



Download(https://airspy.com/download/)

Online SDR(/direc

Quick Start Guide

Installation on 8, 8.1, 10 and 11

Airspy is a plug-and-play device and does not require any particular driver installation on Windows download and install the right driver for you.



There are exceptions where the original configuration of the PC does not allow the automatic insta (/download) should be installed manually with the following procedure:

- Download and unzip the WinUSB Compatibility Driver (/download)
- Open the device manager and select Airspy
- Select "Update Driver" then "Browse My Computer" to the inf file

Installation on Windows Server or Windows X

Please don't. They are not supported.

Using SDR#

Airspy was designed by the same people who developed the SDR# software (http://sdrsharp.com) : its powerful features.

First, go to the download page (/download) and get a copy. Then run SDRSharp.exe and select the '

V	Source: AIRSPY	
AIR	SPY	~

Then next step is the gain configuration. As depicted in this screen shot, there are many gain mode

- Sensitivity
- Linearity
- Free (Custom)

The "Linearity" mode is the one you want to start with:

▼ Source: AIRSPY									
AIRSPY ~									
◯ Sensitivity									
Gain	Gain 10								
Sample rate	10 MSPS	\sim							
Decimation	None	\sim							
Display	8 MHz								
Bias-Tee									
SpyVerter	PPM 0,00	÷							

The following fine tuning procedure ensures you have the maximum SNR on the signal of interest v

- Start with the minimum gain
- Increase the gain until the natural noise floor rises by about 5dB
- Check that increasing the gain no longer increase SNR. If not, increase the gain by an extra notcl
- Fine tune to maximize the SNR (the blue bar graph on the right)



In any case, you should make sure the RF noise floor just overrides the quantization noise floor of t

Using the SpyVerter

Airspy has an option to cover the HF bands: The SpyVerter. It is a low loss, high dynamic range, rug same kind that is used in very high end HF rigs like the Elecraft K3. It offers HF coverage starting ne L of the Airspy alone. The default software settings allow Airspy to power the SpyVerter via the bias connect the "IF Output" of the SpyVerter to the RF Input of the Airspy via the supplied barrel adapted

It is recommended to use the Linearity gain mode in HF.



To verify your setup, plug a HF antenna and tune the AM broadcast band. You should get a view lik



(/downloads/spyverter_vlf_lw_mw.png)

Using the SPY Server for Remote SDR Operati

Presentation

Since revision 1553, we offer a new utility for the Airspy series to convert a Raspberry Pi, an Odroid featured SDR server.

The SPY Server allows you to connect many SDR# "clients" to the same Airspy or RTL-SDR device ov

How does it work?

When only one client is connected, full control (center frequency, gain) is granted. When there are device and the RF gain are locked.

The default settings allow using the server in the LAN with optimal latency. The "Full IQ" option allo SDR client (SDR#). If the network bandwidth is not sufficient to handle the traffic, uncheck the "Full data and reduced IQ data that it necessary for decoding one VFO. The bandwidth savings allows us connection.

Configuration

The SPY Server comes with a standard configuration file that allows you using Airspy or RTL-SDR di the same server, you can have multiple configuration files and pass the right one as parameter to t If the SpyVerter (/products/spyverter-r2) is used, the following parameters should be set in **spyser**

```
# Initial Center Frequency
#
initial_frequency = 7100000
# Minimum Tunable Frequency
# Comment if using the device default
#
minimum frequency = 0
# Maximum Tunable Frequency
# Comment if using the device default
#
maximum_frequency = 35000000
# Converter Offset
# Set to -120000000 to enable the SpyVerter offset
converter offset = -12000000
# Bias-Tee
# For AirspyOne only – Useful for LNA's and SpyVerter
enable_bias_tee = 1
```

Running on Windows

Edit the configuration file if necessary and double click on **spyserver.exe**.

Running on x86 Linux

First, make sure you are have the latest version of **libairspy** (https://github.com/airspy/airspyone_l Extract "spyserver_linux_x86" and "spyserver.config" from the standard zip, chmod and run.

\$ unzip sdrsharp-86.zip
\$ chmod a+x spyserver_linux_x86
\$./spyserver_linux_x86 spyserver.config

Running on ARM Linux (Raspberry Pi or Odroid)

First, make sure you are have the latest version of **libairspy** (https://github.com/airspy/airspyone_l Download and extract the standard ARM package and run.

wget http://airspy.com/downloads/spyserver-arm32.tgz tar xzf spyserver-arm32.tgz ./spyserver spyserver.config

You can also use the **automated** installation script by Rodrigo Pérez which will do everything for you wget -qO - http://airspy.com/downloads/install-spyserver-rpi.sh | sudo bash

Linux Troubleshooting

What could go wrong in the Linux world? Well, many things (see the GPL sections 15 and 16 (https:/ most obvious ones people reported so far:

- The program runs, but cannot acquire the device: The user mode driver is probaby not up to da
- Sometimes using **sudo** makes things just magically work.
- "`GLIBCXX_3.4.21' not found" => Try installing GCC 5

Using the ADSB decoder in embedded ARM be

Prerequisite

You need firmware version 1.0 rc7 or newer to use Airspy as an ADSB receiver. Get the latest updat https://github.com/airspy/firmware/releases (https://github.com/airspy/firmware/releases) **READ** the instructions before doing anything.

Raspberry Pi 3 Performance Tuning

The latest Raspbian distros come with a new default CPU governor that is not suitable for sustained high frequency (1200MHz), get very hot, then throttle back to a very low frequency (600 MHz). The two extremes and the USB controller will drop whole packets, which could affect both the number The following settings will force the "performance" governor at a much more acceptable CPU frequency frequency (1200MHz).

and without sacrificing the performance of the decodes.

If very high MLAT reliability is required, the following switche should be applied to the decoder: sudo /home/pi/airspy_adsb -l 30005:beast -x -m 12

This will run all the decoding in one core using 5 signal phases instead of 10, which requires half of Additionally, we recommend to put these lines in **/etc/rc.local** :

/!\ RPi3 Only! /!\
echo performance > /sys/devices/system/cpu/cpu0/cpufreq/scaling_governor
echo performance > /sys/devices/system/cpu1/cpu1/cpufreq/scaling_governor
echo performance > /sys/devices/system/cpu2/cpufreq/scaling_governor
echo performance > /sys/devices/system/cpu3/cpufreq/scaling_governor

Then append these lines to **/boot/config.txt** :

/!\ RPi3 Only! /!\ force_turbo=1 arm_freq=800

Lastly, you can also disable the "FIQ Fix" that limits the number of USB interrupts. Less USB interru the USB hardware with the risk of missing more buffers.

To disable the "FIQ Fix", you can add the following parameter to the line in **/boot/cmdline.txt** : dwc_otg.fiq_fix_enable=0

Standard setup (non FlightAware)

The whole process for setting up a high performance ADSB receiver has been simplified. For the Ra following commands:

mkdir airspy cd airspy wget http://airspy.com/downloads/airspy_adsb-linux-arm.tgz tar xzf airspy_adsb-linux-arm.tgz sudo ./airspy_adsb -l 30005:beast -l 47806:asavr -p -m 12 -x &

FlightAware Integration

The easiest way to integrate Airspy into an existing FlightAware PiAware is described here (https://c dump1090-fa-configuration/44343).

If you don't need all the details, you can just use this neat installation script by FlightAware membe images:

sudo bash -c "\$(wget -O - https://raw.githubusercontent.com/wiedehopf/airspy-conf/master/install.sh)"

Operation

Once you have your decoder up and running, you can use any aircraft tracking software that suppo

Virtual Radar Sever

Here's an example configuration for Virtual Radar Server (http://www.virtualradarserver.co.uk/):

Options			
Preset Configurations			
Data Sources Receivers		Enabled	*• Wizard
Eccal	Name:	RPi 2 + Airspy	
sdrsharp.com	Format:	AVR or Beast Raw Feed $ \lor$	
Receiver Locations P Home	Location:	Home 🗸 🗙	
Merged Feeds Merged Feed	Connection type:	Network \checkmark	Test Connection
Rebroadcast Servers		Normal	
Local host		 Hide from web site 	
Users		Merge only	
Raw Feed Decoding Web Server	Network		
Users		Push receiver	
Administrators	Address:	192.168.1.XX	
Initial Settings	Port:	47806 🛨	
🔅 General	Passphrase:		
		Send keep-alive packets	
	Idle timeout:	60 🜩 (seconds)	
	Address		
	The network address of the receive	r or program that is sending aircraft data. On	ly used for Network data fe
			ОК

(/downloads/airspy_pi_vrs_config.png)

Plane Plotter

For Plane Plotter (http://www.coaa.co.uk/planeplotter.htm), you can use this configuration:

🛪 PlanePlotter from COAA - Outline -

File	View Process Options	Review	v Tools Help	
	ACARS decoder		🛉 🐵 👄 💿 🔑 🦗 🔍 Map 🔀 Aircft Flight 🗰 📰 📰 📰 📰	
	Aircraft view		. Long. Alt. Course Speed Type Route	
	Alert >		Input/output settings X	
	Audio	>	Input data	
	Calculate Beamfinder fix		ACARS from audio i/p	
	Chart	>	Mode-S/ADS-B> Aurora SSRx TCP	
	Cockpit view		DF from audio input RTL dongle > RTL1090 RTL > RPi+Dump1090	
	Conditional expressions	>	HFDL with PC-HFDL BTL > PC+Dump1090	
	Direction finding	>	UDP/IP data from net	
	Directories	>	UDP/IP audio from net Allow Auto Mlats	
	FEC		HF Selcal VDL2-MultiPSK Raw data for Mlats V	
	Flags	>	UDP/IP local port 9742 Local GPS	
	Fonts and colours	>	Uutput data Google Earth server	
	Graphics output	>	IP1 4180	
	Home location	>	Log desig.acft. IP2 4181	
	I/O settings		Log local GPS	
	Map calibration	>	Airmaster log format	
	Mode-S receiver	>	Memory-Map output Enable Raw IP 30003	
	Purge >		UDP/IP output	
	Remote control >		ACARS Enable Remote port(s)	
	Script >		FDL Remote IP(s)	
	Sharing >		Mode-S 🔲 UDP audio out to net 🔲 Control Remote PP	
	SQB hex database options		DDE output	
	Waypoint file		ACARS DDE service PlanePlotter	
	Zoom >		FIND DDE topic ACARS	
_	ATC sector frequencies	>	Mode-S DDE item LiveData	
			Cancel	

. (/downloads/pp_config1.png) 🛪 PlanePlotter from COAA - Outline -

File	View Process	Options	Review	Tool	s H	Help									
	ACARS decoder		1	٠	Θ	0	12	i 🄑	۰.	Map	X	Aircft Flig	ght	6	1 2
	Aircraft view					Long.		Alt	•	Cour	se	Speed		Type	Route
	Alert		>												
	Audio		>												
	Calculate Beamfir	nder fix													
	Chart		>												
	Cockpit view														
	Conditional expre	essions	>												
	Direction finding		>												1
	Directories		>		TCP	/IP IP add	ress							×	
	FEC					Airopu /AD	SBase		0/10	ooruor IE	127	7 በ በ 1·479	308		
	Flags		>			Aiispy/Au	iooshì	/IX IC		server in	- [12]			_	
	Fonts and colours	5	>			Cancel							0	К	
	Graphics output		>	L]
	Home location		>												
	I/O settings														
	Map calibration		>												
	Mode-S receiver		>	A	irNa	v RadarBo	х			>					
	Purge		>	Α	uror	a SSRx				>					
	Remote control		>	K	ineti	c SBS fam	nily			>					
	Script		>	P	lane	Gadget Ra	adar			>					
	Sharing		>	R	xCor	ntrol				>					
	SQB hex database	options	>	B	east	receiver				>					
	Waypoint file			A	VR re	eceiver				>					
	Zoom		>	R	TL d	ongle RTL	.1090			>					
	ATC sector freque	encies	>	R	TL d	ongle RPi	dumj	p1090		>					
				N	lultil	PSK VDL2	serve	r		>					
				R	TL d	ongle PC	dump	o1090		>					
	Setup TCP/	IP client		A	irspy	//ADSBsp	y rece	iver		>					
				P	lane	Finder Ra	ıdar re	eceive	r	>					

(/downloads/pp_config2.png)

The effects of oversampling and decimation

The decimation option allows you to trade some of the instantaneous bandwidth to get more bit rerule of thumb is 3dB every time you divide the bandwidth by two. So, decimation by two gives you on.

To further leverage the effects of the decimation, you can also readjust the gain using the same progives you more SNR after decimation. So basically, when you use a higher decimation rate, adjust f

The Bias-Tee option: 4.5v @ 50mA

In some cases, one may need a very low noise figure. For example, some satellite communication s 0.2dB. In such case, using an external preamplifier <u>near the antenna system</u> can improve the overa preamplifier directly from Airspy by injecting DC at **4.5v**. Of course, such a preamp should have its amplified RF signals. The current budget is limited to **50mA**, so that's enough to run most of the mean the case one can imagine is to switch between antennas using that bias signal or even power LF and HF, like the SpyVerter mentioned above.

Calibration

Starting from June 2016, Airspy R2 units are calibrated in the factory up to ~0.05 PPM. This calibrations used for the firmware, so upgrading the firmware won't delete it unless you do it by yourself. The procedure to recalibrate a unit is as follows:

- Open the calibration tool (AirspyCalibrate.exe (/download/)),
- Clear the correction,
- Reset the device (unplug/plug again),
- Inject a known and accurate signal,
- Set its exact frequency in the tool,
- Click on "Calibrate",
- Reset the device.

Note that this procedure requires firmware version 1.0-RC9 (https://github.com/airspy/firmware/re

Troubleshooting PC performance problems

We created a set of command line utilities to help troubleshooting the performance problems.

- Download the latest release of the tools package (https://github.com/airspy/host/releases)
- Open a console (cmd.exe) and run airspy_rx -r NUL -t 0
- Leave it running for 30 seconds, then Ctrl+C
- If the average throughput is below 10.0 MSPS then either your USB controller has problems or y
 - Use another USB port
 - Update your USB drivers (Prefer OEM drivers to generic ones)
 - Check your anti-virus or any other CPU heavy task

• See also our Wiki: https://github.com/airspy/host/wiki/Troubleshooting (https://github.com/airsp configuration/solutions)

Known issues

- Slow computers won't be able to run Airspy at 10MSPS without dropping samples. That's a lot of modern machine as described in the minimum hardware requirements.
- In a fresh Windows 7/8/10 installation, Windows Update will grab the generic Microsoft USB driv operation and it is advised to update them with the latest version from your OEM. For example, some PCs from choppy to perfectly smooth.
- Some old generation USB 3.0 controllers are not compatible with USB 2.0 devices at high speed. problem. And again, make sure you run Airspy in a modern machine as described in the minimu
- In some PCs, the experimental 2.5MSPS mode is vulnerable to USB noise. This will be improved to get lower sample rates is to use some decimation with the 10MSPS stream.
- USB Hubs won't work at the full sampling rate. Just don't use them.
- Beware of overheating. Keep your unit in open air environment while running.

That's all folks!

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