, 4 COM RS-232/422/485, 32 Isolated DIO, 16V to 160V wide range power input with 4kV isolation and max 500V surge protection, configurable ignition power control, optional supports UPS, smart remote management features, remote power switch, EN50121-3-2 certified, Vecow IVH-9204MX ICY Series Fanless Embedded System serves all-in-one integrated features, versatile I/O functions, and rugged reliability in harsh environments.

With workstation-grade system performance, fanless -40°C to 55°C extended operating temperature, all-in-one integrated features, smart manageability & data protection functions, outstanding mobile availability, secure power protection, and rugged reliability, Vecow IVH-9204MX ICY Series In-Vehicle Fanless System is your trusted and performance-driven solution for Advanced Driver Assistance System (ADAS), In-vehicle Surveillance, Mobile In-vehicle Communication, Passenger Information System (PIS), Pantograph Inspection and any AIoT/Industry 4.0 applications.

1.2 Features

- LGA 1151 Socket supports Quad Core 7th/6th Generation Intel® Xeon®/Core™ i7/i5/i3 Processor (Kaby Lake-S/Skylake-S) with Intel® C236 Chipset

- Fanless design for railway in-vehicle applications, fully EN50155 certified, -40°C to 55°C Extended Operating Temperature

- 2 DDR4 2400/2133 MHz Memory, up to 64GB (ECC/Non-ECC)

- 6 Independent GigE LAN with 4 X-coded M12 IEEE 802.3at PoE$^+$, iAMT 11.0 supported

- 6 Front-access 7mm to 15mm in height 2.5" SSD/HDD Tray, up to 24TB capacity, RAID 0, 1, 5, 10 supported

- 3 Front-access SIM Card Socket for WiFi/4G/3G/LTE/GPRS/UMTS

- DVI-I, DVI-D and DisplayPort triple independent display, up to 4K displays

- 32 Isolated DIO, 8 USB 3.0, 4 COM, 3 Mini PCIe

- 16V to 160V DC Power Input with 4kV DC Isolation, up to 500V Surge Protection

- Configurable Ignition Power Control

- UPS supported (Optional)

1.3 Product Specification

1.3.1 Specifications of IVH-9204MX ICYU

System	
Processor	Quad Core 7th/6th Gen Intel® Xeon®/Core™ i7/i5/i3 Processor (Kaby Lake-S/Skylake-S)
Chipset	Intel® C236
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2400/2133MHz • Up to 64GB • 2 260-pin SO-DIMM Socket (ECC/Non-ECC)
I/O Interface	
Serial	4 COM RS-232/422/485 with auto flow control (ESD 8kV)
USB	• 8 External USB 3.0 (4 Front, 4 Rear) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO (16 DI, 16 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	2 External SIM Card Socket (SIM 1 unavailable)
Expansion	
Mini PCIe	2 Full-size for PCIe/USB/External SIM Card/mSATA
Graphics	
Graphics Processor	Intel® HD Graphics 630/530
Interface	• DVI-I : Up to 1920 x 1200 @ 60Hz • DVI-D : Up to 1920 x 1200 @ 60Hz • DisplayPort : Up to 4096 x 2304 @ 60Hz
Storage	
SATA	6 SATA III (6Gbps) support software RAID 0, 1, 5, 10
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 6 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 11.0
LAN 2	Intel® I210 GigE LAN
PoE (M12)	
LAN 3 to LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE⁺ by Intel® I210, M12 Connector

Power	
Input Voltage	16V to 160V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Isolation	4kV DC
Surge Protection	0.5kV DC 8/20us Surge
UPS (UPM-100)	Optional supports 3 stackable 18650 LFP batteries (1.1mA/h)
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Windows 8.1, Windows 7, Linux
Mechanical	
Dimension	260.0mm x 215.0mm x 155.1mm (10.24" x 8.46" x 6.10")
Weight	10 kg (22.04 lb)
Mounting	Wallmount by mounting bracket
Environment	
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 40°C
Shock	IEC 61373
Vibration	IEC 61373
EMC	CE, FCC, EN50155:2017, EN50121-3-2, EN45545-2

1.3.2 Specifications of IVH-9204MX ICY

System	
Processor	Quad Core 7th/6th Gen Intel® Xeon®/Core™ i7/i5/i3 Processor (Kaby Lake-S/Skylake-S)
Chipset	Intel® C236
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2400/2133MHz • Up to 64GB • 2 260-pin SO-DIMM Socket (ECC/Non-ECC)
I/O Interface	
Serial	4 COM RS-232/422/485 with auto flow control (ESD 8kV)
USB	• 8 External USB 3.0 (4 Front, 4 Rear) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO (16 DI, 16 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	2 External SIM Card Socket (SIM 1 unavailable)
Expansion	
Mini PCIe	2 Full-size for PCIe/USB/External SIM Card/mSATA
Graphics	
Graphics Processor	Intel® HD Graphics 630/530
Interface	• DVI-I : Up to 1920 x 1200 @ 60Hz • DVI-D : Up to 1920 x 1200 @ 60Hz • DisplayPort : Up to 4096 x 2304 @ 60Hz
Storage	
SATA	6 SATA III (6Gbps) support software RAID 0, 1, 5, 10
mSATA	3 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 6 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 11.0
LAN 2	Intel® I210 GigE LAN
PoE (M12)	
LAN 3 to LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE⁺ by Intel® I210

Power	
Input Voltage	16V to 160V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Isolation	4kV DC
Surge Protection	0.5kV DC 8/20us Surge
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Windows 8.1, Windows 7, Linux
Mechanical	
Dimension	260.0mm x 215.0mm x 155.1mm (10.24" x 8.46" x 6.10")
Weight	10 kg (22.04 lb)
Mounting	Wallmount by mounting bracket
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **65W/80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 55°C
Shock	IEC 61373
Vibration	IEC 61373
EMC	CE, FCC, EN50155:2017, EN50121-3-2, EN45545-2

1.3.3 Specifications of IVH-9204MX ICY4U

System	
Processor	Quad Core 7th/6th Gen Intel® Xeon®/Core™ i7/i5/i3 Processor (Kaby Lake-S/Skylake-S)
Chipset	Intel® C236
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2400/2133MHz • Up to 64GB • 2 260-pin SO-DIMM Socket (ECC/Non-ECC)
I/O Interface	
Serial	4 COM RS-232/422/485 with auto flow control (ESD 8kV)
USB	• 8 External USB 3.0 (4 Front, 4 Rear) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO (16 DI, 16 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	3 External SIM Card Socket
Expansion	
Mini PCIe	3 Full-size for PCIe/USB/External SIM Card/mSATA
Graphics	
Graphics Processor	Intel® HD Graphics 630/530
Interface	• DVI-I : Up to 1920 x 1200 @ 60Hz • DVI-D : Up to 1920 x 1200 @ 60Hz • DisplayPort : Up to 4096 x 2304 @ 60Hz
Storage	
SATA	4 SATA III (6Gbps) support software RAID 0, 1, 5, 10
mSATA	3 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 4 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 11.0
LAN 2	Intel® I210 GigE LAN
PoE (M12)	
LAN 3 to LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE⁺ by Intel® I210, M12 Connector

Power	
Input Voltage	16V to 160V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Isolation	4kV DC
Surge Protection	0.5kV DC 8/20us Surge
UPS (UPM-100)	Optional supports 3 stackable 18650 LFP batteries (1.1mA/h)
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Windows 8.1, Windows 7, Linux
Mechanical	
Dimension	260.0mm x 215.0mm x 155.1mm (10.24" x 8.46" x 6.10")
Weight	8.8 kg (19.40 lb)
Mounting	Wallmount by mounting bracket
Environment	
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 40°C
Shock	IEC 61373
Vibration	IEC 61373
EMC	CE, FCC, EN50155:2017, EN50121-3-2, EN45545-2

1.3.4 Specifications of IVH-9204MX ICY4

System	
Processor	Quad Core 7th/6th Gen Intel® Xeon®/Core™ i7/i5/i3 Processor (Kaby Lake-S/Skylake-S)
Chipset	Intel® C236
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2400/2133MHz • Up to 64GB • 2 260-pin SO-DIMM Socket (ECC/Non-ECC)
I/O Interface	
Serial	4 COM RS-232/422/485 with auto flow control (ESD 8kV)
USB	• 8 External USB 3.0 (4 Front, 4 Rear) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO (16 DI, 16 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	3 External SIM Card Socket
Expansion	
Mini PCIe	3 Full-size for PCIe/USB/External SIM Card/mSATA
Graphics	
Graphics Processor	Intel® HD Graphics 630/530
Interface	• DVI-I : Up to 1920 x 1200 @ 60Hz • DVI-D : Up to 1920 x 1200 @ 60Hz • DisplayPort : Up to 4096 x 2304 @ 60Hz
Storage	
SATA	4 SATA III (6Gbps) support software RAID 0, 1, 5, 10
mSATA	3 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 4 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 11.0
LAN 2	Intel® I210 GigE LAN
PoE (M12)	
LAN 3 to LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE⁺ by Intel® I210

Power	
Input Voltage	16V to 160V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Isolation	4kV DC
Surge Protection	0.5kV DC 8/20us Surge
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Windows 8.1, Windows 7, Linux
Mechanical	
Dimension	260.0mm x 215.0mm x 155.1mm (10.24" x 8.46" x 6.10")
Weight	8.5 kg (18.74 lb)
Mounting	Wallmount by mounting bracket
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **65W/80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 55°C
Shock	IEC 61373
Vibration	IEC 61373
EMC	CE, FCC, EN50155:2017, EN50121-3-2, EN45545-2

1.4 Supported CPU List

Processor No.	Cores	TDP	Cache	Max. Frequency	ECC Memory
Intel® Xeon® E3-1275 v6	4	80W	16M	Up to 4.2GHz	Y
Intel® Xeon® E3-1275 v5	4	80W	16M	Up to 4.0GHz	Y
Intel® Xeon® E3-1225 v5	4	80W	12M	Up to 3.7GHz	Y
Intel® Xeon® E3-1268L v5	4	35W	12M	Up to 3.4GHz	Y
Intel® Core™ i7-7700	4	65W	12M	Up to 4.2GHz	N
Intel® Core™ i7-7700T	4	35W	12M	Up to 3.8GHz	N
Intel® Core™ i7-6700	4	65W	12M	Up to 4.0GHz	N
Intel® Core™ i7-6700TE	4	35W	12M	Up to 3.4GHz	N
Intel® Core™ i5-7500	4	65W	9M	Up to 3.8GHz	N
Intel® Core™ i5-7500T	4	35W	9M	Up to 3.3GHz	N
Intel® Core™ i5-6500	4	65W	9M	Up to 3.6GHz	N
Intel® Core™ i5-6500TE	4	35W	9M	Up to 3.3GHz	N
Intel® Core™ i3-7101E	2	65W	6M	Up to 3.9GHz	Y
Intel® Core™ i3-7101TE	2	35W	6M	Up to 3.4GHz	Y
Intel® Core™ i3-6100	2	65W	6M	Up to 3.7GHz	Y
Intel® Core™ i3-6100TE	2	35W	6M	Up to 2.7GHz	Y

1.5 Mechanical Dimension

1.5.1 Dimensions of IVH-9204MX ICYU

Unit : mm (inch)
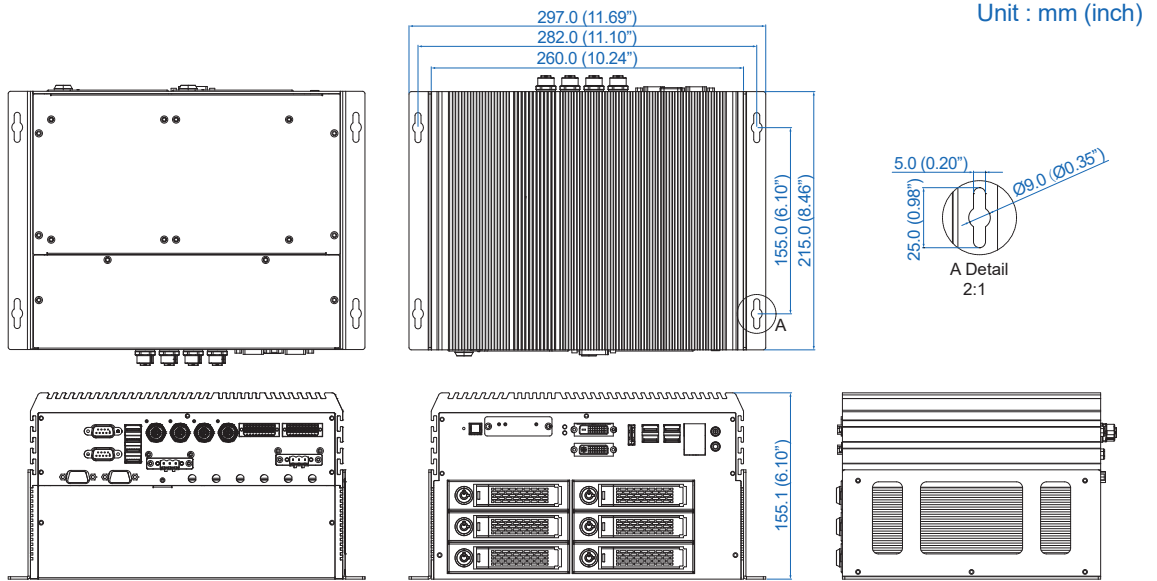
1.5.2 Dimensions of IVH-9204MX ICY

Unit : mm (inch)

1.5.3 Dimensions of IVH-9204MX ICY4U

297.0 (11.69")
282.0 (11.10")
260.0 (10.24")

155.0 (6.10")
215.0 (8.46")

155.1 (6.10")

5.0 (0.20")
25.0 (0.98")
Ø9.0 (Ø0.35")

A Detail
2:1

A

1.5.4 Dimensions of IVH-9204MX ICY4

297.0 (11.69")
282.0 (11.10")
260.0 (10.24")

155.0 (6.10")
215.0 (8.46")

155.1 (6.10")

5.0 (0.20")
25.0 (0.98")
Ø9.0 (Ø0.35")

A Detail
2:1

A
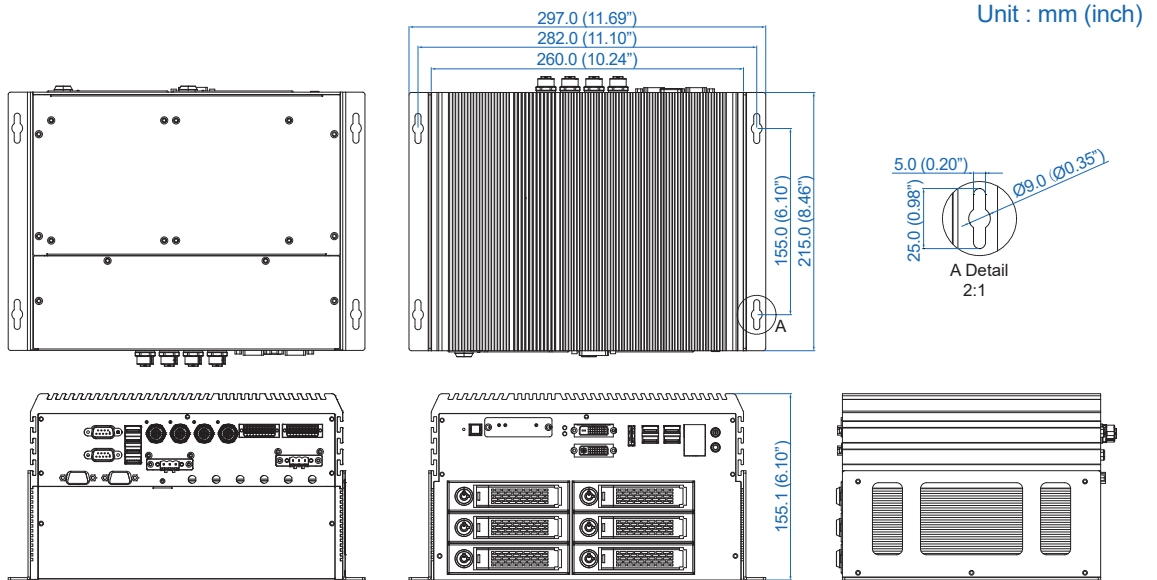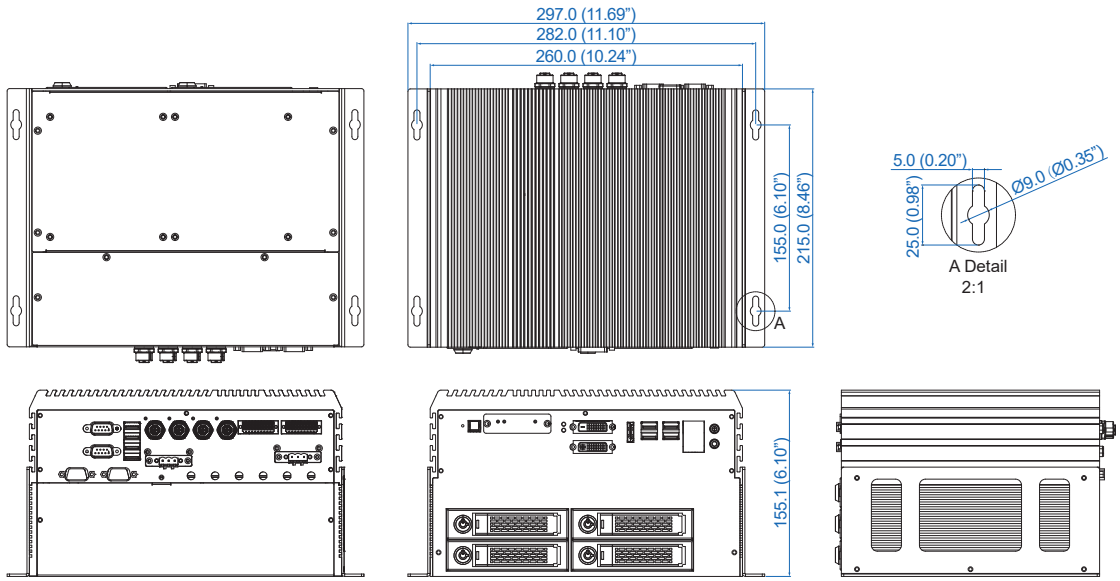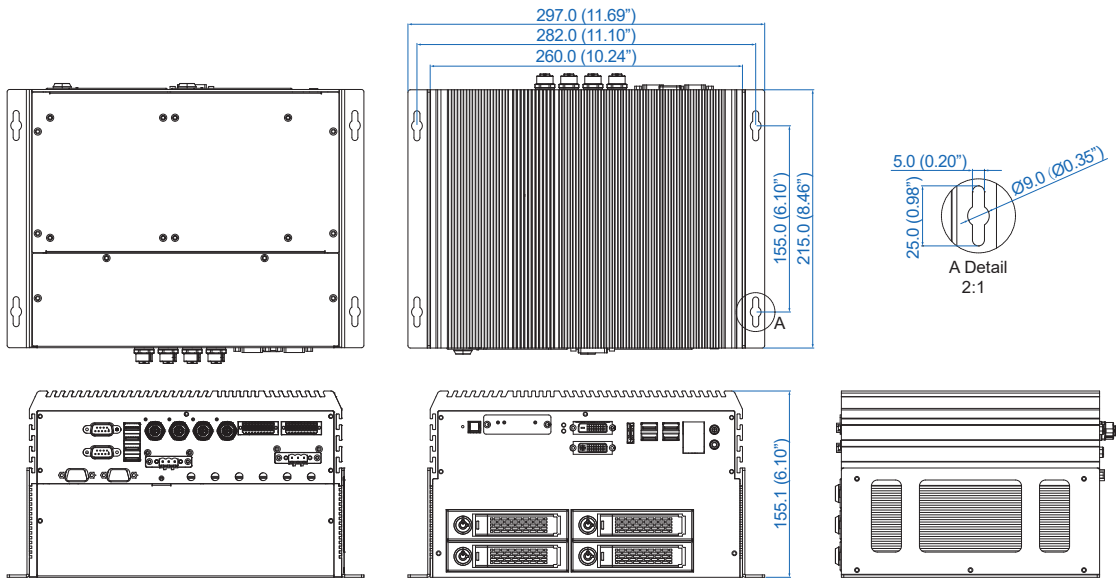
2

GETTING TO KNOW YOUR IVH-9204MX ICY

2.1 Packing List

Item	Description	Qty
1	IVH-9200 series In-Vehicle Fanless Embedded System (According to the configuration you order, the IVH-9200 series may contain SSD/HDD and DDR4 SO-DIMM. Please verify these items if necessary.)	1
2	**IVH-9204MX-ICY/IVH-9204MX-ICYU**-Accessory box, which contains • Vecow Drivers & Utilities DVD • Wall-mounting bracket • KHS#6-32x6 screw for wall-mounting bracket • M2.5x6 screw for Mini PCIe Slot • Din-Rail-PH-M4x16.5-S Ni • 3-pin pluggable terminal block • 20-pin pluggable terminal block • Foot Pad • F-M3x4 for SSD/HDD screws (Tray's packing) • Key for Tray (Tray's packing)	1 2 10 2 4 2 2 4 24 12
3	**IVH-9204MX-ICY4/IVH-9204MX-ICY4U**-Accessory box, which contains • Vecow Drivers & Utilities DVD • Wall-mounting bracket • KHS#6-32x6 screw for wall-mounting bracket • M2.5x6 screw for Mini PCIe Slot • Din-Rail-PH-M4x16.5-S Ni • 3-pin pluggable terminal block • 20-pin pluggable terminal block • Foot Pad • F-M3x4 for SSD/HDD screws (Tray's packing) • Key for Tray (Tray's packing)	1 2 10 3 4 2 2 4 16 8

2.2 Front Panel I/O & Functions

In Vecow IVH-9200 series family, all I/O connectors are located on the front and rear panels. Most of the general connections to the computer device, such as USB, LAN Jack, Audio, Display Port, DVI-I, DVI-D and other additional storage, are placed on the front panel.

2.2.1 Power Button
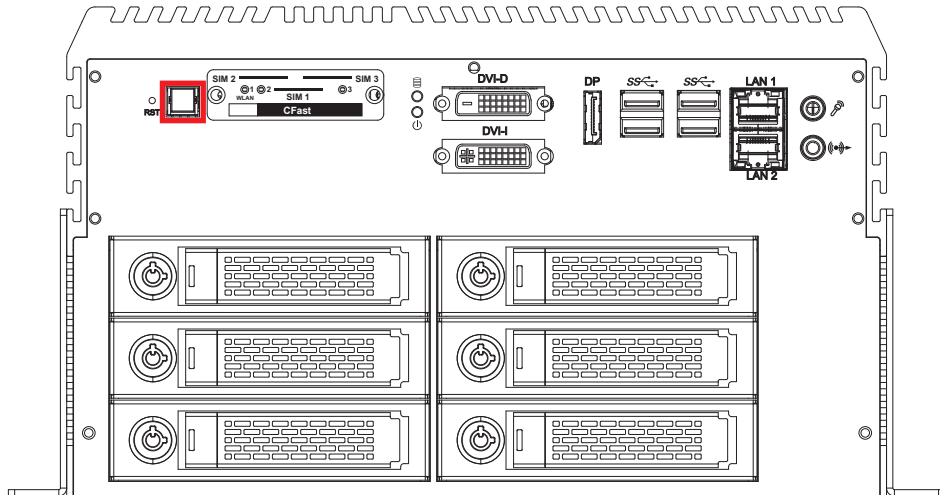
The Power Button is a non-latched switch with dual color LED indication. It indicates power status : S0, S3 and S5. more detailed LED indications are listed as follows :

LED Color	Power Status	System Status
Solid Blue	S0	System working
Solid Orange	S3, S5	Suspend to RAM, System off with standby power

To power on the system, press the power button and then the blue LED will lighten. To power off the system, you can either command shutdown by OS operation, or just simply press the power button.

If there is a system error, you can just press the power button for 4 seconds to shut down the machine directly. Please do note that a 4-second interval between each 2 power-on/power-off operation is necessary in normal working status. (For example, once turning off the system, you have to wait for 4 seconds to initiate another power-on operation.)

2.2.2 Reset Tact Switch
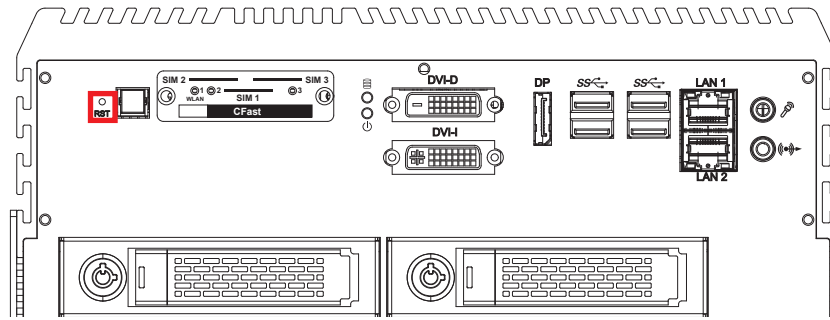
It is a hardware reset switch. Use this switch to reset the system without powering off the system. Press the Reset Switch for a few seconds, and then reset will be enabled.

2.2.3 CFast Card
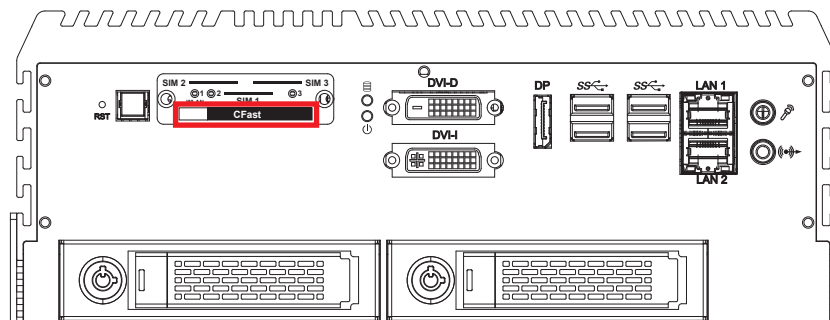
There is a CFast socket on the front panel supporting Type-I/II Compact Flash card. It is implemented by a SATA III Port from C236 PCH. Be sure to disconnect the power source and unscrew the CFast socket cover before installing a CFast card. The IVH-9200 does not support the CFast hot swap and PnP (Plug and Play) functions. It is necessary to remove the power source first before inserting or removing the CFast card.

The pinouts of CFast port are listed as follows :

Pin No.	Description	Pin No.	Description
S1	GND	PC6	NC
S2	SATA_TXP4	PC7	GND
S3	SATA_TXN4	PC8	CFAST_LED
S4	GND	PC9	NC
S5	SATA_RXN4	PC10	NC
S6	SATA_RXP4	PC11	NC
S7	GND	PC12	NC
PC1	GND	PC13	+3.3V
PC2	GND	PC14	+3.3V
PC3	NC	PC15	GND
PC4	NC	PC16	GND
PC5	NC	PC17	NC

2.2.4 PWR & HDD LED Indicator
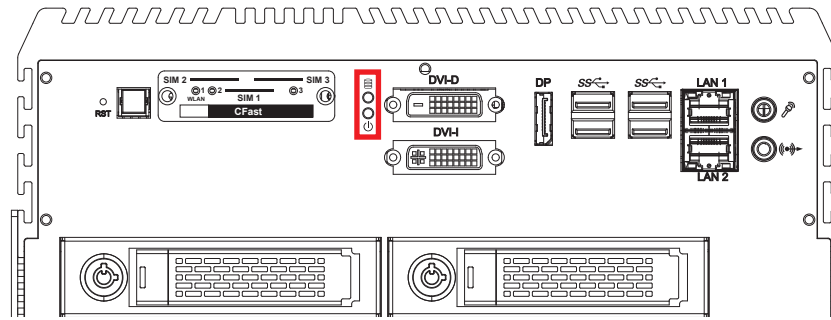
HDD LED/Yellow : A Hard Disk/CFast LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

Power LED/Green : If the LED is solid green, it indicates that the system is powered on.

LED Color	Indication	System Status
Yellow	HDD/CFast	• On/Off : Storage status, function or not • Twinkling : Data transferring
Green	Power	System power status (on/off)

2.2.5 DVI-D Connector
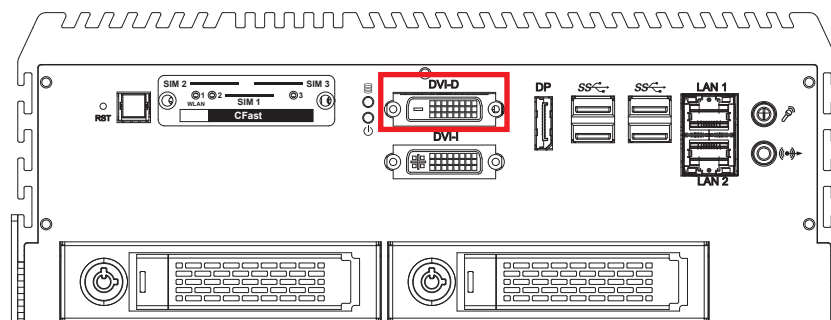
The DVI-D connector on the front panel supports DVI display. This connector can be also output DVI signal. The DVI output mode supports up to 1920 x 1200 resolution and output mode supports up to 1920 x 1200 resolution. The DVI is automatically selected according to the connected display. You will need a DVI-D cable when connecting to a display device.

2.2.6 DVI-I Connector
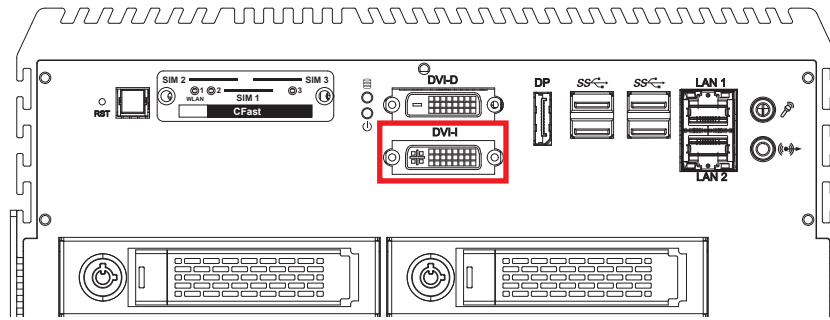
The DVI-I connector on the front panel supports both DVI and VGA display modes. This connector can output DVI signals. The DVI output mode supports up to 1920x1200 resolution. The DVI mode is automatically selected according to the connected display and you will need a DVI-I cable when connecting to a display device. The VGA output mode supports up to 1920x1200 resolution. If using VGA function, you will need a DVI-I to VGA module connected to DVI-I device. Below is the DVI-I to VGA dongle image :

2.2.7 DisplayPort
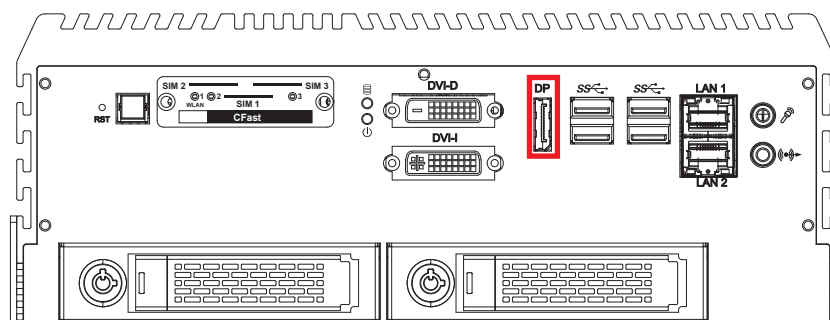
Onboard Display Port supports auxiliary channel dual mode, and the connection supports up to 4096x2304 resolution at 60Hz.

Multi-Stream Transport Display Resolutions Table :

Multi-Stream Transport Display	Max. Resolution
One panel Display	4096 x 2304 @60Hz
Two panel Displays concurrently	2880 x 1800 @60Hz
Three panel Displays concurrently	2304 x 1440 @60Hz

2.2.8 USB 3.0
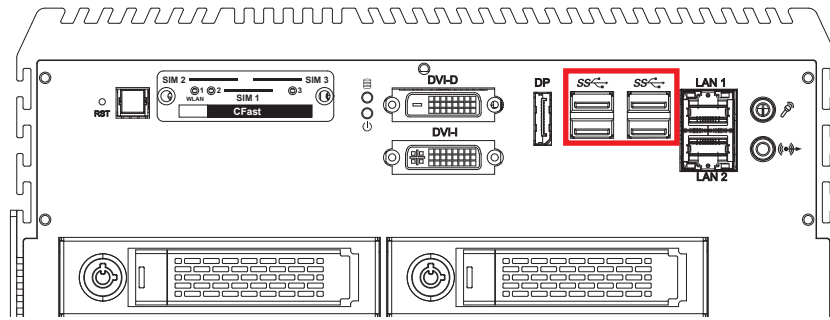
There are 4 USB 3.0 connections available supporting up to 5GB per second data rate in the front side of IVH-9200. It is also compliant with the requirements of Super Speed (SS), High Speed (HS), Full Speed (FS) and Low Speed (LS).

2.2.9 Ethernet Port
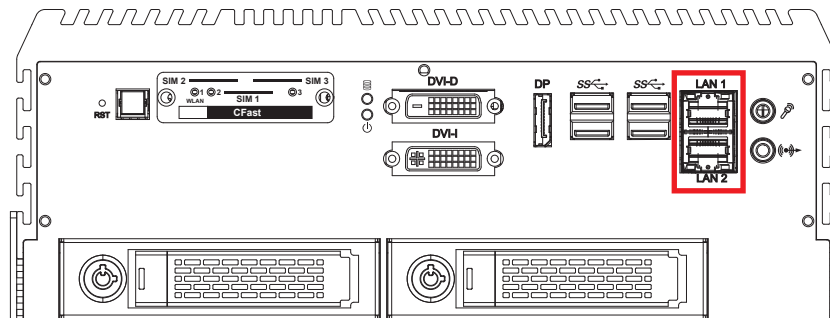
There are dual 8-pin RJ-45 jacks supporting 10/100/1000 Mbps Ethernet connections in the front side. LAN 1 is powered by Intel i219 Ethernet Phy and LAN 2 is powered by Intel I210 Ethernet engine. When both LAN 1 and LAN 2 work at normal status, iAMT 11.0 function is enabled.

Using suitable RJ-45 cable, you can connect the system to a computer or to any other devices with Ethernet connection; for example, a hub or a switch. Moreover, both LAN 1 and LAN 2 support Wake on LAN and Pre-boot functions. The pin-outs of LAN 1 and LAN 2 are listed as follows :

Pin No.	10/100 Mbps	1000Mbps
1	E_TX+	MDI0_P
2	E_TX-	MDI0_N
3	E_RX+	MDI1_P
4	-----	MDI2_P
5	-----	MDI2_N
6	E_RX-	MDI1_N
7	-----	MDI3_P
8	-----	MDI3_N

Each LAN port is supported by standard RJ-45 connector with LED indicators to present Active/Link/Speed status of the connection.

The LED indicator on the right bottom corner lightens in solid green when the cable is properly connected to a 100Mbps Ethernet network; The LED indicator on the right bottom corner lightens in solid orange when the cable is properly connected to a 1000Mbps Ethernet network; The left LED will keep twinkling/off when Ethernet data packets are being transmitted/received.

	10Mbps	100Mbps	1000Mbps
Right Bottom LED	Off	Solid Green	Solid Orange
Left Bottom LED	Flash Yellow	Flash Yellow	Flash Yellow
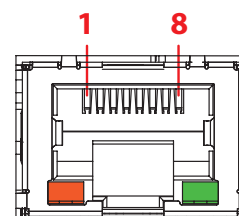
2.2.10 Audio Jack
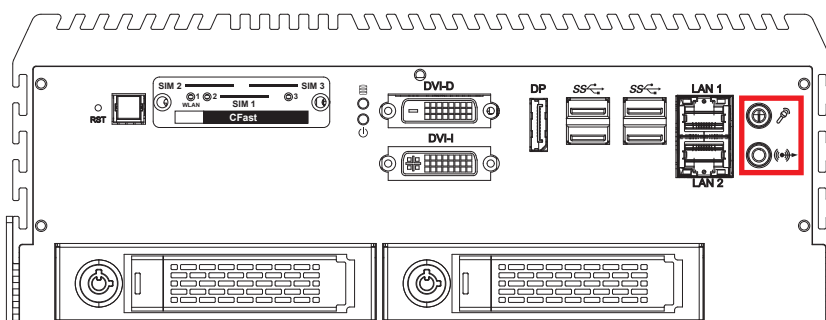
There are 2 audio connectors, Mic-in and Line-out, in the front side of IVH-9200. Onboard Realtek ALC888S-VD audio codec supports 7.1 channel HD audio and fully complies with Intel High Definition Audio (Azalia) specifications.

To utilize the audio function in Windows platform, you need to install the corresponding drivers for both Intel C236 chipset and Realtek ALC888S-VD codec.

2.2.11 WLAN LED, Mini PCIe, SIM Card Comparison
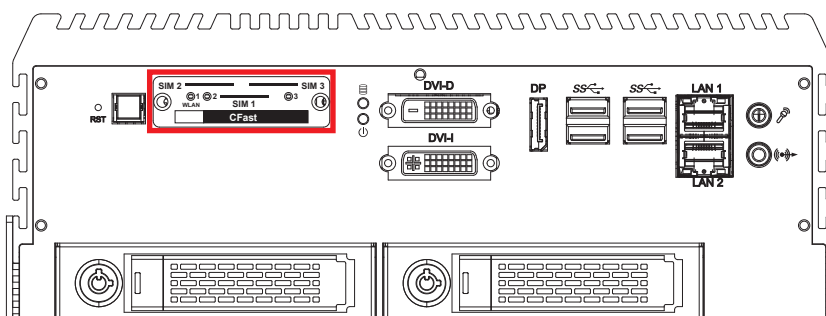
Mini PCIe Slot/SIM Slot/WLAN LED Mapping Table :
IVH-9204MX ICYU and IVH-9204MX ICY can't use SIM3

Mini PCIe	SIM	LED
Mini PCIe 1	SIM 1 (CN11)	1
Mini PCIe 2	SIM 2 (CN12)	2
Mini PCIe 3	SIM 3 (CN13)	3
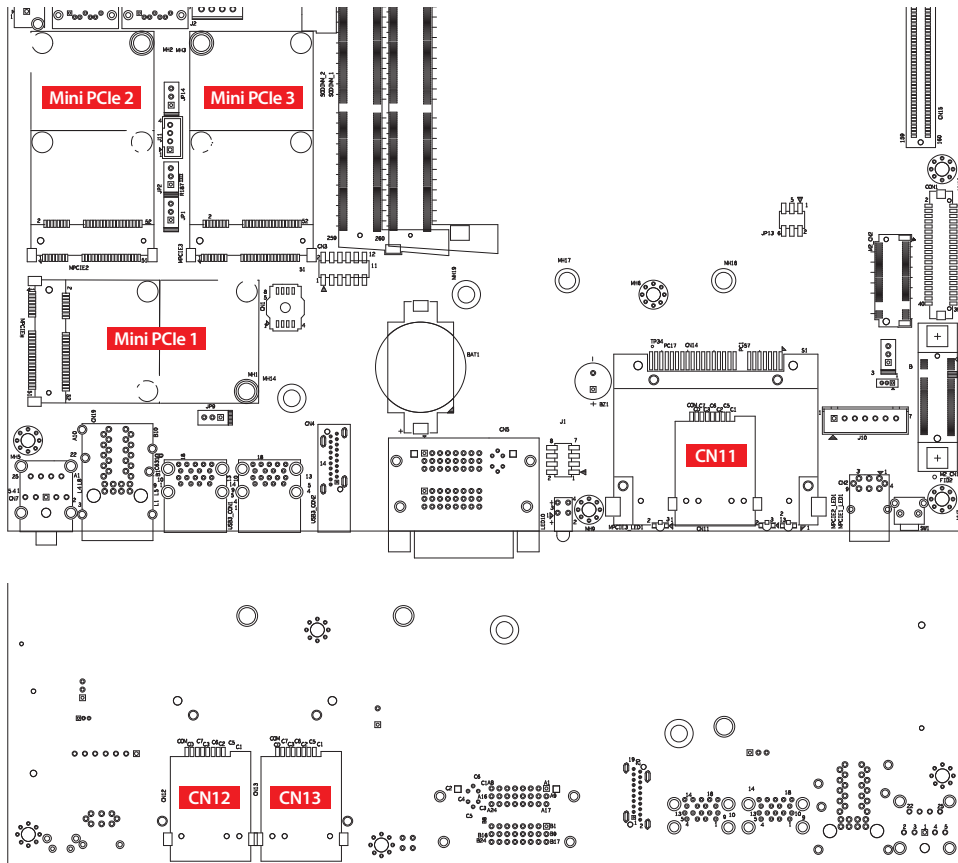
Note :
The SIM card sockets do not support hot-plug. Please make sure to unplug the system power before inserting the SIM cards.

2.2.12 SSD/HDD Tray
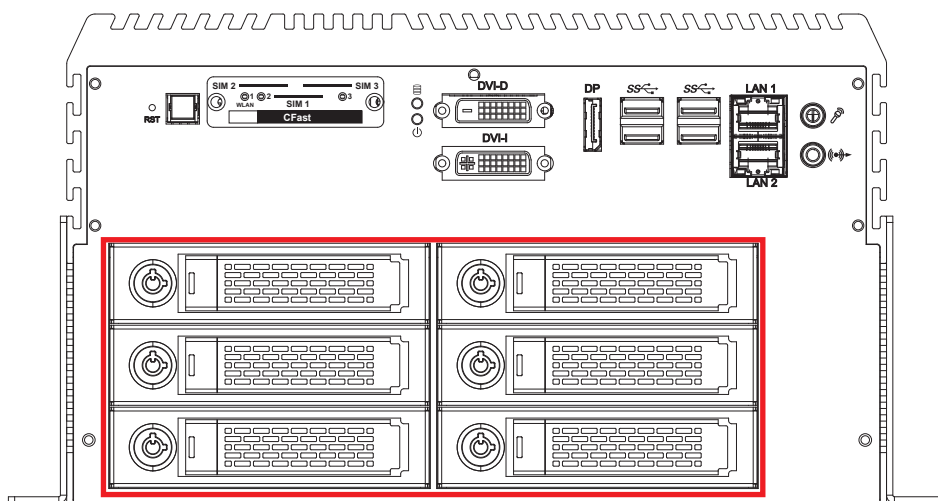
There are 4 front-access 2.5" SSD/HDD trays in the front side of IVH-9200. Just trigger to open the SSD/HDD tray, up to 8TB is available.

2.3 Rear Panel I/O & Functions

2.3.1 Power Terminal Block
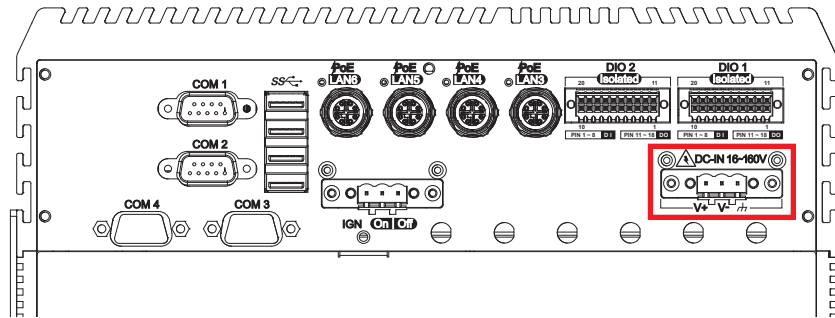
This system supports 16V to 160V DC power input by terminal block in the rear side. In normal power operation, power LED lightens in solid green. It supports up to 80V surge protection.

Pin No.	Definition
1	V+
2	V-
3	Chassis Ground

2.3.2 Remote Power On/Off Switch & Ignition
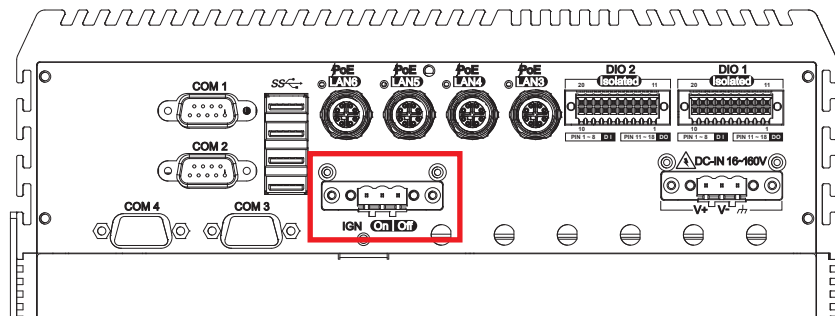
It is a 3-pin power-on or power-off switch through Phoenix Contact terminal block. You could turn on or off the system power by using this contact. This terminal block supports dual functions of soft power-on/power-off (instant off or delay 4 second) and suspend mode.

Pin No.	Definition
1	Ignition (12V/24V)
2	External Power Button V+
3	External Power Button V-

2.3.3 COM Ports
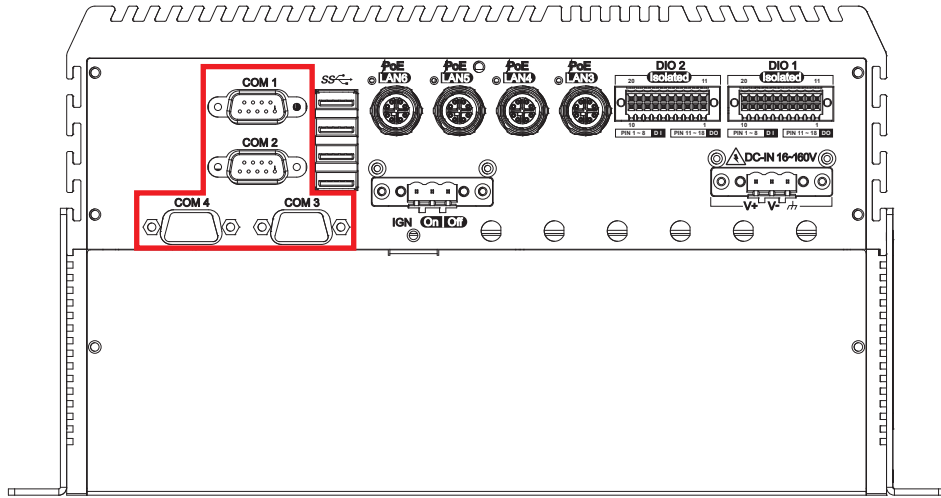
Serial port 1 to 4 (COM 1 to 4) can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. The default definition of COM 1 and COM 2 is RS-232; but if you want to change to RS-422 or RS-485, you can find the setting in BIOS.

BIOS Setting	Function
COM 1 COM 2 COM 3 COM 4	RS-232
	RS-422 (5-wire)
	RS-422 (9-wire)
	RS-485
	RS-485 w/z auto-flow control

The pin assignments are listed in the following table :

Serial Port	Pin No.	RS-232	RS-422 (5-wire)	RS-422 (9-wire)	RS-485 (3-wire)
1, 2 3, 4	1	DCD	TXD-	TXD-	DATA-
	2	RXD	TXD+	TXD+	DATA+
	3	TXD	RXD+	RXD+	------------
	4	DTR	RXD-	RXD-	------------
	5	GND	GND	GND	GND
	6	DSR	------------	RTS-	------------
	7	RTS	------------	RTS+	------------
	8	CTS	------------	CTS+	------------
	9	RI	------------	CTS-	------------

COM 3 & COM 4 MB connector table :

COM Port	MB Connector	COM Port	MB Connector
COM 3	CN9	COM 4	CN10

The pin assignments are listed in the following table :

CN	Pin No.	Signal Name	Pin No.	Signal Name
CN9 (COM 3) CN10 (COM 4)	1	Chassis GND	2	GND
	3	RI	4	DTR
	5	CTS	6	TXD
	7	RTS	8	RXD
	9	DSR	10	DCD
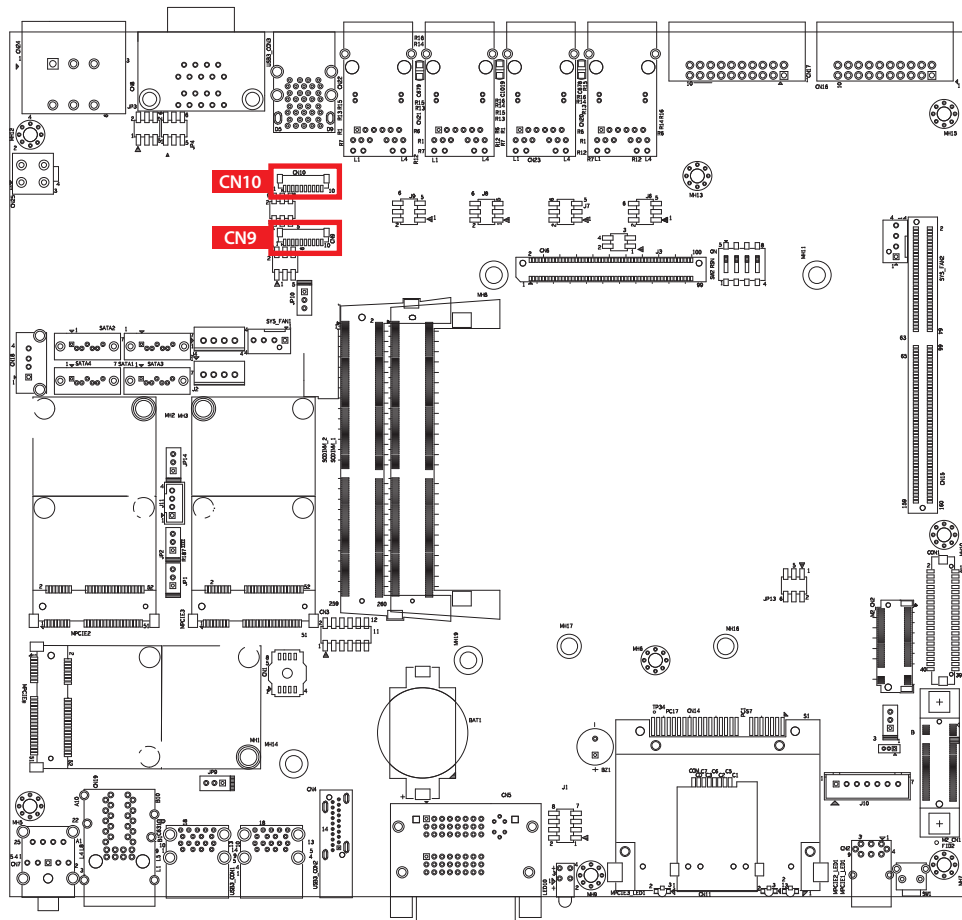
2.3.4 Rear USB 3.0
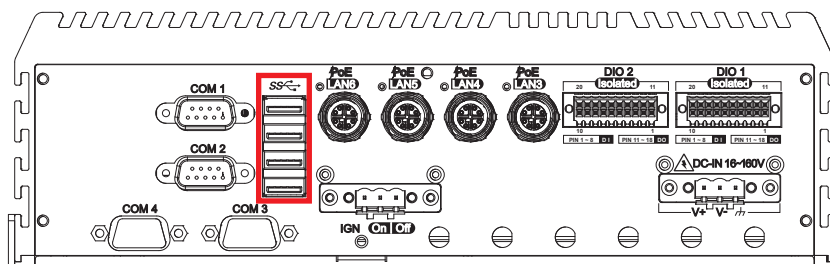
There are 4 USB 3.0 connections available supporting up to 5GB per second data rate in the rear side of IVH-9200. It is also compliant with the requirements of Super Speed (SS), High Speed (HS), Full Speed (FS) and Low Speed (LS).

2.3.5 PoE Ethernet Port
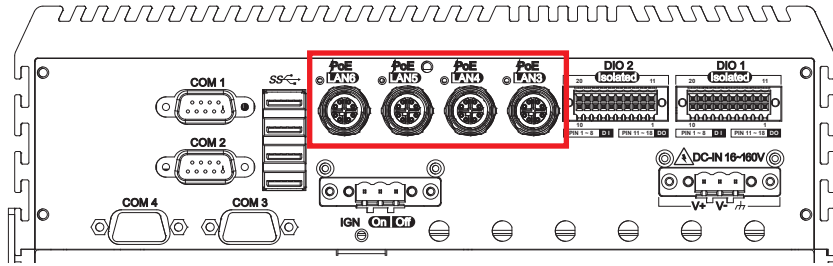
There are 4 X-coded M12 connectors in the rear side of IVH-9204MX ICY. It supports IEEE 802.3at (PoE⁺) Power over Ethernet (PoE) connection delivering up to 30.4W/54V per port and 1000BASE-T GigE data signals over standard Ethernet Cat 5/Cat 6 cable. Each PoE connection is powered by Intel® I210 GigE Ethernet controller and independent PCI express interface to connect with multi-core processor for network and data transmit optimization. Only when PoE port starts to supply power to power devices, the dedicated LED will be lightened.

P.S. It is suggested to use PoE function when power input is over 12V.

The pin-outs of LAN 3 to LAN 6 are listed as follows :

| Pin No.	10/100 Mbps	1000Mbps	PoE Signal
1	E_TX+	MDI0_P	PoE +
2	E_TX-	MDI0_N	PoE +
3	E_RX+	MDI1_P	PoE -
4	----	MDI2_P	-----
5	----	MDI2_N	-----
6	E_RX-	MDI1_N	PoE -
7	-----	MDI3_P	-----
8	-----	MDI3_N	-----

Each LAN port is supported by standard RJ-45 connector with LED indicators to present Active/Link/Speed status of the connection & PoE status LED.

The LED indicator on the right bottom corner lightens in solid green when the cable is properly connected to a 100Mbps Ethernet network. The LED indicator on the right bottom corner lightens in solid orange when the cable is properly connected to a 1000Mbps Ethernet network. The left LED will keep twinkling/off when Ethernet data packets are being transmitted/received.

	10Mbps	100Mbps	1000Mbps
Right Bottom LED	Off	Solid Green	Solid Orange
Left Bottom LED	Flash Yellow	Flash Yellow	Flash Yellow
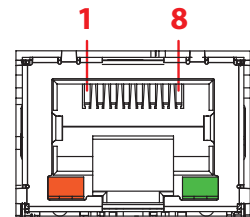
PoE LED indicator

PoE LED	LED Color	PoE Status
LED 3 - 6	Solid Green	PoE ON

2.3.6 Isolated DIO
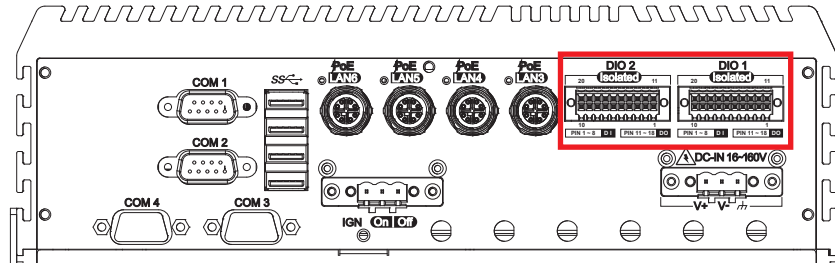
There is a 32-bit (16-bit DI, 16-bit DO) with 2 DIO connectors in the rear side. DI/DIO support NPN (sink) and PNP (Source) mode, Each DI channel is equipped with a photocoupler for isolated protection.

Each DO with isolator chip is configured by a software for each DIO connector. DO Safety-Related Certifications :
- 4242-VPK Basic Isolation per DIN V VDE V 0884-10 and DIN EN 61010-1
- 3-KVRMS Isolation for 1 minute per UL 1577
- CSA Component Acceptance Notice 5A, IEC 60950-1 and IEC 61010-1 End Equipment Standards
- GB4943.1-2011 CQC Certified
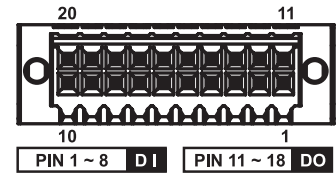
DIO Connectors pin out :

DIO	Pin No.	Definition	Function
DIO 1	1	INPUT 0	SIO_GPI80
	2	INPUT 1	SIO_GPI81
	3	INPUT 2	SIO_GPI82
	4	INPUT 3	SIO_GPI83
	5	INPUT 4	SIO_GPI84
	6	INPUT 5	SIO_GPI85
	7	INPUT 6	SIO_GPI86
	8	INPUT 7	SIO_GPI87
	9	DI1_COM	-
	10	DIO1_GND	-
	11	OUTPUT 0	SIO_GPO70
	12	OUTPUT 1	SIO_GPO71
	13	OUTPUT 2	SIO_GPO72
	14	OUTPUT 3	SIO_GPO73
	15	OUTPUT 4	SIO_GPO74
	16	OUTPUT 5	SIO_GPO75
	17	OUTPUT 6	SIO_GPO76
	18	OUTPUT 7	SIO_GPO77
	19	DIO1_GND	-
	20	DIO1_VDC (6 ~ 48V Input)	-

DIO	Pin No.	Definition	Function
DIO 2	1	INPUT 0	SIO_GPI37
	2	INPUT 1	SIO_GPI56
	3	INPUT 2	SIO_GPI57
	4	INPUT 3	SIO_GPI15
	5	INPUT 4	SIO_GPI16
	6	INPUT 5	SIO_GPI35
	7	INPUT 6	SIO_GPI46
	8	INPUT 7	SIO_GPI11
	9	DI2_COM	-
	10	DIO2_GND	-
	11	OUTPUT 0	SIO_GPO22
	12	OUTPUT 1	SIO_GPO26
	13	OUTPUT 2	SIO_GPO64
	14	OUTPUT 3	SIO_GPO65
	15	OUTPUT 4	SIO_GPO41
	16	OUTPUT 5	SIO_GPO40
	17	OUTPUT 6	SIO_GPO52
	18	OUTPUT 7	SIO_GPO27
	19	DIO2_GND	-
	20	DIO2_VDC (6 to 48V Input)	-

DI reference circuit :
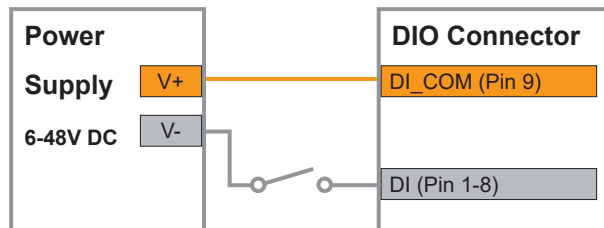
Sink Mode
(NPN)

Source Mode
(PNP)
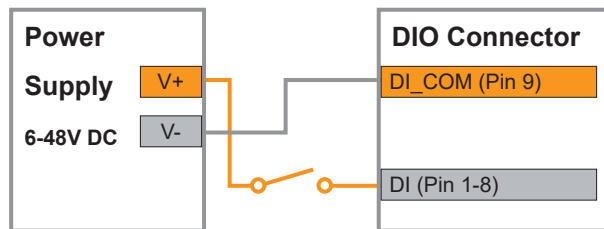
DO reference circuit :

Sink Mode
(NPN, Default)

Source Mode
(PNP)

2.4 Main Board Expansion Connectors

2.4.1 Inside View of IVH-9200 Main Board with Connector Location
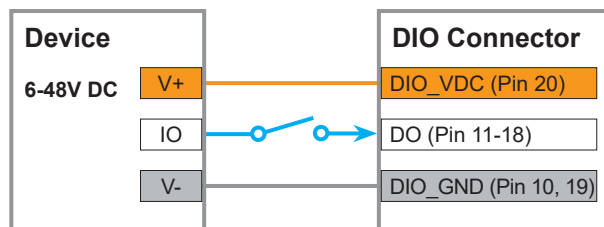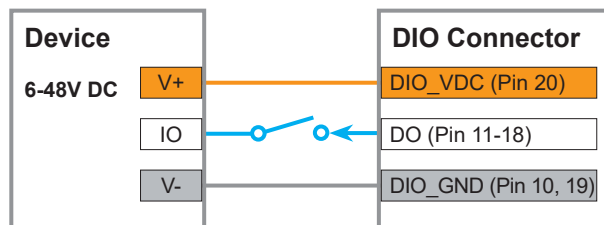
2.4.2 UPS Power Connector

For UPS module optional, 4.2mm 2x2p power connector.
This system has a UPS power input connector for optional part UPS module.
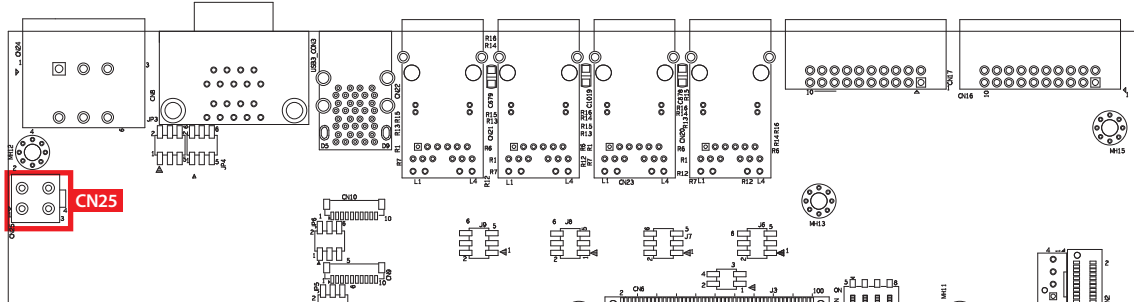
Pin No.	Definition
1	Ground
2	Ground
3	+VDC_IN (6V to 36V, Max.8A)
4	+VDC_IN (6V to 36V, Max.8A)

2.4.3 Miscellaneous Pin Header

2.0mm 2x4p header

This pin header can be used as a backup for functions, such as hard drive LED indicator, reset button, power LED indicator, and power-on/off button, which already can be accessed by front panel and top panel. The pin-outs of Miscellaneous port are listed in the following table :
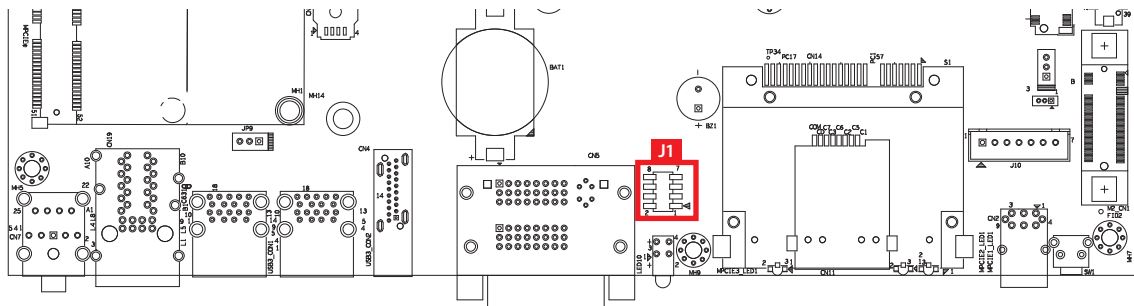
	Group	Pin No.	Description
	HDD LED	1	HDD_LED_P
		3	HDD_LED_N
	RESET BUTTON	5	FP_RST_BTN_N
		7	Ground
	POWER LED	2	PWR_LED_P
		4	PWR_LED_N
	POWER BUTTON	6	FP_PWR_BTN_IN
		8	Ground

2.4.4 DDR4 Slot

For UPS module optional, 4.2mm 2x2p power connector.
This system has a UPS power input connector for optional part UPS module.
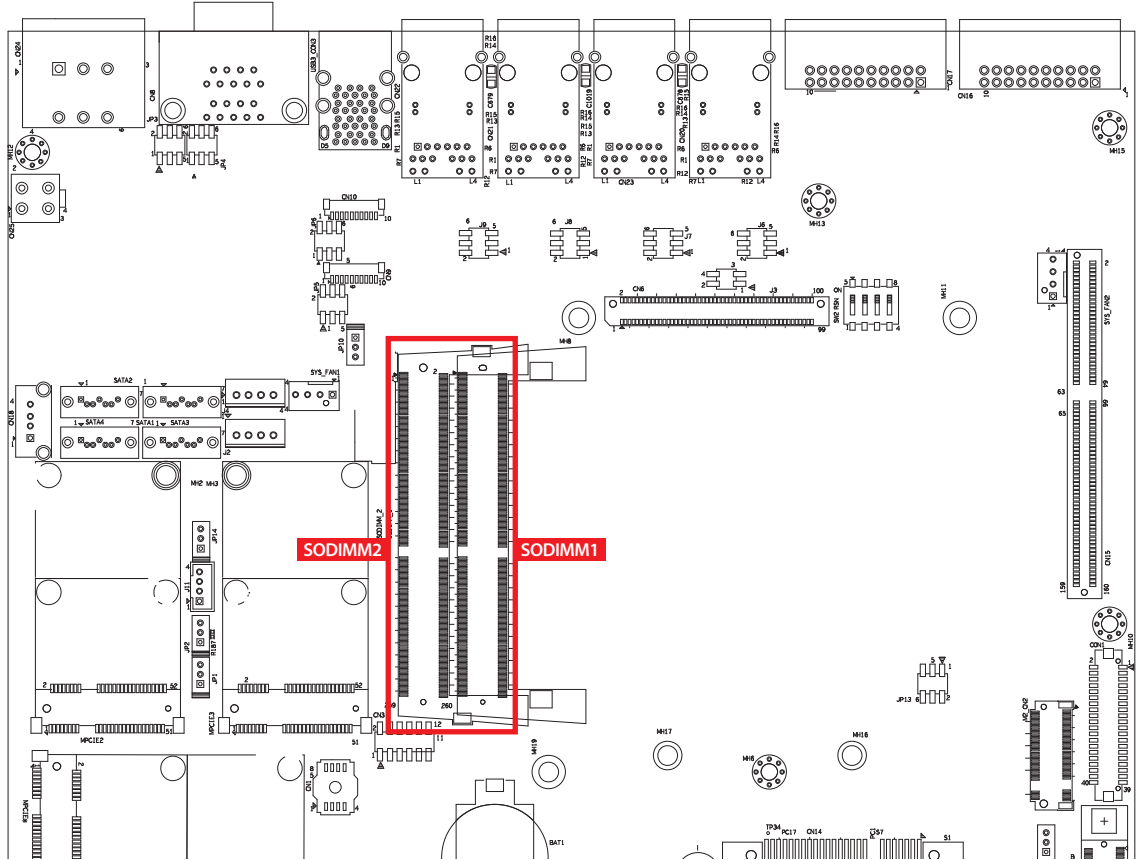
Slot	Description
SODIMM_1	DDR4 Channel A
SODIMM_2	DDR4 Channel B

2.4.5 BIOS Socket

If the BIOS need to be changed, please contact the Vecow RMA service team.
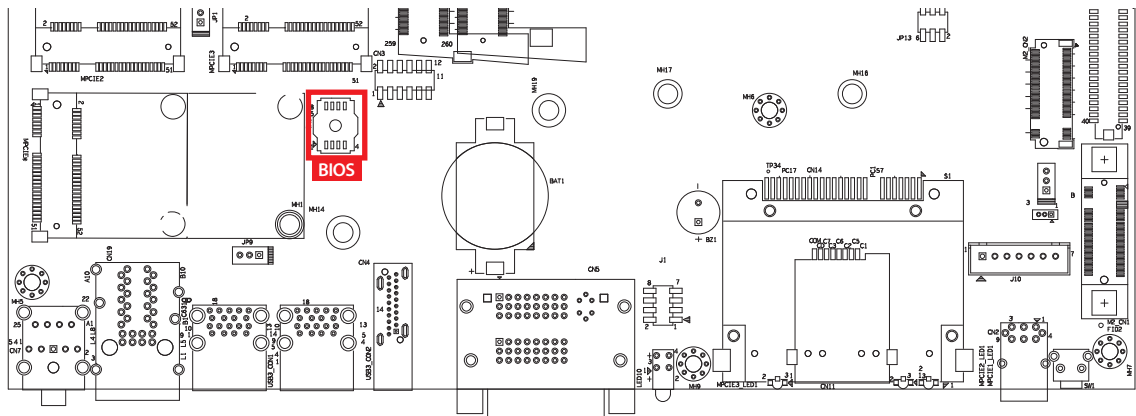
2.4.6 SATA Connector

Standard 7 PIN SATA Connector
There are 4 onboard high performance Serial ATA III. It supports higher storage capacity with less cabling effort and smaller required space.
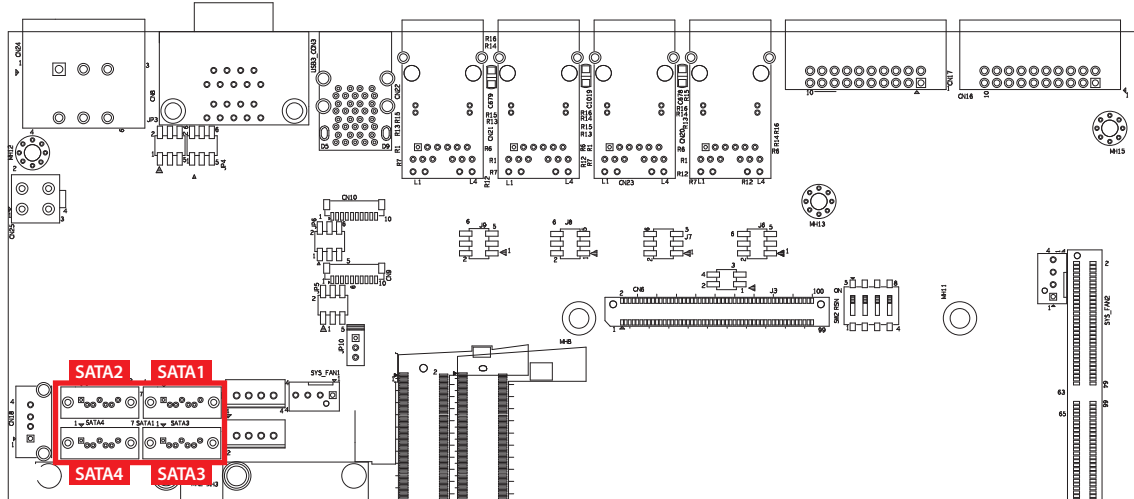
	Pin No.	Description	Pin No.	Description
	1	Ground	2	TX DP
	3	TX DN	4	Ground
	5	RX DN	6	RX DP
	7	Ground		

2.4.7 SATA Power Header

Standard, all form factor 1x4p power header
There are 2 HDD power header on board and each power header supports two 2.5" SATA HDD.
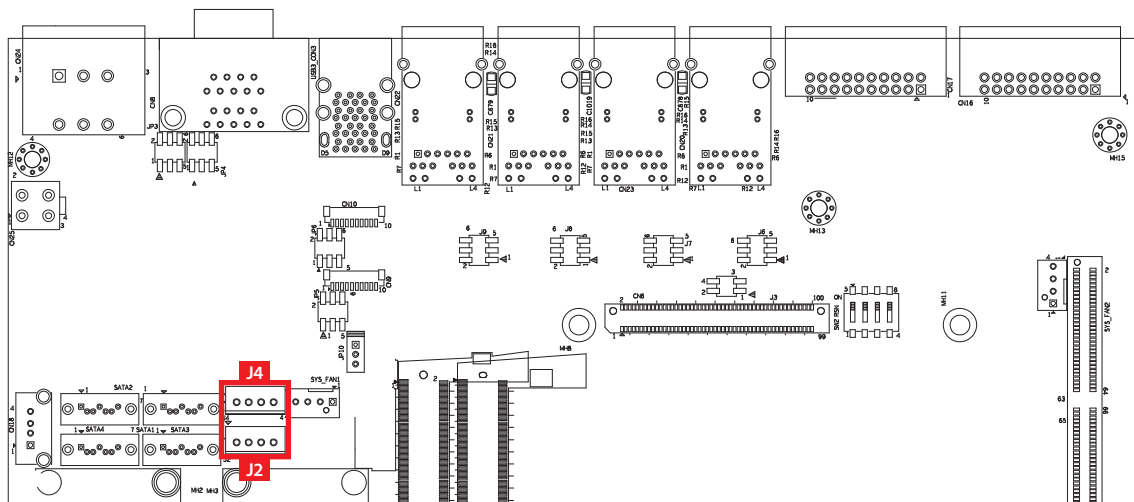
	Pin No.	Description	Pin No.	Description
	1	+V5 (Max. 2A)	2	Ground
	3	Ground	4	+V12 (Max. 1A)

2.4.8 Internal USB 2.0

Standard Vertical USB 2.0 Connector
IVH-9200 main board provides one expansion USB port using plug-and-play for Dongle Key or LCD touch Panel. The USB interface supports 480Mbps transfer rate complied with high speed USB specification Rev. 2.0.

The USB interface is accessed through one standard USB 2.0 connector. This USB 2.0 does not support wake up function.
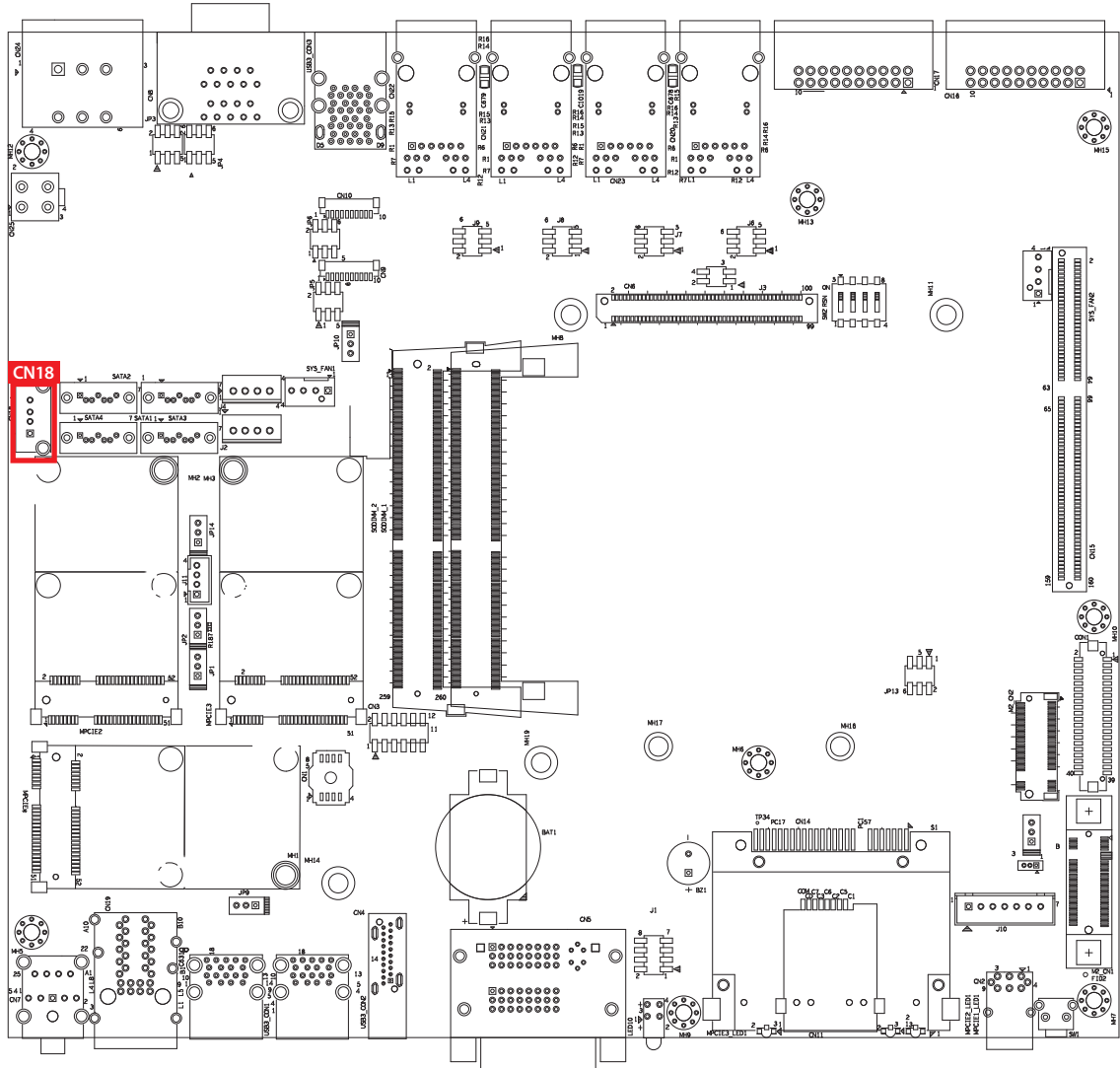
	Pin No.	Description	Pin No.	Description
	1	USB +VCC (+V5/Max. 0.5A)	2	DATA-
	3	DATA+	4	Ground

2.4.9 M2DOM

Innodisk M2DOM S20/S30 3ME3 is a M.2 based disk module with vertical type form factor. Its mechanical design can help board maker to release up to 90% space of motherboard as well as improve system reliability by its fixed mechanism. M2DOM series product will offer with multiple interfaces, including both SATA III and PCIe. The SSD supports hot plug function and can be removed or plugged-in during operating. User has to avoid hot plugging the SSD which is configured as boot device and installed operation system.

Support hot plug : The insertion of a SATA device into a backplane (signal and power combined) that has power present. The device powers up and initiates an OOB sequence.

Support hot removal : The removal of a SATA device from a powered backplane, without first being placed in a quiescent state.
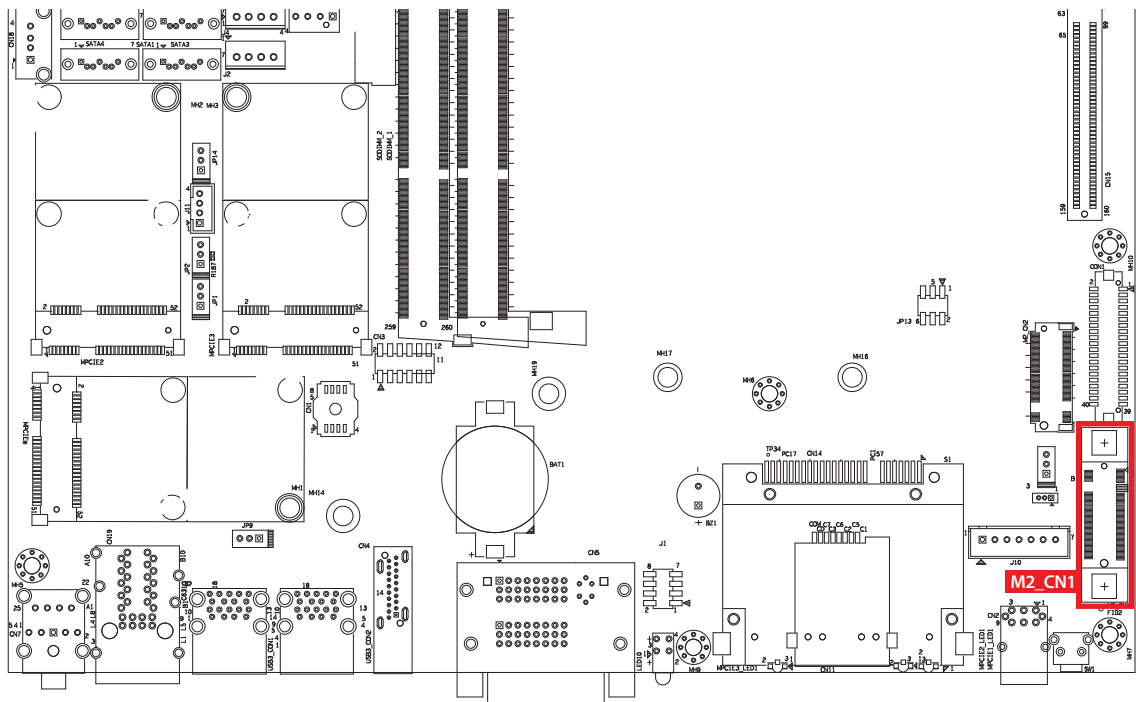
	Model No.		Definition
M2DOM	S20	3ME3	8GB
	S20/S30		16GB
	S20/S30		32GB
	S20/S30		64GB
	S30		128GB
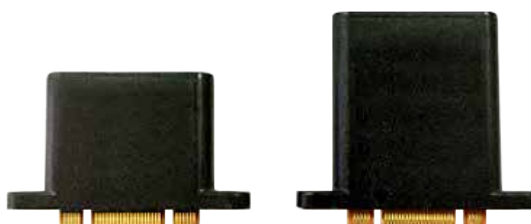
2.4.10 Mini PCIe
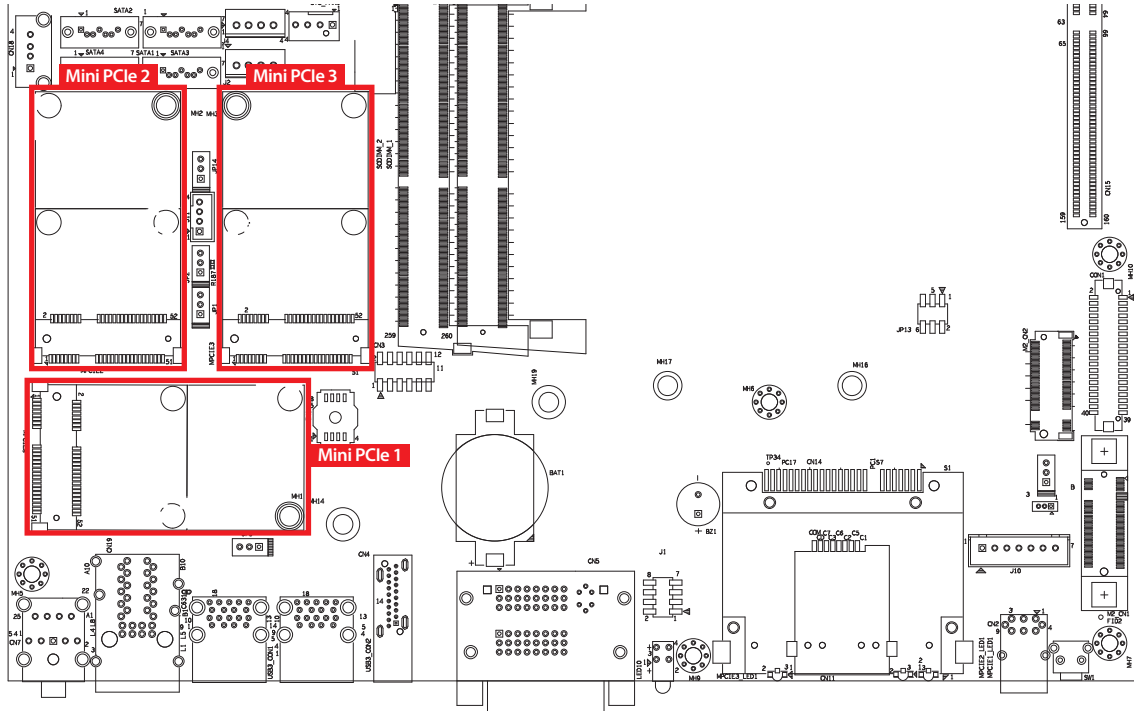
Pin No.	Signal Name	Pin No.	Signal Name
51	Reserved	52	+3.3Vaux
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	Reserved
43	GND	44	Reserved
41	+3.3Vaux	42	Reserved
39	+3.3Vaux	40	GND
37	GND	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	PERn0	26	GND
23	PERp0	24	+3.3Vaux
21	GND	22	PERST#
19	Reserved	20	reserved
17	Reserved	18	GND
Mechanical Key			
15	GND	16	UIM_VPP
13	REFCLK+	14	UIM_RESET
11	REFCLK-	12	UIM_CLK
9	GND	10	UIM_DATA
7	CLKREQ#	8	UIM_PWR
5	Reserved	6	1.5V
3	Reserved	4	GND
1	WAKE#	2	3.3Vaux

2.4.11 RTC Battery

The system's real-time clock is powered by a lithium battery. It is Equipped with Panasonic BR2032 190mAh lithium battery. It is recommended that you not replace the lithium battery on your own. If the battery needs to be changed, please contact the Vecow RMA service team.
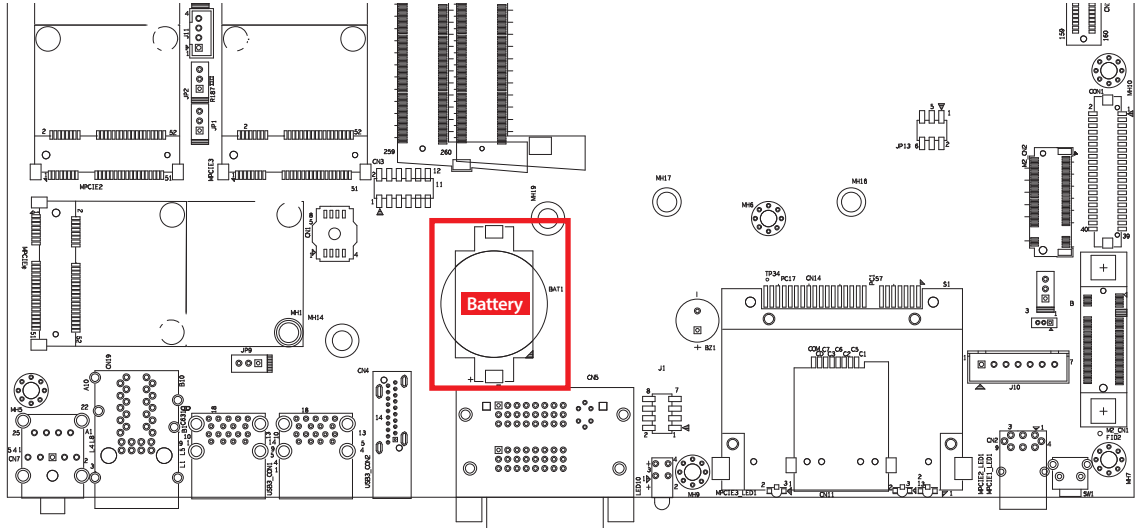
2.4.12 FAN Header

Fan power connector supports any additional thermal requirements. The pin assignments of FAN 1 and FAN 2 are listed in the following table.
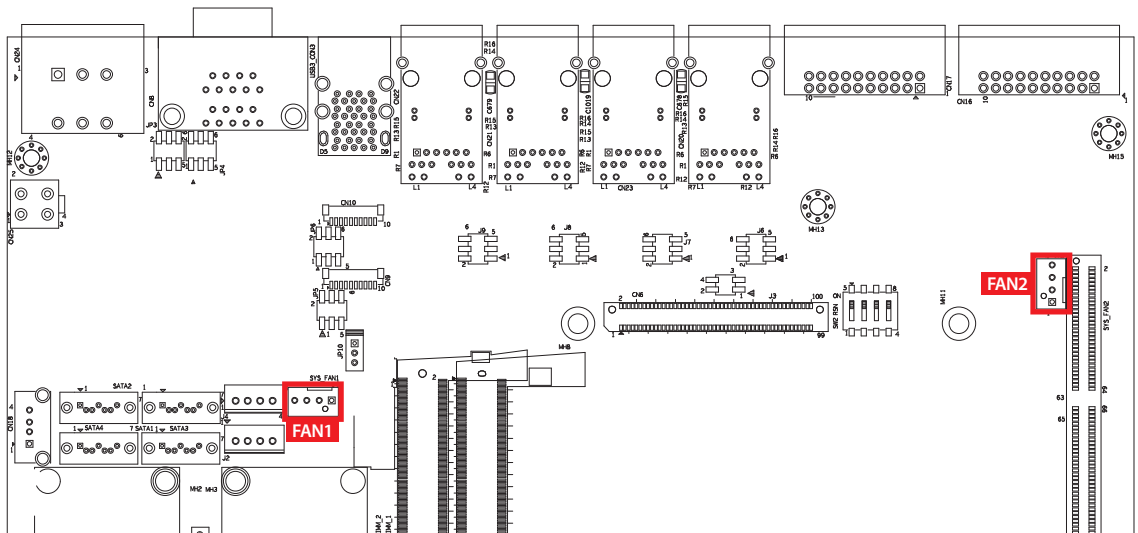
Pin No.	Description	Pin No.	Description
1	GND	2	+12V (1.5A max)
3	Fan speed sensor	4	Fan PWM

2.4.13 LPC Port 80 Header

IVH-9200 provides a LPC Port 80 Header for Debug Card.
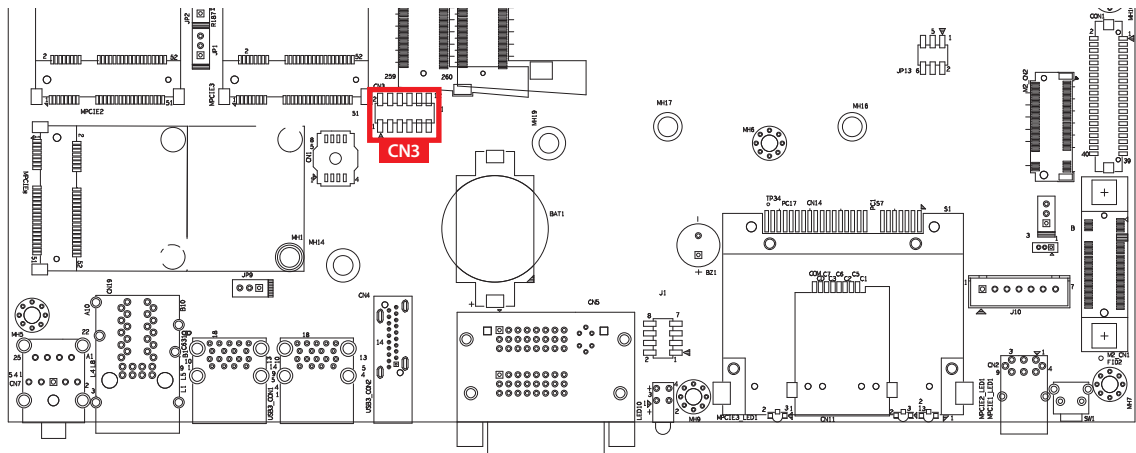
Pin No.	Description	Pin No.	Description
1	SERIRQ	2	+3.3V
3	LA3	4	RESET#
5	LAD1	6	LAD2
7	LFRAME#	8	LAD0
9	N/C	10	Ground
11	CLOCK	12	Ground

2.4.14 LAN IEEE1588 Header
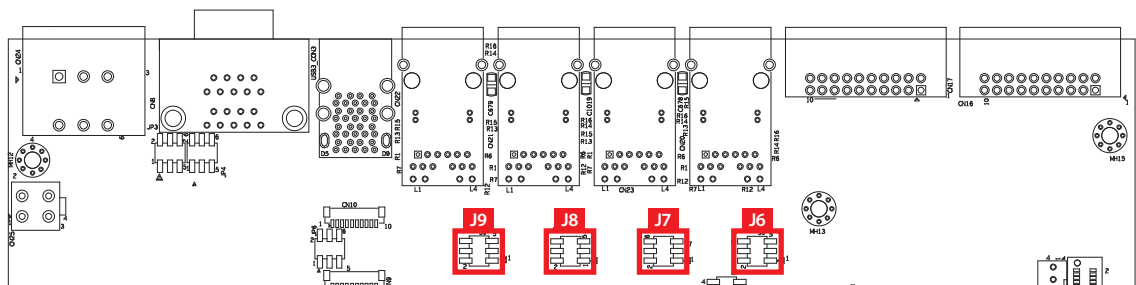
IVH-9200 provides a LAN header for IEEE1588.

LAN Number	MAC Controller	IEEE1588 Header
Rear PoE LAN 3	Intel I210	J6
Rear PoE LAN 4	Intel I210	J7
Rear PoE LAN 5	Intel I210	J8
Rear PoE LAN 6	Intel I210	J9

Pin No.	Description	Pin No.	Description
1	SPD0	2	SPD1
3	SPD2	4	SPD3
5	Ground	6	Ground

2.4.15 COM Port Header

IVH-9200 provides 4 COM port headers for internal COM port cable.
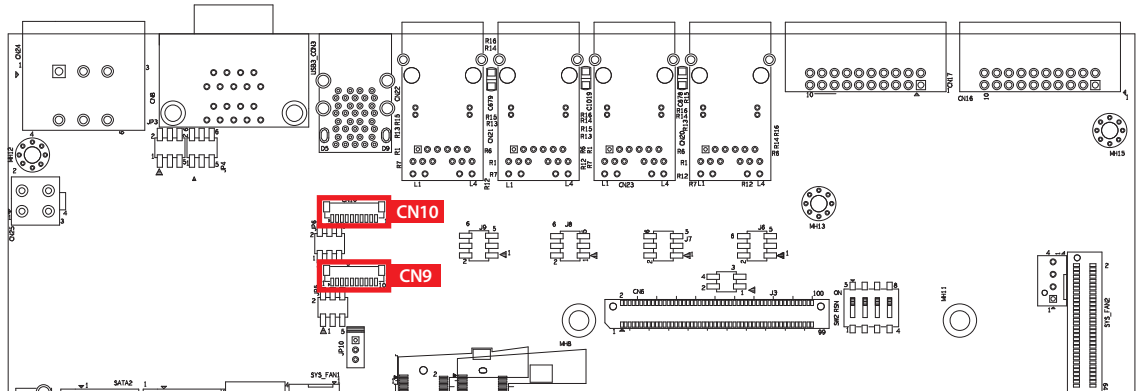
CN9 :

Pin No.	Description	Port
1	Ground_Frame	COM 3
2	Ground	COM 3
3	RI	COM 3
4	DTR	COM 3
5	CTS	COM 3
6	TXD	COM 3
7	RTS	COM 3
8	RXD	COM 3
9	DSR	COM 3
10	DCD	COM 3

CN10 :

Pin No.	Description	Port
1	Ground_Frame	COM 4
2	Ground	COM 4
3	RI	COM 4
4	DTR	COM 4
5	CTS	COM 4
6	TXD	COM 4
7	RTS	COM 4
8	RXD	COM 4
9	DSR	COM 4
10	DCD	COM 4

2.4.16 Wide range power module (WPM-110)

16V to 160V DC Power Input with 4242V DC Isolation & 500V DC Surge Protection.
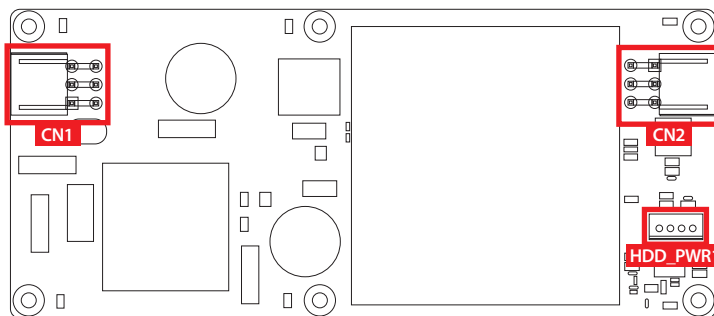
Connector	Description
CN1	Input
CN2	Output
HDD_PWR1	HDD Power

2.4.17 UPS power module (UPM-100)

Uninterruptible Power System (UPS) 12V to 24V DC Power Input with 3pcs 18650 LFP (Lithium-iron Battery) batteries (1.1A/h per pcs)
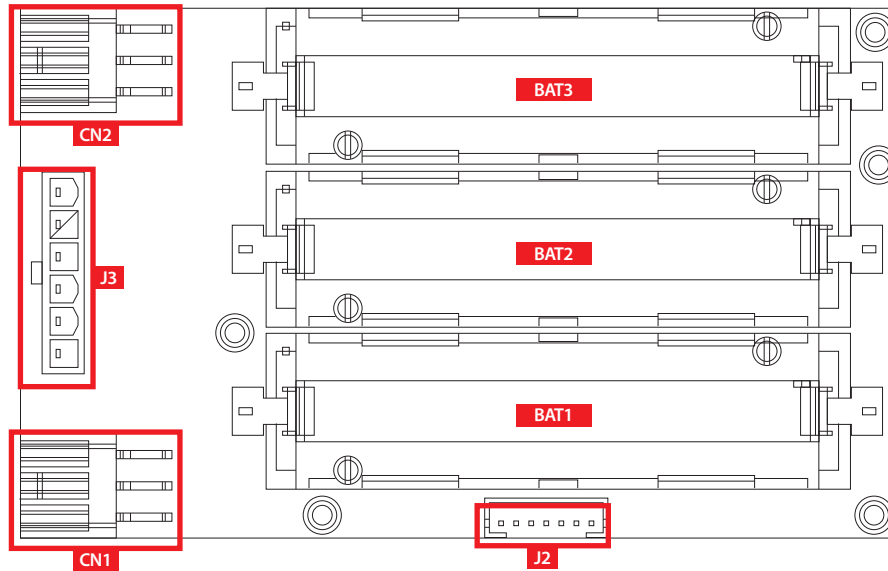
CN2 (Output power ATX connector) :

Pin No.	Description
1	P12V
2	P12V
3	P12V
4	GND
5	GND
6	GND

CN1 (Input power ATX connector) :

Pin No.	Description
1	DCIN
2	DCIN
3	DCIN
4	GND
5	GND
6	GND

J3 (Battery connection) :

Pin No.	Description
1	VBAT
2	VBAT
3	GND
4	GND
5	VBAT_TYPE
6	VBAT_NTC

J2 (Battery status) :

Pin No.	Description
1	GND
2	SDA
3	SCL
4	VBAT_EN
5	VBAT_STAT1
6	VBAT_STAT2
7	VBAT_PG#

BAT1 (Battery) :

Pin No.	Description
1	VBAT_0
2	VBAT_1

BAT2 (Battery) :

Pin No.	Description
1	VBAT_1
2	VBAT_2

BAT3 (Battery):

Pin No.	Description
1	VBAT_0
2	VBAT_1

2.5 Main Board Jumper and DIP Switch Settings

2.5.1 Board Top View of IVH-9200 Main Board With Jumper and DIP Switch
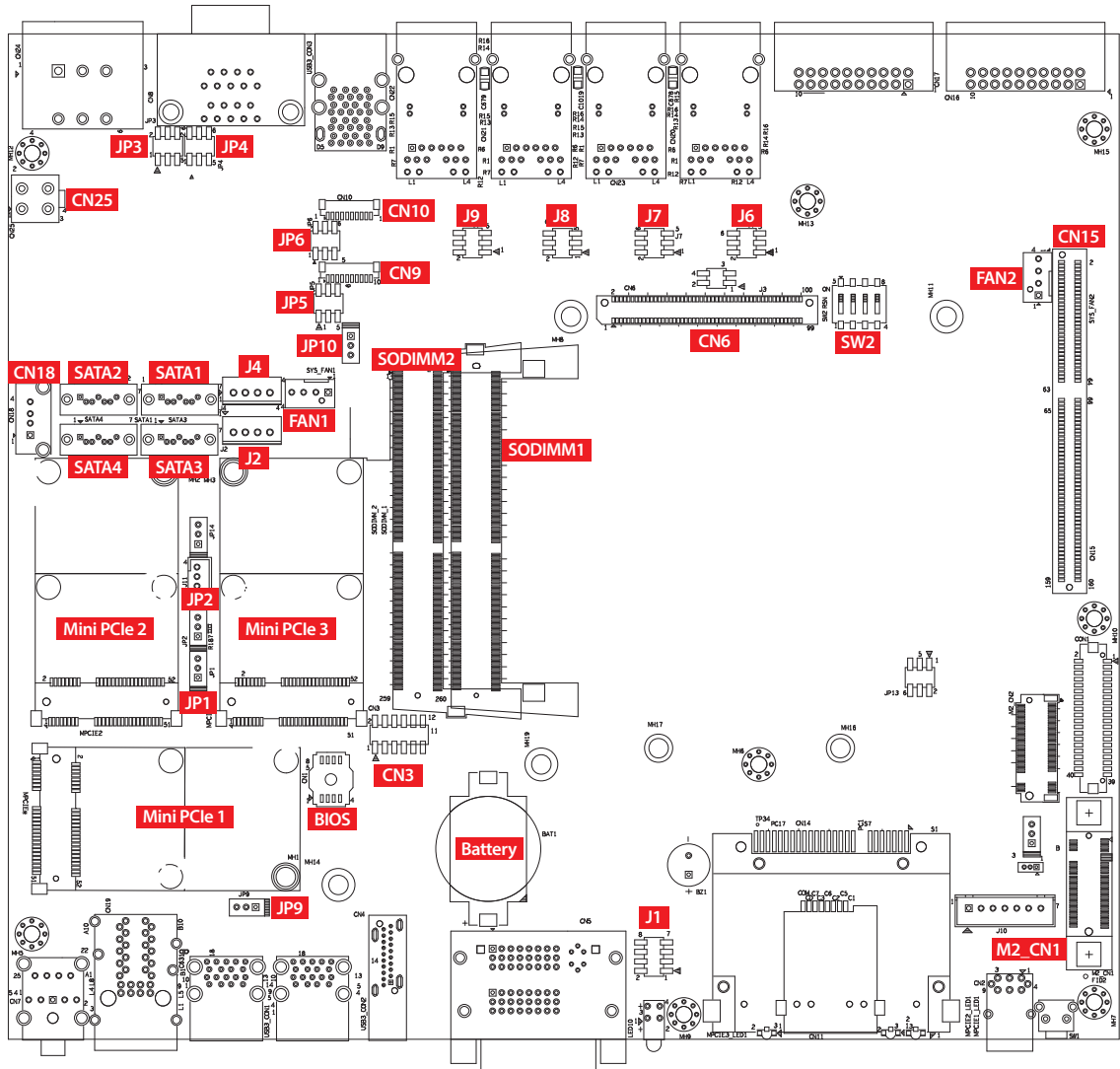
You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper, you connect the pins with the clip. To "open" a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.

Open   Closed   Closed 2-3
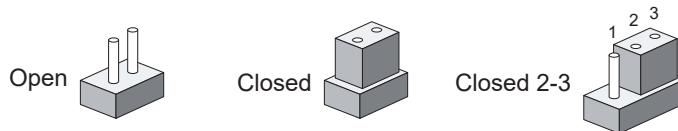
You may configure your card to match the needs of your application by DIP switch. As below show the deep switch on and off.

ON
1   2
1 : OFF
2 : OFF

ON
1   2
1 : ON
2 : OFF

ON
1   2
1 : ON
2 : ON
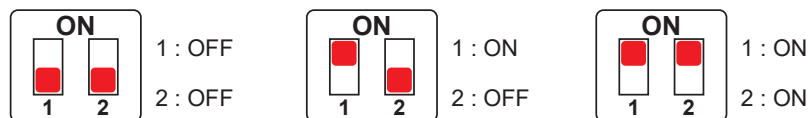
2.5.2 USB Power Jumper
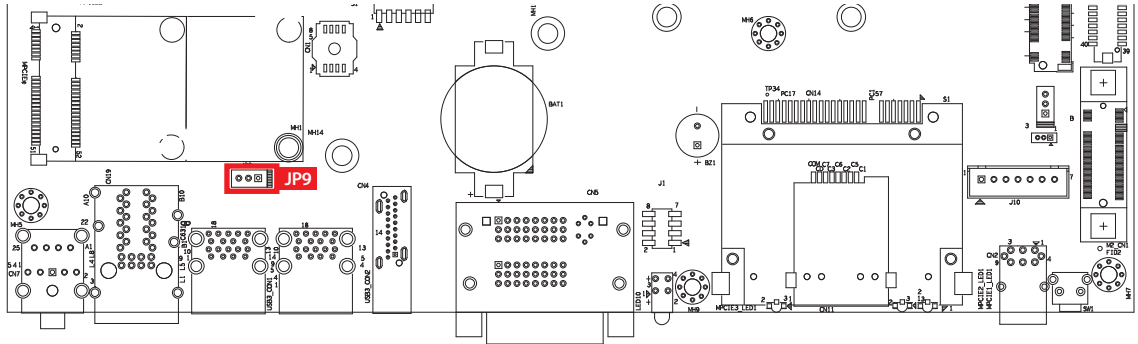
	Setting	Function
3 ◎◎▣ **1**	1:2	Supported Wake Up (Default)
	2:3	Non Wake Up support

2.5.3 COM Port RI Pin Select
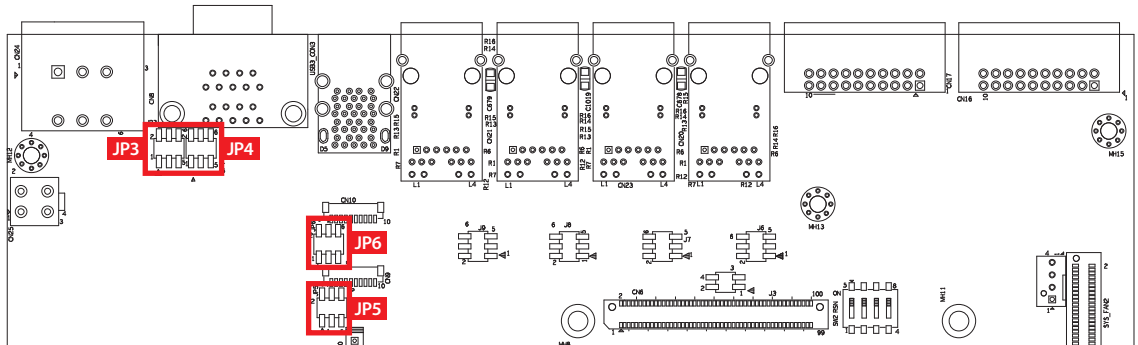
	Pin Header	Pin No.	Description
2 ▯▯▯ **6** **1** ▯▯▯ **5**	COM 1 JP3	1 - 2	+5V (1A max.)
		3 - 4	+12V (0.5A max.)
		5 - 6	RI (Default)

	Pin Header	Pin No.	Description
2 ▯▯▯ **6** **1** ▯▯▯ **5**	COM 2 JP4	1 - 2	+5V (1A max.)
		3 - 4	+12V (0.5A max.)
		5 - 6	RI (Default)

	Pin Header	Pin No.	Description
2 ▯▯▯ **6** **1** ▯▯▯ **5**	COM 3 JP5	1 - 2	+5V (1A max.)
		3 - 4	+12V (0.5A max.)
		5 - 6	RI (Default)

	Pin Header	Pin No.	Description
2 ▯▯▯ **6** **1** ▯▯▯ **5**	COM 6 JP6	1 - 2	+5V (1A max.)
		3 - 4	+12V (0.5A max.)
		5 - 6	RI (Default)

2.5.4 PoE Power ON Select
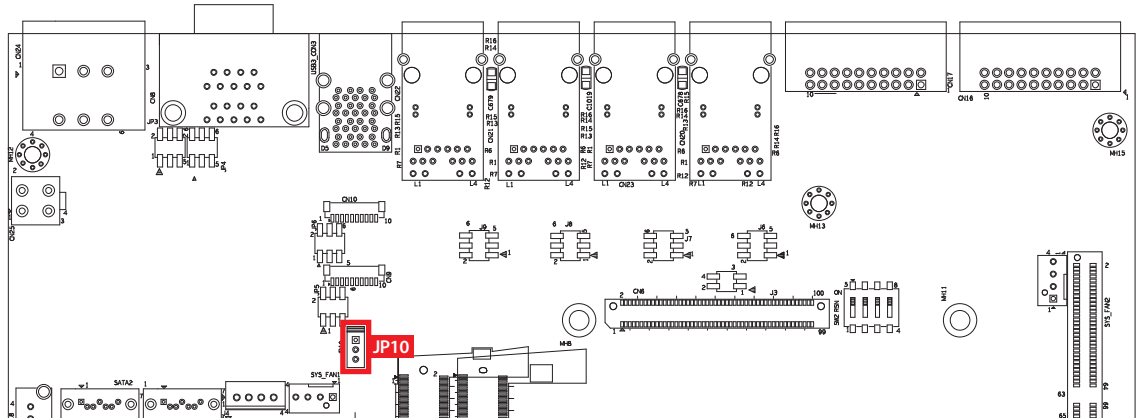
Setting	Function
1:2	PoE power on at standby power ready
2:3	PoE power on after system power on (Default)

2.5.5 Clear CMOS/ME Switch
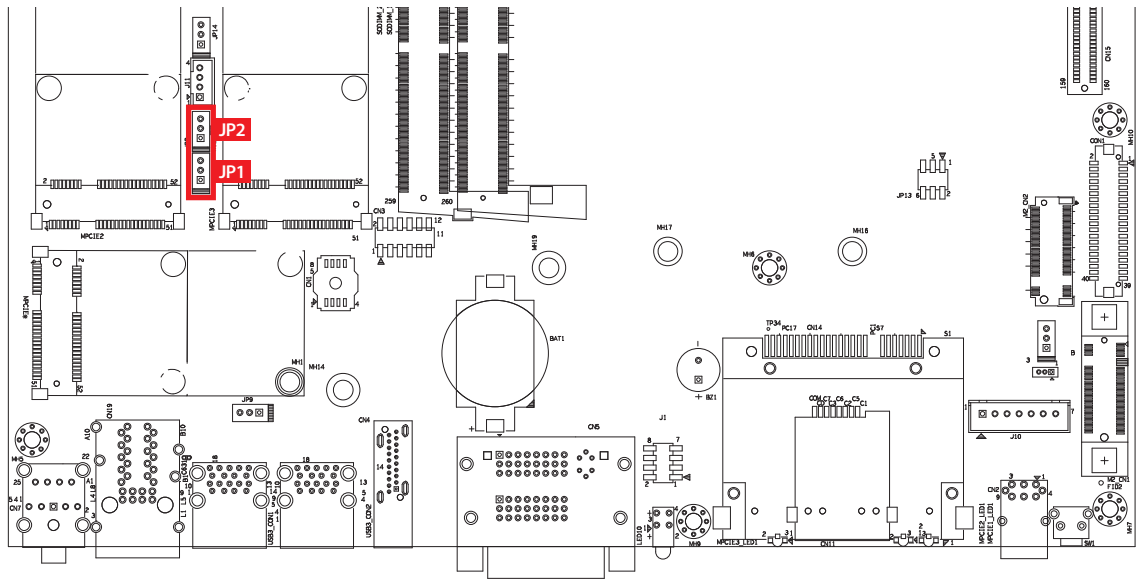
JP1 :

Setting	Function
1:2	*Normal (Default)
2:3	Clear CMOS

JP2 :

Setting	Function
1:2	*Normal (Default)
2:3	Clear ME
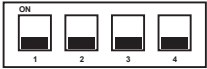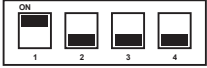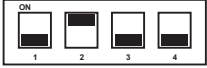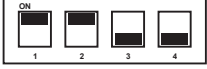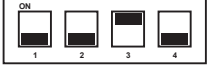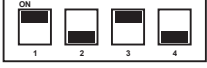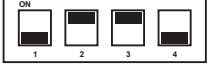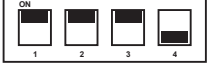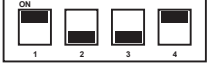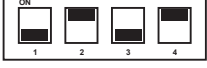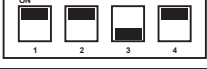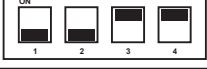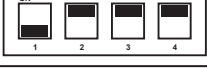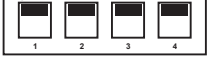
2.6 Ignition Control

IVH-9200 series provides an ignition power control feature for in-vehicle applications. The built-in MCU monitors the ignition signal and turns on/off the system according to pre-defined on/off delay period.

2.6.1 Adjust Ignition Control Modes

IVH-9200 series provides 16 modes of different power on/off delay periods adjustable via SW2 switch. The default rotary switch is set to 0 in ATX/AT power mode.
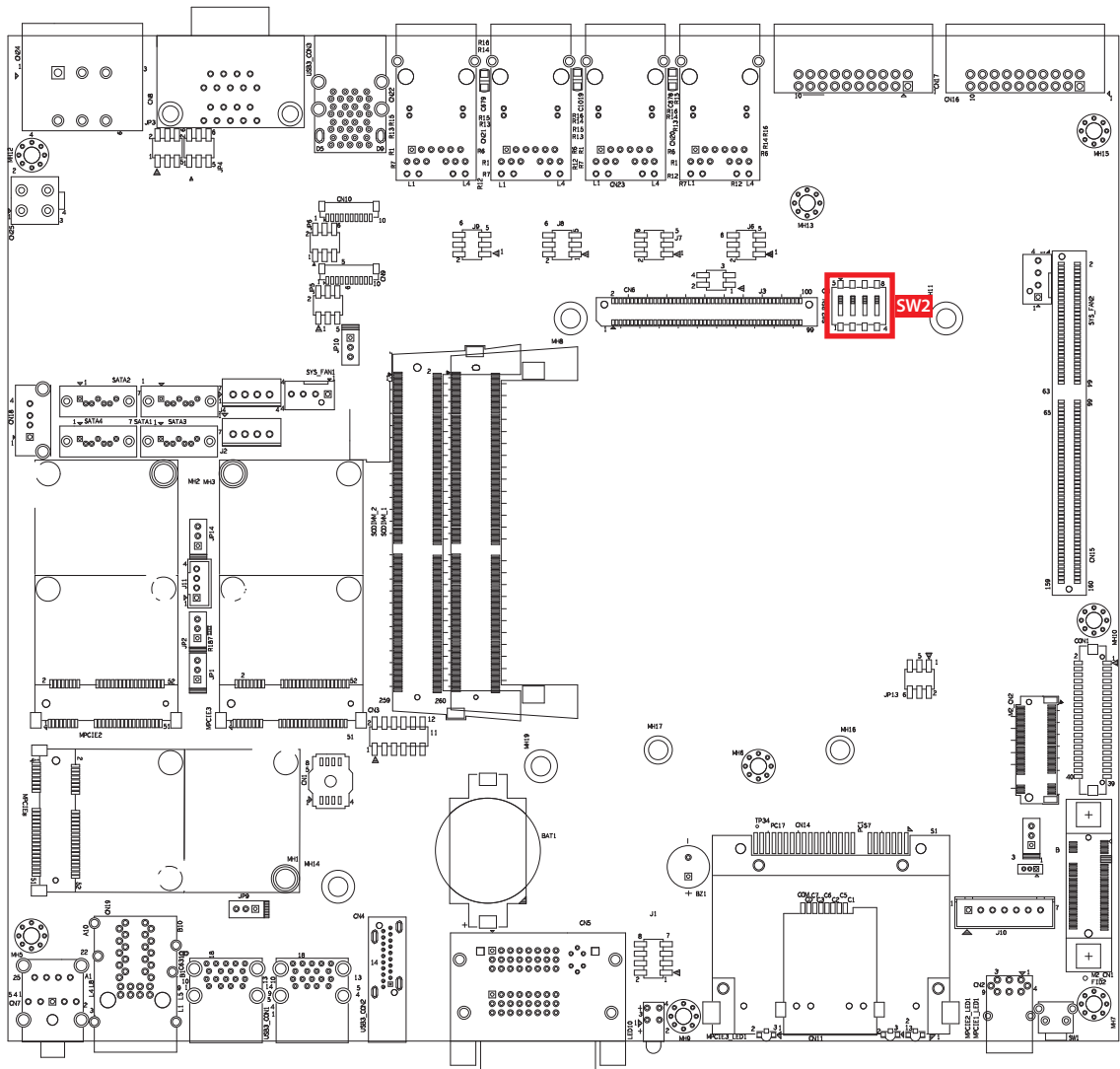
Deep Switch Position	Power on delay	Power off delay	Switch Position
0	ATX/AT mode (Default)		
1	No delay	No delay	
2	No delay	5 seconds	
3	No delay	10 seconds	
4	No delay	20 seconds	
5	5 seconds	30 seconds	
6	5 seconds	60 seconds	
7	5 seconds	90 seconds	
8	5 seconds	30 minutes	
9	5 seconds	1 hour	
A	10 seconds	2 hours	
B	10 seconds	4 hours	
C	10 seconds	6 hours	
D	10 seconds	8 hours	
E	10 seconds	12 hours	
F	10 seconds	24 hours	

2.6.2 Ignition Control Wiring

To activate ignition control, you need to provide IGN signal via the 3-pin pluggable terminal block located in the back panel. It is below the general wiring configuration.

Pin No.	Description
1	Ignition (12V/24V)
2	External Power S/W +
3	External Power S/W -

For testing purposes, you can refer to the picture below to simulate ignition signal input controlled by a latching switch.

Note :

1. In Ignition mode, the input voltage is fixed to 12V/24V for car battery scenario.

2. DC power source and IGN share the same ground.

3. For proper ignition control, the power button setting should be "Power Down" mode.
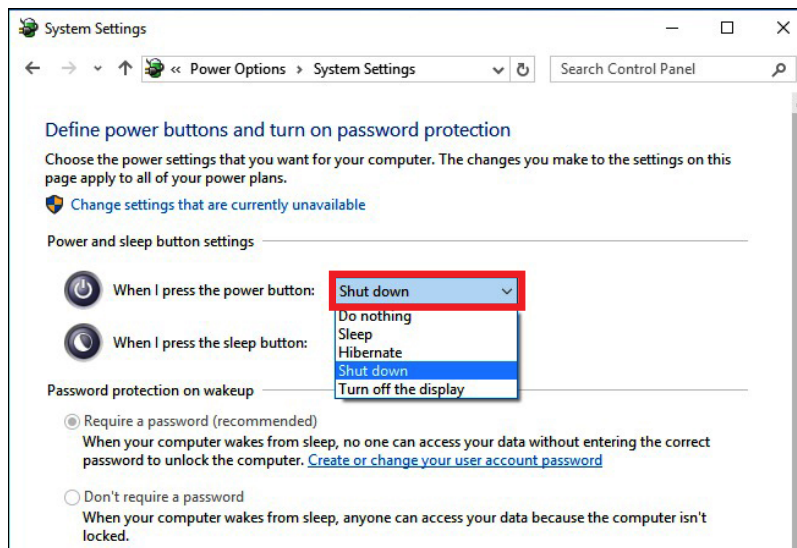
In Windows for example, you need to set "When I press the power button" to Shut down.

2.6.3 Smart Battery Protection

The system with "Ignition Control" can perform Smart Battery Protection, namely Low Battery Detection.

When the system is running on a battery and its voltage drops below the threshold, the system will automatically shut down. The Low Battery Detection is implemented in the ignition control MCU FW and as a default function.

Note :

Battery Voltage	Thresholds
12V	10.5 to 15V
24V	21.5 to 30V

3

SYSTEM SETUP

3.1 How to Open Your IVH-9204MX ICY

Step 1 Remove three #6-32 screws.

Step 2 Finish.

Step 3 Remove eight flat head #6-32 screws.
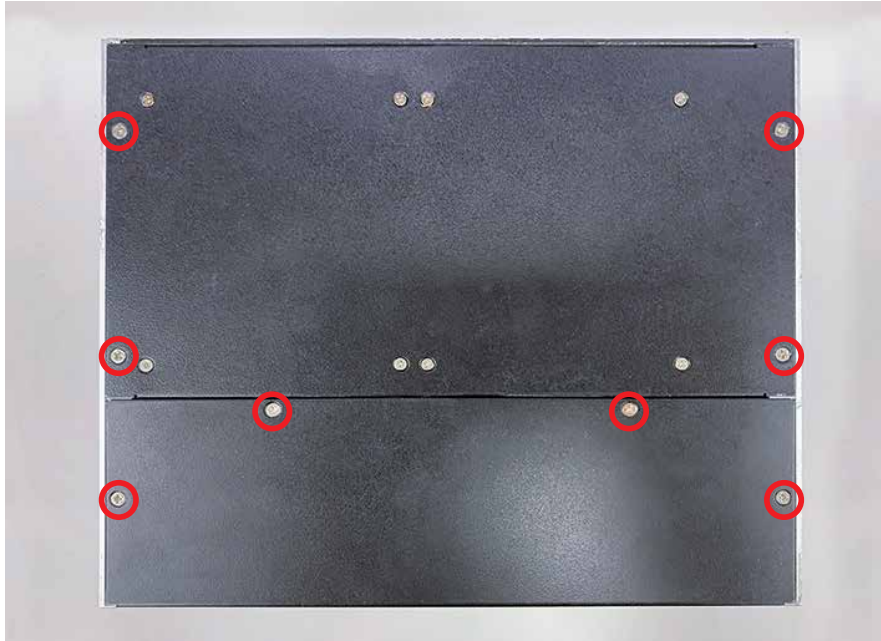
Step 4 Finish.

Step 5 Remove SATA, SATA power cable.

Step 6 Remove SSD tray module.

Step 7 Finish.

3.2 Installing CPU

Step 1 Remove five #6-32 screws.

Step 2 Finish.

Step 3 Remove ATX (red) and COM (blue) cable.

Step 4 Remove COM cable.
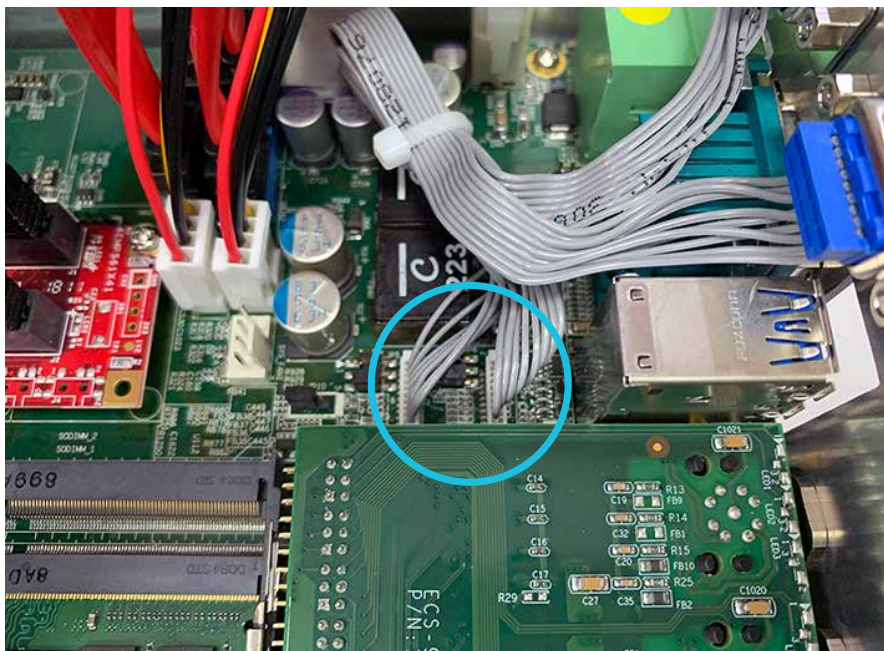
Step 5 Remove rear panel.

Step 6 Finish Step1~5.
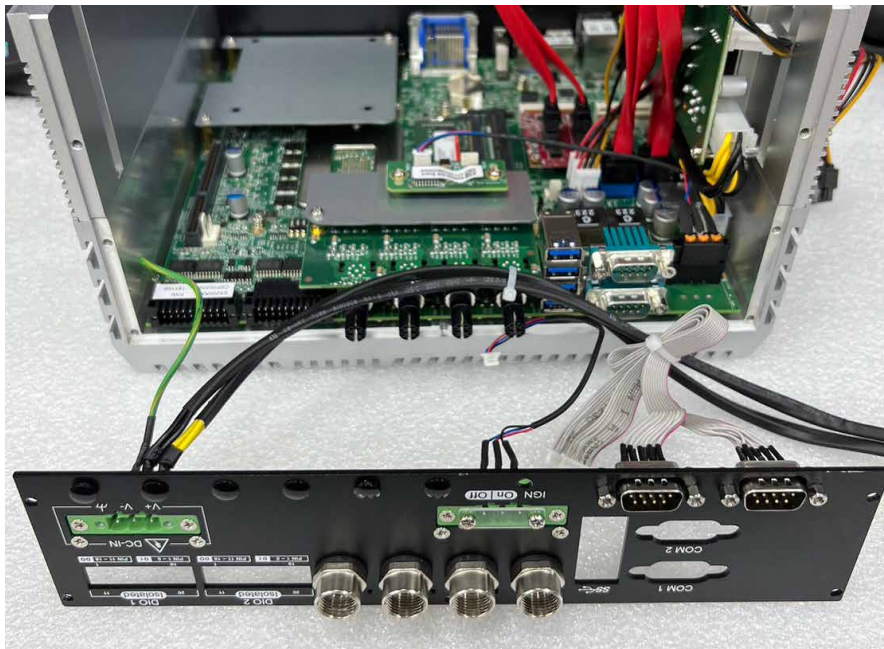
Step 7 Remove seven #6-32 screws.
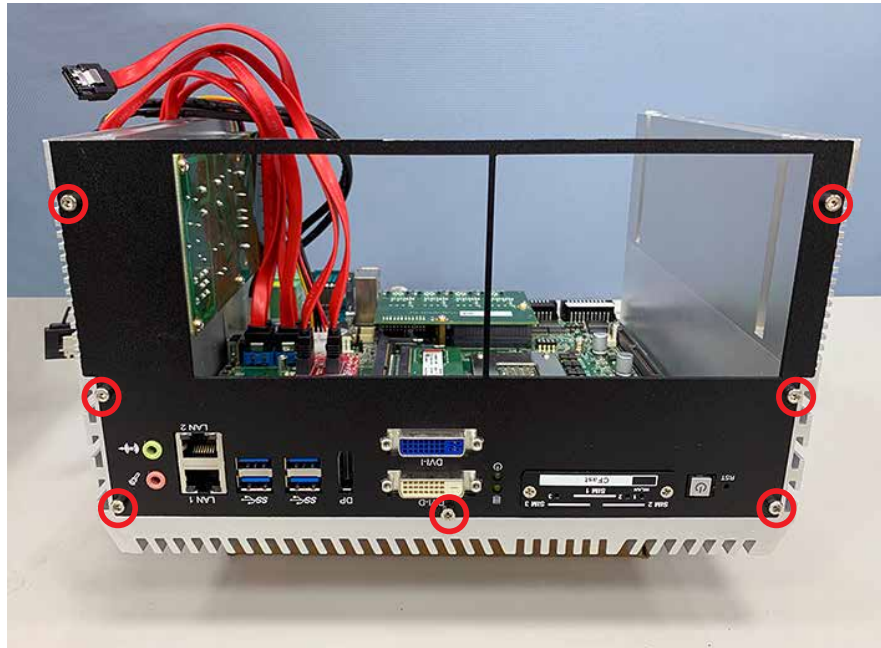
Step 8 Remove front panel.

Step 9 Remove extender.
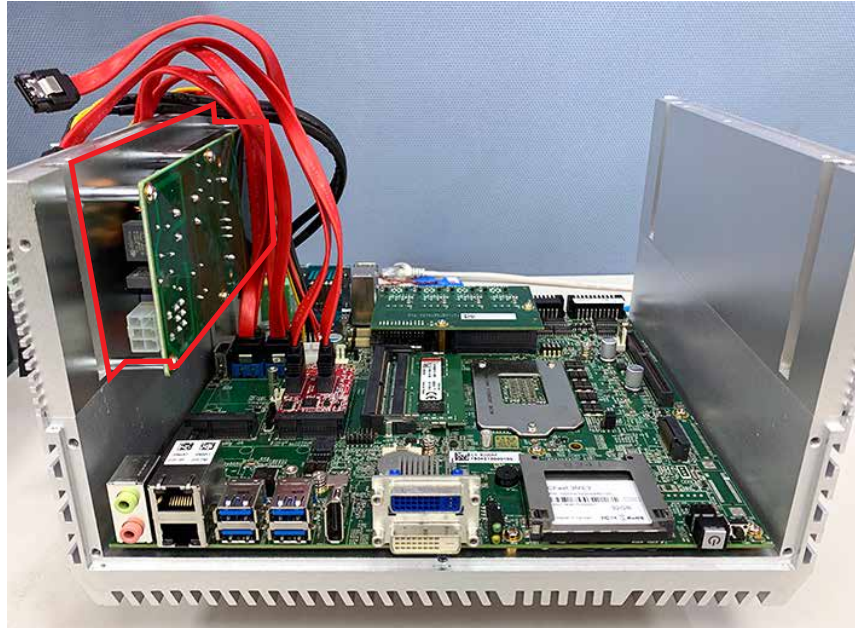
Step 10 Remove #6-32 screw.
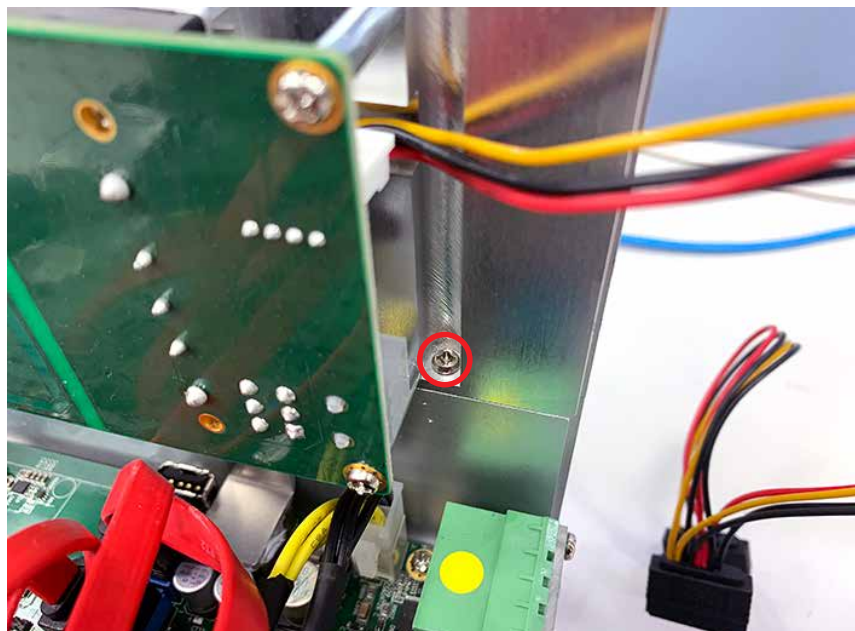
Step 11 Remove #6-32 screw.

Step 12 Pull out extender.
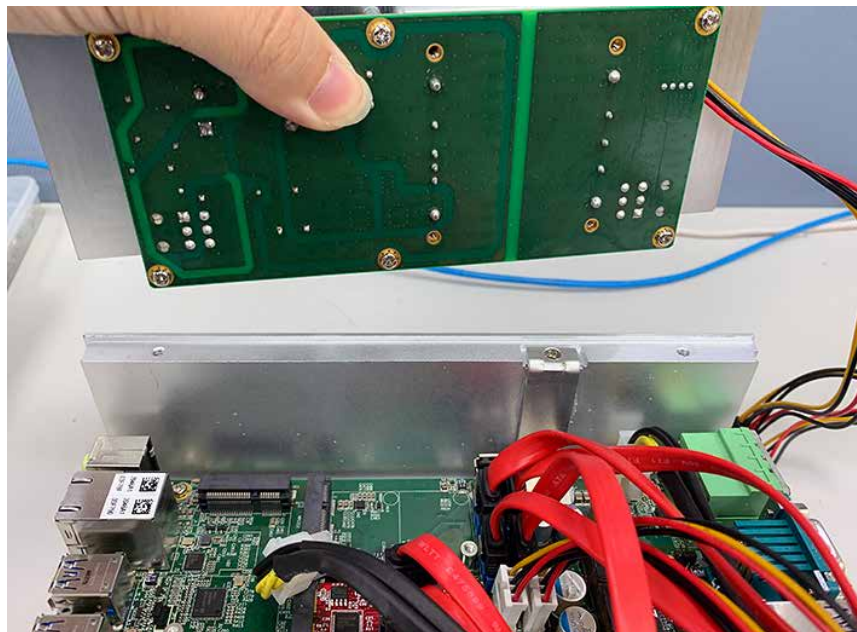
Step 13 Remove SATA, SATA power cable.
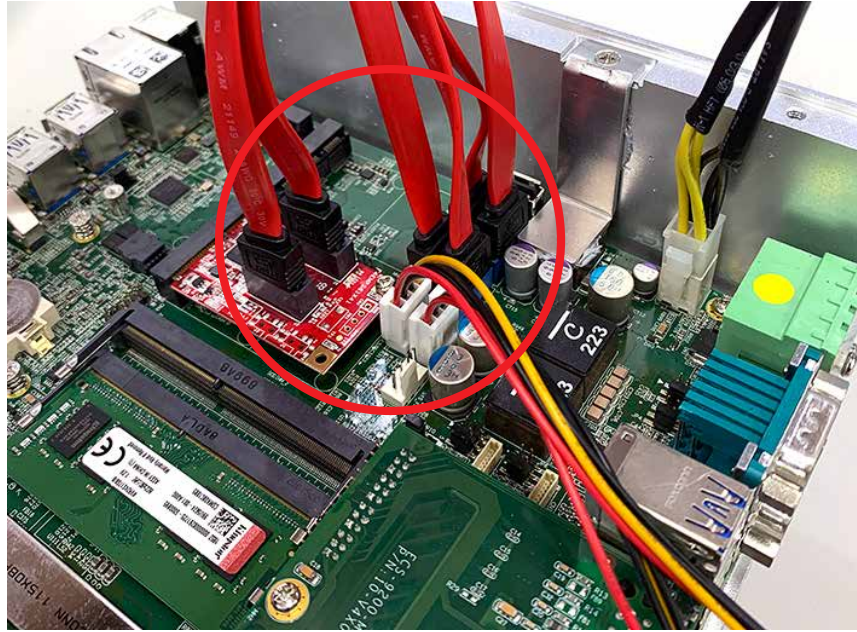
Step 14 Finish Step9~13.

Step 15 Remove one flat head #6-32 and pull out chock bracket.
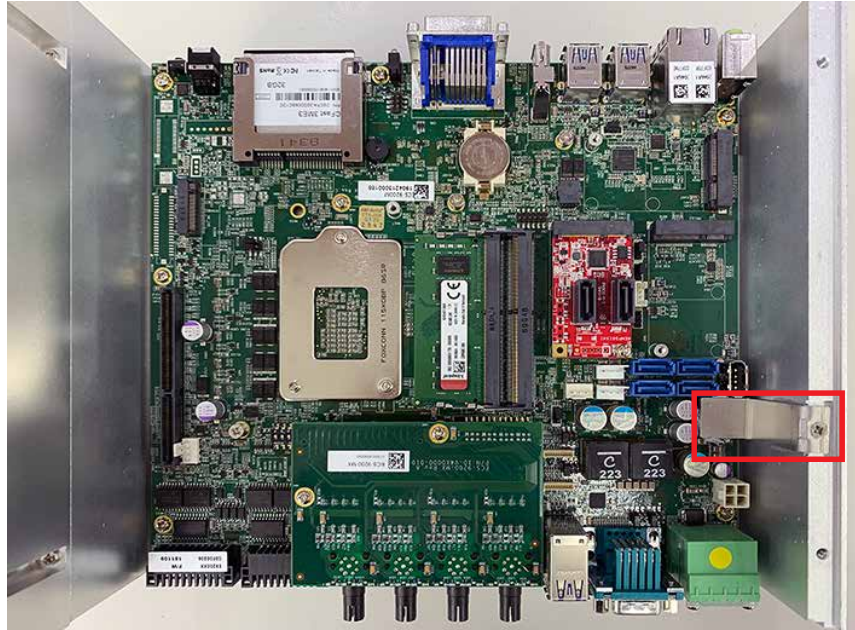
Step 16 Remove three M3x4L Ni+Ny screws.
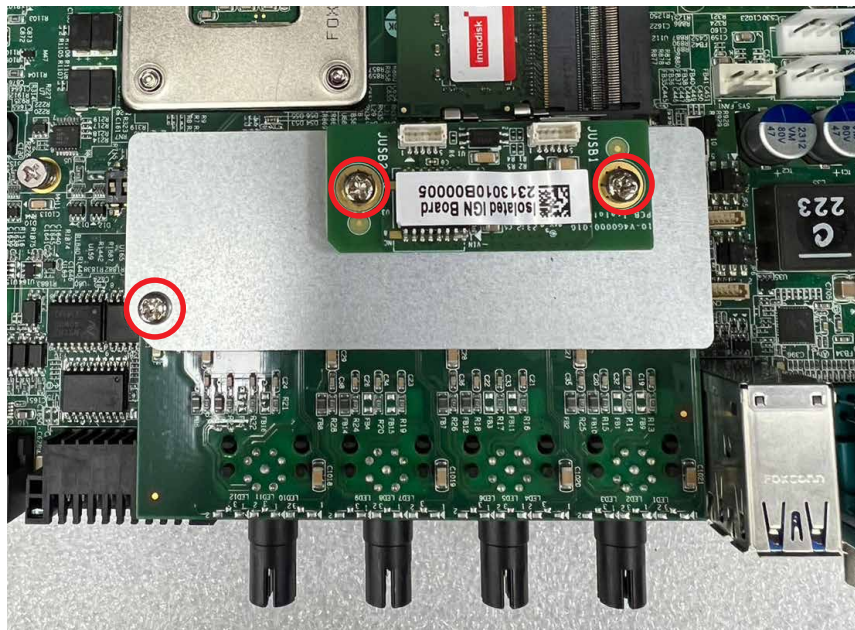
Step 17 Remove one M3x4L Ni+Ny screw.
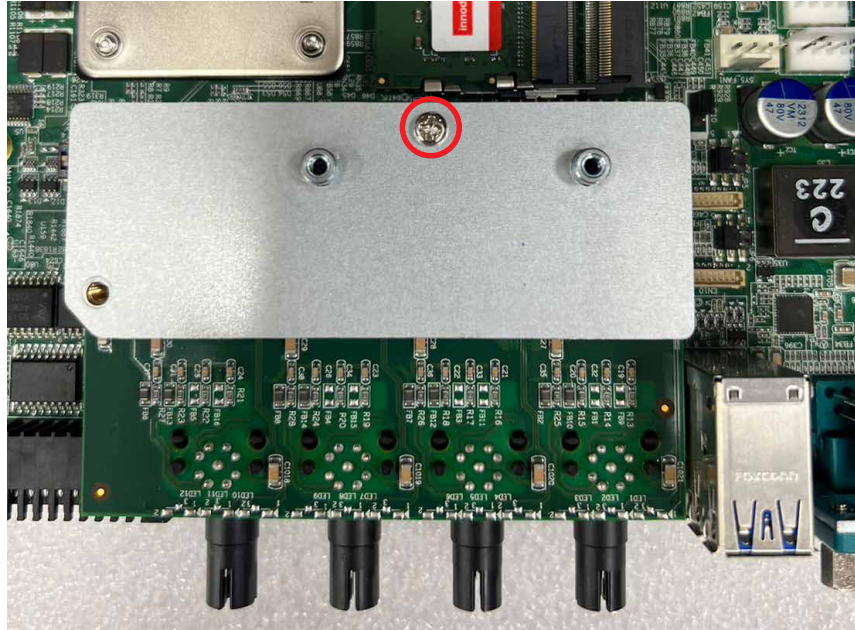
Step 18 Remove two Stand off on the M12 card.
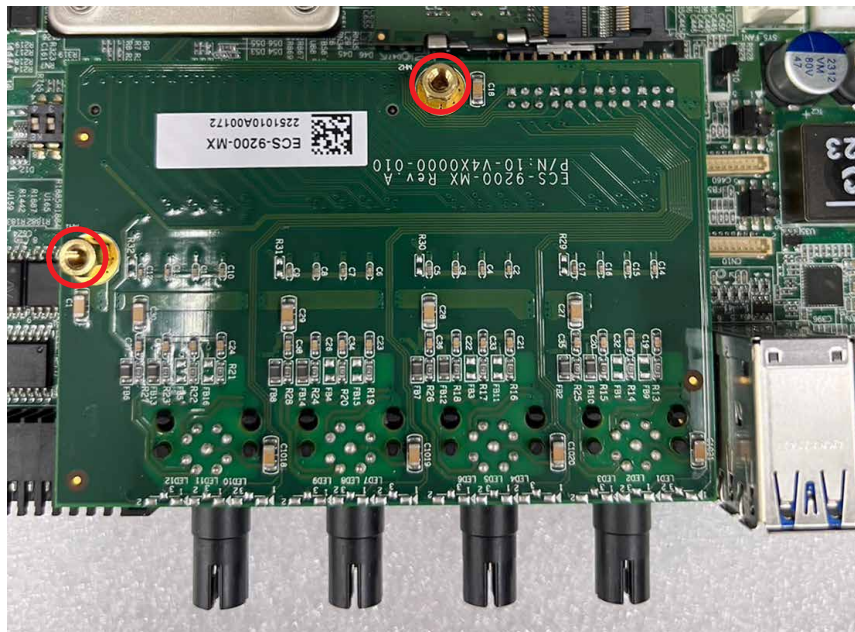
Step 19 Put out M12 card.

Step 20 Remove two stand off (red), three M3 spring screws (blue) and seven M3*6L screws (yellow).
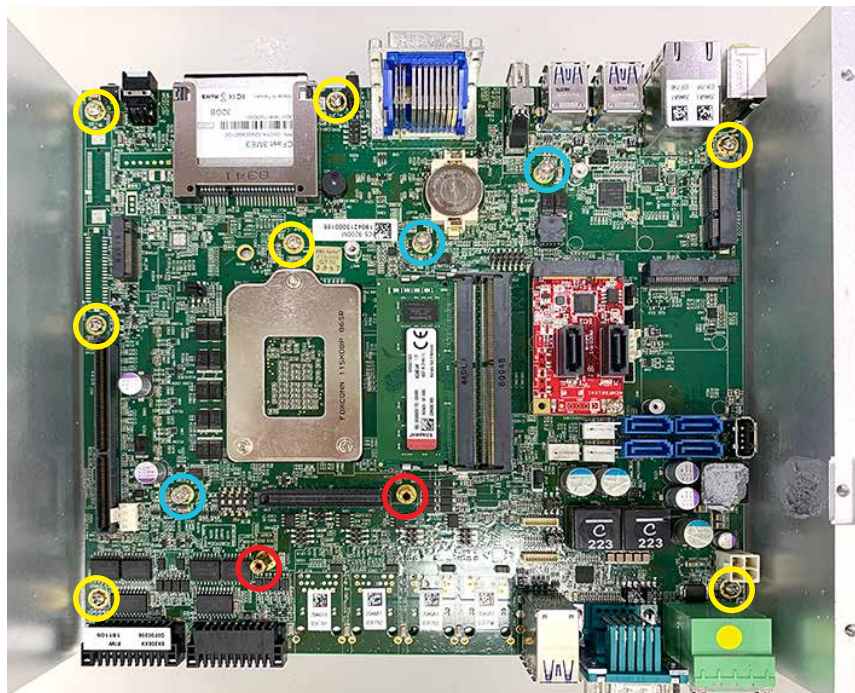
Step 21   Pick up the mother board.
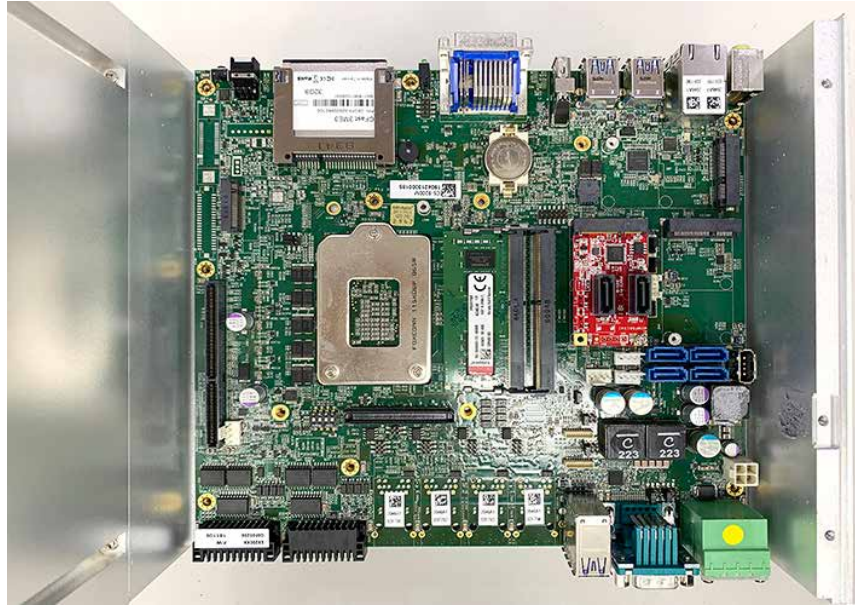
Step 22   Open CPU slot. (Be careful CPU pin)

Step 23 Install CPU on the slot.

Step 24 Finish.

Step 25 Close CPU slot and finish.

3.3 Installing DDR4 SO-DIMM Modules

Step 1 Install DDR4 RAM module into SO-DIMM slot.

Step 2 Make sure the RAM module is locked by the memory slot.

3.4 Installing Mini PCIe Card

Step 1 Install Mini PCIe card into the Mini PCIe socket.

Step 2 Fasten one M2.5 screw.

3.5 Installing Antenna Cable

Step 1 Check Antenna cable and washers.
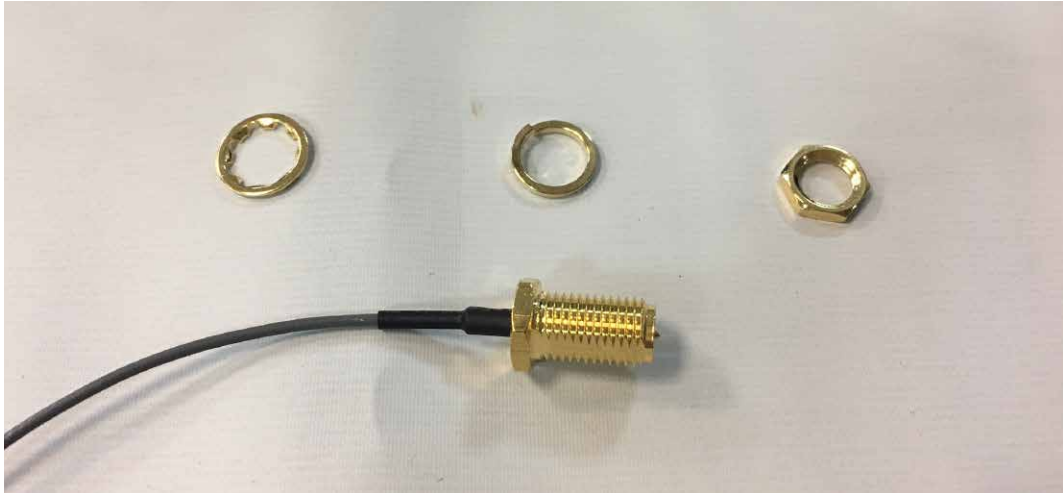
Step 2 Put Antenna cable connector into the hole on the rear panel.

Step 3 Fasten the washer on Antenna cable connector.
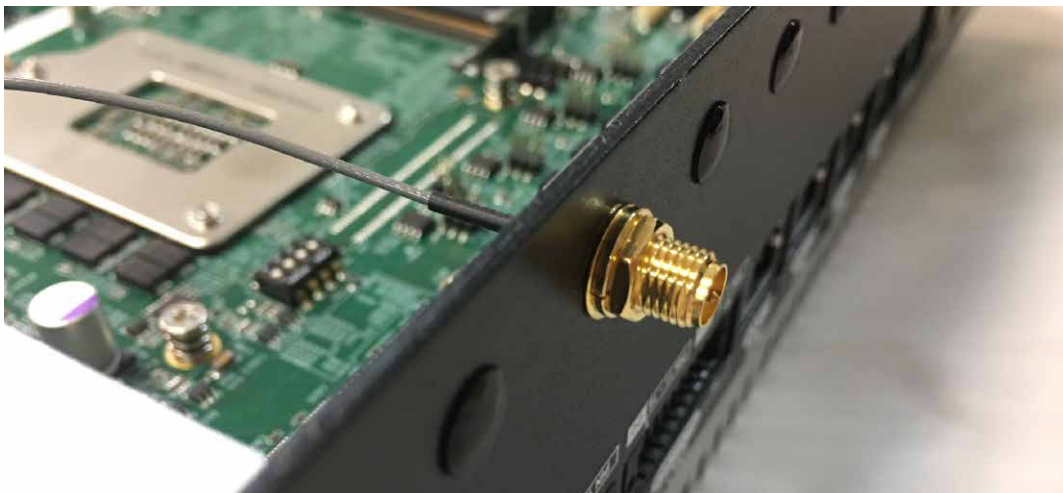
3.6 Installing CFast Card

Step 1 Remove 2 pcs F-M3x4 screws on CFast & SIM cover.

Step 2 Before inserting CFast & SIM Cards, make sure IVH-9200 power is not plugged.

Step 3 Insert CFast card and push to lock.
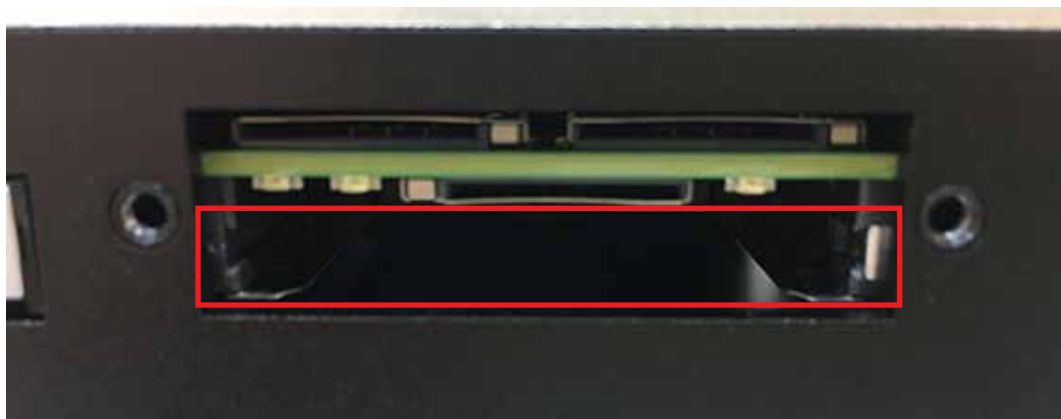
3.7 Installing SIM Card

Step 1 Remove two F-M3x4 screws on CFast & SIM cover.

Step 2 Before inserting SIM Card, make sure the system power is not plugged.

Step 3 Insert SIM card and push to lock.
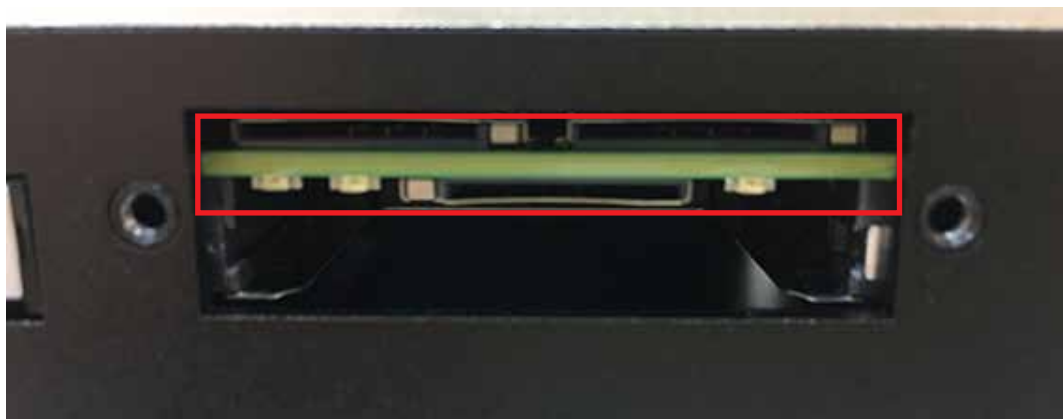
3.8 Installing SSD/HDD

Step 1 Push button to eject.

Step 2 Open the tray.

Step 3 Pull out the tray.

Step 4 The tray accommodates 2.5" drives up to 15mm height.

Step 5   Use the included M3*4 flat head screws to install the drive onto the tray.

Step 6   Use the included M3*4 flat head screws to install the drive onto the tray.

Step 7 Install the tray.
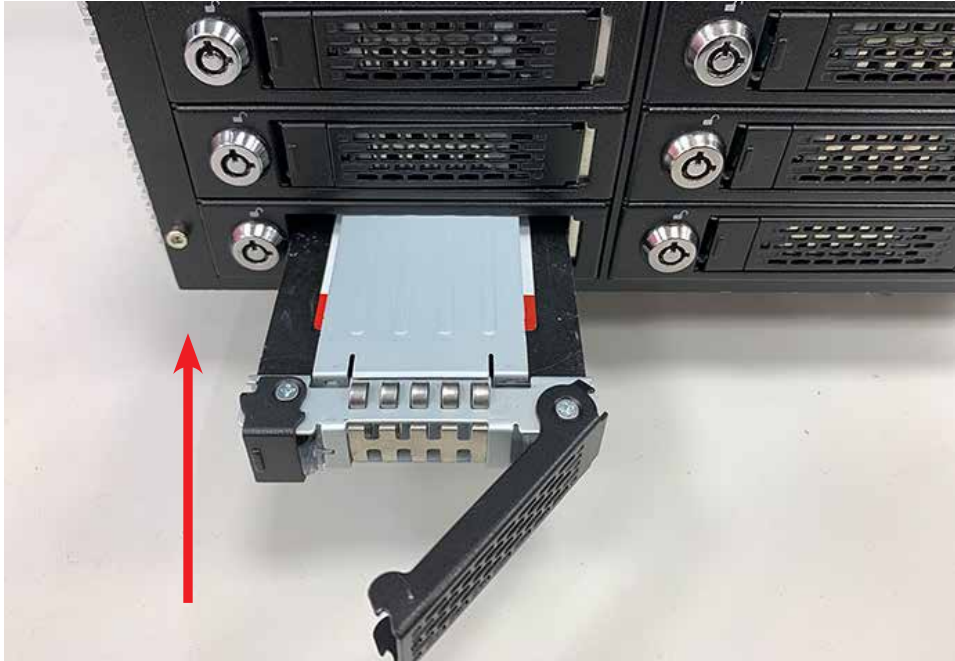
Step 8 Close the door.

Step 9   Can use key to lock.

Step 10   Finish.

3.9 Installing UPM

Step 1 UPM module.

Step 2 UPM Bracket.
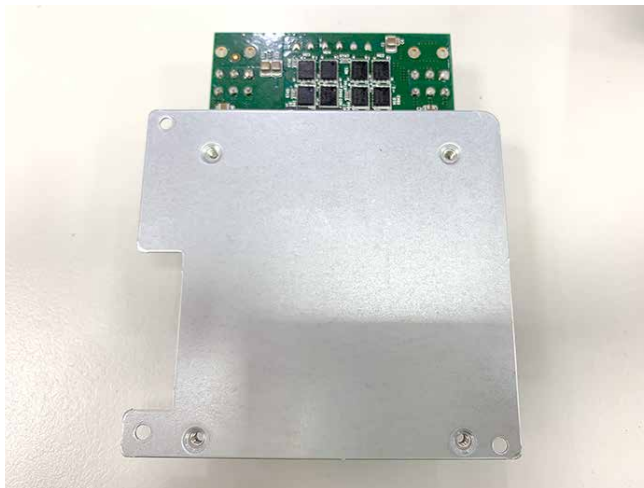
Step 3 Use M3*4 flat head screws to install the UPM bracket.
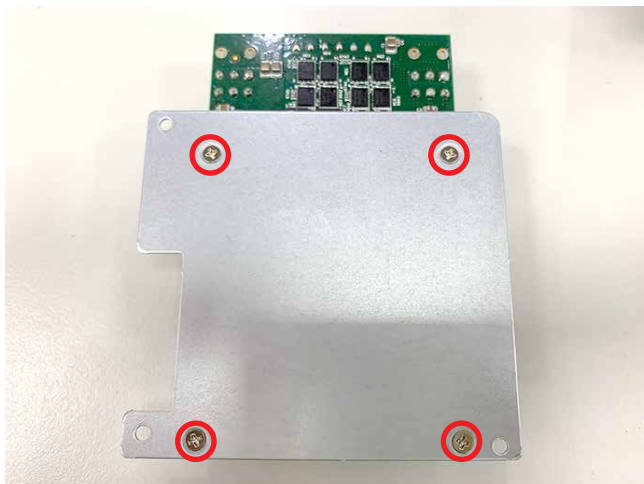
Step 4   Install cable to UPM V-IN.

Step 5   Remove three pcs PH M3*6L Ni+Ny screws.
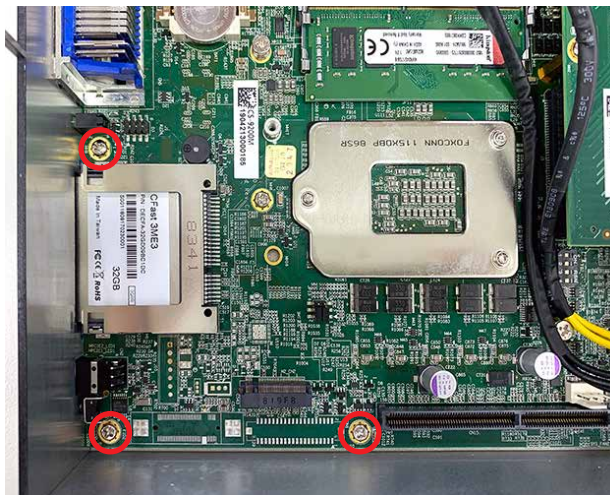
Step 6   Install three M3*15L stand off.
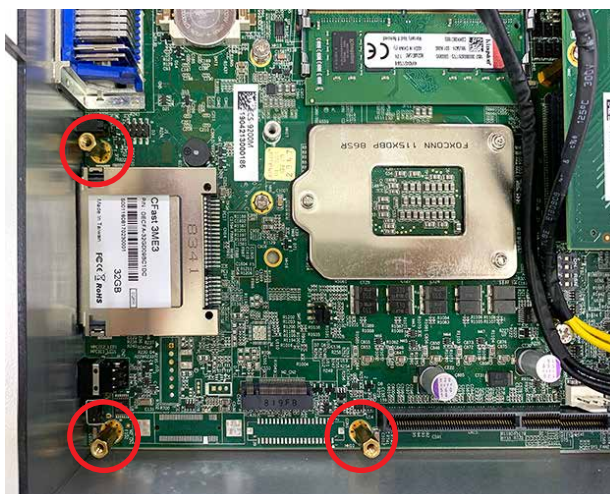
Step 7   Put on UPM module with bracket.

Step 8   Fasten three M3*6L Ni+Ny screws.
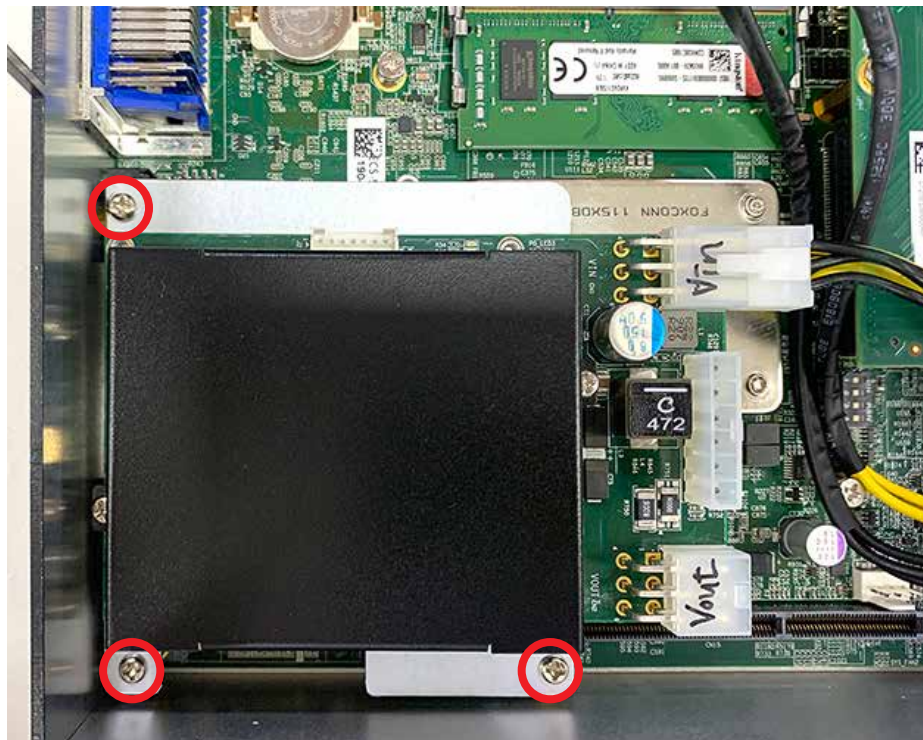
Step 9 Remove ATX cable (red) then into UPM V-out (blue).

Step 10 UPM V-in cable (red) WPM-110 V-out (blue).

Step 11 Finish.
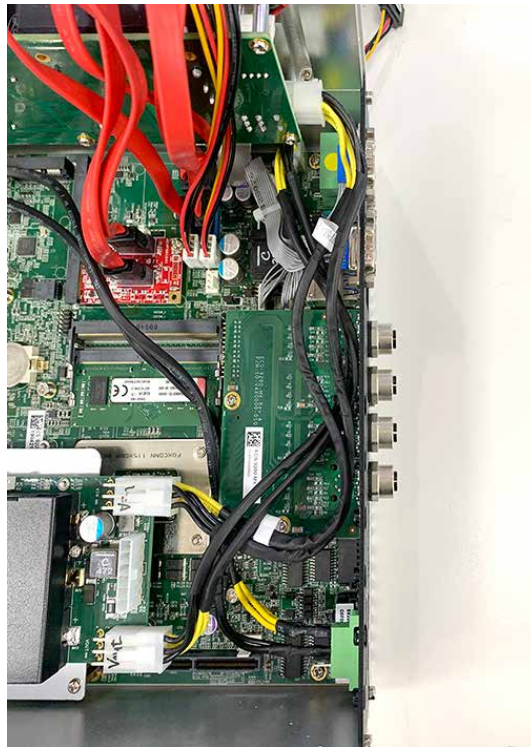
3.10 Mounting Your IVH-9204MX ICY

Step 1 Ensure the screw holes on the right and left sides of upper case match the ones on IVH-9200 wall mount bracket. Fasten ten #6-32 screws.
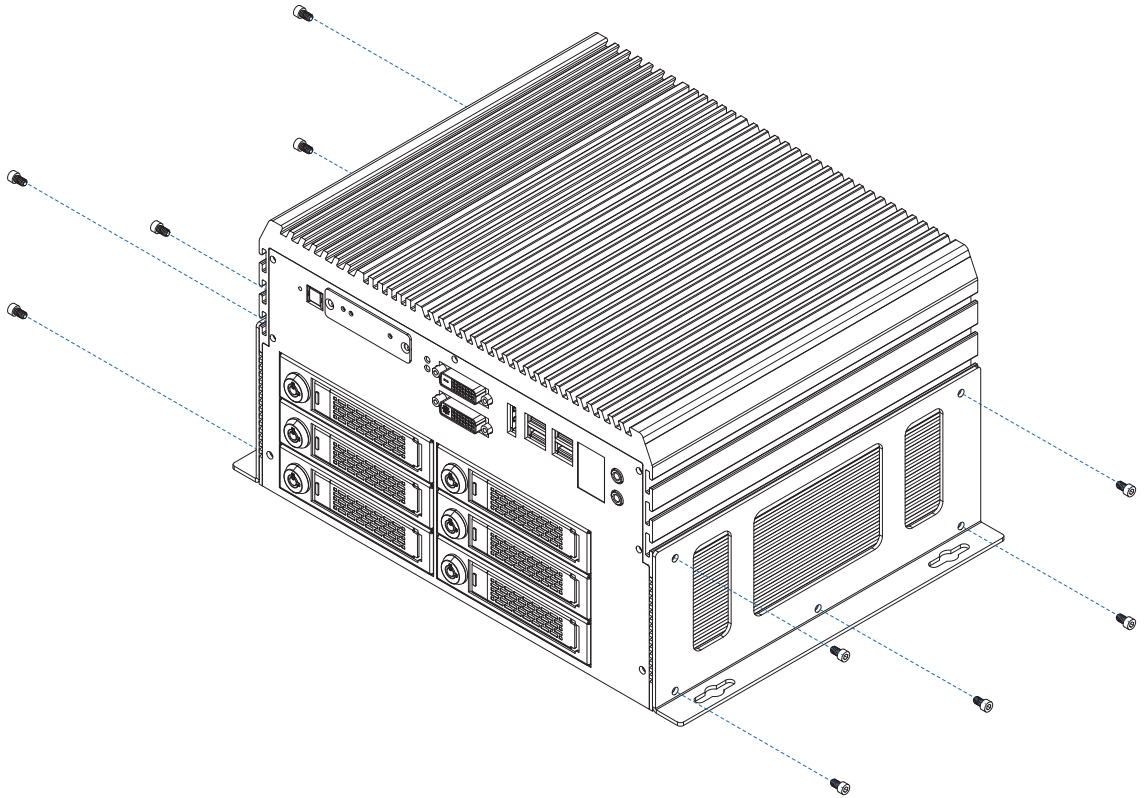
4

BIOS SETUP

4.1 Entering BIOS Setup

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

      BIOS Information                                          Set the Date. Use Tab to
      BIOS Vendor                    American Megatrends        switch between Date elements.
      Core Version                   5.12
      Compliancy                     UEFI 2.6; PI 1.4
      Project Version                E9000XXC0F00200
      Build Date and Time            05/17/2017 10:24:06
      Access Level                   Administrator

      Processor Information
      Name                           Kabylake DT
      Type                           Intel(R) Core(TM)
                                     i7-7700T CPU @ 2.90GHz
      Speed                          2900 MHz
      ID                             0x906E9                    →←: Select Screen
      Stepping                       B0/S0/M0                   ↑↓: Select Item
      Package                        Not Implemented Yet        Enter: Select
      Number of Processors           4Core(s) / 8Thread(s)      +/-: Change Opt.
      Microcode Revision             58                         F1: General Help
      GT Info                        GT2 (0x5912)               F2: Previous Values
                                                                F3: Optimized Defaults
      Memory RC Version              2.2.0.0                    F4: Save & Exit
      Total Memory                   16384 MB                   ESC: Exit
      Memory Frequency                2400 MHz

      PCH Information
```

Figure 4-1 : Entering Setup Screen

BIOS provides an interface for users to check and change system configuration. The BIOS setup program is accessed by pressing the <Del> key when POST display output is shown.

4.2 Main

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

  ID                                  0x906E9          ▲   Set the Time. Use Tab to
  Stepping                            B0/S0/M0          ▒   switch between Time elements.
  Package                             Not Implemented Yet ▒
  Number of Processors                4Core(s) / 8Thread(s) ▒
  Microcode Revision                  58                ▒
  GT Info                             GT2 (0x5912)      ▒
                                                        ▒
  Memory RC Version                   2.2.0.0           ▒
  Total Memory                        16384 MB          ▒
  Memory Frequency                     2400 MHz         ▒
                                                        ▒
  PCH Information                                       ▒
  Name                                SKL PCH-H         ▒
  PCH SKU                             C236              ──: Select Screen
  Stepping                            D1                ↑↓: Select Item
  Hsio Revision                       52                Enter: Select
  Package                             Not Implemented Yet +/-: Change Opt.
  TXT Capability of Platform/PCH      Supported         F1: General Help
  Production Type                     Production        F2: Previous Values
                                                        F3: Optimized Defaults
  ME FW Version                       11.6.29.3287      F4: Save & Exit
  ME Firmware SKU                     Corporate SKU     ESC: Exit

  System Date                         [Wed 07/19/2017]
  System Time                         [13:30:05]        ▼
```

Figure 4-2 : BIOS Main Menu

The main menu displays BIOS version and system information. There are two options on the main menu.

System Date
Set the date. Use <Tab> to switch between date elements.

System Time
Set the time. Use <Tab> to switch between time elements.

4.3 Advanced

```
            Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
   Main  Advanced  Chipset  Security  Boot  Save & Exit

  ► CPU Configuration                                   Monitor hardware status
  ► Power & Performance
  ► PCH-FW Configuration
  ► Trusted Computing
  ► ACPI Settings
  ► SMART Settings
  ► IT8786 Super IO Configuration
  ► Hardware Monitor
  ► Serial Port Console Redirection
  ► Intel TXT Information
  ► Acoustic Management Configuration
  ► PCI Subsystem Settings
  ► Network Stack Configuration
  ► CSM Configuration                                   ──: Select Screen
  ► NVMe Configuration                                  ↑↓: Select Item
  ► USB Configuration                                   Enter: Select
                                                        +/-: Change Opt.
```

Figure 4-3 : BIOS Advanced Menu

Select advanced tab to enter advanced BIOS setup options, such as CPU configuration, SATA configuration, and USB configuration.

4.3.1 CPU Configuration

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

   CPU Configuration                                        To turn on/off the MLC
                                                            streamer prefetcher.
   Type                            Intel(R) Core(TM)
                                   i7-7700T CPU @ 2.90GHz
   ID                              0x906E9
   Speed                           2900 MHz
   L1 Data Cache                   32 KB x 4
   L1 Instruction Cache            32 KB x 4
   L2 Cache                        256 KB x 4
   L3 Cache                        8 MB
   L4 Cache                        N/A
   VMX                             Supported
   SMX/TXT                         Supported
                                                            ----------------------------
                                                            →←: Select Screen
   Hardware Prefetcher             [Enabled]                ↑↓: Select Item
   Adjacent Cache Line Prefetch    [Enabled]                Enter: Select
   Intel (VMX) Virtualization      [Enabled]                +/-: Change Opt.
   Technology                                               F1: General Help
   Active Processor Cores          [All]                    F2: Previous Values
   Hyper-Threading                 [Enabled]                F3: Optimized Defaults
   AES                             [Enabled]                F4: Save & Exit
   Intel Trusted Execution Technology [Disabled]            ESC: Exit
```

Figure 4-3-1 : CPU Configuration

Hardware Prefetcher
To turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch
To turn on/off prefetching of adjacent cache lines.

Intel (VMX) Virtualization Technology
When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Active Processor Cores
Number of cores to enable in each processor package.

Hyper-threading
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and disabled for other OS (OS not optimized for Hyper-Threading Technology). When disabled only one thread per core is enabled.

AES
Enable/disable CPU Advanced Encryption Standard instructions.

Intel Trusted Execution Technology
Enables utilization of additional hardware capabilities provided by Intel® Trusted Execution Technology.
Changes require a full power cycle to take effect.

4.3.2 Power & Performance
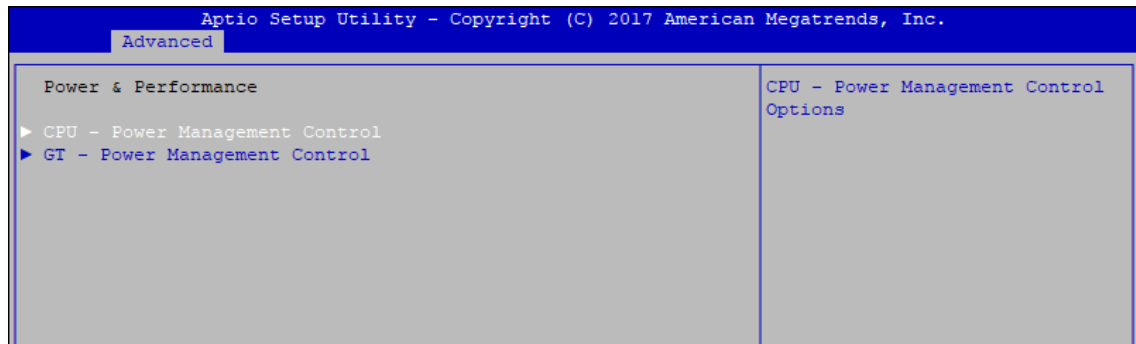
Figure 4-3-2 : Power & Performance

4.3.2.1 CPU – Power Management Control
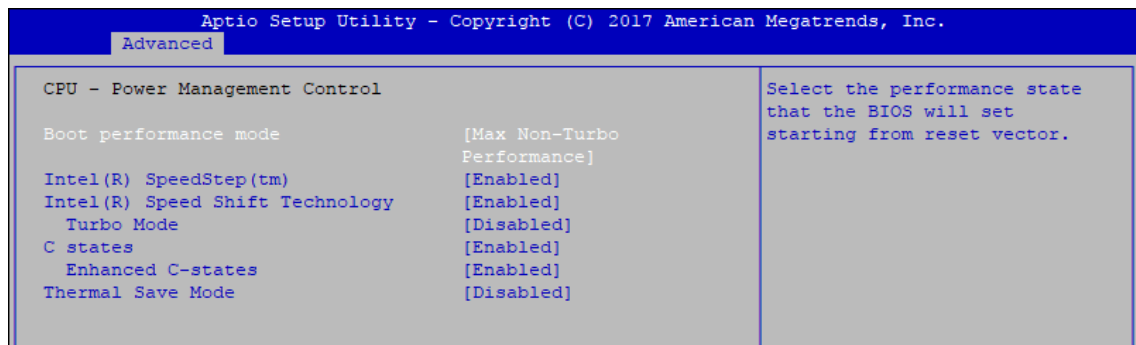
Figure 4-3-2-1 : CPU – Power Management Control

Boot performance mode
Select the performance state that the BIOS will set before OS handoff.

Intel(R) SpeedStep(tm)
Allows more than two frequency ranges to be supported.

Intel(R) Speed shift Technology
Enable/Disable Intel® Speed Shift Technology support. Enabling will expose the CPPCv2 interface to allow for hardware controlled P-states.

Turbo Mode
Turbo Mode.

C states
Enable or disable CPU C states.

Enhanced C-states
Enable/disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.

Thermal Save Mode
Enable/Disable Thermal Save Mode support.

4.3.2.2 GT – Power Management Control

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

     GT - Power Management Control                                Check to enable render standby
                                                                  support.
     RC6(Render Standby)                   [Enabled]
     Maximum GT frequency                  [Default Max Frequency]
```
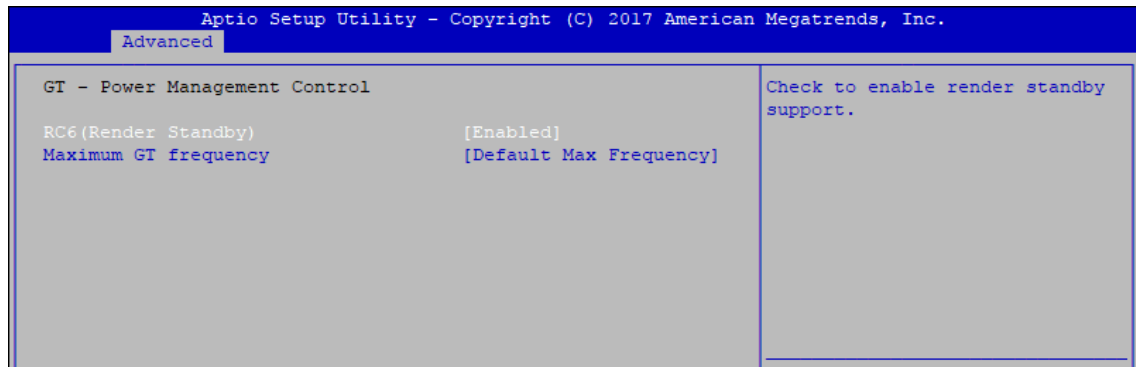
Figure 4-3-2-2 : GT – Power Management Control

RC6(Render Standby)
Check to enable render standby support.

Maximum GT frequency
Maximum GT frequency limited by the user. Choose between 350MHz (RPN) and 1150MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU.

4.3.3 PCH-FW Configuration

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

     ME Firmware Version          11.6.29.3287                When Disabled ME will be put
     ME Firmware Mode             Normal Mode                 into ME Temporarily Disabled
     ME Firmware SKU              Corporate SKU               Mode.
     ME File System Integrity Value    2
     ME Firmware Status 1         0x90000255
     ME Firmware Status 2         0x8A10830E
     NFC Support                  Disabled

     ME State                     [Enabled]
     AMT BIOS Features            [Enabled]
   ► AMT Configuration
     ME Unconfig on RTC Clear     [Enabled]
```

Figure 4-3-3 : PCH-FW Settings

ME State
Set ME to Soft temporarily disabled.

AMT BIOS Features
When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.

AMT Configuration
Configure Intel® Active Management Technology Parameters.

ME Unconfig on RTC Clear State
Disabling this option will cause ME not to unconfigure on RTC clear.

4.3.4 Trusted Computing
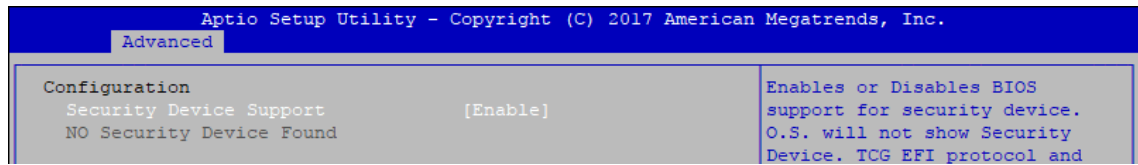
Figure 4-3-4 : Trusted Computing

Control the TPM device status and display related information if TPM chip is present.

4.3.5 ACPI Settings
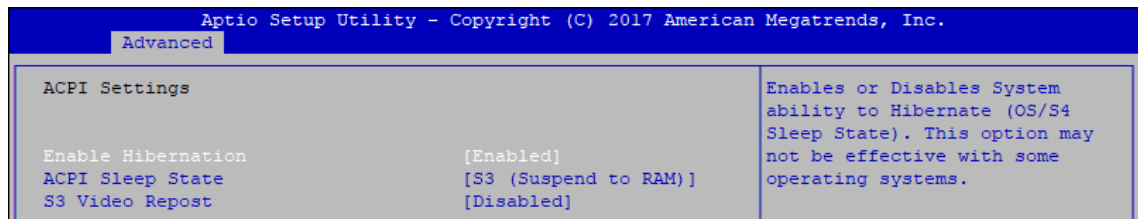
Figure 4-3-5 : ACPI Settings

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

ACPI Sleep State
Selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

S3 Video Repost
Enables or disables S3 video repost.

4.3.6 SMART Settings
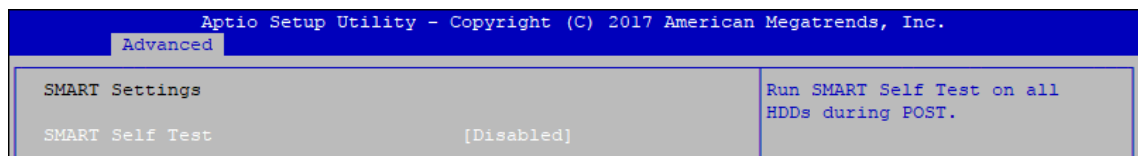
Figure 4-3-6 : SMART Settings

SMART Self Test
Run SMART self test on all HDDs during POST.

4.3.7 IT8786 Super IO Configuration
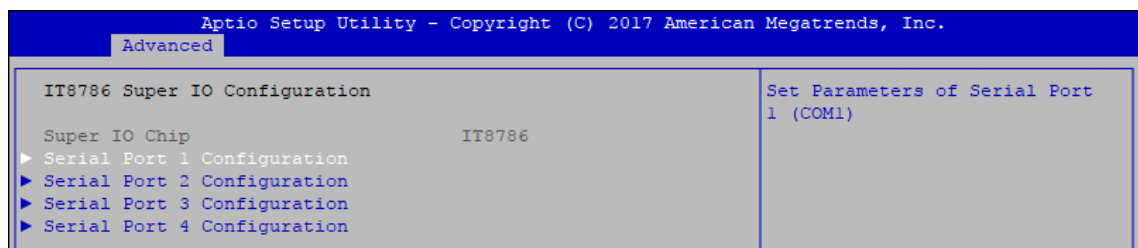
Figure 4-3-7 : IT8786 Super IO Settings

4.3.7.1 Serial Port X Configuration

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

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

  Change Settings                    [Auto]
  Interface Mode                     [RS-232 Mode]
  High Speed Serial Port             [Disable]
```
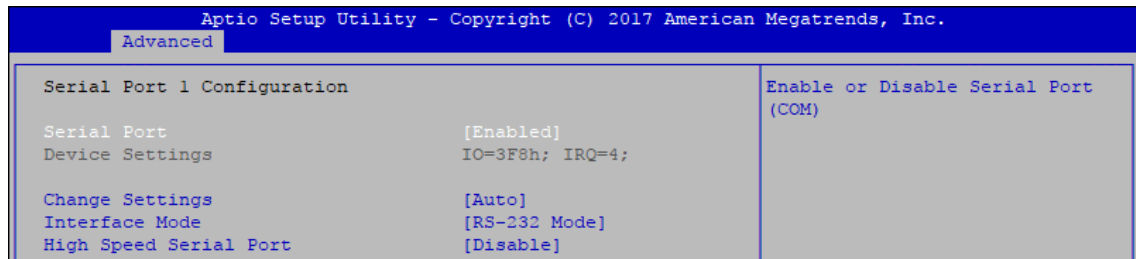
Figure 4-3-7-1 : Serial Port X Configuration

Serial Port 1 to port 4 Configuration
Options for Serial Port 1 to Serial Port 4.

Entering the corresponding Port option then end user can change the settings such as I/O resource and UART mode (High Speed Serial Port is Port 1 only).

4.3.8 Hardware Monitor

```
               Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
         Advanced

  Pc Health Status                                          Smart Fan Support. Work with
                                                            Full Speed if "Smart Fan
  System temperature1              : +44 ℃                  Support" is Disabled.
  System temperature2              : +44 ℃
  CPU temperature                  : +39 ℃
  System Fan1 Speed                : N/A
  VCORE                            : +0.912 V
  DDR                              : +1.200 V
  +12V                             : +12.024 V
  +5V                              : +5.040 V
  +3.3V                            : +3.304 V


  Smart Fan Support                [Enable]
    Smart Fan Mode                 [User]                   →←: Select Screen
      Start Temperature            45                       ↑↓: Select Item
      PWM Start Value(%)           15                       Enter: Select
      Full Speed Temperature       90                       +/-: Change Opt.
                                                            F1: General Help
```

Figure 4-3-8 : Hardware Monitor Settings

The IT8786 SIO features an enhanced hardware monitor providing thermal, fan speed, and system voltages' status monitoring.

Smart Fan Support
Smart Fan Support. Work with Full Speed if "Smart Fan Support" is Disabled.

Smart Fan Mode
Default : Using the default smart fan table.
User : Setting parameters by user.

Start Temperature
Temperature Limit value of Fan Start (Degree C).
(Range : 10 ~ 80)

PWM Start Value (%)
Default PWM Value of Fan.
(Range : 15% ~ 100%)

Full Speed Temperature
Temperature Limit value of Fan Full Speed (Degree C).
(Range : 50 ~ 90)

4.3.9 Serial Port Console Redirection
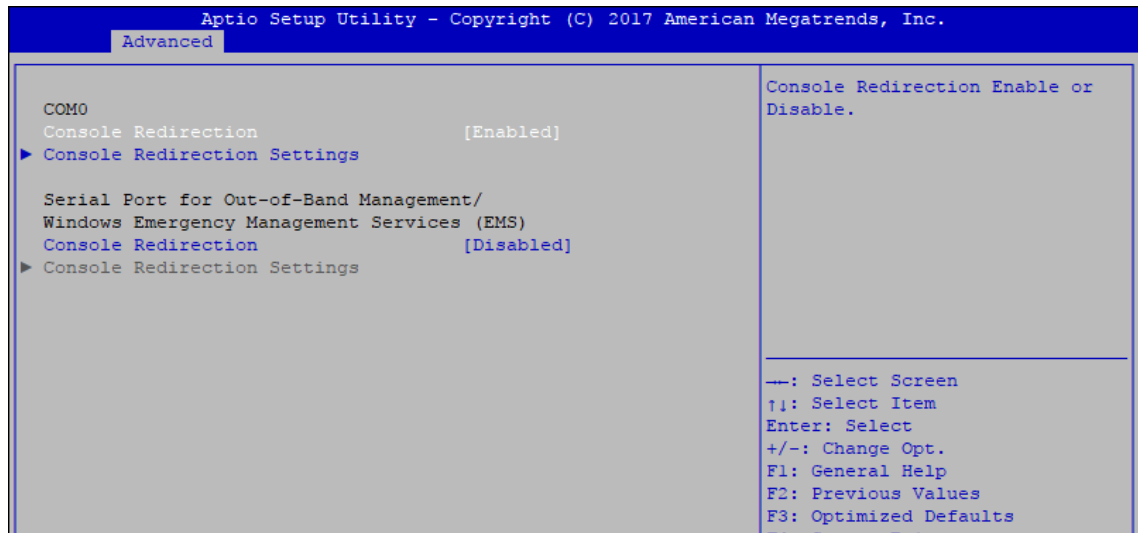
Figure 4-3-9 : Serial Port Console Redirection Settings

Console Redirection

Console redirection enable or disable.

Console Redirection Settings

These settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

4.3.10 Intel TXT Information
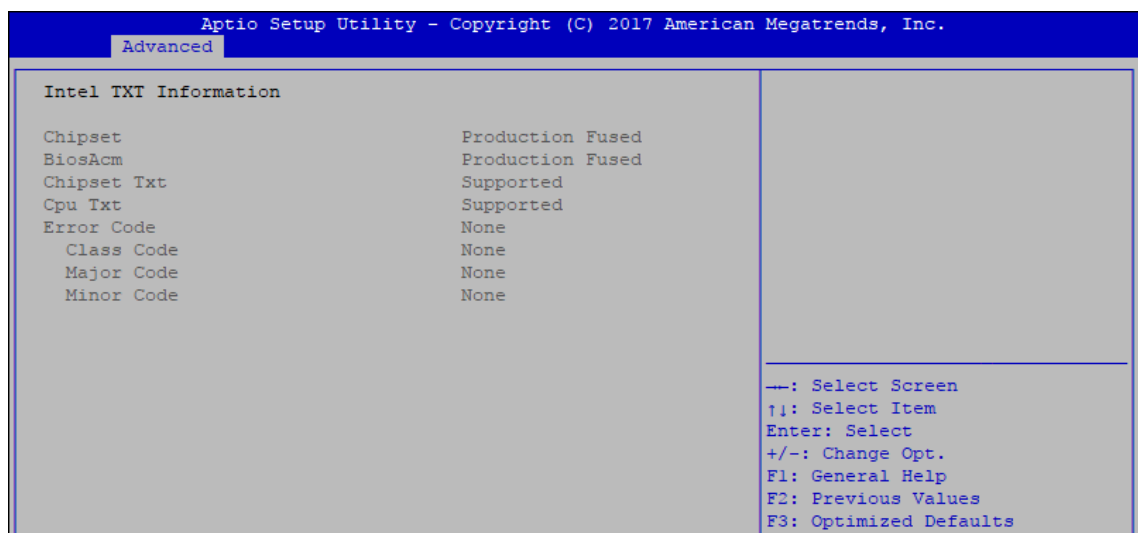
Figure 4-3-10 : Intel TXT Information

Display Intel TXT information.

4.3.11 Acoustic Management Configuration

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

  Acoustic Management Configuration                    Option to Enable or Disable
                                                       Automatic Acoustic Management
  Acoustic Management Configuration    [Disabled]
▶ SATA Controller 0 - PCI Bus 00 Dev 17 Fun 00




                                                       →←: Select Screen
                                                       ↑↓: Select Item
                                                       Enter: Select
                                                       +/-: Change Opt.
                                                       F1: General Help
                                                       F2: Previous Values
                                                       F3: Optimized Defaults
```
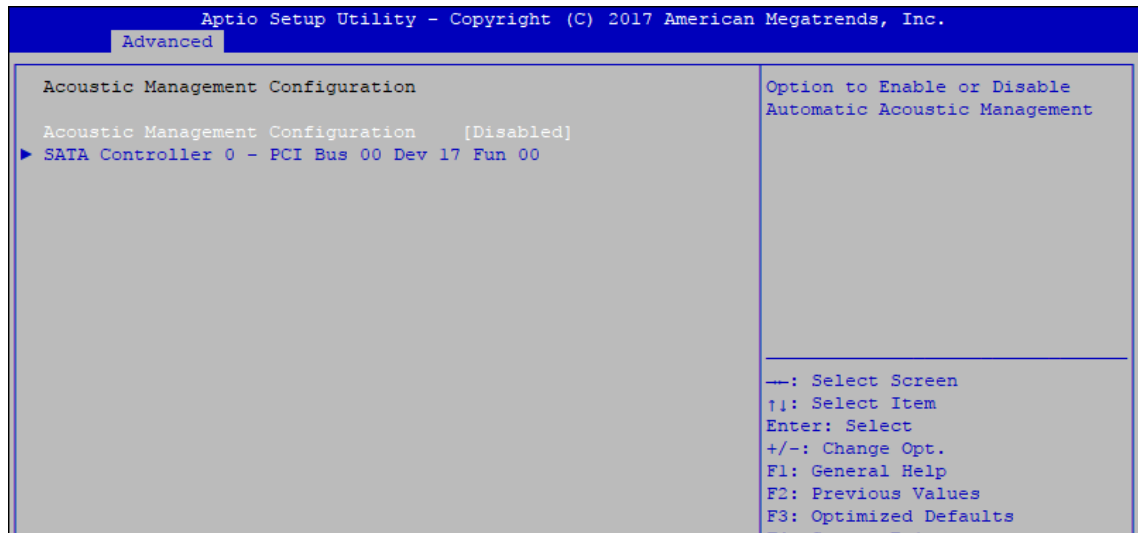
Figure 4-3-11 : Acoustic Management Settings

Acoustic Management Configuration

Option to enable or disable automatic acoustic management.

4.3.12 PCI Subsystem Setting

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

  AMI PCI Driver Version :   A5.01.12                  Globally Enables or Disables
                                                       64bit capable Devices to be
  PCI Settings Common for all Devices:                 Decoded in Above 4G Address
  Above 4G Decoding                  [Disabled]        Space (Only if System Supports
  Hot-Plug Support                   [Enabled]         64 bit PCI Decoding).

  Change Settings of the Following PCI Devices:

  WARNING: Changing PCI Device(s) settings may
  have unwanted side effects! System may HANG!
  PROCEED WITH CAUTION.


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

Figure 4-3-12 : PCI Subsystem Settings

Above 4G Decoding

Globally Enables or Disables 64bit capable Devices to be Decoded in Above 4G Address Space (Only if System Supports bot PCI Decoding)

4.3.13 Network Stack Configuration

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

    Network Stack                    [Enabled]              Enable/Disable UEFI Network
    Ipv4 PXE Support                 [Disabled]             Stack
    Ipv4 HTTP Support                [Disabled]
    Ipv6 PXE Support                 [Disabled]
    Ipv6 HTTP Support                [Disabled]
    IP6 Configuration Policy         [Automatic]
    PXE boot wait time               0
    Media detect count               1




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

```

Figure 4-3-13 : Network Stack Settings

Network Stack
Enable/Disable UEFI Network Stack

Ipv4 PXE Support
Enable/Disable IPv4 PXE boot support.

Ipv4 HTTP Support
Enable/Disable IPv4 HTTP boot support.

Ipv6 PXE Support
Enable/Disable IPv6 PXE boot support.

Ipv6 HTTP Support
Enable/Disable IPv6 HTTP boot support.

IP6 Configuration Policy
Set IP6 Configuration Policy.

PXE boot wait time
Wait time to press ESC key to abort the PXE boot.

Media detect count
Number of times presence of media will be checked.

4.3.14 CSM Configuration

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

   Compatibility Support Module Configuration            Enable/Disable CSM Support.

   CSM Support                          [Enabled]

   CSM16 Module Version                 07.81

   GateA20 Active                       [Upon Request]
   Option ROM Messages                  [Force BIOS]
   INT19 Trap Response                  [Immediate]

   Boot option filter                   [UEFI and Legacy]

   Option ROM execution
                                                          ⟶←: Select Screen
   Network                              [Do not launch]   ↑↓: Select Item
   Storage                              [Legacy]          Enter: Select
   Video                                [Legacy]          +/-: Change Opt.
   Other PCI devices                    [Legacy]          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
```

Figure 4-3-14 : CSM Settings

CSM Support

Enable/disable CSM support.

GateA20 Active

UPON REQUEST - GA20 can be disabled using BIOS services.
ALWAYS - do not allow GA20 to be disabled; this option is useful when any RT code is executed above 1MB.

Option ROM Messages

Set display mode for Option ROM.

INT19 Trap Response

BIOS reaction on INT19 trapping by Option ROM :
IMMEDIATE - execute the trap right away;
POSTPONED - execute the trap during legacy boot.

Boot option filter

This option controls Legacy/UEFI ROM's priority.

Network

Controls the execution of UEFI and Legacy PXE OpROM.

Storage

Controls the execution of UEFI and Legacy Storage OpROM.

Video

Allows more than two frequency ranges to be supported.

Other PCI devices

Determines OpROM execution policy for devices other than network, storage, or video.

4.3.15 NVMe Configuration

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

    NVMe controller and Drive information

    No NVME Device Found
```
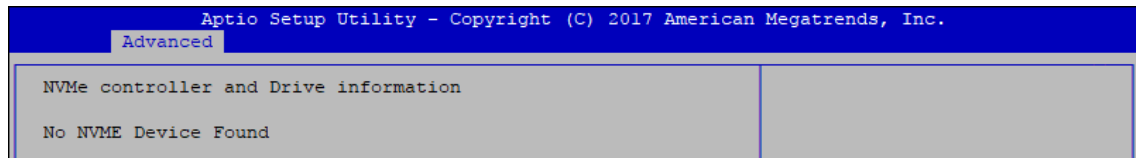
Figure 4-3-15 : NVMe Settings

Display NVMe controller and Drive infomation.

4.3.16 USB Configuration

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

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

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

Figure 4-3-16 : USB Settings

Legacy USB Support

Enables Legacy USB support.
AUTO option disables Legacy support if no USB devices are connected.
DISABLE option will keep USB devices available only for EFI applications.

XHCI Hand-off

This is a workaround for OS-es without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

USB Mass Storage Driver Support

Enable/disable USB mass storage driver support.

Port 60/64 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

USB transfer time-out

The time-out value for control, bulk, and interrupt transfers.

Device reset time-out

USB mass storage device start unit command time-out.

Device power-up delay

Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value, for a root port it is 100 ms, for a hub port the delay is taken from the hub descriptor.

4.4 Chipset

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

  ▶ System Agent (SA) Configuration              System Agent (SA) Parameters
  ▶ PCH-IO Configuration
  ▶ GPIOManager Configuration
```
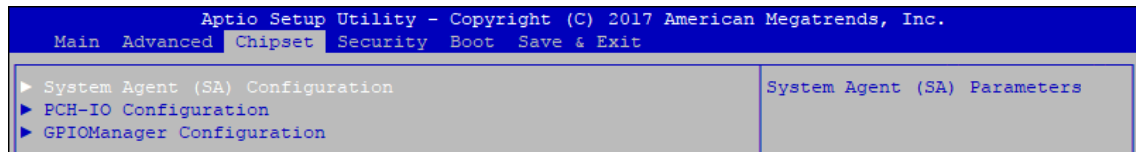
Figure 4-4 : BIOS Chipset Menu

System Agent (SA) Configuration
System Agent (SA) parameters.

PCH-IO Configuration
PCH parameters.

GPIOManager Configuration
GPIOManager Configuration.

4.4.1 System Agent (SA) Configuration

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

    System Agent (SA) Configuration                Memory Configuration Parameters

    SA PCIe Code Version          2.2.0.0
    VT-d                          Supported

  ▶ Memory Configuration
  ▶ Graphics Configuration
  ▶ PEG Port Configuration

    VT-d                          [Enabled]
    GMM Device (B0:D8:F0)         [Enabled]
    Above 4GB MMIO BIOS assignment [Disabled]
```

Figure 4-4-1 : System Agent Settings

VT-d
VT-d capability.

GMM Device (B0:D8:F0)
Enable/disable SA GMM device.

Above 4GB MMIO BIOS assignment
Enable/disable above 4GB MemoryMappedIO BIOS assignment. This is disabled automatically when aperture size is set to 2048MB.

4.4.1.1 Memory Configuration

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

    Memory Configuration

    Memory RC Version             2.0.0.6
    Memory Frequency               2133 MHz
    Memory Timings (tCL-tRCD-tRP-tRAS)  15-15-15-36

    Channel 0 Slot 0              Populated & Enabled
        Size                      8192 MB (DDR4)
        Number of Ranks           2
        Manufacturer              Transcend
    Channel 0 Slot 1              Not Populated / Disabled
    Channel 1 Slot 0              Not Populated / Disabled
    Channel 1 Slot 1              Not Populated / Disabled
```

Figure 4-4-1-1 : Memory Information

Displays memory information.

4.4.1.2 Graphics Configuration

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

  Graphics Configuration                                    If Enable, it will not scan
                                                            for External Gfx Card on PEG
  Skip Scaning of External Gfx Card    [Disabled]           and PCH PCIE Ports

  Primary Display                      [Auto]
► External Gfx Card Primary Display Configuration
  Internal Graphics                    [Auto]
  GTT Size                             [8MB]
  Aperture Size                        [256MB]
  DVMT Pre-Allocated                   [32M]
  DVMT Total Gfx Mem                   [MAX]

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

```

Figure 4-4-1-2 : Graphics Settings

Skip Scaning of External Gfx Card

If enabled, it will not scan for External Gfx Card on PEG and PCH PCIE Ports.

Primary Display

Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.

Internal graphics

Keep IGFX enabled based on the setup options.

GTT Size

Select the GTT Size.

Aperture Size

Select the Aperture Size.
Note : Above 4GB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature, please disable CSM Support.

DVMT Pre-Allocated

Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

DVMT Total Gfx Mem

Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.

4.4.1.3 PEG Port Configuration

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

     PEG Port Configuration                                           Enable or Disable the Root Port

     PEG 0:1:0                              Not Present
       Enable Root Port                     [Auto]
       Max Link Speed                       [Auto]
     PEG 0:1:1                              Not Present
       Enable Root Port                     [Auto]
       Max Link Speed                       [Auto]

   ▶ PEG Port Feature Configuration
     Program PCIe ASPM after OpROM          [Disabled]

                                                                     →←: Select Screen
                                                                      ↑↓  Select Item
```
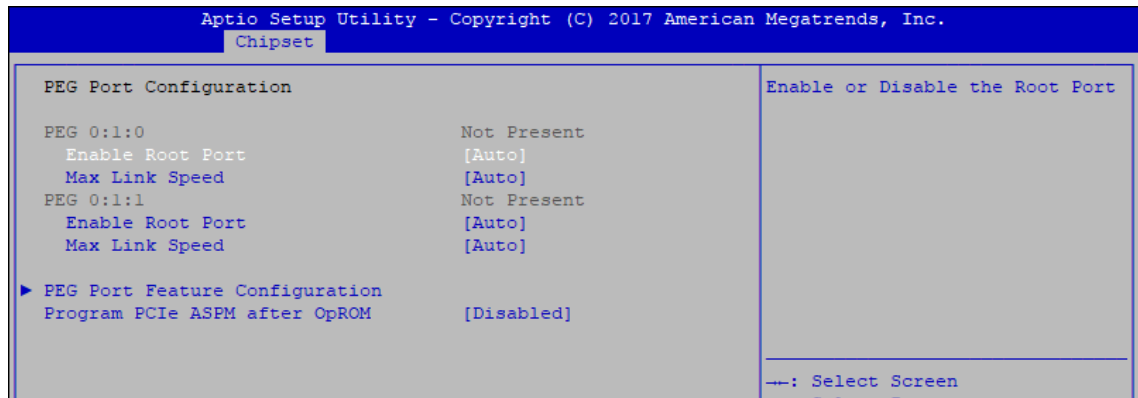
Figure 4-4-1-3 : PEG Port Configuration

PEG port options for PCIe device.

4.4.2 PCH-IO Configuration

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

     PCH-IO Configuration                                            PCI Express Configuration
                                                                     settings
   ▶ PCI Express Configuration
   ▶ SATA And RST Configuration
   ▶ Security Configuration
   ▶ SB Porting Configuration

     PCH LAN Controller                     [Enabled]
       Wake on LAN Enable                   [Enabled]
     Serial IRQ Mode                        [Continuous]
     State After G3                         [S5 State]

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

Figure 4-4-2 : PCH-IO Settings

PCH LAN Controller

Enable or disable onboard NIC.

Wake on LAN

Enable or disable integrated LAN to wake the system. (The wake On LAN cannot be disabled if ME is on at Sx state.)

Serial IRQ Mode

Configure serial IRQ mode.

State After G3

Specify what state to go to when power is re-applied after a power failure (G3 state).
S0 State : Always turn-on the system when power source plugged-in.
S5 State : Always turn-off the system when power source plugged-in.

4.4.2.1 PCI Express Configuration of PCH-IO

```
         Aptio Setup Utility - Copyright (C) 2019 American Megatrends, Inc.
         Chipset

   PCI Express Configuration                              The control of Active State
                                                          Power Management of the DMI
   DMI Link ASPM Control              [Enabled]           Link.
   Native PCIE Enable                 [Enabled]           Auto is equal to POR setting.
   PCIE Port assigned to LAN          4

 ▶ Intel(R) Ethernet Controller I210 LAN2
 ▶ Intel(R) Ethernet Controller I210 LAN3
 ▶ Intel(R) Ethernet Controller I210 LAN4
 ▶ Intel(R) Ethernet Controller I210 LAN5
 ▶ Intel(R) Ethernet Controller I210 LAN6
 ▶ M.2 Slot(PCIEx4)
 ▶ M.2DOM Slot(PCIEx2)                                    ──: Select Screen
 ▶ miniPCIe/SATA Slot 1                                   ↑↓: Select Item
 ▶ miniPCIe/SATA Slot 2                                   Enter: Select
 ▶ miniPCIe/SATA Slot 3                                   +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F3: Optimized Defaults
                                                          F4: Save & Exit
                                                          ESC: Exit
```

Figure 4-4-2-1 : PCH-IO Settings

DMI Link ASPM Control

Enable/Disable the control of Active State Power Management on SA side of the DMI Link.

Native PCIE Enable

PCIE Express Native Support Enable/Disable.

PCI Express device settings

Bios options for PCI Express device setting.

4.4.2.2 SATA and RST Configuration

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

    SATA And RST Configuration                           ▲    Enable/Disable SATA Device.

    SATA Controller(s)                    [Enabled]
    SATA Mode Selection                   [AHCI]
  ► Software Feature Mask Configuration
    Aggressive LPM Support                [Enabled]
    SATA Controller Speed                 [Default]

    Serial ATA Port 0                     Empty
      Software Preserve                   Unknown
      Port 0                              [Enabled]
      Hot Plug                            [Disabled]
      Spin Up Device                      [Enabled]       ←→: Select Screen
      SATA Device Type                    [Hard Disk Drive] ↑↓: Select Item
      Topology                            [Unknown]       Enter: Select
    Serial ATA Port 1                     Empty           +/-: Change Opt.
      Software Preserve                   Unknown         F1: General Help
      Port 1                              [Enabled]       F2: Previous Values
      Hot Plug                            [Disabled]      F3: Optimized Defaults
      Spin Up Device                      [Enabled]       F4: Save & Exit
      SATA Device Type                    [Hard Disk Drive] ESC: Exit
      Topology                            [Unknown]
    Serial ATA Port 2                     Empty
      Software Preserve                   Unknown
      Port 2                              [Enabled]    ▼
```

Figure 4-4-2-2 : SATA And RST Settings

SATA Controller(s)
Enable or disable SATA Device.

SATA Mode Selection
Determines how SATA controller(s) operate.

Software Feature Mask Configuration
RAID OROM/RST driver will refer to the SWFM configuration to enable or disable the storage features.

Aggressive LPM Support
Enable PCH to aggressively enter link power state.

SATA Controller Speed
Indicates the maximum speed the SATA controller can support.

Options for each SATA port :
Port n
Enable or disable SATA Port.

Hot Plug
Designated this port as Hot Pluggable.

Spin Up Device
On an edge detect from 0 to 1, the PCH starts a COMRESET initialization sequence to the device.

SATA Device Type
Identifies that the SATA port is connected to solid state drive or hard disk drive.

Topology
Identify the SATA Topology if it is Default or ISATA or Flex or DirectConnect or M2.

4.4.2.3 Security Configuration

Figure 4-4-2-3 : Security Settings

BIOS Lock
Enable/disable the PCH BIOS Lock Enable (BLE bit) feature.

4.5 Security

Figure 4-5 : BIOS Security Menu

Administrator Password
Set administrator password.

User Password
Set user password.

Secure Boot
Customizable Secure Boot Settings.

4.5.1 HDD Security Configuration

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

   HDD Password Description :                              Set HDD User Password.
                                                           *** Advisable to Power Cycle
   Allows  Access to  Set, Modify  and  Clear              System after Setting Hard Disk
   HardDisk User and Master Passwords.                     Passwords ***.
   User Password need to be installed for                  Discard or Save changes option
   Enabling Security. Master Password can                  in setup does not have any
   be Modified only when successfully unlocked             impact on HDD when password is
   with Master Password in POST.                           set or removed. If the 'Set
   If the 'Set HDD Password' option is grayed out,         HDD User Password' option is
   do power cycle to enable the option again.              grayed out, do power cycle to
                                                           enable the option again
   HDD PASSWORD CONFIGURATION:
                                                           _____
   Security Supported      :      Yes                      →←: Select Screen
   Security Enabled        :      No                       ↑↓: Select Item
   Security Locked         :      No                       Enter: Select
   Security Frozen         :      No                       +/-: Change Opt.
   HDD User Pwd Status     :      NOT INSTALLED            F1: General Help
   HDD Master Pwd Status   :      INSTALLED                F2: Previous Values
                                                           F3: Optimized Defaults
   Set User Password                                       F4: Save & Exit
   Set Master Password                                     ESC: Exit
```
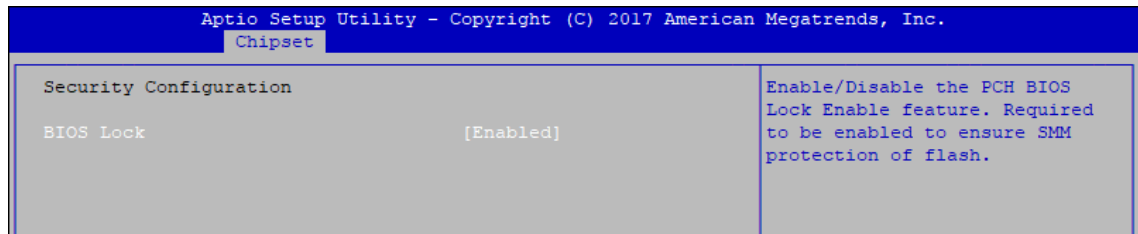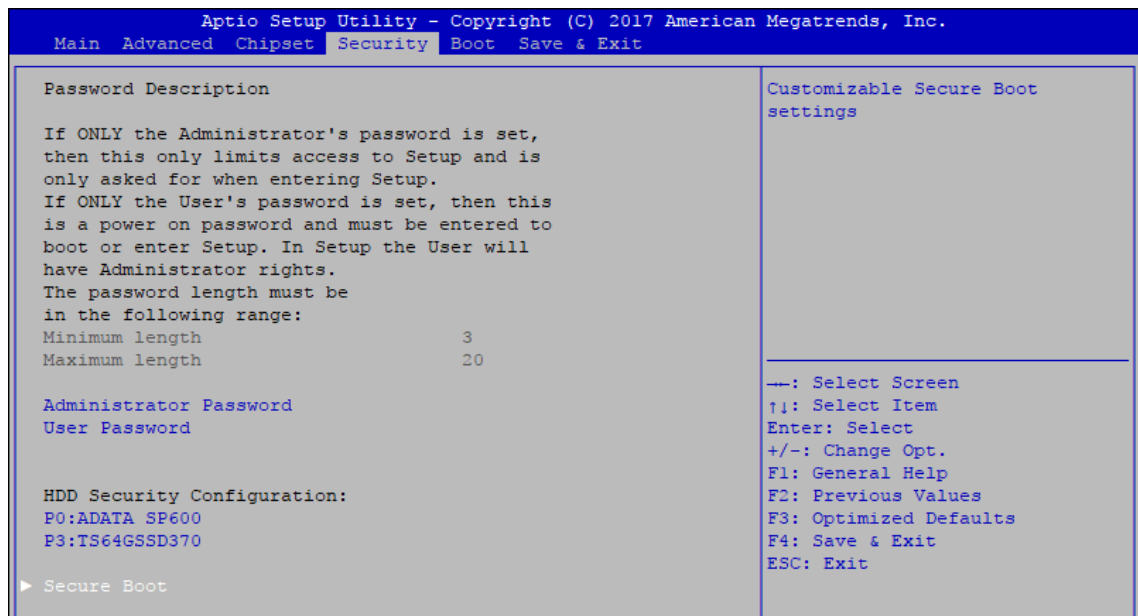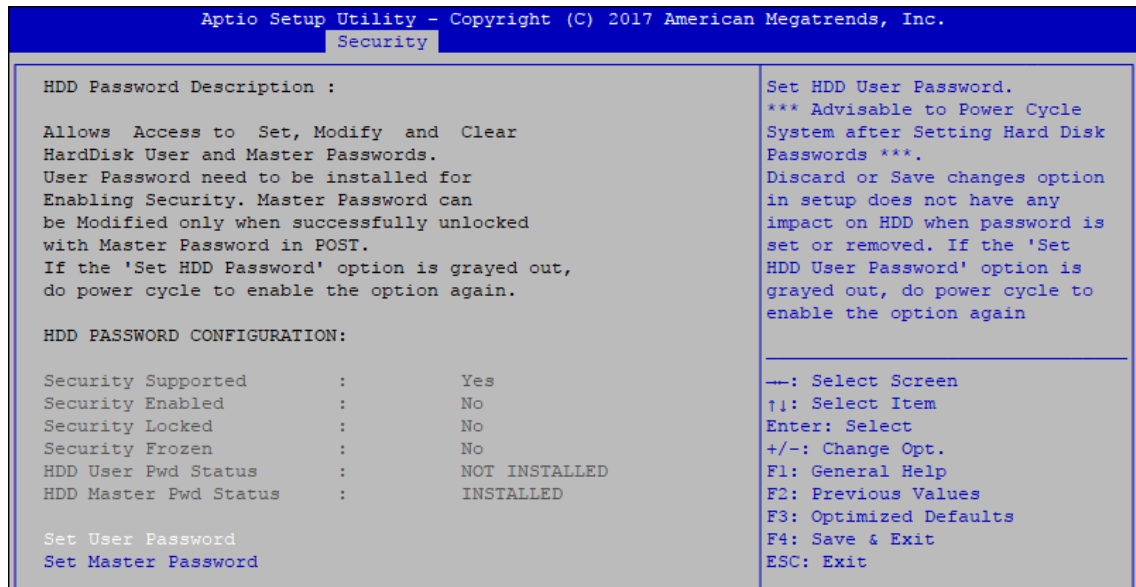
Figure 4-5-1 : HDD Security Settings

Set User Password

Set HDD user password.

*** Advisable to power cycle system after setting hard disk passwords ***
Discard or save changes option in setup does not have any impact on HDD when password is set or removed. If the 'Set HDD User Password' option is gray, do power cycle to enable the option again.

4.5.2 Security Boot

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

                                                           Secure Boot activated when
   System Mode                    Setup                     Platform Key(PK) is enrolled,
   Secure Boot                    Not Active                System mode is User/Deployed,
   Vendor Keys                    Active                    and CSM function is disabled

   Attempt Secure Boot            [Disabled]
   Secure Boot Mode               [Custom]
 ► Key Management
```

Figure 4-5-2 : Security Boot Settings

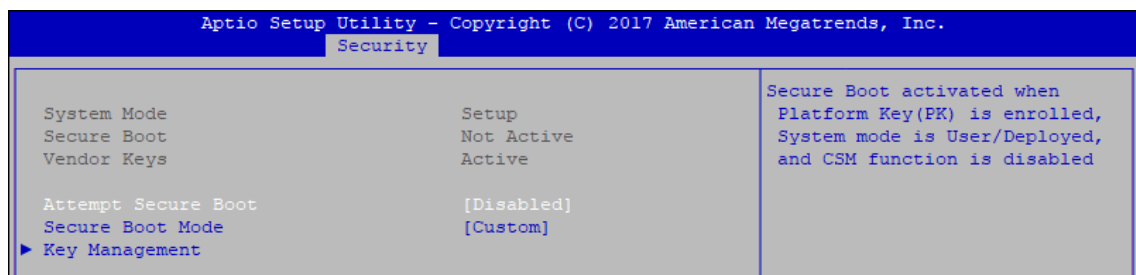### Attempt Secure Boot

Secure Boot activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled.

Secure Boot Mode

Secure Boot mode selector Standard/Custom.
In custom mode Secure Boot Variables can be configured without authentication.

Key Management

Enables expert users to modify Secure Boot policy variables without full authentication.
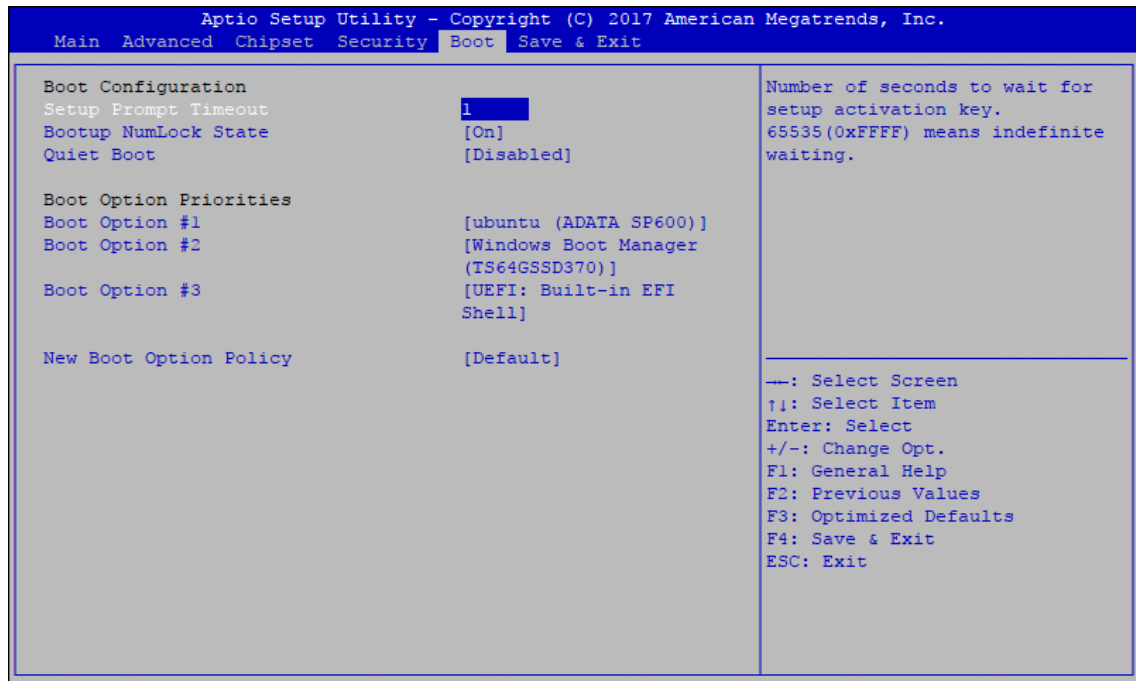
4.6 Boot

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

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

   Boot Option Priorities
   Boot Option #1                    [ubuntu (ADATA SP600)]
   Boot Option #2                    [Windows Boot Manager
                                     (TS64GSSD370)]
   Boot Option #3                    [UEFI: Built-in EFI
                                     Shell]

   New Boot Option Policy            [Default]
                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F3: Optimized Defaults
                                                            F4: Save & Exit
                                                            ESC: Exit
```

Figure 4-6 : BIOS Boot Menu

Setup Prompt Timeout

Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State

Selects the keyboard NumLock state.

Quiet Boot

Enables or disables Quiet Boot option.

Boot Option

Sets the system boot order.

New Boot Option Policy

Controls the placement of newly detected UEFI boot options.

Hard Drive BBS Priorities

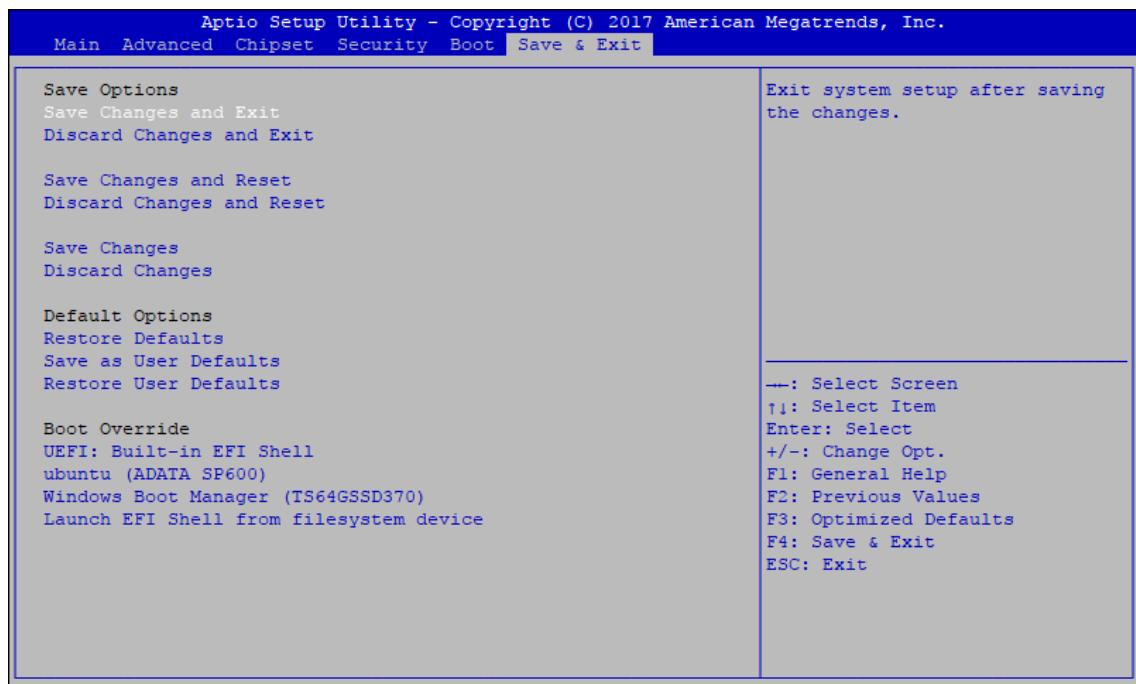Sets the order of the Legacy devices in this group.

4.7 Save & Exit

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

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

   Save Changes and Reset
   Discard Changes and Reset

   Save Changes
   Discard Changes

   Default Options
   Restore Defaults
   Save as User Defaults                                 ──────────────────────────────
   Restore User Defaults                                 →←: Select Screen
                                                         ↑↓: Select Item
   Boot Override                                         Enter: Select
   UEFI: Built-in EFI Shell                              +/-: Change Opt.
   ubuntu (ADATA SP600)                                  F1: General Help
   Windows Boot Manager (TS64GSSD370)                    F2: Previous Values
   Launch EFI Shell from filesystem device              F3: Optimized Defaults
                                                         F4: Save & Exit
                                                         ESC: Exit
```

Figure 4-7 : BIOS Save and Exit Menu

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

Discard Changes and Exit
Exit system setup without saving any changes.

Save Changes and Reset
Reset the system after saving the changes.

Discard Changes and Reset
Reset system setup without saving any changes.

Save Changes
Save Changes done so far to any of the setup options.

Discard Changes
Discard Changes done so far to any of the setup options.
Default Options

Restore Defaults
Restore/Load Default values for all the setup options.

Save as User Defaults
Save the changes done so far as User Defaults.

Restore User Defaults
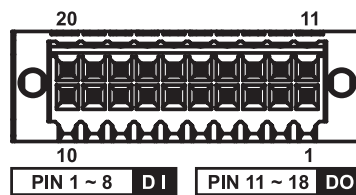Restore the User Defaults to all the setup options.

A

APPENDIX A : Isolated Guide

A.1 Function Description

The IVH-9200 offers two 16-bit Isolated DIO 20-pin terminal block connector and a watchdog timer, and a 4-port PoE.

Isolated DIO pins are fixed by Hardware design that cannot change in/out direction in runtime process.

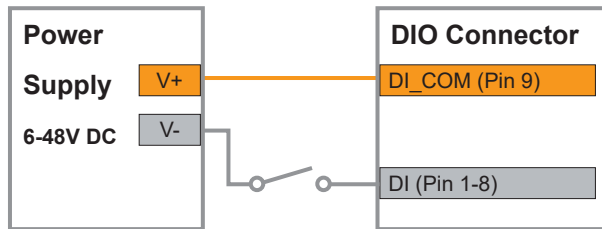DIO definition is shown below :

Pin No.	Isolated DIO Definition	Non-Isolated DIO Definition	Pin No.	Isolated DIO Definition	Non-Isolated DIO Definition
1	DI 0	DIO 0	11	DO 0	DIO 8
2	DI 1	DIO 1	12	DO 1	DIO 9
3	DI 2	DIO 2	13	DO 2	DIO 10
4	DI 3	DIO 3	14	DO 3	DIO 11
5	DI 4	DIO 4	15	DO 4	DIO 12
6	DI 5	DIO 5	16	DO 5	DIO 13
7	DI 6	DIO 6	17	DO 6	DIO 14
8	DI 7	DIO 7	18	DO 7	DIO 15
9	DI COM	NC	19	DIO_GND	DIO_GND
10	DIO_GND	DIO_GND	20	External VDC	NC

A.2 Isolated DIO Signal Circuit
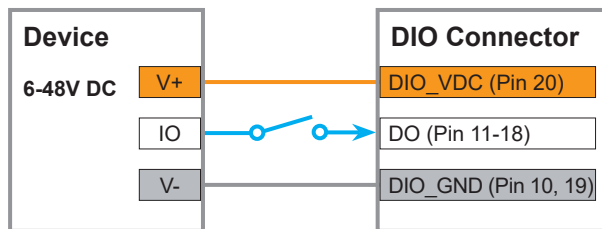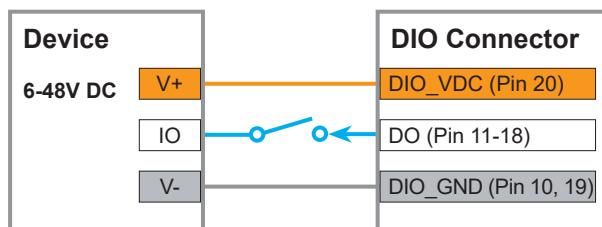
DI reference circuit :

Sink Mode
(NPN)

Power Supply 6-48V DC		DIO Connector	
	V+	DI_COM (Pin 9)	
	V-	DI (Pin 1-8)	

Source Mode
(PNP)

Power Supply 6-48V DC		DIO Connector	
	V+	DI_COM (Pin 9)	
	V-	DI (Pin 1-8)	

DO reference circuit :

Sink Mode
(NPN, Default)

Device 6-48V DC		DIO Connector	
	V+	DIO_VDC (Pin 20)	
	IO	DO (Pin 11-18)	
	V-	DIO_GND (Pin 10, 19)	

Source Mode
(PNP)

Device 6-48V DC		DIO Connector	
	V+	DIO_VDC (Pin 20)	
	IO	DO (Pin 11-18)	
	V-	DIO_GND (Pin 10, 19)	
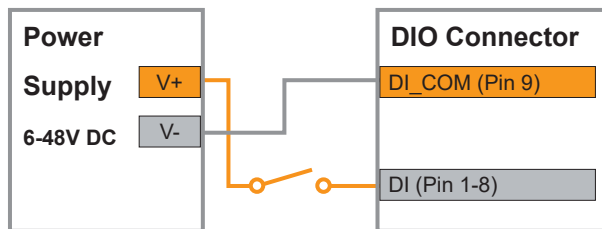
A.3 Software Package Contain

Distribution folder include x32 and x64 versions, use batch file for installation.
  There are included as followed :
    Win7_32.bat :
      Installation for 32-bit driver
    Win7_64.bat :
      Windows update package which driver required
      (need to restart), and Installation for 64-bit driver
    Win8_32.bat, Win8_64.bat :
      Installation for driver, and guideline to Framework 3.5
      distribution for sample
    Win10_32.bat, and Win10_64.bat :
      Installation for driver, and installation to Framework 3.5
      distribution for sample
    Uninstall_32.bat, and Uninstall_64.bat :
      Uninstallation for driver
  Run batch file as Administrator.
  Support Windows 7 above.
  Make sure it is Windows version before installation.
Runtime folder includes head file for software developer or System Integration.
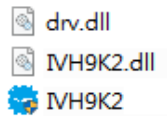Sample folder includes sample program, driver library, and API library. Source
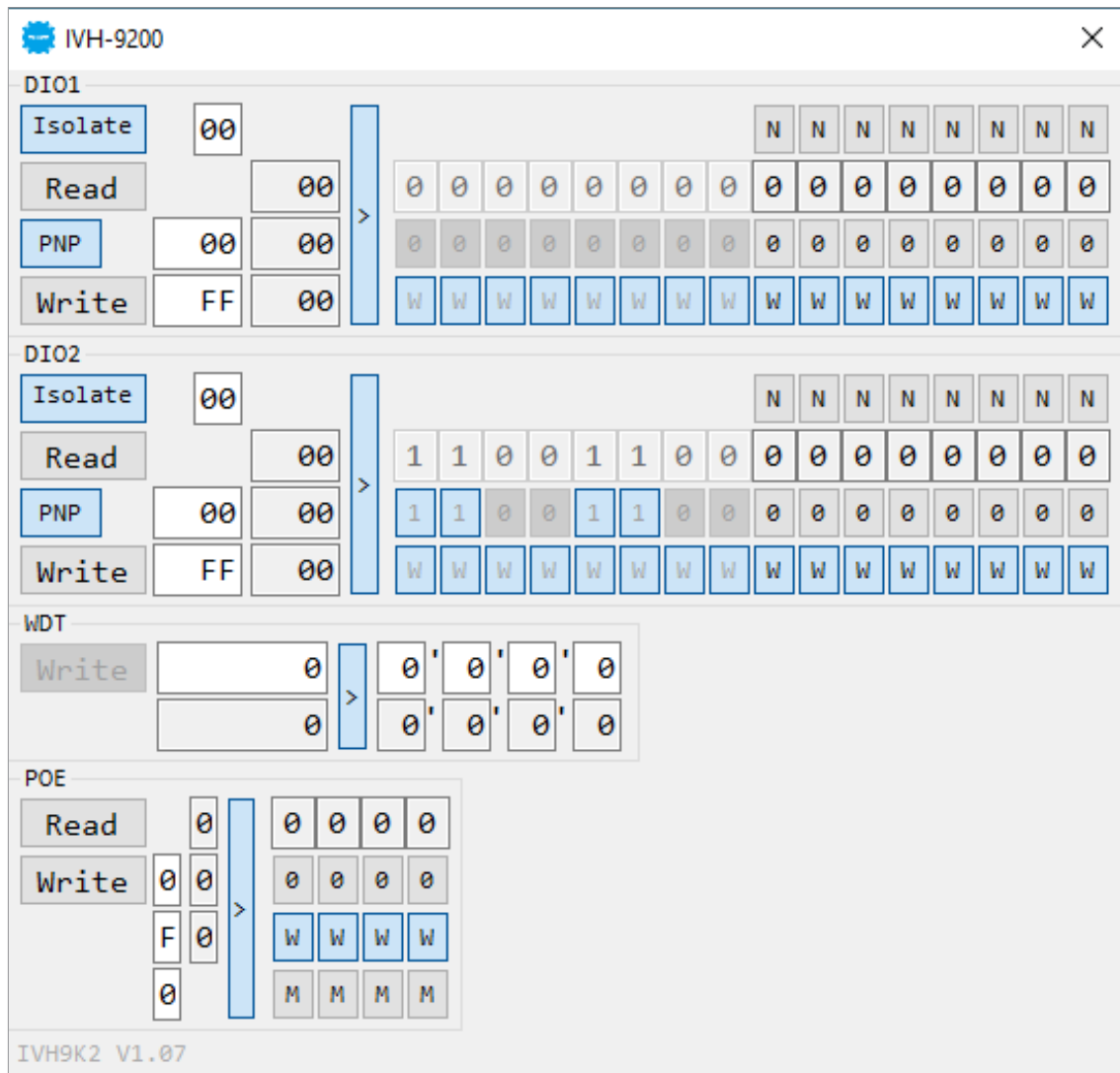folder includes sample program source code that compile on Visual Studio 2008.

📁 Distribution
📁 Runtime
📁 Sample
📁 Source
🔧 Uninstall_32
🔧 Uninstall_64
🔧 Win7_32
🔧 Win7_64
🔧 Win8_32
🔧 Win8_64
🔧 Win10_32
🔧 Win10_64
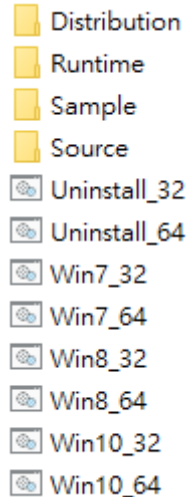
A.4 Sample

Sample folder includes x32 and x64 versions, as shown below :

- drv.dll
- IVH9K2.dll
- IVH9K2

Sample IVH9K2.exe, as shown below :

DIO1/DIO2 group :

Isolate check button :
    DIO type of DIO configuration, isolated/non-isolated.
Read button :
    Set DIO configuration to get DI/DIO input state.
DO type check button :
    User setting, DO type of DIO configuration to setup 8 pins - Source/Sink.
    Use for Write (DO) button activation.
Write button :
    Set DIO configuration to set DO/DIO output state.
DI preference text :
    User setting, DI type of DIO configuration by hexadecimal bitmask - Source/Sink.
    Use for Read (DI) button activation.
DO/DIO output text :
    User setting, DO/DIO output state by hexadecimal bitmask - on/off.
    Use for Write button activation.
DO/DIO writable text :
    User setting, DO/DIO writable of DIO configuration by hexadecimal bitmask - yes/no.
    Use for Read (DIO)/Write button activation.
DI/DIO input text (read only) :
    DI/DIO input state by hexadecimal bitmask - on/off.
    Use for Read button activation.
DO/DIO text (read only) :
    DO/DIO output state with input state (DIO) and configuration.
    Use for Write button activation.
DO/DIO output text (read only) :
    DO/DIO output state with configuration.
    Use for Write button activation.
DI type pin check button (pin 8 ~ pin 1) :
    User setting, DI pin type of DIO configuration - Source/Sink.
DI/DIO input pin texts (read only, pin 8 ~ pin 1/pin 18 ~ pin 11, pin 8 ~ pin 1) :
    DI/DIO input pin state
    Use for Read button activation.
DO/DIO output pin check button (pin 18 ~ pin 11/pin 18 ~ pin 11, pin 8 ~ pin 1) :
    User setting, DO/DIO output pin state
    Use for Write button activation.
DO/DIO pin writable check button (pin 18 ~ pin 11/pin 18 ~ pin 11, pin 8 ~ pin 1) :
    User setting, DO/DIO pin writable of DIO configuration.
    Use for Read (DIO)/Write button activation.

WDT group :

Write button :
  Set WDT when WDT setup text is valid.
Stop button :
  Cancel WDT and counting.
  Use after Write button action.
WDT setup text :
  User setting, WDT value, unit : second.
  Use for Write button activation.
WDT counting text (read only) :
  WDT counting by program timer after set WDT.
  Shown after Write button action.
WDT setup day format texts (user setting) :
  User setting, WDT value, format : day'hour'minute'second.
WDT counting day format text (read only) :
  WDT counting, format : day'hour'minute'second.

POE group :

Read button :
  Set POE configuration to get POE state.
Write button :
  Set POE configuration to set POE state.
POE output text :
  User setting, POE output state by hexadecimal bitmask - on/off.
  Use for Write button activation.
POE writable text :
  User setting, POE writable of POE configuration by hexadecimal bitmask - yes/no.
  Use for Write button activation.
POE mode text :
  User setting, POE mode of POE configuration by hexadecimal bitmask - Auto/Manual.
  Use for Write button activation.
POE input text (read only) :
  POE input state by hexadecimal bitmask - on/off.
  Use for Read button activation.
POE text (read only) :
  POE output state with input state and configuration.
  Use for Write button activation.
POE output text (read only) :
  POE output state with configuration.
  Use for Write button activation.
POE input port texts (read only, port 4 ~ port 1) :
  POE input port state
  Use for Read button activation.

POE output port check button (port 4 ~ port 1) :
   User setting, POE output port state
   Use for Write button activation.
POE port writable check button (port 4 ~ port 1) :
   User setting, POE port writable of POE configuration.
   Use for Write button activation.
POE port mode check button (port 4 ~ port 1) :
   User setting, POE port mode of POE configuration.
   Use for Write button activation.

B

APPENDIX B : Software Functions

B.1 Driver API Guide

In Runtime folder, on IVH9K2.h :

_DLL_IMPORT_ definition is used on LoadLibrary API for IVH9K2.dll.
IVH9K2_EXPORTS definition is used on IVH9K2.dll building.

BOOL Initial(BYTE Isolate_Type, BYTE DIO_NPN)
Initial machine for DIO, watchdog timer, and POE
Isolate_Type : DIO type
1 : Isolated DIO;
0 : Non-Isolated DIO
DIO_NPN : DI/DO type
1 : PNP (Source) mode for European rule;
0 : NPN (Sink) mode for Japanese rule
Return :
TRUE (1): Success;
FALSE (0): Fail (Driver not exists, or initial error (version is too old, or machine not match))

BOOL GetDIO1Config(BYTE *Isolate_Type, BYTE *DI_NPN, BYTE *DO_NPN, WORD *Mask)
BOOL GetDIO2Config(BYTE *Isolate_Type, BYTE *DI_NPN, BYTE *DO_NPN, WORD *Mask)
Get DIO configuration (by variable)
Isolate_Type : DIO type
1 : Isolated DIO;
0 : Non-Isolated DIO
DI_NPN ([7:0]) : DI type, pin setting by hexadecimal bitmask
1 : PNP (Source) mode for European rule;
0 : NPN (Sink) mode for Japanese rule
DO_NPN : DO type
1 : PNP (Source) mode for European rule;
0 : NPN (Sink) mode for Japanese rule
Mask ([15:0]) : In/Out, pin setting by hexadecimal bitmask
1 : Output;
0 : Input
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetDIO1Config(BYTE Isolate_Type, BYTE DI_NPN, BYTE DO_NPN, WORD Mask)
BOOL SetDIO2Config(BYTE Isolate_Type, BYTE DI_NPN, BYTE DO_NPN, WORD Mask)
   Set DIO configuration
     Isolate_Type : DIO type
       1 : Isolated DIO;
       0 : Non-Isolated DIO
     DI_NPN ([7:0]): DI type, pin setting by hexadecimal bitmask
       1 : PNP (Source) mode for European rule;
       0 : NPN (Sink) mode for Japanese rule
     DO_NPN : DO type
       1 : PNP (Source) mode for European rule;
       0 : NPN (Sink) mode for Japanese rule
     Mask ([15:0]): In/Out, pin setting by hexadecimal bitmask
       1 : Output;
       0 : Input
   Return :
     TRUE (1) : Success;
     FALSE (0) : Fail (Initial error, or hardware problem)

BOOL GetDI1(BYTE *DI)
BOOL GetDI2(BYTE *DI)
   Get isolated DIO input (DI)
     DI ([7:0]) : Input state, pin setting by hexadecimal bitmask
       1 : High;
       0 : Low
     Return :
       TRUE (1) : Success;
       FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL GetDO1(BYTE *DO)
BOOL GetDO2(BYTE *DO)
   Get isolated DIO output (DO)
     DO ([7:0]): Output state, pin setting by hexadecimal bitmask
       1 : High;
       0 : Low
   Return :
     TRUE (1) : Success;
     FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetDO1(BYTE DO)
BOOL SetDO2(BYTE DO)
 Set isolated DIO output (DO)
  DO ([7:0]) : Output state, pin setting by hexadecimal bitmask
   1 : High;
   0 : Low
 Return :
  TRUE (1) : Success;
  FALSE (0) : Fail (Initial error, or hardware problem)

BOOL GetDIO1(WORD *DI)
BOOL GetDIO2(WORD *DI)
 Get non-isolated DIO input (DIO input)
  DI ([15:0]): Input state, pin setting by hexadecimal bitmask
   1 : High;
   0 : Low
 Return :
  TRUE (1) : Success;
  FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetDIO1(WORD DO)
BOOL SetDIO2(WORD DO)
 Set non-isolated DIO output (DIO output)
  DO ([15:0]): output state, pin setting by hexadecimal bitmask
   1 : High;
   0 : Low
 Return :
  TRUE (1) : Success;
  FALSE (0) : Fail (Initial error, or hardware problem)

BOOL GetWDT(DWORD *WDT)
 Get watchdog timer setup
  WDT : watchdog timer setup
   Unit : second. (Range : 0 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec))
 Return :
  TRUE (1): Success;
  FALSE (0): Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetWDT(DWORD WDT)
 Set watchdog timer setup
  WDT : watchdog timer setup
   Unit : second. (Range : 1 ~ 65535 sec, 1093 ~ 65535 min (=65580 ~ 3932100 sec))
 Return :
  TRUE (1) : Success;
  FALSE (0) : Fail (Initial error, or setup 0 error, or hardware problem)

BOOL CancelWDT()
Cancel watchdog timer
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or hardware problem)

BOOL GetPOEConfig(BYTE *Auto, BYTE *Mask)
Get POE configuration (by variable)
Auto ([3:0]) : Auto mode, pin setting by hexadecimal bitmask
1 : Auto;
0 : Manual
Mask ([3:0]) : DC Enable/Disable, pin setting by hexadecimal bitmask
1 : Enable;
0 : Disable
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetPOEConfig(BYTE Auto, BYTE Mask)
Set POE configuration
Auto ([3:0]) : Auto mode, pin setting by hexadecimal bitmask
1 : Auto;
0 : Manual
Mask ([3:0]) : DC Enable/Disable, pin setting by hexadecimal bitmask
1 : Enable; 0 : Disable
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or out of range error, or hardware problem)

BOOL GetPOE(BYTE *POE)
Get POE input
POE ([3:0]) : POE state, pin setting by hexadecimal bitmask
1 : On;
0 : Off
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetPOE(BYTE POE)
Set POE output
POE ([3:0]) : POE state, pin setting by hexadecimal bitmask
1 : On;
0 : Off
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or out of range error, or hardware problem)

C

APPENDIX C : RAID Functions

C.1 SATA Mode for RAID

Please select SATA Device to RAID mode on BIOS menu.

Advanced → SATA Configuration → SATA Mode Selection

Main	Advanced	Chipset	Boot	Security	Save & Exit
					Item Specific Help
SATA Controller(s)		[Enabled]			
SATA Model Selection		[AHCI]			

C.2 OS Installation

IVH-9200 is featured with six SATA, include two internal

SATA, three mSATA and one CFast.

You can select one of SATA ports for OS installation

We used CFast card for Windows 10 OS installation as an example.

C.3 To Install All Device Drivers of the System

The instructions are as follows :

1. To install Chipset driver

2. To install VGA driver

3. To install ME driver (if available)

4. To install Network driver

5. To install Audio driver

C.4 To Install "Intel Rapid Storage Technology" Software

You can get the software on IVH-9200 driver CD.

Also, you can find latest information and software directly from Intel website.

http://www.intel.com/p/en_US/support/highlights/chpsts/imsm

The RAID environment has been done if you completed the steps above.

C.5 To Insert SATA HDD for RAID 1

Please notice, you can use six SATA ports for SATA HDD, except for the CFast port and mSATA slot.
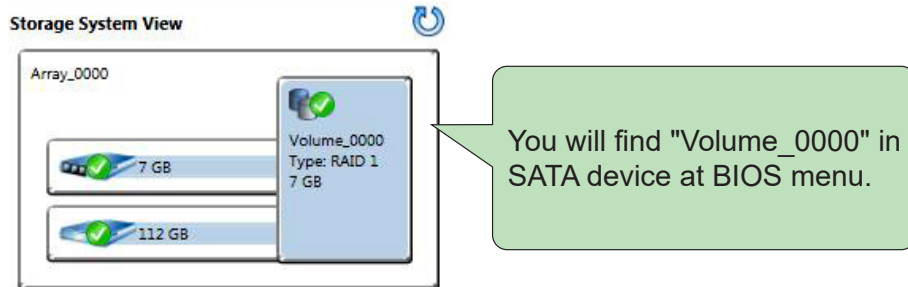
C.6 To Create RAID Volume on "Rapid Storage Technology" Software

IVH-9200 is featured with four SATA HDDs for RAID volume, so there are three options to choose from on this page. Let's take RAID 1 as example, please select "RAID 1".
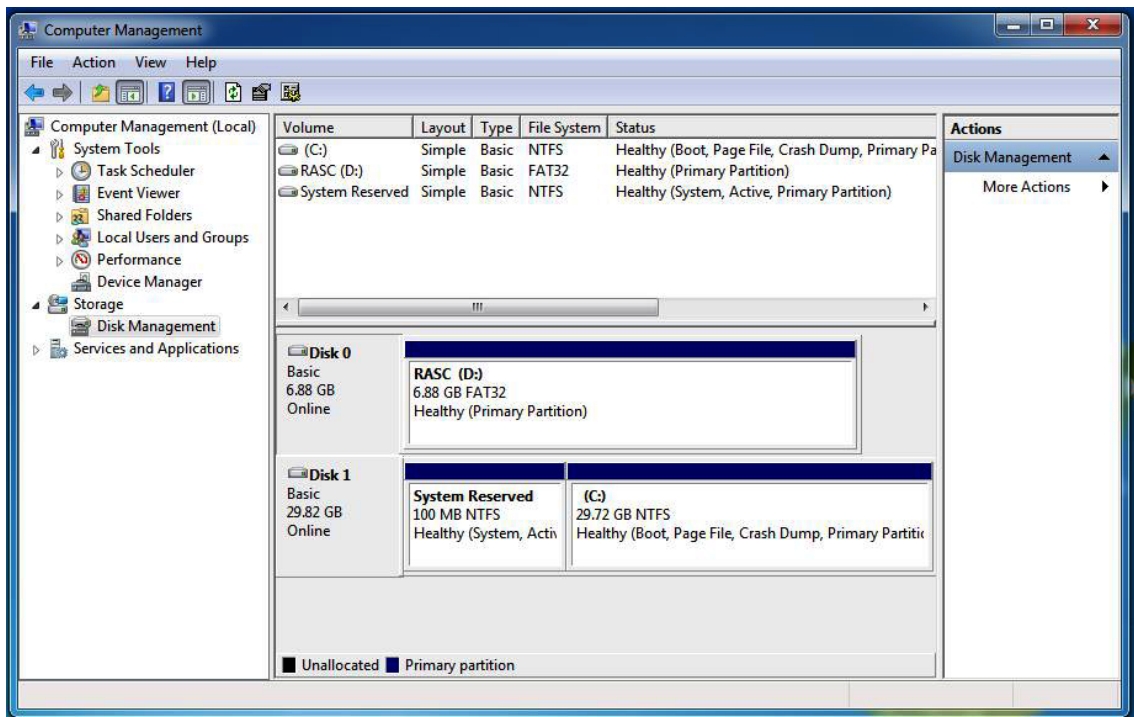
C.7 Disk Management : Partition the Disk

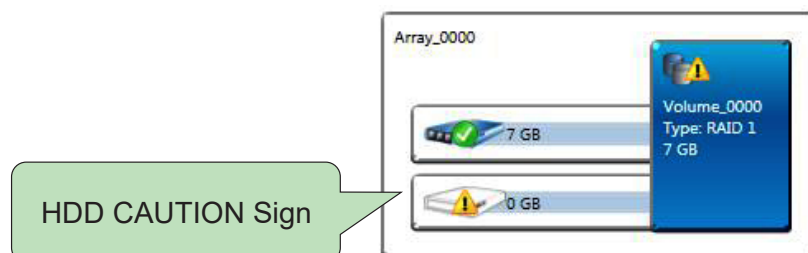After RAID 1 volume created, you can see the figure of SATA device allocation.

To start Disk Management tool, select "initialize disk."

Then add "Logical Device" for Windows access.
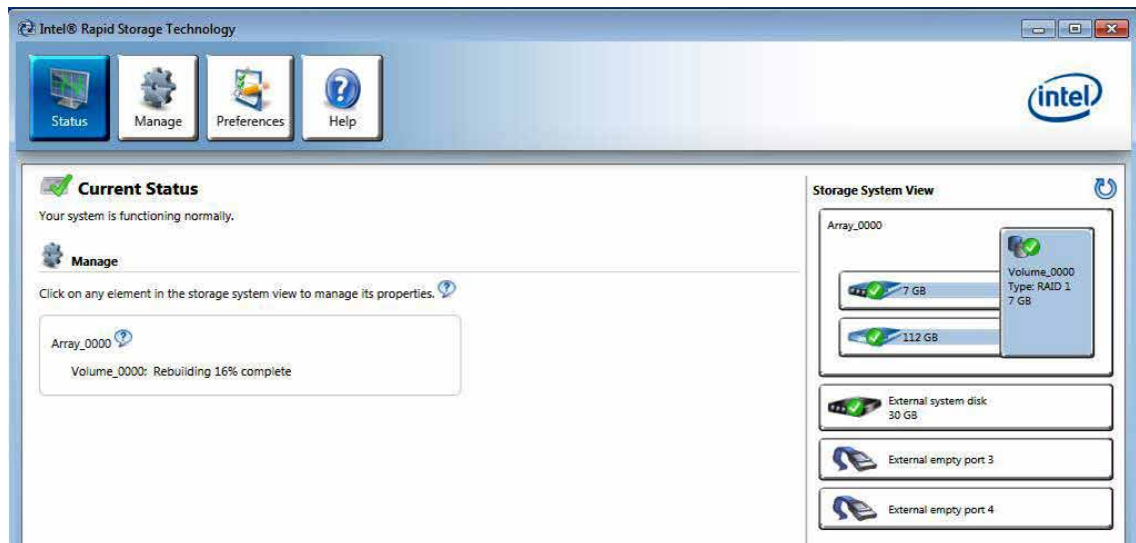

C.8 If One SATA HDD on RAID Volume is Out-of-use

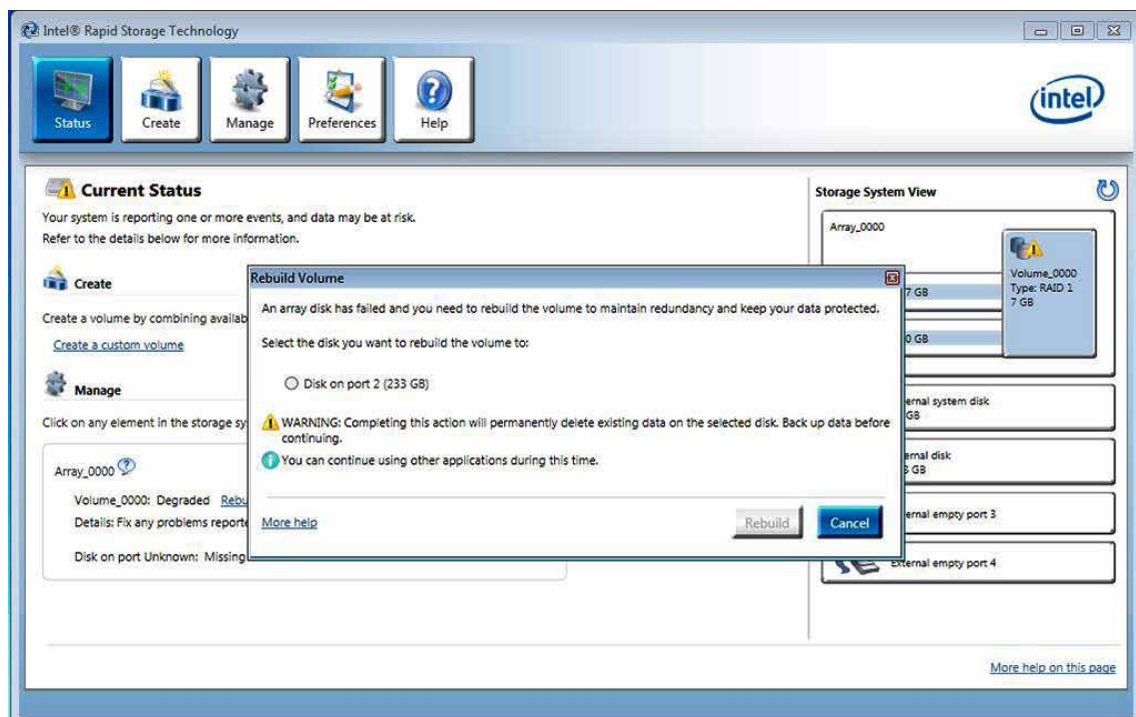After RAID 1 volume is created, you can see the figure of SATA device allocation.

C.9 Original HDD Recovery

C.10 New HDD Recovery

There is a warning that will pop up to ask you if the disk is not a member of original RAID volume.

If you press "Rebuild", it will replace the broken SATA HDD to the last one SATA HDD of RAID volume.

D

APPENDIX D : Power Consumption

Testing Board	IVH-9200
RAM	16GB * 2
USB-1	USB Keyboard Logitech K120
USB-2	USB Mouse Microsoft 1113
USB-3	USB Flash Transcend 3.0 8GB
USB-4	USB Flash Transcend 3.0 8GB
CFAST	Innodisk CFast 3ME3 64GB
SATA 0	Transcend SSD370 64GB
SATA 1	TOSHIBA SSD THNS064GE4BBDC 64GB
LAN 1 (i219)	1.0 Gbps
LAN 2 (i210)	1.0 Gbps
LAN 3 (i210)	1.0 Gbps
LAN 4 (i210)	1.0 Gbps
LAN 5 (i210)	1.0 Gbps
LAN 6 (i210)	1.0 Gbps
Graphics output	DVI
Power plan	Balance (Windows10 Power Plan)
Power Source	Chroma 62006P-100-25

D.1 Intel® Core™ i7-6700@3.40GHz (8M Cache, up to 4.0GHz)

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Sleep Mode		Idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i7-6700	06V	0.936A	05.62W	3.613A	21.68W
Core™ i7-6700	09V	0.612A	05.51W	2.458A	22.12W
Core™ i7-6700	12V	0.448A	05.38W	1.887A	22.64W
Core™ i7-6700	24V	0.307A	07.37W	1.006A	24.14W
Core™ i7-6700	36V	0.272A	09.79W	0.722A	25.99W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage without 3D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i7-6700	06V	10.240A	61.44W	12.649A	75.89W
Core™ i7-6700	09V	6.663A	59.97W	8.164A	73.48W
Core™ i7-6700	12V	4.898A	58.78W	6.079A	72.95W
Core™ i7-6700	24V	2.523A	60.55W	3.084A	74.02W
Core™ i7-6700	36V	1.744A	62.78W	2.149A	77.36W

D.2 Intel® Core™ i5-6500TE@2.30GHz (6M Cache, up to 3.30GHz)

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Sleep Mode		Idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i5-6500TE	06V	0.928A	05.57W	3.464A	20.78W
Core™ i5-6500TE	09V	0.598A	05.38W	2.286A	20.57W
Core™ i5-6500TE	12V	0.443A	05.32W	1.774A	21.29W
Core™ i5-6500TE	24V	0.298A	07.15W	0.962A	23.09W
Core™ i5-6500TE	36V	0.260A	09.36W	0.688A	24.77W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage without 3D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i5-6500TE	06V	5.687A	34.12W	8.032A	48.19W
Core™ i5-6500TE	09V	3.723A	33.51W	5.326A	47.93W
Core™ i5-6500TE	12V	2.823A	33.88W	3.887A	46.64W
Core™ i5-6500TE	24V	1.489A	35.74W	1.994A	47.86W
Core™ i5-6500TE	36V	1.042A	37.53W	1.408A	50.69W

D.3 Intel® Core™ i3-6100@3.70GHz (3M Cache, 3.70GHz)

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Sleep Mode		Idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i3-6100	06V	0.933A	05.60W	3.523A	21.14W
Core™ i3-6100	09V	0.602A	05.42W	2.293A	20.64W
Core™ i3-6100	12V	0.443A	05.32W	1.792A	21.50W
Core™ i3-6100	24V	0.302A	07.25W	0.997A	23.93W
Core™ i3-6100	36V	0.269A	09.69W	0.702A	25.27W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage without 3D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i3-6100	06V	7.032A	42.19W	8.823A	52.94W
Core™ i3-6100	09V	4.787A	43.08W	5.786A	52.07W
Core™ i3-6100	12V	3.586A	43.03W	4.321A	51.85W
Core™ i3-6100	24V	1.852A	44.45W	2.362A	56.69W
Core™ i3-6100	36V	1.286A	46.30W	1.592A	57.31W

E

APPENDIX E : Supported Memory & Storage List

E.1 Supported Memory List

Testing Board	IVH-9200
Memory Test	version : 5.1
Burn-in Test	V8.1

E.2 Tset Item

Channel	Memtest	Bunin	Flash BIOS	Remove Battery
*2	PASS	PASS	PASS	PASS
*1 (Socket 1)	PASS	PASS	N/A	PASS
*1 (Socket 2)	PASS	PASS	N/A	PASS

E.3 NON-ECC

Brand	Info	NOTE & S\N	Test Temp.(Celsius)
Kingston 16GB 2Rx8 2Gx64-Bit PC4-2133	KVR21S15D8/16	BKMM1641607	25ºC
		BKMM1661618	25ºC
Memxpro 4GB DDR4-2133-15 Wild Temp.	D4S4GHIOFEI	01611170040001	25ºC
		01611170040002	25ºC
Memxpro 8GB DDR4-2133-15 Wild Temp.	D4S8GHIOFFI	01611150020001	25ºC
		01611150020002	25ºC
Memxpro 8GB DDR4-2400-17- Wild Temp.	D4S8GHLPGEI	01611170030001	25ºC
		01611170030002	25ºC
Memxpro 16GB DDR4-2400-17 Wild Temp.	D4SAGHLPGFI	01611150030001	85 ºC
		01611150030002	85 ºC
Memxpro 16GB DDR4-2400-17	D4SAGHLPGFC	01611150030003	25ºC
		01611150030004	25ºC
Memxpro 8GB DDR4-2400-17	D4S8GHLPGEC	01611170030003	25ºC
		01611170030004	25ºC
Memxpro 8GB DDR4-2133-15	D4S8GHIOFFC	0161115002003	25ºC
		0161115002004	25ºC
Memxpro 4GB DDR4-2133-15	D4S4GHIOFEC	01611170040003	25ºC
		01611170040004	25ºC
Apacer 8GB DDR4-2400 Wild Temp.	75.CA4GJ.G010B	201646411081	25ºC
Apacer 16GB DDR4-2400 Wild Temp.	75.DA4GJ.G010B	201646411074	25ºC

E.4 ECC

Brand	Info	NOTE & S\N	Test Temp. (Celsius)
Transcend 8GB ECC Wild Temp.	8G 2Rx8 DDR4 2133 ECCSO	TS9CAMESE0000	25 ºC
		C96644-0001	85 ºC
		C96644-0002	85 ºC

E.5 Supported Storage Device List

Type	Brand	Model	Capacity
mSATA	Intel	Intel-310 SSDMAEMC080G2	80GB
	Silicon Power	SP128GIMSA301SW0	128GB
SATA SSD	Transcend	SSD370 TS64GSSD370	64GB
	Memxpro	SSD M3A MI3MA1212802WN	128GB
		SSD M3A MI3MA1225604WN	256GB
		SSD M3A MI3MA1251208WN	512GB
	innodisk	3MR3-P DRS25-64GD70BCAQC	64GB
	Silicon Power	SP128GISSD301RW0	128GB
		SP32GISSD301SV0	32GB
SATA HDD	TOSHIBA	MK5055GSX	500GB
M.2 SATA SSD	Memxpro	M3B MD3MB1164GS1WN	64GB
		M3B MD3MB1164GS1SN	64GB
		M3B MD3MB11128D2WN	128GB
		M3B MD3MB1112 8D2SN	128GB
		M3B MP3MB12256S4WN	256GB
		M3B MP3MB12256S4SN	256GB
M.2 PCIe	Memxpro	ME4ME01128D4SN-M0	128GB
		ME4AE02128D4SNR	128GB
CFast	Transcend	CFX600	32GB
	Silicon Power	SP128GICFX311NV0	128GB

** If more help is needed, please contact Vecow Technical Support.

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For further support information, please visit www.vecow.com