EAC-3000 USER Manual

NVIDIA® Jetson AGX Xavier™ Edge AI Computing System
5 GigE LAN with 4 PoE+, 8 GMSL2, -20°C to 70°C Operation

Vecow

1.2.0 Edition 20230609

Record of Revision

Version	Date	Page	Description	Remark
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1.20	2023/06/09	55	Update	

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FCC

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

CE

The products described in this manual 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
EAC-3000-R64	NVIDIA® Jetson AGX™ Xavier™ Edge AI Computing System, with On-board 64GB RAM and 32GB eMMC, 5 GigE LAN with 4 PoE+, 4 USB 3.0, 3 M.2, 2 COM RS-232/422/485, 2 SIM, 8 GMSL, 2 CAN Bus, High Performance, Rugged, -20°C to 70°C Extended Temperature
EAC-3000F-R64	NVIDIA® Jetson AGX™ Xavier™ Edge AI Computing System with Fan Sink, with On-board 64GB RAM and 32GB eMMC, 5 GigE LAN with 4 PoE+, 4 USB 3.0, 3 M.2, 2 COM RS-232/422/485, 2 SIM, 8 GMSL, 2 CAN Bus, High Performance, Rugged, -20°C to 70°C Extended Temperature
EAC-3000-R32	NVIDIA® Jetson AGX Xavier™ Edge AI Computing System, with On-board 32GB RAM and 32GB eMMC, 5 GigE LAN with 4 PoE+, 4 USB 3.0, 3 M.2, 2 COM RS-232/422/485, 2 SIM, 8 GMSL, 2 CAN Bus, High Performance, Rugged, -20°C to 70°C Extended Temperature
EAC-3000F-R32	NVIDIA® Jetson AGX Xavier™ Edge AI Computing System with Fan Sink, with On-board 32GB RAM and 32GB eMMC, 5 GigE LAN with 4 PoE+, 4 USB 3.0, 3 M.2, 2 COM RS-232/422/485, 2 SIM, 8 GMSL, 2 CAN Bus, High Performance, Rugged, -20°C to 70°C Extended Temperature

Optional Accessories

Part Number	Description
PWA-160WB-WT	160W, 24V, 85V AC to 264V AC Power Adapter with 3-pin Terminal Block
PWA-180WB	180W, 24V, 90V AC to 264V AC Power Adapter with 3-pin Terminal Block
PWA-280WB-WT	280W, 24V, 85V AC to 264V AC Power Adapter with 3-pin Terminal Block,
VESA Mount	VESA Mounting Kit
DIN-RAIL	DIN Rail and VESA Mounting Kit
GMSL Camera Kit	GMSL Camera with Fakra-Z connector
M.2 Storage Module	M.2 Key M/Key B PCIe Storage Module
5G Module	5G Module with Antenna
4G Module	4G/GPS Module with Antenna
WiFi & Bluetooth Module	WiFi & Bluetooth Module with Antenna

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1

GENERAL INTRODUCTION

1.1 Overview

Vecow EAC-3000 Series is an Arm-based Edge AI Computing System. Powered by NVIDIA® Jetson AGX Xavier™ system-on-module, Vecow EAC-3000 Series delivers great power efficiency in a small form factor. Featuring 8 GMSL2 automotive cameras via rugged FAKRA-Z connectors, the EAC-3000 is well suited for industrial and outdoor environments.

Vecow EAC-3000 is based on the new NVIDIA® Jetson AGX Xavier™ that provides an 8-core NVIDIA Carmel ARM® CPU, a 512-core NVIDIA Volta™ GPU, and up to 64GB LPDDR4x memory to support workstation-grade up to 32 TOPS of AI performance.

With support for operating temperature from -20°C to 70°C, 9V to 50V wide range DC-in, along with GMSL1/GMSL2 automotive cameras supported by MAXIM MAX9296 via FAKRA-Z connectors, the EAC-3000 Series brings small size and easy deployment of AI vision and industrial applications including In-Vehicle Computing, Robotic Control, Medical Imaging, Public Security, Smart Factory, AMR/AGV, and any AIoT/Industry 4.0 applications.

1.2 Features

- Compact NVIDIA® Jetson AGX Xavier™ supports workstation-grade up to 32 TOPS AI performance with rich AI tools and workflows
- NVIDIA Volta architecture with 512 NVIDIA® CUDA® cores and 64 Tensor cores
- DC 9V to 50V wide range power input, Ignition Power Control
- 5 GigE LAN with 4 PoE+, 4 USB 3.0, 2 Digital Display
- Supports 8 GMSL2 automotive cameras with Fakra-Z
- 2 CAN Bus support Flexible Data-rate, 2 COM RS-232/422/485
- M.2 supports 5G/4G/LTE/WiFi/BT/GPS
- Tested to MIL-STD-810G for shock and vibration
- Support 24/7 secure remote monitoring, control, and OTA deployment empowered by Allxon

1.3 Product Specification

1.3.1 Specifications of EAC-3000

System	
Processor	NVIDIA® Jetson Xavier™ AGX System-On-Module • 8-core NVIDIA Carmel ARM® v8.2 64-bit CPU • 512-core NVIDIA Volta™ GPU with 64 Tensor Cores
Memory	EAC-3000-R64: LPDDR4x DRAM 64GB EAC-3000-R32: LPDDR4x DRAM 32GB
Storage	eMMC 5.1, 32 GB
Software Support	• Linux • NVIDIA JetPack SDK
Ethernet	
LAN 1	10/100/1000 Base-T Ethernet GigE LAN, RJ45 Connector
PoE	
LAN 2 to LAN 5	IEEE 802.3at (25.5W/48V) GigE PoE+ LAN, RJ45 Connector
Graphics	
Interface	2 Digital Display, up to 4Kx2K @30Hz
Video Encode	• HEVC: Up to 4x4K @60, 8x4K @30, 16x1080p @60, 32x1080p @30 • H.264: Up to 4x4K @60, 8x4K @30, 14x1080p @60, 30x1080p @30
Video Decode	• HEVC: 2x8K @30, 6x4K @60, 12x4K@30, 26x1080p @60, 52x1080p @30 • H.264: 4x4K @60, 8x4K @30, 16x1080p @60, 32x1080p @30
Camera	
GMSL	8 Fakra-Z connectors for GMSL 1/GMSL 2 automotive cameras
I/O Interface	
USB	4 USB 3.0 Type A
Serial	2 COM RS-232/422/485
CAN Bus	• 2 CAN Bus support CAN FD (Optional Isolation)
Button	• 1 Power Button • 1 Force Recovery Button • 1 Reset Button
Micro USB	• 1 Micro USB console debug port • 1 Micro USB OS flash port
SIM	2 SIM Card Socket

LED	Power, HDD, 2 User Programming
Antenna	6 Antenna for 5G/WiFi/4G/LTE/GPRS/UMTS
Expansion	
M.2	• 1 M.2 Key B Socket (3042/3052) • 1 M.2 Key E Socket (2230)
Storage	
SD	1 Micro SD Socket (External)
M.2	1 M.2 Key M Socket (2280)
Power	
Power Input	9V to 50V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16-mode Software Ignition Control
Remote Switch	3-pin Remote Switch Terminal Block
Mechanical	
Dimensions	212.6mm x 149.0mm x 60.4mm (8.37" x 5.87" x 2.38")
Weight	2.4 kg (5.29lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (optional)
Environment	
Operating Temperature	**30W TDP Mode :** -20°C to 70°C (-4°F to 158°F) **MAX TDP Mode :** -20°C to 50°C (-4°F to 122°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	Operating, MIL-STD-810G, Method 516.7, Procedure I
Vibration	Operating, MIL-STD-810G, Method 514.7, Procedure I, Category 4
EMC	CE, FCC, EN50155, EN50121-3-2

1.3.2 Specifications of EAC-3000F

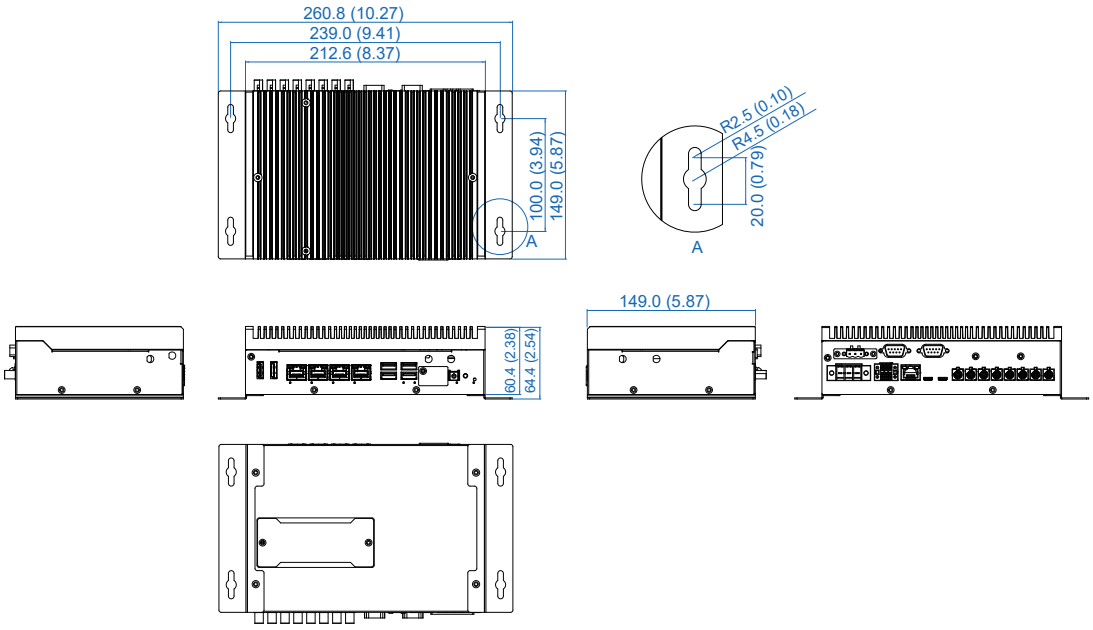
System	
Processor	NVIDIA® Jetson Xavier™ AGX System-On-Module • 8-core NVIDIA Carmel ARM® v8.2 64-bit CPU • 512-core NVIDIA Volta™ GPU with 64 Tensor Cores
Memory	EAC-3000F-R64: LPDDR4x DRAM 64GB EAC-3000F-R32: LPDDR4x DRAM 32GB
Storage	eMMC 5.1, 32 GB
Software Support	• Linux • NVIDIA JetPack SDK
Ethernet	
LAN 1	10/100/1000 Base-T Ethernet GigE LAN, RJ45 Connector
PoE	
LAN 2 to LAN 5	IEEE 802.3at (25.5W/48V) GigE PoE+ LAN, RJ45 Connector
Graphics	
Interface	2 Digital Display, up to 4Kx2K @30Hz
Video Encode	• HEVC: Up to 4x4K @60, 8x4K @30, 16x1080p @60, 32x1080p @30 • H.264: Up to 4x4K @60, 8x4K @30, 14x1080p @60, 30x1080p @30
Video Decode	• HEVC: 2x8K @30, 6x4K @60, 12x4K@30, 26x1080p @60, 52x1080p @30 • H.264: 4x4K @60, 8x4K @30, 16x1080p @60, 32x1080p @30
Camera	
GMSL	8 Fakra-Z connectors for GMSL 1/GMSL 2 automotive cameras
I/O Interface	
USB	4 USB 3.0 Type A
Serial	2 COM RS-232/422/485
CAN Bus	2 CAN Bus support CAN FD (Optional Isolation)
Button	• 1 Power Button • 1 Force Recovery Button • 1 Reset Button
Micro USB	• 1 Micro USB console debug port • 1 Micro USB OS flash port
SIM	2 SIM Card Socket
LED	Power, HDD, 2 User Programming
Antenna	6 Antenna for 5G/WiFi/4G/LTE/GPRS/UMTS
Expansion	

M.2	• 1 M.2 Key B Socket (3042/3052) • 1 M.2 Key E Socket (2230)
Storage	
SD	1 Micro SD Socket (External)
M.2	1 M.2 Key M Socket (2280)
Power	
Power Input	9V to 50V, DC-in
Power Interface	3-pin Terminal Block : V+, V-, Frame Ground
Ignition Control	16-mode Software Ignition Control
Remote Switch	3-pin Remote Switch Terminal Block
Mechanical	
Dimensions	212.6mm x 149.0mm x 60.4mm (8.37" x 5.87" x 2.38")
Weight	2.4 kg (5.29lb)
Mounting	• Wallmount by mounting bracket • DIN Rail Mount (optional)
Environment	
Operating Temperature	**30W TDP Mode :** -20°C to 70°C (-4°F to 158°F) **MAX TDP Mode :** -20°C to 70°C (-4°F to 158°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	Operating, MIL-STD-810G, Method 516.7, Procedure I
Vibration	Operating, MIL-STD-810G, Method 514.7, Procedure I, Category 4
EMC	CE, FCC, EN50155, EN50121-3-2

1.4 Mechanical Dimension

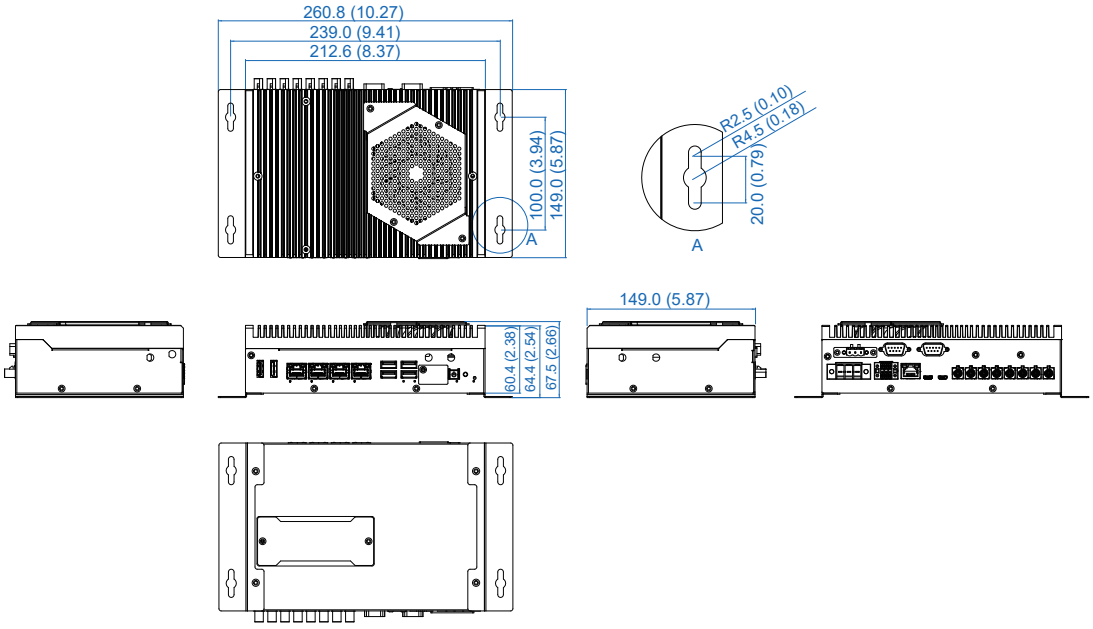
1.4.1 Dimensions of EAC-3000

Unit : mm (inch)



1.4.2 Dimensions of EAC-3000F

Unit : mm (inch)



2

GETTING TO KNOW YOUR EAC-3000/EAC-3000F

2.1 Packing List

2.1.1 EAC-3000 Packing List

Item	Description	Qty
1	EAC-3000 Edge AI Computing System (According to the configuration of your order, EAC-3000 series may contain micro SD and M.2 modules. Please verify these items if necessary.)	1

Item	Description	Outlook	Usage	P/N	Qty
1	Terminal block 3-pin (5.0mm)		IGN	51-2411R03-S1B	1
2	PHILLPIS M3x4L, Ni+Ny		M.2 socket	53-2426204-80B	3
3	Terminal block 3-pin(7.62mm)		DC-IN	51-2611R03-S1N	1
4	Wall mount EAC-3000		Wall mount bracket	62-03P1053-0BA	2
5	Terminal block 3-pin(3.5mm)		CAN	51-2211R03-S01	2
6	Flat #6-32x6L, Black+Ny		Fasten wall mount bracket to EAC-3000	53-I000350-311	4

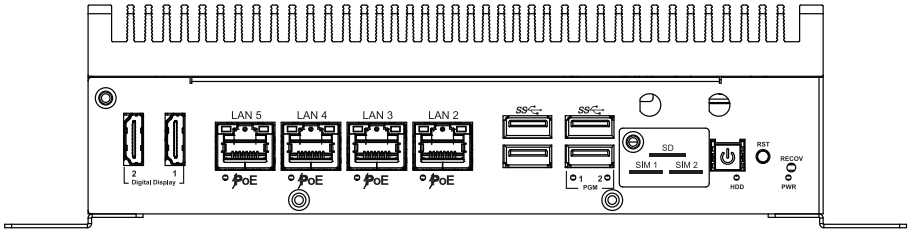
2.1.1 EAC-3000F Packing List

Item	Description	Qty
1	EAC-3000F Edge AI Computing System (According to the configuration of your order, EAC-3000F series may contain micro SD and M.2 modules. Please verify these items if necessary.)	1

Item	Description	Outlook	Usage	P/N	Qty
1	Terminal block 3-pin (5.0mm)		IGN	51-2411R03-S1B	1
2	PHILLPIS M3x4L, Ni+Ny		M.2 socket	53-2426204-80B	3
3	Terminal block 3-pin(7.62mm)		DC-IN	51-2611R03-S1N	1
4	Wall mount EAC-3000		Wall mount bracket	62-03P1053-0BA	2
5	Terminal block 3-pin(3.5mm)		CAN	51-2211R03-S01	2
6	Flat #6-32x6L, Black+Ny		Fasten wall mount bracket to EAC-3000	53-I000350-311	4

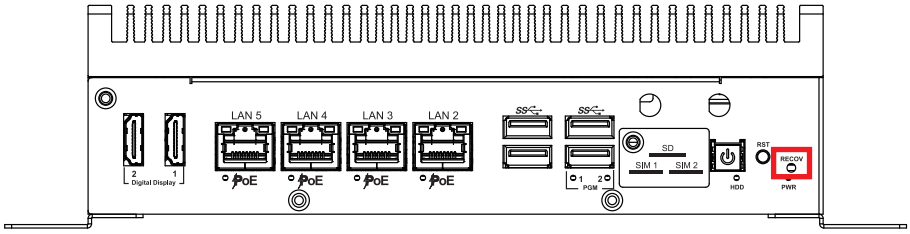
2.2 Front Panel I/O & Functions

2.2.1 Functions of EAC-3000



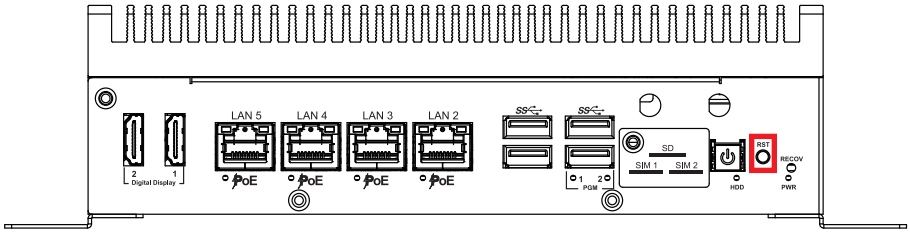
In Vecow EAC-3000 series, Most of the I/O connectors are located on the front panels. Most of the general connections to computer devices, such as USB, LAN, Digital Display Port, Force Recovery button, Power Button,Reset Button, indicators are placed on the front panel.

2.2.1.1 Force Recovery button



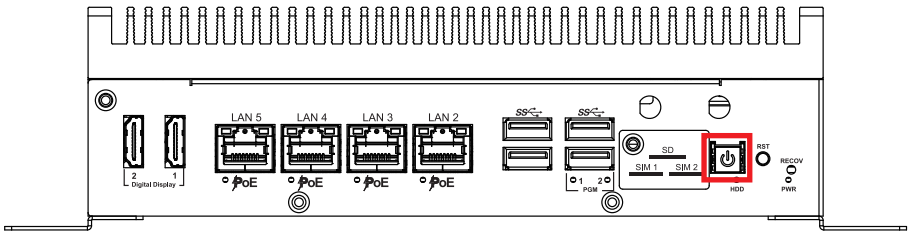
Used to enter Force Recovery Mode. Button is held down while either system is first powered on to put system in USB Force Recovery mode.

2.2.1.2 Reset Button



Used to force a full system reset.

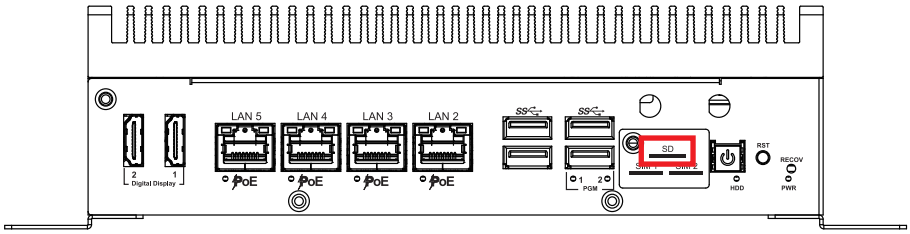
2.2.1.3 Power Button

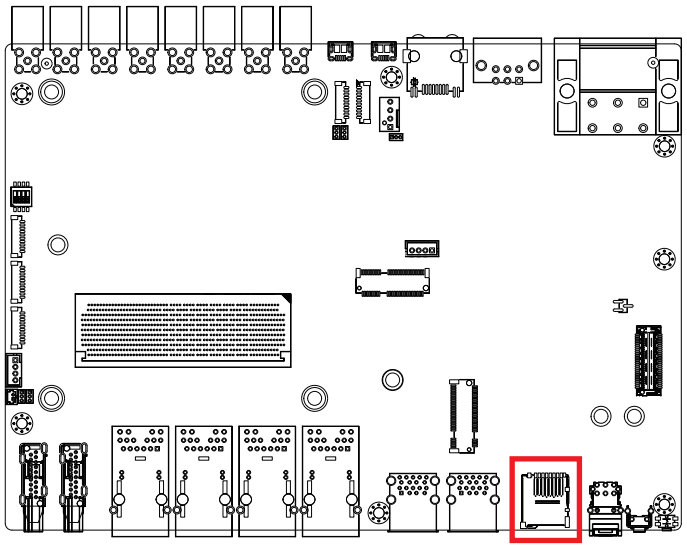


The Power Button is a non-latched switch with dual color LED indication.

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.

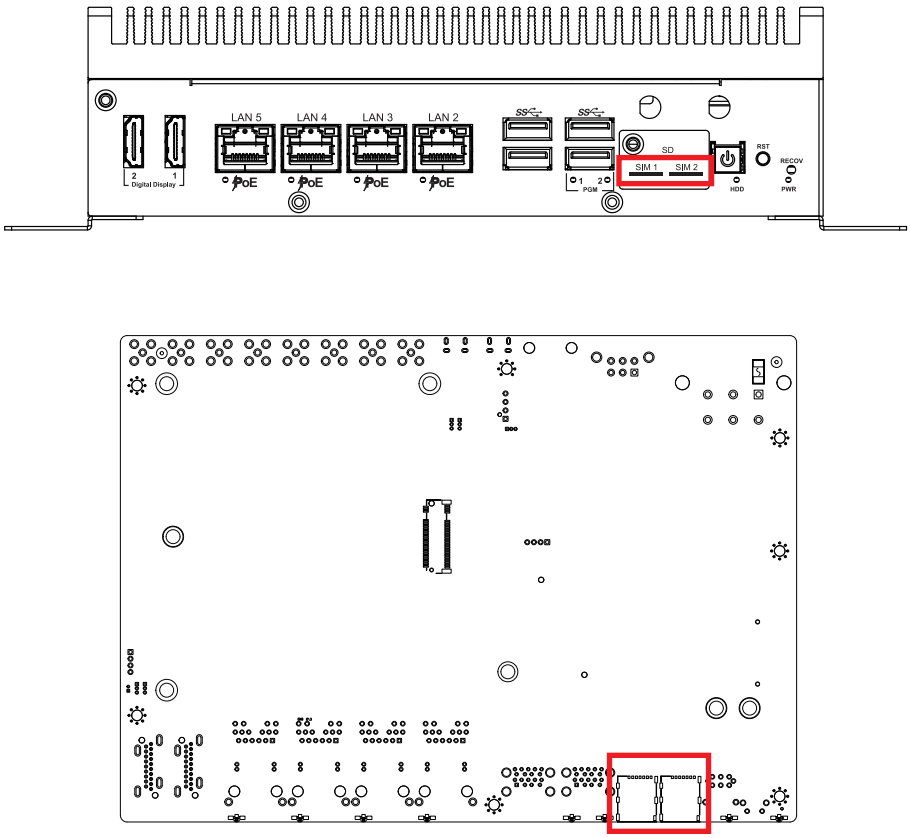
2.2.1.4 Micro SD





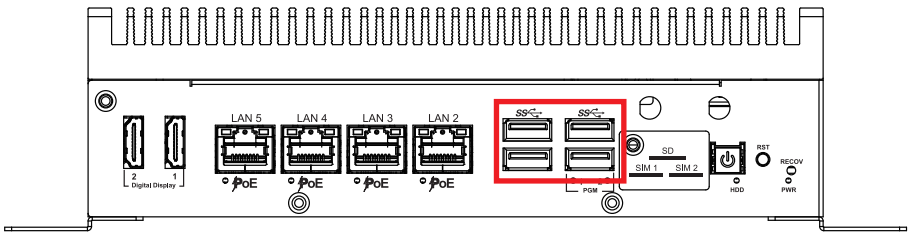
The external Micro SD card provides additional storage expansion. It is located behind the cover-plate on the front panel.

2.2.1.5 Two Nano SIM



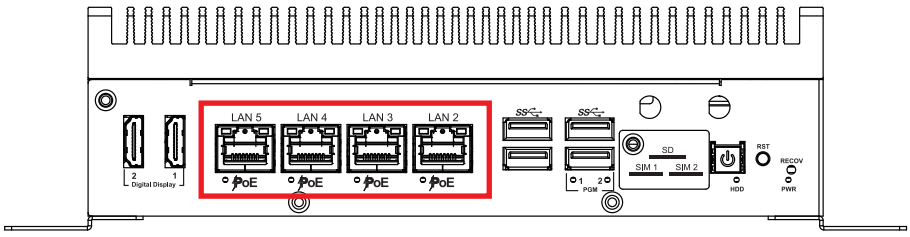
The external Nano SIM card offers wireless communication capability to the system.

2.2.1.6 USB 3.2 Gen1



There are 4 USB 3.2 Gen1 connections available supporting up to 5Gb per second data rate in the front panel of EAC-3000. It is also compliant with the requirements of Speed (SS), High Speed (HS), Full Speed (FS) and Low Speed (LS).

2.2.1.7 LAN2~LAN5: PoE Ports



There are 4 RJ45 connectors in the front panel of EAC-3000. 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® I210 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.

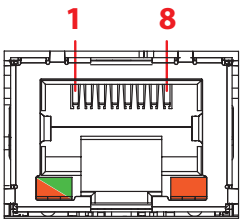
The pin-outs of LAN 2~LAN 5 are listed as follows :

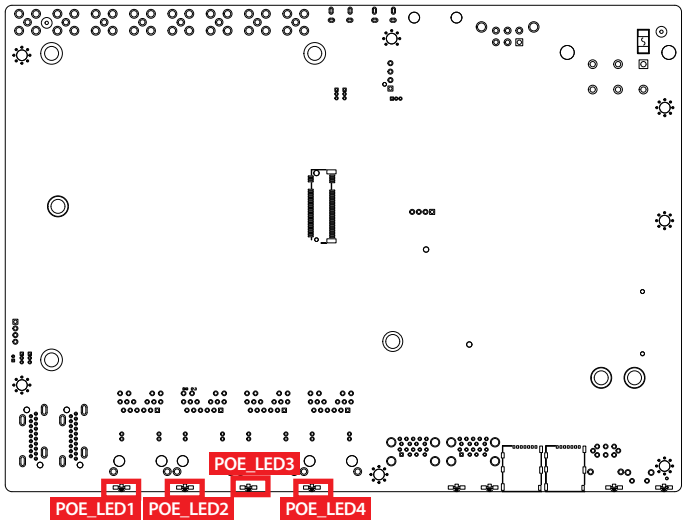
Pin No.	10/100 Mbps	1000Mbps	PoE
1	E_TX+	MDI0_P	PoE+
2	E_TX-	MDI0_N	PoE+
3	E_RX+	MDI1_P	PoE-
4	------	MDI2_P	------
5	------	MDI2_N	------
6	E_RX-	MDI1_N	PoE-
7	------	MDI3_P	------
8	------	MDI3_N	------

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

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.

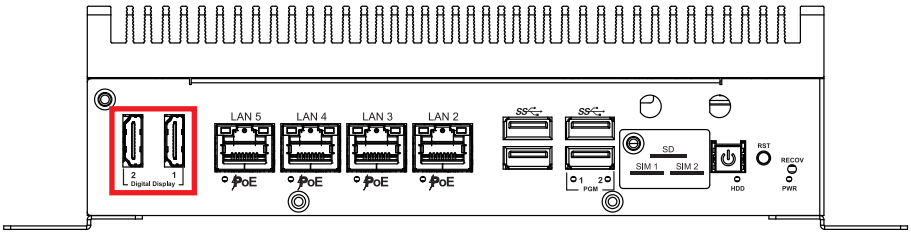
LED Location	LED Color	10Mbps	100Mbps	1000Mbps
Right	Green/ Orange	Off	Solid Green	Solid Orange
Left	Yellow	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow





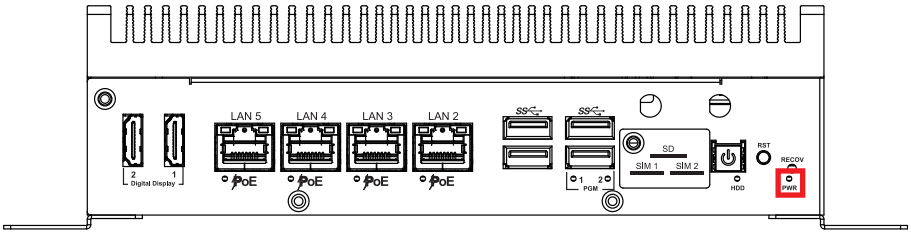
POE LED	LED Color	POE Status
POE_LED1	Solid Orange	PoE ON
POE_LED2	Solid Orange	PoE ON
POE_LED3	Solid Orange	PoE ON
POE_LED4	Solid Orange	PoE ON

2.2.1.8 TWO Digital Display Port



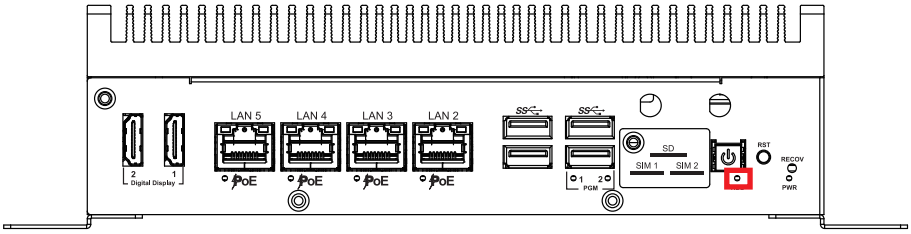
The Digital Display Ports support HDMI V2.0 interface, connection supports up to Up to 3840 x 2160 @60Hz

2.2.1.9 PWR & Status LED Indicators



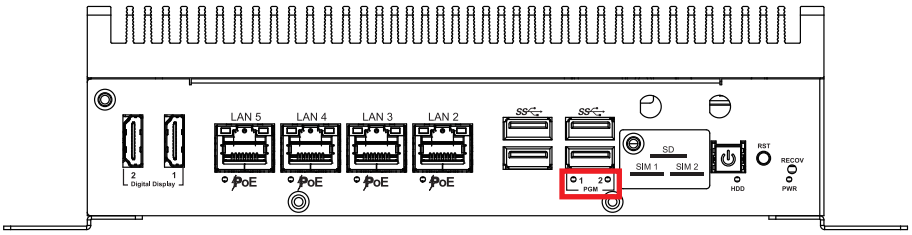
LED Color	System Status
Orange (PWR LED)	+5V Power Ready

2.2.1.10 HDD & Status LED Indicators



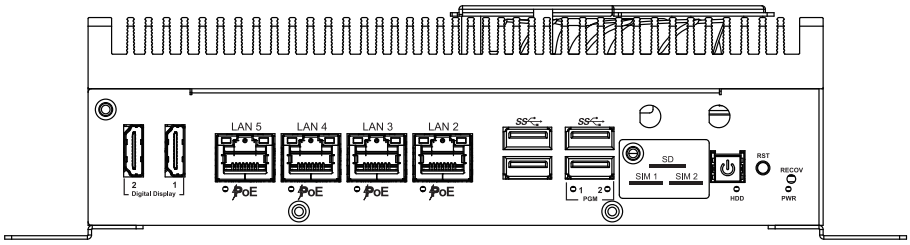
Orange-HDD LED : A SSD Storage LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities are in progress.

2.2.1.11 Two user Programmable LEDs



There are two Programmable LEDs,user can define the state of the led by himself.

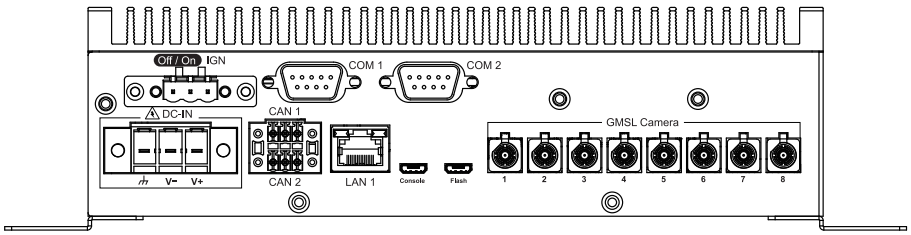
2.2.2 Functions of EAC-3000F



EAC-3000F is the same as EAC-3000, the difference is that EAC-3000F has Fan Sink.

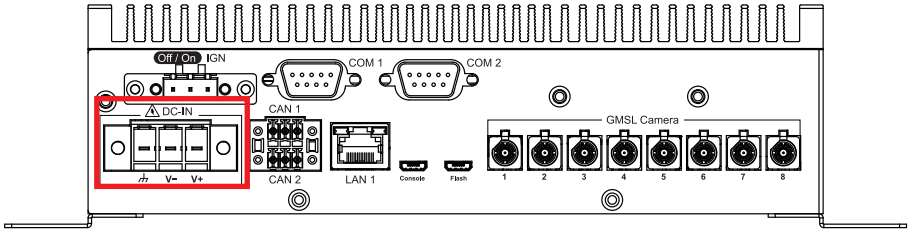
2.3 Rear Panel I/O & Functions

2.3.1 Functions of EAC-3000



In Vecow EAC-3000 series, Some of the I/O connectors are located on the rear panels. Such as GMSL Camera, LAN, CAN Port, COM Port, Power input,Debug Port,Flash Port indicators are placed on the rear panel.

2.3.1.1 Power Terminal Block

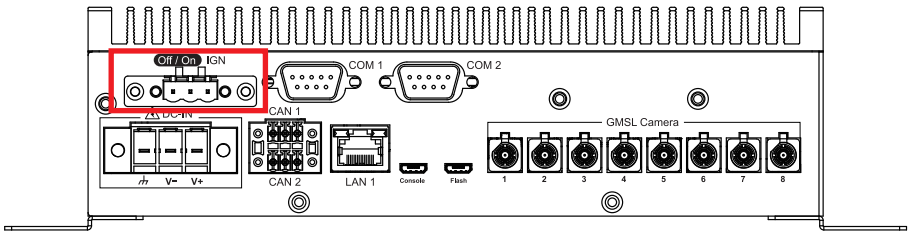


EAC-3000 supports 9V to 50V DC wide range power input by terminal block in the rear side.

And the pin define is as below table.

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

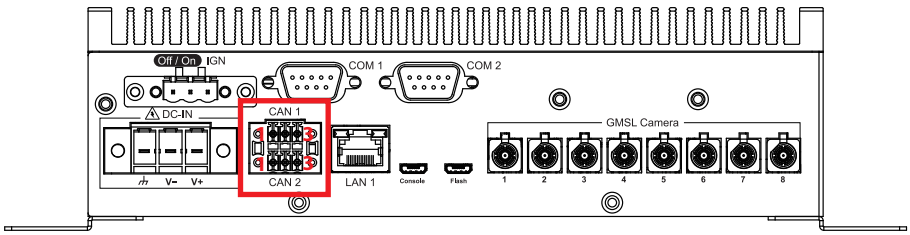
2.3.1.2 Remote Power On/Off Switch & Ignition



It is a 3-pin power-on or power-off switch through 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).

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

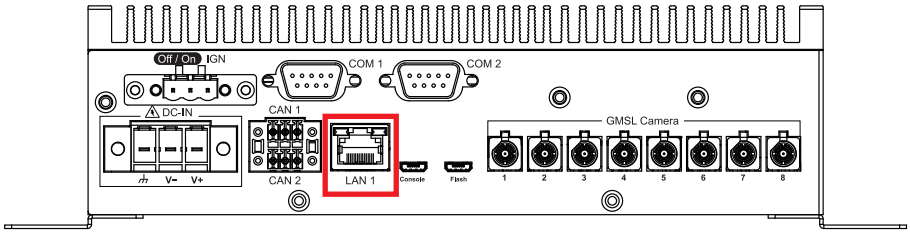
2.3.1.3 CAN Port



System debug Port,Micro USB to UART that connects to the SOM serial console. Console Port Pin Out of Micro USB :

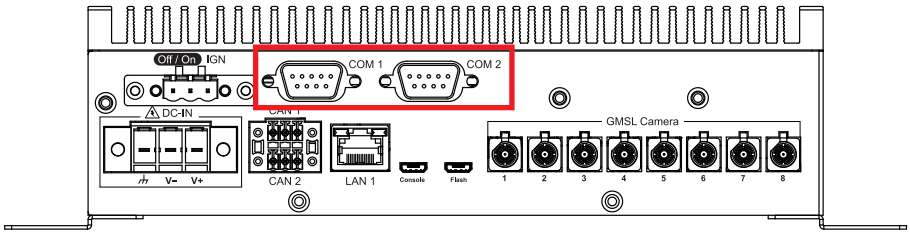
CAN1		CAN2	
Pin No.	Function	Pin No.	Function
1	CAN1_H	1	CAN2_H
2	CAN1_L	2	CAN2_L
3	GND	3	GND

2.3.1.4 LAN1 10/100/1000 Mbps Ethernet Port



This is 8-pin RJ-45 jacks supporting 10/100/1000 Mbps Ethernet connections on the rear panel of EAC-3000. LAN 1 is powered by Microchip USB3.2 to Giga ETH Controller.

2.3.1.5 COM Port

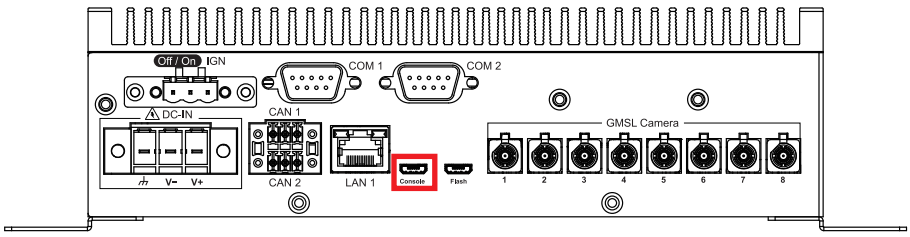


COM 1,2 can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. The default definition of COM 1 and COM2 is RS-232; but if you want to change to RS-422 or RS-485, you can find the setting in software.

The rear D-SUB connector pin assignments are listed in the following table :

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

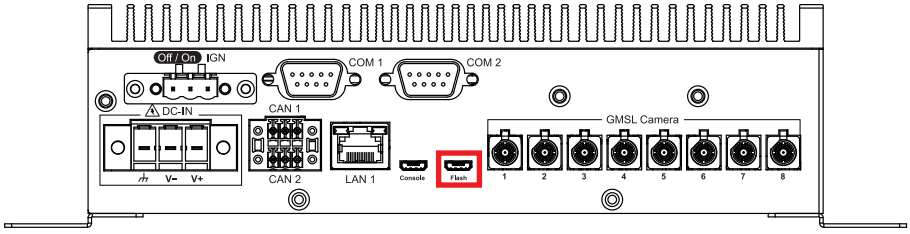
2.3.1.6 Console Port



System debug Port,Micro USB to UART that connects to the SOM serial console.

Pin No.	Function
1	+V5
2	USB_DATA-
3	USB_DATA+
4	NC
5	GND

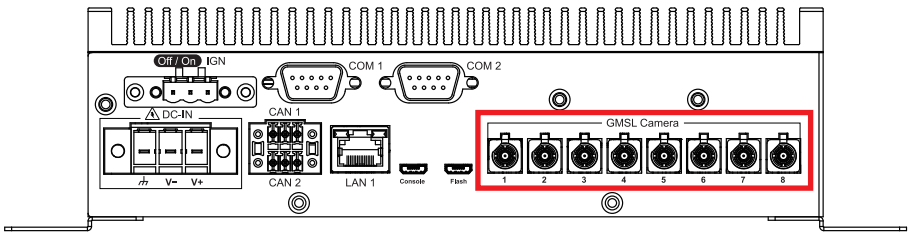
2.3.1.7 Flash Port



The EAC-3000 USB Recovery mode provides an alternate boot device (USB). In this mode, the system is connected to a host system and boots over USB. This is used when a new image needs to be flashed. USB0 must be available to use as USB Device for USB Recovery Mode.

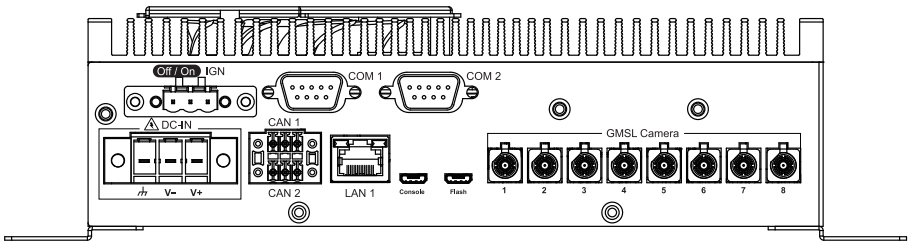
Pin No.	Function
1	VBUS_DET
2	USB_DATA-
3	USB_DATA+
4	NC
5	GND

2.3.1.8 GMSL Camera Port



There are eight FAKRA connectors in the rear side of EAC-3000. Each camera connects to the EAC-3000 through a single coax cable. Using GMSL2 (Gigabit Multimedia Serial Link) connections, the cameras are connected to a two-port deserializer. The output of the deserializer is MIPI CSI-2.

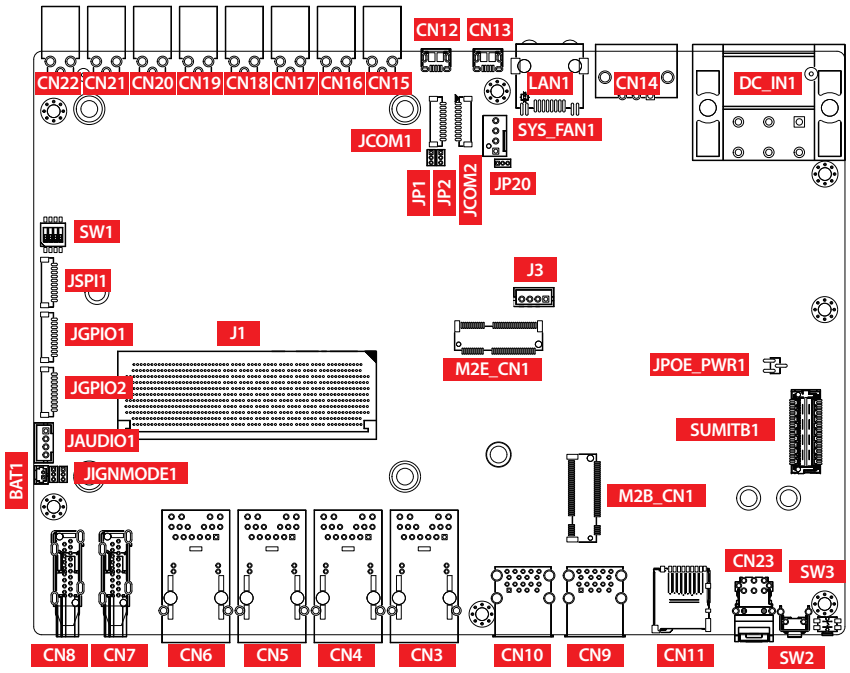
2.3.2 Functions of EAC-3000F



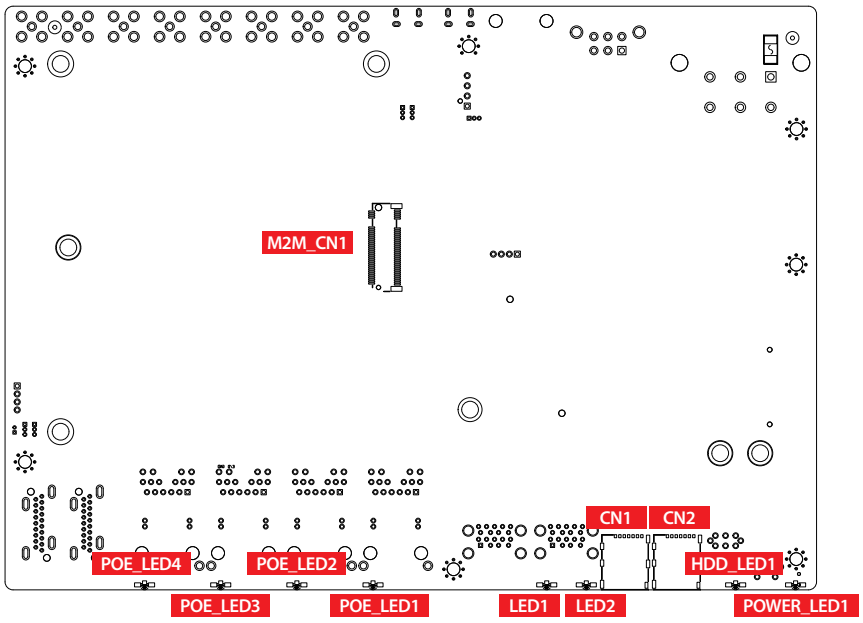
EAC-3000F is the same as EAC-3000, the difference is that EAC-3000F has Fan Sink.

2.4 Main Board Connector & Jumper Locations

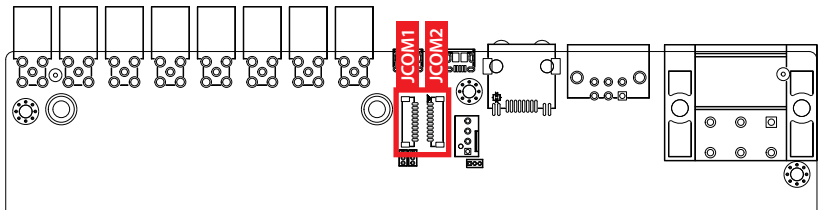
2.4.1 TOP View of MB



BOT View of MB



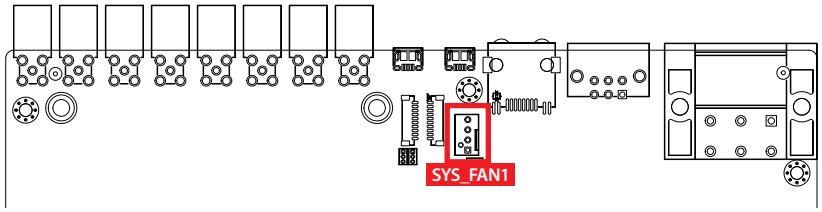
2.4.1.1 JCOM1,JCOM2 Connector



EAC-3000 provides 2 serial ports (COM1-COM2) headers for internal COM port cable and the pin define are listed in the following table.

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

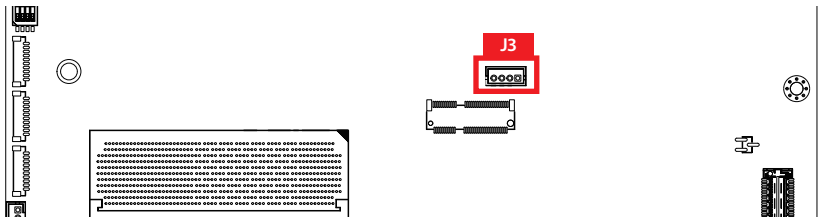
2.4.1.2 Fan Connector (SYS_FAN1)



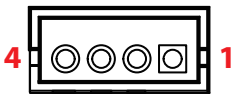
Fan power connector supports for additional thermal requirements. The pin assignments of SYS_FAN1 is listed in the following table.

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

2.4.1.3 J3 : IGNITION Control and Remote Power on switch



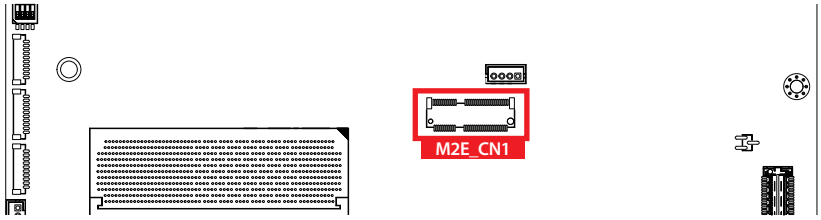
Pin assignment as the following table :



Part location	Signal Name
1	FP_PWR_BTN_P
2	GND
3	IGNITION
4	GND

2.4.1.4 M.2 KEY-E (M2E_CN1)

USB 2.0/PCIe Gen3x1



M.2 KEY E : USB 2.0/PCIe x1 M.2 key E connector is suitable for applications that use wireless connectivity including Wi-Fi, Bluetooth, NFC of GNSS. Module card types include 2230.

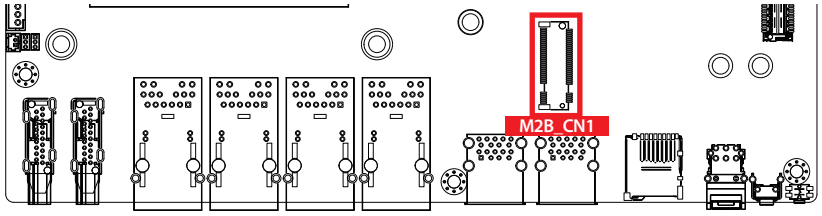
Pin Out :

Pin No.	Signal Name	Pin No.	Signal Name
75	GND	74	+V3.3_AUX
73	NC	72	+V3.3_AUX
71	NC	70	PEWAKE
69	GND	68	NC
67	NC	66	NC
65	NC	64	NC

Pin No.	Signal Name	Pin No.	Signal Name
63	GND	62	I2C_ALERT#
61	NC	60	I2C_CLK
59	NC	58	I2C_DATA
57	GND	56	NC
55	PCIE_WAKE#	54	NC
53	PCIE_CLK_REQ0#	52	PLTRST#
51	GND	50	SUS_CLK
49	PCIE_100M_CLK__N	48	NC
47	PCIE_100M_CLK__P	46	NC
45	GND	44	NC
43	PCIE_RX_N	42	NC
41	PCIE_RX_P	40	NC
39	GND	38	NC
37	PCIE_TX_N	36	NC
35	PCIE_TX_P	34	NC
33	GND	32	NC
Mechanical Key			
23	NC		
21	NC	22	NC
19	GND	20	NC
17	NC	18	GND
15	NC	16	NC
13	GND	14	NC
11	NC	12	NC
9	NC	10	NC
7	GND	8	NC
5	USB-	6	LED1#
3	USB+	4	+V3.3_AUX
1	GND	2	+V3.3_AUX

2.4.1.5 M.2 KEY-B (M2B_CN1)

M.2 key B Connector (3042/3052, PCIe Gen3x2, USB 3.0, USB 2.0)



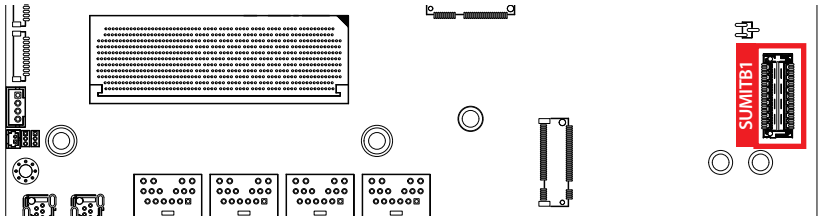
The pin assignments of M2B_CN1 are listed in the following table:

Pin Out :

Pin No.	Signal Name	Pin No.	Signal Name
		80	GND
75	NC	-	-
73	GND	74	V3.3
71	GND	72	V3.3
69	CONFIG_1	70	V3.3
67	NC	68	NC
65	NC	66	SIM_DETECT
63	NC	64	NC
61	NC	62	NC
59	NC	60	NC
57	GND	58	NC
55	RFECLKp	56	NC
53	RFECLKn	54	PCIE_WAKE#
51	GND	52	PCIE_CLK_REQ
49	PETp0	50	PLTRST#
47	PETn0	48	NC
45	GND	46	NC
43	PERp0	44	NC
41	PERn0	42	NC

Pin No.	Signal Name	Pin No.	Signal Name
39	GND	40	NC
37	PETp1/USB3.1-TX+	38	DEVSLP
35	PETn1/USB3.1-TX-	36	UIM_PWR
33	GND	34	UIM_DATA
31	PERp1/USB3.1-RX+	32	UIM_CLK
29	PERn1/USB3.1-RX-	30	UIM_RESET
27	GND	28	NC
25	NC	26	NC
23	NC	24	NC
21	NC	22	NC
		20	NC
Mechanical Key			
11	GND		
9	USB-	10	LED1#
7	USB+	8	W_DISABLE#
5	GND	6	FULL_CARD_PWR_OFF
3	GND	4	V3.3
1	NC	2	V3.3

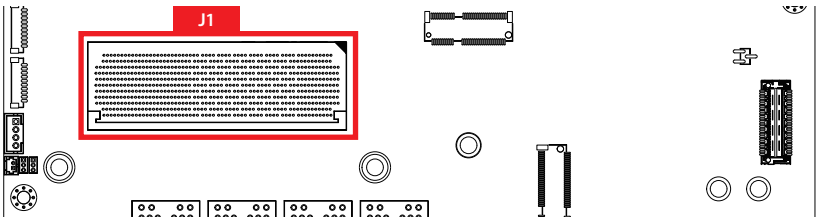
2.4.1.6 SUMITB1 : SUMIT B Connector



SUMIT B Pin Out :

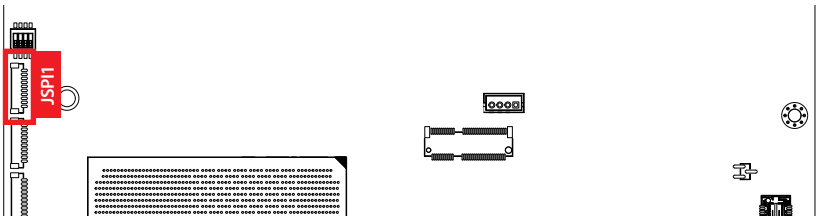
Pin No.	Function	Pin No.	Function
1	GND	2	GND
3	B_PET_P0	4	B_PER_P0
5	B_PET_N0	6	B_PER_N0
7	GND	8	GND
9	C_CLKP	10	B_CLKP
11	C_CLKN	12	B_CLKN
13	CPRSNT#/C_PE_CLKREQ#	14	GND
15	C_PET_P0	16	C_PER_P0
17	C_PET_N0	18	C_PER_N0
19	GND	20	GND
21	C_PET_P1	22	C_PER_P1
23	C_PET_N1	24	C_PER_N1
25	GND	26	GND
27	C_PET_P2	28	C_PER_P2
29	C_PET_N2	30	C_PER_N2
31	GND	32	GND
33	C_PET_P3	34	C_PER_P3
35	C_PET_N3	36	C_PER_N3
37	GND	38	GND
39	PERST#	40	WAKE#
41	Reserved	42	Reserved
43	+5V	44	Reserved
45	+5V	46	+3.3V
47	+5V	48	+3.3V
49	+5V	50	+3.3V
51	+5V	52	+5V_AUX

2.4.1.7 J1 : Jetson AGX Xavier Connector only for Jetson Xavier AGX module.



2.4.1.8 JSPI1 : SPI/I2C Signal Connector

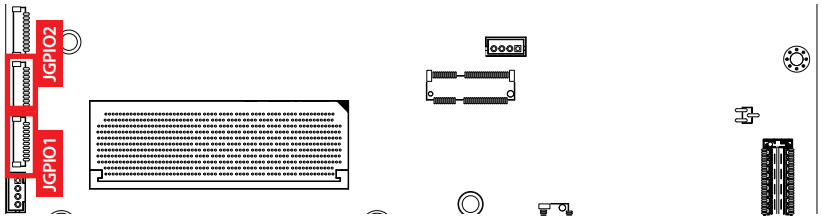
This is SPI+I2C headers, it offered SPI Bus and I2C Bus, in EAC-3000 series.



Pin No.	JSPI1 Definition
1	+3.3V
2	GND
3	SPI1_MOSI
4	SPI1_MISO
5	SPI1_CS0
6	SPI1_SCK
7	SPI1_CS1
8	I2C4_SDA
9	----------
10	I2C4_SCL

2.4.1.9 JGPIO1, JGPIO2 : GPIO from AGX SOM

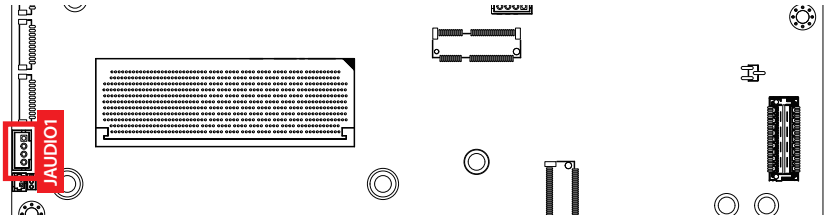
There is a 16-bit GPIO connector in the Top side. Each GPIO channel can be configuration GPI or GPO.



Pin No.	JGPIO1 Definition	Pin No.	JGPIO2 Definition
1	+3.3V	1	+3.3V
2	GND	2	GND
3	GPIO06	3	GPIO19
4	GPIO08	4	GPIO23
5	GPIO10	5	GPIO24
6	GPIO12	6	GPIO25
7	GPIO14	7	GPIO28
8	GPIO18	8	GPIO31
9	----------	9	----------
10	----------	10	GPIO36

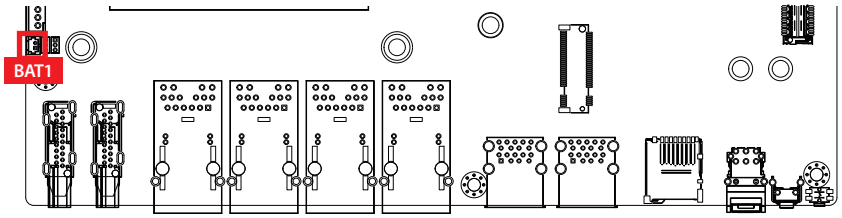
2.4.1.10 JAUDIO1 : Speaker Out Connector.

To drive moving coil loudpeakers only. Speaker impedence must be 4Ω or more.



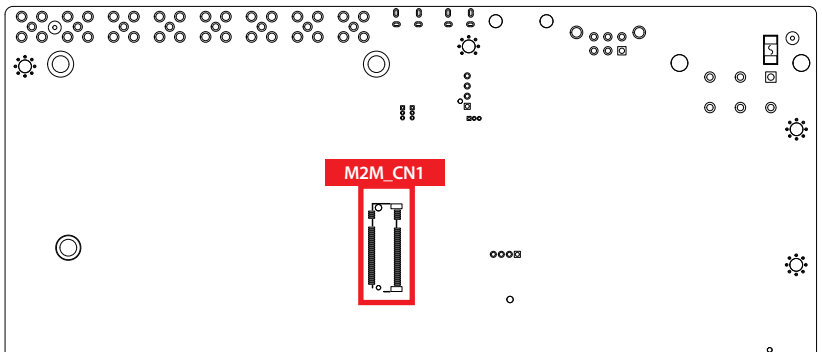
2.4.1.11 BAT1 : RTC Battery Connector.

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.



2.4.1.12 M.2 KEY-M (M2M_CN1)

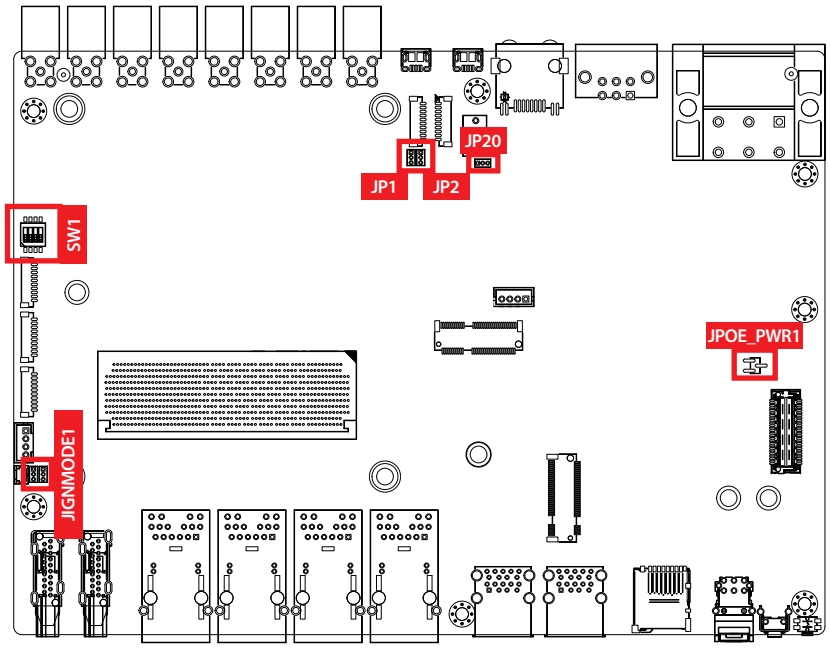
M.2 key M Connector (2280, PCIe Gen3x2)



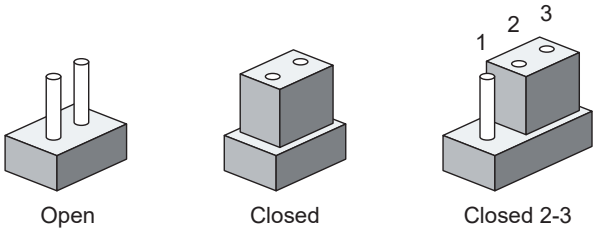
2.5 Main Board Jumper Settings

2.5.1.1 Board Top View of EAC-3000 Main Board with Jumper.

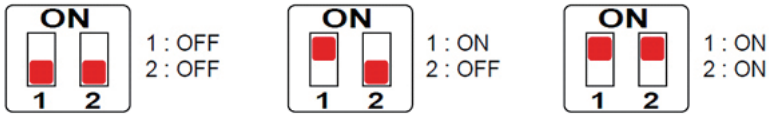
The figure below is the top view of EAC-3000 main board which is the main board. It shows the location of the jumpers.



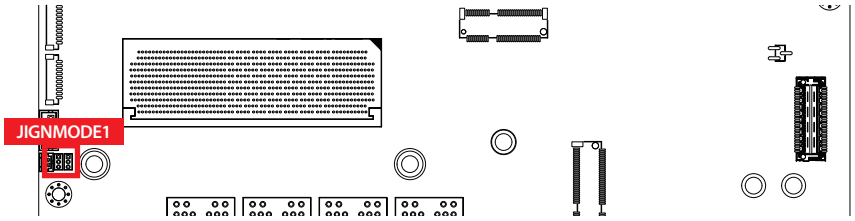
You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper,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

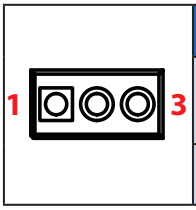


You may configure your card to match the needs of your application by DIP switch. As below show the DIP switch on and off.



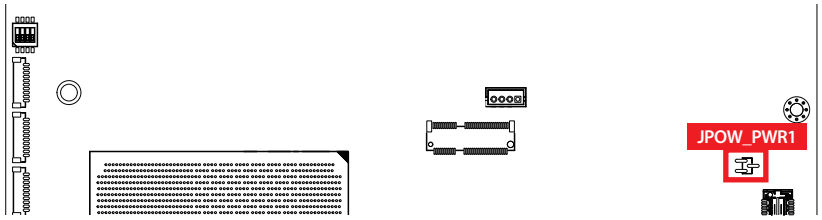
2.5.1.2 JIGNMODE1 : Ignition Mode Select





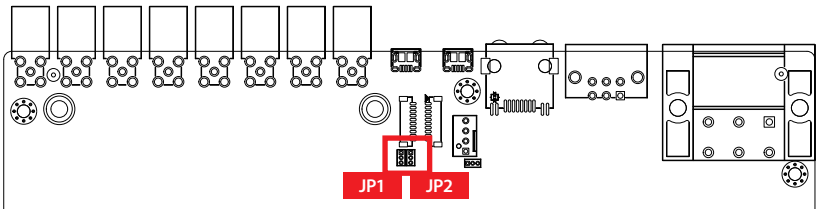
Pin No.	Definition
1-2	H/W MODE(Default)
2-3	S/W MODE

2.5.1.3 JPOE_PWR1 : POE Power On Voltage Select



Jumper	Setting	Function
JPOE_PWR1	1-2	PoE Power On Standby Mode
	2-3	PoE Power On Main Power On Mode (default)

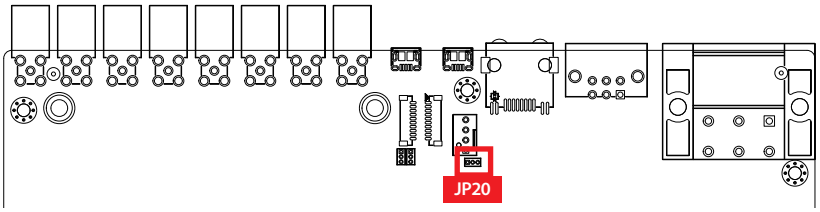
2.5.1.4 JP1,JP2 : COM1,COM2 RS485 Mode Terminal resistance ON/OFF



There are two Pin Header JP1 and JP2 to set terminal resistor (120Ω) ON/OFF of COM RS485 mode function.

Jumper	Setting	Function
JP1 (COM1)	1-2	RS485 Mode Terminal resistance OFF (Default)
	2-3	RS485 Mode Terminal resistance ON
JP1 (COM1)	1-2	RS485 Mode Terminal resistance OFF (Default)
	2-3	RS485 Mode Terminal resistance ON

2.5.1.5 JP20 : FAN Operation Voltage Select



The GMSL2 forward link has a fixed link rate of 3Gbps or 6Gbps.

JP1 and JP3 Pin define :



Pin No.	Definition
1-2	FAN Operation Voltage 5V
2-3	FAN Operation Voltage 12V

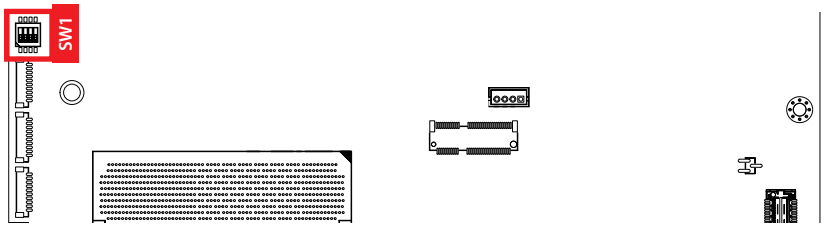
2.6 Ignition Control

EAC-3000 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.

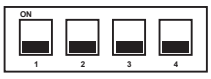
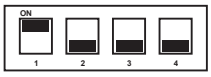
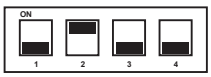
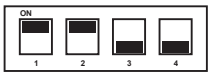
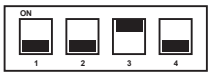
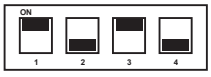
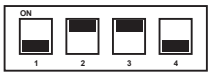
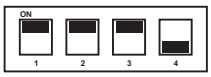
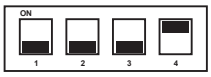
2.6.1 Adjust Ignition Control Modes

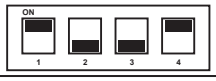
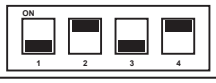
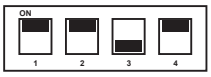
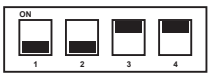
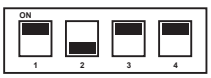
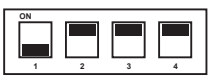
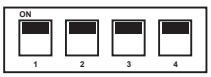
EAC-3000 series provides 16 modes of different power on/off delay periods adjustable via SW1 switch. The default DIP switch is set to 0 in ATX power mode.

SW1 : Ignition Control



The modes are listed in below table :

Deep Switch Position	Power on delay	Power off delay	Switch Position
0	ATX/AT mode (Default)		
1	No delay	10 seconds	
2	No delay	15 seconds	
3	No delay	20 seconds	
4	No delay	30 seconds	
5	No delay	60 seconds	
6	5 seconds	10 seconds	
7	5 seconds	30 seconds	
8	5 seconds	60 seconds	

9	5 seconds	90 seconds	
A	5 seconds	120 seconds	
B	10 seconds	10 seconds	
C	10 seconds	30 seconds	
D	10 seconds	60 seconds	
E	10 seconds	90 seconds	
F	10 seconds	120 seconds	

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.

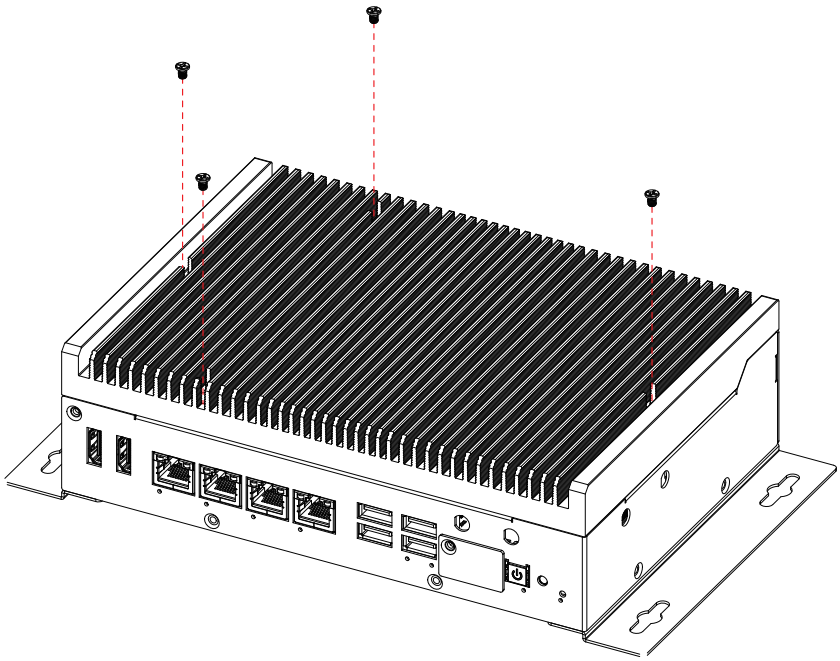
3

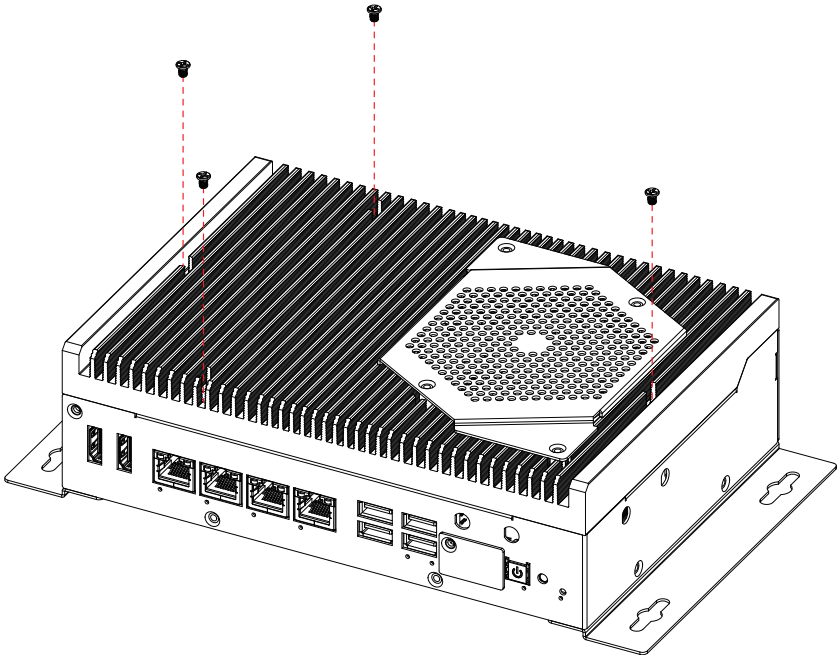
SYSTEM SETUP

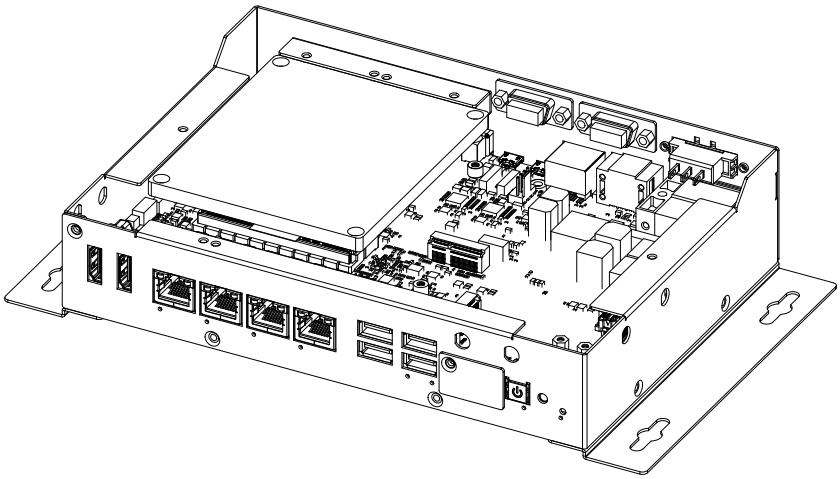
3.1 How to Open Your EAC-3000/EAC-3000F

Remove four I-M3x6L screws and pick up Heat Sink.

(EAC-3000F careful to the fan cable)

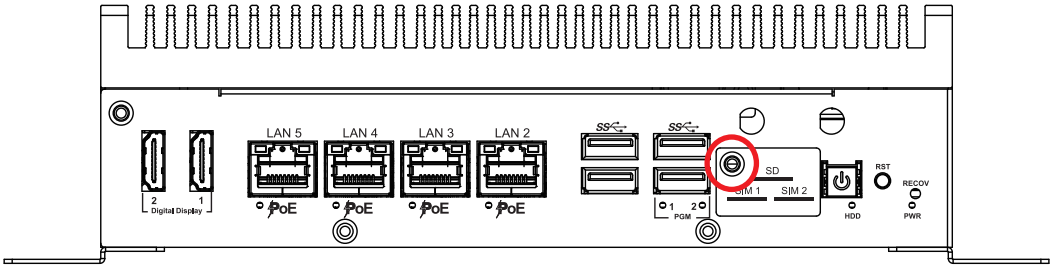




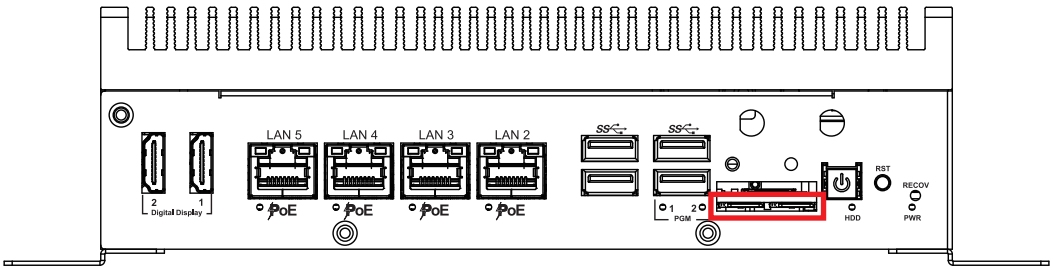


3.2 Installing Nano SIM Card

Step 1 Remove one F-M3x4L screw on SD/SIM cover.

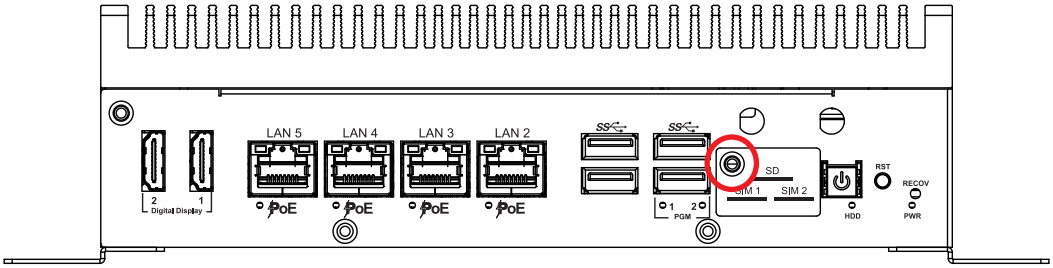


Step 2 Inserting SIM card, make sure the system power is not plugged.

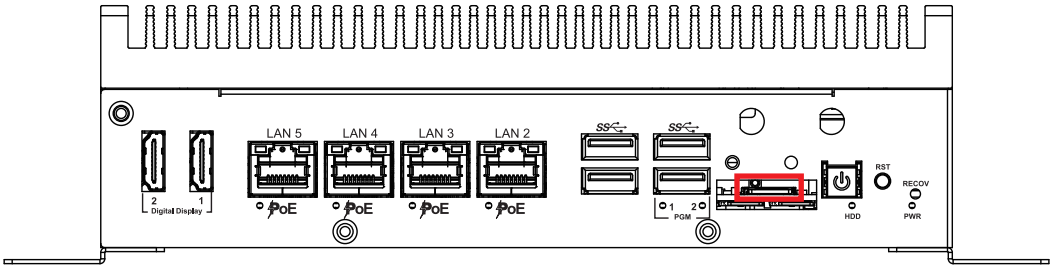


3.3 Installing Micro SD Card

Step 1 Remove one F-M3x4L screw on SD/SIM cover.



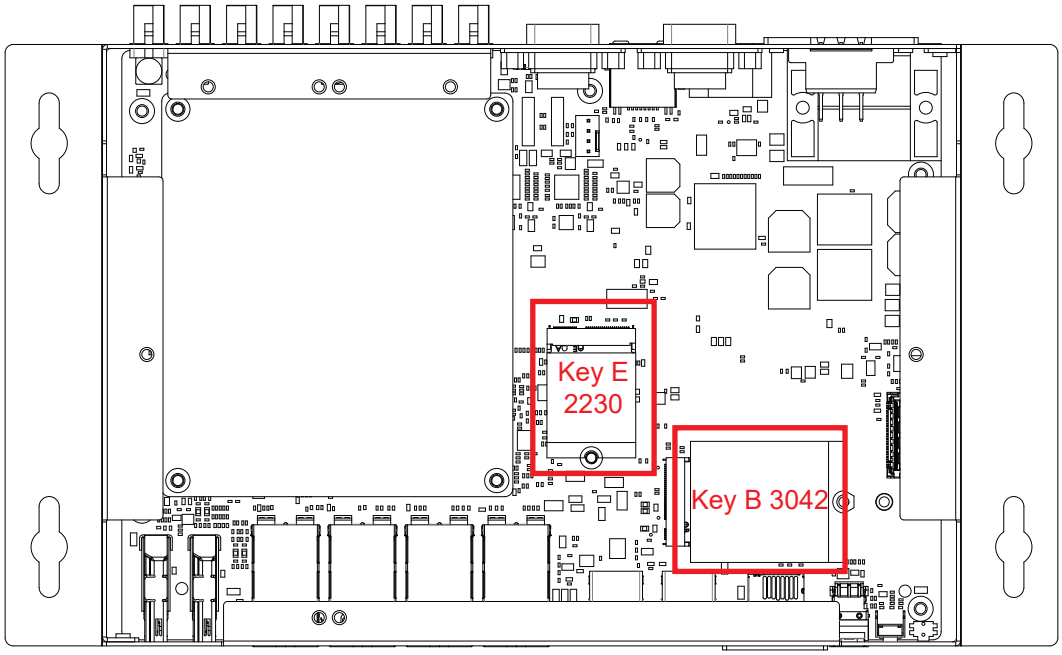
Step 2 Inserting SD card.



3.4 Installing M.2

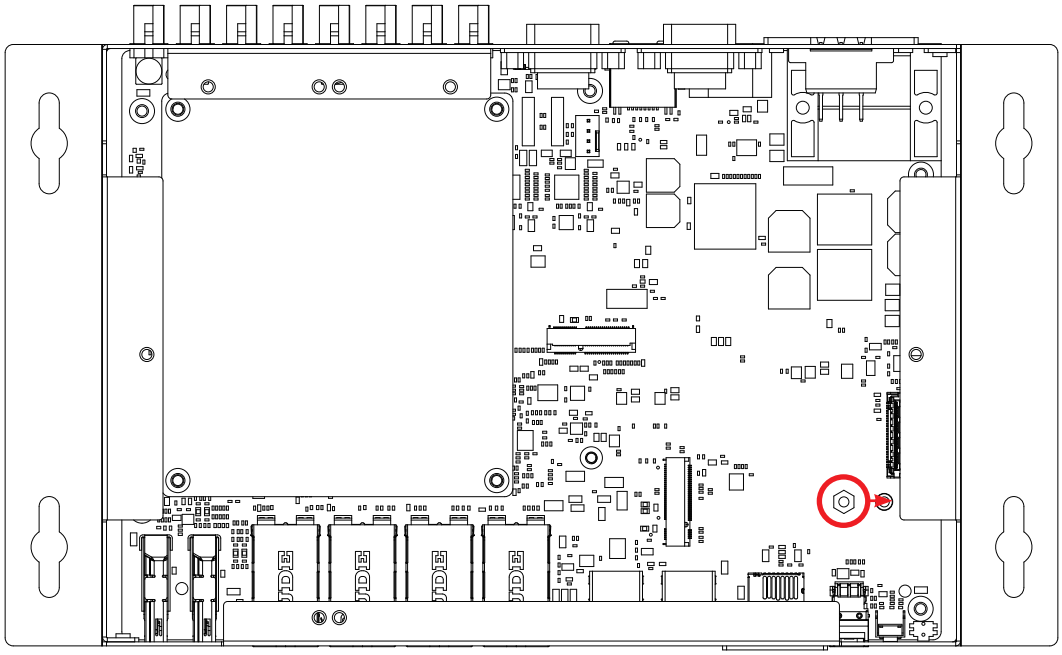
3.4.1 M.2 Key B (3042) M.2 Key E (2230)

Install M.2 card into the M.2 slot and fasten PHILLPIS-M3x4L screw.

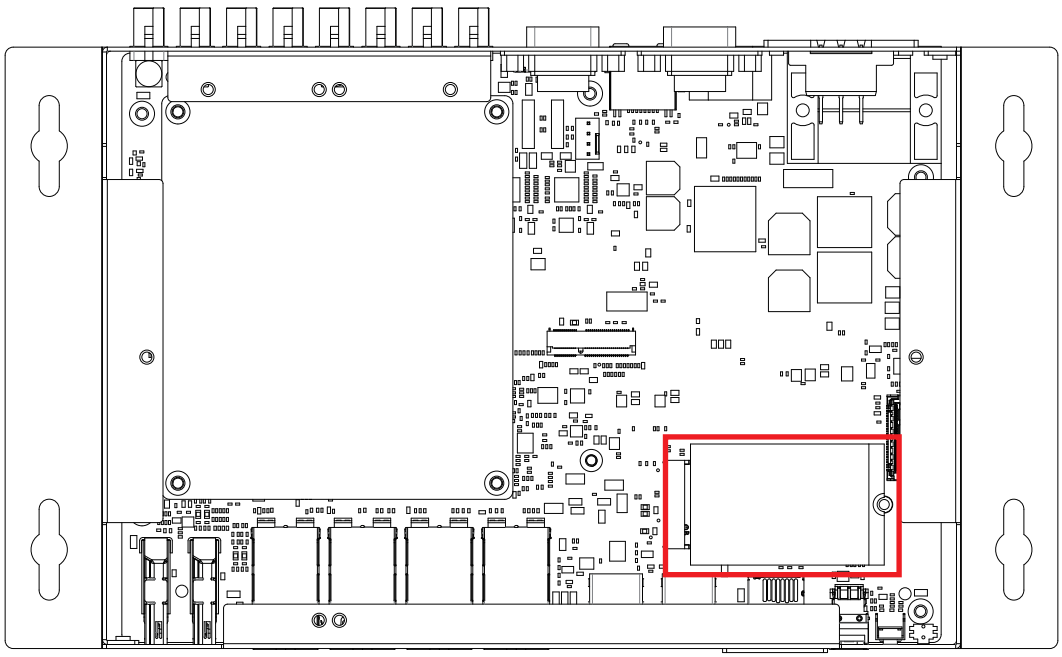


3.4.2 M.2 Key B (3052)

Step 1 Change the stud position.

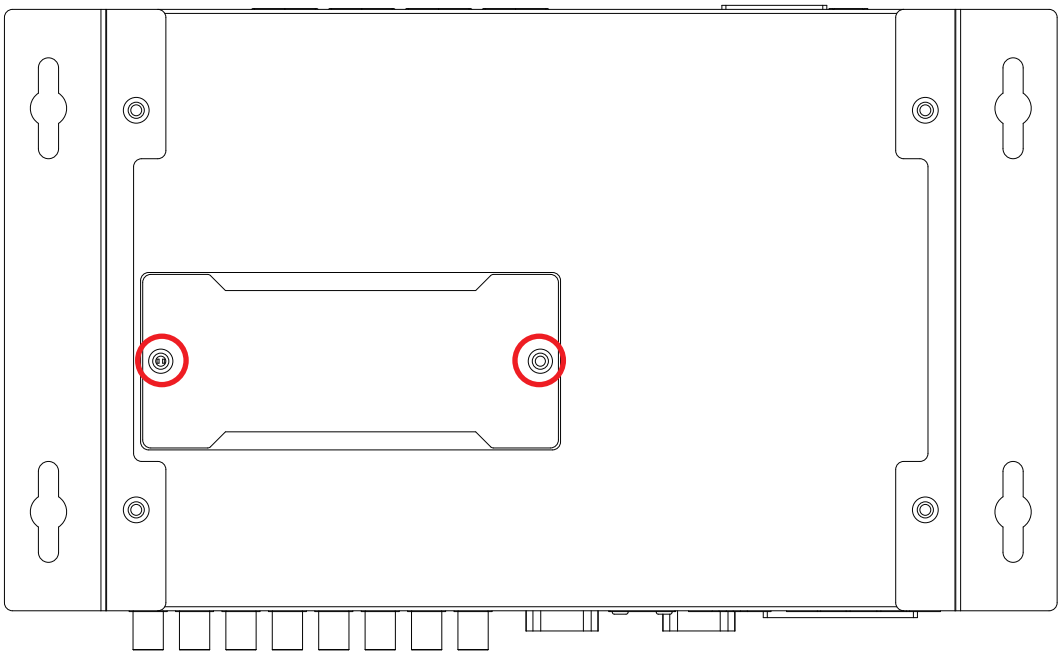


Step 2 Install M.2 card into the M.2 slot and fasten PHILLPIS-M3x4L screw.

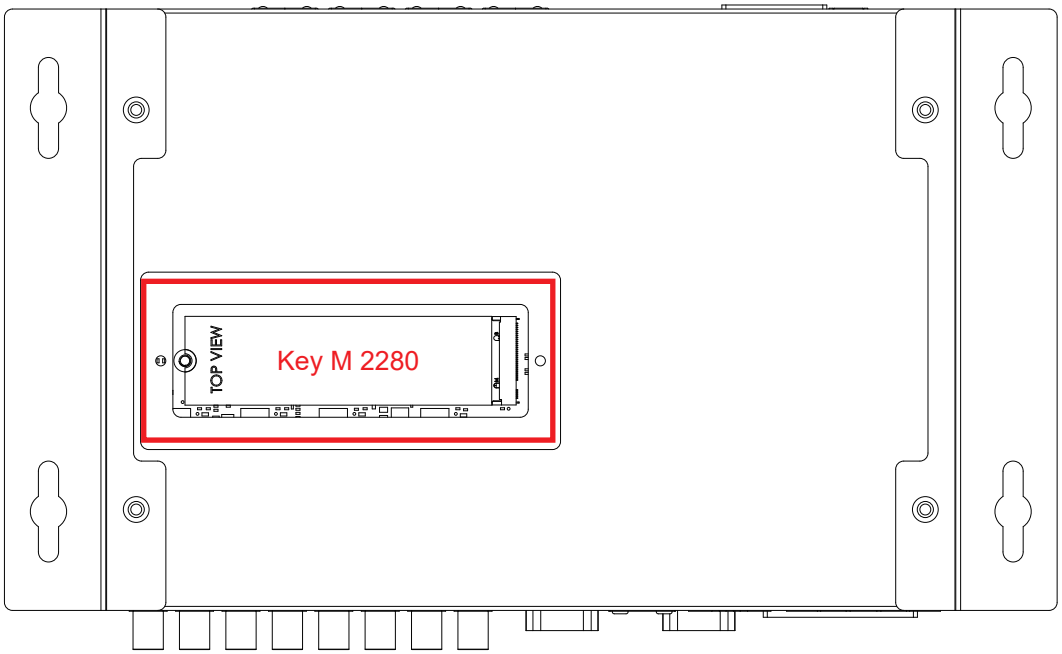


3.4.3 M.2 Key M (2280)

Step 1 Remove two F-M3x4L screws on Storage cover.



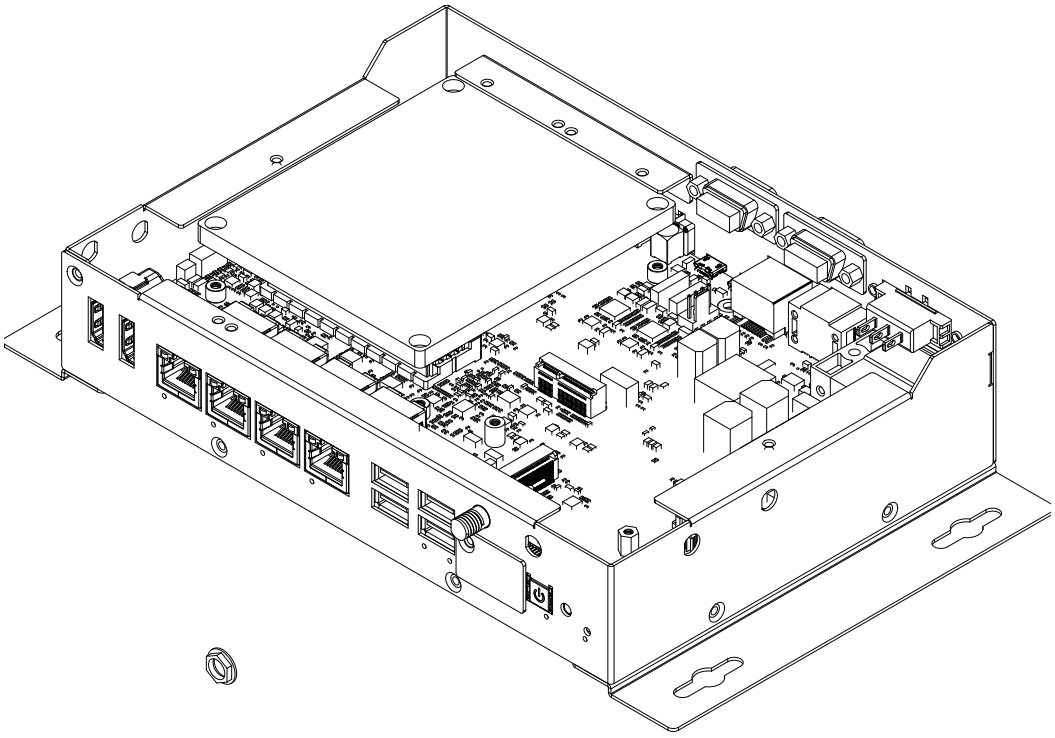
Step 2 Install M.2 card into the M.2 slot and fasten PHILLPIS-M3x4L screw.



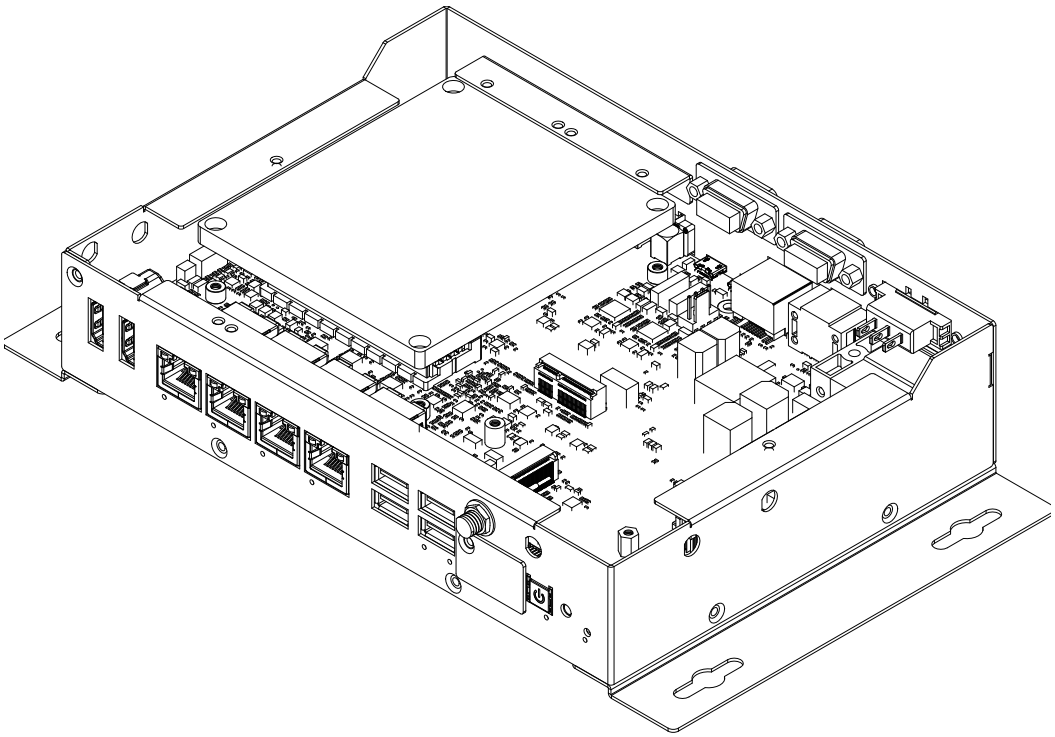
3.5 Installing Antenna Cable

Step 1 Remove the rubber corks on the panel.

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



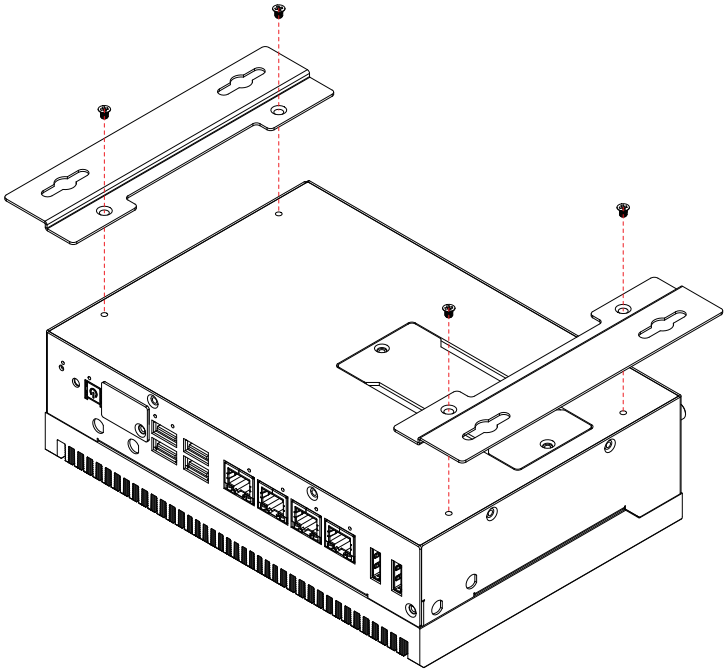
Step 3 Fasten washer on the antenna cable connector.



3.6 Mounting Your EAC-3000/EAC-3000F

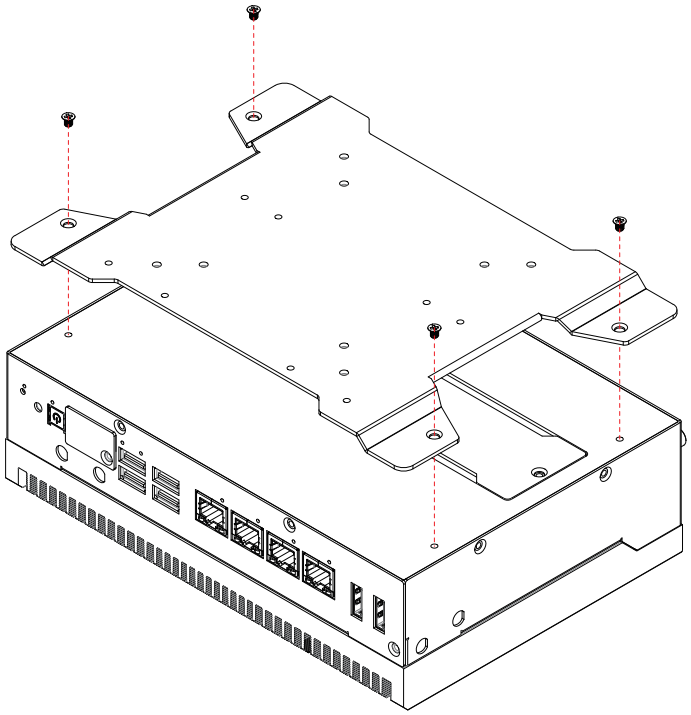
Wall Mount

Install wall mount bracket then fasten four pcs #6-32x6L screws.



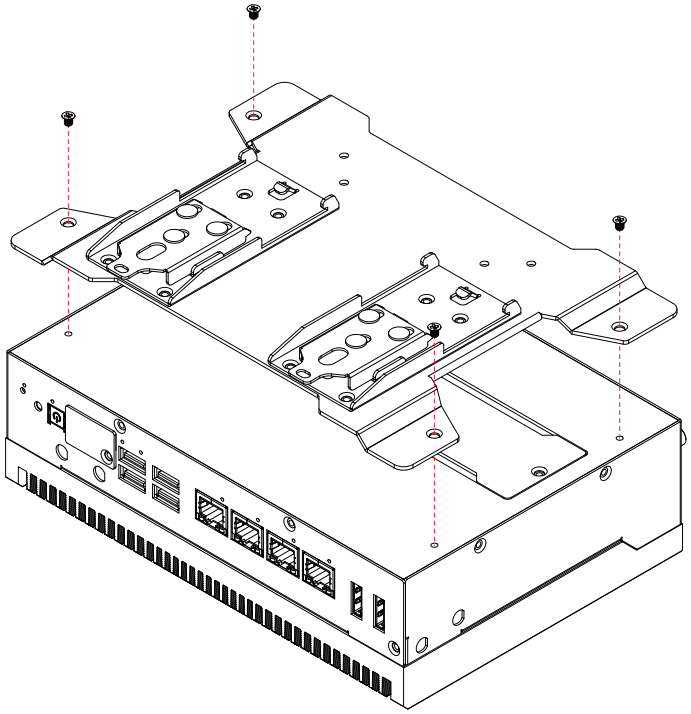
VESA Mount

Install VESA mount then fasten four pcs #6-32x6L screws.



DIN Rail Mount

Install din rail kit then fasten four pcs #6-32x6L screws.



4

SOFTWARE SETUP

4.1 Peripheral Interface Guide

4.1.1 UART

EAC-3000/EAC-3000F have two UARTs, you can access the following path to find an application to config the UART type :

```
$ cd /usr/src/tools/EAC-3000/uart/
```

4.1.2 CAN Bus

You can access the following path to find a CAN FD example :

```
$ cd /usr/src/tools/EAC-3000/canbus/
```

4.1.3 I2S

EAC-3000/EAC-3000F have an internal I2S connector, you can access the following path to find an example to play audio by I2S :

```
$ cd /usr/src/tools/EAC-3000/audio/
```

4.1.4 User Defined LED

You can access the following path to find a user defined LED example application :

```
$ cd /usr/src/tools/EAC-3000/LED/
```

4.1.5 Watch Dog

You can access the following path to find an example application for watch dog :

```
$ cd /usr/src/tools/EAC-3000/watchdog/
```

4.2 Determine Available Drive Space

4.2.1 UART

To determine the amount of available drive space, you can issue the following commands :

```
$ sudo df -h
```

4.3 Install the CUDA package

To install the CUDA package on EAC-3000/EAC-3000F, you can issue the following commands :

```
$ sudo apt update
```

```
$ sudo apt install nvidia-cuda
```

4.4 Flash image to Your EAC-3000/EAC-3000F

Before starting the flashing process, be sure you've properly turned off the **EAC-3000/3000F** and disconnected from the power. You also need to prepare a **host PC** running **Ubuntu 16.04 or later**.

4.4.1 Download the OS image file

Step.1 Download the OS image package file. The file name will be similar to :

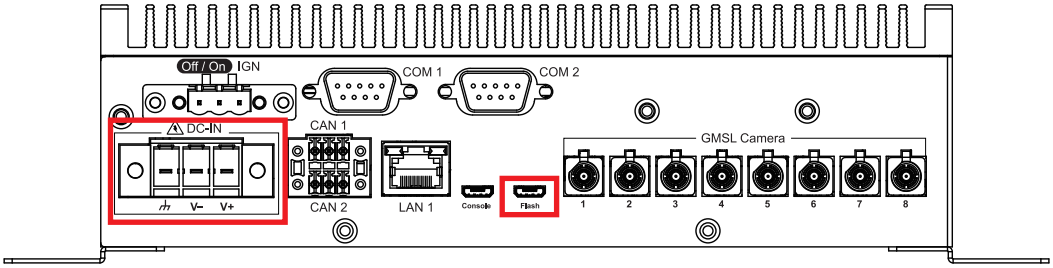
EAC-3000_jetpack4.6.2_v1.00.tar

Step.2 On Host Computer, open a Linux terminal and issue the following command to extract compressed image files :

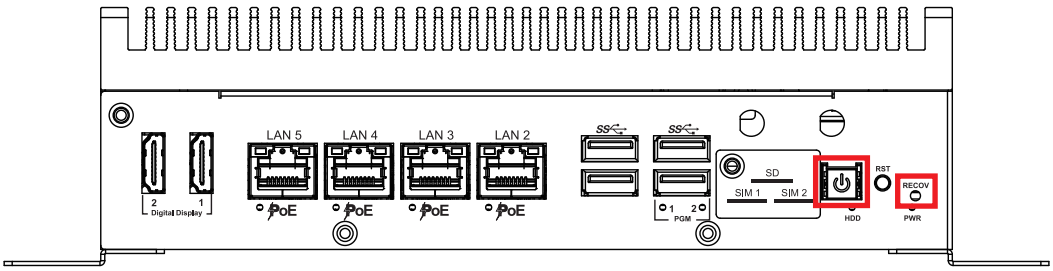
```
$ sudo tar zxvf EAC-3000_jetpack4.6.2_v1.00.tar
```

4.4.2 Connect EAC-3000/3000F to the host computer

Step.1 **Connect** the **power adapter** to the EAC-3000/3000F. Connect the Micro USB cable to the "Flash" Port on EAC-3000/EAC-3000F and the other end to an available USB port on the host PC.



Step.2 **Press** and **hold** the **“RECOV”** button, and **short-press** the **power button** at the same time.



Continue to hold the "RECOV" button for **two seconds**, and release.

Step.3 Now device is in recovery mode, issue “lsusb” command on host PC will find a new USB device :

```
Bus 003 Device 005: ID 0955:7e19 NVidia Corp.
```

4.4.3 Flash image to the EAC-3000/3000F

Step.1 Open a **terminal** on **host PC**, then access the **package folder** you extracted in the **4.4.1 section**.

Step.2 Issue the following command to flash the image :

```
$ sudo ./nvmflash.shh
```

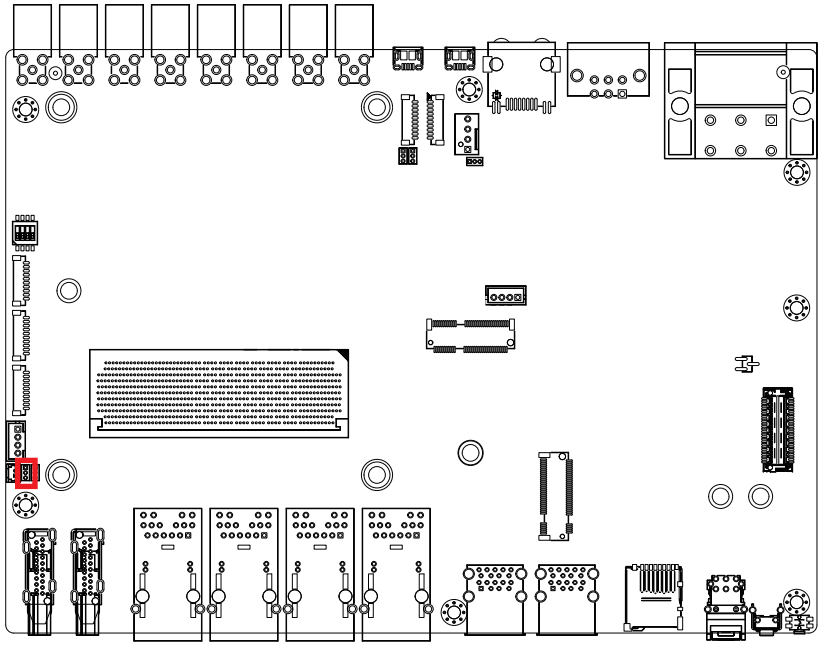
Step.3 Once the process finished, you should see the following log :

```
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes: 11873
Ongoing processes:
Flash complete (SUCCESS)
```

4.5 Software Ignition Control

Vecow provides Ignition Software to control power on/off delay periods.

To activte software ignition control, you need to adjust the JIGNMODE1 jumper to 2-3.



You can access the following path to find an application for software ignition control :

```
$ cd /usr/src/tools/EAC-3000/ignition/
```

APPENDIX A : GMSL Camera Guide

To initialize the GMSL camera, you can access the following path to find the camera scripts :

```
$ cd /usr/src/tools/EAC-3000/camera/
```

“init.sh” includes camera bring up script and camera driver installation

"preview_imx390ISP_example.sh" includes the command to open the camera with GStreamer.

Only the verified cameras shown below are supported in default.

Verified Cameras List

- Otobrite oToCAM264ISP

The verified cameras list may be subject to change without notice.

For further support on GMSL cameras, please contact the Vecow support team.

B

APPENDIX B : Power Consumption

Testing Board	EAC-3000 Rev B
RAM	32 GB 128-bit LPDDR4x
USB-1	Logitech Media Keyboard K200 Y-U0011
USB-2	Microsoft Basic Optical Mouse V2.0 1113
USB-3	Kingston DataTraveler G4 16GB
USB-4	ADATA UV128/8GB
Micro SD	Apacer 16GB
Storage	32 GB eMMC 5.1
M.2 KEY M	SMART FDMP8960GTCXA111 960GB
M.2 KEY B	Quectel RM500Q-AE
M.2 KEY E	Intel 8265NGW
LAN 1	1.0 Gbps
LAN 2	1.0 Gbps
LAN 3	1.0 Gbps
LAN 4	1.0 Gbps
Graphics Output	HDMI
Power Plan	Default (15W TDP mode)
Power Source	Chroma 62006P-100-25
Test Program	Stress-ng Test

B.1 ARMv8 Processor rev 0 (v8l) × 4

Power on and boot to Linux 64bit

CPU	Power Input	Linux 64bit			
		idle status CPU		Run BurnInTest/Stress-ng Test	
		Max Current	Max Consumption	Max Current	Max Consumption
ARMv8 Processor rev 0 (v8l) × 4	9V	1.917A	17.26W	2.915A	26.24W
	12V	1.508A	18.10W	2.182A	26.19W
	24V	0.789A	18.94W	1.142A	27.42W
	36V	0.564A	20.32W	0.814A	29.29W
	50V	0.472A	23.69W	0.607A	30.35W

APPENDIX C : Supported Expansion Module List

C.1 Supported 5G/4G/GPS List

Type	Model	Support Standard
M.2 KEY B	Quectel EM06-E	LTE Category 6 Worldwide LTE-A and UMTS/HSPA+ Coverage GPS/GLONASS/BeiDou (Compass)/Galileo/ QZSS (Optional)
M.2 KEY B	Quectel RM500Q-AE	5G sub-6GHz Worldwide 5G and LTE-A coverage GPS/GLONASS/BeiDou (Compass)/Galileo
M.2 KEY B	Thales MV31-W	5G sub-6GHz Global 5G coverage and LTE Cat. 20 fallback GPS, Glonass, Beidou and Galileo

C.2 Supported Wi-Fi/Bluetooth List

Type	Model	Support Standard
M.2 KEY E	SparkLAN WNFT-237ACN(BT)	IEEE 802.11a/b/g/n/ac 2T2R Bluetooth 5.0
M.2 KEY E	Intel 8265NGW	IEEE 802.11a/b/g/n/ac 2T2R Bluetooth 4.2

Vecow

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

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