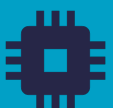




## Data sheet & User manual



## Introduction

The evaluation kit provides a quick introduction to the TT-SF1 module. It is a high quality 1090 MHz band receiver with an integrated ADS-B (Automatic Dependent Surveillance - Broadcast) decoder, conforming to MOPSS specified in TSO-C199. The TT-SF1 module contains also internal GNSS module (Ublox), to utilize concurrent reception of up to three GNSS systems (GPS / Galileo together with BeiDou or GLONASS). Other key feature is implemented FLARM (EU: 868 MHz, USA: 915 MHz) band receiver/transceiver, FLARM is the traffic awareness and collision avoidance technology for General Aviation, light aircraft, and UAVs.

EVAL-TT-SF1 with the dedicated software allows the user to discover the module properties within a short time, paving the way towards quick prototyping. The software allows simple configuration of the module and data visualization in various modes, from raw data, through tabular and 3D views.

**NOTE: The device to operate on FLARM frequency requires FLARM UAS license. The license can be obtained with the device from Aerobits upon purchase. FLARM library expire after year and must be updated with latest firmware.**

[Check all our evaluation kits here](#)

For more information please contact: [support@aerobits.pl](mailto:support@aerobits.pl).

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# 1 Technical parameters

General Technical Parameters				
Parameter	Min.	Typ.	Max.	Unit
Carrier frequency ADS-B	-	1090	-	MHz
RX sensitivity ADS-B	-	approx. -80	-	dBm
RX sensitivity GNSS	-	approx. -167	-	dBm
RX sensitivity FLARM	-	approx. -95	-	dBm
TX power FLARM	-	-	14	dBm
AERO (baud)	115200	921600	3000000	bps
Operation temperature	-30		+85	°C
Storage temperature	-5		+40	°C

Table 1: General technical parameters.

## 1.1 Hardware and layout

The EVAL TT-SF1 is designed around the OEM TT-SF1 module. It uses all I/Os, as well as custom I/Os (unused by the standard firmware). The top layer may be found in fig. 1.

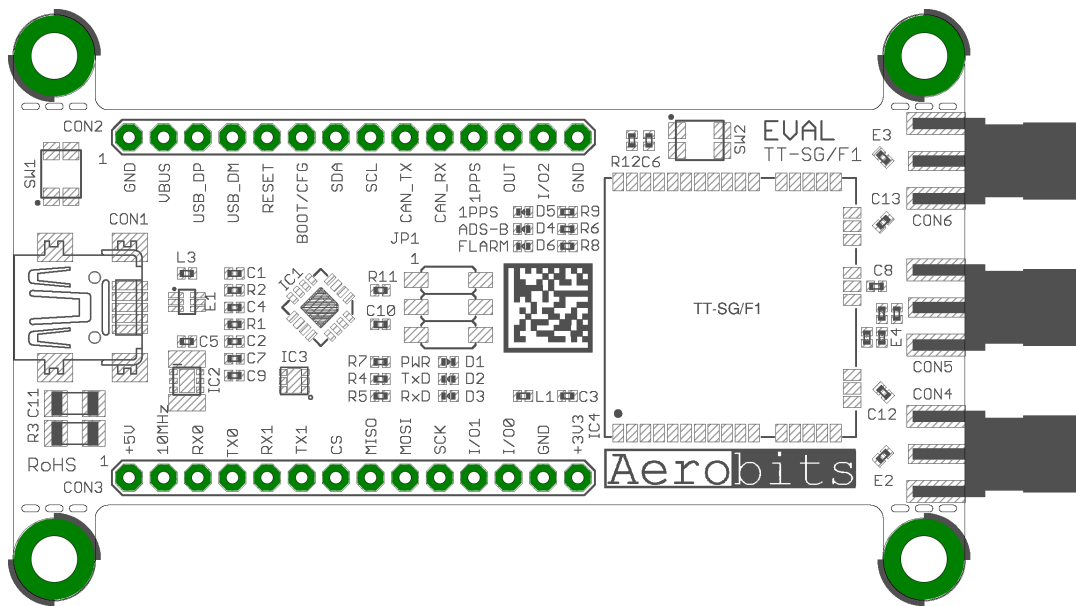


Figure 1: Top view of EVAL TT-SF1.

## 2 Electrical specification

### 2.1 Power supply

Parameter	Value
Power connector	Standard mini USB connector
Power consumption	260 mA
Power supply	3.3V 5V(RF) (recommend mini USB Supply)

Table 2: Power supply of EVAL TT-SF1

### 2.2 Most important components

RefNo	Description
CON1	Mini USB connector
CON2	Extensions connector I
CON3	Extensions connector II
CON4	FLARM RF Input
CON5	GNSS RF Input
CON6	ADS-B RF Input
JP1	Jumper group
SW1(C)	BOOT/CONFIG switch
SW2(R)	RESET switch
D1	POWER LED
D2	UART TX LED
D3	UART RX LED
D4	SYSTEM/ADS-B LED
D5	1PPS LED
D6	FLARM LED
IC4	OEM TT-SF1

Table 3: Most important components. See fig. 1

### 2.3 Connectors and jumpers


CON2	No.	Marking	Function
	1	GND	Ground
	2	VUSB	Power supply of USB
	3	USB_DP	USB: D+ line
	4	USB_DM	USB: D- line
	5	RESET	Reset signal
	6	BOOT/CFG	BOOT/CONFIG signal
	7	SDA	I2C: data line
	8	SCL	I2C: clock line
	9	CAN_TX	CAN: transmit line
	10	CAN_RX	CAN: receive line
	11	1PPS	GNSS: 1 pulse per second input (time reference)
	12	OUT	SYSTEM/ADS-B LED
	13	I/O2	FLARM LED
	14	GND	Ground

Table 4: Connector CON2 description.


CON3	No.	Marking	Function
	1	+5V	5V Power supply
	2	+10MHz	Reserved
	3	RX0	UART0 – Receive line
	4	TX0	UART0 – Transmit line
	5	RX1	UART1 – Receive line
	6	TX1	UART1 – Transmit line
	7	CS	SPI – Chip select
	8	MISO	SPI – MISO signal
	9	MOSI	SPI – MOSI signal
	10	SCK	SPI – Serial clock
	11	I/O0	Reserved
	12	I/O1	Reserved
	13	GND	Ground
	14	+3V3	3.3V Power supply

Table 5: Connector CON3 description.

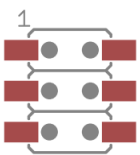
JP1	No.	State	Function
	1	Closed	3.3V power supply provided by on-board regulator (default)
		Open	3.3V power supply provided by CON3 (PIN14)
	2	Closed	UART TX via USB (default)
		Open	UART TX via CON3 (PIN4)
	3	Closed	UART RX via USB (default)
		Open	UART RX via CON3 (PIN3)

Table 6: Jumper group JP1 description.

## 2.4 LED indicators

LED	Color	Description
D1	Green	ON: Power supply
D2	Red	ON: OEM TT-SF1 transmitting data
D3	Yellow	ON: OEM TT-SF1 receiving data
D4	White	In BOOTLOADER state: continuous on In CONFIGURATION state: blinking at 5Hz In RUN state: 1 blink for every ADS-B frame received
D5	White	Blink when GNSS is fixed (1Hz)
D6	White	Blink every FLARM frame received

## 2.5 Layout

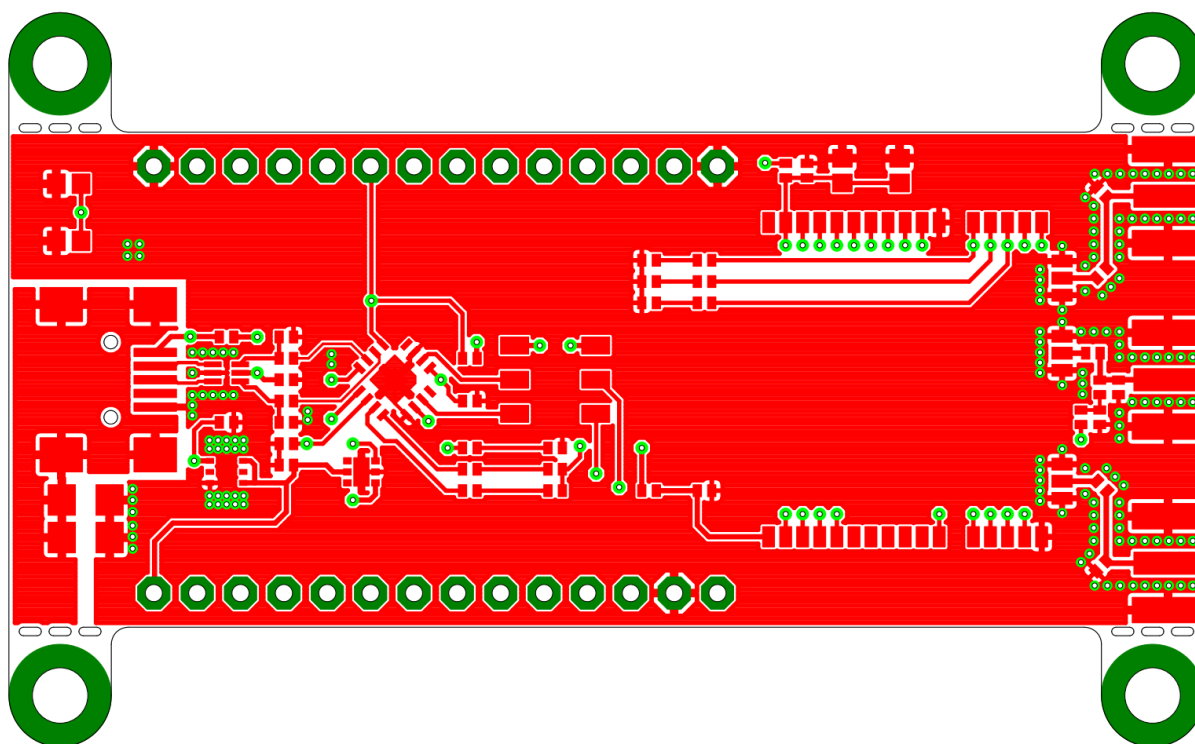


Figure 2: Top copper layer of EVAL TT-SF1

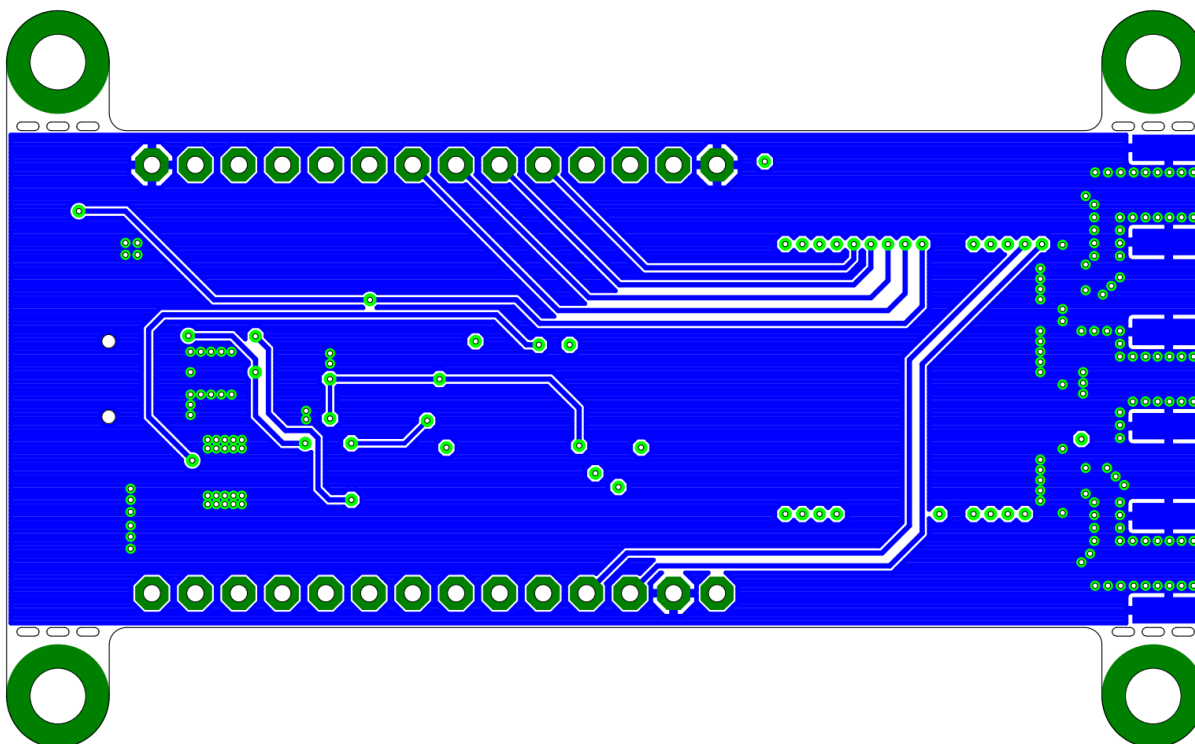


Figure 3: Bottom copper layer of EVAL TT-SF1

## 2.6 Electrical diagram

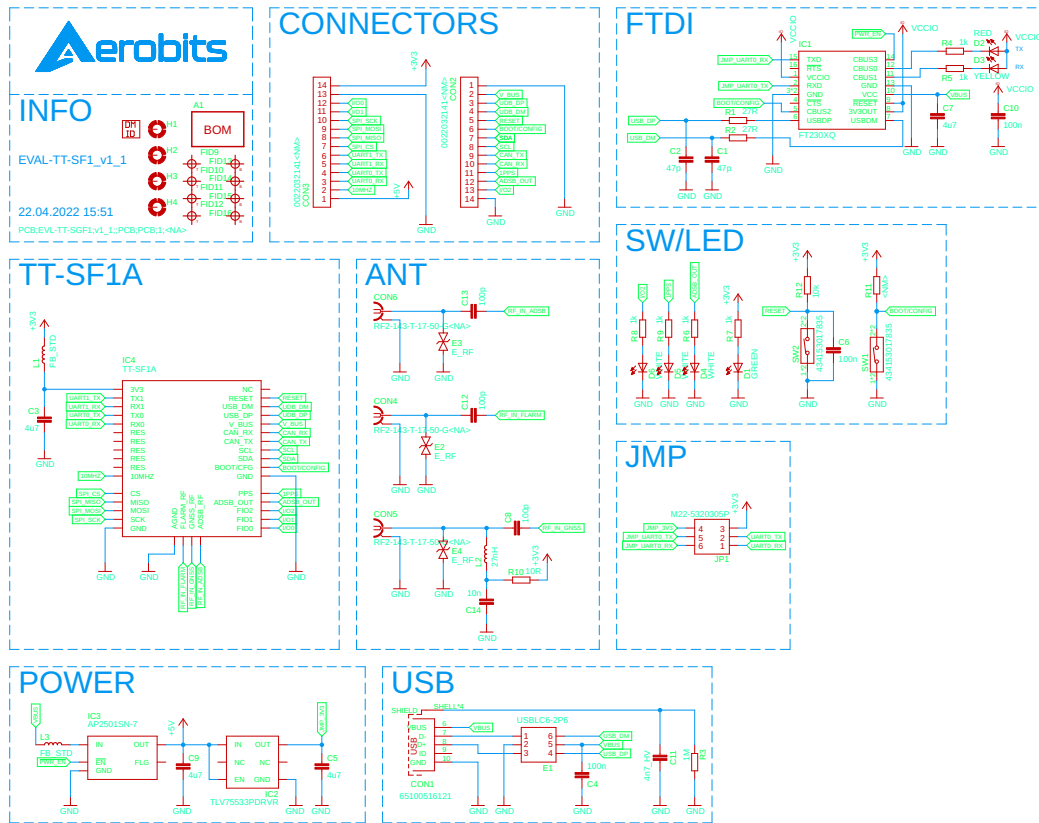


Figure 4: Electrical diagram of EVAL TT-SF1



## 3 Mechanical specification

### 3.1 Mechanical parameters

Parameter	Value
Dimensions	70.0 x 29.0 x 1.5 mm
Weight	16.5 g

Table 7: Mechanical parameters of EVAL TT-SF1

### 3.2 Dimensions

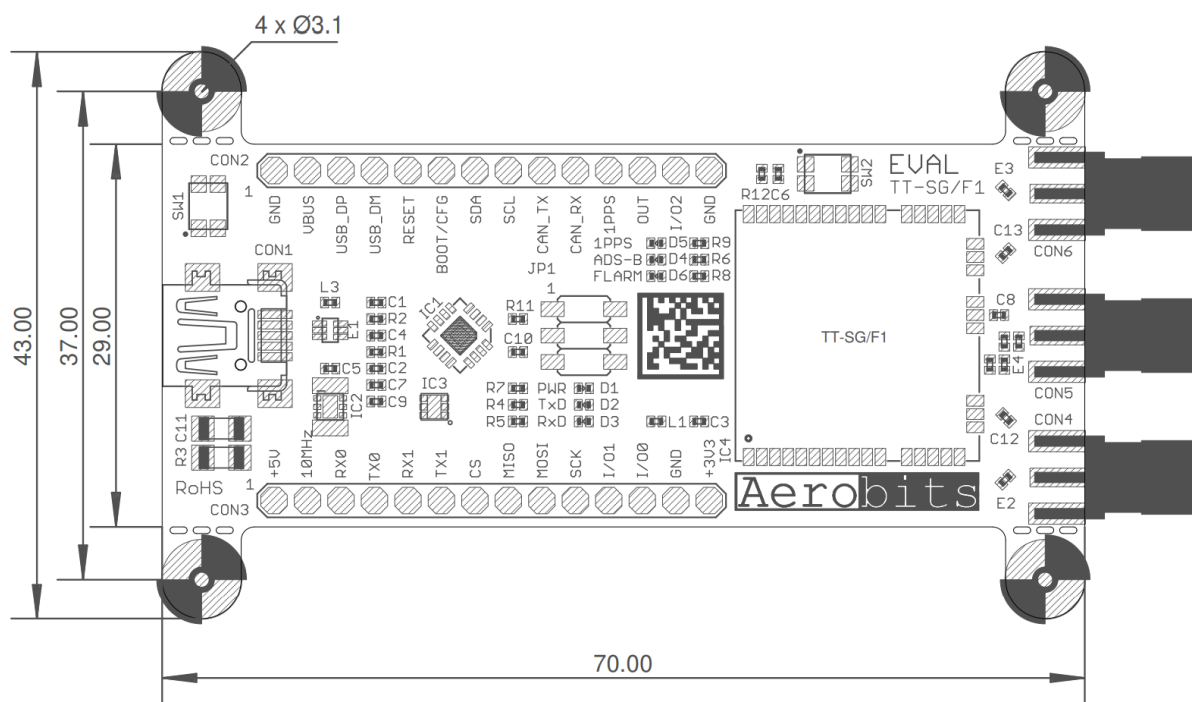


Figure 5: Dimensions of EVAL TT-SF1

**NOTE:** For more specific information see [OEM ADS-B receiver - TT-SF1](#)

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