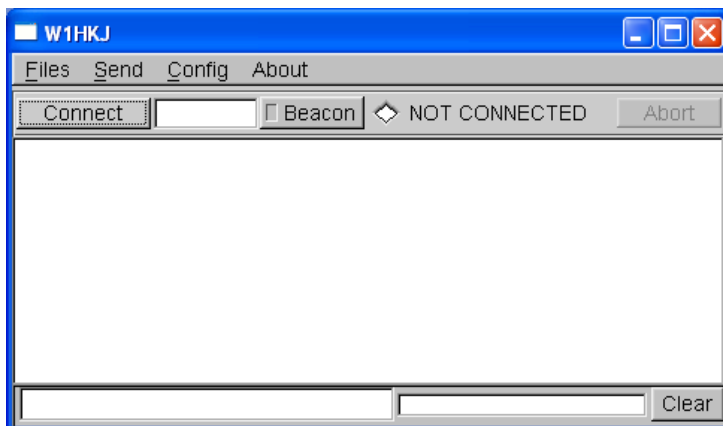


flarq

fast light automatic Repeat reQuest is a file transfer application that is based on the [ARQ specification](#) developed by Paul Schmidt, K9PS. It is capable of transmitting and receiving frames of ARQ data via either vbdigi on Window, or fldigi on Linux. The interaction between flarq and vbdigi/fldigi requires no operator intervention. On the Windows OS the two programs exchange data and command sets using files that both programs recognize. On the Linux OS the exchange is made using the System-V Message Queue. This process is totally transparent to the user. The programs can be executed in either order. It is only necessary that both be executing concurrently for the process to work.

The ARQ transfer must take place between two systems both of which are running the flarq/vbdigi (or the flarq/fldigi in Linux) combination. The ARQ specification and the source code for flarq are LGPL licensed. Other developers wishing to duplicate or expand upon the flarq ARQ implementation may freely do so.

The main screen dialog for flarq is:



Windows image - identical in Linux

There are only two controls that are routinely used by the user. The "Beacon" button will cause the transmission of an UNPROTO frame which can be easily recognized by a receiving station. It will contain the editable text in the entry widget to it's right. Upon receipt of the beacon frame a monitoring flarq will automatically insert the sending stations callsign into the edit control to the right of the "Connect" button. The receiving station can then press the "Connect" button and the connect process begins. The connecting station will make a number of attempts to consummate the connection. During the connecting phase the annunciator to the left of the Qual indicator will glow Yellow (white is the unconnected state). Upon a satisfactory connect the annunciator turns Green. The same thing will occur at the station that sent the initial beacon frame. During the listen / transmit sequences the annunciator will alternately be Green and Red respectively. The diamond indicator annunciates the state of the connection:

Diamond Indicator

WHITE	Not Connected
YELLOW	Connecting
GREEN	Connected - Receiving
RED	Connected - Transmitting

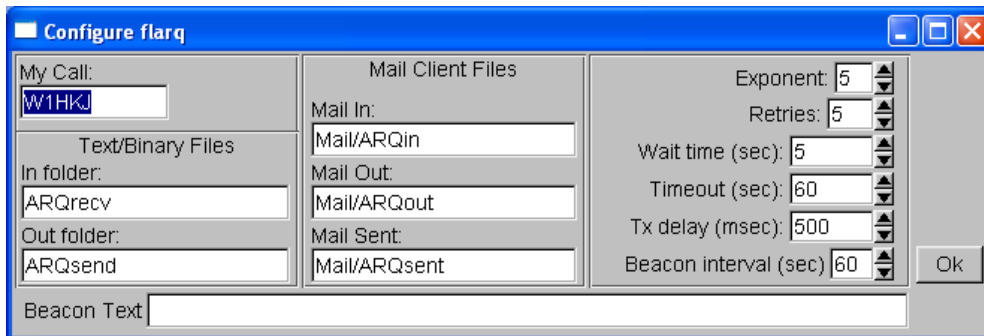
The state of the connection also appears in plain text to the right of the diamond indicator.

Pressing the "Beacon" button sends both the text and T/R commands to either fldigi on Linux or vbdigi on Windows. The beacon will repeat with a wait time between transmissions set by the Beacon interval in seconds on the Configure dialog. During the silent period between beacon transmissions the Beacon button will show the count down timer. You can stop the beacon at any time it is in the count down mode by simply pressing that button or by pressing the Abort button. The default beacon interval is 60 seconds.

The status bar at the bottom of the main dialog contains a status text message area to the left and a progress bar to the right. During a file transfer you will be notified of actions and also see the transfer percent completion in the progress bar.

Configuring flarq

Before using flarq (and upon its initial execution) you will have to enter some configuration parameters:



Windows image - identical on Linux

The highlighted field, "My Call" is the only one that you must fill in to start using the application. The folder locations for Text/Binary Files and also for the Mail Client files should all be OK as preconfigured for the Puppy usage.

Read through the ARQ specification for additional detail. The Exponent is a 2^N factor which delineates the size of the text data block that is transmitted in a data frame. 2^5 is 32 and should be satisfactory for most s/n conditions. If you are experiencing many repeats you can lower the Exponent value. If the path between rx and tx stations is very good you could increase its value. flarq allows the following range of values:

Exponent Block size

4	16
5	32
6	64
7	128

Retries specifies how many times a repeat request should be made before the link is declared DOWN.

Wait time is the time between retries.

Timeout is the time period during which NO RECEPTION of frames occurs before the link is declared DOWN.

The Tx delay is the time between the end of the Rx and the beginning of the Tx cycle for an ARQ exchange. One-half second should be more than sufficient for most transceivers. You might be able to lower the value for

your rig. Older rigs may need the value increased.

Beacon text - will be transmitted with each beacon transmission.

Connecting

The normal connection process is that a station with traffic will send the ARQ beacon. The receiving station who is also running flarq with either fldigi or vbdigi will see the beacon message displayed in the flarq text area and also see the beacon stations callsign appear in the callsign control (widget). The connecting station presses the connect button and after a few automatic exchanges the diamond indicator to the right of the callsign turns green indicating that they are successfully connected. A connect may take a few retries if the transmission path s/n is marginal. During the connect process the diamond indicator will be yellow.

After the two stations are CONNECTED either operator may effect a file transfer. Who goes first may be negotiated using vbdigi in a plain text mode. The vbdigi T/R functions can be used in parallel with any ARQ transmissions. It might be best to conclude those negotiations before establishing the ARQ connection. The beacon message can be used to indicate which station will originate the ARQ file transmission. For example:

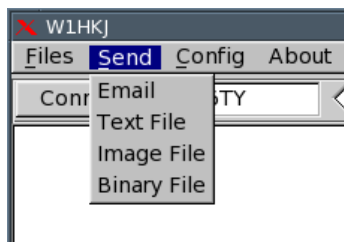
Beacon station has traffic aa1abc at loc:FM64 with EMC traffic

Beacon station can accept traffic ab2bcd at loc:EM66 listening for EMC traffic

Either station may initiate a DISCONNECT process.

Transferring files

You may transfer several different file types:



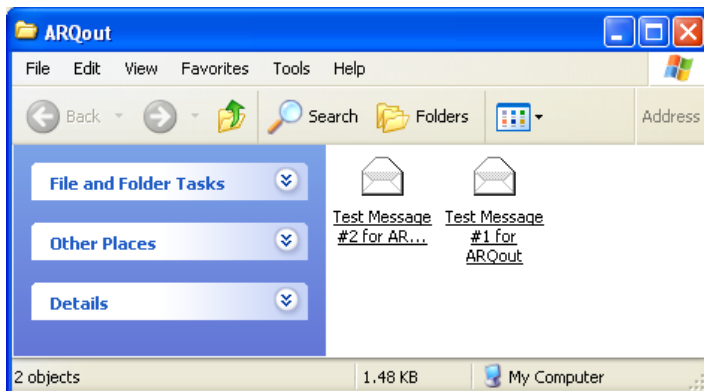
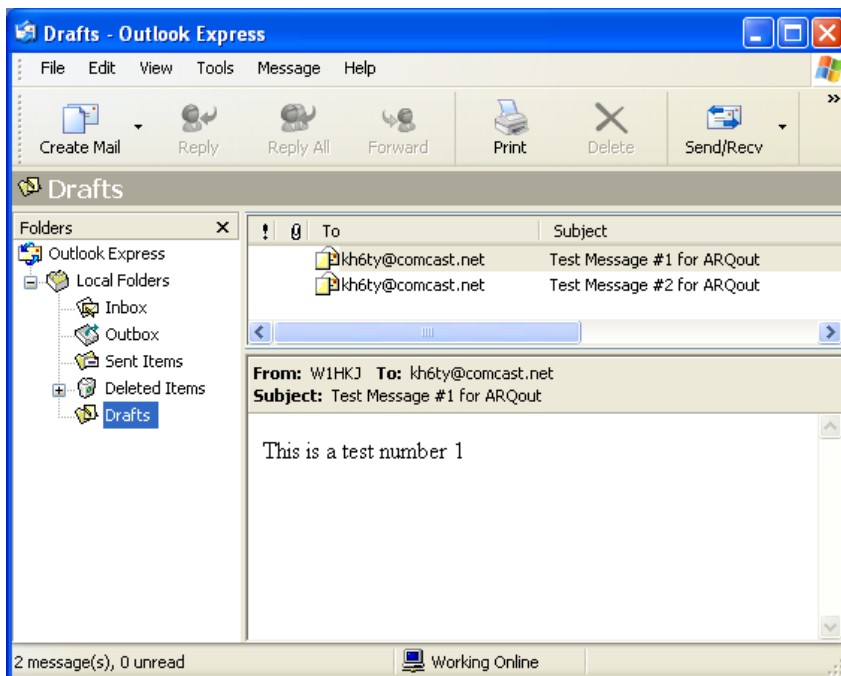
Linux Image - identical to Windows

- Email - created using Outlook Express or Sylpheed on Windows, or Syphleed email client on Linux, or received via the internet and handled by the email client.
- Text - any ASCII file which does not contain non-printable text
- Image - any image file, jpeg, png, bmp, etc.
- Binary - any file containing arbitrary data where each byte is anything from 00 hex to FF hex.

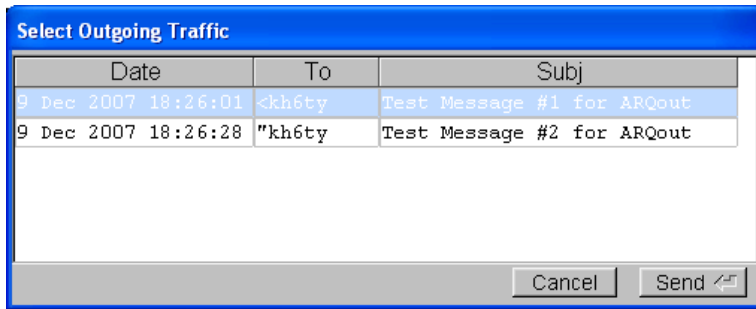
Using Email client - Outlook Express

You can use Outlook or Outlook Express for the email client to create outgoing ARQ traffic. Use the one that you are most familiar with. For most that will probably be Outlook Express. Just remember that you should create all email traffic as ASCII text and not HTML text to reduce the size of the message body. You are going to send this via an RF link and not over the internet with a high speed connection.

Create your email just as you would for transfer over the internet and then save it in the Drafts folder. In Outlook Express, click Create Email and use the format, name@phonenumber, such as information @8005551212, for the address if it is to be delivered by phone, and is not an email. Save each message in the Drafts folder by clicking File, and then Save. Exit the composition window. Open the ARQout folder (located at c:\NBEMS\Mai\ARQout) on the desktop along with Outlook Express as shown below. Then drag the message from the "To ... Subject" area of Outlook Express and drop them on the ARQout folder. This places them in a folder that flarq can locate.



When you select the flarq menu item "Send / Email" a dialog will open that shows the contents of the messages that are in the ARQout folder:



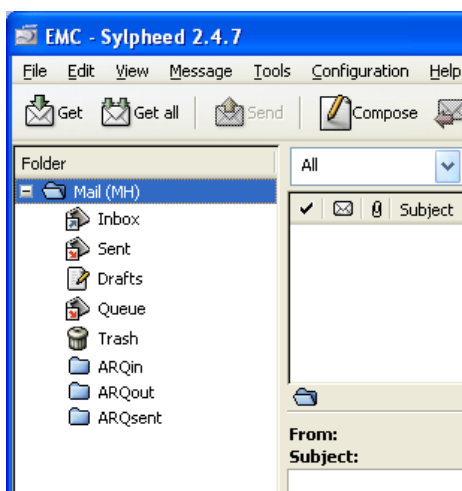
Multiple email entries would appear on separate lines with scroll bars as appropriate. You highlight the desired file and then press "Send" or the Enter key to commence the file transfer. The email may contain attachments (which may be images) or be just plain text. Remember that this is a fairly slow transfer process so small is beautiful. If the email has images then it will be in html and base-64 format. That adds a lot of overhead to the email. "Cancel" aborts the email transfer process. After a successful transfer from sending to receiving station the email is automatically moved from the ARQout to the ARQsent folder. That will transfer will appear immediately if you are using Sylpheed. If you are using Outlook Express you can open the c:\NBEMS\Mail\ARQsent folder the same way that the ARQout folder can be opened. At the receiving end the email will be placed in the sylpheed ARQin folder. Sylpheed does not need to be executing for this to occur at either end.

Using Email client - Sylpheed

flarq has been optimally designed to interoperate with Sylpheed as its email client for emergency communications of email traffic. When you install Sylpheed you will be asked to choose a default directory for the mail store. On Linux this should be the default \$HOME/Mail. On Windows you should choose c:\NBEMS\Mail. Three additional folders are used for transferring files between the flarq application and Sylpheed. These are:

- ARQin
- ARQout, and
- ARQsent

You can create these folders from within the Sylpheed application.



Sylpheed on Windows - identical on Linux

The above image shows the folders already in place. If they were not present they could be created by right clicking on the "Mailbox (MH)" icon and selecting "Create new folder". Name each new folder as specified above and shown in the image. These folders are required for flarq to be able to work with the Sylpheed email messages. Each message in Sylpheed is a separate file. These are usually numbered sequentially in each of the Sylpheed folders. flarq manages the correct sequential naming of files as they are transferred in, out and moved between these three folders. If you run the flarq application before Sylpheed then the c:\NBEMS\Mail and the c:\NBEMS\Mail\ARQin, ARQout, and ARQsent folders will be created by that application and will appear in the Sylpheed folder system.

To create a new email traffic you press the "Compose" button. Fill out the email as usual and then press the "Draft" button from within the composer. The new message for transfer via flarq is now in the Drafts folder shown above. Open that folder by clicking on it. Select the desired draft message and drag and drop in onto the ARQout folder icon. That's it! The message is now ready for flarq to perform the ARQ transfer.

Upon completion of the transfer flarq will move the message to the ARQsent folder. Sylpheed will not immediately recognize that the change has occurred. That is easily accomplished by either changing to another folder and then back again or by right clicking on the ARQout (or ARQin, or ARQsent) folder icon and selecting "Update summary". Sylpheed will re-read the folder contents and adjust it's views accordingly.

Incoming traffic will be placed in the ARQin folder. You may have to refresh the folder as described above.

flarq can find and parse the newly created email document that has been moved or copied to the ARQout folder. If you select to send email a picker dialog will appear that lists all of the out going email traffic that is contained in the Sylpheed ARQout folder.

Transferring Text, Images or Binary Files

If you select Text, Image or Binary file for transfer a regular file picker dialog is opened. You can negotiate anywhere in the file system to pick a file. The default location for the files are unique in Windows and Linux. In Linux the default location is in \$HOME/ARQsend. On Puppy this is /root/ARQsend. In Windows it is c:\NBEMS\ARQsend. Move files to that location to make finding the target file easy. Use the file manager or move the file using command line processing in a terminal window. Image and binary files will be converted into ASCII text files using base64 conversion. This basically is the same type of conversion that an email client would perform on an image or binary attachment. The file is encoded using base64 coding at the sending end and then decoded back to its original form at the receiving end. At the conclusion of a satisfactory ARQ transfer the two files will be identical, including name and size. The target directory for received files is \$HOME/ARQrcvd in Linux, and c:\NBEMS\ARQrcvd in Windows. The receiving station opens the c:\NBEMS\Mail\ARQin folder and drags the incoming message placed there by flarq over to the Outlook Express email client. It is the reciprocal process from that which the sending station uses.

During the transfer of either an email, or a file the sending station transmits blocks of data. Each block has a header, data, checksum and trailing component. The receiving station acknowledges which blocks have been correctly received and which need retransmission. Missing blocks sometimes occur in the middle of the set of acknowledged blocks. The text in the flarq text window will only update as contiguous blocks are available. So you might see the update occur in what appears to be random intervals. As the sending and receiving stations go from receive-to-transmit-to-receive the diamond indicator will toggle from green to red and back to green.

Aborting a transmission

The transmission may be aborted by either the sending or the receiving station at any time during the file transfer. When Connected the Abort button is enabled. Since data is sent in multiple blocks the actual abort will take place at the conclusion of the current group transmission.