



INTRODUCTION TO WINLINK

Global Radio Email

What is WINLINK

Winlink Global Radio Email® is a network of amateur radio and authorized government stations that provide worldwide radio email using radio pathways where the internet is not present. The system is built, operated and administered entirely by licensed "Ham" volunteers.

It supports email with attachments, position reporting, weather and information bulletins, and is well-known for its role in interoperable emergency and disaster relief communications.

It is capable of operating completely without the internet, automatically--using smart-network radio relays.

Source: <https://winlink.org/>



How Can We Use Winlink?

Winlink can be used much like a standard email system, with some pros and cons.

Con: can't be used to send large attachments or images - it takes a long time!

Pro: can be used to send plain text, lists, small attachments, small zip files.

Con: need to be within range of a node or have internet access.

Pro: Winlink has a large number of FORMS for emergency communications.

Forms will be demoed towards the end.



Where can I get WINLINK?

WINLINK Website: <https://winlink.org/>

- No cost, but there is a registration “nag” to remind you to support the project
- Registration (optional) - \$24
- Accounts are created within the software, not on the website!
- Account requirements:
 - A valid amateur radio license, or
 - a license from a participating government service or agency.
 - Ship station, marine or general radiotelephone licenses **DO NOT** qualify.



WINLINK TNC Modes

WINLINK supports the following TNC modes:

- Telnet (through the internet)
- Packet (VHF/UHF) - Virtual TNC (SoundModem)
- PACTOR (HF) - Requires a TNC
- Robust Packet - (vendor specific TNC?)
- ARDOP (HF) - Virtual TNC
- VARA HF & FM (Must purchase VARA software - \$69 covers both)
<https://rosmodem.wordpress.com/>
- Iridium GO



WINLINK Delivery Modes

WINLINK delivers email in the following ways:

- “Store and Forward” using best route, including Internet
- P2P - peer to peer - direct between stations
- RF only - “Store and Forward” without using the Internet



WINLINK Coverage

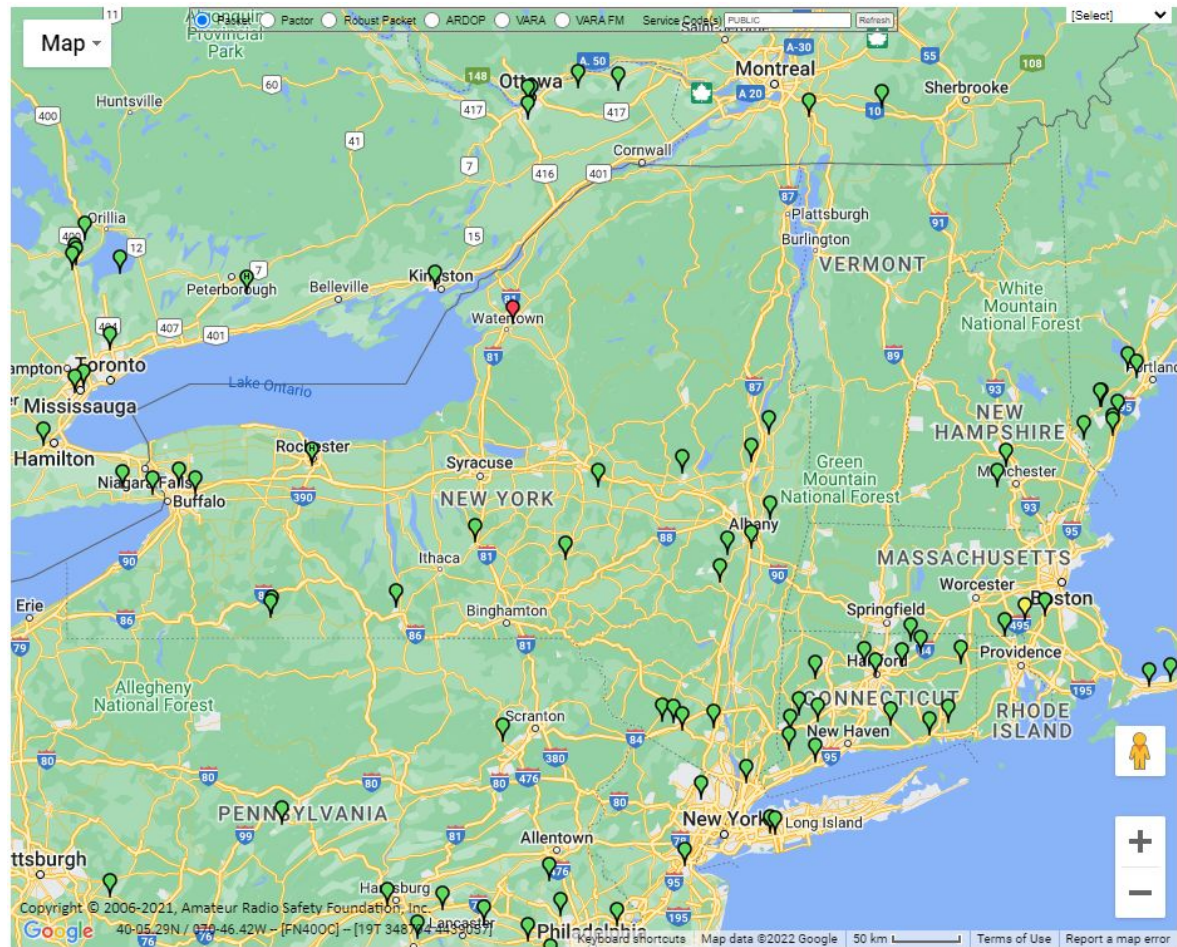
VHF Packet is the most common type in use. (shown here)

ARDOP is the most common for HF use

VARA HF and FM are also commonly used, but require an additional TNC software purchase.

Maps can be found at:

<https://winlink.org/RMSChannels>



WINLINK Setup

Winlink Express Properties

Call Signs

My Callsign:

My Password:
(Case sensitive)

Change password

Callsign suffix (optional):

(Used for country code)

Password recovery e-mail:

(Non-Winlink e-mail address where lost password will be sent when requested)

Remove Callsign

Request password be sent to recovery e-mail

Auxiliary Callsigns and Tactical Addresses

Add Entry

Remove Entry

Edit Entry

My Grid Square:

Lat/Lon to Grid Square

Winlink Express registration key:

Service Codes

(Use PUBLIC for ham call signs. Separate multiple service codes by spaces.)
If you change service codes, you must update the list of channels.

Update

Cancel

Contact Information (Optional)

Name:

Street address 1:

Street address 2:

City:

State/Province:

Country:

Postal code:

Web Site URL (optional):

Phone number:

Non-Winlink e-mail:

Additional information (optional):

Recalculate HF path quality if SFI changes more than:

Keep logs for weeks. Keep deleted messages for days.

☐ Display list of pending incoming messages prior to download

☒ Warn about connections to stations holding messages

☒ Allow diagnostic information to be sent to the Winlink Development Team

☐ Automaticaly install field-test (beta) versions of Winlink Express

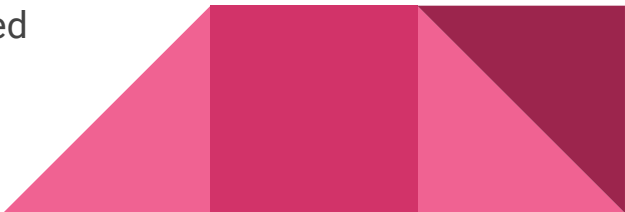
Radio to Computer Interface

In order to use Winlink, you will need a computer controlled interface:

1. Sound Card type - Signalink, RigBlaster, DigiRig, homebrew

- Inexpensive ~ \$100 or less
- Flexible - can be adapted to many brands and models of radio
- Plug-n-play (mostly)
- Homebrew - USB Sound card and interfacing cable

2. Hardware packet TNC - PakRatt-232, Kantronics, etc...

- Inexpensive (HAM fests) to expensive (New)
 - Older hardware, offloads communications from PC
 - Uses Serial ports (9 or 25 pin) - USB adapters can be purchased
 - Adapting to radio can be more difficult, uses Mic port.
- 

WINLINK Packet - Soundmodem Setup 1

If you are using Sound Card TNC, you'll need virtual TNC software.

Soundmodem is very good and easy to use: <http://uz7.ho.ua/packetradio.htm>

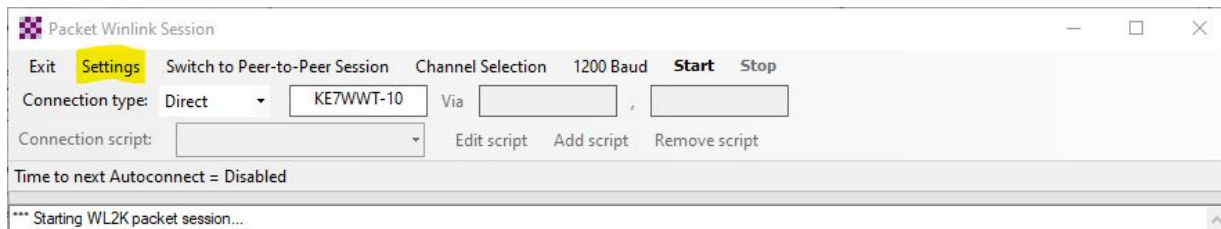
Unzip the file to a folder on your computer. It will end with **.exe**

In WINLINK, select Packet Winlink at the top and then click "Open Session"



WINLINK Packet - Soundmodem Setup 2

When the session window opens, it may prompt you for your TNC, but if not, click SETTINGS:



WINLINK Packet - Soundmodem Setup 3

- Packet TNC Type = KISS
- TNC Model = NORMAL
- Serial Port = TCP
- TCP Host/Port = 127.0.0.1 / 8100
- Packet sound modem - click browse and find the soundmodem###.exe file you unzipped earlier.
- click UPDATE

The screenshot shows the 'Packet Winlink/P2P Setup' window. It is divided into several sections: 'TNC Connection', 'TNC Parameters', and 'Automatic Calling'. In the 'TNC Connection' section, 'Packet TNC Type' is set to 'KISS', 'Packet TNC Model' is 'NORMAL', and 'Serial Port' is 'TCP'. The 'TCP Host/Port' is set to '127.0.0.1' and '8100'. The 'Packet sound modem' path is 'C:\Users\Chris\Desktop\Radio\soundmodem.exe', with a 'Browse' button next to it. A checkbox 'Automatically launch packet sound modem' is checked. The 'TNC Parameters' section has two columns for '1200 Baud' and '9600 Baud' settings. The '1200 Baud' column is selected. Settings include 'TX Delay (Milliseconds): 500', 'Maximum Packet Length: 128', 'Maximum Frames: 4', 'Frack: 2', 'Persistence: 160', 'Slot time: 30', 'Maximum Retries: 5', 'Transmit Level: 100', and 'Enable IPoll' is unchecked. The 'Automatic Calling' section has 'Autoconnect time' set to 'Disabled' and a checkbox 'Automatically call when there are pending outgoing messages' which is unchecked. At the bottom are 'Update' and 'Cancel' buttons.

TNC Connection	
Packet TNC Type:	KISS
Packet TNC Model:	NORMAL
Serial Port:	TCP
TCP Host/Port:	127.0.0.1 / 8100
Packet sound modem:	C:\Users\Chris\Desktop\Radio\soundmodem.exe
(For KISS mode)	☒ Automatically launch packet sound modem

TNC Parameters	
☒ 1200 Baud ☐ 9600 Baud	
TX Delay (Milliseconds):	500
Maximum Packet Length:	128
Maximum Frames:	4
Frack:	2
Persistence:	160
Slot time:	30
Maximum Retries:	5
Transmit Level:	100
Enable IPoll:	☐

Automatic Calling	
Autoconnect time:	Disabled
☐ Automatically call when there are pending outgoing messages	

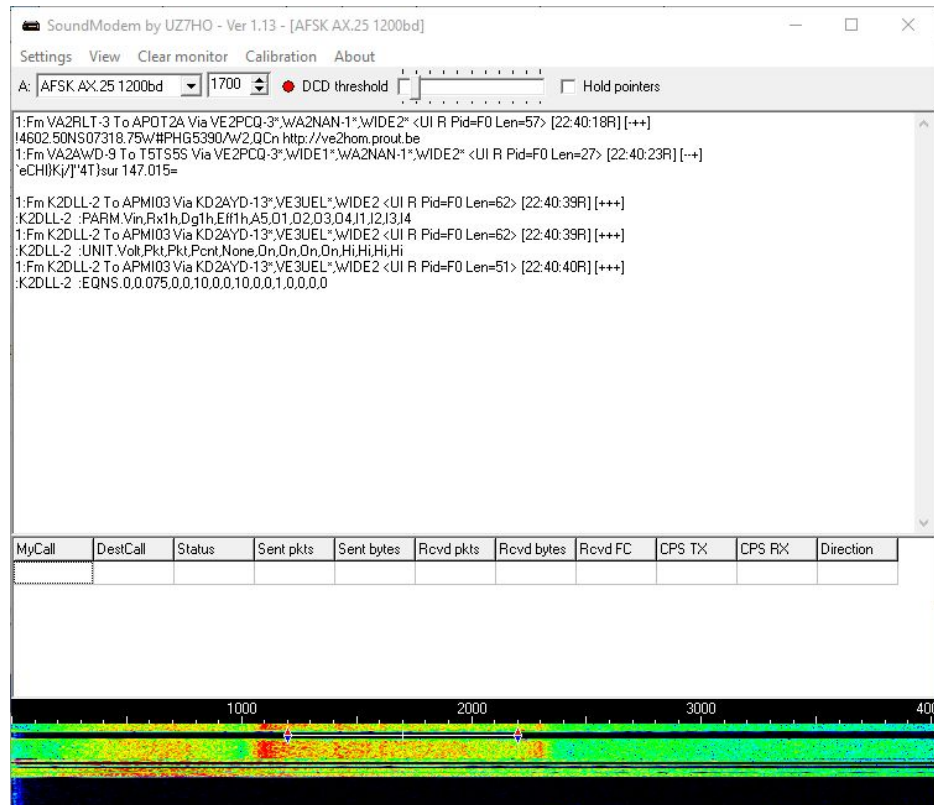
Update Cancel

WINLINK Packet - Soundmodem Setup 4

Close the session and re-open it.
Soundmodem should start
automatically

Make sure A: is
AFSK AX.25 1200bd
and **1700** is the center frequency.

DCD = Data Carrier Detect
(like a Squelch)



WINLINK - Soundmodem Setup 5

Click SETTINGS then MODEMS.

Verify that settings for Ch. A match as shown.

TX Delay and TX Tail may need to be adjusted for your radio.

The screenshot shows the 'Modem settings' dialog box with two main sections for Channel A and Channel B. Channel A settings are on the left, and Channel B settings are on the right. Both sections have a 'Modem filters' and a 'Modem type' sub-section.

Modem filters ch: A

- BPF Width: 1400 [Show]
- TXBPF Width: 1600 [Show]
- LPF Width: 650 [Show]
- BPF Taps: 256
- LPF Taps: 128
- ☐ Default settings
- PreEmphasis filter: None [All]
- ☒ KISS Optimization
- ☒ non-AX25 filter

Modem type ch: A

- Mode: AFSK AX.25 1200bd
- TXDelay: 400 msec
- TXTail: 50 msec
- Add. RX: 0 pairs
- Add. RX shift: 30 Hz
- Bits Recovery: NONE
- FX.25 Mode: RX-ONLY

Modem filters ch: B

- BPF Width: 1400 [Show]
- TXBPF Width: 1600 [Show]
- LPF Width: 650 [Show]
- BPF Taps: 256
- LPF Taps: 128
- ☒ Default settings
- PreEmphasis filter: None [All]
- ☐ KISS Optimization
- ☒ non-AX25 filter

Modem type ch: B

- Mode: AFSK AX.25 1200bd
- TXDelay: 250 msec
- TXTail: 50 msec
- Add. RX: 0 pairs
- Add. RX shift: 30 Hz
- Bits Recovery: NONE
- FX.25 Mode: RX-ONLY

At the bottom are 'Ok' and 'Cancel' buttons.

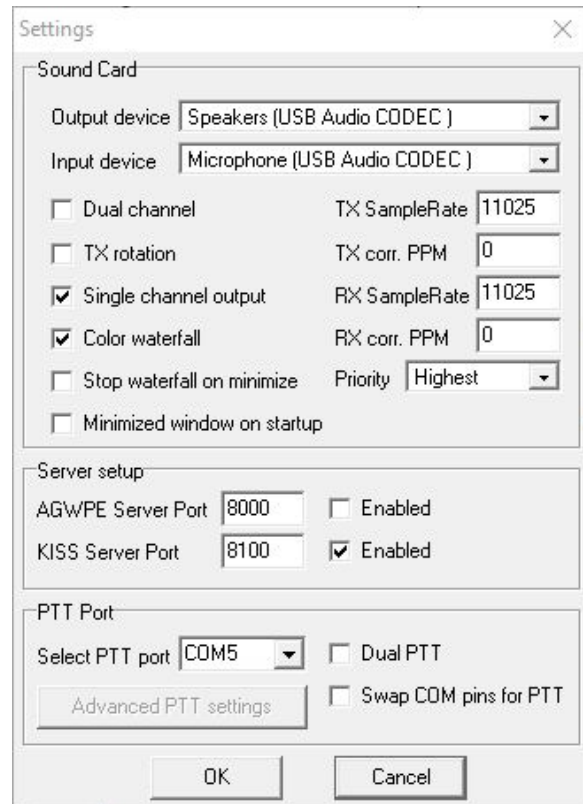
WINLINK - Soundmodem Setup 6

Click **SETTINGS** , then **DEVICES** to get this window. Set **Output** and **Input** devices and **PTT** Port.

Make sure Server Ports are as shown.

Click OK. Tune radio to 144.390 MHz (APRS) and watch for decodes. You may need to adjust settings for optimal performance.

DCD = Digital Carrier Detect (like a Squelch)



The screenshot shows the 'Settings' window for Winlink Soundmodem. It is divided into three main sections: Sound Card, Server setup, and PTT Port.

- Sound Card:**
 - Output device: Speakers (USB Audio CODEC)
 - Input device: Microphone (USB Audio CODEC)
 - ☐ Dual channel
 - ☐ TX rotation
 - ☒ Single channel output
 - ☒ Color waterfall
 - ☐ Stop waterfall on minimize
 - ☐ Minimized window on startup
 - TX SampleRate: 11025
 - TX corr. PPM: 0
 - RX SampleRate: 11025
 - RX corr. PPM: 0
 - Priority: Highest
- Server setup:**
 - AGWPE Server Port: 8000 ☐ Enabled
 - KISS Server Port: 8100 ☒ Enabled
- PTT Port:**
 - Select PTT port: COM5
 - ☐ Dual PTT
 - ☐ Swap COM pins for PTT
 - Advanced PTT settings (button)

At the bottom are 'OK' and 'Cancel' buttons.

WINLINK - Packet Session

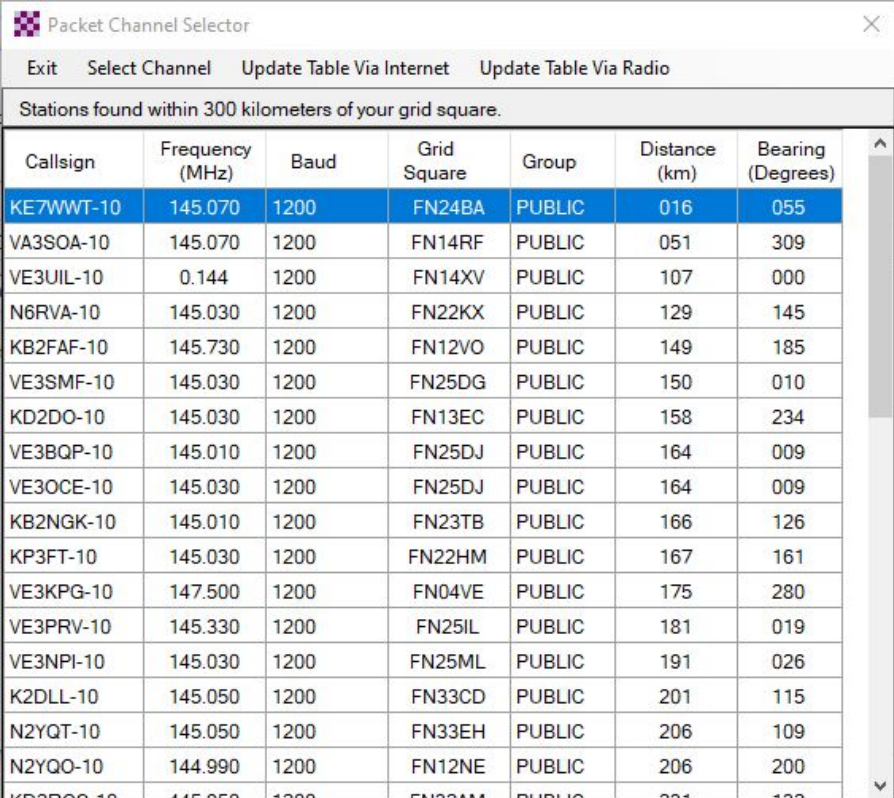
Click on Channel Selection at the top of the session window.

Click **Update Table via Internet**

After a few moments, the table will populate with the nearest nodes.

Double click to select one and it returns you to the session window.

Click **START** at the top of the session window to test if you can connect.



The screenshot shows a window titled "Packet Channel Selector" with a close button (X) in the top right corner. Below the title bar is a menu bar with four items: "Exit", "Select Channel", "Update Table Via Internet", and "Update Table Via Radio". Below the menu bar is a header row that reads "Stations found within 300 kilometers of your grid square." Below this header is a table with seven columns: "Callsign", "Frequency (MHz)", "Baud", "Grid Square", "Group", "Distance (km)", and "Bearing (Degrees)". The table contains 20 rows of data, with the first row highlighted in blue. A vertical scrollbar is visible on the right side of the table.

Callsign	Frequency (MHz)	Baud	Grid Square	Group	Distance (km)	Bearing (Degrees)
KE7WWT-10	145.070	1200	FN24BA	PUBLIC	016	055
VA3SOA-10	145.070	1200	FN14RF	PUBLIC	051	309
VE3UIL-10	0.144	1200	FN14XV	PUBLIC	107	000
N6RVA-10	145.030	1200	FN22KX	PUBLIC	129	145
KB2FAF-10	145.730	1200	FN12VO	PUBLIC	149	185
VE3SMF-10	145.030	1200	FN25DG	PUBLIC	150	010
KD2DO-10	145.030	1200	FN13EC	PUBLIC	158	234
VE3BQP-10	145.010	1200	FN25DJ	PUBLIC	164	009
VE3OCE-10	145.030	1200	FN25DJ	PUBLIC	164	009
KB2NGK-10	145.010	1200	FN23TB	PUBLIC	166	126
KP3FT-10	145.030	1200	FN22HM	PUBLIC	167	161
VE3KPG-10	147.500	1200	FN04VE	PUBLIC	175	280
VE3PRV-10	145.330	1200	FN25IL	PUBLIC	181	019
VE3NPI-10	145.030	1200	FN25ML	PUBLIC	191	026
K2DLL-10	145.050	1200	FN33CD	PUBLIC	201	115
N2YQT-10	145.050	1200	FN33EH	PUBLIC	206	109
N2YQO-10	144.990	1200	FN12NE	PUBLIC	206	200
VE3BQP-10	145.050	1200	FN33AM	PUBLIC	206	109

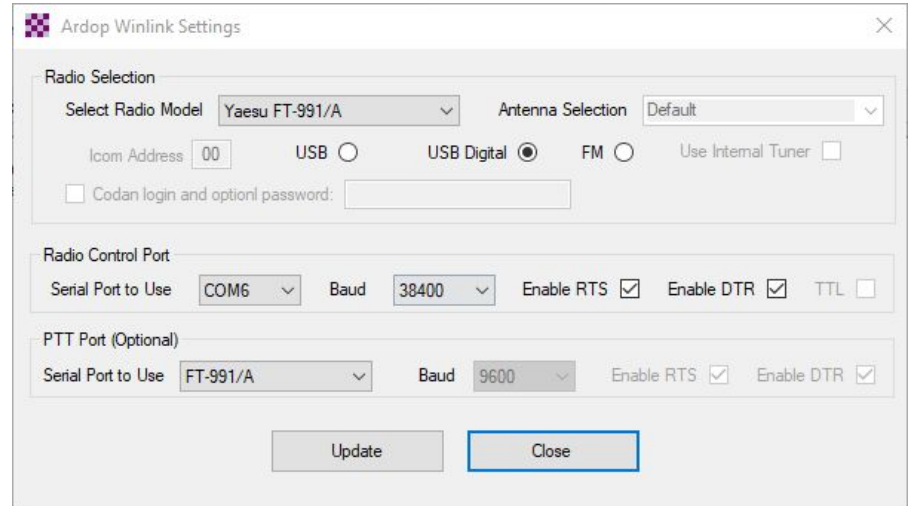
WINLINK - ARDOP

ARDOP is included with WINLINK

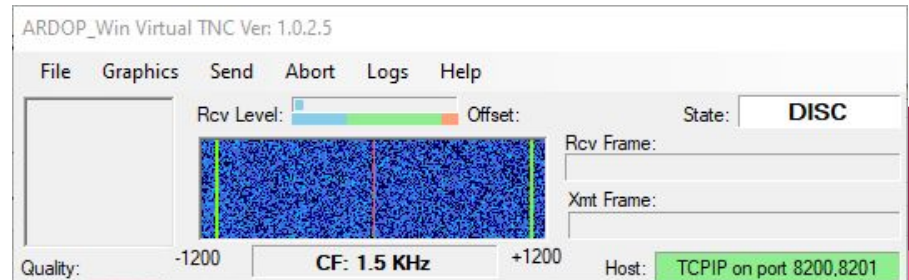
In Session Window, click SETTINGS then Radio Setup and configure for your radio. Click Update.

In Session Window, click Channel Selection, then Update via Internet

Select a station with good reliability and quality estimates (green).



The screenshot shows the 'Ardop Winlink Settings' dialog box. It is divided into three main sections: 'Radio Selection', 'Radio Control Port', and 'PTT Port (Optional)'. In the 'Radio Selection' section, 'Yaesu FT-991/A' is selected for the radio model, and 'Default' is selected for the antenna. The 'Icom Address' is set to '00'. The 'USB Digital' option is selected with a radio button. There is a checkbox for 'Codan login and optional password' which is currently unchecked. The 'Radio Control Port' section shows 'COM6' as the serial port, '38400' as the baud rate, and both 'Enable RTS' and 'Enable DTR' are checked. The 'PTT Port (Optional)' section shows 'FT-991/A' as the serial port, '9600' as the baud rate, and both 'Enable RTS' and 'Enable DTR' are checked. At the bottom, there are 'Update' and 'Close' buttons. The 'Close' button is highlighted with a blue border.



The screenshot shows the 'ARDOP_Win Virtual TNC' interface, version 1.0.2.5. It has a menu bar with 'File', 'Graphics', 'Send', 'Abort', 'Logs', and 'Help'. On the left is a large empty box for a spectrum display. To its right is a 'Rcv Level' bar with a green segment and an 'Offset' field. Below the spectrum display is a 'Quality' meter with a scale from -1200 to +1200, and a 'CF: 1.5 KHz' label. On the right side, there is a 'State' dropdown menu set to 'DISC', and fields for 'Rcv Frame:', 'Xmt Frame:', and 'Host:'. The 'Host' field shows 'TCPIP on port 8200,8201'.

WINLINK - You're in!

If all has gone well, at this point, WINLINK is like most other email programs you have seen. There is an INBOX, OUTBOX, SENT, DELETED, SAVED, etc...

To send an email:

1. Use New Message to compose a message - click send to OUTBOX at the top when done writing.
2. Make sure you've selected the transmission mode you want and then click on Open Session
3. Start the session! If there is mail waiting for you, it will be retrieved and put in your INBOX



Winlink Forms

Winlink has a multitude of forms for communications.

1. Start a new message
2. At the top of the new message window, Select Template (ex: Radiogram)
3. A web browser window opens with fillable fields
4. Fill out your form and click submit.
5. The browser window clears and you are sent back to the message.
6. Click Post to Outbox to queue it for sending.

