# DragonLink MicroRx

## A quick introduction
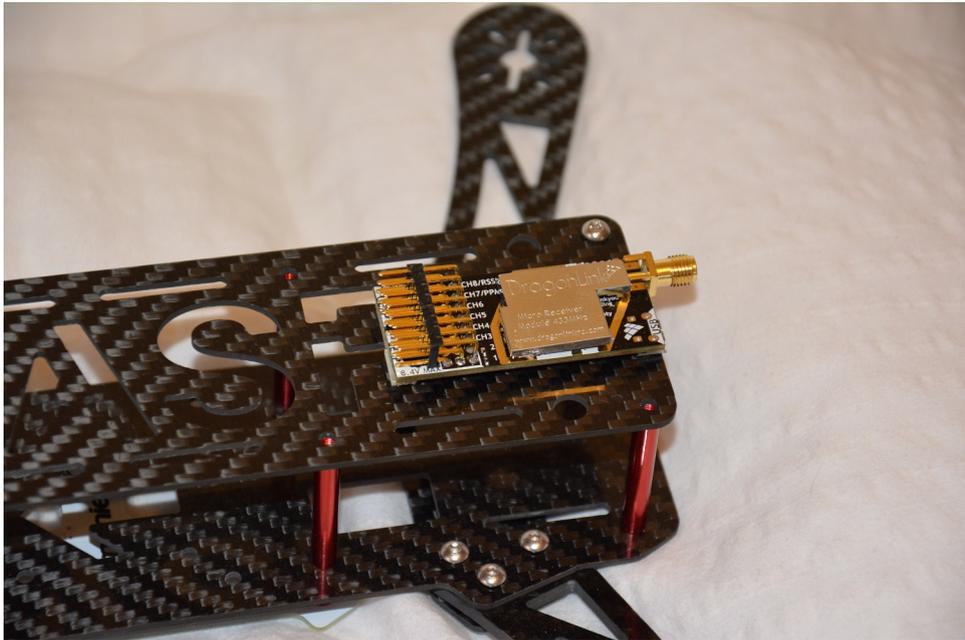


**- to a new a world of possibilities**

October 5, 2014
Written by Dennis Frie

# Contents

# Chapter 1

# Disclaimer

This documentation was written for early beta-testers. We have been working hard to get everything ready for release and things are changing quickly - so don't be surprised, if you see minor differences in the documentation here and the GUI you are using.

# Chapter 2

# Introduction

The DragonLink MicroRx is a full range receiver, meant to be a light yet powerful alternative to the bigger 12-channel receiver

It offers full channel configuration, buffered analog RSSI output, digital RSSI, PWM-output, PPM output, S-bus output and supports a lot of possibilities for later firmware upgrades and hardware expansions using UART (for GPS) and CAN (for future DragonLink products and expansions) connection.

The general specifications can be seen in table 2.1.

<div align="center">

## Specifications

| | |
|---|---|
| Input voltage | 5-8.4 V |
| PWM pins | 8 |
| PPM channels | Max 12 |
| Output power | +15 dBm |
| Log length | TBD |
| Interface | USB, UART & CAN |
| weight | 10 gram |
| Current normal | 80 mA |
| Current max (beacon) | 110 mA |

</div>

Table 2.1: Quick summary of receiver specifications

The supported beacon is currently meant as a test-feature, but should be a free feature available to help finding a lost plane. While the output-power of the MicroRx doesn't match the range of the DragonLink TX, we are sure it will prove interesting for future features.

When the beacon is enabled on the MicroRx, it will no longer be a passive receiver. The output-power is quite small and we have been testing extensively without antenna, but as a rule of thumb, the antenna should be mounted when beacon is enabled.

# Chapter 3

# The hardware

## 3.1  Powering the MicroRx

The MicroRx have all ground-pins and supply-pins connected on the board. Powering of the MicroRx can hence be done at any channel. The recommended input-voltage is 5-8.4 volts. If the receiver is supplied with 10 volts or more, the receiver will continuously flash 5 times, to indicate a too high supply voltage.

It's designed to handle an accidental 3S li-po connected directly to the supply pins, but higher voltage will cause permanent damage.
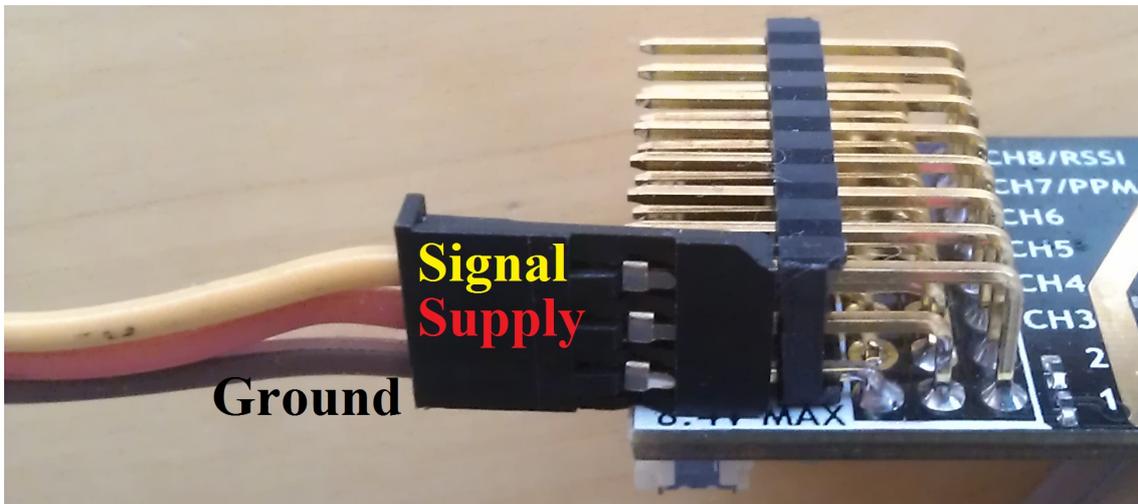


## 3.2  DragonLink TX/firmware compatibility

The MicroRx is only compatible with DragonLink V2 transmitters using the NextGen firmware. Due to the superior overall performance with the NextGen firmware, old firmware versions will not be supported.

# Chapter 4

# The software

## 4.1   Installing the driver

On the DragonLink MicroRx a normal USB Micro B connector can be found next to the SMA connector. The connector is the same, that's used on most mobile-phones and a bunch of other USB devices. On figure 4.1 the MicroRx connected can be seen.
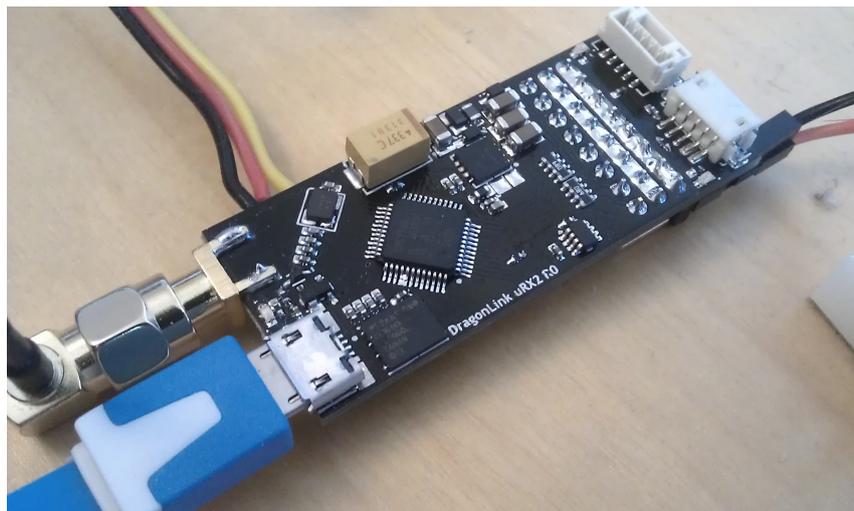


Figure 4.1: USB cable connected to DragonLink MicroRx (note, prototype shown)

The USB port will automatic power the MicroRx and no external power is needed.

First time the MicroRx is connected, windows will search for drivers, but not be able to find a matching driver. In windows, right click on my computer, select properties, and go to Device manager.

In picture 4.2 the DragonLink MicroRx can be seen in the device manager, with no driver installed. Right click on the device, select "update driver software". Select "browse my computer for driver software" and select the driver folder included in the DragonLink download for the MicroRx.

When installing the driver, windows will show a warning, indicating that the driver
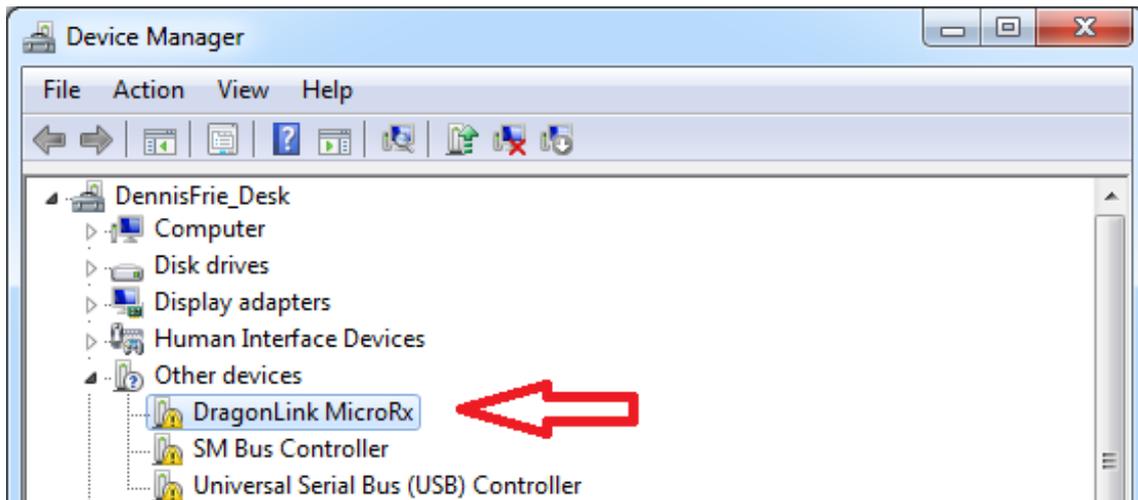
Figure 4.2: DragonLink MicroRx in device manager without driver installed

is not signed. Select "install this driver software anyway", as shown in figure 4.3. If the not signed driver is giving problems, we have an alternative signed driver that can be used.
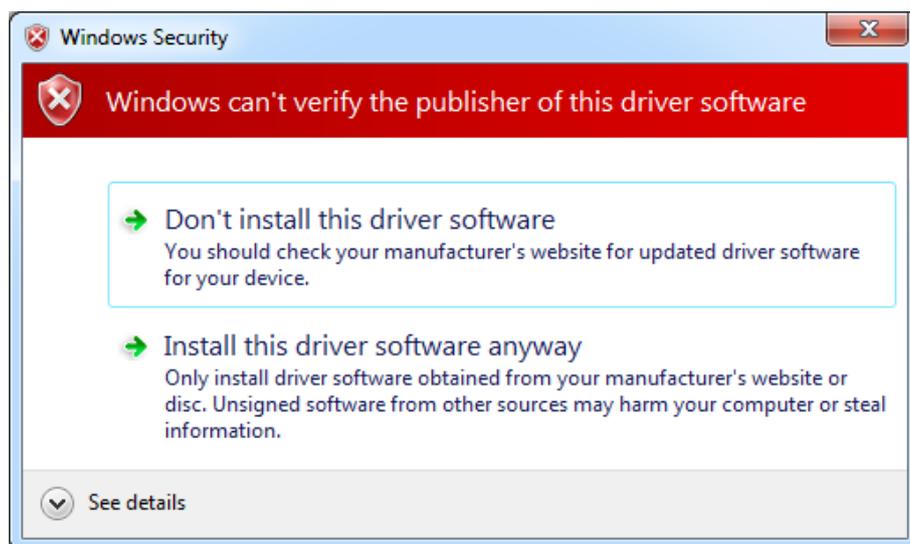


Figure 4.3: Windows message about driver not being signed

The driver should now be successfully installed, and you should get the message as shown in picture 4.4
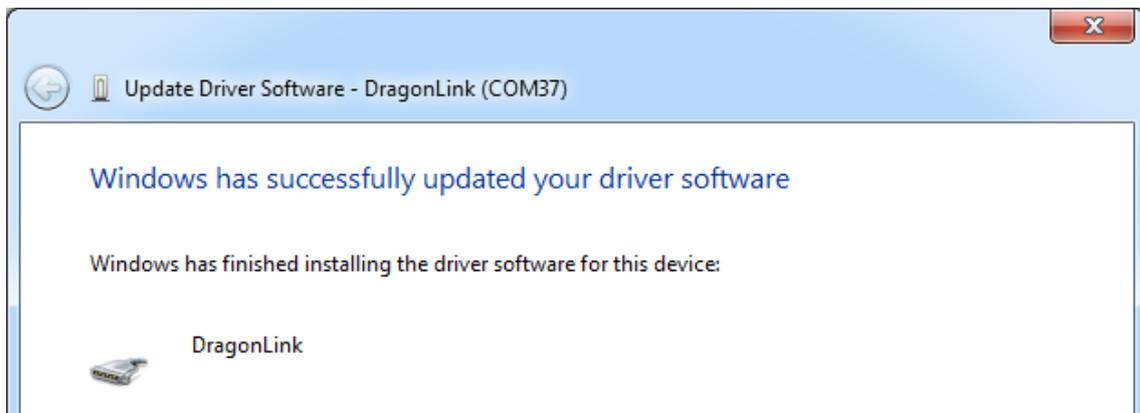
Figure 4.4: Driver successfully installed

## 4.2 Using the GUI

The GUI is a standalone exe-file and will be included in the MicroRx software package. You might have to install Microsoft framework, but most computers will already have this installed.

The GUI can be seen in figure 4.5. The MicroRx should automatic be detected as soon as the hardware is connected. If the receiver is not detected, please try to disconnect and connect the MicroRx.
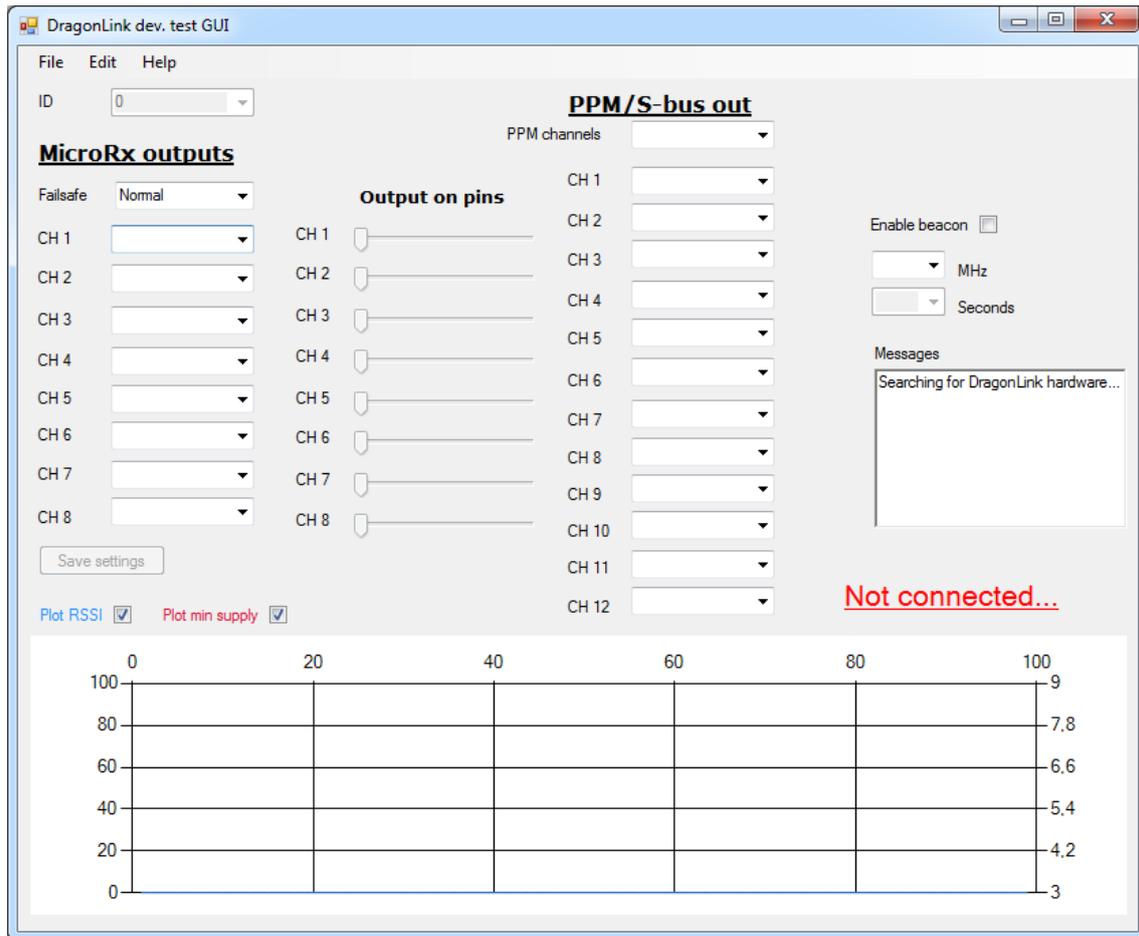


Figure 4.5: GUI for DragonLink MicroRx

When the MicroRx is found, the software will automatic connect and get all settings stored on the MicroRx. The graph will show RSSI and the minimum supply voltage. It will look as seen in figure 4.6, with no TX on.

### 4.2.1 Understanding the channel mix

## 4.3 Updating firmware

In the initial release, firmware updating is done using the separate program called DragonLinkFirmwareUpdate.exe. Connect the MicroRx via USB and launch the program (the
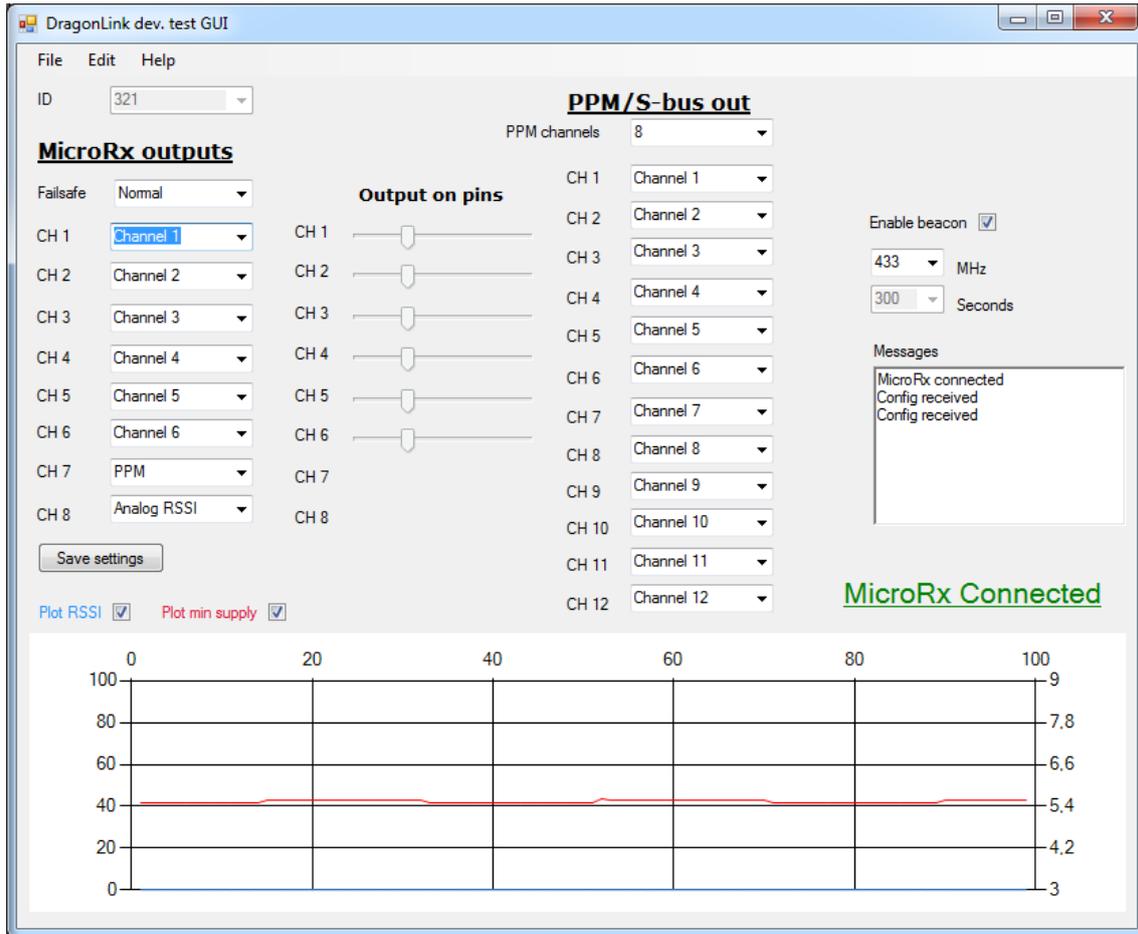
Figure 4.6: GUI connected

order doesn't matter). An early version of the tool can be seen in figure 4.7

When the program have re-booted the receiver, the blue and green LEDs will flash rapidly, to indicate the mode. Press "select firmware" and find the latest firmware-file. For convenience, the file-extension of the firmware-files are called .MicroRx.

With a firmware-file selected, simply press upload and wait for the firmware to be transferred and unpacked.

It's strongly recommended not to interrupt the firmware-update. If the update is interrupted or fails, it's important to re-do the firmware update. In rare cases an interrupted firmware update can result in a bricked receiver. See next section for emergency firmware update.

## 4.4 Emergency firmware update

If the receiver can't enter the firmware-update mode for any reason (can happen if the firmware update is interrupted), there's a backup solution. Disconnect everything hooked
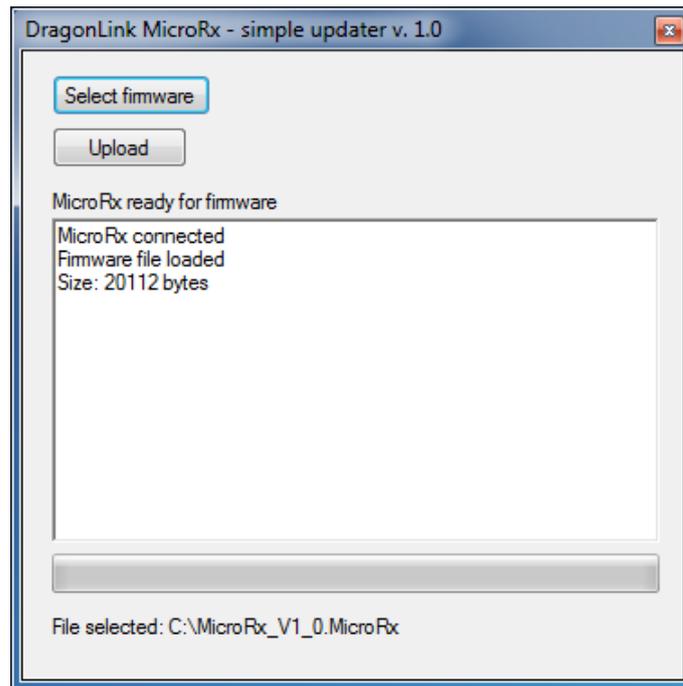
Figure 4.7: GUI for firmware update
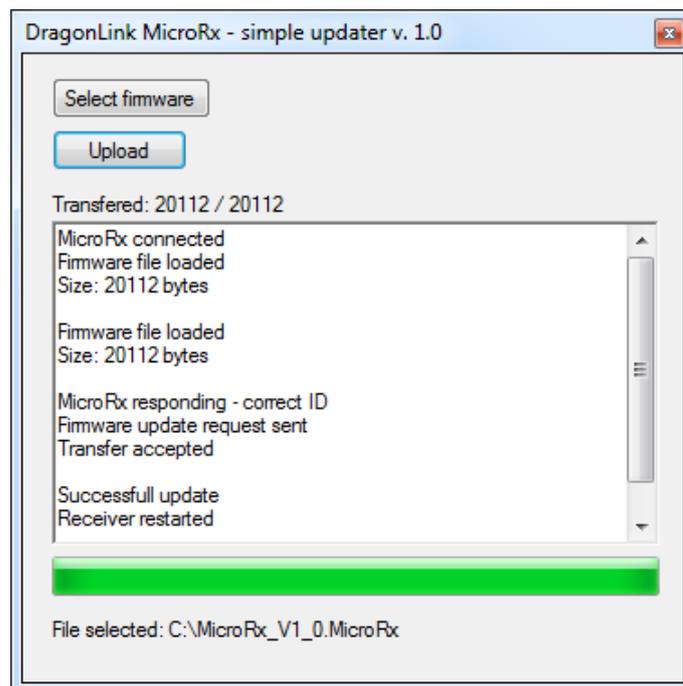


Figure 4.8: Successfull firmware update

up to the servo-pins. Using, preferably a jumper, short the RSSI pin with the supply pin and insert the USB connector. The blue and green led should new start to flash rapidly, indicating that the receiver is ready to receive firmware.

Failing to disconnect servos and BEC can cause permanent damage while having the pins shorted. Please make sure there's nothing connected at all.

With the receiver connected with USB and the LED's flashing, run the updater tool as usually.

## 4.5 Using the spectrum analyzer

Still under development

# Chapter 5

# Beacon functionality

The beacon function is meant to be a backup-solution in case of a downed plane. When the beacon functionality is enabled in the GUI, the timeout will determine the amount of time from failsafe (lost signal) to enabling of the beacon. The default setting is 300 seconds (5 minutes) which should be fine for most users.

Currently the beacon is an unmodulated carrier signal that will be on and off for approx 2 seconds. Using a Spectrum analyzer (or perhaps a second MicroRx connected via USB in the future) the signal can be found and used for locating the downed plane.

With the beacon active, the MicroRx will continuously change between transmitter (beacon) and receiver searching for a valid TX signal. If a valid signal is found, it will disable the beacon and act as a normal receiver again.

If an autopilot is used and the transmitter is on purpose turned off for longer periods, it's recommended to disable the beacon functionality or increase the timeout.



Figure 5.1: Beacon signal seen on a Spectrum analyzer with waterfall

# Chapter 6

# Error codes

At start-up, the receiver will run a series of self-tests, to ensure that everything is working as expected. While the errors should never show up under normal use, they are implemented to ensure reliability and give a warning in case of any detected problems.

The green status LED and blue link LED are both used to flash a number of times, equal to the error code. After the flashes, there will be a very short break and it will continue to flash.

1. Not used, to avoid confusion.

2. Problem validating saved settings. Default settings loaded and saved. Power-cycle the receiver and bind again. Settings from GUI will also be reset. This is normal to see after a firmware update.

3. Problem initialising memory for data logger

4. Problem with the RF hardware

5. Overvoltage detected (typically around 10 volt limit). Power-cycle needed to exit this protection mode.