

Sparrow

Onboard air-data measuring system for R/C aircraft with telemetry option.



Manual version: 1.2

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Introduction

The “Sparrow” is one component of RC Electronics model aircraft telemetry system. The Sparrow is the “on-board” unit intended to be used with the “Snipe / Finch” “Ground station” or with Jeti back-channel link. The Sparrow is designed to measure many parameters of an R/C model aircraft and transmit them to the ground via the telemetry channel working on 433 MHz frequency (Sparrow RF module needed) or Jeti ExBus. The unit is capable of measuring sink/climb rate (Vario), altitude, noise level, servo pulse on servo inputs, GPS data with 5Hz refresh rate and supply voltage. For storage it has external 8Gb SD card.

Key features of the Sparrow

- Various sensors all in one box
- Build in GPS antenna
- 8 GB SD card for virtual unlimited space for logging
- Latest MEAS technology sensors with high resolution and high sample rates.
- **EnI** - Environment noise level detection to detect working electric, impeller or jet motor.
- **FHSS** - Frequency Hopping Spread System on 433MHz telemetry channel to eliminate frequency conflicts – requires Sparrow RF module.
- TEK vario is possible when TEK sensor is connected to the module
- 5 Hz GPS working with GNSS and Glonass global positioning satellites.
- Various telemetry protocol supported over one of servo input (JetiEx, ...)

Specifications

Unit Dimensions	38 mm x 23 mm x 13 mm
Weight	15 grams (without RF module and TEK sensor)
Temperature Range ¹	-10°C ~ +60°C
Input Voltage Range	4.0 – 6.0 volts DC (up to serial nr: 180050) later ones 4.0 – 10.0 volts DC
Input Current	90 milliamps
Measured Voltage	4.0 – 10.0 volts DC
Memory capacity	8 Gigabyte

¹ Specifications are taken from component ratings and system limits and may not have been tested to the full extent of the specified ranges.

Physical overview

Figure 1 is showing the Sparrow module. It has two connectors (one for RF module and one for TEK sensor), SD card slot and a multi-color LED to show the status of the unit.

The two 3-pin servo inputs are used to connect to selected channels on the model aircraft radio receiver for different logging and control options. Top servo input has additional option to serve as external telemetry channel, where 3rd party telemetry can be connected. Currently JetiEx protocol is supported so Jeti users can see all measured data also on their TX system

The Sparrow is powered in flight by either one of the two servo inputs. Do not use more than 6V on power supply lines!

Important: Be careful on polarity when connecting power to the unit. Improper connection can damage unit!

Looking from front: left pin on servo connector is signal, middle is power and right is ground

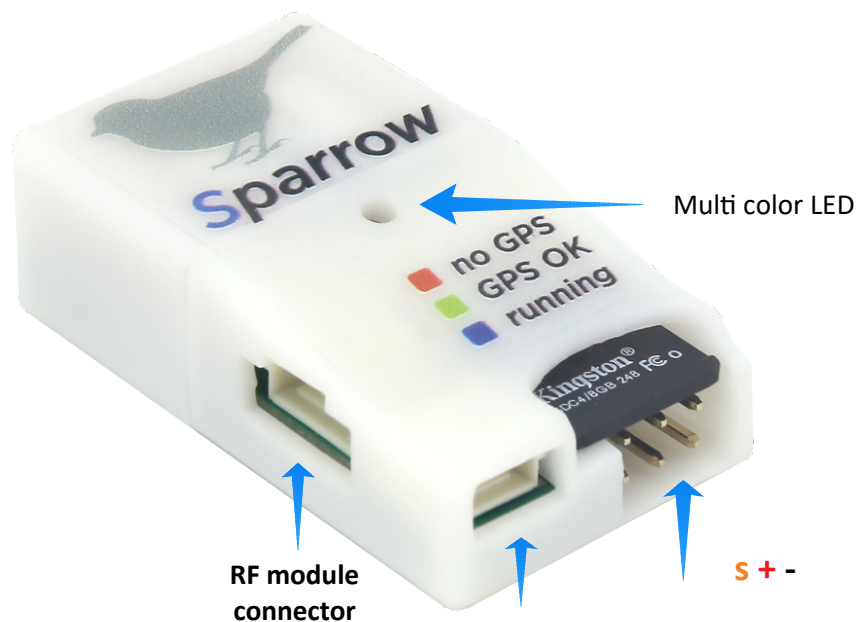


Figure 1: The Sparrow module.

TEK sensor
connector

3rd party telemetry (upper servo connector)

Lower servo connector is used for
controlling application data via servo
channel

Using the Sparrow module

Powering the module

To power the Sparrow module plug the 3 pin female connector cable into one of servo channel inputs and the other end to the R/C aircraft receiver. **Be sure to observe proper polarity when plugging the connector into the module and receiver.** You can also power it directly from a battery. Please respect max voltage input of 6V and correct polarity.

When power on the LEDs will flash red, green, blue and white to confirm its operation. During operation LED status is:

red – module is waiting for GPS signal

green – module is ready for flight

blue – onboard logger is running

white – not yet implemented.

Mounting the module

The Sparrow module can be mounted using double-sided tape, cable ties or Velcro. Velcro is recommended, so that the module can be easily removed. Mount Sparrow under no carbon surface as it has build in GPS antenna. If there is any carbon or metal part above it, GPS reception will be compromised.

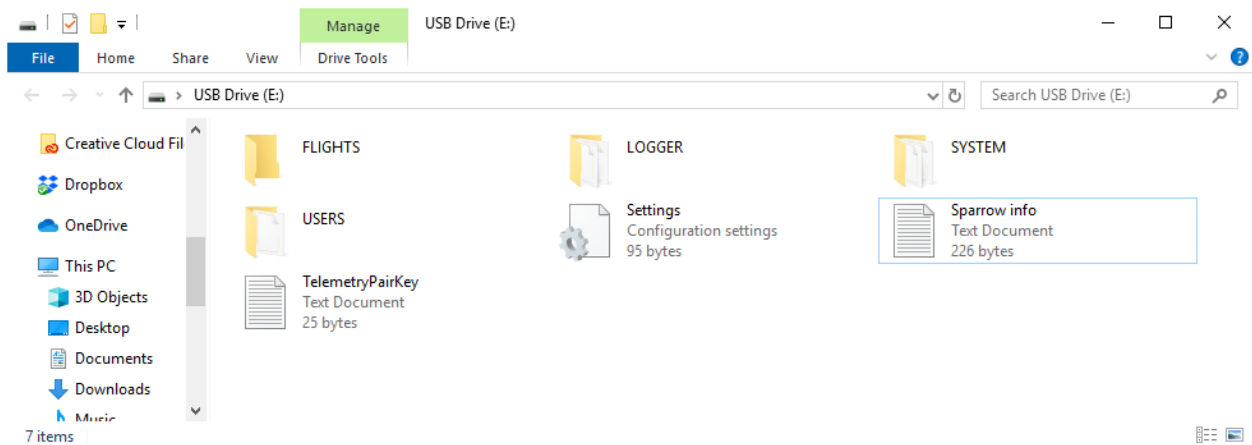
Be sure that the module is not touching any metal surfaces. Although unlikely, there is a possibility of shorting the metal contacts on the module, which could result in a radio system failure.

Do not mount the module on top of power batteries when using electric motors, because they get hot and this can affect the altitude readings by up to 30m.

Be sure to keep the module away from water, fuel and other liquids. Always range check and test the aircraft's radio systems before flying with the Sparrow module installed, to verify that all connections have been made correctly and there is no system interference.

Connecting SD card to PC

Connect the Sparrow SD card to a PC. On SD card there are system folders and files which can be checked for their contents. The “FLIGHTS” folder contains all flight data (IGC, DAT and POL files). The “Sparrow Info.txt” file is a file showing all the information about the module (Name, Serial Number- SN, HW version, Settings used, ...etc.). **Inside TelemetryPairKey.txt user must enter valid and correct serial nr of Snipe unit to pair 2 units together.**



Sparrow info.txt example:

Device: Sparrow - device name
Serial No: 180001 - device serial no.
IGC Sn: 001 - device unique IGC number (for future use)
HW: 1.0 - Hardware version of device
Produced: 27.5.2019 - date of production
FW v: r.0.9.B100 - Firmware version installed
Telemetry Pair key: 168015 - Telemetry pair key (Snipe serial nr)
3rd party telemetry protocol in use: JetiEx Compressed data - Telemetry protocol on 3rd party connector
TE Level: 0 % - electronic compensation level set
Filter: 1.5 s - Vario filter set
Servo trigger level: 30 % - Servo level to arm / restart a task on Albatross
Servo control input: Bottom connector - Can be bottom connector or channel from JetiEX data

TelemetryPairKey.txt example:

Snipe serial nr: 168015 - **Enter here yours Snipe serial nr to have a valid RF link**

Settings.ini example:

```
//0: 3rd party telemetry disabled  
//1: JetiEx  
//2: PowerSystem  
//3: JetiEx compressed data for GPS triangle racing  
3rd party telemetry in use: 3
```

Set a number which represents a system you are using for back channel telemetry. For Jeti we have 2 options. Compressed data is not presenting human readable data and is used for high rate data transfer needed for GPS triangle competitions. Normal JetiEx is sending human readable data which can be seen on transmitter

```
// Servo channle for servo control. If -1 is used then  
// lower servo input on device is used, else servo channel from  
// 3rd party telemetry data  
Servo channel: -1
```

If there is no psychical connector on JetiCB to be used as servo control to start/restart task and switch pages on Albatross application then servo channel from JetiEX data can be taken. On JetiEx bus there is 24 channels! For example Jeti ESC are also using this option to be controlled over JetiEX connector, not requiring extra servo channel for throttle.

Firmware update

1. Download latest firmware for Sparrow from our web site. Firmware should have name Sparrow.rcu
2. Copy Sparrow.rcu to SD card, insert SD card to Sparrow and make power reset.
3. Wait until LED flashes all colors
4. Check on SD in Sparrow info.txt file that new version is installed.

Revision history

06.01.2020	v1.2	- new pictures of Sparrow - corrected input voltage for newer devices (4-10V)
20.11.2019	v1.1	- Added Settings.ini file description - Description of latest Sparrow info.txt file
10.10.2019	v1.0	- initial version