

instruction manual for
Open LRS New Generation



Table of contents

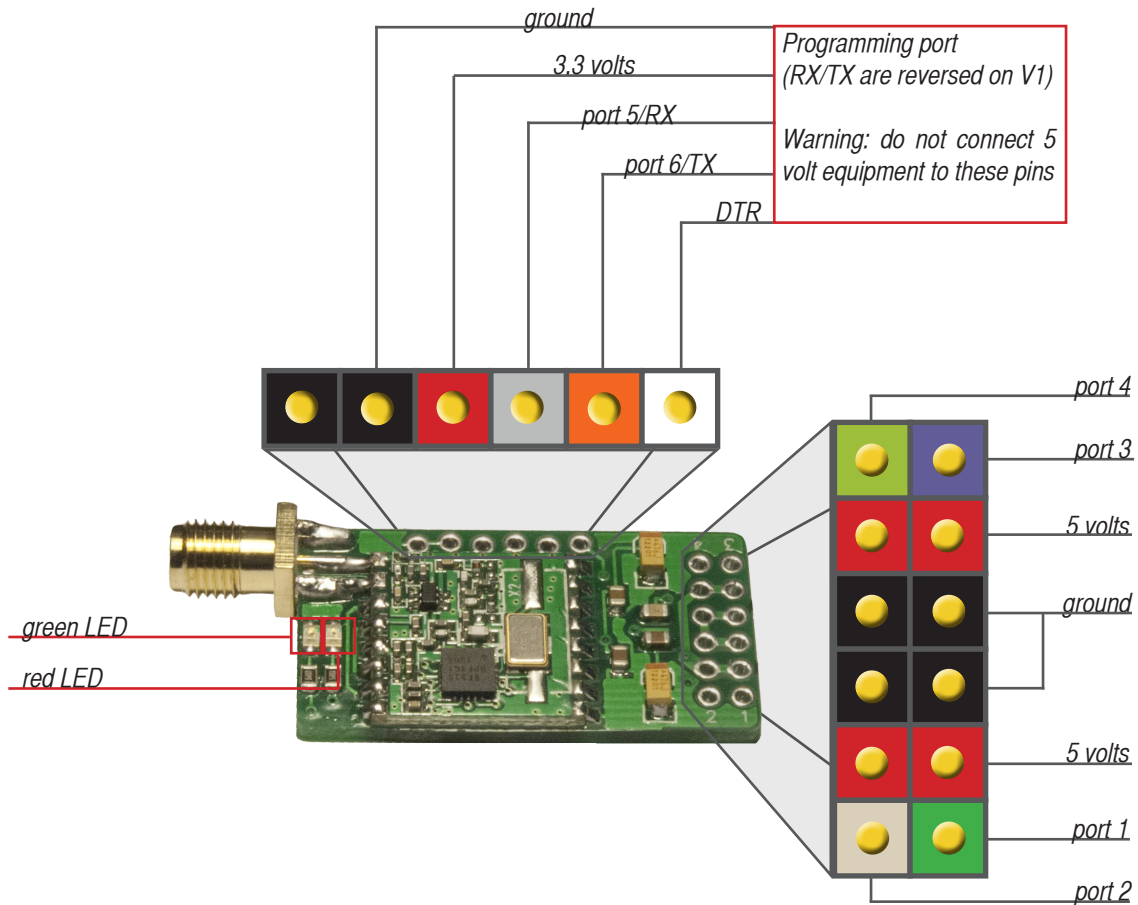
1. Hardware Overview

1.1 DTF UHF 4 Channel	3
1.2 HobbyKing RX	4

2. Instructions

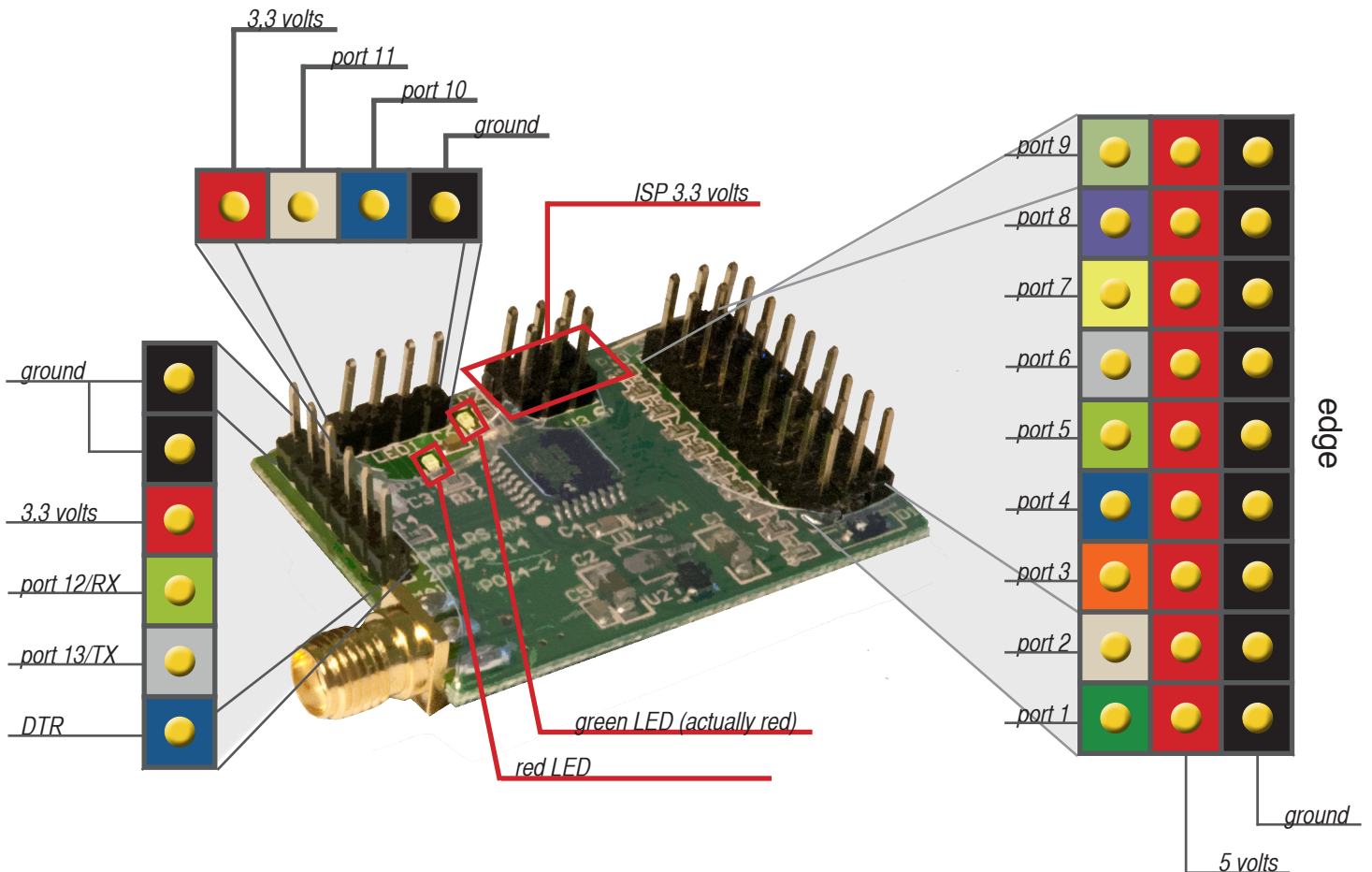
2.1 Basic functions	5
2.2 Flashing	6
2.3 Transmitter configuration	7
2.4 Receiver configuration	10

Hardware Overview : DTF UHF 4 Channel



port	default	alternate
1	channel 1	PPM
2	channel 2	SDA/analogue 0
3	channel 3	high-frequency RSSI/ analogue RSSI
4	channel 4	SCL/analogue 1
5	RX	
6	TX	

Hardware Overview : HobbyKing RX



port	default	alternate
1	high-frequency RSSI	
2	channel 1	
3	channel 2	
4	channel 3	
5	channel 4	
6	channel 5	PPM
7	channel 6	
8	channel 7	
9	channel 8	
10	analogue 0	SDA
11	analogue 1	SCL
12	RX	
13	TX	

Instructions : Basic functions

Binding

Hold down the bind button while connecting power to the transmitter. Once the transmitter beeps once, release the bind button. The transmitter will begin to beep 5 times per second and the red LED will flash. The transmitter is now in bind mode, using the stored bind information.

Connect your receiver to power. After a moment, both the red and green LEDs should stay lit constantly and the transmitter will stop beeping. The receiver is now bound and all binding and transmitter information has been sent to the receiver. To bind additional receivers without restarting the transmitter, press the bind button momentarily and the transmitter will begin to beep again.

Randomizing

Hold down the bind button while connecting power to the transmitter. Continue holding down the bind button for about 5 seconds until the transmitter begins to beep slowly, then release the bind button. The transmitter will begin to beep 5 times per second and the red LED will flash. The transmitter is now in bind mode, and has randomized the binding data, making your transmitter's ID unique. Bind your receivers as normal. All receivers previously bound with this transmitter will have to be re-bound.

Setting failsafe

Failsafe information is stored in the eeprom of each receiver. If failsafe information has not been set, the receiver's behaviour is to keep outputting the last information it receiver. To set failsafe controls to a specific position, turn on a bound transmitter and receiver pair, hold the controls in the failsafe position, and hold down the bind button until the transmitter beeps and the red LED flashes on both the receiver and transmitter. Failsafe information is now set. Always test failsafe operation BEFORE you need to rely on it.

LED information

Transmitter:

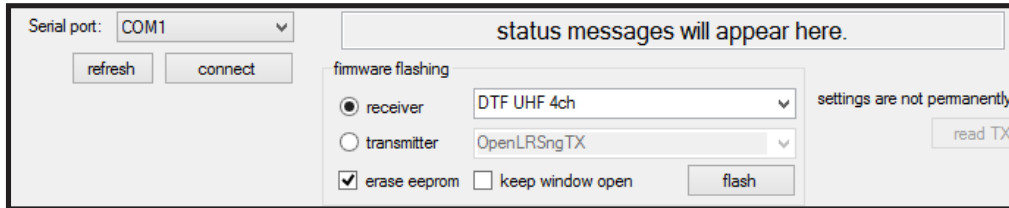
The green LED will flash constantly under normal operation. The red LED will illuminate to indicate a loss of signal from the controller, a lost packet from the receiver (if telemetry is enabled), a problem with the radio, or when failsafe information is set.

Receiver:

The green LED will flash constantly under normal operation. The red LED will illuminate to indicate a loss of signal from the transmitter, a problem with the radio, or when failsafe information is set.

Instructions : Flashing

Flashing: Flytron TX&RX / HobbykingTX&RX / OpenLRSngTX / DTF UHF 4ch RX



Connect your USB-Serial adapter to the computer and ensure the drivers have installed. Driver installation is outside the scope of this manual. Find the COM-port associated with the USB-serial adapter.

Connect the USB-serial adapter to the device being flashed. Ensure you do not connect 5 volt equipment to a 3.3 volt device. Ensure a suitable antenna is attached, even when connecting a receiver. The pins you will need to connect are: GND, TX, RX and DTR. Connecting 3.3v is optional: you may also power the device being flashed through the battery it connected to normally - your controller's battery in the case of a transmitter, or the airplane/helicopter's battery in the case of a receiver.

Open DTF UHF Companion and select the COM-port from the Serial Port menu. If you plugged in your USB-serial adapter after starting DTF UHF Companion, click refresh to update the list of detected COM-ports. Don't click on Connect.

Select whether you are flashing a Receiver or Transmitter. Note that some receivers can also be flashed with transmitter firmware, allowing them to be used as transmitters with some additional components.

Select whether or not to erase eeprom. It is always recommended to leave this enabled unless you know what you're doing.

Select whether or not to keep the flashing window open. It will close immediately upon completion if this option is unchecked and only display the result in the text box. Check this box if you want to see what's going on during flashing.

Click the flash button. If the flashing was unsuccessful, check to make sure the correct COM-port is selected, the pins have been connected properly (you may have to swap TX and RX, depending on your USB-serial adapter), the LEDs on the receiver are off for the duration of the flashing (indicating that the device is indeed being flashed), and that the device being flashed is being powered properly. Some 1-watt transmitters draw more power than a USB port can give; in this case the transmitter must be powered by a battery while flashing.

Instructions: Transmitter configuration

Configuring: Flytron TX / Hobbyking TX / OpenLRsngTX

Connect the transmitter, USB-serial adapter, and power connection as before. The DTR pin is optional for configuration. Click on Connect. Now, put the transmitter in bind mode by holding down the bind button as power is connected. This can be done by holding down the button as you connect the USB-serial adapter with power, or by holding down the button and switching on your controller if you have disconnected the power from the USB-serial adapter. Once the transmitter is in bind mode, click “read TX settings” to connect to the transmitter and stop the beeping.

The screenshot shows a software interface for configuring a transmitter. At the top, it displays 'Serial port: COM18' with 'refresh' and 'disconnect' buttons. A status bar indicates 'read successful'. On the right, there are buttons for 'save and exit bind mode', 'read TX settings', and 'write TX settings', with a note: 'settings are not permanently saved until you click this button ~~~'. The 'firmware flashing' section has radio buttons for 'receiver' (selected) and 'transmitter', dropdown menus for 'DTF UHF 4ch' and 'OpenLRsngTX', and checkboxes for 'erase eeprom' (checked) and 'keep window open'. A 'flash' button is also present. The 'TX settings' section includes 'RF power' (set to 7, with a note '7=highest, 0=lowest'), a 'telemetry' checkbox, a 'bind code (hex)' field with '7850662F', and 'data rate' options (4800, 9600, 19200, with 19200 selected). It also has fields for 'base frequency (Hz)' (435000000), 'channel spacing (x10kHz)' (10), '# of hop channels (max 24)' (6), and 'channel numbers (0-255)' (37,3,27,29,40,12,0,0,0,0,0,0). A 'channel frequencies' box lists frequencies for Hop channels 0 through 5. On the right, there are 'restore defaults' and 'randomize and write' buttons. The 'RC channel configuration' section at the bottom has radio buttons for '4 channels + 4 switches', '8 channels' (selected), '8 channels + 4 switches', '12 channels', '12 channels + 4 switches', and '16 channels', with a note '<- less data, higher refresh rate' and 'more data, slower refresh rate ->'. It also shows 'calculated refresh rate (Hz)' (71Hz) and 'calculated packet interval (µs)' (14000ms).

RF Power

The output power setting of the transmitter.

Telemetry

Enable the telemetry link from the receiver. The transmitter will beep if the receiver experiences packet loss. Other features are available such as FrSky telemetry emulation and serial bridge.

Bind code

The randomly-generated ID of your transmitter. If this reads DEADFEED, you need to randomize the information on your transmitter. Valid characters are hexadecimal (0-9, A-F)

Instructions: Transmitter configuration

Data rate

The rate that data is sent to the receiver. Lower numbers mean slightly improved range at the cost of servo refresh rate.

Base frequency

The frequency that hop channels are referenced to.

Channel spacing

The amount of frequency between each channel.

of hop channels

This will display the current number of hopping channels you have configured.

Channel numbers

The channels that the radio will use to hop, and the order in which they are hopped. The first channel numbered 0 indicates the end of the hopping sequence.

Channel frequencies

The actual frequency of all the hopping channels configured. Frequencies are calculated using this formula:

$$\text{Transmission frequency} = \text{base frequency} + (\text{hop channel} * \text{channel spacing} * 10\text{kHz})$$

As channel numbers can vary from 1 to 255, this gives a maximum bandwidth of 25MHz. Always check your local laws and be sure you are able to legally transmit the frequencies you have selected at the power you have selected.

RC channel configuration

Select the number of channels that will be sent to the receiver. This is also the number of channels that will appear on the receiver's PPM output. Additional channels sent to the transmitter will be ignored. Example: if the transmitter is set to 8 channels, and you controller is set to 12 channels, only the first 8 channels will be sent to the receiver. The "Switch" channels are channels with very low resolution - only 4 positions; however they take 1/5th of the time to transmit, increasing the number of useful channels for a certain refresh rate.

Instructions: Transmitter configuration

Restore defaults

This will load the default settings into the transmitter. It's a good idea to also randomize values after you do this.

Randomize and write

This will randomize the bind code and hop channels, without changing any other settings or the total number of hop channels. This performs the same function as randomizing while binding (the 2nd bind mode).

Save and exit bind mode

No settings are permanently saved until you click this button. Once you do, the transmitter will exit to bind mode so you can bind your receivers.

Instructions: Receiver configuration

Configuring: Flytron RX / Hobbyking RX / DTF UHF 4ch RX

First, enter the transmitter configuration menu as shown above. Click the Connect to RX button, then connect the receiver to power. Configuration is done wirelessly. You can just plug in your airplane or helicopter's battery as normal. There is a 10-second window to power up the receiver.

The screenshot shows the 'RX settings' menu. At the top, there is a 'Connect to RX' button and a 'save and return to Tx menu' button. Below these are 'save settings' and 'restore defaults' buttons. A status bar indicates 'Connected: DTF UHF 4ch'. The main settings area includes: 'failsafe delay' set to 10 (x 0.1s) with checkboxes for 'stop pwm on failsafe' and 'stop ppm on failsafe'; 'minimum PPM sync time' set to 3000 µs with a 'limit PPM out to 8 channels' checkbox; 'inject RSSI on servo channel' set to 'Disable'; and a 'beacon' section with 'frequency' set to 0, 'interval (s)' set to 10, and 'deadtime (s)' set to 30. On the right, the 'Channel Output' section lists ports 1 through 13, with Port 5 set to RXD and Port 6 set to TXD.

failsafe delay

The amount of time after the last packet is received before the receiver will load failsafe values. This can be used to “fly through failsafes” and can be adjusted to your liking. This value is in 1/10ths of a second.

Stop PWM on failsafe

Completely stop PWM outputs on failsafe.

Stop PPM on failsafe

Completely stop PPM outputs on failsafe.

minimum PPM sync time

The minimum time between PPM frames. Some devices that accept PPM are picky about this.

limit PPM out to 8 channels

Some devices that accept PPM are also picky about the number of PPM channels that are in a PPM frame. This is used to only output the first 8 channels in the PPM stream regardless of the number of channels sent to the receiver.

Instructions: Receiver configuration

inject RSSI on servo channel

RSSI information can be indicated using a servo in front of a camera, and some OSDs take RSSI information in the form of a servo pulse. Choose a channel here and the RSSI information will override that channel in the PPM stream and on that channel's output pin.

Channel Output

Select the output for each port in this menu.

Beacon

If this option is enabled a tone is transmitted on the selected frequency that can be picked up using a common FRS, PMR or amateur radio walkie-talkie to aid finding a lost airplane or helicopter. Three tones are sent of descending transmit power and tone to help you zero in on its location. The beacon is sent after failsafe has been activated.

Save settings

Immediately sends information to the RX and writes the information in eeprom.

Restore defaults

Restores the default settings and writes them to eeprom.

Save and return to TX menu

Saves the RX settings to eeprom and returns to the TX menu. You may now disconnect the RX from power.