



carmanah®

R838 Remote Beacon Controller

USER MANUAL



88124_MANUAL_TRA_R838_RevE

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1.0 Safety Precautions



Ensure the equipment is not powered during installation and wiring of the system. Recheck all completed wiring for proper polarity prior to energizing the system.



Perform all installation, wiring, grounding, and maintenance in conformance with local building and electrical codes. Adherence to the National Electrical Code (NEC) is mandatory to comply with any certification markings. Non-adherence to code may void the warranty.



Changes or modifications to Carmanah equipment not expressly approved by Carmanah could void both the user's authority to operate the equipment and the warranty.

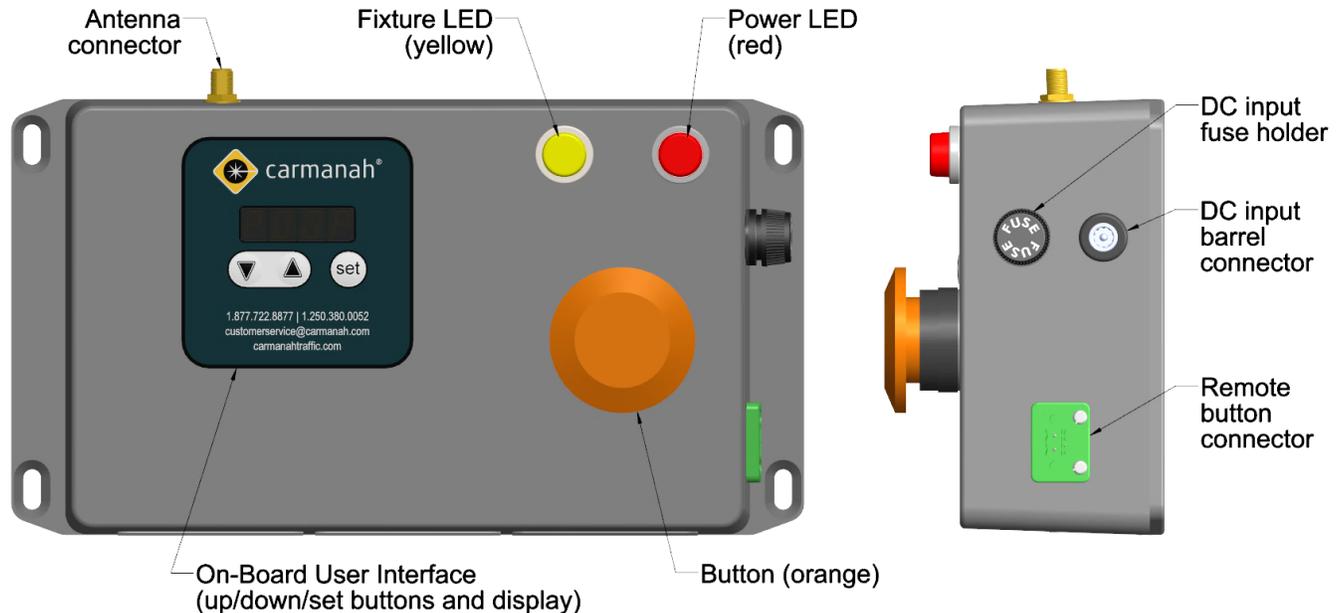


RF Exposure: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

2.0 R838 Remote Beacon Controller Operation

The R838 Remote Beacon Controller is used to control the LED fixtures of wireless, radio-enabled Carmanah traffic systems. Applications include emergency vehicle warning beacons, inspection station beacons and advance traffic warning beacon systems.

The R838's components are shown and described below:



Antenna connector: RP-SMA connector where standard direct-mount antenna is installed, or where optional remote antenna coax cable is installed

Fixture LED (yellow): flashes after button pushed, or when R838 receives an activation from a remote system.

Power LED (red): on when R838 has DC power (either from the standard AC/DC wall-mount power supply or from automotive accessory adapter)

DC input fuse holder: contains fuse on DC input

DC input barrel connector: connects to barrel connector of AC/DC power supply or automotive accessory adapter

Remote button connector: for connecting remote push button or actuator to R838 using included screw-terminal mating connector

On Board User Interface: LED display and buttons to view and change R838 settings

Button: flashes remote systems' fixtures and R838's Fixture LED

The R838 is available in two models which behave differently when the button on the R838 is pressed:

R838 Remote Beacon Controller, Momentary Button

When the button on the R838 **Momentary Button** version is pressed, the LED fixtures of remote systems will flash for a configurable number of seconds (the Flashing Duration setting, described in a later section) and then turn off.

NOTE

The yellow LED on the R838 will also flash for the Flashing Duration setting (in seconds).



Extending the Flashing Duration setting significantly can affect the solar energy balance of the remote system(s). Contact Carmanah for more information about sustainable settings in your location.

NOTE

The R838 Input Type setting for the R838 Momentary Button version is set to **bttm** and should not be changed.

R838 Remote Beacon Controller, Alternate Button

When the button on the R838 **Alternate Button** version is pressed, the LED fixtures of remote systems will flash until the orange button is pressed again, regardless of the R838's Flashing Duration setting.

NOTE

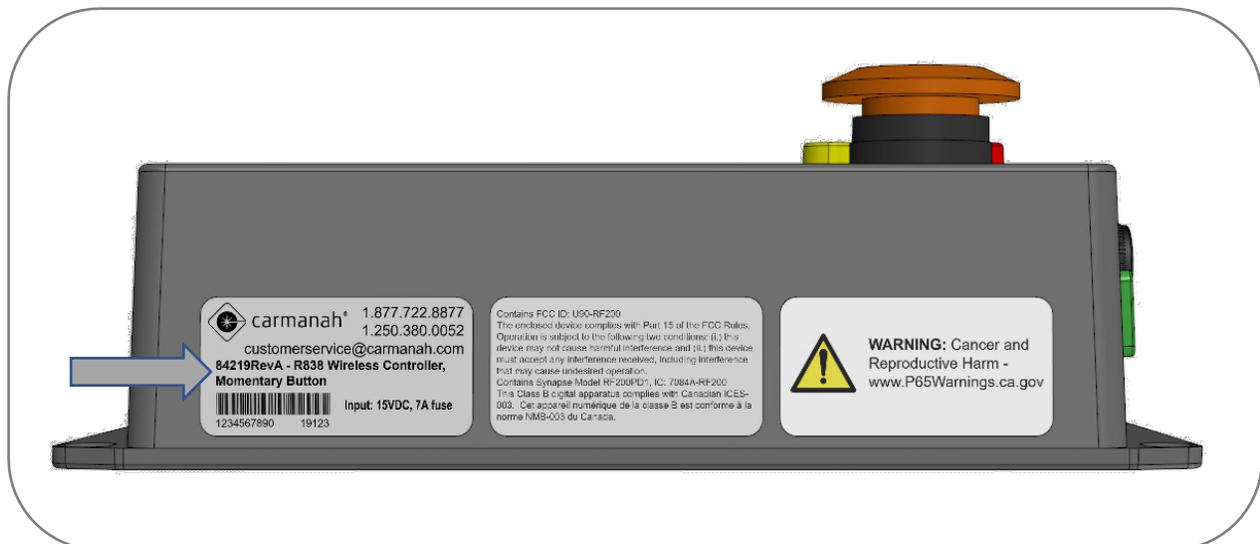
The yellow LED on the R838 will also flash until the orange button is pressed again.

NOTE

The R838 Input Type setting for the R838 Alternate Button version is set to **no** and should not be changed.

NOTE

The model name and part number of the R838 is written on the label on the bottom of the unit (arrow in image below).



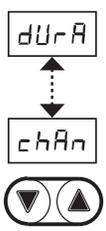
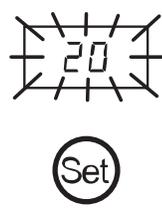
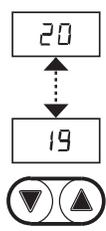
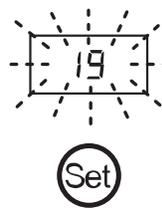
3.0 R838 Settings

The R838 Remote Beacon Controller settings are viewed and modified through the On-Board User Interface (OBUI).

There are three buttons on the R838 OBUI. The Up arrow, Down arrow, and SET buttons are used to scroll through menus, access and change settings, and accept new settings.



EMS On-Board User Interface (OBUI)

<p>Use the Up and Down arrow buttons to scroll through the menu.</p> 	<p>Press and hold the SET button to edit a setting. The display will blink when the setting is ready to edit.</p> 	<p>Use the Up and Down arrow buttons to adjust the setting when in edit mode.</p> 	<p>Press and hold the SET button to accept the new setting. The display will flash 3 times to indicate the setting has been accepted.</p> 
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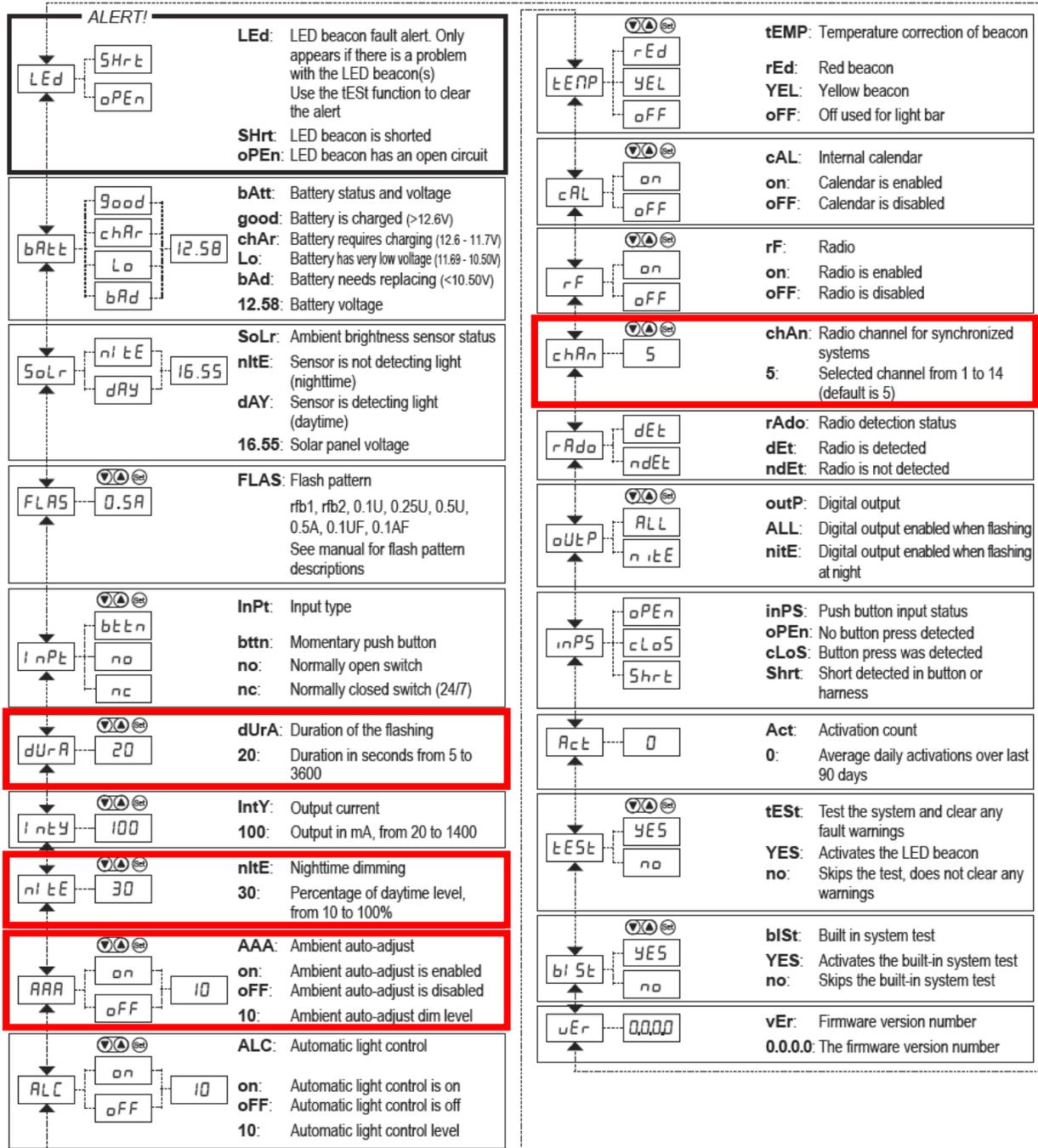
The only settings that are communicated wirelessly to remote systems from the R838 Remote Beacon Controller are:

NOTE

- Flashing Duration
- Night Dimming
- Ambient Auto-Adjust

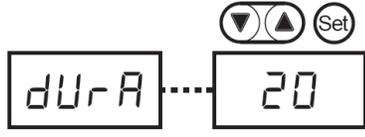


Most of the R838 settings are pre-configured in the factory and should not be modified. **Only the Flashing Duration, Night Dimming, Ambient Auto-Adjust and Radio Channel settings should be modified by the user (if required).** These settings are highlighted in red in the following image. Instructions to change them are provided in the following sections of this guide.



The following sections describe how to change the R838's Flashing Duration, Night Dimming, Ambient Auto-Adjust, and Radio Channel:

Flashing Duration

	<p>dUrA: Duration of the flashing</p> <p>20: Duration in seconds from 5 to 3600</p>
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Flashing Duration sets the amount of time that fixtures of remote systems controlled by the R838 will flash before extinguishing. The available settings are:

- 5 to 60 seconds in 1 second steps
- 60 to 1200 seconds (20 minutes) in 60 second steps
- 3600 seconds (one hour)

The Carmanah default duration is 20 seconds. Longer duration flash periods are useful for applications such as warning traffic of heavy equipment on logging and mining haul roads.

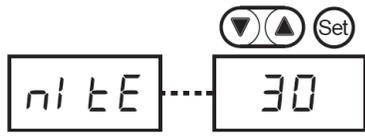
NOTE

Extending the Flashing Duration setting significantly can affect the solar energy balance of the remote system(s). Contact Carmanah for more information about sustainable settings in your location.

NOTE

For the Alternate Button version of R838, the Flashing Duration setting will have no impact on system operation.

Night Dimming

	<p>nItE: Nighttime dimming</p> <p>30: Percentage of daytime level, from 10 to 100%</p>
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Night Dimming sets the night intensity as a percentage of the programmed Intensity setting of the remote system. It is set in 10% steps. For no night dimming (equal to 100% of daytime level), this is set to off.

NOTE

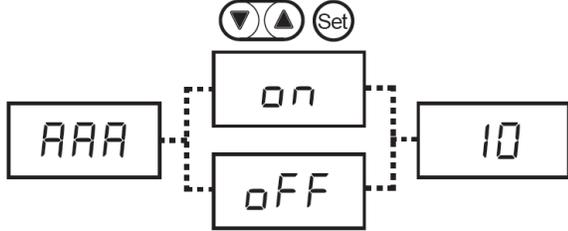
If using night dimming with a system that must meet intensity compliance such as ITE VTCSH or SAE J595, ensure that a worst-case night dimming does not dim the fixtures below the required current needed to achieve compliance.

NOTE

Do not change the Intensity setting of the R838 Remote Beacon Controller, which must remain set to 20mA to avoid damaging the indicator LED. The intensity setting of remote units controlled by the R838 must be set locally at the EMS of the remote systems and is not sent wirelessly from the R838.

Carmanah Night Dimming default is 30% for all fixtures except red beacons which are not dimmed at night per FHWA.

Ambient Auto-Adjust



AAA: Ambient auto-adjust
on: Ambient auto-adjust is enabled
oFF: Ambient auto-adjust is disabled
10: Ambient auto-adjust dim level

AAA automatically adjusts fixture intensity between 50% and 100% of the programmed Intensity setting depending on ambient brightness detected by the EMS in the remote systems controlled by the R838 Remote Beacon Controller. This reduces brightness on overcast days to prevent glare. AAA can be set either on or off. When AAA is on, it reports a value from 1 to 10 corresponding to the instantaneous ambient light level measured by the EMS photosensor. A reading of 1 means ambient light levels are ~1,000 lux and the daytime intensity is currently being dimmed to 50%. A reading of 10 means ambient light levels are at least 27,000 lux and 100% daytime intensity is being applied.

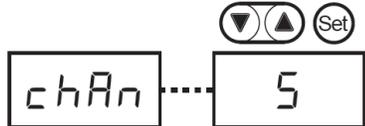
With AAA on, the dim level value (1 – 10) is displayed in real time, so it is a good feature to use for troubleshooting the photosensor operation. A flashlight can be used to shine bright light into the photosensor and invoke a “10” value.

NOTE

If using AAA for circular beacons and if ITE compliance is required, ensure that a minimum value of 50% does not dim the beacons below the level required for compliant operation. For RRFB applications, ensure that a minimum value of 50% does not dim the fixtures below the mandatory SAE J595 specification as per the FHWA. Please contact Carmanah for additional information.

Carmanah Ambient Auto-Adjust default is on.

Radio Channel



chAn: Radio channel for synchronized systems
5: Selected channel from 1 to 14 (default is 5)

The Radio Channel setting is used to configure the channel used for communication between the R838 Remote Beacon Controller and the remote system(s) that the R838 controls. When there are groups of remote systems near to each other and cross-activation between groups is not desired, the groups can have their channels set to different values. Changing the channel is a useful troubleshooting step if some systems are experiencing intermittent issues. The 2.4GHz band that the radio module uses is public spectrum; reception problems can be the result of nearby interference from other sources.

NOTE

The Radio Channel is not broadcast to remote systems. It must be changed locally at the R838 and at any remote system(s).

Carmanah default Radio Channel is 5.

4.0 Installation

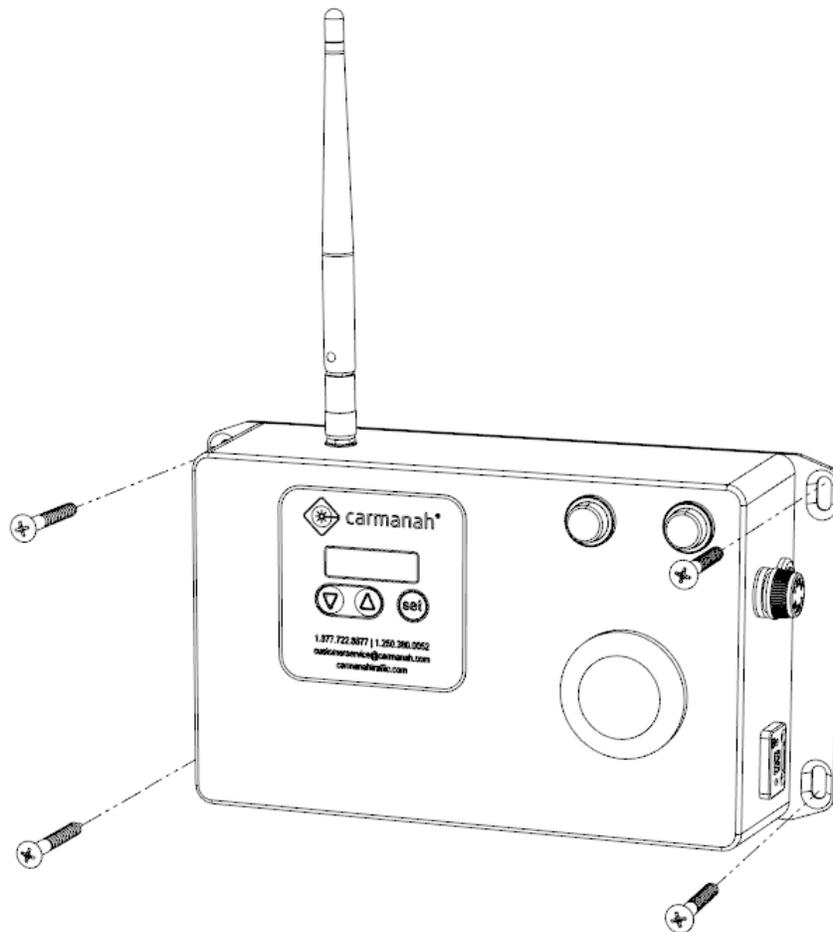
The following tools and materials may be required to mount your Carmanah R838 Remote Beacon Controller:

- | | |
|---|--|
| a. Drill and drill bits | c. Screwdriver |
| b. Four #8 screws suitable for mounting surface | d. Fish tape (for optional remote antenna kit) |

Use four #8 flat head screws (not included) to mount the R838. A drill template is provided near the end of this guide.

NOTE

Make sure the R838 can reliably activate the remote system(s) from the chosen mounting location before drilling and permanently mounting the unit.



5.0 Optional Remote Antenna Kit

The optional Remote Antenna Kit can be used when the required installation location of the R838 is beyond the wireless communication range with the standard, direct-mount antenna. The optional remote antenna kit consists of two elements:

88127 – Antenna bracket with U-bolts and screws

88130 – Low-loss coaxial cable assembly, 35 ft

If the 35-foot coaxial extension cable isn't long enough to reach the external antenna, additional cables can be daisy-chained together to make up the required length.



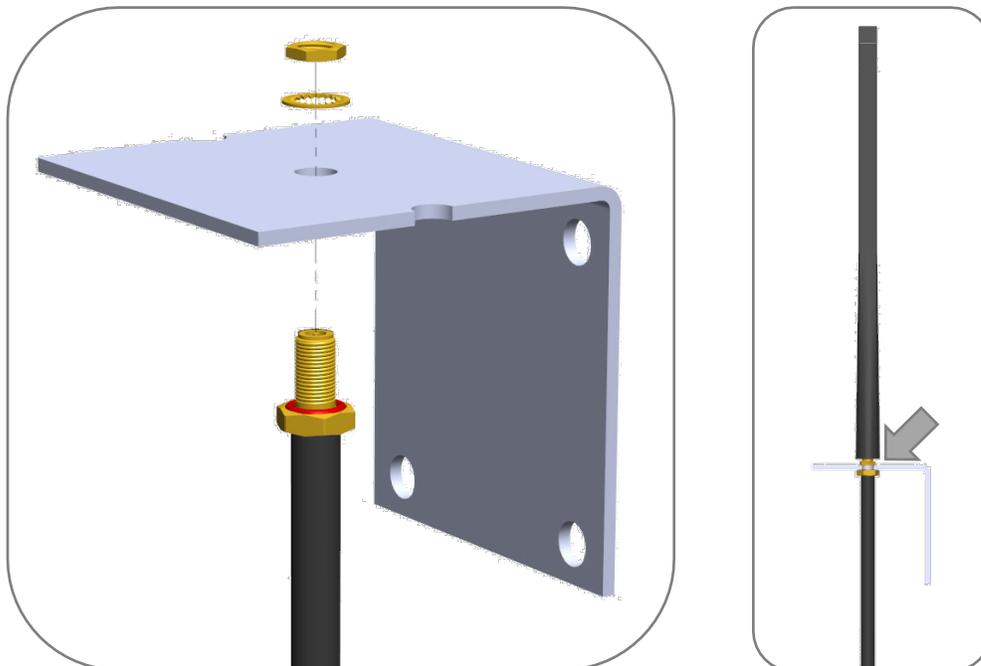
The greater the length of coax cable between the R838 and remote antenna, the greater the reduction in signal power and reduction in wireless range of the system.



Avoid pinching or sharp bends (less than 2 inches radius) in the coaxial cable which can damage it, weakening the signal and reducing the wireless range of the system.

Choose an antenna mounting location that has direct line-of-sight to the remote systems the R838 will be controlling. Test the system before permanently mounting the antenna bracket and routing the coaxial cable.

Mount the bracket using the provided hardware. Route the coaxial cable connector through the bracket and lock washer as shown and tighten the jam nut. Assemble the antenna that came with the R838 onto the connector and tighten firmly. Use the piece of waterproof sealing tape included with the R838 to seal the connection between the antenna and the coaxial connector. Stretch the tape as it is wrapped clockwise (to avoid loosening the antenna) around the antenna-to-connector interface (see arrow below) to ensure a moisture-proof seal.



6.0 Optional Transmitter/Receiver Kit

The optional transmitter/receiver kit can be used when the R838 requires remote activation from various locations nearby. This is accomplished with a battery-powered handheld transmitter. The transmitter/receiver kit consists of two elements:

- 91795 – Remote transmitter kit (transmitter and receiver)
- 91799 – Handheld transmitter (additional transmitter)

The remote transmitter kit includes the receiver and cabling needed to integrate into the R838. One or more handheld transmitters may be used to trigger the receiver. The receiver utilizes the external control interface as shown in [Section 7](#).



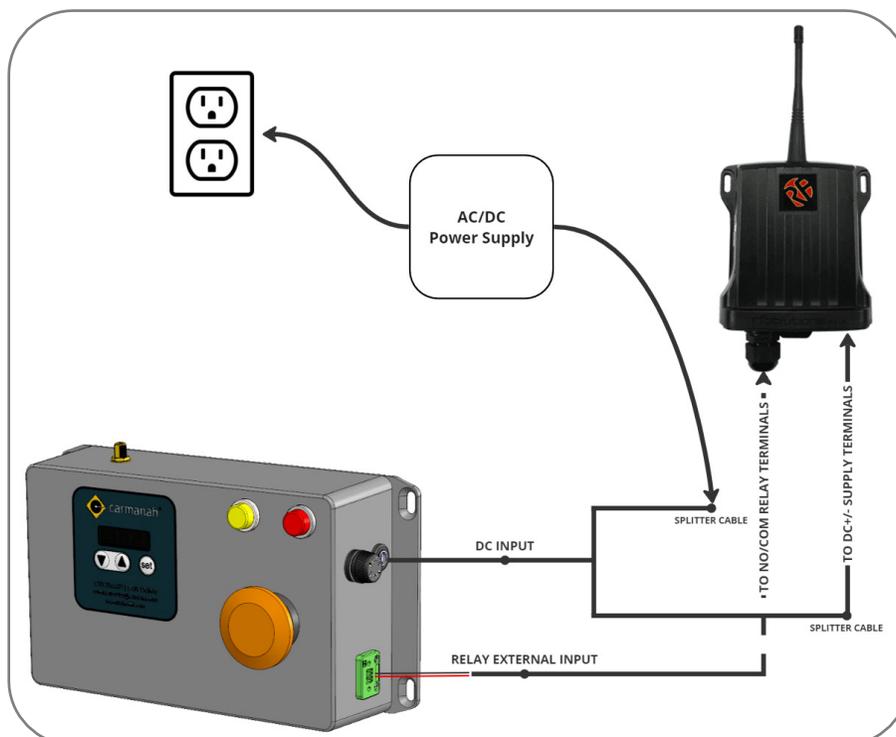
Transmitter and Receiver

The transmitter is IP65 rated, powered by 3x replaceable AAA batteries and operates at 918 MHz. The transmitter has a maximum range of 6 miles (10 km) with good line of site and when used in LoRa Mode 4. Performance will vary depending on the installation.

The receiver is IP65 rated and should be installed close to the R838. Six feet of cable is provided to go from the receiver to the R838's external control interface.



Wiring Diagram

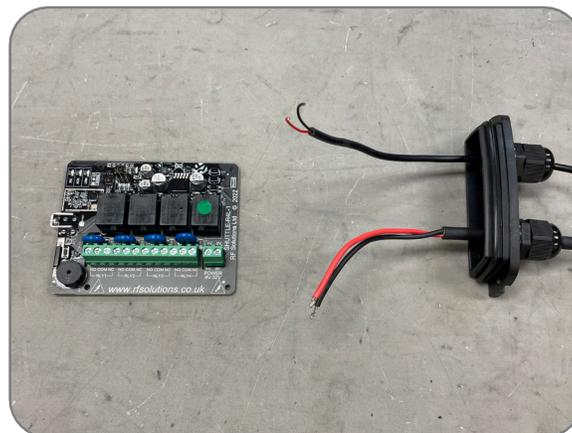


Receiver Setup and Installation

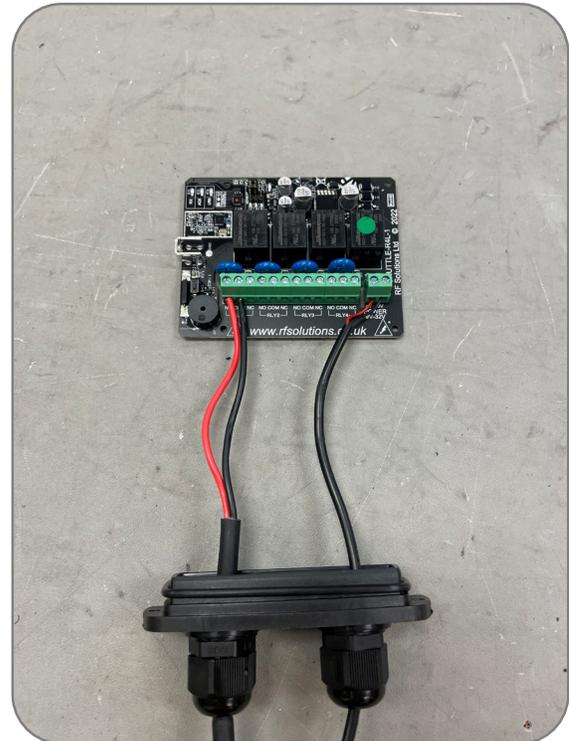
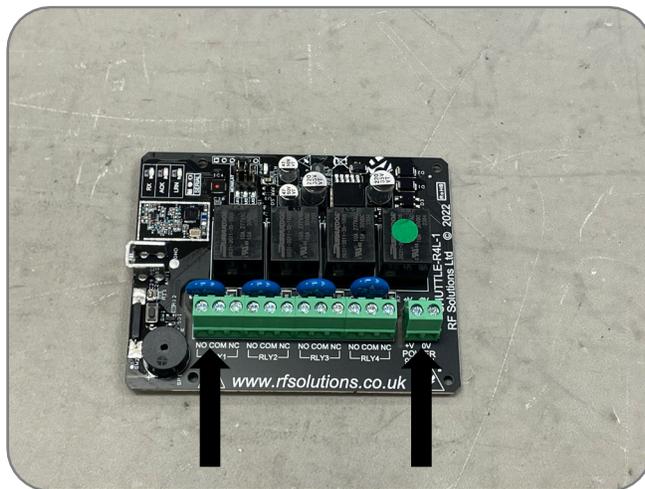
1. Remove receiver antenna and access panel. Ensure gasket remains in place.
2. Slide out receiver circuit board. This may require maneuvering the circuit board side to side to get it out.



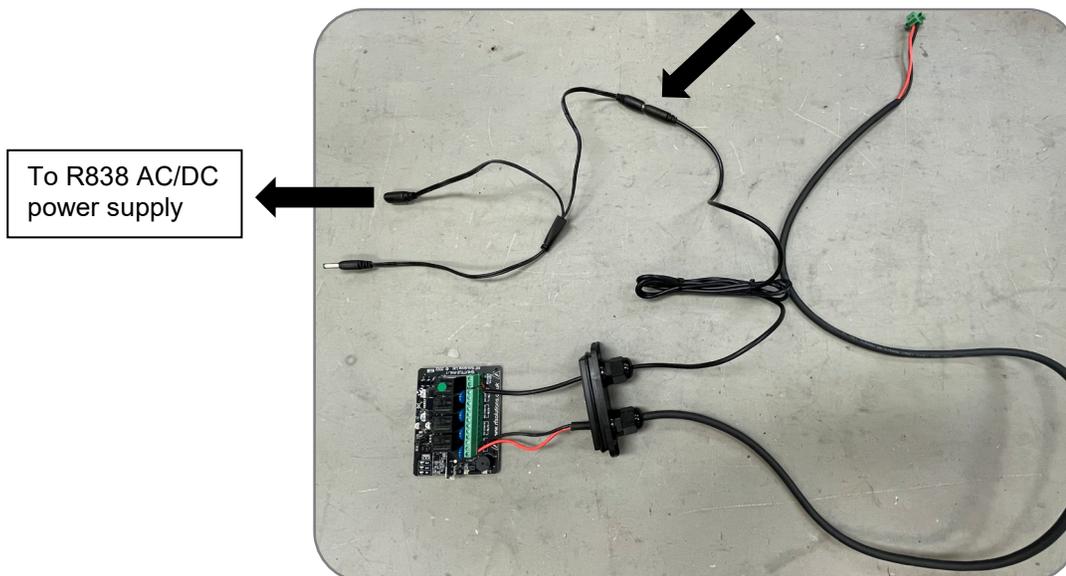
3. Drill hole for second cable gland on receiver access panel. Install included cable gland.
4. Route cables as shown below:
 - a. Larger gauge 2-conductor cable through left cable gland. Remove jacketing and strip wires to expose. This is the “relay” cable.
 - b. Smaller gauge pre-stripped 2-conductor cable through right cable gland. This is the “power” cable.
5. Allow for 4" of cable slack and tighten down glands so the cables don't move. Ensure the securing nuts do not spin when tightening.



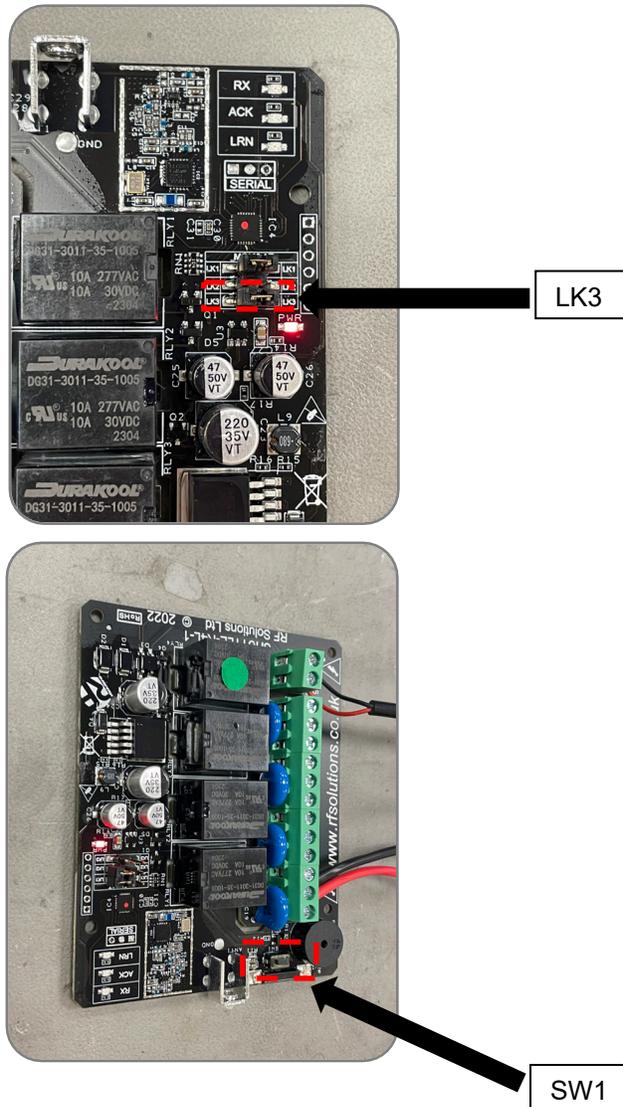
6. Terminate the wires as shown below:
 - a. Power cable – V+ = red, 0V = black.
 - b. Relay cable – RLY1 NO = red, RLY1 COM = black.



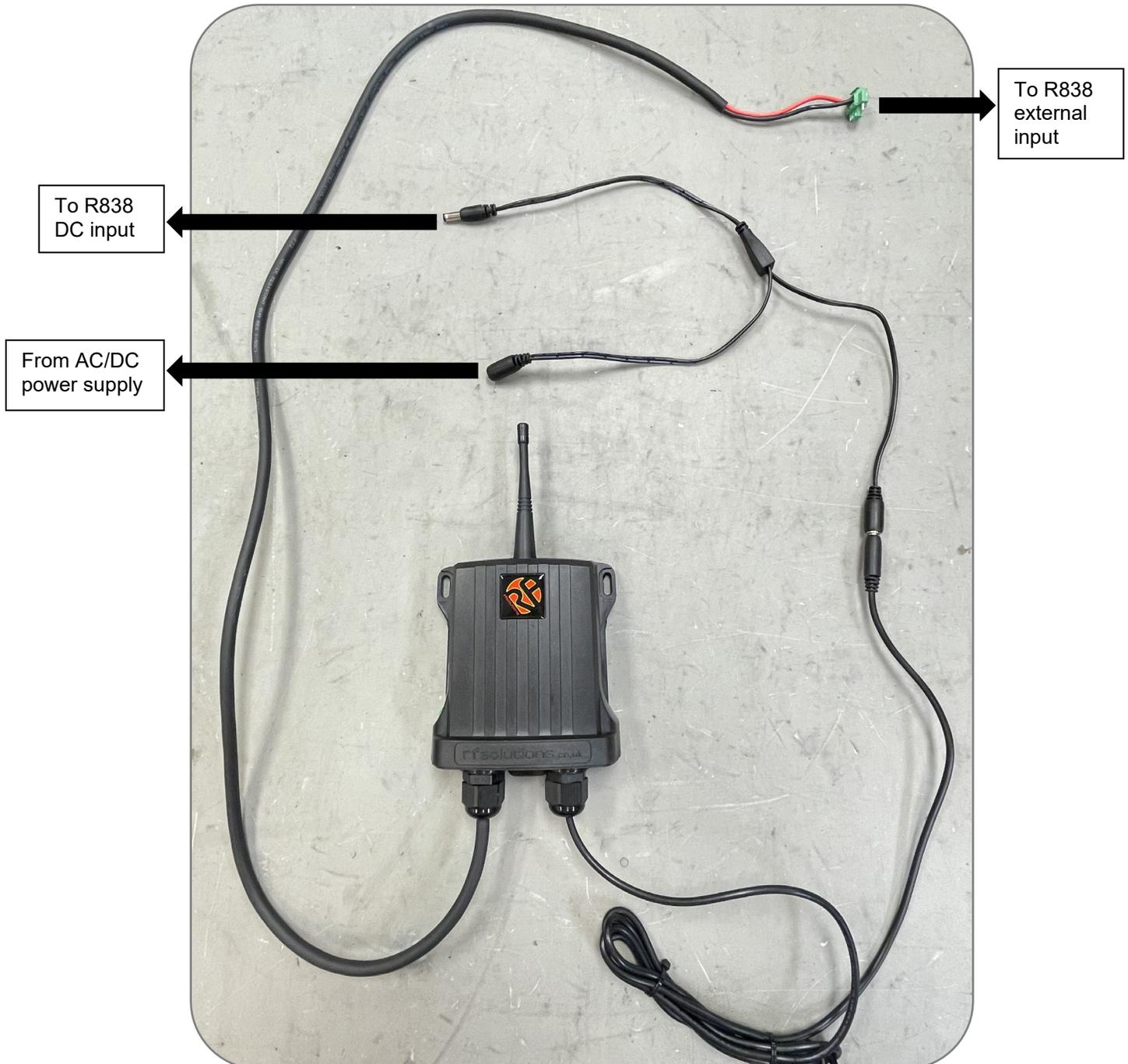
7. Connect the power cable to the barrel connector splitter temporarily. Connect the R838 AC/DC power supply to the splitter. Plug in the power supply to an available outlet to power up the receiver. You should see a red PWR LED on the circuit board showing the board has initialized.



8. Locate the jumpers on the top of the circuit board. Place one of them on LK3. The circuit board will beep confirming you are in setup mode.
9. Press SW1 four times. This will result in five beeps of feedback from the circuit board. This will put you in LoRa Mode 4 for the longest range.
10. Disconnect power to the circuit board. Place the jumper on LK3 back to its original storage location on one of the pins.



11. Reinstall receiver circuit board, antenna, and access panel. Ensure gasket is seated properly.
12. Mount the receiver within cable distance of the R838.
13. Complete the wiring to the R838:
 - a. Plug in male barrel connector to R838 DC input.
 - b. Terminate relay cable to R838 external input (see [Section 7.](#))
 - c. Plug in AC/DC power supply to female barrel connector.



Transmitter Setup

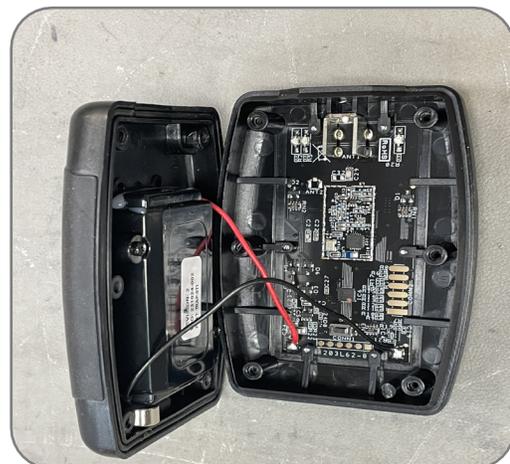
Pair Transmitter

1. Flip the transmitter over as shown below. Tap the transmitter to the receiver. The receiver will beep once.
2. Press the transmit button on the external cover of the transmitter. The receiver will beep twice and then the relay will click. This confirms you have successfully paired with the receiver.

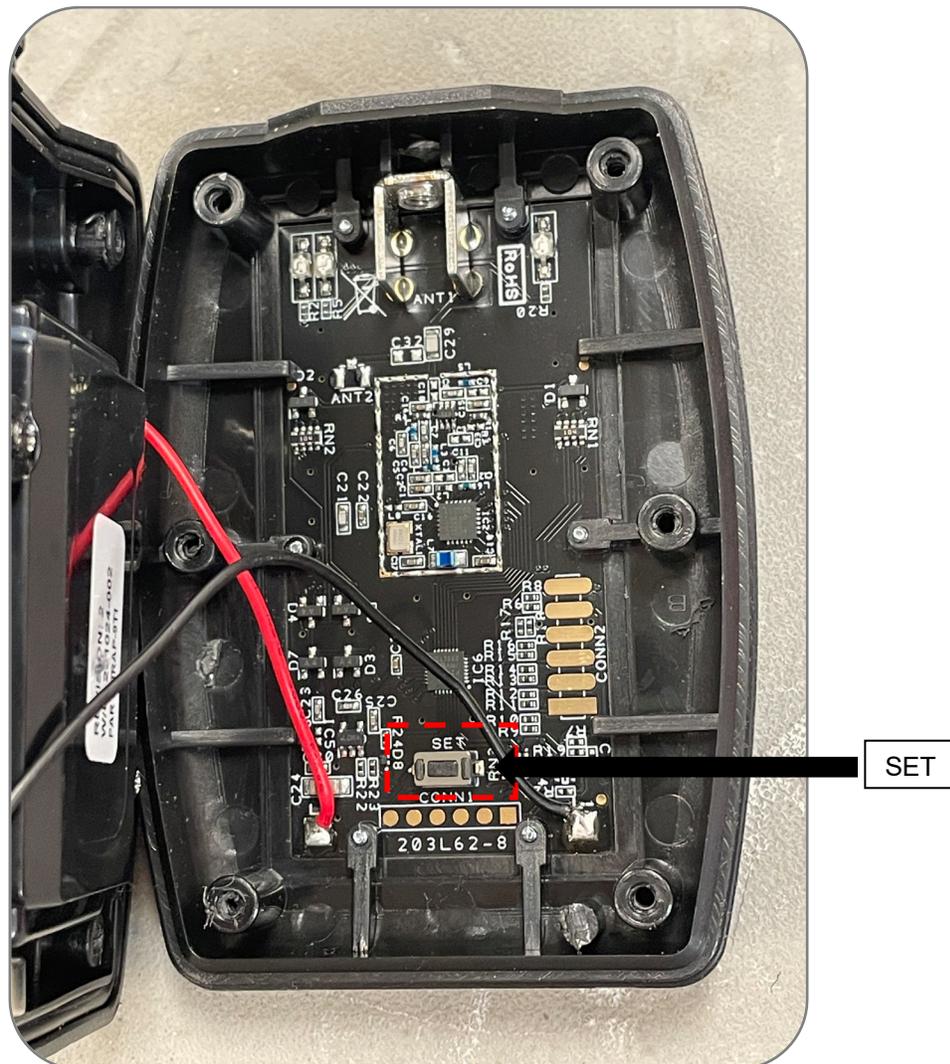


Set Acknowledgement Feedback Feature

1. Remove the protective silicon cover.
2. Remove the six screws on the back of the transmitter and open the enclosure. Use a small flat bladed screwdriver to avoid stripping the screws.
 - a. Note the magnet on the inside below the battery as this is what is used for pairing to the receiver.



3. Press SET button twice. The LED in the top right will blink twice and then once.
4. Press the SET button once more. The LED in the top right will now be on steady.
5. Wait for all LEDs to extinguish.
6. Press the transmit button on the external cover of the transmitter.
7. Reassemble transmitter including antenna.



The transmitter will now accept feedback from the receiver. The LED in the top right corner will blink quickly green or red after pressing transmit button

- Quick green flash = transmit successful from receiver
- Quick red flash = transmit failed from receiver

This feature is handy to confirm the transmission was successfully received and whether the R838 was triggered or not. It is recommended to get an eyes-on visual confirmation of the remote beacons each time you trigger using the remote transmitter.

Functional Test

With everything assembled and set up, proceed with transmitting to the receiver from various locations based on your application. Ensure this is successful given any obstructions you may typically encounter.



If you are receiving a negative acknowledgement on the transmitter (blinking red LED), try with better line of site or closer distance to the receiver. It is recommended to get a visual of the remote beacon systems to ensure they have been triggered instead of relying on the transmitter acknowledgement LED.

Battery Replacement

1. Remove the transmitter protective silicon cover.
2. Remove the six screws on the back of the transmitter to open the enclosure. Use a small flat bladed screwdriver to avoid stripping the screws.
3. Remove the two screws holding the battery cover.
4. Flip the battery cover over and replace the three AAA batteries.

**NOTE**

For additional information regarding installation, wiring and programming details refer to the quick start guides for the transmitter and receiver.

7.0 External Connector Interface

The R838 external connector interface is used to trigger the system via an external source. The external connector interface consists of a 2-pin connector installed on the right side of the R838 and a mating screw terminal connector for wiring to the connected hardware.



Shorting the two pins of the external connector interface will cause remote systems to turn on. Momentary and Alternate Button versions of the R838 behave differently as described below:

Momentary Button version: shorting the pins will cause the R838 to turn remote systems on for the programmed length of time (the Flashing Duration setting). If the pins are left shorted, the system will not turn on again until the pins are disconnected from one another and then shorted again.

Alternate Button version: whenever the pins of the external connector interface are shorted together, the R838 will turn on the remote systems. When the pins are disconnected from one another, remote systems will turn off.



The external push button input is not a dry contact type. There is always ~15VDC present between these terminals. When connecting input devices other than standard traffic push buttons, consideration must be given to electrical compatibility. Failure to isolate input signals operating at different voltages or connection of devices that are designed to operate in a different voltage range could result in poor performance or equipment damage. Please contact Carmanah for additional support on connection of non-standard input devices.

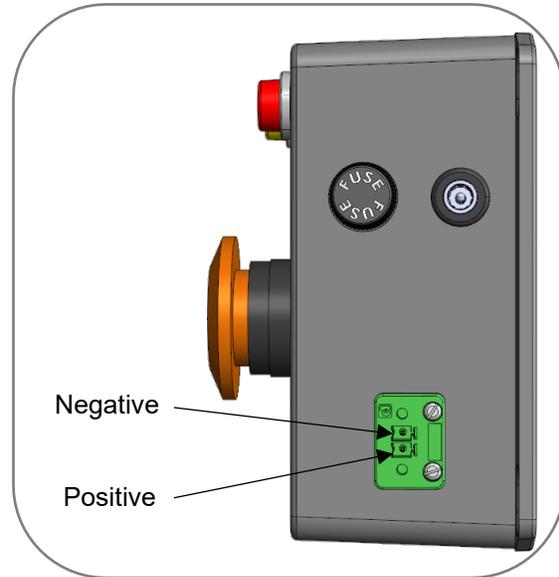
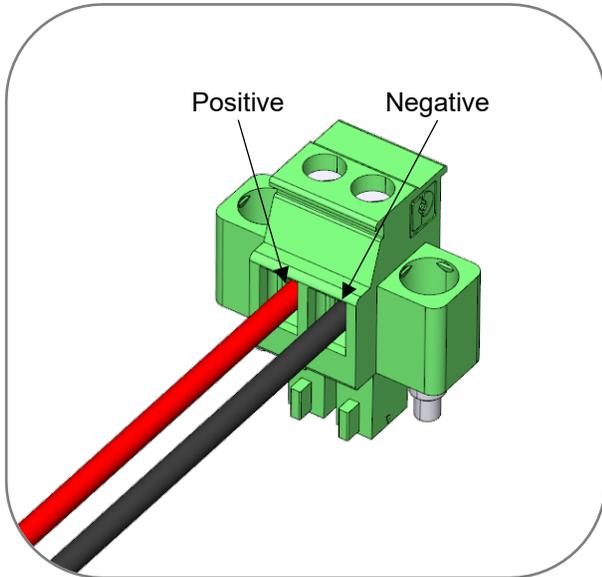
NOTE

The external push button interface is internally wired in parallel with the R838 button for both Momentary Button and Alternate Button versions.

Included with the R838 is a screw-terminal connector which plugs into the R838 external push button connector. The connector can accept 16 – 28AWG wire.



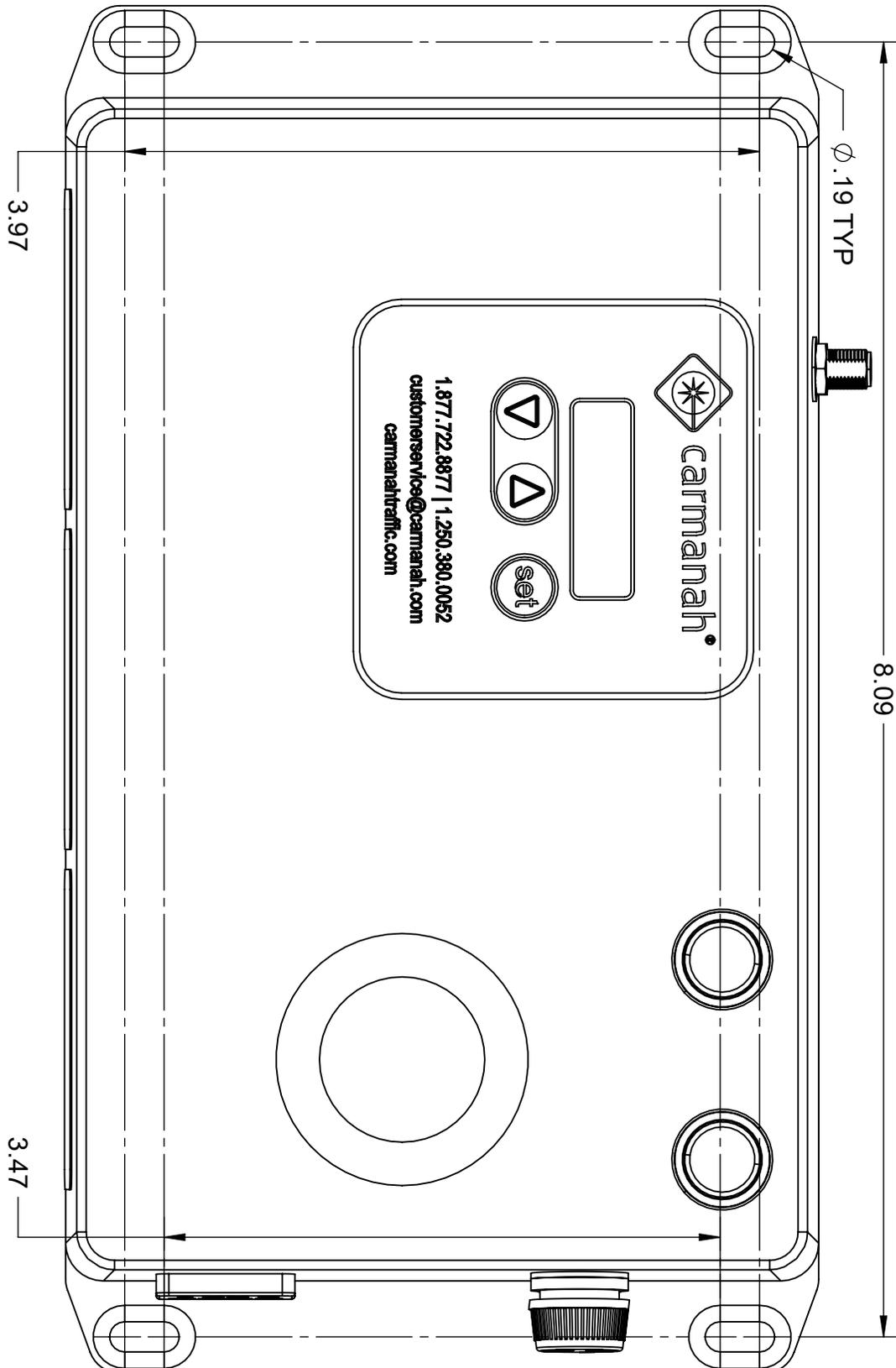
If the equipment being connected to the external connector interface is sensitive to the polarity of the 15VDC that is present across the two pins, note that the positive is the lower pin when viewed from the side as shown below.



8.0 Troubleshooting

Symptom	Possible Cause and What to Check
The R838 does not activate remote systems or display any information.	<ul style="list-style-type: none"> • Standard AC/DC power supply: <ul style="list-style-type: none"> ○ Check that the DC input barrel connector is fully inserted into the connector in the right side of the R838. ○ Check the fuse in the fuse holder on the right side of the R838. ○ Check the breaker for the wall plug being used. • Optional 12V charger kit: <ul style="list-style-type: none"> ○ Ensure the cigarette adapter is fully inserted into the vehicle socket. ○ Check that the vehicle ignition is set to the correct position. ○ Check the fuse in the cigarette adapter.
Remote systems do not activate; R838 display works normally.	<ul style="list-style-type: none"> • Ensure that all the units are set to the same radio channel using the OBU. • See the EMS Programming and Testing section of this manual. • Ensure that the units are not too far apart (ideal, 500 ft.; maximum, 1,000 ft. unobstructed line of sight). • Check for barriers or obstructions between systems such as buildings or billboards. • Check that the R838 Radio Channel setting matches that of the remote system(s).
R838 yellow LED flashes without R838 button being pressed.	<ul style="list-style-type: none"> • Ensure that nearby systems in a different group are set to a different channel. • Remote systems equipped with calendars or push buttons can activate the R838; this is normal behavior.
LED Open Fault is showing on User Interface.	<ul style="list-style-type: none"> • The flash pattern on the R838 has been set to an RRFB or alternating flash pattern. Set it to 0.5u.

Drill Template



Notes:



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