

AERO

Plug&Play ADS-B Receiver

Overview

AeroTM belongs to the class of the smallest ADS-B receivers on market and has been developed for civil and commercial Unmanned Aircraft Systems. It is especially dedicated to UAS controllers supporting the MAVLink protocol. **Aero** operates on 1090MHz and allows to track manned air traffic (equipped with ADS-B technology) in the immediate vicinity of UAS. The goal is to ensure a safe separation between manned and unmanned aircraft. **Aero** opens the way to the implementation of the Detect and Avoid algorithms, supporting the integration of UAS into the airspace.

Basic features

- ✓ Real-time aircraft tracking on 1090MHz
- ✓ Patented FPGA-In-The-LoopTM technology with the capability of receiving thousands of frames per second
- ✓ Implemented MAVLink and AEROTM protocol
- ✓ Designed to meet MOPS DO-260B
- ✓ High sensitive front-end with range up to 100km (300km with external 1dBi antenna)
- ✓ Small power consumption and ultra-low weight design
- ✓ Simple plug&play integration with MAVLink devices
- ✓ Programming via AT commands
- ✓ Dimension: 27.0x14.0x5.5mm

Technical parameters

Parameter	Value
Frequency	1090MHz
Input voltage	5V
Current consumption	70mA
Sensitivity	-80dBm
Max. input	+10dBm
ESD protection	RF part only
MAVLink (baud)	115000bps
AERO (baud)	115000bps (AT commands)
Main connector	DF13A-6P-1.25H
Antenna connector	U.fl
Dimension	27.0x14.0x5.5mm
Weight (with antenna)	2.8grams

Electrical specification

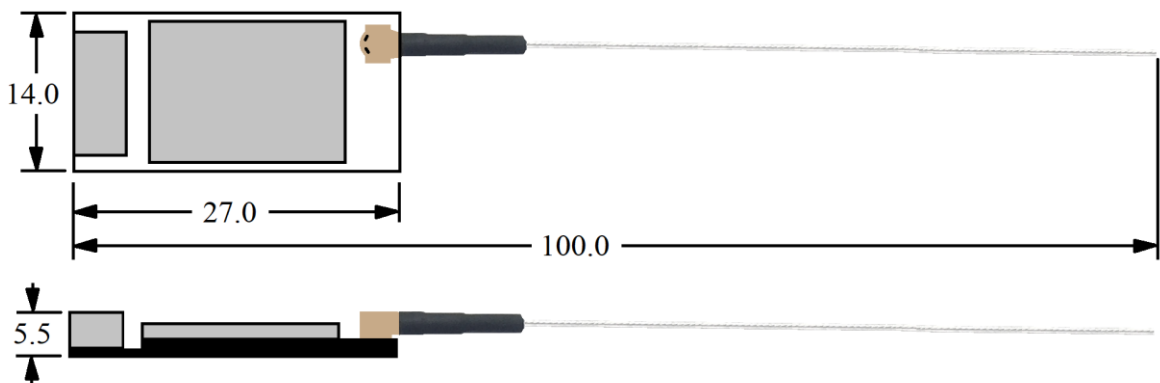
Pin	Name	Function
1	+5V	Power supply (5V/70mA)
2	RX	MAVLink, Aero RXD
3	TX	MAVLink, AERO TXD
4	NC	Not connected
5	NC	Not connected
6	GND	Ground



LED	Function
Green	Power supply indicator
White	Frame detection / receive indicator

Mechanical specification

All dimensions in mm (tolerances $\pm 0.5\text{mm}$)



Connector	Type	Example
Main	Installed on board	DF13A-6P-1.25H
	Mating connector	DF13-6S-1.25C
	Pins	DF13-2630SCF
Antenna	Installed on board	X.FL-R-SMT-1
	Mating connector	X.FL-2LP-04K1T-A



Five steps to integrate **Aero** with Pixhawk2:

1. With the power turned off, connect Aero to Pixhawk2 using a standard telemetry cable. The following settings apply to the installation on the TELEM2 port.
2. Connect the USB cable between Pixhawk2 and your PC and run Mission Planner.
3. Connect to Pixhawk2 by clicking "Connect", then go to the "Configuration" tab.
4. In the menu, go to "Full Parameter Tree" and set the following parameters:
 - a. ADSB->ADSB_ENABLE 1
 - b. SERIAL2->SERIAL2_BAUD 115
->SERIAL2_PROTOCOL 2

ADSB		
ADSB_EMIT_TYPE	14	0:NoInfo 1:Light 2:Small 3:Large 4:HighVortexlarge 5:Heavy 6:HighlyManuv 7:Rotocraft 8:RESERVED 9:Glider 10:LightAir 11:Pa... ADSB classification for the type of vehicle emitting the transponder signal. Default value is 14 (JAV).
ADSB_ENABLE	1	0:Disabled 1:Enabled Enable ADS-B
ADSB_ICAO_ID	0	-1 1677215 ICAO_ID unique vehicle identification number of this aircraft. This is an integer limited to 24bits. If set to 0 then one will be...
SERIAL2		
SERIAL2_BAUD	115	1:1200 2:2400 4:4800 9:9600 19:19200 38:38400 57:57600 111:111100 115:115200 500:500000 921:921600 1500:1500000 The baud rate of the Telem2 port. The APM2 can support all baudrates up to 115, and also can support 500. The FX4 c...
SERIAL2_PROTOCOL	2	-1:None 1:MAVLink1 2:MAVLink2 3:Frsky D 4:Frsky SPort 5:GPS 7:Alexmos Gimbal Serial 8:SToRM32 Gimbal Serial 9:Lidar 10:Fr... Control what protocol to use on the Telem2 port. Note that the Frsky options require external converter hardware. See...

Remember to send the changed settings to the controller by clicking "Write params".

5. Go to the main view. If there is air traffic in your area, you should see it on the map.



NOTE: Not all Mission Planner versions display ADS-B signals correctly. The problem was reported on the forum <https://github.com/ArduPilot/MissionPlanner/issues/1798>. The last, Mission Planner version, with correctly visualized air traffic is: 1.3.52.

Tricks & tips

1. Module installation – There is a high concentration of various electronic systems on a small area at UAS. Try to keep as much separation between **Aero** and other devices, especially radio ones. Despite the high robustness of **Aero** to jamming, try to install the antenna away from other on-board systems.
2. Antenna – **Aero** is supplied with an installed antenna. It allows you to save weight, but requires installation of the module in the sky view. If you want to integrate the module into the UAS interior, you can use an adapter such as U.FL-> SMA and install an external antenna. With a correct selection of the antenna you can get a much larger range.
3. MAVLink vs. AERO protocol – **Aero** is based on OEM TIM-SC1b module. The default is in MAVLink protocol mode, which is a binary protocol. If you want to use the module to work with another system, it is possible to switch the protocol to **AERO**, which has the ASCII representation. Details of the module programming can be found on the page www.aerobits.pl/doc/TIM-SC1.pdf.