FrSky FPORT Protocol

Motivation

FPort is a new RC protocol that was developed by FrSky in collaboration with Betaflight. It has a number of improvements over existing protocols used by FrSky hardware:

- only one serial connection is required, RC control information, telemetry (including MSP tunneling), and RSSI are all sent over this connection;
- the serial connection uses 115200, N81, making it easier to implement on hardware that has limited support for 'exotic' modes;
- it is inverted (not possible with the test firmware for existing RX).

A driver for FPort has been added to Betaflight. It is available since Betaflight 3.3.

The detailed specification for FPort is available here:
F.Port.protocol.betaFlight.V2.1.2017.11.21.pdf

FrSky announcement: here

Compatibility

Receiver	Compatible ?	Firmware download page
FrSky R-XSR	Yes	here
FrSky X4R	Yes	here
FrSky X4R-SB	Yes	here
FrSky XSR	Yes	here
FrSky XSR-M	Yes	here

Receiver	Compatible ?	Firmware download page
FrSky R9M Slim	Yes	here
FrSky R9M Slim+	Yes	here

Using FPort

Requirements:

- a FrSky XSR or X4R(SB) or XSR-m or r-XSR receiver (see the list above);
- a free hardware port on the flight controller (F3 or better) that is capable of running SmartPort with your receiver (i.e. must be able to run inverted bidirectional, or your receiver needs to have the 'uninverted SmartPort' hack applied).

Installation

1. Download and install the receiver firmware (see the list above); Instructions for the firmware installation can be found here and here.
2. Install latest Betaflight version onto your flight controller.
3. Connect the SmartPort port on your receiver to the inverted bidirectional port on your flight controller. On F3 / F4 with a 'uninverted SmartPort' hacked receiver / F7, the receiver is connected to the TX pin of the serial port, on F4 with a non-hacked receiver the connection will be dependent on how the bidirectional inverter is designed - consult your flight controller manual; (Effectively, this connection uses the same pins on both sides that would be used to connect SmartPort if a non-FPort firmware was used.)
4. Configure your flight controller. Enable 'serial RX' for the port the receiver is connected to, choose 'Serial Rx' as receiver type, and 'FPort' as protocol. For F3 / F4 with a 'uninverted SmartPort' hacked receiver / F7, set `serialrx_halfduplex = on` in CLI. If **not** using a receiver with 'uninverted SmartPort' hack, set `serialrx_inverted = on`. After all is done, the relevant bits of a `dump` should look like this (assuming we're using UART3):

F3 / F7:

```
serial 2 64 115200 57600 0 115200
set serialrx_provider = FPORT
set serialrx_halfduplex = ON
set serialrx_inverted = ON
```

F4 with non-hacked receiver (needs bi-directional inverter on the flight controller):

```
serial 2 64 115200 57600 0 115200
set serialrx_provider = FPORT
set serialrx_halfduplex = OFF
set serialrx_inverted = ON
```

F4 with 'uninverted SmartPort' hacked receiver:

```
serial 2 64 115200 57600 0 115200
set serialrx_provider = FPORT
set serialrx_halfduplex = ON
set serialrx_inverted = OFF
```

5. Bind your receiver to your transmitter;
6. Test RC control: With the transmitter on and the flight controller connected to the configurator, make sure the bars in the 'Receiver' tab move when you move the sticks on the transmitter;
7. Test telemetry: (In OpenTx, a rescan of the sensors is required, since the sensor ids are different between SmartPort and FPort.) Check that the telemetry screen shows the values from your flight controller. (caveat: With FPort it is possible that RC commands work, but telemetry doesn't. If this happens, it means that the serial connection that you are using is not bidirectional, and the receiver => flight controller data flow works, but flight controller => receiver doesn't. Id this happens, check your port settings, and (for F4) make sure that the port you are using can support inverted bidirectional.)
8. If you want to use the Betaflight lua telemetry scripts on Taranis / Horus, download and install the latest release (1.0 or newer) from here.
9. Happy flying. ;-)

(As always, any sort of feedback and bug reports are appreciated, please drop them here.)

Built with Docusaurus

made with ❤️ by **VitroidFPV** and **un!t**