EMU-210

IoT Gateway

User's Manual



Manual Rev.:	1.0
Revision Date:	June 20, 2024
Part No:	50M-19701-1000

LEADING EDGE COMPUTING

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Revision History

Revision	Release Date	Description of Change(s)
1.0	2024-06-20	Initial release

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Preface

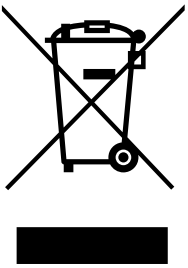
Copyright © 2024 ADLINK Technology Inc.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

Disclaimer

The information in this document is subject to change without prior notice in order to improve reliability, design, and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.



ADLINK is committed to fulfill its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.

Battery Labels (for products with battery)



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

California Proposition 65 Warning

WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov**.**

Trademarks

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Table of Contents

Preface iii

List of Figures vii

1 Introduction 1

1.1 Features 1
1.2 Packing List 2
1.3 Optional Accessories 2
1.4 Specifications 3
1.5 Functional Block Diagram 5
1.6 Mechanical Drawings 6
1.7 I/O Connectors 11

2 Getting Started 17

2.1 Unpacking the EMU-210 17
2.2 Connecting DC Power 18
2.3 Connecting to the EMU-210 20

3 EGiFlow 21

3.1 EGiFlow Login 21
3.2 EGiFlow Menu 23

A Appendix: Debian Linux OS 59

A.1 Hardware Setup 59
A.2 Connecting and Logging in via SSH 60
A.3 LED Function 61
A.4 Serial Port Configuration 61
A.5 Network Settings 62
A.6 5G/4G/LTE Module Configuration 63
A.7 Wi-Fi Configuration and Connection 65

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

B Appendix: Accessory Installation 67
B.1 Wi-Fi Module 67
B.2 4G Module 73
B.3 5G Module 78

Important Safety Instructions 83

Consignes de Sécurité Importantes 85

Getting Service 89

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

List of Figures

Figure 1-1: Functional Block Diagram 5
Figure 1-2: EMU-210 Dimensions 6
Figure 1-3: DIN Rail Mount 1 7
Figure 1-4: DIN Rail Mount 2 8
Figure 1-5: Wall Mount 1 9
Figure 1-6: Wall Mount 2 9
Figure 1-7: Wall Mount 3 10
Figure 1-8: Front View 11
Figure 1-9: Side View 11
Figure 1-10: DC Power Input 13
Figure 1-11: COM Port Pin Definition 15
Figure 3-1: EGiFlow Login Page 22
Figure 3-2: EGiFlow Main Page 22
Figure 3-3: Create EGiFlow iApp 24
Figure 3-4: Modbus TCP/RTU to Cloud 25
Figure 3-5: Create Modbus TCP 26
Figure 3-6: Configure Modbus TCP 26
Figure 3-7: Create Modbus RTU 27
Figure 3-8: Configure Modbus RTU 27
Figure 3-9: Create Compute 28
Figure 3-10: Develop Customized Data Conversion 28
Figure 3-11: Create Azure 29
Figure 3-12: Configure Azure 29
Figure 3-13: Create AWS 30
Figure 3-14: Configure AWS 30
Figure 3-15: Run and Deploy 31
Figure 3-16: Modbus TCP/RTU to MQTT 31
Figure 3-17: Create MQTT Publish 33
Figure 3-18: Configure MQTT Publish 33
Figure 3-19: Modbus TCP/RTU to RESTful 34
Figure 3-20: Create RESTful 35
Figure 3-21: Configure RESTful 35
Figure 3-22: Modbus RTU to Modbus TCP 36
Figure 3-23: Create Modbus TCP Write 37
Figure 3-24: Configure Modbus TCP Write 37
Figure 3-25: OPC UA to AWS 38
Figure 3-26: Create OPC UA 39
Figure 3-27: Configure OPC UA 39

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Figure 3-28: Create Compute 40
Figure 3-29: Develop Customized Data Conversion 40
Figure 3-30: Create AWS 41
Figure 3-31: Configure AWS 41
Figure 3-32: Create Python iApp 42
Figure 3-33: Select a template and enter a name 42
Figure 3-34: The new iApp can be edited 43
Figure 3-35: Run a new iApp 43
Figure 3-36: Network Settings 44
Figure 3-37: Select LAN Port 44
Figure 3-38: Configure LAN Port 45
Figure 3-39: Select DHCP or Static 45
Figure 3-40: Configure Static IP (IPv4) 46
Figure 3-41: Configure Static IP (IPv6) 46
Figure 3-42: DNS Settings (IPv4) 47
Figure 3-43: Network Settings 47
Figure 3-44: WiFi Network Information 48
Figure 3-45: Select Country Code and SSID Name 48
Figure 3-46: Cellular Network 49
Figure 3-47: Enable Cellular Network 49
Figure 3-48: Select Time Settings 50
Figure 3-49: Configure Time Settings 50
Figure 3-50: Configure NTP Settings 51
Figure 3-51: Synchronize Time 51
Figure 3-52: Serial Settings 52
Figure 3-53: Configure Serial Port 52
Figure 3-54: Account Management 53
Figure 3-55: Create User Accounts 53
Figure 3-56: System Management 54
Figure 3-57: Factory Default and Firmware Upgrade 54
Figure 3-58: Event Log 55
Figure 3-59: Event Log Information 55
Figure 3-60: External Storage 56
Figure 3-61: Manage External Storage 56
Figure 3-62: System Information 57
Figure 3-63: Device Information and Software Version 57

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1 Introduction

The EMU-210 IoT Energy Gateway provides communication conversion between different Ethernet or serial-based protocols allowing for wider integration of devices into a network with the ability to send data to the cloud. It is designed to work under a large variety of applications such as monitoring energy consumption, electric vehicle charging control and monitoring, renewable energy monitoring, and smart manufacturing.

The EMU-210 is an i.MX8M Plus based high-performance IoT gateway with a Quad Core processor open platform design, two RS-232/422/485 isolated serial ports, two 10/100/1000 Ethernet ports, two USB 3.0 port and an operating temperature range of -20~70°C. It offers two M.2 slots for integrating Wi-Fi/4G/5G modules. The EMU-210 enables system integrators to develop applications precisely for renewable energy, EV charging, smart cities and factories that require massive data collection, a cloud-based application and video related monitoring solutions.

1.1 Features

- NXP i.MX8M Plus Cortex A53 Quad Core 1.8GHz
- LPDDR4 2GB RAM, 32GB eMMC for system storage
- 2x RS-232/422/485 isolated serial ports
- 2x 10/100/1000 Ethernet ports
- 1x M.2 E-key for Wi-Fi
- 1x M.2 B-key for 5G or 4G/LTE
- Operating Temperature: -20°C to 70°C

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.2 Packing List

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- 1x EMU-210 IoT Gateway
- DIN rail mount kit with 2x flat head screws
- Wall mount kit with 4x pan head screws
- Quick Start Guide

1.3 Optional Accessories

- 12V/240W power adaptor (P/N: 31-62164-0010-A0)
- 24V/90W power adapter (P/N: 31-62187-1000-A0)

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.4 Specifications

Model	EMU-210
System	
Processor	i.MX8M Plus ARM Cortex A53 Quad Core 1.8GHz
Memory	LPDDR4 2GB
Main Storage	32 GB eMMC
Storage Slot	1x microSD
TPM	TPM2.0
RTC	Monthly difference max.180 sec.
WDT	Supported
I/O Interfaces	
Ethernet	2x GbE
Serial Ports	2x RS-232/422/485, 4-wire
USB	2x USB 3.0 Type-A
Display	1x HDMI
Wi-Fi/BT	1x M.2 E-key
Expanded I/F	1x M.2 B-key (USB 3.0) for 5G or 4G/LTE
Mechanical	
Dimensions	110.90 (L) x 40 (W) x 131.4 (H) mm
Mounting	DIN rail kit / wall mount kit
Housing	Metal, IP40
Cooling	Fanless
Power Supply	
DC Input	12-24V DC
Environmental	
Operating Temperature	-20°C to 70°C
Storage Temperature	-25°C to 80°C
Humidity	approx. 95% @ 40°C (non-condensing)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Model	EMU-210
Vibration Resistance	1. Test Standard: Referenced from IEC 60068-2-64 2. Test Mode: Random wave 3. Frequency: 5-500 Hz 4. Acceleration: 2 Grms 5. Direction: X, Y, Z axis 6. Duration: 60 min/axis
Shock Resistance	1. Test Standard: Referenced from IEC 60068-2-27 2. Acceleration: 20G 3. Pulse width: 11ms 4. System condition: Operation mode 5. Test faces: -X,-Y,-Z, X, Y, Z axis 6. Test times: 3 times per axis
Certifications	
EMC	CE / UKCA / RCM / KC / FCC EN/IEC 61000-6-4:2019; EN/IEC 61000-6-2:2019 47 CFR FCC Part 15 Subpart B, class B
UL	IEC 62368-1:2014; EN 62368-1:2014+A11:2017 UL 61010-1; CSA C22.2 No.61010-1 UL 61010-2-201; CSA C22.2 No.61010-2-201

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.5 Functional Block Diagram

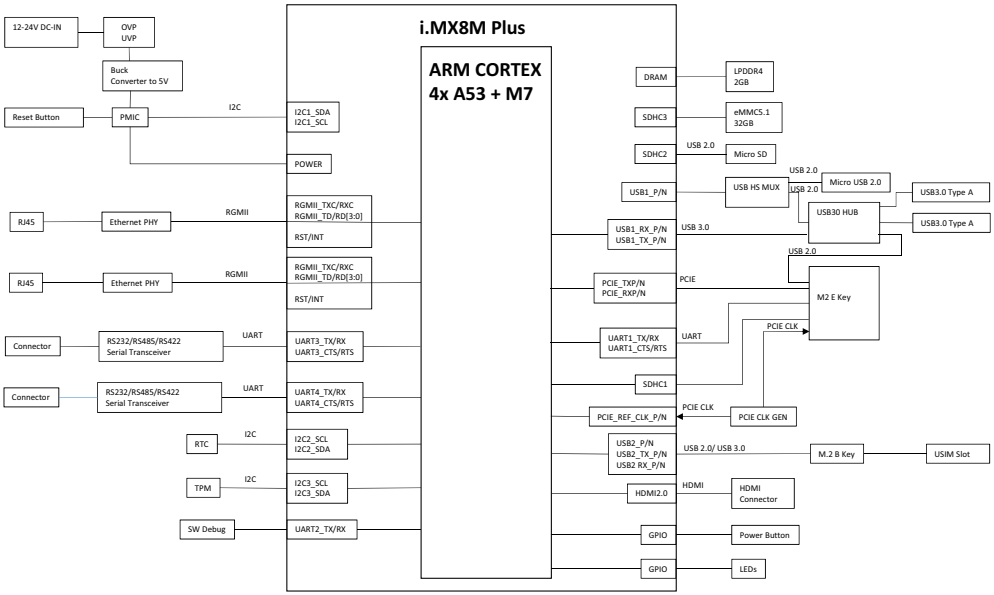


Figure 1-1: Functional Block Diagram

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.6 Mechanical Drawings

NOTE: All dimensions are in millimeters unless noted.

1.6.1 Dimensions

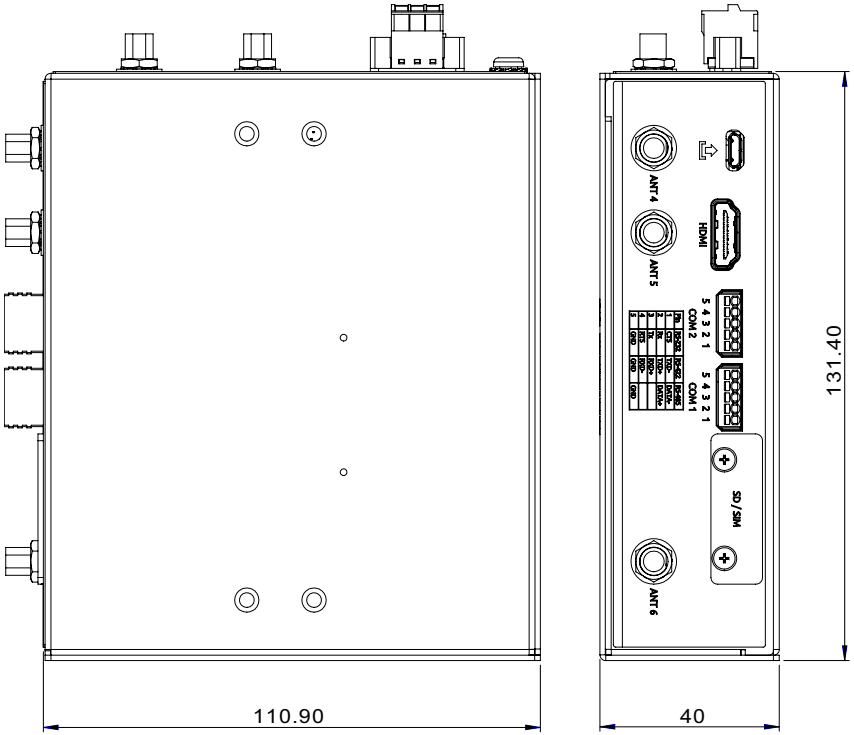


Figure 1-2: EMU-210 Dimensions

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.6.2 DIN Rail Mounting

The DIN rail mount can be attached to the EMU-210 with two screws included in the wall mounting kit.

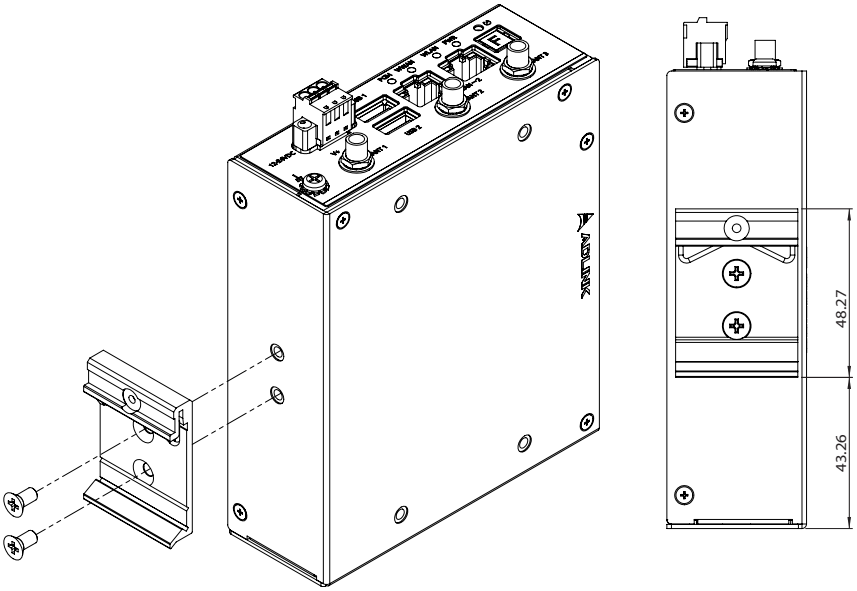


Figure 1-3: DIN Rail Mount 1

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

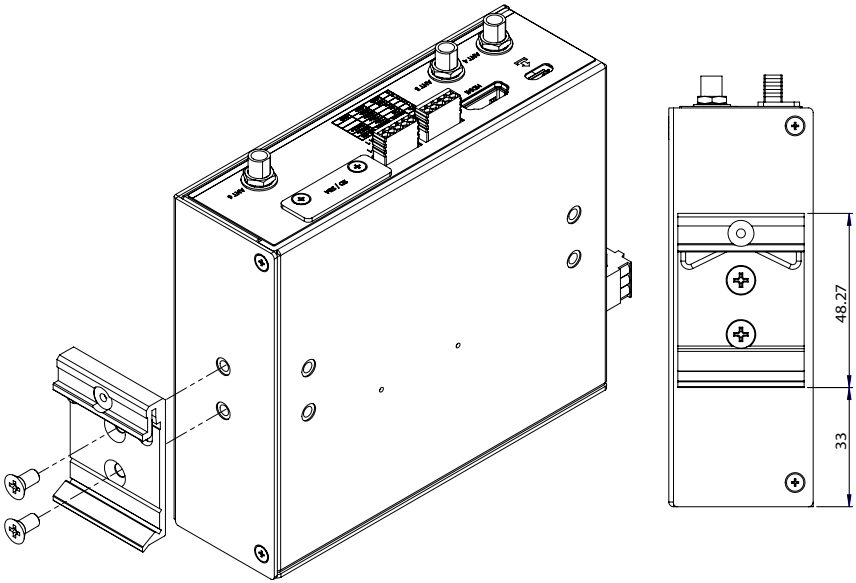


Figure 1-4: DIN Rail Mount 2

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.6.3 Wall Mounting

Each wall mount bracket can be attached to the EMU-210 with two screws included in the wall mounting kit.

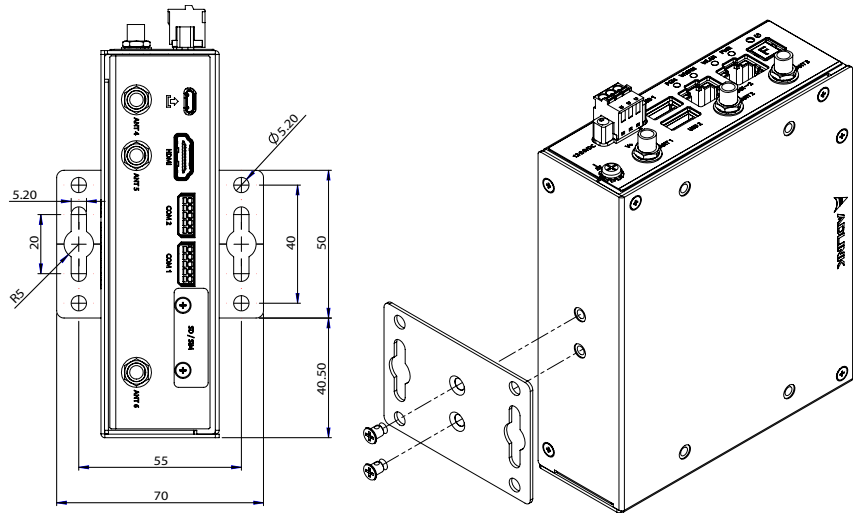


Figure 1-5: Wall Mount 1

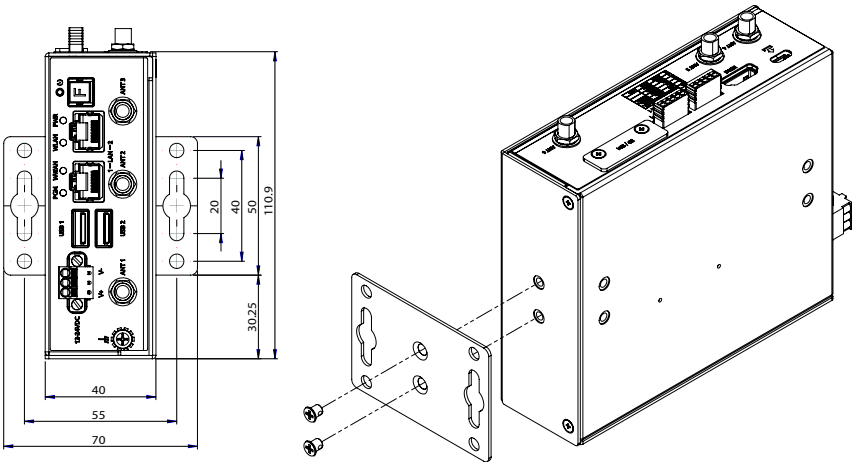


Figure 1-6: Wall Mount 2

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

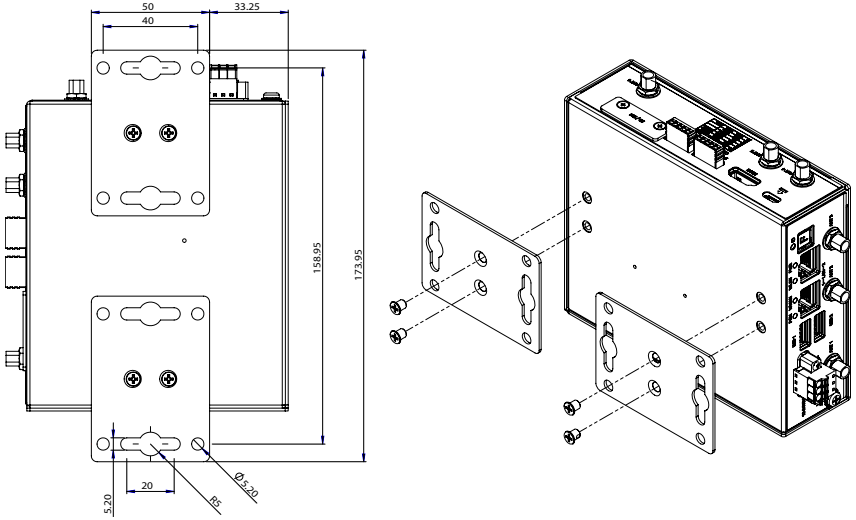


Figure 1-7: Wall Mount 3

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.7 I/O Connectors

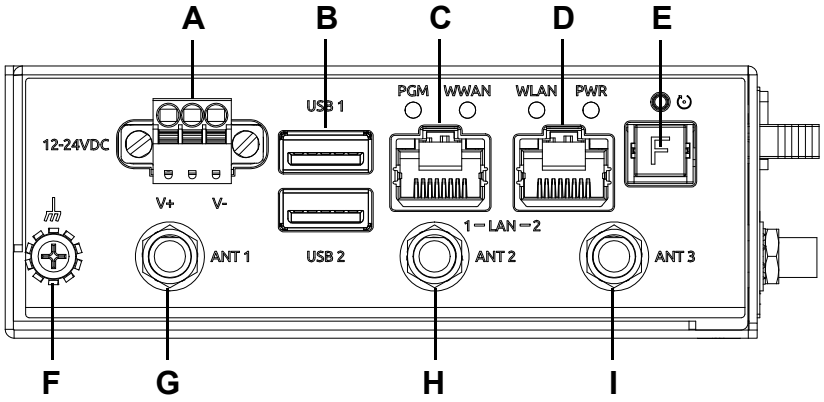
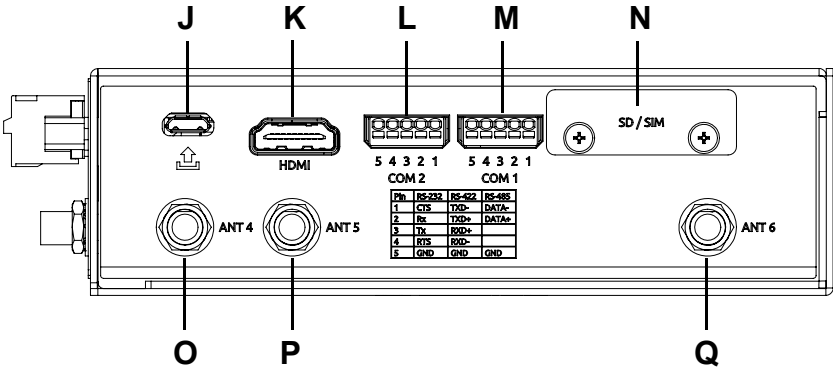


Figure 1-8: Front View



Pin	RS-232	RS-422	RS-485
1	CTS	TXD-	DATA-
2	Rx	TXD+	DATA+
3	Tx	RXD+	
4	RTS	RXD-	
5	GND	GND	GND

Figure 1-9: Side View

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Item	Description
A	DC power input
B	USB 3.0 Type-A
C, D	Gigabit Ethernet (GbE, RJ45)
E	Function button
F	Ground screw
G, H, I, O, P, Q	Antenna connector (optional for Wi-Fi/4G/5G/GPS)
J	Micro USB Connector
K	HDMI
L, M	RS-232/422/485, 4-wire
N	microSD and SIM slot

Table 1-1: I/O Connector Legend

LED	Description
PWR LED	The LED will light up when the system is powered.
WLAN LED	When a Wi-Fi module is installed, the LED will light up after the system loads, otherwise the LED will not light up.
WWAN LED	When a 5G/4G/LTE module is installed, the LED will light up after the system loads, otherwise the LED will not light up.
PGM LED	The LED will light up when flashing the BSP to the eMMC via an SD card.

Table 1-2: I/O Connector Legend

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.7.1 DC Power Input

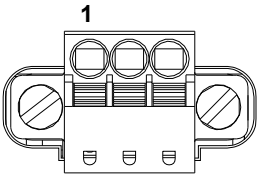


Figure 1-10: DC Power Input

Pin	Signal
1	V+ (DC_IN)
2	GND
3	V-

1.7.2 USB 3.0 Ports

The USB 3.0 Type-A ports support are compatible with SuperSpeed, Hi-Speed, full-speed and low-speed USB devices, with support for multiple boot devices, including USB flash, USB external HDD, and USB CD-ROM drivers, and boot priority and boot device configured in BIOS.

1.7.3 Gigabit Ethernet Ports

There are two Gigabit Ethernet (GbE) ports on the front panel with two MAC address. Either port can be used for connecting to a host PC

- LAN1: The default is DHCP
- LAN2: The default static IP address is 192.168.50.2

1.7.4 Reboot Button

Pressing the reboot button will cause the system to reboot.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.7.5 Function Key

Restore the EMU-210 to factory default settings by pressing the function button until the device reboots.

Item	Default Value
username	root
password	adlink
COM Port 1	RS-485/9600/N/8/1
COM Port 2	RS-485/9600/N/8/1
LAN 1	DHCP
LAN 2	Static IP:192.168.50.2
WiFi	▶ Disconnect WiFi network connection ▶ Clean all parameters
Cellular (optional)	▶ Disconnect cellular network connection ▶ Clean all parameters

1.7.6 Antenna Ports

Antenna ports ANT1-6 support the functions listed in Appendix B: Accessory Installation on page 67.

1.7.7 HDMI Connector

An HDMI Type-A socket is provided to connect a monitor to the system.

1.7.8 Micro-SIM Slot

Insert a micro-SIM card into the slot. Make sure it is properly aligned and inserted all the way. Once the card is inserted, the EMU-210 can connect to a cellular network and access the Internet.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.7.9 COM Port Connectors

The EMU-210 provides two COM ports through 5-pin connectors. The COM1 & COM2 ports support RS-232/422/485 modes.

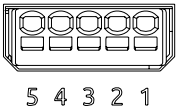


Figure 1-11: COM Port Pin Definition

Pin	Signal		
	RS-232	RS-422	RS-485
1	CTS	TXD-	DATA-
2	Rx	TXD+	DATA+
3	Tx	RXD+	
4	RTS	RXD-	
5	GND	GND	GND

Table 1-3: 5-pin Signal Function of COM Ports

1.7.10 microSD Slot

Insert a microSD card into the slot for additional storage.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2 Getting Started

2.1 Unpacking the EMU-210

Ensure that the following items are included in the package. If any items are missing, contact your sales representative for assistance.

- EMU-210
- DIN rail mount kit with 2x flat head screws
- Wall mount kit with 4x pan head screws
- Quick Start Guide



Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK.

Déballage de la EMU-210

Assurez-vous que les éléments suivants sont inclus dans le colis. Si des éléments sont manquants, veuillez contacter votre représentant commercial pour obtenir de l'aide.

- *EMU-210*
- *Kit de montage sur rail DIN avec 2 vis à tête plate*
- *Kit de montage mural avec 4 vis à tête cylindrique*
- *Guide de Démarrage Rapide*



AVERTISSEMENT: Avant de déballer, vérifiez l'emballage d'expédition pour tout dommage. Si l'emballage d'expédition et/ou le contenu sont endommagés, informez immédiatement votre revendeur. Conservez l'emballage d'expédition et les matériaux d'emballage pour inspection. Obtenez l'autorisation de votre revendeur avant de retourner tout produit à ADLINK.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.2 Connecting DC Power

DC power source output rating:

- Voltage: 12 to 24 VDC
- Current: 5A to 2.5A minimum

Follow these steps to connect power to the EMU-210:

1. Before turning on the power source, connect the positive and negative wires from a 12 to 24V DC power source to the terminal block.
2. Turn on the power source. If the power was connected correctly, the front panel green PWR LED will light up.



- Only use an IEC or UL certified power source.
- The maximum operating altitude is 5000m whose output meets LPS and SELV (ES1) circuits.

If the EMU-210 needs to be shut down, turn off the power source.

To remove the power wires, use a flat head screwdriver to push the orange slots on the terminal block and then pull out the wires.



- Ensure the power source is turned off before connecting or removing the power wires.
- Before providing DC power to the apparatus, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Connexion de l'alimentation CC

Valeur nominale de sortie de la source d'alimentation CC:

- *Tension: 12 à 24 VCC*
- *Courant: 5A à 2,5A minimum*

Suivez ces étapes pour connecter l'alimentation à l'EMU-210:

1. *Avant d'allumer la source d'alimentation, connectez les fils positifs et négatifs d'une source d'alimentation de 12 à 24 V CC au bornier.*
2. *Allumez la source d'alimentation. Si l'alimentation a été correctement connectée, la LED verte PWR du panneau avant s'allumera.*



- *Utilisez uniquement une source d'alimentation certifiée IEC ou UL.*
- *L'altitude maximale de fonctionnement est de 5 000 m dont la sortie répond aux circuits LPS et SELV (ES1).*

Si l'EMU-210 doit être arrêté, coupez la source d'alimentation.

Pour retirer les fils d'alimentation, utilisez un tournevis à tête plate pour pousser les fentes orange du bornier puis retirez les fils.



- *Assurez-vous que la source d'alimentation est éteinte avant de connecter ou de retirer les fils d'alimentation.*
- *Avant de fournir une alimentation CC à l'appareil, assurez-vous que la tension et la polarité fournies sont compatibles avec l'entrée CC. Une tension d'entrée et/ou une polarité incorrecte peuvent être responsables d'endommagements du système.*

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.3 Connecting to the EMU-210

1. When power is supplied, the PWR LED will initially blink green while the system boots up, then change to a solid green indicating the device has successfully booted up.
2. Connect LAN2 of the EMU-210 to the host computer.
3. Set the network domain of the host computer to 192.168.50.xx.
4. Open a web browser (Google Chrome is recommended) on the host computer and enter http://192.168.50.2 to access EGiFlow (Figure 3-1).
5. Enter **admin** as the username and **adlink** as the password (Figure 3-1).
6. After logging in, EGiFlow displays. (Figure 3-2).

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3 EGiFlow

This chapter describes how to use the built-in EGiFlow to configure the EMU-210 and start different kind of applications.

3.1 EGiFlow Login

After the EMU-210 has been successfully powered on, access EGiFlow via one of the default following options.

Option 1: With a host PC connected to the EMU-210 LAN2 port, do the following:

1. Set the host PC's network setting to Static IP mode.
2. Modify the host PC's IP address to be on the same network segment as the device (192.168.50.x).
3. Open a web browser (Google Chrome is recommended) on the host PC to access EGiFlow: http://192.168.50.2, or enter the EMU-210 hostname in the address bar (e.g., http://emu210-2361100lba.local/)

Option 2: With a host PC connected to the EMU-210 LAN1 port, do the following:

1. Set the host PC's network setting to DHCP mode.
2. Open a web browser (Google Chrome is recommended) on the host PC to access EGiFlow by entering the EMU-210 hostname in the address bar (e.g., http://emu210-2361100lba.local/)

Option 3: Connect the LAN1 port of the EMU-210 to a network component (switch/router) with DNS functionality:

1. Set the host PC's network setting to DHCP mode and connect to network component (switch/router).
2. Open a web browser (Google Chrome is recommended) on the host PC to access EGiFlow by entering the EMU-210 hostname in the address bar (e.g., http://emu210-2361100lba.local/)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

A unique default hostname is generated for each EMU-210 device and can be found on the label of the chassis it was shipped in. The hostname can be changed from EGiFlow (default username: **admin**, default password: **adlink**).

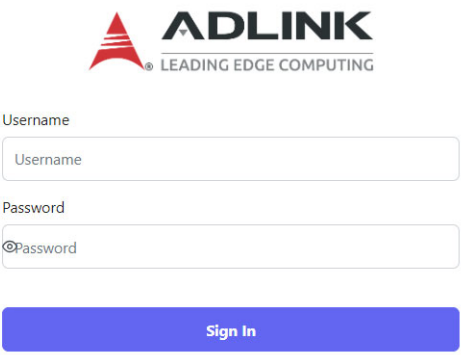


Figure 3-1: EGiFlow Login Page

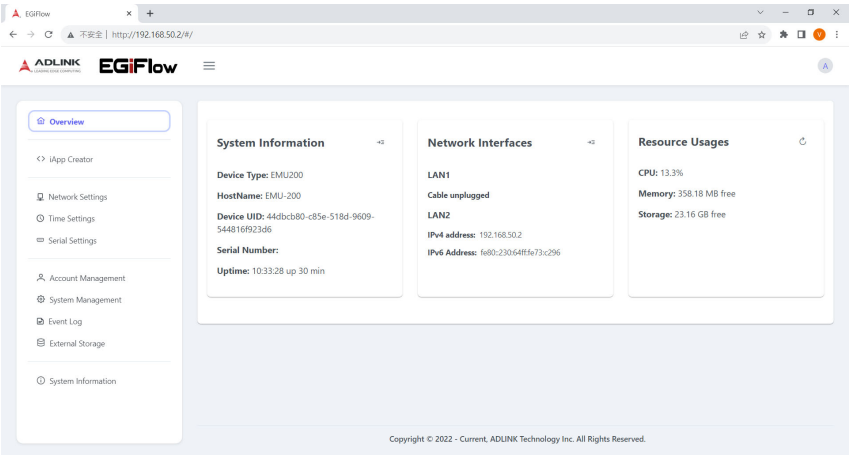


Figure 3-2: EGiFlow Main Page

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.2 EGiFlow Menu

EGiFlow includes the following items for configuration and protocol translation in different field applications.

- EGiFlow iApp
  - Modbus TCP/RTU to AWS and Azure
  - Modbus TCP/RTU to MQTT
  - Modbus TCP/RTU to RESTful
  - Modbus RTU to Modbus TCP
  - OPCUA to AWS
- Python iApp
  - Development
  - Deploy and Run
- Gateway Configuration & Management
  - Network Setting (LAN) (IPv4 IPv6)
  - Network Setting (WiFi) (IPv4 IPv6)"
  - Network Setting (Cellular) (IPv4 IPv6)"
  - Time Sync Setting, NTP
  - Account Management
  - System Management
  - Event Log
  - External Storage
  - System Information
  - Serial Settings

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.2.1 EGiFlow iApp

EGiFlow iApp provides an intuitive and straightforward configuration method, allowing the EMU-210 to acquire the required sensor data for measurement through various communication protocols. It then converts and transmits the data to various services, including edge servers, local SCADA, or the cloud, for applications such as energy monitoring in buildings, factories, smart factories, and for energy storage monitoring.

Below are a few commonly used scenarios to illustrate how to create and use EGiFlow iApp to complete the conversion and data transmission of various communication protocols.

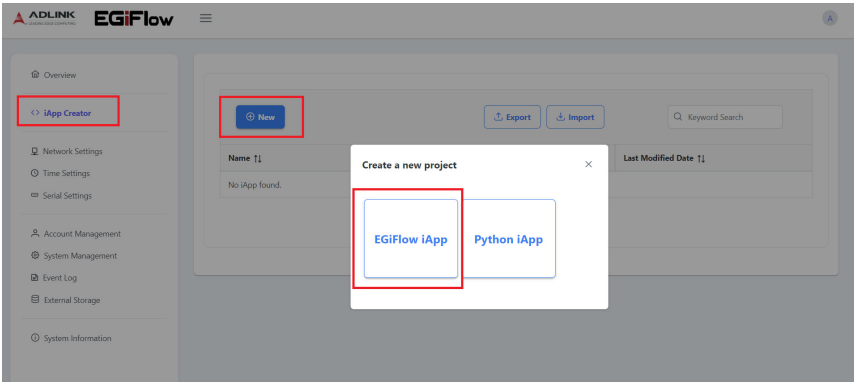


Figure 3-3: Create EGiFlow iApp

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Modbus TCP/RTU to AWS and Azure

The overall architecture of the application is shown below, aiming to acquire sensor data from the Modbus interface and send it to cloud services such as Azure and AWS.

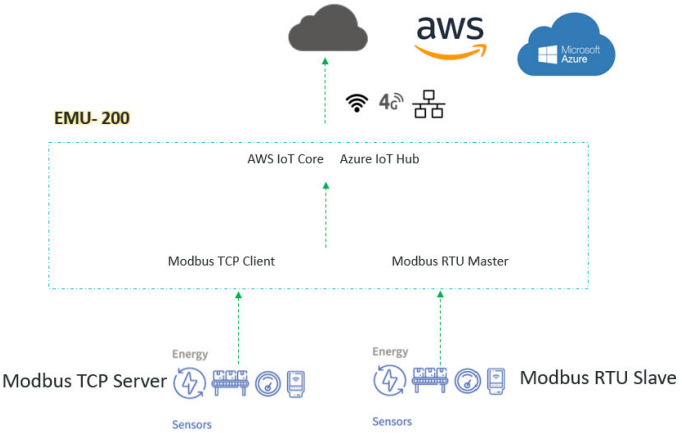


Figure 3-4: Modbus TCP/RTU to Cloud

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

To achieve this, you can utilize EGiFlow iApp as a middleware component.

1. **Modbus TCP Client (Master):** Use EGiFlow iApp's intuitive setup to create and configure the Modbus TCP client (master) functionality. Specify the Modbus server's IP address, port number, and other necessary parameters. EGiFlow iApp provides an interface to define the data registers to be read from the Modbus server.

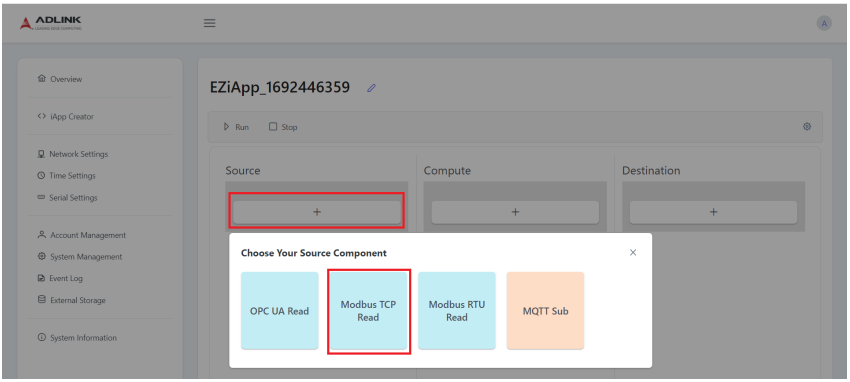


Figure 3-5: Create Modbus TCP

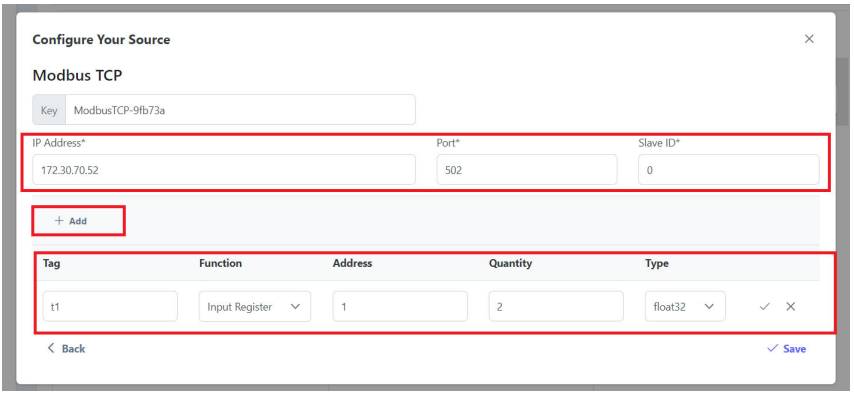


Figure 3-6: Configure Modbus TCP

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. **Modbus RTU Master**: Use EGiFlow iApp's setup to create and configure the Modbus RTU Master functionality. Determine the serial parameters required for communication, such as baud rate, parity, data bits, and stop bits. EGiFlow iApp provides an interface to define the data registers to be read from the Modbus slave.

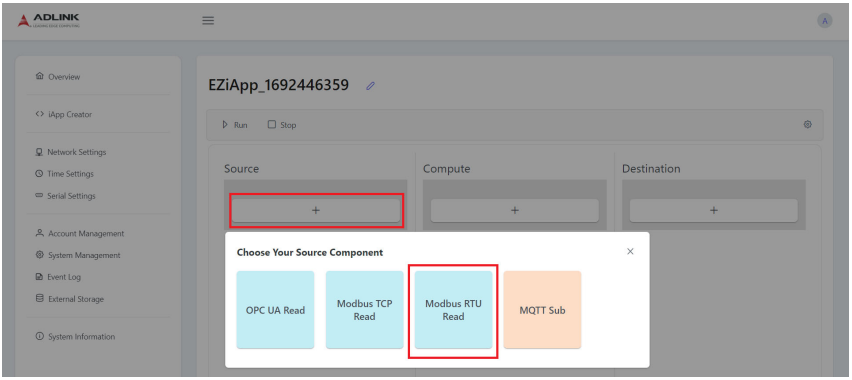


Figure 3-7: Create Modbus RTU

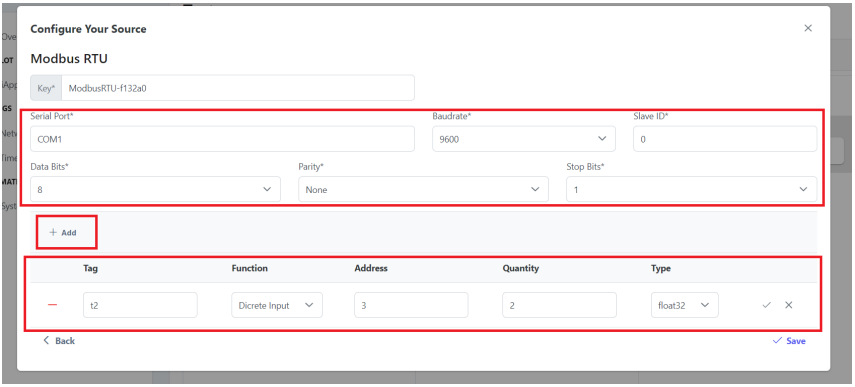


Figure 3-8: Configure Modbus RTU

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. **Data Conversion by Compute**: Upon receiving the sensor data from the Modbus server/slave, EGiFlow iApp can perform any required data conversions or formatting as per the specific requirements of Azure and AWS. This may include transforming the data into the appropriate format, applying data preprocessing or aggregation, and ensuring compatibility with the cloud service APIs.

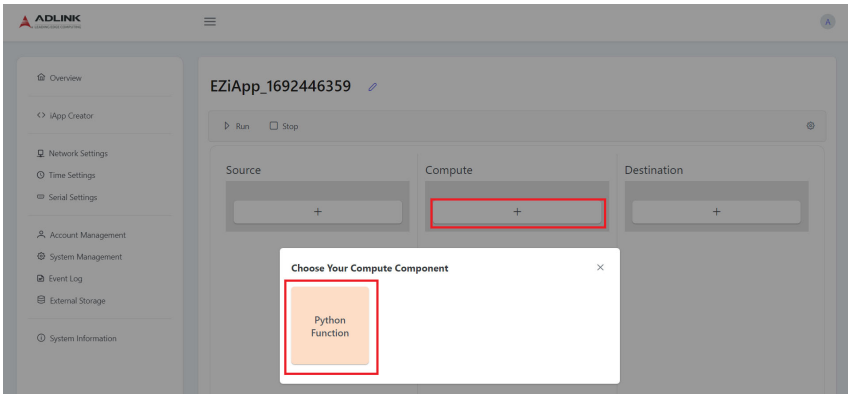


Figure 3-9: Create Compute

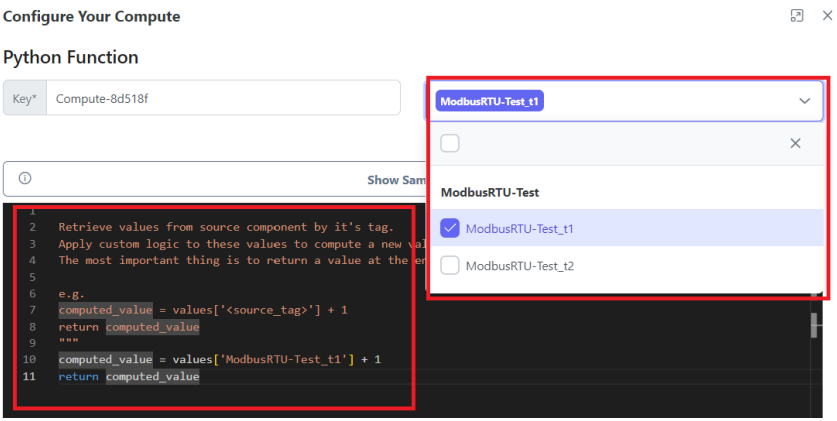


Figure 3-10: Develop Customized Data Conversion

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4. **Data Transmission to Azure**: EGiFlow iApp can utilize Azure IoT Hub to securely transmit the converted sensor data. It establishes a connection with Azure and publishes the data to the desired Azure endpoint.

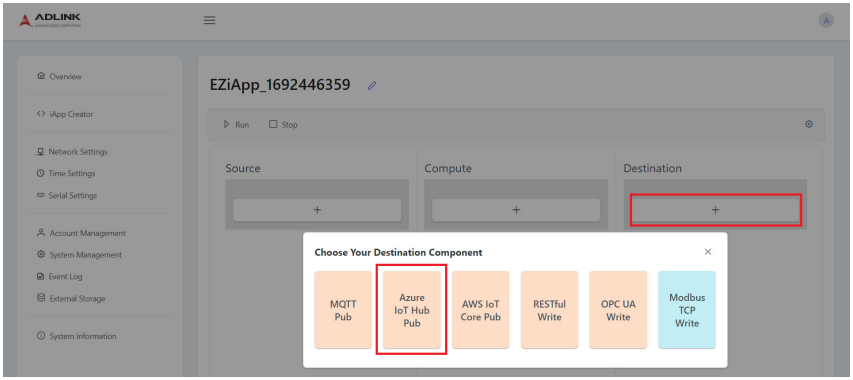


Figure 3-11: Create Azure

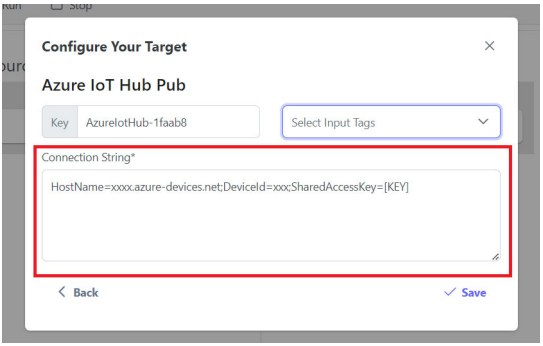


Figure 3-12: Configure Azure

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5. **Data Transmission to AWS**: Similarly, EGiFlow iApp can leverage AWS IoT Core to securely transmit the converted sensor data. It establishes a connection with AWS and publishes the data to the desired AWS end-point.

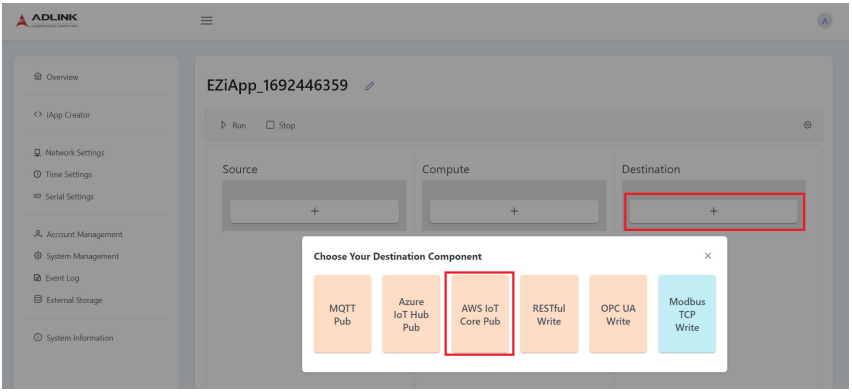


Figure 3-13: Create AWS

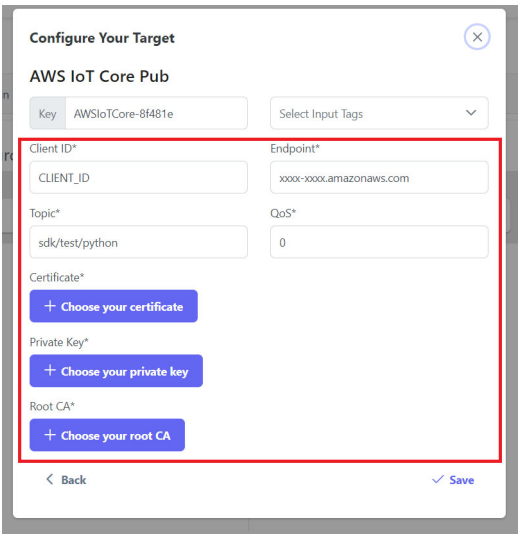


Figure 3-14: Configure AWS

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

6. **Run and Deploy**: Click **Run** and wait for the deployment to finish.

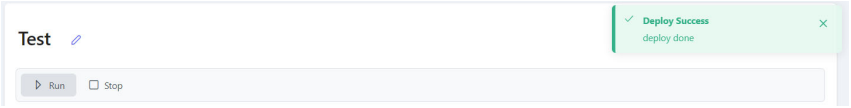


Figure 3-15: Run and Deploy

Modbus TCP/RTU to MQTT

The overall architecture of the application is in Figure 3-16, with the objective of acquiring sensor data from the Modbus interface and transmitting it via MQTT to an Edger Server or Local SCADA.

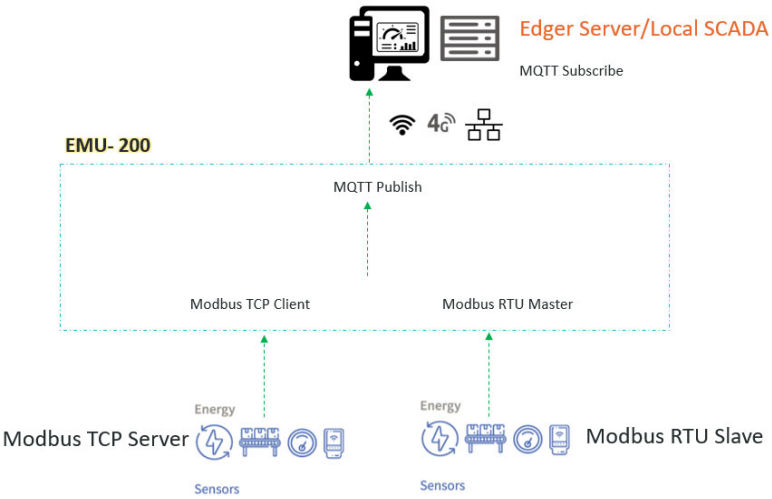


Figure 3-16: Modbus TCP/RTU to MQTT

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

To accomplish this, you can follow the steps below using EGiFlow iApp:

1. **Modbus TCP Client (Master)**: Use EGiFlow iApp's setup to create and configure the Modbus TCP client (master) functionality. Specify the Modbus server's IP address, port number, and other necessary parameters. EGiFlow iApp provides an interface to define the data registers to be read from the Modbus server. (See Figure 3-5 and Figure 3-6)
2. **Modbus RTU Master**: Use EGiFlow iApp's setup to create and configure the Modbus RTU Master functionality. Determine the serial parameters required for communication, such as baud rate, parity, data bits, and stop bits. EGiFlow iApp provides an interface to define the data registers to be read from the Modbus slave. (See Figure 3-7 and Figure 3-8)
3. **Data Conversion by Compute**: Upon receiving the sensor data from the Modbus server/slave, EGiFlow iApp can perform any necessary data conversion or formatting to ensure compatibility with MQTT. This may involve transforming the data into a suitable format, applying any required preprocessing or aggregation, and ensuring adherence to the MQTT payload structure. (See Figure 3-10)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4. **MQTT Communication**: EGiFlow iApp integrates MQTT functionality to connect to an MQTT broker. It establishes a connection with the broker and publishes the converted sensor data as MQTT messages. The MQTT broker can be located on the Edge Server or within the Local SCADA environment.

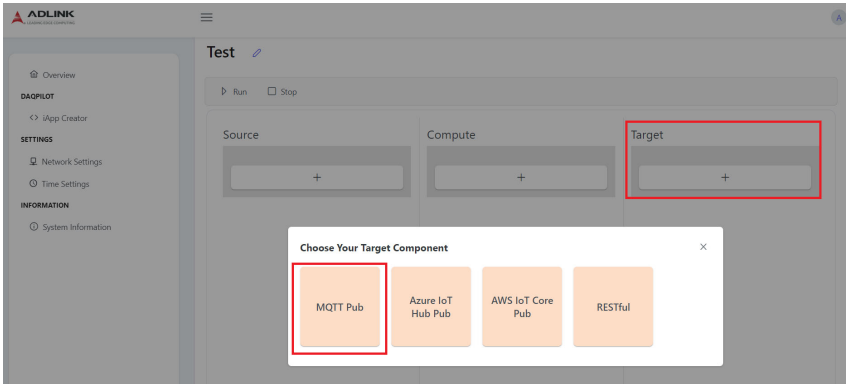


Figure 3-17: Create MQTT Publish

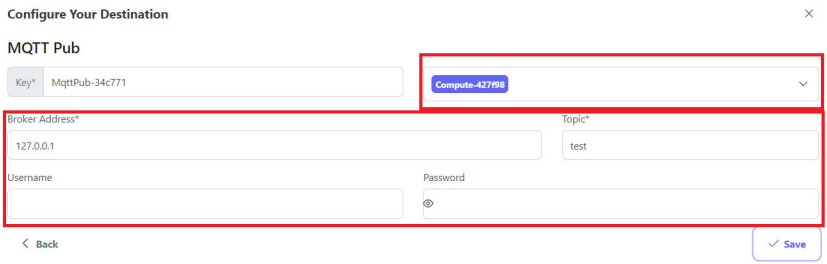


Figure 3-18: Configure MQTT Publish

5. **Run and Deploy**: Click **Run** and wait for the deployment to finish. (See Figure 3-15)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Modbus TCP/RTU to RESTful

The overall architecture of the application is in Figure 3-19, with the objective of acquiring sensor data from the Modbus interface and transmitting it via RESTful API to an Edge Server or Local SCADA.

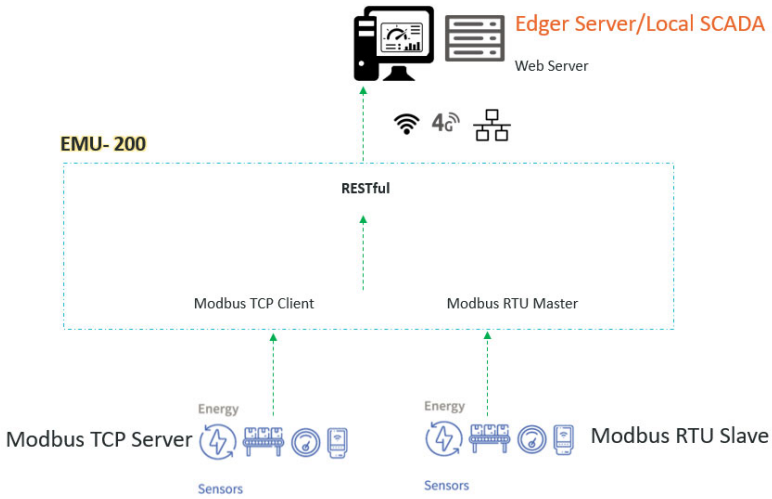


Figure 3-19: Modbus TCP/RTU to RESTful

To achieve this, you can follow the steps below using EGiFlow iApp:

1. **Modbus TCP Client (Master)**: Use EGiFlow iApp's setup to create and configure the Modbus TCP client (master) functionality. Specify the Modbus server's IP address, port number, and other necessary parameters. EGiFlow iApp provides an interface to define the data registers to be read from the Modbus server. (See Figure 3-5 and Figure 3-6)
2. **Modbus RTU Master**: Use EGiFlow iApp's setup to create and configure the Modbus RTU Master functionality. Determine the serial parameters required for communication, such as baud rate, parity, data bits, and stop bits. EGiFlow iApp provides an interface to define the data registers to be read from the Modbus slave. (See Figure 3-7 and Figure 3-8)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. **Data Conversion by Compute**: Upon receiving the sensor data from the Modbus server/slave, EGiFlow iApp can perform any required data conversion or formatting to prepare it for RESTful API transmission. This may involve transforming the data into a compatible format, applying preprocessing or aggregation, and organizing it according to the RESTful API payload structure. (See Figure 3-9)
4. **RESTful API Communication**: EGiFlow iApp integrates RESTful API functionality to connect to the Edge Server or Local SCADA system. It establishes an HTTP/HTTPS connection with the designated API endpoint and sends the converted sensor data as RESTful API requests. The API endpoint should be configured to receive and process the incoming data accordingly.

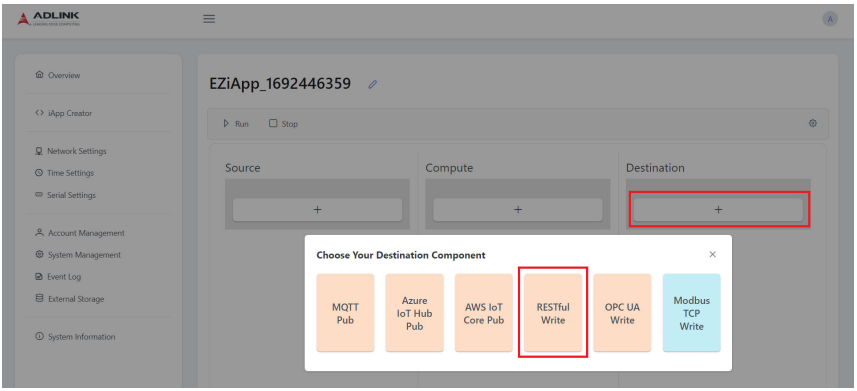


Figure 3-20: Create RESTful

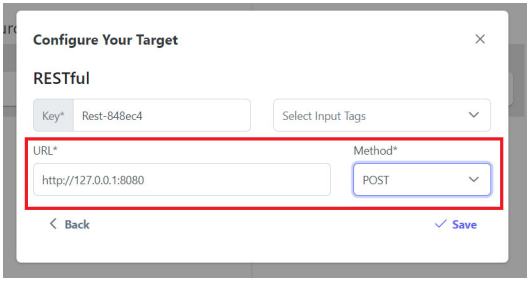


Figure 3-21: Configure RESTful

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5. **Run and Deploy**: Click **Run** and wait for the deployment to finish. (See Figure 3-15)

Modbus RTU to Modbus TCP

The overall architecture of the application, as shown in Figure 3-22, aims to convert Modbus RTU to Modbus TCP.

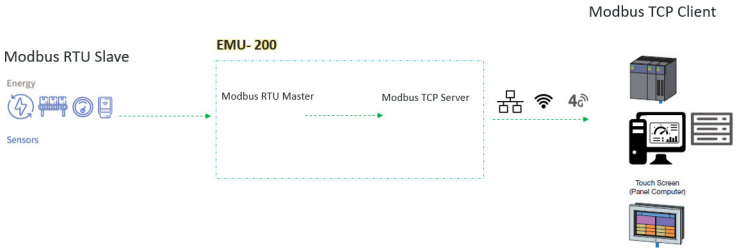


Figure 3-22: Modbus RTU to Modbus TCP

1. **Modbus RTU Master**: Use EGiFlow iApp's setup to create and configure the Modbus RTU Master functionality. Determine the serial parameters required for communication, such as baud rate, parity, data bits, and stop bits. EGiFlow iApp provides an interface to define the data registers to be read from the Modbus slave. (See Figure 3-7 and Figure 3-8)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. **Modbus TCP Conversion**: Modbus RTU requests are recieved from the RTU devices and converted into Modbus TCP requests.

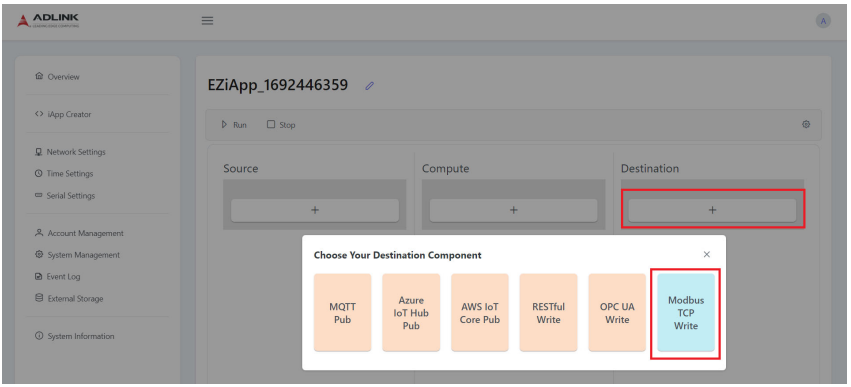


Figure 3-23: Create Modbus TCP Write

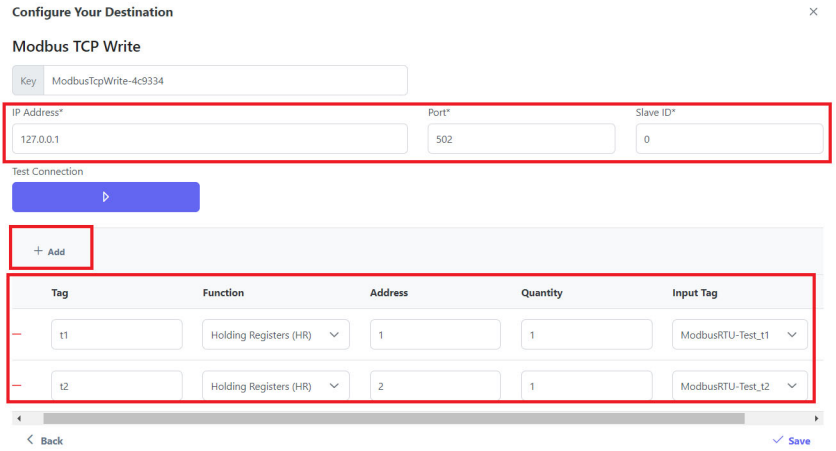


Figure 3-24: Configure Modbus TCP Write

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

OPC UA to AWS

The overall architecture of the application is in Figure 3-25.

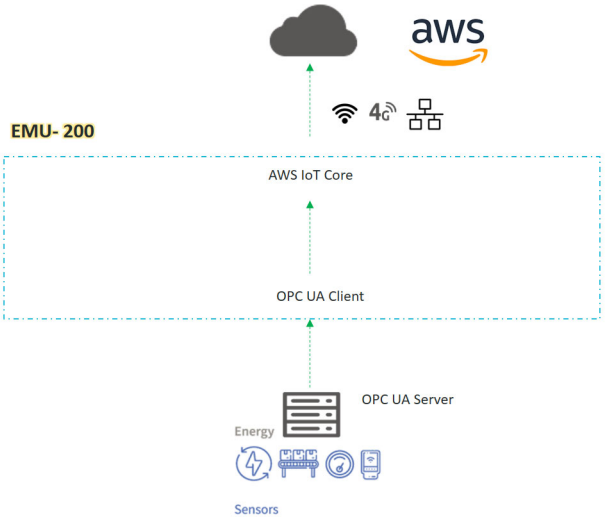


Figure 3-25: OPC UA to AWS

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

To achieve this, you can follow the steps below using EGiFlow iApp:

1. **OPC UA Client**: Use EGiFlow iApp's intuitive setup to create and configure the OPC UA client functionality. Specify the OPC UA server's IP address, port number, and other necessary parameters. EGiFlow iApp provides an interface to browse node information from the server.

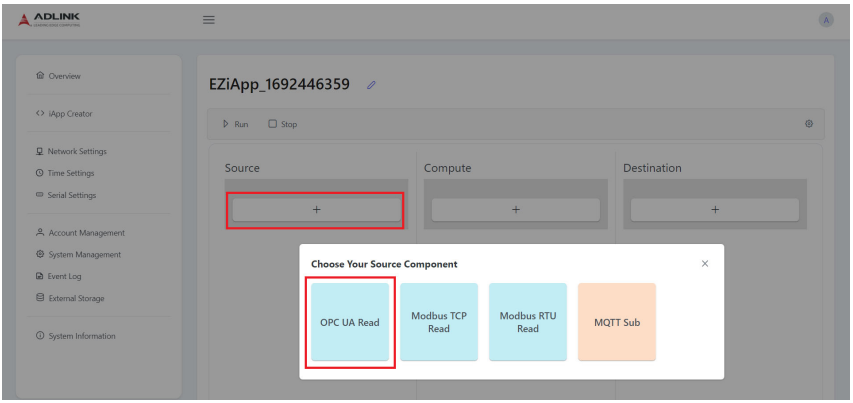


Figure 3-26: Create OPC UA

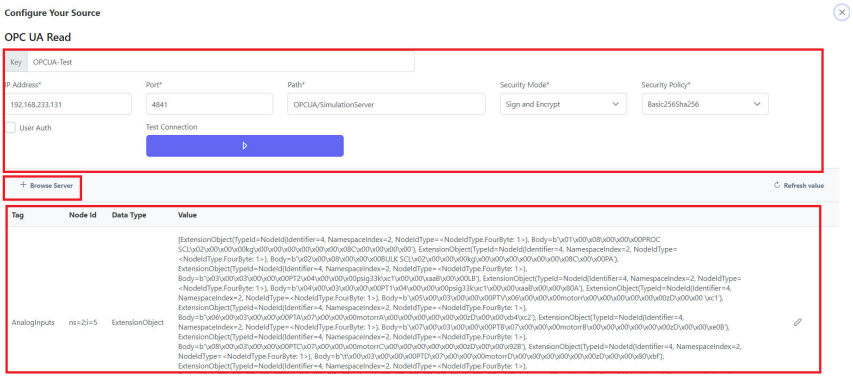


Figure 3-27: Configure OPC UA

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. **Data Conversion by Compute**: Use EGiFlow iApp's setup to create python functions, import OPC UA server data from the drop-down menu, reference sample code or write your own algorithms.

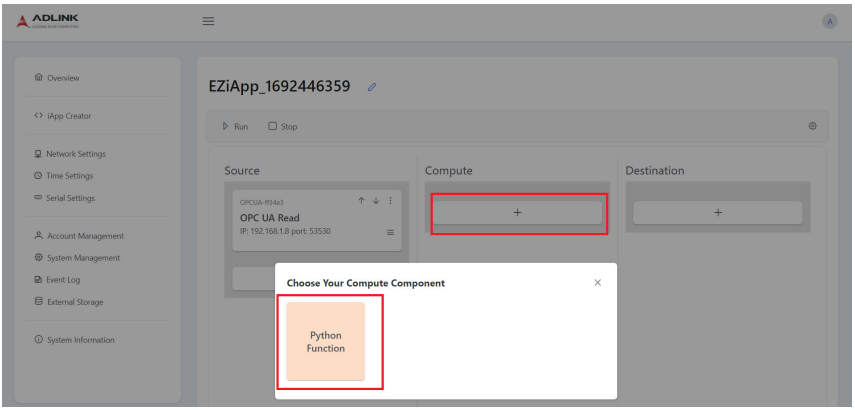


Figure 3-28: Create Compute

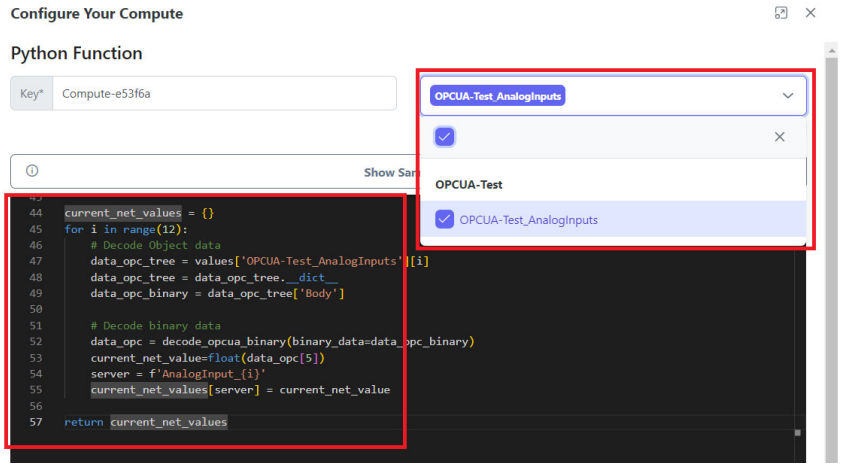


Figure 3-29: Develop Customized Data Conversion

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. **Data Transmission to AWS**: Establishes a connection with AWS and publishes data to the desired AWS endpoint.

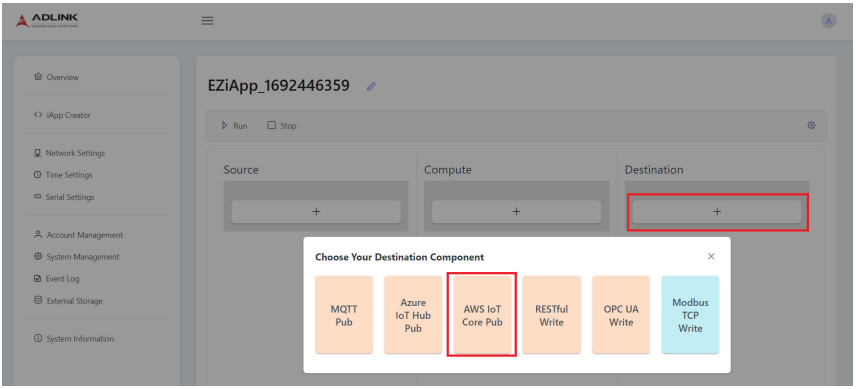


Figure 3-30: Create AWS

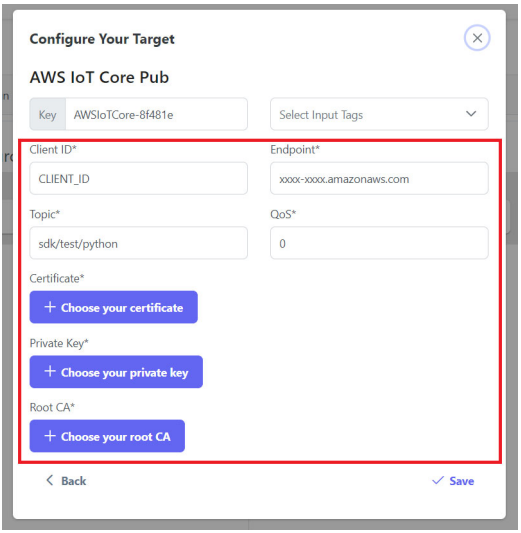


Figure 3-31: Configure AWS

4. **Run and Deploy**: Click **Run** and wait for the deployment to finish. (See Figure 3-15)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.2.2 Python iApp

This section includes a tutorial on how to create an iApp before deployment. iApps are saved in a repository and can be deployed to devices.

1. **Create and Development**: Click **iApp Creator** from the left sidebar and select **Python iApp**.
2. Select an iApp template and enter a name for it and then click **Create**. After creation, the a new iApp will be automatically loaded into the editor where it can be edited as necessary.

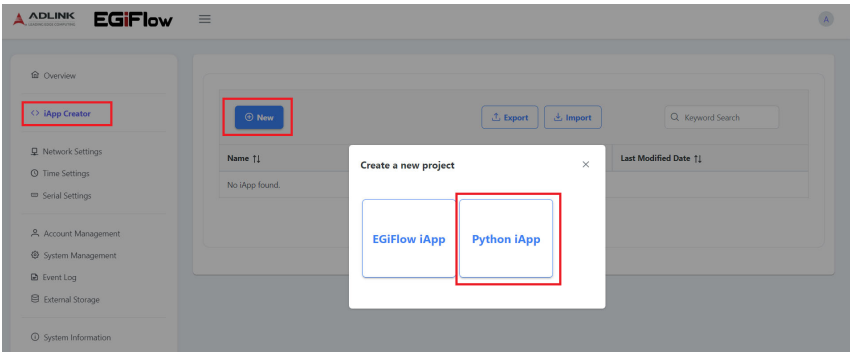


Figure 3-32: Create Python iApp

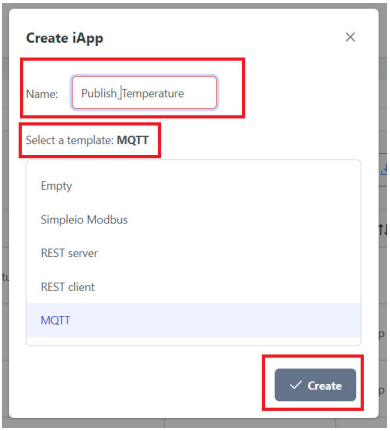


Figure 3-33: Select a template and enter a name

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

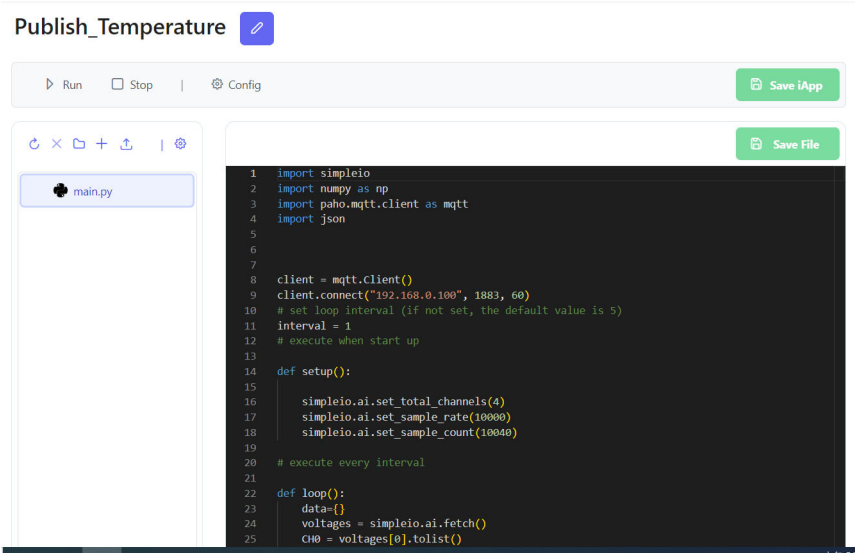


Figure 3-34: The new iApp can be edited

3. **Run and Deploy**: Click **Run** and wait for the deployment to finish.

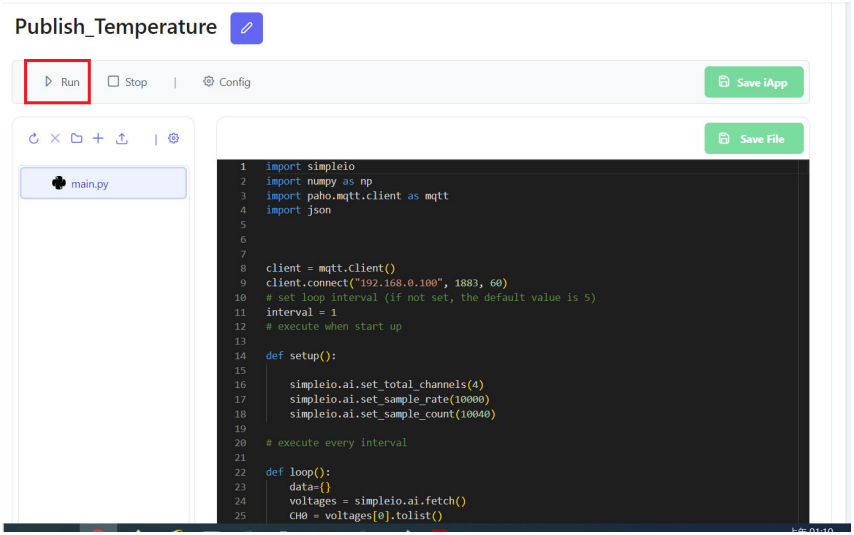


Figure 3-35: Run a new iApp

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.2.3 Gateway Configuration & Management

LAN Network Settings

The EMU-210 has two Ethernet ports that can be configured to support IPv4 and IPv6 network modes.

1. Open the **Network Settings** page.

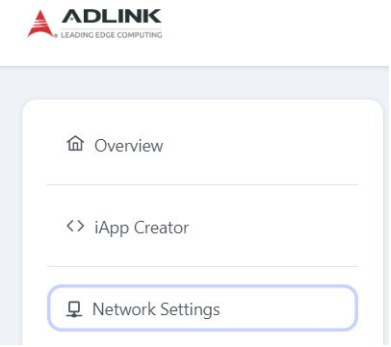


Figure 3-36: Network Settings

2. Select a LAN Port to set the wired network information.

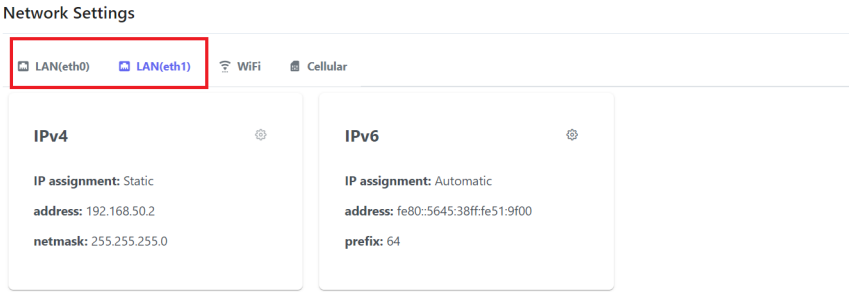


Figure 3-37: Select LAN Port

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. Configure the DHCP or static IP settings.

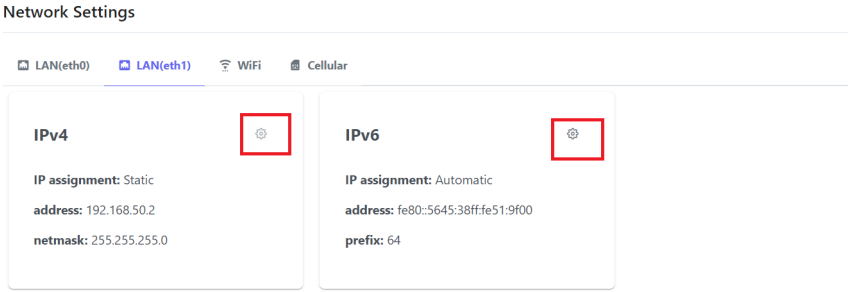


Figure 3-38: Configure LAN Port

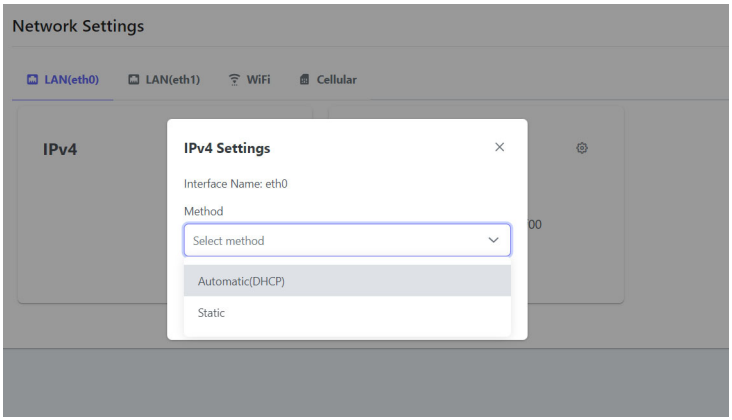


Figure 3-39: Select DHCP or Static

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

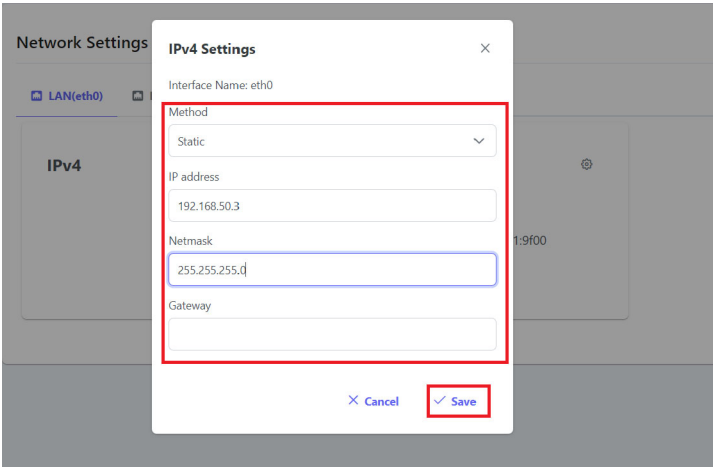


Figure 3-40: Configure Static IP (IPv4)

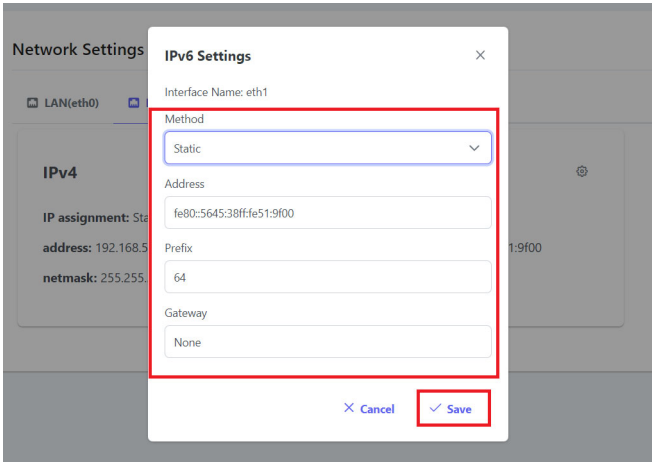


Figure 3-41: Configure Static IP (IPv6)

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4. For DNS settings, The DNS server will be used first.

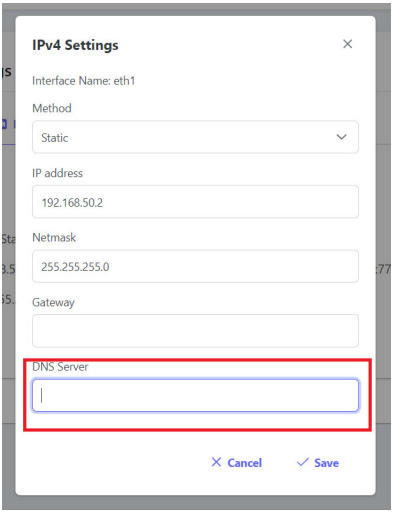


Figure 3-42: DNS Settings (IPv4)

WiFi Network Settings

Similar to the Ethernet port, the WiFi network client mode also supports IPv4 and IPv6 network mode settings.

1. Open the **Network Settings** page.

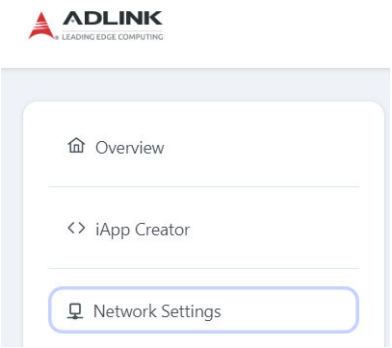


Figure 3-43: Network Settings

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. Select to set WiFi network information.

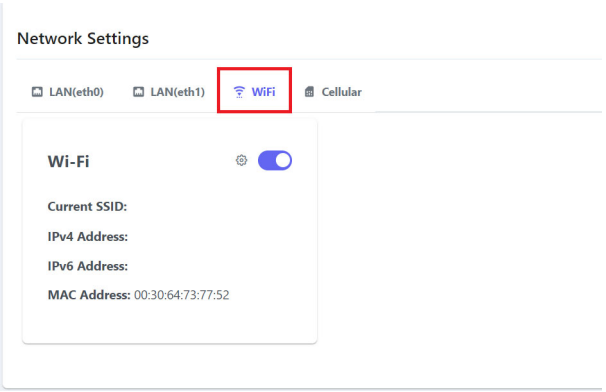


Figure 3-44: WiFi Network Information

3. Users need to select the Country Code, SSID name and security of the WLAN to join the network.

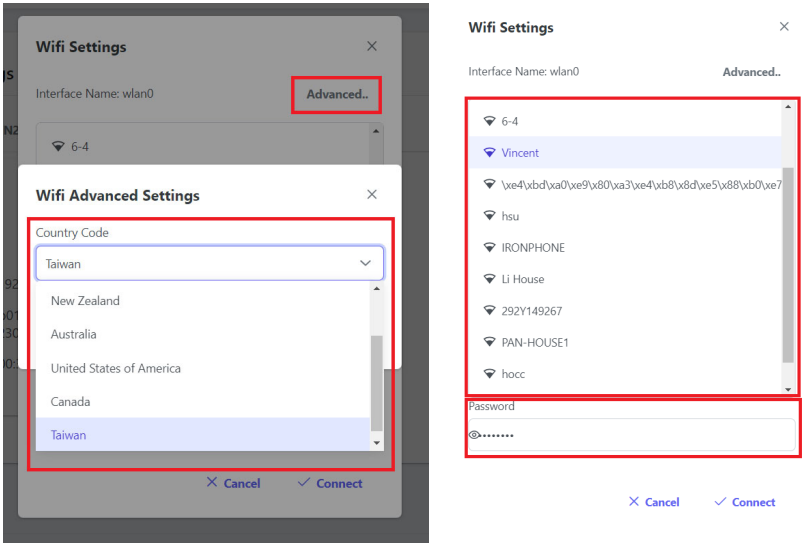


Figure 3-45: Select Country Code and SSID Name

4. Click **Apply** to complete the configuration.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Cellular Network Settings (Optional)

1. Open the **Network Settings** page, and select to set Cellular network information.

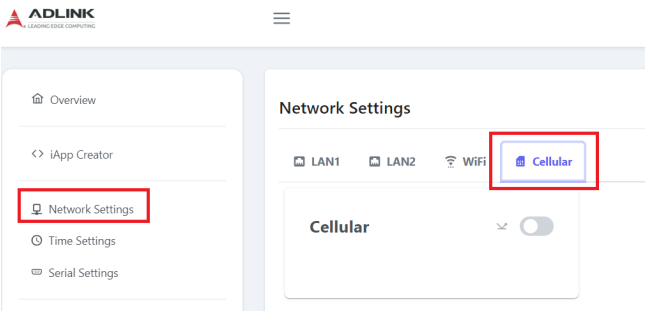


Figure 3-46: Cellular Network

2. Make sure the system has a 5G/4G/LTE module and SIM card installed, and then enable the cellular network.

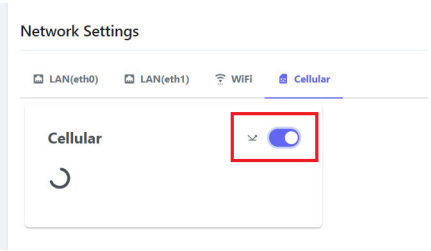


Figure 3-47: Enable Cellular Network

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Time Sync Setting, NTP

Users can adjust the time synchronization settings.

1. Double click **Time Settings** to enter the configuration page.

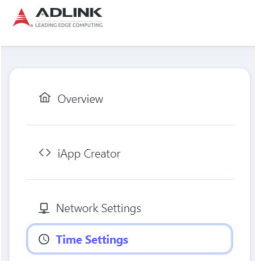


Figure 3-48: Select Time Settings

2. The selection of **synchronization with the NTP server** allows the device to synchronize with a source, and the address of the source can be a domain name or an IP address.

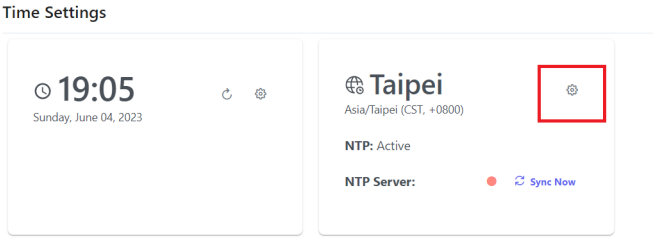


Figure 3-49: Configure Time Settings

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

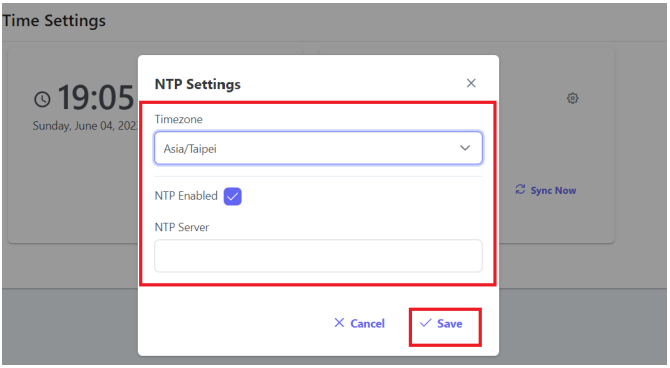


Figure 3-50: Configure NTP Settings

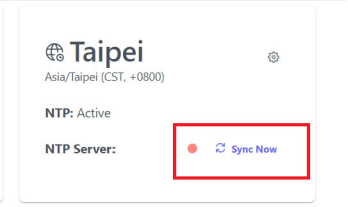


Figure 3-51: Synchronize Time

3. Check **serve as a NTP server** to enable the device to be a time synchronization source for other devices to synchronize their time with this device.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Serial Settings

This page manages serial settings.

1. Double click **Serial Settings** to enter the configuration page.

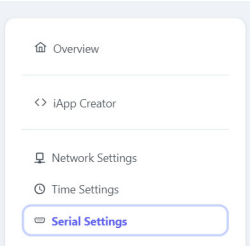


Figure 3-52: Serial Settings

2. Select the serial port to configure it.

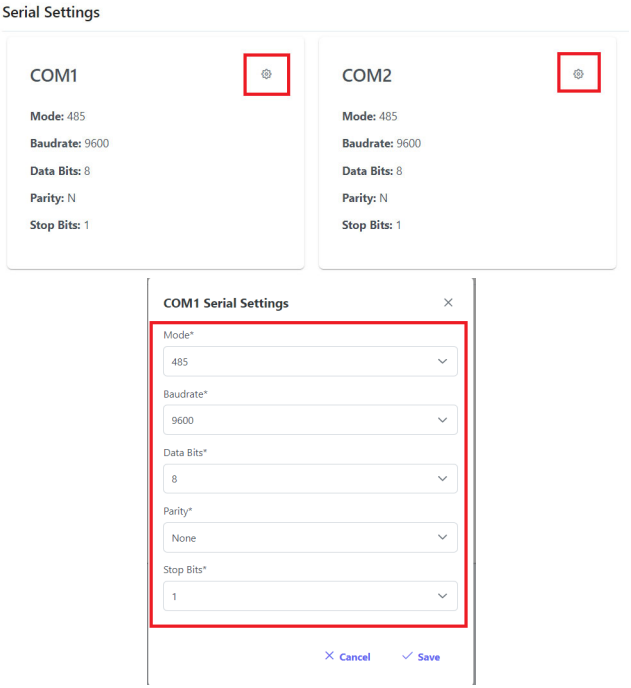


Figure 3-53: Configure Serial Port

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Account Management

This page manages user accounts.

1. Double click **Account Management** to enter the configuration page.

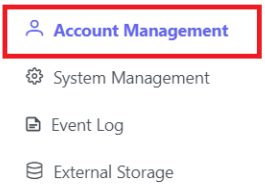
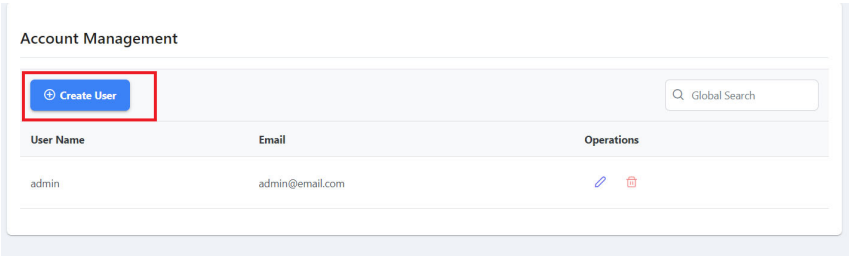


Figure 3-54: Account Management

2. Create user accounts and access privileges.



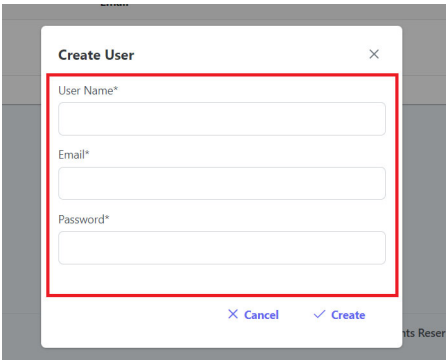


Figure 3-55: Create User Accounts

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

System Management

This page manages restoring to factory defaults and firmware upgrades.

1. Double click **System Management** to enter the configuration page.

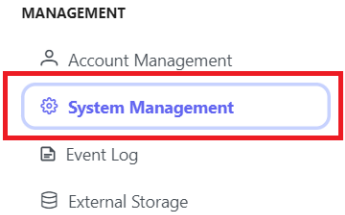


Figure 3-56: System Management

2. **Factory default**: Restores the EMU-210 to factory default settings.
3. **Firmware upgrade**: A firmware upgrade file can be uploaded to the EMU-210 through this feature. These files will periodically be provided through the product web page: https://www.adlinktech.com/Products/Industrial_IoT_and_Cloud_solutions/IoTGateway/EMU-210_Series.

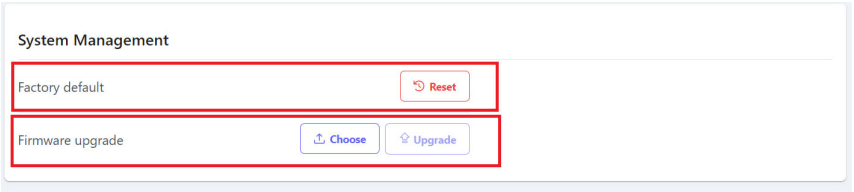


Figure 3-57: Factory Default and Firmware Upgrade

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Event Log

This page manages the system log.

1. Double click **Event Log** to enter the page.

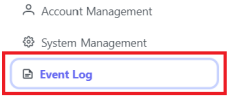


Figure 3-58: Event Log

2. The log information includes Date Time, Level, Module and Message.

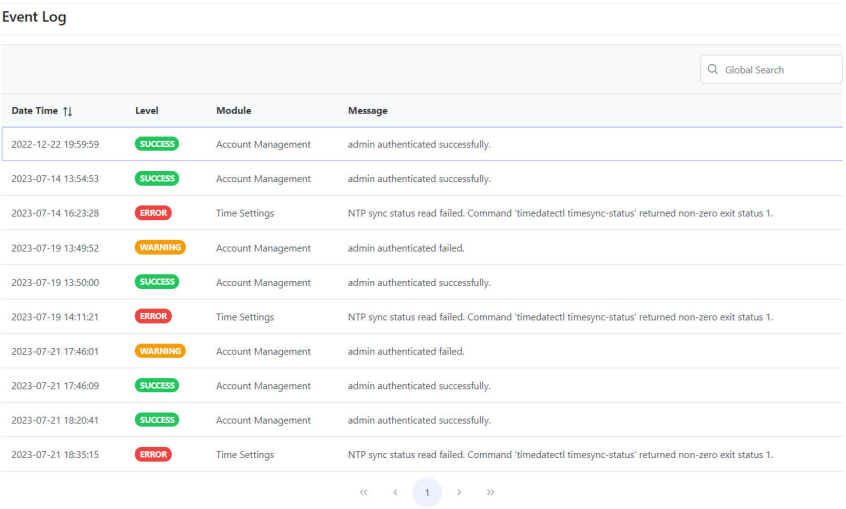


Figure 3-59: Event Log Information

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

External Storage

This page manages external storage.

1. Double click **External Storage** to enter the page.

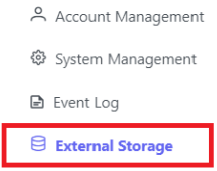


Figure 3-60: External Storage

2. Manage external storage.

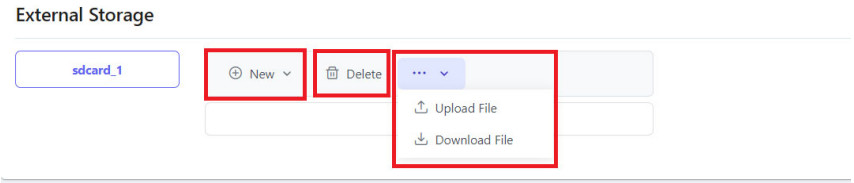


Figure 3-61: Manage External Storage

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

System Information

This page manages system information.

1. Double click **System Information** to enter the page.



Figure 3-62: System Information

2. System information includes device information and software version.

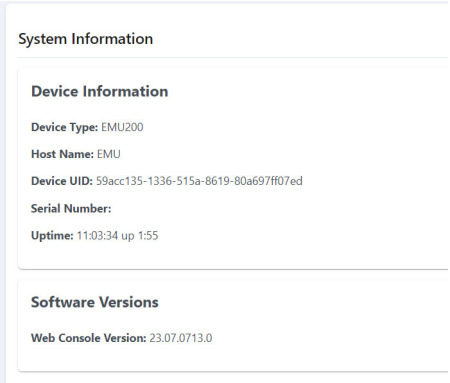


Figure 3-63: Device Information and Software Version

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Appendix A Debian Linux OS

Debian Linux is used as the EMU-210 operating system for system integrators to develop customization applications.This appendix includes information on the following items.

- Hardware Setup
- Connecting and Logging in via SSH
- LED Function
- Serial Port Configuration
- Network Settings
- 5G/4G/LTE Module Configuration
- WiFi Configuration and Connection

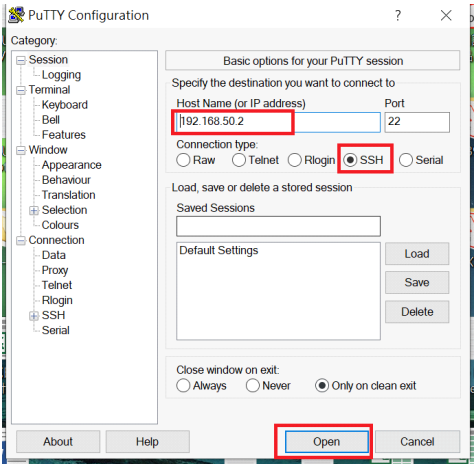
A.1 Hardware Setup

1. LAN1 (DHCP) connects to the network. LAN2 (Static IP) connects to the EMU-210 via SSH.
2. Connect the EMU-210 to a 12-24V DC power supply.
3. The EMU-210 will power on automatically.

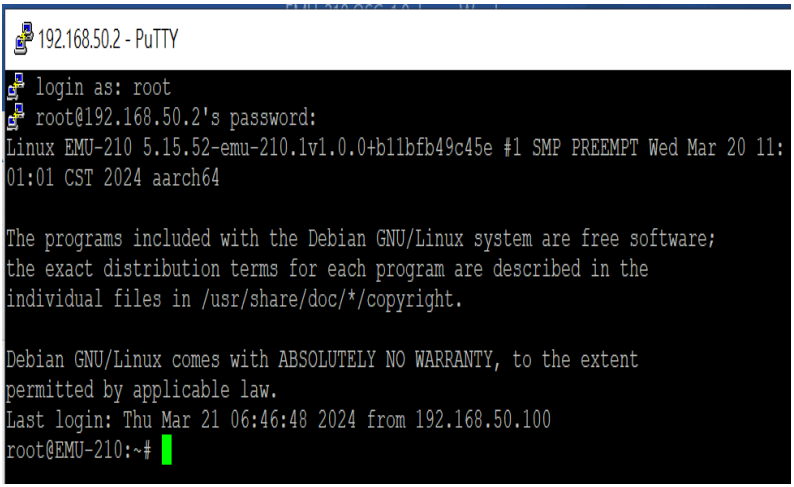
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

A.2 Connecting and Logging in via SSH

1. Set the network domain of the host computer that will be connected to the EMU-210 to 192.168.50.xx.
2. Open Putty on the host computer and enter the IP address of the EMU-210: 192.168.50.2.



3. Log in with the username (**root**) and password (**adlink**).
4. You have successfully connected to the EMU-210.



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

A.3 LED Function

- **PWR LED**: The LED will light up when powered.
- **WLAN LED**: When a Wi-Fi module is installed in the slot, the LED will light up after the system loads. If the hardware does not have a Wi-Fi module installed, the LED will not light up.
- **WWAN LED**: When a 5G LTE module is installed in the slot, the LED will light up after the system loads. If the hardware does not have a 5G LTE module installed, the LED will not light up.
- **PGM LED**: The LED will light up when flashing the BSP to the eMMC via an SD card.

A.4 Serial Port Configuration

Use the following commands to query the current COM1/COM2 serial settings.

```
$ cat /sys/class/gpio_switch/com1Mode
$ cat /sys/class/gpio_switch/com2Mode
```

Use the following commands to set the COM1/COM2 serial settings to RS-232/422/485.

```
$ echo RS232 > /sys/class/gpio_switch/com1Mode
$ echo RS232 > /sys/class/gpio_switch/com2Mode

$ echo RS422 > /sys/class/gpio_switch/com1Mode
$ echo RS422 > /sys/class/gpio_switch/com2Mode

$ echo RS485 > /sys/class/gpio_switch/com1Mode
$ echo RS485 > /sys/class/gpio_switch/com2Mode
```

Use the following commands to set the COM1/COM2 serial paths.

```
COM1: /dev/ttymxc2
COM2: /dev/ttymxc3
```


Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

A.5 Network Settings

Use the following command to Modify LAN1 (eth0).

```
$ vi /etc/systemd/network/10-eth.network.conf
```

Use the following command to Modify LAN2 (eth1).

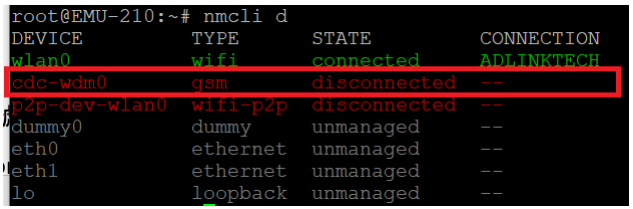
```
$ vi /etc/systemd/network/11-eth1.network.conf
```


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

A.6 5G/4G/LTE Module Configuration

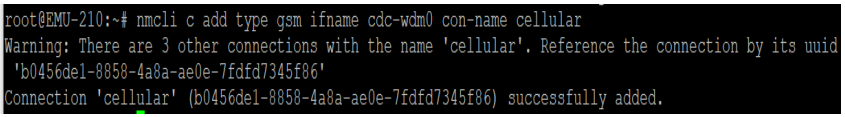
1. Enter the following command to check the interface status.

   ```
   $ nmcli d
   ```



2. Add a connection.

   ```
   $ nmcli c add type gsm ifname cdc-wdm0 con-name
   cellular
   ```



3. Check the connection status.

   ```
   $ nmcli c show cellular
   ```

4. Activate the connection.

   ```
   $ nmcli c up cellular
   ```



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5. Check if the network interface (wwan0) is present.

```
$ ifconfig
```

```
wwan0: flags=4291<UP,BROADCAST,RUNNING,NOARP,MULTICAST>  mtu 1500
        inet 10.131.44.140  netmask 255.255.255.248  broadcast 10.131.44.143
        inet6 2001:b400:e3db:7b17:909b:f846:edf2:4278  prefixlen 64  scopeid 0x0<global>
        ether da:ee:52:5e:92:7e  txqueuelen 1000  (Ethernet)
        RX packets 294  bytes 29244 (28.5 KiB)
        RX errors 46  dropped 0  overruns 0  frame 0
        TX packets 494  bytes 54865 (53.5 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

6. Perform network connectivity test (ping Google DNS).

```
$ ping -I wwan0 8.8.8.8
```

```
root@EMU-210:~#  ping -I wwan0 8.8.8.8
PING 8.8.8.8 (8.8.8.8) from 10.131.44.140 wwan0: 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=55 time=1089 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=55 time=144 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=55 time=14.6 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=55 time=22.3 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=55 time=25.3 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=55 time=13.2 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=55 time=27.4 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=55 time=14.2 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=55 time=32.2 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=55 time=21.4 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=55 time=31.8 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=55 time=13.6 ms
64 bytes from 8.8.8.8: icmp_seq=13 ttl=55 time=25.9 ms
64 bytes from 8.8.8.8: icmp_seq=14 ttl=55 time=24.6 ms
64 bytes from 8.8.8.8: icmp_seq=15 ttl=55 time=26.3 ms
64 bytes from 8.8.8.8: icmp_seq=16 ttl=55 time=24.3 ms
64 bytes from 8.8.8.8: icmp_seq=17 ttl=55 time=30.9 ms
64 bytes from 8.8.8.8: icmp_seq=18 ttl=55 time=16.8 ms
```

7. Close the connection.

```
$ nmcli c down cellular
```

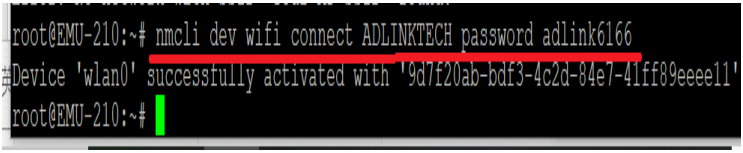
```
root@EMU-210:~# nmcli c down cellular
Connection 'cellular' successfully deactivated (D-Bus active path: /org/freedesktop/
NetworkManager/ActiveConnection/7)
root@EMU-210:~#
```


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

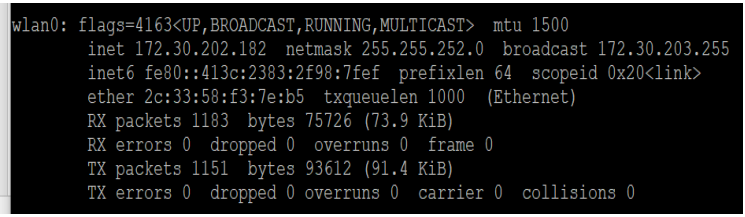
A.7 Wi-Fi Configuration and Connection

1. Enter the following to connect to the Wi-Fi AP.

```
$ nmcli dev wifi connect "Your AP SSID" password
"Your Password"
```

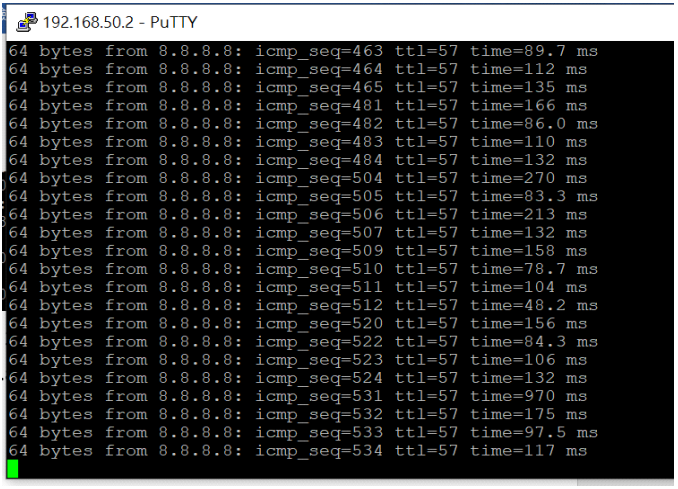


2. Check if the Wi-Fi network interface (wlan0) is present.



3. Enter the following command to execute a Wi-Fi connectivity function test (ping Google DNS).

```
$ ping -I wlan0 8.8.8.8
```



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Appendix B Accessory Installation

B.1 Wi-Fi Module

1. Remove 8 screws from chassis.



2. Remove the top cover



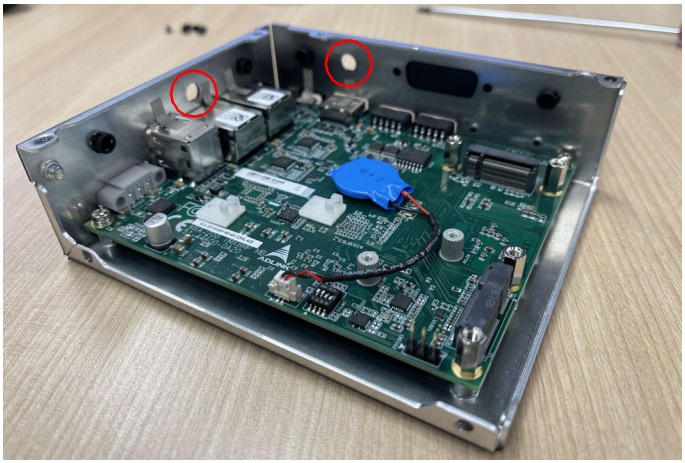
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. Remove the appropriate antenna covers based on the Wi-Fi module used. There are two positions to choose from, depending on whether you will upgrade to a 4G module or a 5G module. If you will not upgrade the system, choose the first option.

Antenna covers for 4G modules Sierra EM7421 and Quectel EM05-G

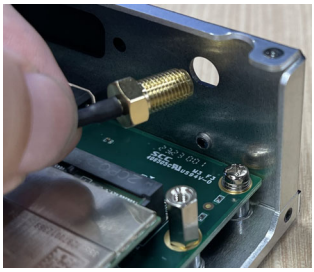


Antenna covers for 5G module: TELIT MV32-W-AD



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4. Install two RF Cables. Thread the SMA connector through the antenna hole.





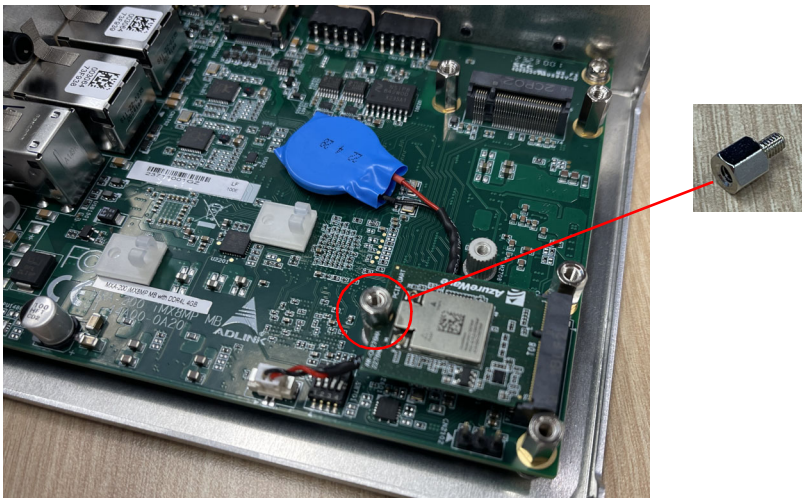
5. Insert the washer and install the hex nut (torque value = 6-8kgf.cm).



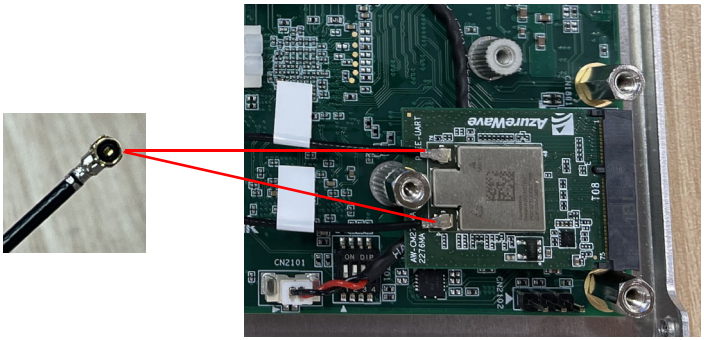


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

6. Install the Wi-Fi module and secure with a hex standoff (torque value = 4-5kgf.cm).



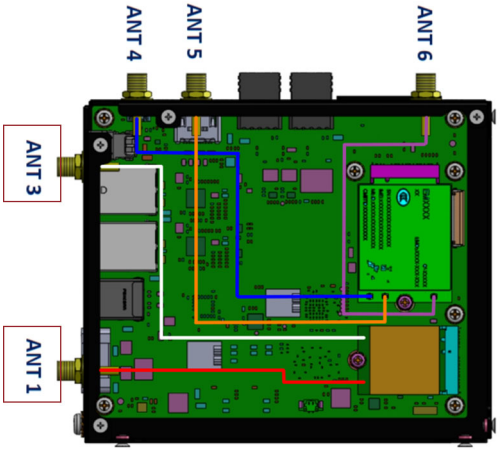
7. Attach the RF cable connector to the module.



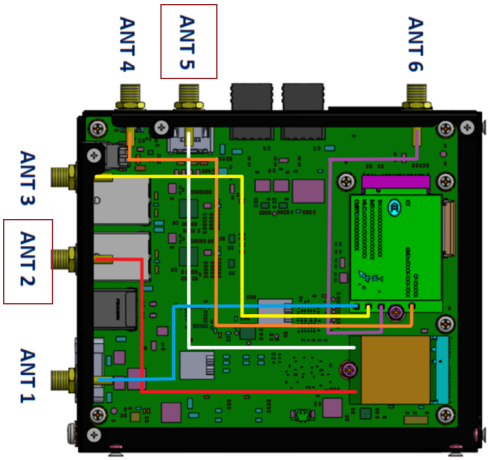
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

8. RF Cable routing. There are two positions to choose from.

Cable routing for 4G modules Sierra EM7421 and Quectel EM05-G

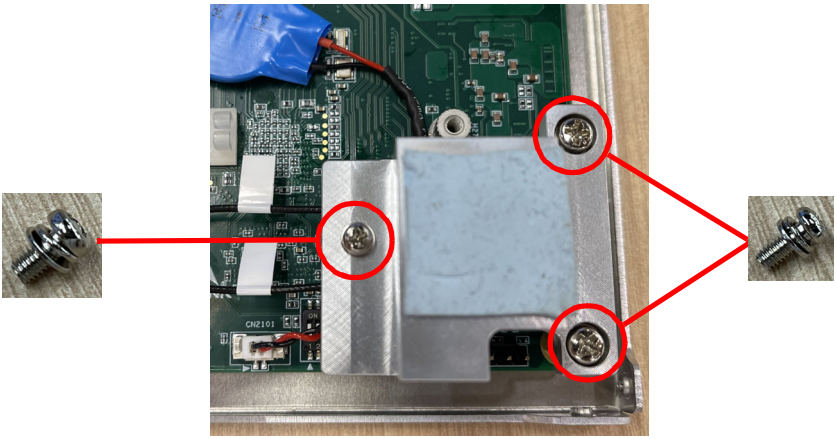


Cable routing for 5G module TELIT MV32-W-AD

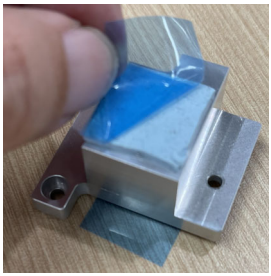


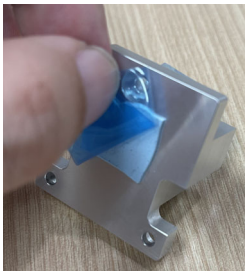
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

9. Install the thermal conductive aluminum block and tighten the M2.5 screw and two M3 screws (torque value = 3.5-4kgf.cm).



The thermal conductive aluminum block has release paper on both sides, which needs to be removed before installation.





10. Replace the top cover and original screws.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

B.2 4G Module

1. Remove 8 screws from chassis.



2. Remove the top cover



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. Remove the appropriate antenna covers based on the 4G module used. There are two positions to choose from, depending on the 4G module used.

Antenna covers for 4G module Sierra EM7421

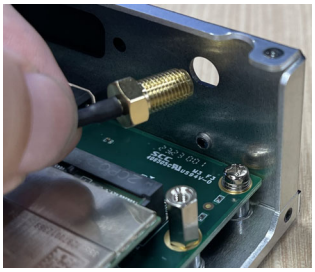


Antenna covers for 4G module Quectel EM05-G



Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4. Install the RF Cables. Thread the SMA connector through the antenna hole.



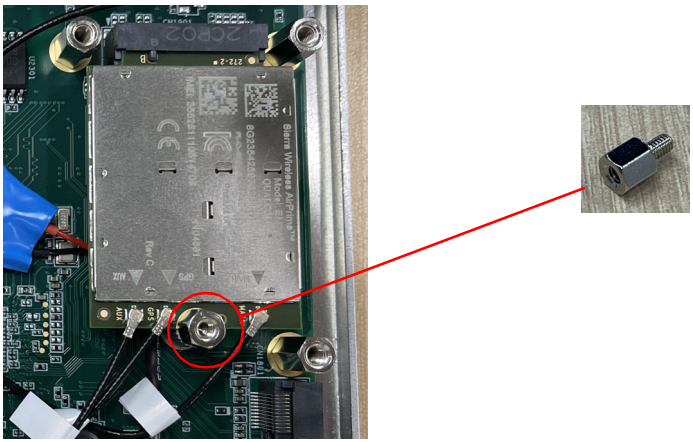


5. Insert the washer and install the hex nut (torque value = 6-8kgf.cm).



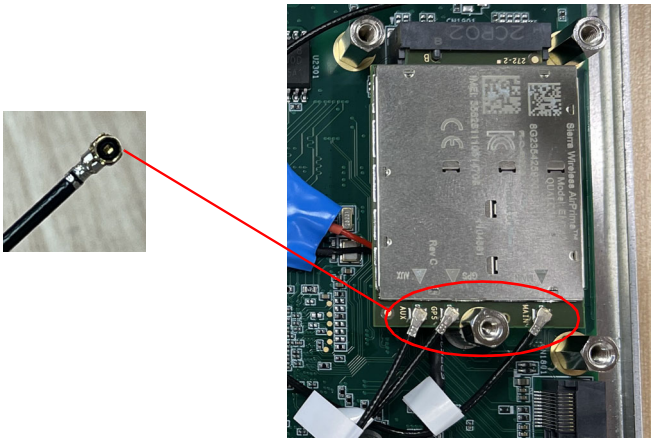


6. Install the 4G module and secure with a hex standoff (torque value = 4-5kgf.cm).



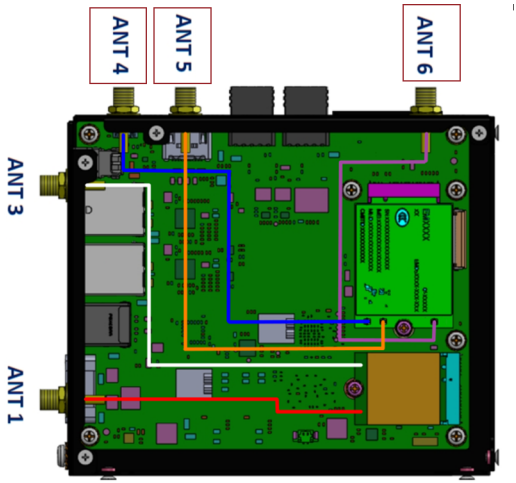
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

7. Attach the RF cable connectors to the module.



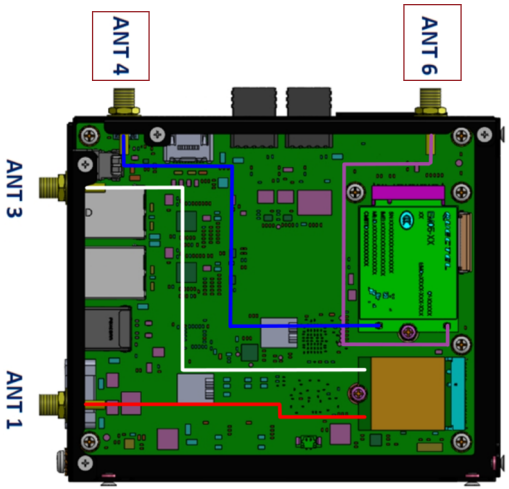
8. RF Cable routing. There are two positions to choose from.

Cable routing for 4G module Sierra EM7421

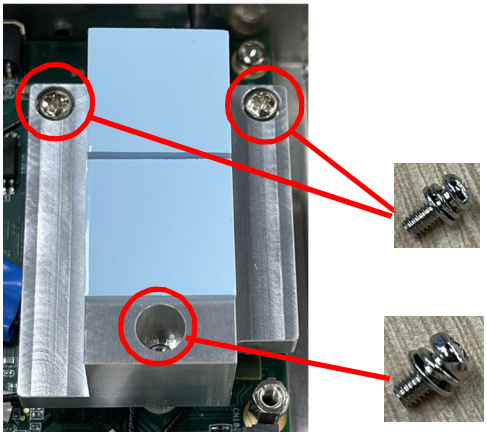


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Cable routing for 4G module Quectel EM05-G

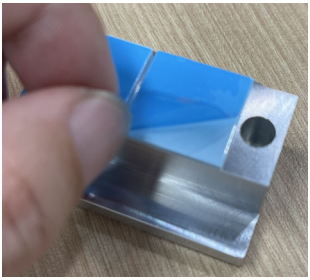


9. Install the thermal conductive aluminum block and tighten the M2.5 screw and two M3 screws (torque value = 3.5-4kgf.cm).



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

The thermal conductive aluminum block has release paper on both sides, which needs to be removed before installation.





10. Replace the top cover and original screws.

B.3 5G Module

1. Remove 8 screws from chassis.

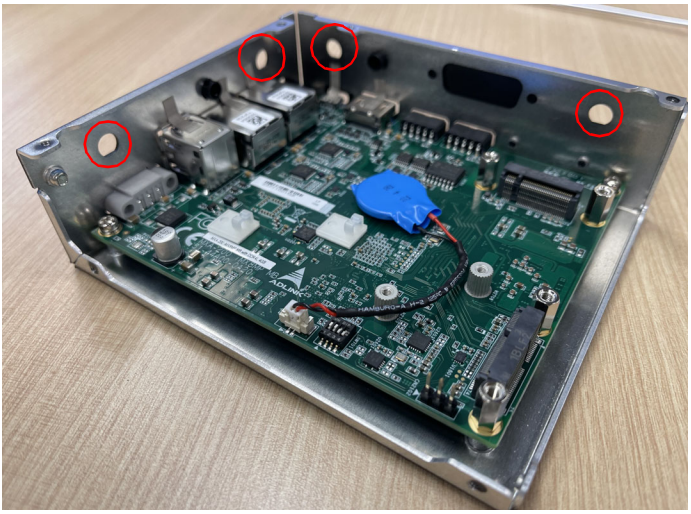


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. Remove the top cover

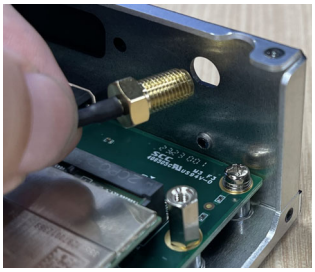


3. Remove four antenna covers.



Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

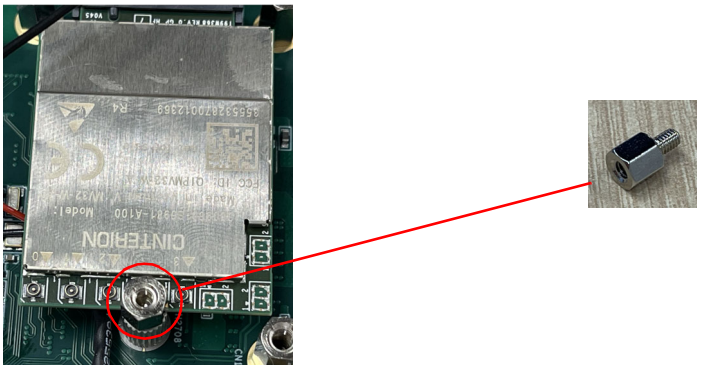
4. Install the RF Cables. Thread the SMA connector through the antenna hole.




5. Insert the washer and install the hex nut (torque value = 6-8kgf.cm).

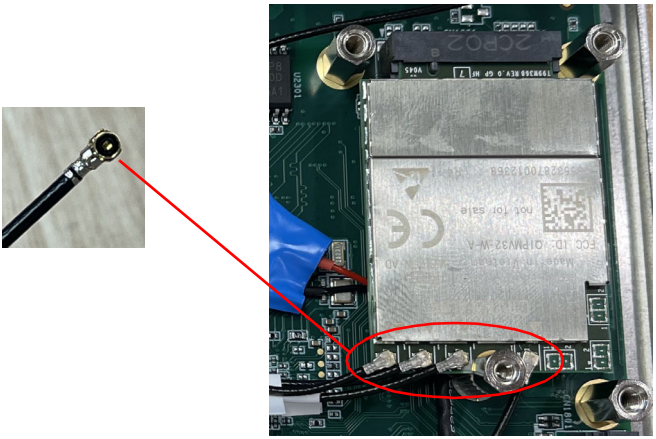



6. Install the 5G module and secure with a hex standoff (torque value = 4-5kgf.cm).

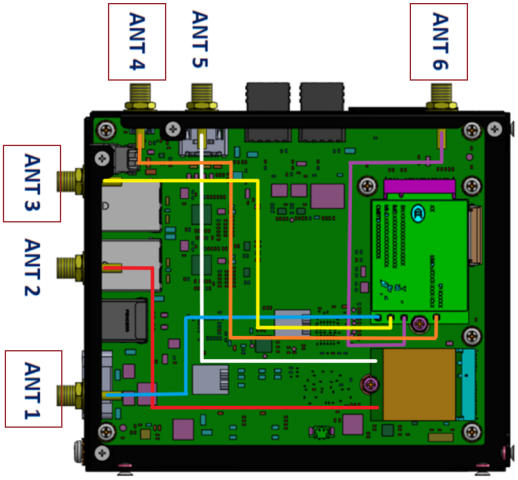


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

7. Attach the RF cable connectors to the module.

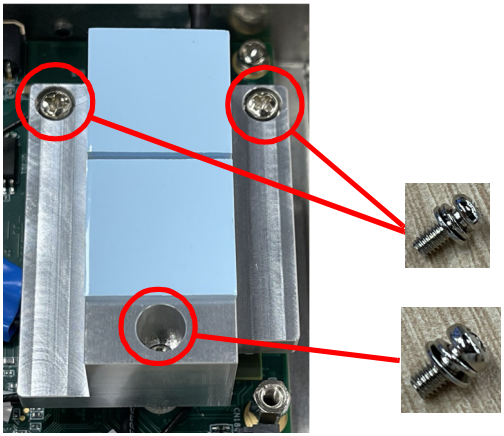


8. RF Cable routing.

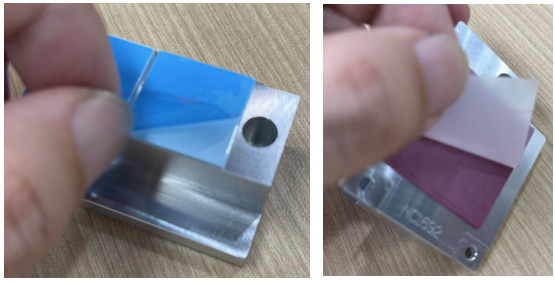


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

9. Install the thermal conductive aluminum block and tighten the M2.5 screw and two M3 screws (torque value = 3.5-4kgf.cm).



The thermal conductive aluminum block has release paper on both sides, which needs to be removed before installation.



10. Replace the top cover and original screws.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

- Read these safety instructions carefully.
- Keep the User's Manual for future reference.
- Read the Specifications section of this manual for detailed information on the recommended operating environment.
- The device can be operated at an ambient temperature of 5ºC to 50ºC.
- It is recommended that the device be installed in Information Technology Rooms that are in accordance with Article 645 of the National Electrical Code and NFPA 75.
- When installing/mounting or uninstalling/removing device:
  - Turn off power and unplug any power cords/cables.
  - Reinstall all chassis covers before restoring power.
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources.
  - Keep device away from high heat or humidity.
  - Keep device properly ventilated (do not block or cover ventilation openings).
  - Always use recommended voltage and power source settings.
  - Always install and operate device near an easily accessible electrical outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate device on stable surfaces and/or recommended mountings.
  - This apparatus is powered by adapter or DC source. Please ensure the adapter or DC source has a grounded connection.
- If the device will not be used for long periods of time, turn off and unplug it from its power source
- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

- A Lithium-type battery may be provided for uninterrupted backup or emergency power.

CAUTION:

Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.
Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged.
  - Liquid has entered the device interior.
  - The device has been exposed to high humidity and/or moisture.
  - The device is not functioning or does not function according to the User's Manual.
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage.
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up.
- Terminal block wires should be fixed tightly by an authorized technician with the recommendation wire range: 16-24, str, sol, wire type: copper.
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required.
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.



BURN HAZARD

Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

RISQUE DE BRÛLURES

Ne touchez pas cette surface, cela pourrait entraîner des blessures.
Pour éviter tout danger, laissez la surface refroidir avant de la toucher.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Consignes de Sécurité Importantes

Pour la sécurité de l'utilisateur, veuillez lire et suivre toutes les instructions, avertissements, mises en garde et notes marqués dans ce manuel et sur l'appareil associé avant de manipuler/ d'utiliser l'appareil, afin d'éviter toute blessure ou tout dommage.

- *Lisez attentivement ces consignes de sécurité*
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé*
- *L'appareil peut être utilisé à une température ambiante de 5ºC à 50ºC.*
- *Il est recommandé d'installer l'appareil dans Information Salles technologiques conformes à l'article 645 du Code national de l'électricité et NFPA 75.*
- *Lorsque l'installation/le montage ou la désinstallation/le retrait du périphérique est requis:*
  Lorsque l'installation/le montage ou la désinstallation/le retrait du périphérique est necessaire:
  - *Mettez l'appareil hors tension et débranchez tous les cordons/câbles d'alimentation*
  - *Réinstallez tous les couvercles de châssis avant de rétablir l'alimentation*
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil:*
  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation)*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible*

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

- *Fixez le cordon d'alimentation (ne placez aucun objet sur le cordon d'alimentation)*
- *Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou sur les fixations recommandées*
- *Cet appareil est alimenté par un adaptateur ou une source DC. Veuillez vous assurer que l'adaptateur ou la source DC est relié à la terre s'il dispose d'une mise à la terre de protection.*

- *Si l'appareil ne doit pas être utilisé pendant de longues périodes, éteignez-le et débranchez-le de sa source d'alimentation*
- *N'essayez jamais de réparer l'appareil, qui ne doit être réparé que par un personnel technique qualifié à l'aide d'outils appropriés*
- *Une batterie de type Lithium peut être fournie pour une alimentation de secours ininterrompue ou d'urgence*.



Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- *L'appareil doit être entretenu par des techniciens agrees lorsque:*
  - *Le cordon d'alimentation ou la prise est endommagé(e)*
  - *Un liquide a pénétré à l'intérieur de l'appareil*
  - *L'appareil a été exposé à une forte humidité et/ou de la buée*
  - *L'appareil ne fonctionne pas ou ne fonctionne pas selon le manuel de l'utilisateur*
  - *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de dommage*
- *Débranchez le cordon d'alimentation avant de desserrer les vis à oreilles et serrez toujours les vis à oreilles avec un tournevis avant de mettre le système en marche*
- *Le fil du bornier doit être fixé fermement par un technicien agréé et recommandé pour la gamme de fils : 16-24, str, sol, type de fil: Cu*

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique où l'accès est:*
  - *Réservé au personnel de service qualifié ou aux utilisateurs familiarisés avec les restrictions appliquées à l'emplacement, aux raisons de ces restrictions et toutes les précautions requises*
  - *Uniquement autorisé par l'utilisation d'un outil, d'une serrure et d'une clé, ou d'un autre moyen de sécurité, et contrôlé par l'autorité responsable de l'emplacement*

	***RISQUE DE BRÛLURES*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures.* *Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

Getting Service

Ask an Expert: https://www.adlinktech.com/en/Askanexpert

ADLINK Technology, Inc.
No. 66, Huaya 1st Road, Guishan District
Taoyuan City 333, Taiwan
Tel: +886-3-216-5088
Fax: +886-3-328-5723
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
6450 Via Del Oro, San Jose,
CA 95119-1208, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-600-1189
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
300 Fang Chun Rd., Zhangjiang Hi-Tech Park
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology GmbH
Hans-Thoma-Straße 11
D-68163 Mannheim, Germany
Tel: +49-621-43214-0
Fax: +49-621 43214-30
Email: emea@adlinktech.com

Please visit the Contact page at www.adlinktech.com for information on how to contact the ADLINK regional office nearest you.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000