

# Interface Manual

## Solar Powered Repeater

*SignalFire Model: Repeater-xxxx*

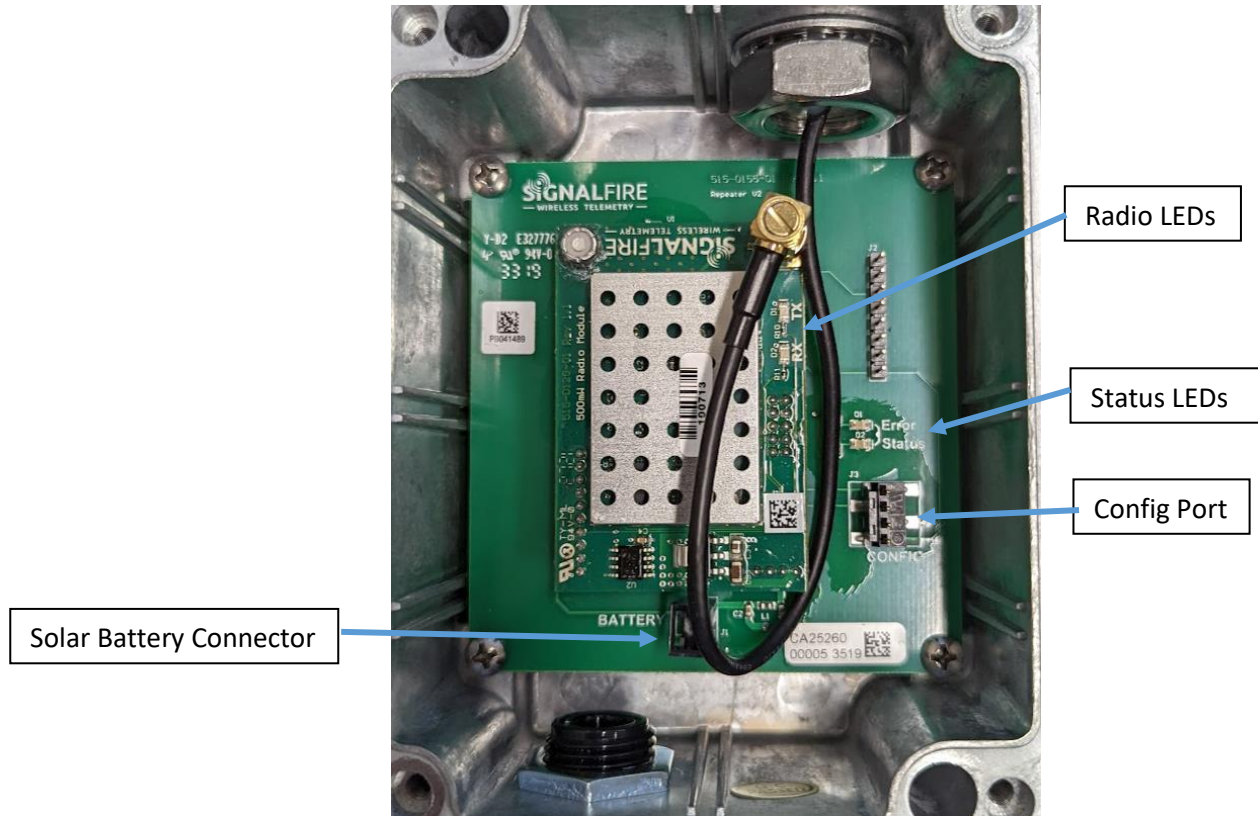


The SignalFire Solar powered repeater is a stand-alone device with the following features:

- Long Range (2-3 miles) 500mW Radio
- Integrated high gain omni-directional antenna or remote antenna options
- Automatically forwards messages from other SignalFire Nodes
- Mounting bracket and U-Bolts to mount to a vertical or horizontal pole
- AES 128bit Encryption

## Specifications

Overall Size	14" tall × 12" wide × 8" deep (not including antenna)
Power Source	Integrated HC Solar system includes 4W solar panel, integrated charger and 9Ah battery pack
Temperature Rating	-40°C to +85°C
Radio	500mW 902-928MHz Ism Band, FHSS radio
Antenna	Integrated omni-directional antenna or N-Connector for external SignalFire antennas
Compliance	FCC/IC Certified. FCC ID: W8V-SFTS500, IC: 8373A-SFTS500



### Radio LEDs

- The Radio TX LED (**green**) flashes each time a radio packet is sent. This LED will blink rapidly while searching for the radio network.
- The Radio RX LED (**red**) blinks on each received radio packet.

### Status LEDs

- The Active LED (**green**) will blink at boot up and will blink rapidly when the sensor is being powered and read.
- The ERROR LED (**red**) will blink to indicate an error condition.

### Solar Battery Connector

- Run the power cable from the solar system through the cord grip and plug into this connector. Tighten cord grip to ensure water tight seal

### Configuration Port

- Connect a SignalFire USB-Serial-4PIN cable to this port to configure the Repeater with the SignalFire ToolKit software

## Setup

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The Repeater must be configured for correct operation before being fielded. The configurable items include:

- Radio Network/Group selection
- Radio encryption setting
- Unique Modbus ID
- Node Name (optional)

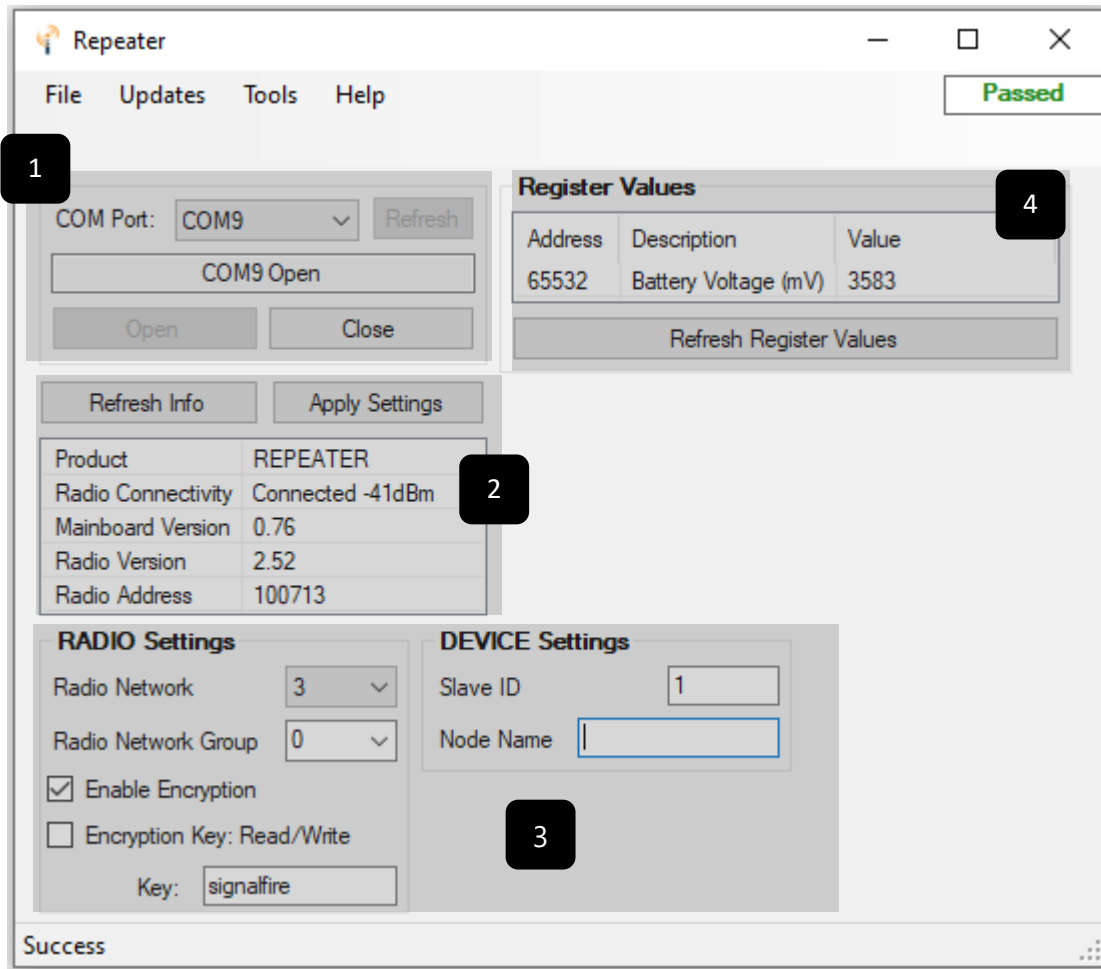
All settings are made using the SignalFire Toolkit PC application and a serial programming cable (USB-Serial-4PIN).

### Using the SignalFire Toolkit

The SignalFire Toolkit application can be downloaded at [www.signal-fire.com/customer](http://www.signal-fire.com/customer). After installation, launch the software and the main toolkit window will open:



Select the COM port associated with the Repeater and click "Auto-Detect Device on COM Port." This will open the device configuration window, where all device settings can be configured.



① COM Settings

④ Register Values

② Node Information

③ Radio and Device Settings

## Network Setting

The network is set using the SignalFire Toolkit. **The network, network group, and corporate ID/encryption key settings must match those of the gateway for them to communicate.**

## Encryption

To protect your over-the-air data and prevent tampering, SignalFire networks come with encryption. Legacy products use a Corporate ID, but can be switched over to use an encryption key if the firmware and ToolKit are up to date.

To set up a legacy Sentinel to use encryption, click the checkbox labeled **Enable Encryption** inside the **Set Corporate ID** box. All newer Sentinels come with this option enabled with "signalfire" as the default encryption key.

*Corporate ID*

*Encryption Enabled*

The box will then change into a **Set Encryption Key** box, and it will prompt instead for the encryption key you would like to use. Note that keys may not contain spaces or angle brackets. Enter it and then press **Set**. If you are setting up a new network, you will need to set the encryption key on all of your devices. If you are adding a Sentinel to a legacy network, you can simply set the Corporate ID without clicking the Enable Encryption box, and it will remain compatible with the older system.

## Slave ID

The Repeater must be configured with a unique (to the Gateway) Modbus Slave ID. The repeater will use this ID to report its status registers to the Gateway

## Node Name

This optional field will be reported to the Gateway and will be visible with the SignalFire Toolkit and can be used to identify the Repeater.

## Operating Mode

The Repeater will automatically act as a repeater in the SignalFire network and forward messages for other devices. No configuration of the meshing is needed. The repeater also reports to the Gateway once every 5-minues and sends it status registers including solar battery voltage. The solar system will provide 7-days of autonomy on a fully charged battery.

## *Mounting and Care*

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Both the repeater box and the solar panel should be mounted to a pole using the supplied bracket and U-Bolts. The repeater should be mounted as high as practical for best radio range. The repeater should be mounted so that the antenna extends above the pole into free space. Route the power cable into the Repeater enclosure through the cord grip and plug into the battery connector. Tighten the cord grip to ensure a water-tight seal.

Mount the solar panel with a clear view of the southern sky.

## Remote Modbus Register Mapping

In addition to forwarding messages for other devices, the Repeater also reports status registers to the SignalFire Telemetry Modbus Gateway. The data that is sent to the gateway is available at the gateway in registers where it can then be read by a Modbus RTU.

This data is accessible at the same Slave ID that the Repeater is configured for

### Register Map

Register Number	Register Address (Offset)	Description
49988	9987 or 65524	Major revision number for the mainboard
49989	9988 or 65525	Minor revision number for the mainboard
49990	9989 or 65526	Major revision number for the radio
49991	9990 or 65527	Minor revision number for the radio
49992	9991 or 65528	High 16 bits of SFTS node address
49993	9992 or 65529	Low 16 bits of SFTS node address (the radio ID)
49994	9993 or 65530	Slave ID readback
49995	9994 or 65531	Received signal strength of last packet from the slave
49996	9995 or 65532	Battery voltage of the Modbus client, in millivolts
49997	9996 or 65533	Minutes until this slave will time out, unless new data is received
49998	9997 or 65534	Number of registers cached for this slave device
49999	9998 or 65535	Remote device type which is 80 for the Repeater

### Technical Support and Contact Information

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*Revision History*

Revision	Date	Changes/Updates
2.0	12/16/21	Updated for current repeater hardware revision. Reformatting

## APPENDIX - FCC and IC Statements

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Changes or modifications not expressly approved by SignalFire Telemetry, Inc could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device has been designed to operate with the antennas listed below and having a maximum gain of 5.8 dBi. Antennas having a gain greater than 5.8 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms.

### ANT-WP-X-X

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication.

To comply with FCC's and IC's RF radiation exposure requirements, the antenna(s) used for this transmitter must be installed such that a minimum separation distance of 20cm is maintained between the radiator (antenna) & user's/nearby person's body at all times and must not be co-located or operating in conjunction with any other antenna or transmitter.

This device complies with Industry Canada's license-exempt RSSs. Operation is subject to the following two conditions:(1) This device may not cause interference; and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.