

QUICK GUIDE: SOLAR 868 MHz LoRa REPEATER

By reading this guide, you will be able to acquire the necessary knowledge to carry out the basic initial configuration, the first start-up, and the daily use of the Solar 868 MHz Meshtastic LoRa Repeater.

Attention! You must first connect the included antenna while the device is turned off, and only then proceed to turn it on.

Topics covered in the guide:

- Features list
- General principle of operation
- Initial assembly and start-up
- Management of initial configuration
- Start-up and use

Features list	
Heltec T114 v2.0 868 MHz Meshtastic LoRa board	■
Connectivity Bluetooth 5 (LE), USBC	■
3,7v 4000 mA LiPo BATT	■
SX1262 LoRa Transceiver	■
Max transmit power +21dBm	■
Hi Gain External antenna	■
Tiltable 6W Solar panel	■
IP67 case with pole bracket	■
GPS/GNSS module	■

General principle of operation

This device allows you to extend the radio coverage of any Meshtastic LoRa terminal in the 868 MHz band within its coverage range: it will act as an active repeater, bidirectionally forwarding packets from client devices and/or other connected repeaters.

Its internal battery is automatically recharged by the solar panel, ensuring service continuity even at night or on days with low solar radiation.

It should be installed in an elevated position (terraces, roofs, etc.) free from obstacles and will create an "umbrella" of radio frequency coverage with an indicative radius of up to a few kilometers (RPT to road user) or much greater if connected to the Mesh.

No electrical connection is required; the solar repeater is autonomous once permanently installed.

It also features a USB-C port for manually charging the battery.

Two or more LoRa-enabled terminals can communicate with each other without the aid of other technologies (WiFi, cellular networks, etc.) as long as they are located within the range of the repeater (a few kilometers) or using the "Meshed" network principle.

The Meshed network is implemented by each powered-on terminal, which automatically acts as an active repeater for messages from anyone within its range.

It goes without saying that through this "store & forward" mechanism, the Meshed network allows a theoretical extension of the range up to several dozen kilometers.

The services available in this area are:

- encrypted short messaging: the ability to exchange short messages between participants in a specific group or directly between two terminals; the messages are decrypted only by those terminals, as they hold the appropriate encryption key.
- real-time group location: the position of group members can be automatically exchanged and displayed on a map.

Initial assembly and start-up

Attention! You must first connect the included antenna while the device is turned off, and only then proceed to turn it on.

- Charge the internal battery to at least 30% using the USB-C service port on the bottom of the box.
- POWER ON: turn on the electronic board if necessary by pressing the button at the top left, check that the control LED is on

Tip: POWER OFF procedure: press the button for at least 5 seconds and release it

- Close the cover by snapping the clips into place.
- Secure the solar panel bracket by rotating the ring nut on the support.
- Check the repeater configuration (see next paragraph) and perform initial connection tests with the client terminals.
- Install the repeater in an open, elevated location free of obstacles.
- Orient the solar panel to the SOUTH at a 45-degree angle.



Management of initial configuration

The Solar 868 MHZ LoRa Meshtastic Repeater device comes with a standard configuration based on the bandplan used (listed below).

Tip: Depending on the country/region of use, the LoRa network configuration will have its own specifics, which must be known to access.

Tip: To use and configure the device, you must connect a smartphone with the Meshtastic  app installed via Bluetooth:

1) Install and launch the Meshtastic app on your smartphone with Bluetooth enabled.

2) Pair the LoRa Smart Modules in the Meshtastic app on your smartphone.

Tip: LoRa circuit boards equipped with display shows the PIN otherwise use default: **123456**

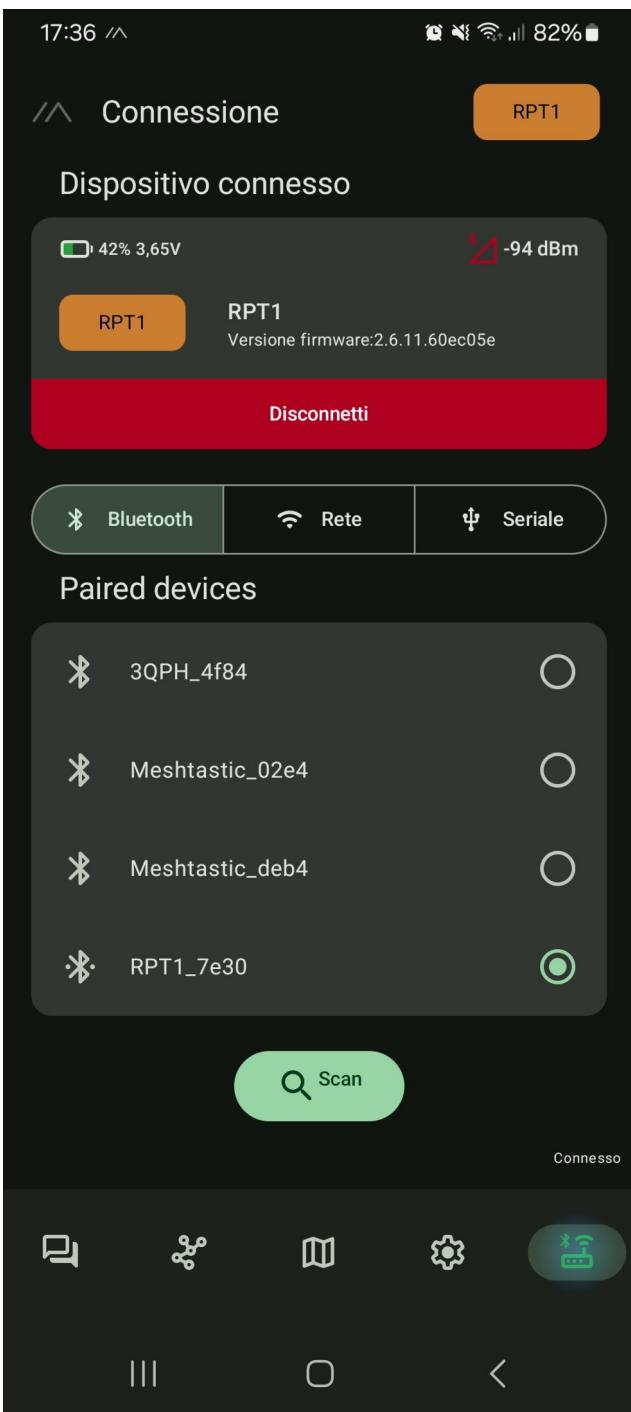
3) Access the configuration menus, as per the manual available at:

- <https://meshtastic.org/>
- <https://www.loraitalia.it/>

Standard configuration LoRa Meshtastic Net bandplan 868 MHz (check in your country)

userconfig	Longname	Changeable default value
	Shortname	Default value, editable max 4 characters
	Licensed	NO
channels	Channel name	MediumFast
	PSK	AQ==
	position	YES
device	role	CLIENT
position	Smart enabled	YES
	GPS mode	ENABLED
LoRa	Use modem preset	YES
	Modem preset	MEDIUM_FAST
	hop	5
	TX enabled	YES
	TX power	27 dBm
	RX boosted gain	NO
	slot	1
	Region	EU 868 MHz

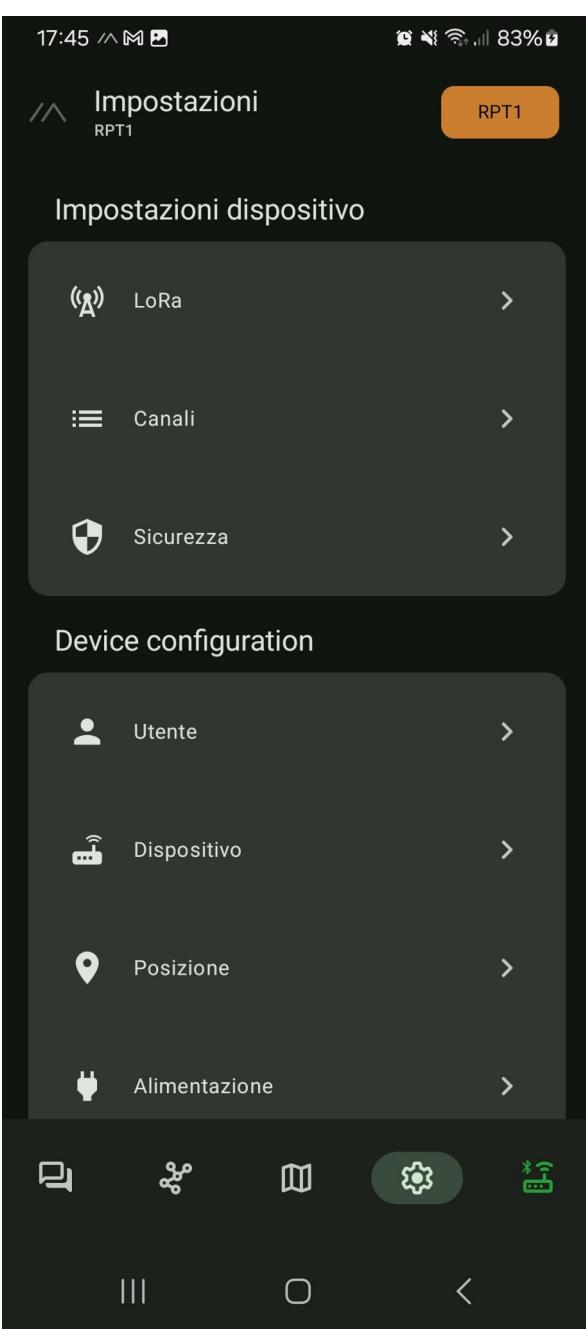
Smart Module LoRa: start-up and use



SYSTEM START-UP:

Once you've connected the antenna, charged the device's internal battery, and launched the Meshtastic app on your smartphone, you can now check and/or change its configuration:

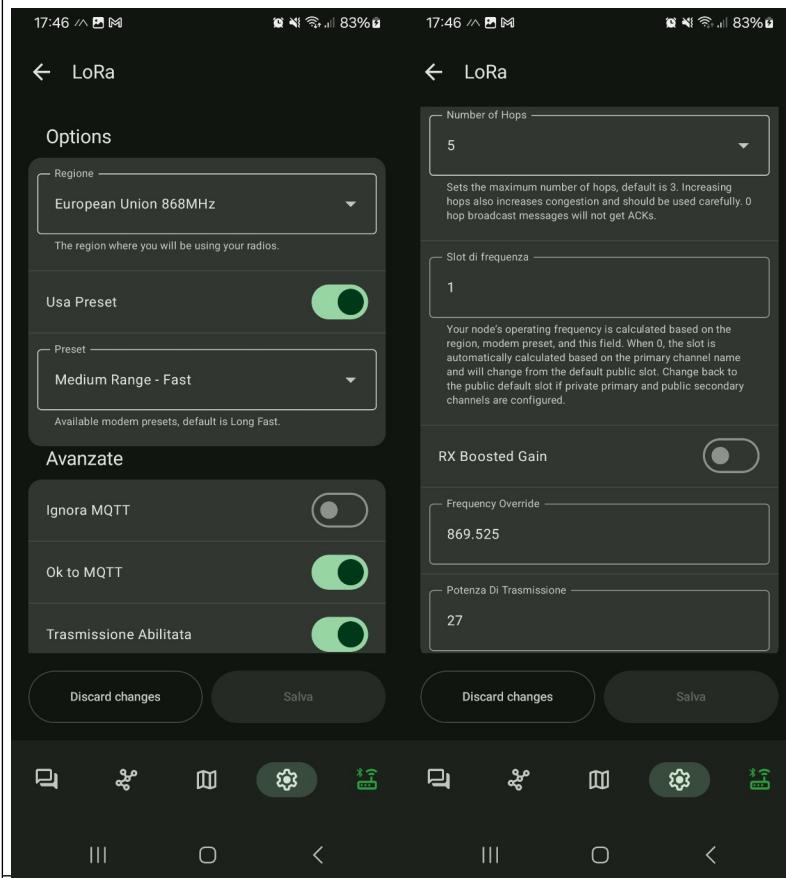
- Select the Bluetooth tab and identify the device from the list after pressing the SCAN button.
- Perform pairing by selecting the device and verifying the correct Bluetooth connection status.
- Access the configuration (wheel) and usage menus (map, node list, messages) indicated by the icons at the bottom.



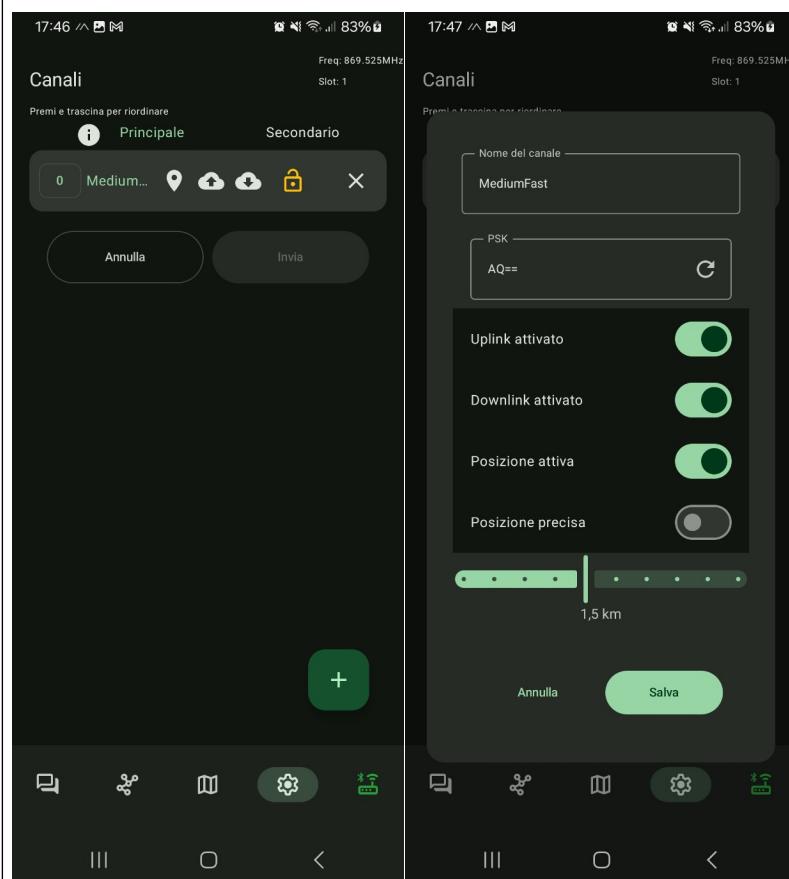
ACCESS TO SYSTEM MENU:

- Select the gear icon and access the configuration.
- The main menus are:
 1. LoRa
 2. Channels
 3. User
 4. Device
- Refer to the table above based on the bandplan used.

System menu: LoRa (bandplan 868 MHz)



- Refer to the table above based on the bandplan used.



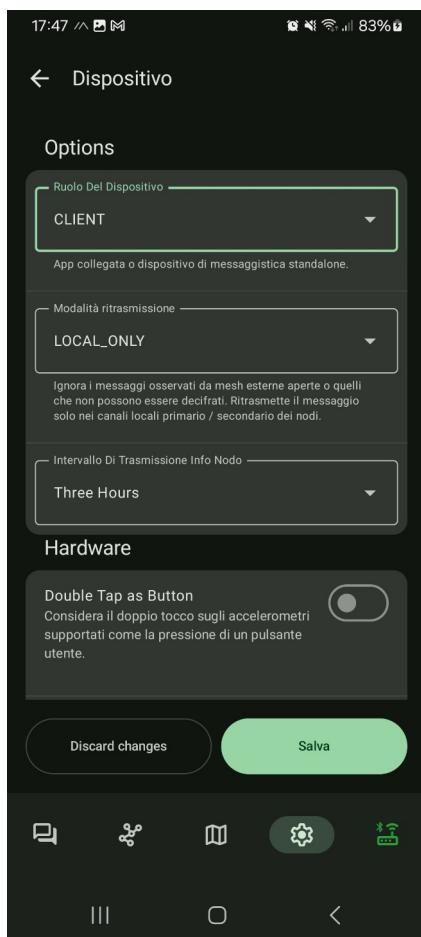
System menu: Channel (bandplan 868 MHz)

- Refer to the table above based on the bandplan used.
- Channel Name and PSK are case sensitive
- define the localization accuracy as desired



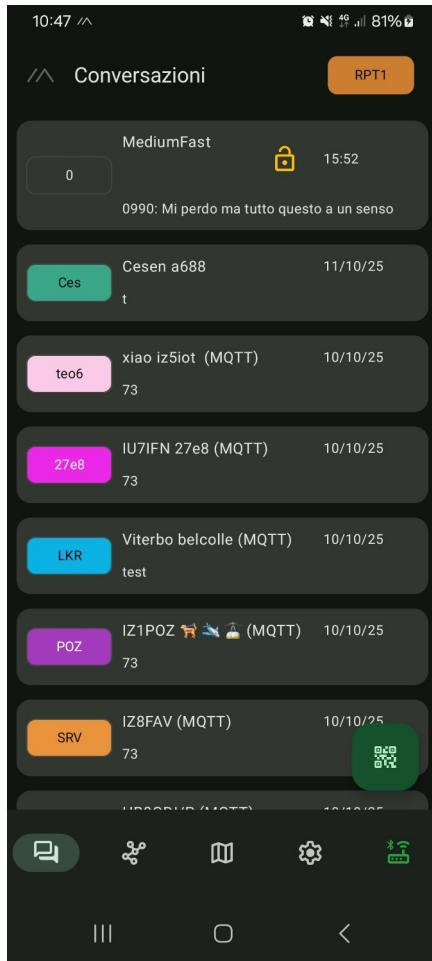
System menu: User (bandplan 868 MHz)

- Refer to the table above based on the bandplan used.
- Short name is 4 chars long



System menu: Device (bandplan 868 MHz)

- Refer to the table above based on the bandplan used.



ACCESS TO ACTIVE CHATS:

- Press the Conversations icon from the main menu
- The folder at the top indicates the default GROUP CHAT
- Any folders below indicate INDIVIDUAL CHATS, if previously activated
- Access the chats to start the conversation
- The cloud with the V mark indicates the chat message was forwarded correctly
- The crossed-out cloud indicates a forwarding problem
- To start a new individual chat: select the node from the node list and invoke the direct message



NODE LIST:

- Press the nodes icon
- Our device is first at the top
- The nodes that are online or previously connected follow, depending on the activated filters.
- By clicking on a node, you can obtain details and perform actions, including:
 - Direct message
 - Traceroute
 - Exchange user information
 - Exchange location

THE MESH MAP:



- Press the map icon
- The nodes in the list that have shared their location will be displayed
- Clicking on the node displays details and actions
- Map panning and zooming