ECX-1200/1100 USER Manual

9th Gen Intel® Xeon®/Core™ i7/i5/i3 Expandable Fanless System
Workstation-grade, 6 GigE LAN w/4 M12 PoE+, 2 SSD Tray, PCI/PCIe Slot

Vecow

2.4.0 Edition 20230531

Record of Revision

Version	Date	Page	Description	Remark
0.10	2019/01/09	All	Preliminary Release	
1.00	2019/01/15		Official Release	
1.10	2019/04/02	56	Update	
2.00	2019/07/24	v, 1, 2, 3, 5, 7, 9, 11, 13, 15, 17, 19	Update	
2.10	2020/09/01	19, 37	Update	
2.20	2021/03/22	All	Update	
2.30	2022/05/23	167-169	Update	
2.40	2023/05/31	All	Update	

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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
ECX-1210M	ECX-1200, 6 GigE LAN with 4 M12 PoE+, 1 PCIe x16, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 32 Isolated DIO
ECX-1201M	ECX-1200, 6 GigE LAN with 4 M12 PoE+, 1 PCI, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 32 Isolated DIO
ECX-1210	ECX-1200, 6 GigE LAN with 4 PoE+, 1 PCIe x16, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 32 Isolated DIO
ECX-1201	ECX-1200, 6 GigE LAN with 4 PoE+, 1 PCI, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 32 Isolated DIO
ECX-1110	ECX-1100, 2 GigE LAN, 1 PCIe x16, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 16 GPIO
ECX-1101	ECX-1100, 2 GigE LAN, 1 PCI, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 16 GPIO
ECX-1200 GTX1050	ECX-1200 with NVIDIA® GeForce® GTX 1050, 6 GigE LAN with 4 PoE+, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 32 Isolated DIO
ECX-1100 GTX1050	ECX-1100 with NVIDIA® GeForce® GTX 1050, 2 GigE LAN, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 16 GPIO
ECX-1200 AIO	ECX-1200, 6 GigE LAN with 4 PoE+, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 32 Isolated DIO, 32 AI, 2 AO
ECX-1100 AIO	ECX-1100, 2 GigE LAN, 2 SSD Tray, 6 USB 3.1, 4 COM, 3 SIM, 16 GPIO, 32 AI, 2 AO

CPU List

Series	CPU	Cores	GHz	TDP (W)	CPU	Cores	GHz	TDP (W)	ECC RAM
Intel® Xeon®	E-2176G	6	4.6	80	E-2278GE	8	4.7	80	Yes
					E-2278GEL	8	3.9	35	
	E-2124G	4	4.5	71	E-2226GE	6	4.6	80	
Intel® Core™	i7-8700	6	4.6	65	i7-9700E	8	4.4	65	N/A
	i7-8700T	6	4	35	i7-9700TE		3.8	35	
	i5-8500	6	4.1	65	i5-9500E	6	4.2	65	
	i5-8500T	6	3.5	35	i5-9500TE		3.6	35	
	i3-8100	4	3.6	65	i3-9100E	4	3.7	65	Yes
	i3-8100T	4	3.1	35	i3-9100TE		3.2	35	

Optional Accessories

Part Number	Description
DDR4 32G	Certified DDR4 32GB 2666MHz RAM
DDR4 16G	Certified DDR4 16GB 2666/2400/2133MHz RAM
DDR4 8G	Certified DDR4 8GB 2666/2400/2133MHz RAM
DDR4 4G	Certified DDR4 4GB 2666/2400/2133MHz RAM
PWA-160WB-WT	160W, 24V, 85V AC to 264V AC Power Adaptor with 3-pin Terminal Block (7.62mm pitch), Wide Temperature -30°C to +70°C
PWA-280WB-WT	280W, 24V, 85V AC to 264V AC Power Adaptor with 3-pin Terminal Block (7.62mm pitch), Wide Temperature -30°C to +70°C
PWS-360W	360W, 24V, 90V AC to 264V AC Power Supply
PWS-480W-WT	480W, 24V, 90V AC to 305V AC Power Supply, Wide-Temp, IP65
VESA Mount	VESA Mounting Kit
DIN-RAIL Kit	DIN Rail and VESA Mounting Kit
Rack Mount	2U Rackmount Kit
TMK2-20P-100	Terminal Block 20-pin to Terminal Block 20-pin Cable, 100cm
TMK2-37P-150	Terminal Block 37-pin to Terminal Block 37-pin Cable, 150cm
TMK2-37P-300	Terminal Block 37-pin to Terminal Block 37-pin Cable, 300cm
TMK2-20P-500	Terminal Block 20-pin to Terminal Block 20-pin Cable, 500cm
TMB-TMBK-20P	Terminal Board with One 20-pin Terminal Block Connector and DIN-Rail Mounting
TMB-TMBK-37P	Terminal Board with One 37-pin Terminal Block Connector and DIN-Rail Mounting
4G Module	Mini PCIe 4G/GPS Module with Antenna
M.2 Storage Module	M.2 Key M/Key B PCIe Storage Module
5G Module	5G Module with Antenna
WiFi & Bluetooth	WiFi & Bluetooth Module with Antenna

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GENERAL INTRODUCTION

1.1 Overview

Vecow ECX-1200/1100 Series is a compact and rugged workstation-grade expandable Fanless Embedded System. LGA1151 Socket supports workstation-grade 8-core 9th Generation Intel® Xeon®/Core™ i7/i5/i3 processor (Coffee Lake Refresh) running with workstation-grade Intel® C246 chipset, dual channel DDR4 2666MHz up to 64GB ECC memory, advanced Intel® UHD Graphics 630 supporting DirectX 12, OpenGL 4.5, OpenCL 2.0 API, and up to Ultra HD 4K resolution, ECX-1200/1100 delivers new generation CPU & chipset performance, power efficiency, and graphics performance; Powered by optional NVIDIA® GeForce® GTX 1050 graphics engine, ECX-1200/1100 GTX1050 boosts leading system performance by CUDA core computing; Multiple 10G SuperSpeed USB 3.1 Gen 2 (10Gbps), PCIe 3.0 (8GT/s), SATA III (6Gbps), USB 3.1 (5Gbps), PoE (1Gbps) LAN, GigE LAN (1Gbps) and wireless connections make seamless real-time high-speed data conveying possible.

Fanless -40°C to 75°C operating temperature, multiple VGA, DVI, HDMI and DisplayPort display interfaces support up to 6 independent displays, 6 GigE LAN ports with 4 M12 IEEE 802.3at (25.5W/48V) PoE+ without additional power connections, 6 external USB 3.1 connections, 2 Front-access 2.5" SSD/HDD trays, 3 SIM sockets for multiple WiFi, 4G, 3G, LTE, GPRS or UMTS wireless data transfer, 1 Front-access CFast socket, 2 SATA III support software RAID function, 4 COM RS-232/422/485, 2 M.2 for storage, 1 M.2 expansion, 2 Mini PCIe/mSATA expansion, PCI/PCIe expansion slot with up to 200W power budget, 32 Isolated DIO, 6V to 36V wide range power input with 80V surge protection, configurable ignition power control, smart remote management features, remote power switch, EN50155 and EN50121-3-2 compliant, optional full function SUMIT A, B expansion supports multiple SIM sockets, 10GigE RJ45 or 10G SPF+ Fiber connections, Vecow ECX-1200/1100 Expandable Fanless system serves new-generation compact integrated functions for intelligent embedded applications.

With outstanding system performance, optimized system designs, flexible expansion features, smart manageability, mobile availability, secure power protection and rugged reliability, Vecow ECX-1200/1100 Series Expandable Fanless Embedded System is your smart solution for Machine Vision, Intelligent Automation, Smart Manufacturing, Intelligent Surveillance, Vehicle Computing, Robotic Control, Deep Learning and any AIoT or Industry 4.0 embedded applications.

1.2 Features

- LGA 1151 Socket supports 8 cores 9th Generation Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh) with workstation-grade Intel® C246 Chipset
- Fanless, -40°C to 75°C Operating Temperature
- 2 DDR4 2666MHz Memory, up to 64GB (ECC/Non-ECC)
- 6 GigE LAN with 4 M12 IEEE 802.3at PoE+, iAMT 12.0 supported
- Multiple external USB 3.1 Gen 2, up to 10Gbps data transfer
- Expansion : 1 PCI/PCIe, 2 Mini PCIe/mSATA, 1 M.2
- PCIe x16 expansion supports up to 200W Power Budget
- 32 Isolated DIO, 6 USB 3.1, 4 COM RS-232/422/485
- 3 External SIM Card sockets support WiFi/4G/3G/LTE/GPRS/UMTS
- Storage : 2 Front-access 2.5" HDD/SSD Tray, 1 Front-access CFast Socket, 1 M.2 Socket
- VGA, DVI-D and DisplayPort display interface, up to 4K display
- NVIDIA® GeForce® GTX 1050 graphics engine, NVIDIA® Pascal™ GPU architecture, up to 8K resolution (ECX-1200/1100 GTX1050)
- 1 VGA, 1 HDMI, 2 DVI and 3 DisplayPort display interfaces, up to 6 independent HD displays (ECX-1200/1100 GTX1050)
- 6V to 36V DC Power Input with 80V Surge Protection
- 12V to 36V DC Power Input with 80V Surge Protection (ECX-1200/1100 GTX1050)
- Configurable Ignition Power Control
- AD Block (ECX-1200 AIO/1100 AIO)
  32 channels AD input
  Multi-range : 0~5V,0~10V, -5~+5V, -10~+10V
  Programmable input type : single end or differential
- DA Block (ECX-1200 AIO/1100 AIO)
  channel 12 bit resolution, (option 16 bit, AIO3315A)
  Output range : –10 ~ +10V

1.3 Product Specification

1.3.1 Specifications of ECX-1210M

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO : 16 DI, 16 DO
LED	Power, HDD, Wireless, PoE
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
PCI/PCIe	1 PCIe x16 Slot
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	Intel® UHD Graphics 630
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

PoE (M12)	
LAN 3	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
LAN 4	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
LAN 5	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.5 kg (9.92 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 75°C (-40°F to 167°F) **65W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 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

1.3.2 Specifications of ECX-1201M

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO : 16 DI, 16 DO
LED	Power, HDD, Wireless, PoE
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
PCI/PCIe	1 PCI Slot
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	Intel® UHD Graphics 630
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

PoE (M12)	
LAN 3	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
LAN 4	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
LAN 5	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350, M12 Connector
Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.5 kg (9.92 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 75°C (-40°F to 167°F) **65W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 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

1.3.3 Specifications of ECX-1210

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO : 16 DI, 16 DO
LED	Power, HDD, Wireless, PoE
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
PCI/PCIe	1 PCIe x16 Slot
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	Intel® UHD Graphics 630
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

PoE	
LAN 3	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.5 kg (9.92 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 75°C (-40°F to 167°F) **65W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 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

1.3.4 Specifications of ECX-1201

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO : 16 DI, 16 DO
LED	Power, HDD, Wireless, PoE
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
PCI/PCIe	1 PCI Slot
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	Intel® UHD Graphics 630
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

PoE	
LAN 3	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.5 kg (9.92 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 75°C (-40°F to 167°F) **65W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 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

1.3.5 Specifications of ECX-1110

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
GPIO	16 GPIO
LED	Power, HDD, Wireless
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
PCI/PCIe	1 PCIe x16 Slot
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	Intel® UHD Graphics 630
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.5 kg (9.92 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 75°C (-40°F to 167°F) **65W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 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

1.3.6 Specifications of ECX-1101

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
GPIO	16 GPIO
LED	Power, HDD, Wireless
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
PCI/PCIe	1 PCI Slot
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	Intel® UHD Graphics 630
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.5 kg (9.92 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -40°C to 75°C (-40°F to 167°F) **65W TDP CPU :** -40°C to 55°C (-40°F to 131°F) **80W TDP CPU :** -40°C to 45°C (-40°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 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

1.3.7 Specifications of ECX-1200 GTX1050

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO : 16 DI, 16 DO
LED	Power, HDD, Wireless, PoE
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
M.2	1 M.2 Key E Socket
Graphics	
Graphics Processor	• Intel® UHD Graphics 630 • NVIDIA® GeForce® GTX 1050 Ti/GTX 1050
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 HDMI : Up to 4096 x 2304 @60Hz • 2 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 7680 x 3840 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

PoE	
LAN 3	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
Power	
Input Voltage	12V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.8 kg (10.58 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -20°C to 60°C (-4°F to 140°F) **65W TDP CPU :** -20°C to 55°C (-4°F to 131°F) **80W TDP CPU :** -20°C to 45°C (-4°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 60°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

1.3.8 Specifications of ECX-1100 GTX1050

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
GPIO	16 GPIO
LED	Power, HDD, Wireless, PoE
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
M.2	1 M.2 Key E Socket
Graphics	
Graphics Processor	• Intel® UHD Graphics 630 • NVIDIA® GeForce® GTX 1050 Ti/GTX 1050
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 HDMI : Up to 4096 x 2304 @60Hz • 2 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 7680 x 3840 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN

Power	
Input Voltage	12V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.8 kg (10.58 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** -20°C to 60°C (-4°F to 140°F) **65W TDP CPU :** -20°C to 55°C (-4°F to 131°F) **80W TDP CPU :** -20°C to 45°C (-4°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 60°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

1.3.9 Specifications of ECX-1200 AIO

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
Isolated DIO	32 Isolated DIO : 16 DI, 16 DO
LED	Power, HDD, Wireless, PoE
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
Graphics	
Graphics Processor	Intel® UHD Graphics 630
Interface	• 1 VGA : Up to 1920 x 1200 @60Hz • 1 DVI-D : Up to 1920 x 1200 @60Hz • 2 DisplayPort : Up to 4096 x 2304 @60Hz
AD Block	
Resolution	12 bit, (option 16 bit, AIO3315A)
Range	0 ~ 5V, 0 ~ 10V, -5 ~ +5V, -10 ~ +10V
Conversion Speed	10us per channel
Integral Nonlinearity Error	• -1 ~ +1 LSB (max, AIO3315) • -3 ~ +3 LSB (max, AIO3315A)
Zero Error	Bipolar 3 LSB (max, AIO3315) 12 LSB (max, AIO3315A) Unipolar 3 LSB (max, AIO3315) 12 LSB (max, AIO3315A)
Full Scale Error	Bipolar -0.45% ~ +0.45%(max, AIO3315) -0.4% ~ +0.4% (max, AIO3315A) Unipolar -0.75% ~ +0.75%(max)
Input Impedance	Bipolar : 31K ohm Unipolar : 42K ohm

DA Block	
Resolution	12 bit (option 16 bit, AIO3315A)
Range	-10 ~ +10V
Capacity	±10mA(typ)
Capacitive Load	≤1000pf
Conversion Time	< 1us
Integral Nonlinearity Error	-4 ~ +4 LSB (max)
Differential Linearity Error	-0.5 ~ +0.5 LSB (max)
Zero Error	9 LSB(max)
Offset Error	9 LSB(max)
Full Scale Error	-0.7% ~ +0.7%(max)
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN
PoE	
LAN 3	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 4	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 5	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
LAN 6	GigE IEEE 802.3at (25.5W/48V) PoE+ by Intel® I350
Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power

Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux
Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.6 kg (10.1 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** 0°C to 70°C (32°F to 158°F) **65W TDP CPU :** 0°C to 55°C (32°F to 131°F) **80W TDP CPU :** 0°C to 45°C (32°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 70°C
Shock/Vibration	• IEC 61373 : 2010 • Railway Applications : Rolling Stock Equipment, Shock and Vibration Tests
EMC	CE, FCC, EN50155, EN50121-3-2

1.3.10 Specifications of ECX-1100 AIO

System	
Processor	8 cores Intel® Xeon®/Core™ i7/i5/i3 Processor (Coffee Lake Refresh)
Chipset	Intel® C246 Chipset
BIOS	AMI
SIO	IT8786E
Memory	• DDR4 2666MHz (ECC/Non-ECC) • Up to 64GB • 2 260-pin SO-DIMM Socket
I/O Interface	
Serial	4 COM RS-232/422/485 (ESD 8kV)
USB	• 6 USB 3.1 (External) • 1 USB 2.0 (Internal)
GPIO	16 GPIO
LED	Power, HDD, Wireless
SIM Card	3 SIM Card Socket (External)
Expansion	
Mini PCIe	2 Full-size Mini PCIe Socket for PCIe/USB/External SIM Card/ mSATA
M.2	1 M.2 Key E Socket
SUMIT A, B	2 SUMIT Slot (Optional)
AD Block	
Resolution	12 bit, (option 16 bit, AIO3315A)
Range	0 ~ 5V, 0 ~ 10V, -5 ~ +5V, -10 ~ +10V
Conversion Speed	10us per channel
Integral Nonlinearity Error	• -1 ~ +1 LSB (max, AIO3315) • -3 ~ +3 LSB (max, AIO3315A)
Zero Error	Bipolar 3 LSB (max, AIO3315) 12 LSB (max, AIO3315A) Unipolar 3 LSB (max, AIO3315) 12 LSB (max, AIO3315A)
Full Scale Error	Bipolar -0.45% ~ +0.45%(max, AIO3315) -0.4% ~ +0.4% (max, AIO3315A) Unipolar -0.75% ~ +0.75%(max)
Input Impedance	Bipolar : 31K ohm Unipolar : 42K ohm

DA Block	
Resolution	12 bit (option 16 bit, AIO3315A)
Range	-10 ~ +10V
Capacity	±10mA(typ)
Capacitive Load	≤1000pf
Conversion Time	< 1us
Integral Nonlinearity Error	-4 ~ +4 LSB (max)
Differential Linearity Error	-0.5 ~ +0.5 LSB (max)
Zero Error	9 LSB(max)
Offset Error	9 LSB(max)
Full Scale Error	-0.7% ~ +0.7%(max)
Storage	
SATA	2 SATA III (6Gbps) support S/W RAID 0, 1
mSATA	2 SATA III (Mini PCIe Type, 6Gbps)
M.2	• 1 M.2 Key M Socket • 1 M.2 Key B Socket
Storage Device	• 1 CFast Socket, Push-in/Push-out Ejector • 2 Front-access 2.5" SSD/HDD Tray
Audio	
Audio Codec	Realtek ALC888S-VD, 7.1 Channel HD Audio
Audio Interface	1 Mic-in, 1 Line-out
Ethernet	
LAN 1	Intel® I219LM GigE LAN supports iAMT 12.0
LAN 2	Intel® I210 GigE LAN
Power	
Input Voltage	6V to 36V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Software Support	
OS	Windows 10, Linux

Mechanical	
Dimension	260mm x 215mm x 79mm (10.2" x 8.5" x 3.1")
Weight	4.6 kg (10.1 lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (Optional) • 2U Rackmount (Optional)
Environment	
Operating Temperature	**35W TDP CPU :** 0°C to 70°C (32°F to 158°F) **65W TDP CPU :** 0°C to 55°C (32°F to 131°F) **80W TDP CPU :** 0°C to 45°C (32°F to 113°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Humidity	5% to 95% humidity, non-condensing
Relative Humidity	95% at 70°C
Shock/Vibration	• IEC 61373 : 2010 • Railway Applications : Rolling Stock Equipment, Shock and Vibration Tests
EMC	CE, FCC, EN50155, EN50121-3-2

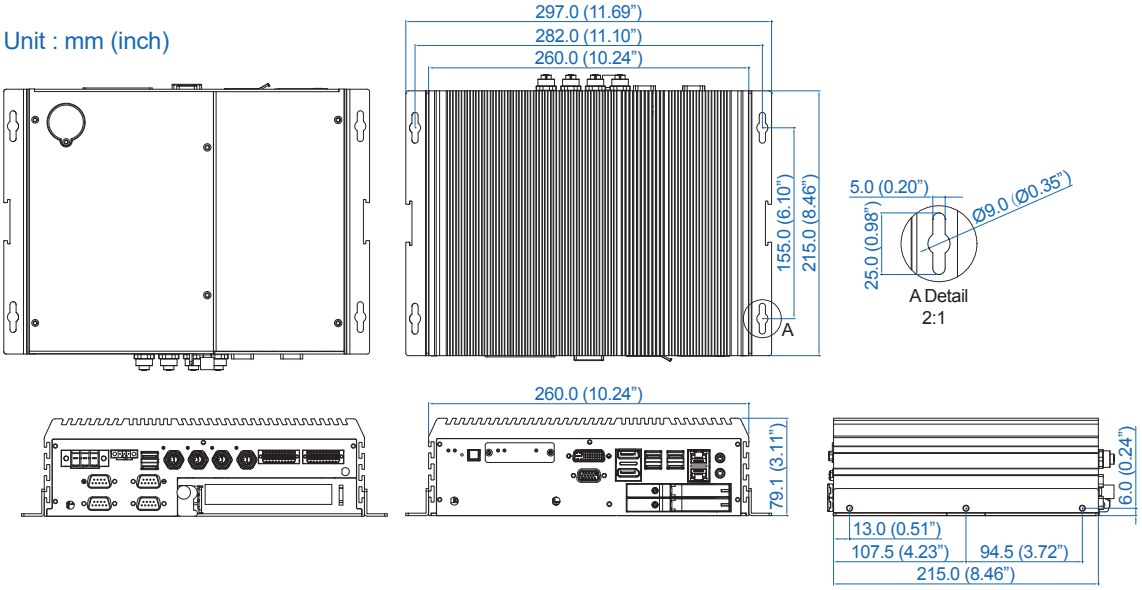
1.4 Supported CPU List

Series	CPU	Cores	GHz	TDP (W)	CPU	Cores	GHz	TDP (W)	ECC RAM
Intel® Xeon®	E-2176G	6	4.6	80	E-2278GE	8	4.7	80	Yes
					E-2278GEL	8	3.9	35	
	E-2124G	4	4.5	71	E-2226GE	6	4.6	80	
Intel® Core™	i7-8700	6	4.6	65	i7-9700E	8	4.4	65	N/A
	i7-8700T	6	4	35	i7-9700TE		3.8	35	
	i5-8500	6	4.1	65	i5-9500E	6	4.2	65	
	i5-8500T	6	3.5	35	i5-9500TE		3.6	35	
	i3-8100	4	3.6	65	i3-9100E	4	3.7	65	Yes
	i3-8100T	4	3.1	35	i3-9100TE		3.2	35	

1.5 Mechanical Dimension

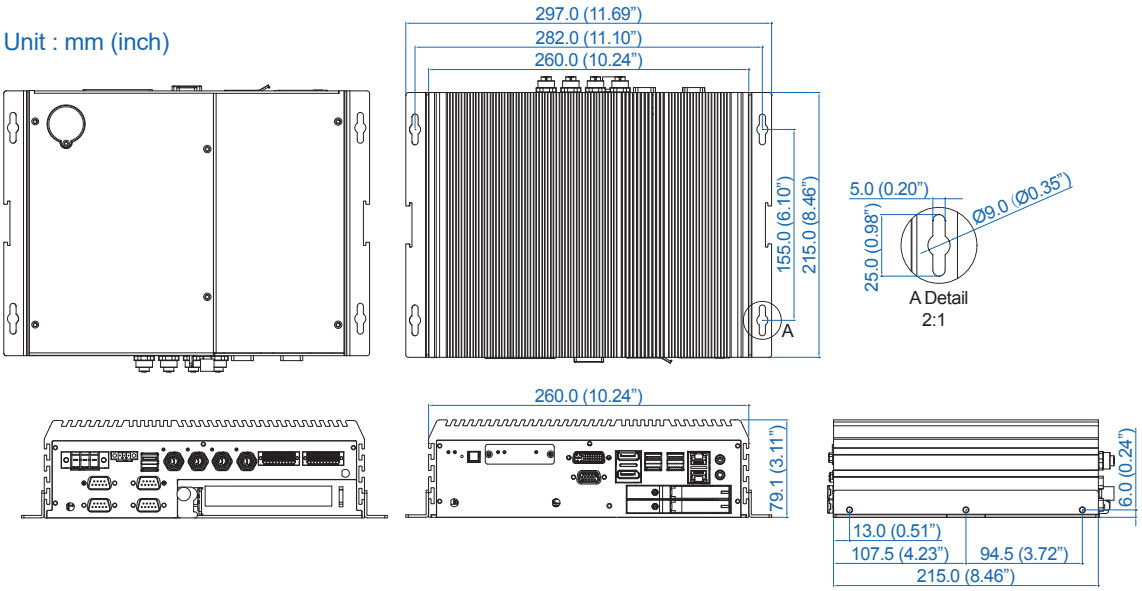
1.5.1 Dimensions of ECX-1210M

Unit : mm (inch)



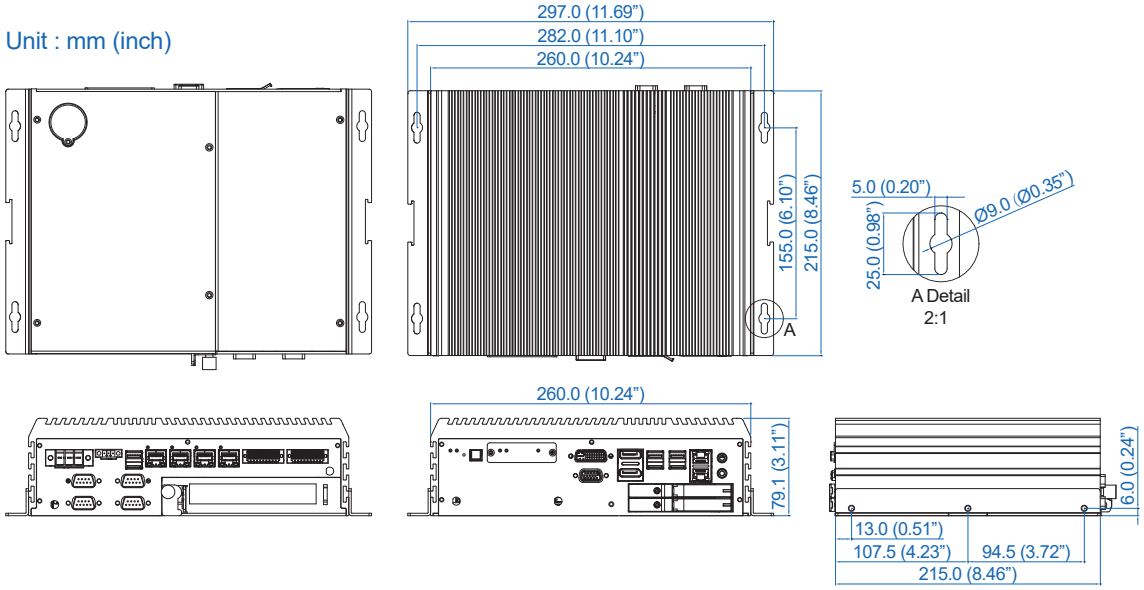
1.5.2 Dimensions of ECX-1201M

Unit : mm (inch)



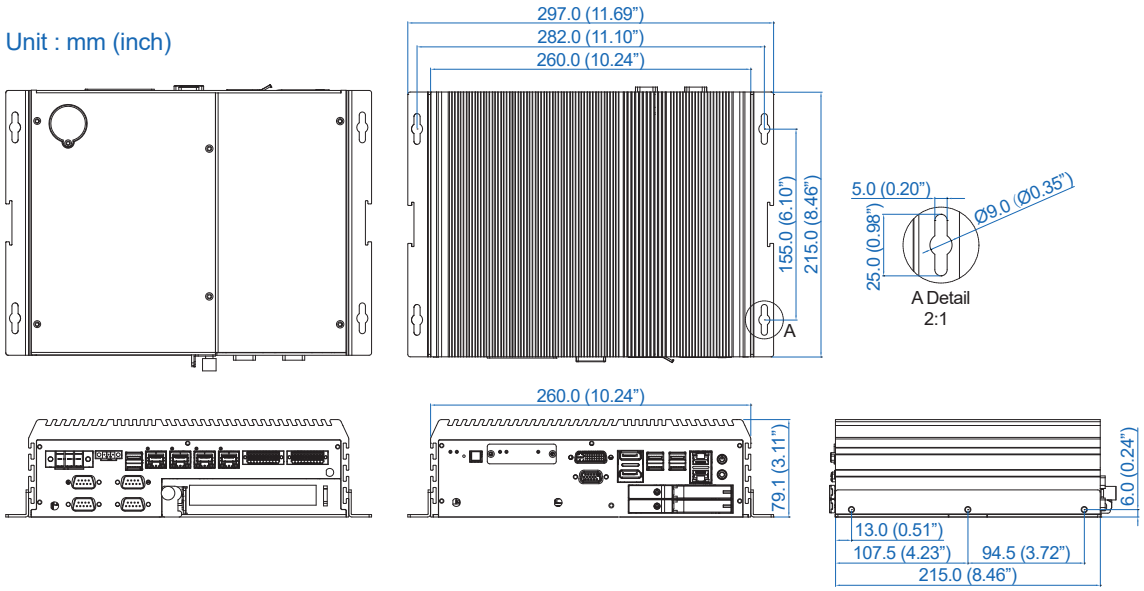
1.5.3 Dimensions of ECX-1210

Unit : mm (inch)



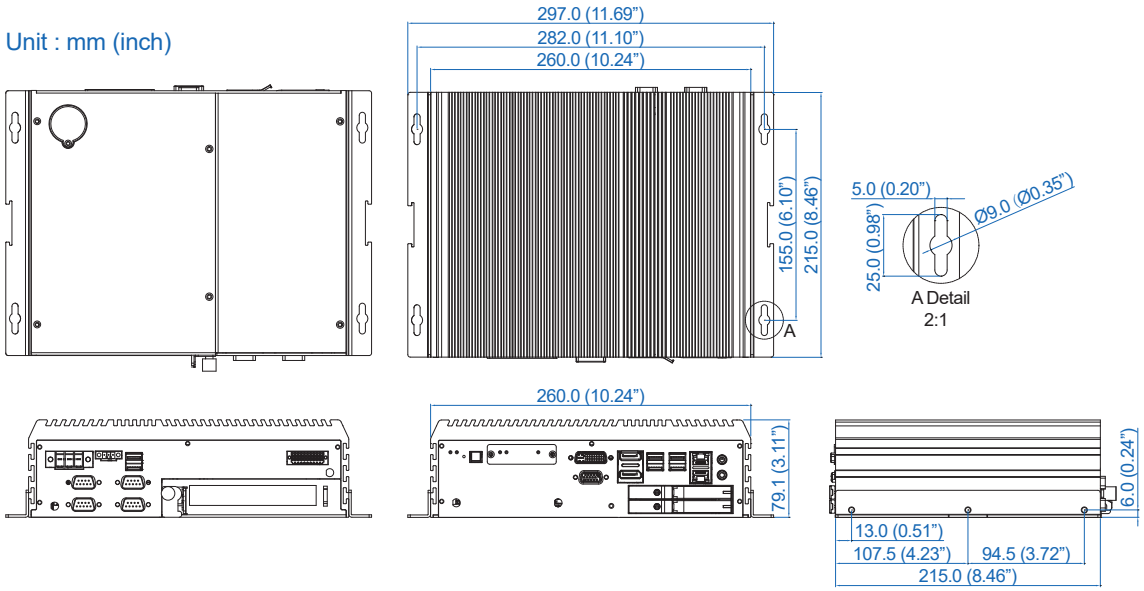
1.5.4 Dimensions of ECX-1201

Unit : mm (inch)



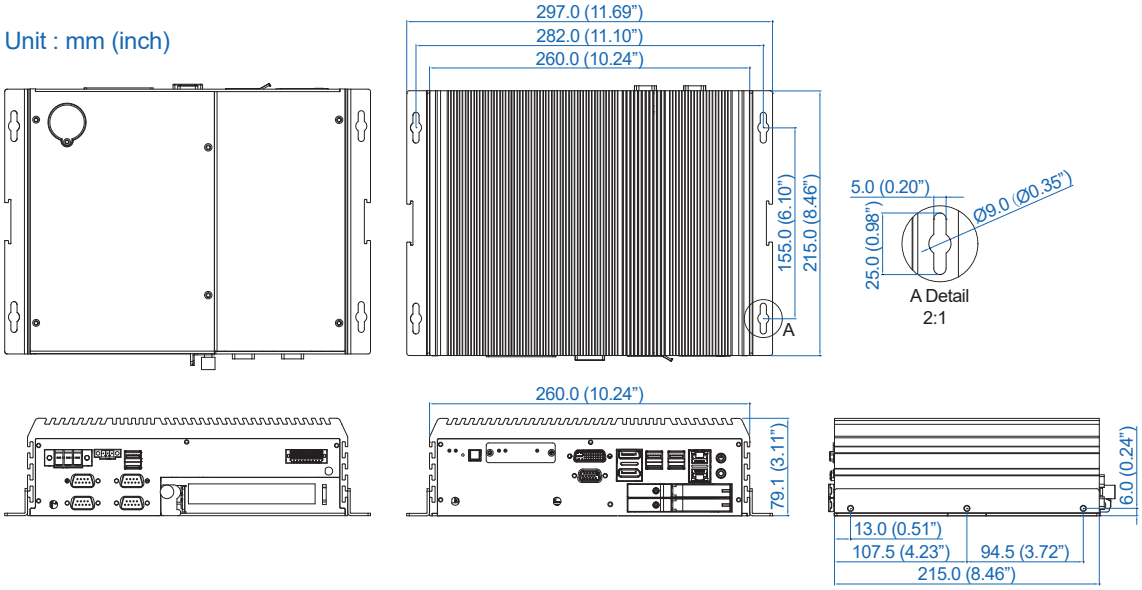
1.5.5 Dimensions of ECX-1110

Unit : mm (inch)



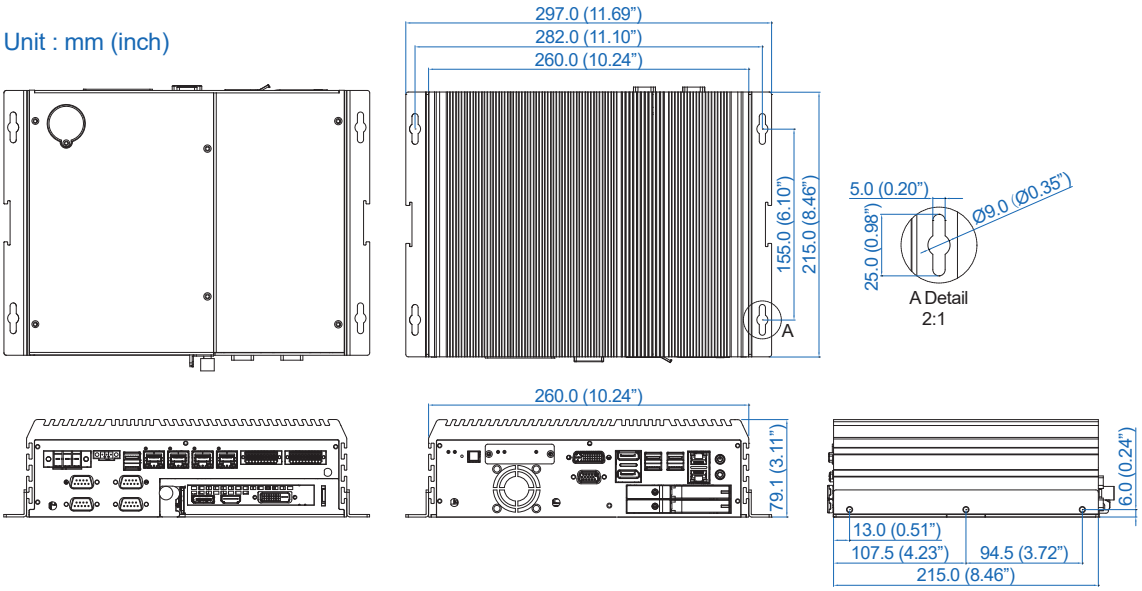
1.5.6 Dimensions of ECX-1101

Unit : mm (inch)



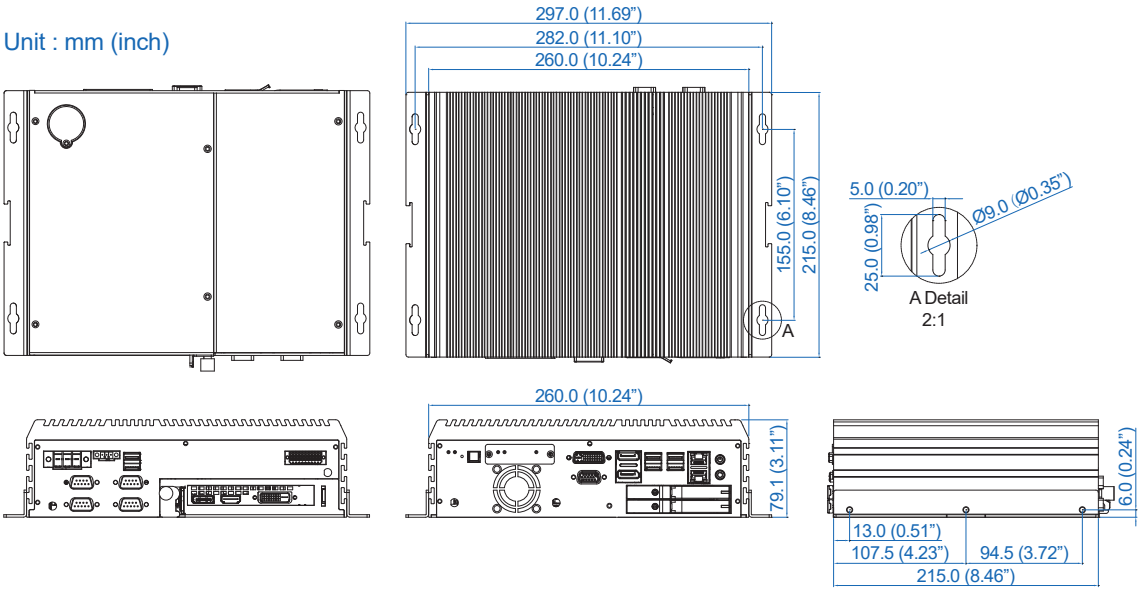
1.5.7 Dimensions of ECX-1200 GTX1050

Unit : mm (inch)



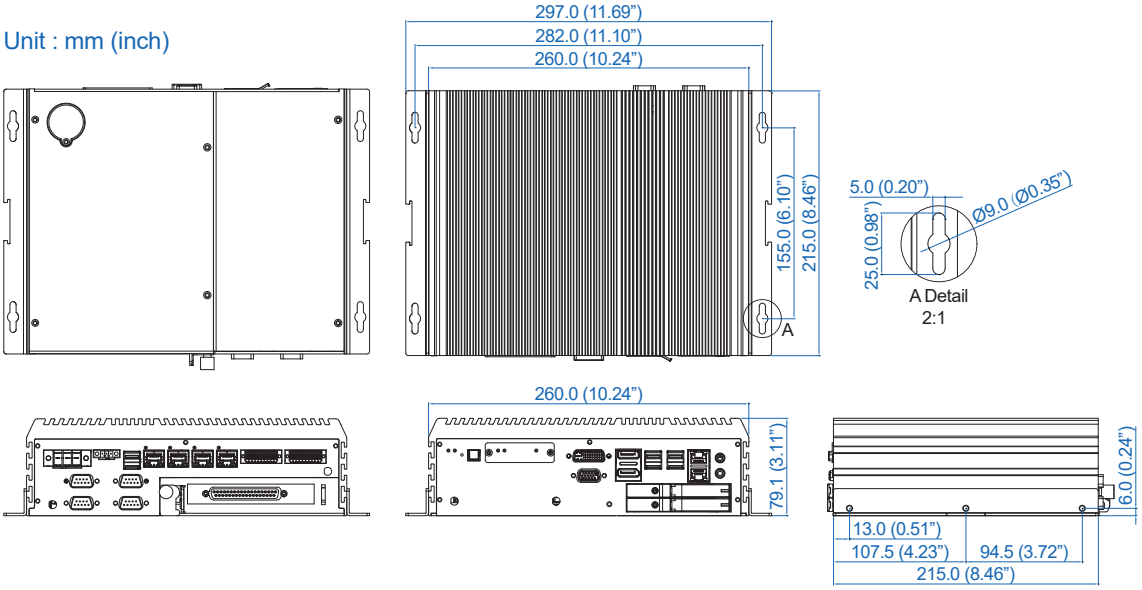
1.5.8 Dimensions of ECX-1100 GTX1050

Unit : mm (inch)



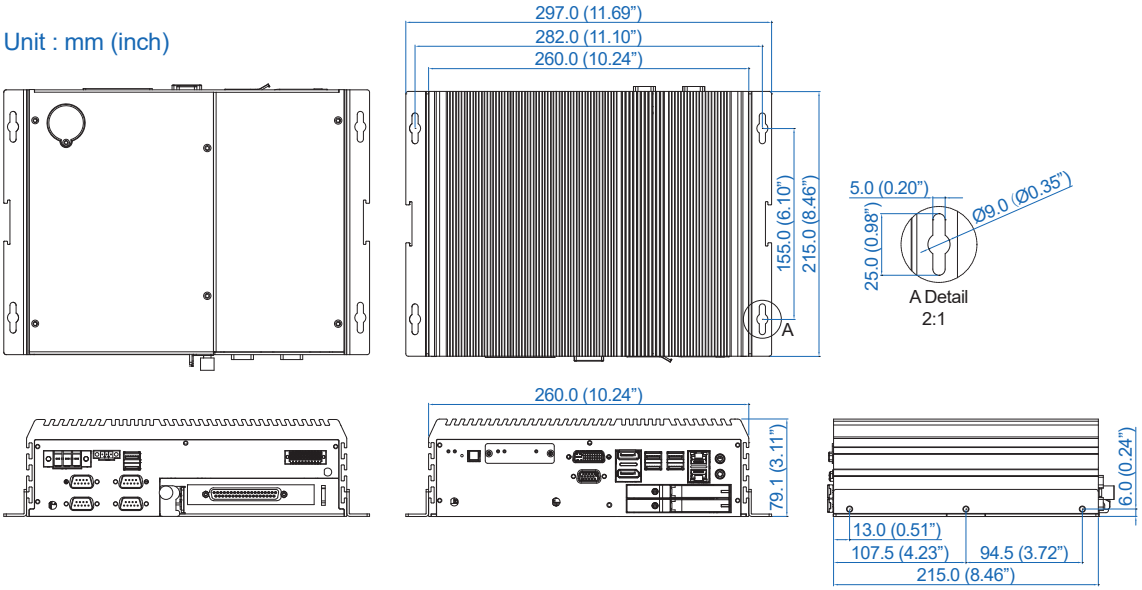
1.5.9 Dimensions of ECX-1200 AIO

Unit : mm (inch)



1.5.10 Dimensions of ECX-1100 AIO

Unit : mm (inch)



2

GETTING TO KNOW YOUR ECX-1200/1100

2.1 Packing List

Item	Description	Qty
1	ECX-1200 Expandable Fanless Embedded System (According to the configuration of you order, the ECX-1200 series may contain SSD/ HDD and DDR4 SO-DIMM. Please verify these items if necessary.)	1

Item	Description	Outlook	Usage	P/N	Qty
1	PHILLPIS M4x16L with washer, Ni		Mount	53-24D6416-30B	4
2	PHILLPIS M2.5x6L, Ni		Mini PCIe slot	53-2426906-30B	4
3	PHILLPIS M3x6L, Ni+Ny		M.2	53-2426206-80B	3
4	PHILLPIS #10-32x6L, Ni		Wall mount bracket	53-I000510-000	6
5	Terminal block 3-pin (7.62mm)		DC-IN	51-2611R03-S1N	1
6	Terminal block 3-pin (3.5mm)		Switch	51-2211R03-S1A	1
7	Terminal block 20-pin (2.54mm)		Isolated DIO/ GPIO	51-2112R20-S1D	2
8	Foot Pad		Foot pad	53-4000042-303	4
9	Wall-mounting bracket		Mount	62-00P0047-000	2
10	Key		SSD/HDD tray	N/A	2

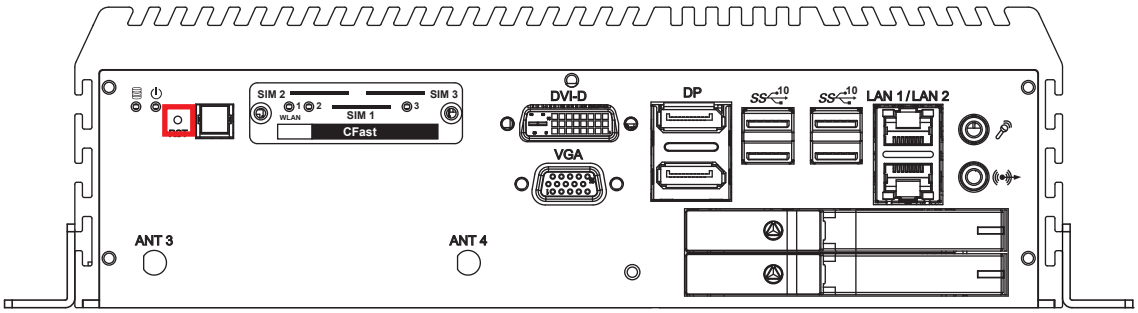
Item	Description	Qty
1	ECX-1100 Expandable Fanless Embedded System (According to the configuration of you order, the ECX-1100 series may contain SSD/ HDD and DDR4 SO-DIMM. Please verify these items if necessary.)	1

Item	Description	Outlook	Usage	P/N	Qty
1	PHILLPIS M4x16L with washer, Ni		Mount	53-24D6416-30B	4
2	PHILLPIS M2.5x6L, Ni		Mini PCIe slot	53-2426906-30B	4
3	PHILLPIS M3x6L, Ni+Ny		M.2	53-2426206-80B	3
4	PHILLPIS #10-32x6L, Ni		Wall mount bracket	53-I000510-000	6
5	Terminal block 3-pin (7.62mm)		DC-IN	51-2611R03-S1N	1
6	Terminal block 3-pin (3.5mm)		Switch	51-2211R03-S1A	1
7	Terminal block 20-pin (2.54mm)		Isolated DIO/ GPIO	51-2112R20-S1D	1
8	Foot Pad		Foot pad	53-4000042-303	4
9	Wall-mounting bracket		Mount	62-00P0047-000	2
10	Key		SSD/HDD tray	N/A	2

2.2 Front Panel I/O Functions

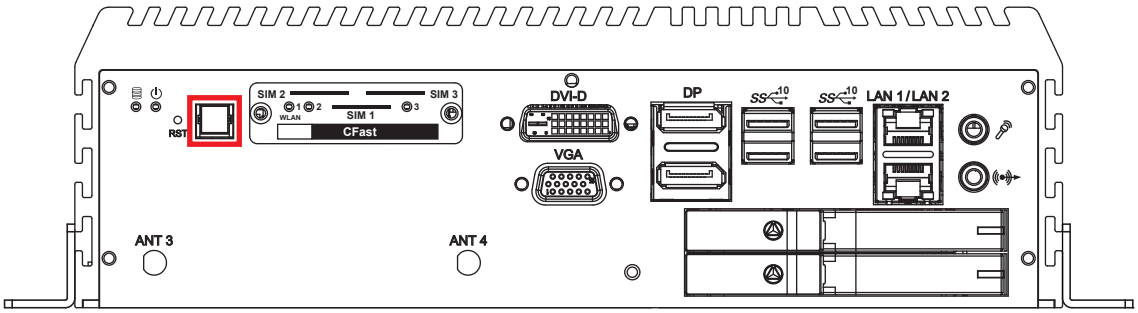
In Vecow ECX-1200/1200M/1100 series family, all I/O connectors are located on front panel and rear panel. Most of the general connections to computer device, such as USB, LAN Jack, Display, VGA, DVI-D, Display Port and any additional storage, are placed on the front panel.

2.2.1 Reset Tact Switch



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

2.2.2 Power Button



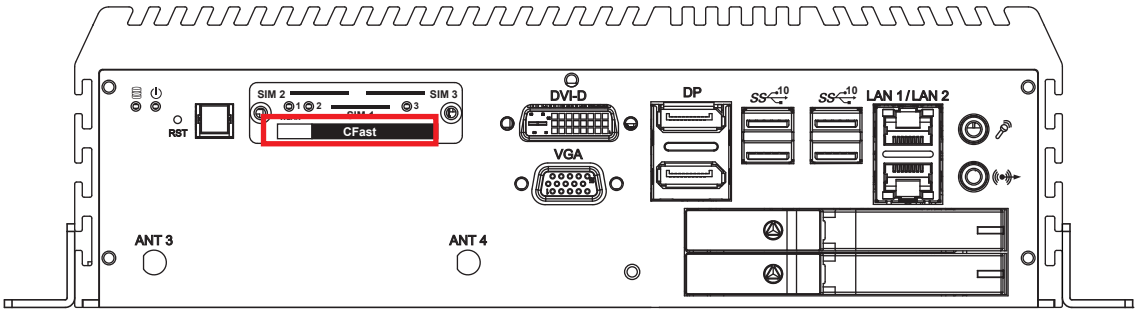
The Power Button is a non-latched switch with dual color LED indication. It indicates power status : S0, S3 and S5. More detail LED indications are listed as follows :

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 the system, 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 CFast Card

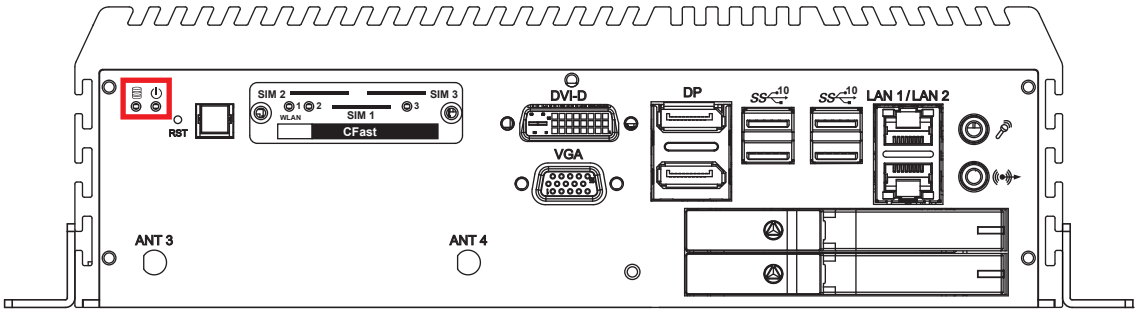


There is a CFast socket on the front panel supporting Type-I/II Compact Flash card. It is implemented by a SATA III Port from C246 PCH. Be sure to disconnect the power source and unscrew the CFast socket cover before installing a CFast card. The ECX-1200/1200M/1100 series does not support the CFast hot swap and PnP (Plug and Play) functions. It is necessary to remove power source first before inserting or removing the CFast card.

The pinouts of CFast port are listed as follows :

Pin No.	Description	Pin No.	Description
S1	GND	PC6	NC
S2	SATA_TXP6	PC7	GND
S3	SATA_TXN6	PC8	CFAST_LED
S4	GND	PC9	NC
S5	SATA_RXN6	PC10	NC
S6	SATA_RXP6	PC11	NC
S7	GND	PC12	NC
PC1	GND	PC13	+3.3V
PC2	GND	PC14	+3.3V
PC3	NC	PC15	GND
PC4	NC	PC16	GND
PC5	NC	PC17	NC

2.2.4 PWR & HDD LED Indicator

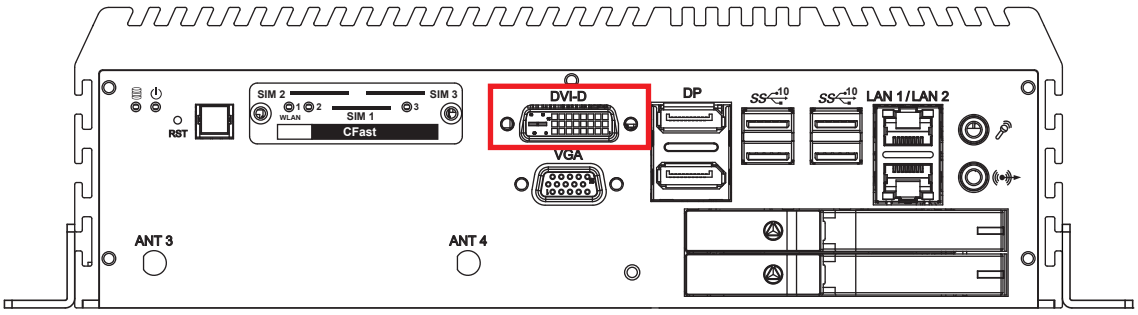


HDD LED/Yellow : A Hard Disk/CFast LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

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

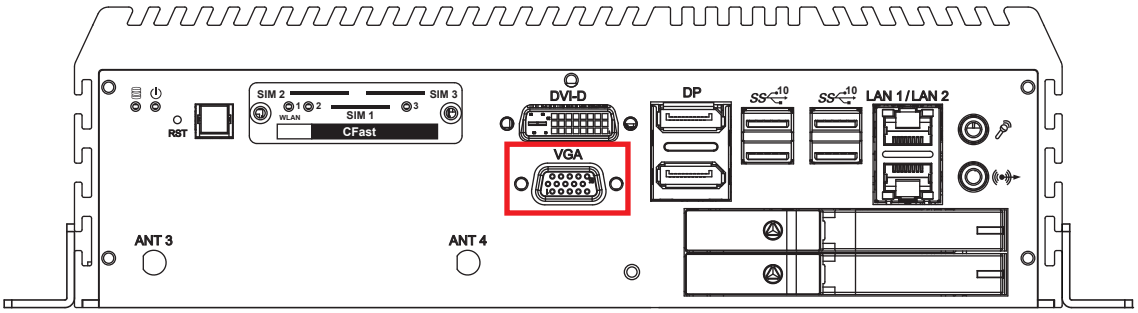
LED Color	Indication	System Status
Yellow	HDD/CFast	• On/Off : Storage status, function or not. • Twinkling : Data transferring.
Green	Power	System power status (on/off)

2.2.5 DVI-D Connector

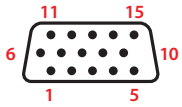


The DVI-D connector on the front panel supports DVI display. This connector can either output DVI signal. The DVI output mode supports up to 1920 x 1200 resolution and output mode supports up to 1920 x 1200 resolution. The DVI is automatically selected according to the display device connected. You will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

2.2.6 VGA Connector

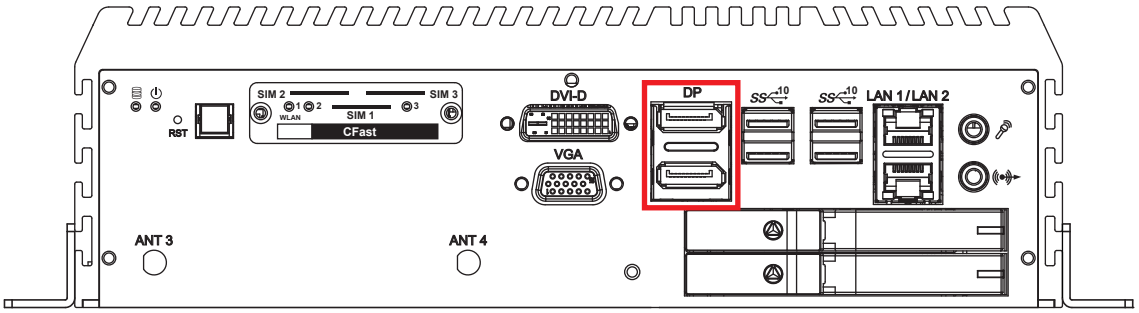


The ECX-1200/1200M/1100 series comes with a DB15 female connector on the front panel to connect a VGA monitor. To ensure that the monitor image remains clear, be sure to tighten the monitor cable after connecting it to the ECX-1200/1200M/1100. The VGA output mode supports up to 1920x1200 resolutions. The pin assignments of the VGA connector are shown below.



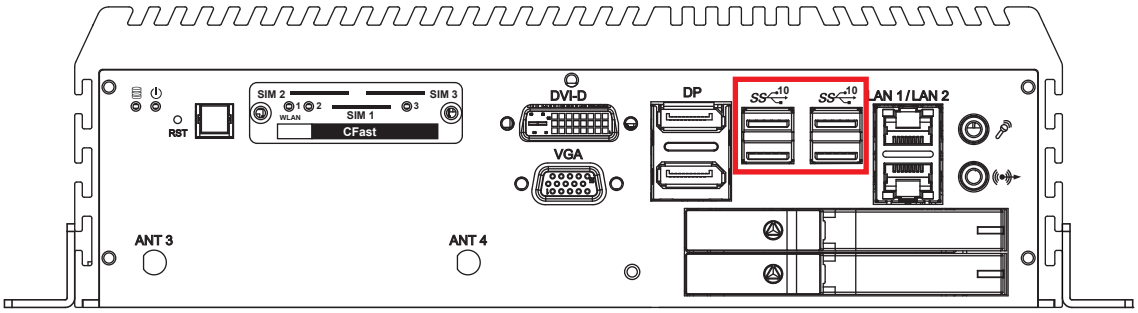
Pin No.	Description	Pin No.	Description
1	Red Color Signal	2	Green Color Signal
3	Blue Color Signal	4	NC
5	Ground	6	Ground
7	Ground	8	Ground
9	VCC	10	Ground
11	NC	12	DDC-DATA
13	H-Sync.	14	V-Sync.
15	DDC-CLK		

2.2.7 DisplayPort



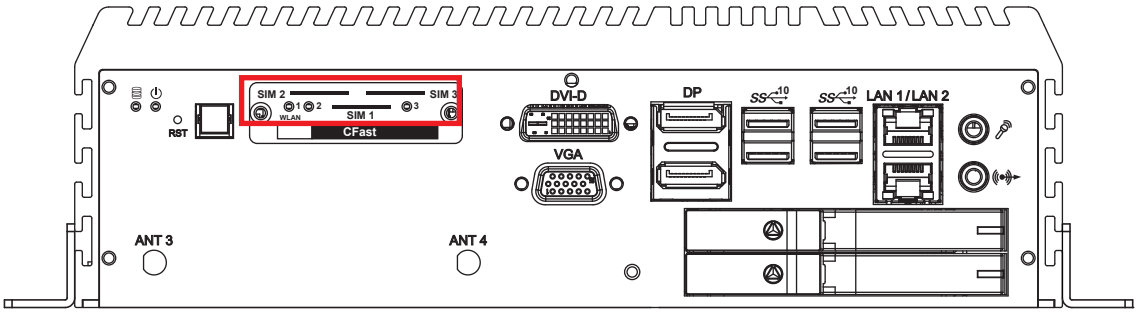
Onboard Display Port support auxiliary channel dual mode, connection supports up to 4096x2304 resolution at 60 Hz.

2.2.8 USB 3.1



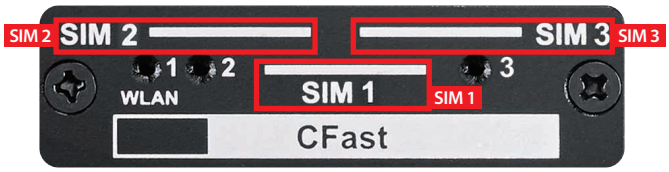
There are 4 USB 3.1 connections available supporting up to 10GB per second data rate in the front side of ECX-1200/1200M/1100 series. It also compliant with the requirements of Super Speed (SS), high speed (HS), full speed (FS) and low speed (LS).

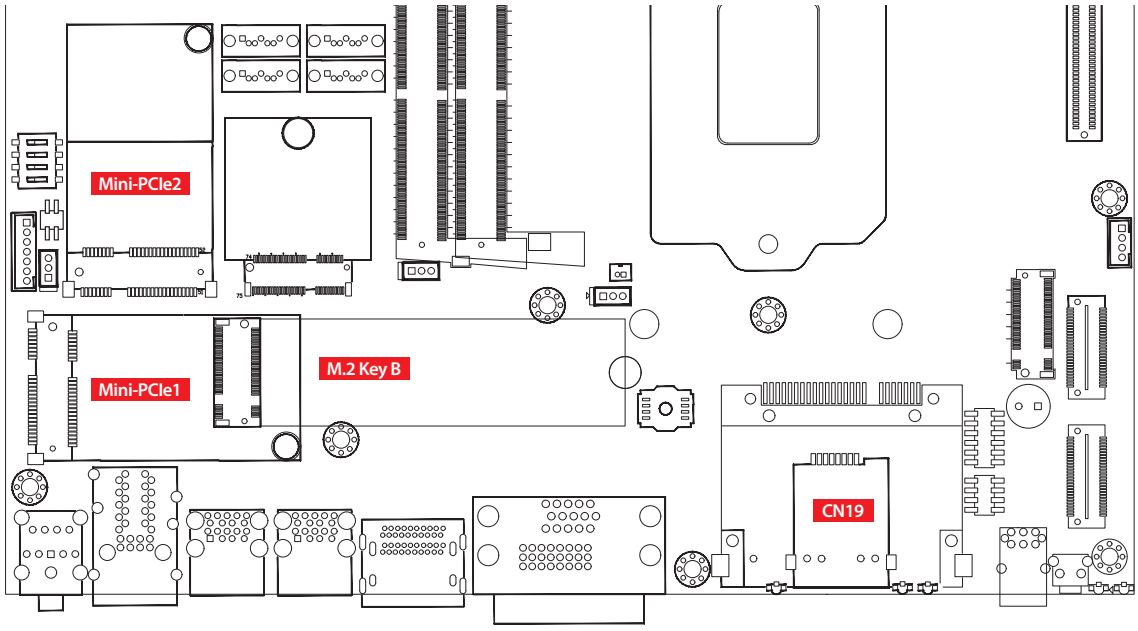
2.2.9 WLAN LED, Mini PCIe, SIM Card Comparison

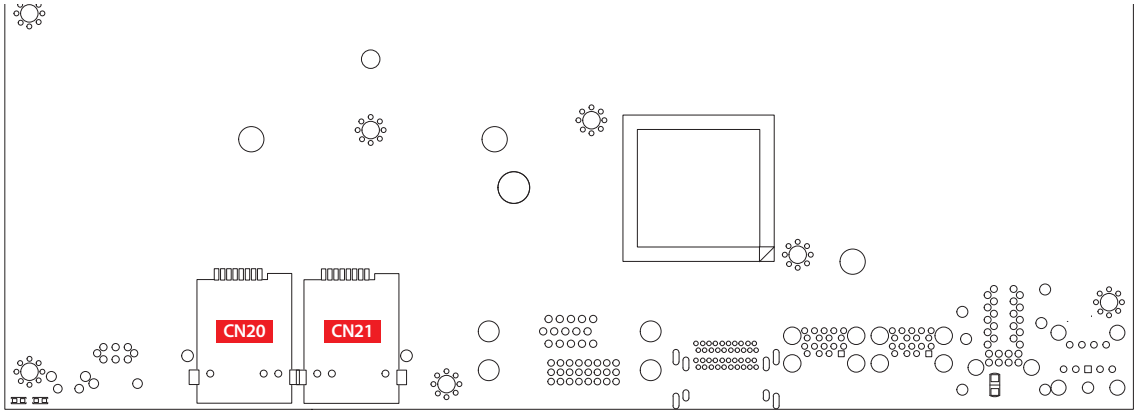


Mini PCIe Slot/SIM Slot/WLAN LED Mapping Table :

Mini PCIe	SIM	LED
MPCIe 1	SIM 1 (CN19)	1
MPCIe 2	SIM 2 (CN20)	2
M.2 KEY B	SIM 3 (CN21)	3

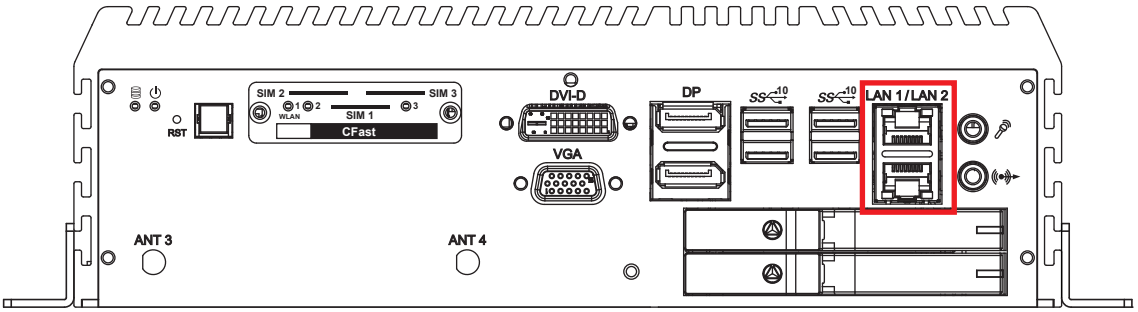






Note :
The SIM card sockets do not support hot-plug. Please make sure to unplug the system power before inserting the SIM card(s).

2.2.10 Ethernet Port



There are 2 8-pin RJ-45 jacks supporting 10/100/1000Mbps Ethernet connections in the front side. LAN 1 is powered by Intel® i219 Ethernet Phy; LAN 2 is powered by Intel® I210 Ethernet engine. When both LAN 1 and LAN 2 work in normal status, iAMT 12.0 function is enabled.

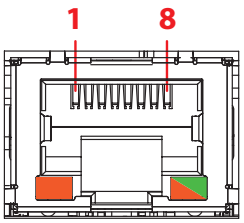
Using suitable RJ-45 cable, you can connect the system to a computer, or to any other devices with Ethernet connection, for example, a hub or a switch. Moreover, both of LAN 1 and LAN 2 supports Wake on LAN and Pre-boot functions. The pin-outs of LAN 1 and LAN 2 are listed as follows :

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

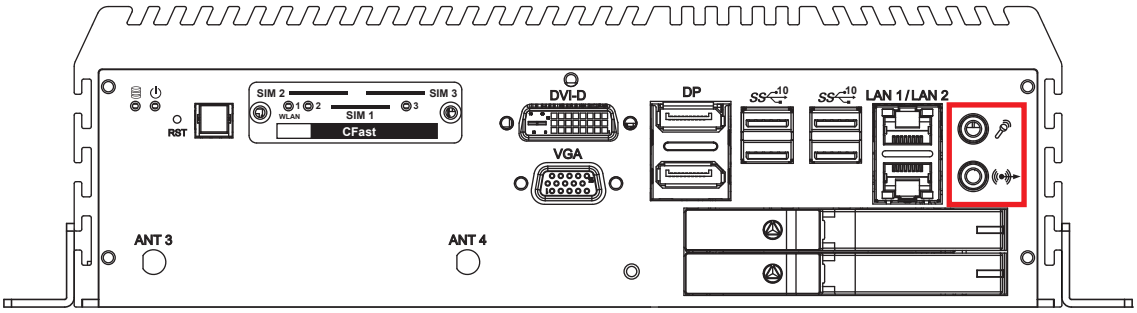
Each LAN port is supported by standard RJ-45 connector with LED indicators to present Active/Link/Speed status of the connection.

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

LED Location	LED Color	10Mbps	100Mbps	1000Mbps
Right	Green/ Orange	Off	Solid Green	Solid Orange
Left	Green	Twinkling Green	Twinkling Green	Twinkling Green



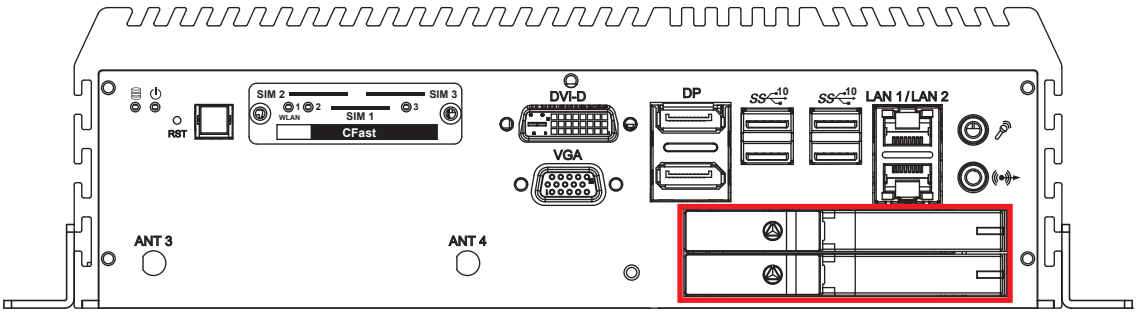
2.2.11 Audio Connector



There are 2 audio connectors, Mic-in and Line-out, in the front side of ECX-1200/1200M/1100 series. Onboard Realtek ALC888S-VD audio codec supports 7.1 channel HD audio and fully complies with Intel® High Definition Audio (Azalia) specifications.

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

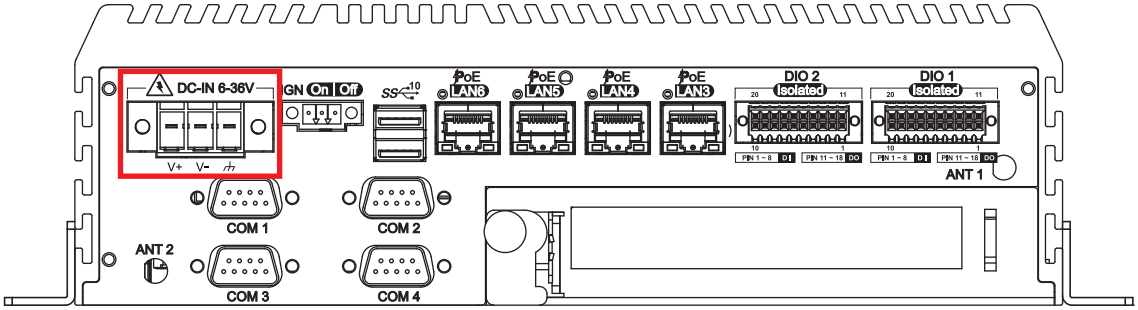
2.2.12 SSD/HDD Tray



There are 2 front-access 2.5" SSD/HDD trays in the front side of ECX-1200/1200M/1100 series. Just trigger to open the SSD/HDD tray, up to 4TB is available.

2.3 Rear Panel I/O & Functions

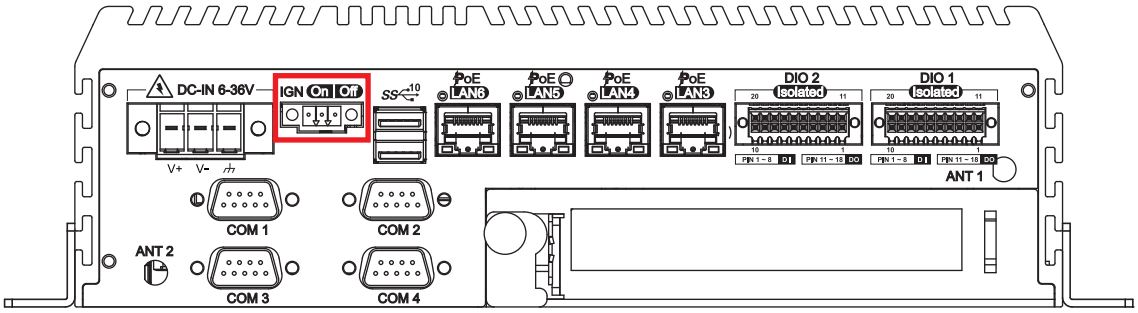
2.3.1 Power Terminal Block



This system supports 6V to 36V DC power input by terminal block in the rear side. In normal power operation, power LED lightens in solid green. Supports up to 80V surge protection.

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

2.3.2 Remote Power On/Off Switch & LED Terminal Block



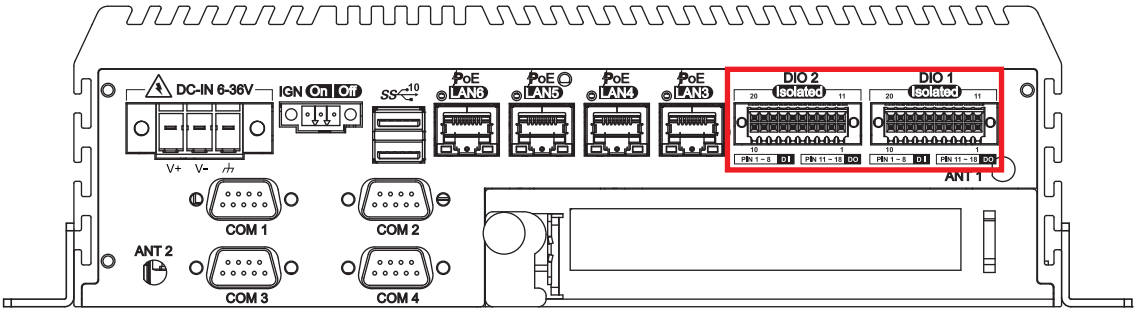
It is a 2-pin power-on or power-off switch through Phoenix Contact terminal block. You could turn on or off the system power by using this contact. This terminal block supports dual function of soft power-on/power-off (instant off or delay 4 second), and suspend mode.

Pin No.	Definition	Pin No.	Definition
1	Ignition	2	SW+
3	SW-		

2.3.3 Isolated DIO/GPIO

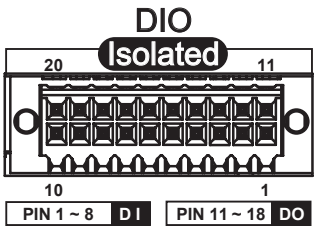
2.3.3.1 Isolated DIO

ECX-1200/1200M series :



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

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



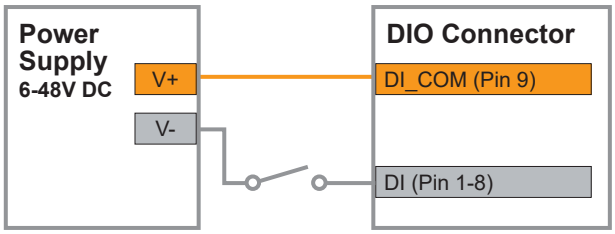
DIO Connectors pin out :

DIO	Pin No.	Definition	Function
DIO 1	1	INPUT 0	SIO_GPI70
	2	INPUT 1	SIO_GPI71
	3	INPUT 2	SIO_GPI72
	4	INPUT 3	SIO_GPI73
	5	INPUT 4	SIO_GPI74
	6	INPUT 5	SIO_GPI75
	7	INPUT 6	SIO_GPI76
	8	INPUT 7	SIO_GPI77
	9	DI_COM	-
	10	DIO_GND	-
	11	OUTPUT 0	SIO_GPO80
	12	OUTPUT 1	SIO_GPO81
	13	OUTPUT 2	SIO_GPO82
	14	OUTPUT 3	SIO_GPO83
	15	OUTPUT 4	SIO_GPO84

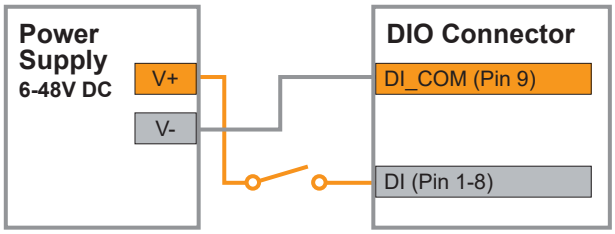
DIO	Pin No.	Definition	Function
DIO 1	16	OUTPUT 5	SIO_GPO85
	17	OUTPUT 6	SIO_GPO86
	18	OUTPUT 7	SIO_GPO87
	19	DIO_GND	-
	20	External 6-40VDC (NPN) External 6-48VDC (PNP)	-
DIO 2	1	INPUT 0	SIO_GPI37
	2	INPUT 1	SIO_GPI56
	3	INPUT 2	SIO_GPI57
	4	INPUT 3	SIO_GPI15
	5	INPUT 4	SIO_GPI16
	6	INPUT 5	SIO_GPI35
	7	INPUT 6	SIO_GPI46
	8	INPUT 7	SIO_GPI11
	9	DI2_COM	-
	10	DIO2_GND	-
	11	OUTPUT 0	SIO_GPO22
	12	OUTPUT 1	SIO_GPO26
	13	OUTPUT 2	SIO_GPO64
	14	OUTPUT 3	SIO_GPO65
	15	OUTPUT 4	SIO_GPO41
	16	OUTPUT 5	SIO_GPO40
	17	OUTPUT 6	SIO_GPO52
	18	OUTPUT 7	SIO_GPO27
	19	DIO2_GND	-
	20	External 6-40VDC (NPN) External 6-48VDC (PNP)	-

DI reference circuit :

Sink Mode
(NPN)

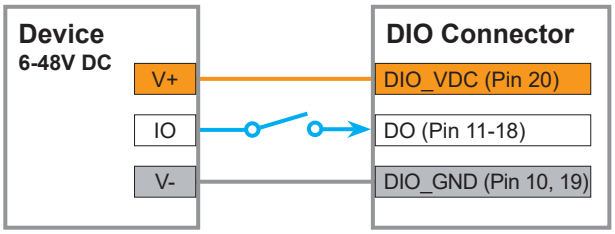


Source Mode
(PNP)

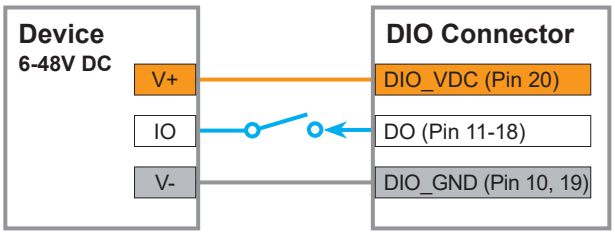


DO reference circuit :

Sink Mode
(NPN, Default)



Source Mode
(PNP)

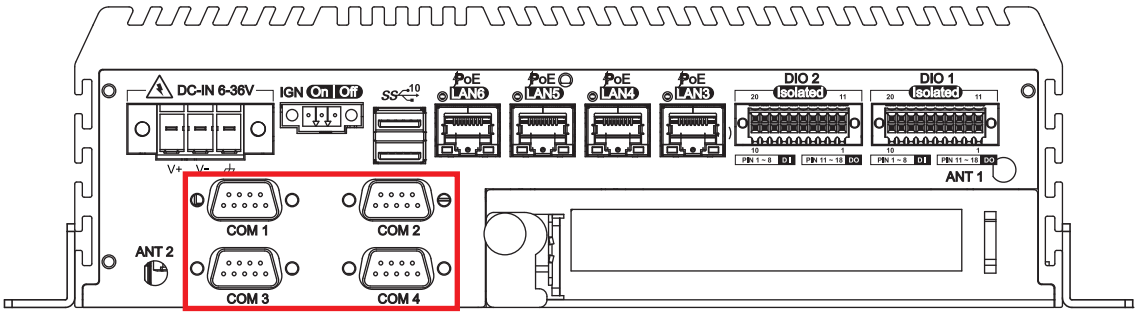


The system offers sixteen programmable I/O (3.3V Level).
If the GPIO is logic high, it indicates that the mapping SIO GPIO pin is logic high level.
If the GPIO is logic low, it indicates that the mapping SIO GPIO pin is logic low level.

GPIO Connectors pin assignments

Pin No.	Mapping to SIO GPIO Function	Pin No.	Mapping to SIO GPIO Function
1	SIO_GPI37	11	SIO_GPO22
2	SIO_GPI56	12	SIO_GPO26
3	SIO_GPI57	13	SIO_GPO64
4	SIO_GPI15	14	SIO_GPO65
5	SIO_GPI16	15	SIO_GPO41
6	SIO_GPI35	16	SIO_GPO40
7	SIO_GPI46	17	SIO_GPO52
8	SIO_GPI11	18	SIO_GPO27
9	----------	19	GND
10	GND	20	----------

2.3.4 Serial Port



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

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

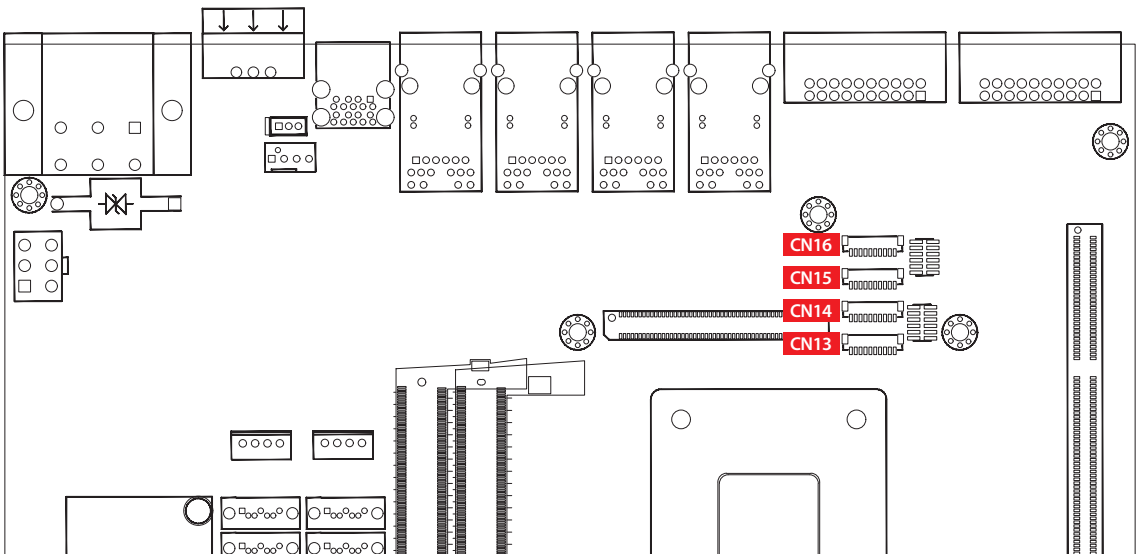
The pin assignments are listed in the following table :

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

COM 1 to COM 4 MB connector table :

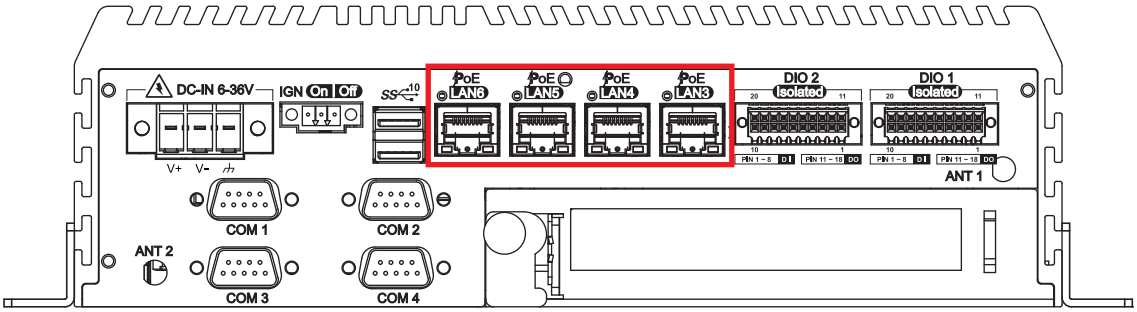
COM Port	MB Connector	COM Port	MB Connector
COM 1	CN13	COM 2	CN14
COM 3	CN15	COM 4	CN16

	Pin No.	Signal Name
CN13 to CN16	1	NC
	2	GND
	3	RI
	4	DTR
	5	CTS
	6	TXD
	7	RTS
	8	RXD
	9	DSR
	10	DCD

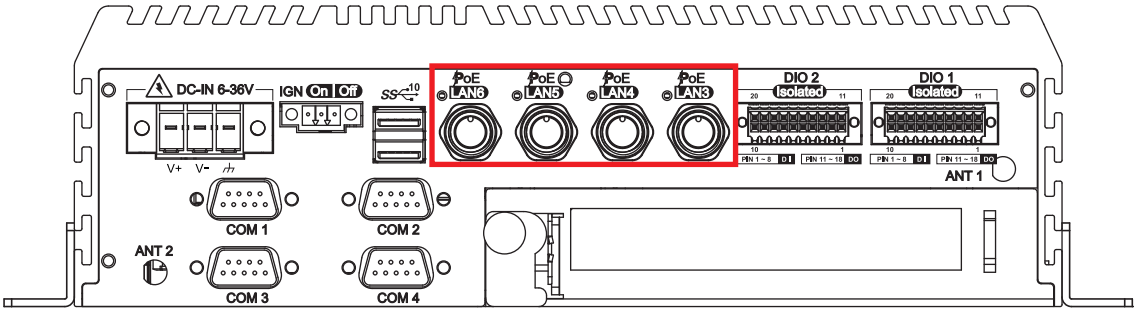


2.3.5 PoE Ports

ECX-1200 :



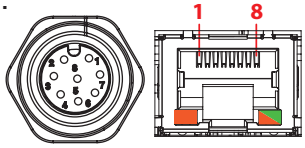
ECX-1200M :



There are 4 RJ45 connectors in the rear side of ECX-1200/1200M. It supports IEEE 802.3at (PoE+) Power over Ethernet (PoE) connection delivering up to 37W/54V per port and 1000BASE-T gigabit data signals over standard Ethernet Cat 5/Cat 6 cable.

Each PoE connection is powered by Intel® I350 Gigabit Ethernet controller and independent PCI express interface to connect with multi-core processor for network and data transmit optimization. Only when PoE port starts to supply power to power devices, the dedicated LED will be lightened.

PS. Suggest to use PoE function when power input is over 12V.



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

	RJ45 (ECX-1200)			M12 (ECX-1200M)		
Pin No.	10/100Mbps	1000Mbps	PoE	10/100Mbps	1000Mbps	PoE
1	E_TX+	MDI0_P	POE+	-----	MDI2_P	-----
2	E_TX-	MDI0_N	POE+	-----	MDI3_P	-----
3	E_RX-	MDI1_P	POE-	-----	MDI3_N	-----
4	-----	MDI2_P	-----	E_TX-	MDI0_N	POE+
5	-----	MDI2_N	-----	E_RX+	MDI1_P	POE-
6	E_RX+	MDI1_N	POE-	E_TX+	MDI0_P	POE+
7	-----	MDI3_P	-----	-----	MDI2_N	-----
8	-----	MDI3_N	-----	E_RX-	MDI1_N	POE-

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

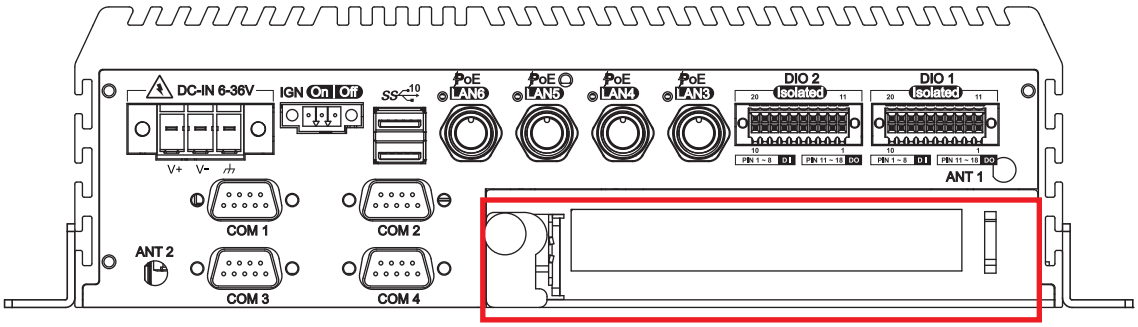
The LED indicator on the right bottom corner lightens in solid green when the cable is properly connected to a 100Mbps Ethernet network; The LED indicator on the right bottom corner lightens in solid orange when the cable is properly connected to a 1000Mbps Ethernet network; The left LED will keep twinkling/off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

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

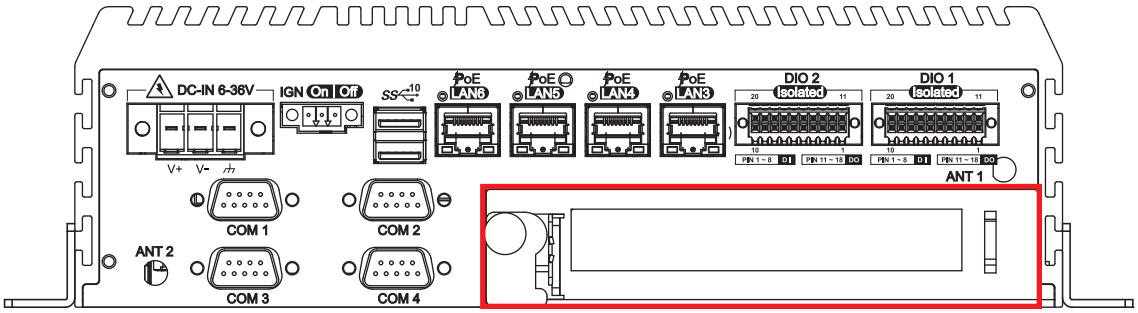
POE LED	LED Color	POE Status
LED 1 - 4	Solid Green	POE ON

2.3.6 Add Card

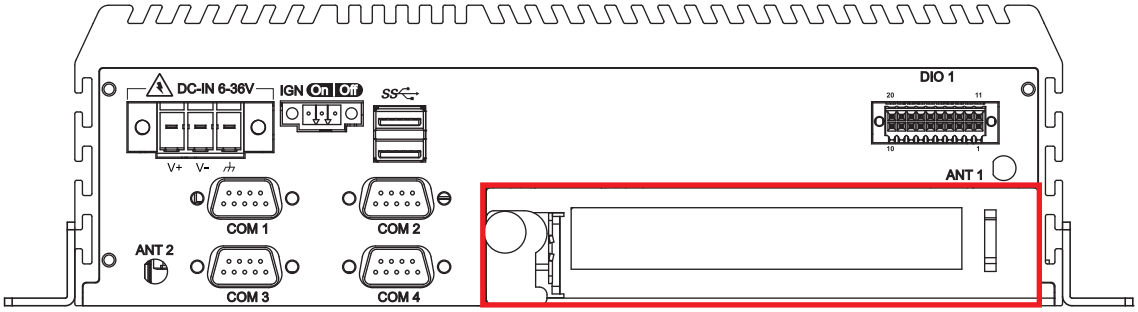
ECX-1210M/1201M :



ECX-1210/1201 :



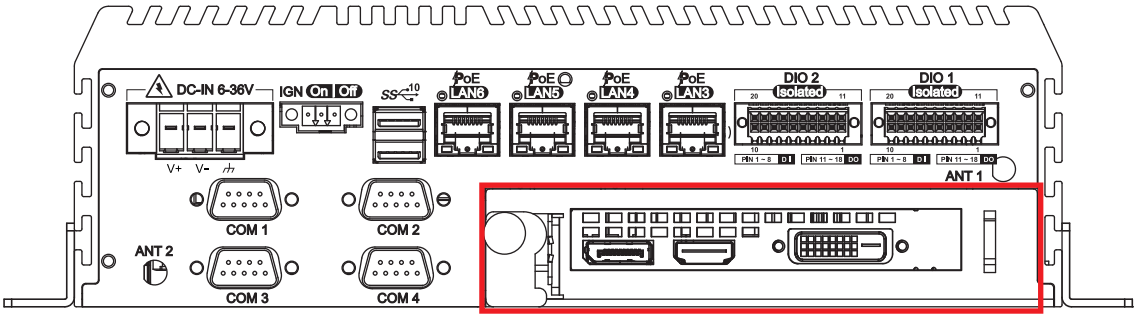
ECX-1110/1101 :



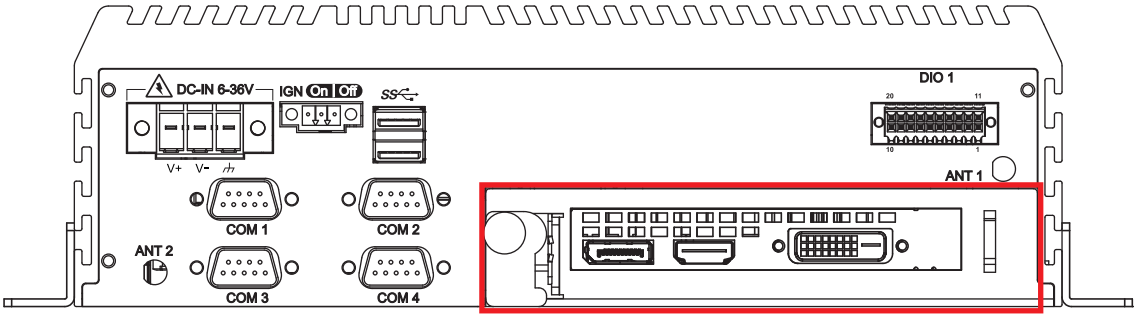
There is the flexible expansion feature in the rear side of ECX-1110/1101/1210/1201/1210M/1201M. Optional for PCIe x16 FHHL add on card or PCI card.

2.3.7 GTX 1050 Graphic Card

ECX-1200 GTX1050 :



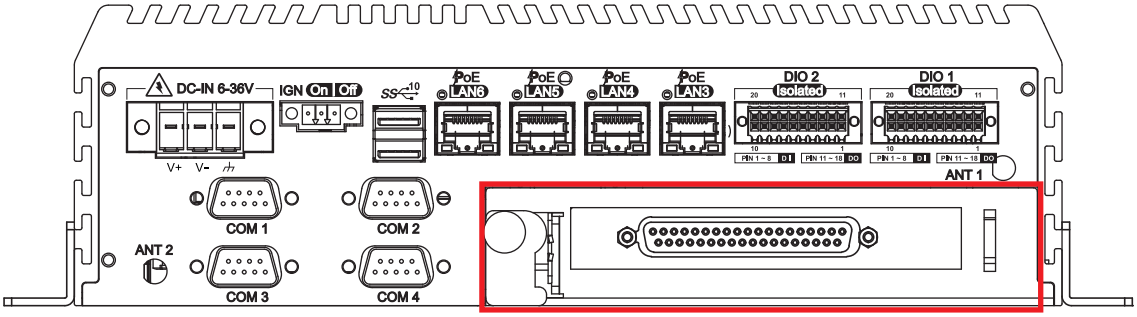
ECX-1100 GTX1050 :



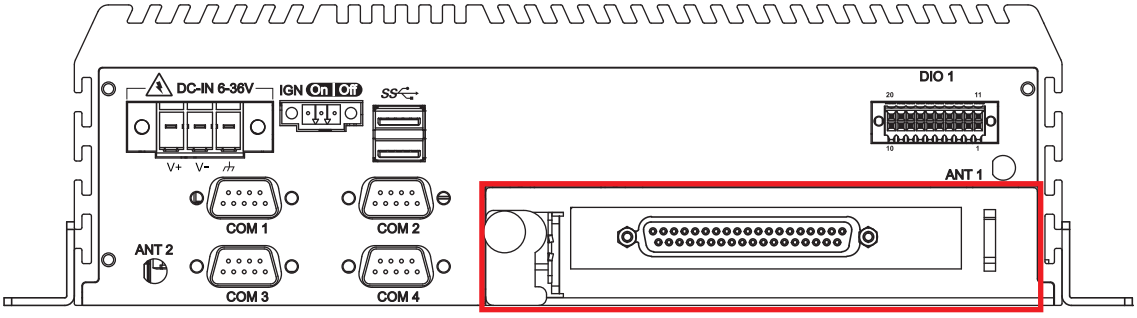
ECX-1200/1100 with GTX1050 support GTX1050 graphic card only.

2.3.8 ECX-1100/1200 AIO Card

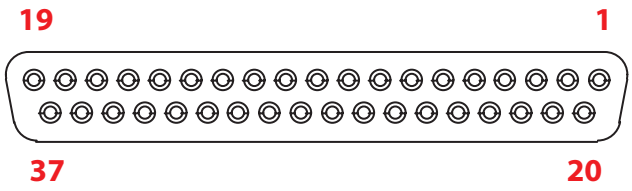
ECX-1200 AIO :



ECX-1100 AIO :

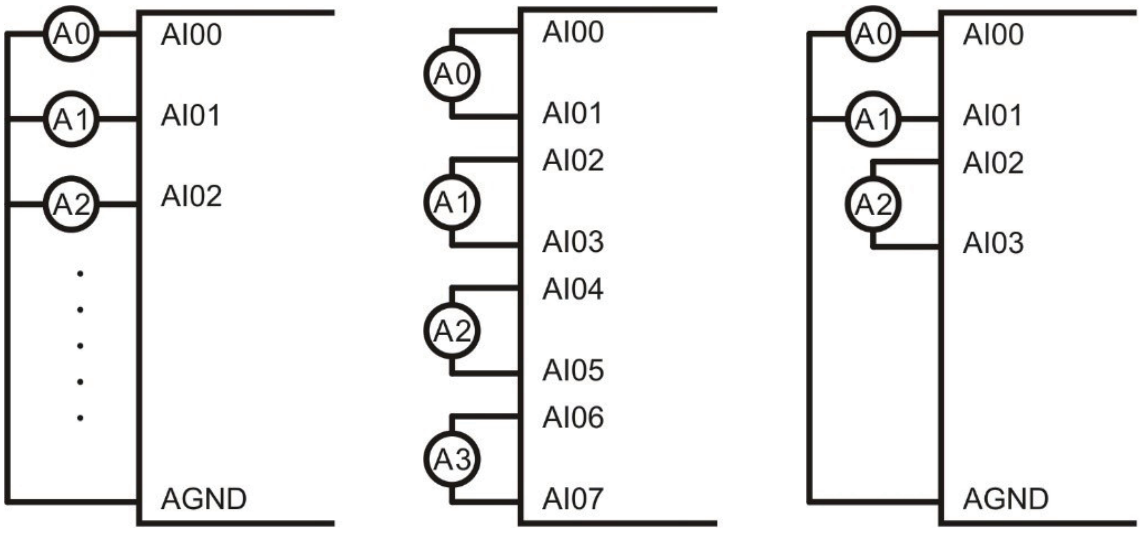


There is the Analog I/O in the rear side of ECX-1100/1200 AIO.



Pin	Descriptions	Pin	Descriptions
1	AI00 : port0 ai0	20	AI01 : port0 ai1
2	AI02 : port0 ai2	21	AI03 : port0 ai3
3	AI04 : port0 ai4	22	AI05 : port0 ai5
4	AI06 : port0 ai6	23	AI07 : port0 ai7
5	AI10 : port1 ai0	24	AI11 : port1 ai1
6	AI12 : port1 ai2	25	AI13 : port1 ai3
7	AI14 : port1 ai4	26	AI15 : port1 ai5
8	AI16 : port1 ai6	27	AI17 : port1 ai7
9	AI20 : port2 ai0	28	AI21 : port2 ai1
10	AI22 : port2 ai2	29	AI23 : port2 ai3
11	AI24 : port2 ai4	30	AI25 : port2 ai5
12	AI26 : port2 ai6	31	AI27 : port2 ai7
13	AI30 : port3 ai0	32	AI31 : port3 ai1
14	AI32 : port3 ai2	33	AI33 : port3 ai3
15	AI34 : port3 ai4	34	AI35 : port3 ai5
16	AI36 : port3 ai6	35	AI37 : port3 ai7
17	GND	36	GND
18	GND	37	DA1 : analog out1
19	DA0 : analog out0		

External Wiring Diagram

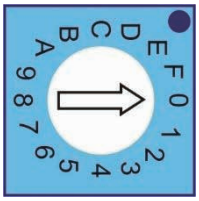


Single end connection Differential connection Mixed connection

CARD ID Setting

Since PCI cards have plug and play function, the card ID is required for programmer to identify which card he/she will control without knowing the physical address assigned by the Windows. A 4-bit DIP switch or rotary switch for distinguishing the 16 identical card.
The following example sets the card ID at 0.

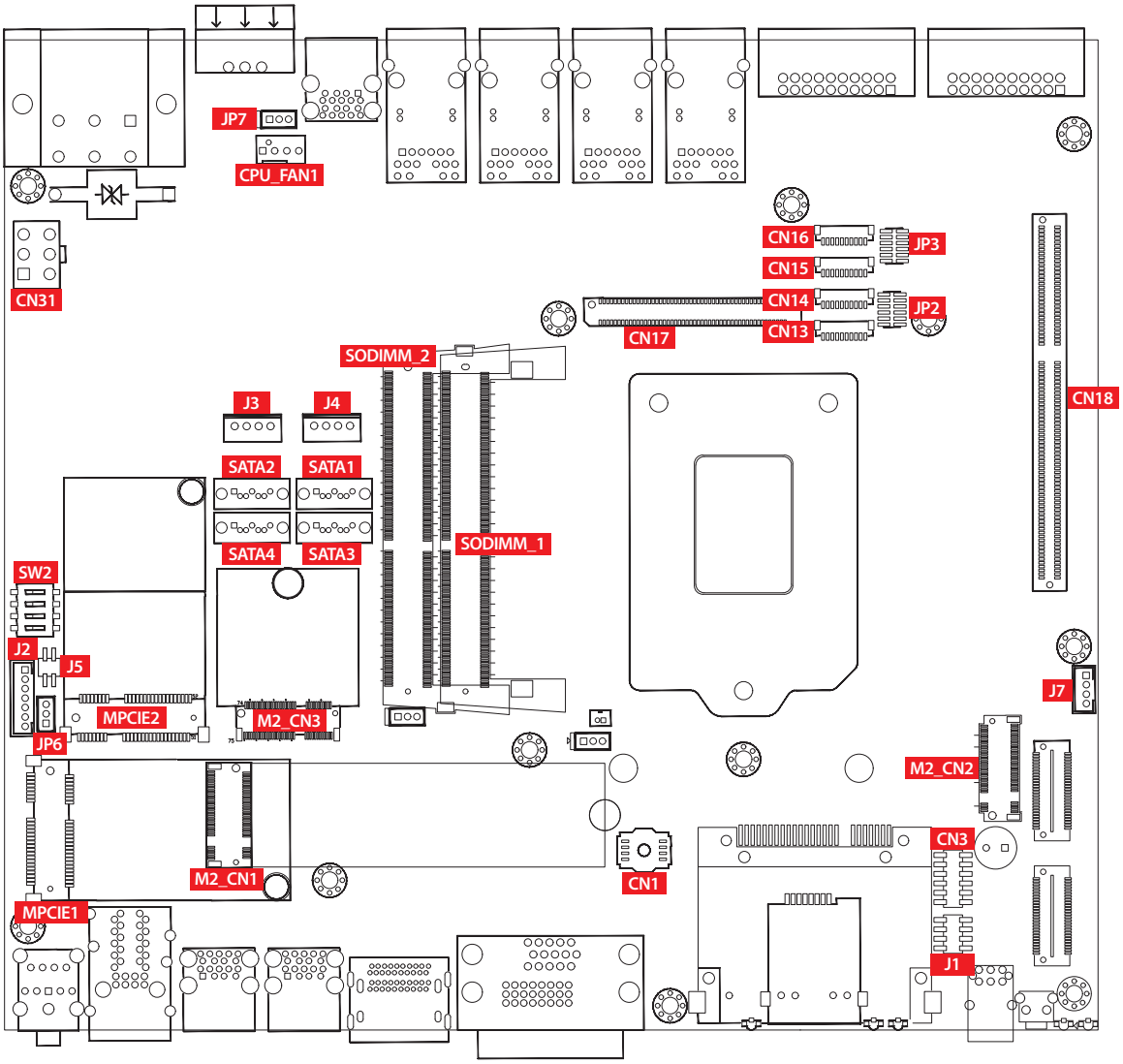
Example for card ID setting



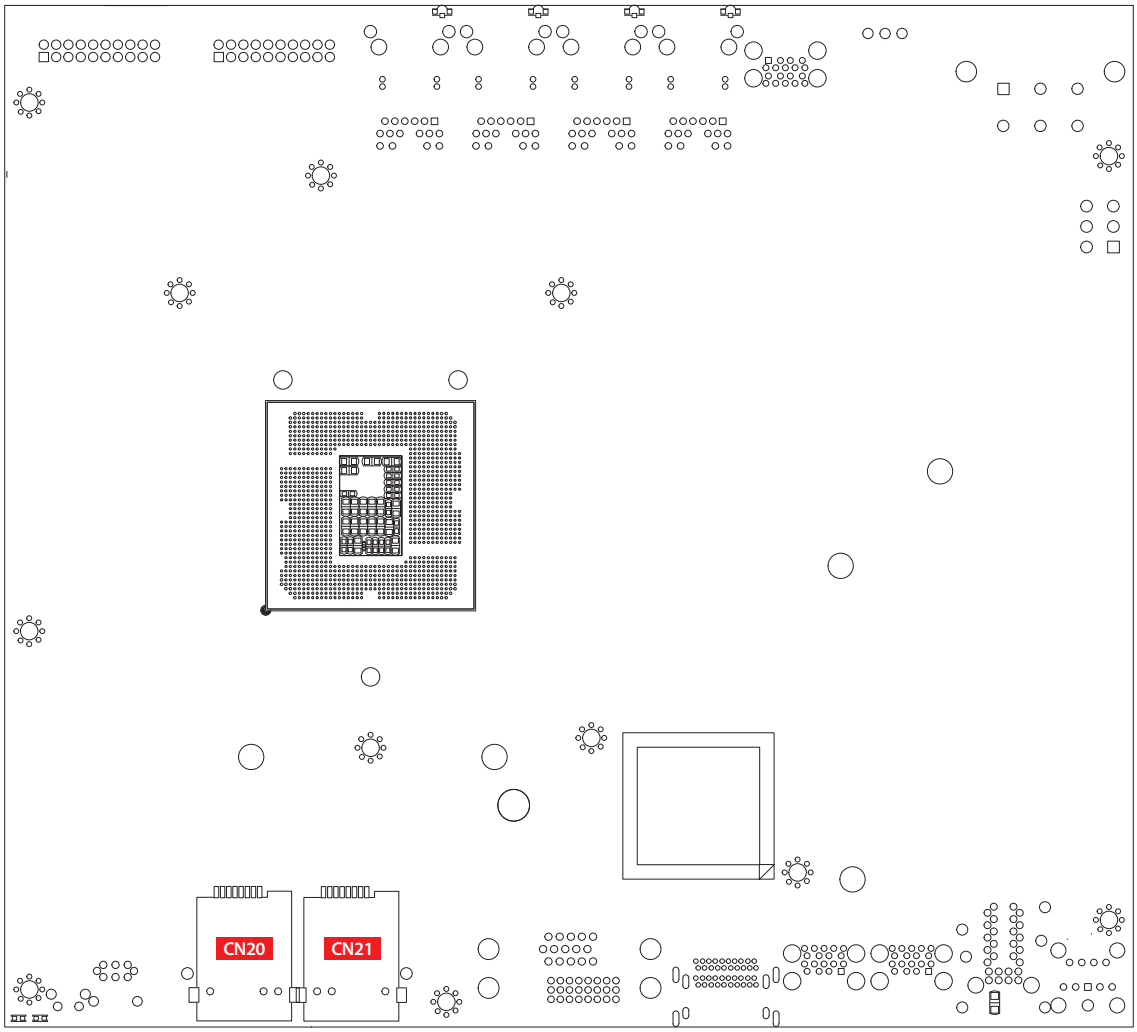
Rotary switch set at ID=0

2.4 Main Board Expansion Connectors

2.4.1 Top View (Component Side) of ECX-1200/1200M/1100 Main Board With Connector Location

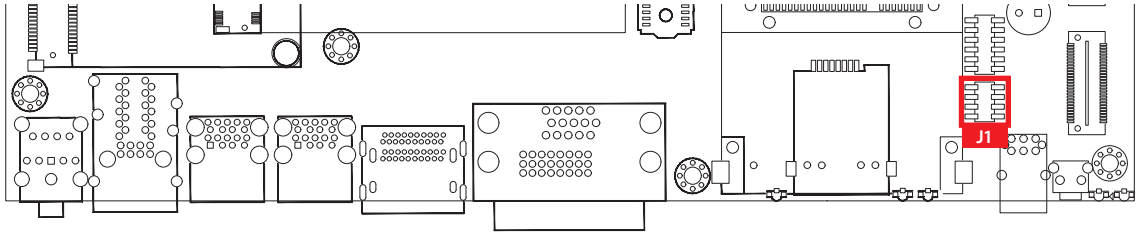


2.4.2 Bottom View (Solder Side) of ECX-1200/1200M/1100 Main Board With Connector Location



2.4.3 J1 : Miscellaneous Pin Header

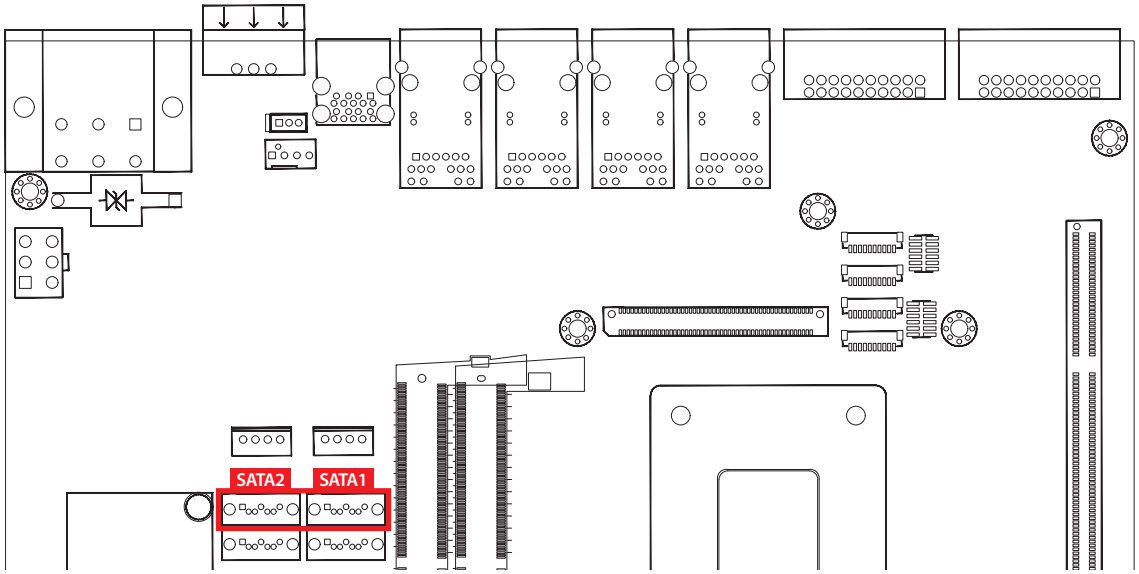
This pin header can be used as a backup for following functions, hard drive LED indicator, reset button, power LED indicator, and power-on/off button, which already can be accessed by front panel and top panel. The pin-outs of Miscellaneous port are listed in following table :



Group	Pin No.	Description
HDD LED	1	HDD_LED_P
	3	HDD_LED_N
RESET BUTTON	5	FP_RST_BTN_N
	7	Ground
POWER LED	2	PWR_LED_P
	4	PWR_LED_N
POWER BUTTON	6	FP_PWR_BTN_IN
	8	Ground

2.4.4 SATA1, SATA2 : SATA III Connector

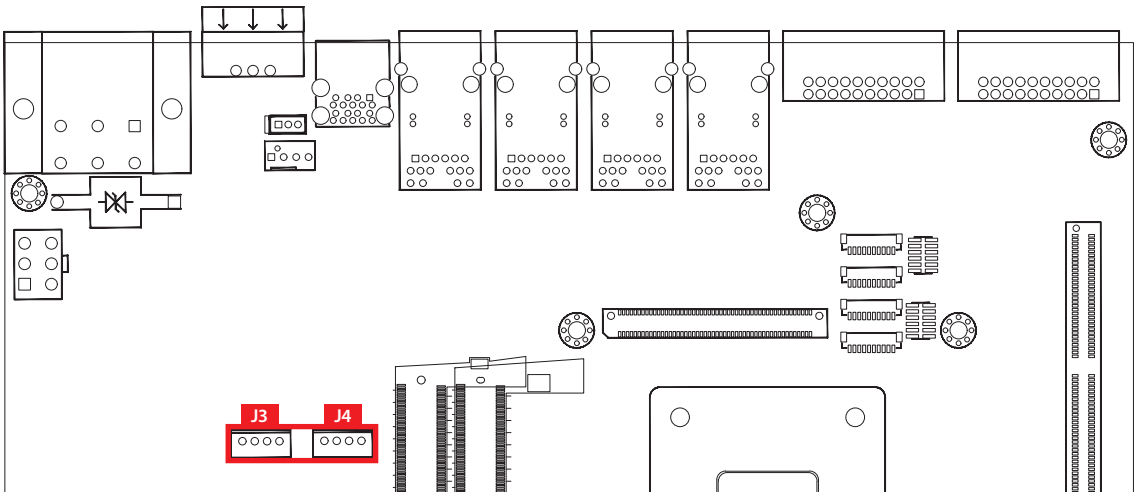
There are 2 onboard high performance Serial ATA III (SATA III) on ECX-1200/1200M/1100. It supports higher storage capacity with less cabling effort and smaller required space. The pin assignments of SATA1 and SATA2 are listed in the following table :



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

2.4.5 J3, J4 : SATA Power Connector

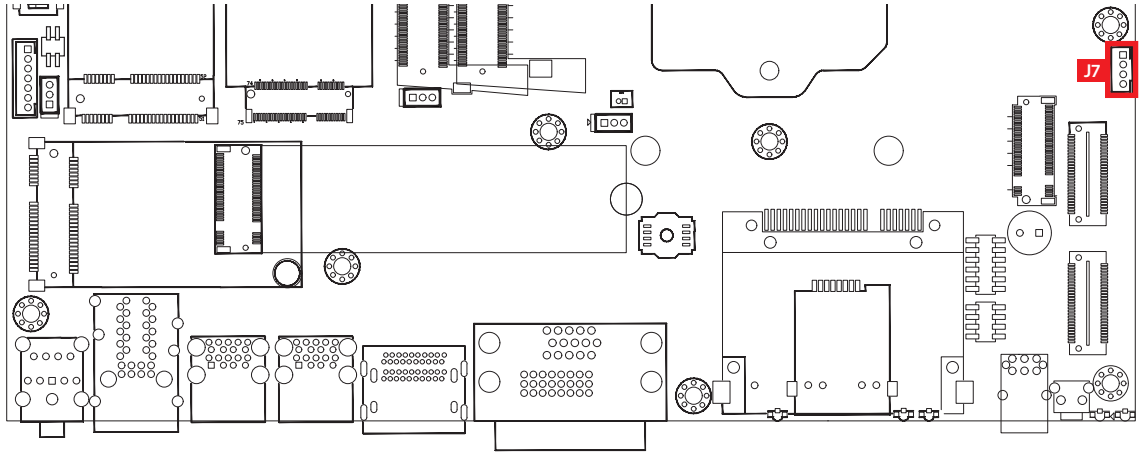
The ECX-1200/1200M/1100 also equip with a SATA power connector. The one port supports 5V (Up to 2A) and 12V (Up to 2A) current to the hard drive or SSD. The pin assignments of J3, J4 are listed in the following table :



Pin No.	Definition	Pin No.	Definition
1	+12V	3	GND
2	GND	4	+5V

2.4.6 J7 : Internal USB

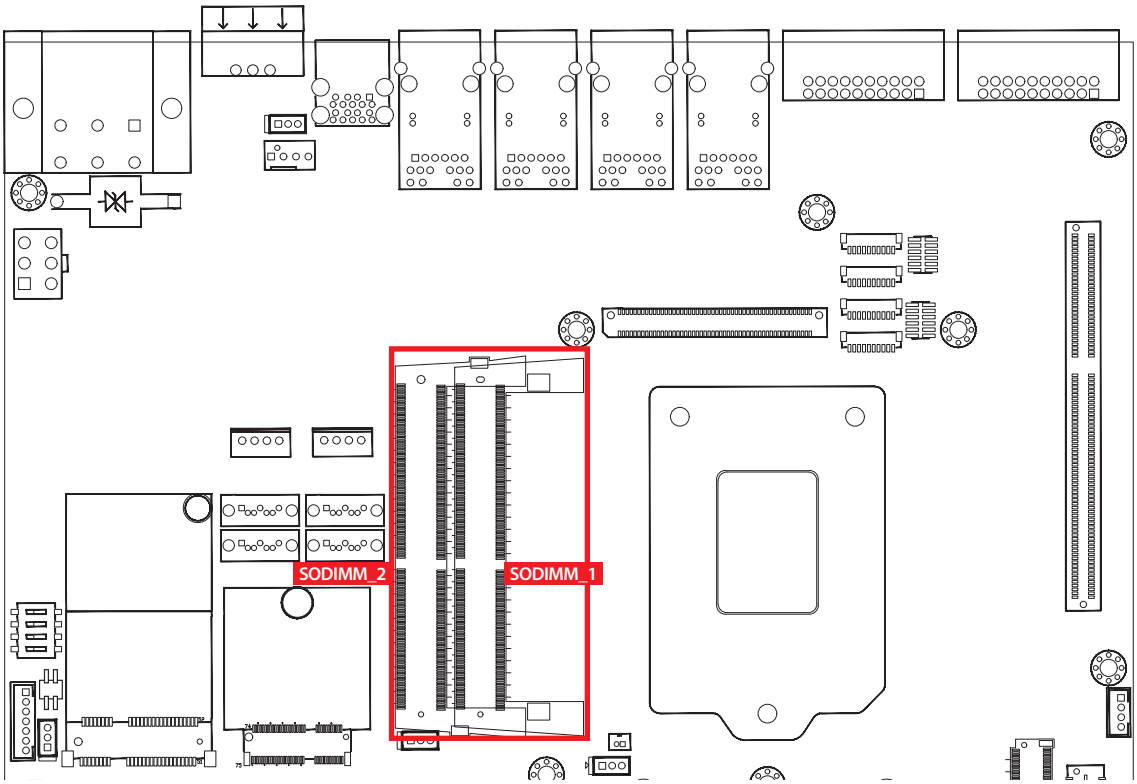
The USB 2.0 connections available supporting up to 480Mbps per second data rate. It also compliant with the requirements of SuperSpeed (SS), high speed (HS), full speed (FS) and low speed (LS). The pin assignments of CN14 are listed in the following table :



Pin No.	Description	Pin No.	Description
1	USB_VCC	3	USBD+
2	USBD-	4	GND

2.4.7 SODIMM_1, SODIMM_1 : DDR4 Slot

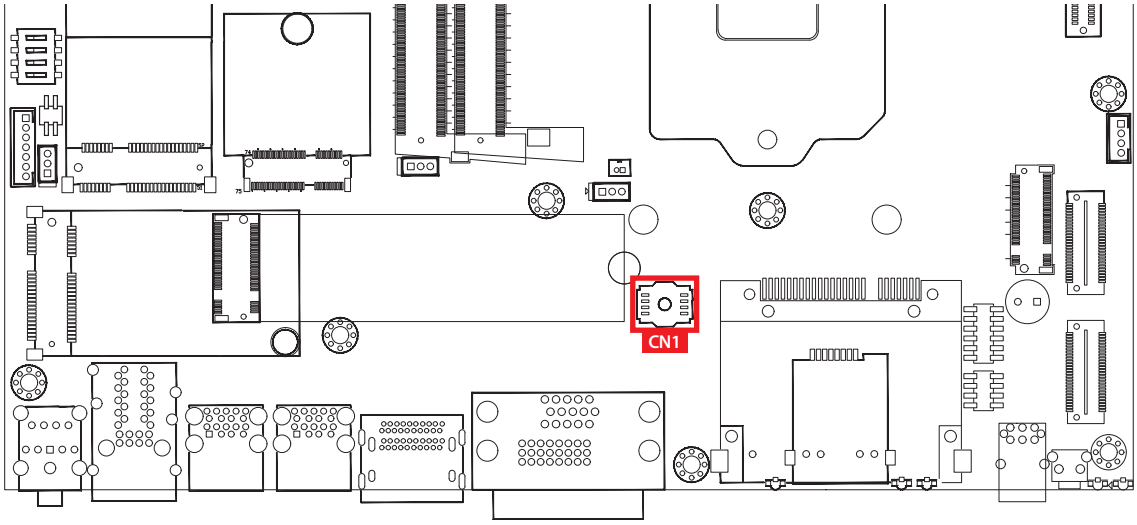
There are 2 DDR4 channel onboard, support DDR4 2666/2400/2133, max 64GB
Each channel supports up to 32GB.



Slot	Description
SODIMM_1	DDR4 Channel A
SODIMM_2	DDR4 Channel B

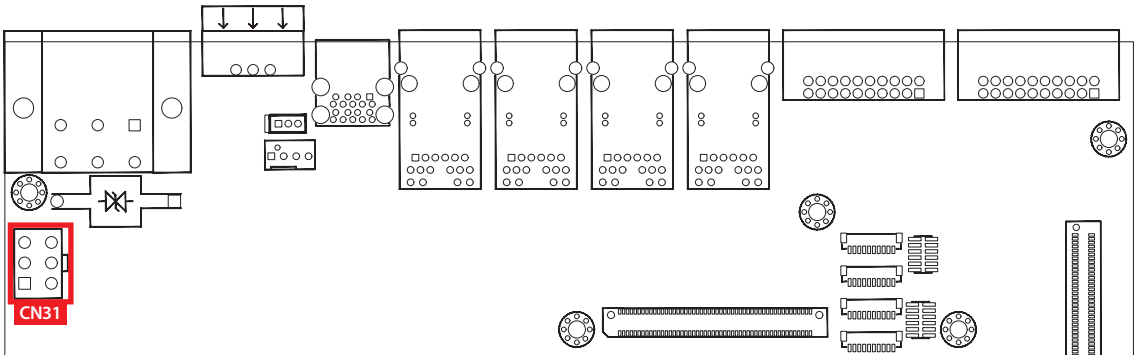
2.4.8 CN1 : BIOS Socket

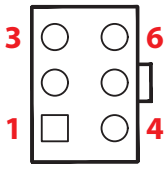
If the BIOS needs to be changed, please contact the Vecow RMA service team.



2.4.9 CN31 : UPS Power Connector

For UPS module optional, we use 4.2mm 3x2p power connector.

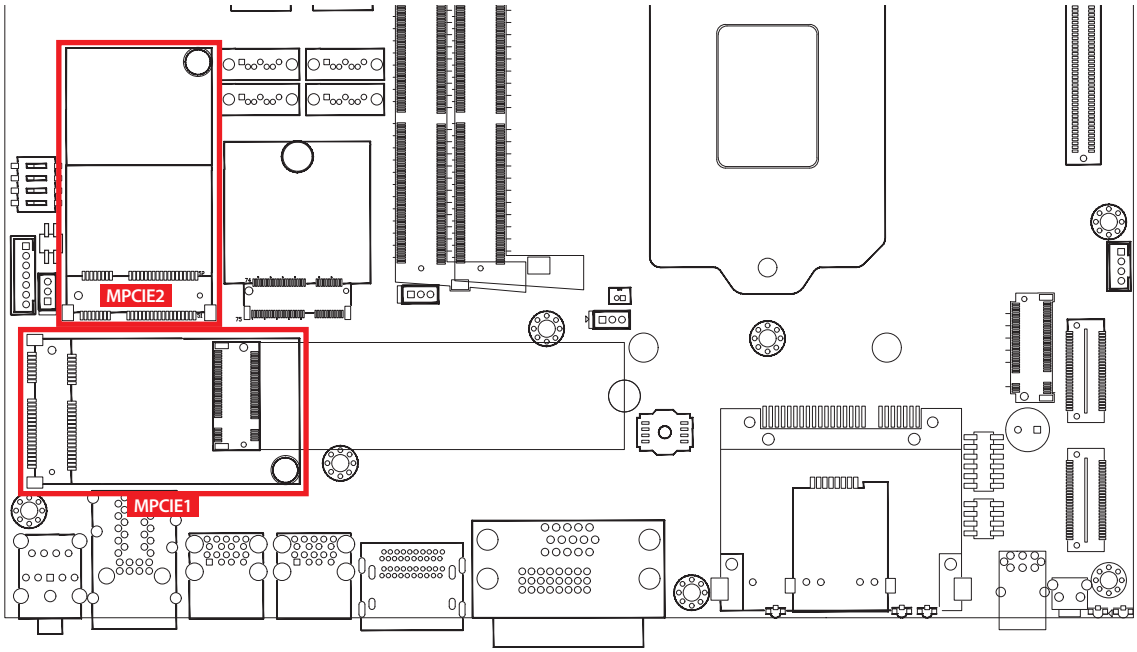




Pin No.	Description	Pin No.	Description
1	+VDC_IN (6~36V, Max.9A)	3	+VDC_IN (6~36V, Max.9A)
2	+VDC_IN (6~36V, Max.9A)	4	Ground
5	Ground	6	Ground

2.4.10 Mini PCIe : MPCIe_1, MPCIe_2

Standard full length mini PCIe slot

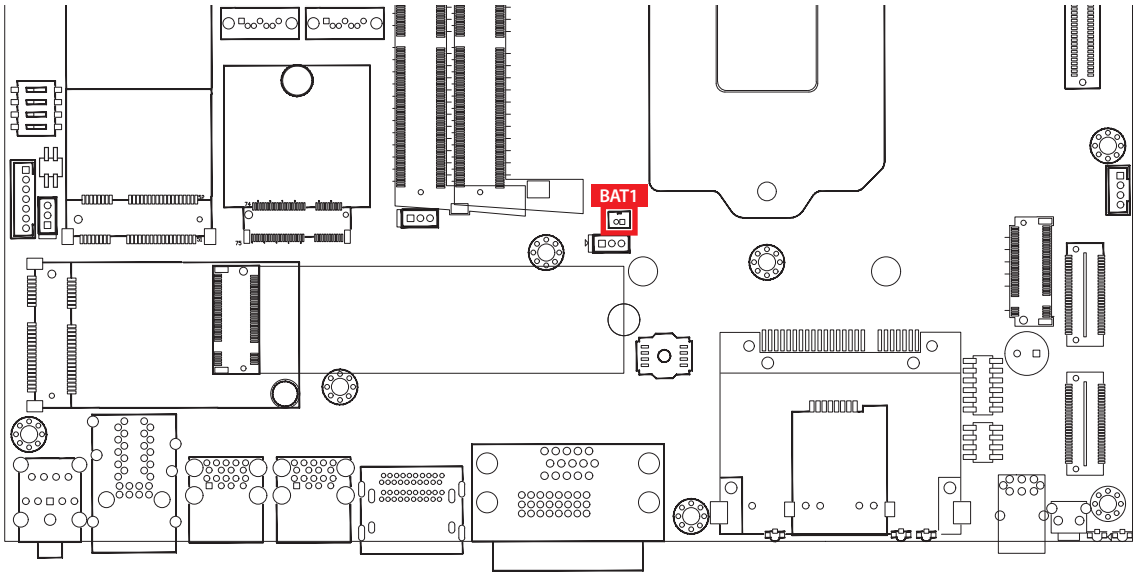


The pin assignments of MPCIe 1, MPCIe 2 ted in the following table :

Pin No.	Signal Name	Pin No.	Signal Name
51	Reserved	52	+3.3Vaux
49	Reserved	50	GND
47	Reserved	48	+1.5V
45	Reserved	46	Reserved
43	GND	44	Reserved
41	+3.3Vaux	42	Reserved
39	+3.3Vaux	40	GND
37	GND	38	USB_D+
35	GND	36	USB_D-
33	PETp0	34	GND
31	PETn0	32	SMB_DATA
29	GND	30	SMB_CLK
27	GND	28	+1.5V
25	PERp0	26	GND
23	PERn0	24	+3.3Vaux
21	GND	22	PERST#
19	Reserved	20	reserved
17	Reserved	18	GND
Mechanical Key			
15	GND	16	UIM_VPP
13	REFCLK+	14	UIM_RESET
11	REFCLK-	12	UIM_CLK
9	GND	10	UIM_DATA
7	CLKREQ#	8	UIM_PWR
5	Reserved	6	1.5V
3	Reserved	4	GND
1	WAKE#	2	3.3Vaux

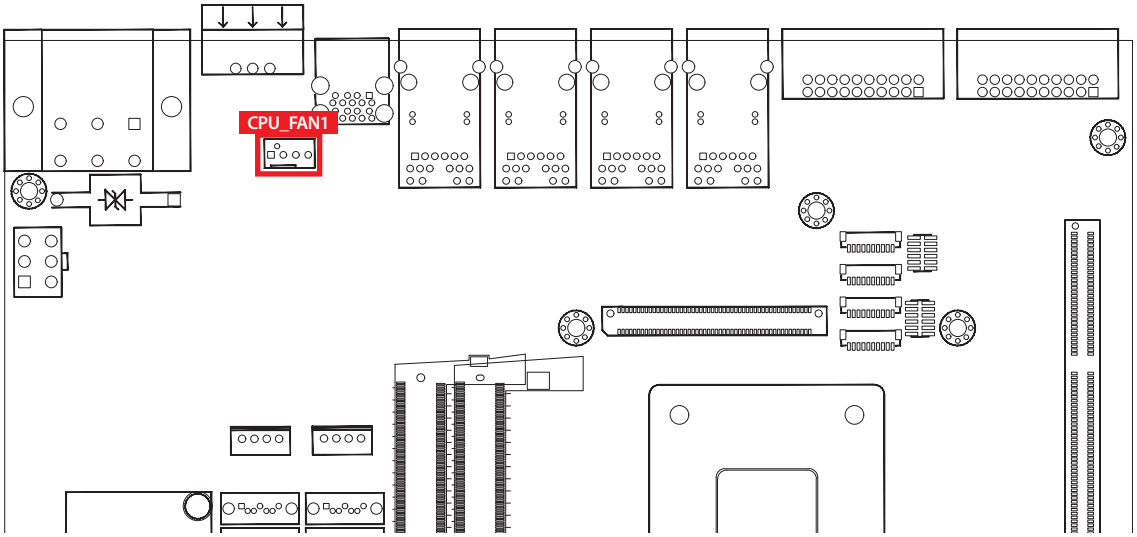
2.4.11 BAT1 : RTC Battery

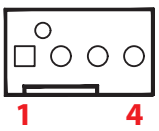
The system's real-time clock is powered by a lithium battery. It is Equipped with Panasonic BR2032 190mAh lithium battery. It is recommended that you not replace the lithium battery on your own. If the battery needs to be changed, please contact the Vecow RMA service team.



2.4.12 CPU_FAN1 : FAN Header

Fan power connector supports for additional thermal requirements. The pin assignments of CPU_FAN1 are listed in the following table.

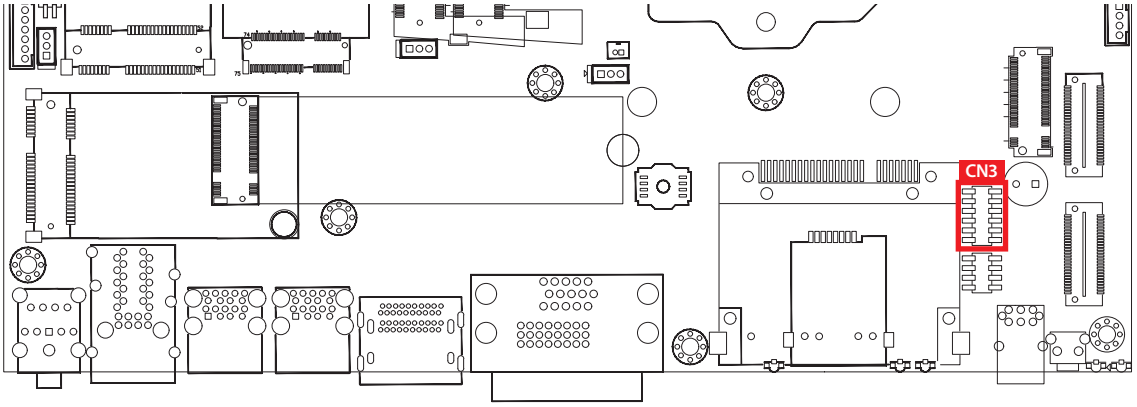


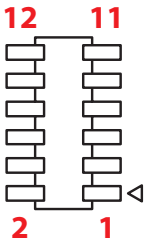


Pin No.	Definition	Pin No.	Definition
1	GND	3	Fan speed sensor
2	+12V (1.5A max)	4	Fan PWM

2.4.13 CN3 : LPC Port 80 Header

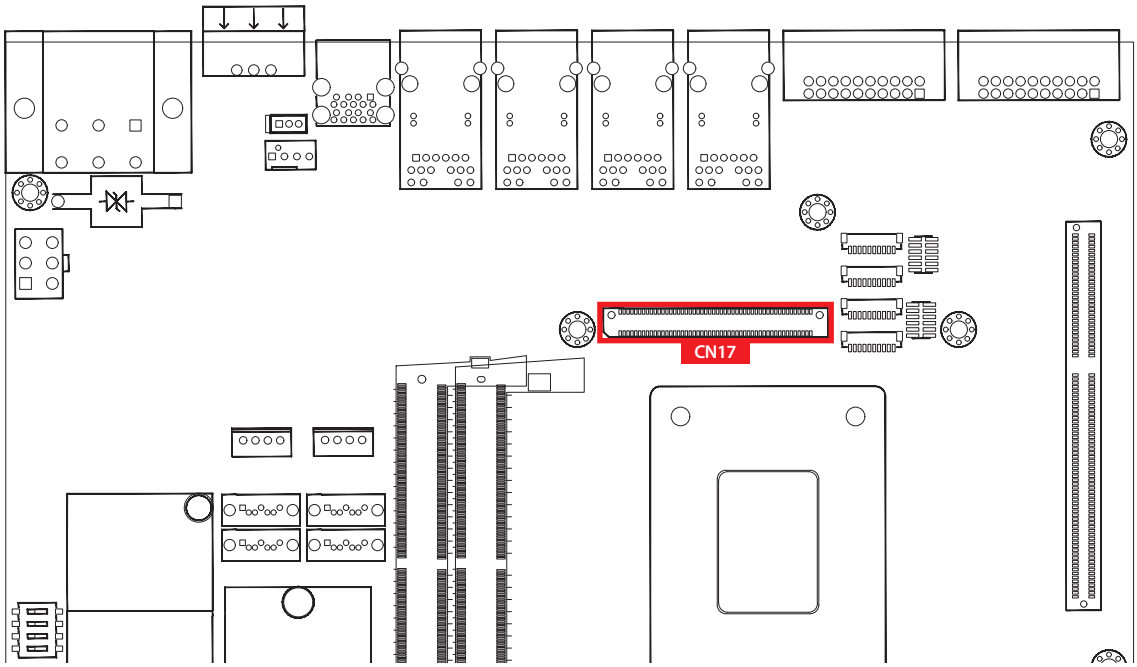
The system's provide a LPC Port 80 Header for Debug Card.





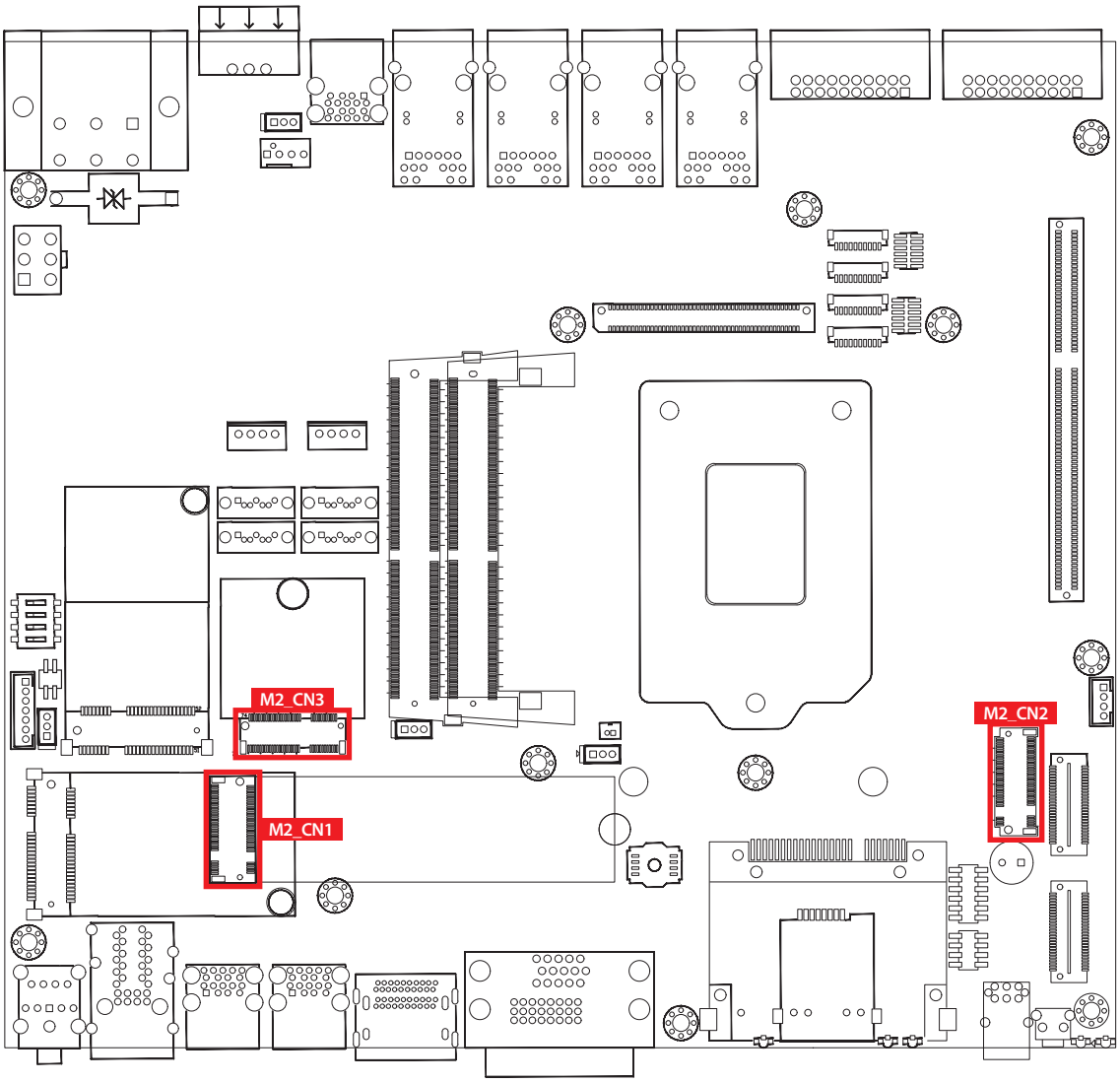
Pin No.	Definition	Pin No.	Definition
1	SERIRQ	7	LFRAME#
2	+3.3V	8	LAD0
3	LA3	9	N/C
4	RESET#	10	Ground
5	LAD1	11	CLOCK
6	LAD2	12	Ground

2.4.14 ECX-1200M CN17 : support M12 connector



2.4.15 M2_CN1, M2_CN2, M2_CN3 : M.2 slot

2280 length and 2230 length M.2 slot
The pin assignments of M2_CN1, M2_CN2, M2_CN3 in the following table :



M2_CN1 : M.2 KEY B (Dimension : 2280)

Pin No.	Signal Name	Pin No.	Signal Name
		80	Ground
75	NC		
73	Ground	74	3.3V
71	Ground	72	3.3V
69	CONFIG_1	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	PETn0/SATA-A+	50	PERST#
47	PETn0/SATA-A-	48	NC
45	Ground	46	NC
43	PERn0/SATA-B-	44	NC
41	PERn0/SATA-B+	42	NC
39	Ground	40	NC
37	NC	38	DEVSLP
35	NC	36	UIM-PWR
33	Ground	34	UIM-DATA
31	NC	32	UIM-CLK
29	NC	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

M2_CN2 : M.2 KEY M (Dimension : 2280)

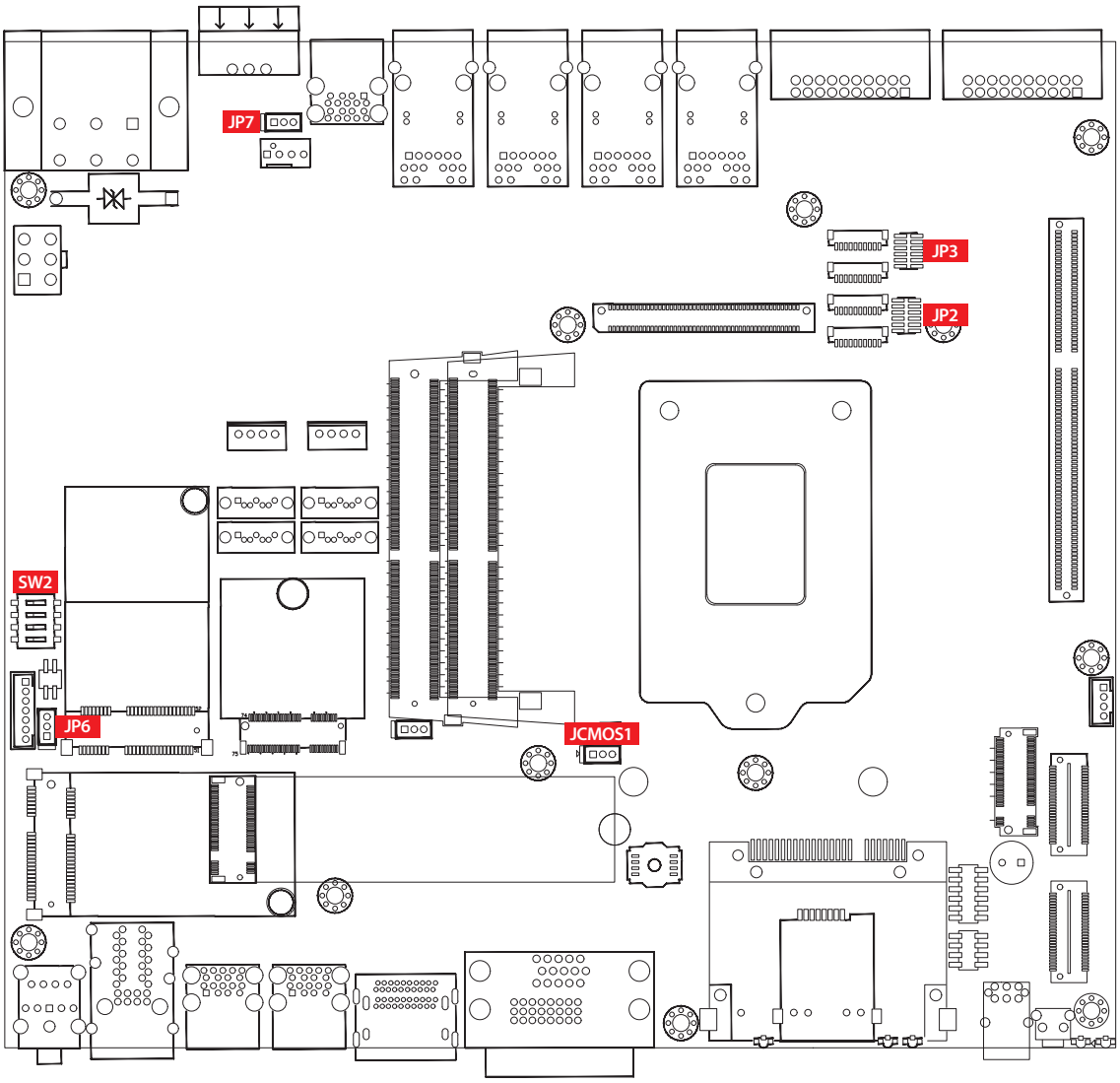
Pin No.	Signal Name	Pin No.	Signal Name
75	Ground		
73	Ground	74	3.3V
71	Ground	72	3.3V
69	PEDET	70	3.3V
67	Ground	68	NC
Mechanical Key			
57	Ground	58	NC
55	REFCLKp	56	NC
53	REFCLKn	54	PEWAKE#
51	Ground	52	CLKREQ#
49	PETp0/SATA_A+	50	PERST#
47	PETn0/SATA_A-	48	NC
45	Ground	46	NC
43	PERp0/SATA_B-	44	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

M2_CN3 : M.2 KEY E (Dimension : 2230)

Pin No.	Signal Name	Pin No.	Signal Name
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
		32	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

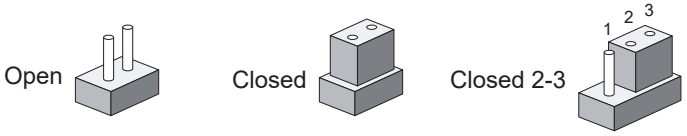
2.5 Main Board Jumper Settings

2.5.1 Board top view of the system main board with jumper and DIP switch

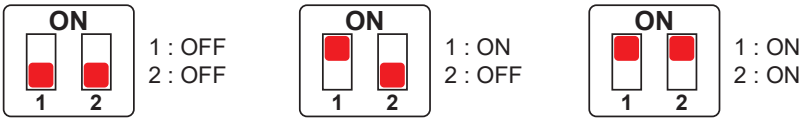


The figure below is the top view of the system main board which is the main board. It shows the location of the jumpers and the switches.

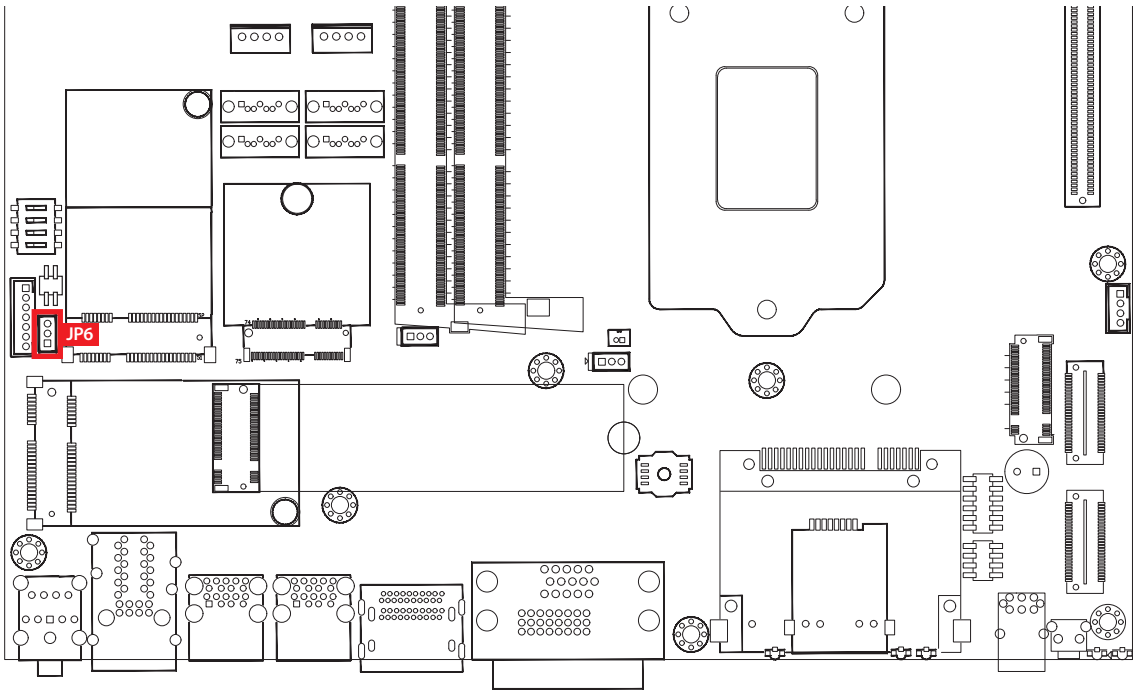
You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper,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



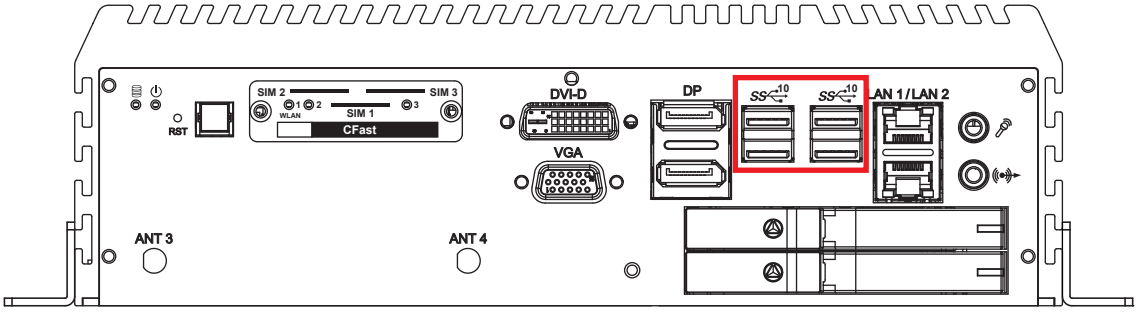
You may configure your card to match the needs of your application by DIP switch. As below show the DIP switch on and off.

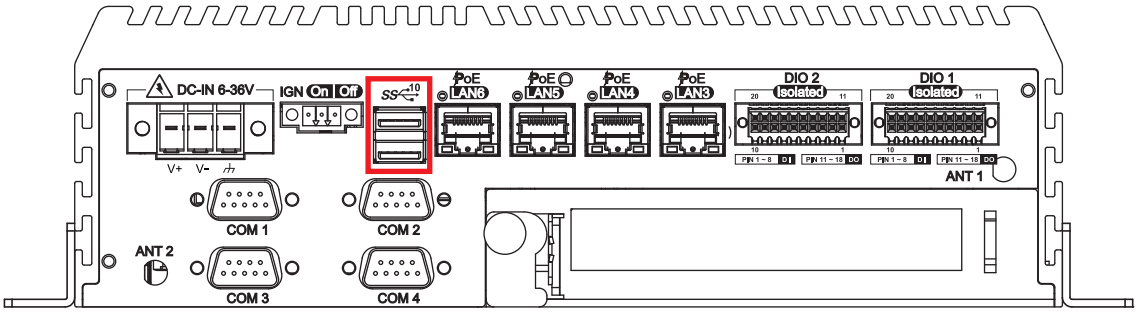


2.5.2 JP6 : USB Wake Up

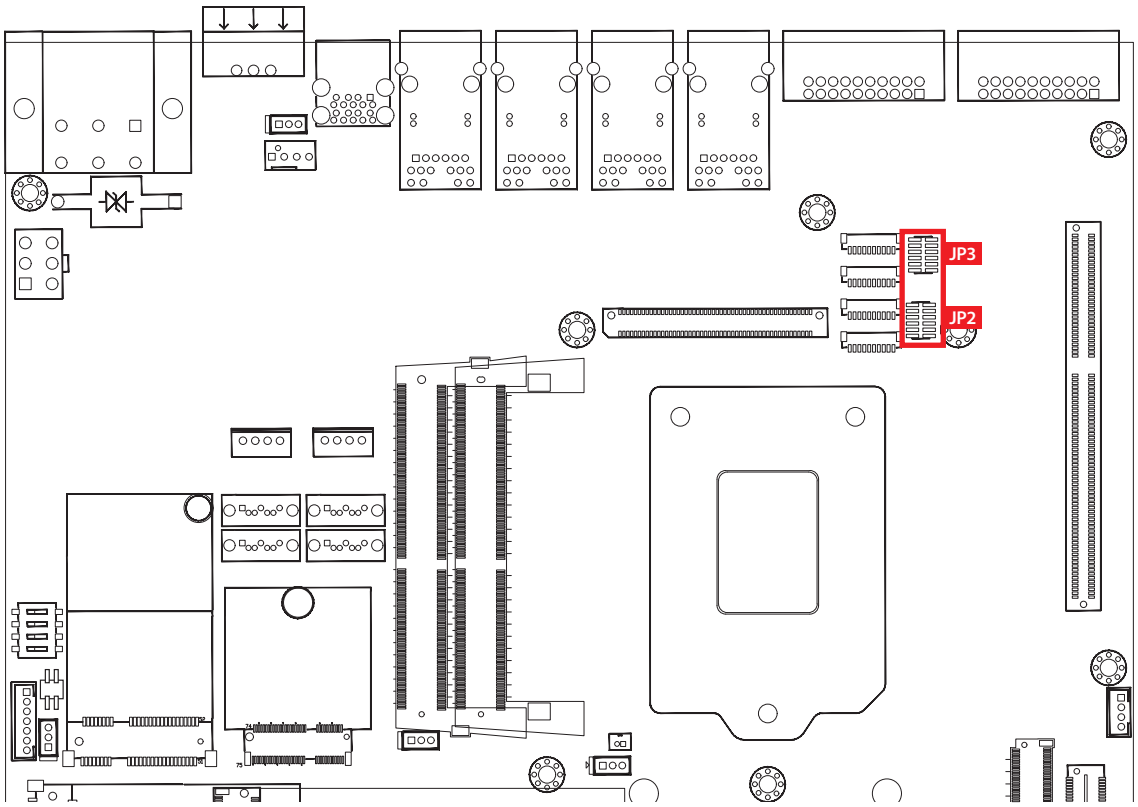


Jumper	Setting	Function
JP6	2 : 3	Non Wake Up support
JP6	1 : 2	Supported Wake Up (Default)





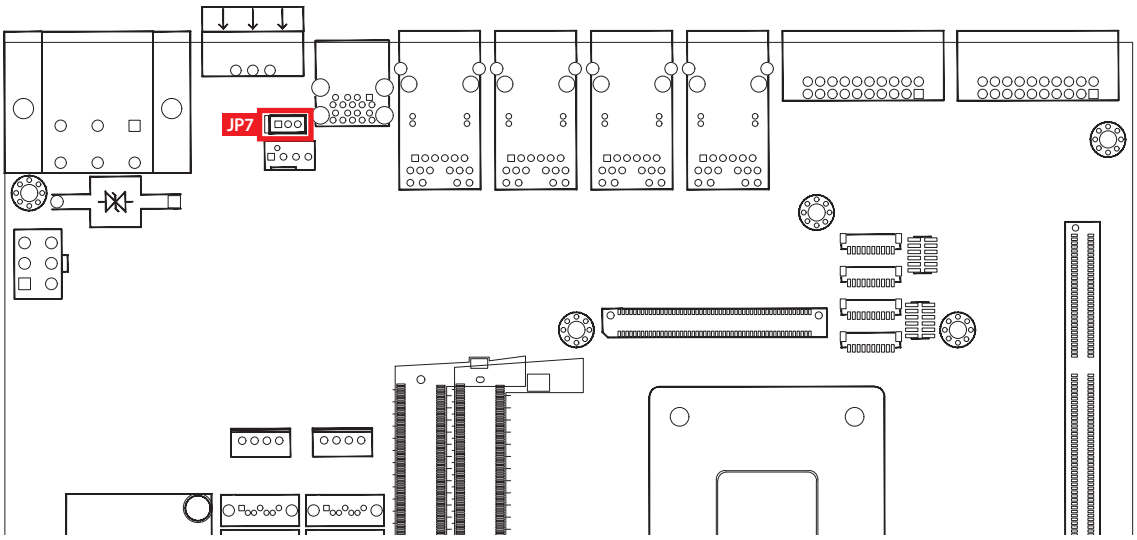
2.5.3 JP2, JP3 : COM Port RI pin Select



Pin Header	Pin No.	Description
COM1 to COM2 JP2	1 - 2	+5V (1A max.)
	3 - 4	+12V (0.5A max.)
	5 - 6	RI (Default)
	7 - 8	+5V (1A max.)
	9 - 10	+12V (0.5A max.)
	11 - 12	RI (Default)

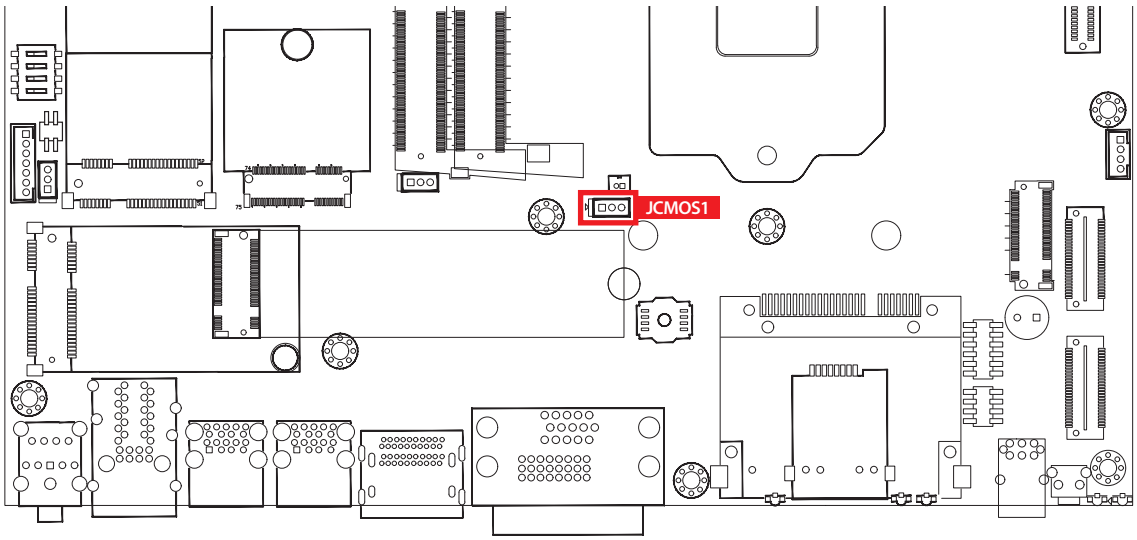
Pin Header	Pin No.	Description
COM3 to COM4 JP3	1 - 2	+5V (1A max.)
	3 - 4	+12V (0.5A max.)
	5 - 6	RI (Default)
	7 - 8	+5V (1A max.)
	9 - 10	+12V (0.5A max.)
	11 - 12	RI (Default)

2.5.4 JP7 : PoE Power ON Select



Jumper	Setting	Function
JP7	1 : 2	PoE power on at standby power ready
JP7	2 : 3	PoE power on after system power on (Default)
JP7	No Jumper	Disable PoE power

2.5.5 JCMOS1 : CMOS



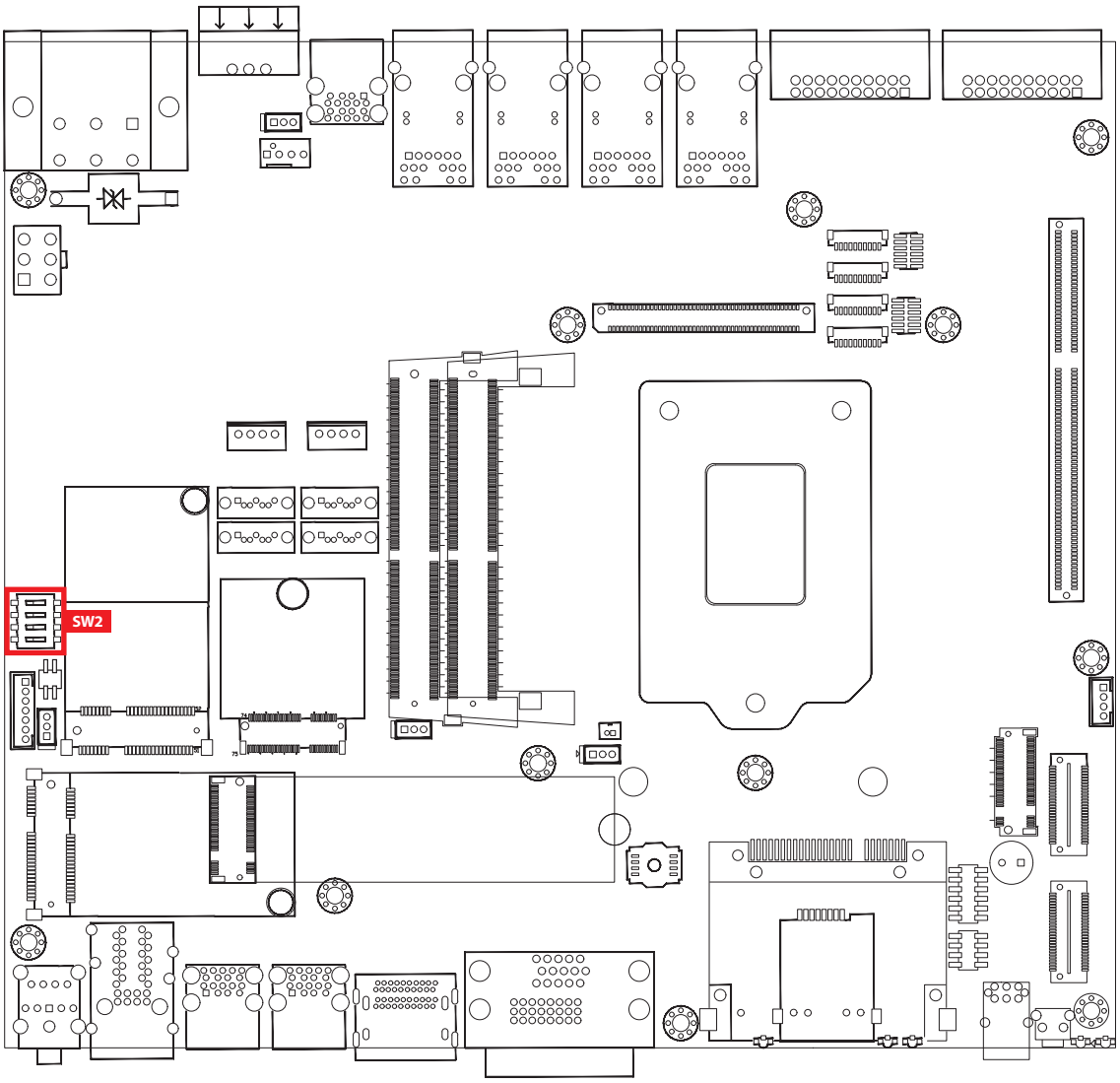
Jumper	Setting	Function
JCMOS1	1 : 2	*Normal (Default)
JCMOS1	2 : 3	Clear CMOS

2.6 Ignition Control

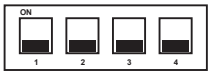
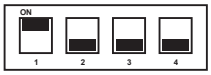
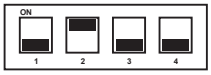
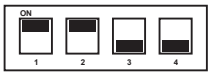
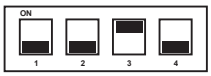
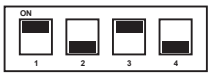
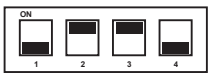
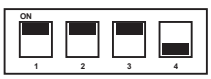
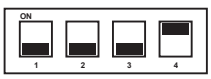
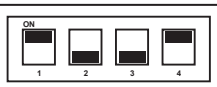
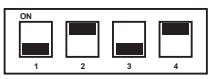
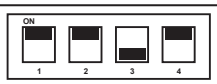
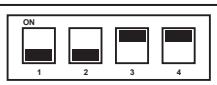
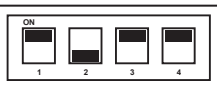
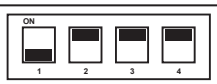
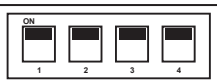
ECX-1200/1200M/1100 series provides ignition power control feature for in-vehicle applications. The built-in MCU monitors the ignition signal and turns on/off the system according to pre-defined on/off delay period.

2.6.1 Adjust Ignition Control Modes

ECX-1200/1200M/1100 series provides 16 modes of different power on/off delay periods adjustable via SW2 switch. The default rotary switch is set to 0 in ATX/AT power mode.



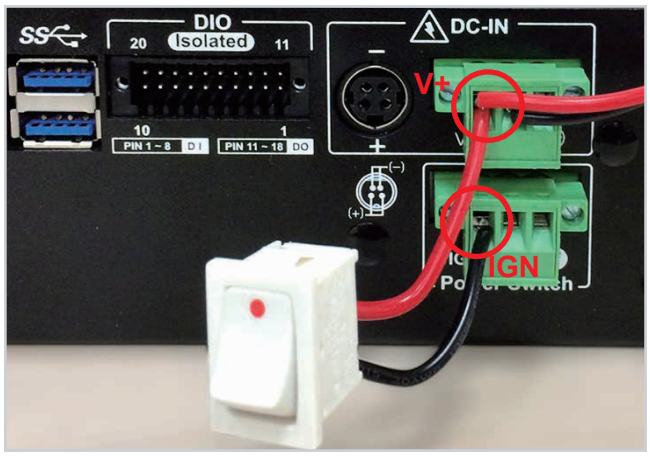
The modes are listed in below table :

DIP Switch Position	Power on delay	Power off delay	Switch Position
0	ATX/AT mode (Default)		
1	No delay	No delay	
2	No delay	5 seconds	
3	No delay	10 seconds	
4	No delay	20 seconds	
5	5 seconds	30 seconds	
6	5 seconds	60 seconds	
7	5 seconds	90 seconds	
8	5 seconds	30 minutes	
9	5 seconds	1 hour	
A	10 seconds	2 hours	
B	10 seconds	4 hours	
C	10 seconds	6 hours	
D	10 seconds	8 hours	
E	10 seconds	12 hours	
F	10 seconds	24 hours	

2.6.2 Ignition Control Wiring

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

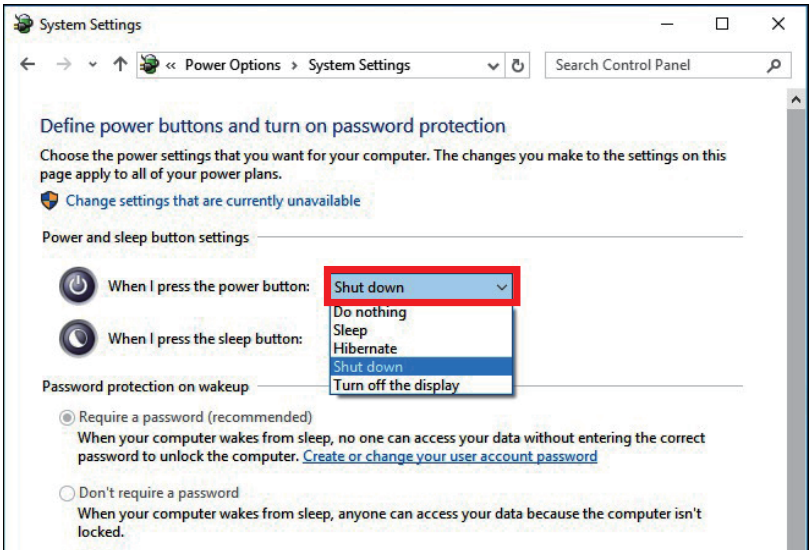
Pin No.	Definition
1	Ignition (IGN)
2	SW+
3	SW-



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. ECX-1200/1200M/1100 supports 6V to 36V 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.



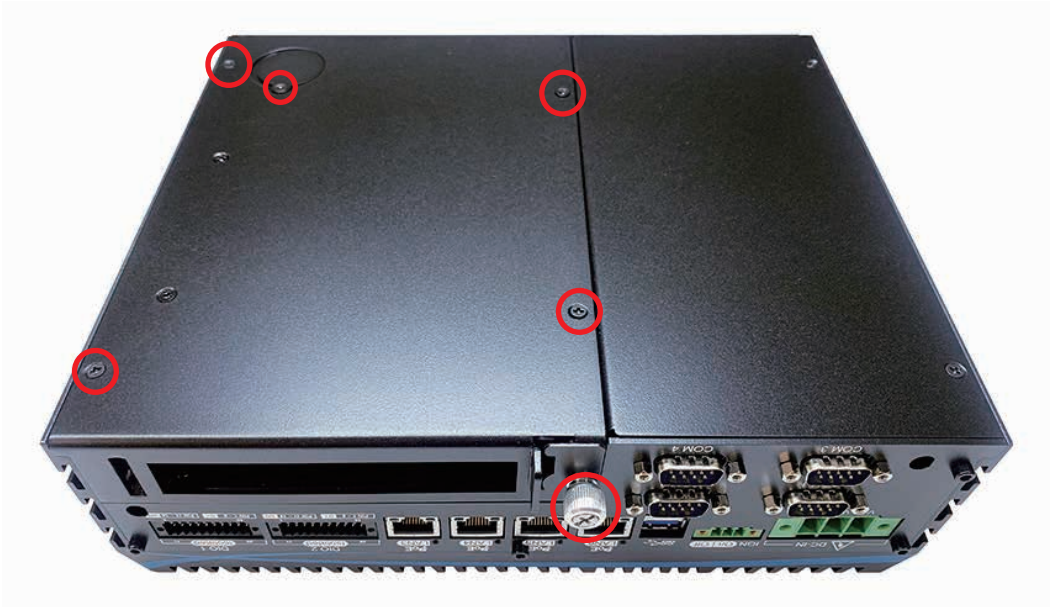
In Windows for example, you need to set "When I press the power button" to Shut down.

3

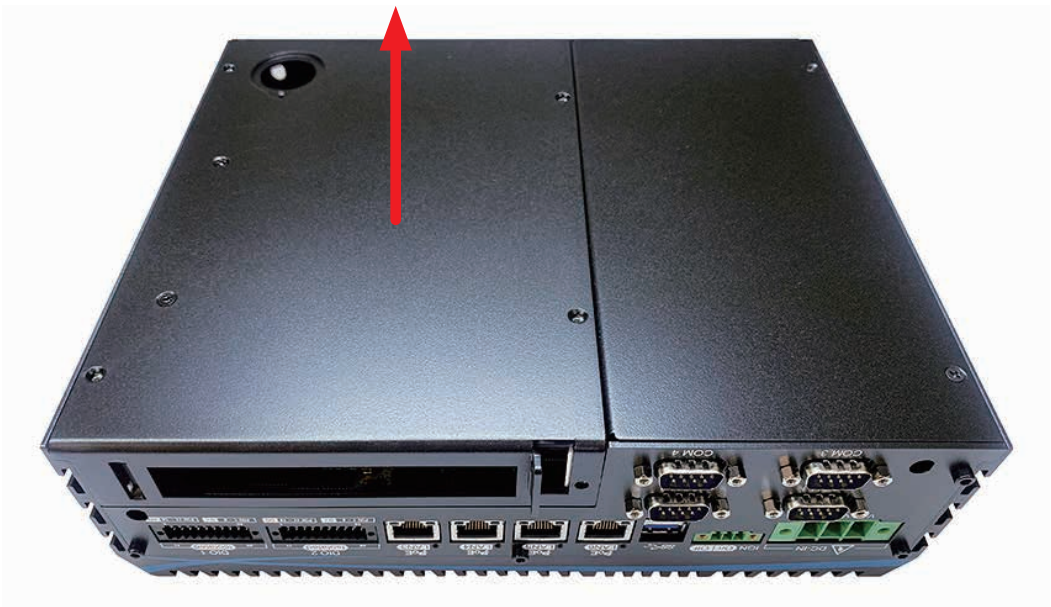
SYSTEM SETUP

3.1 How to Open Your ECX-1200/1100

Step 1 Remove six PHILLIPS#6-32 screws and two cover.



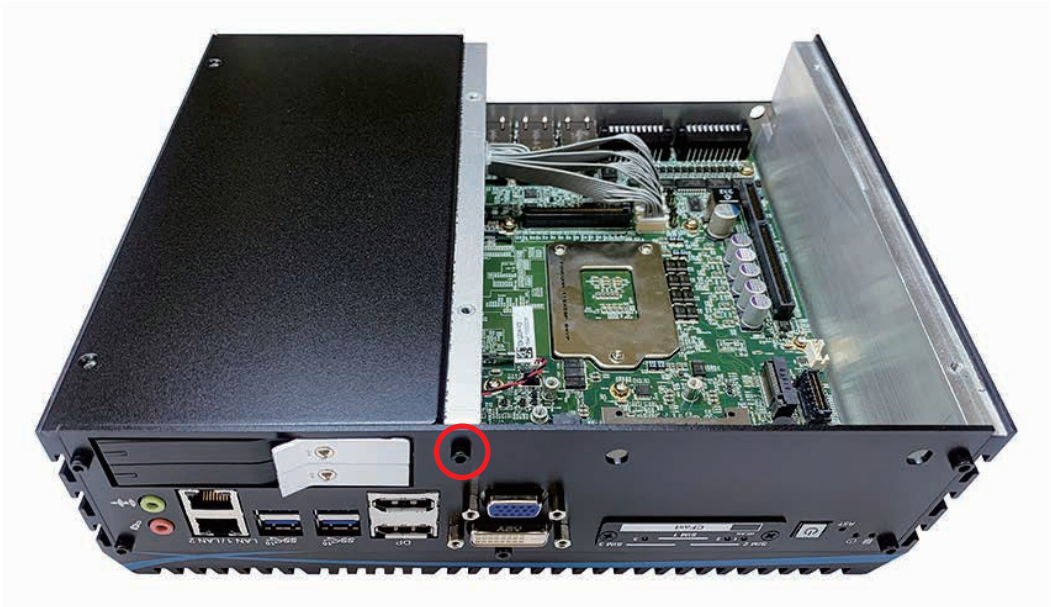
Step 2 Take off the PCI/PCIe tray.



Step 3 Remove two PHILLIPS#6-32 screws.

Step 4 Turn over ECX-1200 to face the front side.

Step 5 Remove one HEX#6-32 screw.



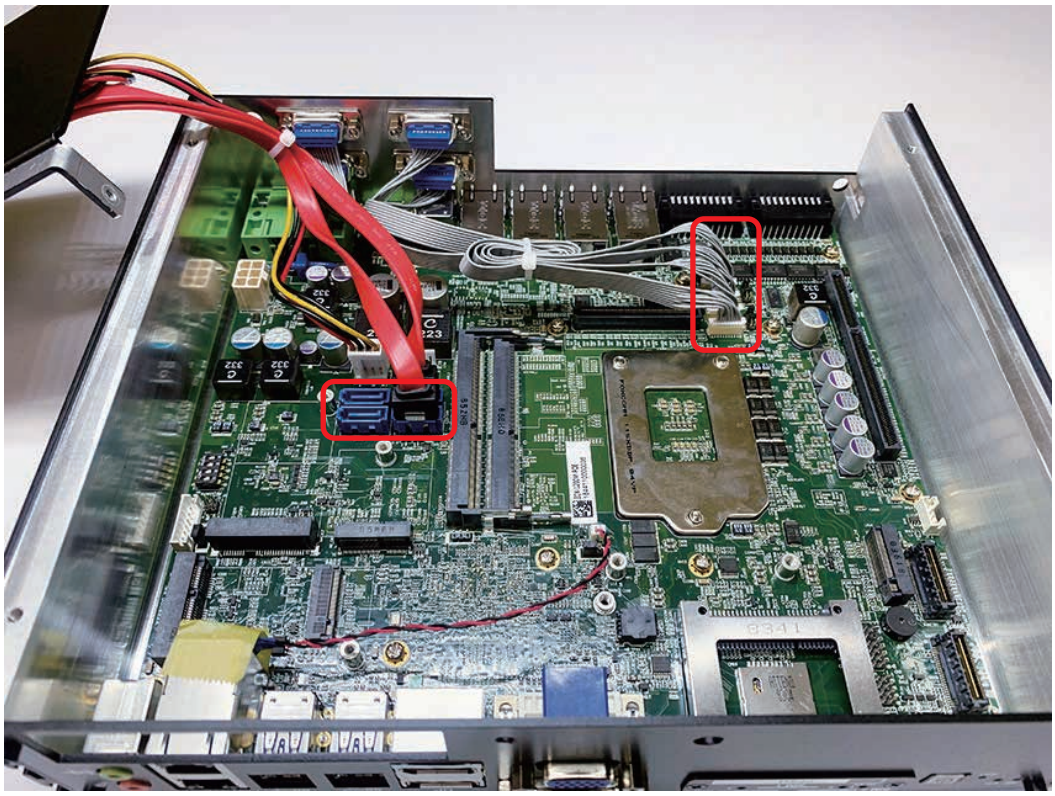
Step 6 Take out SSD/HDD tray module.

Step 7 Finish.

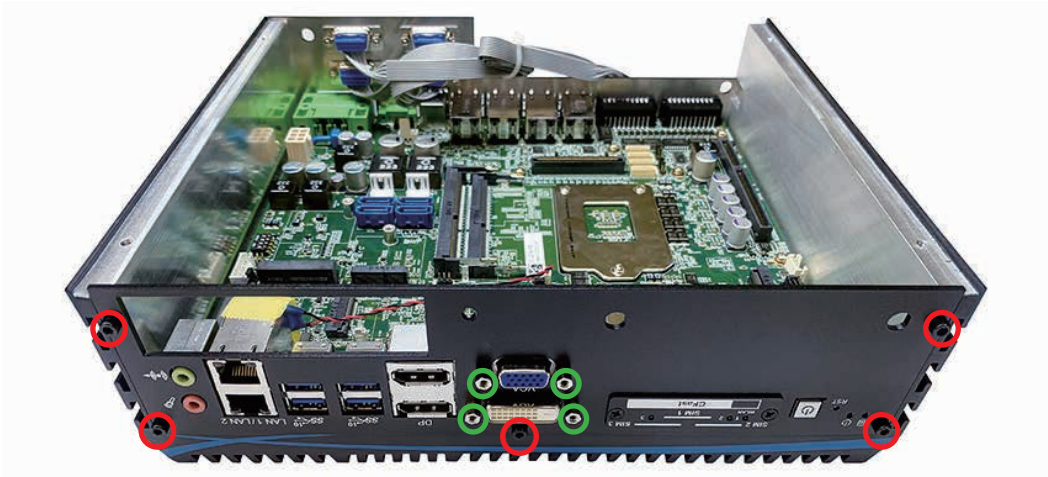
3.2 Installing CPU

3.2.1 ECX-1200/1100

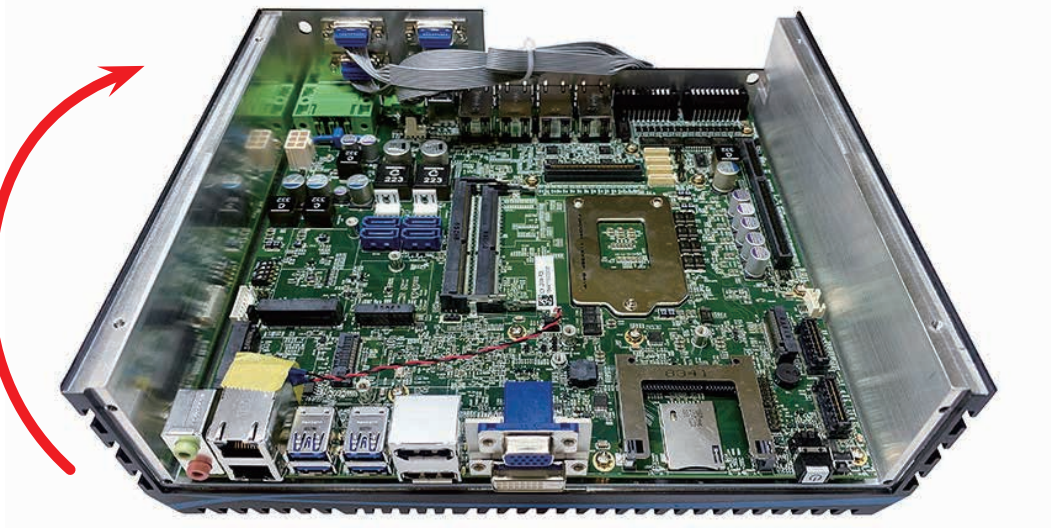
Step 1 Remove SATA DATA, SATA Power and COM cable.



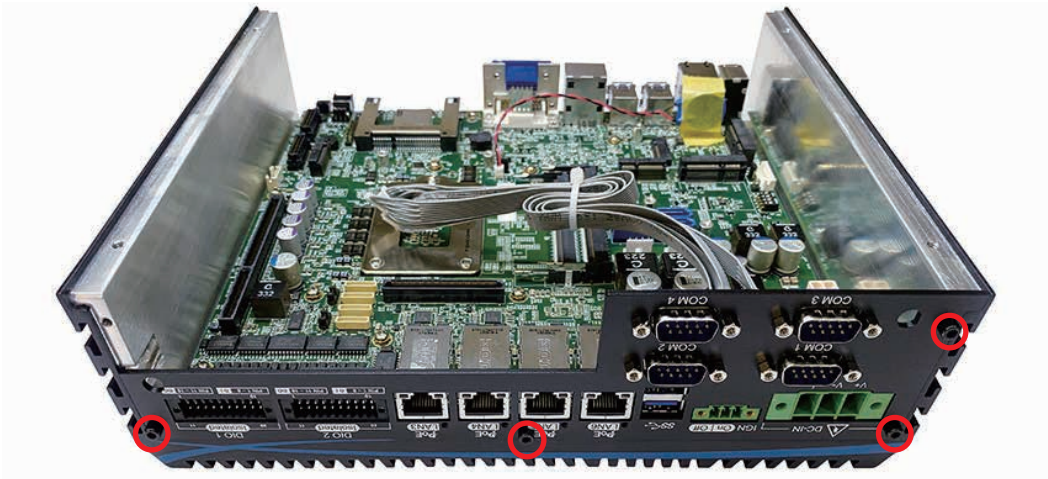
Step 2 Remove five HEX#6-32 and four HEX#4-40 screws.



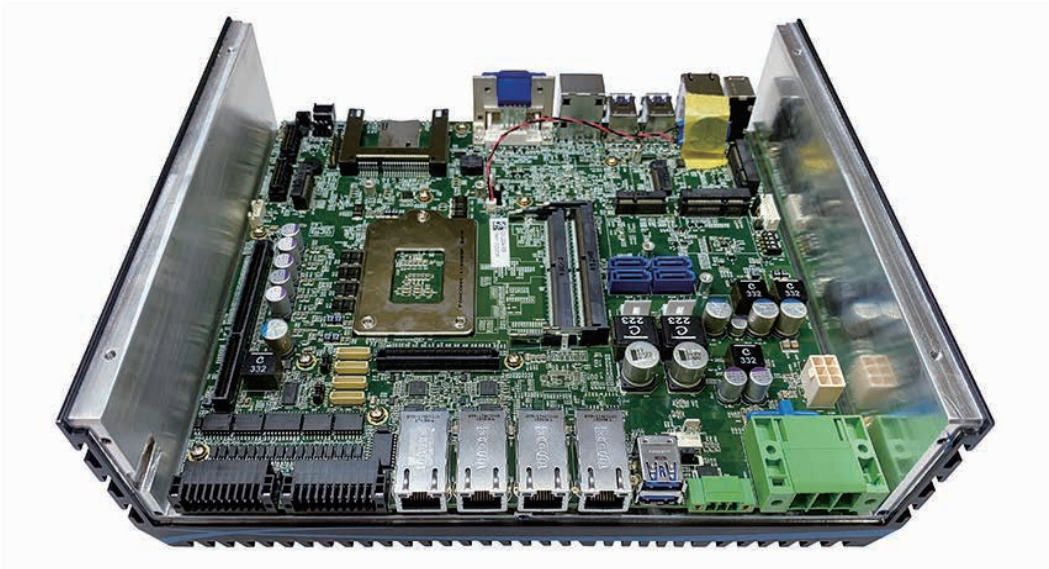
Step 3 Remove front panel and turn over to face the rear side.



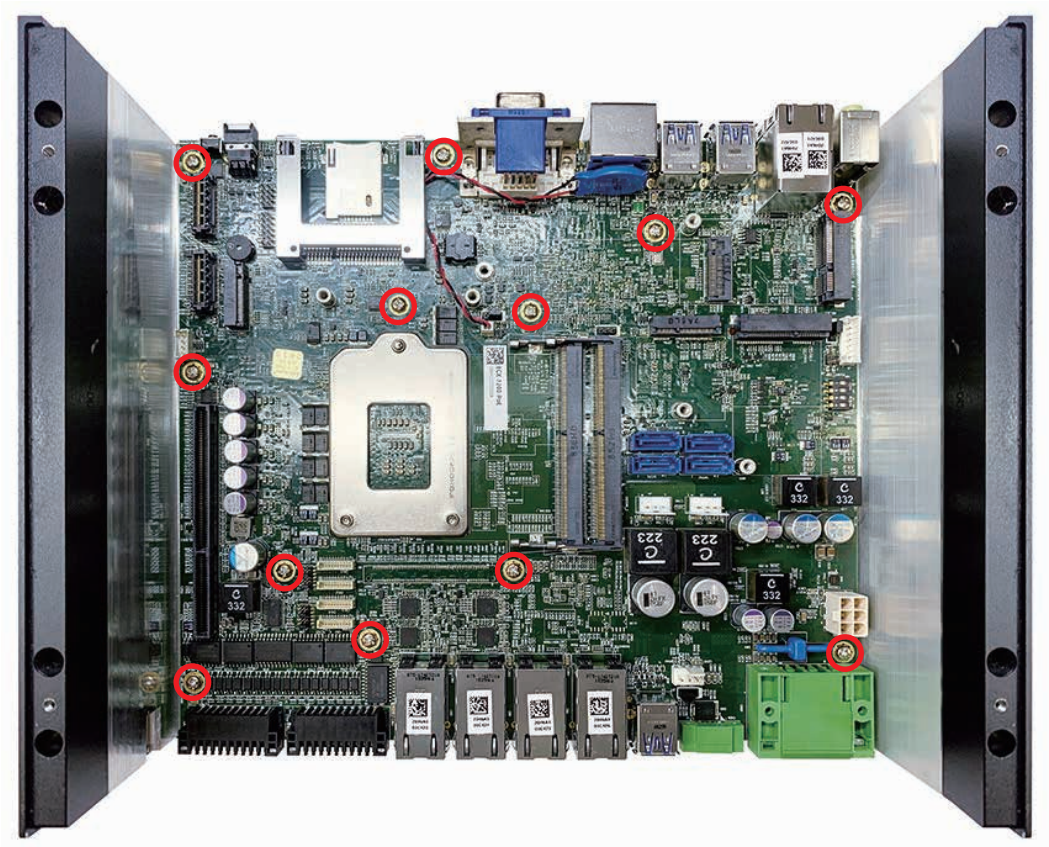
Step 4 Remove four HEX#6-32 screws.



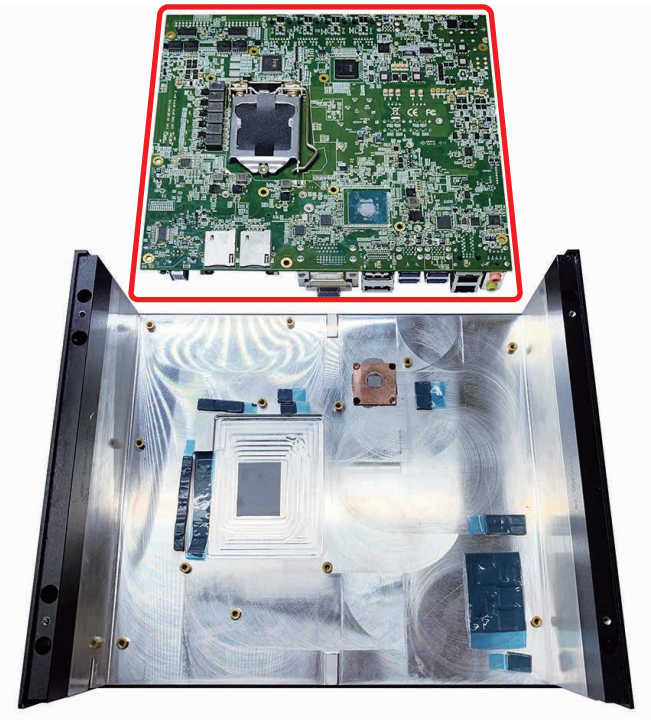
Step 5 Remove rear panel.



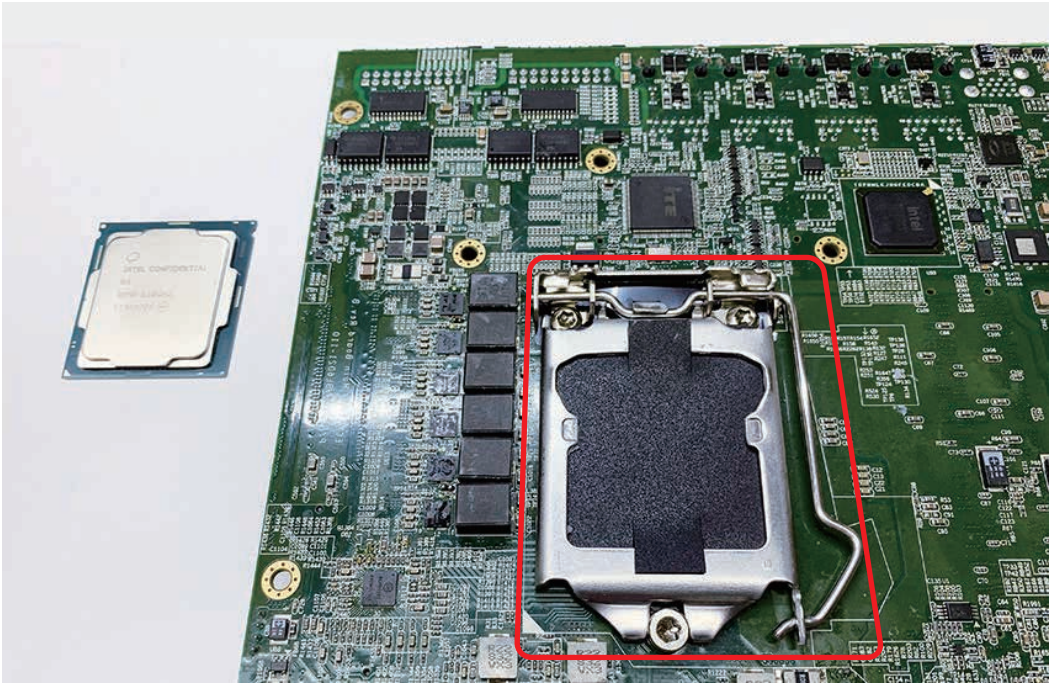
Step 6 Remove twelve PHILLIPS M3 screws and take out main board from the heat sink.



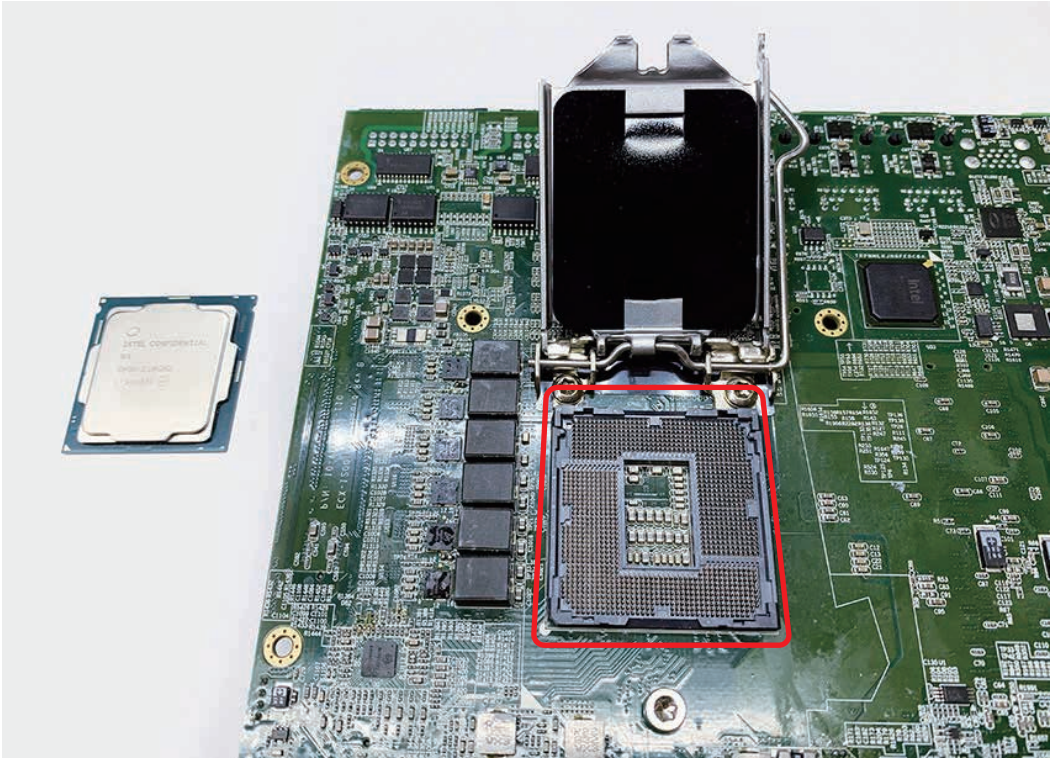
Step 7 Turn over the main board to make the CPU socket side up.



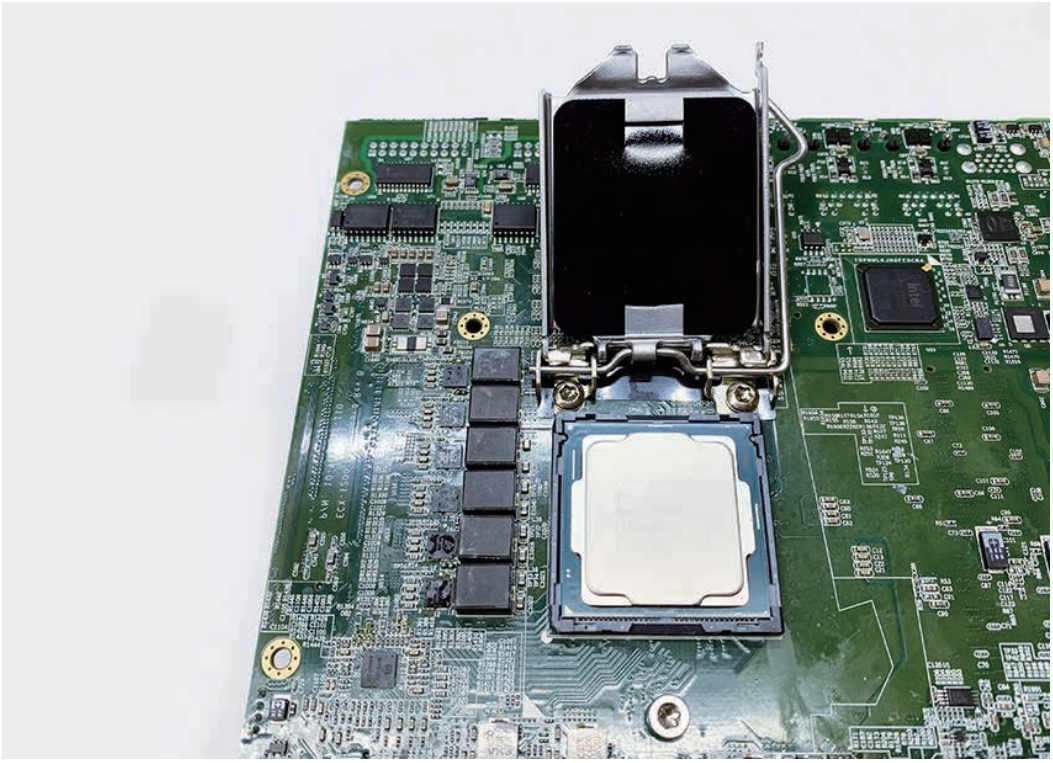
Step 8 Unlock the CPU socket.



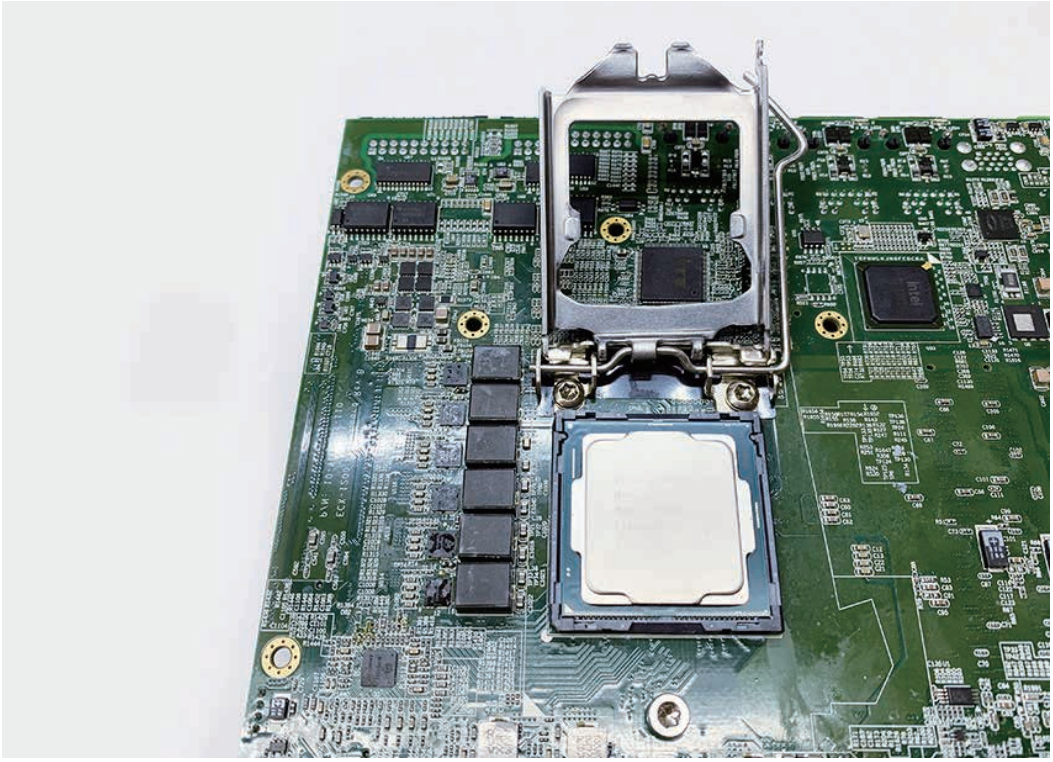
Step 9 Open the CPU socket cover.



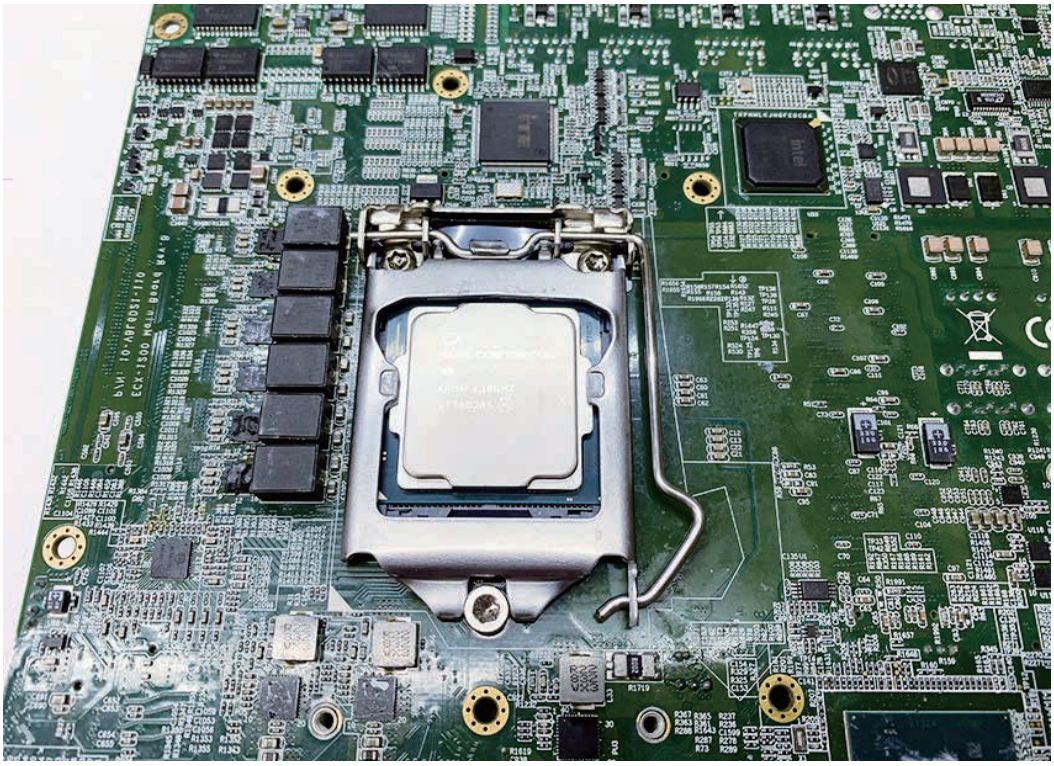
Step 10 Watch out the direction of CPU and put CPU into the CPU socket.



Step 11 Remove the mylar from CPU cover and lock the cover.

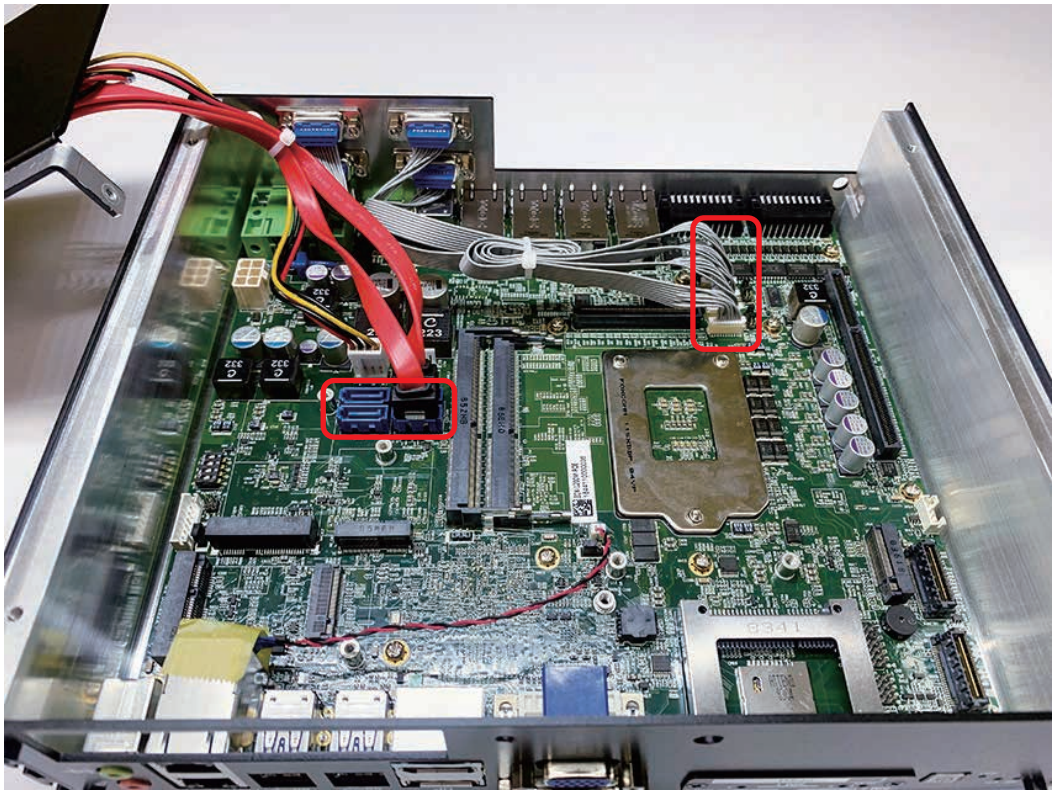


Step 12 Cover and lock the CPU socket.

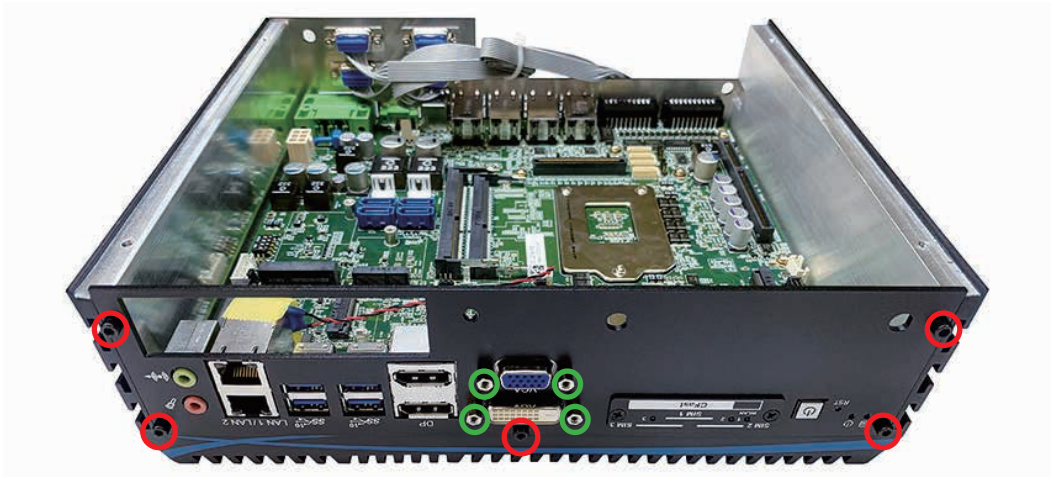


3.2.2 ECX-1200M

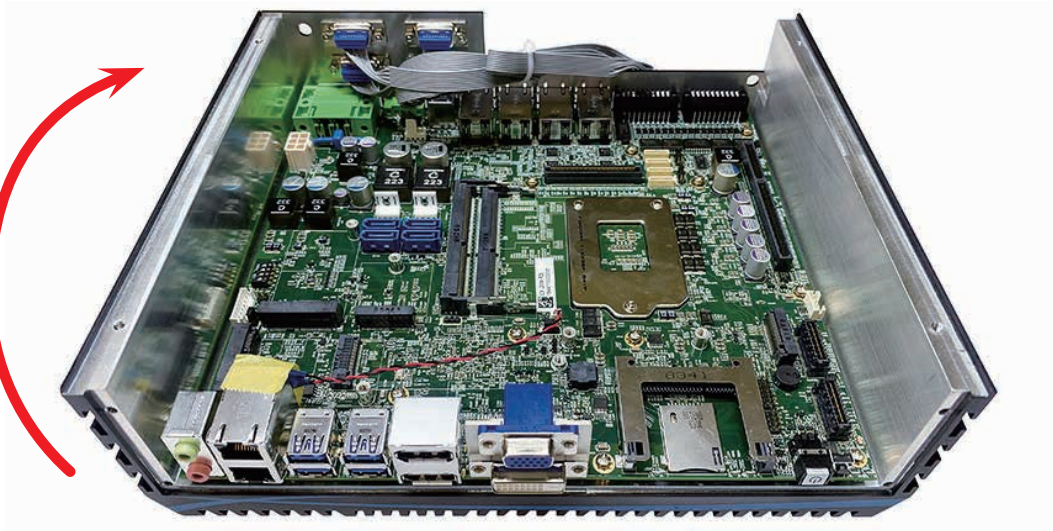
Step 1 Remove SATA DATA, SATA Power and COM cable.



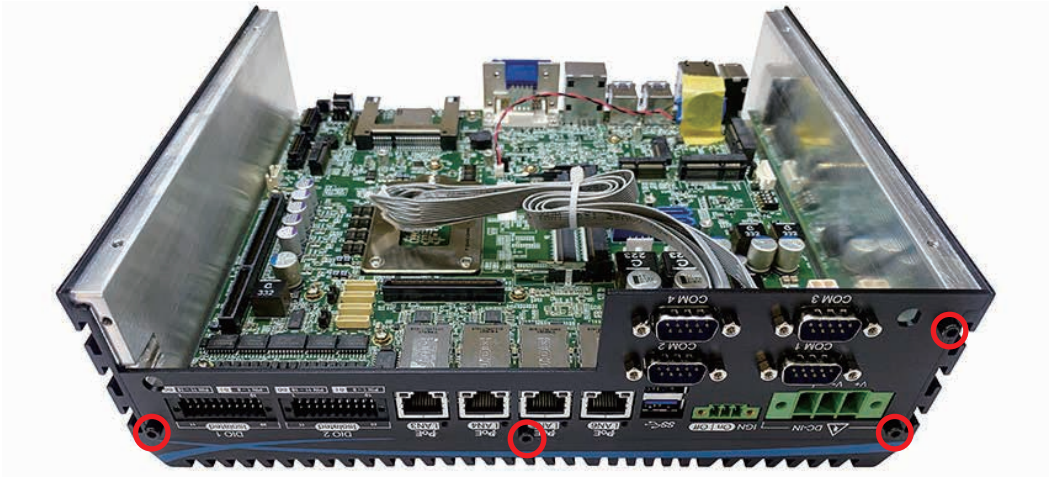
Step 2 Remove five HEX#6-32 and four HEX#4-40 screws.



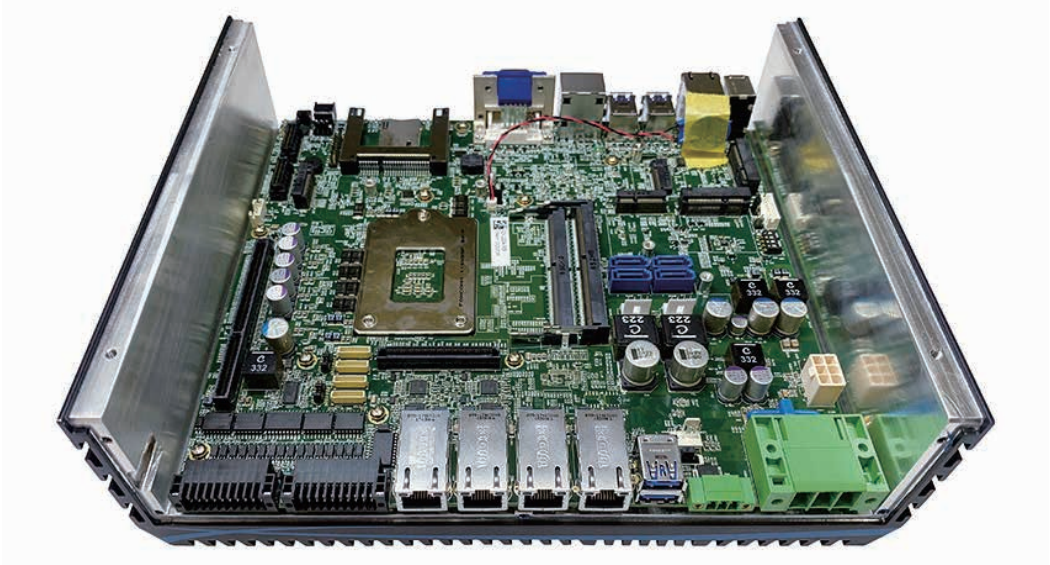
Step 3 Remove front panel and turn over to face the rear side.



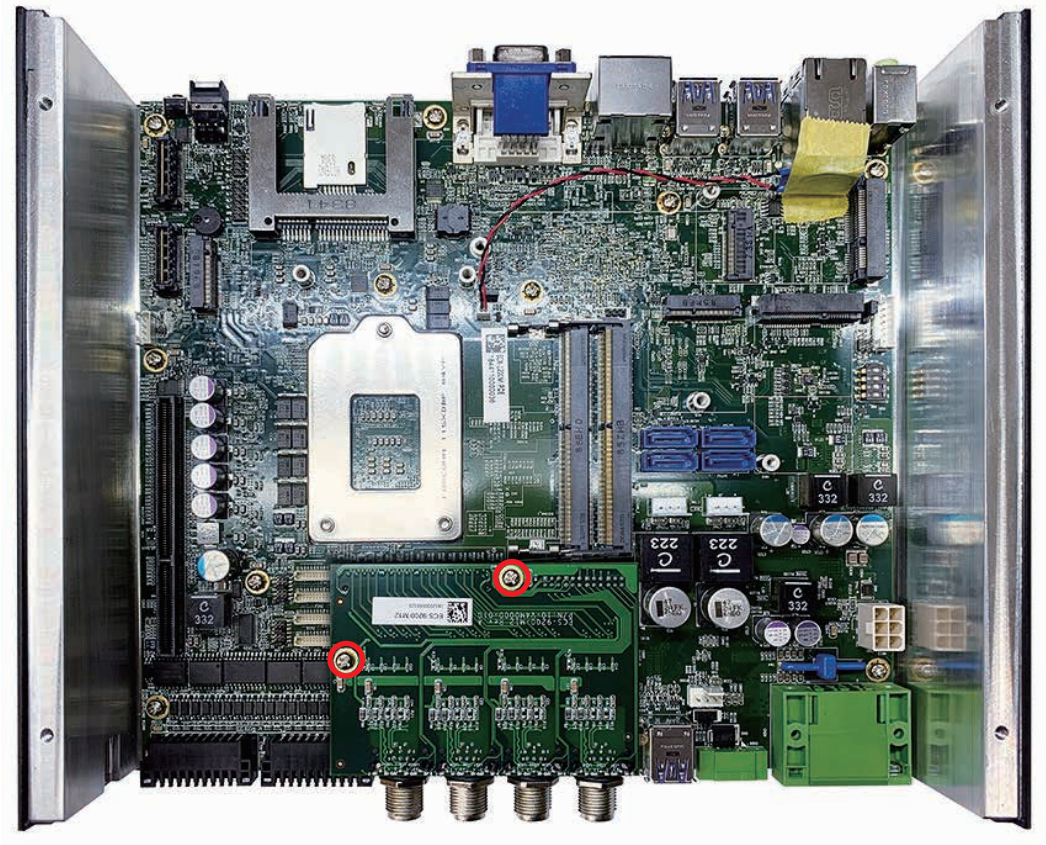
Step 4 Remove four HEX#6-32 screws.



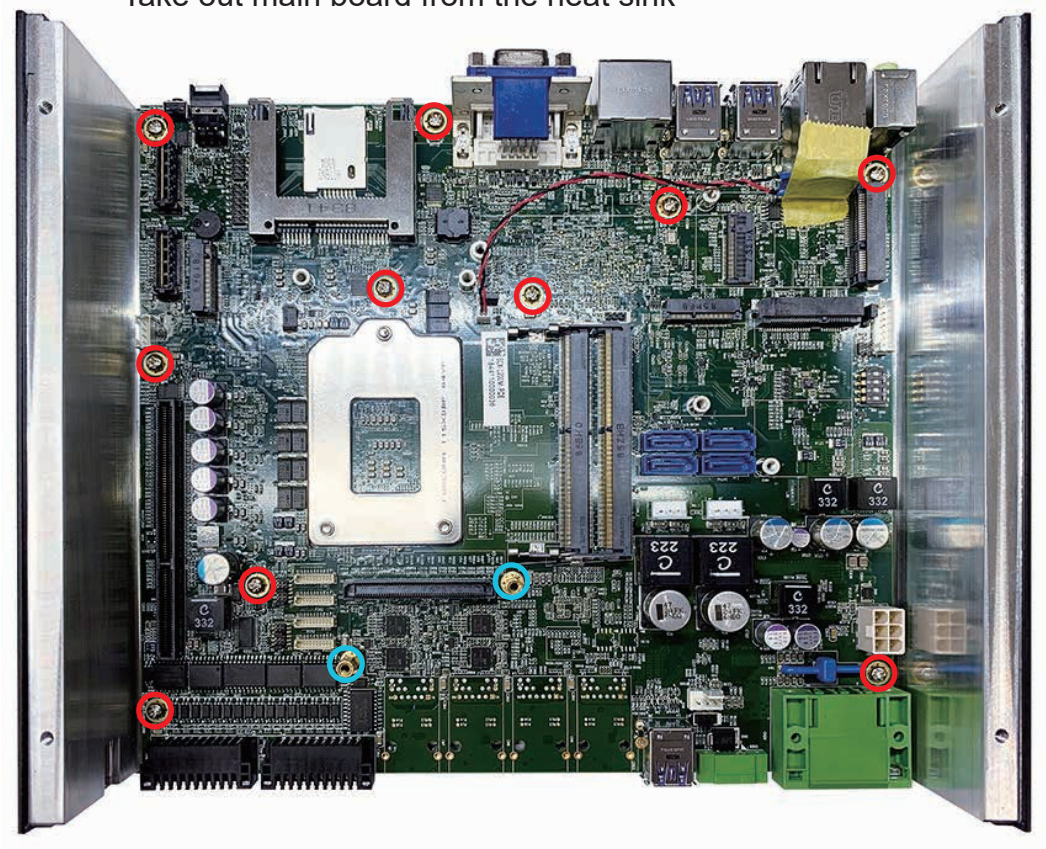
Step 5 Remove rear panel.



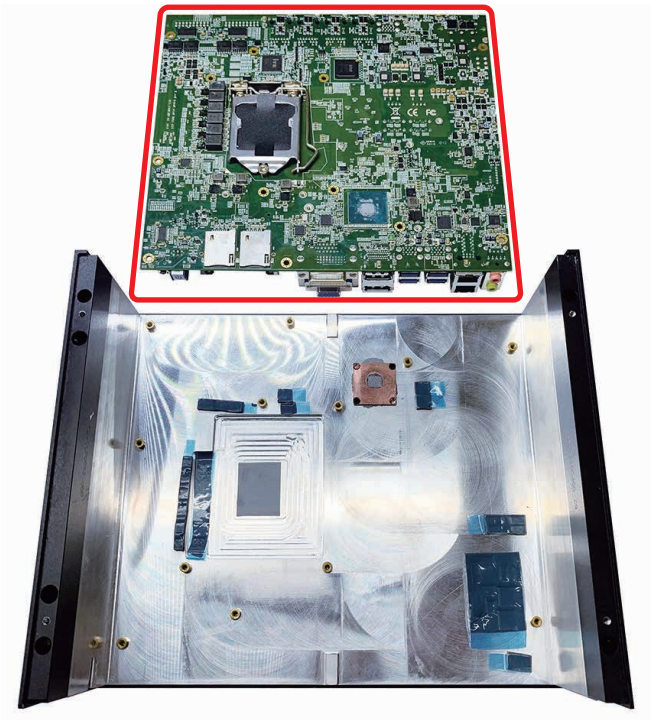
Step 6 Remove two PHILLIPS M3 screws.



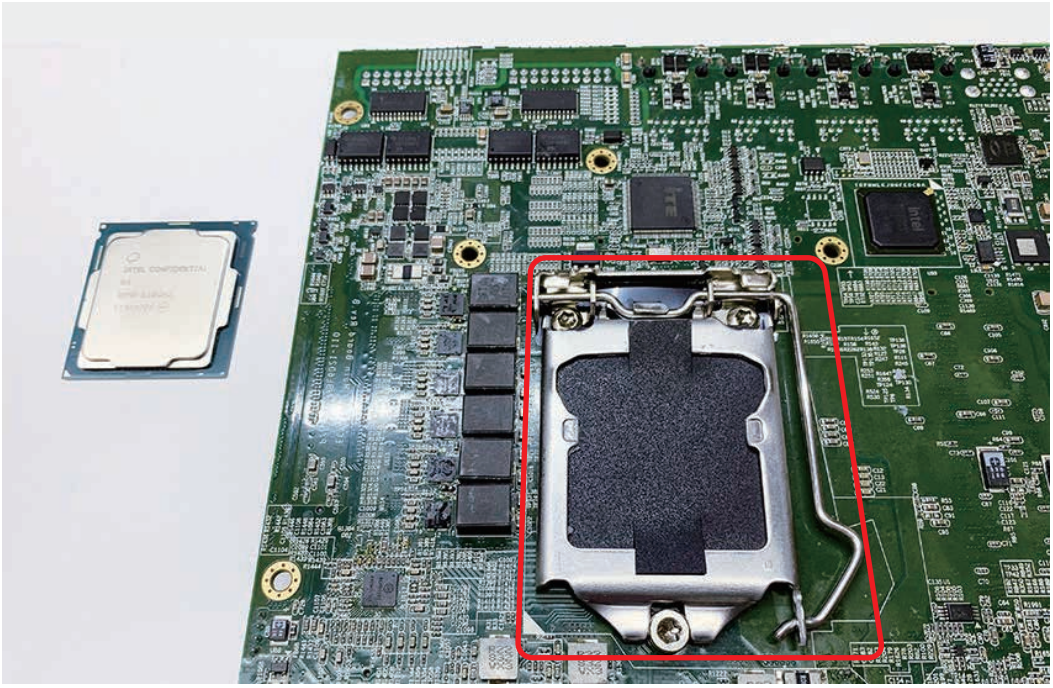
Step 7 Remove ten PHILLIPS M3 screws and two stand off M3*16mm. Take out main board from the heat sink



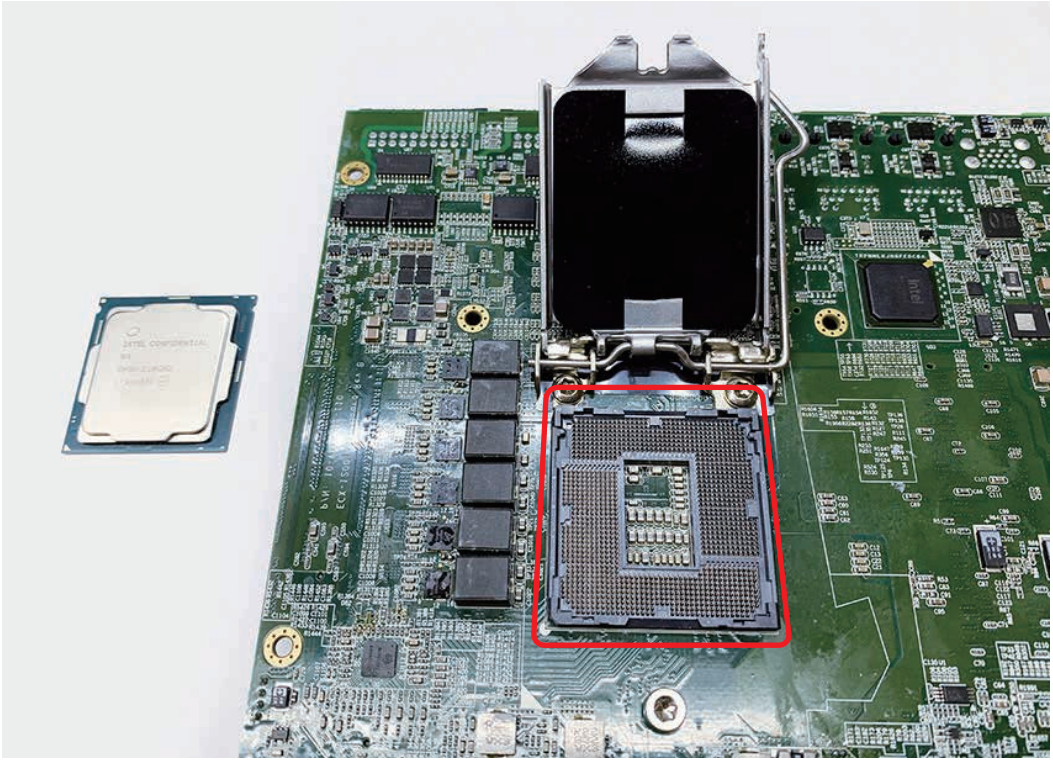
Step 8 Turn over the main board to make the CPU socket side up.



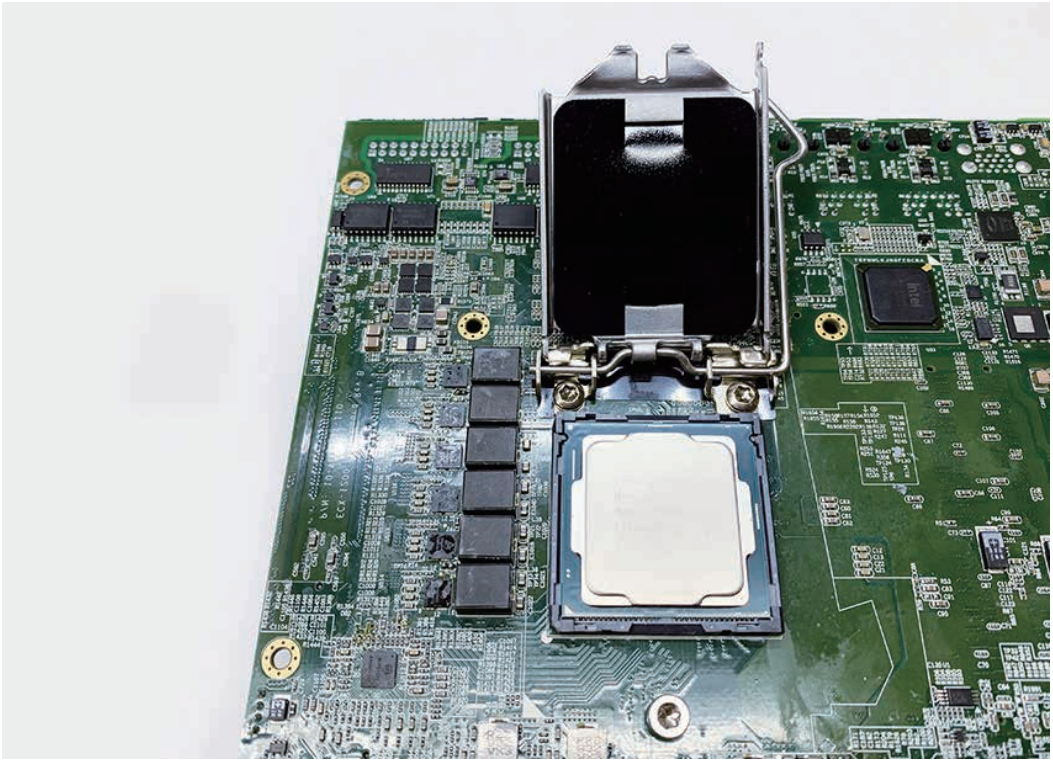
Step 9 Unlock the CPU socket.



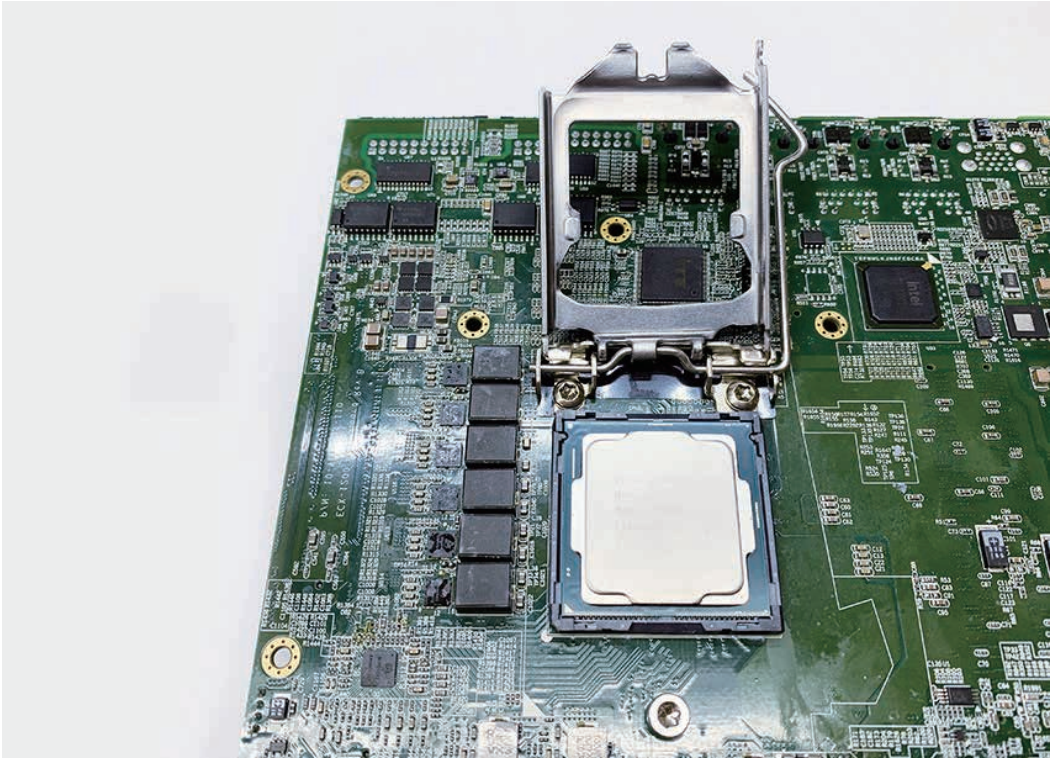
Step 10 Open the CPU socket cover.



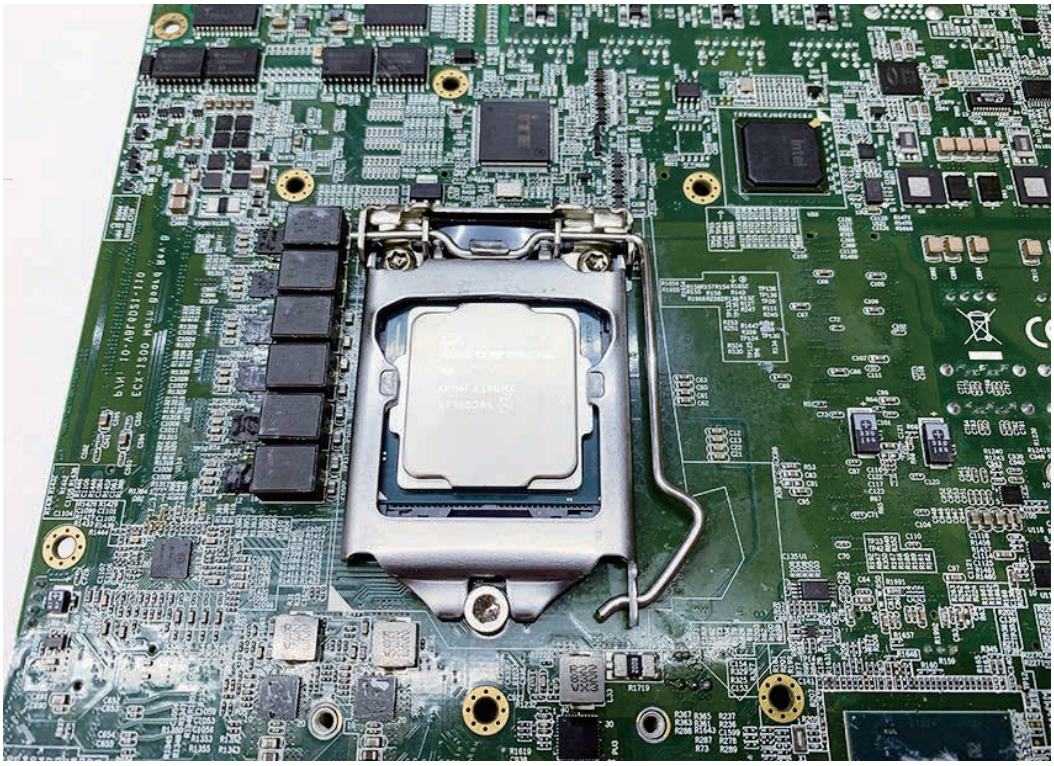
Step 11 Watch out the direction of CPU and put CPU into the CPU socket.



Step 12 Remove the mylar from CPU cover and lock the cover.

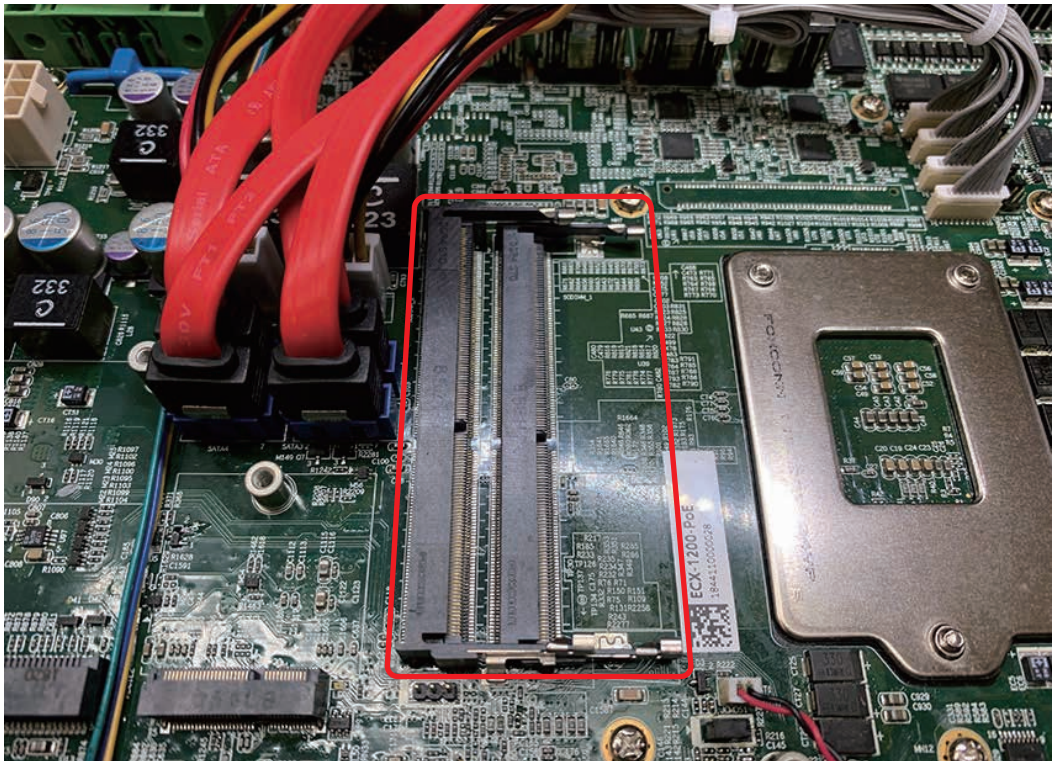


Step 13 Cover and lock the CPU socket.

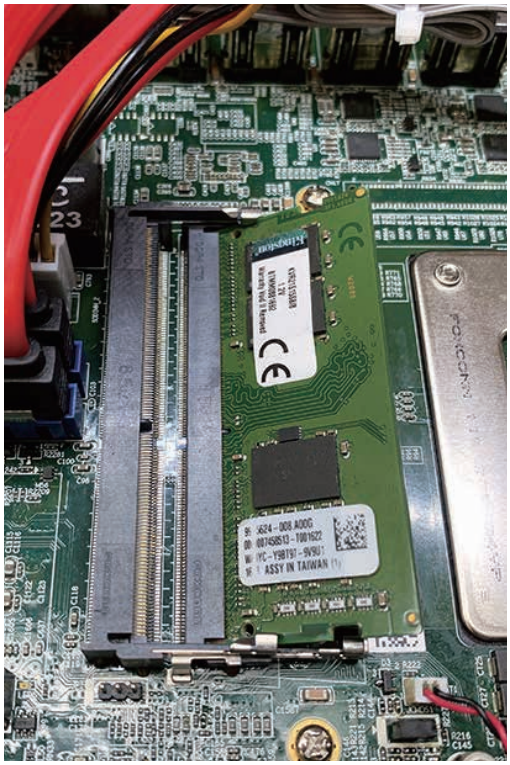


3.3 Installing DDR4 SO-DIMM Modules

Step 1 DDR4 SO-DIMM socket.



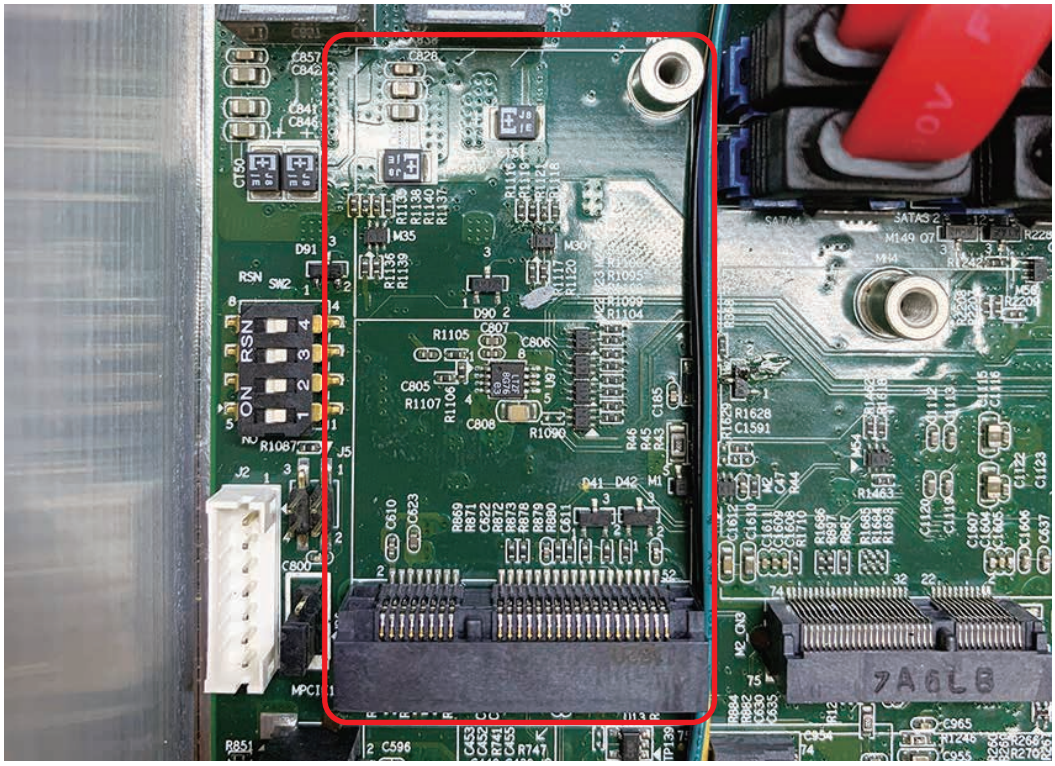
Step 2 Install DDR4 RAM module into SO-DIMM socket and locked.



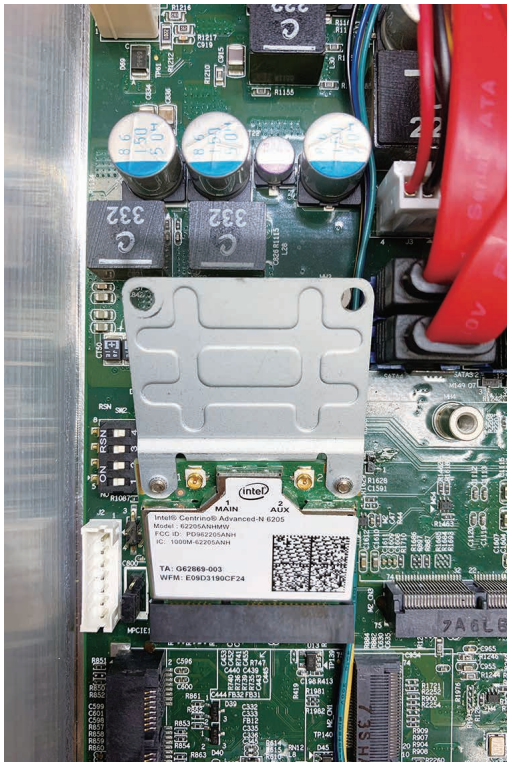
Step 3 Install DDR4 RAM module into SO-DIMM socket and locked.

3.4 Installing Mini PCIe Card

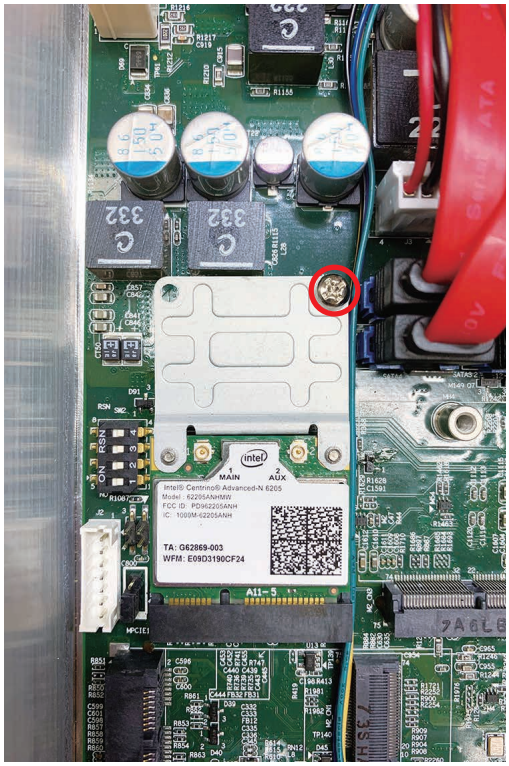
Step 1 Mini PCIe socket.



Step 2 Install Mini PCIe card into socket.



Step 3 Fasten PHILLIPS M2.5 screw.



3.5 Installing Antenna Cable

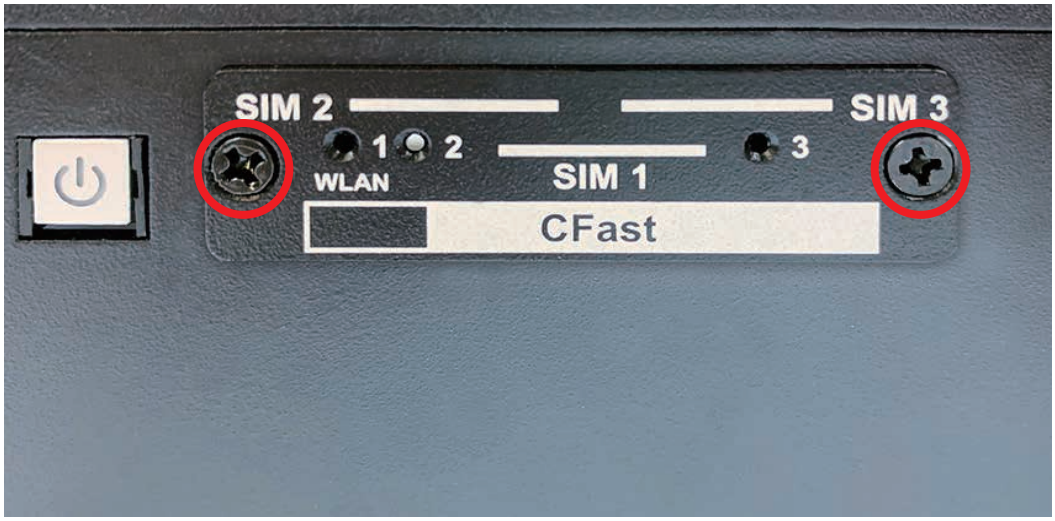
Step 1 Check Antenna cable and washer.

Step 2 Fasten washer 1 and 2.

Step 3 Finished.

3.6 Installing CFast Card

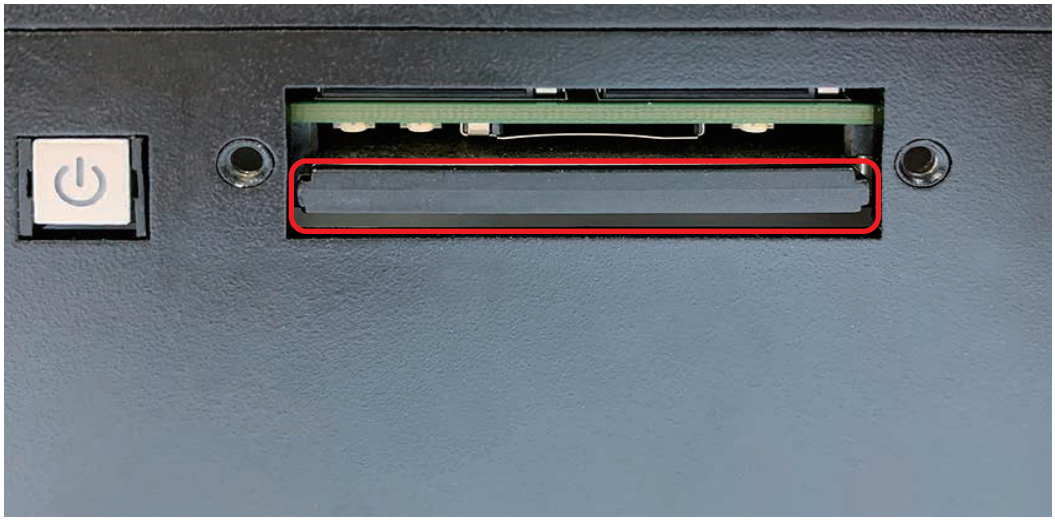
Step 1 Remove two PHILLIPS M3 screws on CFast & SIM Card cover at front panel.



Step 2 Remove CFast & SIM Card cover.

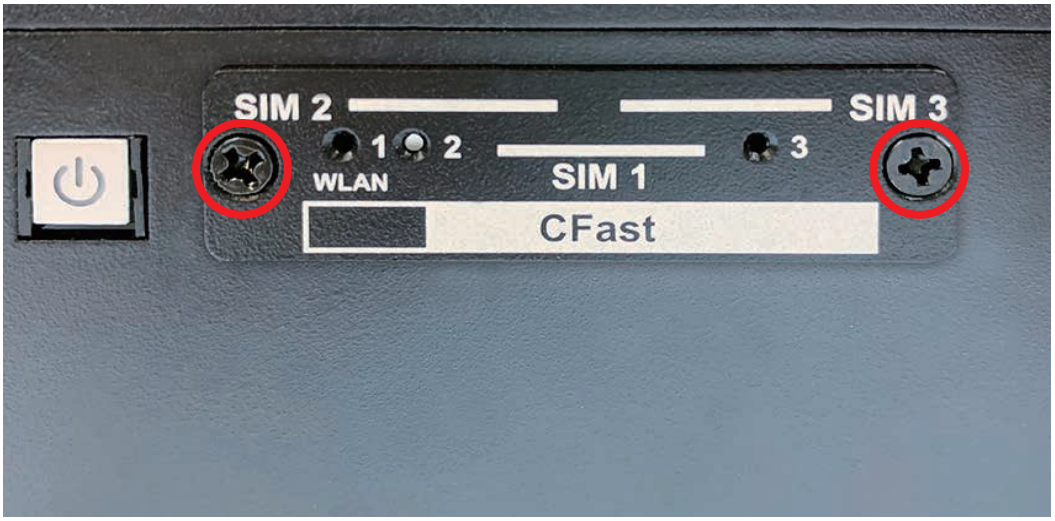
Step 3 Before Inserting CFast & SIM Card, make sure the system power is not plugged.

Step 4 Insert CFast card and push to lock.



3.7 Installing SIM Card

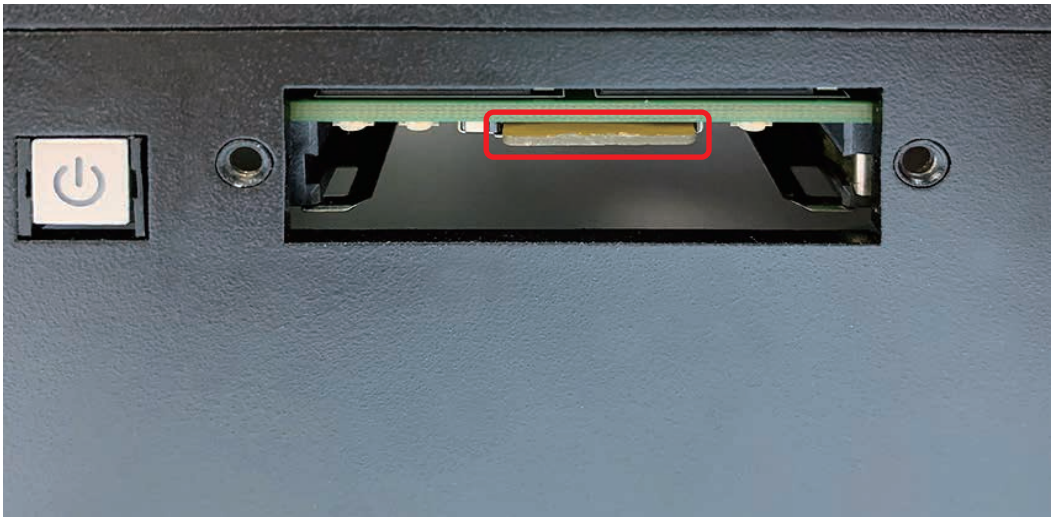
Step 1 Remove two PHILLIPS M3 screws on CFast & SIM Card cover at front panel.



Step 2 Remove CFast & SIM Card cover.

Step 3 Before Inserting CFast & SIM Card, make sure the system power is not plugged.

Step 4 Insert SIM card and push to lock.



3.8 Installing PCI/PCIe Card

ECX-1200/1100:
System designs will support 111.15 mm standard height, 200 mm maximum length (without the I/O bracket & power cable) expansion cards.

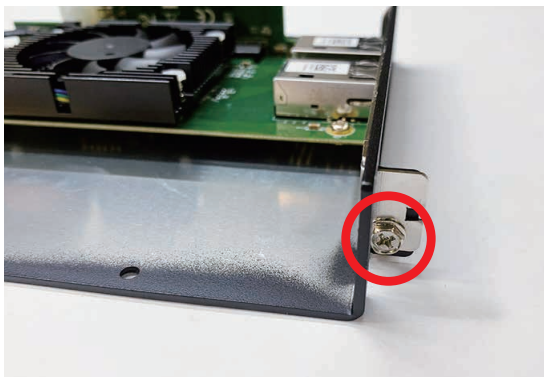
ECX-1200/1100-PEG:
System designs will support 111.15 mm standard height, 168 mm maximum length (without the I/O bracket & power cable) expansion cards.

(*Based on the position of power connectors and the card sink/case design, not all expansion card within the maximum dimension can fit in to the system. Please consult the Vecow support team for confirmation.)

Step 1 Remove PCI bracket and PHILLIPS#6-32 screw.

Step 2 Match the PCI/PCIe card and the tray.

Step 3 Fasten PHILLIPS#6-32 screw.



3.9 Installing SSD/HDD

Step 1 Unlock SSD/HDD tray.

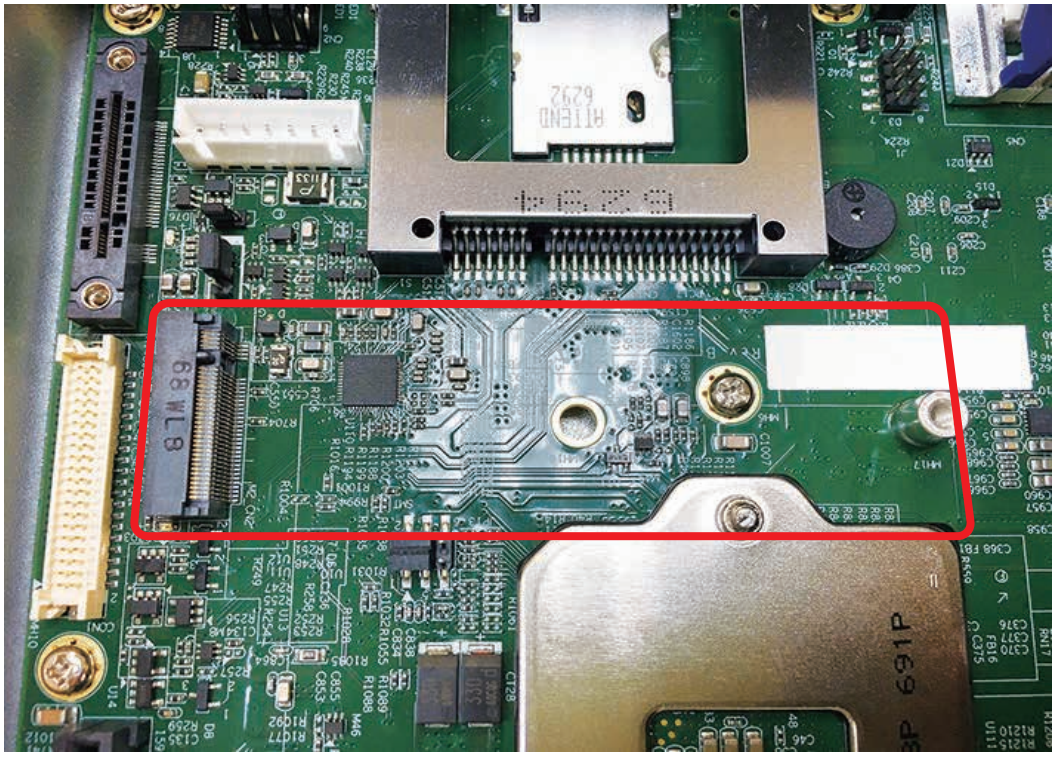
Step 2 Pull the trigger and open SSD/HDD tray.

Step 3 Install 2.5" SSD/HDD into the tray and then push back to close the tray.

Step 4 Lock the SSD/HDD tray with key.

3.10 Installing M.2

Step 1 M.2 socket.

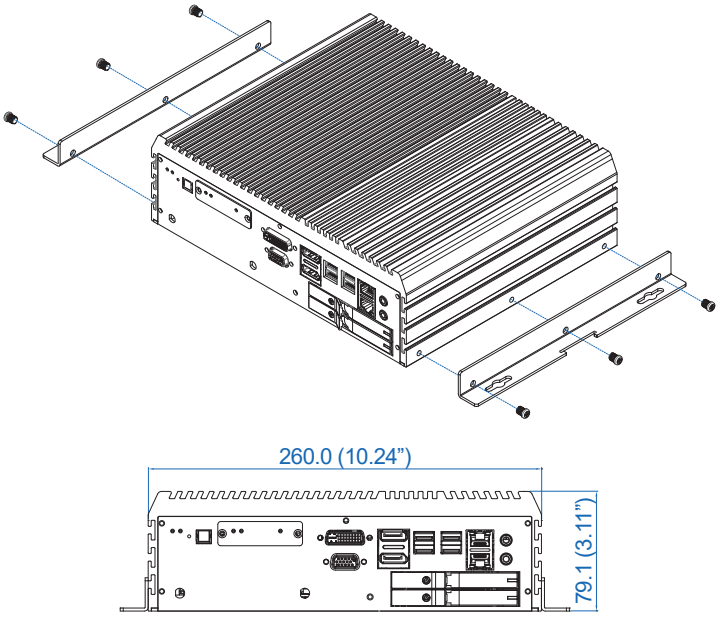


Step 2 Install M.2 into socket and fasten 1pcs PHILLIPS M3 screw.

3.11 Mounting Your ECX-1200/1200M/1100 Series

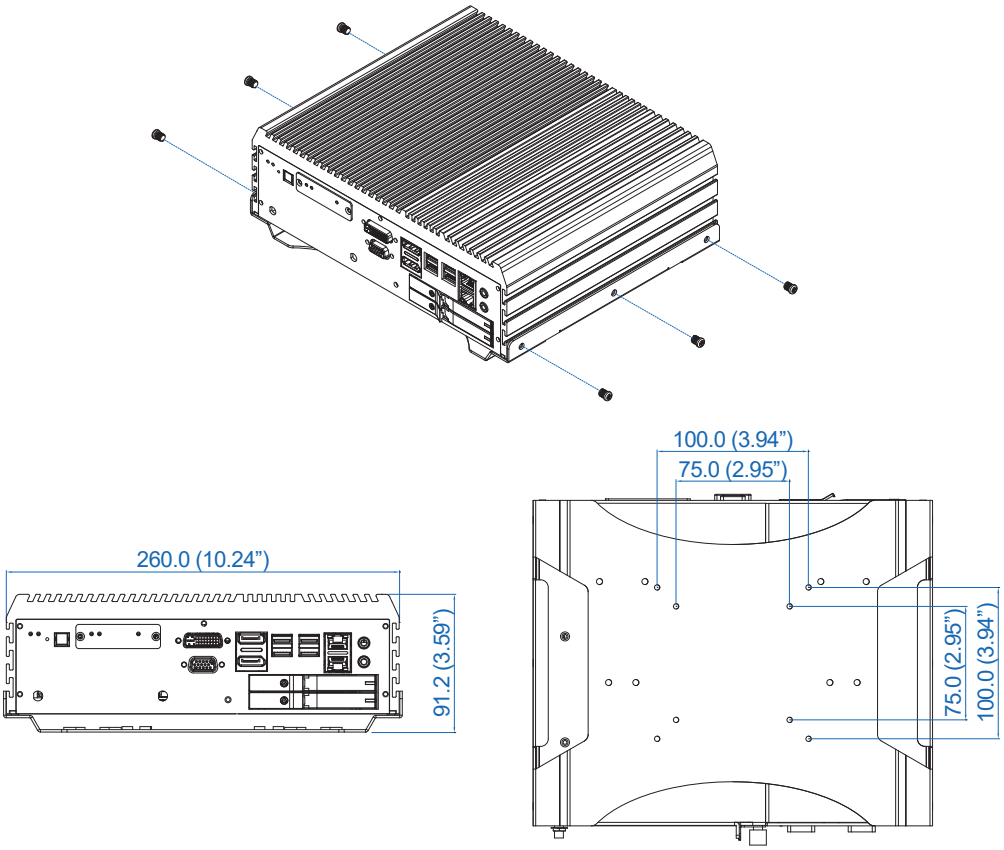
3.11.1 Wall mount

Fasten six PHILLIPS#10-32 screws.



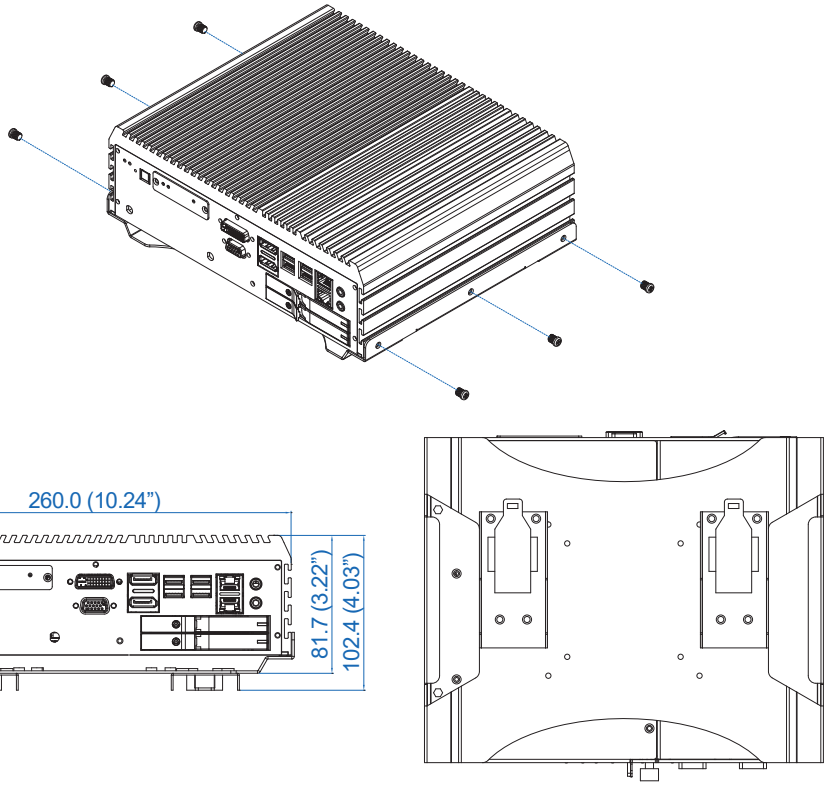
3.11.2 VESA mount

Fasten six PHILLIPS#10-32 screws.
VESA 75 x 75/100 x 100 mm

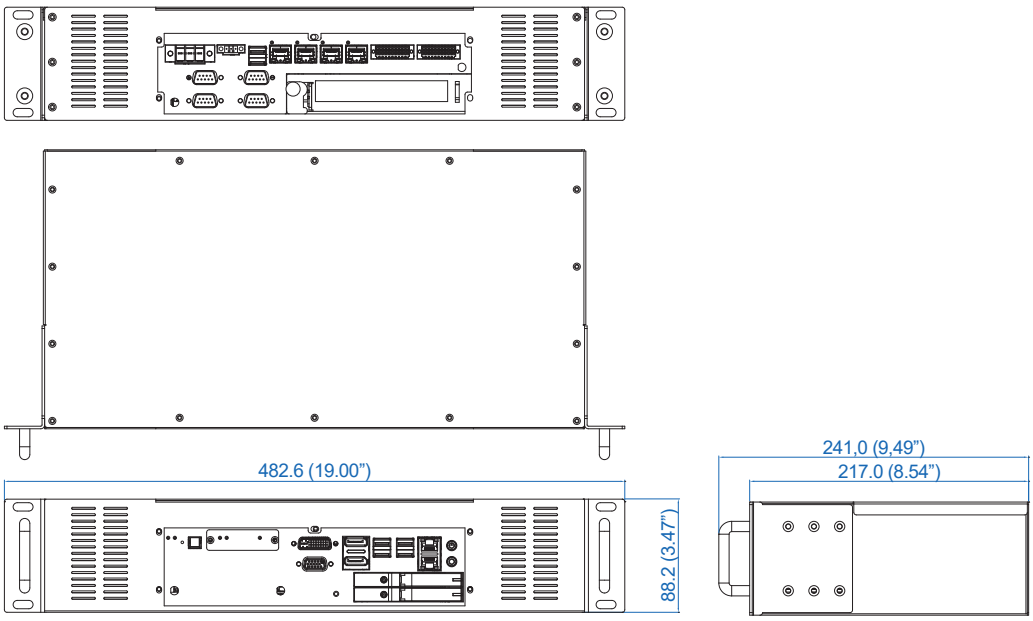


3.11.3 Din Rail Kit

Fasten six PHILLIPS#10-32 screws.



3.11.4 2U rack mount kit



4

BIOS SETUP

4.1 Entering BIOS Setup

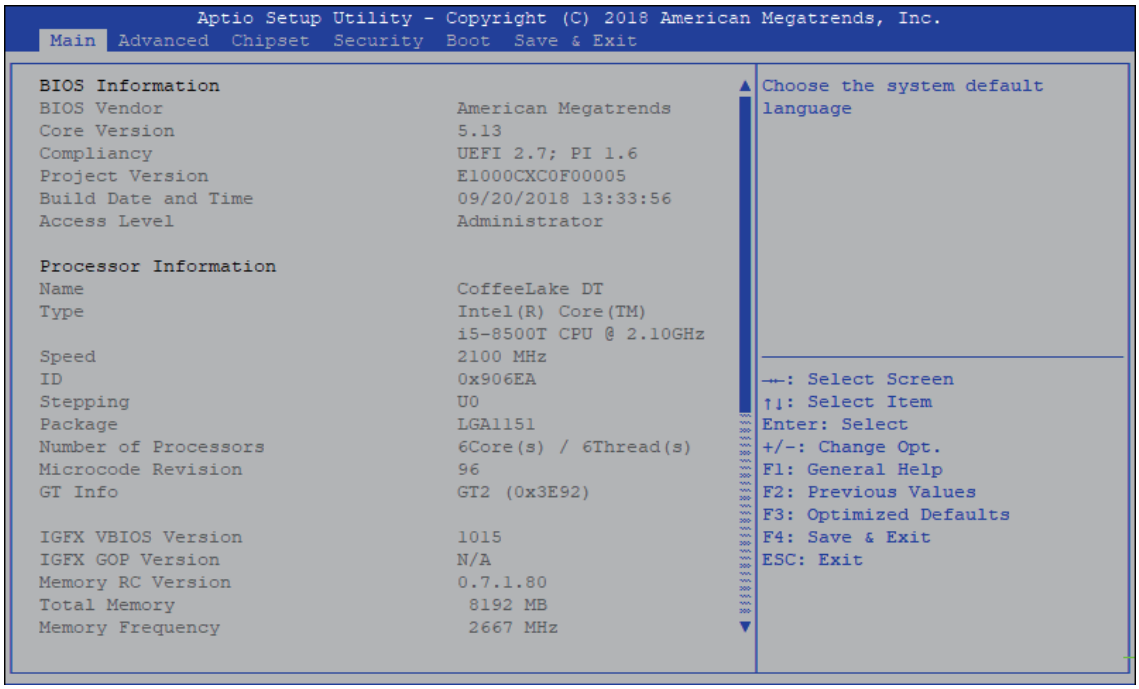


Figure 4-1 : Entering Setup Screen

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

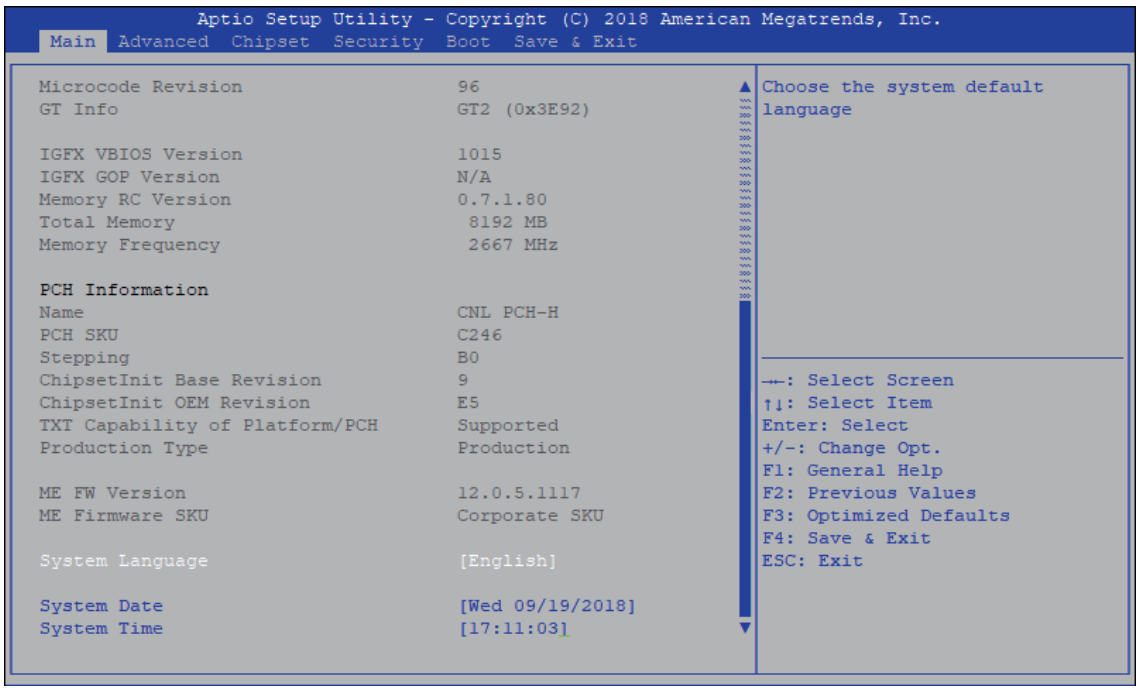


Figure 4-2 : BIOS Main Menu

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.

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

4.3 Advanced

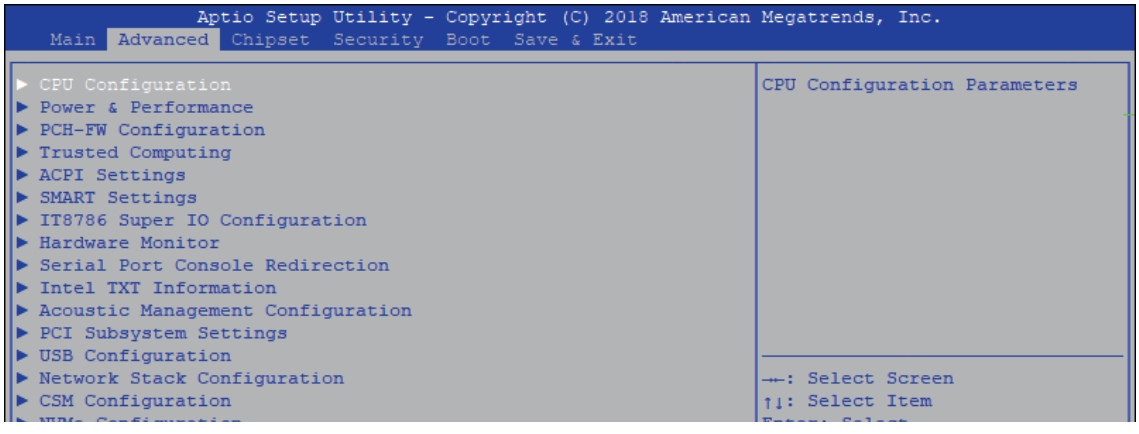


Figure 4-3 : BIOS Advanced Menu

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

4.3.1 CPU Configuration

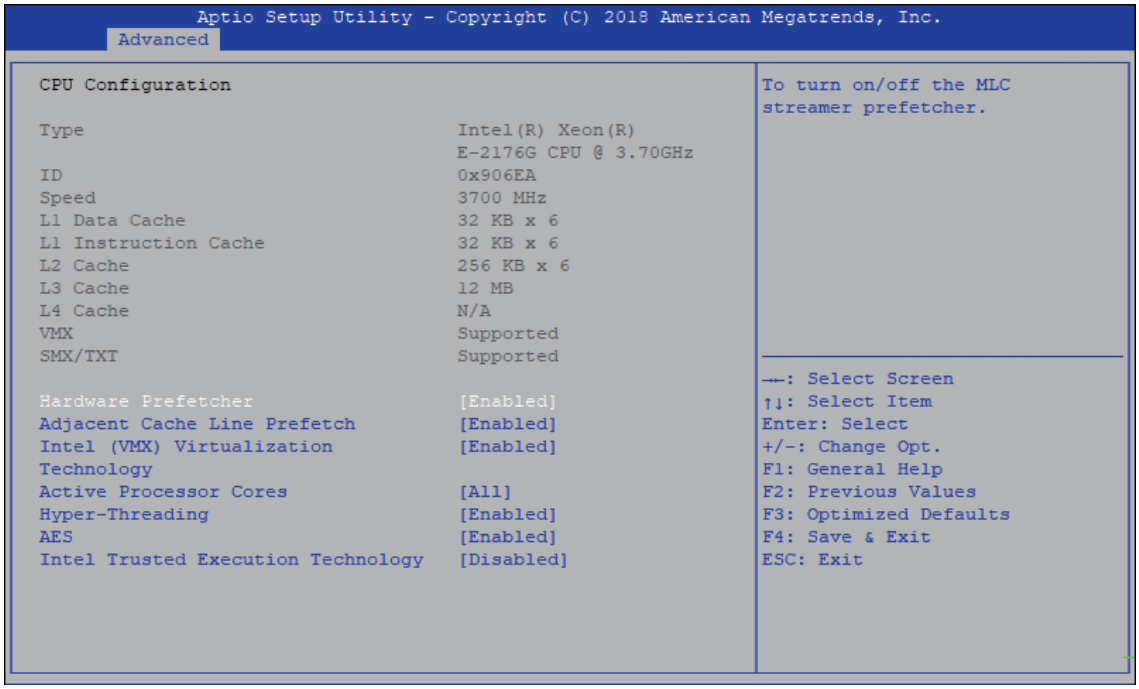


Figure 4-3-1 : CPU Configuration

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

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

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

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

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

AES
Enable/disable CPU Advanced Encryption Standard instructions.

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

4.3.2 Power & Performance

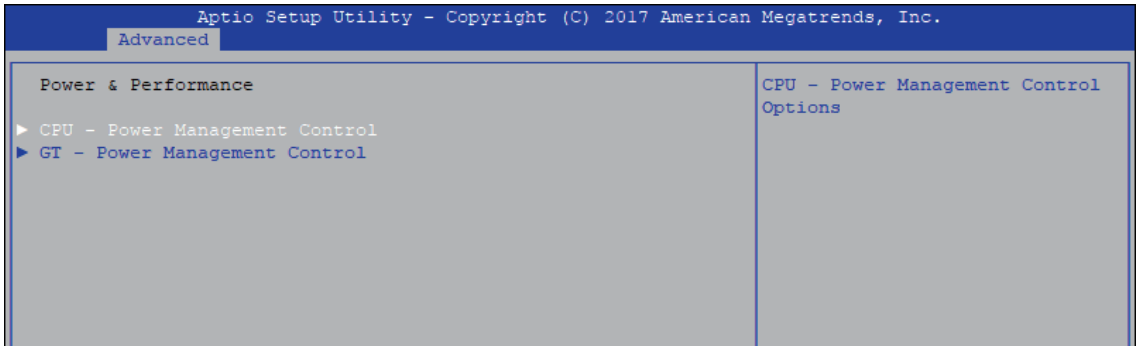


Figure 4-3-2 : Power & Performance

4.3.2.1 CPU – Power Management Control

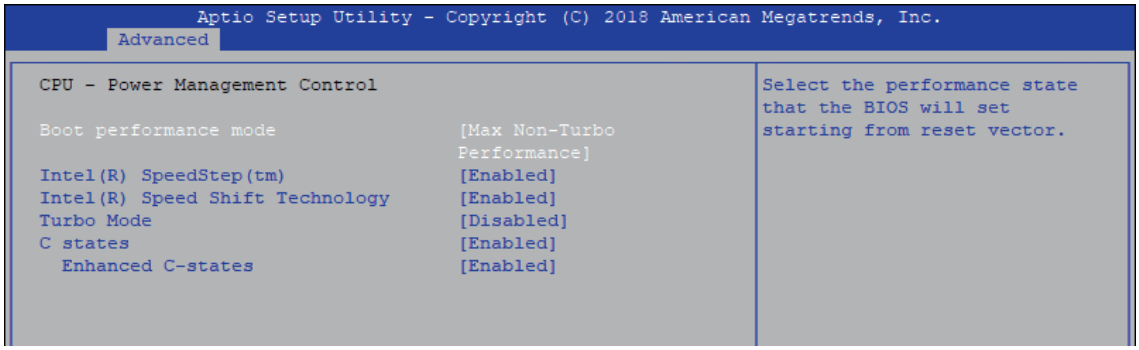


Figure 4-3-2-1 : CPU – Power Management Control

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

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

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

Turbo Mode
Turbo Mode.

C states
Enable or disable CPU C states.

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

4.3.2.2 GT – Power Management Control

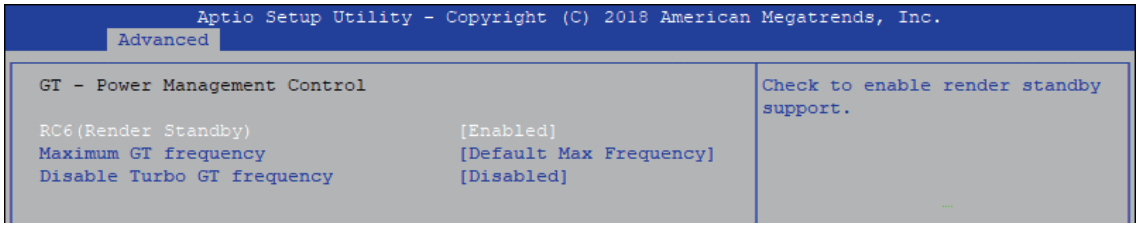


Figure 4-3-2-2 : GT – Power Management Control

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

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

Disable Turbo GT frequency
Check to enable render standby support.

4.3.3 PCH-FW Configuration

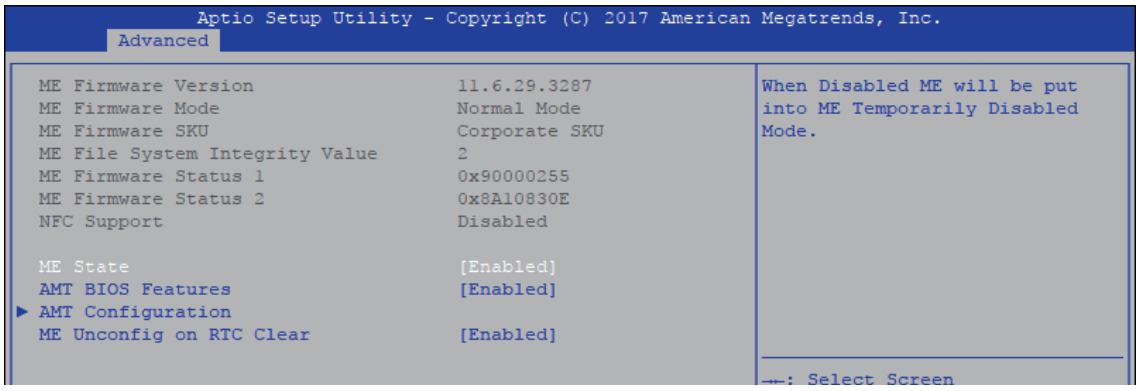


Figure 4-3-3 : PCH-FW Settings

ME State
Set ME to Soft temporarily disabled.

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

AMT Configuration
Configure Intel® Active Management Technology Parameters.

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

4.3.4 Trusted Computing

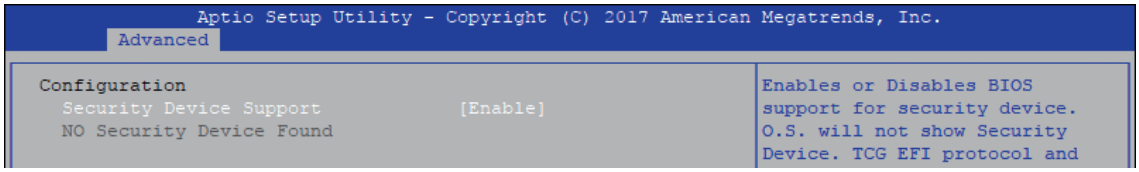


Figure 4-3-4 : Trusted Computing

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

4.3.5 ACPI Settings

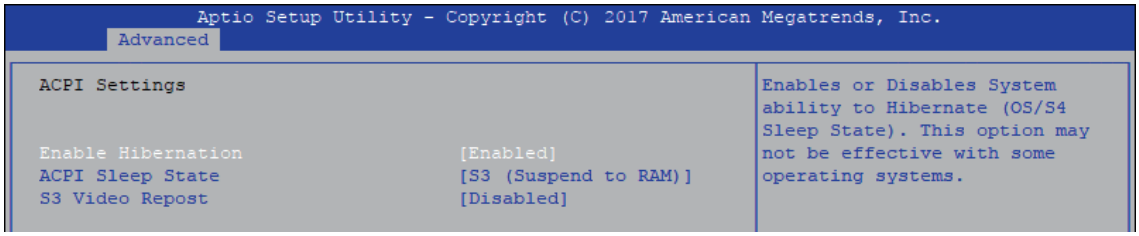


Figure 4-3-5 : ACPI Settings

Enable Hibernation

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

ACPI Sleep State

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

S3 Video Repost

Enables or disables S3 video repost.

4.3.6 SMART Settings

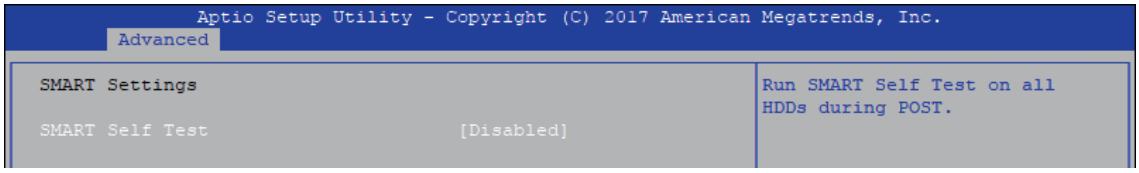


Figure 4-3-6 : SMART Settings

SMART Self Test

Run SMART self test on all HDDs during POST.

4.3.7 IT8786 Super IO Configuration

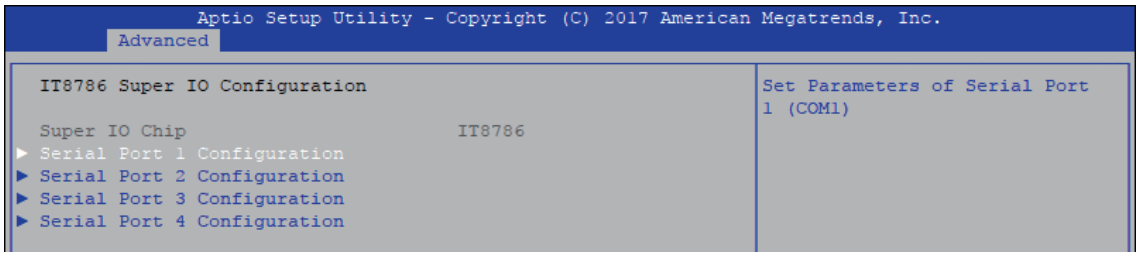


Figure 4-3-7 : IT8786 Super IO Settings

4.3.7.1 Serial Port X Configuration

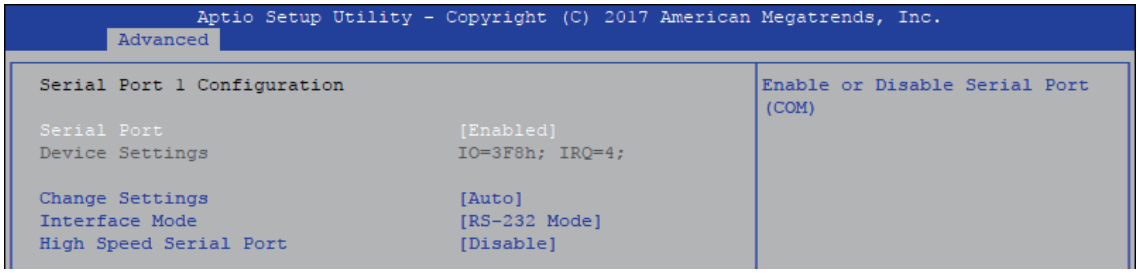


Figure 4-3-7-1 : Serial Port X Configuration

Serial Port 1 to port 4 Configuration

Options for Serial Port 1 to Serial Port 4.

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

4.3.8 Hardware Monitor

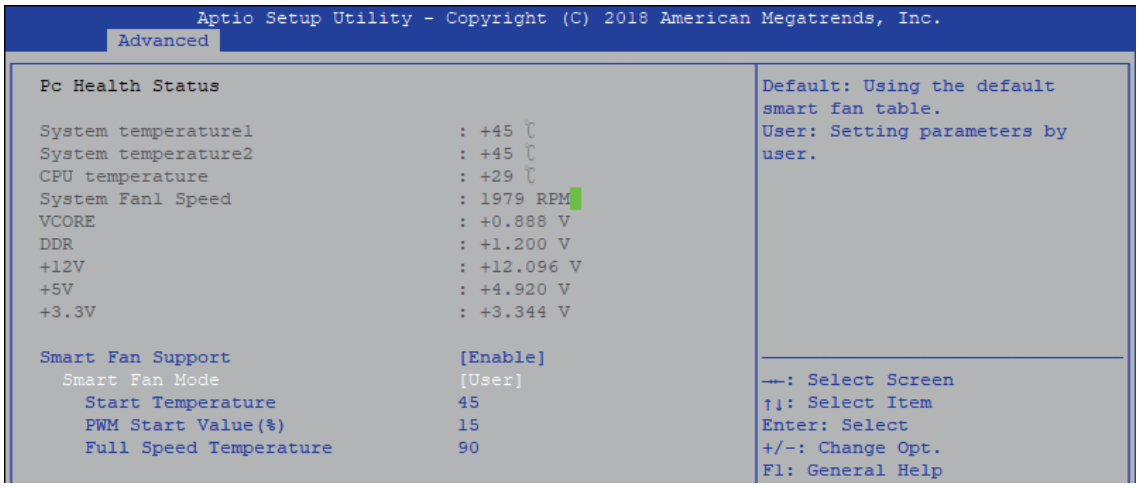


Figure 4-3-8 : Hardware Monitor Settings

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

Smart Fan Support

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

Smart Fan Mode

Default : Using the default smart fan table.

User : Setting parameters by user.

Start Temperature

Temperature Limit value of Fan Start (Degree C).

(Range : 10~80)

PWM Start Value (%)

Default PWM Value of Fan.

(Range : 15%~100%)

Full Speed Temperature

Temperature Limit value of Fan Full Speed (Degree C).

(Range : 50~90)

4.3.9 Serial Port Console Redirection

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

Console Redirection

Console redirection enable or disable.

Console Redirection Settings

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

Legacy Console Redirection

Legacy Console Redirection Settings.

Serial Port for Out-of-Band Management/Windows Emergency Management Services (EMS)

Console redirection enable or disable.

4.3.10 Intel TXT Information

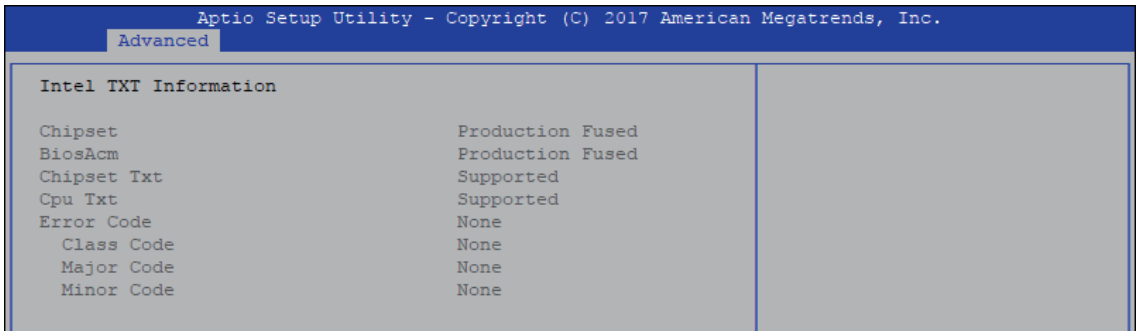


Figure 4-3-10 : Intel TXT Information

Display Intel TXT information.

4.3.11 Acoustic Management Configuration

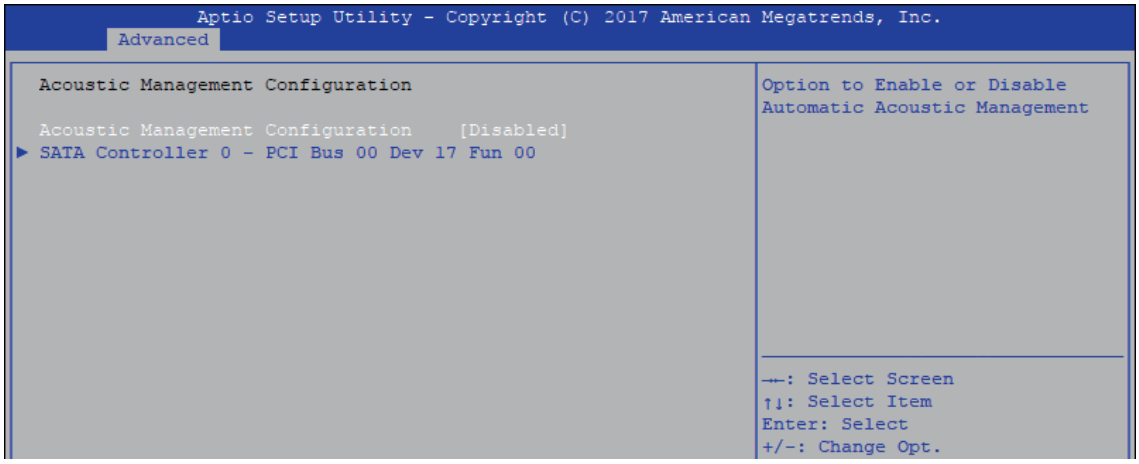


Figure 4-3-11 : Acoustic Management Settings

Acoustic Management Configuration

Option to enable or disable automatic acoustic management.

4.3.12 PCI Subsystem Setting

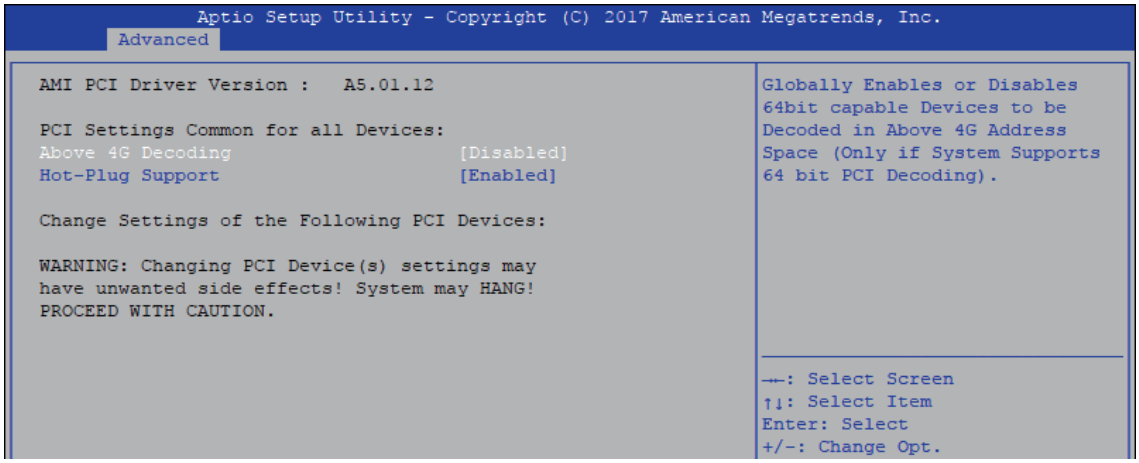


Figure 4-3-12 : PCI Subsystem Settings

Above 4G Decoding

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

Hot-Plug Support

Globally Enables or Disables Hot-Plug support for the entire System. If system has Hot-Plug Capable Slots and this option set to Enabled, it provides a Setup screen for selecting PCI resource padding for Hot-Plug.

4.3.13 Network Stack Configuration

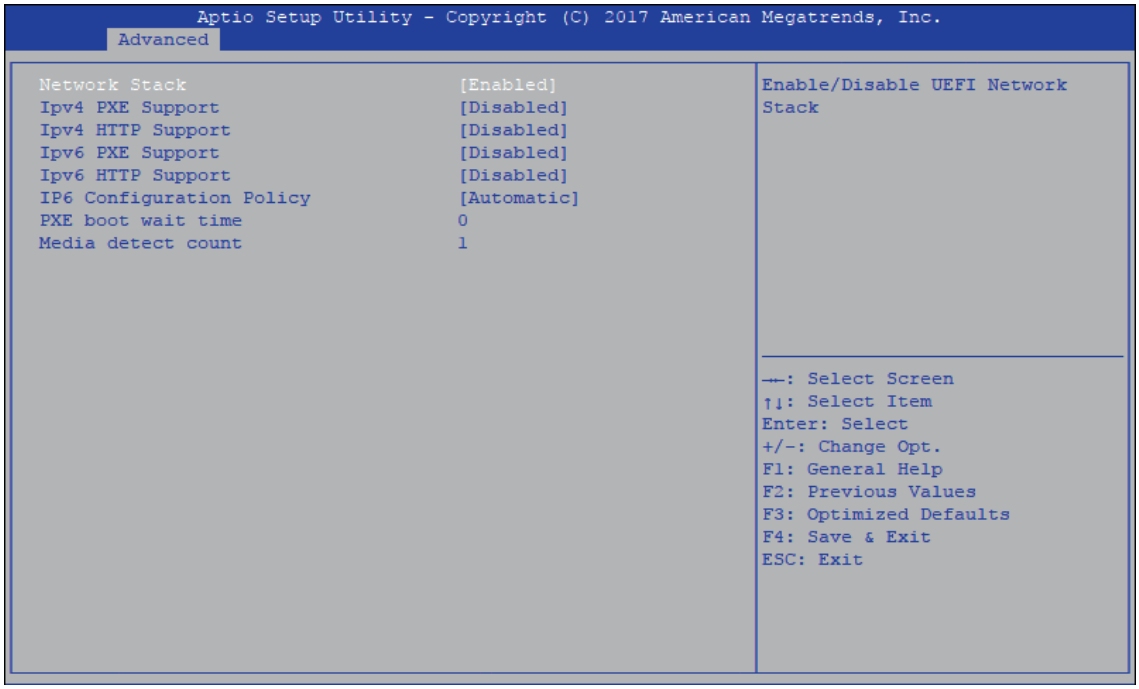


Figure 4-3-13 : Network Stack Settings

Network Stack
Enable/Disable UEFI Network Stack.

Ipv4 PXE Support
Enable/Disable IPv4 PXE boot support.

Ipv4 HTTP Support
Enable/Disable IPv4 HTTP boot support.

Ipv6 PXE Support
Enable/Disable IPv6 PXE boot support.

Ipv6 HTTP Support
Enable/Disable IPv6 HTTP boot support.

IP6 Configuration Policy
Set IP6 Configuration Policy.

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

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

4.3.14 CSM Configuration

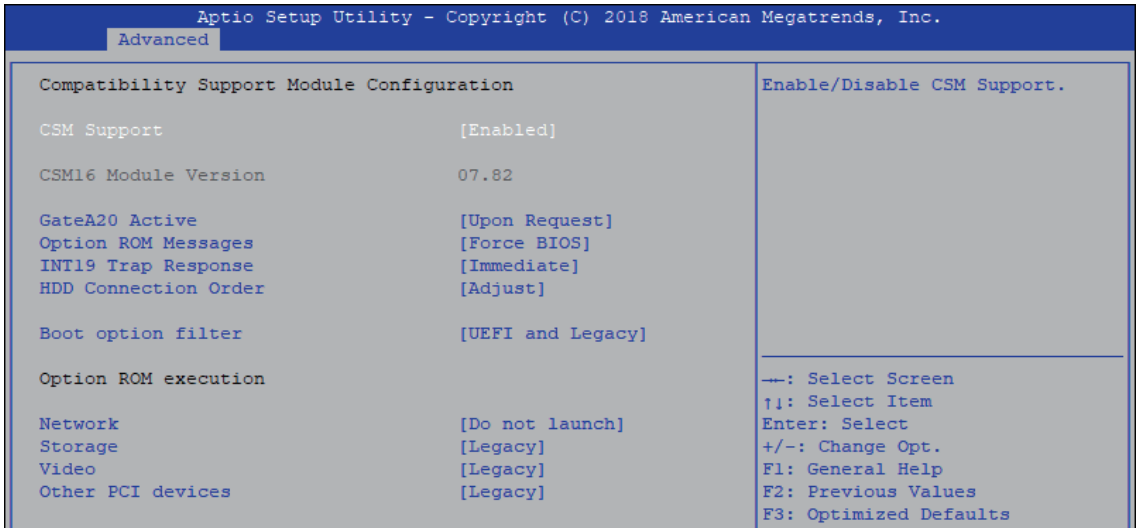


Figure 4-3-14 : CSM Settings

CSM Support
Enable/disable CSM support

GateA20 Active
UPON REQUEST - GA20 can be disabled using BIOS services.
ALWAYS - do not allow GA20 to be disabled; this option is useful when any RT code is executed above 1MB.

Option ROM Messages
Set display mode for Option ROM.

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

HDD Connection Order
Some OS require HDD handles to be adjusted, i.e. OS is installed on drive 80h.

Boot option filter
This option controls Legacy/UEFI ROM's priority.

Network
Controls the execution of UEFI and Legacy PXE OpROM.

Storage
Controls the execution of UEFI and Legacy Storage OpROM.

Video
Allows more than two frequency ranges to be supported.

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

4.3.15 NVMe Configuration

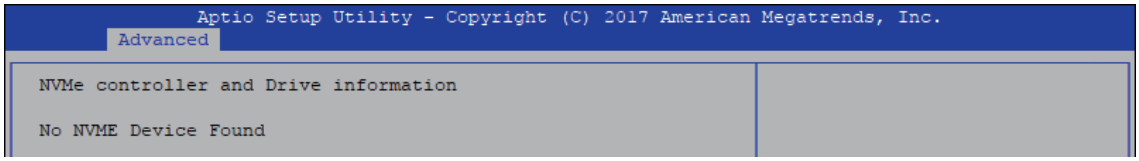


Figure 4-3-15 : NVMe Settings

Display NVMe controller and Drive information.

4.3.16 USB Configuration

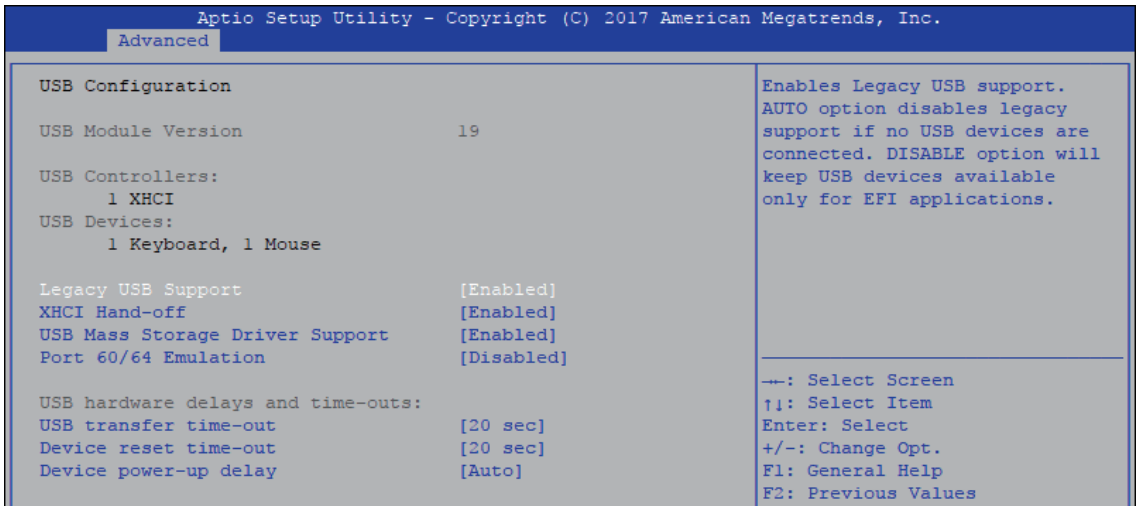


Figure 4-3-16 : USB Settings

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

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

USB Mass Storage Driver Support
Enable/disable USB mass storage driver support.

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

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

Device reset time-out
USB mass storage device start unit command time-out.

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

4.4 Chipset

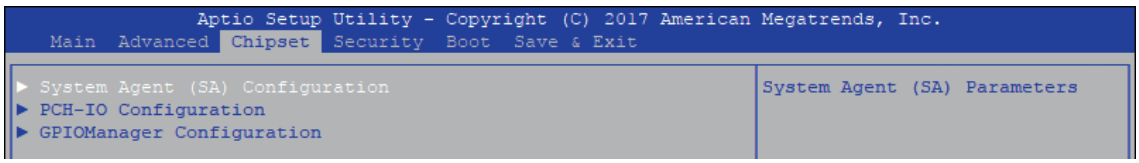


Figure 4-4 : BIOS Chipset Menu

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

PCH-IO Configuration
PCH parameters.

GPIOManager Configuration
GPIOManager Configuration.

4.4.1 System Agent (SA) Configuration

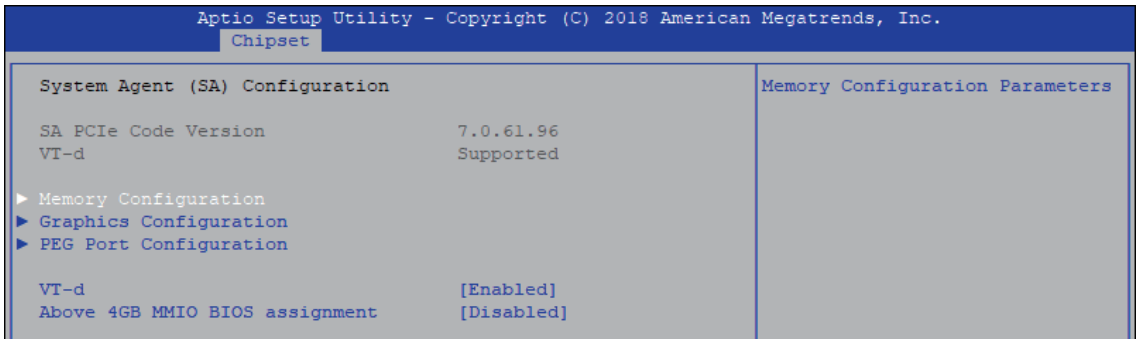


Figure 4-4-1 : System Agent Settings

VT-d
VT-d capability.

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

4.4.1.1 Memory Configuration

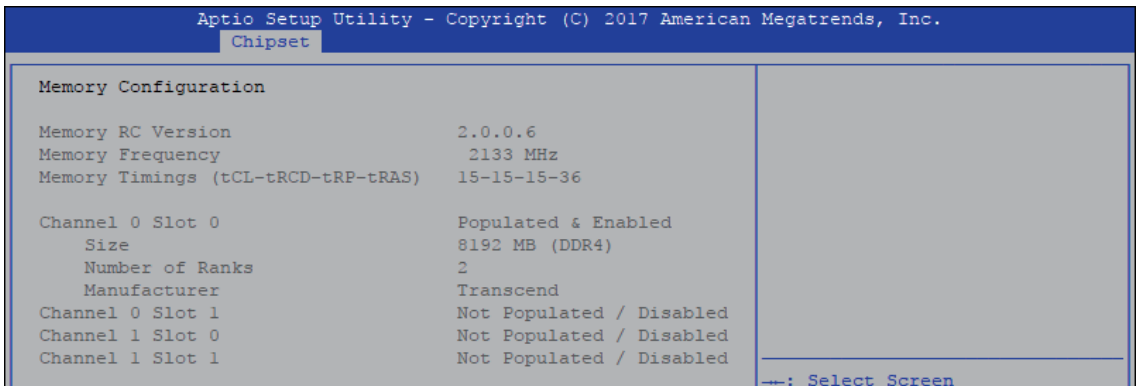


Figure 4-4-1-1 : Memory Information

Displays memory information.

4.4.1.2 Graphics Configuration

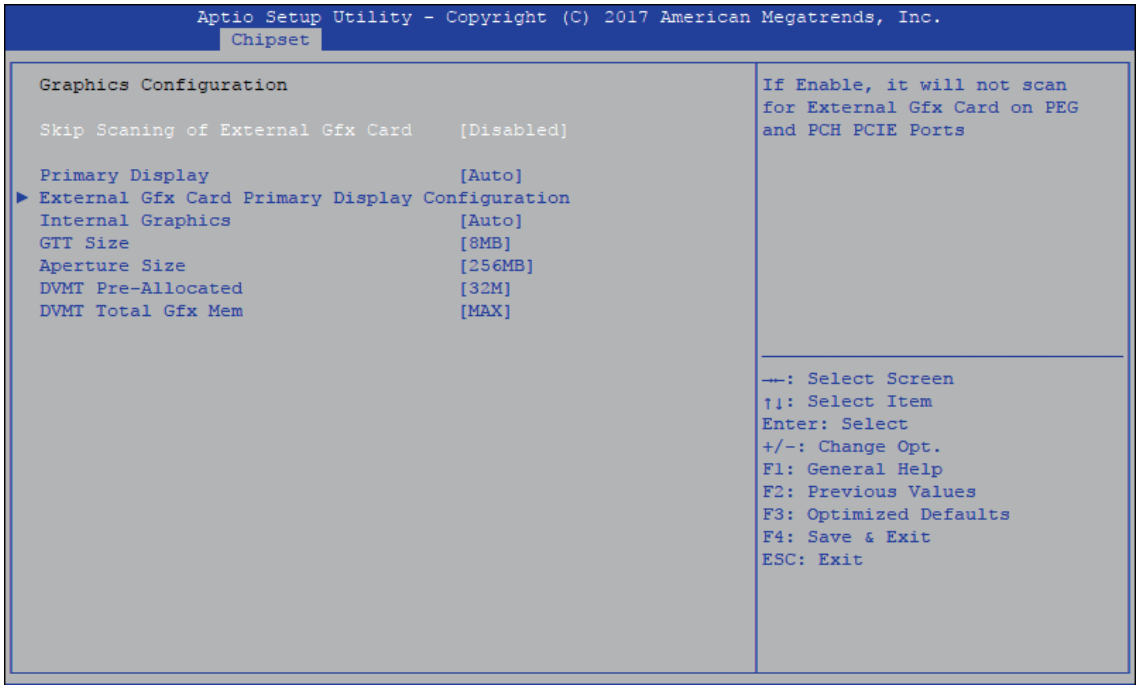


Figure 4-4-1-2 : Graphics Settings

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 SG for Switchable Gfx.

Internal graphics
Keep IGFX enabled based on the setup options.

GTT Size
Select the GTT Size.

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

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

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

4.4.1.3 PEG Port Configuration

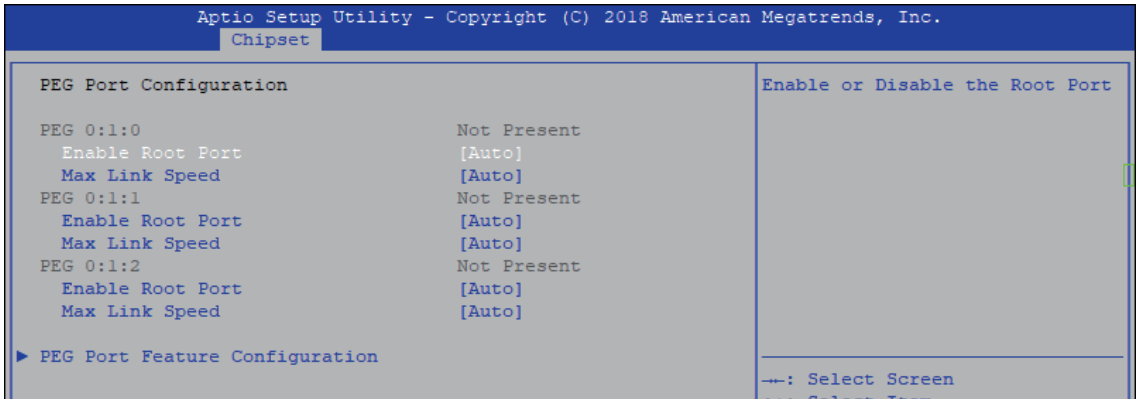


Figure 4-4-1-3 : PEG Port Configuration

PEG port options for PCIe device.

4.4.2 PCH-IO Configuration

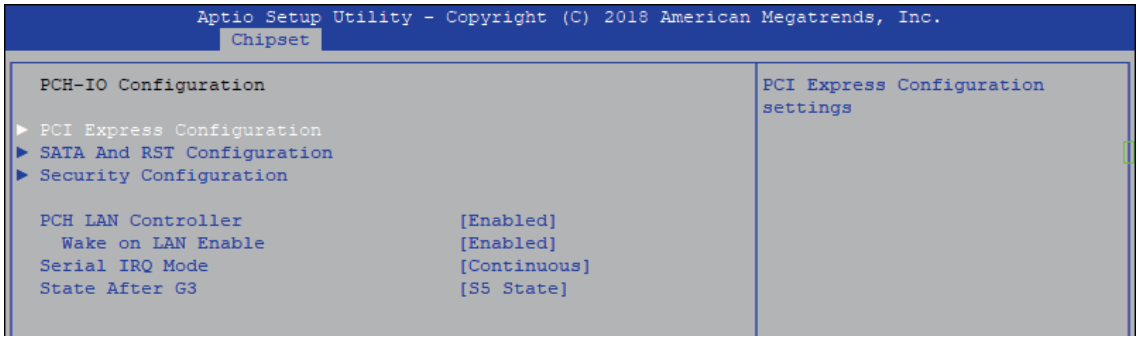


Figure 4-4-2 : PCH-IO Settings

PCH LAN Controller
Enable or disable onboard NIC.

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

Serial IRQ Mode
Configure serial IRQ mode.

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

4.4.2.1 PCI Express Configuration of PCH-IO

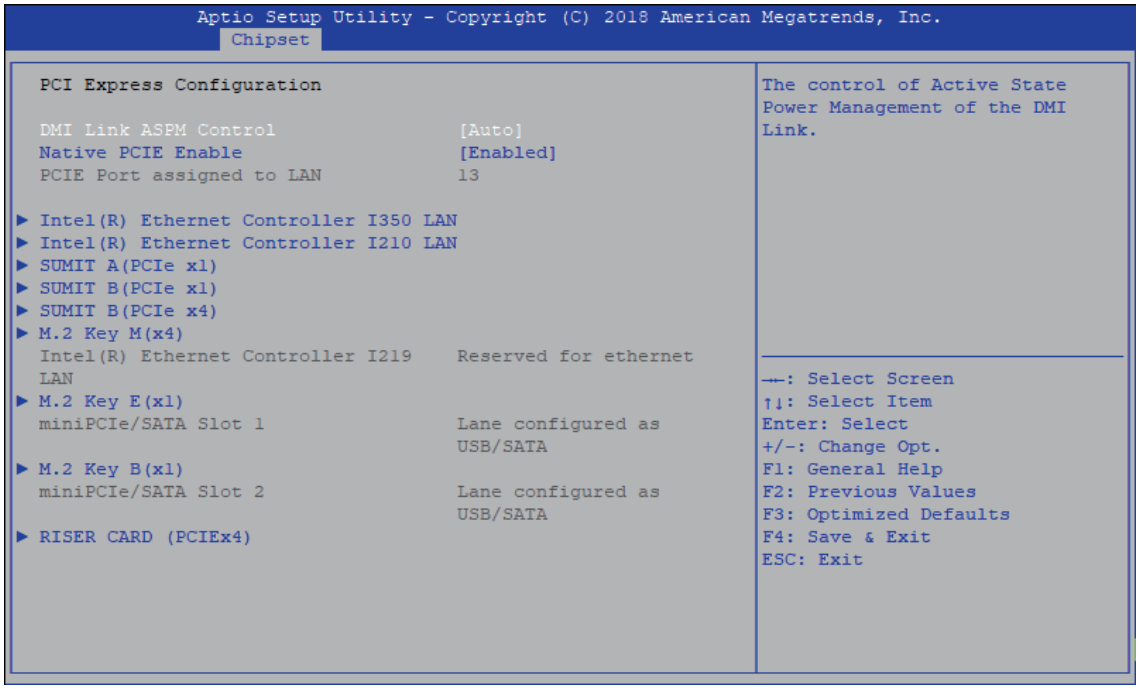


Figure 4-4-2-1 : PCH-IO Settings

DMI Link ASPM Control

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

Native PCIE Enable

PCIE Express Native Support Enable/Disable.

PCI Express device settings

Bios options for PCI Express device setting.

4.4.2.2 SATA and RST Configuration

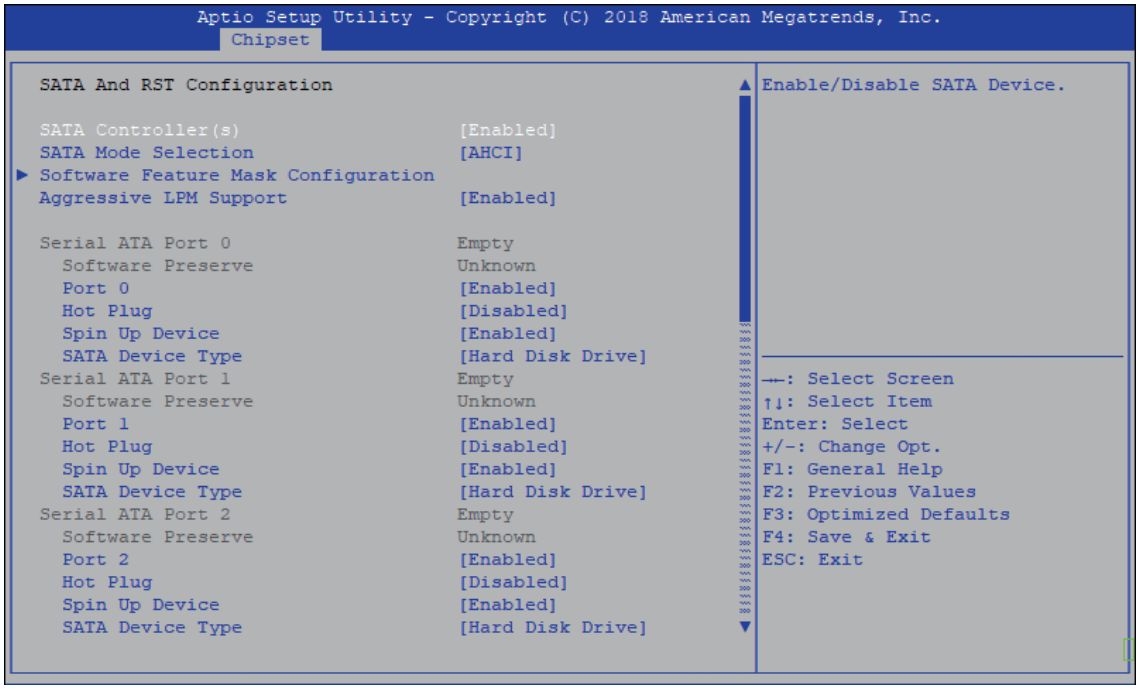


Figure 4-4-2-2 : SATA and RST Settings

SATA Controller(s)
Enable or disable SATA Device.

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

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

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

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

Hot Plug
Designated this port as Hot Pluggable.

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

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

4.4.2.3 Security Configuration

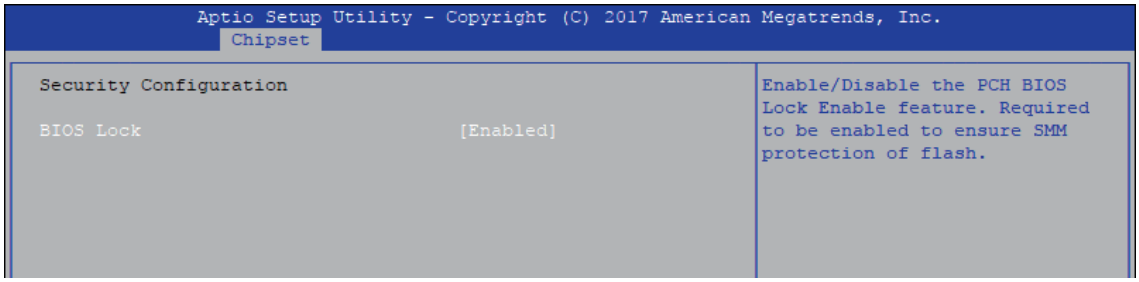


Figure 4-4-2-3 : Security Settings

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

4.5 Security

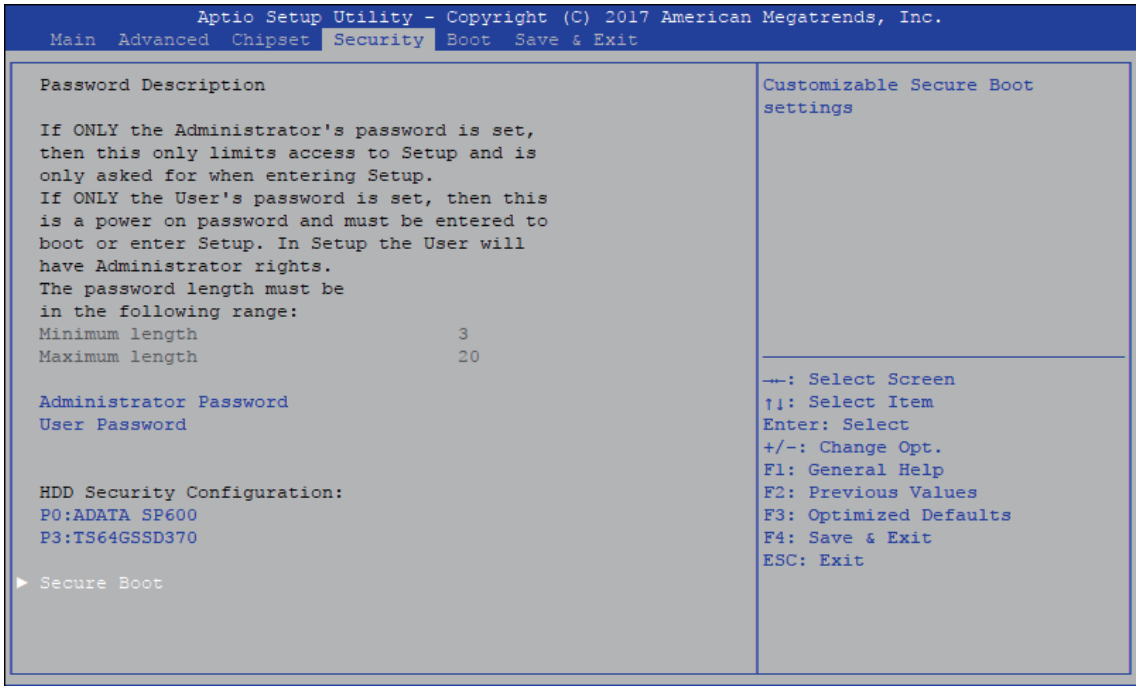


Figure 4-5 : BIOS Security Menu

Administrator Password
Set administrator password.

User Password
Set user password.

Secure Boot
Customizable Secure Boot Settings.

4.5.1 HDD Security Configuration

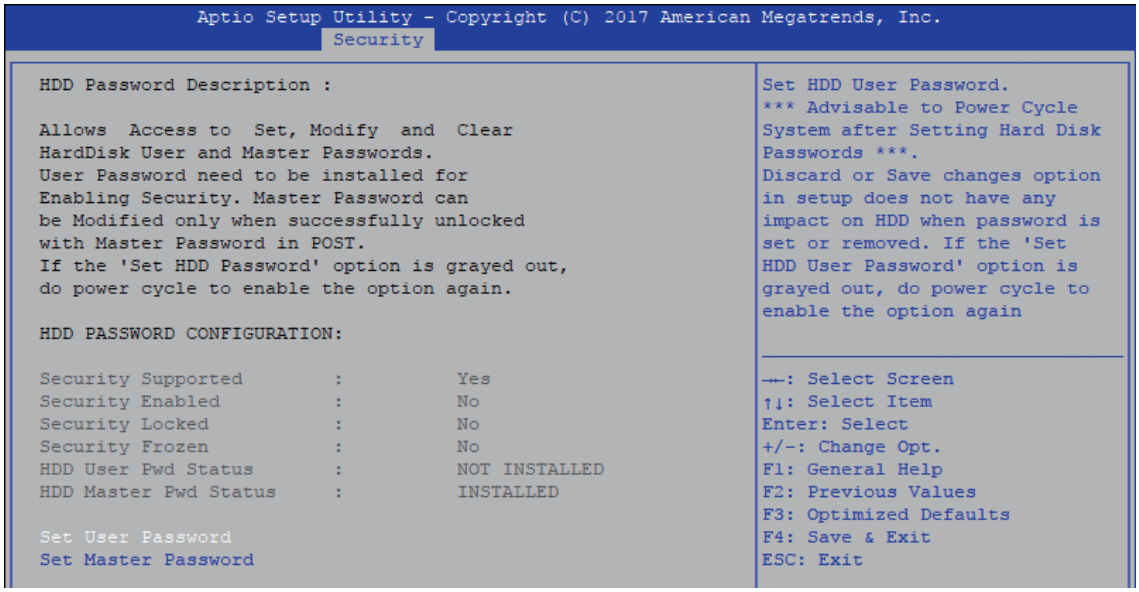


Figure 4-5-1 : HDD Security Settings

Set User Password

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

4.5.2 Security Boot

Figure 4-5-2 : Security Boot Settings

Attempt Secure Boot

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

Secure Boot Mode

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

Key Management

Enables expert users to modify Secure boot policy variables without full authentication

4.6 Boot

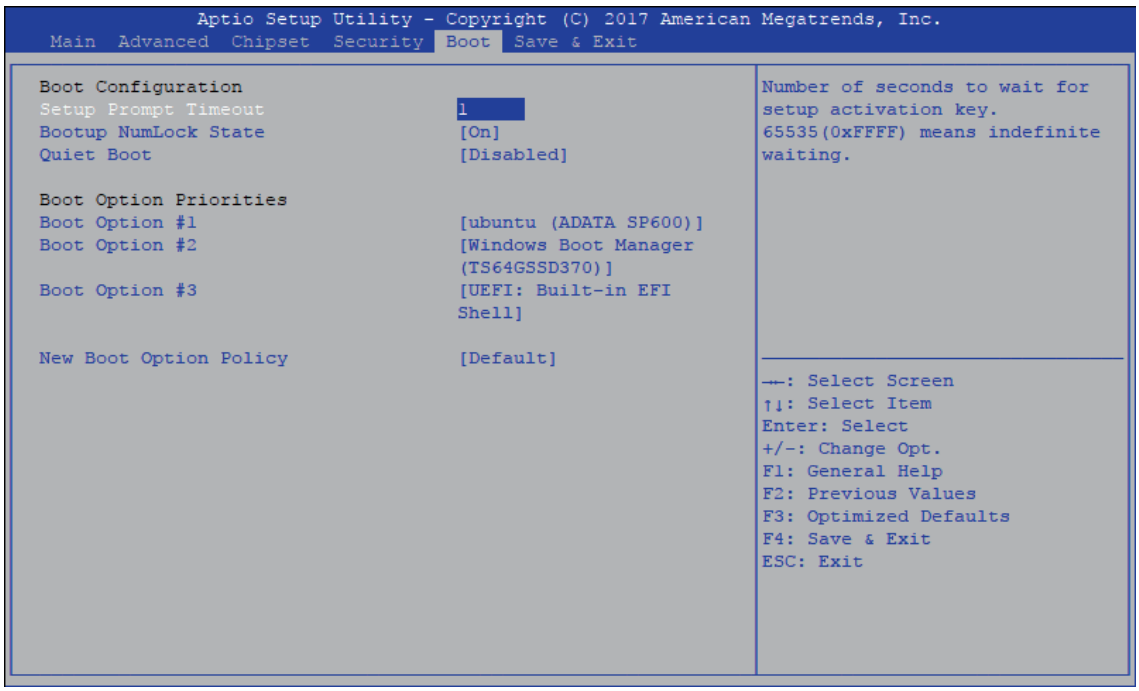


Figure 4-6 : BIOS Boot Menu

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

Bootup NumLock State
Select the keyboard NumLock state.

Quiet Boot
Enables or disables Quiet Boot option.

Boot Option
Sets the system boot order.

New Boot Option Policy
Controls the placement of newly detected UEFI boot options.

Hard Drive BBS Priorities
Set the order of the Legacy devices in this group.

4.7 Save & Exit

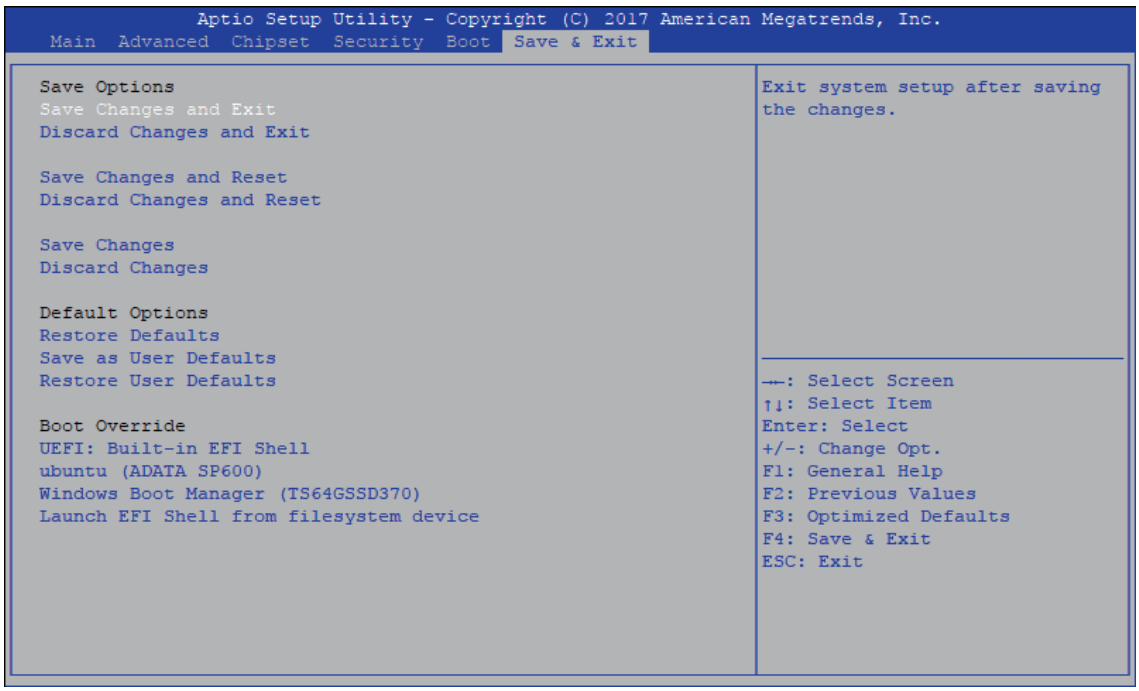


Figure 4-7 : BIOS Save and Exit Menu

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

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

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

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

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

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

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

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

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

A

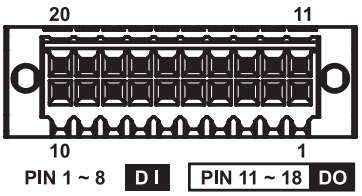
APPENDIX A : Isolated DIO Guide

A.1 Function Description

The ECX-1100/ECX-1200 offers a 16-bit Non-Isolated DIO/two 16-bit Isolated DIO 20-pin terminal block connector, a watchdog timer, and a 4-port POE.

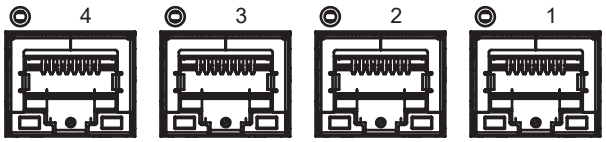
Isolated DIO pins are fix by Hardware design that cannot change in/out direction in runtime process.

DIO definition is shown below :



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

POE definition is shown below :



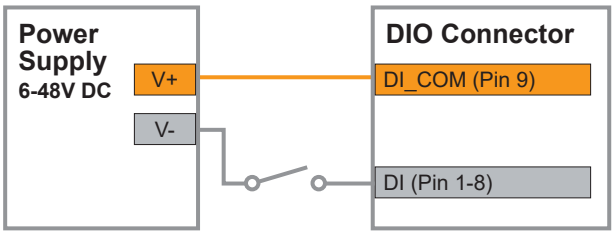
Port No.	Definition	Port No.	Definition
1	POE 0	3	POE 2
2	POE 1	4	POE 3

Do NOT use these functions in below :
1. PE-2000 : DIO1 (ID = 0), POE
2. PE-3000 : POE
3. UE-1000 : USB (ID = 0)

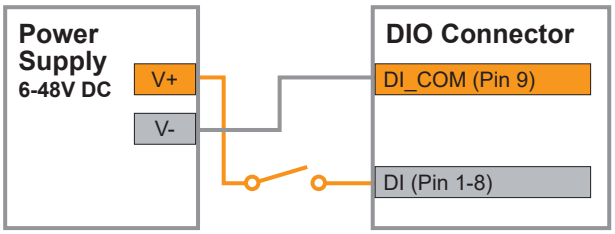
A.2 Isolated DIO Signal Circuit

DI reference circuit :

Sink Mode (NPN)

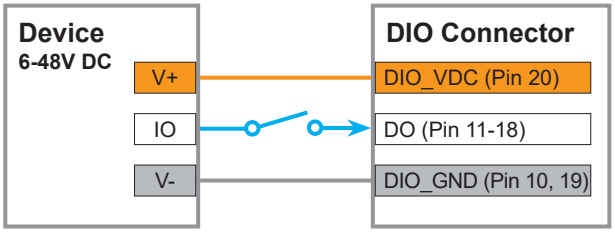


Source Mode (PNP)

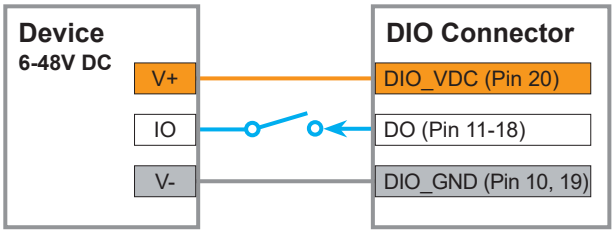


DO reference circuit :

Sink Mode (NPN, Default)



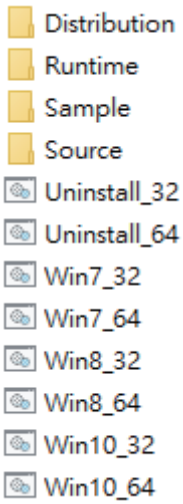
Source Mode (PNP)



A.3 Software Package Contain

Distribution folder include x32 and x64 versions, use batch file for installation.
There are included as fallowed :

Win7_32.bat :
Installation for 32-bit driver
Win7_64.bat :
Windows update package which driver required (need to restart), and
Installation for 64-bit driver
Win8_32.bat, Win8_64.bat :
Installation for driver, and
guideline to Framework 3.5 distribution for sample
Win10_32.bat, and Win10_64.bat
Installation for driver, and
installation to Framework 3.5 distribution for sample
Uninstall_32.bat, and Uninstall_64.bat :
Uninstallation for driver
Run batch file as Administrator.
Support Windows 7 above.
Make sure Windows version before installation.

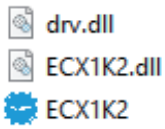


Runtime folder include head file for software developer or System Integration.
Sample folder include sample program, driver library, and API library.

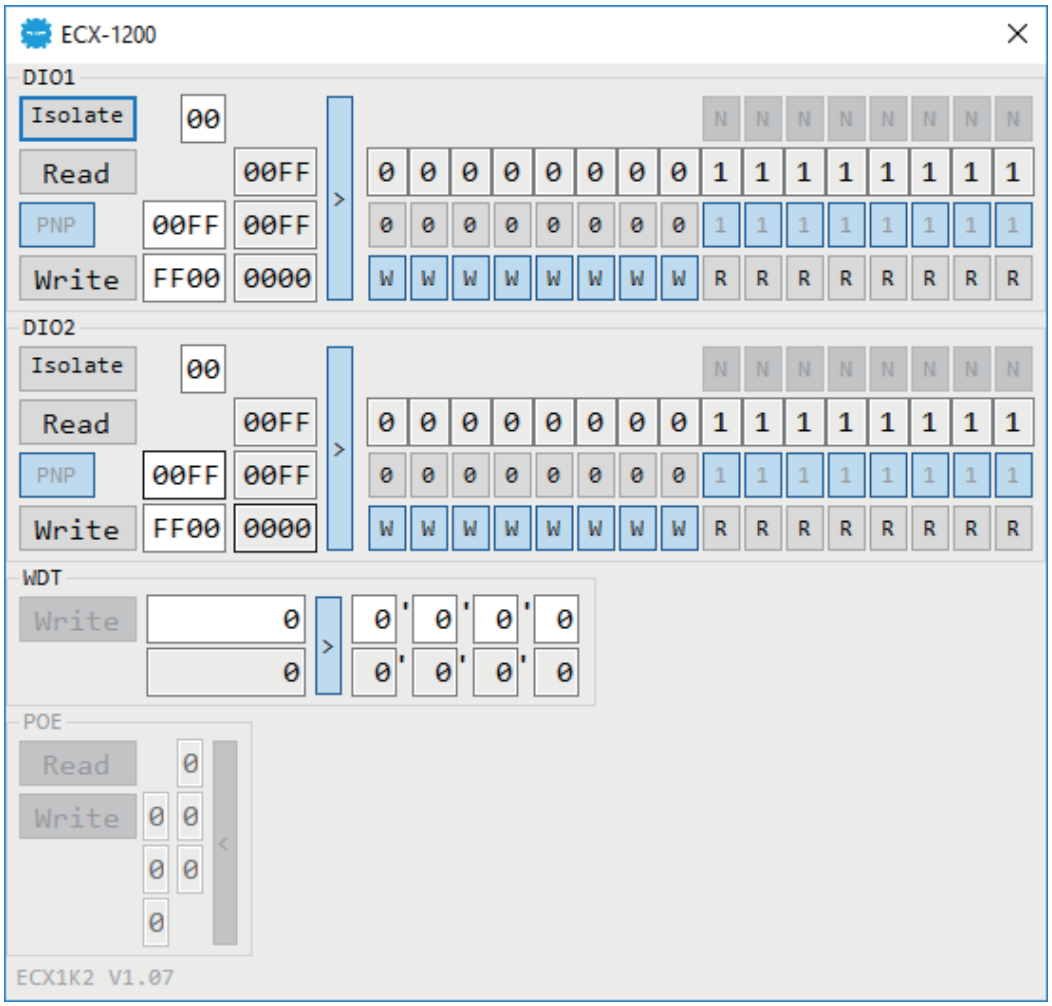
Source folder include sample program source code that compile on Visual Studio 2008.

A.4 Sample

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



Sample ECX1K2.exe, as shown below :



DIO1/DIO2 group :

Isolate check button :

DIO type of DIO configuration, isolated/non-isolated.

Read button :

Set DIO configuration to get DI/DIO input state.

DO type check button :

User setting, DO type of DIO configuration to setup 8 pins - Source/Sink.
Use for Write (DO) button activate.

Write button :

Set DIO configuration to set DO/DIO output state.

DI preference text :

User setting, DI type of DIO configuration by hexadecimal bitmask - Source/Sink.
Use for Read (DI) button activate.

DO/DIO output text :

User setting, DO/DIO output state by hexadecimal bitmask - on/off.
Use for Write button activate.

DO/DIO writable text :

User setting, DO/DIO writable of DIO configuration by hexadecimal bitmask - yes/no.
Use for Read (DIO)/Write button activate.

DI/DIO input text (read only):
DI/DIO input state by hexadecimal bitmask - on/off.
Use for Read button activate.
DO/DIO text (read only):
DO/DIO output state with input state (DIO) and configuration.
Use for Write button activate.
DO/DIO output text (read only):
DO/DIO output state with configuration.
Use for Write button activate.
DI type pin check button (pin 8 ~ pin 1):
User setting, DI pin type of DIO configuration - Source/Sink.
DI/DIO input pin texts (read only, pin 8 ~ pin 1/pin 18 ~ pin 11, pin 8 ~ pin 1):
DI/DIO input pin state
Use for Read button activate.
DO/DIO output pin check button (pin 18 ~ pin 11/pin 18 ~ pin 11, pin 8 ~ pin 1):
User setting, DO/DIO output pin state
Use for Write button activate.
DO/DIO pin writable check button (pin 18 ~ pin 11/pin 18 ~ pin 11, pin 8 ~ pin 1):
User setting, DO/DIO pin writable of DIO configuration.
Use for Read (DIO)/Write button activate.

WDT group :

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

POE group :

Read button :
Set POE configuration to get POE state.
Write button :
Set POE configuration to set POE state.
POE output text :
User setting, POE output state by hexadecimal bitmask - on/off.
Use for Write button activate.

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

B

APPENDIX B : Software Functions

B.1 Driver API Guide

In Runtime folder, on ECX1K2.h :
_DLL_IMPORT_ definition is used on LoadLibrary API for ECX1K2.dll.
ECX1K2_EXPORTS definition is used on ECX1K2.dll building.
Otherwise, that is used to compile with ECX1K2.lib.

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

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

BOOL SetDIO1Config (BYTE Isolate_Type, BYTE DI_NPN, BYTE DO_NPN, WORD Mask)
BOOL SetDIO2Config (BYTE Isolate_Type, BYTE DI_NPN, BYTE DO_NPN, WORD Mask)

Set DIO configuration

Isolate_Type : DIO type

1 : Isolated DIO;

0 : Non-Isolated DIO

DI_NPN ([7:0]) : DI type, pin setting by hexadecimal bitmask

1 : PNP (Source) mode for European rule;

0 : NPN (Sink) mode for Japanese rule

DO_NPN : DO type

1 : PNP (Source) mode for European rule;

0 : NPN (Sink) mode for Japanese rule

Mask ([15:0]) : In/Out, pin setting by hexadecimal bitmask

1 : Output;

0 : Input

Return :

TRUE (1) : Success;

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

BOOL GetDI1 (BYTE *DI)
BOOL GetDI2 (BYTE *DI)

Get isolated DIO input (DI)

DI ([7:0]) : Input state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

BOOL GetDO1 (BYTE *DO)
BOOL GetDO2 (BYTE *DO)

Get isolated DIO output (DO)

DO ([7:0]) : Output state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

BOOL SetDO1 (BYTE DO)
BOOL SetDO2 (BYTE DO)

Set isolated DIO output (DO)

DO ([7:0]) : Output state, pin setting by hexadecimal bitmask

1 : High;

0 : Low

Return :

TRUE (1) : Success;

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

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

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

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

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

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

BOOL GetPOEConfig (BYTE *Auto, BYTE *Mask)
Get POE configuration (by variable)
Auto ([3:0]) : Auto mode, pin setting by hexadecimal bitmask
1 : Auto;
0 : Manual

Mask ([3:0]) : DC Enable/Disable, pin setting by hexadecimal bitmask
1 : Enable;
0 : Disable
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or call by pointer error, or hardware problem)

BOOL SetPOEConfig (BYTE Auto, BYTE Mask)

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

BOOL GetPOE (BYTE *POE)

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

BOOL SetPOE (BYTE POE)

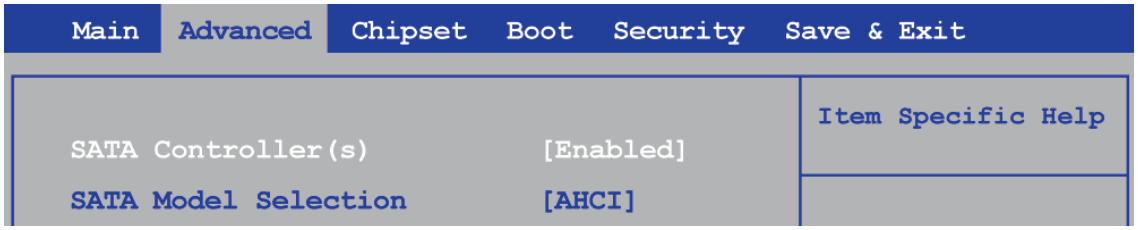
Set POE output
POE ([3:0]) : POE state, pin setting by hexadecimal bitmask
1 : On;
0 : Off
Return :
TRUE (1) : Success;
FALSE (0) : Fail (Initial error, or out of range error, or hardware problem)

APPENDIX C : RAID Functions

D.1.1 SATA Mode for RAID

Please select SATA Device to RAID mode on BIOS menu.

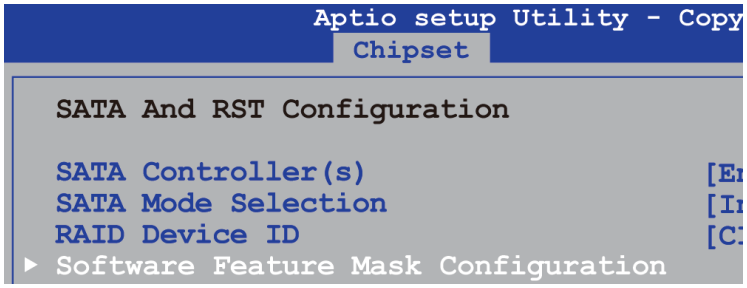
Advanced → SATA Configuration → SATA Mode Selection → RAID (Skylake platform)/Intel RST Premium (Kaby Lake/Coffee Lake platform)



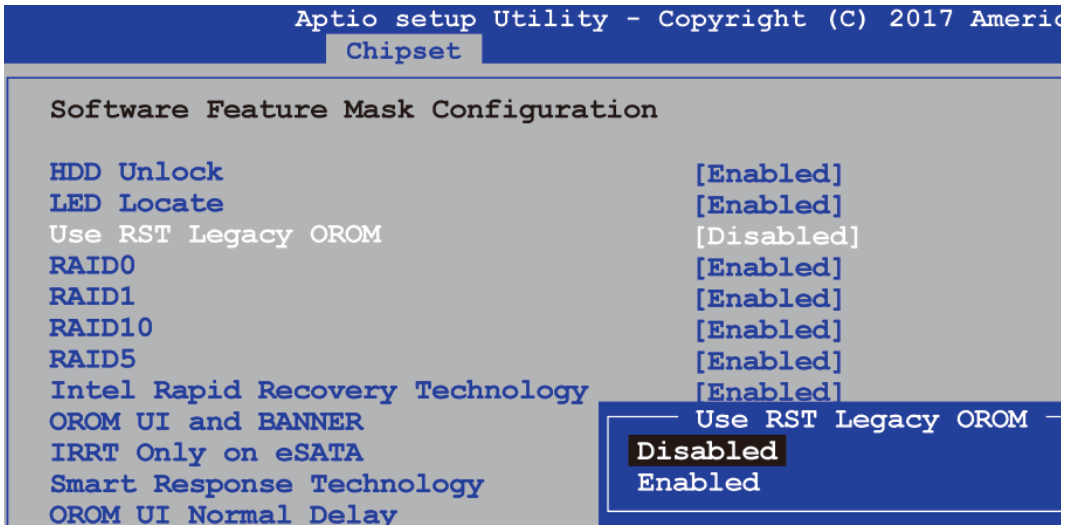
D.1.2 UEFI Mode for RAID

1. Please select SATA device to RAID mode on BIOS menu.
Advanced → SATA Configuration → SATA Mode Selection → RAID (Skylake platform)/Intel RST Premium (Kaby Lake/Coffee Lake platform)

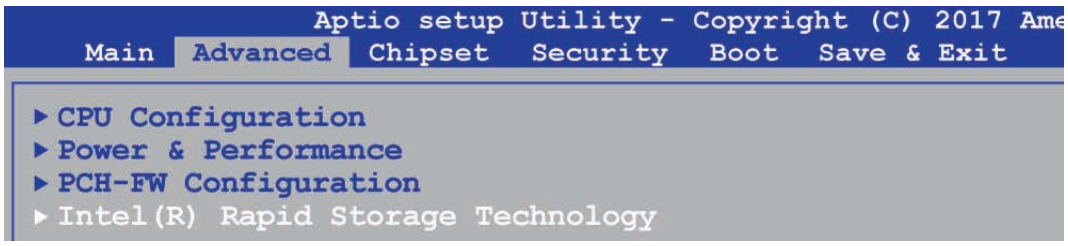
2. Please select Software Feature Mask Configuration on BIOS menu.



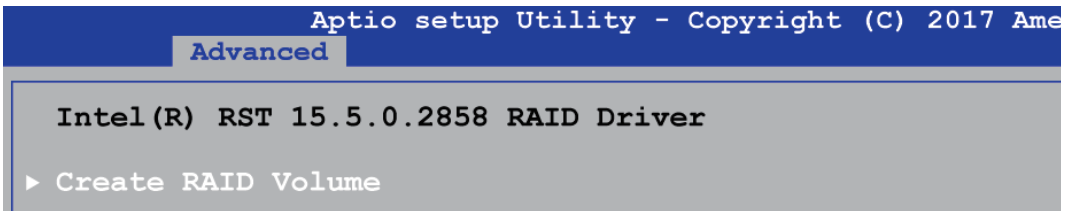
3. Use RST Legacy OROM → Disabled → Save Changes and Reset.



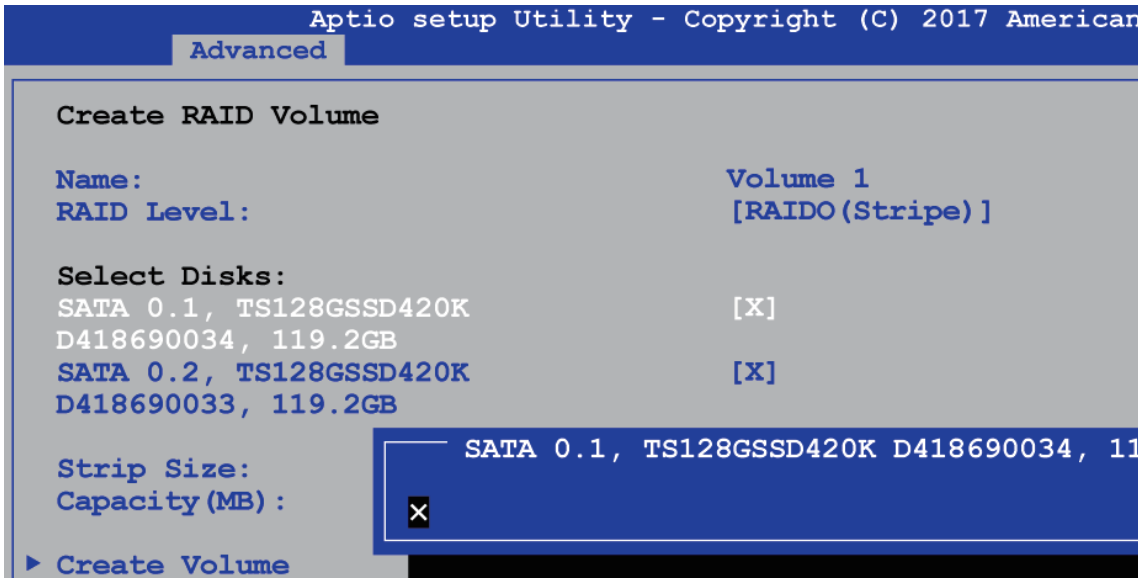
4. Into BIOS menu again, select Intel(R) Rapid Storage Technology on BIOS menu.



5. Select Create RAID Volume on BIOS menu.



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



C.2 OS Installation

ECX-1200 is featured with seven SATA, including two internal SATA, two mSATA, two M.2 and one CFast.
We used SATA for Windows 10 OS installation as an example.

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 get the latest information and the software directly from Intel website.

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

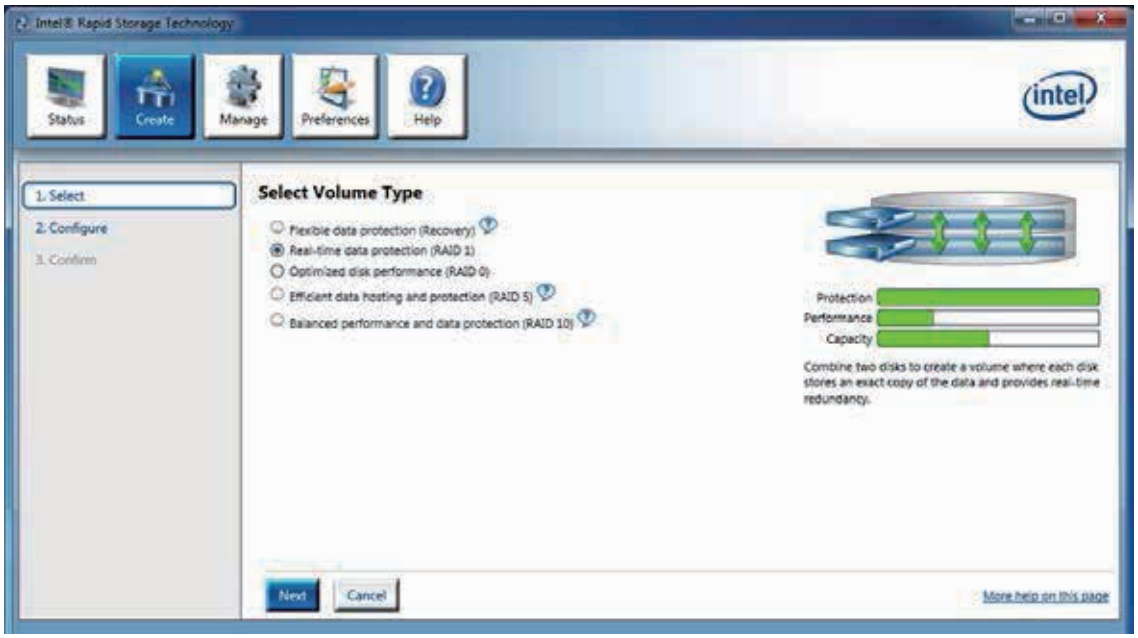
The RAID environment has been done if you completed the steps above.

C.5 To Insert SATA HDD for RAID 1

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

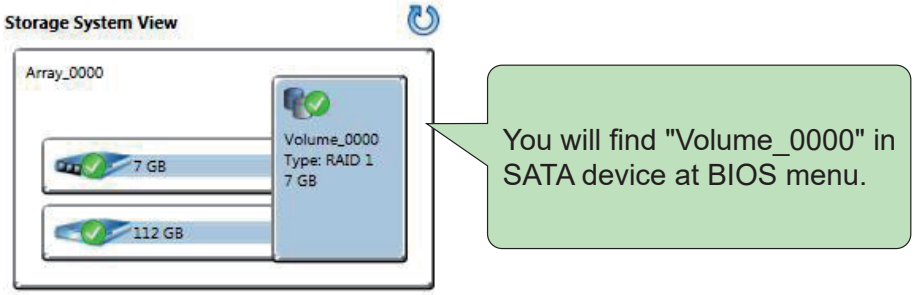
C.6 To Create RAID Volume on "Rapid Storage Technology" Software

ECX-1200/1100 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".



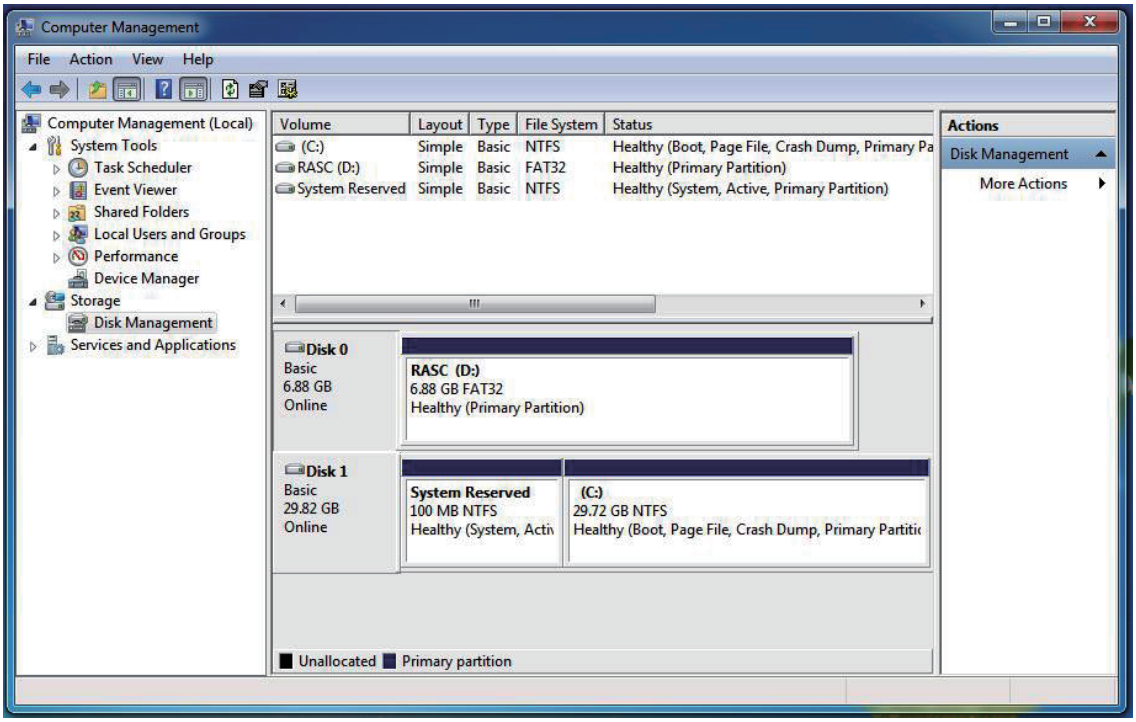
C.7 Disk Management : Partition the Disk

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



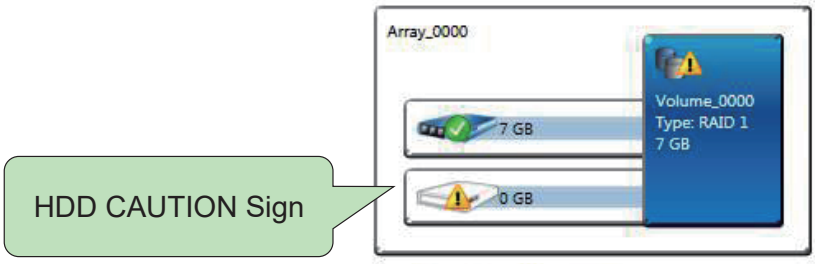
To start disk management tool, select "initialize disk".

Then add "Logical Device" for Windows access.

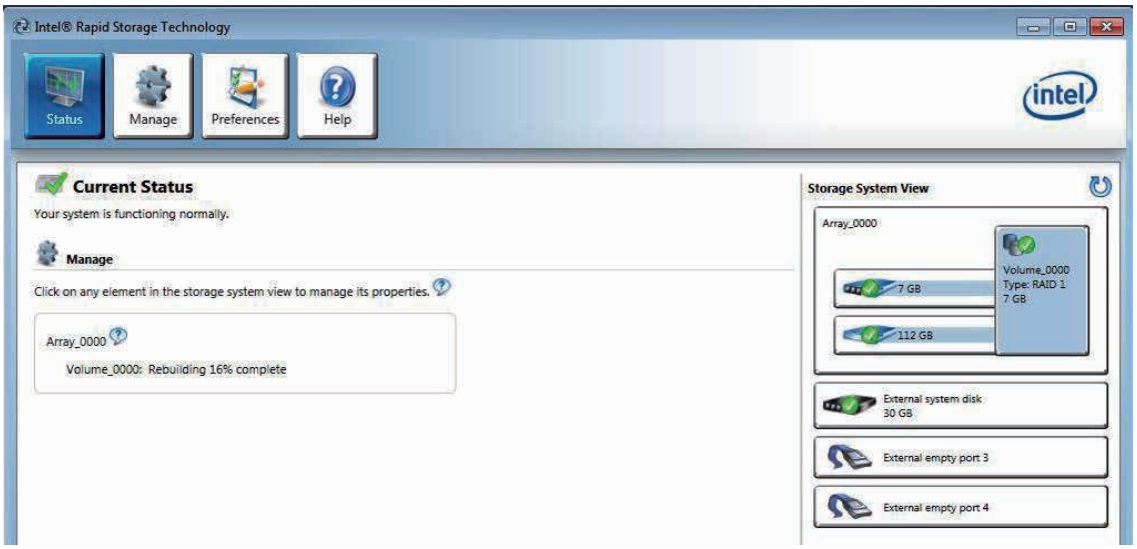


C.8 If One SATA HDD on RAID Volume is Out-of-use

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



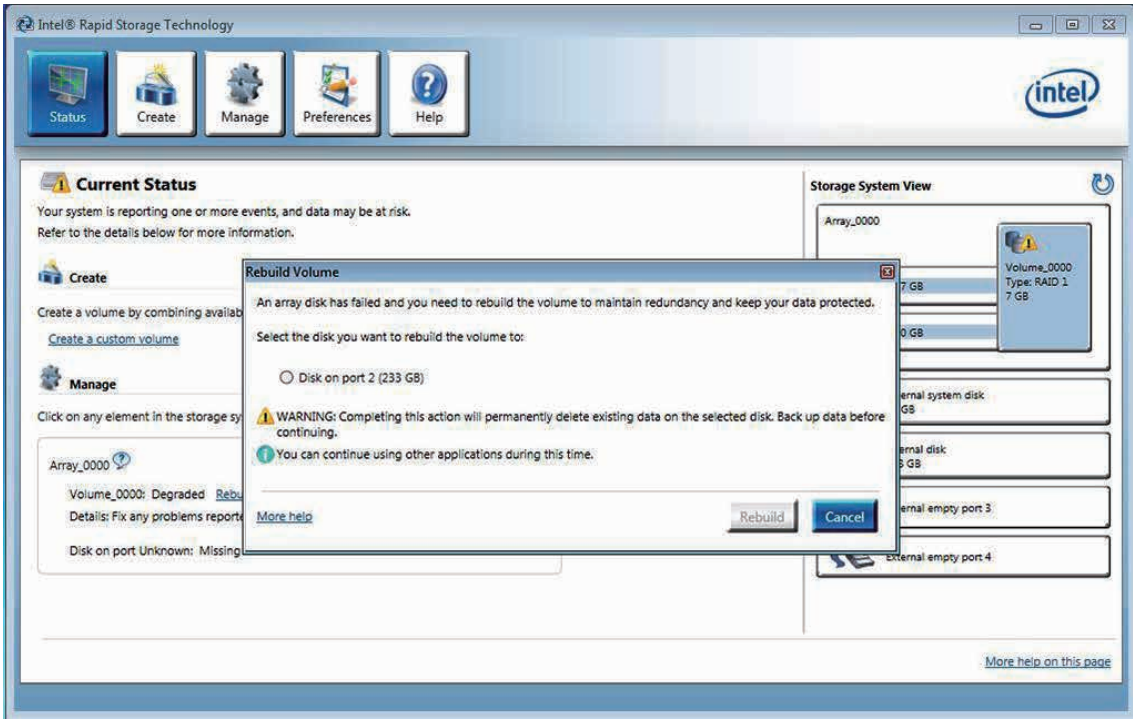
C.9 Recovery and Auto Rebuild When Use the SAME RAID HDD



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	ECX-1200
RAM	32GB * 2
USB-1	USB Micsoft Wired Keyboard 600
USB-2	USB Mouse HP G1K28AA
USB-3	USB Flash Transecnd 3.0 8GB
USB-4	USB Flash Transecnd 3.0 8GB
USB-5	USB Flash Kingston 3.0 16GB
USB-6	USB Flash Kingston 3.0 32GB
CFAST	Transcend CFX600 CFast 128GB
SATA 0	Transcend SATA SSD420 128GB
SATA 1	Seagate HDD 500GB
LAN 1 (i219)	1.0Gbps
LAN 2 (i210)	1.0Gbps
Graphics output	DVI
Power plan	Balance (Windows10 Power plan)
Power Source	Chroma 62006P-100-25
Test Program-1	BurnInTest
Test Program-2	FurMark

D.1 Intel® Core™ i7-8700T (8M Cache, 2.40GHz)

Power on and boot to Win 10 (64-bit)

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
Core™ i7-8700T	6V	0.670A	04.02W	0.766A	04.60W	4.149A	24.89W
Core™ i7-8700T	9V	0.374A	03.36W	0.488A	04.39W	2.149A	19.34W
Core™ i7-8700T	12V	0.309A	03.71W	0.393A	04.71W	1.634A	19.60W
Core™ i7-8700T	24V	0.320A	07.68W	0.353A	08.46W	1.238A	29.72W
Core™ i7-8700T	36V	0.315A	11.33W	0.333A	11.99W	0.837A	30.14W

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
Core™ i7-8700T	6V	7.121A	42.73W	9.143A	54.86W
Core™ i7-8700T	9V	4.788A	43.10W	6.594A	59.35W
Core™ i7-8700T	12V	3.774A	45.29W	4.345A	52.13W
Core™ i7-8700T	24V	2.071A	49.71W	2.782A	66.77W
Core™ i7-8700T	36V	1.435A	51.65W	1.658A	59.67W

D.2 Intel® Core™ i7-8700 (12M Cache, 3.20GHz)

Power on and boot to Win 10 (64-bit)

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
Core™ i7-8700	6V	0.604A	03.62W	0.882A	05.29W	3.322A	19.93W
Core™ i7-8700	9V	0.445A	04.01W	0.559A	05.03W	2.138A	19.25W
Core™ i7-8700	12V	0.368A	04.41W	0.452A	05.42W	1.656A	19.87W
Core™ i7-8700	24V	0.331A	07.94W	0.386A	09.27W	1.071A	25.69W
Core™ i7-8700	36V	0.326A	11.72W	0.353A	12.72W	0.816A	29.38W

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
Core™ i7-8700	6V	9.537A	57.22W	12.126A	72.76W
Core™ i7-8700	9V	6.364A	57.28W	8.232A	74.08W
Core™ i7-8700	12V	4.794A	57.53W	6.097A	73.16W
Core™ i7-8700	24V	2.629A	63.10W	3.218A	77.23W
Core™ i7-8700	36V	1.885A	67.86W	2.431A	87.53W

D.3 Intel® Xeon® E-2176G (12M Cache, up to 4.70GHz)

Power on and boot to Win 10 (64-bit)

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
Xeon® E-2176G	6V	0.613A	03.68W	0.915A	05.49W	3.204A	19.22W
Xeon® E-2176G	9V	0.449A	04.04W	0.577A	05.19W	2.128A	19.15W
Xeon® E-2176G	12V	0.368A	04.41W	0.464A	05.56W	1.626A	19.51W
Xeon® E-2176G	24V	0.332A	07.96W	0.388A	09.32W	1.054A	25.28W
Xeon® E-2176G	36V	0.324A	11.67W	0.306A	11.03W	0.823A	29.61W

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
Xeon® E-2176G	6V	12.925A	77.55W	15.803A	94.82W
Xeon® E-2176G	9V	8.721A	78.49W	9.501A	85.50W
Xeon® E-2176G	12V	6.005A	72.05W	8.597A	103.16W
Xeon® E-2176G	24V	3.346A	80.31W	4.111A	98.66W
Xeon® E-2176G	36V	2.281A	82.11W	2.653A	95.50W

D.4 Intel® Core™ i7-8700 Add GTX-1050 Graphics Card

Power on and boot to Win 10 (64-bit)

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
Core™ i7-8700	24V	0.308A	07.38W	0.371A	08.90W	1.292A	31.00W
Core™ i7-8700	36V	0.302A	10.86W	0.344A	12.39W	1.061A	38.19W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with FurMark	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i7-8700	24V	2.942A	70.60W	5.005A	120.11W
Core™ i7-8700	36V	2.075A	74.71W	3.504A	126.13W

D.5 Intel® Core™ i7-8700 Add GTX-1070 Graphics Card

Power on and boot to Win 10 (64-bit)

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
Core™ i7-8700	24V	0.310A	07.43W	0.376A	09.02W	1.542A	37.01W
Core™ i7-8700	36V	0.304A	10.93W	0.348A	12.53W	1.166A	41.96W

CPU	Power Input	Power on and boot to Win10 (64-bit)			
		Run 100% CPU usage with 2D		Run 100% CPU usage with FurMark	
		Max Current	Max Consumption	Max Current	Max Consumption
Core™ i7-8700	24V	3.113A	74.70W	9.035A	216.85W
Core™ i7-8700	36V	2.197A	79.08W	5.879A	211.66W

APPENDIX E : Supported Memory & Storage List

E.1 Test Item

Testing Board	ECX-1200
Memory Test	version : 5.1
BurnInTest	V8.1

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

E.2 Supported Non-ECC Memory List

Brand	Info	Test Temp. (Celsius)
Innodisk 16G DDR4 2400 SODIMM	M4S0-AGS1OCSJ-H03	25ºC
		25ºC
Innodisk 4G DDR4 2400 SODIMM	M4S0-4GSSN5SJ-H03	25ºC
		25ºC
Innodisk 16G DDR4 2666 W/T SODIMM	M4S0-AGS1O5IK-H03	25ºC
		25ºC
Innodisk 16G DDR4 2666 SODIMM	M4S0-AGS1OCIK-H03	25ºC
		25ºC
Innodisk 8G DDR4 2666 W/T SODIMM	M4S0-8GS1N5IK-H03	25ºC
		25ºC
Innodisk 8G DDR4 2666 W/T SODIMM	M4S0-8GSSOCIK-H03	25ºC
		25ºC
Innodisk 4G DDR4 2666 W/T SODIMM	M4S0-4GSSN5IK-H03	25ºC
		25ºC
Innodisk 4G DDR4 2666 W/T SODIMM	M4S0-4GSSNCIK-H03	25ºC
		25ºC

Brand	Info	Test Temp. (Celsius)
MEMXPRO 16G DDR4 2666-19 SODIMM	D4SAGHLQHFI	25ºC
		25ºC
MEMXPRO 16G DDR4 2666-19 SODIMM	D4SAGHLQHFC-AH	25ºC
		25ºC
MEMXPRO 8G DDR4 2666-19 SODIMM	D4S8GHLQHEC-AH	25ºC
		25ºC
MEMXPRO 8G DDR4 2666-19 SODIMM	D4S8GHLQHEI	25ºC
		25ºC
ADATA 8G DDR4 2666 (19)	AD4S266638G19-BSSC	25ºC
		25ºC
ADATA 8G DDR4 2666 (19)	AD4S2666316G19-BSSC	25ºC
		25ºC
Kingston 16GB PC4-2666 CL19	KVR26S19DS8/16	25ºC
		25ºC
Kingston 8GB PC4-2666 CL19	KVR26S19S8/8	25ºC
		25ºC
Kingston 4GB PC4-2666 CL19	KVR26S19S6/4	25ºC
		25ºC
SLINK (MBG-JBM) 32G DDR4 2666	J4BGSS2G8QHXC	25ºC
		25ºC
SLINK (MBG-JBM) 32G DDR4 2666	J4BGSS2G8QHXI	25ºC
		25ºC
SLINK (MBG-JBM) 16G DDR4 2666	J4AGSH1G8QHFC	25ºC
		25ºC
SLINK (MBG-JBM) 8G DDR4 2666	J48GSH1G8QHEC	25ºC
		25ºC
MEMXPRO 16G DDR4 2666-19	D4SAGHLQHFI	25ºC
		25ºC
MEMXPRO 16G DDR4 2666-19	D4SAGHLQHFC-AH	25ºC
		25ºC
MEMXPRO 8G DDR4 2666-19	D4S8GHLQHEC-AH	25ºC
		25ºC
MEMXPRO 8G DDR4 2666-19	D4S8GHLQHEI	25ºC
		25ºC

E.3 Supported ECC Memory List

Brand	Info	Test Temp. (Celsius)
Innodisk 16G DDR4 2400 SODIMM	M4D0-4GSSPCSJ-H03	25ºC
		25ºC
Innodisk 4G DDR4 2400 SODIMM	M4D0-AGS1Q5SJ-H03	25ºC
		25ºC
Innodisk 16G DDR4 2666 SODIMM W/T	M4S0-AGS1Q5IK-H03	25ºC
		25ºC
Innodisk 16G DDR4 2666 SODIMM W/T	M4S0-AGS1QCIK-H03	25ºC
		25ºC
Innodisk 8G DDR4 2666 SODIMM W/T	M4S0-8GS1P5IK-H03	25ºC
		25ºC
Innodisk 4G DDR4 2666 SODIMM W/T	M4S0-4GSSP5IK-H03	25ºC
		25ºC
Innodisk 4G DDR4 2666 SODIMM W/T	M4S0-4GSSPCIK-H03	25ºC
		25ºC
SLINK (MBG-JBM) 32G DDR4 2666	J4BGDS2G8QHKC	25ºC
		25ºC
SLINK (MBG-JBM) 32G DDR4 2666	J4BGDS2G8QHKI	25ºC
		25ºC
SLINK (MBG-JBM) 16G DDR4 2666	J4AGDH1G8QHKC	25ºC
		25ºC
SLINK (MBG-JBM) 8G DDR4 2666	J48GDH1G8QHJC	25ºC
		25ºC
MEMXPRO 16G DDR4 2466-19	D4DAGHLQHKC-AH	25ºC
		25ºC
MEMXPRO 16G DDR4 2466-19	D4DAGHLQHKI-AH	25ºC
		25ºC
MEMXPRO 8G DDR4 2666-19	D4D8GHLQHJI-AH	25ºC
		25ºC
MEMXPRO 8G DDR4 2666-19	D4D8GHLQHJC-AH	25ºC
		25ºC

E.4 Supported Storage Device List

Type	Brand	Model	Capacity
mSATA	Transcend	mSATA TS64GMSA370	64GB
	Intel	Intel-310 SSDMAEMC080G2	80GB
	Innodisk	DEMSR-32GD06SW2QC	32GB
SSD	Intel	SSD E 5400s SSDSC2KR120H6	120GB
		SSD 540s SSDSC2KW120H6	120GB
	Innodisk	3MG2-P DGS25-64GD81BC1QC	64GB
	LITE-ON	K8-L1512	512GB
		K8-L1256	256GB
	Transcend	TS128GSSD420K	128GB
		SSD370 TS64GSSD370I	64GB
	Kingston	SUV400S37	120GB
	FORESEE	S903S128G	128GB
		S903S256G	256GB
	ADATA	ISSS332-128GM	128GB
		ISSS332-256GM	256GB
SATA HDD	Seagate	SDC001	500GB
CFast	Transcend	TS128GCFX600	128GB
	Innodisk	3ME4 DECFA-A28M41BC1DC-H03	128GB
M.2 Key M	Toshiba	KXG50ZNV512G	512GB

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

APPENDIX F : AIO3315 Analog IO Card Software Development Kit

F.1 How to Install the Software

F.1.1 Install PCI driver

The PCI card is a plug and play card, once you add on a new card, the window system will detect while it is booting. Please follow the following steps to install your new card.
For Windows XP/Windows 7 and up : (take Win XP as example)
1. Make sure the power is off
2. Plug in the interface card
3. Power on
4. A hardware install wizard will appear and tell you it finds a new PCI card
5. Do not response to the wizard, just Install the file (..\AIO3315_A\Software\WinXP_7_10\ or if you download from website please execute the file AIO3315_Install(Vx.x_yyyymm).exe to get the file)
6. After installation, power off
7. Power on, it's ready to use

F.1.2 Where to Find the Files

For Windows XP/Windows 7 and up, the directory will be located at your install path :
..\AIO3315\API\(header files and lib files for VB, VC, BCB, C#, VB.net)
..\AIO3315\API\x64(for x64 system, header files and lib files for VC, BCB, C#, VB.net)
..\AIO3315\Driver\(backup copy of AIO3315 drivers)
..\AIO3315\exe\(demo program and source code)
The system driver is located at windows_folder\system32\Drivers and the DLL is located at windows_folder\system.
Note :
- For Windows 32-bit system, the default directory at "C:\Program Files"
- For Windows 64-bit system, the default directory at "C:\Program Files (x86)"
- Windows folder : windows install path (usually at "C:\windows\")

For your easy startup, the demo program with source code demonstrates the card functions and help file.

F.1.3 About the Software Package

AIO3315 software includes a set of dynamic link library (DLL) and system driver that you can utilize to control the I/O card's ports and points separately.

Your AIO3315 software package includes setup driver, tutorial example and test program that help you how to setup and run appropriately, as well as an executable file which you can use to test each of the AIO3315 functions within Windows' operation system environment.

To set up and use your AIO3315 software, you need the following :

- AIO3315 software
- AIO3315 hardware Main board
- Wiring board (Option)

You have several options to choose from when you are programming AIO3315 software. You can use Borland C/C++, Microsoft Visual C/C++, Microsoft Visual Basic, or any other Windows-based compiler that can call into Windows dynamic link libraries (DLLs) for use with the AIO3315 software.

F.2 Language Support

The AIO3315 software library is a DLL used with Windows XP/Windows 7 and up. You can use these DLL with any Windows integrating development environment that can call Windows DLLs.

F.2.1 Building Applications with the AIO3315 Software Library

The AIO3315 function reference topic contains general information about building AIO3315 applications, describes the nature of the AIO3315 files used in building AIO3315 applications, and explains the basics of making applications using the following tools :

- Microsoft Visual C/C++
- Borland C/C++
- Microsoft Visual C#
- Microsoft Visual Basic
- Microsoft VB.net

If you are not using one of the tools listed, consult your development tool reference manual for details on creating applications that call DLLs.

F.2.2 AIO3315 Windows Library

The AIO3315 for Windows function library is a DLL called AIO3315.dll. Since a DLL is used, AIO3315 functions are not linked into the executable files of applications. Only the information about the AIO3315 functions in the AIO3315 import libraries is stored in the executable files. Import libraries contain information about their DLL-exported functions. They indicate the presence and location of the DLL routines. Depending on the development tools you are using, you can make your compiler and linker aware of the DLL functions through import libraries or through function declarations.

Refer to Table 1 to determine to which files you need to link and which to include in your development to use the AIO3315 functions in AIO3315.dll.

Table 1. Header Files and Import Libraries for Different Development Environment.

Language	Header File	Import Library
Microsoft Visual C/C++	AIO3315.h	AIO3315VC.lib
Borland C/C++	AIO3315.h	AIO3315BC.lib
Microsoft Visual C#	AIO3315.cs	
Microsoft Visual Basic	AIO3315.bas	
Microsoft VB.net	AIO3315.vb	

F.3 DLL Functions

F.3.1 Function Format and Language Difference

F.3.1.1 Function Format

Every AIO3315 function is consist of the following format :

Status = function_name (parameter 1, parameter 2, … parameter n);

Each function returns a value in the Status global variable that indicates the success or failure of the function. A returned Status equal to zero that indicates the function executed successfully. A non-zero status indicates failure that the function did not execute successfully because of an error or executed with an error.

Note : Status is a 32-bit unsigned integer.

The first parameter to almost every AIO3315 function is the parameter CardID which is located the driver of AIO3315 board you want to use those given operation. The CardID is assigned by DIP/ROTARY SW. You can utilize multiple devices with different card CardID within one application; to do so, simply pass the appropriate CardID to each function.

Note : CardID is set by DIP/ROTARY SW (0x0-0xF)

These topics contain detailed descriptions of each AIO3315 function. The functions are arranged alphabetically by function name. Refer to AIO3315 Function Reference for additional information.

F.3.1.2 Function Format

Every function description has a parameter table that lists the data types for each parameter. The following sections describe the notation used in those parameter tables and throughout the manual for variable data types.

Table 2. Data Type Parameter Table

Primary Type Names					
Name	Description	Range	C/C++	Visual BASIC	Pascal (Borland Delphi)
u8	8-bit ASCII character	0 to 255	char	Not supported by BASIC. For functions that require character arrays, use string types instead.	Byte
I16	16-bit signed integer	-32, 768 to 32, 767	short	Integer (for example : Device Num%)	Small Int
U16	16-bit unsigned integer	0 to 65, 535	unsigned short for 32-bit compilers	Not supported by BASIC. For functions that require unsigned integers, use the signed integer type instead. See the i16 description.	Word
I32	32-bit signed integer	-2, 147, 483, 648 to 2, 147, 483, 647	long	Long (for example : count&)	Long Int
U32	32-bit unsigned integer	0 to 4, 294, 967, 295	Unsigned long	Not supported by BASIC. For functions that require unsigned long integers, use the signed long integer type instead. See the i32 description.	Cardinal (in 32-bit operating systems). Refer to the i32 description.
F32	32-bit single-precision floating-point value	-3.402823E+38 to 3.402823E+38	float	Single (for example : num!)	Single
F64	64-bit double-precision floating-point value	-1.797683134862 315E+308 to 1.797683134862 315E+308	double	Double (for example : voltage Number)	Double

F.3.1.3 Programming Language Considerations

Apart from the data type differences, there are a few language-dependent considerations you need to be aware of when you use the AIO3315 API. Read the following sections that apply to your programming language.

Note : Be sure to include the declaration functions of AIO3315 prototypes by including the appropriate AIO3315 header file in your source code. Refer to Building Applications with the AIO3315 Software Library for the header file appropriate to your compiler.

Function format for C/C++
For C or C++ programmers, parameters listed as Input/Output parameters or Output parameters are pass-by-reference parameters, which means a pointer points to the destination variable should be passed into the function. For example, the Read Port function has the following format :

*Status = AIO3315_port_read (u8 CardID, u8 port, u8*data);*

where CardID and port are input parameters, and data is an output parameter. Consider the following example :

u8 CardID, port; u8 data,
u32 Status;
Status = AIO3315_port_read (CardID, port, &data);

Function format for Visual basic
The file AIO3315.bas contains definitions for constants required for obtaining DIO Card information and declared functions and variable as global variables. You should use these constants symbols in the AIO3315.bas, do not use the numerical values.

In Visual Basic, you can add the entire AIO3315.bas file into your project. Then you can use any of the constants defined in this file and call these constants in any module of your program. To add the AIO3315.bas file for your project in Visual Basic 4.0, go to the File menu and select the Add File... option. Select AIO3315.bas, which is browsed in the AIO3315 \ API directory. Then, select Open to add the file to the project.

To add the AIO3315.bas file to your project in Visual Basic 5.0 and 6.0, go to the Project menu and select Add Module. Click on the Existing tab page. Select AIO3315.bas, which is in the AIO3315 \ API directory. Then, select Open to add the file to the project

Function format for Borland C++ builder
To use Borland C++ builder as development tool, you should generate a .lib file from the .dll file by implib.exe.

implib AIO3315BC.lib AIO3315.dll

Then add the AIO3315BC.lib to your project and add #include “AIO3315.h” to main program.

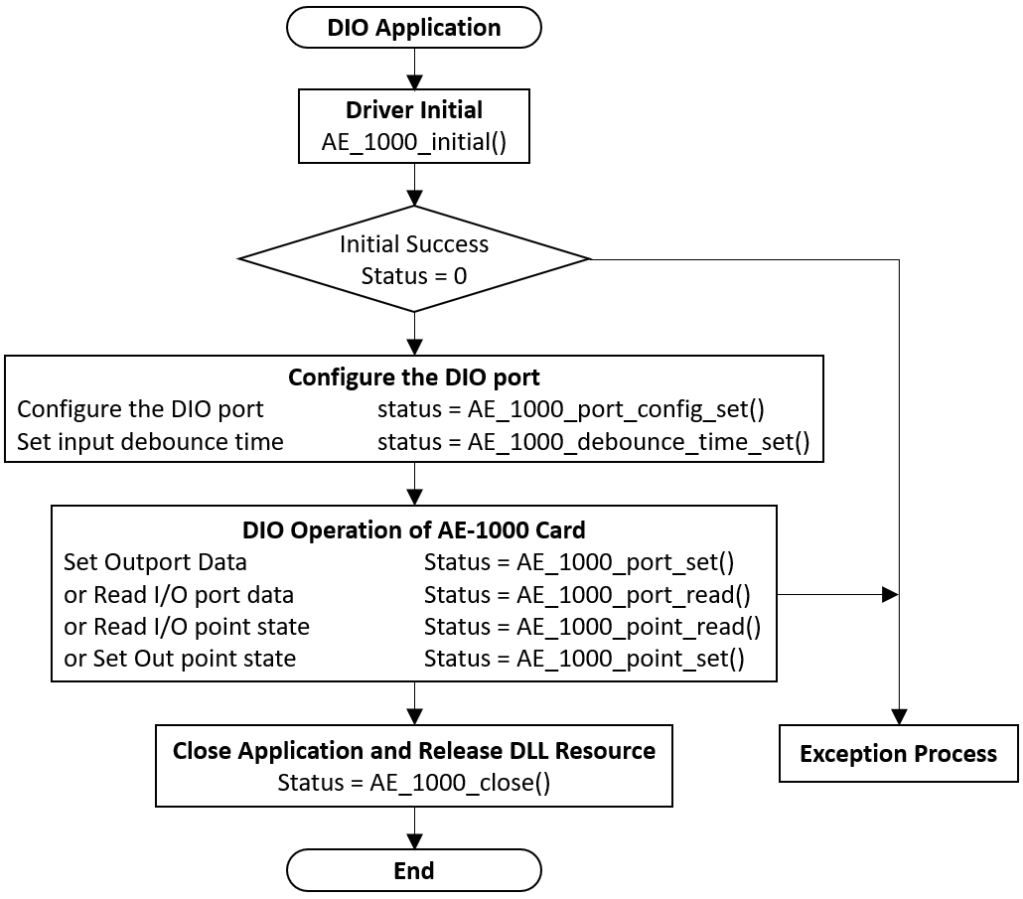
Now you may use the DLL functions in your program. For example, the Read Port function has the following format :

*Status = AIO3315_port_read (u8 CardID, u8 port, u8*data);*

where CardID and port are input parameters, and data is an output parameter. Consider the following example :

```
u8 CardID, port; u8 data;
u32 Status;
Status = AIO3315_port_read (CardID, port, &data);
```

F.3.2 Flow Chart of Application Implementation



You need to initialize system resource each time you run your application. *AIO3315_initial()* will do. Once you want to close your application, call *AIO3315_close()* to release all the resource. If you want to know the physical address assigned by OS. Use *AIO3315_info()* to get the address and Card Type

F.3.3 Software Overview and DLL Function

F.3.3.1 DLL list

No.	Function Name	Description
1	AIO3315_initial( )	AIO3315 Initial
2	AIO3315_close( )	AIO3315 Close
3	AIO3315_info( )	get OS. Assigned address
4	AIO3315_DA_set( )	DA output
5	AIO3315_DA_read( )	read back DA setting data
6	AIO3315_AD_config_set( )	configure each channel as differential or single end
7	AIO3315_AD_config_read( )	read back configuration of each channel
8	AIO3315_AD_range_set( )	set up each group conversion range
9	AIO3315_AD_range_read( )	Read back each group conversion range setting
10	AIO3315_AD_start( )	start AD conversion of designated channel
11	AIO3315_AD_read( )	read AD conversion data
12	AIO3315_AD_all_read( )	Read a specific port AD data
13	AIO3315_port_config_set( )	Port direction configuration
14	AIO3315_port_config_read( )	Read back port configuration
15	AIO3315_debounce_time_set( )	Set input port debounce time
16	AIO3315_debounce_time_read( )	Read back input port debounce time
17	AIO3315_port_set( )	Set Output port
18	AIO3315_port_read( )	Read the register or input values of the I/O port
19	AIO3315_point_set ( )	Set the bit data of output port
20	AIO3315_point_read( )	Read the state of the input points or output register
21	AIO3315_timer_set( )	Set timer constant
22	AIO3315_timer_read( )	Read timer on the fly
23	AIO3315_timer_start( )	Start timer operation
24	AIO3315_timer_stop( )	Stop timer operation
25	AIO3315_TC_set( )	load data to timer related registers
26	AIO3315_TC_read( )	Read back data of timer related registers
27	AIO3315_IRQ_polarity_set( )	Sets the IRQ polarity of port0
28	AIO3315_IRQ_polarity_read( )	Read back the setting of IRQ polarity
29	AIO3315_IRQ_mask_set( )	Mask off the IRQ
30	AIO3315_IRQ_mask_read( )	Read back the mask
31	AIO3315_IRQ_process_link( )	Link irq service routine
32	AIO3315_IRQ_enable( )	Enable interrupt function
33	AIO3315_IRQ_disable( )	Disable interrupt function
34	AIO3315_IRQ_status_read( )	Read back the IRQ status

F.3.3.2 General Functions

AIO3315_initial
Format : u32 status =AIO3315_initial (void)
Purpose : Initial the AIO3315 resource when start the Windows applications.

AIO3315_close
Format : u32 status =AIO3315_close (void);
Purpose : Release the AIO3315 resource when close the Windows applications.

AIO3315_info
Format : u32 status =AIO3315_info(u8 CardID, u8 *CardType, u16 *DIO_address, u16 *TC_address);
Purpose : Read the physical I/O address assigned by O.S.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
Output	CardType	u8	0 : AIO3315 (12 bit version) 1 : AIO3315A (16 bit version)
	DIO_address	u16	physical I/O address assigned to DIO block by OS
	TC_address	u16	physical I/O address assigned to timer block by OS

F.3.3.3 DA (Digital to Analog) Function

The digital to analog conversion function is implemented by hardware, to output analog voltage just use :
AIO3315_DA_set( ), and you can also read back the settings by AIO3315_DA_read( ).
AIO3315_DA_set
Format : u32 status = AIO3315_DA_set(u8 CardID, u8 channel, u16 data)
Purpose : DA output
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	channel	u8	0 : DA0 channel 1 : DA1 channel
	data	u16	0~0xfff (AIO3315), 0~0xffff (AIO3315A) for analog output range -10V~ +10V 0 : -10V … 0x7ff (AIO3315) 0x7fff (AIO3315A): 0V … 0xfff (AIO3315) 0xffff (AIO3315A): 10V

AIO3315_DA_read

Format: u32 status = AIO3315_DA_read(u8 CardID, u8 channel, u16 *data)
Purpose : read back DA setting data
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	channel	u8	0 : DA0 channel 1 : DA1 channel
Output	data	u16	0~0xfff (AIO3315), 0~0xffff (AIO3315A) for analog output –10V ~ 10V 0 : -10V … 0x7ff (AIO3315) 0x7fff (AIO3315A) : 0V … 0xfff (AIO3315) 0xffff (AIO3315A) : 10V

F.3.3.4 AD (Analog to Digital) Function

The analog input maybe single end or differential, you can configure individual channel as single end input or the corresponding pair as differential input by :

AIO3315_AD_config_set( ) and read back to verify the configuration setting by AIO3315_AD_config_read( ).

The analog inputs maybe at different voltage range, you can configure the adequate input range to fit the inputs by :

AIO3315_AD_range_set( ) and read back to verify the settings by :
AIO3315_AD_range_read( )

Once the input type and input range has been set, you can start AD conversion by :

AIO3315_AD_start ( ) and read the conversion data by
AIO3315_AD_read( ).

To read a specific port (contains 8 channels) use :
AIO3315_AD_all_read( )
AIO3315_AD_config_set

Format : u32 status = AIO3315_AD_config_set (u8 CardID, u8 port, AD_config *AD_config)
Purpose : configure each channel as differential or single end.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	channel	u8	0 : port0, AD0x 1 : port1, AD1x 2 : port2, AD2x 3 : port3, AD3x

	AD_config	AD_config	struct _AD_config{ u8 ch01_config, u8 ch23_ config, u8 ch45_ config, u8 ch67_ config
			}
			// ch01 : AIx0~AIx1
			// ch23 : AIx2~AIx3
			// ch45 : AIx4~AIx5
			// ch67 : AIx6~AIx7
			// chNM_config :
			//0 : chNM is paired differential and polarity is normal
			//1 : chNM is paired differential and polarity is inverse
			//2 : invalid
			//3 : chNM is single end
			For example, if you will configure
			channel 0, 1 as differential with polarity normal,
			channel 2, 3 as single end
			channel 4, 5, channel 6, 7 as differential with inverse
			polarity then struct AD_config is {0, 3, 1, 1}

AIO3315_AD_config_read

Format : u32 status = AIO3315_AD_config_read (u8 CardID, u8 port, AD_ config*AD_config)

Purpose : read back configuration of each channel.

Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	port	u8	0 : port0, AD0x 1 : port1, AD1x 2 : port2, AD2x 3 : port3, AD3x
Output	AD_config	AD_config	struct _AD_config{ u8 ch01_config, u8 ch23_ config, u8 ch45_ config, u8 ch67_ config}

AIO3315_AD_range_set

Format : u32 status = AIO3315_AD_range_set(u8 CardID, u8 port, AD_range *AD_range)
Purpose : set up each group conversion range
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	port	u8	0 : port0, AD0x 1 : port1, AD1x 2 : port2, AD2x 3 : port3, AD3x
	AD_range	AD_range	struct _AD_Range{ u8 ch0_ range, u8 ch1_ range, u8 ch2_ range, u8 ch3_ range u8 ch4_ range, u8 ch5_ range, u8 ch6_ range, u8 ch7_ range} // chN_range //0 : +-5V //1 : 0-5V //2 : +-10V //3 : 0-10V

Note :

- If the even channel is configured as differential input, the next odd number channel member is invalid.
- For example ch0 is configured as differential input by *AIO3315_AD_config_set*, then the AD_Range.ch1_range is of no use.

AIO3315_AD_range_read

Format : u32 status = AIO3315_AD_range_read(u8 CardID, u8 port, AD_range *AD_range)
Purpose : read back each group conversion range setting
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
Output	port	u8	0 : port0, AD0x 1 : port1, AD1x 2 : port2, AD2x 3 : port3, AD3x

	AD_range	AD_range	struct _AD_Range{ u8 ch0_ range, u8 ch1_ range, u8 ch2_ range, u8 ch3_ range
			u8 ch4_ range, u8 ch5_ range, u8 ch6_ range, u8 ch7_ range
			}
			// chN_range
			//0 : +-5V
			//1 : 0-5V
			//2 : +-10V
			//3 : 0-10V

AIO3315_AD_start

Format : u32 status = AIO3315_AD_start(u8 CardID, u8 port, u8 channel)
Purpose : start AD conversion of designated port and channel
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	port	u8	0 : port0, AD0x 1 : port1, AD1x 2 : port2, AD2x 3 : port3, AD3x
	channel	u8	0~7, channel no for portN

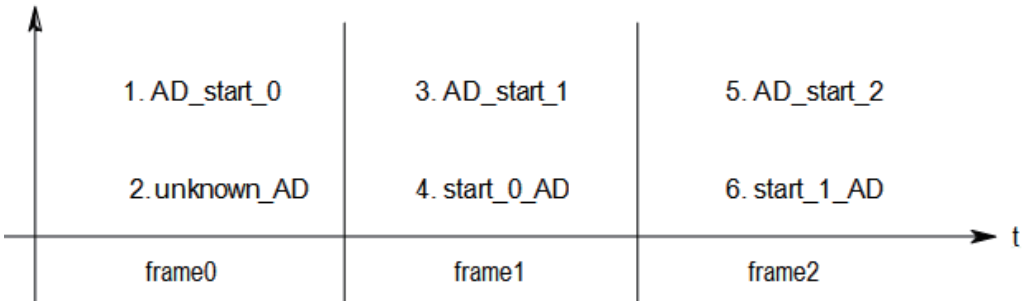
AIO3315_AD_read

Format : u32 status = AIO3315_AD_read(u8 CardID, u8 port, u16 *data)
Purpose : read AD conversion data of previous designated port and channel
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	port	u8	0 : port0, AD0x 1 : port1, AD1x 2 : port2, AD2x 3 : port3, AD3x
	data	u16	0~0xfff (AIO3315), 0~0xffff (AIO3315A). AD converted data

Note :

- *AIO3315_AD_start* will select the port and channel for the next AD operation.
- Before read back the data by *AIO3315_AD_read*, you must check the status by *AIO3315_IRQ_status_read* (no matter you use interrupt or not) to confirm the AD data is ready.
- The AD conversion time frame is as follows :



At the same time frame, the command starts the designated AD channel and collect the converted data. In order to confirm the operation is complete, we suggest using *AIO3315_IRQ_status_read* to verify the completeness of conversion then use *AIO3315_AD_read* to read the converted data.

AIO3315_AD_all_read

Format : u32 status = AIO3315_AD_all_read(u8 CardID, u8 port, u16 data[8])
Purpose : read AD conversion data of all channels of a specific port.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by jumper setting
	port	u8	0 : port0, AD0x 1 : port1, AD1x 2 : port2, AD2x 3 : port3, AD3x
	data[8]	u16	0~0xfff (AIO3315), 0~0xffff (AIO3315A). AD converted data

Note :
To read all channels, please follow the sequence :
1. Set up start channel at channel 0 by *AIO3315_AD_start*.
2. Read all channels by *AIO3315_AD_all_read*.

F.3.3.5 I/O Port R/W

Before using a IO port, you must configure the port direction (as input or as output) first by *AIO3315_port_config_set( )* and any time you can read back configuration by *AIO3315_port_config_read( )*

Mechanical contact or noisy environment always induced unstable state at digital inputs, the AIO3315 provides software selectable debounce function (the former digital IO cards use hardware debounce and fixed at one frequency). You can filter out the pulse width at 10ms (100Hz), 5ms (200Hz), 1ms (1KHz) or no filter as you need.
Use *AIO3315_debounce_time_set( )* to select the debounce frequency and read back the setting by *AIO3315_debounce_tme_read( ).*

Then you can use the following functions for I/O port output, data reading and control :
AIO3315_port_set( ) to output byte data to output port,
AIO3315_port_read( ) to read a byte data from I/O port,
AIO3315_point_set ( ) to set output bit,
AIO3315_point_read( ) to read I/O bit,

AIO3315_port_config_set

Format : u32 status =AIO3315_port_config_set (u8 CardID, u8 port, u8 configuration)
Purpose : Sets port configuration.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
	configuration	u8	b0 : 0 : port0 as input port (default) 1 : port0 as output port b1 : 0 : port1 as input port (default) 1 : port1 as output port

AIO3315_port_config_read

Format : u32 status =AIO3315_port_config_read (u8 CardID, u8 port, u8 *configuration)
Purpose : read port configuration.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
	data	u16	b0 : 0 : port0 as input port (default) 1 : port0 as output port b1 : 0 : port1 as input port (default) 1 : port1 as output port

AIO3315_debounce_time_set

Format : u32 status = AIO3315_debounce_time_set (u8 CardID, u8 port, u8 debounce_time)
Purpose : set the input port debounce time
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
	debounce_time	u8	Debounce time selection : 0 : no debounce 1 : filter out duration less than 10ms (default) 2 : filter out duration less than 5ms 3 : filter out duration less than 1ms

Note : only valid for port configured as input

AIO3315_debounce_time_read

Format : u32 status = AIO3315_debounce_time_read (u8 CardID, u8 port, u8 *debounce_time)
Purpose : To read back configuration of debounce mode
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
Output	debounce_time	u8	Debounce time selection : 0 : no debounce 1 : filter out duration less than 10ms (default) 2 : filter out duration less than 5ms 3 : filter out duration less than 1ms

AIO3315_port_set

Format : u32 status = AIO3315_port_set (u8 CardID, u8 port, u8 data)
Purpose : Sets the output data.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
	data	u8	bitmap of output values If port is configured as input, the data is registered and do not output. If port is configured as output, the data is registered and output.

Note : If you change the configuration from input to output, the previous registered data will be output.

AIO3315_port_read

Format : u32 status = AIO3315_port_read (u8 CardID, u8 port, u8 *data)
Purpose : Read the register or input values of the I/O port.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
Output	data	u8	I/O data If port is configured as input, the data is external input data. If port is configured as output, the data is the output register data.

AIO3315_point_set

Format : u32 status =AIO3315_point_set (u8 CardID, u8 port, u8 point, u8 state)
Purpose : Sets the bit data of output port.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
	point	u8	point number 0~7 for bit0~bit7
	state	u8	state of output point If port is configured as input, the data is registered and do not output. If port is configured as output, the data is registered and output.

Note : If you change the configuration from input to output, the previous registered data will be output.

AIO3315_point_read

Format : u32 status =AIO3315_point_read (u8 CardID, u8 port, u8 point, u8 *state)
Purpose : Read the state of the input points or output register.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	port	u8	port number 0 : port0 1 : port1
	point	u8	point number of input 0~7 for bit0~bit7
Output	state	u8	state of point of input If port is configured as input, the data is external input data. If port is configured as output, the data is the output register data.

F.3.3.6 Timer Function

There is a build in 32 bit timer run on 1us time base, you can set the timer constant by *AIO3315_timer_set( )* and *AIO3315_timer_read( )* to read timer value on the fly. *AIO3315_timer_start( )* to start its operation and generate interrupt, *AIO3315_timer_stop( )* to stop operation.

For the timer related registers use : *AIO3315_TC_set( )* to set registers, *AIO3315_TC_read( )* to read back registers.

AIO3315_timer_set

Format : u32 status = AIO3315_timer_set (u8 CardID, u32 Timer_ constant)
Purpose : set time constant.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	Timer_constant	u32	Timer _constant based on 1us time base

Note :
1. Time constant is based on 1us clock, period T= (time_constant +1) * 1us
2. If you also enable the timer interrupt, the period T must at least larger than the system interrupt response time else the system will be hanged by excess interrupts.

AIO3315_timer_start

Format : u32 status = AIO3315_timer_start (u8 CardID)
Purpose : start timer function.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW

Note : timer time out will generate interrupt if you do not mask off by using *AIO3315_IRQ_mask_set*.

AIO3315_timer_stop

Format : u32 status = AIO3315_timer_stop (u8 CardID)
Purpose : stop timer function.
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW

AIO3315_TC_set

Format : u32 status= AIO3315_TC_set (u8 CardID, u8 index, u32 data)
Purpose : To load data to timer related registers
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	index	u8	0 : TC_CONTROL 1 : PRELOAD 2 : TIMER
	data	u32	For index = TC_CONTROL 0 : stop timer operation 1 : timer run For index = PRELOAD or TIMER Data is the constant to be load

Note : PRELOAD is the register for timer to re-load, the value will be valid while timer count to zero and reload the data.

AIO3315_TC_read

Format : u32 status= AIO3315_TC_read (u8 CardID, u8 index, u32 *data)
Purpose : To read data from timer related registers
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by DIP/ROTARY SW
	index	u8	0 : TC_CONTROL 1 : PRELOAD 2 : TIMER
Output	data	u32	Data read back

F.3.3.7 Interrupt Function

Sometimes you want your application to take care of the I/O while special event occurs, interrupt function is the right choice. AIO3315 provide IO00 ~ IO07 as external event trigger input. You may configure the trigger polarity by :

AIO3315_IRQ_polarity_set( ) and read back by
AIO3315_IRQ_polarity read( )

For timer, AD and digital IO interrupts, you can mask off the source you don' want by

AIO3315_IRQ_mask_set( ) and read back by
AIO3315_IRQ_mask_read( ).

After all the above is prepared, you must first link your service routine to the driver by

AIO3315_IRQ_process_link( )

Now all is ready, you can enable the interrupt by AIO3315_IRQ_enable( ) or disable by AIO3315_IRQ_disable( ).

To read back the interrupt status (at interrupt service routine or polling routine) use

AIO3315_IRQ_status_read( ).
After reading the status register on card will be cleared.

AIO3315_IRQ_polarity_set

Format : u32 status = AIO3315_IRQ_polarity_set (u8 CardID, u8 polarity)
Purpose : Sets the IRQ polarity of port0 (IO00~IO07)
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	index	u8	Data to be set, 0x0 ~ 0xff bit0 : IO00 0 : normal (default) 1 : invert … bit7 : IO07 0 : normal (default) 1 :invert

Note : Port0 must configured as input port for IO00~IO07 IRQ function.

AIO3315_IRQ_polarity_read

Format : u32 status = AIO3315_IRQ_polarity_read (u8 CardID, u8 *polarity)
Purpose : Read the IRQ polarity of the IO00~IO07
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
Output	polarity	u8	Data to be set, 0x0 ~ 0xff bit0 : IO00 0 : normal (default) 1 : invert … bit7 : IO07 0 : normal (default) 1 : invert

Note : PRELOAD is the register for timer to re-load, the value will be valid while timer count to zero and reload the data.

AIO3315_IRQ_mask_set

Format : u32 status = AIO3315_IRQ_mask_set (u8 CardID, u8 source, u8 mask)

Purpose : Mask interrupt from port0 IO07~IO00 or timer

Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	source	u8	0 : digital I/O block 1 : AD block 2 : timer block
	2: timer block	u8	Digital IO block : b0=0, IO00 input disable irq b0=1, IO00 input can generate irq … b7=0, IO07 input disable irq b7=1, IO07input can generate irq AD block : b0=1 means AD0 end of conversion can generate interrupt b0=0 AD0 will not generate interrupt while end of conversion b1=1 means AD1 end of conversion can generate interrupt b1=0 AD1 will not generate interrupt while end of conversion b2=1 means AD2 end of conversion can generate interrupt b2=0 AD2 will not generate interrupt while end of conversion b3=1 means AD3 end of conversion can generate interrupt b3=0 AD3 will not generate interrupt while end of conversion Timer block : b0=1 means timer time out can generate interrupt b0=0 timer will not generate interrupt while time out

AIO3315_IRQ_mask_read

Format : u32 status = AIO3315_IRQ_mask_read (u8 CardID, u8 source, u8 *mask)
Purpose : read back interrupt Mask of IO07~IO00 or ADC or timer
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	source	u8	0 : digital I/O block 1 : AD block 2 : timer block
Output	mask	u8	Digital IO block : b0=0, IO00 input disable irq b0=1, IO00 input can generate irq … b7=0, IO07 input disable irq b7=1, IO07input can generate irq AD block : b0=1 means AD0 end of conversion can generate interrupt b0=0 AD0 will not generate interrupt while end of conversion b1=1 means AD1 end of conversion can generate interrupt b1=0 AD1 will not generate interrupt while end of conversion b2=1 means AD2 end of conversion can generate interrupt b2=0 AD2 will not generate interrupt while end of conversion b3=1 means AD3 end of conversion can generate interrupt b3=0 AD3 will not generate interrupt while end of conversion Timer block : b0=1 means timer time out can generate interrupt b0=0 timer will not generate interrupt while time out

AIO3315_IRQ_enable

Format : u32 status = AIO3315_IRQ_enable (u8 CardID, HANDLE *phEvent)
Purpose : Enable interrupt from selected source
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
Output	phEvent	HANDLE	event handle

AIO3315_IRQ_disable

Format : u32 status = AIO3315_IRQ_disable (u8 CardID)
Purpose : Disable interrupt from selected source
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW

AIO3315_IRQ_status_read

Format : u32 status = AIO3315_IRQ_status_read (u8 CardID, u8 source, u8 *Event_Status)
Purpose : To read back the interrupt status to identify the source
Parameters :

I/O	Name	Type	Description
Input	CardID	u8	assigned by Rotary SW
	source	u8	0 : digital I/O block 1 : AD block 2 : timer block
Output	Event_Status	u8	Digital IO block : b0=1, IO00 input generate irq … b7=1, IO07 input generate irq AD block : b0=1, AD0 end of conversion and data is ready b0=0, AD0 is under conversion b1=1, AD1 end of conversion and data is ready b1=0, AD1 is under conversion b2=1, AD2 end of conversion and data is ready b2=0, AD2 is under conversion b3=1, AD3 end of conversion and data is ready b3=0, AD3 is under conversion Timer block : b0=1 means timer count up occurred. b0=0 means timer not count up.

Note :

- Status read back will also clear the on board status register.
- The status will reflect the on board digital input or timer count up status are irrelevant to the IRQ_MASK

F.3.3.8 Error Conditions

The status returned by AIO3315 functions may indicate an internal hardware problem on the board.
Error Codes contains a detailed listing of the error. AIO3315 card's error conditions. There are three possible fatal failure modes :

- System Fail Status Bit Valid
- Communication Loss
- Hardware not ready

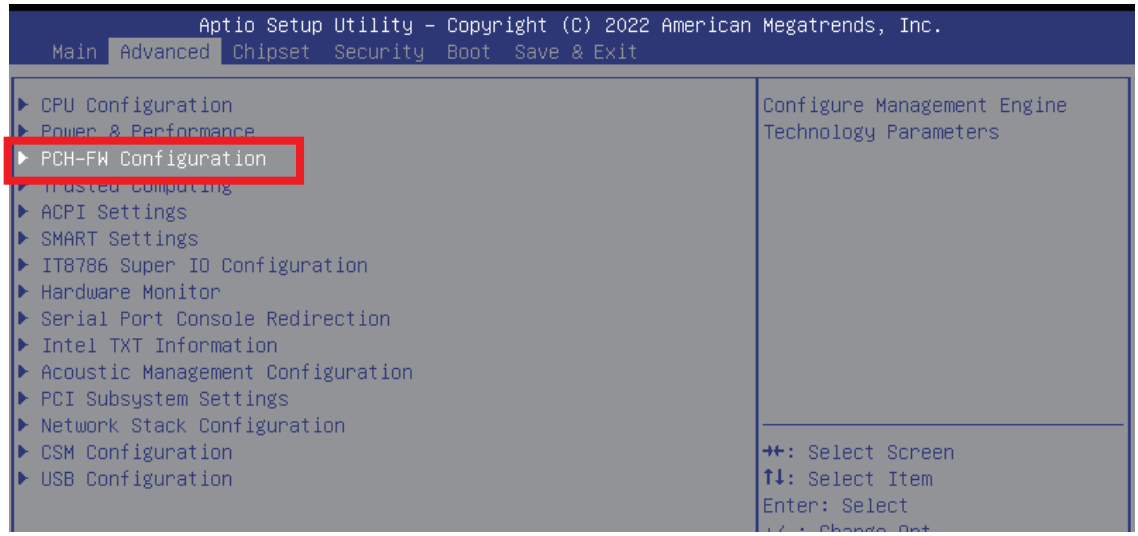
Please take the error code as reference to solve the problem.

F.3.4 Error Code Table

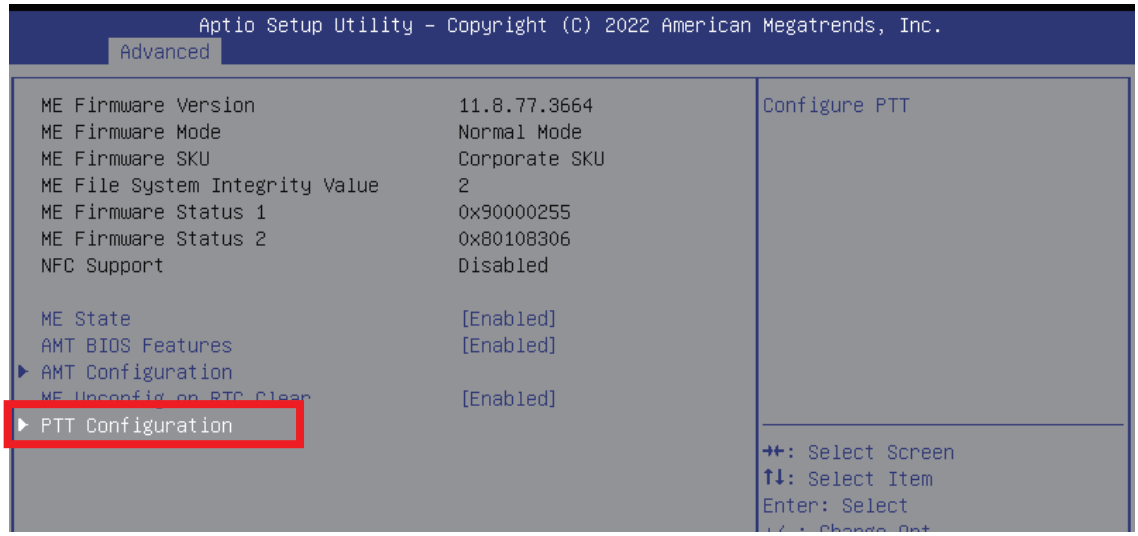
Error Code	Symbolic Name	Description
0	DRV_NO_ERROR	No error.
1	DRV_READ_DATA_ERROR	Read data error
2	DRV_INIT_ERROR	Driver initial error
100	DEVICE_IO_ERROR	Device Read/Write error
101	DRV_NO_CARD	No AIO3315 card on the system.
102	DRV_DUPLICATE_ID	AIO3315 CardID duplicate error.
103	DRV_NOT_INSTALL	AIO3315 driver not installed completely
300	ID_ERROR	Function input parameter error. CardID setting error, CardID doesn't match the DIP SW setting
301	PORT_ERROR	Function input parameter error. Parameter out of range.
302	POINT_ERROR	Function input parameter error. Parameter out of range.
303	DATA_ERROR	Function input parameter error. Parameter out of range.
304	CONFIGURATION_ERROR	Hardware version can not match with software version
305	DEBOUNCE_TIME_ERROR	Debounce timer setting error
400	INDEX_ERRROR	TC register index error
401	CONSTANT_ERROR	Time constant error
402	TC_CONTROL_ERROR	TC control register setting error
500	DA_DATA_ERROR	DA setting data error
501	DA_CHANNEL_ERROR	DA channel selection error
600	AD_PORT_ERROR	AD port selection error
601	AD_CHANNEL_ERROR	AD channel selection error
602	AD_CONFIG_ERROR	AD channel configuration error
603	AD_RANGE_ERROR	AD range setting error
700	SOURCE_ERROR	IRQ source error
701	POLARITY_ERROR	IRQ polarity error
702	MASK_ERROR	IRQ mask error

APPENDIX G : Install Win11 (BIOS TPM Setting)

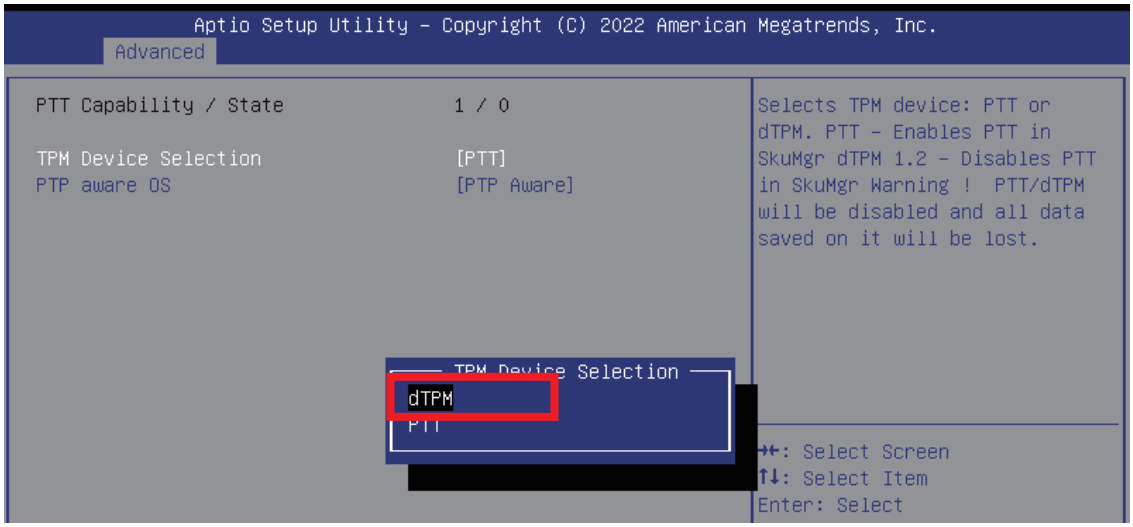
Step 1 Click on “Advanced”, then click on “PCH-FW Configuration”

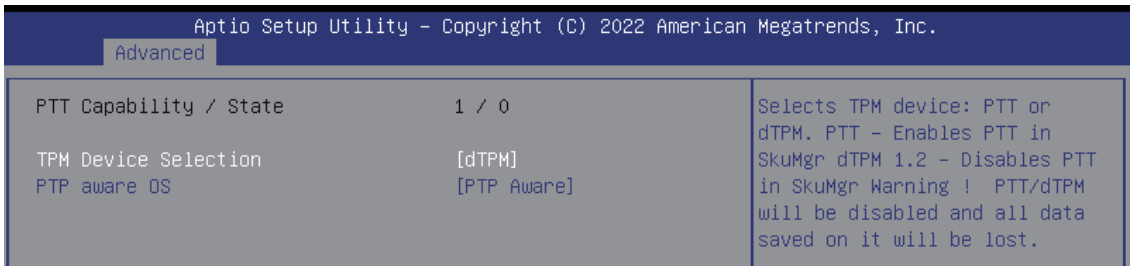


Step 2 Click on “PTT Configuration”

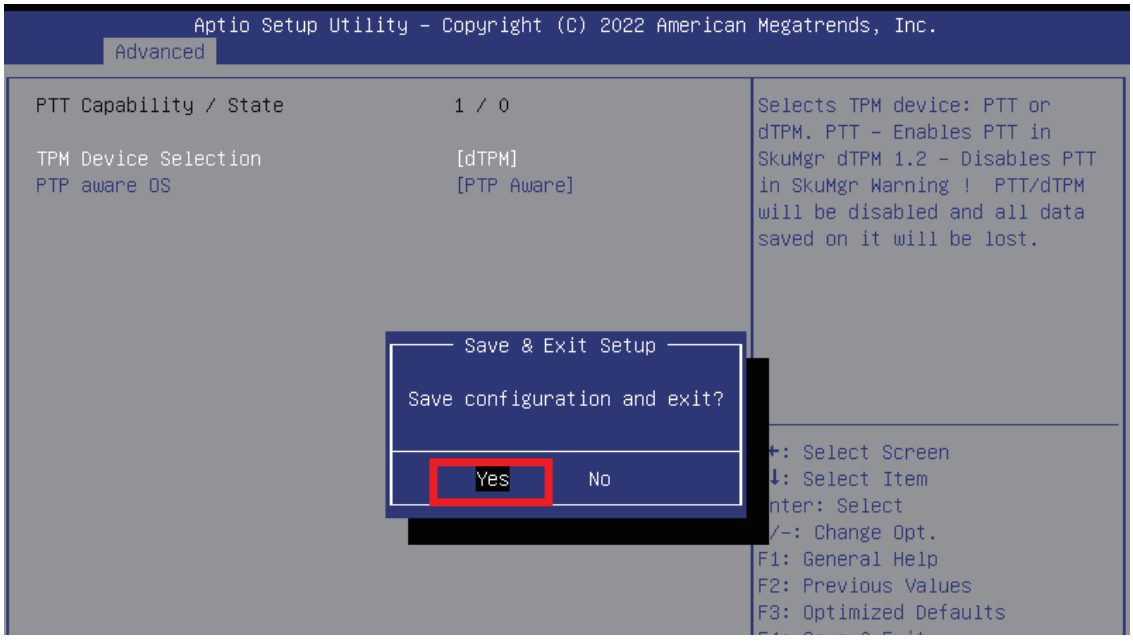


Step 3 Click on “dTPM” (TPM Device Selection)

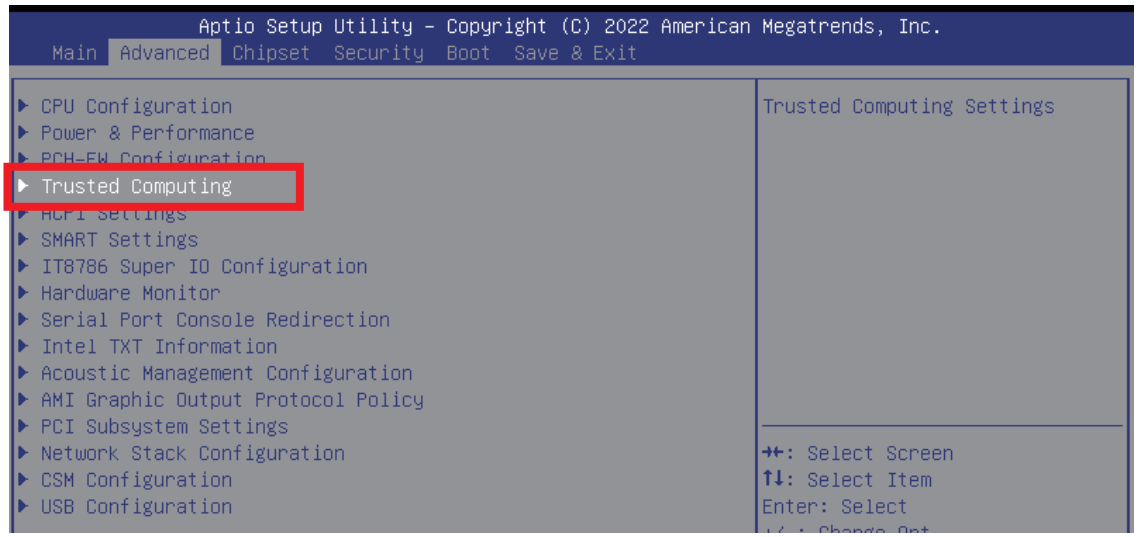




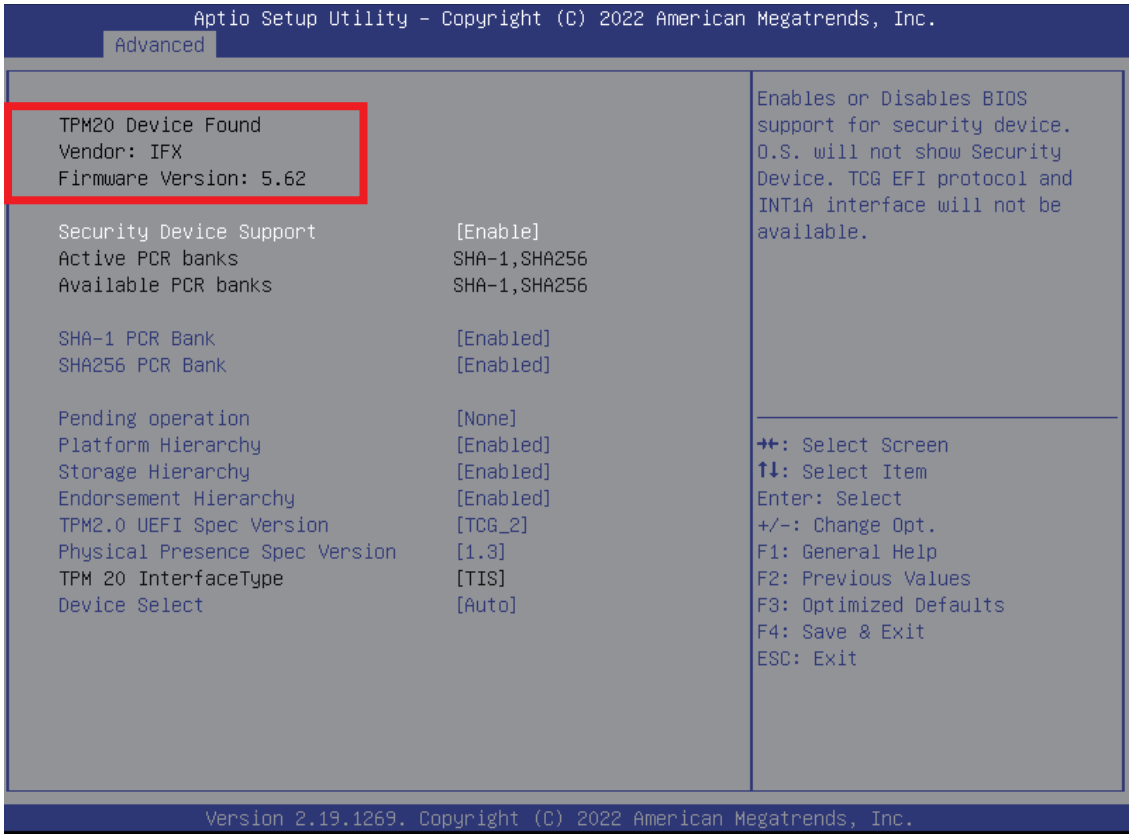
Step 4 Please save the BIOS settings by pressing F4. Please press Enter when the pop-up window which asks “Save configuration and exit?” appears. The computer will then restart.



Step 5 Click on “Trusted Computing”



Step 6 If the window shows “TPM2.0 Device Found Firmware Version:5.62”, then the setting is completed.



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

Vecow

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