Swift Onboard Air-data Measuring System for R/C Aircraft User Manual

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Introduction

The “Swift” is one component of RC Electronics model aircraft telemetry system. The Swift is the “onboard” unit intended to be used with the “Snipe / Finch” “Ground station” or with Jeti/Core/Graupner back-channel link. It 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 viar 3rd party telemetry bus (JetiEx, P2Bus, HoTT). The unit is capable of measuring sink/climb rate (Vario), altitude, noise level, servo pulse on servo inputs, GPS data with 18Hz refresh rate and supply voltage. For storage it has external 16Gb SD card.

Key features of the Sparrow

- Various sensors all in one box
- External high sensitive GPS antenna
- 16 GB SD card for virtual unlimited space for logging
- Latest MEAS technology sensors with high resolution and high sample rates.
- Enl – 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
- 18 Hz GPS working with GNSS and Glonass global positioning satellites.
- Various telemetry protocol supported over one of servo input (JetiEx, P2Bus, HoTT…)

Specifications

Unit Dimensions	45 mm x 22 mm x 11 mm
Weight	12 grams (without external GPS antenna, RF module and TEK sensor)
Temperature Range[1]	-10°C ~ +60°C
Input Voltage Range	4.0 – 10.0 volts DC
Input Current	90 milliamps
Measured Voltage	4.0 – 10.0 volts DC
Memory capacity	16 Gigabyte

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 Swift 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.

The Sparrow is powered in flight by either one of the two servo inputs. Do not use more than 10V 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

The Swift module

Using the Swift module

Powering the module

To power the Swift 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 10V 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 Swift module can be mounted using double-sided tape, cable ties or Velcro. Velcro is recommended, so that the module can be easily removed. Its external GPS antenna has to be mounted under no carbon surface. If there is any carbon or metal part above it, GPS reception will be compromised. GPS label on antenna must look towards the sky!

Be sure that the module is not touching any metal surfaces. Although unlikely, there is a possibility of shorting the

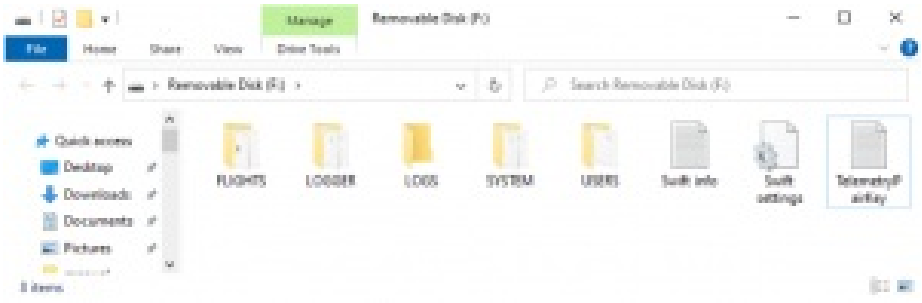
metal contacts on the module, which could result in a radio system failure.

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 Swift SD card to a PC. On SD card there are system folders and files which can checked for their contents. The "FLIGHTS" folder contains all flight data (IGC files). The "Swift 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 / Finch / T3000 unit to pair 2 units together.**



Swift info.txt example:

- **Device:** Swift – device name
- **Serial No:** 200001 – device serial no.
- **IGC Sn:** 001 – device unique IGC number (for future use)
- **HW:** 1.0 – Hardware version of device
- **Produced:** 15.4.2021 – date of production
- **FW v:** r.1.3.B0 – Firmware version installed
- **Telemetry Pair key:** 168015 – Telemetry pair key (Snipe serial nr)
- **3rd party telemetry protocol in use:** JetiEx – 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/P2Bus data.

TelemetryPairKey.txt example:
Snipe serial nr: 168015 – Enter here yours Snipe / Finch serial nr to have a valid RF link

Swift Settings.ini example:
//0: 3rd party telemetry disabled
//1: JetiEx
//2: PowerSystem
//3: JetiEx compressed data for GPS triangle racing
//4: Graupner HoTT
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 channel 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 Jeti / Power System P2Bus to be used as servo control to start/restart task and switch pages on Albatross application then servo channel from JetiEX/P2Bus data can be taken.

Firmware update

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

Revision history

16.04.2021	v1.0	– initial version

Documents / Resources

	Swift Onboard Air-data Measuring System for R/C Aircraft [pdf] User Manual Onboard Air-data Measuring System for R C Aircraft

References

- support@rc-electronics.org
- Home ~ RC Electronics