

Black Cat SSTV Version 2.3.0 April 10, 2023

Black Cat SSTV is an app to receive and transmit Slow Scan TV (SSTV) images. Why yet another SSTV app? There's plenty of SSTV apps already out there. The emphasis of this app is good reception of even weak SSTV signals received under marginal conditions. If you want an SSTV app that will show you the DX you've been missing, Black Cat SSTV is for you.

Requirements:

Macintosh: macOS 10.9.5 or later. It is 64 bit, so works fine with 10.15 and 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 app will not run.

First Things First:

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

You need to set a few things up.

First, the directory where saved SSTV images will be stored. Select Set Image Save Directory from the File menu to do this.

Second, select the correct sound input device. This is done via the Sound Input popup menu. Also set the input gain appropriately (note that not all sound input devices let you change the gain).

Third, if you will transmit, go to the Transmit tab, and set the Sound Output device.

Fourth, if you wish to use the Black Cat SDRuno plugin, go to the Setup tab and check

the Use SDRuno Plugin checkbox. Note that communications between SDRuno and this app use UDP ports 58283, 58284, and 58286. Make sure you do not have any Firewall or other settings blocking these ports or blocking this application or SDRuno from using networking, or the plugin will not work. If you wish to directly receive sound from SDRuno via the plugin rather than use a virtual sound device, select Streaming as the sound input device.

The Basics:

I'd strong suggest reading the entire documentation below, so you know how to use the app. But here are the basics, to receive SSTV images.

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.

Tune to an SSTV frequency, 14230 USB is a good choice.

Make sure you have the Auto checkboxes near SSTV Mode and Manual Receive ticked.

Make sure Pause decoding is not ticked.

Make sure you have not deselected all the SSTV modes.

Make sure you have Auto Adjust ticked next to Skew and Offset.

Make sure the x10 button next to Skew is not toggled on.

Click Reset next to VIS Quality to go to the default value.

Sit back and wait for some SSTV images to be sent, and hopefully decoded.

If nothing decodes, and you are sure your radio is actually tuned to 14230 USB and you really heard a fairly strong SSTV transmission, you can try lowering the VIS Quality value (but this is very unlikely to be necessary). Double check your volume levels, make sure the app is getting audio (the volume indicator should hover around half way or so, bouncing around). The Spectrum display should look like random noise when nothing is being received, and somewhat less random when SSTV is being received.

If you are getting too many false decodes, raise the VIS Quality value a little, wait, repeat if needed, until they stop.

A tour of the controls for receive mode:

Sound Input: Select the input device, and set the gain (note that not all sound input devices let you change the gain). Also view the input level, to make sure you are not clipping.

Spectrum: This displays the audio spectrum. There are ticks at the bottom, in 100 Hz steps. Important SSTV frequencies of 1200 (sync), 1500 (black) and 2300 (white) are in bold.

SSTV mode: This popup menu lets you select the SSTV mode. If the Auto checkbox is ticked, the app will automatically set the received mode based on the received VIS code. You can override this if you wish, and manually select the mode. You can change the mode while the image is still being received, and it will be redrawn. Once all of the lines for a particular mode have been received, if you change to another mode that has a longer transmit time, the bottom of the image will of course be clipped.

Manual Receive: You can use these buttons to manually start and stop decoding. If the Auto checkbox is ticked, the app will automatically start receiving when a VIS code is received.

Pause decoding: tick this checkbox if you want to prevent a new image from being decoded while you are fiddling with the skew or offset, audio will be buffered while you do this, so you should not lose any new images (for a few minutes anyway).

Pause decoding: tick this checkbox if you want to prevent a new image from being decoded while you are fiddling with the skew or offset, audio will be buffered while you do this, so you should not lose any new images (for a few minutes anyway).

Save image: click the button to manually save an image. Be sure you have set your save directory by choosing Set Image Save Directory from the File menu.

Auto save: the app will automatically save images if this box is ticked. All image filenames are timestamped.

Format: select PNG or JPG. If you select JPG you can also pick the quality, 0-100%. I would not advise numbers less than 50% or so. Experiment.

VIS Quality slider: how "good" the detected VIS code can be, to still be considered valid. Larger numbers require a "better" signal, smaller numbers allow "worse" signals to be possibly detected. Too small and you mis-detect noise as a VIS code. The Reset button will go back to the default value.

Next to the slider are three numbers. The first is what the slider is set to. The second (in brackets) is the current detected value. The third is what the software has detected so far as a best value for the current image.

The skew and Offset controls under the SSTV decode image adjust the received image timing:

Skew is the slant of the image, due to timing difference between the sending and receiving computer sound cards. A skew of 1 means there is no timing difference. The Reset button will go back to the default value. You can manually adjust the skew if you need to. The x10 button can be clicked if you need to make drastic changes to the timing.

For many sliders, you can click or right click on the slider name text to increment or decrement the value, for more precise control. The shift, option/alt and command modifier keys can also be used for larger adjustments.

The Auto Adjust checkbox next to the skew slider will make the app auto-compute the skew when the image decoding is done. This is a computationally intensive process and can take a few seconds.

The offset is the timing difference between the VIS signal and the start of the image data. This can be adjusted manually if the image is horizontally offset. If you change the skew or offset to fix an image, you must manually re-save it by clicking the Save Image button. You'll get a new image file with the current timestamp, in addition to any image automatically saved by the app. The \pm Line button can be clicked to adjust the offset by +/-1 scan line, useful if a Robot 12C or 36C image comes in offset by one scan line.

The Auto Adjust checkbox next to the offset slider will make the app auto-compute the offset when the image decoding is done. Note that for this to occur, the skew auto adjust must also be enabled.

The second offset slider adjusts the image by (roughly) entire scan lines. It can be useful if you have decoded from a sound file, when the actual transmission begins some time into the file.

A tour of the menu bar:

File menu:

Set Image Save Directory: specifies where the app saves received SSTV images.

Set Gallery Directory: Sets the directory on your computer used to populate the received image gallery.

Set Gallery Category: Selects which category is used to populate the received image gallery.

Set Category Directories: Sets the base directory for the gallery.

Archive Saved Images: Moves all the saved received images to another directory.

Set Transmit Image Directory: Sets the directory on your computer used to populate the transmit image gallery.

Decode Audio File: Decodes an audio file into an SSTV image. The audio file must be a WAVE file. It won't alert you if the file is the wrong format, it just won't work. Mono and stereo files are supported, either 8 or 16 bits, and in theory any sample rate above 5 kHz.

Decode Audio File With Auto Start: Same as above, except the app will start decoding immediately, using the correct SSTV mode, without waiting for a VIS start. Useful if you have a recording of a very weak SSTV transmission that simply will not normally decode. You need to know the SSTV mode used, or guess by changing it while decoding. You will also of course need to manually set the offset and possibly skew.

Load Transmit Image: Loads the JPG or PNG image to be sent. Only enabled when in the Transmit tab of the app.

Edit menu:

Copy Image: Copies the image into the pasteboard, so you can paste it into another app.

Upload Image To Imgur: Uploads the image to the Imgur service. When the upload is finished, a window will appear with the URL of the image. Copy this, and you can share it so others can see your image.

Paste Image To Transmit Buffer: Will paste an image from the pasteboard into the transmit buffer, so you can send it. You can also paste from the menu, or drag and drop an image file.

Refresh Gallery Images: Will reload the gallery images from the directory. This item will be greyed out if the program is still processing the images.

Delete All Saved Images: Delete all the saved received images. Warning: This cannot be un-done.

Clear Image: clears the received image.

Previous/Next Mode: Cycle through enabled SSTV modes.

Previous/Next Mode (All): Cycle through all SSTV modes.

Start Image Receive: Manually trigger receive.

Abort Image Receive: Stop receiving the image.

Enter Registration Code: Enter your registration information.

Windows menu:

Main: Selects the app's main window.

Received Image Gallery: Opens the gallery window that shows all received images.

Callsign Lookup: Enter a callsign and your browser will be opened with information about that callsign.

Received Mode Statistics: This brings up a window showing how many SSTV images of each mode have been received.

Modes To Auto Detect: This brings up a window where you can select which modes the app should auto detect. You can deselect modes that are rarely received, so noise doesn't trigger false decodes.

Help: Opens this document.

Transmit Tab:

Sound Output: Select the sound output device and volume level.

SSTV Mode: Select which mode will be transmitted.

Send CW: Type some text into the box and click the button, it will be sent as CW.

1750 Tone: When toggled on, 1750 Hz will be sent. The frequency can be changed in the Settings tab.

PTT: When toggled on, the PTT line of the selected serial port will be turned on.

CW ID: When clicked, your callsign will be sent as CW.

Transmit: When clicked, the image will be sent.

Abort: When clicked, the transmission will be aborted.

Paste Image: Will paste an image from the pasteboard into the transmit buffer, so you can send it. You can also paste from the menu, or drag and drop an image file.

Tx Audio ppm: Can be used to compensate for sound device sample rate errors.

Positive or negative ppm (parts per million) values can be entered. This only affects the transmit audio, not receive audio.

Editor Tab:

This can be used as a very simple (not full featured!) graphics editor to create images to send. You can set the background color/image, and add image/text objects. These objects can be dragged around.

Select an object by clicking on it, a blue border will appear. You can also use the tab key to cycle through the objects. Objects can be dragged around, or resized by using the mouse thumb wheel.

If the object is a text object, you can change the text by typing. You can also change the font, size, text color, and attributes.

Load Background: Loads a JPG or PNG file, and sets the background of the image to this picture. If you hold the shift key when clicking on the button, the image will be rescaled to just fit the entire canvas.

Color: Click to set the background to a solid color, which you can pick.

Add Received: Adds the current received image as a graphics object. Handy if you want to sent back an image just received, as part of your next transmission.

Clipboard Background: Sets the background image from the picture in the clipboard, if there is one. Again, hold down shift to have it resized to the entire canvas.

Clipboard Image: Adds the picture in the clipboard, if there is one, to the canvas as an object.

Load Image: Loads a JPG or PNG file, and adds the picture to the canvas as an object.

Add Text: Creates a text object and adds it to the canvas. You can edit the text by selecting the object and typing.

Make Tx Image: When clicked, the current picture in the canvas will be sent to the transmit buffer, so you can transmit it.

Save as JPG: Use this to save the current picture as a JPG image. It will be flattened (all the objects will be deleted).

Save as PNG: Use this to save the current picture as a PNG image. It will be flattened (all the objects will be deleted).

Save: The background and set of objects is saved.

Load: Load a background and set of objects.

These controls can be used with text objects, select the object to change them:

Font popup menu: Use to select the font.

Font Size menu.

Bold

Italic

Underlined

Outline

Color: Click the rectangle to set the color of the text.

These controls can be used to set/control the Header at the top of an image:

Header: Check this box to use a header.

Color: Click the rectangle to set the color.

Gradient: Not yet implemented.

Text: Type in the text for the header here.

Color: Click the rectangle to set the color.

Setup Tab:

Callsign: Type your callsign here, so you can send it from the Transmit tab. Set the speed to your desired WPM. You can also check the box to have your call automatically sent at the end of an image, and set the time delay before the call is sent.

Invert Scroll Wheel Polarity: flips the polarity of the scroll wheel on your mouse, when you scroll it over a slider control.

Serial Port: Select your serial port from the popup menu, and which handshake line to use. That line will be turned on when in transmit mode. Can be used to automatically control the PTT line of your radio. You will need to figure out the hardware to do this. There are a nearly infinite combination of radios and serial ports, I cannot provide any assistance with this.

Add timestamp info a bottom of saved images: When checked, saved images will get a small area of additional image added to the bottom where the timestamp will be displayed. It is not displayed overtop the image as in some other SSTV apps, which is ugly. The frequency offset in Hz is also displayed.

UDP Status Port: The app sends some status messages out this UDP port. Leave this box blank normally, if you do not want this to happen. Messages sent:

RXSTOP: An image has been received

RXSTART mode: Start of image reception along with mode

FREQOFFSET nnn: Frequency offset of image in Hz

MANUALRXSTART: Manual reception of image started

MANUALRXSTOP: Manual stop of image reception

SAVEIMAGE path: Image saved, along with path

TXSTART mode: Start of image transmission along with mode

TXSTOP: End of image transmission

TXABORT: Image transmission manually aborted/stopped

Rejection of noisy images:

Black Cat SSTV has a built-in algorithm (courtesy of AA7AS, thanks!) to compute how noisy a received image is. This can be used to not save images that are too noisy, as well as abort reception of images that are noisy (and may not even be actual SSTV images but false VIS triggers).

Computed image noise values range from 0.0 (for a perfect image, if such a thing existed) to about 0.25 for an image that is entirely noise. Please remember that this algorithm tries to determine how noisy an image is based on relationships between the pixel values, and is only an estimate that is influenced by the original image itself. In other words, it is not perfect :)

Three parameters are used to control these functions:

Max Noise To Auto Save: At the end of reception of an image, the noise is computed. If it is less than this value, it will be auto saved (assuming auto save is enabled). Otherwise it is discarded.

Noise To Abort Receive: Part way through reception of the image, the noise is computed. If it is less than this value, the rest of the image is received, otherwise the reception process is aborted. This can be useful to deal with false VIS triggers caused by non-SSTV transmissions on the frequency.

Percentage to Check: This specifies when the above check is made. It should be larger than 0 and less than 100 of course. I find 20% works well, but this is up to the user.

Noise Threshold: Used by the internal noise calculation routine. Leave set to 64 unless you have a specific reason to change it.

Append Noise To Saved Filename: Appends the calculated noise value to the name of saved files as a three digit integer. 0.071 is appended as 071 for example, with a dash before it.

Upload received images to an FTP server:

Received images can also be uploaded to an FTP server, after they are saved. The saved image format defines whether they are JPG or PNG files. For brevity, the following instructions assume PNG, in JPG mode the filename extensions will of course be different.

With some simple html/php/etc coding, you can create a website to display these images on your server. It is beyond the scope of this document to explain how to do

this, and technical support for creating your own webpage is not available. There are numerous resources online explaining how to create websites and display images. The same applies to setup and administration of an FTP server.

In the Setup tab, use the popup menu to select one of these modes of operation:

Off – FTP uploading is disabled

Just Latest – Each image is uploaded with the filename latest.png

Rotate N Images – Images are upload with names image1.png, image2.png, image3.png... and so on. When the limit is reached (defined by the text box just to the right of the popup menu), the next image reverts back to image1.png. This mode allows you to have a gallery of recently received images available for display on your website.

Rotate N Images + Latest – Works the same as above, but the image is also uploaded with the name latest.png so that the most recent image can also be displayed prominently and separate from a gallery of images.

Timestamped – Uploaded images have the same filename as the saved image. Old images are no deleted, it is up to you to do that manually or automated.

Next, the username and password for the FTP server must be entered. If you prefer to use SFTP, check the box.

The final piece of information is the URL. This is the FTP server the program will connect to, along with the path to the directory in which to store images, which should be followed by a trailing slash: / (Assuming the sever is running some linux / bsd / etc. variant.) The path is relative to whatever the default directory is when that FTP user logs onto the server, not the absolute path on the server. You may need to make use of symbolic links or other means to make sure files are accessible by your web server.

For example, say the domain name for your server is myserver.com , and relative to the initial / current working directory that FTP user starts with when they log in you wish the files to be placed in the sstv_pics directory, then the URL would be:

myserver.com/sstv_pics/

Getting the URL correct is probably the trickiest part of the setup.

When files are uploaded, a status field just below the URL entry field will be updated. When the file is being uploaded, it will contain the final URL for the file, with either ftp:// or sftp:// automatically prepended. For example:

ftp:// myserver.com/sstv_pics/image3.png

Then after the file transfer is complete, a error code will be displayed, which is zero if it was a success with no errors:

FTP Status: 0

A non-zero error code means the transfer failed. There are numerous possible causes for this. Some of the most common errors are listed below. CURL is used to transfer files, so you can also search online for a comprehensive list of error codes, one such list is here:

https://timi.eu/docs/anatella/5_1_8_1_list-of-curl-error-co.html

For example, error code 67 generally means an invalid username/password.

Every time a file is saved, it is uploaded. Clicking on the Save button will start an upload, assuming there is some sort of received image, it could even be just static. This provides an easy way to test your FTP configuration without having to wait for an image to be received. Just click the Save button. If the upload did not work, edit your settings, and try again, until it does.

Tone Button: Lets you change the frequency of the tone produced with the 1750 Hz button. The button caption will change to reflect this change. Note that if you change the frequency while the tone is being produced, you will need to click the button off and back on again for the new frequency to be generated.

Rx Gallery Tab:

Displays a gallery that shows all received images.

Normally the gallery shows the images in the received image directory. If you wish, you can change this to another directory via Set Gallery Directory in the File menu.

Saved image Categories: You can also create another directory of your own for images, containing one level of sub-directories. Set this directory in the app by using Set Categories Directory in the File menu. Each sub-directory in this directory is treated as a special category of image types, you can pick whatever name(s) you want. You can use these directories to help sort out your received images, rather than keeping them in one giant directory.

You can right click on an image thumbnail, and specify which directory to move the image into. You can instead move a copy of the image there instead of moving it, if you wish.

You can also specify which category of images to view in the gallery, either by right clicking a thumbnail in the gallery, selecting Set Gallery Category and one of the sub menus, or directly from Set Gallery Category in the File menu, again from one of the sub menus. The first 9 sub menus will have a shortcut key, shortcut key 0 will re-set the gallery back to the received images directory.

Tx Gallery Tab:

Displays a gallery of images that can be quickly selected for transmission.

Select Set Transmit Image Directory from the File menu, and select the directory you want to use. This directory will be monitored for files being added or removed. The gallery will show these images. Right click on an image, and you can select it to be placed into the transmit image buffer to be sent, or used as the background image for the editor.

Revision History

April 10, 2023 – 2.3.0

Option to change the frequency produced with the 1750 Hz Tone button.

November 21, 2022 – 2.2.0

Check for bad image files to prevent a crash.

Fixed some bugs regarding gallery popup menus.

June 30, 2021 – 2.1.0b2

Normalized calculate image noise values across SSTV modes.

June 29, 2021 – 2.1.0b1

Added FTP upload of received images.

February 27, 2021 – 2.0.3b2

Bugfix – possible crash when updating the spectrum display.

February 26, 2021 – 2.0.3b1

Added an option to email crash reports.

January 21, 2021 – 2.0.2

Changes to timestamped text added to the bottom of images.

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