Radio Less Node Z2 (RLNZ2) User Guide

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Important
In normal operation, to shut down the RLNZ2 safely hold both buttons for 5 seconds to initiate a safe closedown procedure.

Removing power to a running system can cause corruption of the SD card.

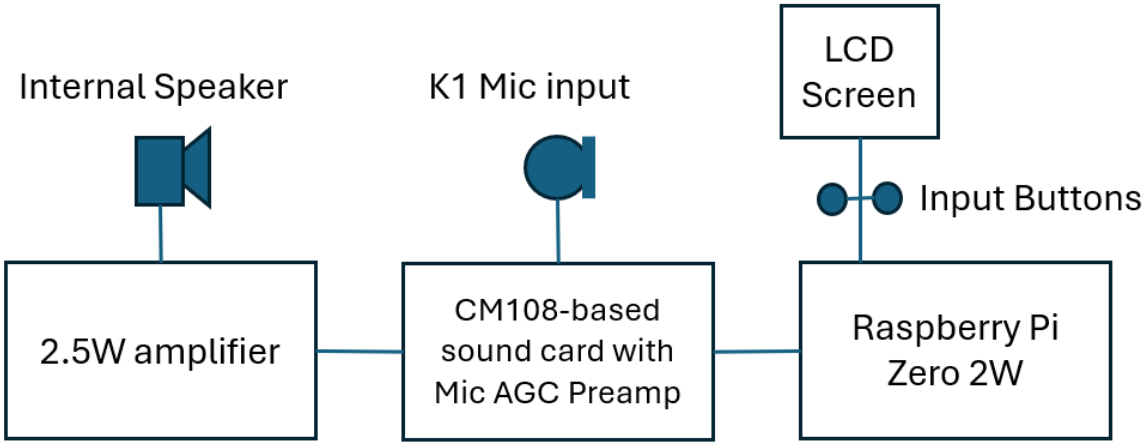
Introduction

The RLNZ2 is an all-in-one appliance designed to connect to the AllStarLink (ASL) network.

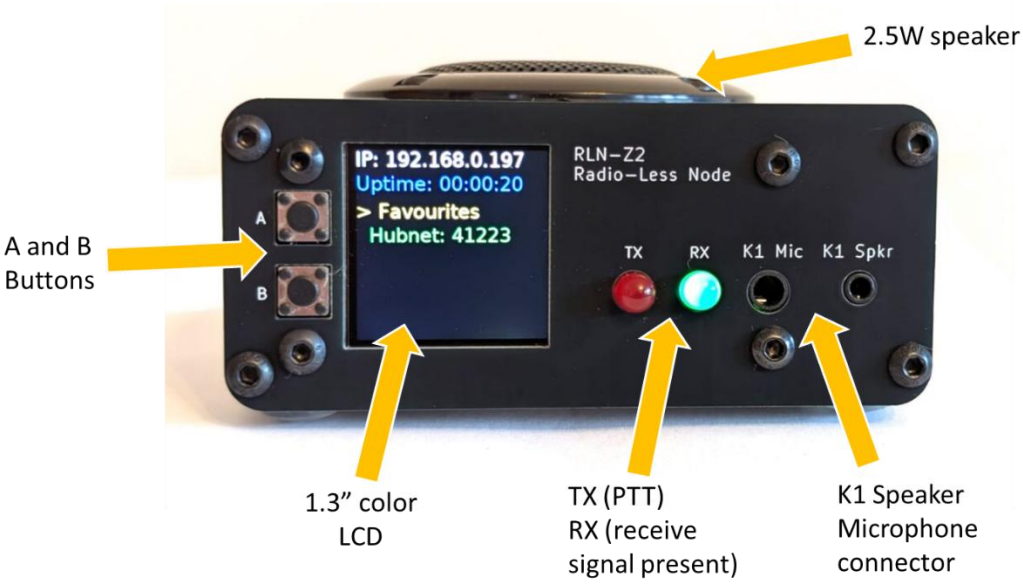
The unit contains all the required components to operate as an ASL node, fabricated into a sturdy aluminum enclosure with front-panel controls. No PC required.

What's in the (Radio-less-node) RLN-Z2?

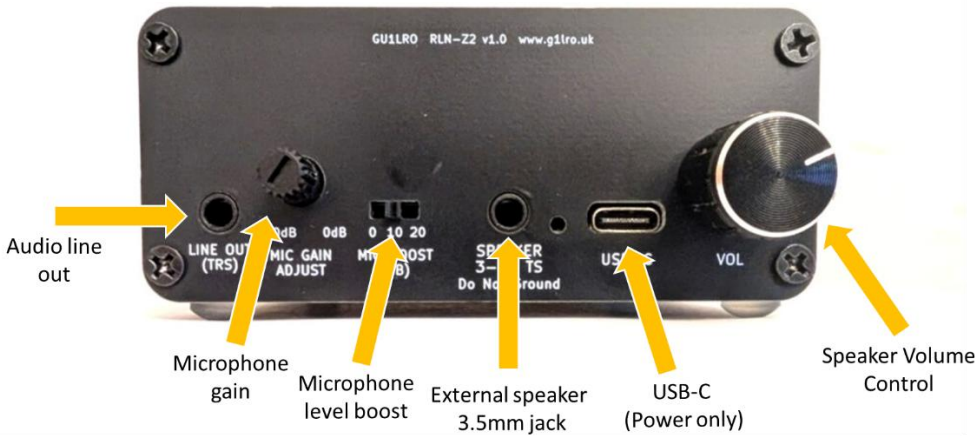
- A powerful Raspberry Pi Z2 W quad-core processor with WiFi
- 32GB SD card with ASL3 and the G1LRO custom setup firmware pre-installed
- 1.3 inch color LCD screen with button navigation to select favorite node connections in ASL3
- Audio interface based on the industry-standard CM108 sound processor
- Powerful 2.5W amplifier with internal speaker – audio design by Allscan.info
- Controls for microphone gain to support a wide range of microphone types
- Line-out for connection to auxiliary audio equipment
- Manual Bourns volume control and External speaker out
- Sturdy 88x38x100(mm) extruded aluminum case with rubber feet
- Front panel 'K1' microphone socket with supplied mic.
- Powered from 5v USB-C (cable provided) >1A PSU needed



Front and Rear Panel Details



Front Panel Details



Rear panel details

Setting up the RLNZ2

The unit is shipped with a pre-installed version of the ASL3 software and custom software to manage the built-in display and operation as a simple stand-alone appliance.

Factory-configured units will arrive ready to connect to a Wi-Fi network. Initial configuration is done via a mobile phone, tablet or laptop.

Before you start.

For the initial configuration, you will need the following 6 pieces of information to set up the RLNZ2. There is a form at the end of this document to fill in to be ready.

You must be registered on the AllStarLink.org website and have a node number and password. If you are new to AllStarLink then review the getting started guide in Appendix A.

Before you begin, prepare these 6 pieces of information:

Wifi Access Point Name	Your home Wi-Fi access point name
Wifi Password	The password used to log into the Wi-Fi.
Node Number	From AllStarLink Server Settings
Node Password	From AllStarLink Server Settings
Callsign	Your Ham Radio callsign
Password	Choose the password you want to use to log in to the RLNZ2 admin portal and Allmon3 (numbers and letters only).

Starting up and configuring the RLNZ2

When shipped from the factory, the RLNZ2 is configured to automatically enter the mode for initial Wi-Fi connection and node setup.

During first power-on, you will see the following sequence on the display. **Please allow up to one minute for the system to boot.**

If the unit is new and has not yet been configured, the RLNZ2 will enter hotspot mode and show a “Connect to Wi-Fi” screen. When you next boot up the RLNZ2 this message will appear again and you have approximately five seconds to press Button A to re-enter configuration hotspot mode.

On a configured unit, if you do not press Button A within the time window, the unit will proceed directly to the main operating screen once Asterisk is ready.

The RLNZ2 will create a Wi-Fi access point for you to connect to from a phone, tablet, or laptop. The access point name will be displayed on the screen.

Select this network and connect using the password: ***radioless***

Your device may indicate that no internet connection is available. This is normal.

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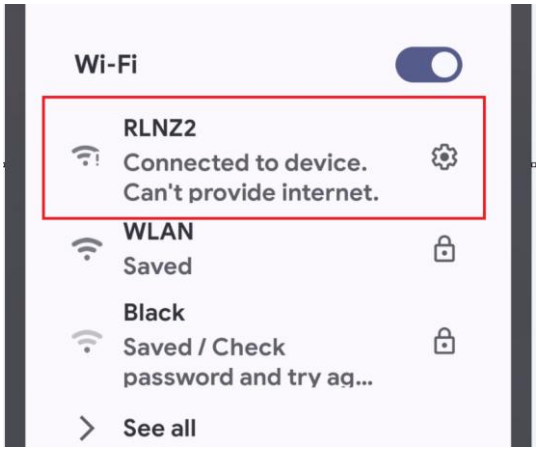


Access the RLNZ2 configuration screen by opening a browser and entering the following address:

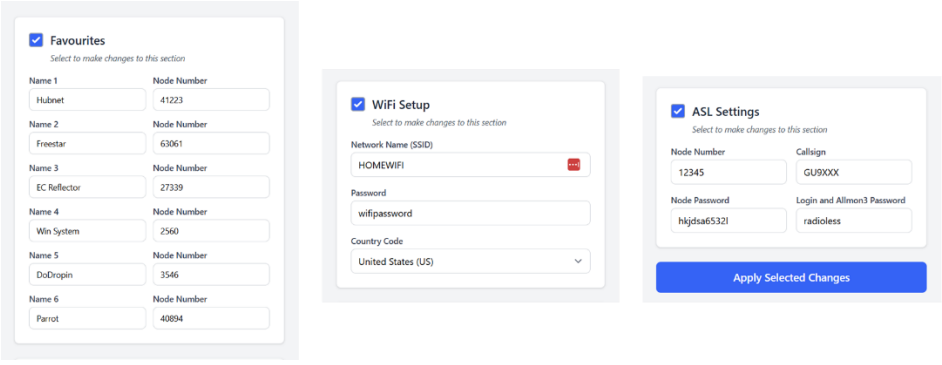
10.1.2.3

This should bring up the RLNZ2 configuration page.

The page has three sections. For initial configuration, you should update the Wi-Fi and ASL settings.

<u>Important:</u> Configure Wi-Fi ***and*** ASL settings on first setup.

This configuration page will remain permanently available once the unit is online, allowing favourites to be updated at any time.



When you press Submit on the page, the RLNZ2 hotspot will disconnect, and the unit will begin its configuration and reboot sequence.

Wait approximately **one minute** for this process to complete. When finished, an IP address on your local network will be displayed.

Your phone, tablet, or laptop will normally reconnect to your home Wi-Fi automatically.

RLNZ2 Front Panel operation

Now the unit is connected to the network and the AllStarLink system is configured, you can navigate the menus using the A and B buttons.

Important
To shut down the RLNZ2 safely hold both buttons for 5 seconds to initiate a safe closedown procedure.
Removing power to a running system can cause corruption of the SD card.

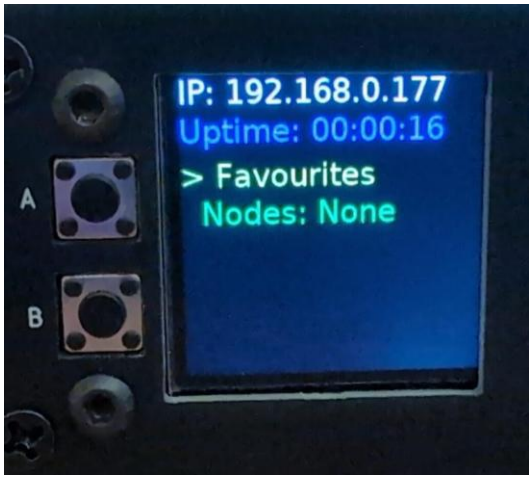
There are two buttons:

- The top (A) button **moves** the cursor around the screen to select things.
- The bottom button (B) does the **select** action.
- Pressing both (A) and (B) simultaneously for 5 seconds will make the system safely close down

The main screen uses colour coding to help you read it at a glance:

- the IP address is shown in white,
- the uptime in blue,
- the Favourites menu entry in yellow,
- currently connected nodes in green, and
- any error messages in red.

Connect to a favourite station



Enter the favourites menu by pressing button B when the word Favourites is selected by the '>' cursor

Press button A a few times to move to the chosen station and press the B button. This will connect to the station and take you back to the main screen

Note: if you are unable to connect to any favourites, your ASL3 credentials may be invalid. Verify them and re-enter using the config screen.

Disconnect from a station

With an active station shown on the main screen, use button A to navigate to it, then press button B to disconnect.

The main screen will display up to three currently connected nodes; if you are connected to more than three, use Allmon3 in a browser to manage the additional connections.

Accessing the RLNZ2 from any browser on your network.

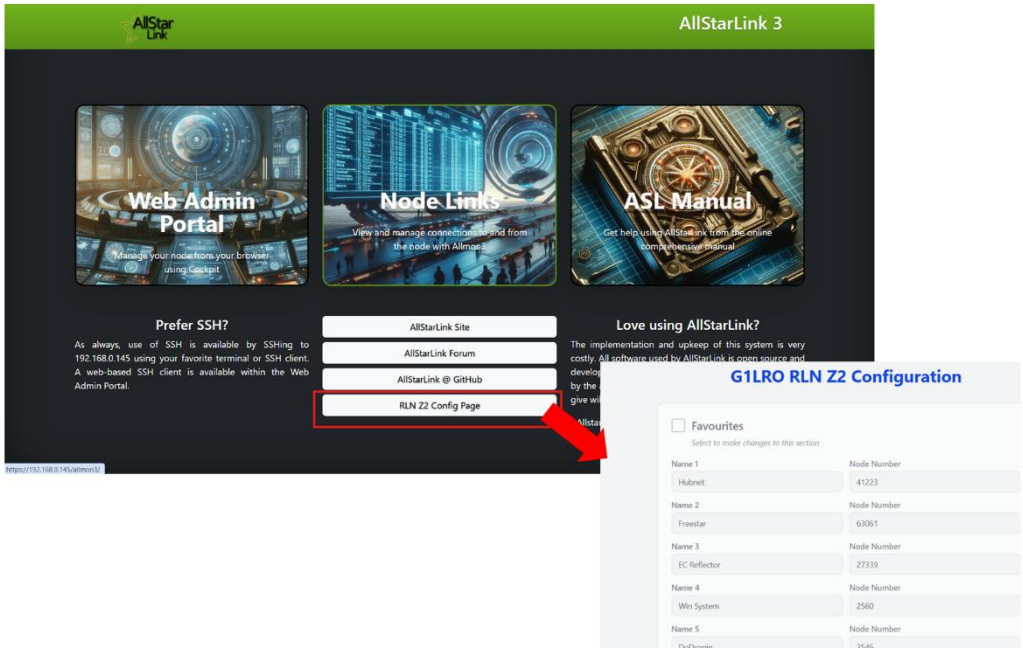
The RLNZ2 has the AllStarLink web server running, allowing the service to be administered from any browser on the network.

Enter the IP address shown on the screen into your browser to access the AllStarLink 3 home screen.

The Node Links menu provides access to the standard Allmon3 control system for manually connecting to nodes and viewing statistics.

The username for accessing Allmon3 and the web admin portal is: rln

The password is the one you set during the initial setup.



Note that there is an additional button to enter the RLNZ2 configuration page. This allows you to manage your favourites list.

Six favourites can be configured from the web interface for use in the menu system. Due to limited screen width, it's best to try to fit each entry on one line.

The Wi-Fi and ASL settings can also be updated from this screen. Please be aware that entering invalid Wi-Fi credentials will break the network connection and require recovery using hotspot mode.

Accessing the RLNZ2 using the Hotspot feature

The Wi-Fi hotspot feature can be invoked during startup by pressing Button A when prompted on the screen.

The two-button shutdown is not available during hotspot mode.

To exit hotspot mode, make and save a menu entry and allow the system to restart. If you do not wish to change any settings, save the favourites unchanged.

It is important to exit the menu cleanly rather than powering off the unit, to ensure the hotspot message is cleared.

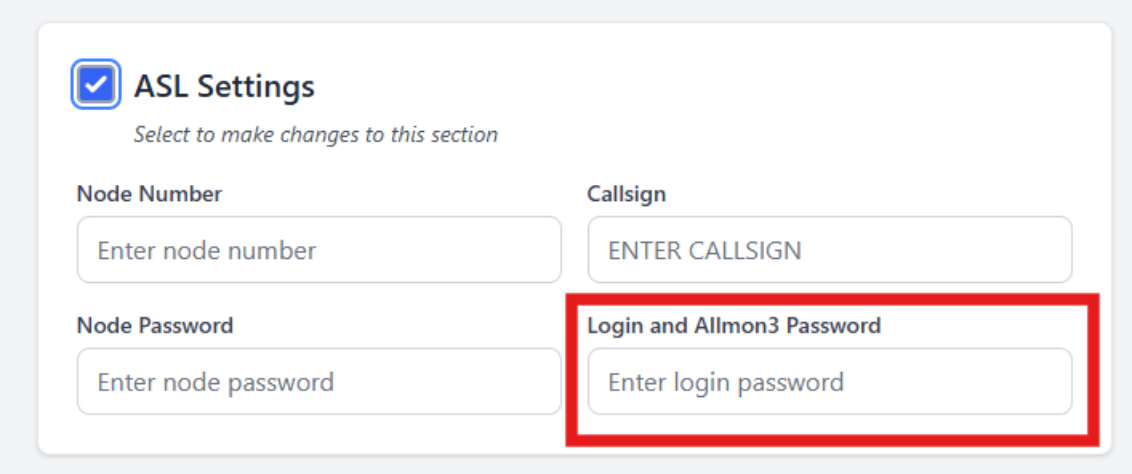
Passwords

The unit ships with the following default passwords:

- Wi-Fi hotspot password: ***radioless***
- Web Admin Portal access: user ***rln*** – password ***radioless****
- SSH/PUTTY access: user ***rln*** – password ***radioless****
- AllMon3 & Node Links: user ***rln*** – password [not set]*
- Allscan: user ***rln*** – password [not set]*

  * The SSH, Web Portal and AllMon3 and Allscan passwords are re-set to the same value during initial setup and via the RLNZ2 config page (see image below).

If you wish to change the password, access the RLNZ2 menu via the web interface or enter hotspot mode and use the setup menu (ASL section).



Troubleshooting

Unable to connect to your Wi-Fi.

Important: Configure Wi-Fi ***and*** ASL settings on first setup.

Most likely cause – incorrect credentials; check for numbers hiding as letters. Verify the credentials you are using with another device such as a mobile phone to be sure. Re-run the Wi-Fi setup wizard (press A after startup).

Other causes – low signal. The RLNZ2 has an internal antenna behind the front panel. Put the unit in an area with strong Wi-Fi for most reliable operation.

Try connecting to your phone hotspot to prove Wi-Fi connectivity.

No IP address displayed on LCD

Check and verify Wi-Fi credentials. Close down unit and re-start pressing A to enter hotspot mode and re-enter Wi-Fi credentials.

Unable to connect to ASL nodes

Most likely cause – if it is all nodes then your AllStarLink server credentials may be incorrect (or the Wi-Fi connection is off-line). Refer to the section on creating an account to find where to check an existing account.

If it's only one node, check that the node number is correct. Also, for some hubs there are several ASL node numbers — try a different one.

Try using Node Links (Allmon 3) on the web browser to connect to the desired nodes and if that gives any meaningful error messages.

Issues with your transmitted audio

If you are receiving reports about audio problems on your transmission, then connect the Parrot node where your transmitted audio will be played back to you and you can identify the issue.

Low or too-loud audio can be caused by the microphone controls on the rear panel of the RLNZ2 being incorrectly set. Use the Parrot node to help set these correctly or use the echo feature in the asl-menu Tune settings.

Mains hum on transmitted audio is most likely caused by a power-supply related problem with poor regulation or leakage current from the internal mains filter in the USB supply. Prove this by switching to a USB battery unit to power the unit and try alternative power supplies. Units supplied with a Galvanic Isolator or internal isolation switch can try this to reduce USB-borne interference.

The best way to resolve this is a simple modification to a USB power supply to remove mains leakage currents on this blog article: https://g1lro.uk/?p=1245

Unit shows 'Hardware Error' and won't start up.

The hardware checking on early software versions can be temperamental and show this error erroneously. It's highly unlikely there is a hardware fault.

Software versions from mid-April 2026 do not halt on this error so the best option is to upgrade the SD card image.

Later software versions will display and log the error and continue normally.

Unit won't start

Check USB power into another device and try an alternative supply/battery and cable.
If there is sign of the backlight being on or the Raspberry Pi being active (the RX lamp will glimmer showing the Raspberry Pi activity LED behind), then unplug the K1 connector and look in the large jack (K1 Mic) socket to see the PI's LED clearly. If the Pi is not booting there may be an error code:

- **Continuous/Irregular Flashing:** The Pi is attempting to read the SD card, but usually fails to find a valid OS (try flashing a new image).
- **3 Green Flashes:** start.elf not found; boot partition is missing (try flashing a new image).
- **4 Green Flashes:** start.elf found but corrupt (try flashing a new image).
- **7 Green Flashes:** kernel.img not found (try flashing a new image).
- **8 Green Flashes:** SDRAM failure (hardware issue).

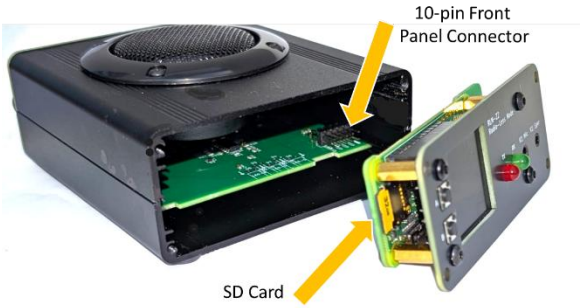
Most causes of the flashing error are a corrupted SD card, re-flash using the process in the next section.

Loading a New Software Update

Images available at https://g1lro.uk/images/

If there is a new software update, or to recover a corrupted SD card, then it will be necessary to re-flash the unit SD card.

Remove the SD card from the RLNZ2



The front panel sub-assembly is removed easily by pulling it forward from the chassis -remove the 4 corner screws only. It's advised to also remove the top section of the enclosure (two screws on the rear) to have better access.

The SD card is a push fit into the socket on the Raspberry Pi and easily removed. Do not attempt to remove the Raspberry Pi module as this is soldered in-place and is easily damaged.

Take care when re-assembling the front panel. Align the 10-pin connector on the rear of the front-panel safely on to the pins on the main board. When installed correctly, the top of front panel will be level with the case lid, and the 4 screw holes line-up.

Flashing the SD card image

Balena Etcher is recommended for re-flashing images for the RLNZ2 although the latest Raspberry Pi imager also works well.

Download the etcher program for your platform: https://github.com/balena-io/etcher/releases (download balenaEtcher-2.x.x.Setup.exe if you have Windows). Run/install the downloaded program so you can launch Balena Etcher.

1 Download image from the G1LRO provided link (do not unzip)
2 Insert sd card from the RLNZ2 into your computer (you may need an SD card adaptor)
3 Start Belena Etcher
4 Click 'Flash from file'
5 Select your image as downloaded in step 1
6 Click 'Select target'
7 Select your sd card
8 Click 'Flash' and wait for the process to complete before removing the SD card

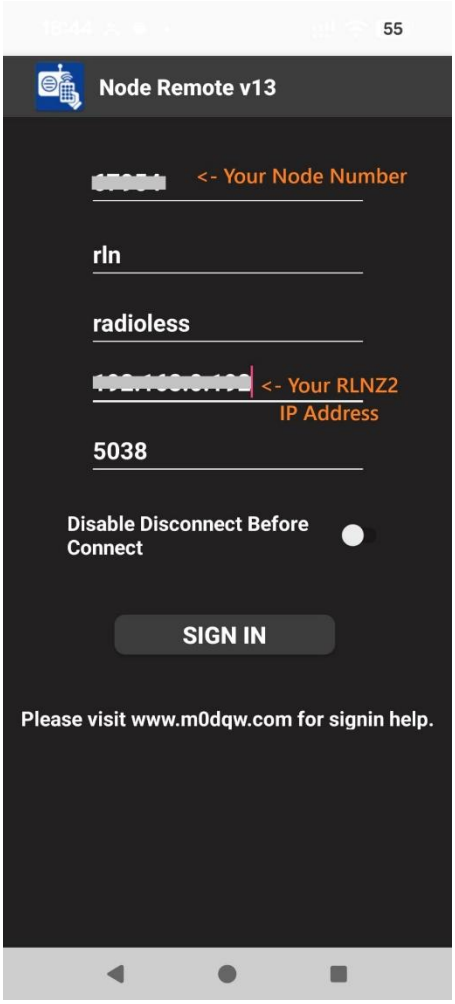
Re-install into the RLNZ2 and reassemble before applying power.

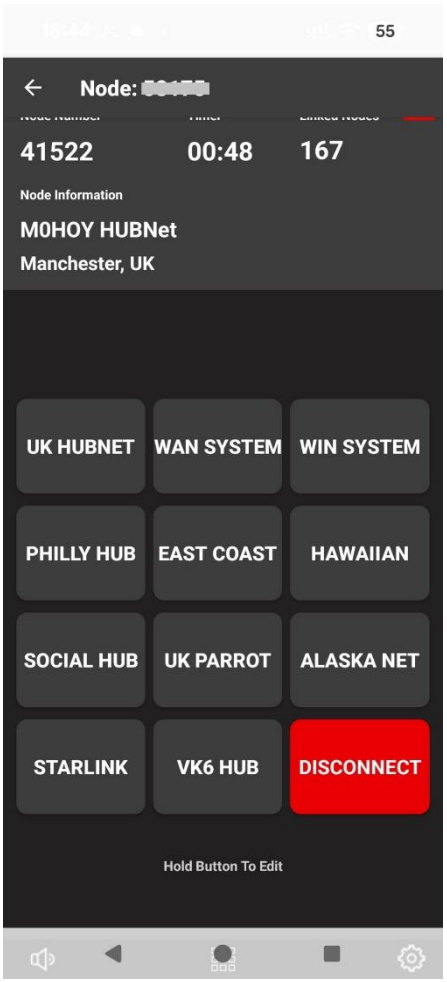
The new image may take up to 2 minutes to unpack before booting to the startup screen.

Node Remote

The RLNZ2 is configured for use with the Node Remote mobile app by M0DQW.
https://dstarcomms.com/node-remote/

Default credentials are set and the various firewall settings are preconfigured, so all that is needed is a simple configuration of the Node Remote's App's login page:





As per the image above, use a **login** name ***rln*** and a **password** ***radioless*** <- this is pre-set in the configuration.

Use the **IP address** shown on the display of the RLNZ2

Note: to increase reliability of the Node Remote app, set your home router to provide a fixed address for the RLNZ2, normally available in the router's DHCP settings.

New Users: Getting an AllStarLink account

To obtain an AllStarLink node number and password, you must first create an account on the official AllStarLink website and then request a node through the portal.

Step 1: Create an Account and Verify Your Callsign

1. **Visit the Website:** Go to the AllStarLink.org website and click on the "Login/Sign Up" link.
2. **Sign Up:** Follow the prompts to create a free account. You will need to provide your Amateur Radio call sign.
3. **Verify Information:** Verify your email address by clicking the link sent to your email. The AllStarLink system also needs to verify you are a valid ham radio operator.

Step 2: Request a New Node Number

1. **Log In to the Portal:** Once your account is set up and verified, log in to the AllStarLink portal.
2. **Add a Server:** Navigate to the "Portal" and then "Server Settings". Click "add a new server" and provide details like a server name and location.
3. **Request a Node:** Go to "Node Settings" under your call sign and click "Continue" to request a new node. Select the server you just created from the dropdown menu and submit the request.
4. **Receive Your Node Number:** The request goes to the AllStarLink admin, and a new node number is typically assigned within 24 hours. Check your email or the nodes page for the assigned number.

Step 3: Obtain Your Node Password

The node password is automatically generated and available in the user portal after your node is assigned.

- **Locate the Password:** Log in to the AllStarLink portal, go to **Portal** > **Node Settings**, and select the specific node number. The associated password (sometimes a long, secret alphanumeric string) will be displayed on that page.
- **Use the Password for Configuration:** This is the password you will use in your AllStarLink software configuration file (e.g., iax.conf's register statement) when setting up your physical node, not your main AllStarLink website login password.

Note: If you forget your node password later, you can retrieve it from the same "Node Settings" page in the portal, provided you know your email address and node number.

RLNZ2 Quick start guide

1 Prepare these six pieces of information:

Wi-Fi Access Point Name	
Wi-Fi Password	
AllStarLink Node Number	
AllStarLink Node Password	
Your Callsign	
Desired Password (letters & numbers only)	

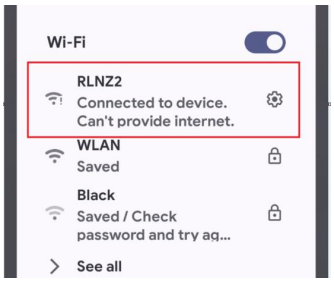
2 Power up the unit with the USB-C connector at the rear

Wi-Fi Password for configuration is:

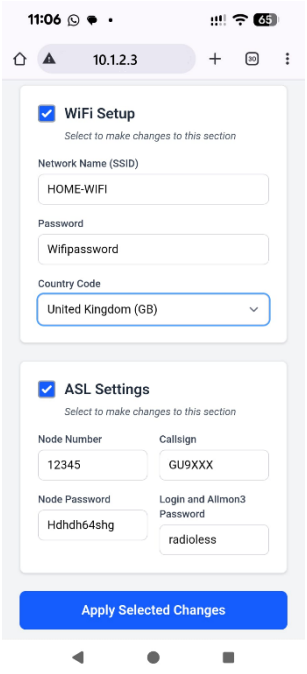
`radioless`
(all lower case)

Username for Allmon3 and the ASL3 Admin portal is:
`rln`

3 Connect to Wi-Fi: RLNZ2 then browse to 10.1.2.3



Windows 11 may not login to this type of Wi-Fi, use an Android or IOS device



4 Enter the six pieces of information into the form

Important: Configure Wi-Fi ***and*** ASL settings on first setup

5 Apply, and system will restart, and is ready for use.

Download the full user-guide at G1LRO.UK