RED'S ENGINEERING

SRPT-02
Simplex Repeater
Users Manual

RED'S ENGINEERING SRPT-02

PWR REC PLAY TX CHRG

GMRS - HAM RADIO
Simplex Repeater

GND / SPKR
PTT / MIC

Power   Opensource   802.11 Wireless   Setup
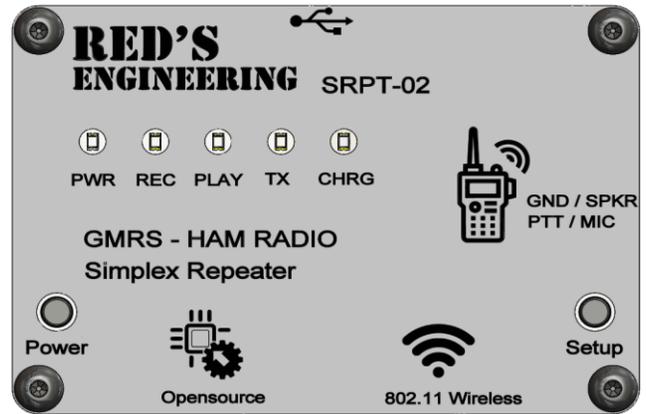
Overview:

The SRPT-02 is an affordable repeater system designed for GMRS and Ham Radio enthusiasts. It offers fast plug-and-play repeater operation and works with UV-5R compatible two-way radios. This repeater comes equipped with a built-in rechargeable battery that can be charged via a USB C connection, making it an excellent choice for trips where repeater coverage is unavailable. The internal battery can provide a weekend's worth of use on a single charge. This small and compact device can be easily attached to any base station or handheld radio for mobile use. It's simple to use and works right out of the box.

Configuration can be performed using a web application. The repeater can be powered either by the internal battery or the USB port located on the top of the unit. Real-time LED indicators provide operational status updates. DTMF tone detection allows you to enable or disable the repeater directly from the field. Additionally, an open frame design allows for compactness, and plastic shields can be attached for added ruggedness when needed. The SRPT-02 also supports CCTSS on your radio for added privacy and interference prevention. Currently, it supports UV-5R and compatible radios.

Features

- Plug and play, works right out of the box
- Web based configuration via cell phone
- Works with UV-5R compatible radios
- DTMF detection, enable disable repeater
- 10 second message record time
- Station Identification (Morse Code generation)
- LED Indicators show current status
- Works with UV-5R compatible radios
- USB C power / Charging
- Open source software
- OTA Firmware Updates (WiFi)
- Long battery life, ~12 hours talk time, ~10 month active standby

What's in the kit:

(1) SRPT-02 Repeater
(1) 1 UV-5R Compatible Cable
(1) USB C Cable
(1) 1000mA Battery (installed)

USB charger not included

A simplex repeater can be a valuable tool for both ham (amateur radio) and GMRS (General Mobile Radio Service) radio users. Here are some of the benefits of using a simplex repeater for these purposes:

- **Cost-Effective Solution:** Running a simplex repeater can be more cost-effective than setting up a full-fledged duplex repeater system, making it an attractive option for budget-conscious users.

- **Extended Range:** Simplex repeaters can significantly extend the communication range of radios operating in simplex mode. They record signals on one frequency and re-transmit them on the same or a different frequency, effectively increasing the range of communication. No duplexer needed.

- **Emergency Communications:** During emergency situations or disaster scenarios, simplex repeaters can play a crucial role in maintaining communication when other infrastructure may be compromised. They can relay important information across a wider area.
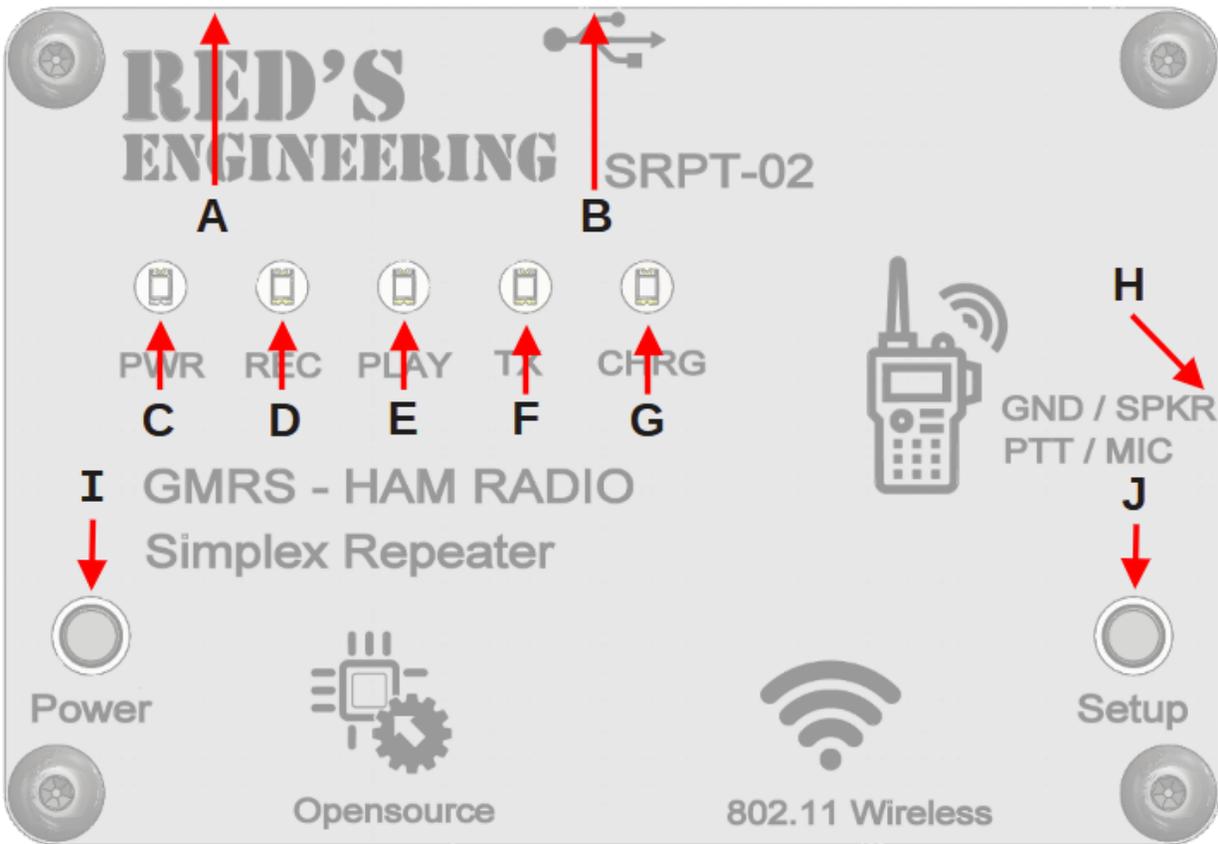
Figure 2.1

Table 2.1:

A. **RESET:** System reset switch
B. **USB PWR:** Power / Charge
C. **PWR:** Power indicator
D. **REC:** Voice recording indicator
E. **PLAY:** Voice playback indicator
F. **TX:** Radio transmitting indicator
G. **CHRG:** Battery charging indicator
H. **Radio:** Radio connector
I. **Power:** Power switch press on/off
J. **Setup:** Setup mode / enable wireless configuration

Connection

What you will need:

- A Baofeng UV-5R or compatible radio
- SRPT-02 Repeater
- UV-5R Speaker/MIC cable (included with SRPT-02)

1. Connect the radio to the SRPT-02 using the supplied cable. See fig. 2.2
2. Enable the repeater by pressing the reset switch
3. Power on the SRPT-02 using the power button lower front of the repeater
4. For more advanced connections, see 3.5mm connection diagram below

Figure 2.2

Operation:

In operation, it's highly recommended to enable CTCSS for the channel you're using to prevent the repeater from detecting and repeating unwanted signals from other radio operators. The SRPT-02 will record and repeat any signal heard on the channel under normal operation.

It is also recommended to disable voice prompts on the radio when using the UV-5R. Failing to do so will result in the radio recording and replaying "Frequency Mode" when the radio is first powered on.

Normal operation:

Once the radio and the SRPT-02 are connected and powered on, you are ready to use it. Adjust the volume on the radio to approximately 50% of the full range. You may need to make further adjustments based on the specific model of the two-way radio you're using.
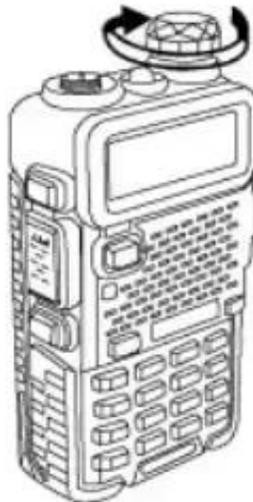
Once the radio detects a carrier signal, the SRPT-02 will begin recording voice transmissions from the airwaves. It will continue until the carrier signal is lost or until a maximum recording time of 10 seconds is reached. After the carrier signal is lost, the repeater will pause and key up the radio to start transmitting the recorded voice. Additionally, if Station ID is enabled, it will be transmitted in Morse Code after the voice transmission is complete.

Enable/Disable Repeater:

You can enable or disable the repeater in the field using DTMF detection by keying up your radio and pressing "#" to disable the repeater or "*" to enable it during your transmission.

#="Disable Repeater"

*="Enable Repeater"

When the repeater has been disabled, the repeater will acknowledge with three slow beeps.
When the repeater has been enabled, the repeater will acknowledge with three fast beeps.

Configuration:

The SRPT-02 features a web interface for system configuration and firmware upgrades. It can be accessed via a standard web browser on your phone or PC over Wi-Fi. The web interface is disabled during normal operation for power-saving and security reasons.

Setup:

Follow these steps to access the web interface and configure your SRPT-02 repeater:

1. With the SRPT-02 powered on, press the "Setup" button on the front of the repeater. In Setup mode, "PWR," "REC," "PLAY," and "TX" LEDs will be illuminated. In this mode, the SRPT-02 acts as a wireless hotspot for configuration.

2. In your wireless settings, select the access point labeled "SRPT-02" see figure 3.1.

3. Once connected (no authentication required), a web browser page should open see figure 3.2.

4. Older phones will require you to enter the URL into your Web browser this is: http://192.168.244.1

5. Click on the Menu Icon, then select "Configure".

6. Adjust the settings as needed and click "Save" see figure 3.3.
7. Press the "Setup" button on the front of the SRPT-02 to apply your settings. The repeater is now ready for normal operation.

Setup Options:

Enable Station ID:

When enabled, your call sign will be transmitted in Morse code after each SRPT-02 transmission.

Station ID:

This is your call sign, which will be transmitted in Morse code.

Morse Code WPM:

This is the speed at which Morse code will be transmitted, with options ranging from 20 to 40 words per minute.

Station ID Delay:

This is the time delay between the voice transmission and the Station ID transmission, with a default setting of 1000ms (1 second).

Carrier Detect Delay:

This is the delay before confirming a valid carrier detect, used in conjunction with radio squelch settings to filter out noise or weak signals. The default value is 100ms (0.1 second).

Minimum Message Length:

This setting allows you to re-transmit recorded audio only if the recorded message meets a minimum length, useful for filtering out unwanted noise or accidental microphone key presses.

Transmit Delay:

This is the delay time the repeater will wait before transmitting a recorded message.

Enable LED's

Unchecking this option disables all status LED's on the repeater to conserve power. In this mode the unit will report power on by flashing the power LED two times and will report power off by flashing once.

Deep Sleep Mode:

The repeater may be operated in deep sleep mode for further reduced power consumption. Please note that when operating in this mode, there is a 1.5 second delay that is needed for the repeater to wake from deep sleep mode once a carrier has been detected. With this feature enabled, the front panel LED's will not be operational. Powering the repeater on in this mode will be indicated by the Power LED flashing twice. Powering off will be indicated by a single flash.

Enable Debug Mode:

This is used for debugging purposes and should only be enabled when instructed to do so by a qualified engineer or software developer. Debug messages can be monitored using a standard USB cable connected to a PC.

Firmware Update:

From time to time, it may be necessary to perform a firmware update for the SRPT-02 repeater. Here's how to do it:

1. Obtain a firmware image from Red's Engineering, which will typically be in a compressed .zip file format.
2. Decompress the zip file to obtain a .txt file (release notes) and the image file with a .bin extension.
3. Power on the SRPT-02 and place it in configuration mode by pressing the Setup button. In this mode, the "PWR," "REC," "PLAY," and "TX" LEDs will be illuminated.
4. In your wireless settings, select the access point labeled "SRPT-02."
5. Once connected (no authentication required), a web browser page should open with the main SRPT-02 configuration screen. See figure 3.2
6. Click on the Menu Icon, then select "Upgrade".
7. Note the current firmware revision running on the repeater See figure 3.4
8. Click "Choose File" and select the .bin file provided by Red's Engineering.
9. Press the "Update" button and wait for approximately 30 seconds. The repeater will reboot and be ready for normal operation.
10. It's recommended to enter setup again and verify the new firmware version.

Please note that OTA (over-the-air) updates have fail-safe mechanisms in place to prevent catastrophic failures during the upgrade. If any issues occur, pressing the reset switch will roll the system back to the previous firmware revision. Firmware updates can also be performed via USB if needed. For more information, contact Red's Engineering.

Button Lockout Feature:

The SRPT-02 repeater can lock the front buttons to prevent the unit from being accidently turned-on during shipment. To enable this feature, press and hold the power button for approximately 5 seconds when the repeater is powered off. You will see the Power LED lash briefly twice indicating the feature has been enabled. Press the reset button, located under the front panel (next to the USB port) to resume normal operation.

Restore Default Settings:

In the rare event that you need to restore the factory default configuration, follow the following procedure. Note, the reset switch is located at the top of the unit under the face plate. If there is a problem, you should press this switch first.

1. Turn on the power using the power switch, and the power LED should illuminate.
2. Press and hold the Setup button for 10 seconds, then release it.

The "PWR," "REC," "PLAY," and "TX" LEDs will flash twice, and the unit will power cycle. The repeater is now restored to its factory default settings.

## Configuration Screens
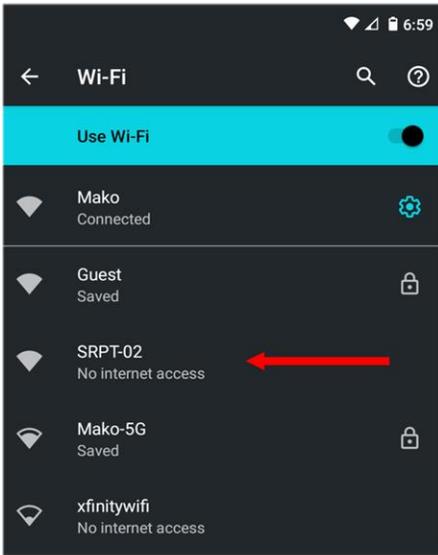

Figure 3.1
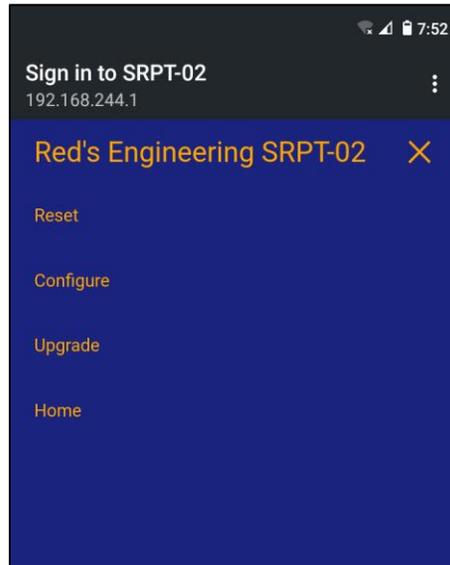
Figure 3.2
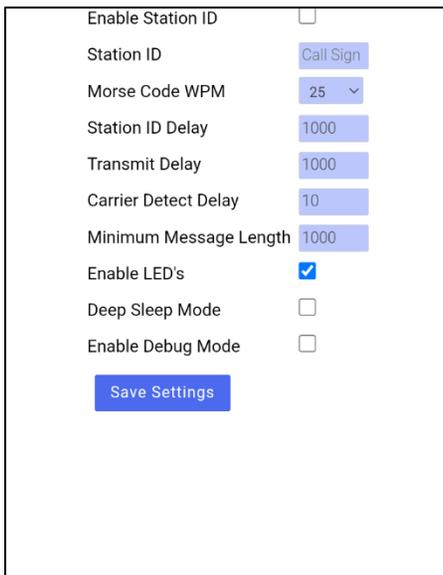
Figure 3.3
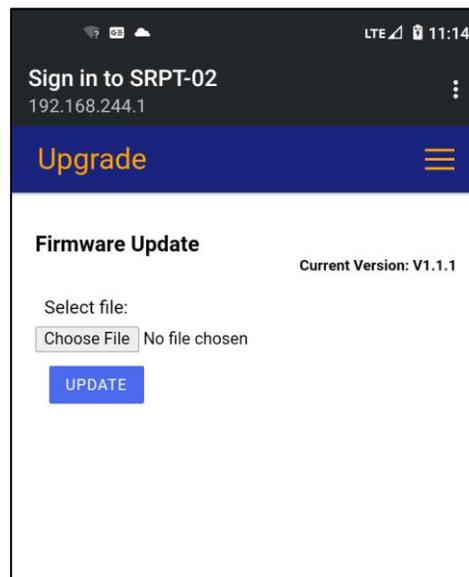
Figure 3.4

TECHNICAL SPECIFICATIONS

- Dimensions: 2.7"W x 1.9"D x 0.7"H (70 x 48 x 18 mm)

- Weight: 2.2 oz. (0.63 g)

- Power Supply: 5 VDC, max 500mA current

- Wireless Technology: IEEE 802.11b/g

- Antenna: 1 x 2dBi Built-in

- Frequency Band/Bandwidth: 2.4 GHz IEEE 802.11b/g

- Channels: 1 to 11 IEEE 802.11b/g (North America)

- Wireless Transmission Speed: 20Mbps

- Battery Capacity: 1000mA

- USB type C connection

- Full charge time: 3 Hours

- Interfaces/Ports: USB C, 3.5mm audio connection

- Serial Interface: 115200 Baud

3.5mm Wiring Diagram
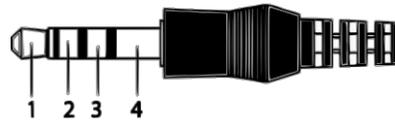
1. Mic
2. PTT
3. Speaker
4. Ground