

Black Cat ACARS

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Black Cat ACARS is an app to decode and display ACARS aircraft messages sent over VHF radio. The emphasis of this app is good reception of even weak signals received under marginal conditions. It also features up to 16 decoders, so you can decode transmissions from lots of frequencies at once, possibly all the active ACARS frequencies in your area. Virtual audio devices are supported, which can be used in conjunction with SDR programs to tune/decode from all the frequencies at the same time. You will need to consult the documentation for your particular SDR program for the details on running multiple receivers at once.

Requirements:

Macintosh: macOS 10.9.5 or later.

Windows: Windows 8, 10, 11.

Installation:

Presumably you've gotten this far, and have downloaded and unzipped the .zip file.

If you are running on macOS, move the application anywhere you wish.

If you are running Windows, you can move the entire download directory/folder wherever you wish, but you must keep the Libs and Resources directories with the EXE file, or the program will not run.

First Things First:

Run the program by double clicking on the app's icon. You'll see the main window.

First, select the correct sound input device(s). This is done via the Sound Input popup menus, one for each decoder tab. Also set the input gain appropriately (note that not all sound input devices let you change the gain).

The Basics:

I'd strongly suggest reading the entire documentation below, so you know how to use the app. But here are the basics, to receive ACARS messages.

Make sure you have selected the correct sound input device and set the gain appropriately.

Feed sound into that device from your radio, set the volume of the radio appropriately. The volume indicator should be showing activity, but not pegged to the right.

Tune to an ACARS frequency, using AM mode on your radio. Make sure the radio's squelch is disabled, so you always hear static when there are no transmissions. If your radio has an adjustable AGC setting, you may need to adjust it for best reception (most decodes).

It is entirely normal for only some audible ACARS transmissions to decode, as weak or garbled transmissions cannot be decoded.

There are two settings checkboxes:

Suppress Parity Errors: won't display transmissions that have detected errors

Graph: displays a moving window graph of the signal level, useful for diagnostics.

Statistics for the number and percent of good and bad packets is displayed. These can be cleared to zero using the Reset button.

There are several windows you can open to view a summary of messages received, from menu items in the File menu:

The Planes List Window shows messages sorted by the plane number.

The Flights List Window shows messages sorted by the flight number.

The Messages List Window shows messages sorted by the message type.

The Frequency List Window shows messages sorted by the frequency.

You can click on a summary line in any window to bring up another window, showing all received messages fitting that description.

The Message List Window additionally allows you to specify certain message types that will not be displayed on screen, nor written to log files. To ignore messages of a certain type, right click on that type in the window, and select Ignore this message type. An asterisk (*) will be displayed next to any message types that are being ignored. You can right click again and select Stop ignoring this message type if you wish to start displaying/logging messages of this type again.

Logging Received Messages:

There is an option in the File menu to start logging decoded messages to a text file. Select Stop Logging to close the logging file. If the file exists, it will be appended to, rather than overwritten.

Start Rolling Log can be used if you want to write a series of log files, rather than just one large file. First, go to the program Settings, and specify the directory for rolling logs, as well as the duration of each log file in hours.

Aircraft Database:

Black Cat ACARS can use the Open Sky Network database file to display information about many commercial aircraft.

You can download this file from:

<https://opensky-network.org/datasets/metadata/>

As of now the direct URL for the file is:

<https://opensky-network.org/datasets/metadata/aircraftDatabase.csv>

A ZIP archive version is currently available here:

<https://opensky-network.org/datasets/metadata/aircraftDatabase.zip>

Make sure the file is named aircraftDatabase.csv

There are three possible locations where you can place the file on your computer, so Black Cat ACARS can find it:

1. In the BlackCatSystems directory in the Application Data directory for your user account. For Windows, this is usually:
`\Users\UserName\AppData\Roaming\BlackCatSystems`

For macOS, this is usually:

`/Users/UserName/Library/Application Support/BlackCatSystems`

You can easily navigate to this directory on your computer by opening the Settings/ Preferences window in Black Cat ACARS, and then click on the Open Application Data Directory button. Note that this directory will not exist until you have run Black Cat ACARS at least once.

2. In the Documents directory for your user account. If running macOS, make sure your privacy settings for Black Cat ACARS allow it to access your Documents directory.

3. In the same directory as Black Cat ACARS itself. If running macOS, note that due to Gatekeeper Translocation, you may have to move Black Cat ACARS out of your Downloads directory first.

When the database is correctly loaded at program startup, a message will be displayed in the first decoder tab, showing how many aircraft were loaded. Usually this number is about half a million, so it will take the programs a few seconds at launch to read and process this much data.

If you aren't using the Open Skies database, Black Cat ACARS has a built in database with model information about many planes. As such information can quickly become out of date, you can add your own plane information. Create a text file called ACARS.TXT (note this must be a plain text file, not an RTF or word processing format file!). This file contains one line of information for each plane. The first 7 characters of each line are the plane registration number, followed by a space. The rest of the line contains the text to be displayed. Leading period(s) are required to force the registration number to be seven characters long.

When a packet is decoded, the plane registration number is compared to the registration numbers of the planes in the ACARS.TXT file. If a match is found, the text from that line of the file is displayed after the timestamp. You may use this file to display text or comments about each aircraft. Any entries in this file supersede those from the built in database.

An example of the file format follows below:

```
.N814US This is plane number 1
.N320US This is plane number 2
.NIM5AA This is plane number 3
.N781NC This is plane number 4
.N609AA This is plane number 5
```

Running Multiple Decoders

Up to 16 decoders can run at the same time. The default number is 1, to change this open the app settings/preferences and change the number, then quit and restart the app for the change to take effect.

ACARS Frequencies

129.125 MHz USA and Canada Additional
129.350 MHz
130.025 MHz USA and Canada Secondary
130.425 MHz USA Additional
130.450 MHz USA and Canada Additional
131.125 MHz USA Additional
131.450 MHz Japan Primary
131.450 MHz NZ ARINC Channel
131.475 MHz Air Canada Company Channel
131.525 MHz European Secondary
131.550 MHz World Primary
131.725 MHz Europe Primary
131.850 MHz New European Channel
136.700 MHz USA Additional
136.750 MHz USA Additional
136.750 MHz New European Channel
136.800 MHz USA Additional
136.850 MHz SITA North America
136.900 MHz European Secondary

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