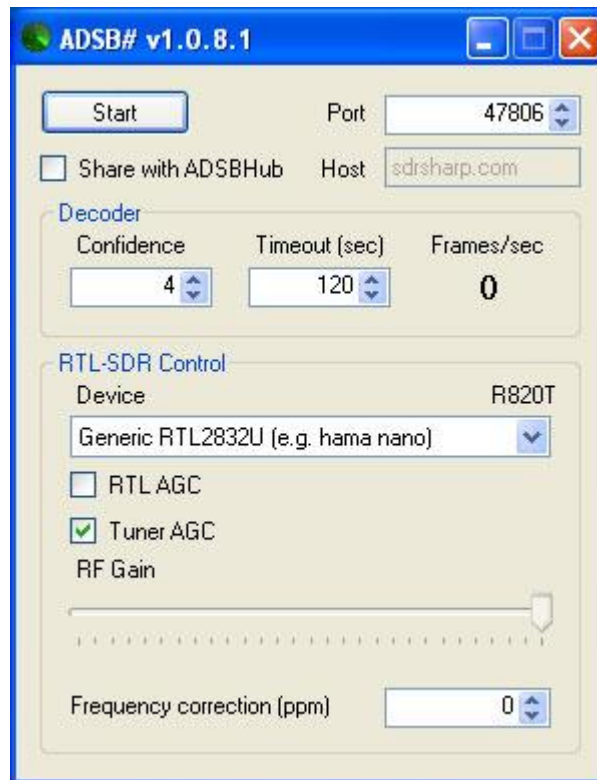




ADSB#

BASIC LAYOUT



There's really not a lot to look at when you open ASDB#. The panel is broken down into three sections;

The top section contains the **Start/Stop** button, and a selector for the **Port** number that you want to use to talk to your decode/display program (default 47806). It also includes two additional settings. A checkbox to enable data sharing with a hub and a **Host** address box. This allows multiple users to send data to a single point (hub) where it can be combined and shared as if it was from a single point. The **Host** box (default **sdrsharp.com**) is the **IP** or **URL** of the hub listening at port 47806. See the section on **ASDBHUB** for additional information.

The **Decoder** section includes to adjustments for handling the received data packets. **Confidence** is to determine how many packets from a single ICAO ID is needed before the decoder recognizes that target. Lower will allow more distant or weaker targets to be tracked, while a higher number may be necessary in areas with lots of RF noise to eliminate false or distorted signals. The **Timeout** is used to adjust how long between packets from a single target will be allowed before it must pass the **Confidence** filter again. There is also a display showing the framerate for the decoded data in **Frames/sec**. This can be useful for tuning RTL-SDR settings or antenna configurations at your receiver location.

The **RTL-SDR Control** section has settings to fine tune your SDR dongle via the rtl-sdr device driver. This driver is included in the ADSB# zip, and is released under the MIT license. See the LICENSE file in the zip for details and further information. Inside the RTL-SDR Control section are five controls. The first is to select which device to use if you have more than one device installed on your system. If you only have one dongle plugged into a USB port, no change is necessary here.

NOTE: ADSB# requires a realtek based DVB-T with either the E4000, or R820 tuner chip. Other tuners have been tested to not have the necessary sensitivity or range to detect and use the ADS-B signal. Some E4000 tuners also have difficulty with this signal, and the R820 is the currently recommended tuner for this operation. This program will not use other sources such as audio input for operation as SDR# does.

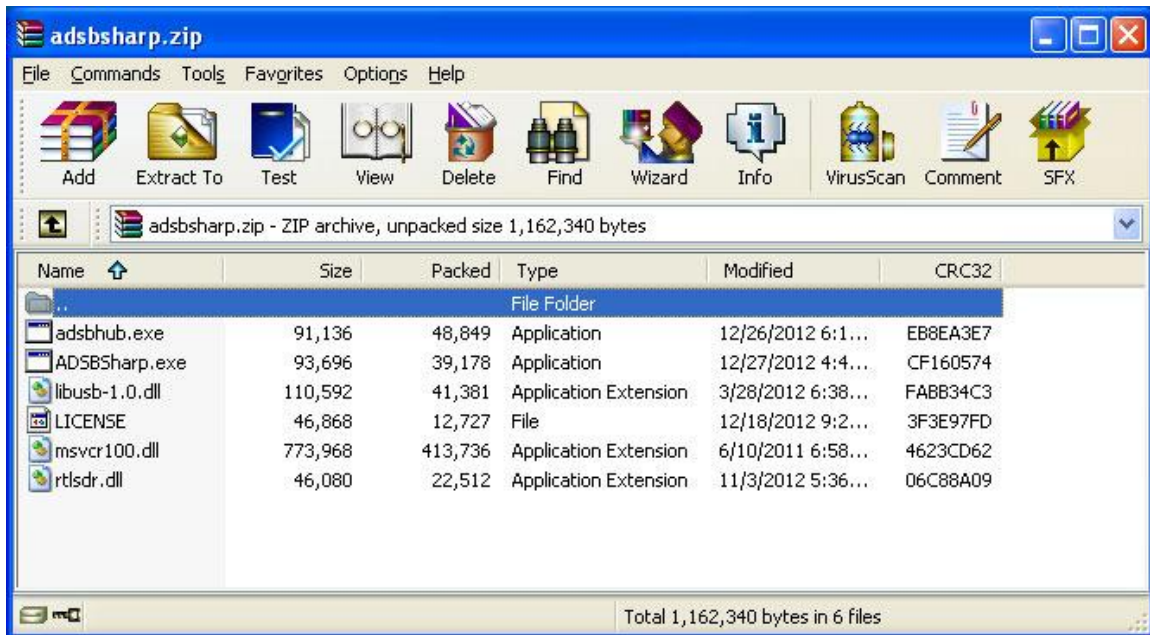
The next two checkboxes are for enabling the AGC (automatic gain control) of either the realtek controller (**RTL AGC**), or the tuner (**Tuner AGC**). Beneath that is a slider for manually setting the **RF Gain** if **Tuner AGC** is deselected. The last control is for setting the **Frequency Correction** of the tuner in **ppm** (parts per million). This is not a critical setting as the signal is wide enough to be detected without knowing the correction of your device. However, if it is known, setting it may provide some additional sensitivity. See the SDR# QuickStart for determining the ppm correction for your device. This is probably unnecessary as the bandwidth of the ADS-B signal is so wide that satisfactory detection with extreme ppm errors is still typical.

The default settings should be a good starting point for most users, and may not need any further changes depending on factors such as antenna, cable, local RF noise, interference, and other site specific variables. Feel free to play with the individual options to tune your setup for the best reception.

NOTE: It is recommended that you hit the Stop button before changing any of the RTL-SDR settings. Not doing so may cause your system to lock up or become unresponsive for several seconds to several minutes. This is caused by the rtl-sdr device driver and is annoying, but normal.

INSTALLING ADSB#

The ADSB# zip includes five files. Extract all of these into the folder of your choice.



Your folder will now contain all of the files needed for operation of ADSB#. The program itself, and the necessary drivers to communicate with your dongle.

There is one additional step needed to get SDR# running with RTL based devices. Installing the zadig USB driver, replacing the default windows one. Full instructions and a link to the driver can be found at <http://rtlsdr.org/softwarewindows>. This driver MUST be installed successfully for proper operation of the dongle.

This is only necessary if you have not installed it for operation of SDR#, or other SDR program requiring it.

ADSB# only receives and decodes the raw hex data from the ads-b signal, and acts as a multi-client TCP server to send that data to whichever decoding and display program you are using. The two most popular of these are Virtual Radar Server, ADSBscope, and PlanePlotter. ADSB# works equally well with any or all of these programs at the same time, or to a single ADSBHub. Since ADSB# is acting as a TCP server, you can access the data stream from any computer that is accessible on your network. This means that multiple users may have access to the data at the same time, and that the dongle may be used in a remote computer with the best access to an outside antenna if one is available.

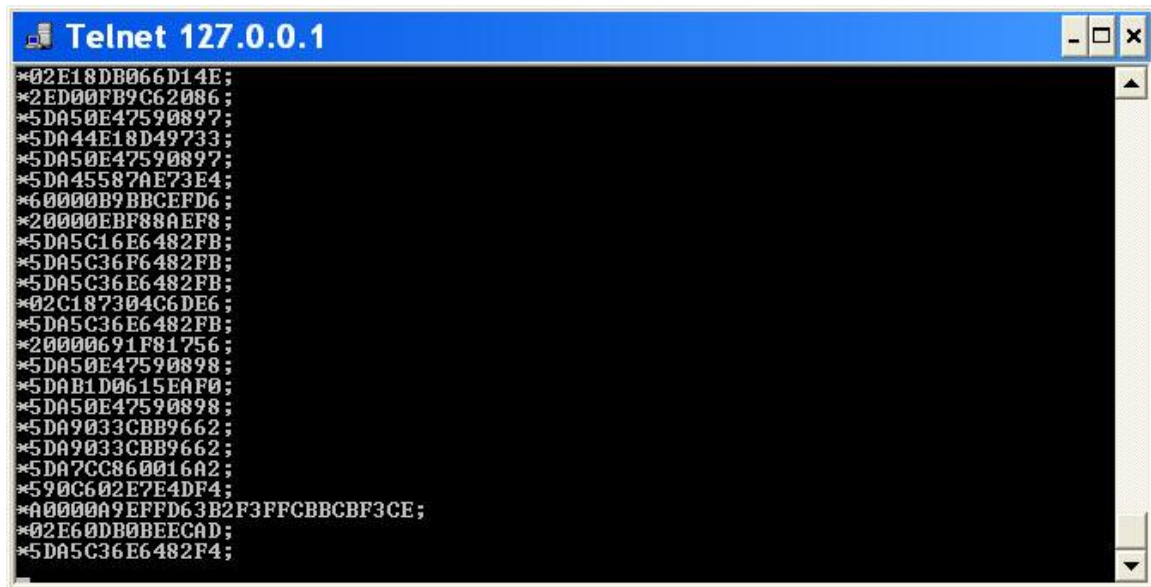
If you wish to see the actual data being sent from ADSB#, you can also open up a telnet session. In the below example, from the Start menu, hit run and enter telnet and press enter. A CLI will open with

Microsoft Telnet>

Enter (in this case, the localhost ip, and the default port). Note the space between the IP and the port number instead of the usual :.

o 127.0.0.1 47806

If you have a working setup, with an antenna capturing a signal, you should see data scrolling by that looks like;

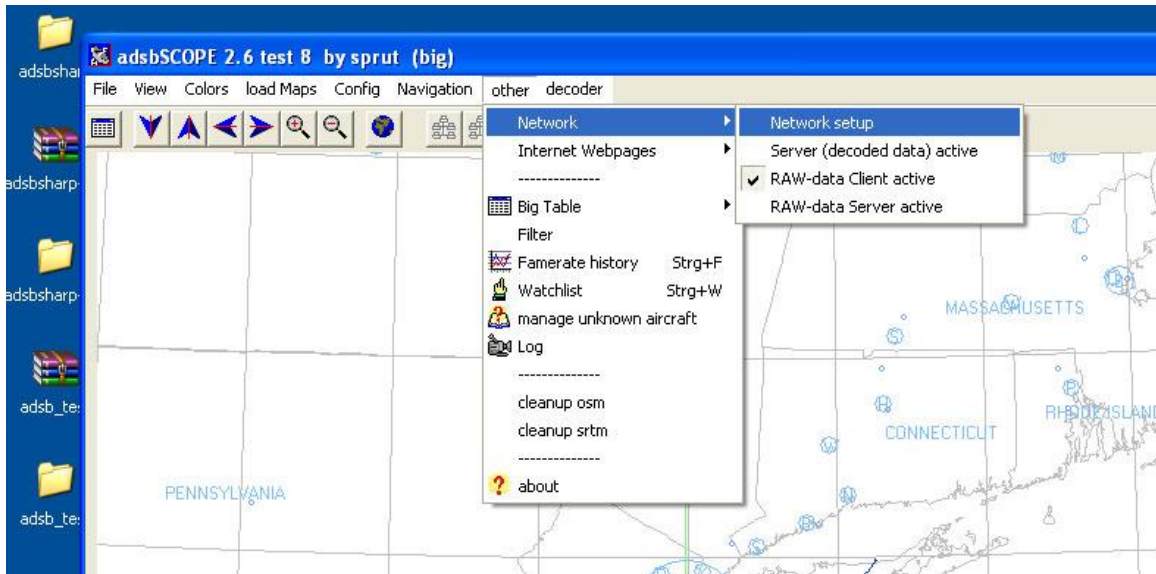


```
Telnet 127.0.0.1
*02E18DB066D14E;
*2ED00FB9C62086;
*5DA50E47590897;
*5DA44E18D49733;
*5DA50E47590897;
*5DA45587AE73E4;
*60000B9BBCEFD6;
*20000EBF88AEF8;
*5DA5C16E6482FB;
*5DA5C36E6482FB;
*5DA5C36E6482FB;
*02C187304C6DE6;
*5DA5C36E6482FB;
*20000691F81756;
*5DA50E47590898;
*5DAB1D0615EAF0;
*5DA50E47590898;
*5DA9033CBB9662;
*5DA9033CBB9662;
*5DA7CC860016A2;
*590C602E7E4DF4;
*A00000A9E9FD63B2F3FFCBBBCBF3CE;
*02E60DB0BEECAD;
*5DA5C36E6482F4;
```

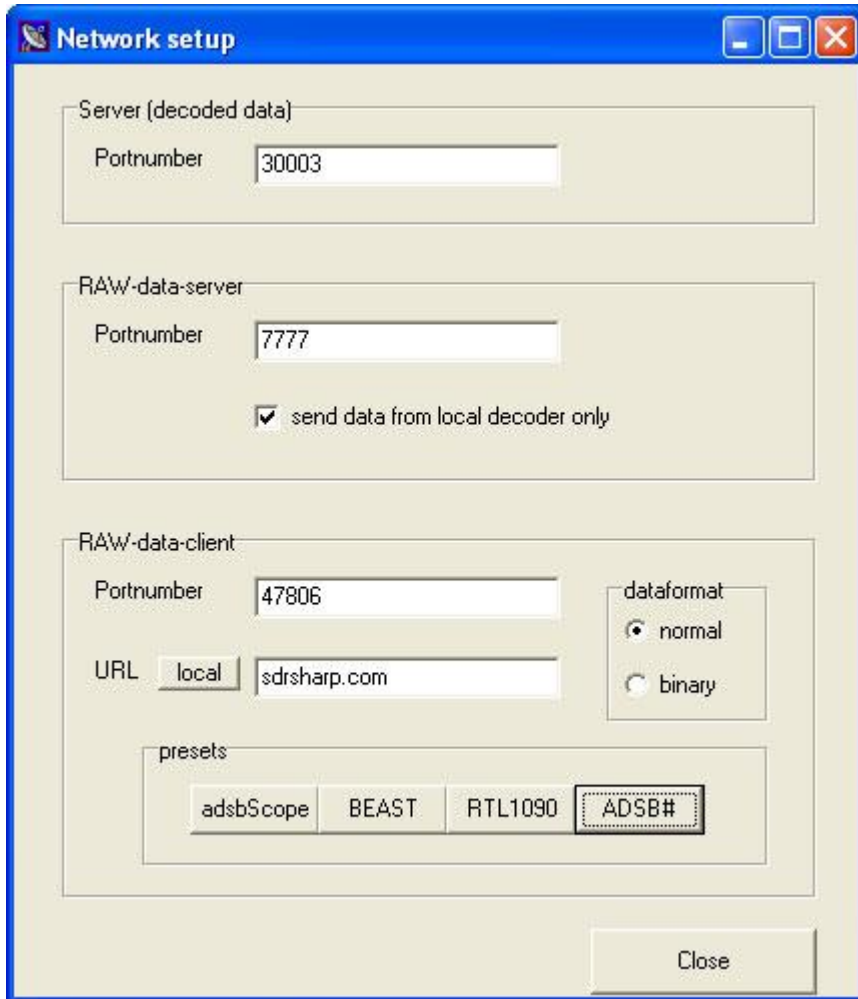
This is the raw hex data used by your decode/display program. Now that we have a working installation, you can close that window and never open it again.

Configuring ADSBSCOPE

For operation with ADSBSCOPE, only a single entry needs to be changed. From the menu bar, click other -> Network -> Network Setup.



The following window will popup with sections for entering IP and Port information. We are only interested in the bottom section, RAW-data-client.



The screenshot shows a 'Network setup' window with three main sections. The 'Server (decoded data)' section has a 'Portnumber' field set to '30003'. The 'RAW-data-server' section has a 'Portnumber' field set to '7777' and a checked checkbox for 'send data from local decoder only'. The 'RAW-data-client' section has a 'Portnumber' field set to '47806', a 'URL' dropdown set to 'local' with a text field containing 'sdrsharp.com', and a 'dataformat' section with 'normal' selected. Below these is a 'presets' row with buttons for 'adsbScope', 'BEAST', 'RTL1090', and 'ADSB#', with 'ADSB#' being the active preset. A 'Close' button is at the bottom right.

Pressing the ADSB# preset will enter the default port 47806 into the Portnumber box. For the URL box you have more than one possible entry depending on your preferences;

127.0.0.1 – Where you are running ADSB# locally and only want to use the data from that source.

192.168.x.xxx – IP address of another server on a local network where ADSB is running. This may be useful if you are using a separate machine for the dongle and ADSB# because its location may be better suited for an external antenna, or just want to see the ADSB# data on several machines within the same network.

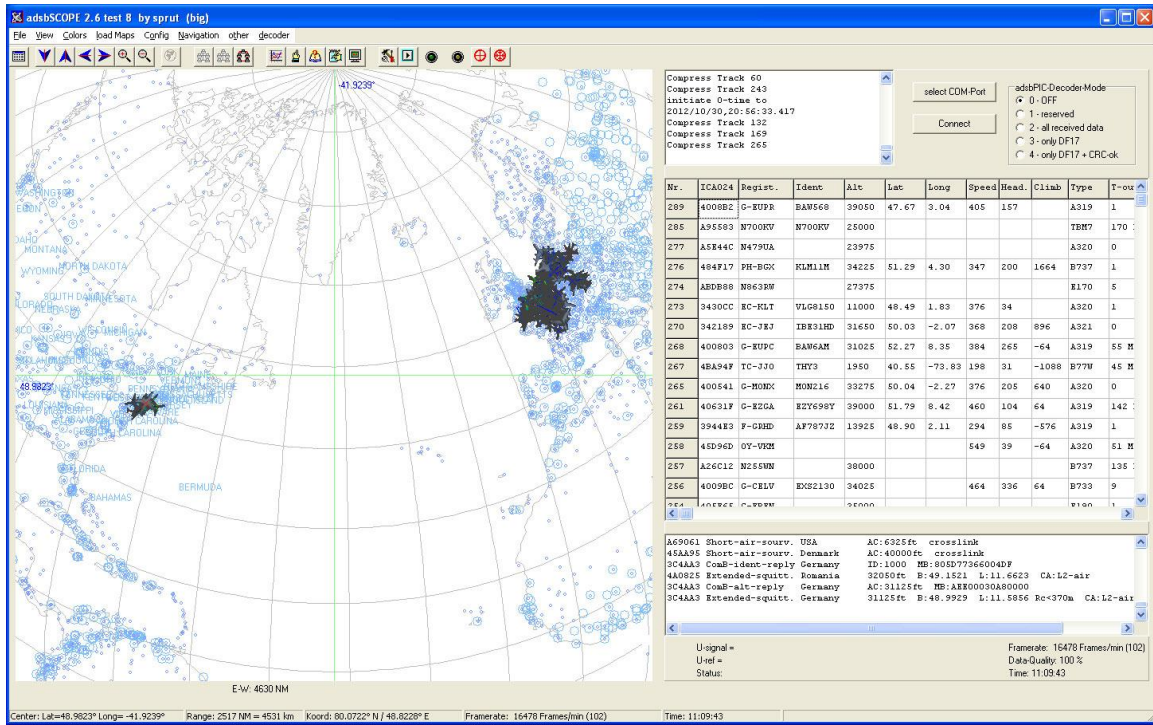
sdrsharp.com – If you are sharing data with other ADSB# users, and wish to see all of the planes being reported by all of the users connected to the official hub.

Other URL/IP – To connect to a private network running either ADSB# or ADSBHub.

Dataformat should be set to normal, not binary.

[illegible]

To view targets from other sharers, zoom back



The above sample is from a single east coast US sharer, and 4 in Europe.

Configuring Virtual Radar Server

For VRS operation, there are only four settings that need to be entered. From the main program screen, select TOOLS.

Virtual Radar Server

File **Tools** Help

Data feed status

Connection status:	Connected	Aircraft tracked:	75
Total messages:	2,340,371	Bad messages:	0

Web server status

The web server is online Take Offline

UPnP support has not been enabled Put onto Internet

IP Address	Last Request	Bytes Sent	Last URL
127.0.0.1	12/18/2012 9:39:38...	17,610,298	/Images/Rotate-205/PL1-529/PL2-N537J...

Show local address ▼ Default Version ▼ <http://127.0.0.1:8001/VirtualRadar>

Rebroadcast server status

Configuration: None

IP Address	Port	Format	Bytes Sent

,and the OPTIONS

Options

Data Sources

- Raw Feed Decoding
- Web Server
- Web Site
- General

1. Data Feed

1.1 Data source	AVR or Beast Raw Feed
1.2 Connection type	Network
1.3 Ignore badly formatted messages	No

2. Network

2.1 Address	127.0.0.1
2.2 Port	47806

3. Serial

3.1 COM port	
3.2 Baud rate	115200
3.3 Data bits	8
3.4 Stop bits	1
3.5 Parity	None
3.6 Handshake	None
3.7 Startup command	#43-02\r
3.8 Shutdown command	#43-00\r

4. Aircraft Data

4.1 Database filename	C:\SBS-resources\Files\Registration\BaseStation.sqb
4.2 Flags folder	C:\SBS-resources\Files\SQB0pFlags
4.3 Silhouettes folder	C:\SBS-resources\Files\SilhouettesLogos
4.4 Pictures folder	

1.1 Data source
The receiver or program that will be sending aircraft data to Virtual Radar Server. The AVR option supports *, @ and : messages as well as Beast binary format messages.

[Reset settings to defaults](#)

[Test Connection](#)

[OK](#) [Cancel](#)

For data source select, AVR or Beast Raw Feed.

Connection Type, Network

Address 127.0.0.1 for localhost, or the IP or URL of the computer running ADSB# or ADSBUB

Port, 47806 (or selected port if not ADSB# default)

Hit OK, and you're done.

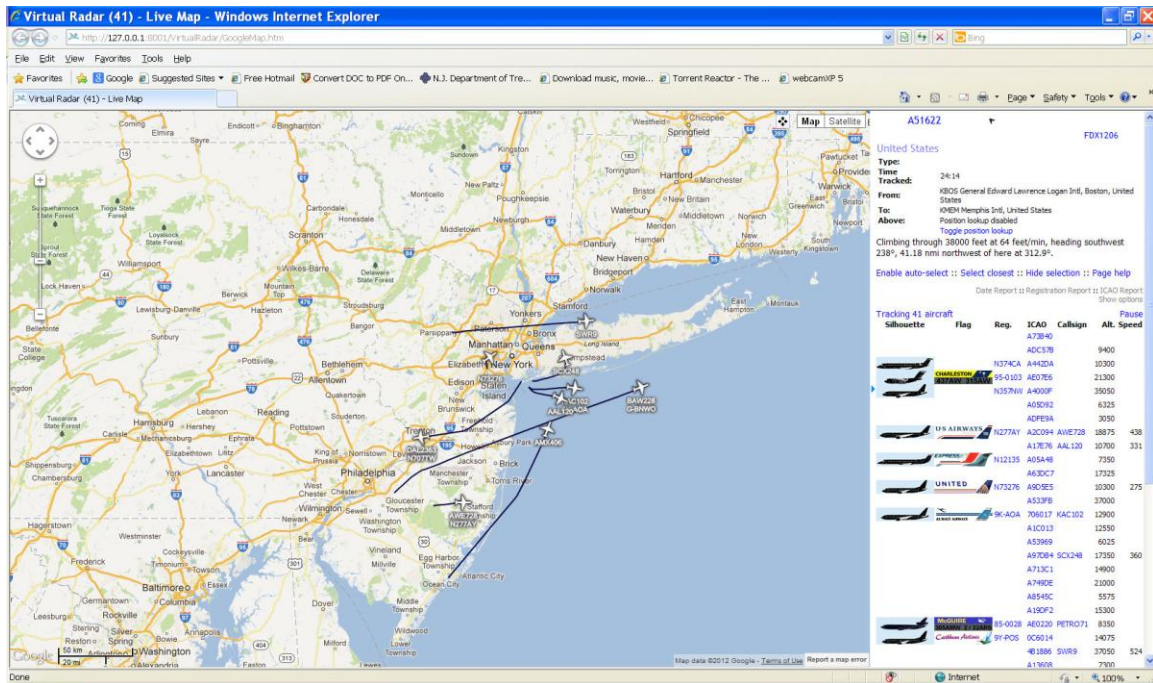
The next part is to open the VRS page displaying your received data. Near the bottom of the main VRS screen you'll see;

[Show local address](#) [Default Version](#) <http://127.0.0.1:8001/VirtualRadar>

[Rebroadcast server status](#)

On the left side, you have three choices, local address, network address, and internet address. Select the one appropriate for your installation, and on the right side, the link will display the correct address for connecting the VRS web server.

If everything goes right, by clicking on that you'll see your browser open up and display something similar to;

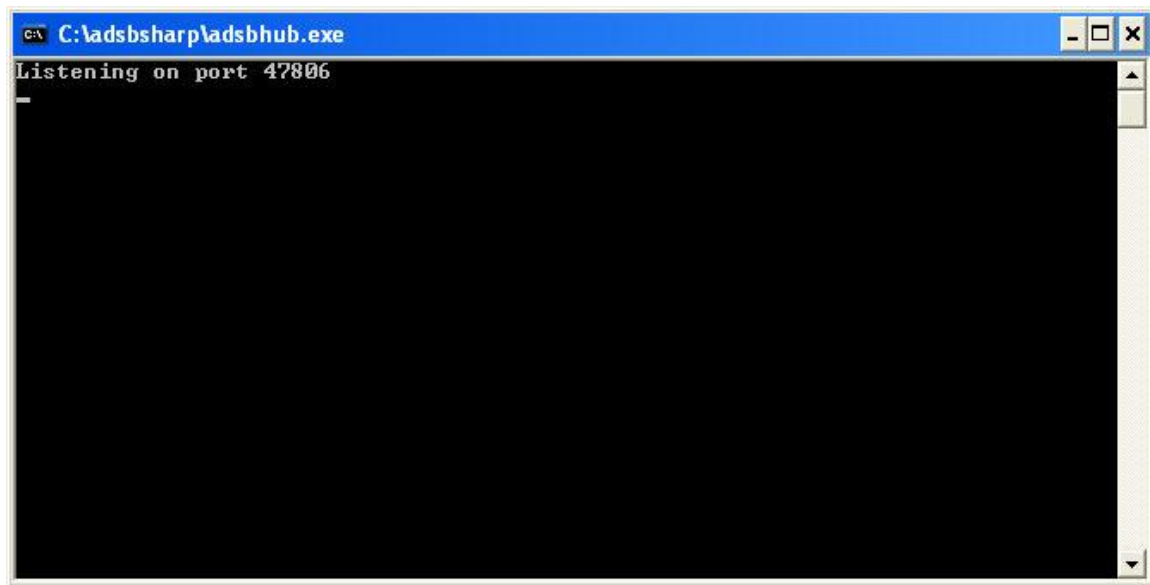


A default install of VRS will not display the airplane silhouettes or flag graphics as above. Additional software is required and available on the web. See the VRS homepage and instructions for complete configurations information.

Running ADSBHub

ADSBHUB is a small program that acts as a wedge between ADSB# and port 47806. It will listen for incoming AVR packets, and then retransmit them so other listeners connected to your installation at that port. It may be started either before or after ADSB#, and will only display a single line **Listening on port 47806** during normal program operation.

Some antivirus programs may detect this program as a threat and ask permission for it to be added to the exceptions list. It is safe to do so, and allowing ADSBHUB to handle all traffic through this port will cause no threat to your computer or network.



Common Problems

Issues with firewalls, network settings, or certain antivirus software may cause issues with your installation. These should be investigated and corrected by the individual users.

Not all dongles are created equal. While the R820 and E4000 have the best track record of receiving 1090 MHz, some E4000 equipped dongles simply refuse to lock onto a signal at this frequency.

Antennas have a huge impact on ADS-B reception. Feed line also. There are plenty of links on the web covering home built antenna design and construction. That little antenna that came with your dongle may or may not be adequate for reception depending on location, local noise levels, individual construction quality, etc. This would be the first thing I'd recommend upgrading.

Common sources of local noise that may mask or overpower the ADS-B signal include, but are not limited to, Wi-Fi hubs, fluorescent lights, noisy power supplies (wall warts), LCD monitors, and 'green' light bulbs.

NOTICE: The authors of this software are not responsible for the utility, quality, interoperability, performance, or operation of this software in any other computer systems other than their own. Use it at your own risk. The user is also responsible for obeying all local laws, but not limited to the operation or use of this software. Use common sense and obey all pertinent ordinances including operation while intoxicated, sober, driving, flying, swimming, or listening to jazz music while having an espresso.

No warranties are granted, implied, suggested, or assumed. Do not work on exterior antennas during high winds or thunder storms. Do not mix with other prescription software without the consent of a Doctor, or someone who just plays one on television. Do not attempt to swallow the dongle or a copy of this software. Do not feed after midnight.

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