GPS-FilterBox 2.0

Connect your ADS-B now!

Manual
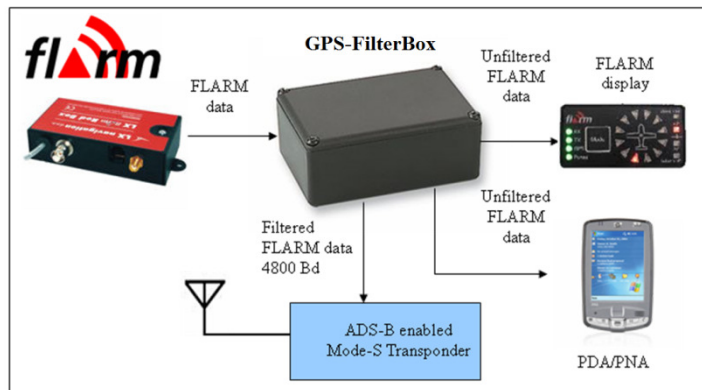
Version 1.1

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Contents

1.   Introduction

The GPS-FilterBox is a device that is able to convert baudrates and filter GPS NMEA-sentences. The main purpose is to enable the ADS-B functionality of any transponder without the need for an extra GPS device. Instead existing devices like a FLARM can provide position data.

Be sure to read and understand the entire manual before proceeding!

2. Typical use

How can you use the GPS-FilterBox? The GPS-FilterBox is built to use in a wide variety of ways.

The design enables you to connect a Mode S transponder to your FLARM ánd a PDA/PNA as well as your regular FLARM display. In double seaters the GPS-FilterBox can be connected to both displays and a transponder, or if you wish, your PDA/PNA on the filtered output instead of a transponder.
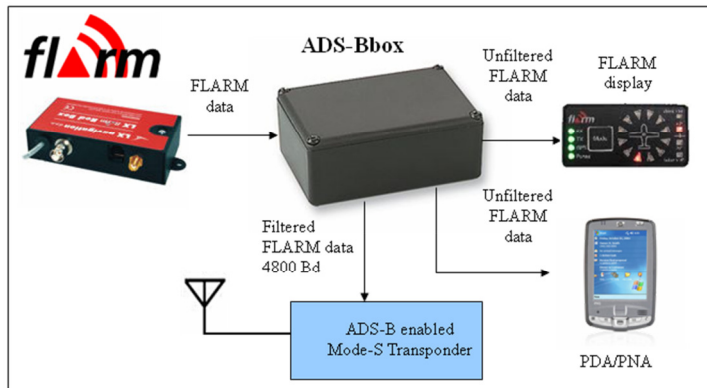

Figure 1: Example of typical use

3. Overview

The GPS-FilterBox contains 2 indication LED's and 4 RJ12 connectors for the main functions of the device. For (extra) configuration options a configuration matrix is available.
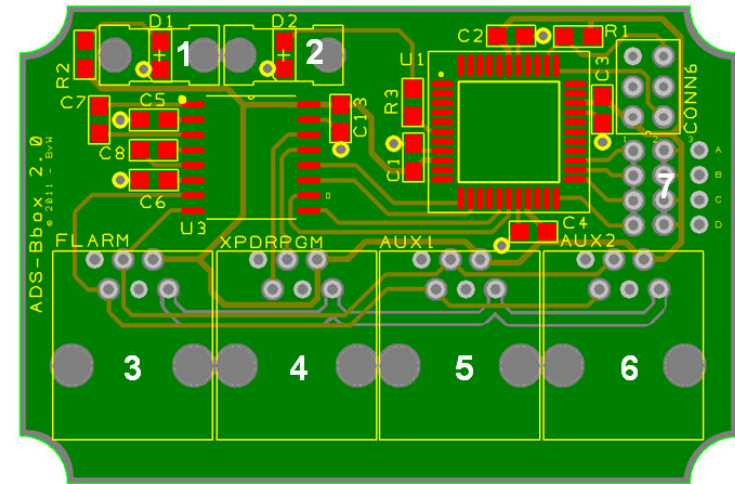
Figure 2: Product overview

Number	Description
1	Power LED
2	Data LED
3	Data in connector (e.g. FLARM)
4	Data out connector (e.g. Transponder)
5	Splitter connector (e.g. FLARM display)
6	Splitter connector (e.g. FLARM display)
7	Configuration Matrix A-D/1-3

Table 1: Product overview

4. Installation

Installation of the GPS-FilterBox is made simple by using the standard pinout configuration of a FLARM device. Read this chapter to get your ADS-B working right away!

4.1. General

The GPS-FilterBox is configured and ready to go right out of the box. To start using your GPS-FilterBox, please connect the following:

1. Connect your input device -for example a FLARM- to the FLARM connector. Be sure the values on pin 1-6 do not exceed the maximum ratings as specified in chapter 6: Technical Data. Make sure all pins are connected according to the pinout specification described in chapter 6: Technical Data.
2. **Connect your output device -for example a transponder- to the XPDRPGM connector. Connect at least pin 6 to GND of your device and pin 5 to the Rx of the device, see paragraph 4.3.**
3. Power on all devices.
4. The Power LED (1) will be lit.
5. When NMEA sentences are passed through the filter, The Data LED (2) will flash with each passed NMEA sentence.

Warning: The GPS-FilterBox is not protected against wrong polarity or overvoltage! Be sure to correctly connect and supply the device!

4.2. Output on/off switch

An on/off switch for controlling the data output can be connected to the GPS-FilterBox.

Connect the switch to the configuration matrix between A1 and A2, or use a 3-way switch between A1-A2-A3. The schematic below shows both connection diagrams.
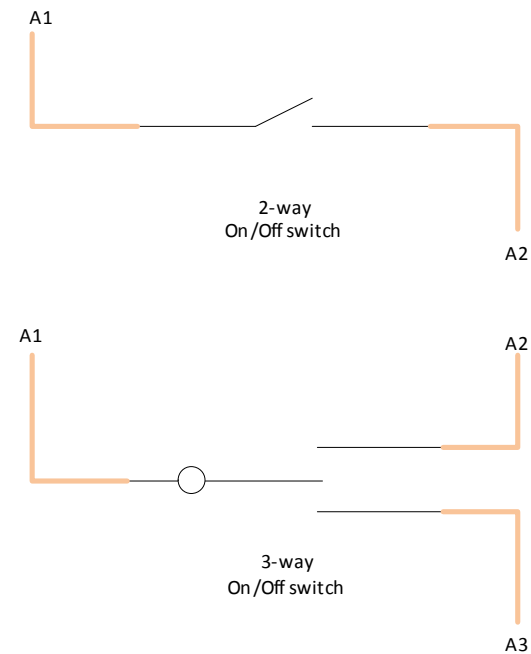
A1

2-way
On /Off switch

A2

A1

A2

3-way
On /Off switch

A3

Figure 3: On/Off switch configuration

4.3. Typical use

In most cases the GPS-FilterBox can be connected to for example your transponder using only two wires.

In most cases the wire connected to pin 6 of your RJ-12 connector will be white. Connect this one to the ground pin of your transponder. The wire on pin 5 (usually black) has to be connected to the Rx of your transponder, see the picture below.
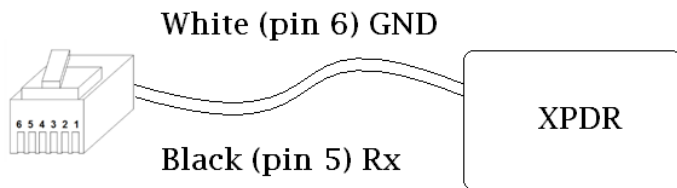
Figure 4: Typical use

5. Configuration

The GPS-FilterBox is configured out of the box. The standard configuration will mostly fit your needs.

5.1. Standard configuration

The table below shows all configurable items as configured when new or after a hard reset.

Part	Configuration
Input baudrate	19200 bps
Output baudrate	4800 bps
Filter	On
RMC sentences	Pass
GGA sentences	Block
GSA sentences	Block
On/off switch	Enabled

Table 2: Standard configuration

5.2. Configuration options

Your GPS-FilterBox can be configured to suit your needs. The following options can be configured using the GPS-FilterBox configuration tool (see: http://www.zweefvlieg.net/adsb/) or a terminal to connect to your GPS-FilterBox.

Part	Configuration options	Program key
Input baudrate	4800/9600/19200/ 38400/115200 bps	5/6/7/8/9
Output baudrate	4800/9600/19200/ 38400/115200 bps	0/1/2/3/4
Filter	On/Off	f/F
RMC sentences	Pass/Block	m/M
GGA sentences	Pass/Block	g/G
GSA sentences	Pass/Block	a/A
On/off switch	Enabled/Disabled	O/o
Help		?
Firmware version		c
Health Status		h
Reboot		r
Reset to factory default		x
Show current settings		s

Table 3: Configuration options

5.3. Connecting to the GPS-FilterBox

To configure your GPS-FilterBox, connect it to a computer using the XPDRPGM port on the device.

Because the GPS-FilterBox is designed as a splitter, the connection cable to a computer is slightly different: The Tx and Rx pins must be connected the other way around compared to a standard FLARM programming connector. The illustrations and table below may help to correctly connect.

Be aware that the GPS-FilterBox still needs to be powered, either by an external power supply, or by connecting a FLARM unit to the FLARM input on the GPS-FilterBox.

Note that the pin numbering differs from the official numbering, but it is compliant with the FLARM manual!

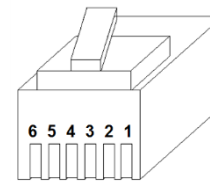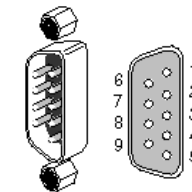Figure 5: RJ12 Plug   Figure 6: DSUB9

RJ12	DSUB9	Description
1		+12V
2		+3V
3	5	GND
4	3	Tx of device (PC/FLARM)
5	2	Rx of device (PC/FLARM)
6	5	GND

Table 4: Pinout for PC connection

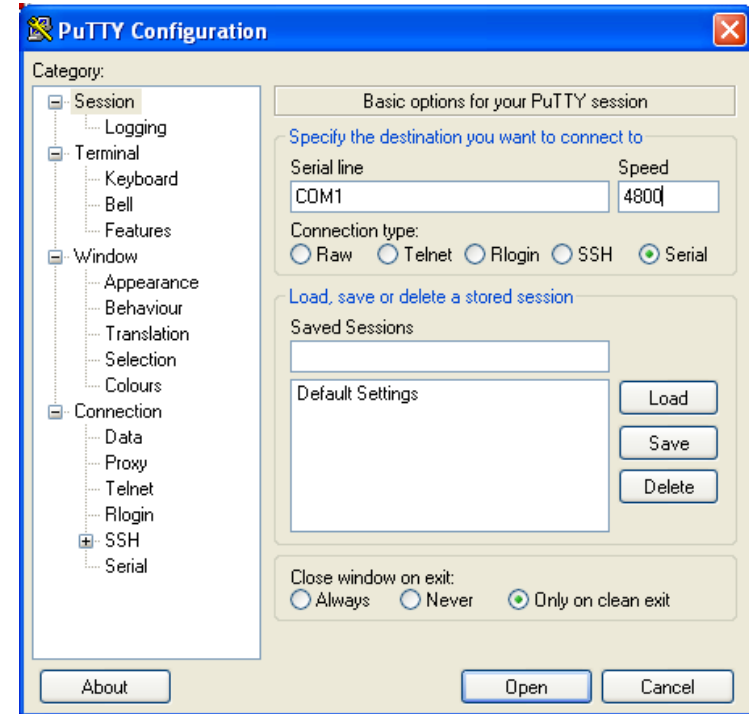Use the GPS-FilterBox Tool or a Terminal program like _Putty_ to connect to your GPS-FilterBox.

Be aware that the baudrate can differ if you configured the device before. If you are not able to connect, you may consider resetting the device to factory default.
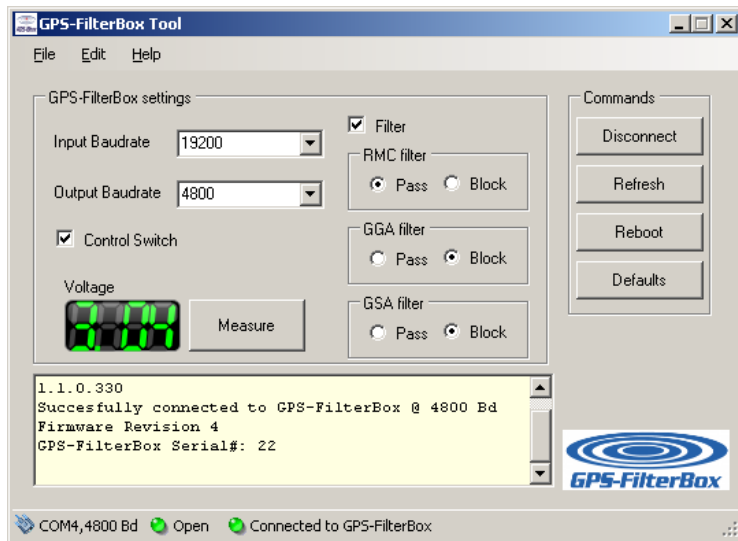
Figure 7: GPS-FilterBox Tool

Below is a screenshot of the Putty configuration you will probably need.

Figure 8: Putty configuration

```
? = help
c = show firmware version
h = show health status
r = reboot
x = reset to default
s = show current settings
o = control switch on
O = control switch off
f = filter on
F = filter off
m = pass RMC sentences  (filter has to be on)
M = block RMC sentences (filter has to be on)
g = pass GGA sentences  (filter has to be on)
G = block GGA sentences (filter has to be on)
a = pass GSA sentences  (filter has to be on)
A = block GSA sentences (filter has to be on)
0 = output speed to 4800
1 = output speed to 9600
2 = output speed to 19200
3 = output speed to 38400
4 = output speed to 115200
5 = input speed to 4800
6 = input speed to 9600
7 = input speed to 19200
8 = input speed to 38400
9 = input speed to 115200
```

Figure 9: Example of the help-screen in Putty

5.4. Reset to factory default

The GPS-FilterBox can be reset using hardware and software. During a hard reset all settings will be reset to default, as described in paragraph 5.1: Standard configuration.

5.4.1. Reset using hardware

To do a reset to factory default without using software, connect pin B1 and B2 of the configuration matrix.

Power up the device. After approximately 5 seconds LED D2 will start flashing 2 times a second. The reset is now complete.

Remove the connection between B1 and B2. Your GPS-FilterBox is now ready for use with the default settings.
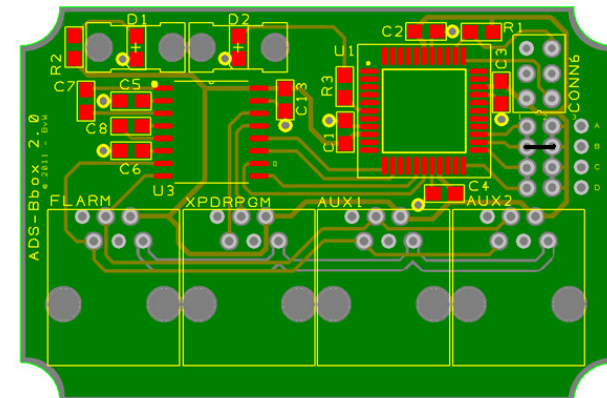
Figure 10: Example reset connection (black wire)

5.4.2. Reset using software

Connect to your GPS-FilterBox as described in paragraph 5.3: Connecting to the GPS-FilterBox.

Press 'x' to reset to factory defaults. A message confirming the defaults are set will appear. Press 'r' to reboot or interrupt the power supply for a few seconds.

5.5. Firmware update

At this time no firmware updates are available. As soon as it will this manual will be updated with instructions.

6. Technical Data

Part	Description
Width:	60 mm
Length:	40 mm
Height:	20 mm
Power supply:	2.7-3.3 Volt
Power drain:	Max 0.06 Watt
Communication:	RS232
Country of origin:	The Netherlands

Table 5: Technical Data

RJ12 pin	Description
1	+12V
2	+3V
3	GND
4	Tx of device (PC/FLARM)
5	Rx of device (PC/FLARM/Transponder)
6	GND

Table 6: RJ12 connectors pinout

Config pin	Description	Connection
A1	On/Off switch	A1-A2 = off
B1	Reset	B1-B2 = reset
C1	Start Bootloader	C1-C2 = start
D1	Not implemented	-
A2…D2	Vcc	-
A3…D3	GND	-

Table 7: Configuration matrix

7. Disclaimer

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These trademark holders are not affiliated with our products, manuals or our website. They do not sponsor or endorse our products or any of our other solutions.

8. Limitations

The GPS-FilterBox has not been certified in line with the usual aviation procedures. The GPS-FilterBox does not alter nor verify data send to other devices like a transponder. Certified aviation devices are responsible for the verification of the signals processed by the GPS-FilterBox. Use of the GPS-FilterBox and the output signal of the GPS-FilterBox is the owners' own responsibility.

Use of the GPS-FilterBox is forbidden in the USA or Canada or in aircraft registered in the USA or Canada.

9. Limited Warranty

This limited warranty is valid only if you purchased the product from a GPS-FilterBox authorized Reseller in the country of purchase.

PLEASE RETAIN YOUR SALES RECEIPT. IT IS YOUR PROOF OF PURCHASE COVERING YOUR LIMITED WARRANTY. THIS LIMITED WARRANTY IS VOID WITHOUT SUCH PROOF OF PURCHASE.

The GPS-FilterBox manufacturer warrants electronic components only of this product to be free of defects in material and workmanship if used under normal operating conditions for a period of one (1) year from the original date of retail.If the product shows any defects within the specified warranty period and that defect is not excluded the GPS-FilterBox manufacturer shall, at its discretion, either replace or repair the product using suitable new or reconditioned product or parts. In case the GPS-FilterBox manufacturer decides to replace the entire product, this limited warranty shall apply to the replacement product for the remaining initial warranty period, i.e., one (1) year from the date of purchase of the original product.

Warranty claims other than those indicated above are expressly excluded.

This limited warranty does not cover the product if it has been electronically or mechanically modified in any way. This limited warranty does not cover any such modification/adaptation, regardless of whether it was carried out properly or not. Under the terms of this limited warranty, the GPS-FilterBox manufacturer shall not be held responsible for any cost resulting from such a modification/adaptation.

This limited warranty covers only the product hardware. It does not cover technical assistance for hardware or software usage and it does not cover any software products whether or not contained in the product. Any such software is provided "AS IS" unless expressly provided for in any enclosed software limited warranty.

Damage/defects caused by the following conditions are not covered by this limited warranty:

- *Improper handling, neglect or failure to operate the unit in compliance with the instructions given in the user or service manuals;*
- *Connection or operation of the unit in any way that does not comply with the technical or safety regulations applicable in the country where the product is used;*
- *Conducting firmware updates;*
- *Damage/defects caused by acts of God/Nature (accident, fire, flood, etc) or any other condition that is beyond the control of the GPS-FilterBox manufacturer.*