HOW-TO DOCUMENT FOR HIGH FREQUENCY OPERATION / WINLINK EXPRESS EMAIL ACCESS AT THE ALACHUA COUNTY EOC

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file: EOCRADIOCLUB/EOCHFWinlinkExpressPrimerV2.odt

Purpose: This document is to assist volunteers at the Alachua County EOC (Hawthorne Road, right beside the Sheriff station, Gainesville Florida) in being able to perform sending and receiving of email over HF to any of scores of HF radio message servers all over the world. While it is written specifically for that site, the information may be generally applicable and useful to others learning the WINLINK system.

Disclaimer: These instructions may be less-than-perfect, and the equipment and installation may have changed between when these instructions were written and your intended operation. Use them as a starting point, be flexible and enjoy learning!

YAESU SYSTEM 600 OPERATION

Top Row Pushbutton Keys

LOCK	(The important one) **M**	S	E
Locks pushbuttons. Press again to unlock	**MEMORY vs VFO** **Selects MB (Memory Band) choices, versus VFO. For our operations, VFO is usually the desired choice**	**Selective Calling (Not utilized)**	**Encryption (Not utilized)**

KEYPAD KEYS

MODE **1**	**NB** **2**	**TUNER** **3**	**ENT**
Selects Emission Mode Very Important • **A1A -- CW** • **J2B -- DIGITAL (e.g. Winlink - USB)** • **J3E USB -- upper side band voice** • **J3E LSB -- lower side band voice**	Noise Blanker on / off	**Automatic Antenna Tuner - important ! Hold to force tuning at current Transmit Frequency.**	Both ACTIVATES and COMPLETES frequency entry from keypad
STEP **4**	**5**	**A/N** **6**	**F**
Sets "step" of VFO dial **10 Hz** **100 Hz** **1000 Hz (1 kHz)**		Toggles Display from Numeric Frequency to "Alpha Tag" Numeric is preferred usually.	Pressing this key prior to another keypad choice activates the secondary keystroke functions
SPK **7**	**D/W** **8**	**M/W** **9**	**DIM**
Careful! This turns the speaker ON/ OFF	Enables / Disable Dual Watch (receiver scans two frequencies)	Memory Write -- used to store frequencies	

Note: F + 1/Mode can be used to select between various filter widths in modes including A1A (CW) and J2B (digital) If you make the filter width too narrow, digital won't work!

(Emission) **MODE**: Pushbutton 1 is also emission **MODE**. Click this until you see J2B USB

displayed at the left of the LDC screen. This is upper sideband audio digital. J3B is normal upper side band SSB (single side band). *Note: this rig comes normally configured to do LOWER sideband audio digital, which will not work with WINLINK. The turn-on option was reconfigured so that it works properly with WINLINK and other digital software such as FLDIGI.*

FREQUENCY SELECTION
The Easy Way

Manual Front Knob VFO -- in VFO mode, using various steps (10 Hz, 100 Hz, 1 kHz) you can dial the transceiver to a frequency like any normal amateur radio transceivers

CAT Computer Control: With proper settings on the WINLINK software, you can automatically control the transceiver frequencies.

Pushbutton Entry:

The System 600 allows simplex or split frequency entry (RX and TX on different frequencies). For most amateur operation you will wish to enter one time, to select both TX and RX frequencies:

- Press the ENT button momentarily (a "tap") to begin
- Enter a 7 digit number including the "tens digit" for MHz, and the last digit being tens of Hz. For example to enter 7104.50 kHz, you enter 0-7-1-0-4-5-0 Important: now press and hold the ENT key for >= ONE-HALF SECOND (longer than a "momentary tap"!!) Both RX and TX frequencies are entered.

If you instead make the second press of the ENT key be only "momentary" (< 1/2 second) you'll have to enter the TX frequency next and then hold the ENT key for its desired 1/2 second.....

Pushbutton entry is very useful to get to a desired BAND -- and then use the Manual Front Knob VFO to move around in the band.

----------WINLINK OPERATION----------

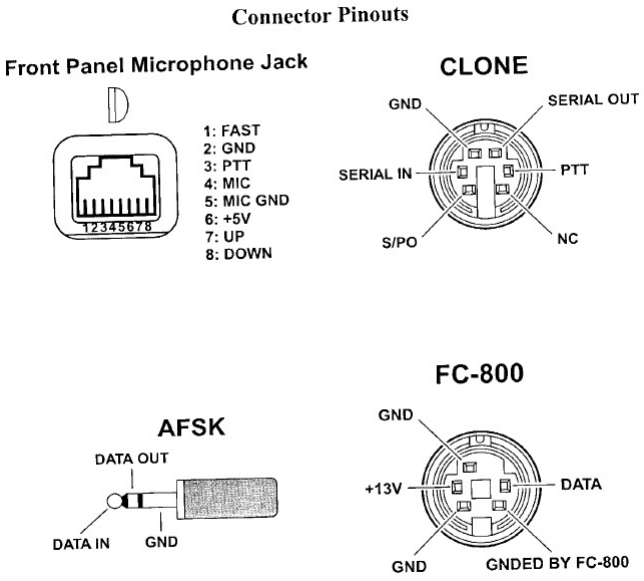
There are several YouTube videos that can also be helpful:
What is Winlink? by K4REF: https://www.youtube.com/watch?v=qGhUfW8pjY8
Using a Sound modem TNC... by K4REF: https://www.youtube.com/watch?v=RF0OMNZCEVA
Setting up sound levels.... by K4REF: https://www.youtube.com/watch?v=7G1DBs-04MM

1. **COMPUTER:** EOC now has both a desktop and laptop Windows-based computer with USB ports. The Signalink (from the Series 600 Yaesu) should be plugged into one of these, and also the USB plug that controls frequency control of the Series 600 Yaesu into another.
2. **USB CABLE:** In order to use the SIGNALINK audio interface, a USB cable must be inserted into a USB port of the chosen WINDOWS computer and connected to the SIGNALINK audio interface. The cable provided is a shielded cable and I have inserted ferrite beads at both ends with a turn of cable in the beads to further suppress RFI. I have not yet seen RFI problems at the EOC. (If the USB port ever does freeze, close the application, remove the USB cable from the computer port; reinstall the USB cable into the computer port and re-start the program.)
3. **RADIO CABLE**: The SIGNALINK must then be connected to the YAESU SYSTEM 600 transceiver. There is a yellow RJ45 cable already connected to the YAESU SYSTEM 600 that makes the proper connections for audio WINMOR digital connections. In the future, we may also add a cable that can function through the mic jack as well.

    - **SETTINGS:** The TX gain on the Signalink should be at the 9:30 o'clock position to develop approximately 50% of full power (reasonable for a high-duty-cycle digital signal) , and the RX gain will likely be in the 9:30 o'clock position also -- you'll adjust this a bit while watching the waterfall on the WINMOR TNC display. The DELAY should be turned fully counter-clockwise to minimum.

4. **Interface Software: FOR HF:** You do NOT need to start up anything like the UZ7HO soundmodem.exe that you must use for packet on VHF, because on HF, the WINLINK EXPRESS software automatically provides the WINMOR TNC interface software. **Baud rate is 4800 8N2 (yes 2!)**

CONNECTIONS



- **CLONE -- 6 Pin mini DIN connector for frequency control from the WINLINK computer using a special cable. Please be very careful inserting this cable as it must be inserted correctly or the pins can be badly damaged.**

- **AFSK -- speaker and mic connections from the Signalink**

- **PTT -- RCA phono connector from the Signalink**

- **FC-800 -- this unusual connector with 2 pins on one side and 3 on the other (please be very careful when inserting) goes to the Antenna Tuner. Without out, the antenna tuner will not tune.**

5. **WINLINK EXPRESS.** Start up the WINLINK EXPRESS software. I suggest that it be positioned in the left half of the computer screen.

6. **CALLSIGN:** After starting the WINLINKEXPRESS software, at the upper left corner you will need to select the proper `CALLSIGN` for your operation. **The EOC Radio Call is NF4AC**

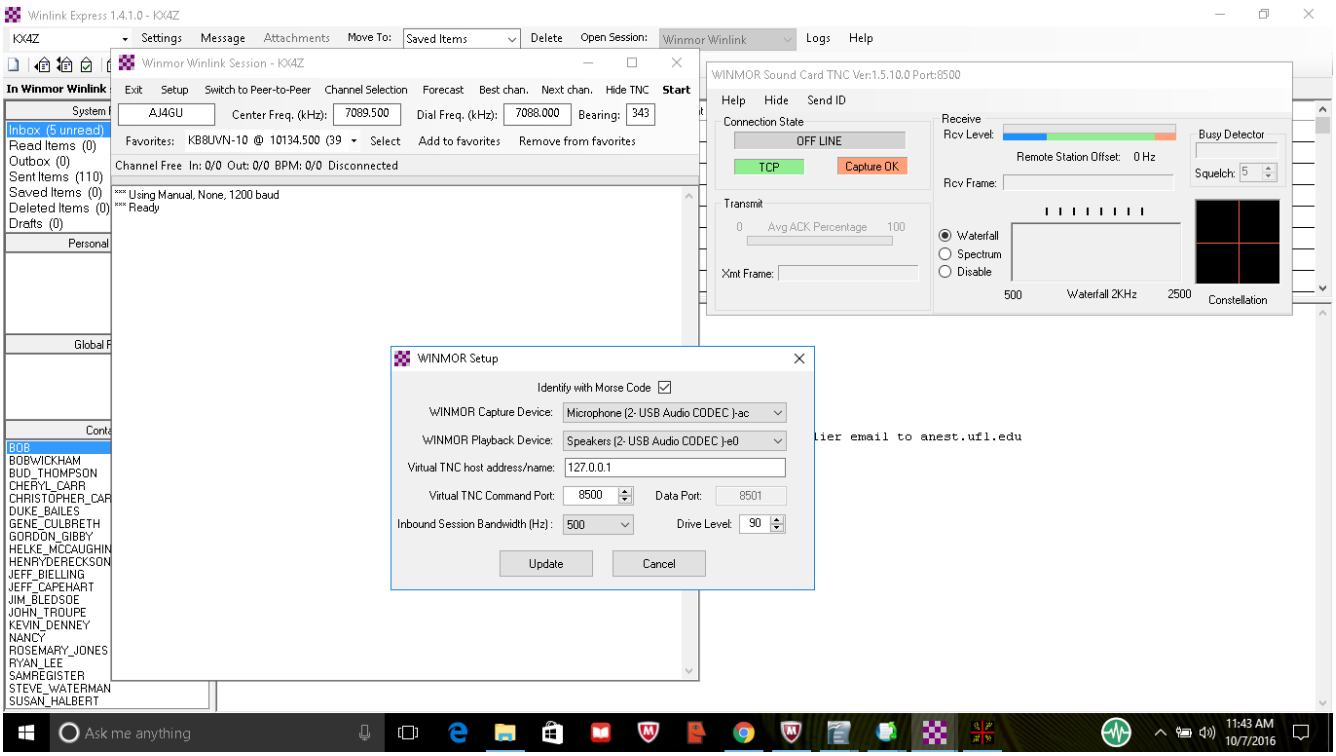
If your callsign isn't listed, you can add yourself and run through the setup information which mainly involves putting in your WINLINK password and adding some location information about yourself.

7. **OPTIONAL REGISTRATION:** If the software requests a "registration" number , just wait a moment and it will give you the option to "remind me later"

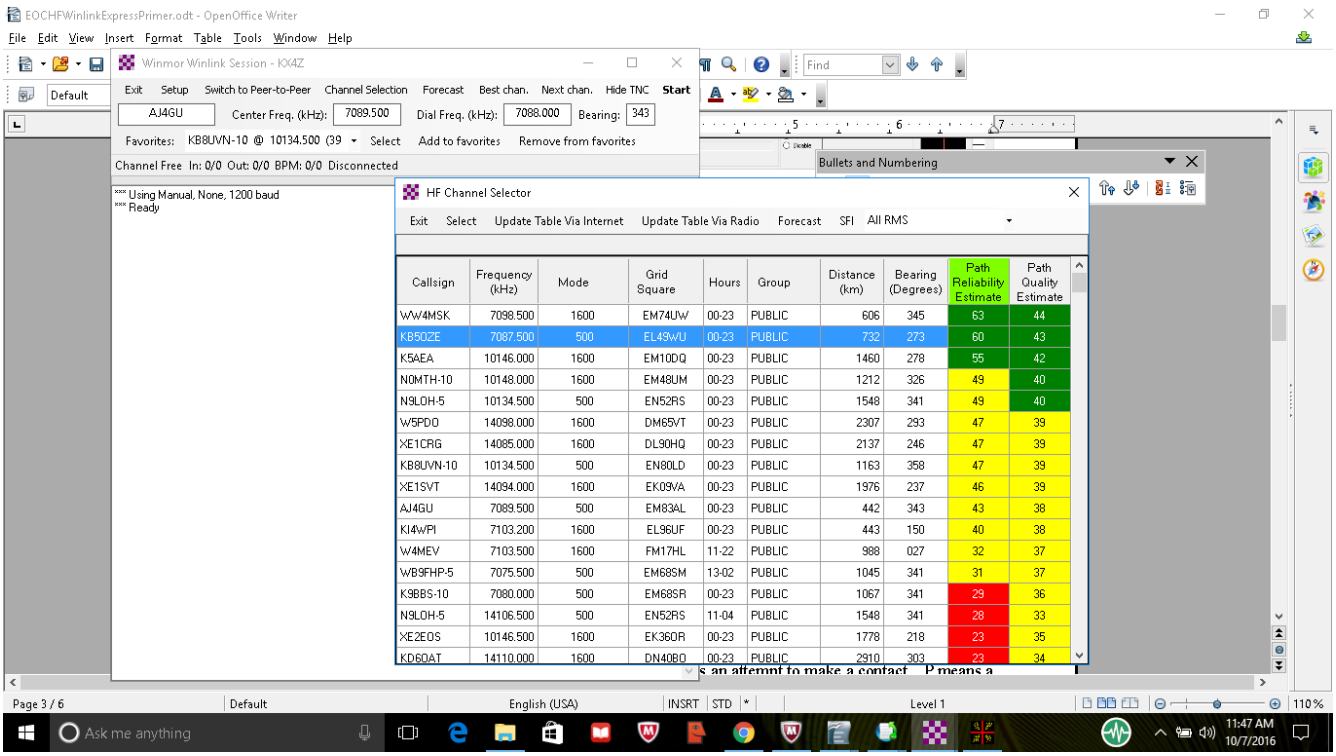
8. **Writing an Email Message.** If you wish to create an email, that option is under **`Message | New Message`** and works pretty much like any email system. There is a contacts list that you can access by clicking on TO: or CC: buttons. Emails allow attachments, but the size may be limited to 40K (or some other number) due to the limited bandwidth available. Once you are finished with your email, be certain to **`Post to Outbox`**, which queues it up to be transmitted on the next connection to a RMS (radio message server). You should see the number in the OutBox increment by 1.

9. **Selecting the Mode:** The soundcard modes available incluce WINMOR and ARDOP (and in the future, possibly VARA): In the "Open Session" drop down, select either WINMOR WINLINK or ARDOP WINLINK (for connections via the Central Message Server (CMS)) -- or alternatively select Radio-Only modes to force delivery only to a Message Pick Up Station (without using the Internet).

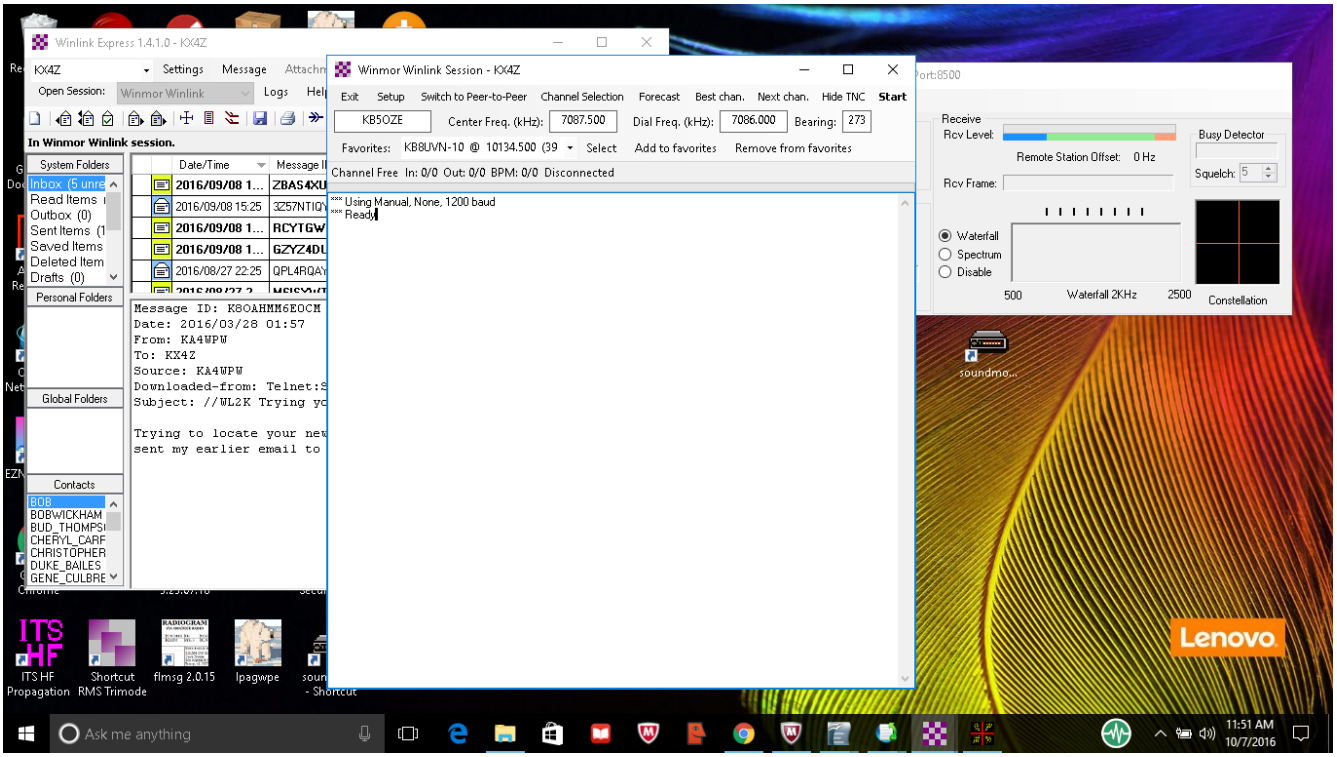
10. **Settings:** Once you have the Session dialog open, you may wish to check the **`SETTING`** to verify that it is correctly set for both Capture and Playback to **`the USB-based Signalink`** **(instead of the computer speakers!).**



11. **Choosing an RMS to try to contact:** Once you have the Session dialog open, click CHANNEL SELECTION to get to the propagation prediction screen (which knows all the available winlink servers and displays which are easiest to reach at the current time, and on which bands):

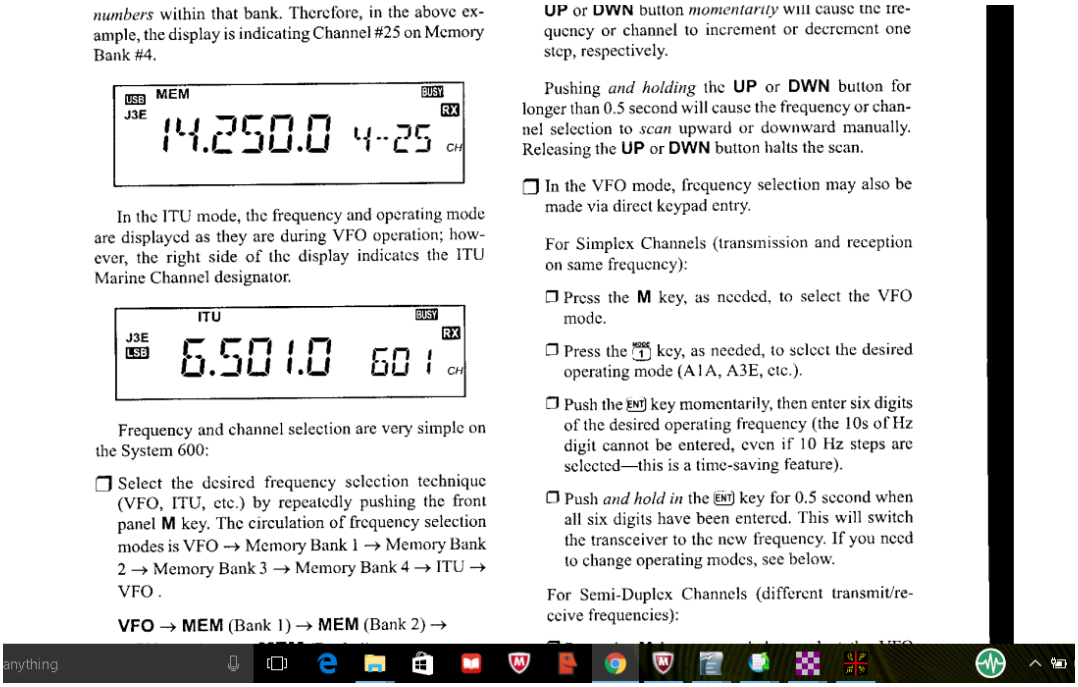


12. **Click on a station you'd like to connect to.** You'll be returned the session connect dialog and it will show you two different frequencies: CENTER FREQUENCY and DIAL FREQUENCY. The DIAL FREQUENCY is the important one for you!



13. Dialing in the YAESU SYSTEM 600 This is a “push button” commercial transceiver with 150 watts of power. It operates a bit differently than typical ham radio transceivers so a bit of time perusing the manual might be useful. Here are basics of getting it set up to make the connection you're going to attempt: (NOTE: if your Radio Settings are correct, the frequency will be set automatically for you)

Online Manual for the YAESU SYSTEM 600:
http://www.w1npp.org/ares/redcross/yaesu_system_600_scanned_operating_manual.pdf



numbers within that bank. Therefore, in the above example, the display is indicating Channel #25 on Memory Bank #4.

In the ITU mode, the frequency and operating mode are displayed as they are during VFO operation; however, the right side of the display indicates the ITU Marine Channel designator.

Frequency and channel selection are very simple on the System 600:

❒ Select the desired frequency selection technique (VFO, ITU, etc.) by repeatedly pushing the front panel **M** key. The circulation of frequency selection modes is VFO → Memory Bank 1 → Memory Bank 2 → Memory Bank 3 → Memory Bank 4 → ITU → VFO .

VFO → **MEM** (Bank 1) → **MEM** (Bank 2) →

UP or **DWN** button *momentarily* will cause the frequency or channel to increment or decrement one step, respectively.

Pushing *and holding* the **UP** or **DWN** button for longer than 0.5 second will cause the frequency or channel selection to *scan* upward or downward manually. Releasing the **UP** or **DWN** button halts the scan.

❒ In the VFO mode, frequency selection may also be made via direct keypad entry.

For Simplex Channels (transmission and reception on same frequency):

❒ Press the **M** key, as needed, to select the VFO mode.

❒ Press the MODE key, as needed, to select the desired operating mode (A1A, A3E, etc.).

❒ Push the ENT key momentarily, then enter six digits of the desired operating frequency (the 10s of Hz digit cannot be entered, even if 10 Hz steps are selected—this is a time-saving feature).

❒ Push *and hold in* the ENT key for 0.5 second when all six digits have been entered. This will switch the transceiver to the new frequency. If you need to change operating modes, see below.

For Semi-Duplex Channels (different transmit/receive frequencies):

14. **TUNING ANTENNA:** Press the TUNER button (push button 3) on the YAESU SYSTEM 600 and it will cause the automatic antenna tuner to tune your antenna (automatically at a low power setting to protect the antenna tuner).

15. **Making a connection:** **START** When you Click **START**, you should see the system begin to transmit and send digital tones in an attempt to connect to the RMS. During the first few calls, the system will measure your T->R latency (delay). This needs to be lower than about 250 milliseconds to function properly. Good systems may run 60-100 milliseconds. You can adjust your transmit power with the TX gain control on the Signalink --- the display on the YAESU SYSTEM 600 will show Po (power output) and you want it about half scale. If you can get an answer, you'll be able to observe the waterfall and also the tuning 4-quadrant display. If there is a clear geometric pattern in the tuning display, you will have a good contact!

16. **Try Try Again.** HF is not like VHF. Making a connection is NOT a guaranteed thing. The HF Antenna at the EOC only works properly when raised off the roof and properly tuned using the TUNER. My normal process is to select a station to call, automatically reaching their frequency with CAT control, press and hold the TUNE button until the tuner is tuned, then on the computer select START and see if a contact is achieved. After a maximum of 2 tries, switch to a new station. You'll quickly learn which stations have strong signals at which times of the day.

Map to find other packet stations: http://www.winlink.org/RMSChannels (Click the WINMOR option.)

WHAT HAPPENS TO YOUR EMAIL:

You would be using this software for real in the circumstance that no Internet is available in your area due to any of several causes. Once you make contact and send your email to a distant RMS over HF, it will then be immediately put on the Internet at that (unaffected) station or alternatively, put up for further HF forwarding. It is a good move to read the logon script information from the station you're connecting to as their script may tell you whether they have internet or are operating in "RADIO ONLY MODE"