GRT AVIONICS

Stratux Open Source ADS-B Receiver

Equipment Supplement

Revision A

17-Mar-2016

Revision Notes

Revision	Date	Change Description
A	Thursday March 17 2016	Initial Release

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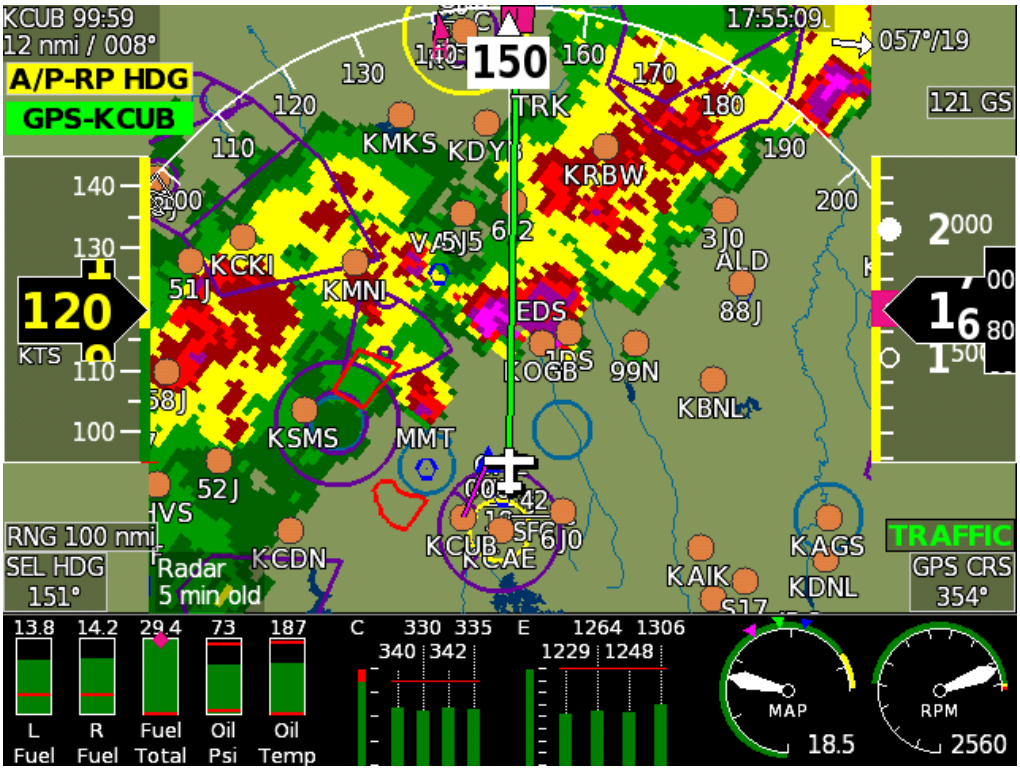


Radar imagery on the Sport SX (courtesy of James Clark)

Section 1: Introduction

1.1 About the Stratux Open Source ADS-B Receiver

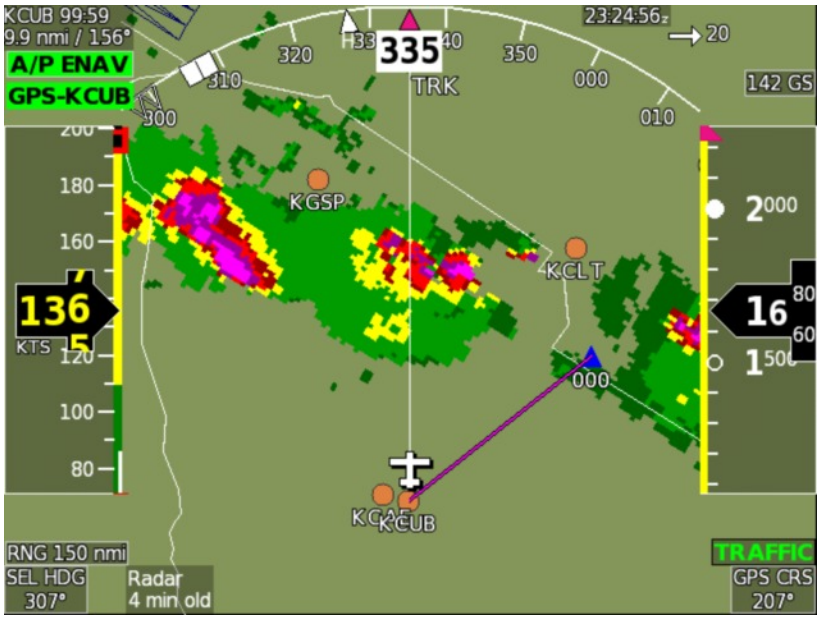
The Stratux is an open source system cable of receiving 978 MHz UAT and/or 1090 extender squitter data. When configured with a 978 MHz UAT function, the provides FIS-B weather and TIS-B traffic data and displays it via a serial port connection all models of on GRT Horizon HX, Hxr, Sport SX, and Mini (versions with moving map), EFIS display units, as well as the WS, HS, and Sport HS legacy display units. The Statux receiver, when equipped with a wi-fi adapter, is also transmits this data to a large variety of tablet-based apps on Ipad and Android devices. See www.Stratux.me for more information.

WARNING: The Stratux is a receiver ONLY. Do not expect or rely on any traffic information unless your aircraft is also participating in ADS-B OUT. GRT recommends the use of an ADS-B compliant Mode S extended-squitter transponder, such as the Trig TT22, coupled with WAAS GPS for full ADS-B participation. Please read the ADS-B page on the GRT website for more information on current ADS-B options and how the system works.

The Stratux open source ADS-B receiver may be purchased completely assembled (approximately $250 as of this writing for a dual band version), or as parts that are assembled by the user (approximate cost $100 at the time of this writing.) If choosing to build the Stratux, we recommend testing its operation using a web browser to view its output on a tablet or PC. This supplement is intended to support GRT users with information about connection and use with GRT EFIS systems,.

The interface between this receiver and GRT display units allows for:

- FIS-B subscription-free weather information displayed on a GRT display unit while within ADS-B ground coverage;



Radar image on a Sport SX

(Image courtesy of James Clark)

- TIS-B traffic information displayed on a GRT display unit while within ADS-B ground coverage;
- Direct airplane- to-airplane traffic information displayed on a GRT display unit from nearby aircraft participating in ADS-B OUT on 978 MHz UAT frequencies.

1.2 Stratux Raspberry Pi Software

Software that supports the serial port is required in the Raspberry Pi. At this time, serial data is not part of the main release of Stratux software, but will becomes so soon. As of this writing, the following software was tested and is known good. This software is configured for 38400 buad, and will not support a USB GPS when used to send serial data to the EFIS. This will change in a future update.

https://www.dropbox.com/s/owvhmhxt3w6c31n/stratux-serialout_test.img.zip?dl=0

After loading this software, the Raspberry Pi must be run with a keyboard and monitor connected. It will boot to a screen that asks about expanding the filesystem. Do this, and re-boot, and it should re-boot to a prompt, at which point it will be working.

1.3 Serial Port and Hardware Requirements

A high-speed serial port is required on each display unit that will be used to display weather, with the exception that traffic will transfer over the inter-display link, and weather can transfer over the Ethernet inter-display link.

Antennas: The use of an externally-mounted antenna is optional. GRT beta testers in Van's RV aircraft have reported good signal with the included antenna when the unit is within view of the sky (typically on the instrument panel glare shield). Signal reception may be improved by mounting an antenna on the belly of the aircraft. The included antenna may be removed and a dedicated passive transponder or DME antenna may be connected in its place.

Section 2: Installation & Wiring

2.1 Electrical Connections

Wiring to the Stratux should be accomplished as follows:

USB-Serial Cable 9-pin d-sub pin	EFIS Connection	EFIS Setting
Serial Data Out - Pin 3	Any Unused high-speed serial input	Set baud to 38400 (115200 may be used in the future) Set Serial Port Function to "ADS-B" Requires a high-speed serial port. These are*: Hx, Hxr - All ports Sport SX - All ports WS/HS - Horizon - Ports 1 & 2 WS/HS - Sport Port 4 *Except when using the serial port pass-thru via an ARINC Module
Serial Data In - Pin 2	Serial output on the same port used for serial input	Set Function to "Stratux" (this setting may require a software update)
Serial Data Ground - Pin 5	None	Connect to ground.

Stratux, when equipped with wi-fi, can display ADS-B information on tablets running Electronic Flight Bag (EFB) apps such as Avare, WingX Pro7, Avare, Naviator, FlightPro, and AOPA FlyQ. See www.stratux.me for more information.

Section 3: Setup & Programming

3.1 Display Unit Setup

1. After the Stratux installed and wired, use the following procedure to program the display unit to communicate with it.
2. Power up the system. Access the Setup Menu on the display unit that the Stratux is connected to.
3. Under General Setup, scroll to just below the Serial Port setup options. Highlight **USB ADS-B** option and turn knob to select ON.
4. Stay on General Setup screen. Scroll down to Traffic Altitude Filter. Use this to filter out traffic beyond a certain reported altitude from your position, excluding irrelevant traffic from the map.
5. Press SAVE softkey.
6. If your transponder is being used for ADS-B Out and it has not already been programmed, set it up using the transponder manufacturer's instructions and its GRT supplement if applicable. **Note to Trig Users:** Answer "1090ES Receiver On Board?" with NO.

Setting	**Value**	**Notes**
Flight ID and Address*	–	Press to activate menu
Flight ID*	Enter actual value	Enter aircraft registration/N-number
Mode S Address*	Enter actual value	Mode S code (base 16-Hex). Find by looking up N-number on FAA website. Note: The 6-digit Mode S code is only listed for aircraft with an airworthiness certificate, and not for reserved N-numbers.
USB ADS-B	On	Tells display unit to expect ADS-B data through USB port.
Traffic Altitude Filter	Set to preference	Excludes traffic alerts outside of the selected altitude.
*Set this up to receive traffic data if you are transmitting ADS-B Out using an extended-squitter transponder.		

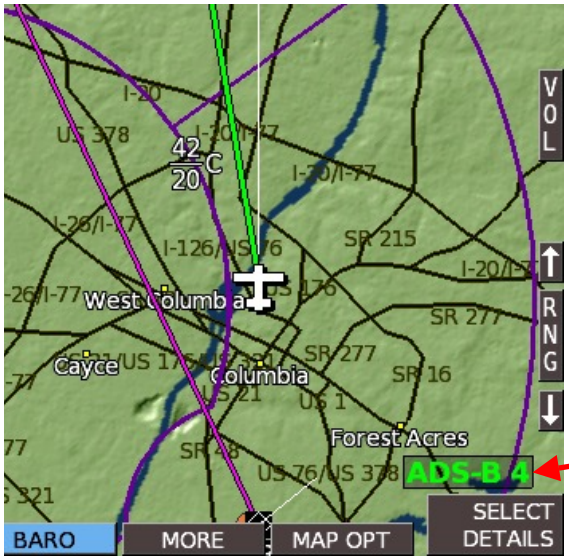
3.2 Post-Installation Checkout

1. Pull the aircraft outside and power up the EFIS system and ADS-B receiver.

2. Check the LED status lights on the ADS-B receiver for power and signal. Note that ADS-B often cannot be received on the ground unless a ground station is nearby.

3. Go to Set Menu > Display Unit Maintenance. Scroll to ADS-B Status. If the Valid Frames counter is counting, data packets are being received.

4. When the receiver is within range of one or more ADS-B ground towers, a green **ADS-B x** icon will appear on the side of the moving map, with the "x" representing the number of towers received. See image below.



The receiver is communicating with 4 ADS-B ground towers.

Section 4: Using the StratuxADS-B Receiver

1. **WEATHER:** Bring up the MAP screen. Under the SHOW softkey, there is a list of items to choose from. (RADAR, SHADE, TERRAIN, WIND, METARS, etc.) Note that only one of the map features can be selected; Radar information will replace Terrain because the color shading of both features together is confusing. (On HXr, access SHOW softkey by pressing SCREEN, then MAP OPTIONS softkeys.) When selected on the MAP screen, radar will also be displayed in the HXr map inset.

2. **METARS and TAFS**, if available, are shown on the WPT DETAILS page of the airport. Select METARS on the moving map SHOW menu to display color-coded METAR symbols.

3. Go to the Moving Map Setup Menu for traffic alert and AIRMET, METAR, & TAF viewing options:

Setting	Value	Notes
Traffic Alert Window	On or Off	Traffic inset automatically appears when traffic is a threat.
Show AIRMET	Choose to show on all MAP pages, on North-Up page only, or never.	
Color airports using METARS		
METAR Text	Choose to display weather report text in Raw or Translated (English) form	
TAF Text		

4. **TFRs** are currently not shown, but will be available with a future software update.

5. **Traffic** is shown as a black diamond icon with the altitude above or below you in hundreds of feet, an arrow that shows if it is climbing or descending, and a vector line that shows the approximate direction of flight. In addition to the moving map and geo-referenced charts, traffic icons can also be displayed in 3D on the PFD. To turn PFD traffic on or off, go to Set Menu > Primary Flight Display and scroll to Traffic In View. Select ON or OFF.