



Renewable IoT Systems

Installation Manual

Revision 2.1.8

Thank you for purchasing a RIOT Device. This setup guide will get your system connected to the cloud and put the data you want at your fingertips.

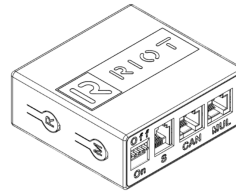
For up-to-date version of this guide please visit www.riotsystems.cloud/

It is important that you read this manual before attempting the installation of your device. Depending on your setup, certain steps will be needed to ensure compatibility.

WARNING: Working with high voltage systems is dangerous. Do not attempt to modify your inverter and battery setup unless you are certain you understand the risk. Speak to a qualified electrician if you are unsure

Package Content

1 x RIOT CloudLink Device with unique serial identifier



Serial

1 x RJ12 (6 pin) to RJ2 (6 pin) cable used to connect the RIOT CloudLink "S" port to the Serial/Terminal of the battery. See compatibility chart for list of compatible batteries on page 14



2 x RJ12 (6 pin) to RJ45 (8 pin) Blue / Red cable used to connect RIOT CloudLink "S" port to the Serial/RS232 port of the inverter. See compatibility chart for list of compatible inverters on page 14



Note 1: The use of the RJ12 (6 pin) to RJ45 (8 pin) Blue cable will require external power to the device. Please follow Section 1 of the manual for external power installation

Note 2: The use of the RJ12 (6 pin) to RJ45 (8 pin) Red cable does not require external power. Please follow directly to Section 2 of the manual



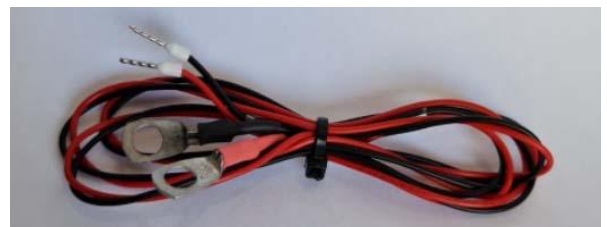
CANBUS

1 x Red RJ45 (8pin) to RJ45 (8pin) cable used to connect RIOT CloudLink "CAN" port to the CAN port of your battery or Inverter. See compatibility chart for list of compatible inverters on page 14



Power

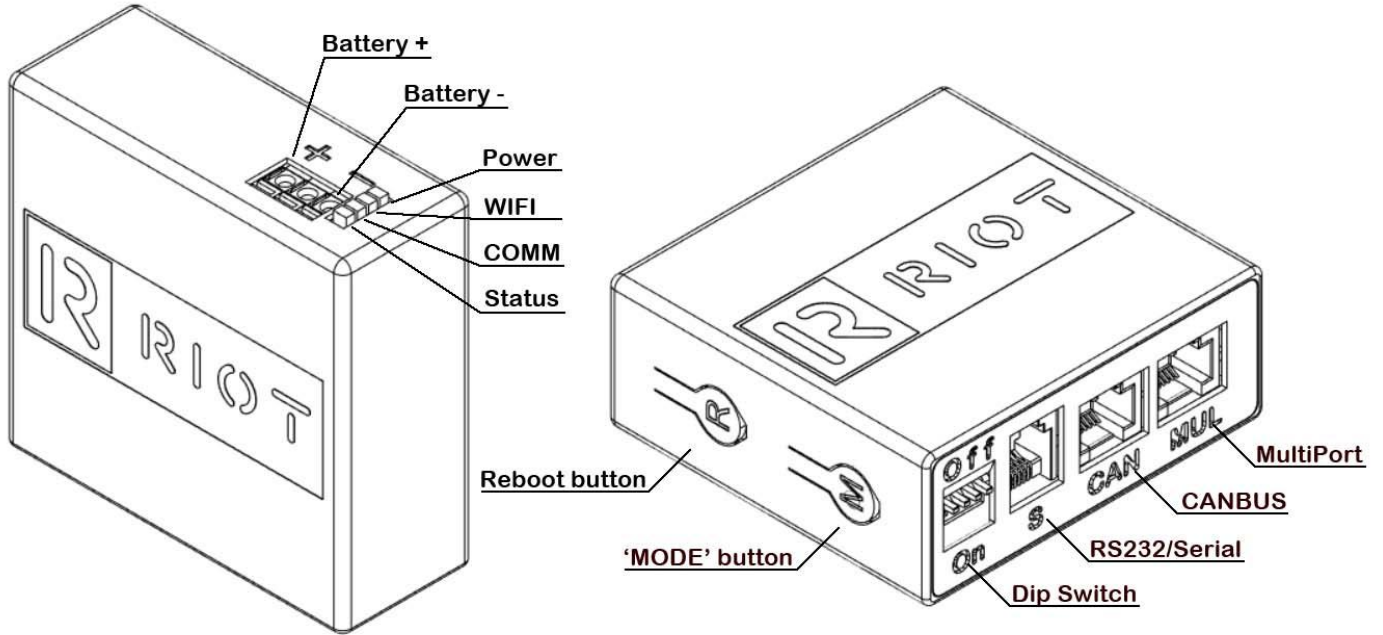
1 x Power cable pair for providing power to the device if not using the RJ12 (6 pin) to RJ45 (8 pin) Red cable.



As your setup will be different, please refer to the compatibility chart on page 14 for more information on which cables are best suited for your setup.

Your contents may vary, please see the insert in the box that came with your RIOT CloudLink.

RIOT CloudLink Device overview



Indicators		Off	Flash / Pulse	On
	LED-1 PWR	No Power	na	Power Good
	LED-2 WiFi	Boot	WiFi connected	Internet active
	LED-3 Com	No Coms	Battery connected	CAN conected
	LED-4 Status	CPU fault	boot	Config Mode
	Buzzer	-	Config mode (X-n)	Button Pressed
	Special Modes	LED's - "WiFi", "Com" and "Status"		
	Downloading Firmware	Flash in an alternating sequence		
Device in Config Mode	Flash together, all on and off at the same time			
Mode Button	Press Button "M"	Buzzer and Status LED pulses		Mode
	Hold for 1 sec	1		-
	Hold for 5 Sec	2		Toggle Config Mode
	Hold for 10 Sec	3		Check for new Firmware
	Hold for 30 Sec	4		Factory defaut settings
	Hold for 40 Sec	5		Erase WiFi passwords
	Hold for 50 Sec	On continuously		Exit and reboot

Section 1: Connecting your RIOT device to your system

Your RIOT CloudLink can accept a nominal input voltage from 24v to 48v DC. The following steps are based on a 48V inverter installation. Your inverter setup may vary. If you are unsure, contact a qualified electrician for assistance. Refer to the inverter compatibility table on page 15. 12v Compatible RIOT Cloudlink are available on request.

Step 1: Power cable.

If your device did not come with a set of power leads or your supplied power leads are not adequate for your setup, Assemble 2 lengths of cable in red and black with the 8mm ring lugs on one side to suit your inverter or battery. On the other end of the cable fit a 0.5mm² bootlace ferrule.

Step 2: Installing power.

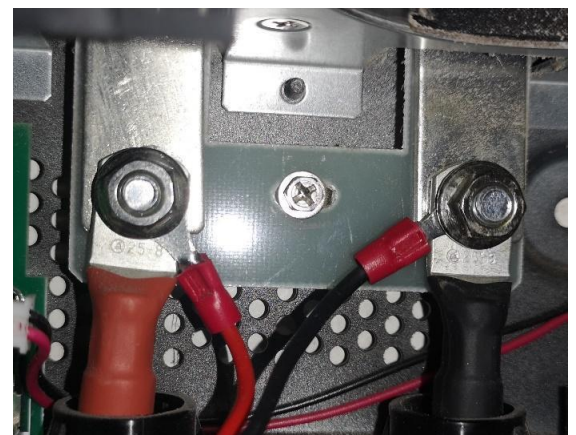
WARNING: Follow the steps in order as stated. Failure to do so can cause damage to the device and render it inoperable.

- 1) Isolate power to the inverter
- 2) Turn off the inverter and Battery (Lithium).
- 3) Wait 5 minutes for any residual power in the inverter to drain before disconnecting the battery from the inverter.
- 4) Fully insert the black cable into the negative (-) terminal of the device (closest to the LED bar) as shown. Lightly pull back on the cable and make sure that it has been securely fitted.
- 5) Fully insert the red cable into the positive (+) terminal of the RIOT CloudLink (furthest away from the LED bar) as shown. Lightly pull back on the cable and make sure that it has been securely fitted.
- 6) Install the black wire on top of the negative battery terminal and affix the nut to the terminal. Tighten to the recommended torque in the manual for your inverter.
- 7) Install the red wire on top of the positive battery terminal and affix the nut to the terminal. Tighten to the recommended torque in the manual for your inverter.
- 8) Reconnect the battery and power up your inverter and battery.

You will see the PWR led on the RIOT CloudLink turn on.

WARNING: DO NOT use the Red Serial cable and external power at the same time. Use only the blue Serial cable with external power. **Not following this step correctly could damage your device!**

Note: Your device may differ from illustration. Consult your inverter and/or battery manual for connection of your battery to the inverter or contact a qualified electrician for assistance.

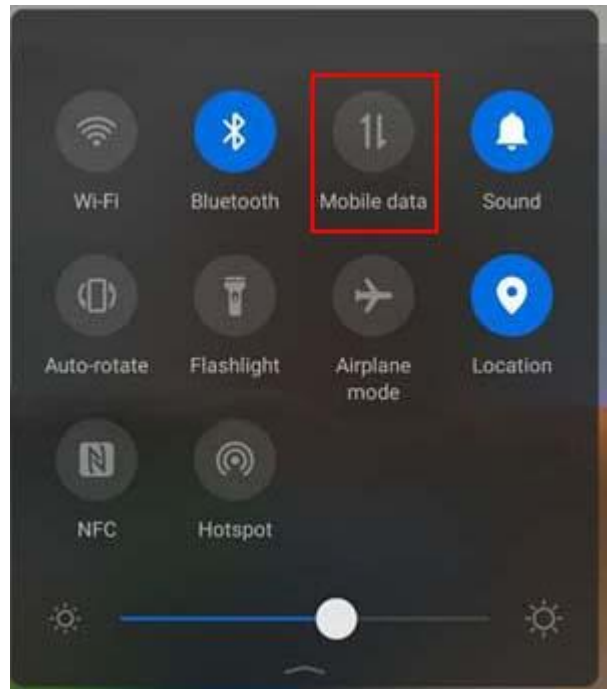


Section 2: Configuration Setup

After powering up your RIOT CloudLink for the first time, you will need to configure the Wi-Fi credentials. This will enable cloud access to your RIOT CloudLink for monitoring while also allowing the device to automatically download and install the latest firmware version.

1) If using your mobile device, ensure that your mobile data is disabled. This will prevent your mobile device from disconnecting from the RIOT CloudLink during the configuration procedure.

2) Put the RIOT CloudLink into configuration mode by holding down the “Mode” button marked “M” on the side of your device. A short beep will be heard followed by a 5 second pause then two short consecutive beeps. Release the “Mode” button after the 2 short consecutive beeps.



The RIOT CloudLink will now go into configuration mode. Observe the LED bar. The “Status” LED will blink rapidly for two seconds then begin to blink slowly. After a few seconds the “Status”, “comm’s” and “WiFi” LEDs will toggle on and off together repeatedly and in a synchronized manner. This indicates that the device is now in config mode and that you can proceed to the next step.



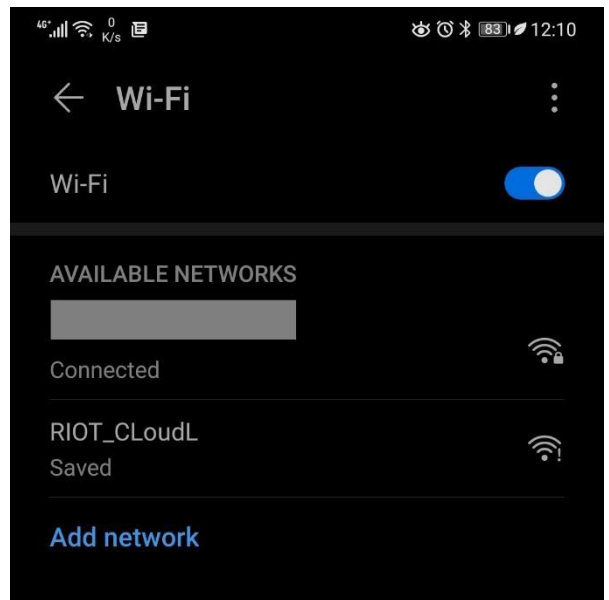
Note about security: The RIOT CloudLink will automatically exit configuration mode after 5 minutes of inactivity and or after a maximum of 10 minutes. If you do not complete the configuration process during this allocated time you will need to restart the configuration procedure. This is a built in security mechanism.

Note about security: The RIOT CloudLink WiFi AP “RIOT_CloudL” is only available and or accessible while the device is in configuration mode. This is a built in security mechanism.

3) Open the Wi-Fi menu on your Computer or mobile device, scan for any available Wi-Fi networks in your area.

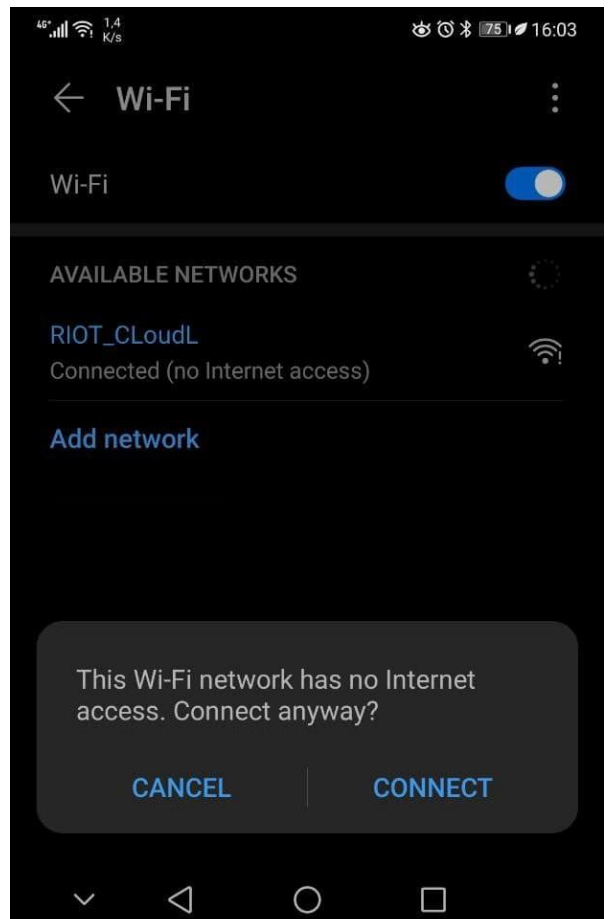
You may have to scroll down to locate the RIOT_CloudL Wi-Fi access point. If you do not see the RIOT Wi-Fi connection, refresh your Wi-Fi list. If after ten seconds you do not see the RIOT_CloudL Wi-Fi connection, please confirm that the 3 LED's are still flashing in sequence as described in the previous step, if not then return to the beginning of Section 2, and repeat the process.

Tap on the RIOT_CloudL Wi-Fi connection and connect to the RIOT device.



Note: “RIOT_CloudL” is an open network so it does not require a password to connect.

Note: If Your mobile device prompts you to disconnect from the “RIOT_CloudL” network. Please select “Connect anyway” or “Keep the connection” to proceed.



Note about security: The RIOT CloudLink will automatically exit configuration mode after 5 minutes of inactivity and or after a maximum of 10 minutes. If you do not complete the configuration process during this allocated time you will need to restart the configuration procedure. This is a built in security mechanism.

Note about security: The RIOT CloudLink WiFi AP “RIOT_CloudL” is only available and or accessible while the device is in configuration mode. This is a built in security mechanism.

4) Open your browser on your Computer or mobile device (Google Chrome or IOS Safari) and enter the following address in the URL box at the very top of the page

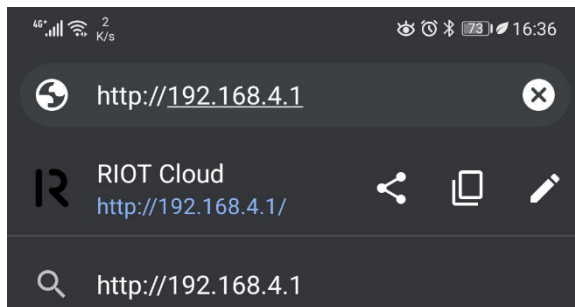
<http://192.168.4.1>

and tap enter.

Alternatively you can scan this QR code which will also navigate you to the configuration page.

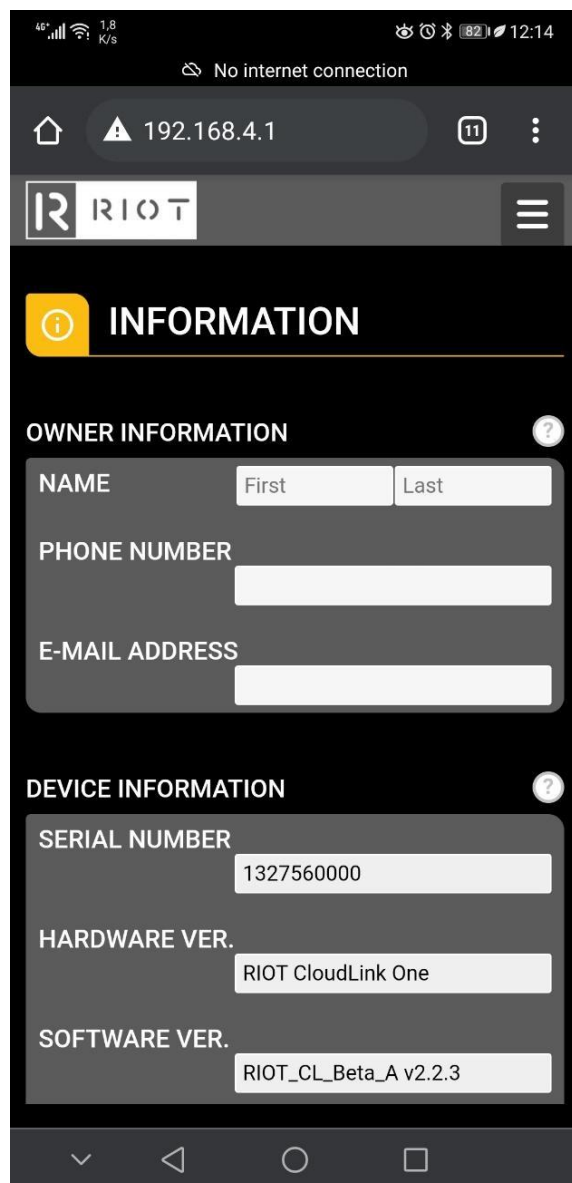
Note: It is especially important for iOS devices that you type in the full URL into the search bar (including the "http://")

If your mobile device shows that it cannot locate the web page, please ensure that 1) the device is still in configuration mode indicated by the LED sequence and 2) that your mobile device is still connected to the "RIOT_CloudL" WiFi AP. If not then return to the beginning of section 2.



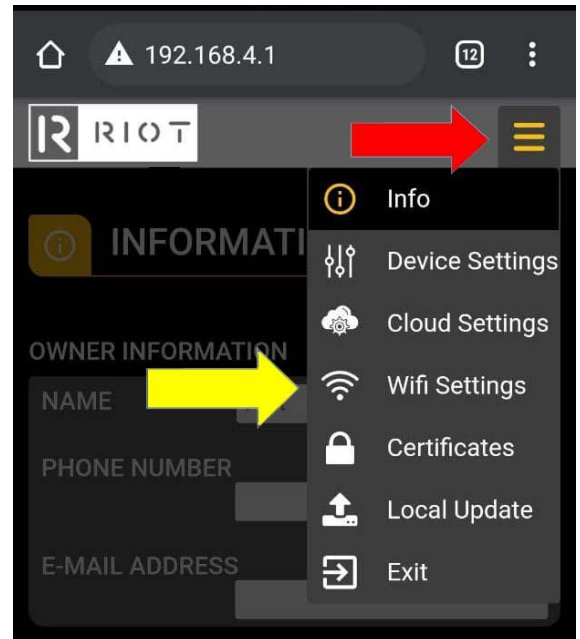
192.168.4.1

5) The opening page will display owner information and device information on your RIOT CloudLink.



6) From this page, tap the hamburger button (☰) and select the Wi-Fi settings from the drop-down menu.

Alternatively, you can swipe left on the main page to go through the different menus to select WIFI Settings.



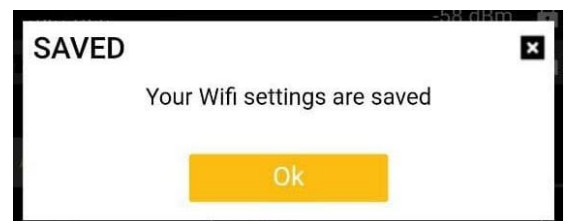
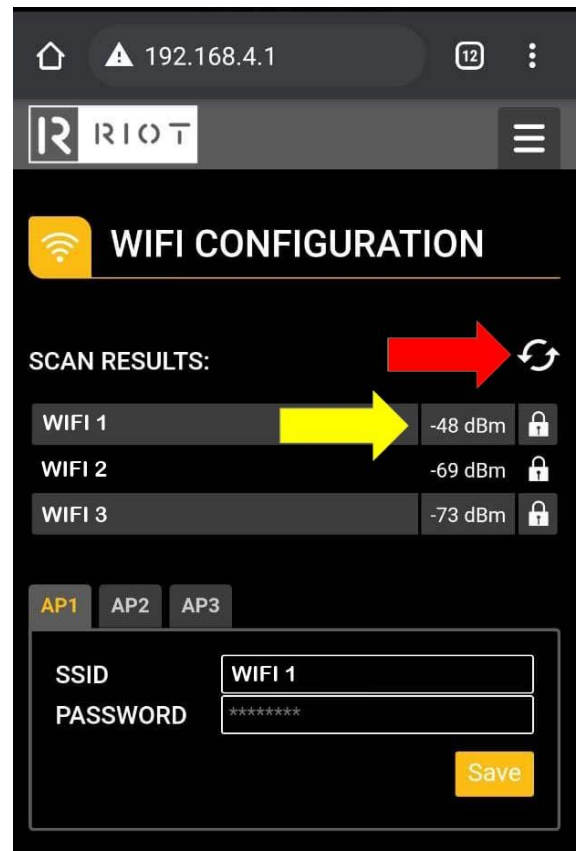
7) On the WIFI configuration page, tap the refresh button to have the RIOT CloudLink scan for the available WiFi connections in your area.

Select the WIFI connection that you wish for the RIOT CloudLink device to connect to. Type in the password into the password box.

Note: It is especially important that you choose the WIFI connection with the strongest signal. The stronger the signal, the higher up in the list the AP will be. So ideally select the first AP in the list.

The AP that your device connects to should ideally have a RSSI between 0 and -60dBm. If not, then the RIOT CloudLink device may have trouble with day-to-day operations. (Speak to RIOT about the external antenna option or install a WIFI booster closer to the RIOT CloudLink Device)

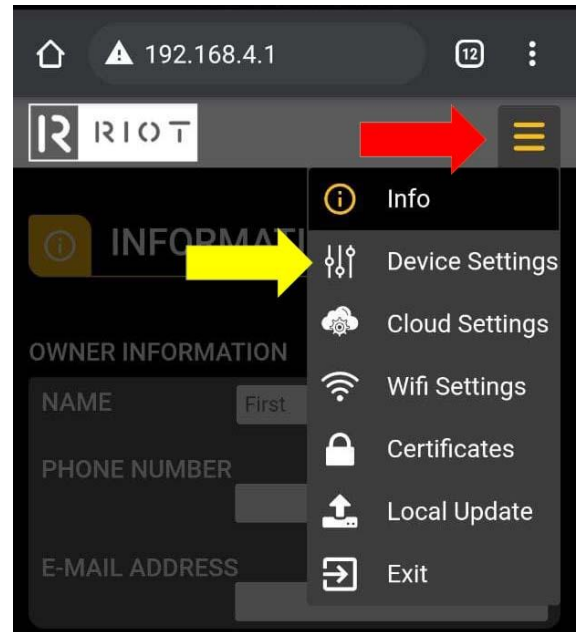
Tap save at the bottom of the page to complete the process.



Note: Your RIOT CloudLink device will only remain in configuration mode for a maximum of 10 minutes. If for any reason the setup process is interrupted, you will have to return to the start of Step 3.

8) Tap the hamburger button (☰) and select the Device settings from the drop-down menu.

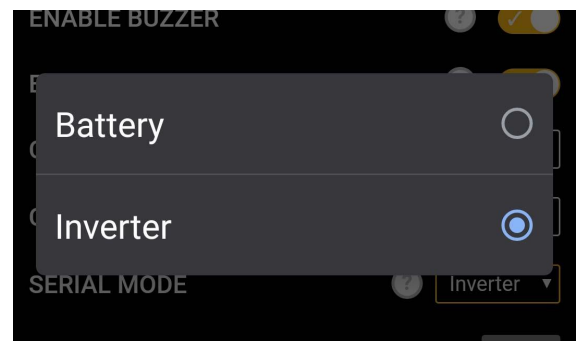
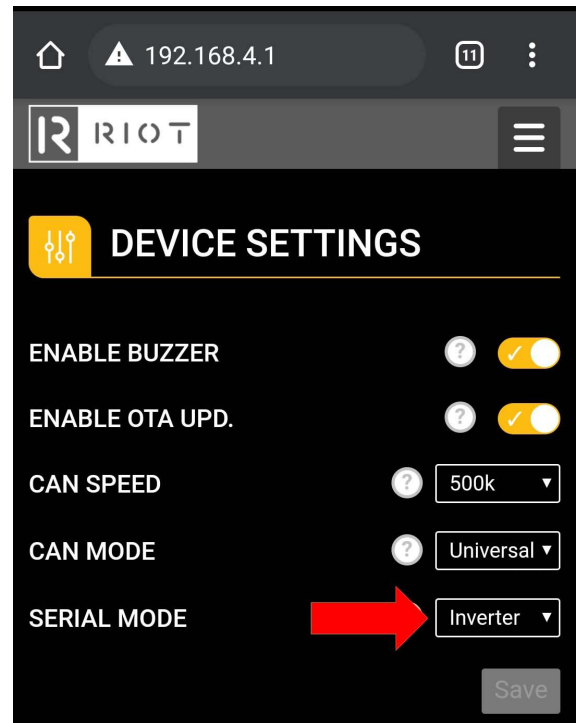
Alternatively, you can swipe right on the main page to go through the different menus to select Device Settings.



9) Depending on how you want your device configured, select the drop down box from "serial mode" and select either Battery or Inverter.

Note: If your device "S" port is plugged into your inverter, select the inverter option. If your device "S" port is plugged into your battery serial port/Terminal select the Battery option.

Tap save at the bottom of the screen to save your changes.



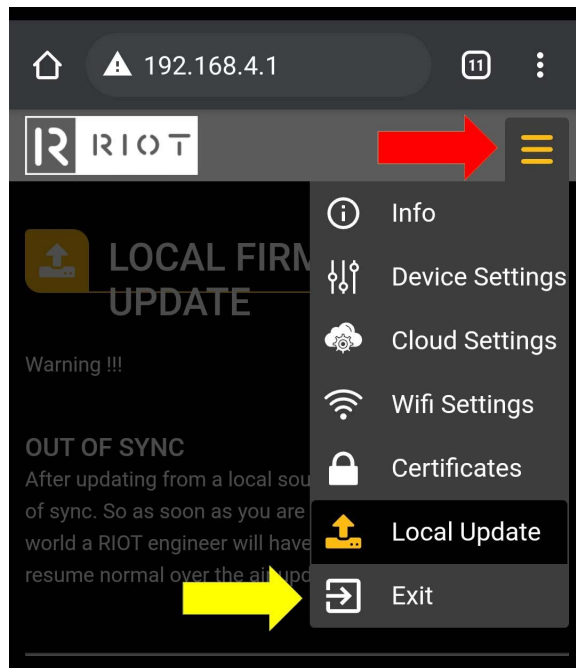
Tap the hamburger button (☰) and then tap the Exit button. This will save the settings and reboot the RIOT CloudLink device after which it will return to its normal operating state.

After a few seconds the Status LED will turn off, signalling that it has left config mode.

If the WiFi LED remains off after this process then it means that the device is unable to connect to the network and you may have typed the incorrect password for the selected AP.

If the WiFi LED stays flashing then it signals that it was able to connect to the local AP (so the password is correct) but it is unable to make a connection to the internet. This may be due to a firewall blocking internet access or that the network may have reached its data cap. This may be the case when the device is installed at the guesthouse, office building or similar environment. Please consult with the business IT department to allow internet traffic to and from the RIOT cloudLink device.

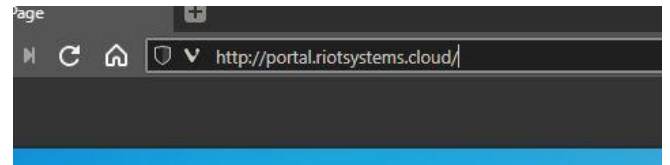
Note: If needed, the device will download and install new firmware automatically. This will be indicated by the 3 “Status”, “Comm” and “WiFi” LEDs flashing one at a time in sequence. This must not be confused with the signalling of “Configuration mode” where the 3 LEDs are flashing on and off at the same time.



Section 3: Setup your CloudLink on the Portal

To access your RIOT CloudLink device on the cloud, a RIOT CloudLink Portal Profile will need to be created.

1) Open the browser (google chrome) on your desktop device and navigate to <https://portal.riotsystems.cloud/signup> or [click here](#) or scan the QR code which will navigate you to the signup page



RIOTsystems.cloud/signup

NOTE: If you have an existing RIOT Systems account then login with your existing username and password and skip to Section 4 of page 12

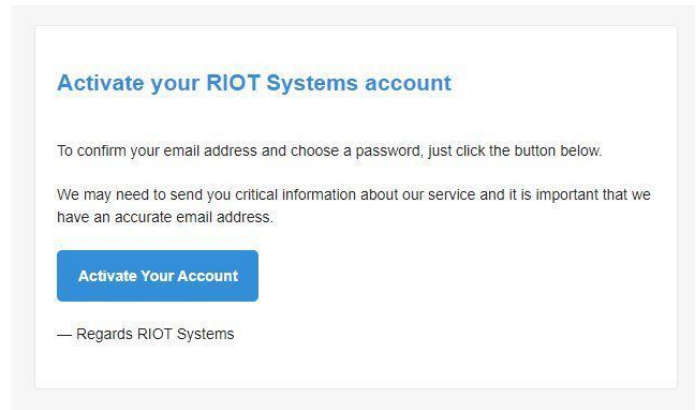
3) Complete the Self registration form by filling in your first name, last name, email address (which will be your username), and password. It is highly recommended that you use a strong password, containing at least 8 characters of capital letters, lower case, numbers, and symbols in combination.

Tick the reCAPTCHA box and read the privacy policy. If you accept the privacy policy, tick the check box, and click Sign up.

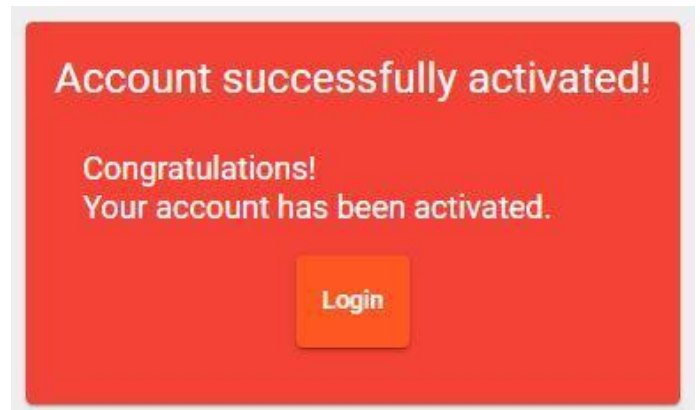
The screenshot shows the self-registration page for RIOT Renewable IOT Systems. The page has a red background. At the top, there is the RIOT logo (a stylized 'R' in a red square followed by 'RIOT' in white on a black background) and the text 'Renewable IOT Systems'. Below the logo, it says 'Self registration'. The form contains several input fields: 'First name *', 'Last name *', 'Email *', 'Create a password *', and 'Repeat your password *'. There is a reCAPTCHA section with a checkbox labeled 'I'm not a robot' and a reCAPTCHA logo. Below that is a checkbox labeled 'Accept Privacy Policy'. At the bottom, there is a large orange 'Sign up' button and a link for 'Already have an account? Sign in'.

4) You will be emailed an activation link to the email address that you have provided. Click the “Activate your account link” in the email to complete your registration.

NOTE: If the activation link email does not appear in your inbox after 10 minutes, please check the email address provided or check your spam folder.



5) Once your account has been successfully activated, navigate to the login page from the login link or by navigating to <https://portal.riotsystems.cloud/login> and login using the username and password used during the registration process.



Section 4: Claiming your device

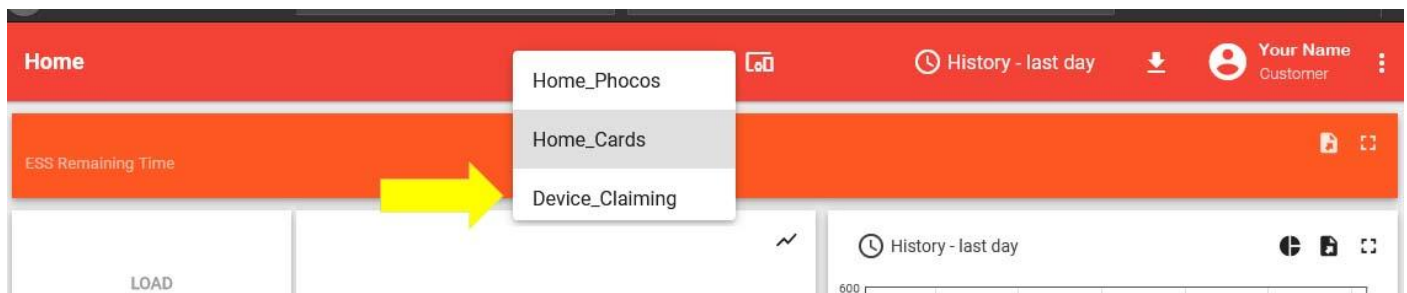
Your RIOT CloudLink device is connected to the cloud service and your RIOT cloud account has been created. To access the data from your device, your RIOT CloudLink device needs to be paired with your RIOT systems Portal.

1) Navigate to your portal using the link <https://portal.riotsystems.cloud/login> or scan the QR code



RIOTsystems.cloud/login

2) At the home screen, navigate to the Dashboard dropdown box and select the “Device_Claiming” option.



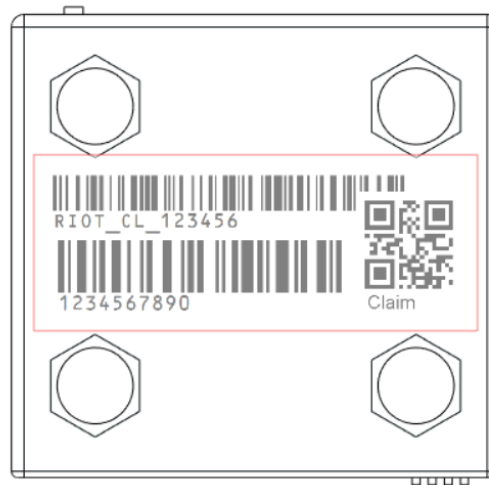
Alternatively, [Click here](#) to go directly to the device claiming screen or scan the QR code

Note: You need to have previously signed in with your account for the direct link to work.



Claim Form

3) On the back of your RIOT CloudLink device, you will find the “name” and serial number of your device. You will need these codes to complete your device registration.



4) On the device claiming form, fill in your RIOT CloudLink device name exactly as it appears on the barcode.

e.g) Device name = RIOT_CloudLink_1_000123

5) Fill in your device serial number under Serial number

e.g.) Serial number = 12345679

6) If everything is correct, press the “Claim device” button to claim your device.

Congratulations! Your RIOT CloudLink will now give you access to your renewables from anywhere in the world.

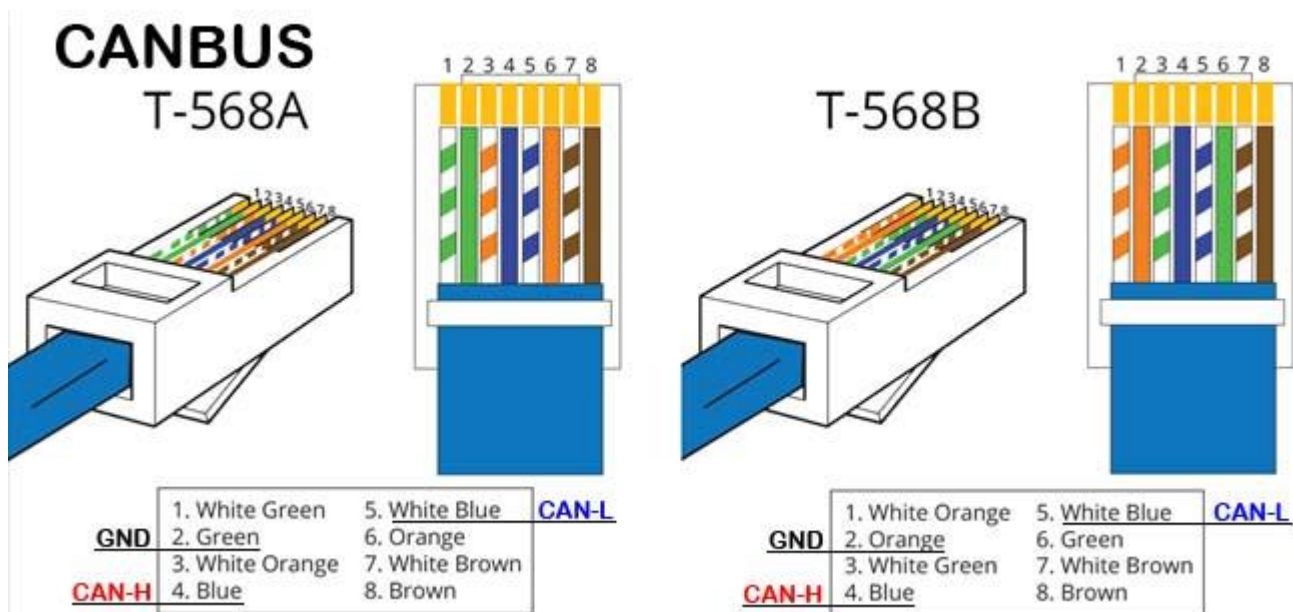
Firmware Version	RIOT_CloudLink_V2R2B3
List_Faults	No Faults
List_Warnings	No Warnings
WIFI_Signal	52.00
WIFI_SSID	
WIFI_IP	192.168.1.154
Sys_T_Env	0.00
Config_Mode_Active	false
OTA_Active	false
Cell Balance	
BMS Controls	
BMS Indicators	

Section 5: Additional information and technical specifications

1) Compatibility Chart

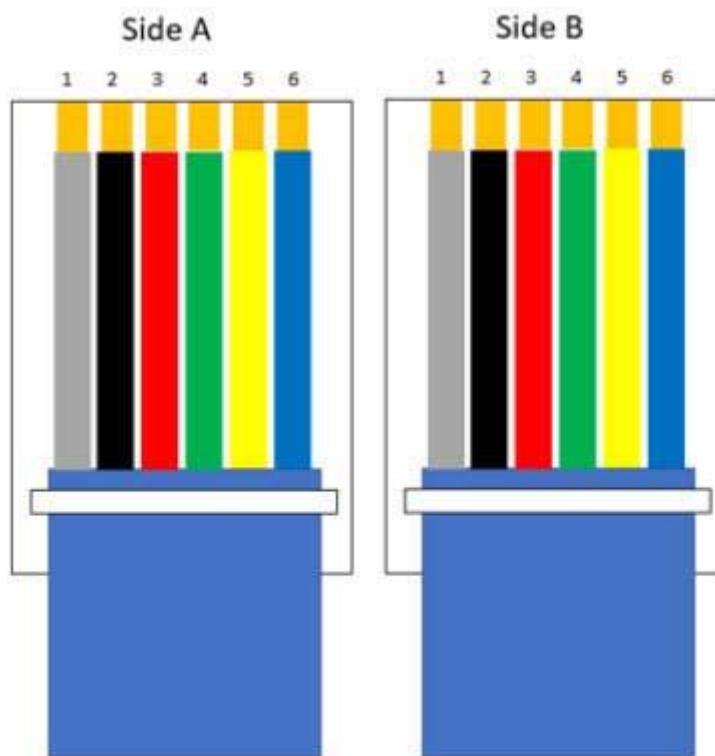
RS232	Inverter	Battery
	Voltronic, Mecer, Axpert, Phocos	Hubble, Pylontech, Delta,
RS485 / MOD	Energy Meter	
	Eaton-Modbus, Easton-Modbus: SDM120, SDM220, SDM630	
CANBUS	To - Inverter	From - Battery
	Victron, SunSync, Deye, Goodwe, Schneider, Growatt	Hubble, Pylontech, Delta, SolarMD, Freedomwon, Bluenova
Serial Power	Voltronic	

2) CANBUS Pinout



3) Serial Pinout

RS232 / Serial



- | | |
|----------------|-----------|
| 1 - Grey/White | - 12v |
| 2 - Black | - N/A |
| 3 - Red | - RIOT Rx |
| 4 - Green | - RIOT Tx |
| 5 - Yellow | - GND |
| 6 - Blue | - 5v |

4) Technical Specification

Input	Voltage	20v to 75v DC		
	Power	<2W		
Indicators		Off	Flash / Pulse	On
	LED-1 PWR	No Power	N/A	Power Good
	LED-2 WiFi	Boot	WiFi connected	Internet active
	LED-3 Com	No Coms	Battery connected	CAN conected
	LED-4 Status	CPU fault	boot	Config Mode
	Buzzer	-	Config mode (X-n)	Button Pressed
	Special Modes	LED's - "WiFi", "Comm" and "Status"		
	Downloading Firmware	Flash in an alternating sequence		
	Device in Config Mode	Flash together, all on and off at the same time		
Mode Button	Press Button "M"	Buzzer and Status LED pulses	Mode	
	Hold for 1 sec	1		-
	Hold for 5 Sec	2		Toggle Config Mode
	Hold for 10 Sec	3		Check for new Firmware
	Hold for 30 Sec	4		Factory default settings
	Hold for 40 Sec	5		Erase WiFi passwords
	Hold for 50 Sec	On continuously		Exit and reboot
Compatabilitiy				
RS232	Inverter		Battery	
	Voltronic, Mecer, Axpert, Phocos		Hubble, Pylontech, Delta,	
RS485 / MOD	Energy Meter			
	Eaton-Modbus, Eastron-Modbus: SDM120, SDM220, SDM630			
CAN	To - Inverter		From - Battery	
	Victron, SunSync, Deye, Goodwe, Schneider, Growatt		Hubble, Pylontech, Delta, SolarMD, Freedomwon, Bluenova	
Communications				
Protocol	Standard	Physical	Built in termination	Pinouts
CAN Bus	CAN J1939 & NMEA2000	2xRJ45	Yes	H-4, L-5, GND-2
MOD Bus	RS485	Config	Yes	Config
Serial	RS232	RJ11	na	TX-4, RX-3, GND-5, P-6
Included Cables				
RS232	RJ12 to RJ12	For RS232 compatible Battery		
	RJ12 to RJ45	For RS232 compatible Inverter		
RS485 / MOD	-	-		
CAN	CAT5e Type B	Inverter with compatable pinouts (*Victron has custom pinouts)		
WiFi				
Wi-Fi mode	Station/SoftAP/SoftAP+Station/P2P			
Standards	FCC/CE/IC/TELEC/KCC/SRRC/NCC			
Protocol	802.11 b/g/n/e/i (802.11n up to 150 Mbps)			
Security	WPA/WPA2/WPA2-Enterprise/WPS			
Bluetooth				
Protocols	Bluetooth v4.2 BR/EDR and BLE specification			
Radio	NZIF receiver with -98 dBm sensitivity			
	Class-1, class-2 and class-3 transmitter			

Victron Inverters

The CANBUS cable supplied will work for all inverters except for Victron. Order the correct cable from Victron Energy directly or use the link below to create your own cable. Please visit the website for the latest information on correct cables for your application.

https://www.victronenergy.com/live/battery_compatibility:can-bus_bms-cable

Type A

Function	Victron VE.Can side	Battery side
GND	Pin 3	Pin 6
CAN-L	Pin 8	Pin 5
CAN-H	Pin 7	Pin 4

Type B

Function	Victron VE.Can side	Battery side
GND	Pin 3	Pin 2
CAN-L	Pin 8	Pin 5
CAN-H	Pin 7	Pin 4