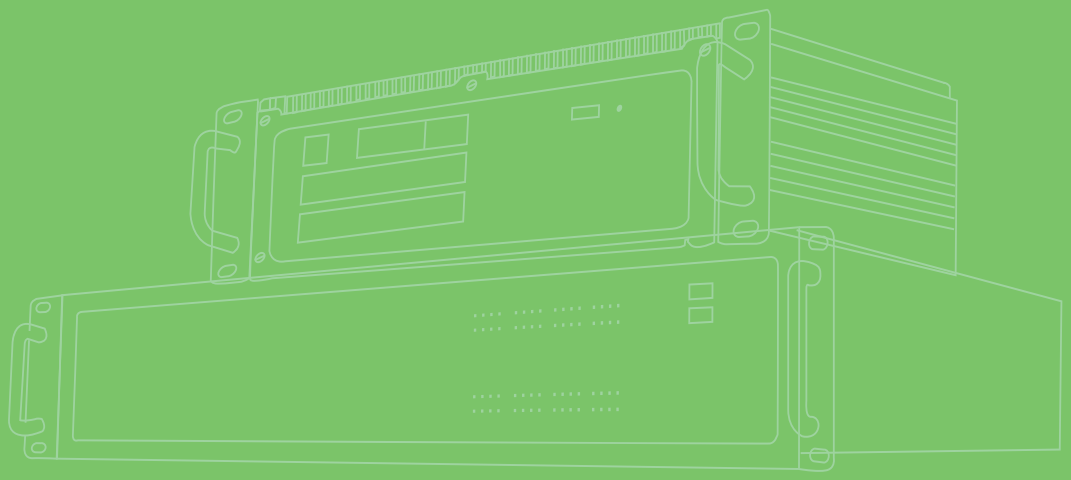

User Manual

ECU-1170

High-Performance All-in-One Gateway for Battery Energy Storage Systems

ADVANTECH

Enabling an Intelligent Planet

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Acknowledgments

Support

For more information on this and other Advantech products, please visit our websites at: http://www.advantech.com

For technical support and service, please visit our support website at: http://www.advantech.com/support/

Part No. 2003U11700 Edition 1

Printed in China March 2025

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

Test conditions for passing also include the equipment being operated within an industrial enclosure. In order to protect the product from damage caused by electrostatic discharge (ESD) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

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

Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards while the PC is powered on.
- Disconnect the power before making any configuration changes. A sudden rush of power after connecting a jumper or installing a card may damage sensitive electronic components.

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. Do not cover the openings.
8. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If any of the following occurs, have the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the equipment.
    - The equipment has been exposed to moisture.
    - The equipment is malfunctioning, or does not operate according to the user manual.
    - The equipment has been dropped and damaged.
    - The equipment shows obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -30° C (-22° F) OR ABOVE 70°C (158° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
17. This product is intended to be supplied by an UL certified power supply or dc source with SELV output, rated 10 to 30Vdc, 2.7 to 0.9Aminimum and maximum ambient temperature (Tma) 70 degree C minimum without power source or adapter. If you need further assistance, please contact Advantech for further information.
18. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet. The power outlet socket should have a grounded connection.
19. For use in pollution free environments and indoor use.
20. This equipment is not suitable for use in locations where children are likely to be present.

21. If the equipment is used in a manner not specified by the Advantech, the protection provided by the equipment may be impaired.
22. The equipment contains no user-serviceable parts. Do not open, Return to manufacturer for servicing.
23. Do not block air ventilation holes.
24. This is open type equipment and should be installed in a suitable enclosure.
25. Equipment is intended for installation in Restricted Access Area.

Consignes de sécurité

1. Lire attentivement les instructions de sécurité.
2. Conserver ce manuel pour utilisation ultérieure,
3. Débranchez cet équipement de toute prise secteur avant le nettoyer. Utilisez seulement un chiffon humide. N'utilisez pas de détergent liquide ou pulvérisé pour le nettoyage.
4. Gardez cet équipement à l'abri de l'humidité.
5. Placez cet équipement sur une surface fiable pendant l'installation. Le faire ou bien le laisser tomber peut causer des dégâts.
6. Les ouvertures sur l'enceinte servent à la convection de l'air. Protégez l'équipement contre surchauffe. NE COUVREZ PAS LES OUVERTURES.
7. Assurez-vous que la tension de la source d'alimentation est correcte avant de connecter l'équipement à une prise de courant. La prise de courant doit avoir une connexion à la terre.
8. Placez le câble d'alimentation de manière à ce que personne ne puisse marcher dessus. Ne placez rien sur le câble d'alimentation.
9. Toutes les mises en garde et tous les avertissements sur l'équipement doivent être notés.
10. Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter tout endommagement dû à une surtension transitoire.
11. Ne jamais verser de liquide dans une ouverture. Cela pourrait provoquer un incendie ou un choc électrique.
12. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, l'équipement doit être ouvert uniquement par du personnel qualifié.
13. Si l'une des situations suivantes se présente, faites vérifier l'équipement par le personnel de service:
    - un liquide a pénétré dans l'équipment.
    - L'équipement a été exposé à l'humidité.
    - L'équipement ne fonctionne pas bien, ou vous ne pouvez pas le faire fonctionner selon le manuel de l'utilisateur.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - L'équipement est tombé et endommagé.
    - L'équipement présente des signes évidents de rupture.
14. NE LAISSEZ PAS CET ÉQUIPEMENT DANS UN ENVIRONNEMENT OU LA TEMPÉRATURE DE STOCKAGE PEUT ÊTRE INFÉRIEURE À -30 ° C (-22 ° F) OU BIEN SUPÉRIEURE À 70 ° C (158 ° F). CECI POURRAIT ENDOMMAGER L'EQUIPEMENT. L'ÉQUIPEMENT DEVRAIT ÊTRE DANS UN ENVIRONNEMENT CONTRÔLÉ.
15. Ce produit est destiné à être alimenté par une source d'alimentation certifiée UL ou par une source cc convenant à une utilisation à une température minimal de 40 degrés Celsius, dont la sortie est conforme à la norme SELV et dont la puis-

sance nominale est de 10 to 30Vdc, 2.7 to 0.9A en cas de besoin. Température ambiante maximale (tma) minimum 70 degrés Celsius sans alimentation ni adaptateurcontactez Advant-ech pour plus d'informations.

16. Pour une utilisation dans des environnements non polluant et à l'intérieur.
17. C'est appareil ne doit pas être utilisé dans des endroits où se trouvent des enfants.
18. Si l'équipement est utilisé d'une manière non spécifiée par le fabricant, la protection fournie par l'équipement peut être altéré.
19. L'équipement ne contient aucune pièce réparable par l'utilisateur. Ne pas ouvrir, retourner au fabricant pour réparation.
20. Ne bloquez pas les ou es de ventilation.
21. Il s'agit d'un équipement de type ouvert et doit être installé dans un boîtier approprié.
22. Les matériels sont destinés à être installés dans des EMPLACEMENTS À ACCÈS RESTREINT

ATTENTION! *Danger d'explosion si la batterie est mal remplace. Remplacer uniquement par le meme type ou equivalent recommandé par le fabricant. Jeter les piles usagées selon les instructions du fabricant.*

Contents

Chapter 1

Overview

1.1 Introduction

The ECU-1170 is a purpose-built gateway designed specifically for Battery Energy Storage System (BESS) applications. Featuring integrated multi-I/O interfaces and paired with EdgeLink software, the ECU-1170 supports a wide range of communication protocols, enabling seamless connectivity between various BESS sub-systems. With its high computational performance, the ECU-1170 not only functions as a robust gateway, but also serves as a local EMS (Energy Management System) or a BAU (Battery Auxiliary Unit), offering exceptional versatility and efficiency for energy storage solutions.

1.2 Specifications

1.2.1 General

Table 1.1: General	
Certifications	CE, FCC, UL 62368, IEC-62368
Dimensions	183 x 108 x 43 mm
Power Input	10 ~ 30 VDC
Mounting	Din Rail/Wall-Mount
Ingress Protection	IP30
Storage Temperature	-40 ~ 85°C
Operating Temperature	-40 ~ 70°C
Humidity	5-95% (non-condensing)
Operating System	Primary: Yocto Linux with Edgelink Secondary: Ubuntu 22.04 (Linux kernel 5.10)

1.2.2 System

Table 1.2: System	
CPU	Rockchip RK3568J Quad-Core Arm Cortex A55 1.4GHz (Up to 1.8GHz)
RAM	4GB LPDDR4 (Up to 8GB)
eMMC	32GB eMMC (up to 128GB)
Extension Storage	1 x NVMe (Optional by customization)
Display	1 x HDMI (Up to 1080p @120Hz and 4096 x 2304 @60Hz)
Real Time Clock	Yes
Watchdog Timer	Yes
TPM2.0	Optional by customization
Super-Capacitor	Optional by customization (5 seconds power hold upon power loss)
LED	6 x LED (1 x power, 5 x programmable LED)

1.2.3 I/O Interfaces

Table 1.3: I/O Interfaces								
Serial	8 x isolated RS-485/232, 2000VDC isolation							
		COM1	COM2	COM3	COM4	COM5	COM6	COM7	COM8
	Mode	RS-232/485							
	Speed	50 ~ 115200 bps				1200 ~ 115200 bps			
	Data bit	5,6,7,8				8			
	Isolation	2000 VDC							
LAN	4 x 10/100/1000Mbps Ethernet								
USB	1 x USB2.0 HOST, 1 x USB3.0 HOST (OTG function reserved)								
CAN	2 x Isolated CAN2.0B, 2000VDC isolation (20Kbps~1000Kbps)								
SD Card	1 x Micro SD Card Slot								
Expansion Slot	1 x Mini-PCIe (full-size) Signal: PCIe for WI-FI (optional USB2.0/SATA by customization) 1 x M.2 B-Key (2280) Signal: USB2.0,USB3.0 for LTE or 5G (Optional PCIe for NVMe by customization)								
SIM Card	2 x Nano SIM card slot for redundancy								
ADC	2 x AI 0-20mA or 0-10V (jumper optional), Accuracy 1%, sampling rate: 40sps								
DI	4 x isolated DI (wet contact) 16 x isolated DI (dry & wet contact) 2000VDC isolation								
DO (LSD, HSD)	4 x Isolated HSD, Source Type, 10-30V, 1A 2 x isolated LSD, Sink Type, 10-30V, 1A 2000VDC isolation								
DO (Relay Output)	8 x Isolated relay (Form A): 5A@250VAC; 3A@30VDC Breakdown voltage: 750VAC Initial insulation 1GΩ at 500VDC								
Console	1 x RS-232 (RJ-45)								

1.2.4 Edgelink*

Table 1.4: Edgelink	Table 1.5:
NorthBound Protocol	IEC-61850*, Modbus Server, DNP3 Outstation, BACnet Server, OPC UA Server
SouthBound Protocol	Modbus Client, DNP3Master, DL/T645, IEC-101, IEC-103, IEC-104, OPC UA Client, BACnetIP, BACnet MS/TP, SNMP
PLC Driver	ABB/Advantech/Allen-Bradley/BECKHOFF/ DELTA/FATEK/GE/ Honeywell/Keyence/Mitsubishi/Omron/Panasonic/Schneider/ Sharp/Siemens/ Toyopuc/Wago 750/Yaskawa/Yokogawa
Configuration Tool	WISE-EdgeLink Studio
Data Monitoring	20000 Tags Max
Cloud Connectivity (MQTT)	Azure, AWS, Google Cloud IoT Core, and more
Database Transmission	SQL Server, MySQL, ORACLE, FTP Server
VPN	OpenVPN

*Please refer to EdgeLink specifications for further details. Activation of the IEC-61850 protocol requires an additional fee.

1.3 Software Configurations

Table 1.6: Software Configurations	
Operating System:	Ubuntu 22.04 / Yocto+EdgeLink
Programming:	IEC-61131-3, Linux C, Python
Login Details:	User Name: root Password: no password (press "Enter")
Default IP:	LAN1: 10.0.0.1 LAN2: 11.0.0.1 LAN3: 12.0.0.1 LAN4: 13.0.0.1

1.4 Chassis Dimensions

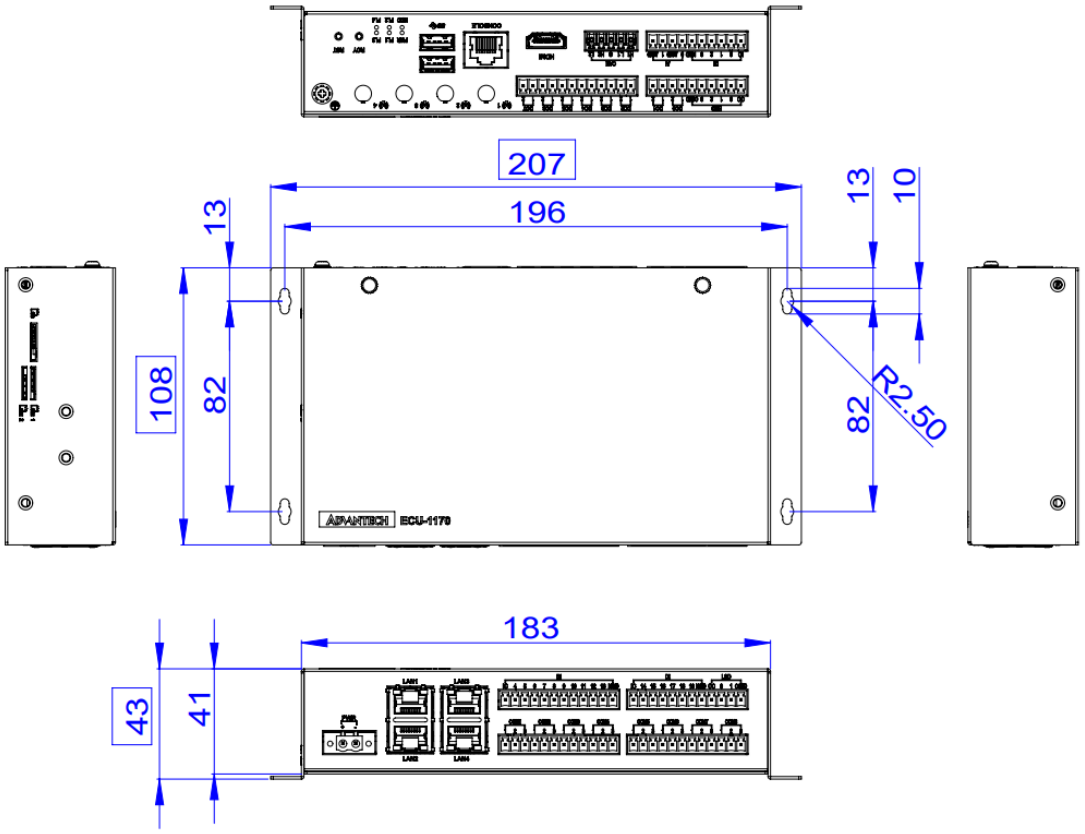


Figure 1.1 ECU-1170 Chassis Dimensions

1.5 Packing List

The accessory package of the ECU-1170 contains the following items:

(A) ECU-1170

(B) Connectors

(C) Din Rail

(D) Screws

Chapter 2

Hardware Functionality

2.1 Overview

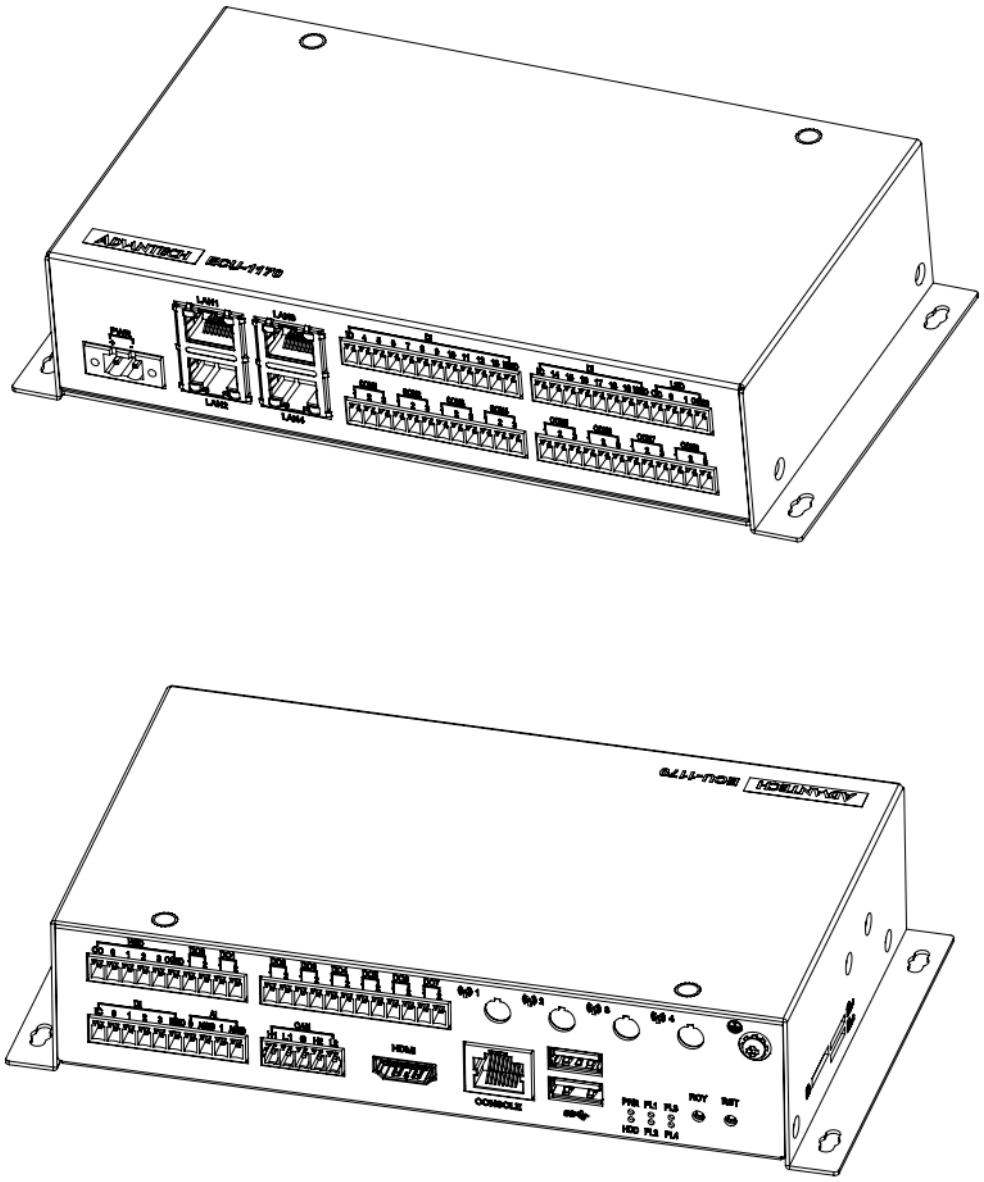


Figure 2.1 ECU-1170 Overview

2.2 LED Status Indicators and Buttons

2.2.1 System Status Indicators

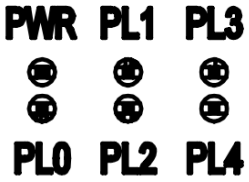


Figure 2.2 System Status LED

Table 2.1: System Status Indicators

LED	Description
PWR	Power On
PLx	Programmable LED

2.2.2 Ethernet Status Indicators

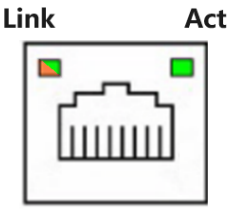


Figure 2.3 Ethernet Status Indicators

Table 2.2: Ethernet Status Indicators

LED	Status	Description
Link	Off	10 Mbps
	Orange	100 Mbps
	Green	1000 Mbps
Act	Green Lighting	Not transmitting data
	Green Blinking	Transmitting data

2.3 System Button

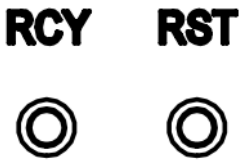


Figure 2.4 System Button

Table 2.3: System Button	
Button	**Description**
RCY	Recovery
RST	Reset

Caution! *The RCY button is used for recovering the system. This will erase your project and restore the system.*

1. Ensure the device is turned off.
2. Press and hold the RCY button while turning the device on.
3. After powering on, continue holding the RCY button for 10 seconds and observe the upgrade indicator (PL1). Once it starts flashing in a regular pattern, release the RCY button. The device will then begin the recovery process.
4. Wait for 3 minutes until the upgrade indicator (PL1) stops flashing, indicating that the recovery is complete.

Note! *Recovery restores the last updated image, not the factory image.*

Table 2.4: Table 2.4: Recovery Options		
OS	**Yocto + EdgeLink**	**Ubuntu**
Image that Supports Recovery	Supported from 2.8.4.2 and above	Supported from 1.0.3 and above
Folders/Files that Will Be Retained	#/home/sysuser/project/elic (license file) #/home/sysuser/project/edgelink.lic (license file)	None

Chapter 3

Pins, Jumper Settings, and Wiring

3.1 Power Supply

The ECU-1170 supports a power input range of 10~30 VDC

DC-In Connector Wiring

1. Must be installed by a skilled professional.
2. Only use copper conductors.
3. Choose the appropriate wire diameter.
4. The terminal block is suitable for a 14 AWG torque value of 7 in-lbf.

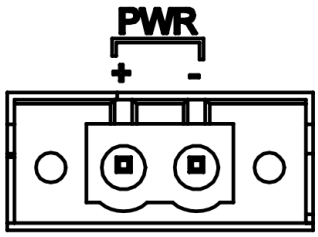


Figure 3.1 Power Supply

Table 3.1: Power Supply

Pin Charge	Description
+	DC power in V+
_	DC power in V-

3.2 Ethernet Ports

4 x 10/100/1000 Mpbs Ethernet ports

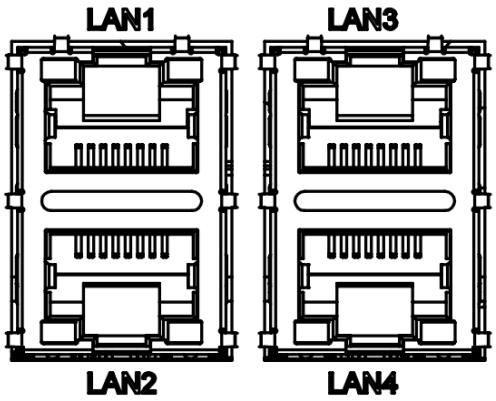


Figure 3.2 Ethernet Ports

Table 3.2: Ethernet Ports

Pin Number	Description
A1/B1	MDI0+
A2/B2	MDI0-
A3/B3	MDI1+
A4/B4	MDI1-
A5/B5	MDI2+
A6/B6	MDI2-
A7/B7	MDI3+
A8/B8	MDI3-

3.3 USB Ports

3.3.1 1 x USB2.0 HOST, 1 x USB3.0 HOST

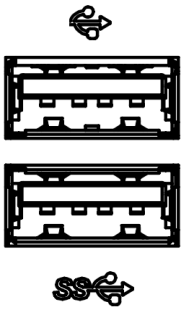


Figure 3.3 USB Ports

Table 3.3: USB Ports	
USB2.0	
Pin Number	**Description**
1	+5V
2	DATA+
3	DATA-
4	GND

USB3.0	
Pin Number	**Description**
1	+5V
2	DATA+
3	DATA-
4	GND
5	STDA_SSRX-
6	STDA_SSRX+
7	Shield GND_DRAIN
8	STDA_SSTX-
9	STDA_SSTX+

3.3.2 1 x USB3.0 OTG (Function Reserved)

Short CN 40 and pins 1-2 of CN1 to enter maskrom mode.

Table 3.4: OTG Jumper Settings

USB 3.0	OTG	USB HOST
CN1	1-2 ON	3-4 ON
CN40	ON	OFF

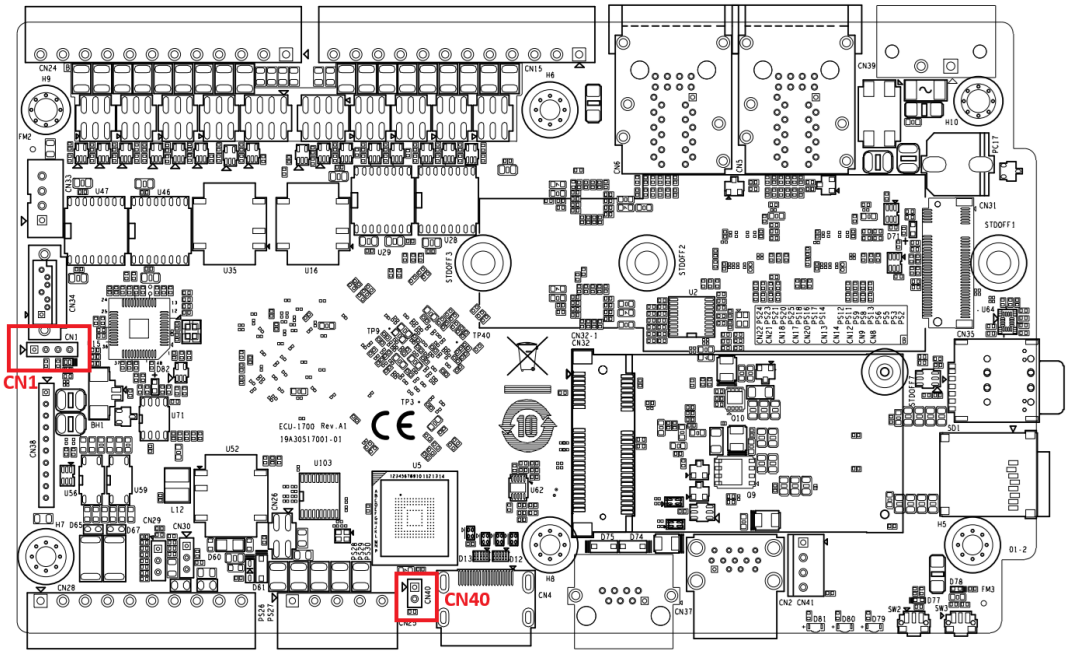


Figure 3.4 USB3.0 OTG

3.4 Console Ports

1 x RS-232 console port (RJ-45)

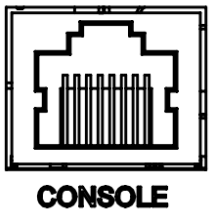


Figure 3.5 Console Ports

Table 3.5: Console Ports

Pin Number	Description
1	Not used
2	Not used
3	Debug Tx
4	GND
5	GND
6	Debug Rx
7	Not used
8	Not used

Console Configuration	
Serial Port	RS-232
Baud Rate	115200
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None

3.5 HDMI Ports

Figure 3.6 HDMI Ports

Table 3.6: HDMI Ports

Pin	Description	Pin Number	Description
1	HDMI1_z_DATA2+	11	GND
2	GND	12	HDMI1_z_CLK-
3	HDMI1_z_DATA2-	13	HDMI1_z_CEC
4	HDMI1_z_DATA1+	14	N/A
5	GND	15	HDMI1_DDC_CLK
6	HDMI1_z_DATA1-	16	HDMI1_DDC_DATA
7	HDMI1_z_DATA0+	17	GND
8	GND	18	+V5_HDMI
9	HDMI1_z_DATA0-	19	HDMI1_HPD
10	HDMI1_z_CLK+		

3.6 CAN Ports

2 x CAN bus

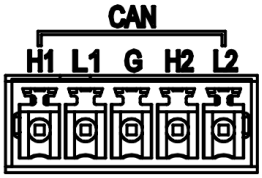
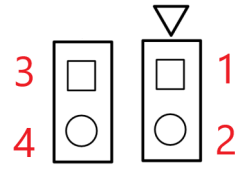


Figure 3.7 CAN Ports-1

Table 3.7: CAN Ports

Pin	Description
Hx	CAN High
Lx	CAN Low
G	GND

Ports	120Ω Jumper	CN26
CAN1	CN26(1-2)	
CAN2	CN26(3-4)	

ON: Termination resistor connected
OFF: Termination resistor disconnected (default)

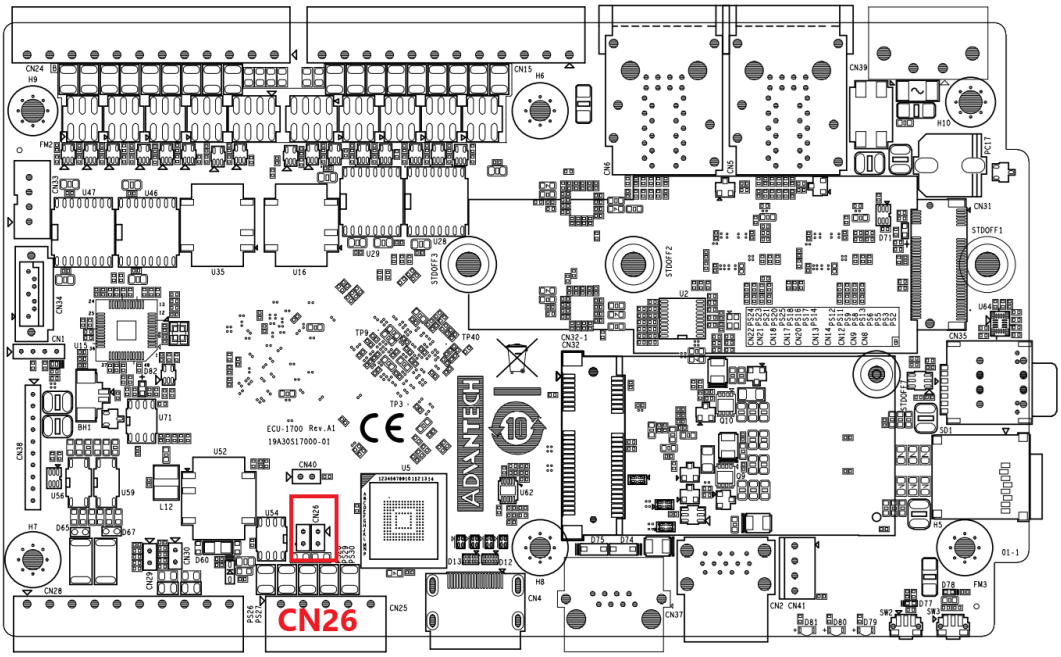


Figure 3.8 CAN Ports-2

3.7 Analog Input Ports

Do not input value over range and short unused channel to GND to avoid interfere.

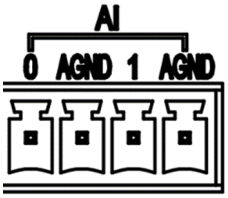


Figure 3.9 Analog Input Ports

Table 3.8: Analog Input Ports

Pin	Description
0/1	Analog Input
AGND	Analog GND

Table 3.9: Voltage/Current Jumper Settings

Pin	Status	Description
CN29/30	1-2	Voltage (Default)
	2-3	Current

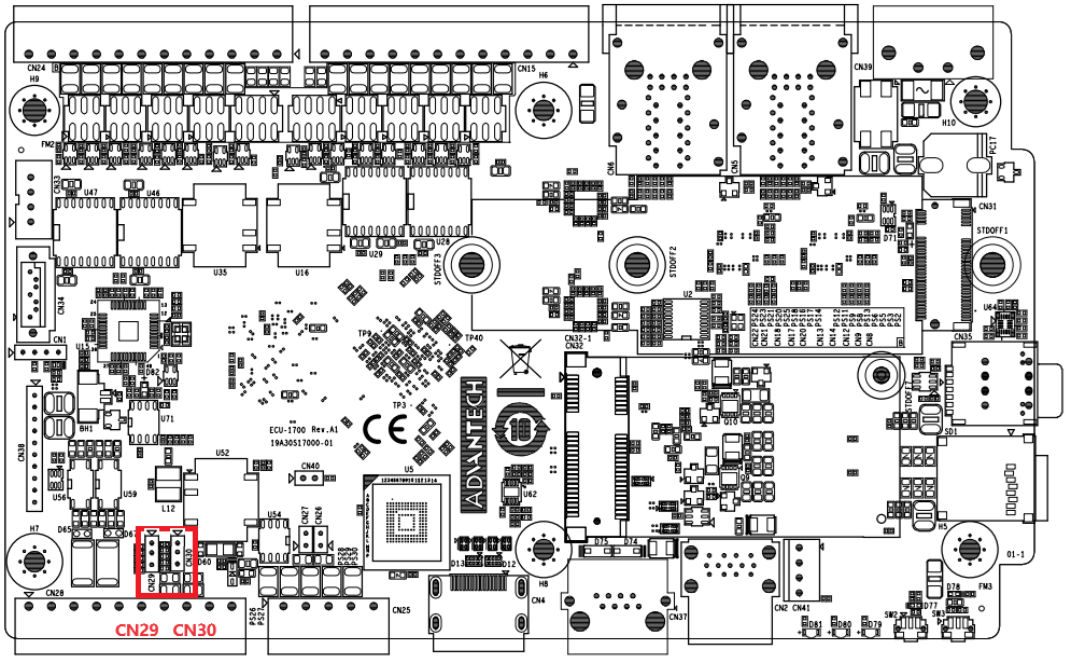


Figure 3.10 Voltage/Current Jumper Settings

3.8 Serial Ports

8 x RS232/485

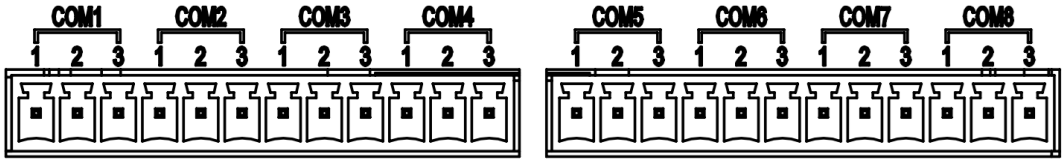
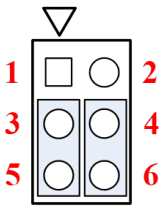
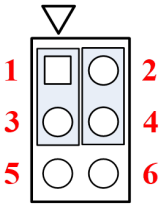


Figure 3.11 Serial Ports

Table 3.10: Serial Ports

Pin Number	Description	
	RS-232	RS-485
1	RX	Data+
2	TX	Data-
3	GND	GND

Table 3.11: RS-232/485 Jumper Settings

Ports	Jumper	RS-232	RS-485 (Default)
COM1	CN8		
COM2	CN9		
COM3	CN12		
COM4	CN14		
COM5	CN17		
COM6	CN18		
COM7	CN21		
COM8	CN22		

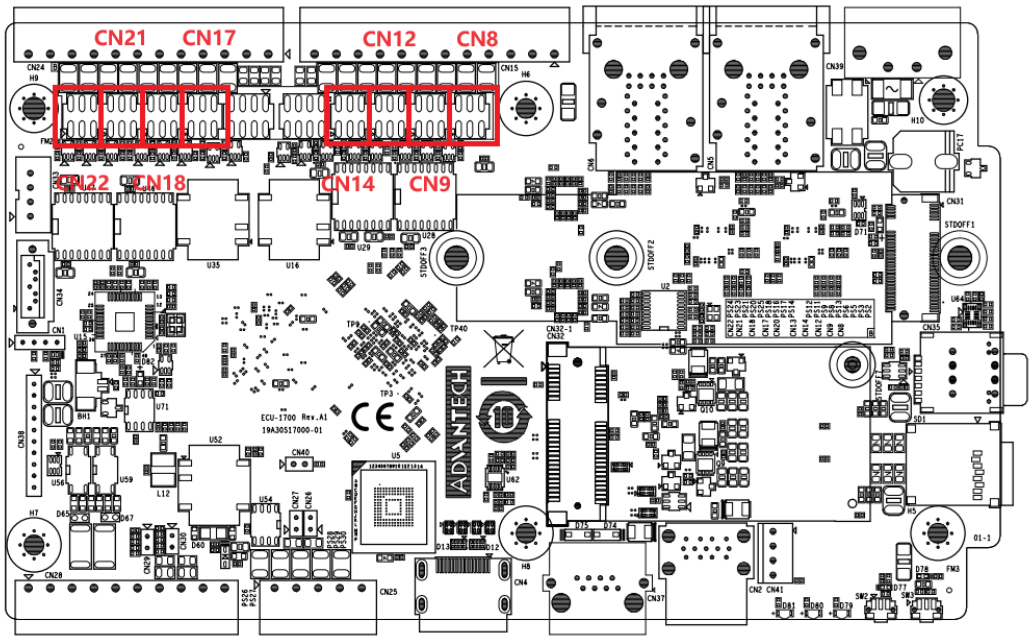
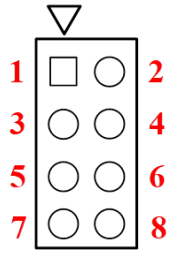


Figure 3.12 RS-232/485 Jumper Settings

Table 3.12: RS-232/485 Termination Resistors		
Ports	**120Ω Jumper**	**CN13/20**
COM1	CN13(1-2)	
COM2	CN13(3-4)	
COM3	CN13(5-6)	
COM4	CN13(7-8)	
COM5	CN20(1-2)	
COM6	CN20(3-4)	
COM7	CN20(5-6)	
COM8	CN20(7-8)	
ON: Termination resistor connected		
OFF: Termination resistor disconnected (default)		

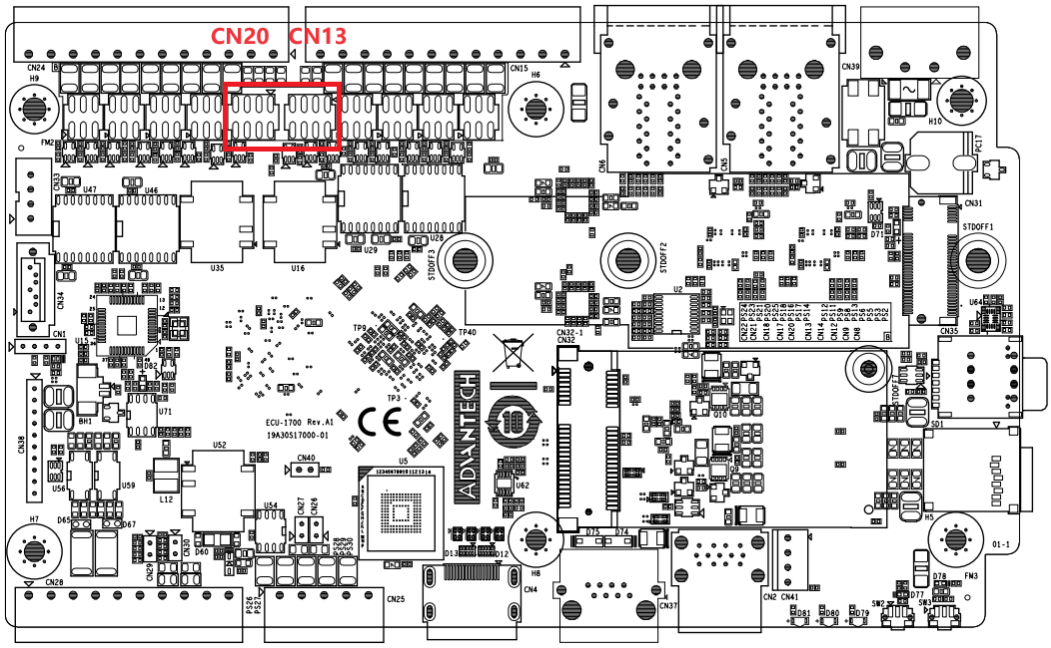


Figure 3.13 RS-232/485 Termination Resistors

3.9 Digital Inputs 0~3 (Wet Contacts)

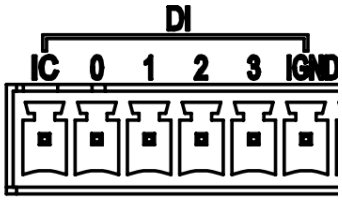


Figure 3.14 Digital Input 0~3 (Wet Contacts) -1

Table 3.13: Digital Input 0~3 (Wet Contacts)

Pin	Definition	
0~3	Digital Input	Logic 1: 5~30V Logic 0: 0~2V
IC	Input Common	
IGND	Input Ground	

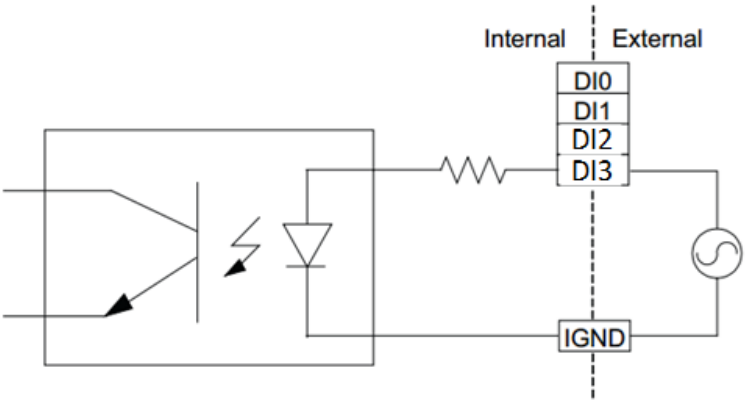


Figure 3.15 Digital Input 0~3 (Wet Contacts) -2

3.10 Digital Inputs 4~19 (Dry/Wet Contacts)

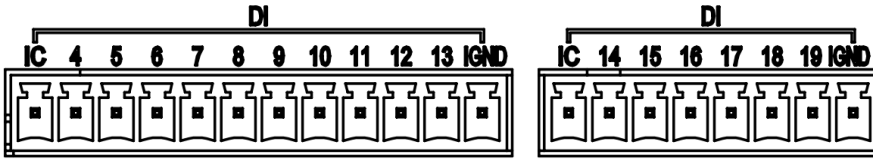


Figure 3.16 Digital Inputs 4~19 (Dry/Wet Contacts) -1

Table 3.14: Digital Inputs 4~19 (Dry/Wet Contacts)		
Pin	**Definition**	Wet: Logic 1: 5~30V Logic 0: 0~2V Dry: Logic 1: Grounding Logic 0: Open Circuit
4~13,14~19	Digital Input	
IC	Input Common	
IGND	Input Ground	

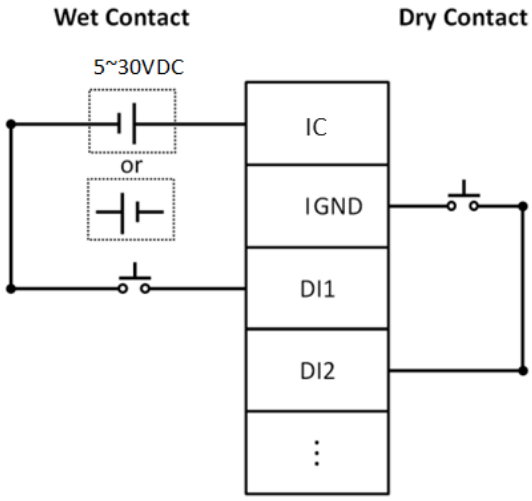


Figure 3.17 Digital Input 4~19 (Dry/Wet Contacts) -2

3.11 Digital Output 0~1 (Low Side Drive)

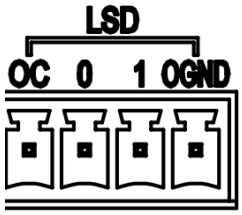


Figure 3.18 Digital Output 0~1 (Low Side Drive) -1

Table 3.15: Digital Output 0~1 (Low Side Drive)	
Pin	**Definition**
0~1	Digital Output
OC	Output Common
OGND	Output Ground

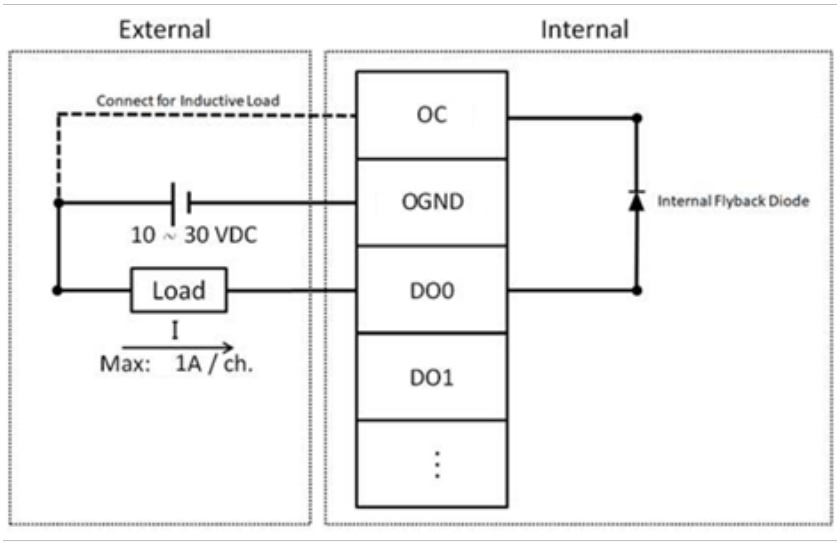


Figure 3.19 Digital Output 0~1 (Low Side Drive) -2

3.12 Digital Output 0~3 (High Side Drive)

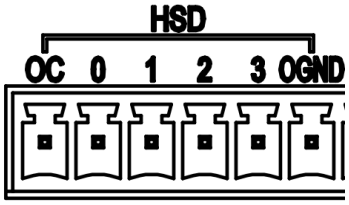


Figure 3.20 Digital Output 0~3 (High Side Drive)

Table 3.16: Digital Output 0~3 (High Side Drive)

Pin	Definition
0~3	Digital Output
OC	Output Common
OGND	Output Ground

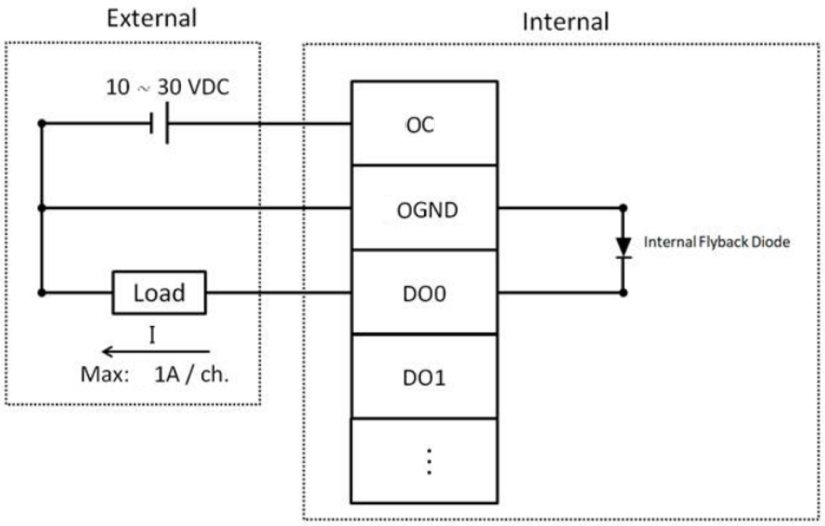


Figure 3.21 Digital Output 0~3 (High Side Drive)

3.13 Digital Output 0~7 (Relay Output)

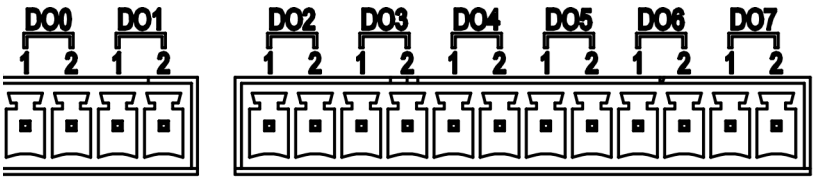


Figure 3.22 Digital Output 0~7 (Relay Output) - 1

Table 3.17: Digital Output 0~7 (Relay Output)	
Pin Number	**Definition**
1	NO (Normal Open)
2	COM (Output Common)

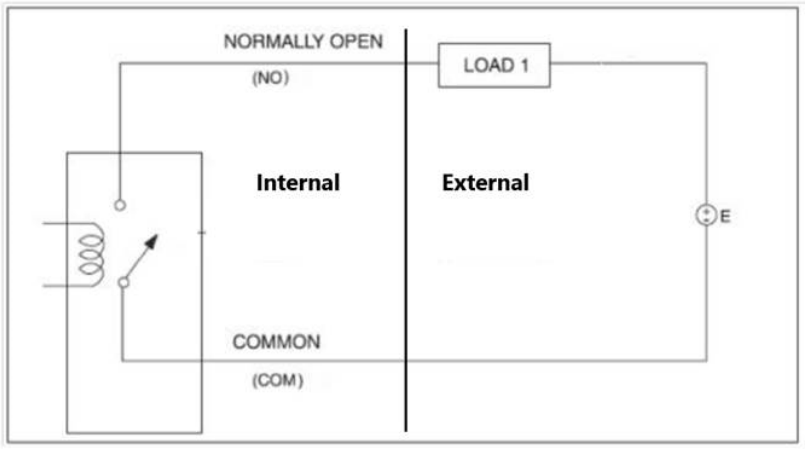


Figure 3.23 Digital Output 0~7 (Relay Output) - 2

3.14 SD And SIM Slots

The ECU-1170 is equipped with 1 x full-size Mini-PCIe and 1 x M.2 B-Key socket. It also includes 1 x SD card and 2 x SIM card slots to the left side of chassis.

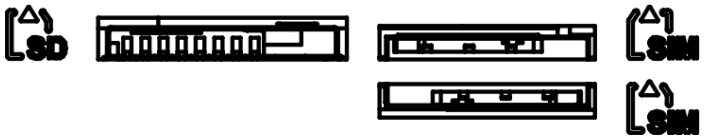


Figure 3.24 SD and SIM slots

Table 3.18: Location of Mini-PCIe and M.2 Socket

Socket	Support Package
Mini-PCIe	3050/3026
M.2 B-Key	2080/3042/3052

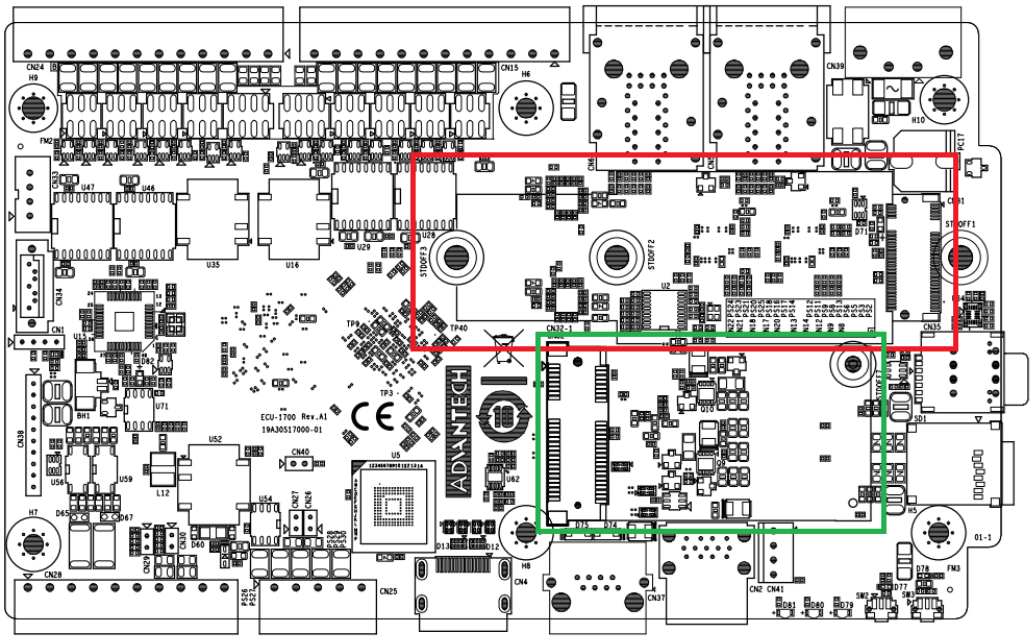


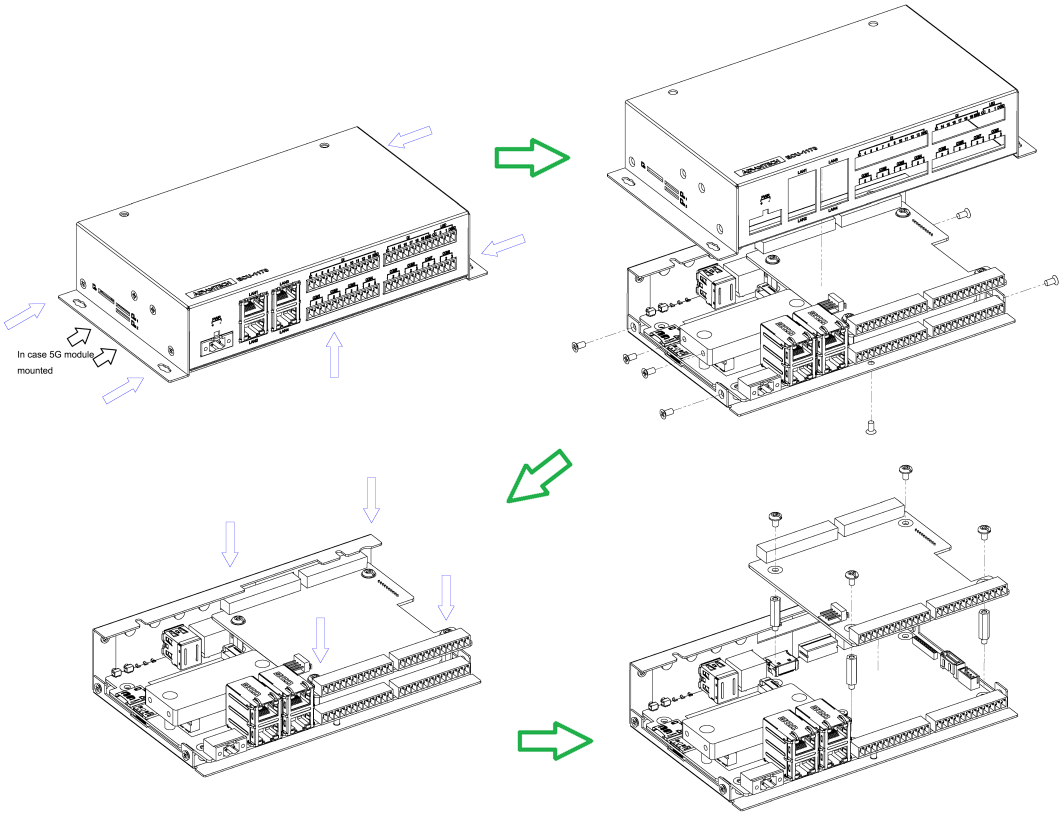
Figure 3.25 Location of Mini-PCIe and M.2 Socket

Chapter 4

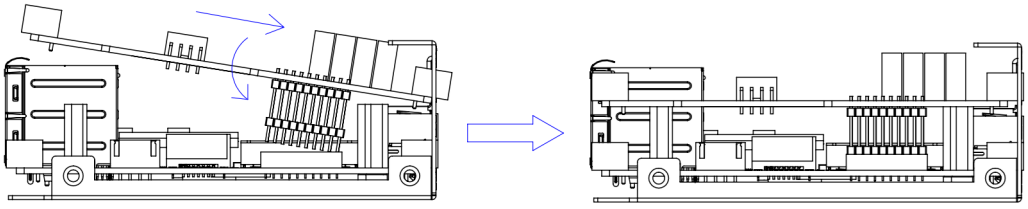
Installation

4.1 Jumper and RTC Battery Location

Disassemble the chassis and upper board to set jumpers and replace RTC battery on the lower board.

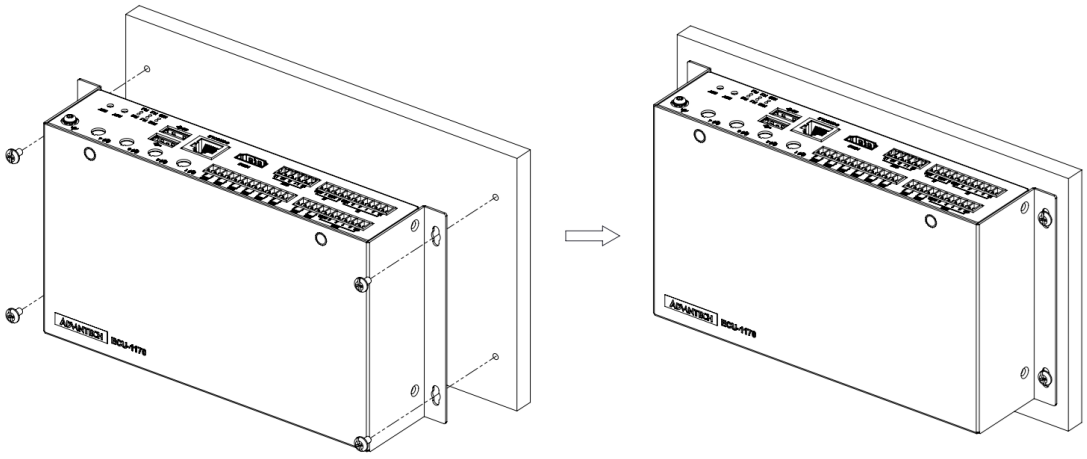


Assemble upper board

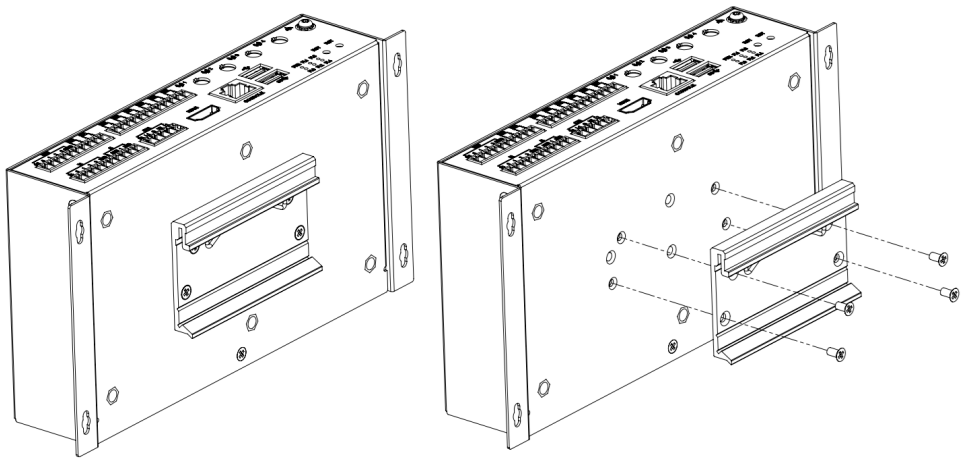


4.2 DIN Rail And Wall Mount Installation

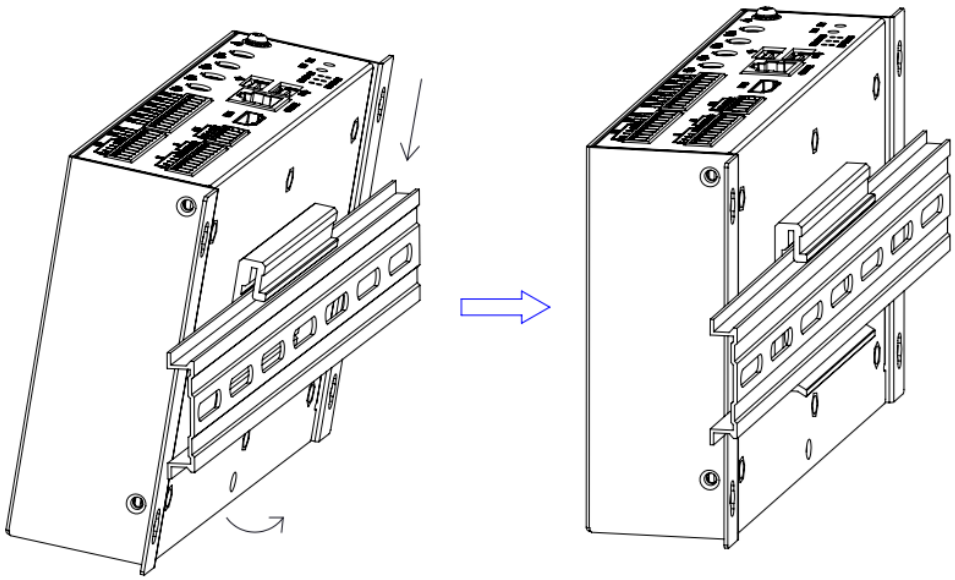
The wall mount bracket is built-in with the chassis and Din rail is also offered in accessories.



To mount the wall plate, use screws of the size M4*6Lmm min, 4pcs.



DIN rail mounting screws (4pcs, M3x6L).



4.3 Module Installation

4.3.1 M.2 Slot Module Assembly

The M.2 slot supports 2280/2242/3042 modules. In the case of 2242/3042, an adapter is needed. The set of the adapter and screws in the below table is the customer's PO. The set of post and screws is within the BOM of shipment and pre-installed. In the case of 2280, the IO board needs to be removed before installation

Table 4.1: M.2 Slot Module Assembly

Part Number	Description
1960102502T000	Adapter
19350304A0	Screw

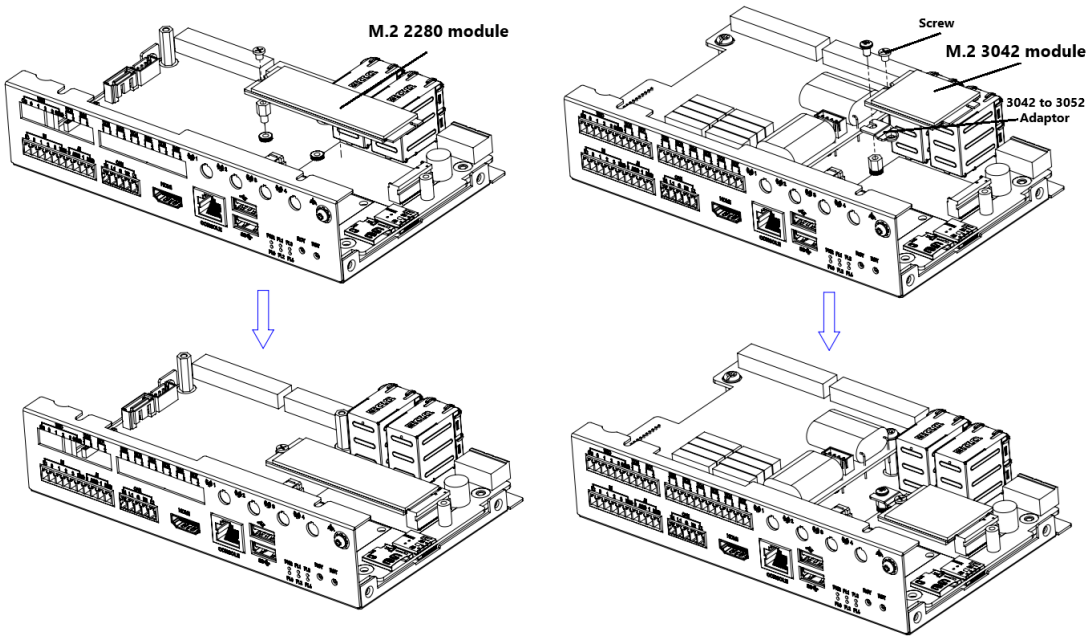


Figure 4.1 M.2 Slot Module Assembly

4.3.2 5G Module Assembly

1. Remove the top cover and place rubber under the 5G module for better support.
2. Assembly the 5G module, thermal pad, and thermal bracket.
3. Remove two plugs from the top cover. Then assemble the top cover and connect the thermal bracket with the chassis with two screws for better heat dissipation.

The set of thermal accessories and screws in the below table are upon customer's PO.

Table 4.2: 5G Module Assembly

Part Number	Description
1960116055N001	5G thermal bracket
1990042003N000	Support rubber
1990042007N000	Thermal pad
1930007459-01	Screw for thermal bracket
1930000071	Screw for 5G thermal bracket connected chassis

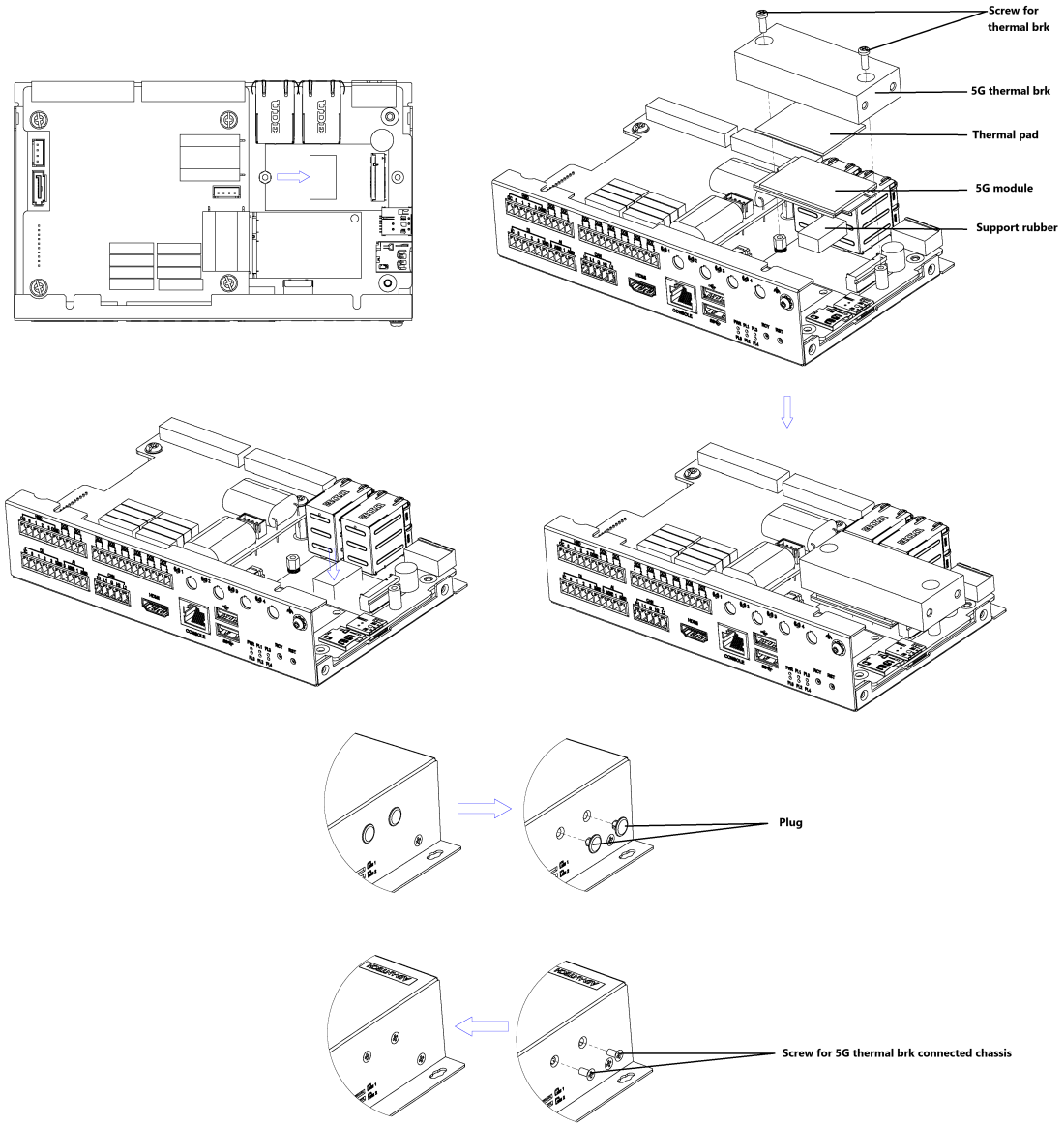


Figure 4.2 5G Module Assembly

4.3.3 Mini-PCIe Slot Module Assembly

The Mini-PCIe slot is compatible with the M.2 E-Key module using an adapter. The set of adapter and screw in the below table is upon the customer's PO. The screw for the adapter is pre-installed.

Table 4.3: Mini-PCIe Slot Module Assembly

Part Number	Description
EXM-CMPF1-M2E01E	M.2 E-Key to mPCIe adapter board
1930000016	Screw

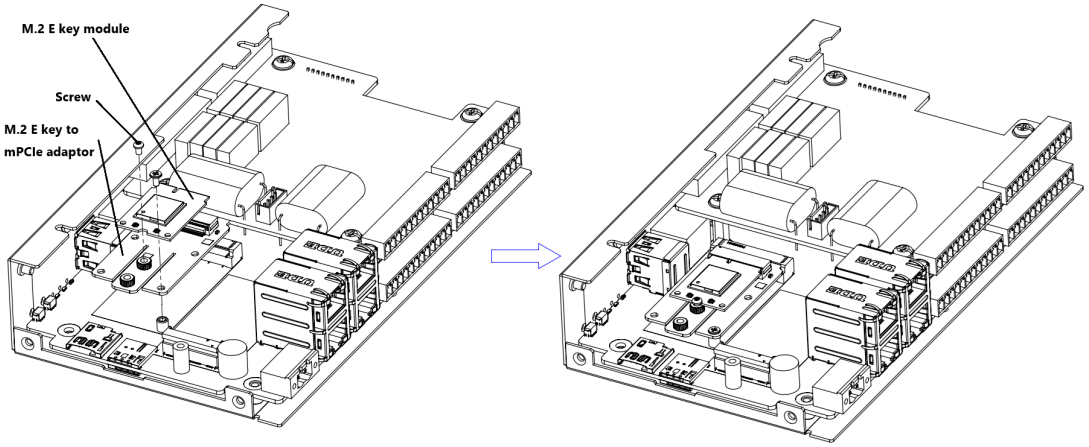


Figure 4.3 Mini-PCIe Slot Module Assembly

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