



Winlink Basics

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Peoria Illinois

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Scope of this Presentation

- What's In
 - Winlink for the typical amateur radio operator
 - The basics to send and receive messages
- What's Out
 - Settings for particular radios and interfaces
 - Many fine-points, tips, and tricks for using Winlink
 - Details regarding use of Digipeaters/Nodes
 - How operate an RMS Gateway



Winlink Global Radio Email®

- The Winlink system is a worldwide radio email service that uses radio pathways where the internet is not present, and is capable of operating completely without the internet--automatically--using smart-network radio relays.
- The Winlink system uses the Internet (when available) to send messages between users. Multiple servers worldwide provide the backbone.
- Winlink provides users email messaging with attachments, position reporting, weather and information bulletins, and is well-known for its role in emergency and disaster relief communications.
- Winlink can send messages to & from regular Internet Email Addresses.
- Winlink can also send messages direct between users (Peer-to-Peer).
- User software was formerly called RMS Express, now Winlink Express.



Winlink Background Info

- Does not replace your normal email account
- Regulations prohibit commercial content over the air
- All messages passing through licensed US amateur radio stations by radio are freely readable by other licensed amateurs
- Messages sent via Radio transmit slower than most home internet or cell phone connections
- Max size of email and attachments=120,000 bytes
- Earliest version was in use in 1990. Now full-featured software.
- Regular updates are made, including fixes and new features.
- Winlink messages are NOT encrypted, are NOT private, and can be easily read by Gateway SYSOPS and licensed amateurs.



Why Use Winlink?

- Regional Internet outages can occur during natural and man-made disasters
- Detailed, accurate messages can be transmitted via ham radio with Winlink
- Send messages out of an effected region
 - Quickly alert family of your status
- Support emergency services within effected region
 - Served agencies are familiar with email messages



Multiple Modes in One Program

- Winlink Express includes multiple modes in one program - Packet, VARA-FM, Pactor, ARDOP, VARA-HF, and directly between user's systems (Peer-to-Peer)
- VHF/UHF & HF & Telnet (Internet)
- I recommend Winlink Express – a full-featured email client, which is free. Donations accepted.
- More Mode info can be found at www.winlink.org or in the Winlink Express program.



Uses & Users

- Popular with ARES & EmComm folks
- Used during at least 20 recent hurricanes
- 2021 Texas Winter Freeze
- 2020 California Earthquakes
- 2019 Mexico City Wildfires
- Other high profile disasters
- Lives and property saved, damage mitigated
- Sailors stay connected at sea, over marine radio



Statewide Winlink Growth

- Over 40 VHF Gateways are online in Illinois, most are operating on VHF frequency 145.610 MHz
- Former IL State Police Radios have been repurposed and are used in some of these gateways
- Peoria County now has one VHF Winlink Gateway
Name is KD9ANU-10, Digipeater Name = PEORIA
- Tazewell County has one VHF Gateway
Name is W9TAZ-10, Digipeater Name = TAZWEL
- A VHF Digipeater is also operating in Mason County
Digipeater Name is WD9FMB-1 or MASON
(Use of Digipeater can increase your range)



Illinois VHF RMS Gateways

- Go to winlink.org
- Select >Tools
- On the RMS Map, choose the radio button "Packet"
- Zoom in to the region of interest





RMS Stations – ARDOP HF



- Go to winlink.org
- Select >Tools
- On the RMS Map, choose the radio button “ARDOP”
- Zoom in to the region of interest



Getting Going with Winlink

- Practice using Winlink software without Radio
 - Use only an Internet Connection (Telnet mode)
 - All the non-radio software features are available
- Start sending radio messages at later time
 - After you become comfortable with Winlink



Software & Equipment Needs

- Winlink Express client software runs only on Windows (7 thru 11)
- Microsoft .NET Framework 3.5 must be enabled (it's typically loaded)
- Create your own Winlink account using Winlink Express software
- VHF radio uses Packet or VARA-FM modes
- HF radio uses Pactor, ARDOP, or VARA-HF modes
- You may need an Interface (TNC or external sound card) and Cable
- Some radios have built-in TNC (Kenwood D700 & D710)
- Some radios w/built-in sound card (IC-7100/7300/7410/7600/9100/9700)
- Radio 101 applies – higher Antenna, SWR, Propagation, Power Level
- RFI can cause issues – remote antenna mount, ferrites on cable ends
- Handi-Talkies and rubber duck antennas may disappoint users



Interface Box Examples

- If not built-in to your radio, there are many options
- TNC (Terminal Node Controller) for VHF Packet
 - Kantronics KPC-3+ USB (\$239)
- Sound Cards (with SoundModem or Direwolf - free software that forms Virtual TNC)
 - Signalink USB (\$135, cable adds \$22)
 - Masters Communication Radio Adapters (\$41 kit to \$86 built)
 - West Mountain RigBlaster line (\$70 to \$320)
- High End Modem for PACTOR I thru PACTOR IV
 - Spezielle Communications Systeme GmbH & Co. KG
 - P4dragon DR-7400 (\$1500)



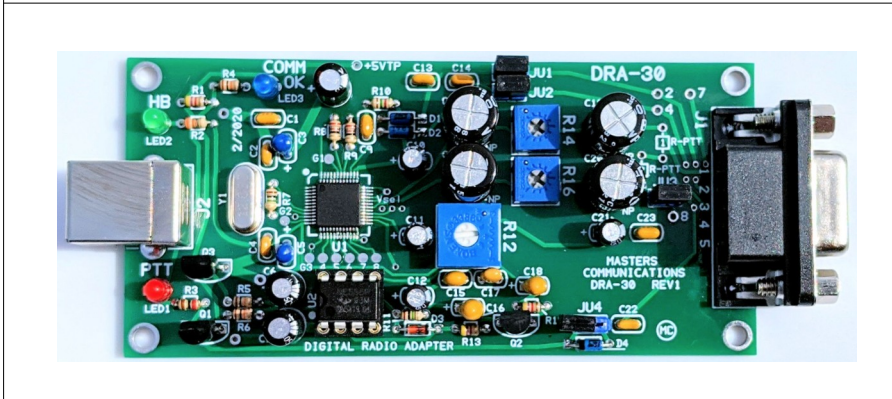
Some External Interface Options



Kantronics KPC-3 Plus TNC



Signalink USB Sound Card



Masters Communication DRA-30



P4dragon DR-7400 PACTOR Modem



Winlink Modes

- Internet Only
 - **Telnet** – Uses an Internet connection to the Winlink web servers.
- VHF/UHF Radio
 - **Packet** – (TNC or Sound Card) Uses the AX.25 (Amateur X.25) data link layer protocol, adapted for amateur radio use in the 1970's.
 - **VARA-FM** – (Sound Card) Number of such IL Gateways is small, Check www.Winlink.org/RMSChannels to locate a nearby VARA-FM Gateway.
- HF Radio
 - **FACTOR I-IV** (SCS Modem) - Utilizes a combination of simple FSK modulation, and the ARQ protocol for robust error detection and data throughput.
 - **ARDOP** – (Sound Card) HF software modem offering high-throughput and adaptive multi-bandwidth operation.
 - **VARA-HF** - (Sound Card) HF sound-card software modem offering high-throughput, fixed 2.5 KHz wide-bandwidth operation. (Free & paid versions)



How to Install Winlink Express

- Visit the Winlink Download page to obtain Winlink Express software, at <https://downloads.winlink.org/>
- In the directory list, click on “User Programs”
- Click on “Winlink_Express_install_1-7-0-0.zip” to download
- Extract the files to another directory
- Double-click the file named “Winlink Express Install.msi”
- Select the Run button in the next window
- After the installation finishes, find and click on the “RMS Express” Program Icon. Might need to look in c:\RMS Express for RMS Express.exe.





Create a Winlink Account (1 of 2)

- Must have a valid Ham Radio License
- When run the first time, the program opens the “Properties Tab”
- Fill the blanks as much as you can
- Don’t change or delete any default values that may be provided
- Be sure to include your email in the fields labeled Password recovery email and also Non-Winlink e-mail
- You DO NOT need a Winlink Express registration key, leave that blank. (The key can be purchased and avoid Nag screen.)
- When finished, click on the “Update” button



Create a Winlink Account (2 of 2)

- Connect with the Winlink system to create your account (use the Telnet mode Internet connection)
- Do not use a password on your first connection
- A message containing your password will be sent to your account. (Can change the password later.)
- Retrieve password with a second Telnet connection
- Enter password in “Settings”, “Winlink Express Setup”
- Your email address will be CALLSIGN@winlink.org



Winlink Express Setup

Winlink Express Properties

Call Signs

My Callsign: My Password:
(Case sensitive) Show 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)

Auxiliary Callsigns and Tactical Addresses

My 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.

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
- Automatically install field-test (beta) versions of Winlink Express



Connect to the System (1 of 3)

Winlink Express 1.5.10.0 - KD9ANU

KD9ANU Settings Message Attachments Move To: Saved Items Delete **Open Session: Telnet Winlink** Logs Help

No active session...

Date/Time	Message ID	Size	Source	Sender	Recipient	Subject
-----------	------------	------	--------	--------	-----------	---------

System Folders

- Inbox (0 unread)
- Read Items (10)
- Outbox (0)
- Sent Items (4)
- Saved Items (1)
- Deleted Items (3)
- Drafts (2)

Personal Folders

Global Folders

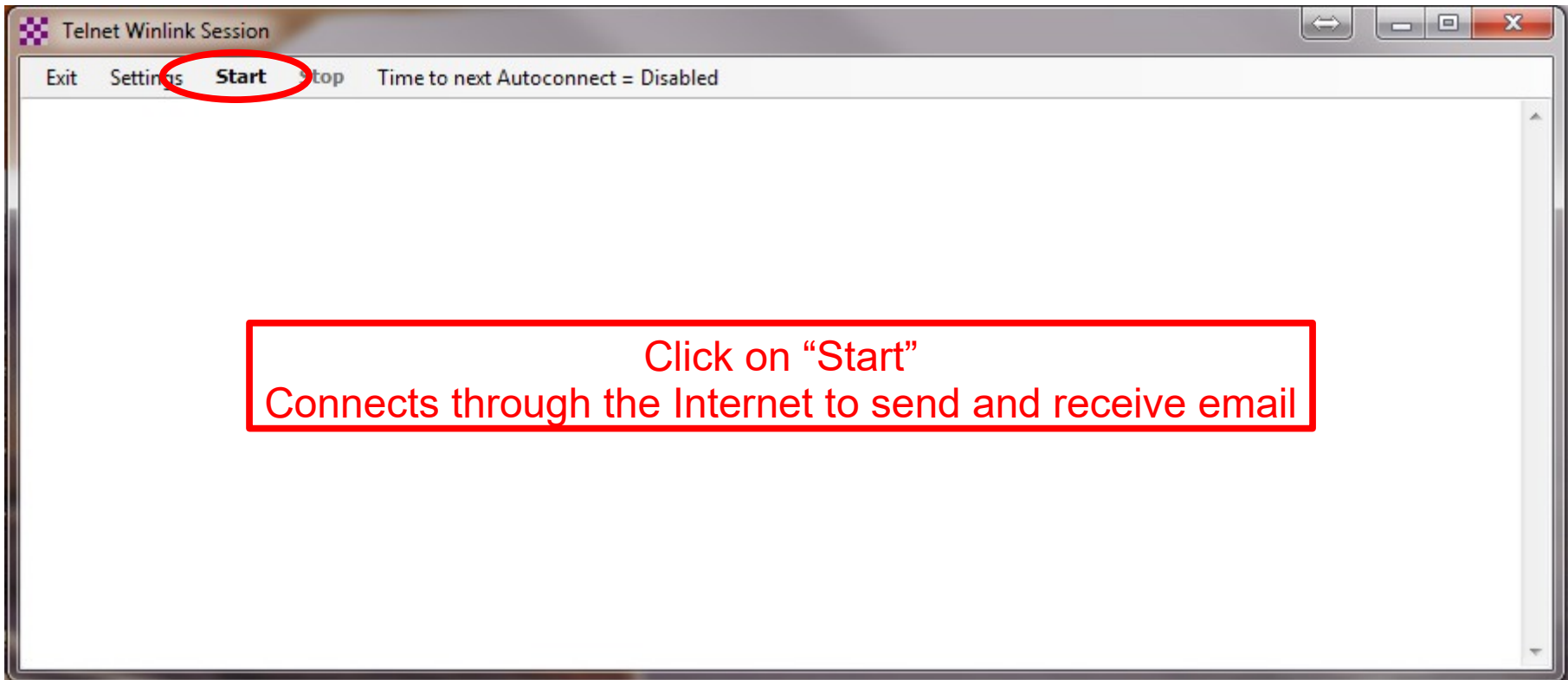
Contacts

- FRITZ_BOCK
- GARY_SHANKS
- JIM_HANLEY
- KD9ANU
- RICH.HOLTMAN@GMAIL.CC
- RON_MORGAN

With the mode Telnet Winlink showing,
Click on "Open Session"



Connect to the System (2 of 3)





Connect to the System (3 of 3)

Telnet Winlink Session

Exit Settings Start Stop Time to next Autoconnect = Disabled

```
*** Connecting to a CMS...
*** Connected to AWS at 2017/12/05 22:45:09
[WL2K-4.0-B2FWIHJM$]
:PQ: 34327558
CMS>
:FW: KD9ANU
[RMS Express-1.5.10.0-B2FHM$]
:PR: 95475577
:WL2K DE KD9ANU (EN50EU)
FF
FQ
*** -- End of session at 2017/12/05 22:45:10 --
*** Messages sent: 0. Total bytes sent: 0, Time: 00:00, bytes/minute: 0
*** Messages Received: 0. Total bytes received: 0, Total session time: 00:00, bytes/minute: 0
*** Disconnected at 2017/12/05 22:45:15
```

Click on "Exit" after Disconnected is displayed
This window will then close



Create a New Message

Winlink Express 1.5.18.0 - KD9ANU

KD9ANU Settings Message Attachments Move To: Weekly Winlink Ex Delete Open Session: Packet Winlink Logs Help

In Packet Winlink session. *** Received and processed RMS VHF Channels update message ***

	Date/Time	Message ID	Size	Source	Sender	Recipient	Subject
	2019/01/23 20:41	125_W9KJ	283	W9KJ	W9KJ	KD9ANU	Weekly Winlink Exercise #4-2019
	2019/01/23 18:18	GD4FMCTZKKEP	1413	WD9FMB	WD9FMB	KD9ANU	//WL2K ICS214A-Weekly Winlink Exercis
	2019/01/23 17:53	A3P8LFM051XC	236	N9JWI	N9JWI	KD9ANU	//WL2K Weekly Winlink Exercise #4-201
	2019/01/22 02:55	6KHNFVIFV8D5	2334	KC9RAV	KC9RAV	KD9ANU	//WL2K Re: ICS 213: Weekly Winlink Ex
	2019/01/20 20:18	118_W9KJ	3630	W9KJ	W9KJ	KD9ANU	Re: ICS 213: Weekly Winlink Exercise #3
	2019/01/20 02:40	101_W9KJ	3282	W9KJ	W9KJ	KD9ANU	Re: ICS 213: Weekly Winlink Exercise #3

Message ID: A3P8LFM051XC
 Date: 2019/01/23 17:53
 From: N9JWI
 To: KD9ANU
 Source: N9JWI
 Downloaded-from: RMS:KD9ANU-10
 Subject: //WL2K Weekly Winlink Exercise #4-2019

N9JWI, Frank, Amboy, Packet, 145.610.N9JWI-10 gateway



Sending the New Message

A screenshot of the Winlink 'Enter a new message' window. The window title is 'Enter a new message'. The menu bar includes 'Close', 'Select Template', 'ICS213', 'HW', 'NORCAL', 'Attachments', 'Post to Outbox' (circled in red), 'Spell Check', and 'Save in Drafts'. The 'From' field is set to 'KD9ANU'. The 'Send as' dropdown is set to 'Winlink Message'. There is an unchecked checkbox for 'Request read receipt' and a 'Set Defaults' button. The 'To:', 'Cc:', 'Subject:', and 'Attach:' fields are empty. The message body contains the text: '73|', 'Rich Holtman - KD9ANU', 'Assistant Emergency Coordinator', 'Peoria County ARES', 'Home QTH - Illinois - en50eu', 'cell 309-256-4272 - text me!', and 'W9UVI - Peoria Area Amateur Radio Club (Illinois)'.



Telnet Session Screen - Internet

Telnet Winlink Session

Exit Settings **Start** Stop Time to next Autoconnect = 59:58

```
*** Connecting to a CMS...
*** Connected to AWS at 2019/01/30 00:40:15
[WL2K-5.0-B2FWIHJM$]
;PQ: 16167235
CMS>
;FW: KD9ANU
[RMS Express-1.5.18.0-B2FHM$]
;PR: 59685885
; WL2K DE KD9ANU (EN50EU)
FF
FQ
*** -- End of session at 2019/01/30 00:40:16 --
*** Messages sent: 0. Total bytes sent: 0, Time: 00:00, bytes/minute: 0
*** Messages Received: 0. Total bytes received: 0, Total session time: 00:00, bytes/minute: 0
```

1) Click on "Start" to begin sending and receiving messages

2) Click on Exit or "X" to close the window after the session completes



Packet Session Screen - VHF

The screenshot shows the Packet Winlink Session window. The title bar reads "Packet Winlink Session". The menu bar includes "Exit", "Settings", "Switch to Peer-to-Peer Session", "Channel Selection", "1200 Baud", "Start", and "Stop". The "Settings" and "Channel Selection" items are circled in red. The main area shows connection details: "Connection type: Direct", "KD9ANU-10", and "Via". Below this is a "Connection script" dropdown and buttons for "Edit script", "Add script", and "Remove script". A status bar shows "Received: 125 Sent: 1537 Time to next Autoconnect = 24:46". The main text area contains a log of a session, including a message sent to 477DG5SBRN9V and session statistics. A red box with white text is overlaid on the log, stating "Settings need to be adjusted for your radio & interface".

Settings need to be adjusted for your radio & interface



Packet Channel Selection

Packet Channel Selector

Exit Select Channel **Update Table Via Internet** Update Table Via Radio

Stations found within 160 kilometers of your grid square.

Callsign	Frequency (MHz)	Baud	Grid Square	Group	Distance (mi)	Bearing (Degrees)
KD9ANU-10	145.610	1200	EN50CS	PUBLIC	010	237
WD9FMB-10	145.610	1200	EN50EQ	PUBLIC	011	180
K9WRA-10	145.610	1200	EN50HS	PUBLIC	014	113
KD9JFF-10	145.610	1200	EN50ML	PUBLIC	043	126
KB9YFW-10	145.610	1200	EN51LH	PUBLIC	044	044
NS0A-10	145.610	1200	EN41WK	PUBLIC	048	328
N9JWI-10	145.610	1200	EN51IR	PUBLIC	063	016
KB9APW-10	145.610	1200	EN51DU	PUBLIC	069	357
KD9FSG-10	145.610	1200	EN51JU	PUBLIC	072	017
N9PUZ-10	145.610	1200	EM59FT	PUBLIC	072	176
KD9BNQ-10	145.610	1200	EM59FS	PUBLIC	075	176
W9DUA-10	145.610	1200	EM59DS	PUBLIC	075	183
N9EF-10	145.610	1200	EN51QP	PUBLIC	076	043
KD9KDG-10	145.610	1200	EN50UE	PUBLIC	084	123
K9KRO-10	145.610	1200	EN51SS	PUBLIC	088	043
K9MLT-10	145.610	1200	EN50UB	PUBLIC	089	127
NG9R-10	145.610	1200	EN40LA	PUBLIC	094	233



SoundModem (Virtual TNC)

Settings View Clear monitor Calibration About

A: AFSK AX.25 1200bd 1700 DCD threshold Hold pointers

1:Fm KD9ANU To KD9ANU-10 <UA R F> [06:51:57T]
1:Fm ON To ID <UI R Pid=F0 Len=21> [06:52:44R] [+++]
Network Node (WOOD2)
1:Fm K9WRA-10 To BEACON <UI R Pid=F0 Len=31> [06:54:56R] [+++]
Winlink 2000 RMS Packet Server
1:Fm KD9ANU To KD9ANU-10 <SABM C P> [06:56:49T]
1:Fm KD9ANU-10 To KD9ANU <UA R F> [06:56:50R] [+++]
1:Fm KD9ANU-10 To KD9ANU <I C R0 S0 Pid=F0 Len=65> [06:56:52R] [+++]
Welcome to KD9ANU-10, serving Peoria County and Central Illinois
1:Fm KD9ANU To KD9ANU-10 <RR R R1> [06:56:53T]

MyCall	DestCall	Status	Sent pkts	Sent bytes	Rcvd pkts	Rcvd bytes	Rcvd FC	CPS TX

Settings need to be adjusted for your radio & interface

Start SoundModem before opening Packet session if using a sound card interface



ARDOP Session Screen - HF

Ardop Winlink Session - KD9ANU

Exit **Settings** Switch to Peer-to-Peer Channel Selection Map Forecast Best chan. Next chan. **Start** **Stop**

N0LCR-1 Center Freq. (kHz): 7113.500 Dial Freq. (kHz): 7112.000 Bearing: 348 Quality: 53

Favorites: KB5LZK @ 7101.600 [2500] (50) Select Add to favorites Remove from favorites

Channel Free In: 0/0 Out: 298/298 BPM: 561 Disconnected

```
RMS Trimode 1.3.47.0 Node in Knife River MN EN46cx
KD9ANU has 238 daily minutes remaining with N0LCR-1 (EN46CX)
[WL2K-5.0-B2FWIHJM$]
:PQ: 56992792
CMS via N0LCR-1 >
:FW: KD9ANU
[RMS Express-1.7.0.0-B2FHM$]
:PR: 54963766
:N0LCR-1 DE KD9ANU (EN50CS)
FC EM PMC7QH4SH3C4 521 298 0
F> A4
FS Y
*** Sending PMC7QH4SH3C4.
FF
*** Completed send of message PMC7QH4SH3C4
*** Sent 1 message. Bytes: 385, Time: 01:09, bytes/minute: 330
FQ
*** -- End of session with N0LCR-1 at 2022/09/13 01:38:39 --
*** Messages sent: 1. Total bytes sent: 385, Time: 02:06, bytes/minute: 183
*** Messages Received: 0. Total bytes received: 0, Total session time: 02:06, bytes/minute: 0
*** Disconnecting
*** Disconnected from Winlink RMS: N0LCR-1 @ 2022/09/13 01:38:46
*** Session: 2.2 min; Avg Throughput: 268 Bytes/min; 1 Min Peak Throughput: 268 Bytes/min
```

Settings need to be adjusted
for your radio & interface



HF Channel Selection Tool

HF Channel Selector

Exit Select **Update Table Via Internet** Update Table Via Radio Forecast SFI All RMS

Callsign	Frequency (kHz)	Mode	Grid Square	Hours	Group	Distance (mi)	Bearing (Degrees)	Path Reliability Estimate	Path Quality Estimate
KG5KS-10	7101.500	1600	EM45JP	00-23	PUBLIC	369	194	91	55
N0LCR-1	7113.500	500	EN47DA	00-23	PUBLIC	438	347	89	56
N0LCR-1	7103.500	1600	EN47DA	00-23	PUBLIC	438	347	89	56
K0SI	3586.500	1600	EM39UA	00-23	PUBLIC	189	229	86	53
KD7UHR	3588.500	1600	EM58BQ	00-23	PUBLIC	150	185	86	54
W9FE	3597.000	1600	EM59AA	00-23	PUBLIC	127	188	84	53
W9JUN-10	7102.500	1600	EM78GU	00-23	PUBLIC	260	121	84	57
W6IDS	7084.500	500	EM79NV	12-23	PUBLIC	258	103	83	57
NF9D	3595.000	1600	EN51TW	00-23	PUBLIC	99	040	83	53
NS0A	3510.000	500	EN41WK	00-23	PUBLIC	48	328	83	53
W6IDS	7102.500	500	EM79NV	12-23	PUBLIC	258	103	82	56
KC8YJJ	7102.500	1600	EN90PL	00-23	PUBLIC	467	090	75	48
AJ4FW	10146.000	1600	FM07BC	00-23	PUBLIC	583	113	74	46
K9BBS-10	7102.500	1600	EM68SR	00-23	PUBLIC	223	130	74	53
KB5LZK	7101.200	1600	EM34UT	00-23	PUBLIC	441	200	73	46
AD5EO	7103.000	1600	EM34QN	00-23	PUBLIC	464	202	71	45
K0SI	7103.500	1600	EM39UA	00-23	PUBLIC	189	229	69	50

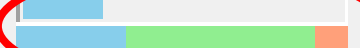


ARDOP Virtual TNC - HF

ARDOP_Win Virtual TNC Ver: 1.0.2.5

File Graphics Send Abort Logs Help

Connected N0LCR-1

Rcv Level:  Offset: -26.8 Hz @ -3dB State: **IRS**

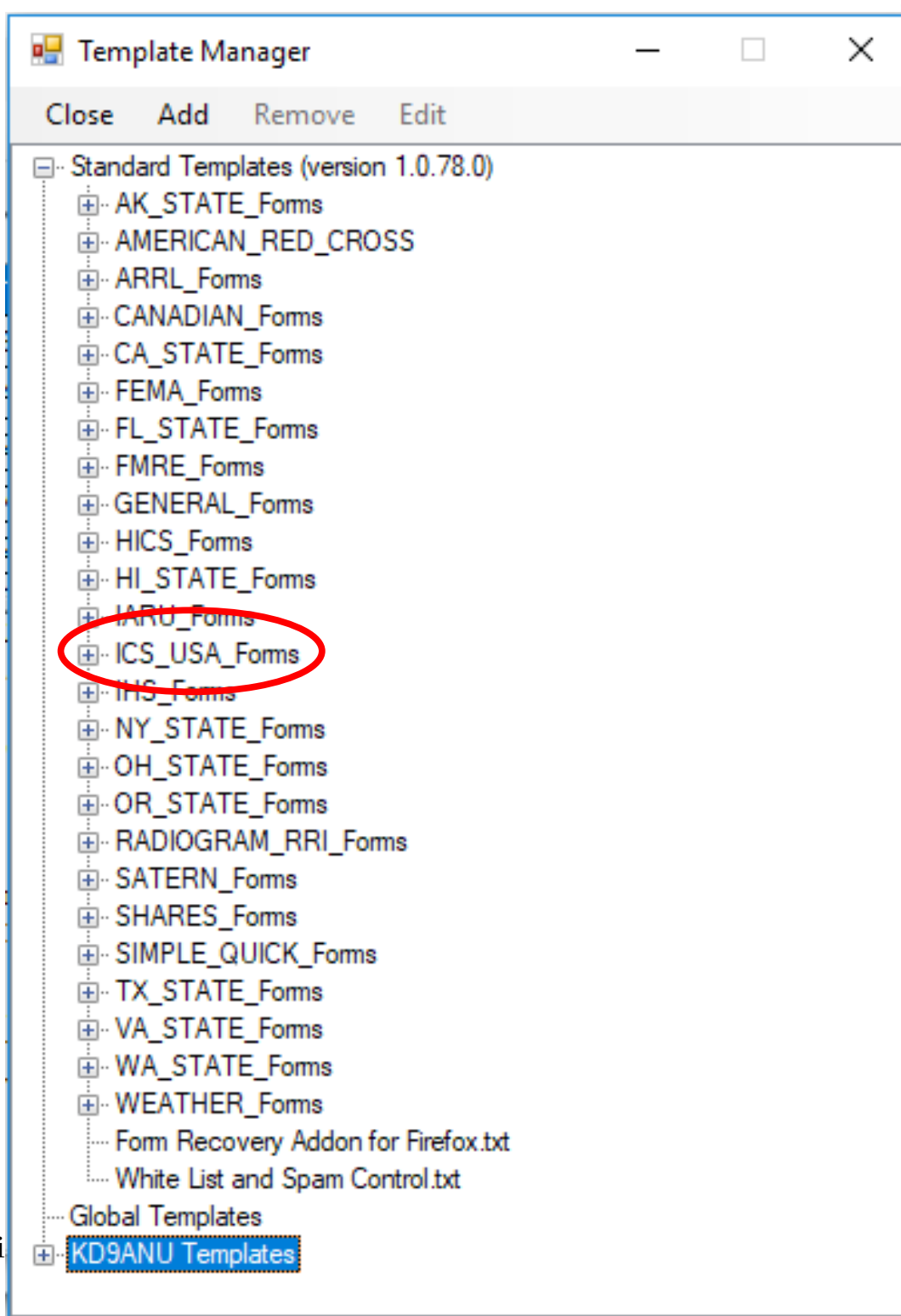
Rcv Frame: 4PSK.200.100.E

Xmt Frame:

4PSK Quality: 86 -1200 **USB dial 7112.000 KHz** +1200 Host: **TCPIP on port 8200,8201**



Forms or Templates





Winlink Support

- Good indexed Help within the Winlink Express program. USE THIS!
- Winlink Book of Knowledge (download latest pdf file)
https://winlink.org/content/winlink_faq_september_29_2019_revised_frequently_asked_questions
- Winlink Forum on Google Groups (text-searchable)
 - Winlink Programs Group
- The San Diego ARES group has a series of short videos. Search for “San Diego Winlink Series youtube”
- Can also be hard to find up-to-date detailed help using general Internet searches. Yet this may be a good way to find help for specific radio and interface, if you include enough specifics in the search string.
- Ask other Winlink users



Reminders

- Log in and use regularly – after 400 inactive days your account is turned off – Contact Admin to fix
- Winlink Express software updates automatically while open or when opened, also auto updates the Templates/Forms
- If your software become out-of-date too much, a full reinstall is necessary
- You cannot send a Winlink message to your Winlink address – rejected as a duplicate. Send messages to your personal Internet address for testing.



Take Aways

- Download Winlink Express Software on your PC
- Create your Account
- Debug and practice using Telnet Internet Mode
- Move to Winlink via Radio – VHF and/or HF
- Practice! Send messages to yourself & others
- Plenty of practice sessions exist – Talk to me afterwards
- Use Help in Winlink Express, FAQ, & Google forum
- Post issues in the Google forum if you need help



Questions?