

How to Set up VARA to Access DTN Hub Stations

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INTRODUCTION

This document describes how to set up an HF Digital Traffic Station (DTS) and send digital radiograms over the RRI Digital Traffic Network (DTN) using the VARA mode software modem. Also, those stations that retrieve traffic from a hub station over HF can use VARA to pick up any traffic in their message queues.

Most DTN HF hub stations offer access through the VARA digital mode in addition to the traditional Pactor modes. Typically, all frequencies scanned by hub stations offering VARA listen for either Pactor or VARA calls and respond accordingly. The advantage of VARA is that it does not require a hardware modem. VARA is a digital communications mode generated and decoded using a computer sound card. As with other sound card modes such as FT8, audio and PTT connections need to be made between the computer and the transceiver. Other than that, accessing the DTN hub only requires two software packages on the station computer.

The remaining portion of this document explicitly references use of the KY2D Eastern Area hub in the examples but access to any other VARA-equipped DTN hub station should be the same except for changing KY2D to the callsign of the other hub and using that hub's frequencies.

SOFTWARE

To access the KY2D hub via VARA requires the VARA HF modem software. It can be downloaded from <https://rosmodem.wordpress.com>. Look for the VARA HF modem. The software runs at slower speed in the free version, which is fine for testing or infrequent digital traffic handling. Paying the license fee unlocks high speed. The hub stations will accept both slow and high-speed connections and automatically negotiate speed with the calling station.

At the time of writing this document, the VARA software is not supported by the software historically used by DTN Pactor stations: Airmail or Outpost PMM. To use VARA, Winlink Express is needed as the client software. A download for Winlink Express can be found at <https://downloads.winlink.org/User%20Programs>.

A Winlink email account is not needed to use Winlink Express to send radiograms over HF VARA in DTN. In DTN, Winlink Express is only used as a message display and input mechanism. The messages will all be sent over the air to a DTN hub.

HARDWARE AND CONNECTIONS

Hardware requirements are minimal. Many modern radios have a USB sound card and CAT control interface integrated into the transceiver. If not, a computer sound card will be needed. It can be a simple USB external sound card or something like the Signalink. It's better not to use the computer's built-in sound card. Doing so can far too easily result in Windows sounds or other computer audio being inadvertently sent over the air.

Many modern rigs offer a data port, typically a 6-pin Mini-DIN connector used for digital signal input/output. Though it is often designated as a "DATA" or "PACKET" port on major radios, it carries analog audio signals and control lines, not raw binary data. Such a port simplifies connecting the rig to the sound card.

If a data port isn't available, the audio output from the sound card needs to be connected to the radio's mic input. Even better is using AUX-in or line-in if either of those are available on the radio. The radio's speaker or line-out output needs to be connected to the sound card's input. Finally, a CAT control cable is the preferred way to connect the PTT signal although VOX can work if the VOX delay is set short enough to quickly drop out of transmit.

Computer control of the radio via CAT is also useful if you wish to put the needed frequencies on Winlink Express. But, entering the frequency manually on the radio works fine.

SETUP

Instructions for setting sound card and rig audio levels are given on the Winlink and VARA web pages and won't be repeated here. In the Winlink Express setup, select the VARA modem option. Further, the Winlink express automatic connect option must not be enabled in settings. Look for Auto Session Open on Startup and uncheck it.

FREQUENCIES

The KY2D DTN hub scans several frequencies listening for both Pactor and VARA calls. Each frequency is monitored for 3 seconds before moving to the next frequency in the list. If a call comes in, KY2D stays on that frequency until the communication is complete then the connection is dropped and frequency scanning resumes. The KY2D frequencies are: 3.5904, 3.5924, 7.1009, 10.1424, 14.0964, 14.1089, 18.1069, and 21.0919 MHz

Note these are “dial” frequencies. Some software packages store “center” frequencies. For example, the Airmail software table shows DTN hub frequencies as center frequencies, which are 1500 Hz higher than dial frequencies. If Airmail is using CAT control, it automatically sets your rig to 1500 Hz lower than the specified center frequency. Thus, when using Winlink Express with VARA, pay attention to the difference between dial and center frequencies.

All frequencies are USB and require a bandwidth setting of at least 2.7 KHz. Set your radio to USB or “audio data” if your radio has a data mode and set bandwidth accordingly. A receive or transmit bandwidth that is too narrow seriously limits data speed and can even completely prevent connections.

SENDING OUTGOING RADIOGRAMS TO A DTN HUB

Most DTN hubs will accept incoming messages from any station without prearranging to use the hub. Before sending an outgoing radiogram, it must be entered into the message composition software, such as Winlink Express. There are RRI radiogram templates in Winlink Express for sending to RRI regional liaisons. When connecting directly to a DTN hub, using them requires that you change the “To” address. They are intended for sending messages via the Winlink network, not the DTN.

In addition to the information in the addressee section of a radiogram, a “To” address is used in the DTN to properly route messages. Outgoing messages must use “To” addresses in NTS:zip@NTSxx format. Unlike Airmail or Outpost, the address must start with “NTS:” to indicate it’s going to the DTN. Then the postal code, an atsign, “NTS” followed by the two-letter state or province is given. For example, a message to KY2D would use “NTS:04543@NTSME” in the “to” field. Note that there are no blanks in the address string. International messages are addressed as NTS:call@-xxx where “call” is the call sign of the addressee and “xxx” is the 3-letter ISO country code. Note the minus sign preceding the country code. For example, the address for Peter DL4FN is NTS:DL4FN@-DEU.

In the subject line, specify one of:

- City followed by callsign of the addressee (e.g., "DAMARISCOTTA KY2D")
- City followed by area code followed by NNX of the addressee (e.g., "DAMARISCOTTA 973 723")
- City followed by - - if no phone is available (e.g., "NEW YORK - -")

Then place the actual radiogram, all in upper case, in the Winlink Express message text area, starting with the usual preamble, e.g.

NR 123 R KY2D 12 DAMARISCOTTA ME JAN 21

Several radiograms can be entered before connecting to the DTN hub and sending them. However, each radiogram should be entered as a separate message. Once outgoing radiograms have been entered, initiate an HF WINLINK VARA connection to the DTN hub.

If you are using Winlink Express to connect to the Winlink network as well as to DTN, be careful what messages are sent where. Unlike Airmail, Winlink Express does not have any way to indicate what gateway should be used to inject the message into the network. When a Winlink Express connection is established over the air, all **messages** waiting to be sent will go out to that station. If you have entered messages for Winlink.org and for DTN, they will both go out over the next connection. That can put DTN messages into Winlink.org or Winlink messages into DTN. Thus, be careful to enter messages for DTN then connect to a DTN hub station like KY2D and send them before making any other Winlink Express connection. If you have messages for Winlink addresses, like KY2D@WINLINK.ORG, connect to a Winlink CMS and send them before connecting to a DTN hub.

PICKING UP MESSAGES

To receive messages, a station must be configured in an assigned regional hub with information about what state(s) or portion of a state the station represents. A registered station initiates an HF Winlink VARA call to the regional DTN hub on any of the hub's scanned frequencies, such as those for KY2D noted above. If there are messages queued for the station, they will be transferred to the station's PC and will be marked for deletion on the hub. Note that connecting to a DTN hub like KY2D only retrieves DTN messages in your station's queue. Winlink.org messages are not in that queue. Remember what messages are to be placed in your queue must be prearranged and configured in the hub. Thus, unless you already pick up messages from a DTN hub, you do not have a defined message queue, and one will need to be set up.