ECS-4700 USER Manual

Intel® Core™ i7/i5 SoC U-series Processor, Rugged Compact Embedded System
IEEE 802.3at PoE+, High Performance, Rugged, -25°C to 75°C

Vecow

1.1.0 Edition 20240719

Record of Revision

Version	Date	Page	Description	Remark
1.0.0	2024/04/01	All	Official Release	
1.1.0	2024/07/19	All	Update	

Disclaimer

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Declaration of Conformity

FCC

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if 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 complies 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
ECS-4700-PoER365UE	ECS-4700, Intel® Core™ i7-1365UE Processor, 2 2.5G LAN, 4 GigE LAN w/ Isolated PoE+, 2 SSD Tray, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 Isolated DIO
ECS-4700-PoER345UE	ECS-4700, Intel® Core™ i5-1345UE Processor, 2 2.5G LAN, 4 GigE LAN w/ Isolated PoE+, 2 SSD Tray, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 Isolated DIO
ECS-4700-PoE365UE	ECS-4700, Intel® Core™ i7-1365UE Processor, 2 2.5G LAN, 4 GigE LAN w/ Isolated PoE+, 2 internal SSD, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 Isolated DIO
ECS-4700-PoE345UE	ECS-4700, Intel® Core™ i5-1345UE Processor, 2 2.5G LAN, 4 GigE LAN w/ Isolated PoE+, 2 internal SSD, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 Isolated DIO
ECS-4700-2G365UE	ECS-4700, Intel® Core™ i7-1365UE Processor, 2 2.5G LAN, 2 internal SSD, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 GPIO
ECS-4700-2G345UE	ECS-4700, Intel® Core™ i5-1345UE Processor, 2 2.5G LAN, 2 internal SSD, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 GPIO
ECS-4700F-PoER370PE	ECS-4700F, Intel® Core™ i7-1370PE Processor, 2 2.5G LAN, 4 GigE LAN w/ Isolated PoE+, 2 SSD Tray, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 Isolated DIO
ECS-4700F-PoE370PE	ECS-4700F, Intel® Core™ i7-1370PE Processor, 2 2.5G LAN, 4 GigE LAN w/ Isolated PoE+, 2 internal SSD, 2 USB 3.2 Gen 2 Type-A, 1 USB 3.1 Gen 2x2 Type-C, 2 USB 2.0, 4 COM, 2 DP, 1 HDMI, 16 Isolated DIO

Order Accessories

Part Number	Description
DDR5 48G	Certified DDR5 48GB 5600MHz RAM
DDR5 32G	Certified DDR5 32GB 4800/5600MHz RAM
DDR5 24G	Certified DDR5 24GB 5600MHz RAM
DDR5 16G	Certified DDR5 16GB 4800/5600MHz RAM
DDR5 8G	Certified DDR5 8GB 4800/5600MHz RAM
PWA-180W	180W, 24V, 90V AC to 264V AC Power Adapter with 3-pin Terminal Block (*Recommended when enable turbo mode)
PWA-120W1	120W, 24V, 90V AC to 264V AC Power Adapter with 3-pin Terminal Block
VESA Mount	VESA Mounting Kit
DIN-RAIL	DIN Rail Kit
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-SCSI-20P	Terminal Board with One 20-pin SCSI Connector and DIN-Rail Mounting
5G Module	5G Module with Antenna
4G Module	4G/GPS Module with Antenna
WiFi & Bluetooth Module	WiFi & Bluetooth Module with Antenna

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1

GENERAL INTRODUCTION

1.1 Overview

Vecow ECS-4700 is an innovative and robust compact system. Built on 13th Gen Intel® Core™ i7/i5 processor, the EN60945 ECS-4700 delivers exceptional performance meticulously designed for rugged environments with space-constrained applications such as Marine, Machine Vision, Mobile NVR and other Edge AI applications.

The ECS-4700 is equipped with a variety of industrial I/O interfaces, including 2 2.5G LAN, 4 USB with 2 USB 3.2 Gen 2, 1 USB 3.2 Gen 2x2 Type-C, 4 PoE+ LAN, and 4 COM RS 232/422/485 ports. Measuring a mere 256.8x141x48.1mm, the ECS-4700 is a compact design while supporting a comprehensive system implementation including PoE+, 2.5” SSD internal bracket or 2 front-access 2.5” SSD Tray and M.2 for storage. Furthermore, it offers flexible expansions with 1 M.2 key B and M.2 Key E.

With Vecow’s industrial-grade thermal design, the fanless ECS-4700 offers a wide temperature range from -25°C to 75°C and supports 9V to 50V power input. Compliant with EN60945 standards and redundant power input, the ECS-4700 delivers trusted and reliable operation even in the most demanding conditions.

1.2 Features

- Low-power 13th Gen Intel® Core™ i7/i5 U-series Processor (Raptor Lake-P), 15W TDP CPU
- Marine-grade Designs, EN60945 EMC compliant
- Supports Intel® vPro, TSN, TCC, and TPM 2.0
- 2 2.5G LAN, 4 PoE+ LAN, Isolated PoE Protection
- 2 USB 3.2 Gen 2, 1 USB 3.2 Gen 2x2 Type-C supports up to 20Gbps data transfer
- Compact Design, fanless -25°C to 75°C Operating Temperature
- DC 9V to 50V Redundant Power Input, Software Ignition Power Control
- Fully supports Intel OpenVINO toolkit for AI Computing
- Supports 5G/WiFi/4G/LTE/GPRS/UMTS Wireless Communication

1.3 Product Specification

1.3.1 Specifications of ECS-4700-PoER

System	
Processor	Intel® Core™ i7-1365UE/i5-1345UE Processor (Raptor lake-P)
Chipset	Intel® SoC
GPU	Intel® Iris Xe
BIOS	AMI
SIO	IT8786E
Memory	• DDR5 5200MHz • UP to 96GB • 2 262-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485
USB	• 2 USB 3.2 Gen2 Type-A • 1 USB 3.2 Gen 2x2 Type-C, support DP 1.4a • 2 USB 2.0 Type-A
Display	• 2 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz • 1 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz by USB Type-C • 1 HDMI 2.0 : Up to 3840 x 2160 @ 60Hz
Isolated DIO	16 Isolated DIO (8 DI, 8 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	1 SIM Card Socket (External)

Expansion	
M.2	• 1 M.2 Key B Socket (2280/3052, PCIe x2/USB 3 Default) with Internal SIM • 1 M.2 Key E Socket (2230, PCIe x1)
Storage	
SATA	2 Front-access 2.5” SSD/HDD Tray, SATA III (6Gbps) support S/W RAID 0, 1
M.2	1 M.2 Key M Socket (2280, PCIe4.0 x4)
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I226 2.5G LAN supports TSN
LAN 2	Intel® I226 2.5G LAN supports TSN
PoE	
LAN 3	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
Remind : PoE power budget supports up to 25.5W/each, total 35W.	
Power	
Power Input 1	DC 9V to 50V, Redundant Power Input
Power Input 2	DC 9V to 50V, Redundant Power Input
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode Software Ignition Control
Remote Switch	3-pin Terminal Block : On, Off, IGN
Others	
TPM	Infineon SLB9672 supports TPM 2.0, SPI interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 11, Windows 10, Linux

Mechanical	
Dimensions (WxDxH)	256.8mm x 141mm x 48.1mm (10.1" x 5.6" x 1.9")
Weight	2.1 kg (4.6 lb)
Mounting	• Wallmount by mounting bracket • VESA Mount (Optional) • DIN Rail Mount (Optional)
Environment	
Operating Temperature	-25°C to 75°C (-13°F to 149°F) with air flow
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 75°C
Shock	• IEC 60068-2-27 • SSD : 50G @ Wallmount, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • SSD : 5Grms, 5Hz to 500Hz, 3 Axis
EMC	CE, FCC, EN50155, EN50121-3-2, EN60945

1.3.2 Specifications of ECS-4700-PoE

System	
Processor	Intel® Core™ i7-1365UE/i5-1345UE Processor (Raptor lake-P)
Chipset	Intel® SoC
GPU	Intel® Iris Xe
BIOS	AMI
SIO	IT8786E
Memory	• DDR5 5200MHz • Up to 96GB • 2 262-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485
USB	• 2 USB 3.2 Gen2 Type-A • 1 USB 3.2 Gen 2x2 Type-C, support DP 1.4a • 2 USB 2.0 Type-A
Display	• 2 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz • 1 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz by USB Type-C • 1 HDMI 2.0 : Up to 3840 x 2160 @ 60Hz
Isolated DIO	16 Isolated DIO (8 DI, 8 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	1 SIM Card Socket (External)
Expansion	
M.2	• 1 M.2 Key B Socket (2280/3052, PCIe x2/USB 3 Default) with Internal SIM • 1 M.2 Key E Socket (2230, PCIe x1)
Storage	
SATA	2 2.5” SSD/HDD by internal bracket, SATA III (6Gbps) support S/W RAID 0, 1
M.2	1 M.2 Key M Socket (2280, PCIe4.0 x4)
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I226 2.5G LAN supports TSN
LAN 2	Intel® I226 2.5G LAN supports TSN

PoE	
LAN 3	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
Remind : PoE power budget supports up to 25.5W/each, total 35W.	
Power	
Power Input 1	DC 9V to 50V, Redundant Power Input
Power Input 2	DC 9V to 50V, Redundant Power Input
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode Software Ignition Control
Remote Switch	3-pin Terminal Block : On, Off, IGN
Others	
TPM	Infineon SLB9672 supports TPM 2.0, SPI interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 11, Windows 10, Linux
Mechanical	
Dimensions (WxDxH)	256.8mm x 141mm x 48.1mm (10.1" x 5.6" x 1.9")
Weight	2.1 kg (4.6 lb)
Mounting	• Wallmount by mounting bracket • VESA Mount (Optional) • DIN Rail Mount (Optional)
Environment	
Operating Temperature	-25°C to 75°C (-13°F to 149°F) with air flow
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 75°C
Shock	• IEC 60068-2-27 • SSD : 50G @ Wallmount, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • SSD : 5Grms, 5Hz to 500Hz, 3 Axis
EMC	CE, FCC, EN50155, EN50121-3-2, EN60945

1.3.3 Specifications of ECS-4700-2G

System	
Processor	Intel® Core™ i7-1365UE/i5-1345UE Processor (Raptor lake-P)
Chipset	Intel® SoC
GPU	Intel® Iris Xe
BIOS	AMI
SIO	IT8786E
Memory	• DDR5 5200MHz • Up to 96GB • 2 262-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485
USB	• 2 USB 3.2 Gen2 Type-A • 1 USB 3.2 Gen 2x2 Type-C, support DP 1.4a • 2 USB 2.0 Type-A
Display	• 2 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz • 1 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz by USB Type-C • 1 HDMI 2.0 : Up to 3840 x 2160 @ 60Hz
GPIO	16 GPIO
LED	Power, HDD, Wireless
SIM Card	1 SIM Card Socket (External)
Expansion	
M.2	• 1 M.2 Key B Socket (2280/3052, PCIe x2/USB 3 Default) with Internal SIM • 1 M.2 Key E Socket (2230, PCIe x1)
Storage	
SATA	2 2.5” SSD/HDD by internal bracket, SATA III (6Gbps) support S/W RAID 0, 1
M.2	1 M.2 Key M Socket (2280, PCIe4.0 x4)
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I226 2.5G LAN supports TSN
LAN 2	Intel® I226 2.5G LAN supports TSN

Power	
Power Input 1	DC 9V to 50V, Redundant Power Input
Power Input 2	DC 9V to 50V, Redundant Power Input
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode Software Ignition Control
Remote Switch	3-pin Terminal Block : On, Off, IGN
Others	
TPM	Infineon SLB9672 supports TPM 2.0, SPI interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 11, Windows 10, Linux
Mechanical	
Dimensions (WxDxH)	256.8mm x 141mm x 48.1mm (10.1" x 5.6" x 1.9")
Weight	2.1 kg (4.6 lb)
Mounting	• Wallmount by mounting bracket • VESA Mount (Optional) • DIN Rail Mount (Optional)
Environment	
Operating Temperature	-25°C to 75°C (-13°F to 149°F) with air flow
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 75°C
Shock	• IEC 60068-2-27 • SSD : 50G @ Wallmount, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • SSD : 5Grms, 5Hz to 500Hz, 3 Axis
EMC	CE, FCC, EN50155, EN50121-3-2, EN60945

1.3.4 Specifications of ECS-4700F-PoER

System	
Processor	Intel® Core™ i7-1370PE Processor (Raptor lake-P)
Chipset	Intel® SoC
GPU	Intel® Iris Xe
BIOS	AMI
SIO	IT8786E
Memory	• DDR5 5200MHz • Up to 96GB • 2 262-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485
USB	• 2 USB 3.2 Gen2 Type-A • 1 USB 3.2 Gen 2x2 Type-C, support DP 1.4a • 2 USB 2.0 Type-A
Display	• 2 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz • 1 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz by USB Type-C • 1 HDMI 2.0 : Up to 3840 x 2160 @ 60Hz
Isolated DIO	16 Isolated DIO (8 DI, 8 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	1 SIM Card Socket (External)
Expansion	
M.2	• 1 M.2 Key B Socket (2280/3052, PCIe x2/USB 3 Default) with Internal SIM • 1 M.2 Key E Socket (2230, PCIe x1)
Storage	
SATA	2 Front-access 2.5” SSD/HDD Tray, SATA III (6Gbps) support S/W RAID 0, 1
M.2	1 M.2 Key M Socket (2280, PCIe4.0 x4)
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I226 2.5G LAN supports TSN
LAN 2	Intel® I226 2.5G LAN supports TSN

PoE	
LAN 3	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
Remind : PoE power budget supports up to 25.5W/each, total 35W.	
Power	
Power Input 1	DC 9V to 50V, Redundant Power Input
Power Input 2	DC 9V to 50V, Redundant Power Input
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode Software Ignition Control
Remote Switch	3-pin Terminal Block : On, Off, IGN
Others	
TPM	Infineon SLB9672 supports TPM 2.0, SPI interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 11, Windows 10, Linux
Mechanical	
Dimensions (WxDxH)	256.8mm x 141mm x 54.9mm (10.1" x 5.6" x 2.16")
Weight	2.2 kg (4.8 lb)
Mounting	• Wallmount by mounting bracket • VESA Mount (Optional) • DIN Rail Mount (Optional)
Environment	
Operating Temperature	-25°C to 75°C (-13°F to 149°F) with fan
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 75°C
Shock	• IEC 60068-2-27 • SSD : 50G @ wallmount, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • SSD : 5Grms, 5Hz to 500Hz, 3 Axis
EMC	CE, FCC, EN50155, EN50121-3-2, EN60945

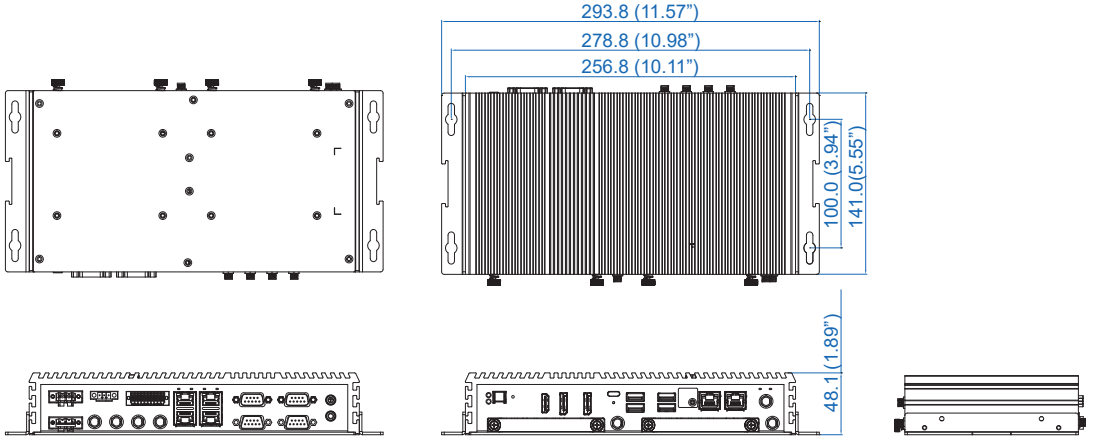
1.3.5 Specifications of ECS-4700F-PoE

System	
Processor	Intel® Core™ i7-1370PE Processor (Raptor lake-P)
Chipset	Intel® SoC
GPU	Intel® Iris Xe
BIOS	AMI
SIO	IT8786E
Memory	• DDR5 5200MHz • Up to 96GB • 2 262-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485
USB	• 2 USB 3.2 Gen2 Type-A • 1 USB 3.2 Gen 2x2 Type-C, support DP 1.4a • 2 USB 2.0 Type-A
Display	• 2 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz • 1 DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz by USB Type-C • 1 HDMI 2.0 : Up to 3840 x 2160 @ 60Hz
Isolated DIO	16 Isolated DIO (8 DI, 8 DO)
LED	Power, HDD, Wireless, PoE
SIM Card	1 SIM Card Socket (External)
Expansion	
M.2	• 1 M.2 Key B Socket (2280/3052, PCIe x2/USB 3 Default) with Internal SIM • 1 M.2 Key E Socket (2230, PCIe x1)
Storage	
SATA	2 2.5” SSD/HDD by internal bracket, SATA III (6Gbps) support S/W RAID 0, 1
M.2	1 M.2 Key M Socket (2280, PCIe4.0 x4)
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I226 2.5G LAN supports TSN
LAN 2	Intel® I226 2.5G LAN supports TSN

PoE	
LAN 3	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/54V) PoE+ by Intel® I350
Remind : PoE power budget supports up to 25.5W/each, total 35W.	
Power	
Power Input 1	DC 9V to 50V, Redundant Power Input
Power Input 2	DC 9V to 50V, Redundant Power Input
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode Software Ignition Control
Remote Switch	3-pin Terminal Block : On, Off, IGN
Others	
TPM	Infineon SLB9672 supports TPM 2.0, SPI interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 11, Windows 10, Linux
Mechanical	
Dimensions (WxDxH)	256.8mm x 141mm x 54.9mm (10.1" x 5.6" x 2.16")
Weight	2.2 kg (4.8 lb)
Mounting	• Wallmount by mounting bracket • VESA Mount (Optional) • DIN Rail Mount (Optional)
Environment	
Operating Temperature	-25°C to 75°C (-13°F to 149°F) with fan
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 75°C
Shock	• IEC 60068-2-27 • SSD : 50G @ wallmount, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • SSD : 5Grms, 5Hz to 500Hz, 3 Axis
EMC	CE, FCC, EN50155, EN50121-3-2, EN60945

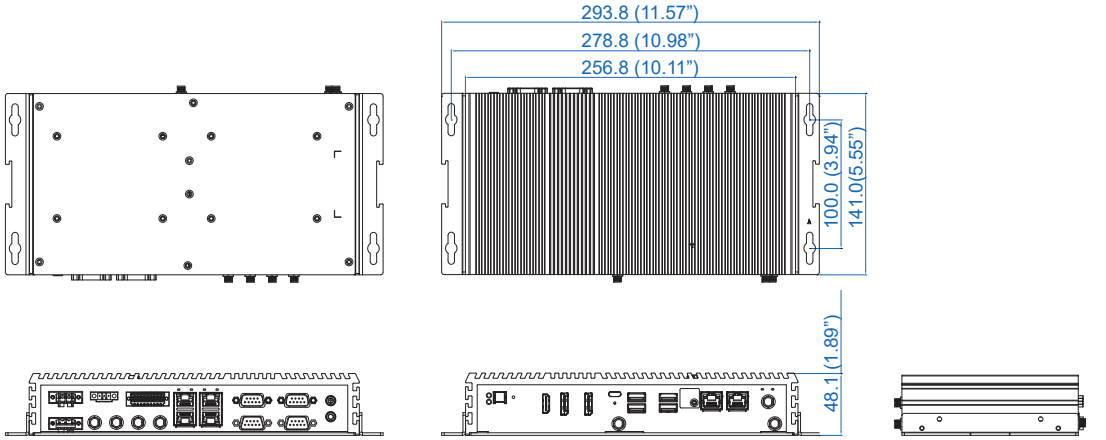
1.4 Mechanical Dimension

1.4.1 Dimensions of ECS-4700-PoER



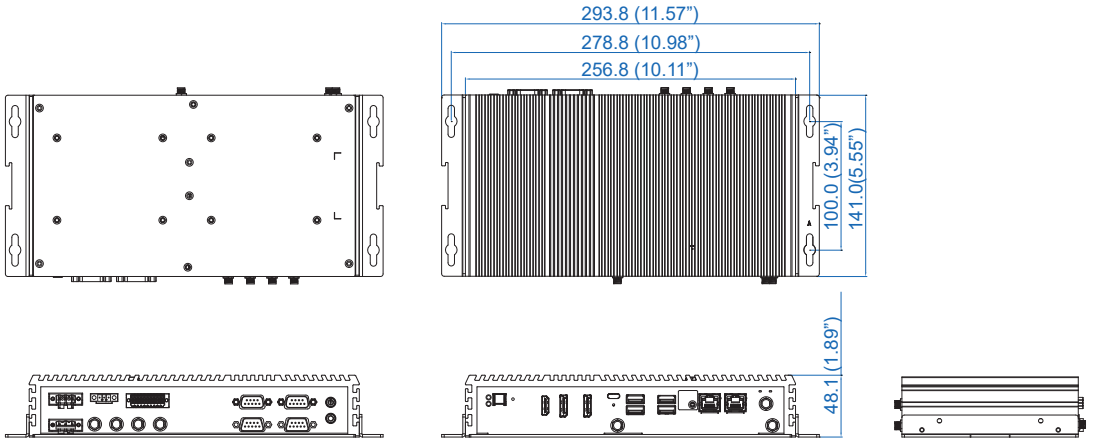
Unit: mm (inch)

1.4.2 Dimensions of ECS-4700-PoE



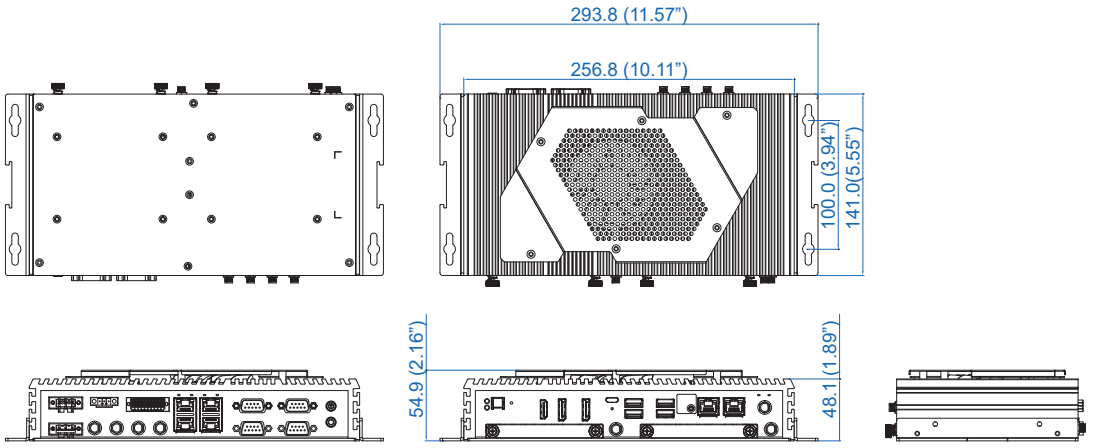
Unit: mm (inch)

1.4.3 Dimensions of ECS-4700-2G



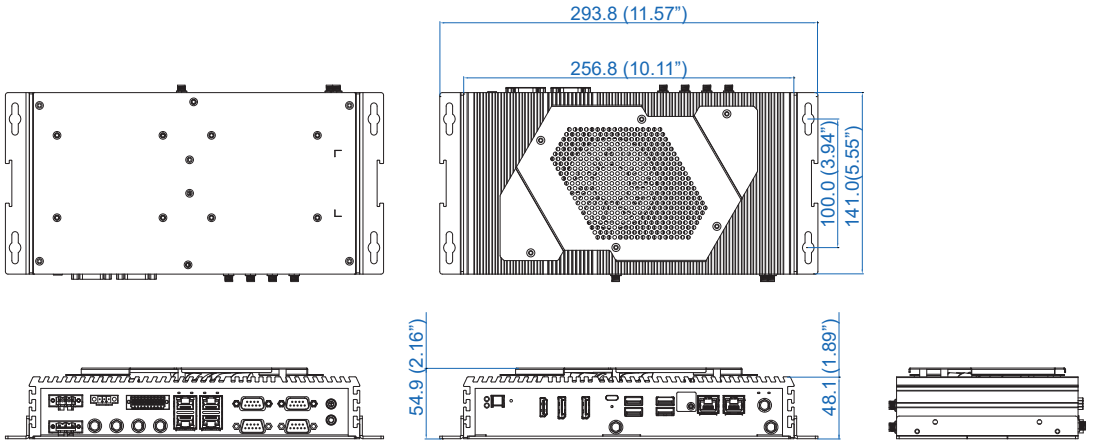
Unit: mm (inch)

1.4.4 Dimensions of ECS-4700F-PoER



Unit: mm (inch)

1.4.5 Dimensions of ECS-4700F-PoE



Unit: mm (inch)

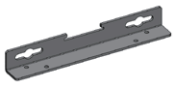
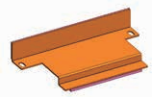
2

GETTING TO KNOW YOUR ECS-4700

2.1 Packing List

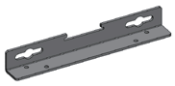
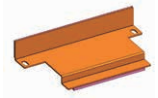
2.1.1 ECS-4700-PoER/ECS-4700F-PoER Packing List

Item	Description	Qty
1	ECS-4700- Slim Fanless Embedded System (According to the configuration of you order, the ECS-4700 series may contain SSD/ HDD and DDR5 SO-DIMM. Please verify these items if necessary.)	1

Item	Description	Outlook	Usage	P/N	Qty
1	Terminal block 3-pin (5.0mm)		DC-IN	51-2411R03-S1K	2
2	Terminal block 3-pin(3.5mm)		IGN	51-2211R03-S1A	1
3	Terminal block 20-pin(2.54mm)		Isolated DIO/GPIO	51-2112R20-S1D	1
4	Wall Mount Bracket		Mount	62-6645WAL-014	2
5	M.2 Cu Plate		M.2 Key M	62-07P1459-30A	1
6	DDR5 Cu Plate		DDR5	62-07P1461-30A	1
7	M.2 Extender Bracket(42/52 to 80)		M.2 Key B 3042/3052	62-03P0997-30A	1
8	PHILLPIS M3x4L, Ni+Ny		M.2 socket*4 Cu DDR5*2 Cu M2*2	53-2426204-80B	8
9	Hexagon #6-32x6L		Fasten Wall Mount to ECS-4700	53-I000231-311	4
10	Flat M3x4L		SSD/HDD	53-2466204-30B	8

2.1.2 ECS-4700-PoE/ECS-4700F-PoE/ECS-4700-2G Packing List

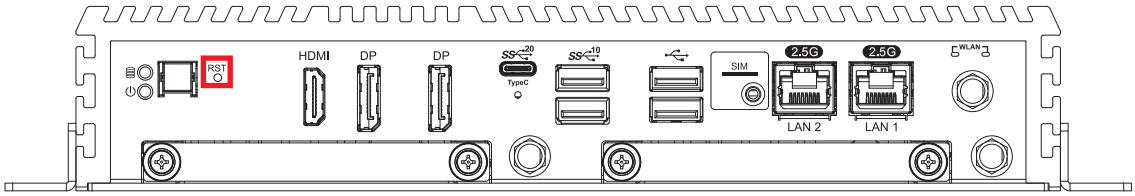
Item	Description	Qty
1	ECS-4700 Slim Fanless Embedded System (According to the configuration of you order, the ECS-4700 series may contain SSD/ HDD and DDR5 SO-DIMM. Please verify these items if necessary.)	1

Item	Description	Outlook	Usage	P/N	Qty
1	Terminal block 3-pin (5.0mm)		DC-IN	51-2411R03-S1K	2
2	Terminal block 3-pin(3.5mm)		IGN	51-2211R03-S1A	1
3	Terminal block 20-pin(2.54mm)		Isolated DIO/GPIO	51-2112R20-S1D	1
4	Wall Mount Bracket		Mount	62-6645WAL-014	2
5	M.2 Cu Plate		M.2 Key M	62-07P1459-30A	1
6	DDR5 Cu Plate		DDR5	62-07P1461-30A	1
7	M.2 Extender Bracket(42/52 to 80)		M.2 Key B 3042/3052	62-03P0997-30A	1
8	PHILLPIS M3x4L, Ni+Ny		M.2 socket*4 Cu DDR5*2 Cu M2*2	53-2426204-80B	8
9	Hexagon #6-32x6L		Fasten Wall Mount to ECS-4700	53-I000231-311	4
10	I-M3x3		SSD/HDD	53-2512303-60C	8

2.2 Front Panel I/O Functions

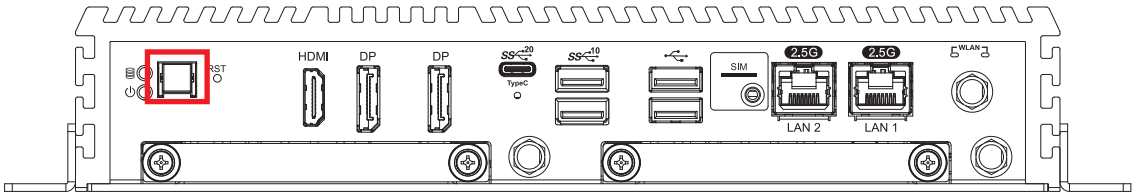
In Vecow ECS-4700 series family, all I/O connectors are located on front panel and rear panel. Most of the general connections to computer device, such as USB, HDMI, DisplayPort, LAN Jack and any additional storage, are placed on the front panel.

2.2.1 Reset Tact Switch



It is a hardware reset switch. Please use this switch to reset ECS-4700 without power off. Press the Reset Switch for a few seconds, and then reset will be enabled.

2.2.2 Power Button



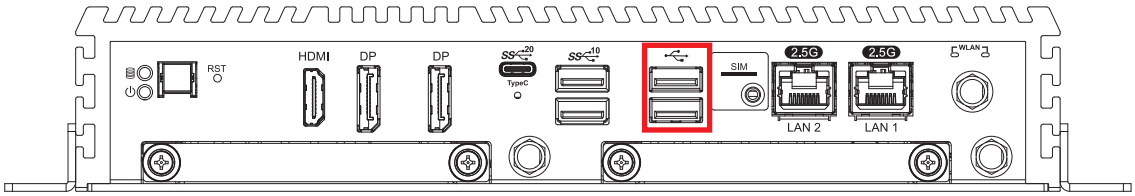
The Power Button is a non-latched switch with dual color LED indications. It indicates power status: S0, S3 and S5. More detail LED indications are listed as follows:

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 ECS-4700, please press the power button and then the blue LED is lightened. To power off the system, you can either command shutdown by OS operation, or just simply press the power button.

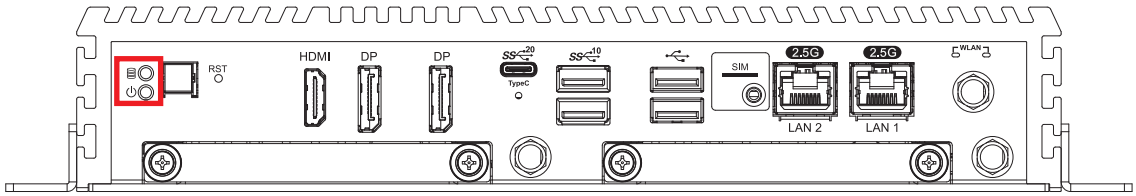
If system error, you can just press the power button for 4-seconds to shut down the machine directly. Please do note that a 4-second interval between each 2 power-on/ power-off operation is necessary in normal working status. (For example, once turning off the system, you have to wait for 4 seconds to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

2.2.3 USB2.0



There are 2 USB 2.0 connections available supporting up to 480MB per second data rate.

2.2.4 PWR and HDD LED Indicator

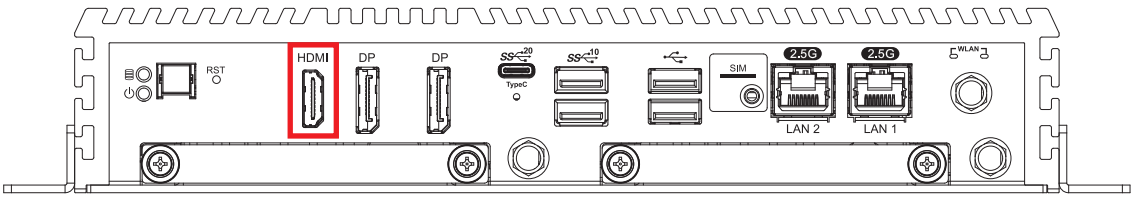


HDD LED/ Yellow : A hard disk/M.2 M key LED. If the LED is on, it indicates that ECS-4700 storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

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

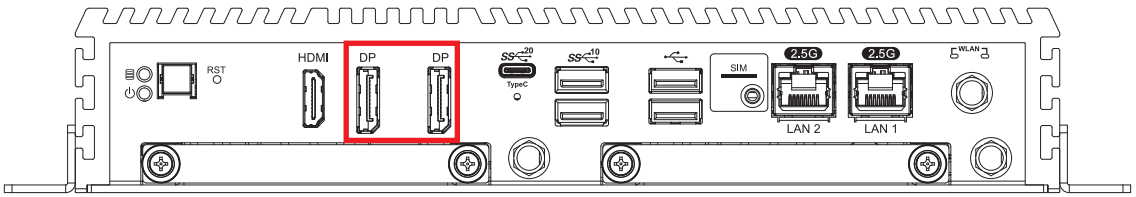
LED Color	Power Status	System Status
Yellow	HDD/CFast	• On/Off : Storage status, function or not. • Twinkling : Data transferring.
Green	Power	System power status (on/off)

2.2.5 HDMI



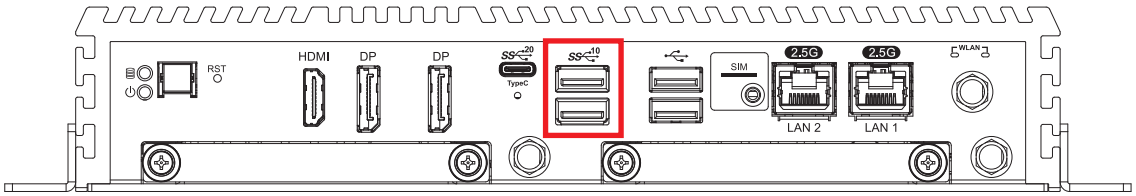
Onboard HDMI Port supports DDC channel mode. The connection supports up to 3840 x 2160 resolution at 60Hz

2.2.6 DisplayPort



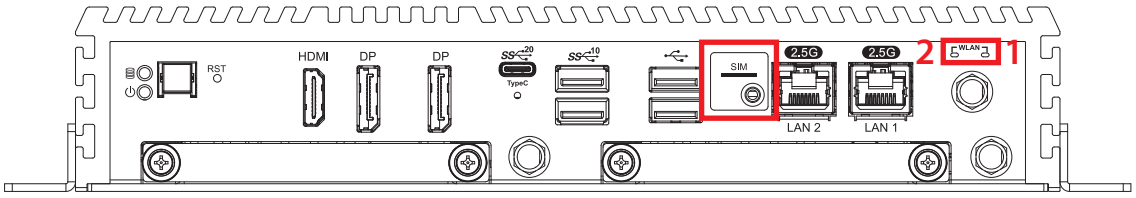
Onboard Display Port support auxiliary channel dual mode, connection supports up to 3840 x 2160 resolution at 60 Hz.

2.2.7 USB3.2



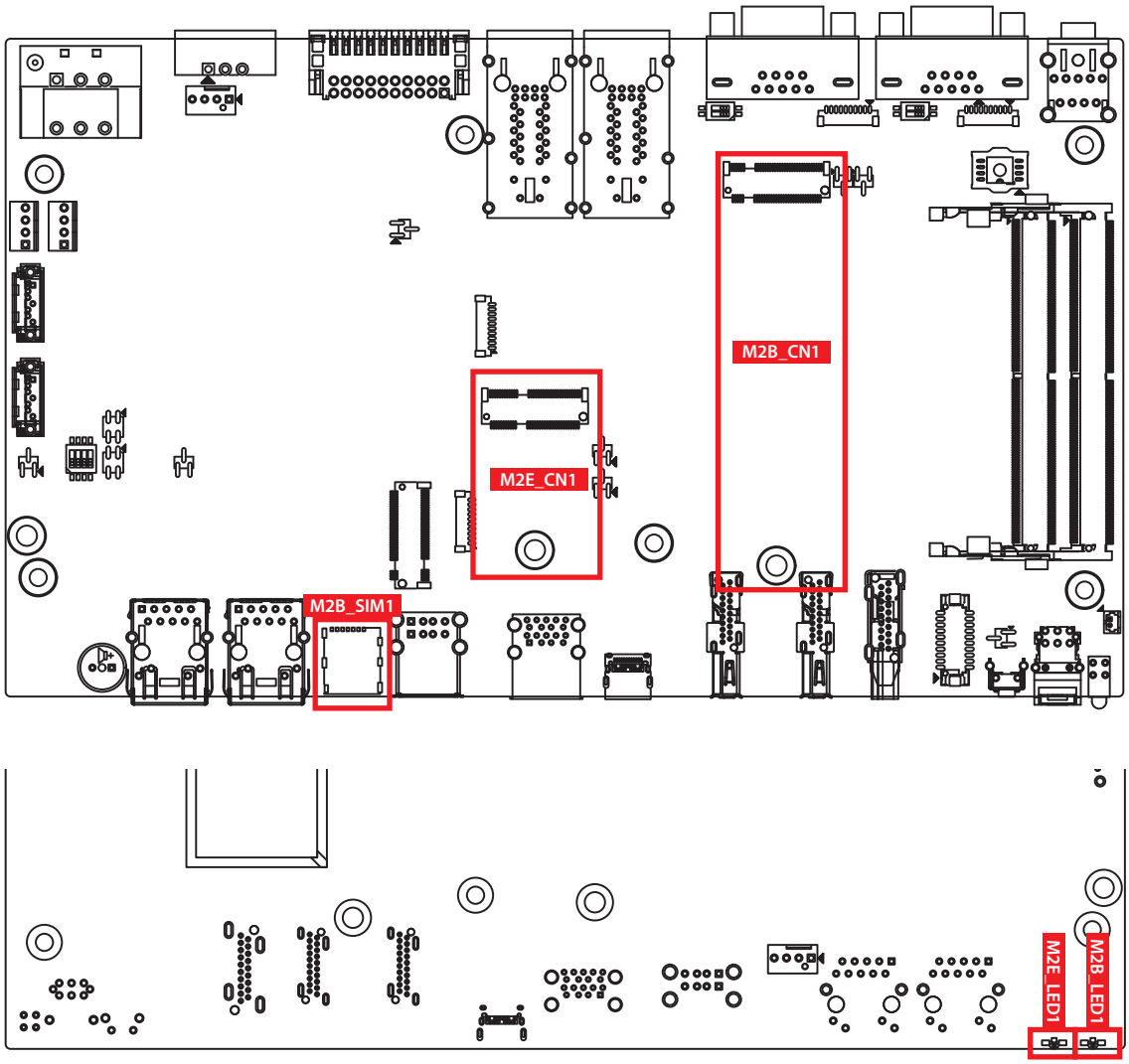
There are 2 USB 3.2 connections available supporting up to 10GB per second data rate in the front side of ECS-4700 series. It also compliant with the requirements of Super Speed (SS), high speed (HS), full speed (FS) and low speed (LS).

2.2.8 WLAN LED, Mini PCIe, SIM Card Comparison

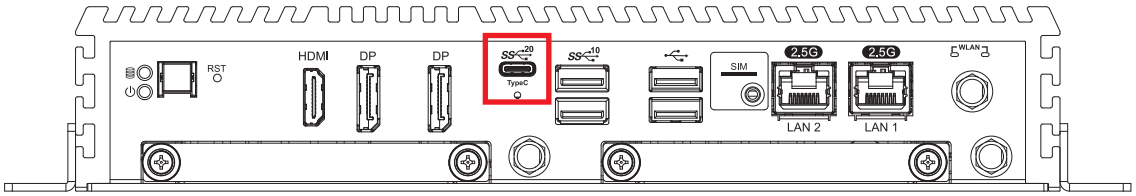


M.2/NANO SIM Slot/WLAN LED Mapping Table :

M.2	SIM	LED
M.2 B KEY	M2B_SIM1	1
M.2 E KEY	X	2

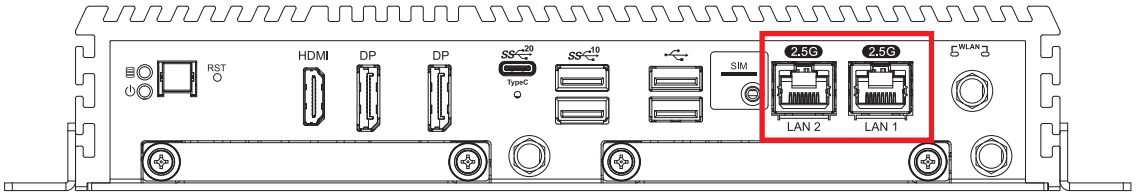

M2B_CN1
M2E_CN1
M2B_SIM1
M2E_LED1
M2B_LED1

2.2.9 USB TYPE C



USB Type-C connector support up to 20GB per second data rate and DisplayPort 1.4a : Up to 3840 x 2160 @ 60Hz by USB Type-C in the front side of ECS-4700 series.

2.2.10 Ethernet Port



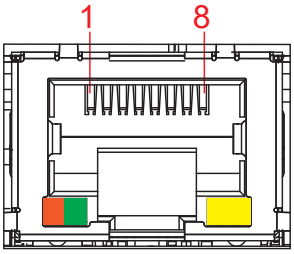
There are two 8-pin RJ-45 jacks supporting 10/100/1000/2500 Mbps Ethernet connections on the front side of ECS-4700. LAN1 and LAN 2 is powered by Intel I226 Ethernet engine.

LAN Chip	Function	Connetor
Intel I226	RJ45(10/100/1000/2500Mbps)	LAN1
Intel I226	RJ45(10/100/1000/2500Mbps)	LAN2

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:

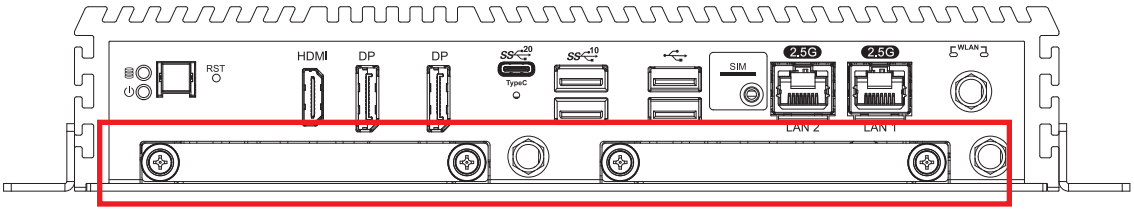
Pin Number	10/ 100 Mbps	1000/2500 Mbps
1	E_TX+	MDI0_P
2	E_TX-	MDI0_N
3	E_RX+	MDI1_P
4	----	MDI2_P
5	----	MDI2_N
6	E_RX-	MDI1_N
7	-----	MDI3_P
8	-----	MDI3_N

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



LAN	LED Location	LED Color	10 Mbps	100 Mbps	1000 Mbps	2500 Mbps
LAN1	Left	Green/ Orange	Off	Off	Solid Green	Solid Orange
	Right	Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow
LAN2	Left	Green/ Orange	Off	Off	Solid Green	Solid Orange
	Right	Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow

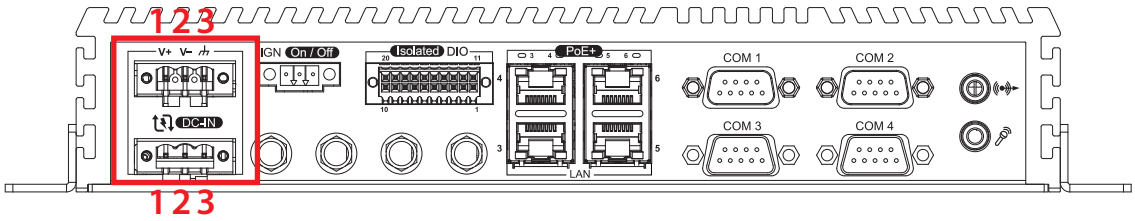
2.2.11 SSD/HDD Tray



There are 2 front-access 2.5” SSD/HDD trays in the front side of ECS-4700-PoER series. Just trigger to open the SSD/HDD tray, up to 4TB is available.

2.3 Rear Panel I/O and Functions

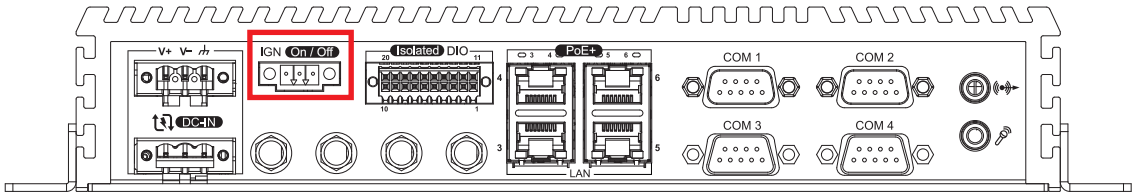
2.3.1 Power Terminal Block



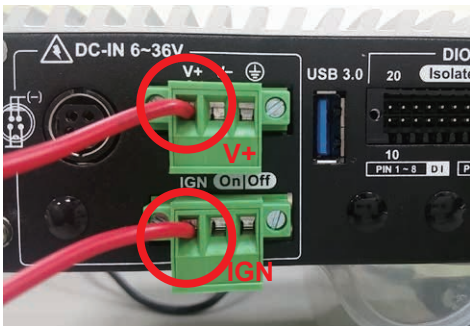
ECS-4700 supports dual 9V to 50V DC power input by terminal block in the rear side. In normal power operation, power LED lightens in solid green.

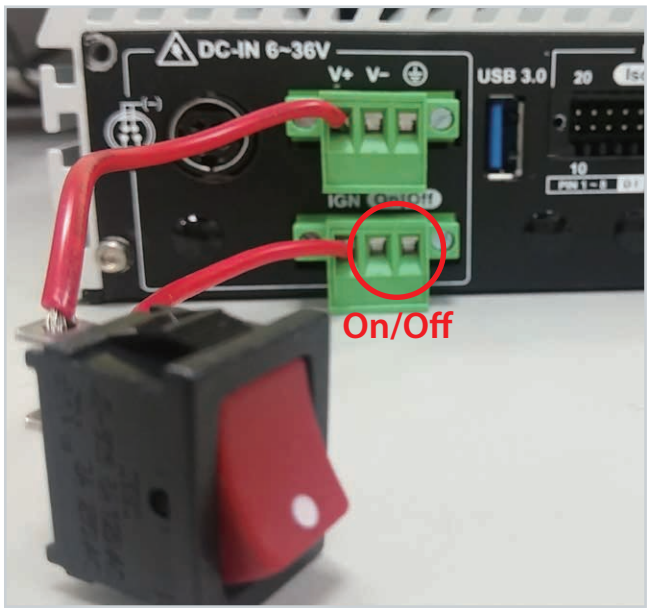
Pin No.	Definition	Pin No.	Definition
1	V+	2	V-
3	Chassis Ground		

2.3.2 Remote Power On/Off Switch & Ignition



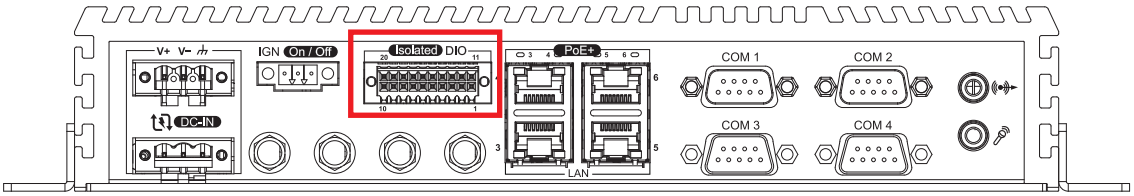
It is a 2-pin power-on or power-off switch through Phoenix Contact terminal block. You could turn on or off the system power by using this contact. This terminal block supports dual function of soft power-on/ power-off (instant off or delay 4 second), and suspending mode.



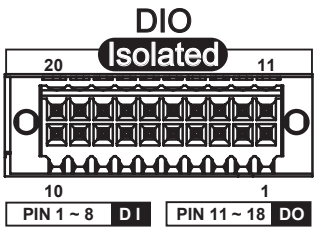


Pin No.	Definition
1	Ignition (IGN)
2	SW+
3	SW-

2.3.3 Isolated DIO



There is a 16-bit (8-bit DI, 8-bit DO) connectors in the rear side. DI/DO support NPN(sink) and PNP(Source) mode, Each DI channel is equipped with a photocouper for isolated protection. Each DO with isolator chip, Config by a Jumper for each DIO connector.

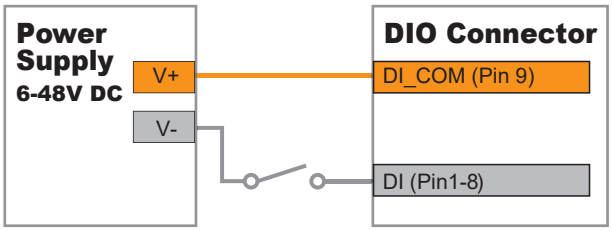


- 4242-VPK Basic Isolation per DIN V VDE V 0884-10 and DIN EN 61010-1
- 3-KVRMS Isolation for 1 minute per UL 1577
- CSA Component Acceptance Notice 5A, IEC 60950-1 and IEC 61010-1 End Equipment Standards
- GB4943.1-2011 CQC Certified

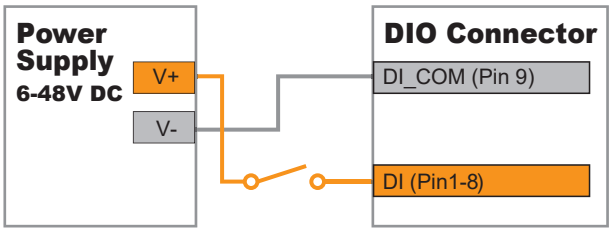
DIO	Pin No.	Definition
DIO	1	INPUT 0
	2	INPUT 1
	3	INPUT 2
	4	INPUT 3
	5	INPUT 4
	6	INPUT 5
	7	INPUT 6
	8	INPUT 7
	9	DI_COM
	10	DIO_GND
	11	OUTPUT 0
	12	OUTPUT 1
	13	OUTPUT 2
	14	OUTPUT 3
	15	OUTPUT 4
	16	OUTPUT 5
	17	OUTPUT 6
	18	OUTPUT 7
	19	DIO_GND
	20	External 9~50VDC Input

DI reference circuit:

Sink Mode (NPN)

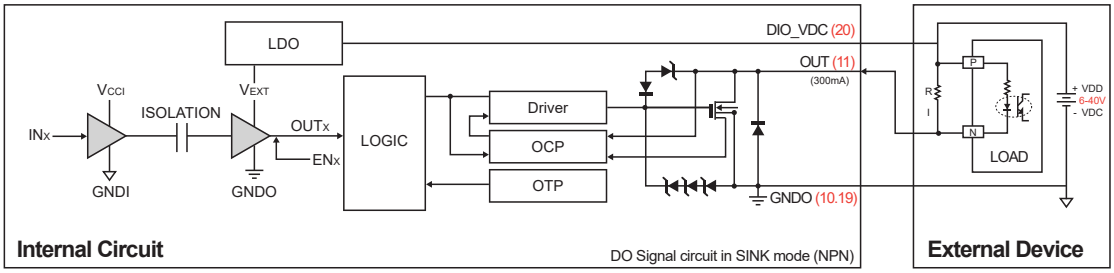


Source Mode (PNP)

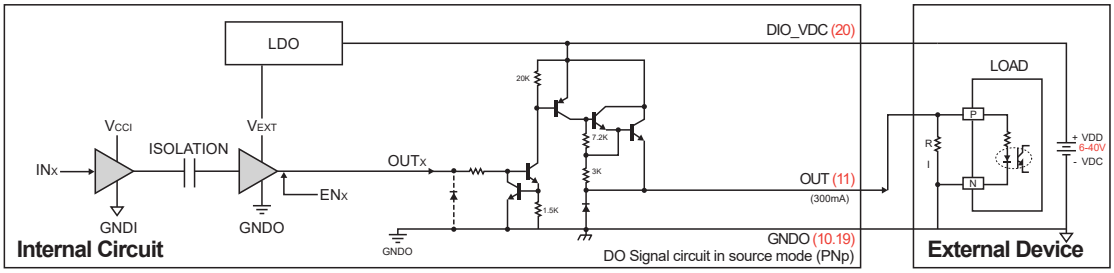


DO reference circuit :

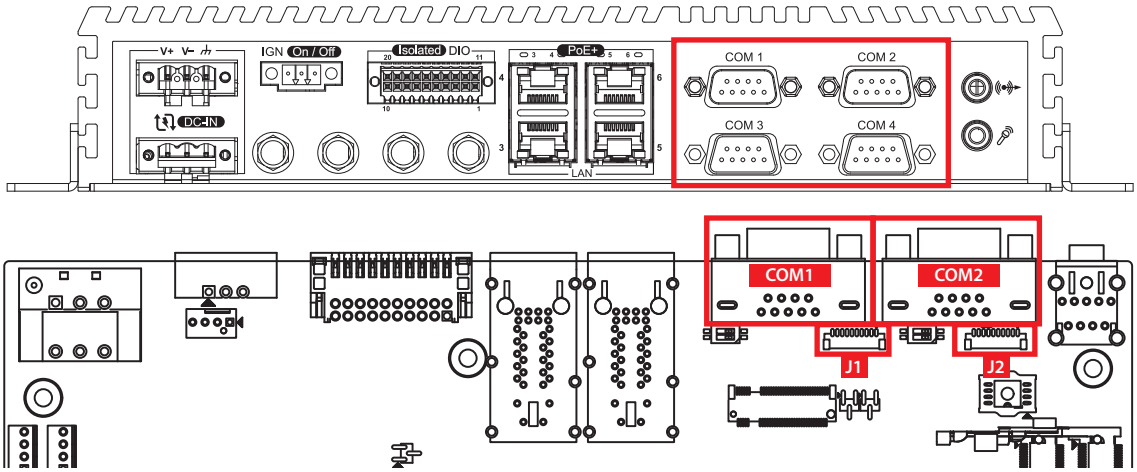
Sink Mode (NPN, Default)



Source (PNP)

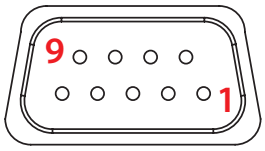


2.3.4 Serial Port COM



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 is RS-232. If you want to change to RS-422 or RS-485, you can find the setting in BIOS.

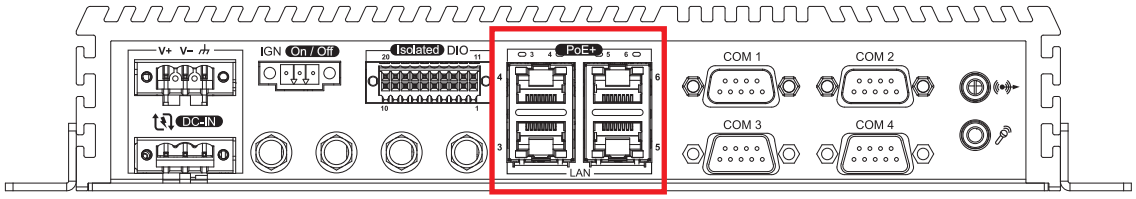
BIOS Setting	Function
COM1 (COM1) COM2 (COM2) COM3 (J1) COM4 (J2)	RS-232
	RS-422 (5-wire)
	RS-485
	RS-485 w/z auto-flow control



The pin assignments are listed in the table as follow :

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

2.3.5 PoE (Power over Ethernet) Ports



There are 4 RJ45 connectors in the rear side of ECS-4700. It supports IEEE 802.3at (PoE+) Power over Ethernet (PoE) connection delivering up to 25W/54V per port and 1000BASE-T gigabit data signals over standard Ethernet Cat 5/Cat 6 cable.(Remind : PoE power budget supports up to 25.5W/each, total 35W.)

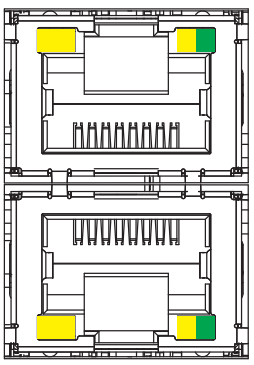
When using suitable RJ-45 cable, you can connect the system to a computer, or to any other devices with Ethernet connection; for example, a hub or a switch. Moreover, all of LAN3, LAN4, LAN5 and LAN6 support Wake on LAN and Pre-boot functions. The pin-outs of LAN3, LAN4, LAN5 and LAN6 are listed as follows:

Pin No.	10/ 100 Mbps	1Gbps	PoE
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 100 Mbps Ethernet network, and it lightens in solid yellow when the cable is properly connected to a 1000 Mbps Ethernet network. The left LED will keep twinkling/ off when Ethernet data packets are being transmitted/ received.

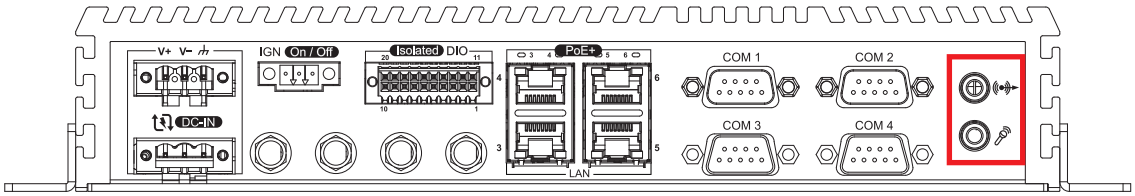
Bottom LED	10Mbps	100Mbps	1000Mbps
Left	Off	Solid Green	Solid Yellow
Right	Flash Yellow	Flash Yellow	Flash Yellow



PoE LED indicator:
Strongly suggest to use PoE function when power input is over 11V.

LED Location	LED Color	Status
LAN3	Solid Green	Green Light: PD installed & powered Green Off: Non PD
LAN4	Solid Green	Green Light: PD installed & powered Green Off: Non PD
LAN5	Solid Green	Green Light: PD installed & powered Green Off: Non PD
LAN6	Solid Green	Green Light: PD installed & powered Green Off: Non PD

2.3.6 Audio Jack

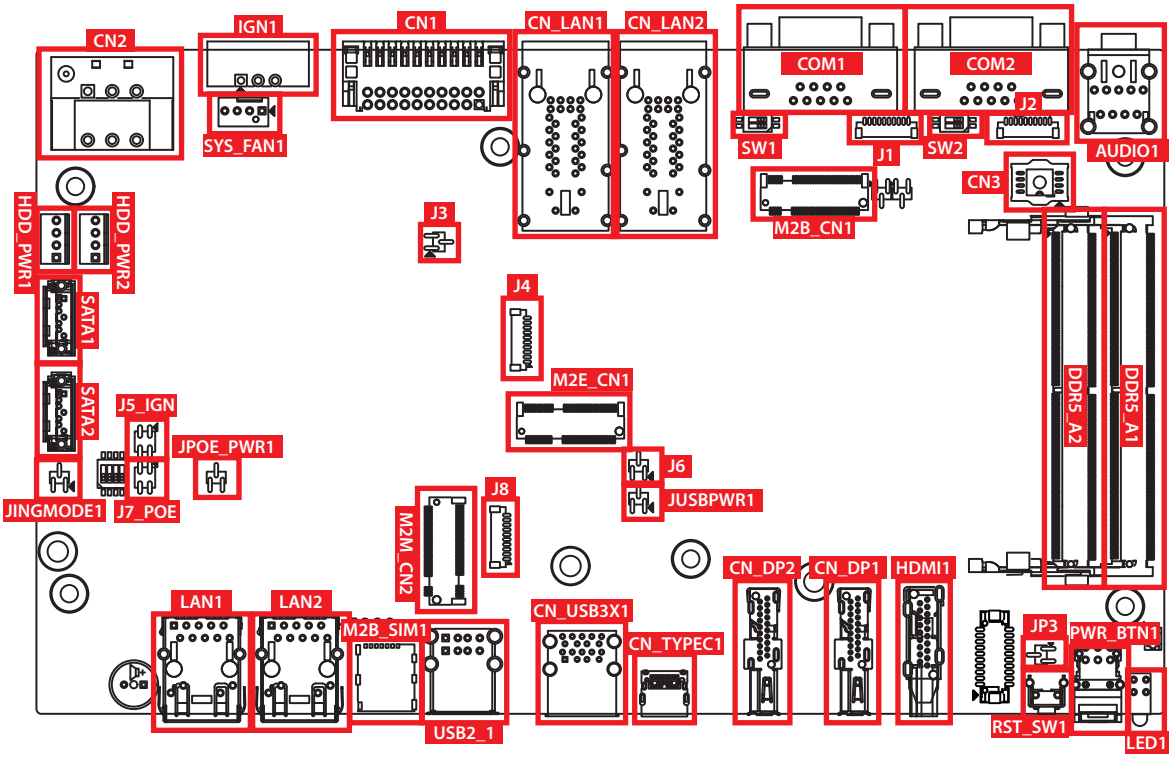


There are 2 audio connectors, Mic-in and Line-out, in the front side of ECS-4700 Onboard Realtek ALC888 audio codec supports 7.1 channel HD audio and fully complies with Intel® High Definition Audio (Azalia) specifications.

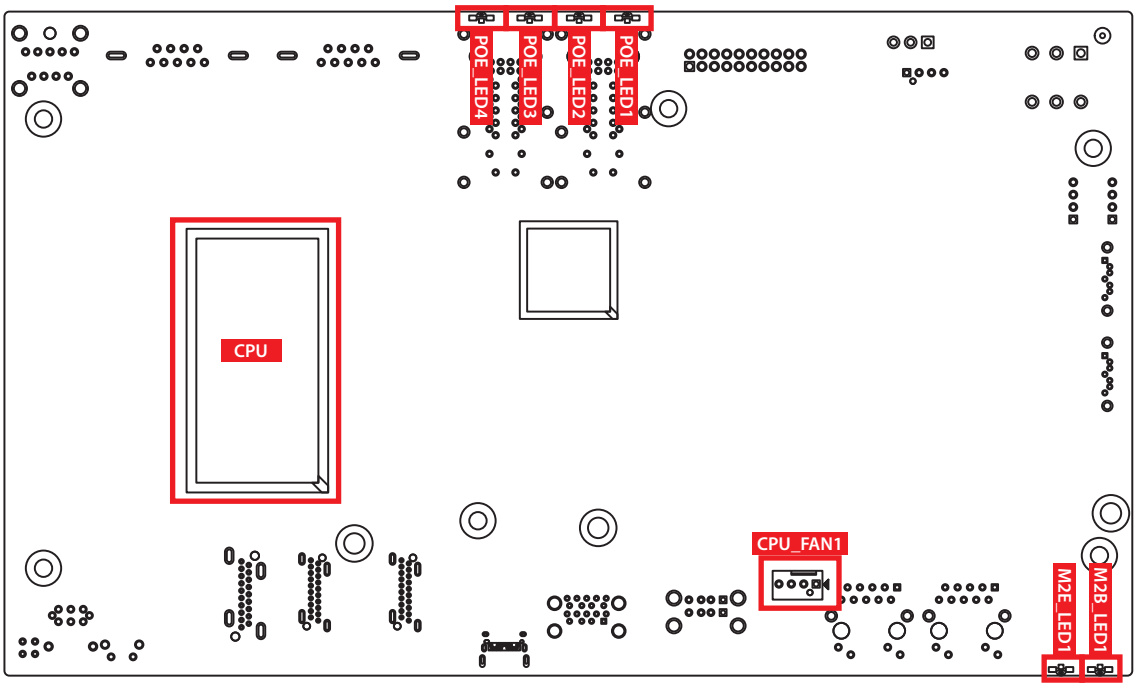
To utilize the audio function in Windows platform, you need to install corresponding drivers for both Intel Sunrise Point chipset and Realtek ALC888 codec.

2.4 Main Board Expansion Connectors

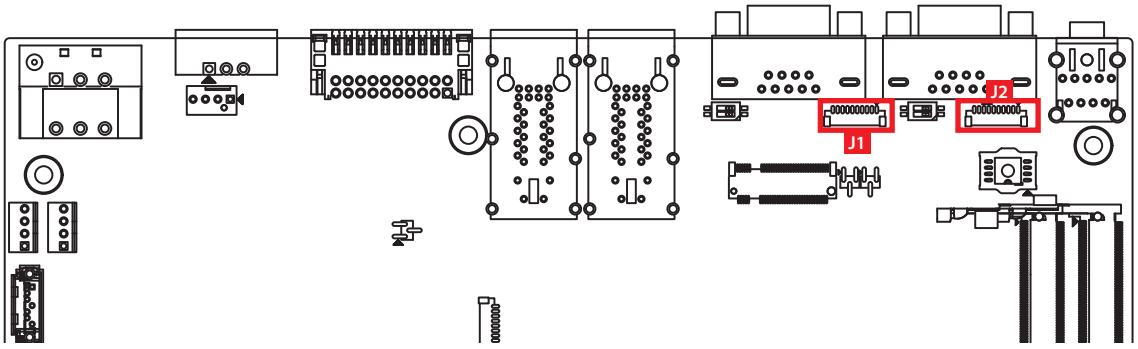
2.4.1 Top View of ECS-4700 Main Board With Connector Location



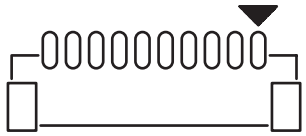
2.4.2 Bottom View of ECS-4700 Main Board with Connector Location



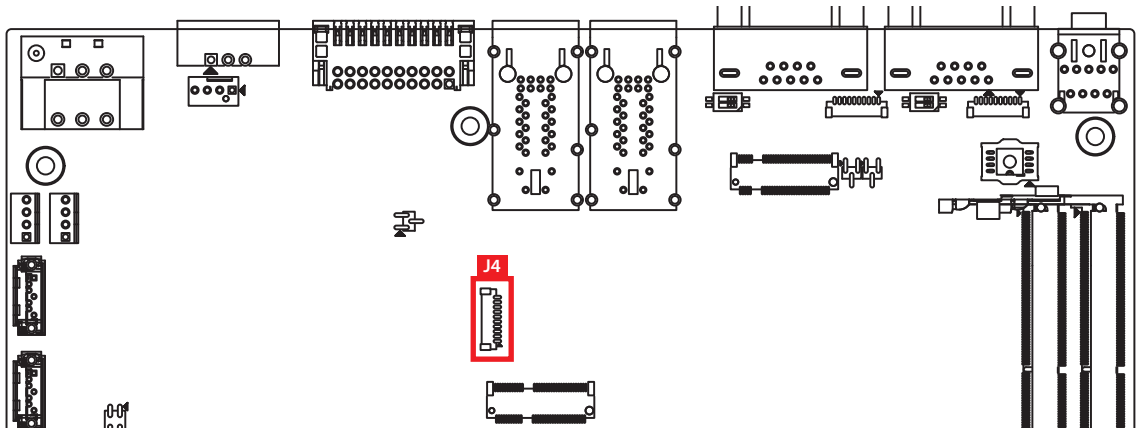
2.4.3 J1 J2 : Serial Port cable Connector



Location	Definition
J1	COM3
J2	COM4

Layout	Pin No.	Description
	1	NC
	2	GND
	3	RI
	4	DTR
	5	CTS
	6	TXD
	7	RTS
	8	RXD
	9	DSR
	10	DCD

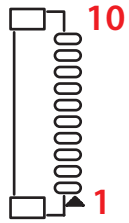
2.4.4 J4:Internal USB 2.0



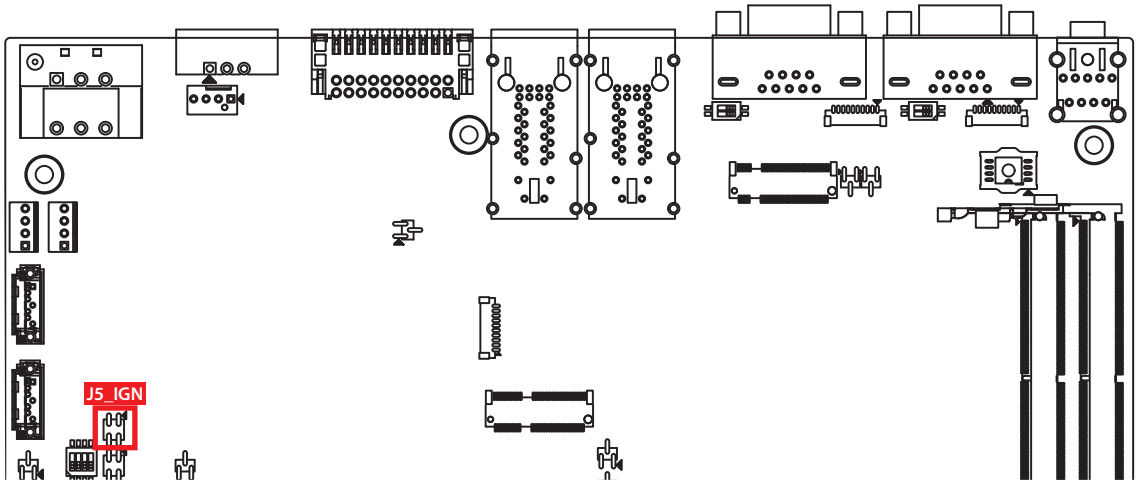
The ECS-4700 main board provides maxima two expansion USB ports. The USB interface supports 480Mbps transfer rate which comply with high speed USB specification Rev. 2.0.

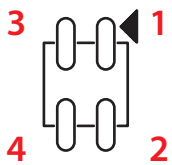
The J4 interface is accessed through one 10-pin JST 1.0mm connector(selection option). You will need an adapter cable if you use a standard USB connector. The adapter cable has a 10-pin connector on one end and a USB connector on the other.

The pin assignments of J4 are listed in the following table:

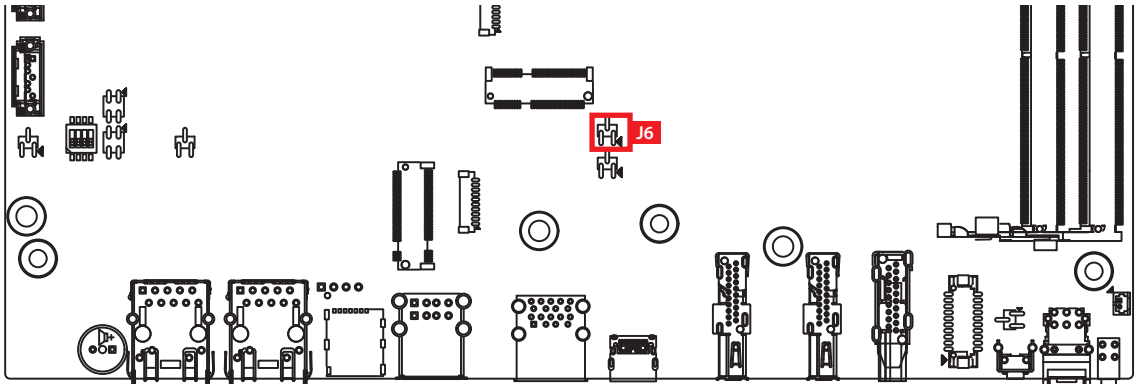
J4 (Option)	Pin No.	Definition	Pin No.	Definition
	1	USB_VCC	2	USB_VCC
	3	USB_VCC	4	USB_D_6N
	5	USB_D_6P	6	USB_D_4N
	7	USB_D_4P	8	GND
	9	GND	10	GND

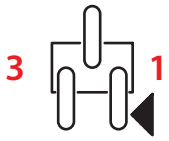
2.4.5 J5_IGN : IGNITION FW Programming Header



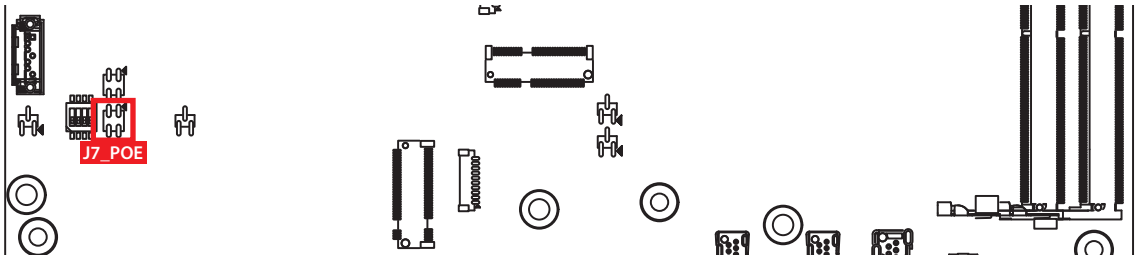
Layout	Pin No.	Description
	1	GND
	2	MCU_RST#
	3	+V3.3_MCU
	4	MCU_PRG

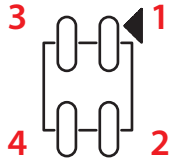
2.4.6 J6:VCORE FW Programming Header



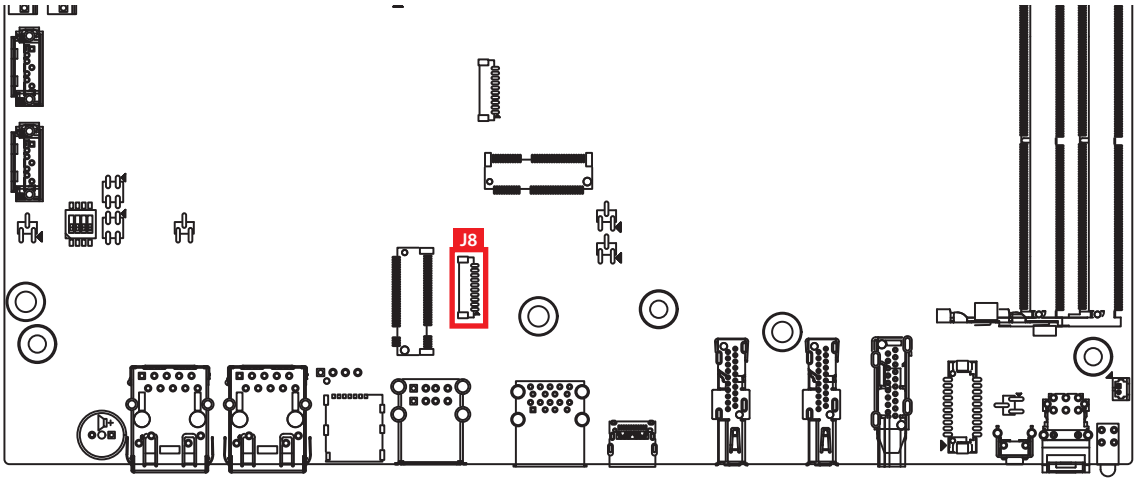
Layout	Pin No.	Description
	1	SDA_P
	2	SCL_P
	3	GND

2.4.7 J7_POE:POE FW Programming Header

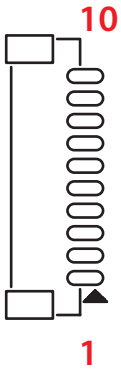


Layout	Pin No.	Description
	1	GND
	2	POE_MCU_RST#
	3	+3V_ISO
	4	POE_MCU_PRG

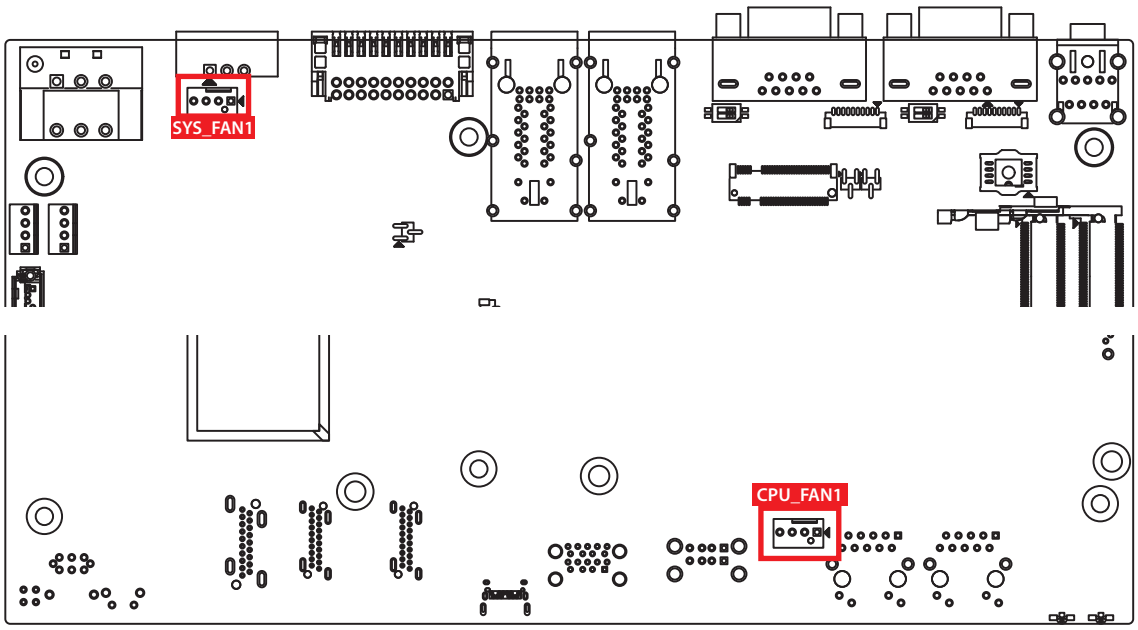
2.4.8 J8 : ESPI Port 80 Header



The system's provide a ESPI Port 80 Header for Debug Card.

Layout	Pin No.	Description
	1	+V3.3S
	2	Port 80_ESPI_CS#
	3	Port 80_ESPI_IO0
	4	Port 80_ESPI_IO1
	5	Port 80_ESPI_IO2
	6	Port 80_ESPI_IO3
	7	GND
	8	Port 80_ESPI_CLK
	9	RST 80_ESPI_RST#
	10	GND

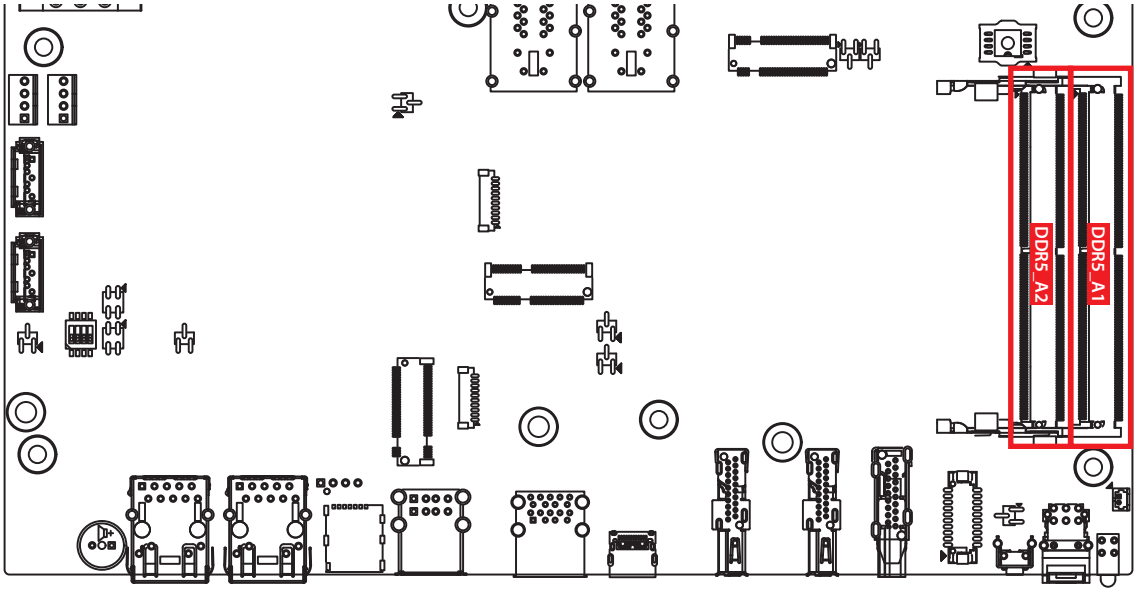
2.4.9 CPU_FAN1 ,SYS_FAN1: FAN Header



Fan power connector supports for additional thermal requirements. The pin assignments of CPU_FAN1/SYS_FAN1 are listed in the following table. CPU_FAN1 header soldering by customized request.

Layout	Pin No.	Definition	Pin No.	Definition
10 1	1	GND	2	+12V (1.5A max)
	3	Fan speed sensor	4	Fan PWM

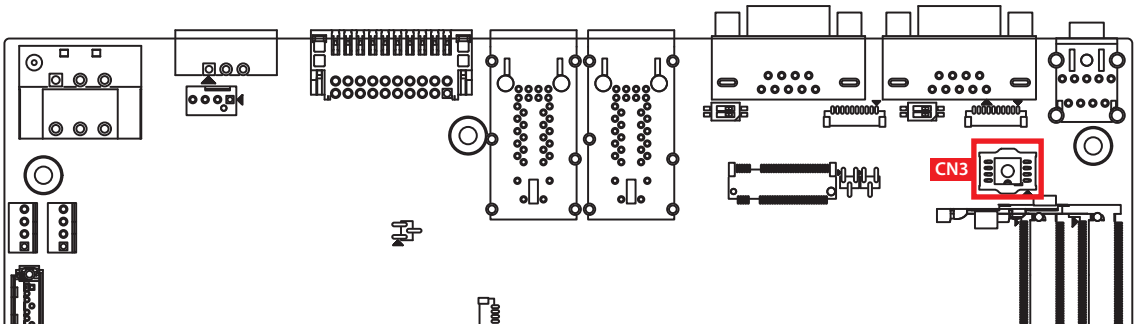
2.4.10 DDR5_A1, DDR5_A2: DDR5 Slot



There are 2 DDR5 channel onboard, support DDR5 4800, max 64GB, each channel 32GB.

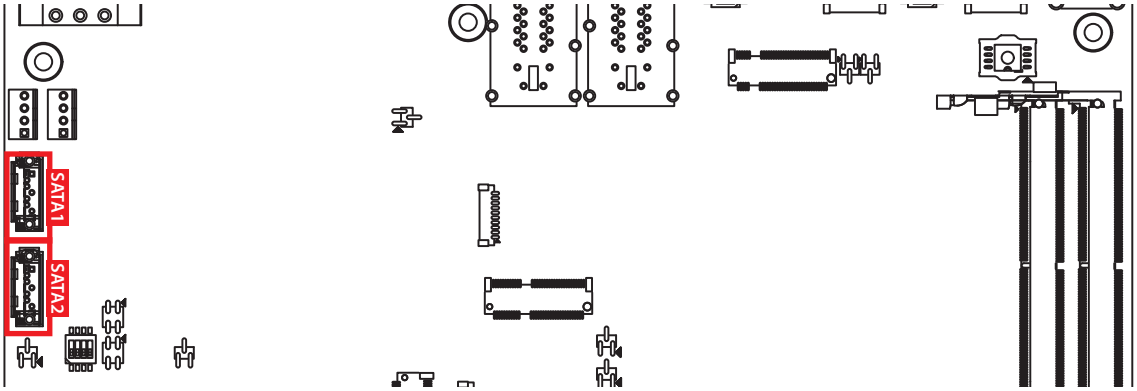
Slot	Description
DDR5_A2	DDR5 Channel A
DDR5_A1	DDR5 Channel B

2.4.11 CN3: BIOS Socket

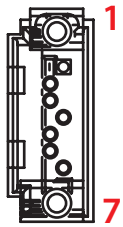


If the BIOS needs to be changed, please contact the Vecow RMA service team.

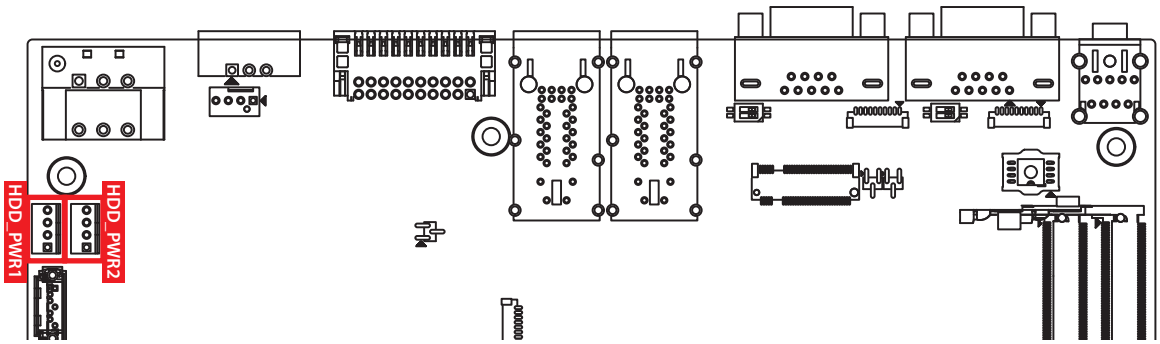
2.4.12 SATA1, SATA2 : SATA III Connector



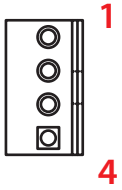
There are 2 onboard high performance Serial ATA III (SATA III) on ECS-4700. It supports higher storage capacity with less cabling effort and smaller required space. The pin assignments of SATA1 and SATA2 are listed in the following table :

SATA1/SATA2	Pin No.	Definition	Pin No.	Definition
	1	GND	2	TXP
	3	TXN	4	GND
	5	RXN	6	RXP
	7	GND		

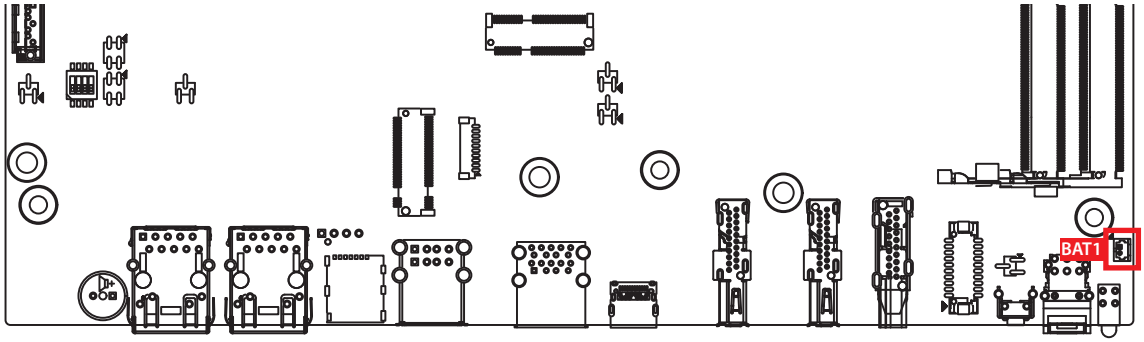
2.4.13 HDD_PWR1, HDD_PWR2 : SATA Power Connector



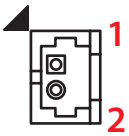
The ECS-4700 also equip with a SATA power connector. The one port supports 5V (Up to 2A) and 12V (Up to 1A) current to the hard drive or SSD. The pin assignments of HDD_PWR1, HDD_PWR2 are listed in the following table:

Layout	Pin No.	Description
	1	1A max
	2	GND
	3	GND
	4	+5V (2A max)

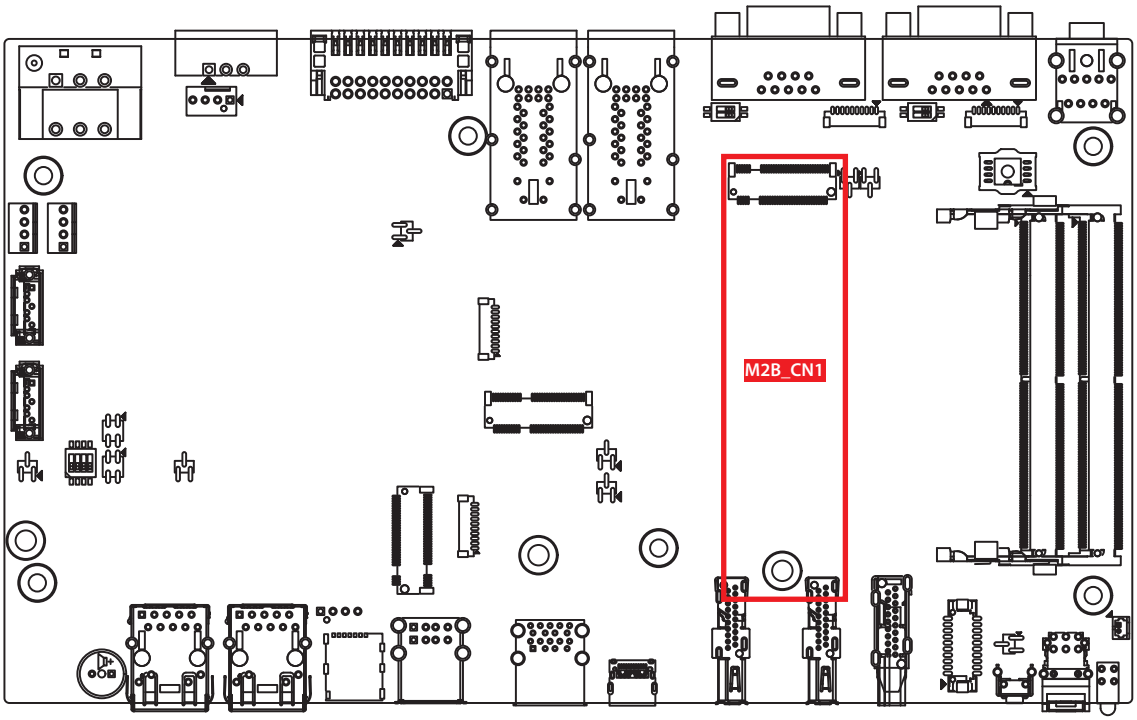
2.4.14 BAT1: RTC Battery



The ECS-4700'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, but if the battery needs to be changed, please contact the Vecow RMA service team.

Layout	Pin No.	Description
	1	+3V_BAT
	2	GND

2.4.15 M.2 KEY-B(M2B_CN1)

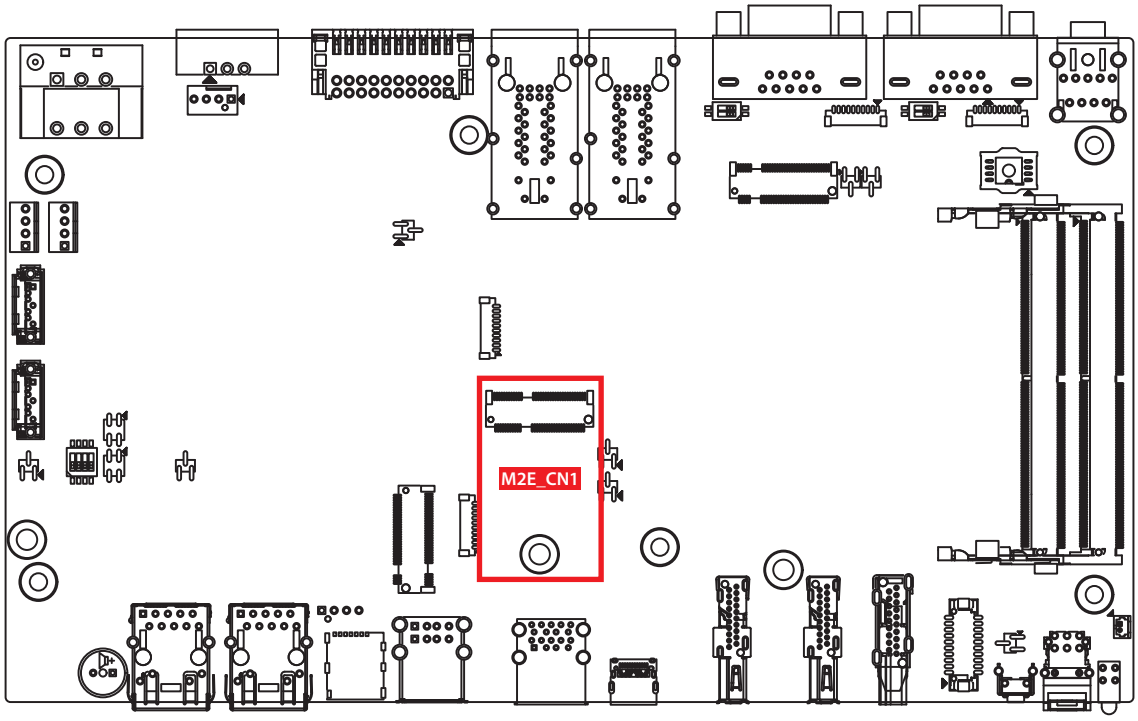


M.2 KEY-B support USB3.2/USB2.0 and PCIe x2, if you want to change to USB3.2 or PCIe x2, you can find the setting in BIOS.Module card types include 3052,2280. (Remind: The default BIOS setting is M.2 Key B for USB3.2. If wanting to use PCIe, an optional BIOS is required.)

Pin No.	Function	Pin No.	Function
		80	NC
75	NC		
73	Ground	74	3.3V
71	Ground	72	3.3V
69	NC	70	3.3V
67	NC	68	NC
65	NC	66	SIM DETECT
63	NC	64	NC
61	NC	62	NC
59	NC	60	NC
57	Ground	58	NC
55	REFCLKp	56	NC
53	REFCLKn	54	PEWAKE#
51	Ground	52	CLKREQ#
49	PETp0/SATA-A+	50	PERST#
47	PETn0/SATA-A-	48	NC
45	Ground	46	NC
43	PERp0/SATA-B-	44	NC
41	PERn0/SATA-B+	42	NC
39	Ground	40	NC
37	PETp1/USB3.1-TX+	38	DEVSLP
35	PETn1/USB3.1-TX-	36	UIM-PWR
33	Ground	34	UIM-DATA
31	PERp1/USB3.1-RX+	32	UIM-CLK
29	PERn1/USB3.1-RX-	30	UIM-RESET
27	Ground	28	NC
25	NC	26	NC
23	NC	24	NC

21	NC	22	NC
		20	NC
Mechanical Key			
11	Ground		
9	USB-	10	LED_1#
7	USB+	8	W_DISABLE1
5	Ground	6	FULL_CARD_PWR_OFF/ON
3	Ground	4	3.3V
1	NC	2	3.3V

2.4.16 M.2 KEY-E (M2E_CN1)

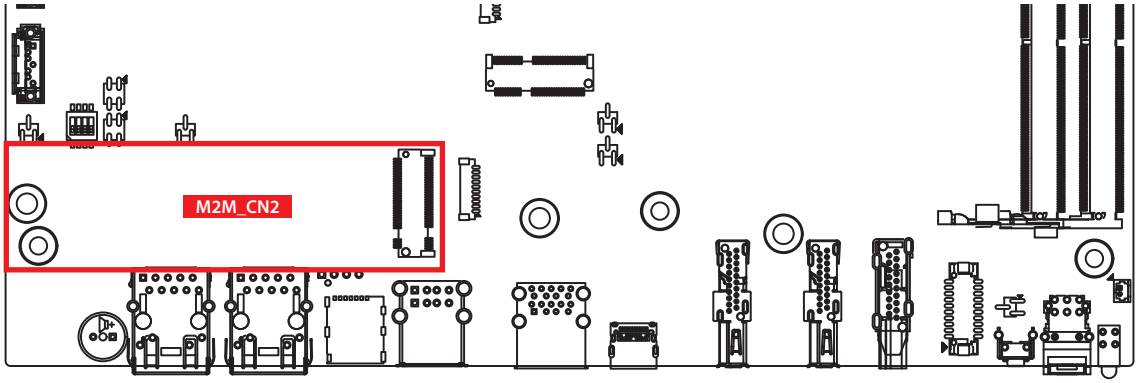


M.2 KEY E: USB2.0/PCIex1 M.2 key E connector is suitable for applications that use wireless connectivity including Wi-Fi, Bluetooth, NFC of GNSS. Module card types include 2230.

Pin No.	Function	Pin No.	Function
75	Ground		
73	NC	74	3.3V
71	NC	72	3.3V
69	Ground	70	PEWAKE1#
67	NC	68	NC
65	NC	66	NC
63	Ground	64	NC
61	NC	62	ALERT
59	NC	60	I2C_CLK
57	Ground	58	I2C_DATA
55	PEWAKE0#	56	NC
53	CLKREQ0#	54	NC
51	Ground	52	PERST0#
49	REFCLKn0	50	NC
47	REFCLKp0	48	NC
45	Ground	46	NC
43	PERn0	44	NC
41	PERp0	42	NC
39	Ground	40	NC
37	PETn0	38	DEVSLP
35	PETp0	36	NC
33	Ground	34	NC
Mechanical Key			
23	NC		
21	NC	22	NC
19	Ground	20	NC
17	NC	18	Ground
15	NC	16	NC

13	Ground	14	NC
11	NC	12	NC
9	NC	10	NC
7	Ground	8	NC
5	USB-	6	LED1#
3	USB+	4	3.3V
1	Ground	2	3.3V

2.4.17 M.2 KEY-M(M2M_CN2)



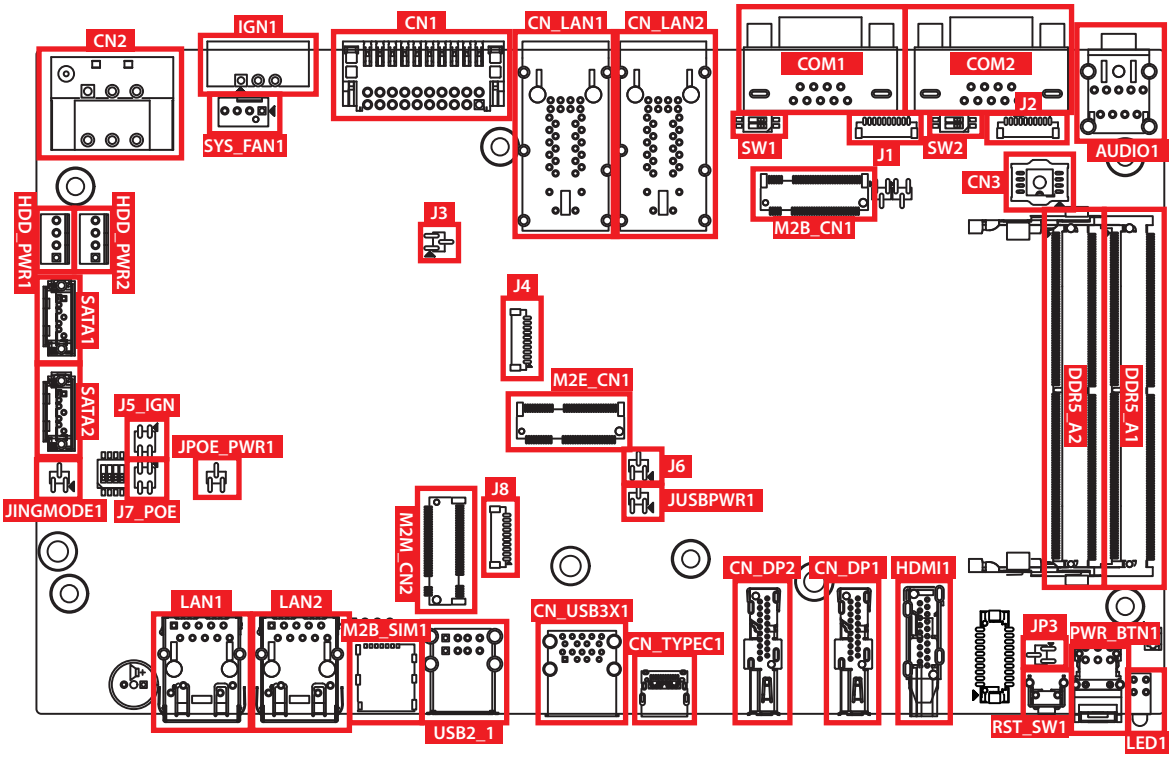
M.2 key M connector is suitable for applications that use Host I/Fs supported by either PCIe Module card types include 2280 (Only Support PCIEx4)

Pin No.	Function	Pin No.	Function
75	Ground		
73	Ground	74	3.3V
71	Ground	72	3.3V
69	PEDET	70	3.3V
67	Ground	68	NC
Mechanical Key			
57	Ground	58	NC
55	REFCLKp	56	NC
53	REFCLKn	54	PEWAKE#

51	Ground	52	CLKREQ#
49	PETp0/SATA_A+	50	PERST#
47	PETn0/SATA_A-	48	NC
45	Ground	46	NC
43	PERp0/SATA_B-	44	NC
41	PERn0/SATA_B+	42	NC
39	Ground	40	NC
37	PETp1	38	DEVSLP
35	PETn1	36	NC
33	Ground	34	NC
31	PERp1	32	NC
29	PERn1	30	NC
27	Ground	28	NC
25	PETp2	26	NC
23	PETn2	24	NC
21	Ground	22	NC
19	PERp2	20	NC
17	PERn2	18	3.3V
15	Ground	16	3.3V
13	PETp3	14	3.3V
11	PETn3	12	3.3V
9	Ground	10	LED1#
7	PERp3	8	NC
5	PERn3	6	NC
3	Ground	4	3.3V
1	Ground	2	3.3V

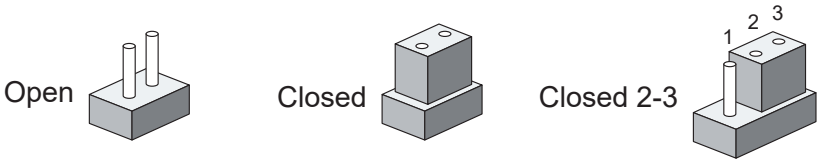
2.5 Main Board Jumper & DIP Switch Settings

2.5.1 Top View of ECS-4700 With Jumper and DIP Switch

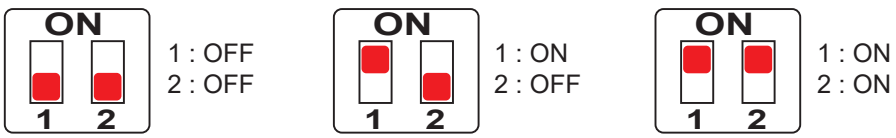


The figure below is the top view of ECS-4700 board, and it shows the location of the jumpers and the switches.

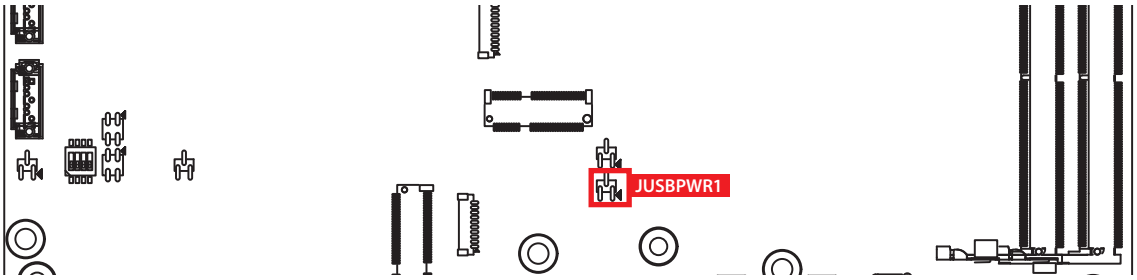
You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper, please connect the pins with the clip. To “open” a jumper, please 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.

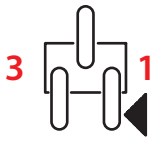


You may configure your card to match the needs of your application by DIP switch as shown below (the DIP switch on and off)

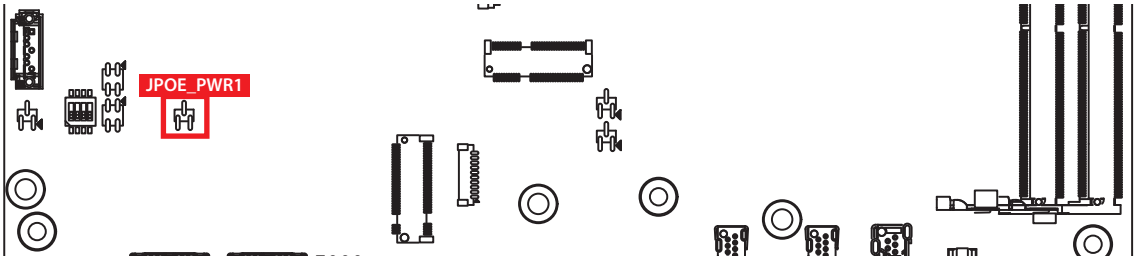


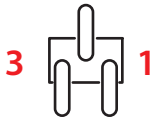
2.5.2 USB Power Jumper (JUSBPWR1)



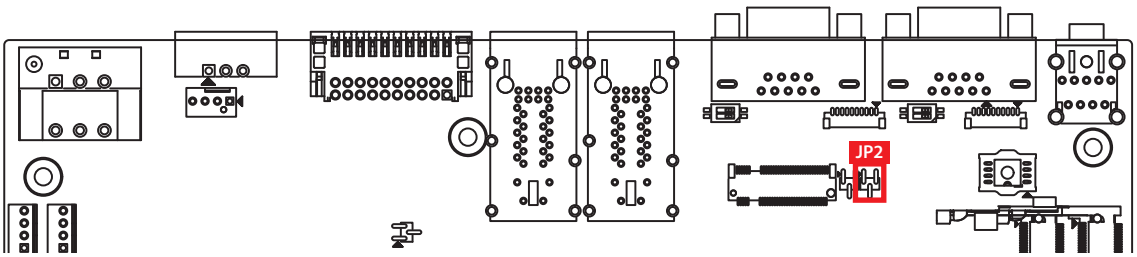
Layout	Pin No.	Description
	1-2	Supported Wake Up(Default)
	2-3	Non Wake Up support

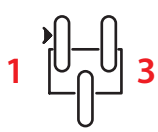
2.5.3 PoE Power ON Select(JPOE_PWR1)



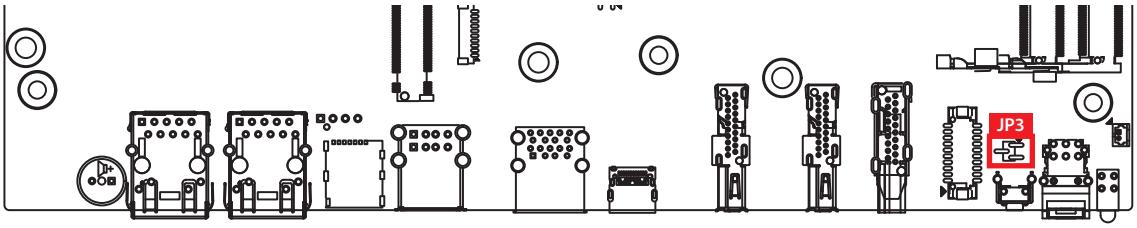
Layout	Pin No.	Description
	1-2	PoE power on at standby power ready
	2-3	PoE power on after system power on(Default)
	No Jumper	Disable PoE power

2.5.4 HDA_SDO1(JP2)



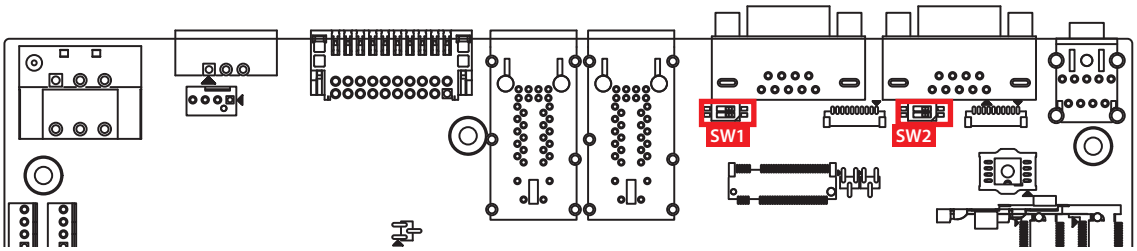
Layout	Pin No.	Description
	1-2	Enable security measures defined in the Flash Descriptor. (Default)
	2-3	Disable Flash Descriptor Security (override)

2.5.5 Clear CMOS(JP3)



Layout	Pin No.	Description
	1-2	Normal (Default)
	2-3	Clear CMOS

2.5.6 SW1,SW2: RS-485/422 RECEIVER TERMINATION RESISTANCE



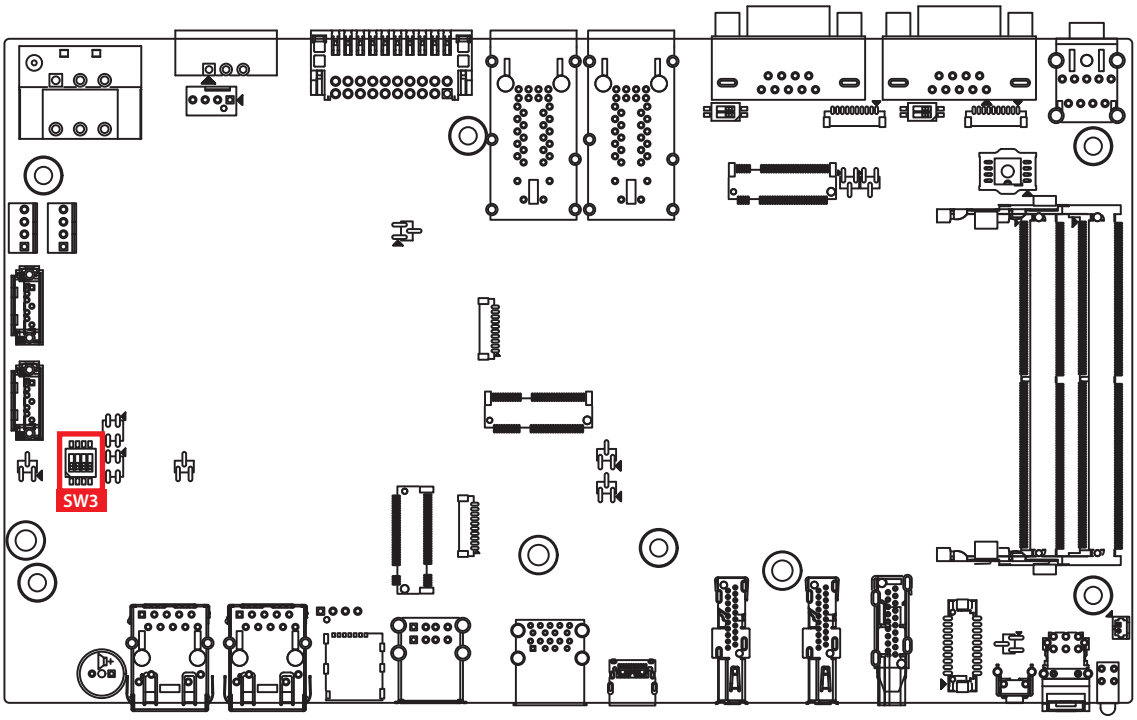
Location	Port	Setting	Function
SW1	COM1	1(ON)	DCD / RXD Termination 120R enable
		1(OFF)	DCD / RXD Termination 120R Disable(default)
	COM2	2(ON)	DCD / RXD Termination 120R enable
		2(OFF)	DCD / RXD Termination 120R Disable(default)
SW2	COM3	1(ON)	DCD / RXD Termination 120R enable
		1(OFF)	DCD / RXD Termination 120R Disable(default)
	COM4	2(ON)	DCD / RXD Termination 120R enable
		2(OFF)	DCD / RXD Termination 120R Disable(default)

2.6 Ignition Control

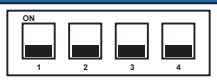
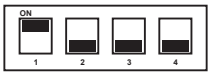
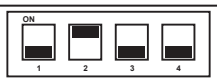
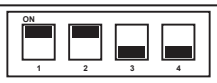
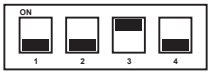
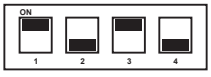
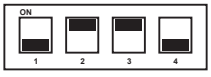
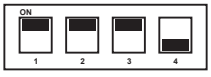
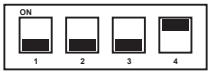
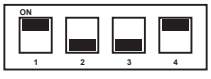
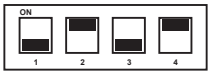
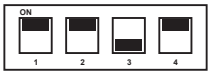
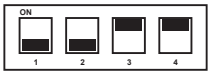
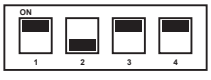
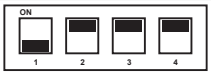
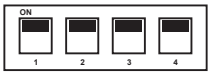
ECS-4700 series provides ignition power control feature for vehicle applications. The built-in MCU monitors the ignition signal and turns on/ off the system according to pre-defined on/off delay periods.

2.6.1 Adjust Ignition Control Modes

ECS-4700 series provides 16 modes of different power on/ off delay periods adjustable via rotary switch. The default rotary switch is set to 0 in ATX/AT power mode.

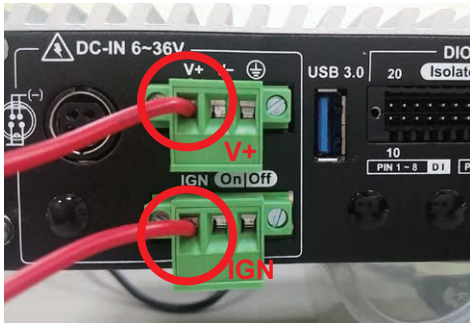


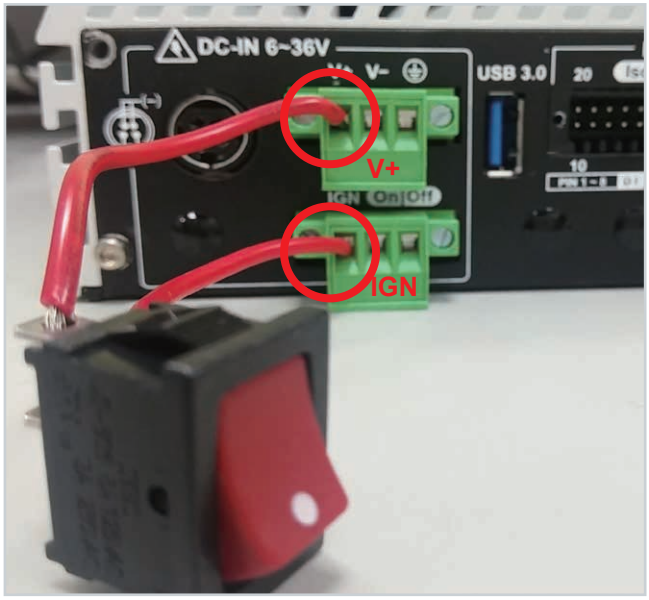
The modes are listed in the following table:

Item	Power on delay	Power off delay	Switch Position
0	ATX mode		
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 locates in the back panel. Please find below the general wiring configuration.



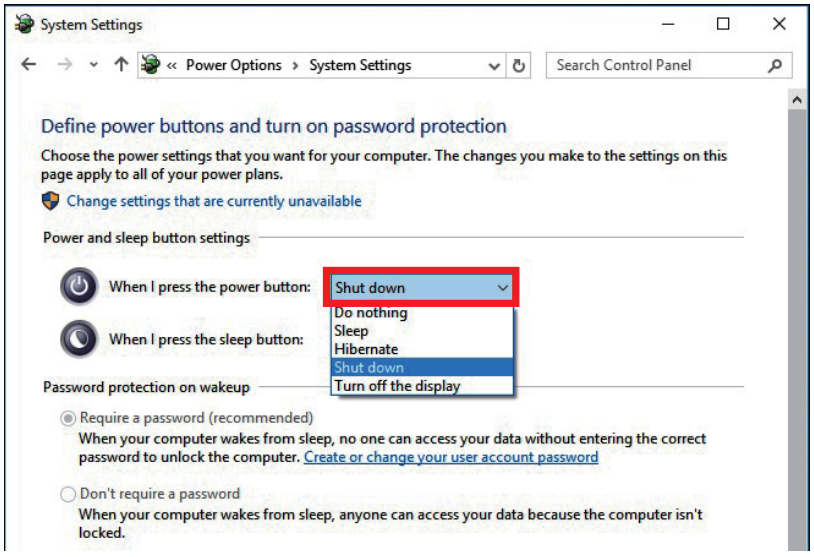


Pin No.	Definition
1	Ignition (IGN)
2	External Power S/W +
3	External Power S/W +

V+ : Positive polarity of DC power input (Car battery+ for 12/24/36V)
V- : Ground of DC power input (Car battery -/GND line to GND)
IGN : Ignition signal input (ACC power of vehicle)

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

Note:
1. DC power source and IGN share the same ground.
2. ECS-4700 supports 9V to 50V wide range DC power input in ATX/ AT mode. In Ignition mode, the input voltage is fixed to 12V/ 24V for car battery scenario.
3. For proper ignition control, the power button setting should be “Power down” mode.



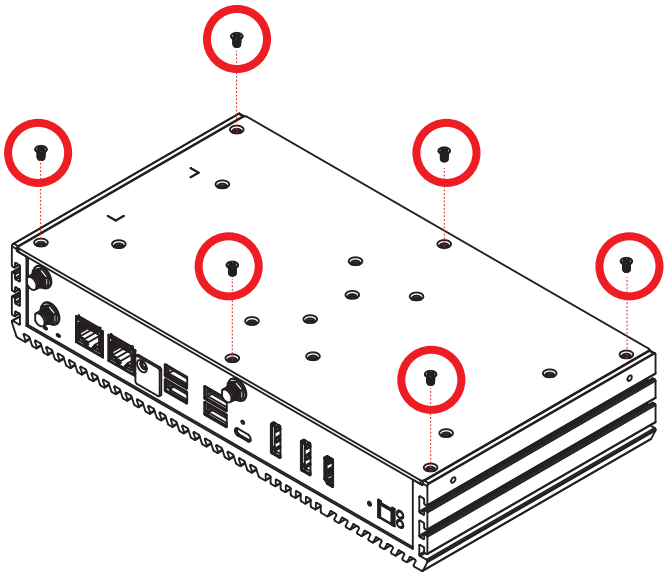
In Windows, for example, you need to set “When I press the power button” to "Shut down."

3

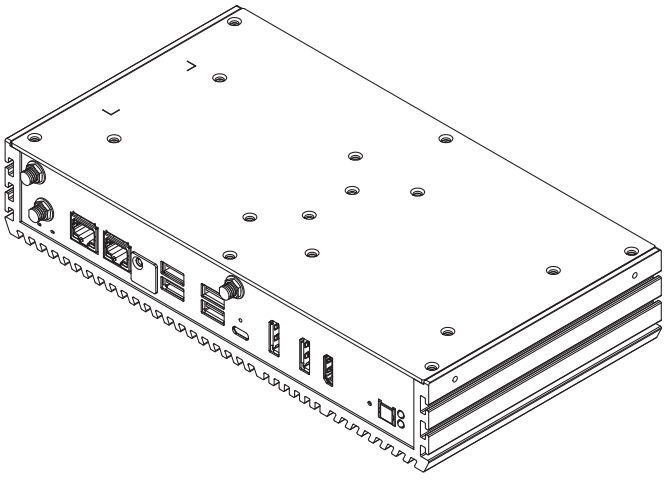
SYSTEM SETUP

3.1 How to Open Your ECS-4700

Step 1 Remove six Flat-M3x5L screws .

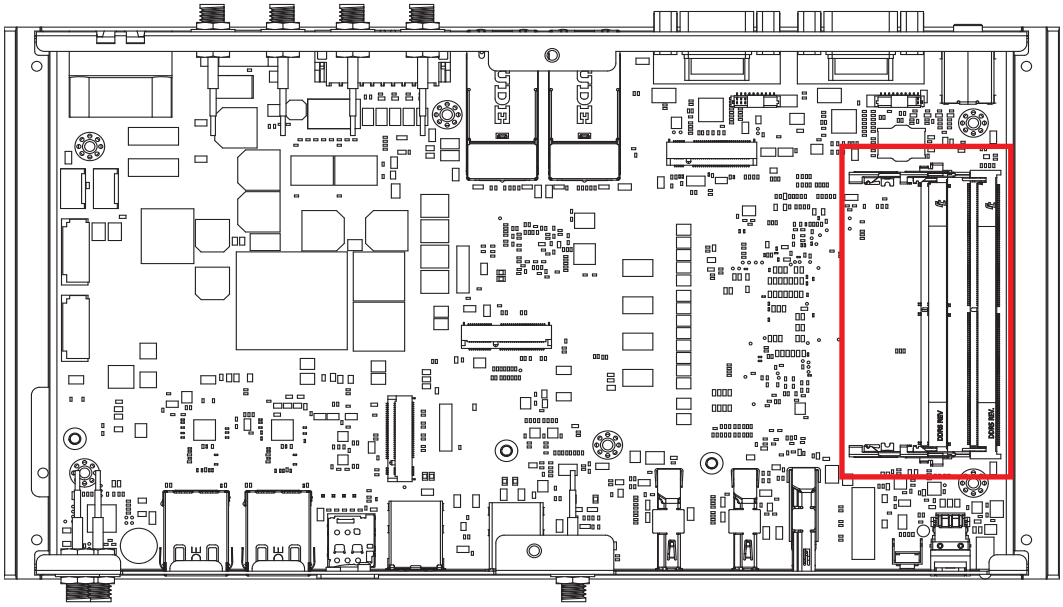


Step 2 Finish.

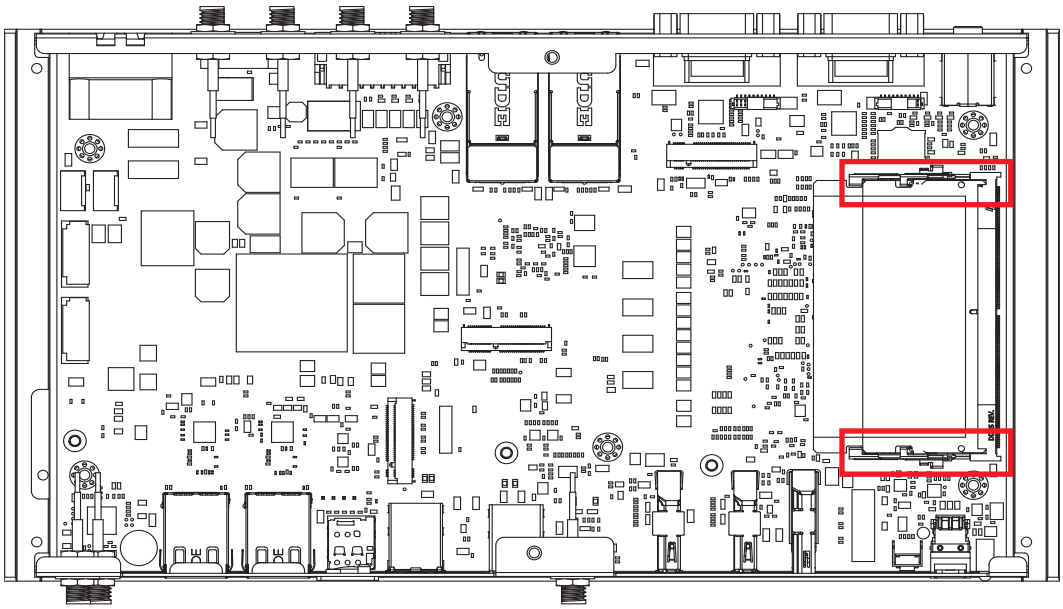


3.2 Installing DDR5 SO-DIMM Modules

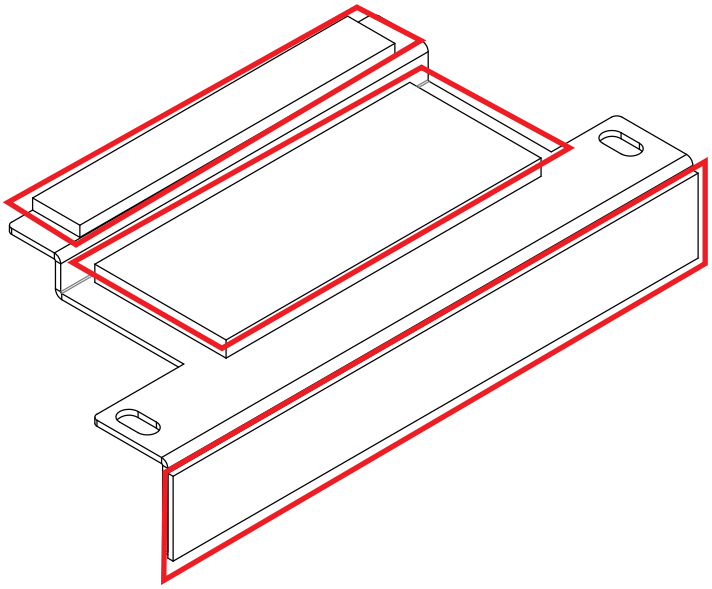
Step 1 Install DDR5 into SO-DIMM slot.
(Only install one DDR5, it is recommend to install on DDR5_A1)



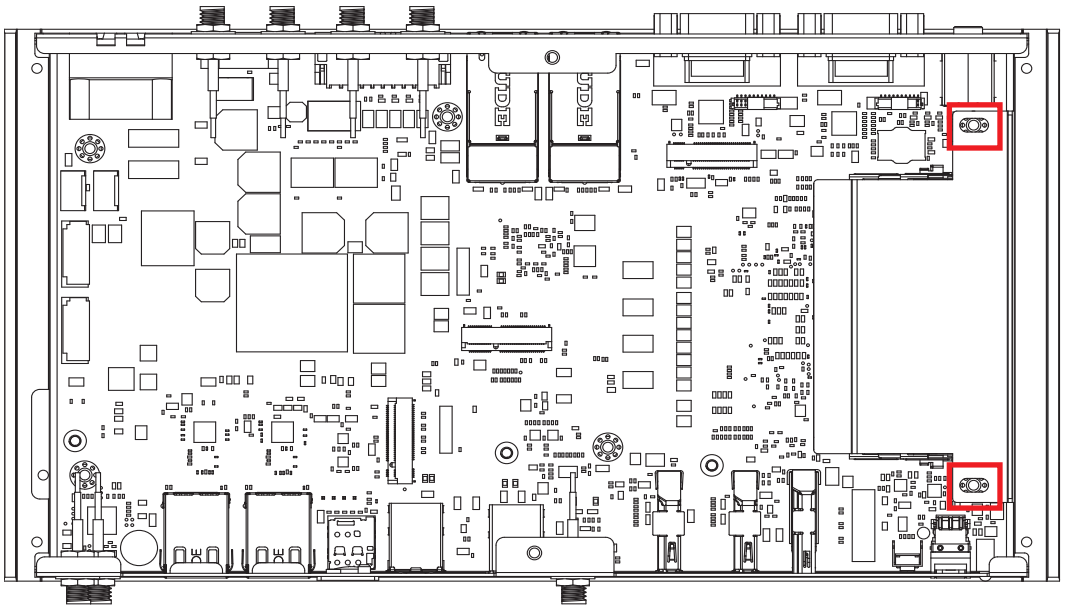
Step 2 Make sure the RAM module is locked by the memory slot.



Step 3 Reomve thermal pad flim on DDR5 Cu Plate.

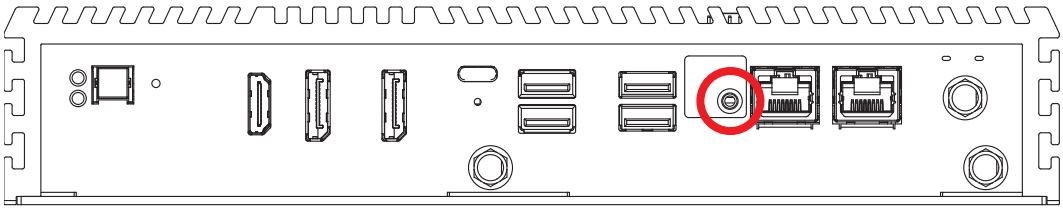


Step 4 Install DDR5 Cu Plate on SO-DIMM and fasten two PH-M3x4L screws.



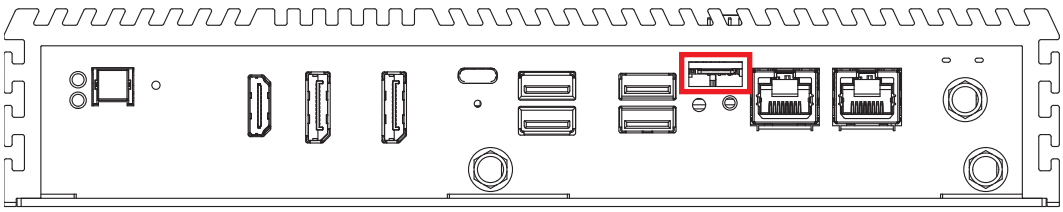
3.3 Installing Nano PCIe Card

Step 1 Remove one Flat-M3x5L screw on SIM cover at front panel.



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

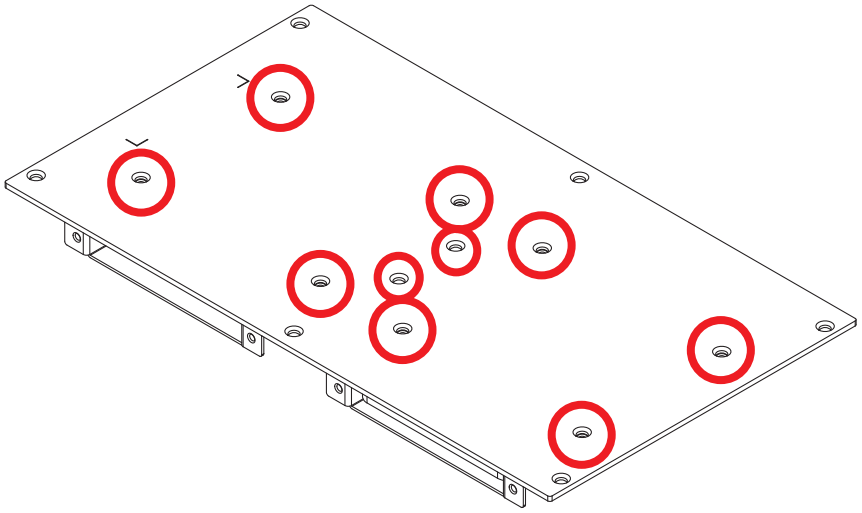
Step 3 Insert SIM card and push to lock.



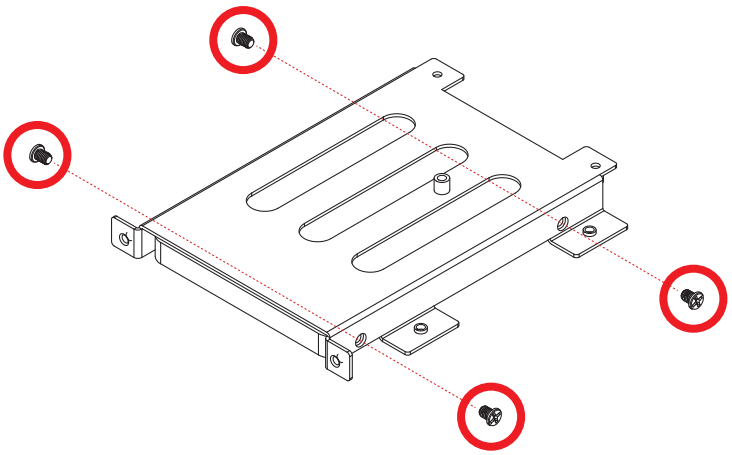
3.4 Installing SSD/ HDD

3.4.1 ECS-4700-PoE/2G

Step 1 Remove ten Flat-M3x5L screws.

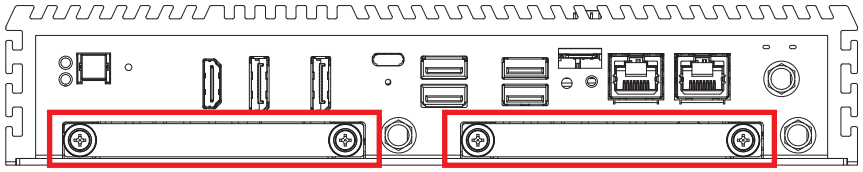


Step 2 Fix one SSD/HDD on the tray with four I-M3x3 screws .

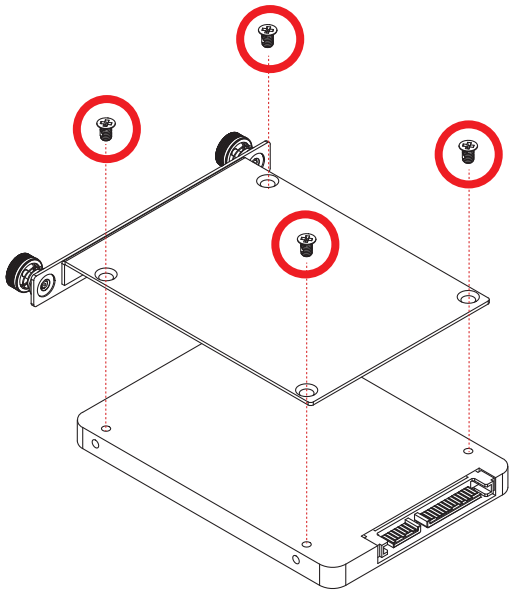


3.4.2 ECS-4700-PoER

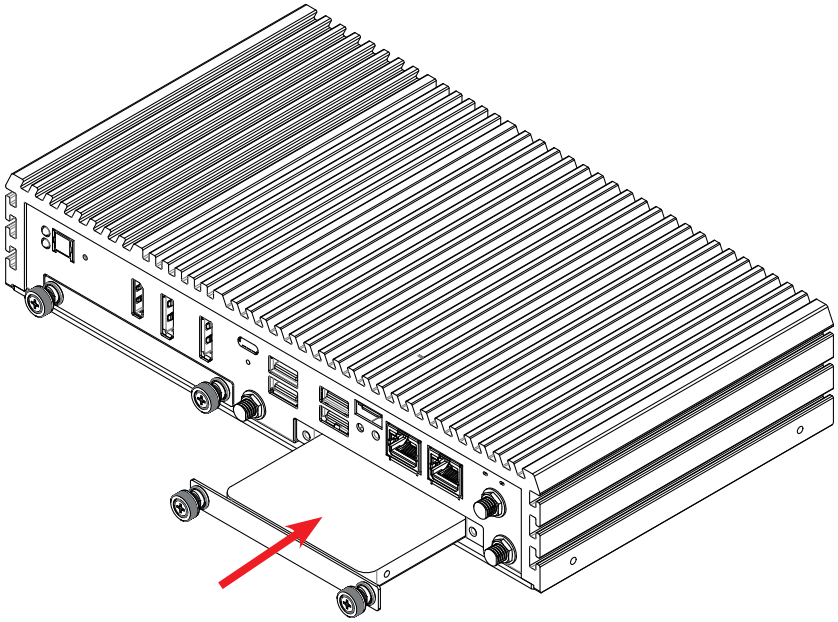
Step 1 SSD/HDD Tray.



Step 2 Fix one SSD/HDD on the tray with four Flat-M3x4L screws.



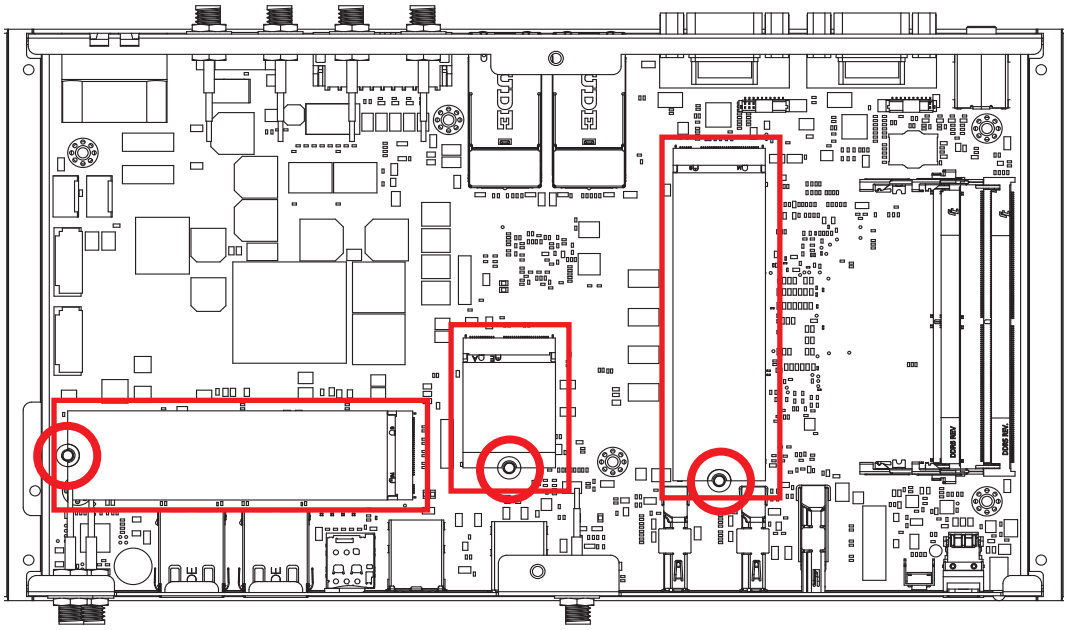
Step 3 Put the SSD/HDD tray and then clockwisely fasten the locks.



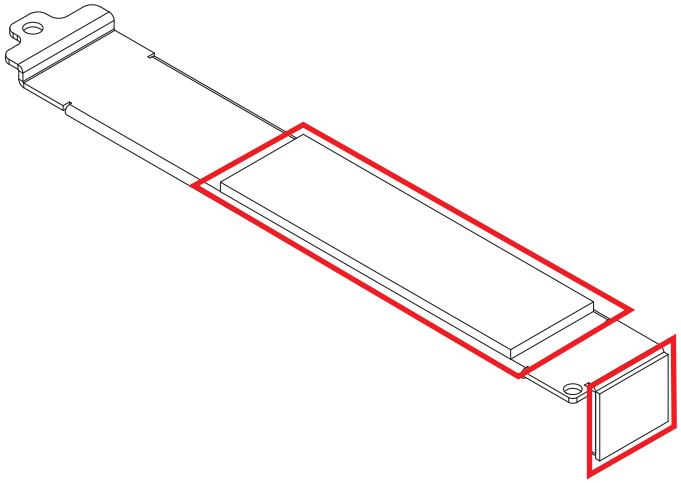
3.5 Installing M.2

3.5.1 M.2 Key E 2230 / Key B 2280 / Key M 2280

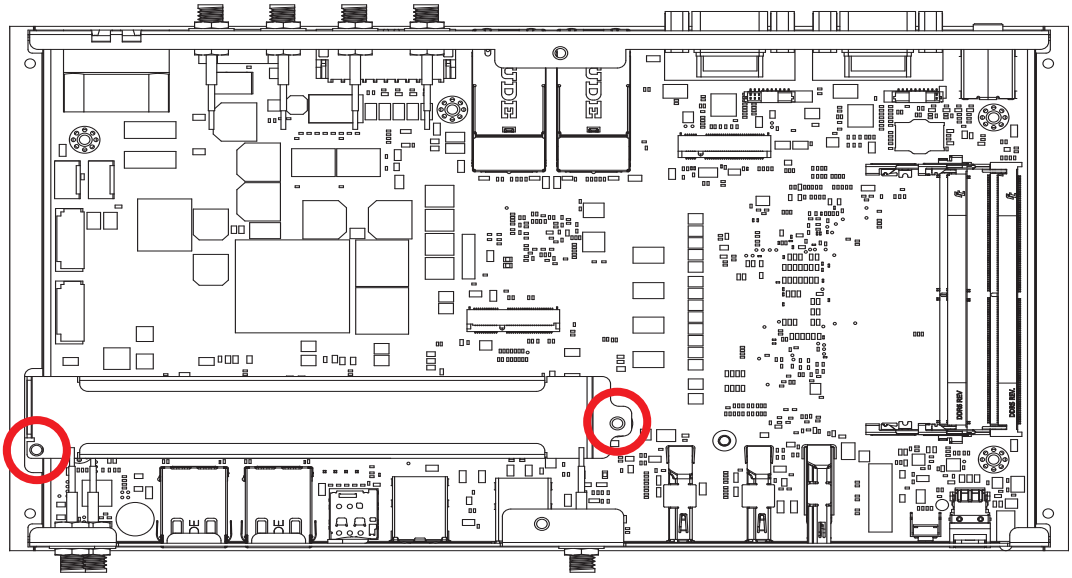
Step 1 Install M.2 Key E 2230/ Key B 2280 / Key M 2280 into slot and fasten PH M3x4L screw.



Step 2 Reomve thermal pad flim on M.2 Key M Cu Plate.

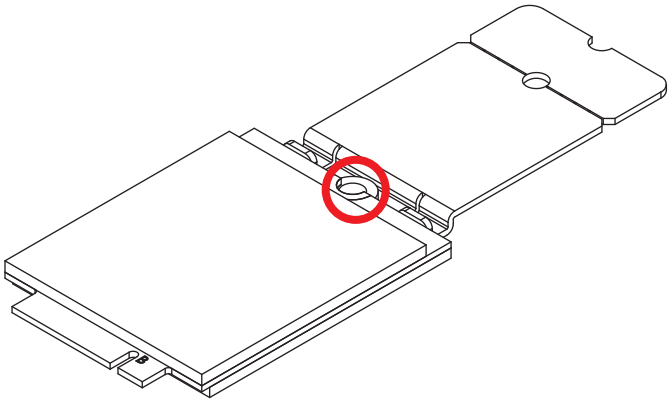


Step 3 Install M.2 Key M Cu Plate and fasten two PH-M3x4L screws.

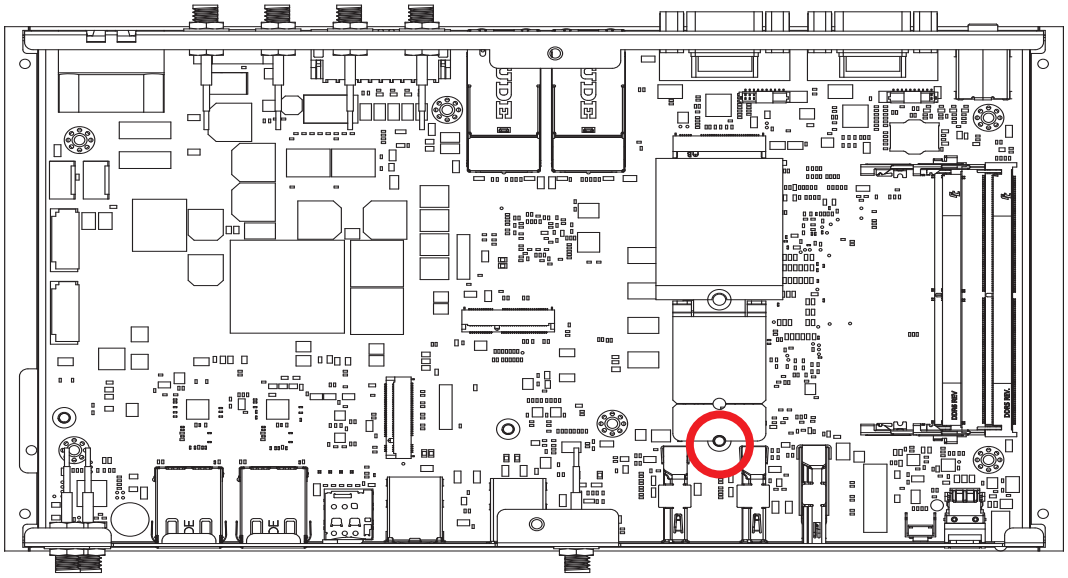


3.5.2 M.2 Key B 3042

Step 1 Install M.2 Key B 3042 on extend bracket and fasten one PH-M3x4L screw.

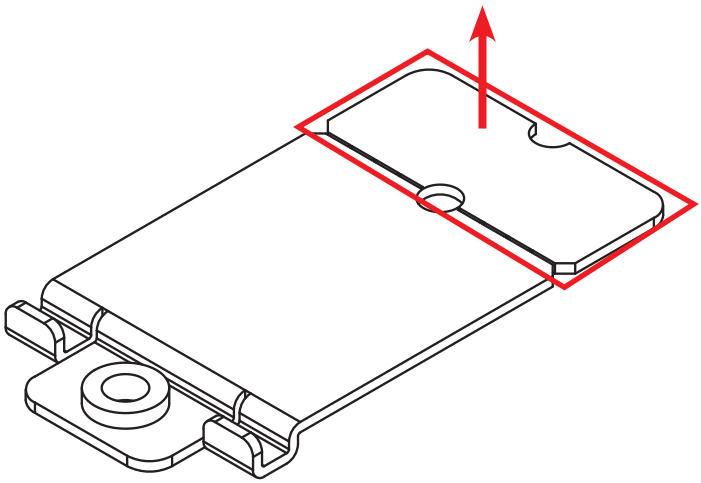


Step 2 Install module into slot and fasten PH M3x4L screw.

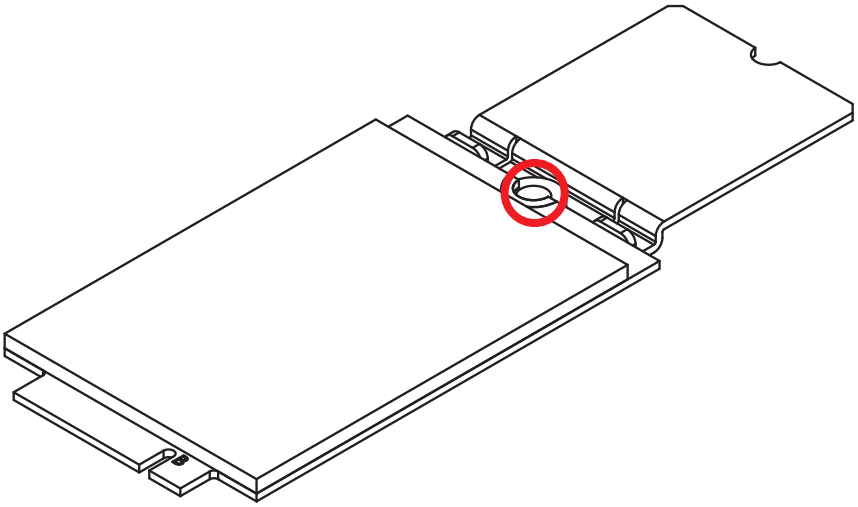


3.5.3 M.2 Key B 3052

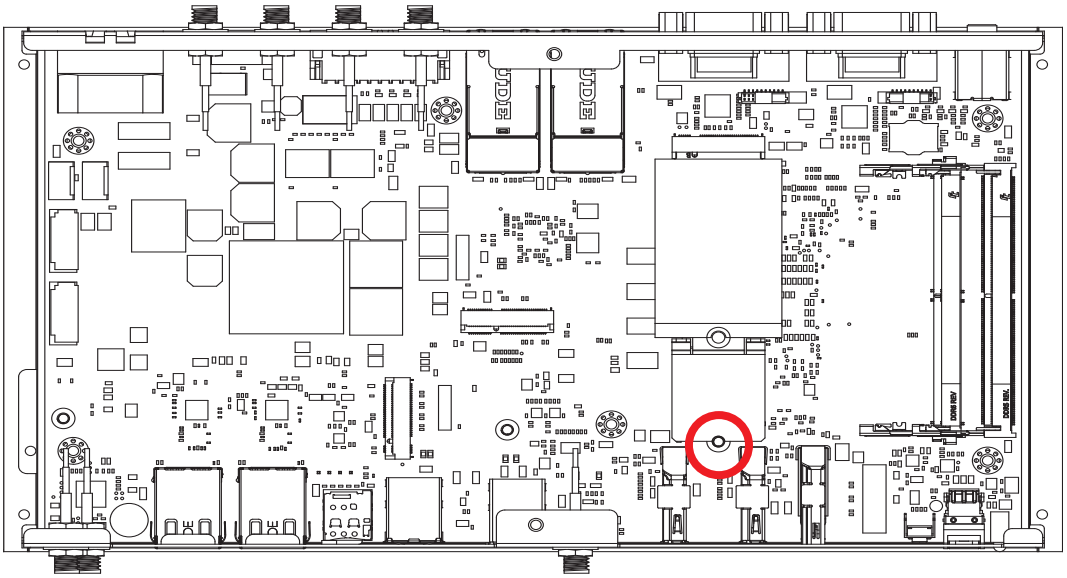
Step 1 Break off excess extender bracket.



Step 2 Install M.2 Key B 3052 on extend bracket and fasten one PH-M3x4L screw.



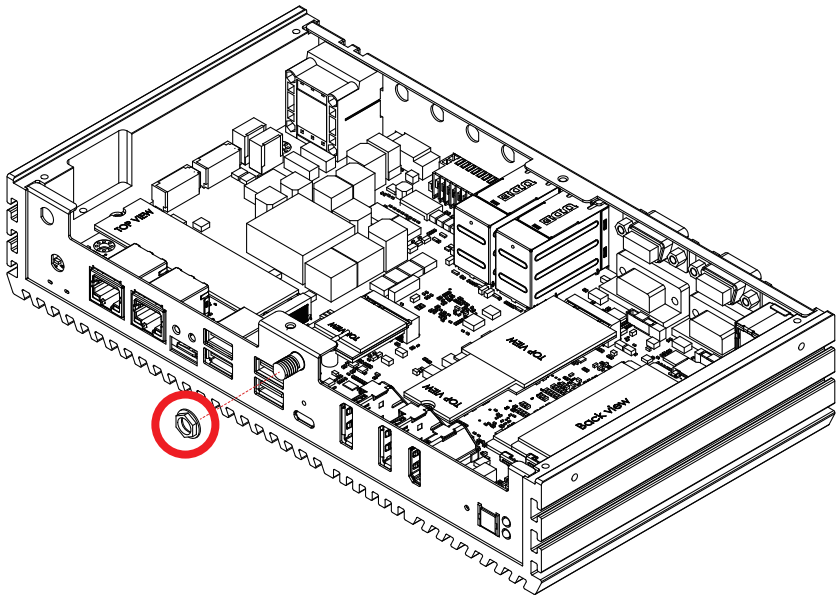
Step 3 Install module into slot and fasten PH M3x4L screw.



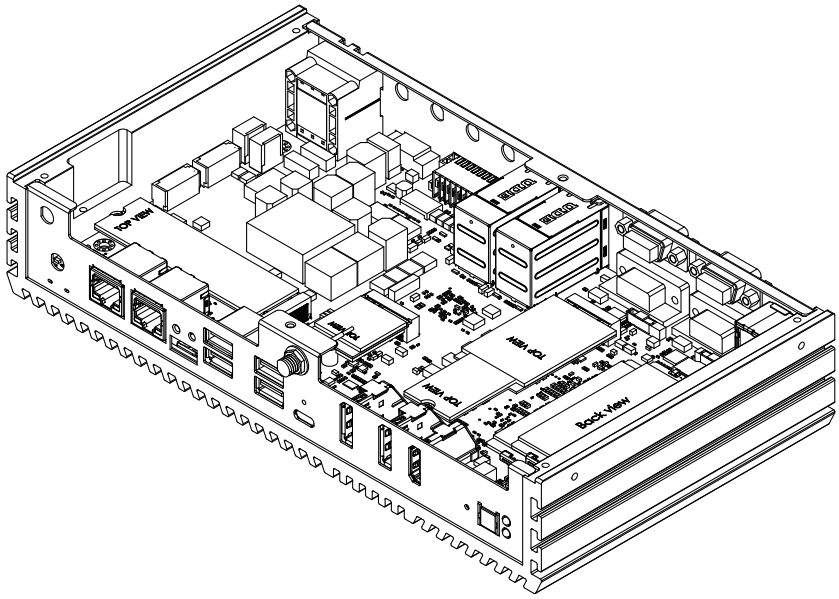
3.6 Installing Antenna Cable

Step 1 Remove the rubber corks on the panel.

Step 2 Put antenna cable connector into the hole on panel.



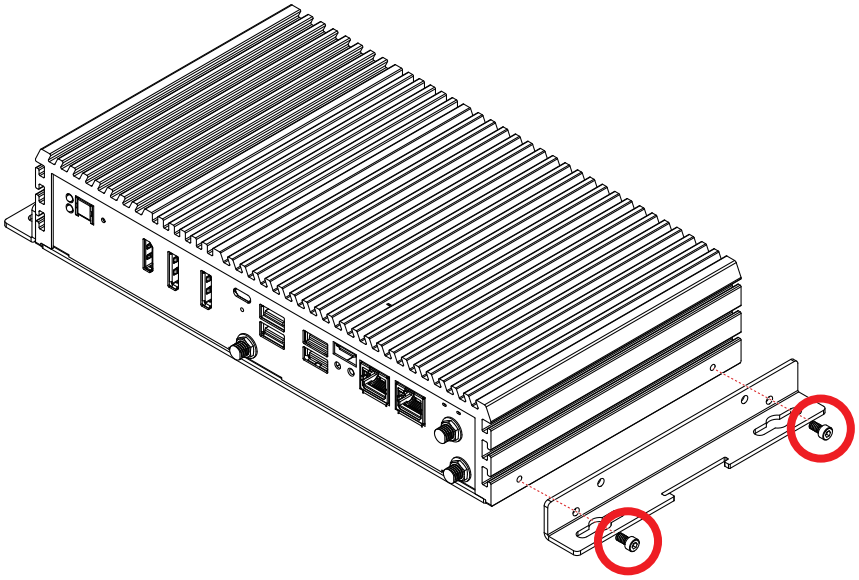
Step 3 Fasten washer on the antenna cable connector.



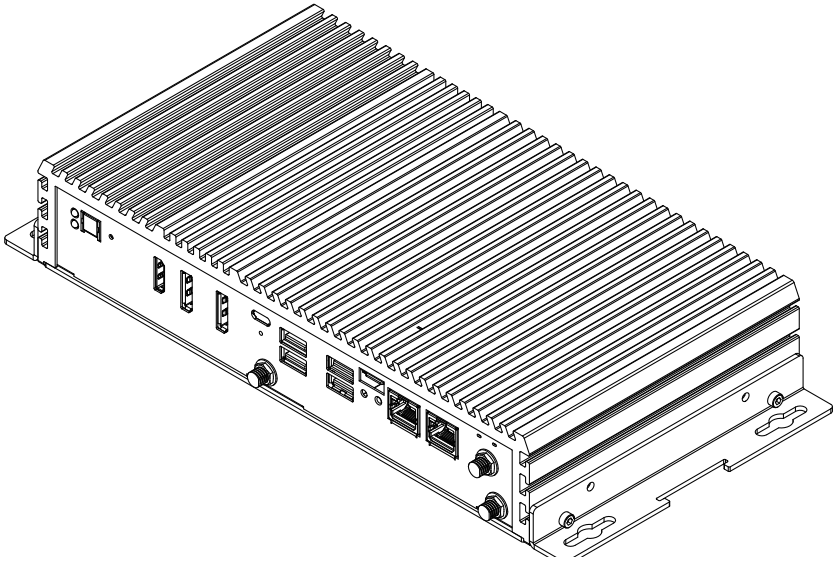
3.7 Mounting Your ECS-4700

3.7.1 Wall Mount Bracket

Step 1 Ensure the screw holes on the right and left side of upper case match the ones on ECS-4700.Fasten four Hexagon #6-32x6L screws.

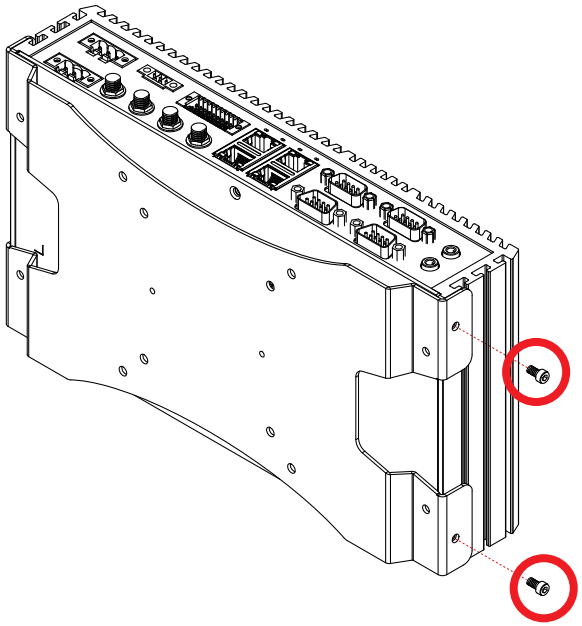


Step 2 Finish.

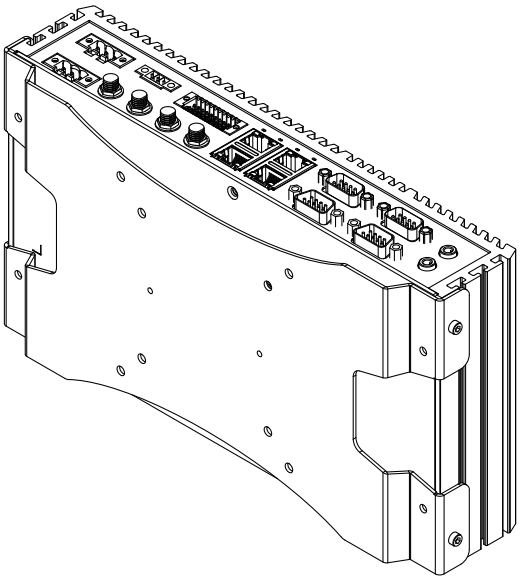


3.7.2 VESA Mount (75mm x 75mm & 100mm x 100mm)

Step 1 Ensure the screw holes on the right and left side of upper case match the ones on ECS-4700.Fasten four Hexagon #6-32x6L screws.

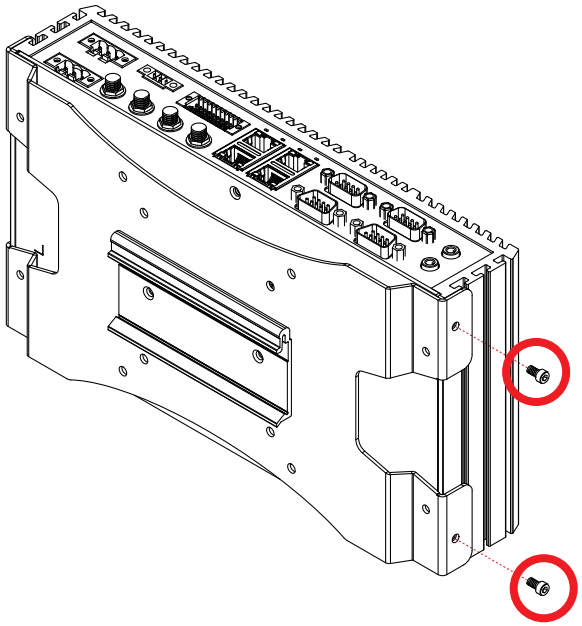


Step 2 Finish.

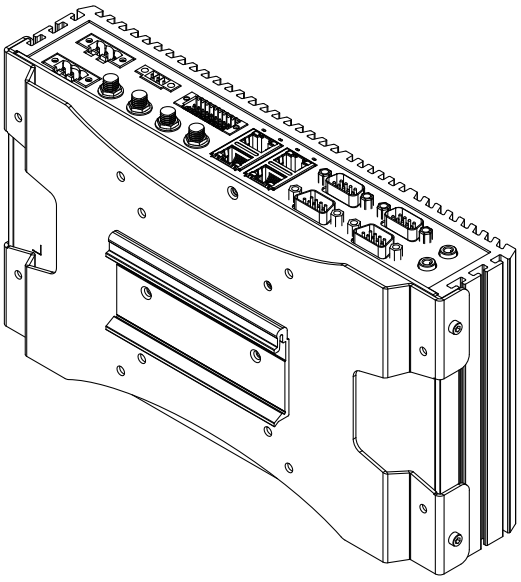


3.7.3 Din Rail Kit

Step 1 Ensure the screw holes on the right and left side of upper case match the ones on ECS-4700.Fasten four Hexagon #6-32x6L screws.



Step 2 Finish.



4

BIOS SETUP

4.1 BIOS SETUP

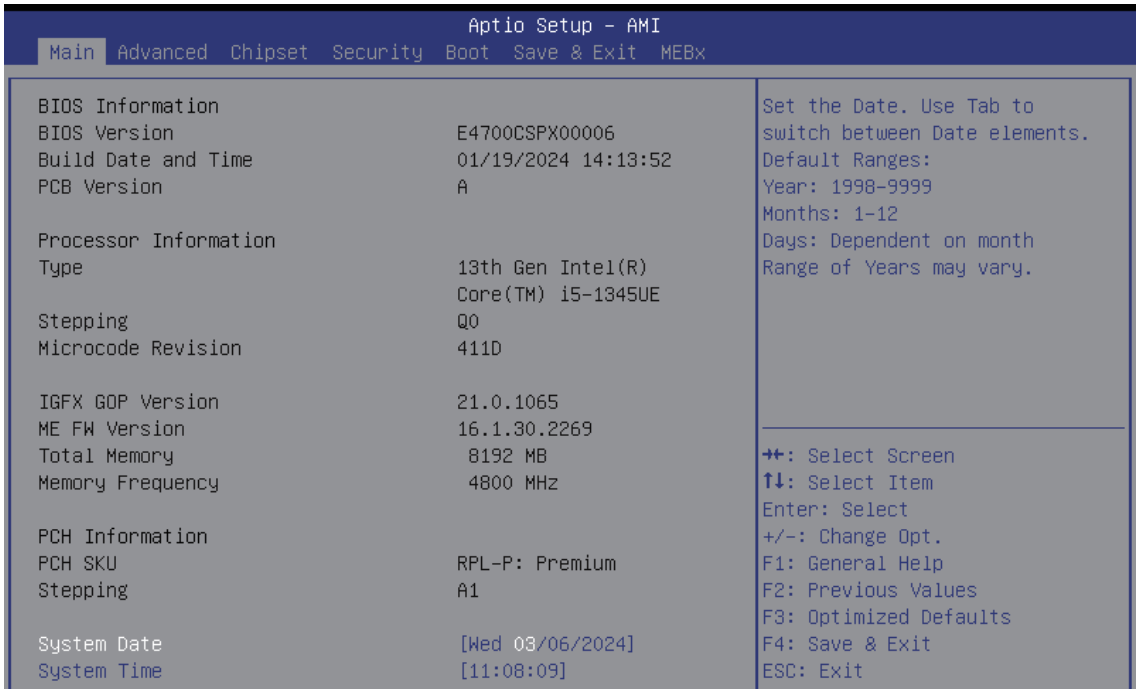


Figure 4-1: Entering Setup Screen

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 Menu

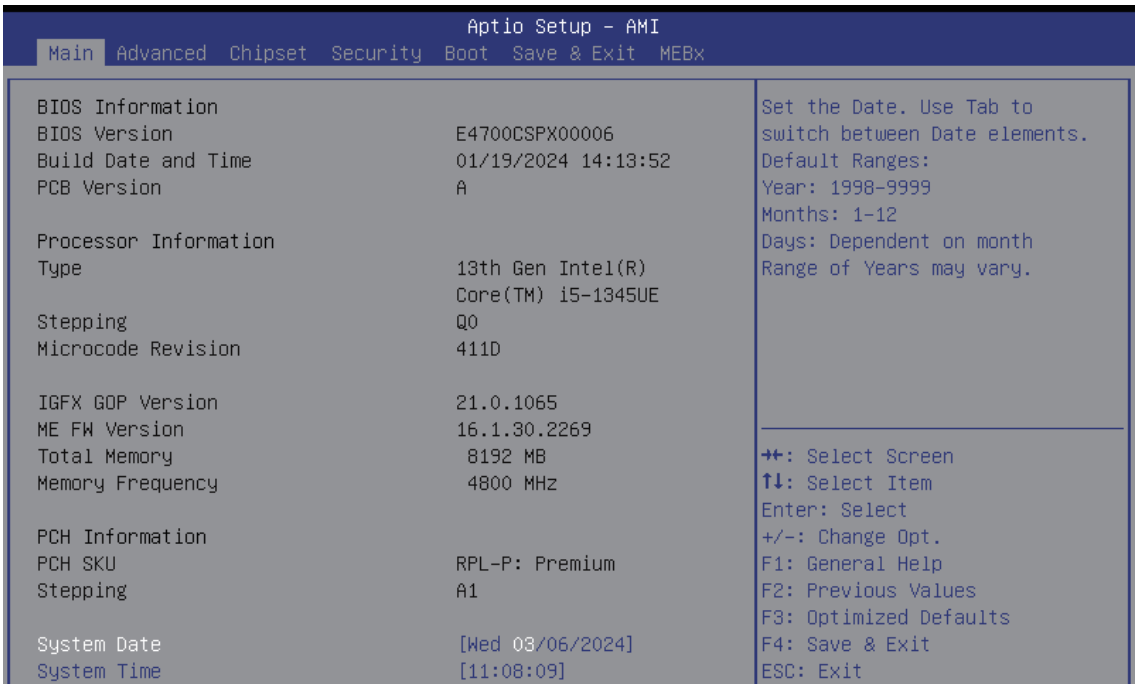


Figure 4-2: BIOS Main Menu

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

System Date

Set the Date. Use <Tab> to switch between Date elements.
Default Ranges:
Year: 1998-9999
Months: 1-12
Days: Dependent on month
Range of Years may vary.

System Time

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

4.3 Advanced Function

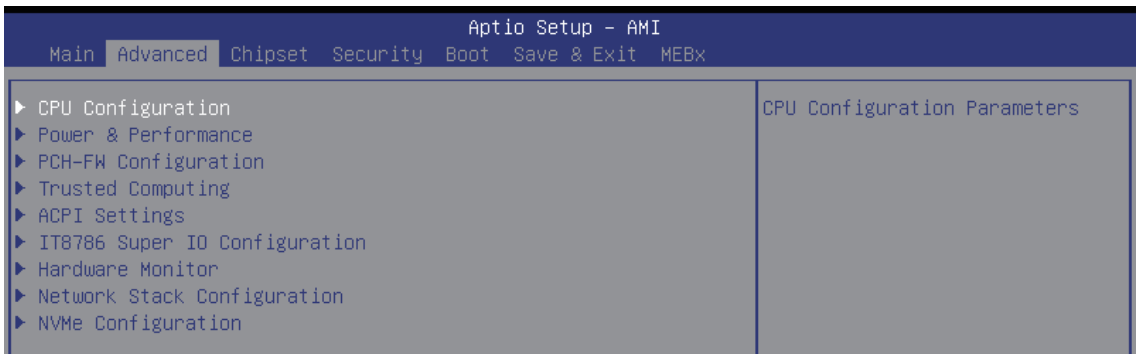


Figure 4-3: BIOS Advanced Function

Select advanced tab to enter advanced BIOS setup options such as CPU configuration, ACPI settings, and Super IO configuration.

4.3.1 CPU Configuration

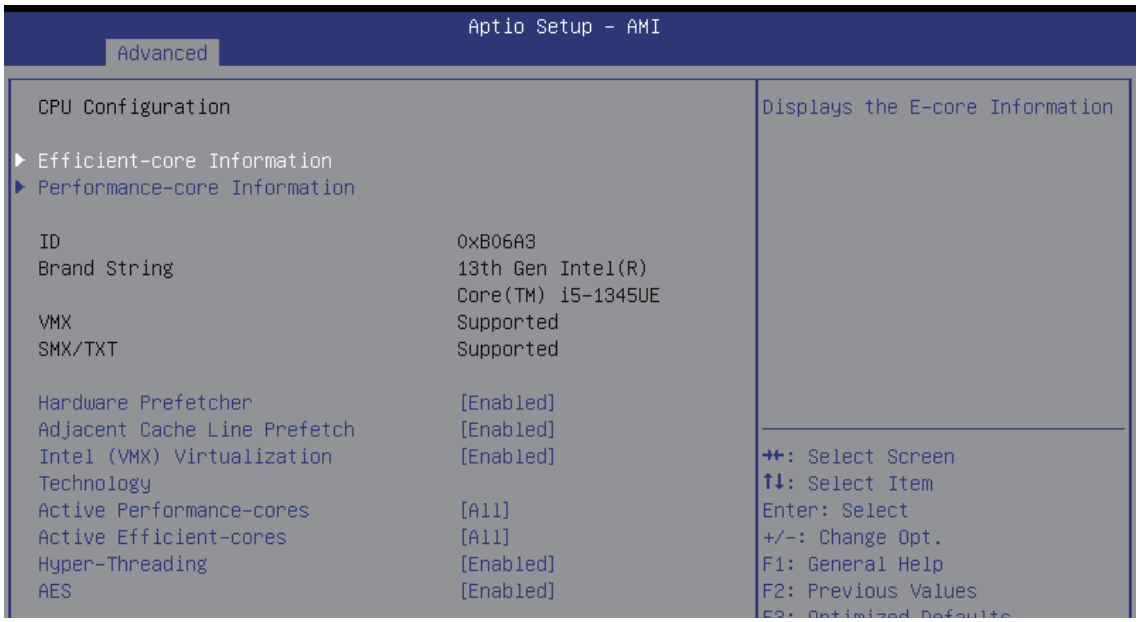


Figure 4-3-1: CPU Configuration

Efficient-core Information
Displays the E-core Information

Performance-core Information
Displays the P-core Information

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 Performance-cores
Number of P-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.

Active Efficient-cores
Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.

Hyper-Threading
Enable or Disable Hyper-Threading Technology.

AES
Enable/Disable AES (Advanced Encryption Standard)

4.3.2 Power & Performance

Figure 4-3-2: Power & Performance

4.3.2.1 Power & Performance

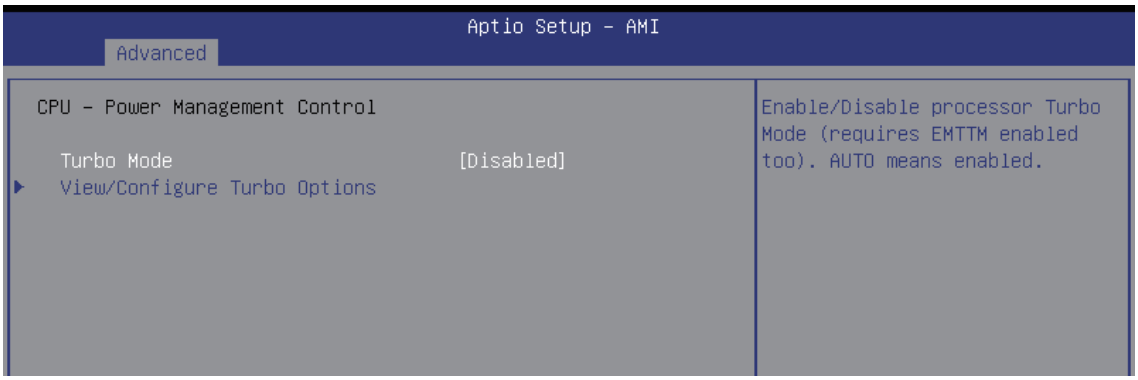


Figure 4-3-2-1: CPU - Power Management Control

Turbo Mode
Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.

View/Configure Turbo Options
View/Configure Turbo Options

4.3.3 PCH-FW Configuration

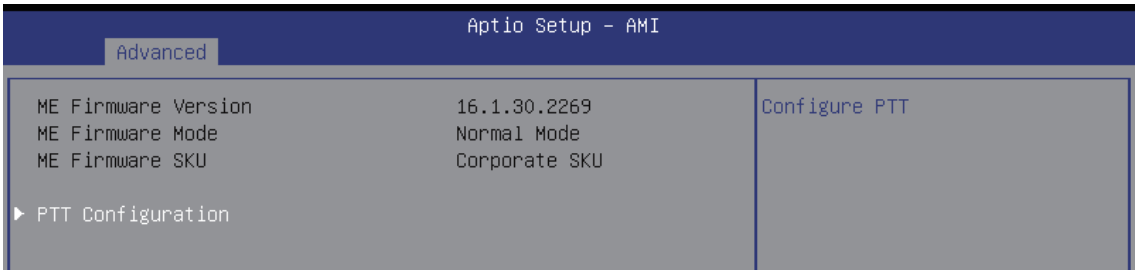


Figure 4 3-3: PCH-FW Configuration

4.3.3.1 PTT Configuration

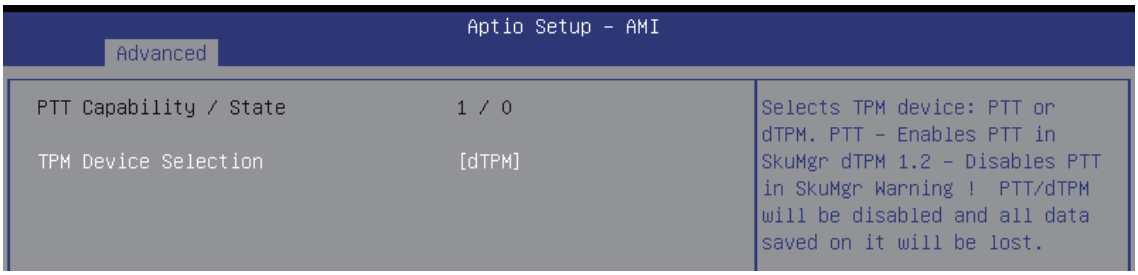


Figure 4-3-3-1: PTT Configuration

TPM Device Selection
Selects TPM device: PTT or dTPM.
PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT is SkuMgr Warning! PTT/dTPM will be disabled and all data saved on it will be lost.

4.3.4 Trusted Computing

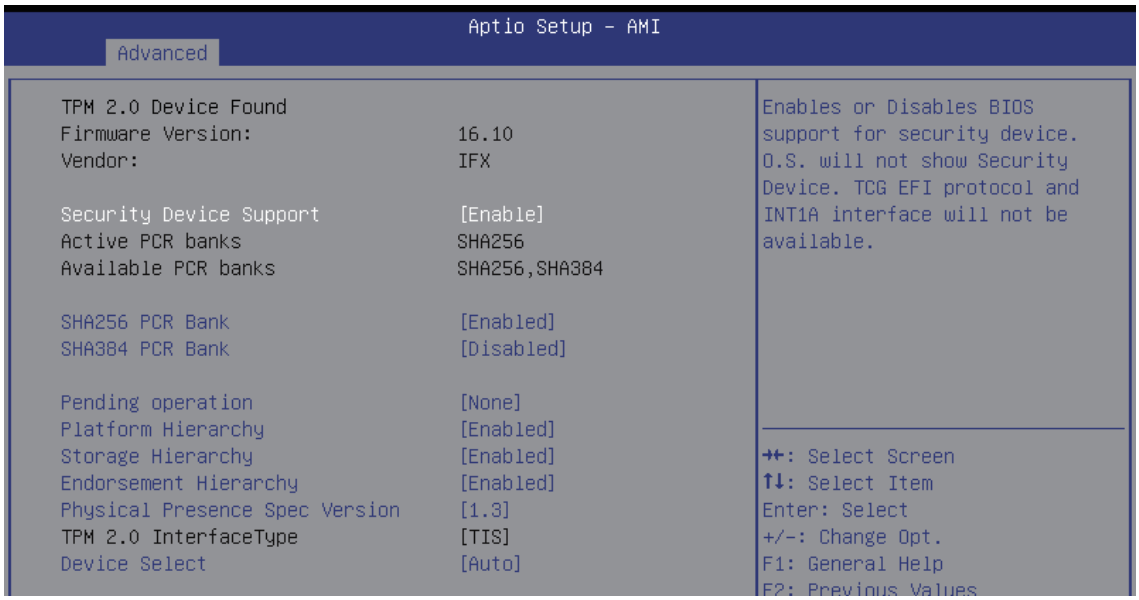


Figure 4-3-4: Trusted Computing

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

4.3.5 ACPI Settings

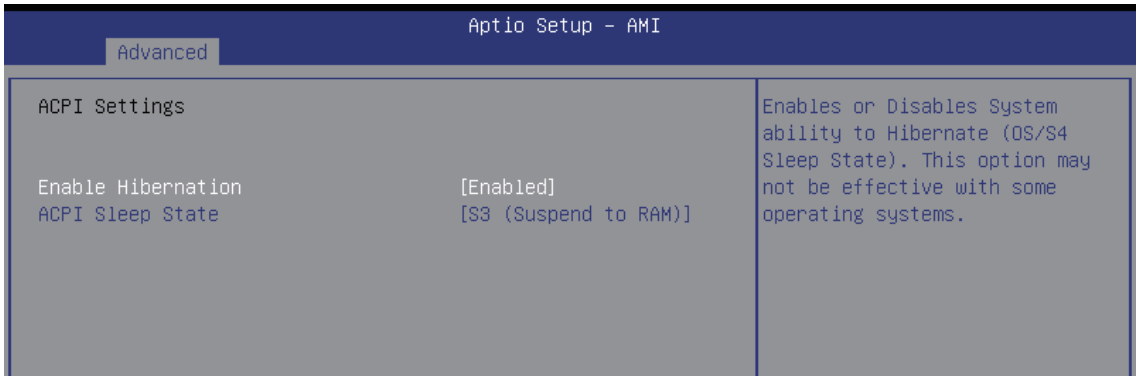


Figure 4-3-5: ACPI Settings

Enable Hibernation

Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.

ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

4.3.6 IT8786 Super IO Configuration

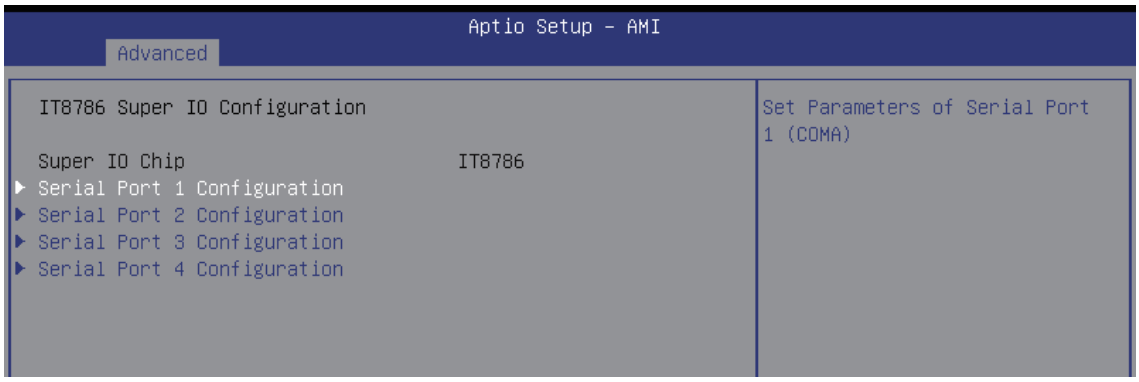


Figure 4-3-6: IT8786 Super IO Configuration

4.3.6.1 Serial Port X Configuration

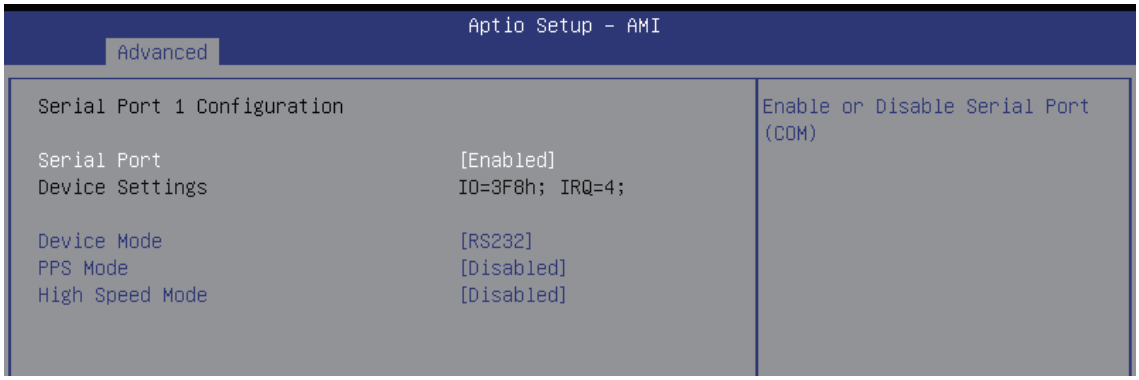


Figure 4-3-6-1: Serial Port X Configuration

Serial Port
Enable or Disable Serial Port (COM)

Device Mode
Select Device Mode.

PPS Mode
Enable or Disable PPS.

High Speed Mode (Port 1 only)
Enable or Disable Serial Port High Speed.

4.3.7. Hardware Monitor

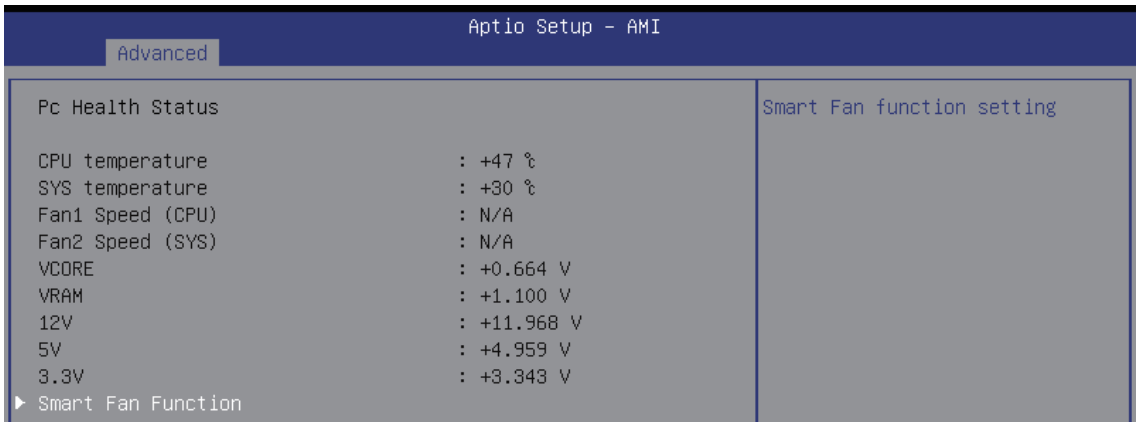


Figure 4-3-7-: Hardware Monitor

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

4.3.7.1 Smart Fan Function

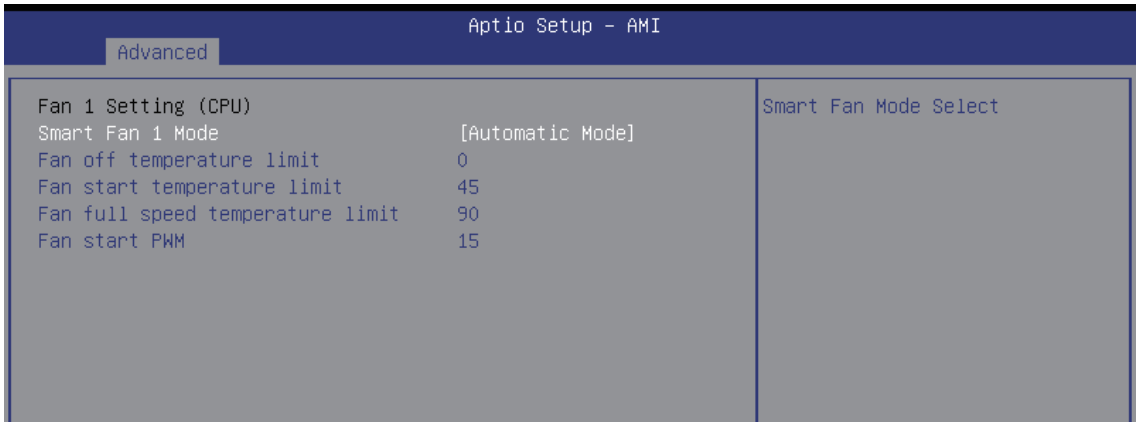


Figure 4-3-7-1: Smart Fan Function

Smart Fan X Mode
Smart Fan Mode Select

Fan off temperature limit
Fan will off when temperature lower than this limit

Fan start temperature limit
Fan will work when temperature higher than this limit

Fan full speed temperature limit
Fan will full speed when temperature higher than this limit

Fan start PWM
Fan will start with this PWM value.

Manual PWM Setting
Fan will work with this Manual PWM Value

4.3.8 Network Stack Configuration

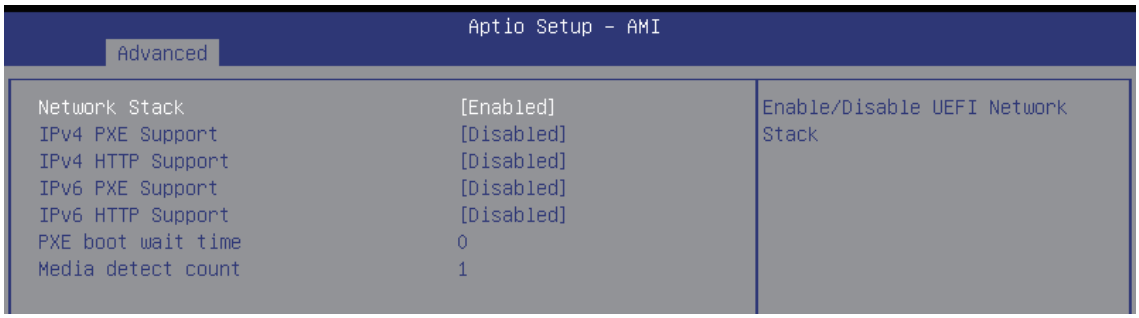


Figure 4 3-8: Network Stack Configuration

Network Stack
Enable/Disable UEFI Network Stack.

IPv4 PXE Support
Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

IPv4 HTTP Support
Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.

IPv6 PXE Support
Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

IPv6 HTTP Support
Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.

PXE boot wait time
Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count
Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

4.3.9 NVMe Configuration

Figure 4 3-9: NVMe Configuration

Display NVMe controller and Drive information.

4.4 Chipset Function

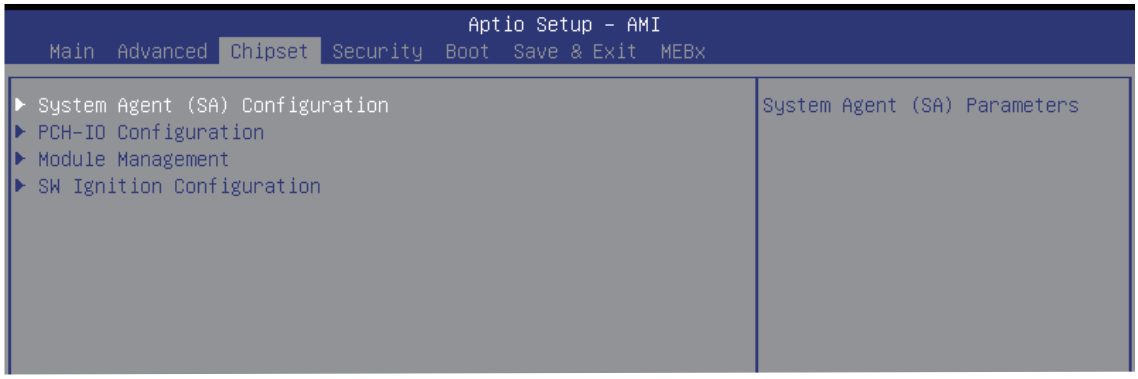


Figure 4-4: Chipset Function

Select Chipset tab to enter chipset BIOS setup options, such as System Agent (SA) Configuration, PCH-IO Configuration, and SW Ignition Configuration.

4.4.1 System Agent (SA) Configuration

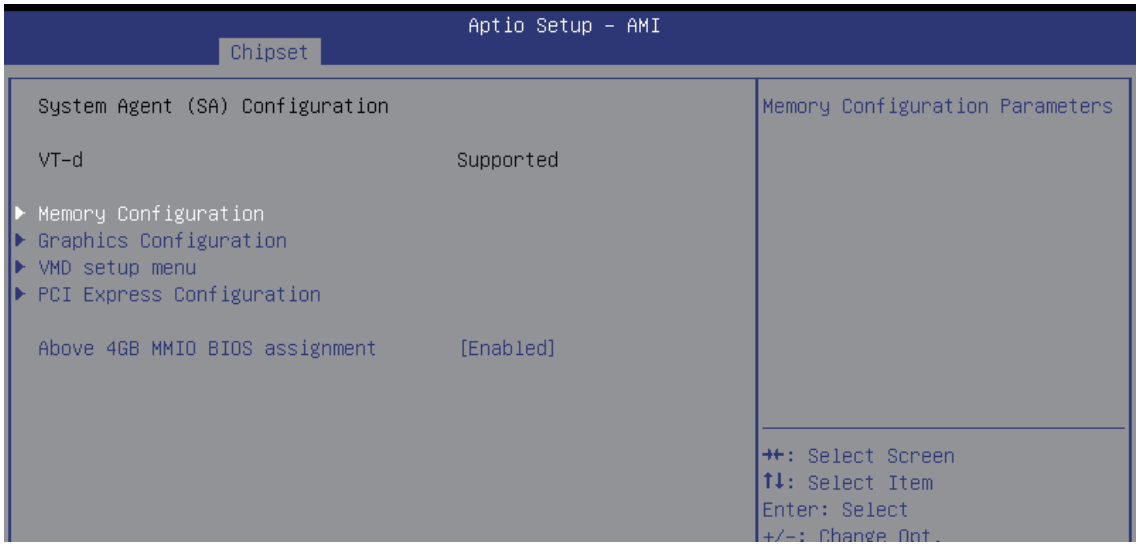


Figure 4-4-1: System Agent (SA) Configuration

Above 4GB MMIO BIOS assignment

Enable/Disable above 4GB MemoryMappedIO BIOS assignment. This is enabled automatically when Aperture Size is set to 2048MB.

4.4.1.1 Memory Configuration

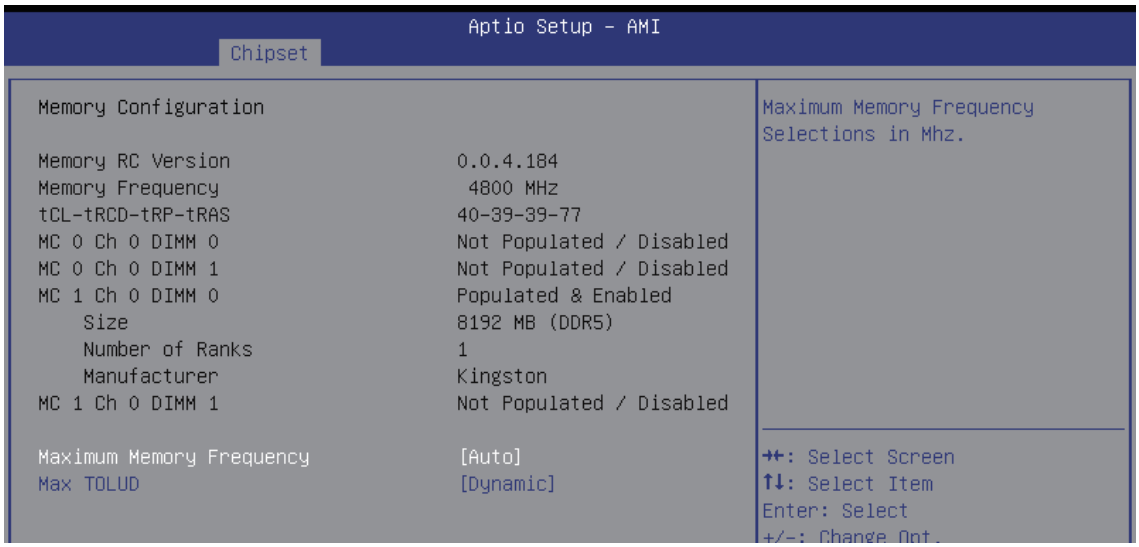


Figure 4-4-1-1: Memory Configuration

Maximum Memory Frequency

Maximum Memory Frequency Selections in Mhz.

Max TOLUD

Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller

4.4.1.2 Graphics Configuration

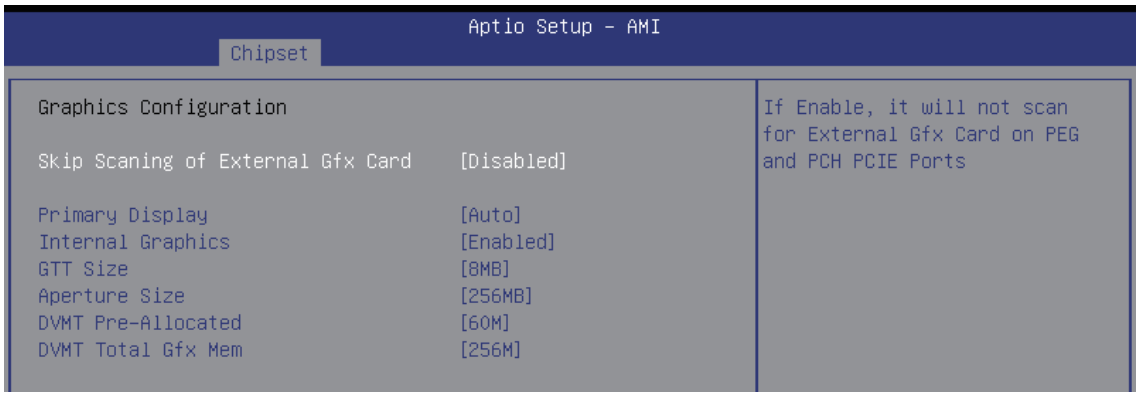


Figure 4-4-1-2: Graphics Configuration

Skip Scaning of External Gfx Card
If Enable, 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 HG for Hybrid 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 VMD setup menu

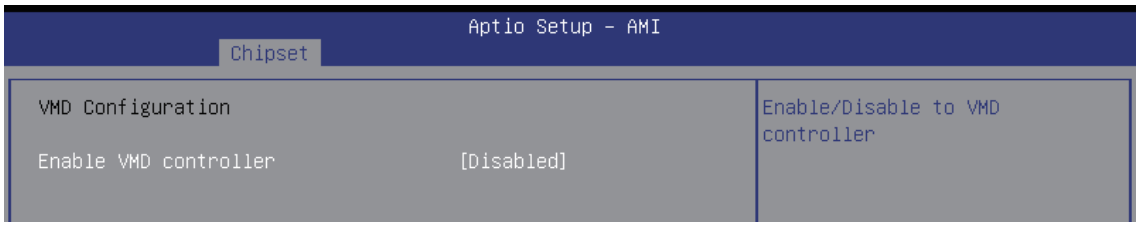


Figure 4-4-1-3: VMD setup menu

Enable VMD controller
Enable/Disable to VMD controller.

4.4.1.4. PCI Express Configuration (SA)

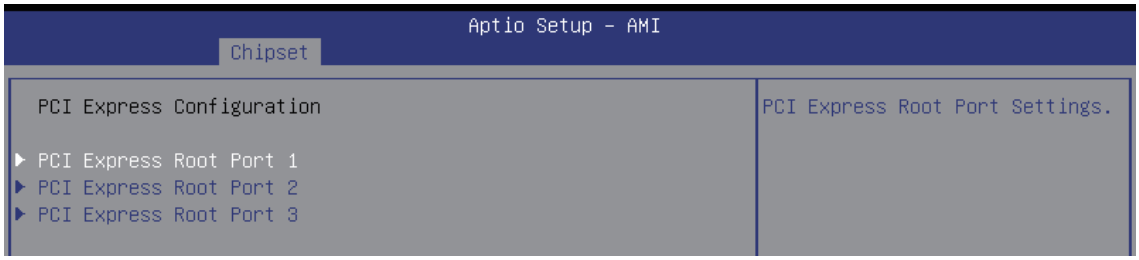


Figure 4-4-1-4: PCI Express Configuration (SA)

PCI Express Root Port X
PCI Express Root Port Settings.

4.4.1.4.1 PCI Express Root Port X (SA)

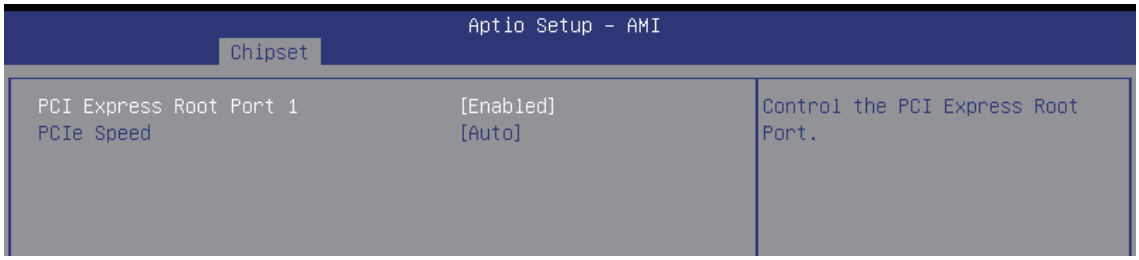


Figure 4-4-1-4-1: PCI Express Root Port X (SA)

PCI Express Root Port X
Control the PCI Express Root Port.

PCIe Speed
Configure PCIe Speed.

4.4.2 PCH-IO Configuration

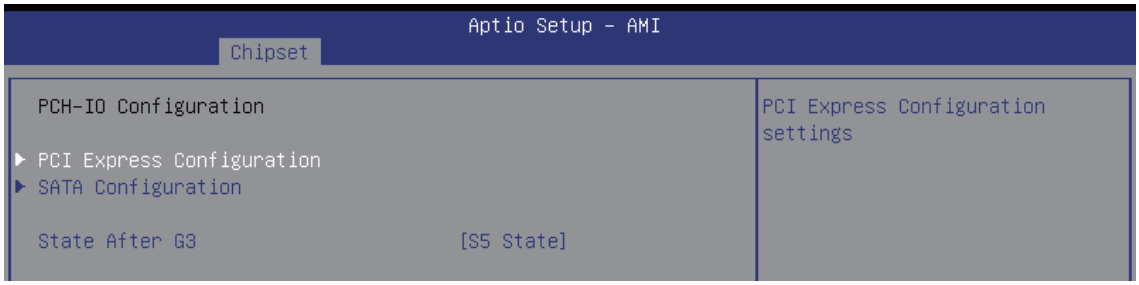


Figure 4-4-2: PCH-IO Configuration

State After G3

Specify what state to go to when power is re-applied after a power failure (G3 state).

4.4.2.1 PCI Express Configuration (PCH-IO)

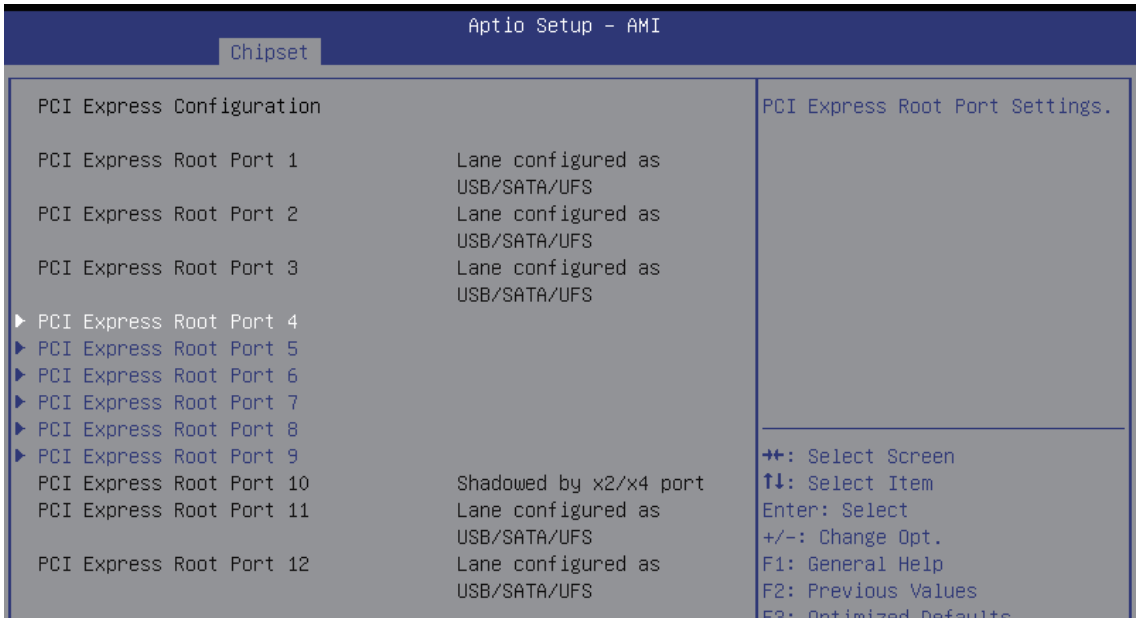


Figure 4-4-2-1: PCI Express Configuration (PCH-IO)

4.4.2.2 PCI Express Root Port X (PCH-IO)

Figure 4-4-2-2: PCI Express Root Port X (PCH-IO)

PCI Express Root Port X

Control the PCI Express Root Port.

PCIe Speed

Configure PCIe Speed.

4.4.2.3 SATA Configuration

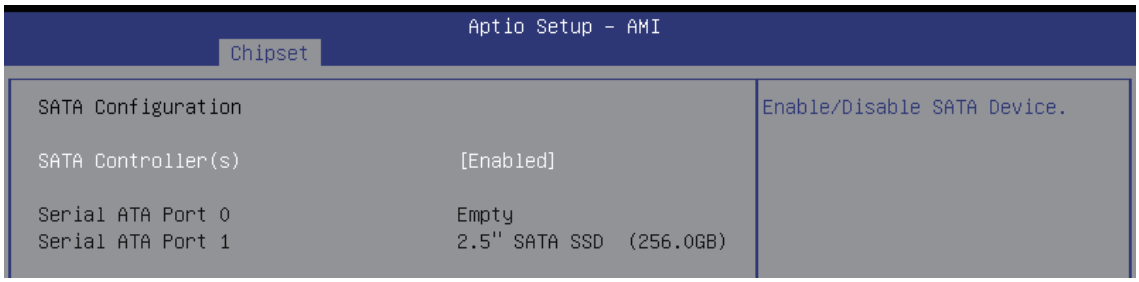


Figure 4-4-2-3: SATA Configuration

SATA Controller(s)
Enable / Disable SATA Device.

4.4.3 Module Management

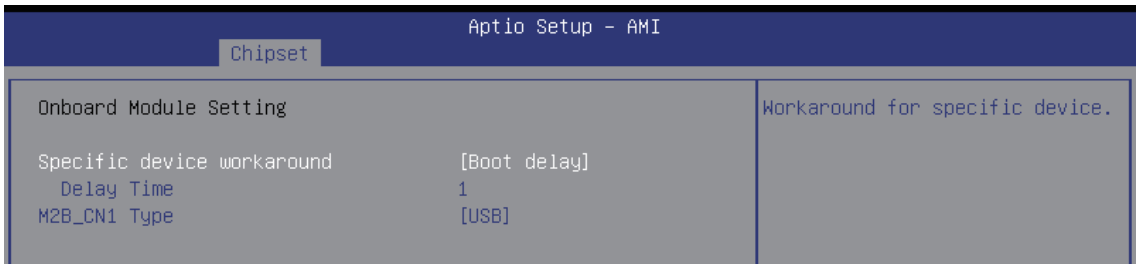


Figure 4-4-3: Module Management

Specific device workaround
Workaround for specific device.

Delay Time
0~255 (second).

M2B_CN1 Type
Select M2B_CN1 Type.

4.4.4 SW Ignition Configuration

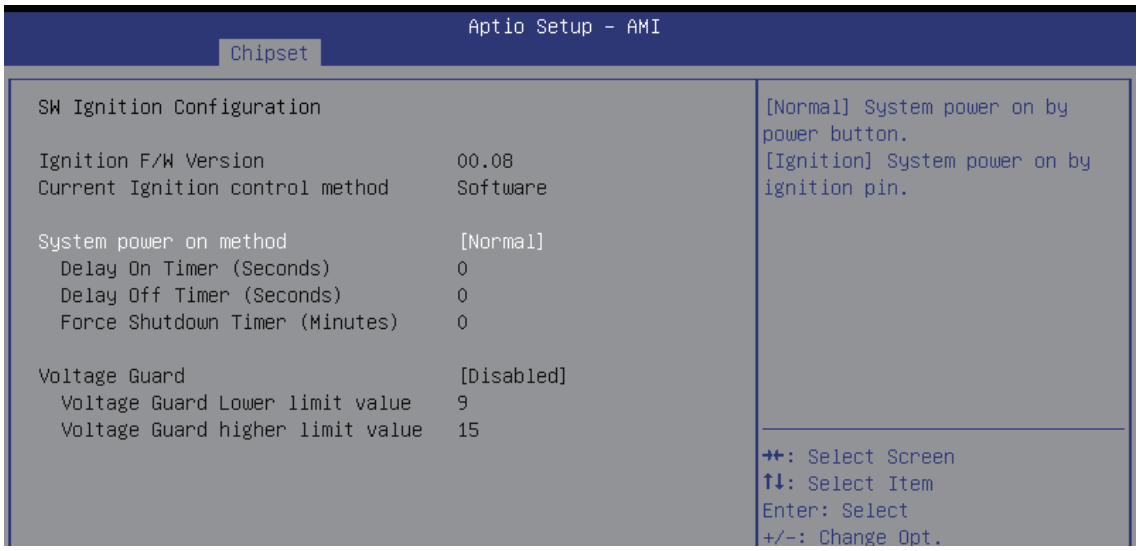


Figure 4-4-4: SW Ignition Configuration

System power on method
[Normal] System power on by power button.
[Ignition] System power on by ignition pin.

Delay On Timer (Seconds)
The delay time after user trigger ignition on signal (Seconds).

Delay Off Timer (Seconds)
The delay time after user trigger ignition off signal (Seconds).

Force Shutdown Timer (Minutes)
Used to force cut off system power when OS unable gracefully shutdown system successfully.

Voltage Guard
Voltage Guard enable or disable, only effect on Ignition mode.

Voltage Guard Lower limit value
Voltage Guard lower limit value setting. Range: 9v ~ 40v.

Voltage Guard higher limit value
Voltage Guard Higher limit value setting. Range: 15v ~ 55v.

4.5 Security Functions

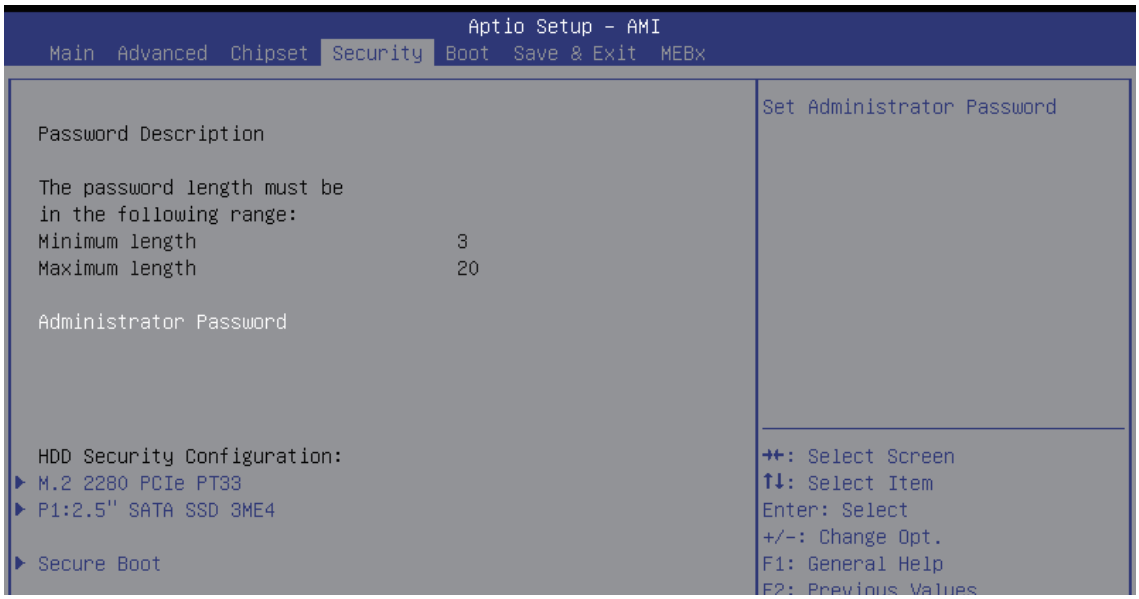


Figure 4-5: Security Functions

Administrator Password

Set administrator password.

4.5.1 HDD Security Configuration

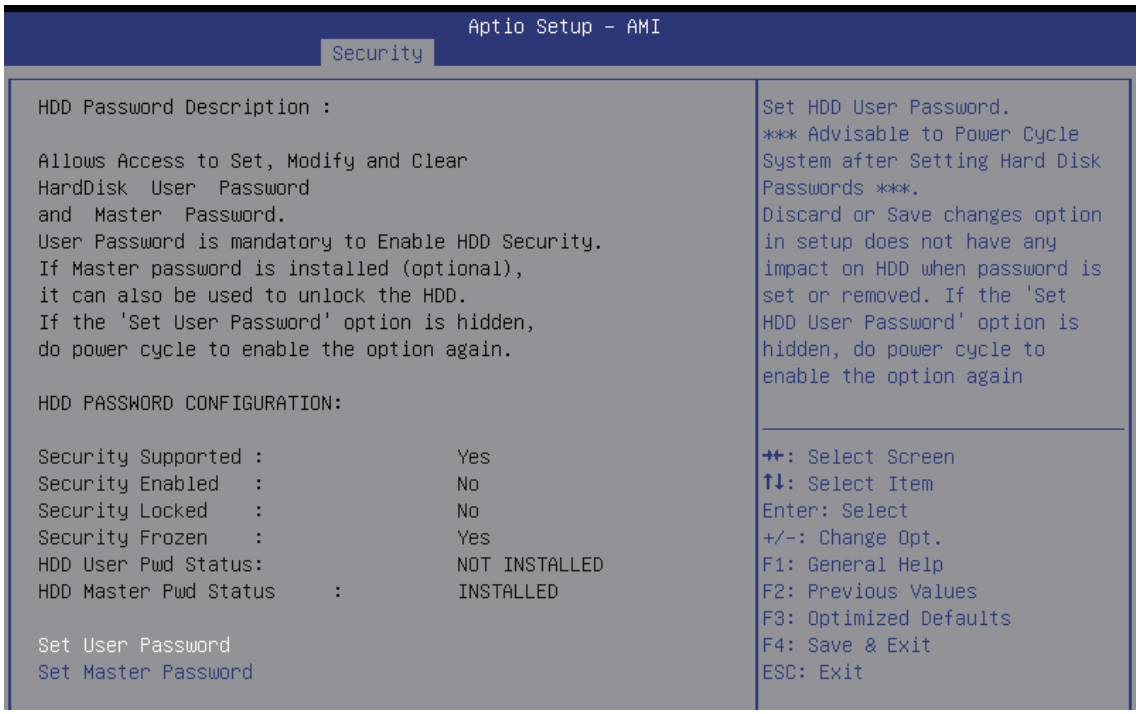


Figure 4-5-1: HDD Security Settings

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 hidden, do power cycle to enable the option again.

Set Master Password
Set Master Password.

4.5.2 Secure Boot

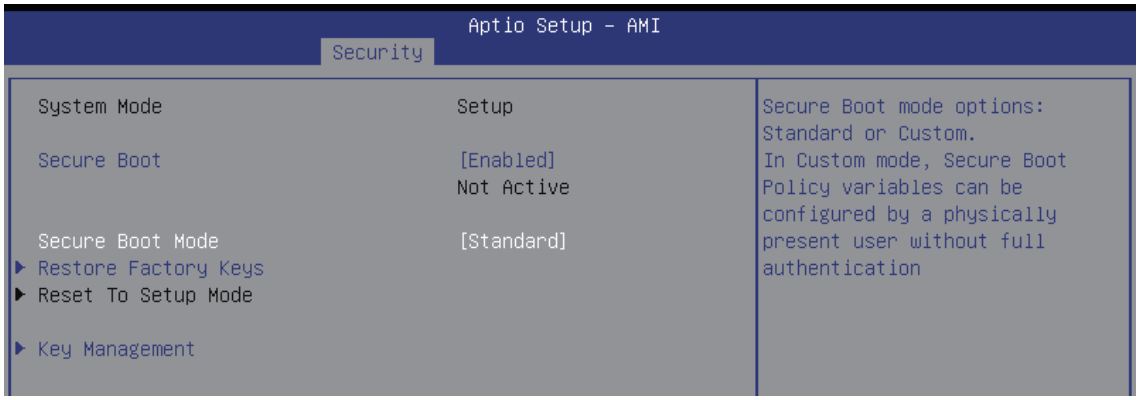


Figure 4-5-2: Secure Boot

Secure Boot
Secure Boot feature is Active if Secure Boot is Enabled, Platform Key(PK) is enrolled and the System is in User mode. The mode change requires platform reset.

Secure Boot Mode
Secure Boot mode options: Standard or Custom.
In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication

Restore Factory Keys
Force System to User Mode. Install factory default Secure Boot key databases

Reset To Setup Mode
Delete all Secure Boot key databases from NVRAM

Key Management
Enables expert users to modify Secure Boot Policy variables without variable authentication.

4.6 Boot Function

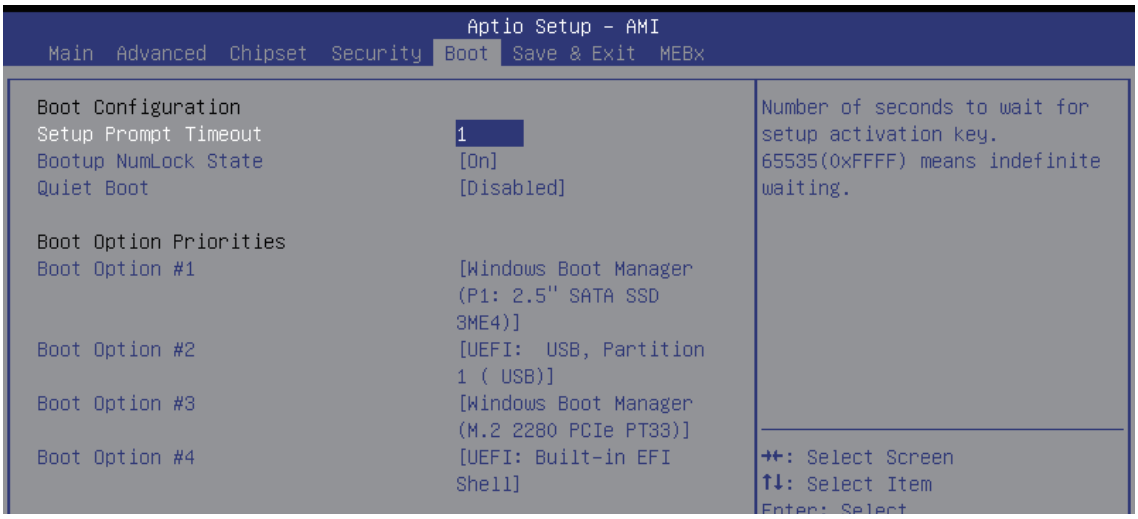


Figure 4-6: Boot Function

Setup Prompt Timeout

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

Bootup NumLock State

Select the keyboard NumLock state.

Quiet Boot

Enables or disables Quiet Boot option.

Boot Option Priorities

Sets the system boot order.

4.7 Save & Exit

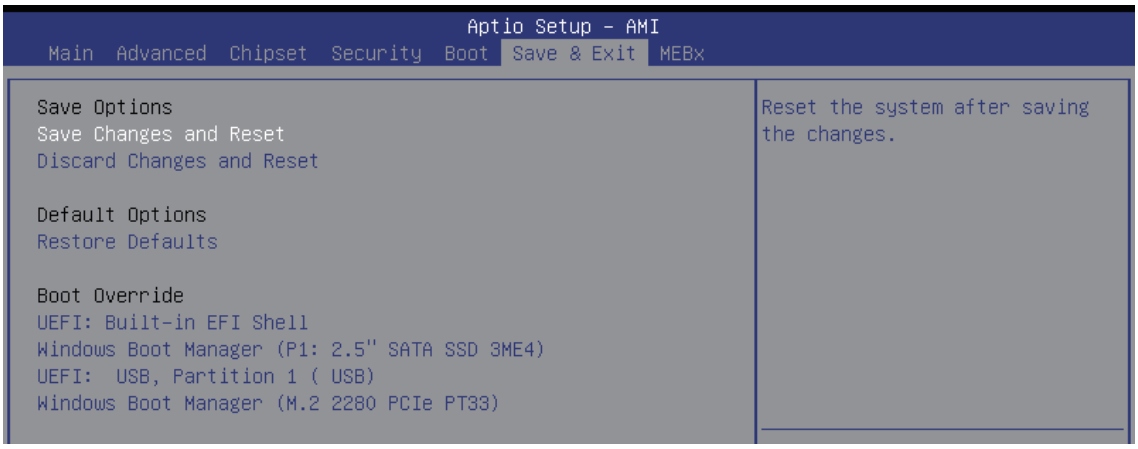


Figure 4-7: Save & Exit

Save Changes and Reset

Reset the system after saving the changes.

Discard Changes and Reset

Reset system setup without saving any changes.

Restore Defaults

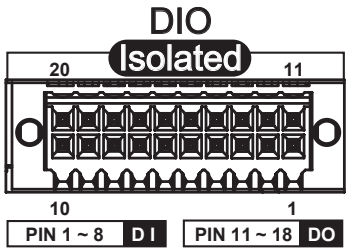
Restore/Load Default values for all the setup options.

A

APPENDIX A : Isolated DIO Guide

A.1 Function Description

The ECS-4700 series offers a 16-bit DIO (8-DI/ 8-DO) 20-pin terminal block connector. Each bit of DI and DO equipped with a photo-coupler for isolated protection. All IO pins are fixed by Hardware design and cannot change in/out direction in runtime process. The definition is listed as follows:

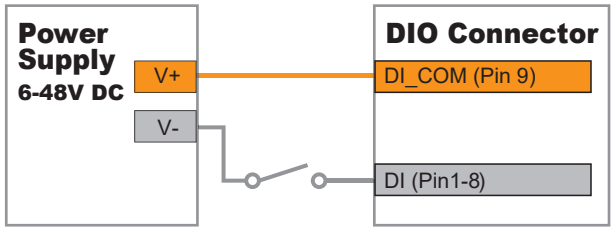


Pin No.	Definition	Description	Pin No.	Definition	Description
1	DI 0	DIO 0	11	DO 0	DIO 8
2	DI 1	DIO 1	12	DO 1	DIO 9
3	DI 2	DIO 2	13	DO 2	DIO 10
4	DI 3	DIO 3	14	DO 3	DIO 11
5	DI 4	DIO 4	15	DO 4	DIO 12
6	DI 5	DIO 5	16	DO 5	DIO 13
7	DI 6	DIO 6	17	DO 6	DIO 14
8	DI 7	DIO 7	18	DO 7	DIO 15
9	DI COM	NC	19	DIO_GND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

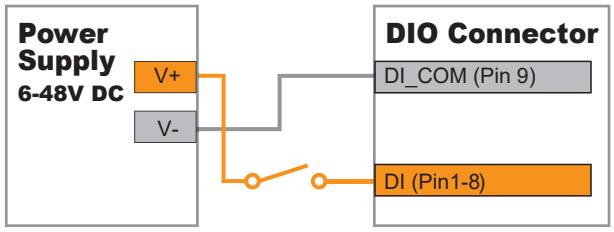
A.2 DIO Signal Circuit

DI reference circuit:

Sink Mode (NPN)

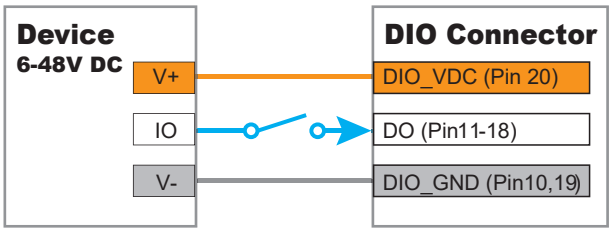


Source Mode (PNP)

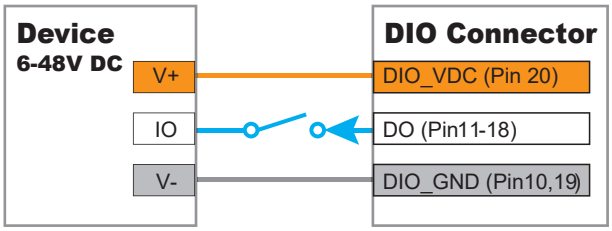


DO reference circuit:

Sink Mode (NPN, Default)



Source Mode (PNP)

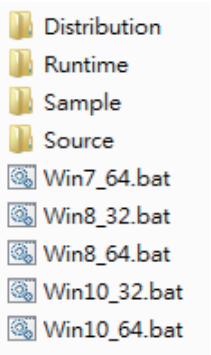


A.3 Software Package contain

· Distribution folder include x32 and x64 versions, use batch file for installation.
There are included as fallowed:
Win10_32.bat, and Win10_64.bat:
Installation for driver, and
Uninstall_32.bat, and Uninstall_64.bat:
Uninstallation for driver
Run batch file as Administrator.

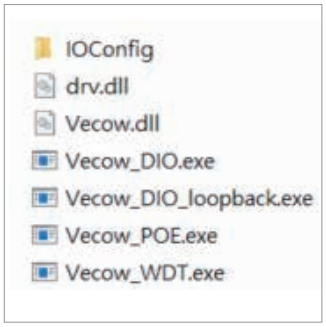
Make sure Windows version before installation.

· Header folder include head file for software developer or System Integration.
· Manual folder include API description.
· Sample folder include sample program, driver library, and API library for Windows/Linux
· Source folder include sample program source code that compile on Visual Studio 2008/Ubuntu18.04.

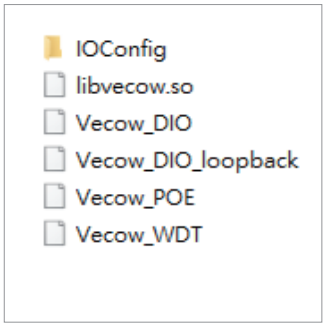


A.4 Sample

Execute demo tool.

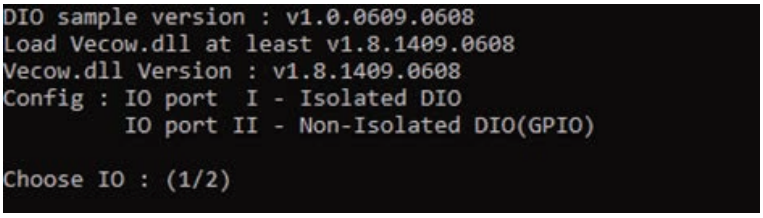


Windows

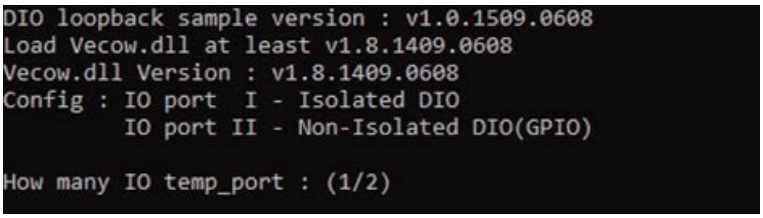


Linux

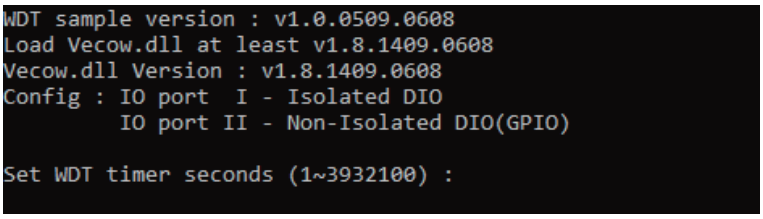
Sample, as shown below :



Vecow_DIO

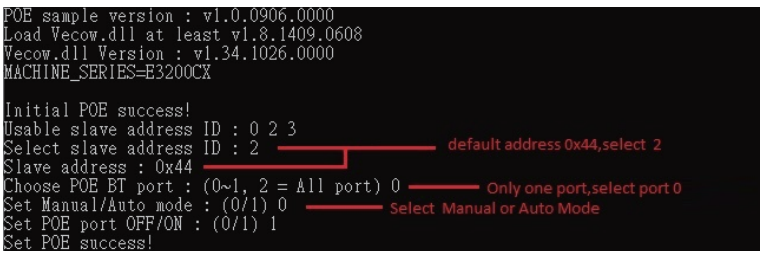


Vecow_DIO_loopback



Vecow_WDT

POE Default Address:0x44(8bit),0x22(7bit)



POE

B

APPENDIX B : Software Functions

B.1 Driver API Guide

In Header folder, Vecow.h and VecowLinux.h contain usabled API for Windows/Linux.

BOOL initial_SIO(BYTE Isolate_Type, BYTE DIO_NPN)

Initial machine for IO and watch dogtimer.

- Isolate_Type: DIO type.
  1: Isolated DIO; 0: Non-Isolated DIO(GPIO).
- 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 version is too old, or machine not match).

BOOL get_IO1_configuration(BYTE *Iso, BYTE *DI_mode, BYTE *DO_mode, WORD *Mask)

BOOL get_IO2_configuration(BYTE *Iso, BYTE *DI_mode, BYTE *DO_mode, WORD *Mask)

Get DIO configuration (by variable)

- Isolate_Type: DIO type.
  1: Isolated DIO; 0: Non-Isolated DIO(GPIO).
- DI_mode ([7:0]): DI type, pin setting by hexadecimal bitmask only for Isolated DIO.
  0xFF: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.
- DO_mode: DO type only for Isolated DIO.
  1: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.
- Mask ([15:0]): In / Out, pin setting by hexadecimal bitmask only for Non-Isolated DIO(GPIO).
  1: Output; 0: Input

Return:

TRUE (1): Success.

FALSE (0): Fail (Initial error, or call by pointer error, or hardware problem).

BOOL set_IO1_configuration(BYTE Iso, BYTE DI_mode, BYTE DO_mode, WORD Mask)
BOOL set_IO2_configuration(BYTE Iso, BYTE DI_mode, BYTE DO_mode, WORD Mask)

Set DIO configuration.

- Isolate_Type: DIO type.
  1: Isolated DIO; 0: Non-Isolated DIO(GPIO).
- DI_mode ([7:0]): DI type, pin setting by hexadecimal bitmask only for Isolated DIO.
  0xFF: PNP (Source) mode for European rule; 0: NPN (Sink) mode for Japanese rule.
- DO_mode: DO type only for Isolated DIO.
  1: PNP (Source) mode for European rule;
  0: NPN (Sink) mode for Japanese rule.
- Mask ([15:0]): In / Out, pin setting by hexadecimal bitmask only for Non-Isolated DIO(GPIO).
  1: Output; 0: Input

Return:
TRUE (1): Success.
FALSE (0): Fail (Initial error or hardware problem).

BOOL get_DIO1(BYTE *DO_data, BYTE *DI_data)
BOOL get_DIO2(BYTE *DO_data, BYTE *DI_data)

Get isolated DIO output(DO) and input (DI).

- DI ([7:0]): Input state, pin setting by hexadecimal bitmask.
  1: High; 0: Low.
- 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).
FALSE (0): Fail (Initial error or hardware problem).

BOOL set_DIO1(BYTE DO_data)
BOOL set_DIO2(BYTE DO_data)

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).
FALSE (0): Fail (Initial error or hardware problem).

BOOL get_GPIO1(WORD *GPIO_data)

Get GPIO.

- GPIO_data ([15:0]): GPIO state, pin setting by hexadecimal bitmask.
  1: High; 0: Low.

Return:
TRUE (1): Success.
FALSE (0): Fail (Initial error or hardware problem).

BOOL set_GPIO1(WORD GPIO_data)

Set GPIO.

• GPIO_data ([15:0]): GPIO state, pin setting by hexadecimal bitmask.
1: High; 0: Low.

Return:

TRUE (1): Success.

FALSE (0): Fail (Initial error or hardware problem).

BOOL get_WDT(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 set_WDT(DWORD WDT)

Set 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 setup 0, or hardware problem).

BOOL cancel_WDT()

Cancel watchdog timer.

Return:

TRUE (1): Success.

FALSE (0): Fail (Initial error or hardware problem).

FALSE (0): Fail (Driver not exists, or version is too old, or out of range error).

BOOL config_COMPORT(BYTE *PORT_NUM)

Set COMPORT configuration.

• PORT_NUM: Usable COMPORT number.
Range: 1~6.

Return:

TRUE (1): Success.

FALSE (0): Fail (Initial error, or setup 0, or hardware problem).

BOOL set_COMPORT_mode(BYTE port, BYTE mode, BYTE term)

Set COMPORT mode.

• port: which port set.
Range: 1~6.

• mode: Usable COMPORT number.
0: RS232 mode; 1: RS422-5Wire mode.
2: RS422-9Wire mode; 4: RS485 mode.
4: Loopback mode.

• term: Termination enable for RS422/RS485 mode.
1: Enable; 0: Disable.

Return:
TRUE (1): Success.
FALSE (0): Fail (Initial error or hardware problem).

BOOL get_COMPORT_mode(BYTE port, BYTE *mode, BYTE term)

Get COMPORT mode.

- port: which port get.
  Range: 1~6.
- mode: Usable COMPORT number.
  0: RS232 mode; 1: RS422-5Wire mode.
  2: RS422-9Wire mode; 4: RS485 mode.
  4: Loopback mode.
- term: Termination enable for RS422/RS485 mode.
  1: Enable; 0: Disable.

Return:
TRUE (1): Success.
FALSE (0): Fail (Initial error or hardware problem).

BOOL initial_POE(BYTE Scan, BYTE ID)

Initial card for POE

- Scan: POE ID scan type
  0: Auto scan; 1: Manual setup.
- ID ([3:0]): POE ID by manual setting

Return:
TRUE (1): Success;
FALSE (0): Fail (Driver not exists, or version is too old, or out of range error).

BOOL get_POE_configuration(BYTE ID, BYTE *Auto, BYTE *Mask)

Get POE configuration (by variable)

- ID : POE ID.
  Range:2~15.
- 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 set_POE_BT(BYTE ID, BYTE CH,BYTE Mode, BYTE POE)

Set POE state.

- ID : POE ID
  Range:2(default address:0x44(8bit))~15
- CH : port number
  Range:0
- Mode : Manual/Auto
  0: Manual
  1: Auto
- POE ([3:0]): POE state
  1: On; 0: Off

Return:

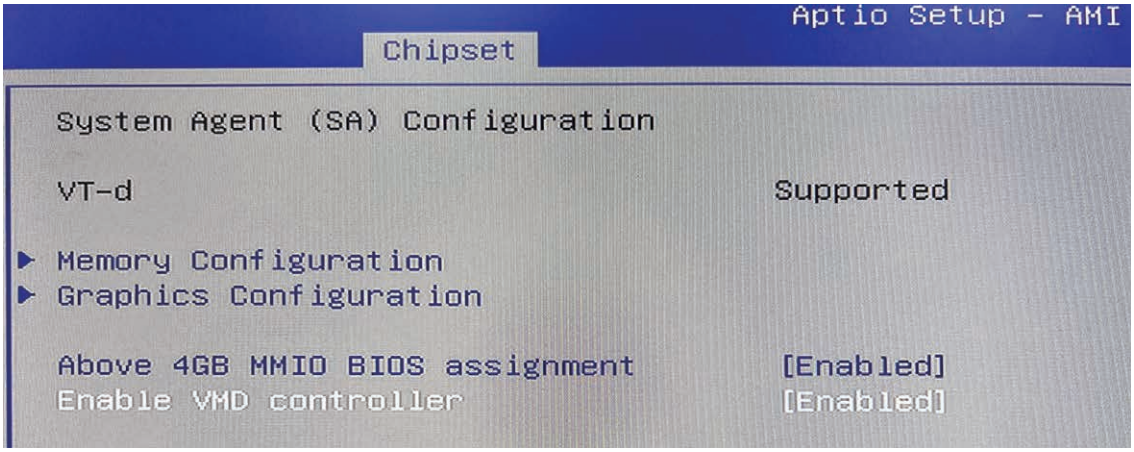
TRUE (1): Success;

FALSE (0): Fail (Initial error, or out of range error, or hardware problem)

APPENDIX C : RAID Functions

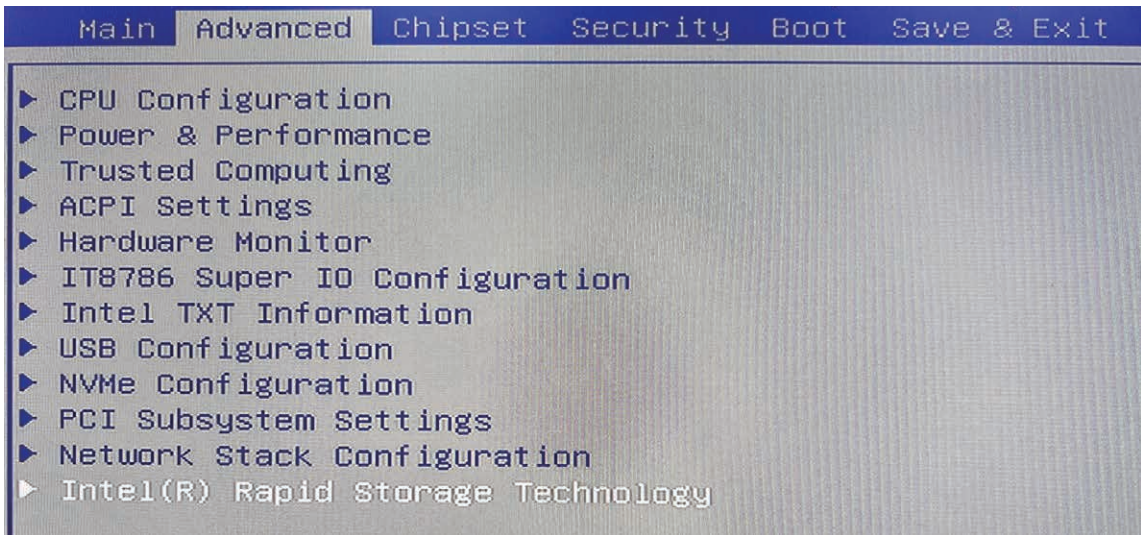
C.1.1 VMD Controller for RAID

Please set Enable VMD controller as Enabled on BIOS menu.
Chipset → System Agent (SA) Configuration → Enable VMD controller → Enabled → Save Changes and Reset.

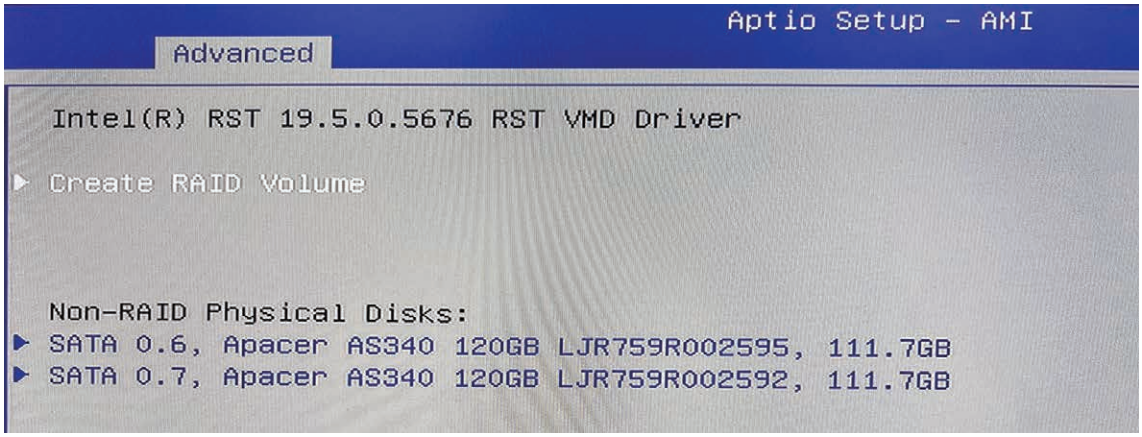


C.1.2 UEFI Mode for RAID

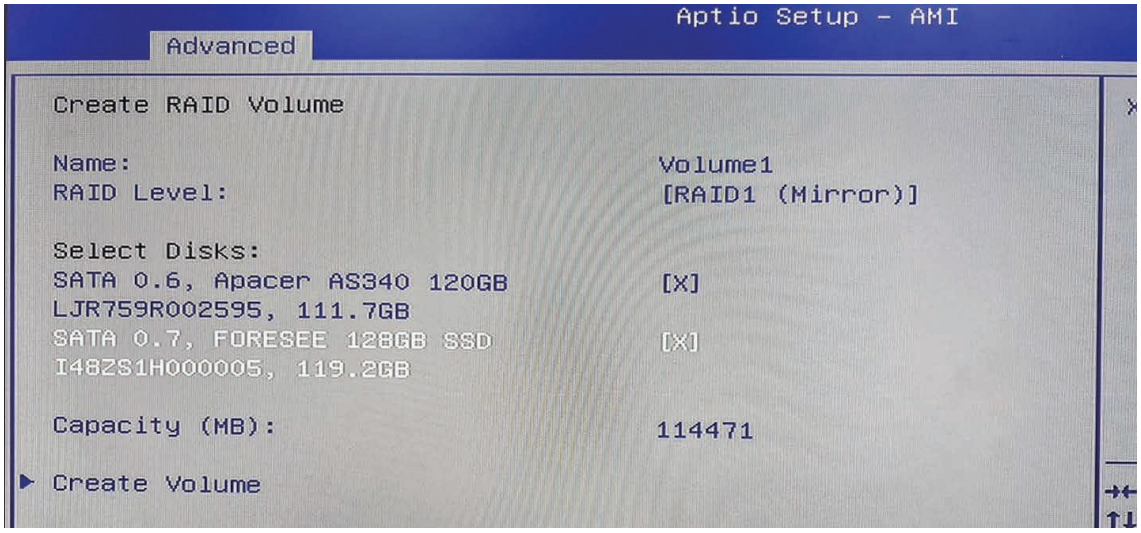
1. Into BIOS menu again, select Intel(R) Rapid Storage Technology on BIOS menu.
Advanced → Intel(R) Rapid Storage Technology



2. Select Create RAID Volume on BIOS menu.



3. Select disks to create RAID Volume then Save Changes and Reset to install OS with EFI mode.



C.2 OS Installation

The system is featured with one M.2 key M for NVME, one mSATA slot, and including two internal SATA.
We used SATA for Windows 10 OS installation as an example.

Note:
ECX-3100 PEG, ECX-3200 PEG, ECX-3200MX PEG are equipped with 2 SATA.
ECX-3400 PEG, ECX-3600 PEG, ECX-3800 PEG are equipped with 4 SATA.

C.3 To Install All Device Drivers of the System

The instructions are as follows :
1. Install Chipset driver
2. Install Network driver
3. Install ME driver (if available)
4. Install Audio driver
5. Install VGA driver

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

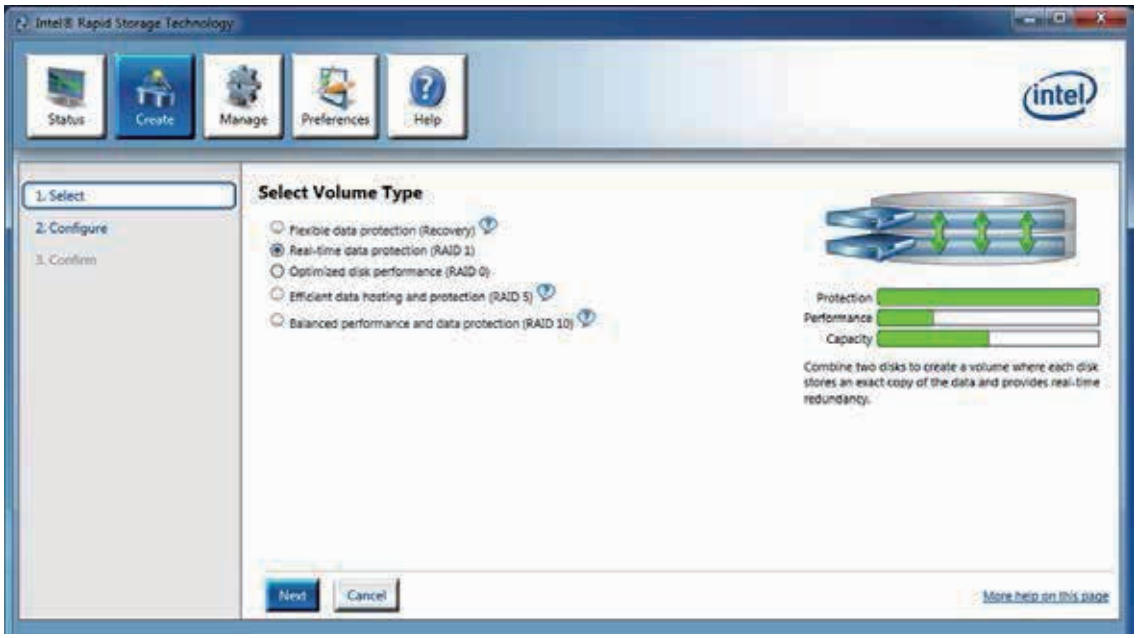
You can find the latest information and software directly from Intel's website.
http://www.intel.com/p/en_US/support/highlights/chpsts/imsm
The RAID environment has been done if you completed the steps above.

C.5 To Insert SATA HDD for RAID 1

Please note, you can use two SATA ports for SATA HDD, except for mSATA slot.

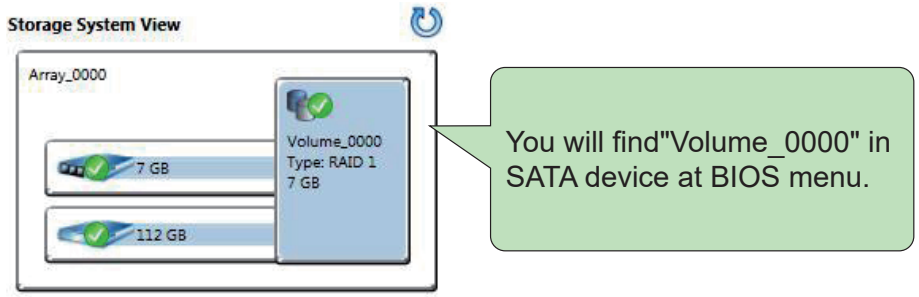
C.6 To Create RAID Volume on"Rapid Storage Technology" Software

ECX-3000 PEG is featured with two SATA HDD's for RAID volume, so there are two options to choose on this page. Let's take RAID 1 as an example, select "RAID 1".

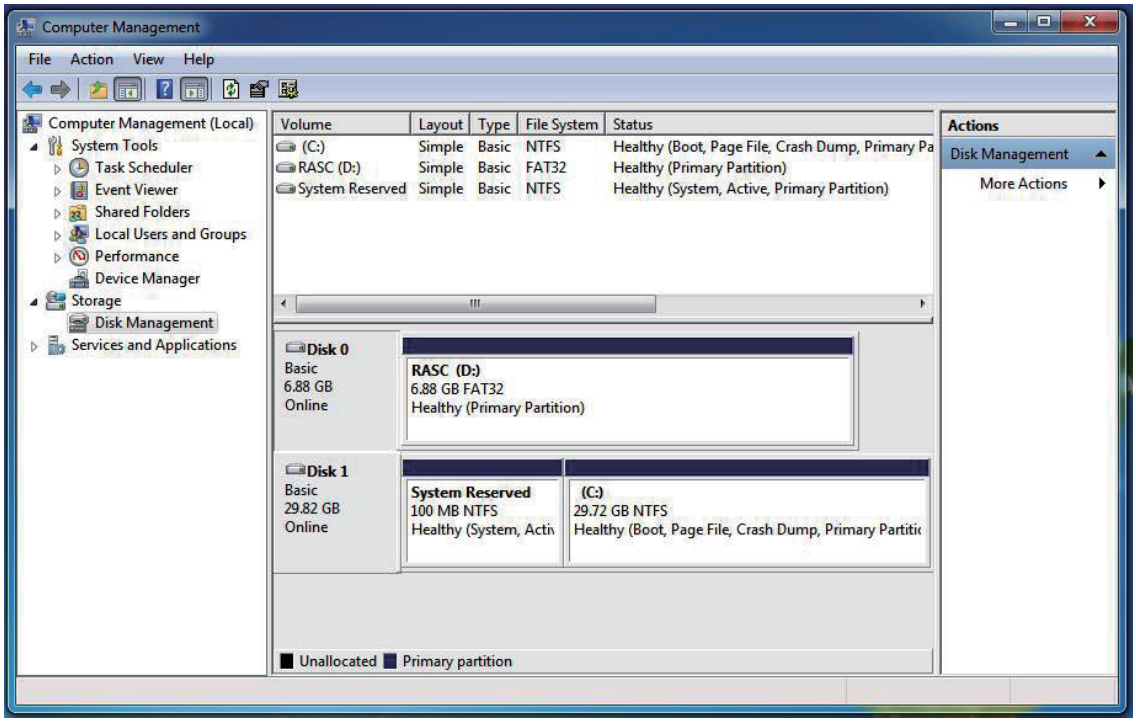


C.7 Disk Management : Partition the Disk

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

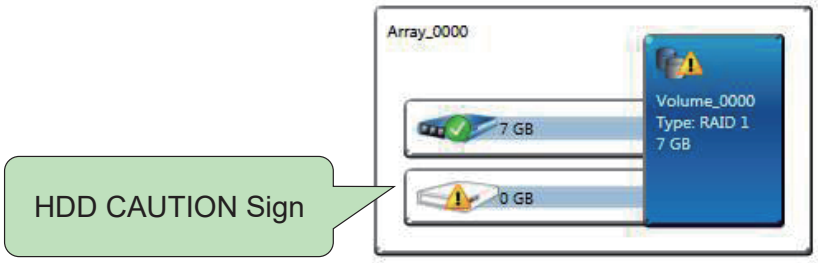


To start disk management tool, select"initialize disk".
Then add"Logical Device" for Windows access.

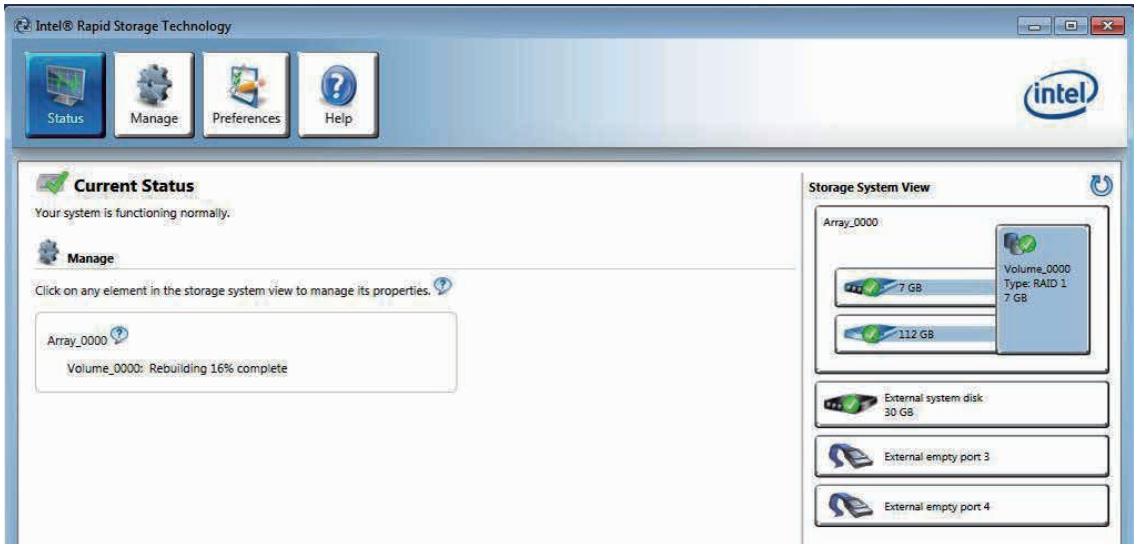


C.8 If One SATA HDD on RAID Volume is Out-of-use

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

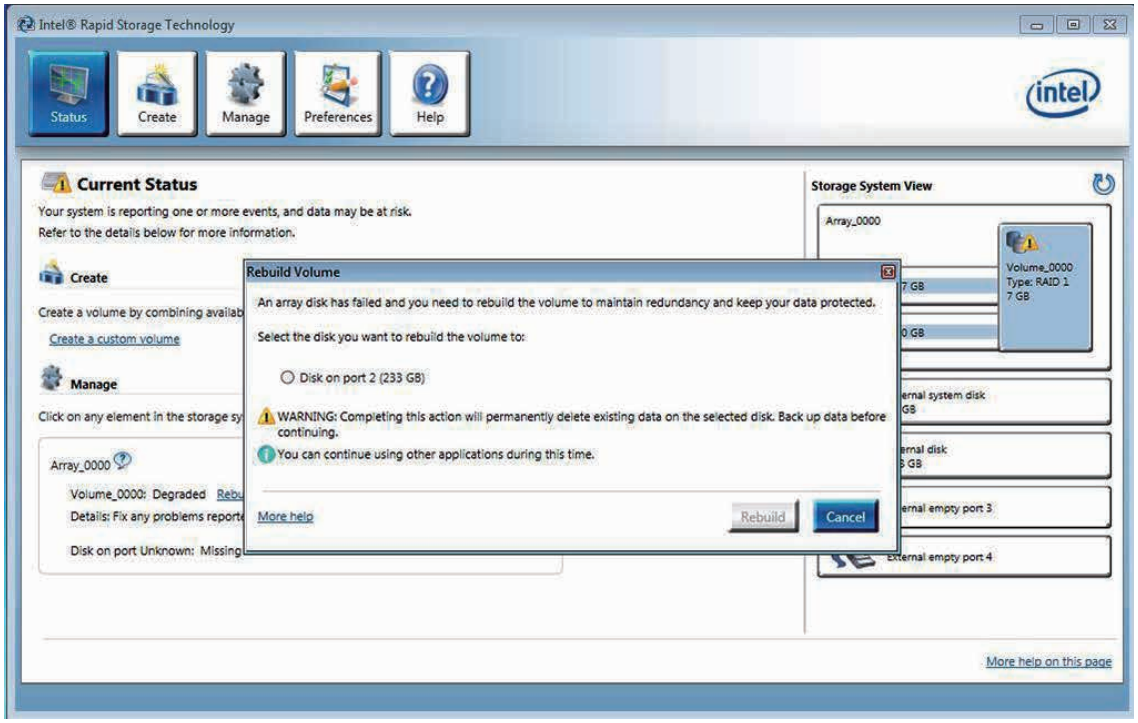


C.9 Recovery and Auto Rebuild When Use the SAME RAID HDD



C.10 Recovery and Auto Rebuild When Use DIFFERENT RAID HDD

A warning will pop-up to ask you if the disk is not a member of the original RAID volume.
If you press"Rebuild", it will replace the broken SATA HDD to the last SATA HDD of RAID volume.



D

APPENDIX D : Power Consumption

Testing Board	ECS-4700
RAM	32GB X 2
USB-1	USB Micsoft Wired Keyboard 600
USB-2	USB Mouse HP G1K28AA
USB-3	USB Flash ADATA 3.0 8GB
USB-4	USB Flash ADATA 3.0 8GB
SATA 0	Transcend SATA SSD420 128GB
SATA 1	Seagate HDD 160GB
LAN 1 (i226)	2.5 Gbps
LAN 2 (i226)	2.5 Gbps
LAN 3 (i350)	1.0 Gbps
LAN 4 (i350)	1.0 Gbps
LAN 5 (i350)	1.0 Gbps
LAN 6 (i350)	1.0 Gbps
Graphics Output	DP
Power Plan	Balance(Windows10 Power plan)
Test Program	BurnInTest V10.2
Power Source :	Chroma 62006P-100-25

D.1 Intel® Core™ i5-1345UE 1.40 GHz (12M Cache, up to 4.60 GHz)

Power on and boot to Win 10 64-bit (without turbo boost technology)

CPU	Power Input	Standby Mode		Power on and boot to Win 10 (64-bit)			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
i5-1345UE	9V	0.3872	03.48W	0.502	04.52W	2.6258	23.63W
i5-1345UE	12V	0.318A	03.81W	0.404A	04.85W	1.924A	23.08W
i5-1345UE	24V	0.213A	05.12W	0.247A	05.92W	1.019A	24.45W
i5-1345UE	50V	0.142A	07.12W	0.161A	08.06W	0.516A	25.78W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
i5-1345UE	9V	3.3933	30.54W	3.494	31.45W
i5-1345UE	12V	2.548A	30.58W	2.569A	30.83W
i5-1345UE	24V	1.400A	33.60W	1.345A	32.28W
i5-1345UE	50V	0.721A	36.03W	0.701A	35.06W

D.2 Intel® Core™ i5-1345UE 1.40 GHz (12M Cache, up to 4.60 GHz)

Power on and boot to Win 10 64-bit (with turbo boost technology)

CPU	Power Input	Standby Mode		Power on and boot to Win 10 (64-bit)			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
i5-1345UE	9V	0.389A	03.50W	0.502A	04.52W	3.101A	27.91W
i5-1345UE	12V	0.344A	04.12W	0.406A	04.87W	2.362A	28.34W
i5-1345UE	24V	0.217A	05.20W	0.246A	05.91W	1.182A	28.37W
i5-1345UE	50V	0.141A	07.07W	0.162A	08.08W	0.639A	31.96W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
i5-1345UE	9V	3.547A	31.92W	3.486A	31.37W
i5-1345UE	12V	2.650A	31.80W	2.617A	31.40W
i5-1345UE	24V	1.394A	33.46W	1.373A	32.95W
i5-1345UE	50V	0.706A	35.30W	0.731A	36.56W

D.3 Intel® Core™ i7-1365UE 1.70 GHz (18M Cache, up to 5.00 GHz)

Power on and boot to Win 10 64-bit (with turbo boost technology)

CPU	Power Input	Standby Mode		Power on and boot to Win 10 (64-bit)			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
i7-1365UE	9V	0.389A	03.50W	0.507A	04.56W	2.211A	19.90W
i7-1365UE	12V	0.317A	03.80W	0.407A	04.88W	1.696A	20.35W
i7-1365UE	24V	0.203A	04.86W	0.248A	05.95W	0.930A	22.32W
i7-1365UE	50V	0.140A	07.01W	0.162A	08.11W	0.464A	23.21W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
i7-1365UE	9V	3.458A	31.12W	3.685A	33.17W
i7-1365UE	12V	2.685A	32.22W	2.765A	33.18W
i7-1365UE	24V	1.410A	33.84W	1.435A	34.44W
i7-1365UE	50V	0.693A	34.65W	0.713A	35.64W

D.4 Intel® Core™ i7-1365UE 1.70 GHz (18M Cache, up to 5.00 GHz)

Power on and boot to Win 10 64-bit (with turbo boost technology)

CPU	Power Input	Standby Mode		Power on and boot to Win 10 (64-bit)			
				Sleep Mode		idle status CPU usage less 3%	
		Max Current	Max Consumption	Max Current	Max Consumption	Max Current	Max Consumption
i7-1365UE	9V	0.372A	03.35W	0.508A	04.57W	3.188A	28.69W
i7-1365UE	12V	0.316A	03.80W	0.431A	05.17W	2.415A	28.98W
i7-1365UE	24V	0.215A	05.16W	0.248A	05.95W	1.255A	30.12W
i7-1365UE	50V	0.146A	07.28W	0.168A	08.42W	0.465A	23.24W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with 3D	
		Max Current	Max Consumption	Max Current	Max Consumption
i7-1365UE	9V	3.754A	33.78W	3.848A	34.63W
i7-1365UE	12V	2.712A	32.54W	2.927A	35.13W
i7-1365UE	24V	1.411A	33.86W	1.428A	34.27W
i7-1365UE	50V	0.725A	36.23W	0.734A	36.70W

APPENDIX E : Supported Memory & Storage List

E.1 Supported Memory List

Testing Board	ECS-4700
Memory Test	MemTest86 V10.4
BurnInTest	V10.2

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

Brand	Info	Test Temp.(Celsius)
SLLINK 32G DDR5 4800 SO-DIMM	J5BGSH2G8A4FC	25ºC
		25ºC
		25ºC
SMART 32G DDR5 4800 SO-DIMM	SR4G6SO5285-SB	25ºC
		25ºC
		25ºC

E.2 Supported Storage Device List

Type	Vendor	Model	Capacity
SATA HDD	Seagate	SDC001	500GB
SATA SSD	Apacer	AS340X	120GB
	SMART	FDMP8960GTCXA111	960GB
	MEMXPRO	M3A MI3MA1212802WN	128GB
	Transcend	TS128GSSD420K	128GB
		TS128GSSD230S	128GB
	Kingston	SHFS37A	240GB
	Innodisk	2.5” SATA SSD 3TE4 DES25-A28M41BW1DC-H03	128GB
		2.5”SATA SSD 3TG2-P DGS25-64GD81BC1QC	64GB
		2.5” SATA SSD 3TE7 DES25-C12DK1KCCQL-H03	512GB
M.2 PCIe SSD	Toshiba	KXG50ZNV512G	512GB
	Innodisk	(P80) 3TE6 DEM28-C12DD1KCCQF-H03	512GB
	Kingston	SA2000MB	250GB
	SAMSUNG	970 EVO PLUS MZ-V7S250	250GB
		980 EVO PRO MZ-V8P250BW	250GB
	INTEL	760P SSDPEKKW128G8	128GB
	SMART	FDMP8960GTCXA111	960GB
	Transcend	TS512GMTE460T	512GB

** If more help is needed, please contact Vecow technical support **

Vecow

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