HRI-485x

RS485 Converter

Document Version

Version	Time	Description	Remark
Rev. 1.0	2023-4-12	Preliminary version	Richard
Rev. 1.1	2023-5-15	Typographic modification	Aaron

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1. Description

1.1 Overview

The HRI-485x series is a DTU device that converts the RS-485 bus to wireless data. Sub models achieve RS-485 data to LTE (Cat. 1/Cat. 4), private LoRa, standard LoRaWAN, Ethernet, etc. communications method.

This is a highly reliable DTU device that can be used in industrial scenarios, directly installed on rack rails, and provide a method that makes previous devices realize IoT evolution. All these series come with an easy configuration function, which can directly manage and configure options and parameters in the LAN.

RS485 Converter are available in three product variants:

Table1.1: HRI-485x model list

No.	Model	Description	Protocol	Internet Access
1	**HRI-4851**	RS-485 to Custom LoRa	Custom LoRa	HRI-4852
2	**HRI-4851L**	RS-485 to LoRaWAN	LoRaWAN	LoRaWAN Gateway
3	**HRI-4852**①	Collect HRI-4851 LoRa signals to Ethernet/LTE	TCP/UDP/MQTT	Ethernet/LTE
4	**HRI-4853**	RS-485 to Ethernet/LTE	TCP/UDP/MQTT	Ethernet/LTE

① HRI-4852 is usually only used as a gateway for HRI-4851 to enter the network.

1.2 Application Example

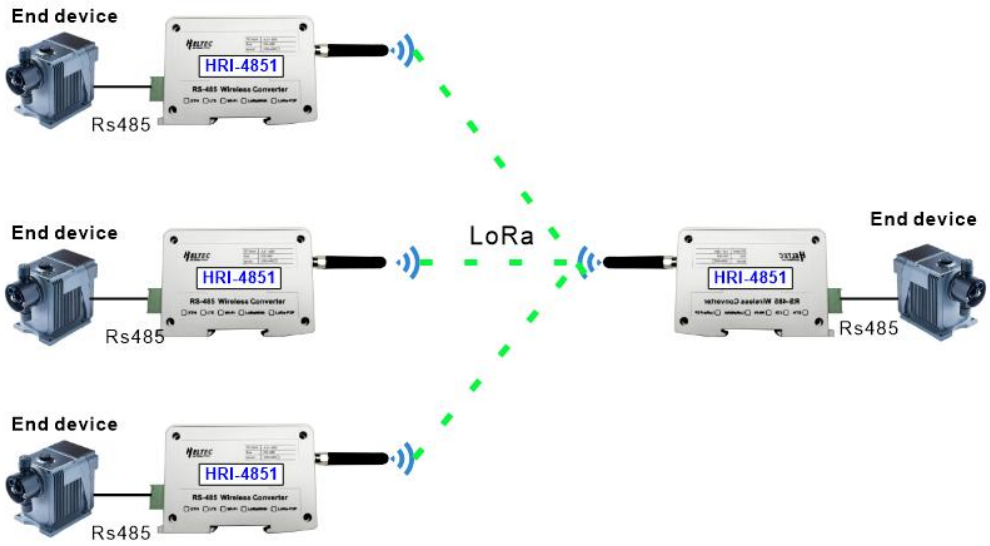
HRI-485x series has a variety of networking methods. For details, please refer to the user manual.

Refer to this documentation for the protocol and Settings:

https://docs.heltec.org/en/ready2use/hri-485x/setting_of_communication_conditions.html

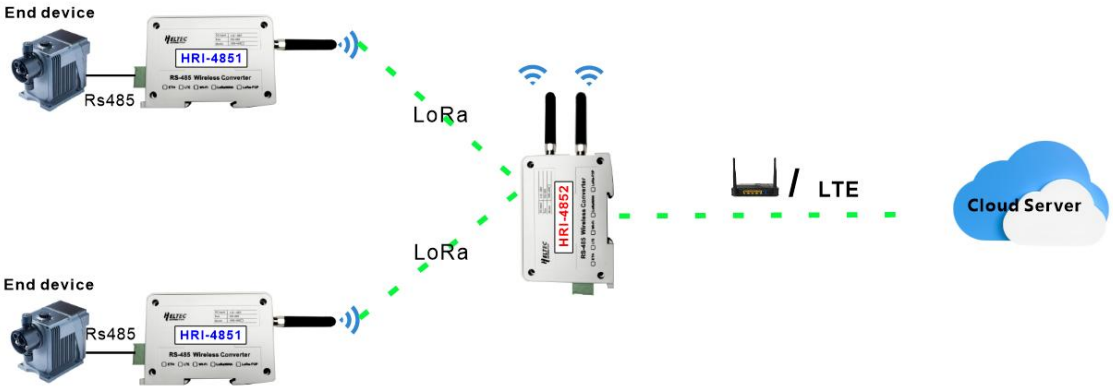
1.2.1 HRI-4851+HRI-485

HRI-4851 can be configured to achieve point-to-point and point-to-many SerialNet.



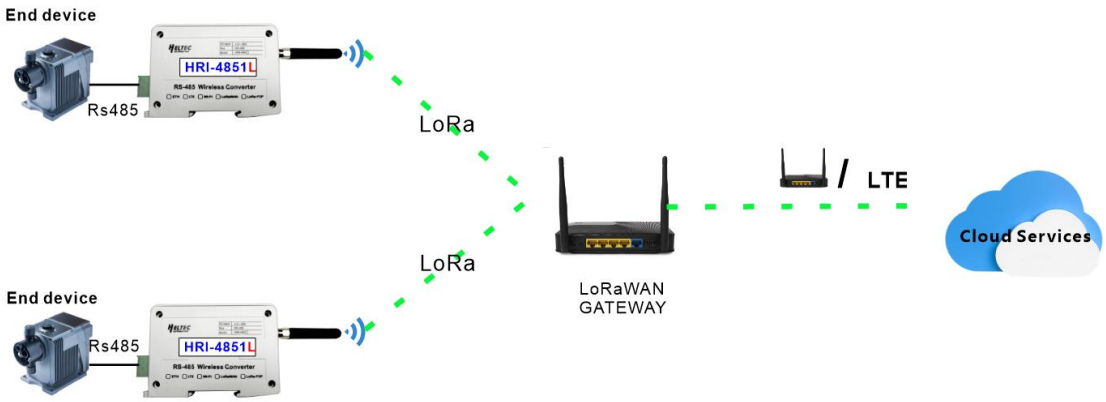
1.2.2 HRI-4851+HRI-4852

The device is connected to the HRI-4851 through RS-485 and sends the data to the HRI-4852 through LoRa signal, and then sends the data to the cloud server through the ordinary gateway or LTE. Attention please , HRI-4852 is usually only used as a tool for HRI-4851 to enter the network.



1.2.3 HRI-4851L + LoRaWAN Gateway

The device connect to the HRI-4851 via RS-485, HRI-4851 sends data via LoRaWAN to the gateway, gateway sends data to the LoRaWAN server.



1.2.4 HRI-4853

HRI-4853 connects the device via RS-485 and uploads the data to the cloud server via LTE or Ethernet.

1.2.5 HRI-4851 Relayer

In some special occasions, HRI-4851 can be used as a forwarding device of two HRI-4851 or HRI-4852.

In some special occasions, HRI-4851 can be used as a forwarding device of two HRI-4851 or HRI-4852.

1.3 Product Features

- DC 4.5~28V wide voltage input.
- Rack rails compatible.
- **Built in configuration page**, without the need for other configuration software, the device can be configured and maintained through the local area network.
- LoRa/LoRaWAN, Ethernet, LTE multiple network modes.
- In LoRa private network mode, it can be configured as point to point, point to many, or mesh mode.
- Support for data encryption,1024 bytes cache, a single packet supports up to 240 bytes.
- Support communication key function, prevent data interception.
- Support LBT function.
- Operating temperature range: -40 ~ 85 °C.

2.Specifications

2.1 General specifications

Table2.1: General specifications

Parameters	Description
MCU	ESP32C3-FN4 / ESP32DOWDQ6
LoRa chipset	SX1262
Frequency	470~490MHz(470M+200K*N) 863~883MHz(863M+200K*N) 902~922MHz(902M+200K*N) N: 0~100
LTE module	Air724UG
Rack rail width	35 mm
Max. TX Power	21±1 dbm
Max. Receiving sensitivity	-139 dBm
Supply voltage	4.5 ~ 28v
Operating temperature	-40 ~ 85℃
Operating humidity	10%～90%, no-condensing
Antenna impedance	50 Ω
Address Code	0000 ~ FFFF
Baud rate	1200/2400/4800/9600/19200/38400/57600/115200
Buffer	1024 bytes

2.2 Operating conditions

2.2.1 Power supply range

Table 2.2.1: Power supply range

Parameter	Min.	Typical	Max.	Unit
Device operating input voltage	4.5	12/24	28	V

2.2.2 Power consumption（mA）

The following are the current parameters of the product at a transmit power of 20dbm.

Table 2.2.2: Working current

Model		**HRI-4851**		**HRI-4852/3**	
Mode Condition		12v	24v	12v	24v
Sleep		0.7	0.35	36	18
Work	**RX**	11	5.8	54	27
	TX	63	32	75	37
Debug		10	5.3	53	26
Configuration		29	15	78	39

2.2.3 Air firing rate

Table 2.2.3: Air firing rate

Unit	Levels	Air rate
bps	8	0.9k,1.8k,3.1k,6.2k,12.5k,15.6k,31.2k,62.5k

2.2.4 Tx Power levels

Table 2.2.4: Tx Power levels

Unit	Levels	Tx Power
dBm	4	22(default), 17, 14, 10

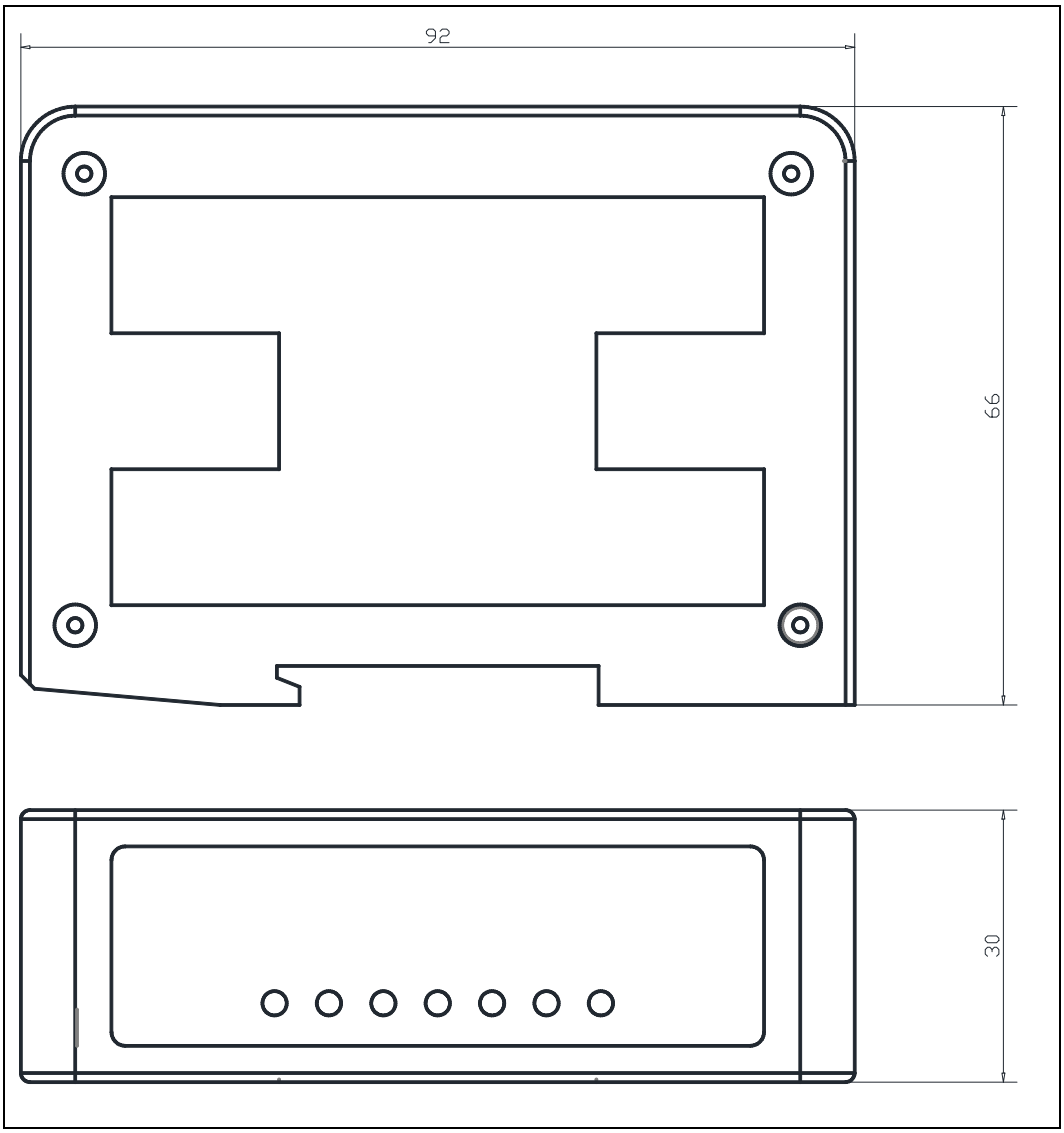
2.2.5 Interact

Table 2.2.5: Interact

Symbol/Name	Type	Function
VCC	Socket	Positive Pole
GND	Socket	Negative Pole
485A	Socket	485 interface A
485B	Socket	485 interface B
ETH	Socket	Cable interface
RST	Key	Mode switch
LTE	Socket	LTE antenna.
LoRa	Socket	LoRa antenna.

3.Hardware resource

3.1Physical dimensions



4.Resource

4.1 Relevant resource

- HRI-485x Documents Page:

  https://docs.heltec.org/en/ready2use/hru-485-1-i/index.html

- Heltec LoRaWAN test server based on TTS V3:

  https://docs.heltec.org/en/ready2use/hri-485x/lorawan.html

- HRI-4851L resource Download:https://resource.heltec.cn/download/HRI-485X

4.2 Contact Information

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