Winlink for Rookies
Zoom Class

K3EUI Barry

Winlink For Rookies

Goal: learn the fundamentals of using Winlink as an emergency communications package

HF SSB modes

VHF/UHF FM modes

Winlink Express software (free)

Send email to

GATEWAY (internet connect)

or

Peer-to-Peer

Hardware needed

RADIO - HF SSB or VHF/UHF FM or HT

TX: input port - MIC or DATA port

RX: output port – speaker/headphone or DATA port

Sound Card or TNC

INPUT - Rx **analog** audio from radio

OUTPUT – Tx **analog** audio to radio

PTT - COM port or VOX (voice relay)

GND - common ground cable

Winlink Express

HF SSB modes

Pactor II, III (requires TNC)

VARA HF SSB (sound card)

ARDOP (sound card)

VHF/UHF FM modes

Packet (TNC or Sound Modem)

VARA FM (sound card)

Which bike would you want to ride up a mountain?

PACKET vs. VARA

EMCOMM modes: the software

Adapt to a changing propagation

Send data nearly error-free

Efficient use of bandwidth?

Be inexpensive

Complete Winlink/NBEMS FLDIGI station

Icom 706MIIG (HF/VHF/UHF) SSB-FM

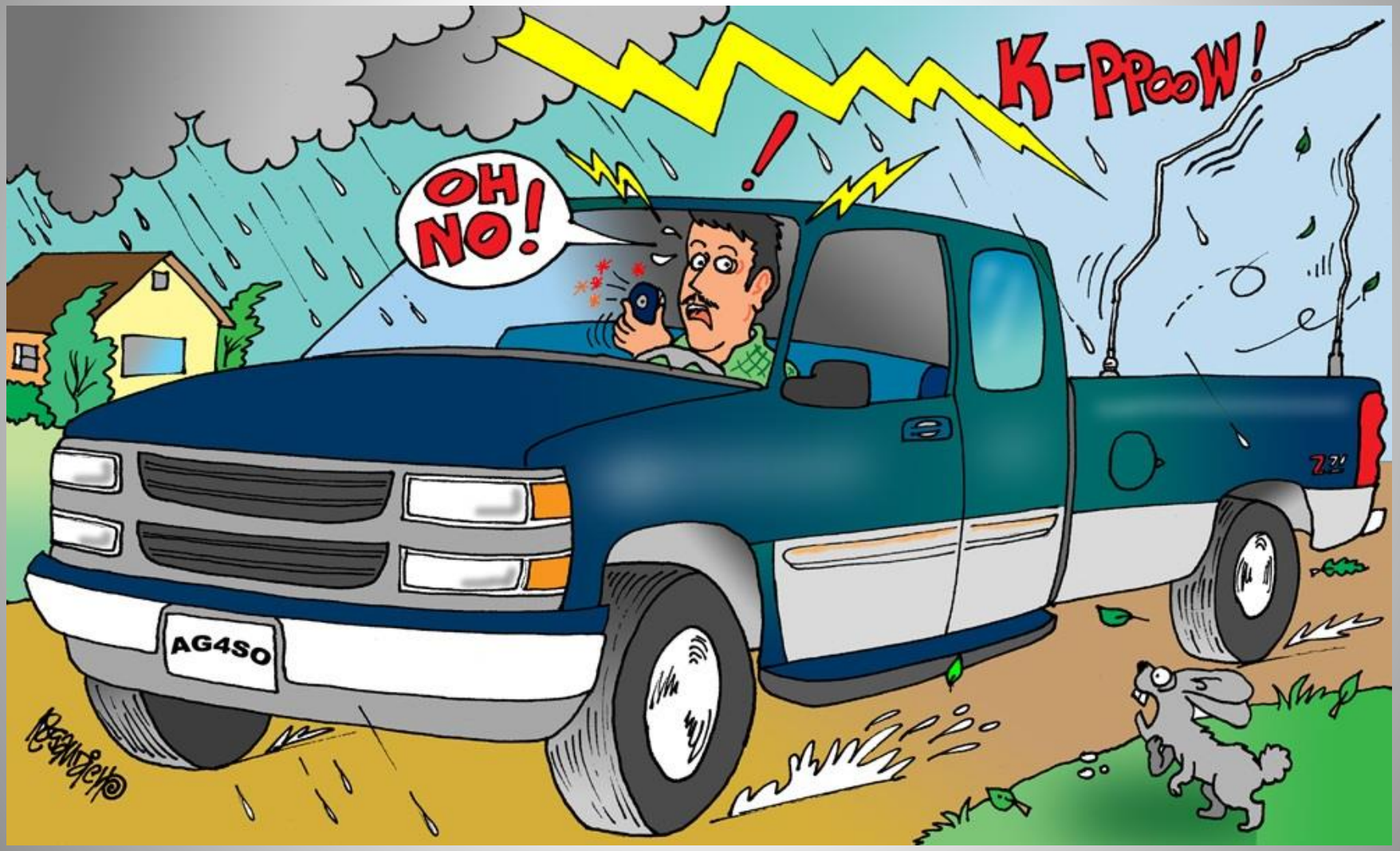
USB-serial converter COM port PTT and CAT (rig control)

SignaLink usb audio and HF antenna tuner

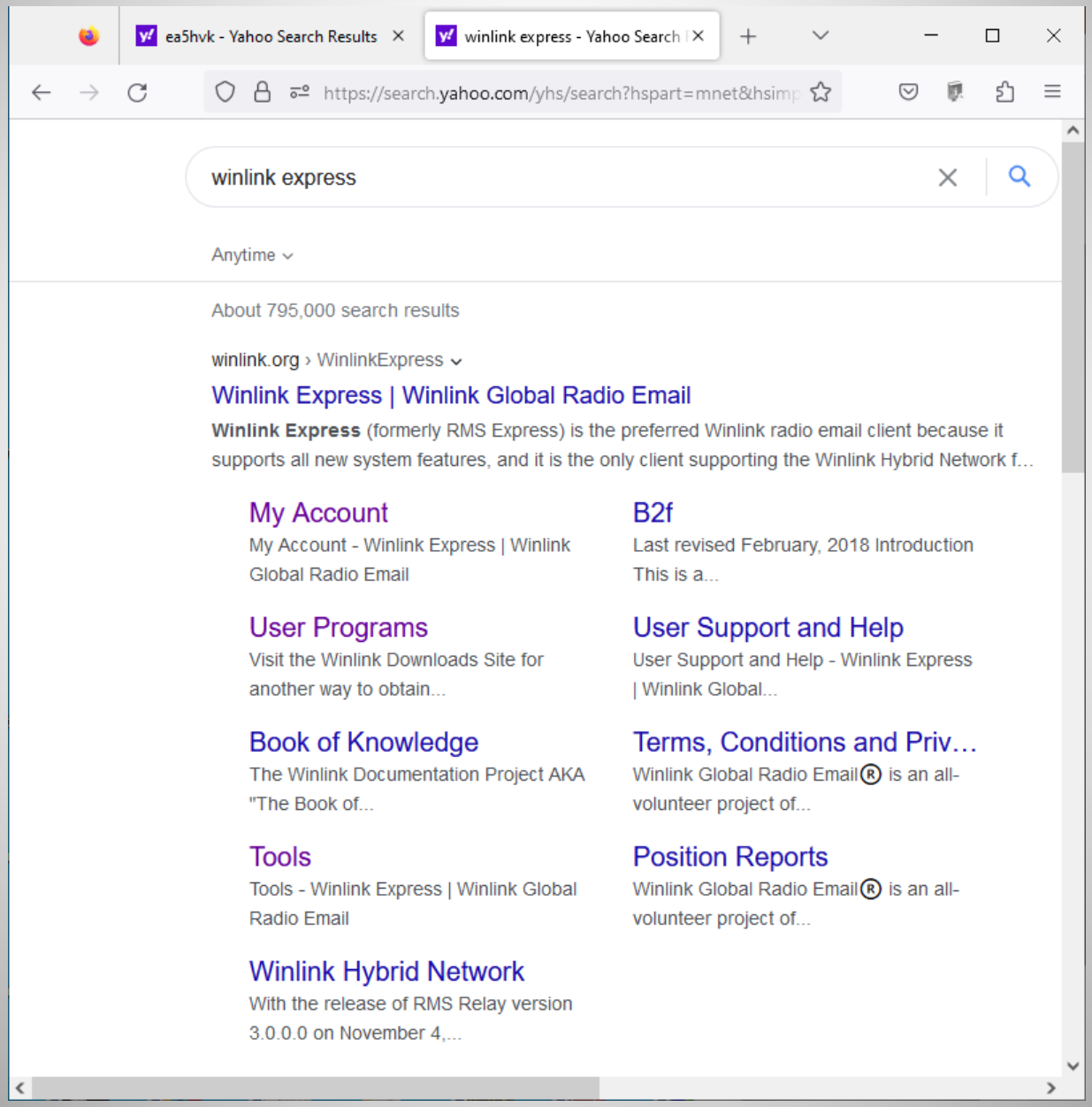
Pactor III TNC for HF Pactor 3 and VHF PACKET

Sometimes we operate EMCOMM from our home QTH

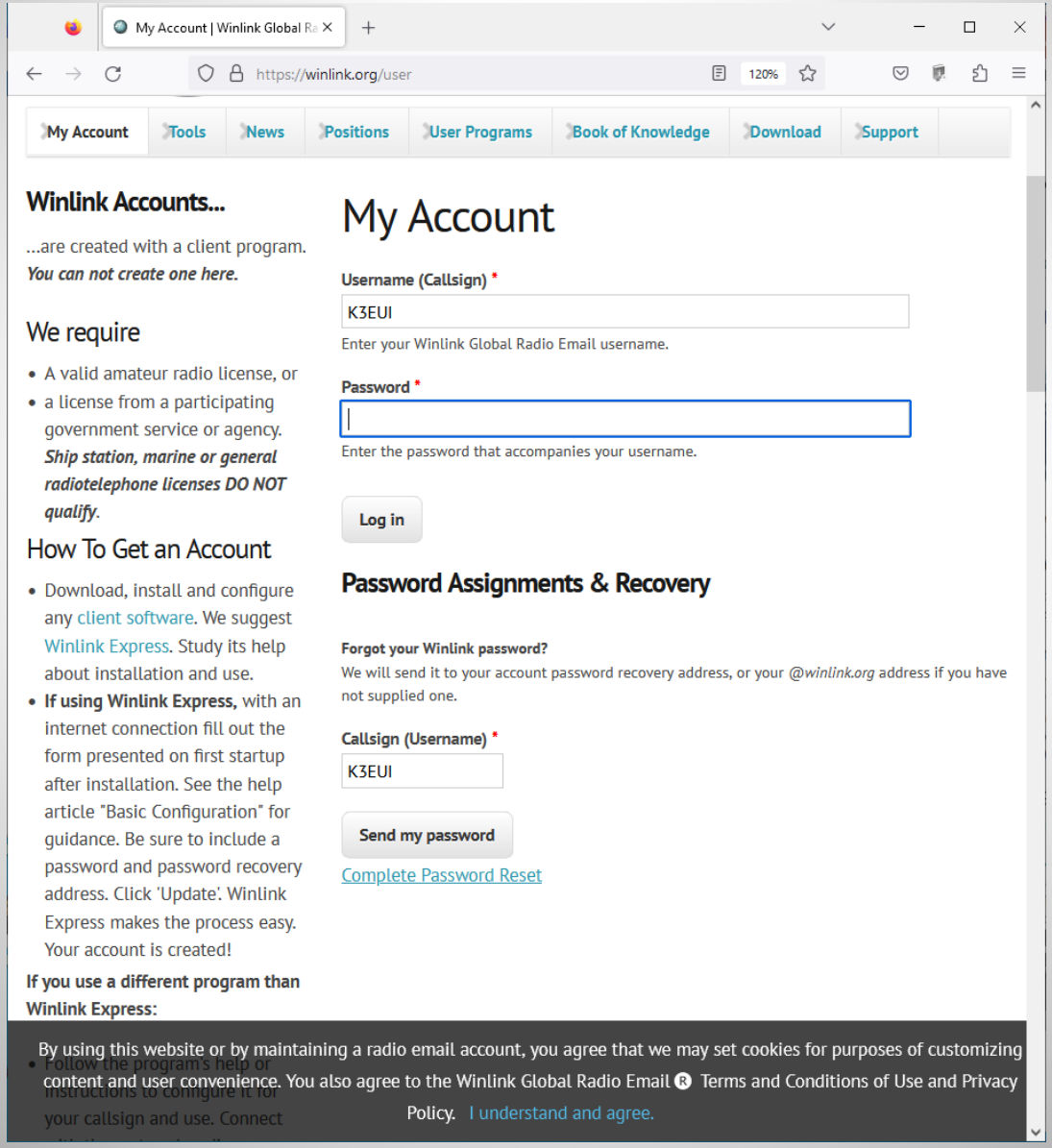
Other times Portable/Mobile



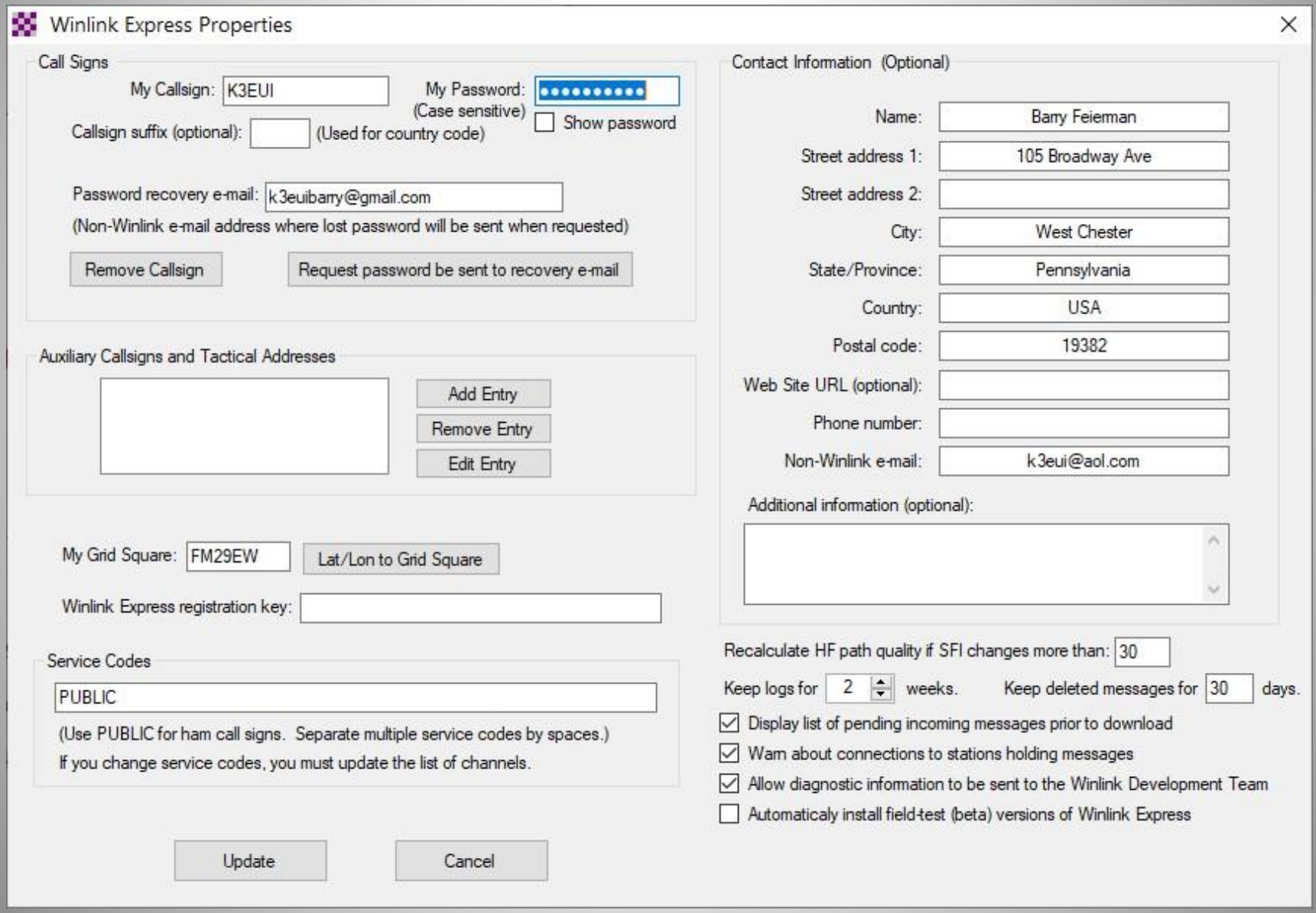
Start with Winlink Express



Get an account (free): **My Account** set up **Recovery Acct** and password

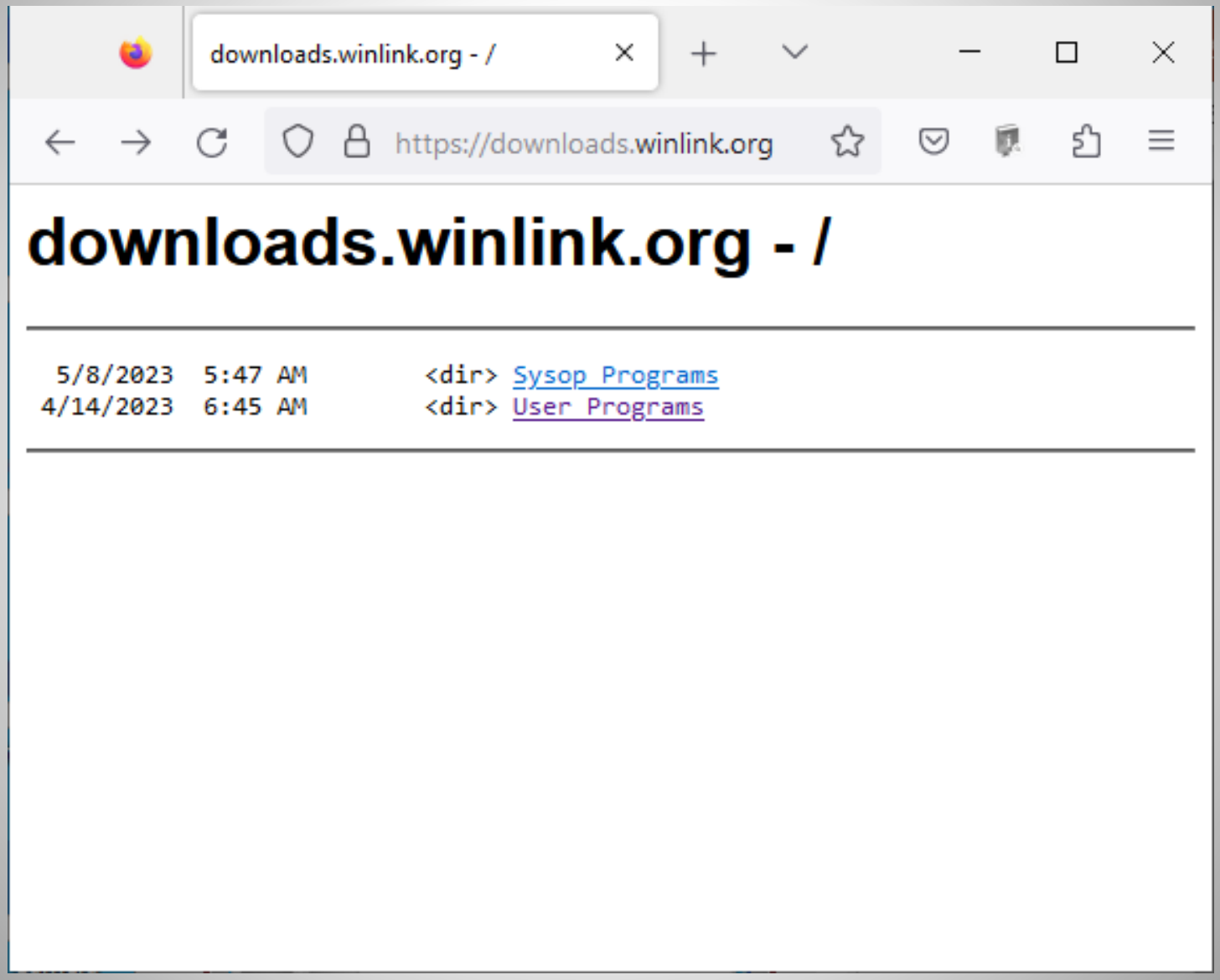


Register your call with Winlink.org pick a "recovery" email account

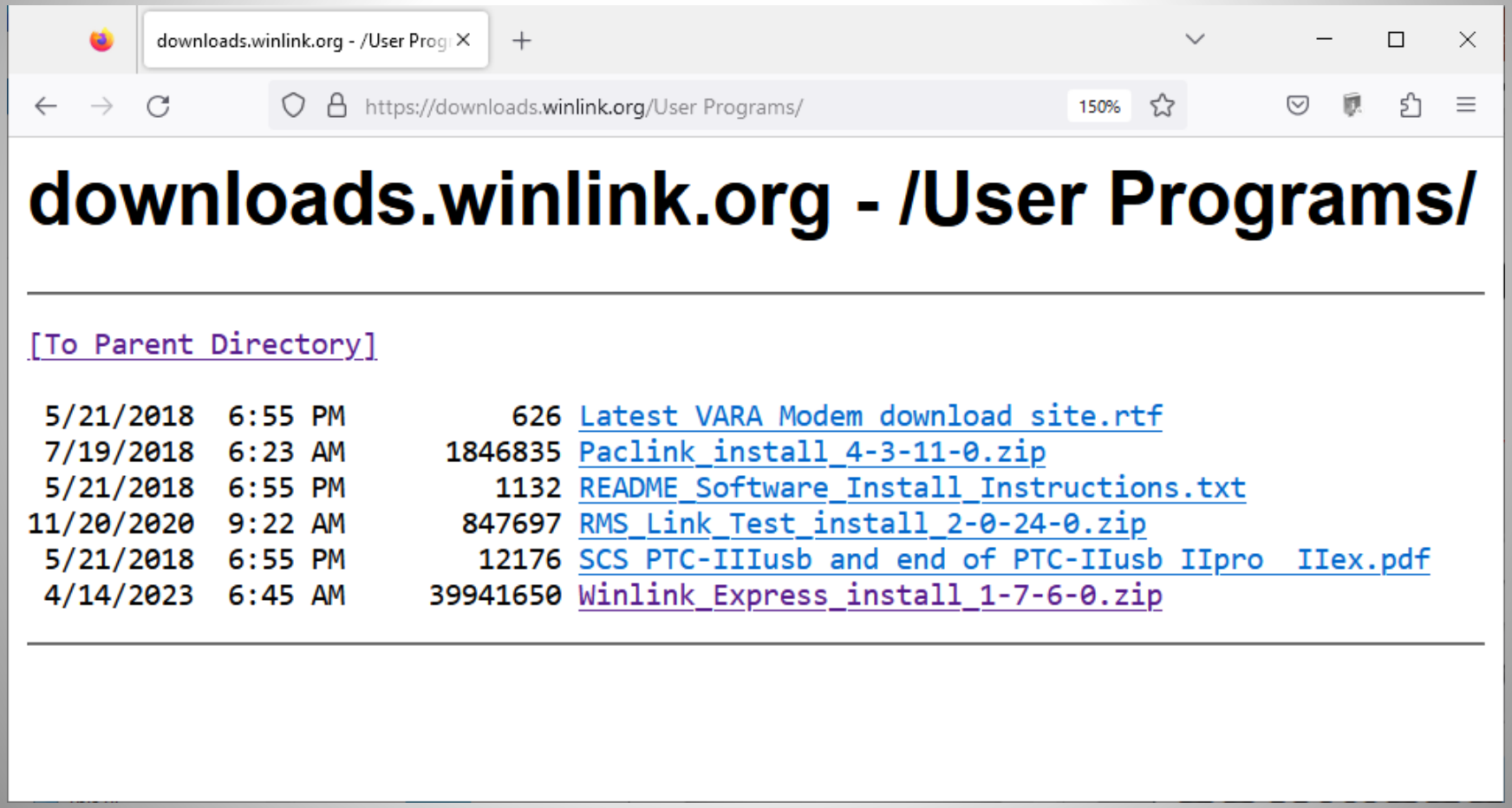


Choose Download next

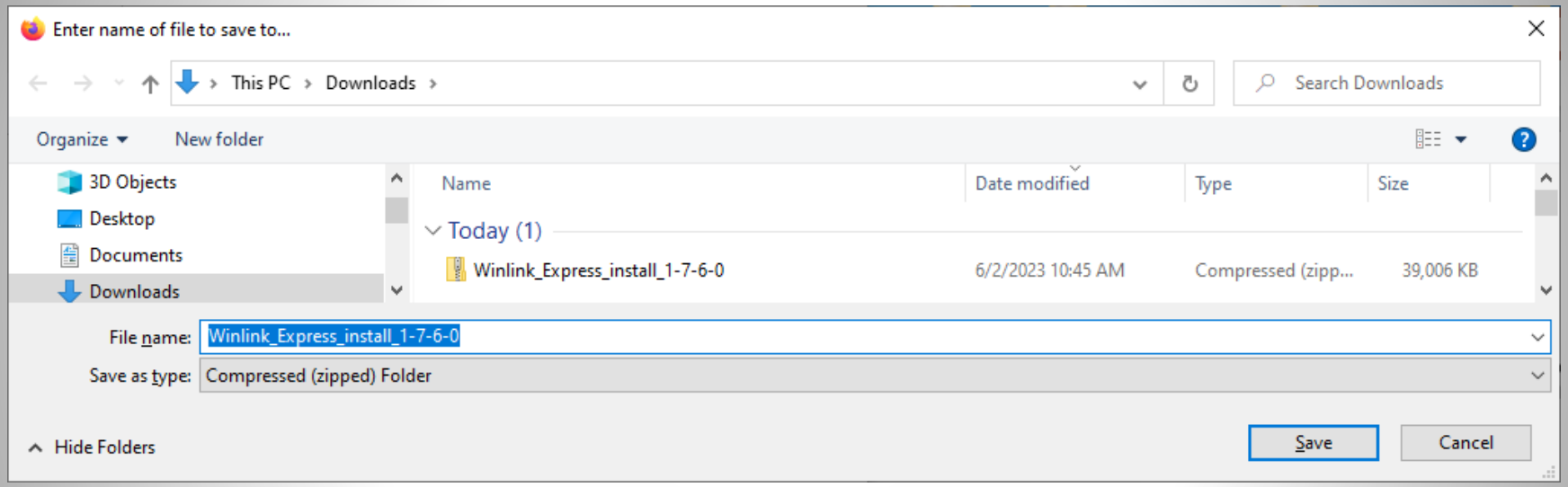
Choose User Programs



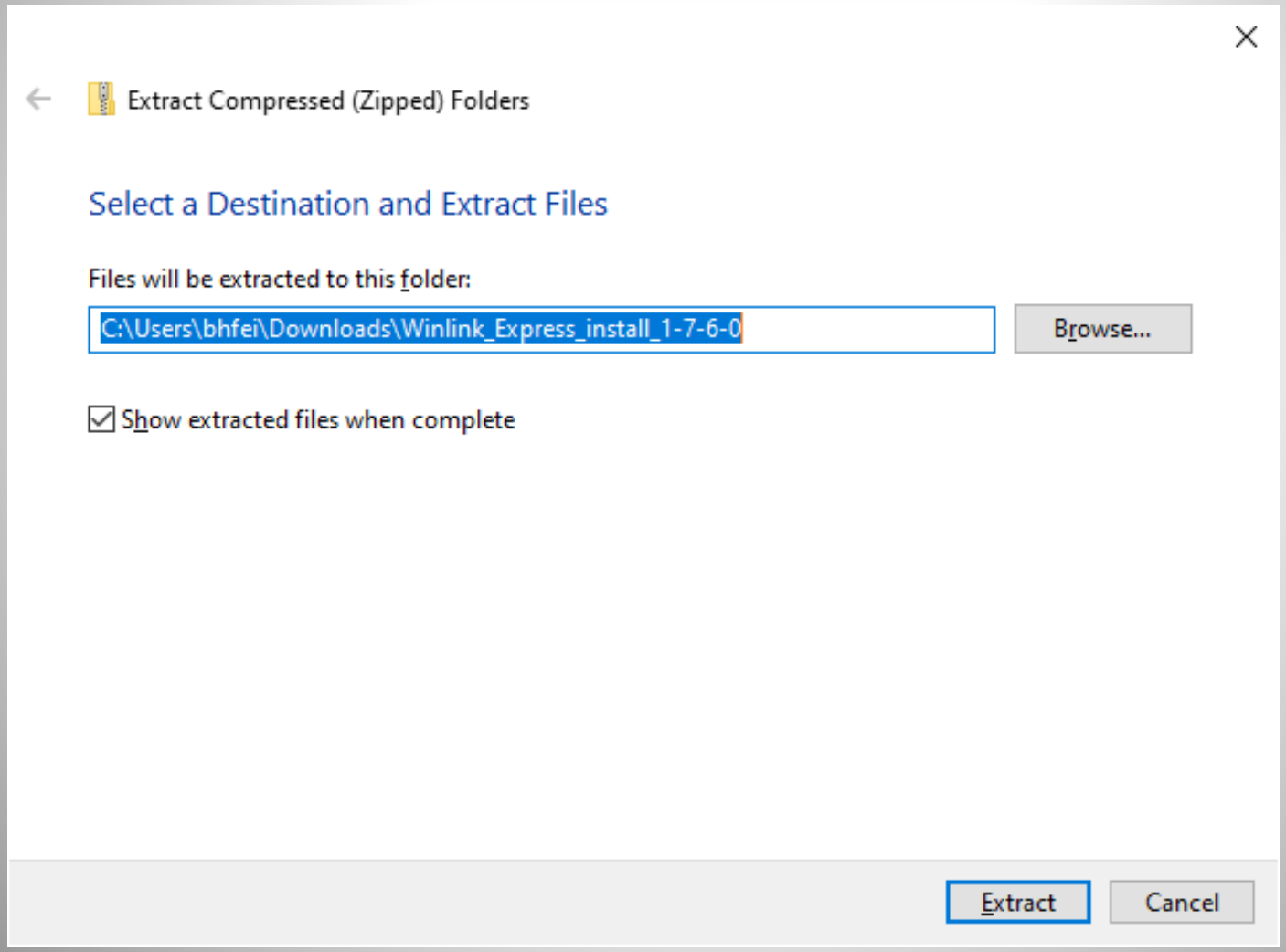
Download Winlink Express install (zip)



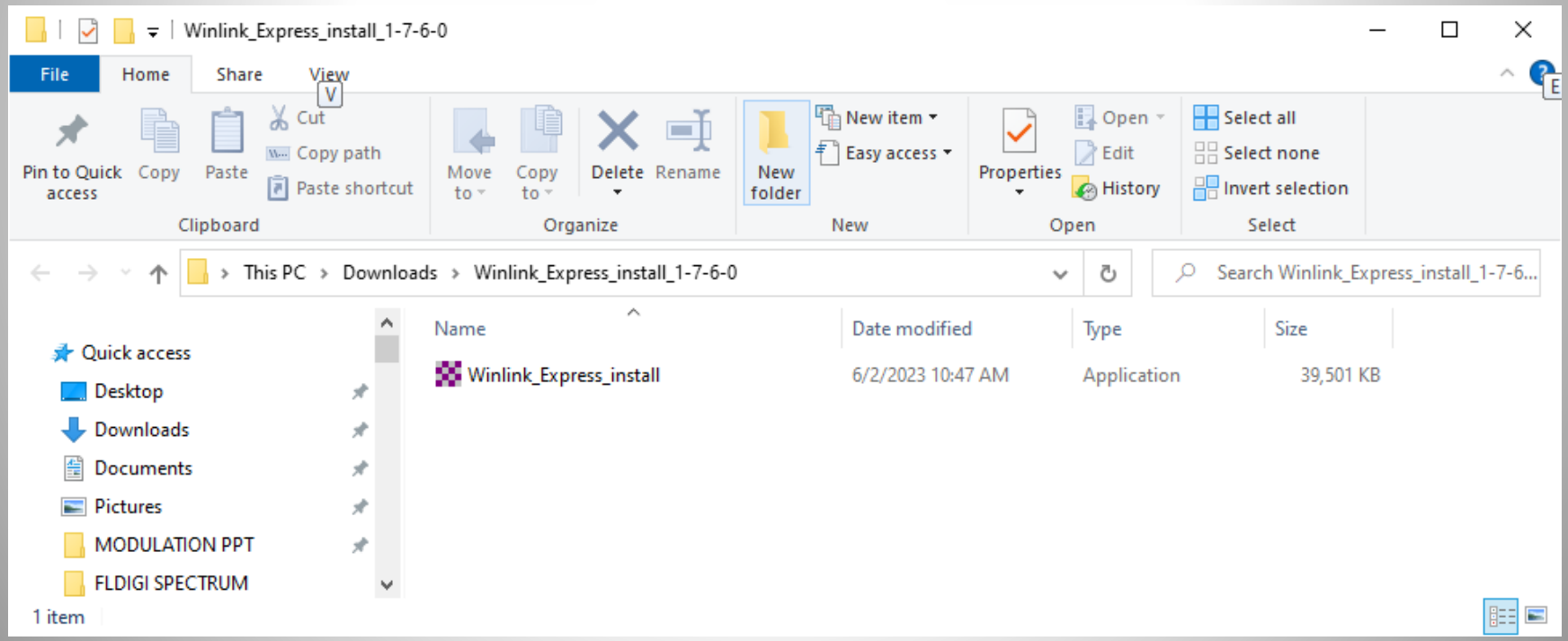
Install in Downloads folder as a compressed ZIP file



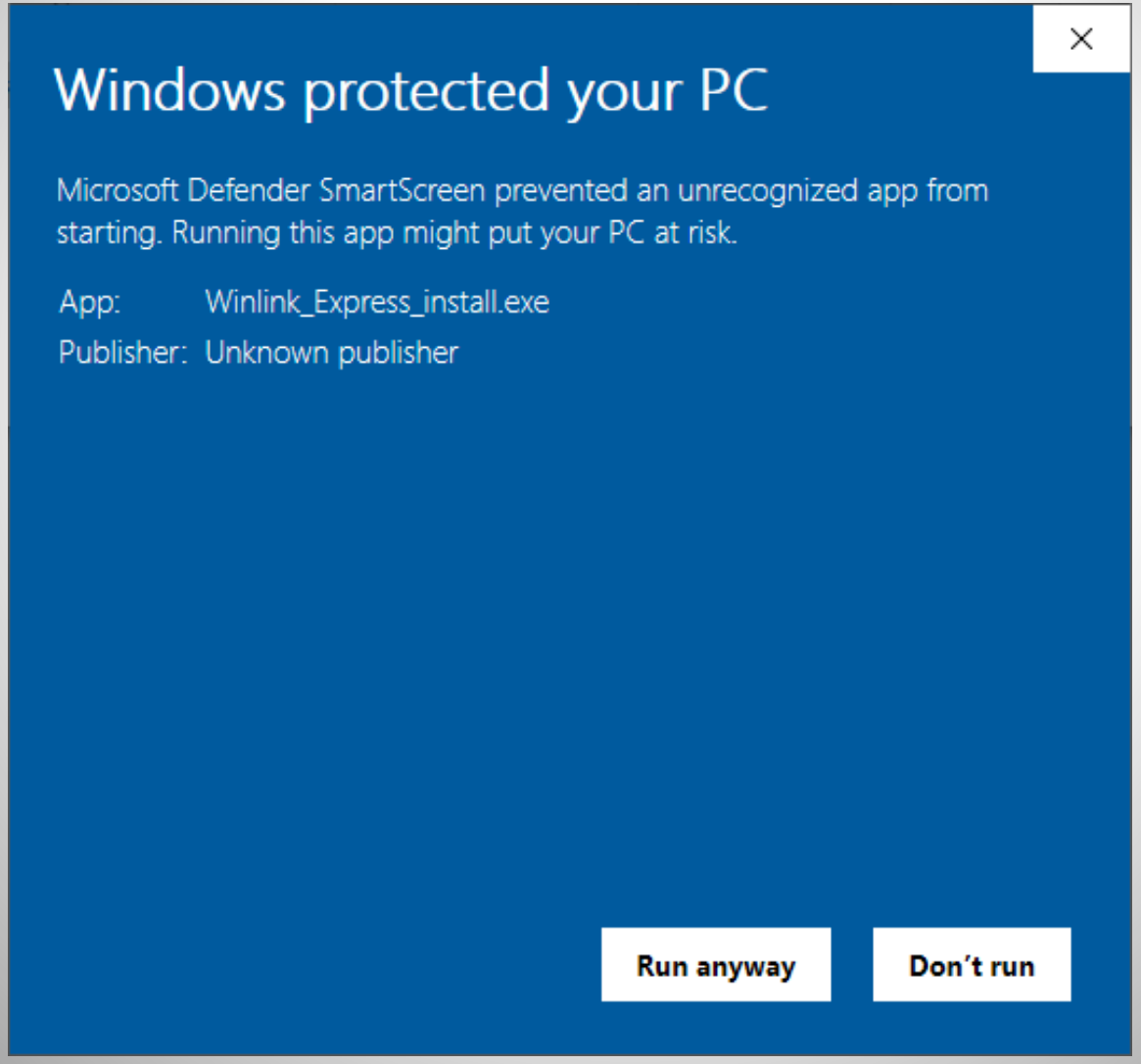
Choose folder to EXTRACT files suggest using the default folder



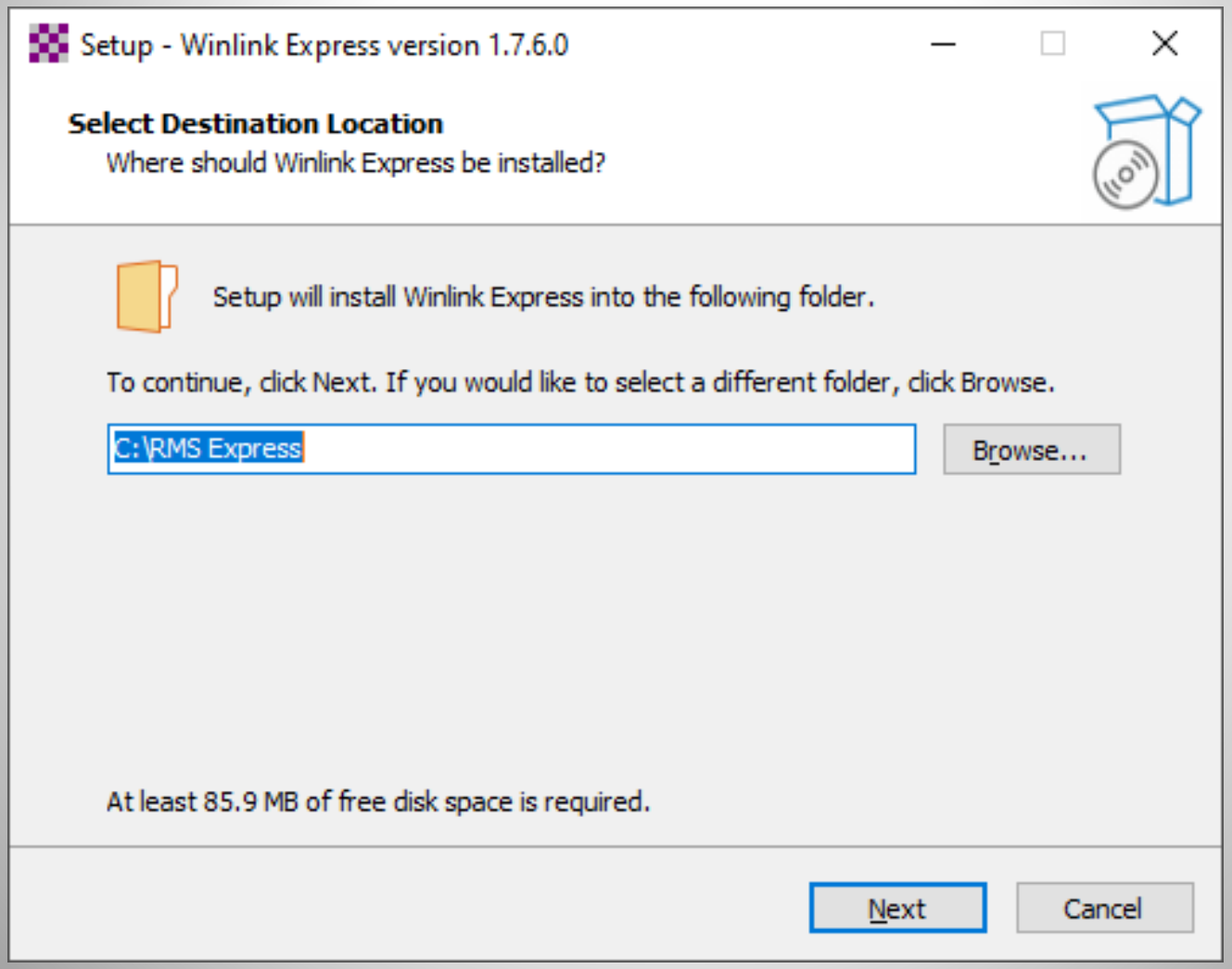
Ready to download Winlink Express install (39,501 kB here)



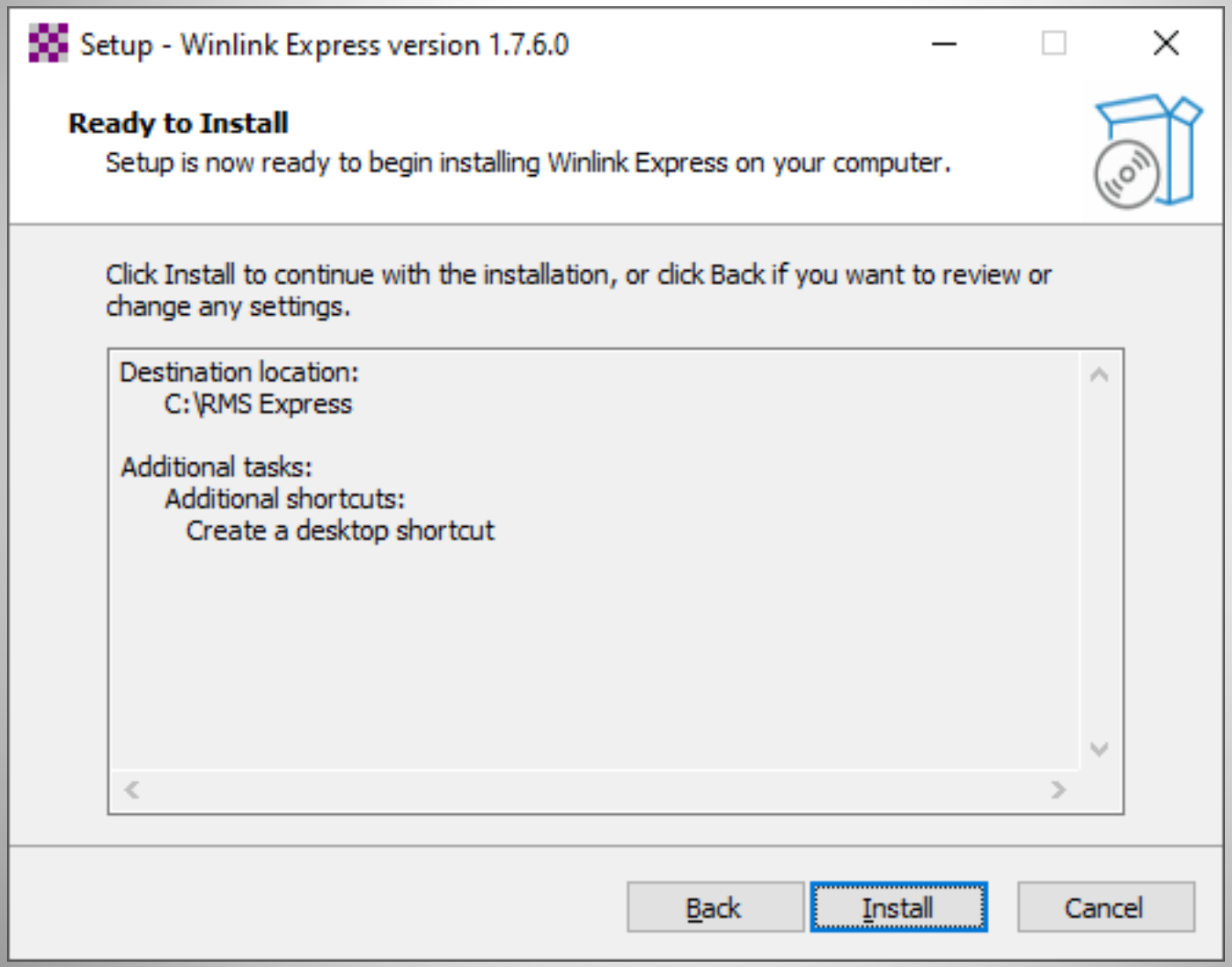
It is OK to RUN



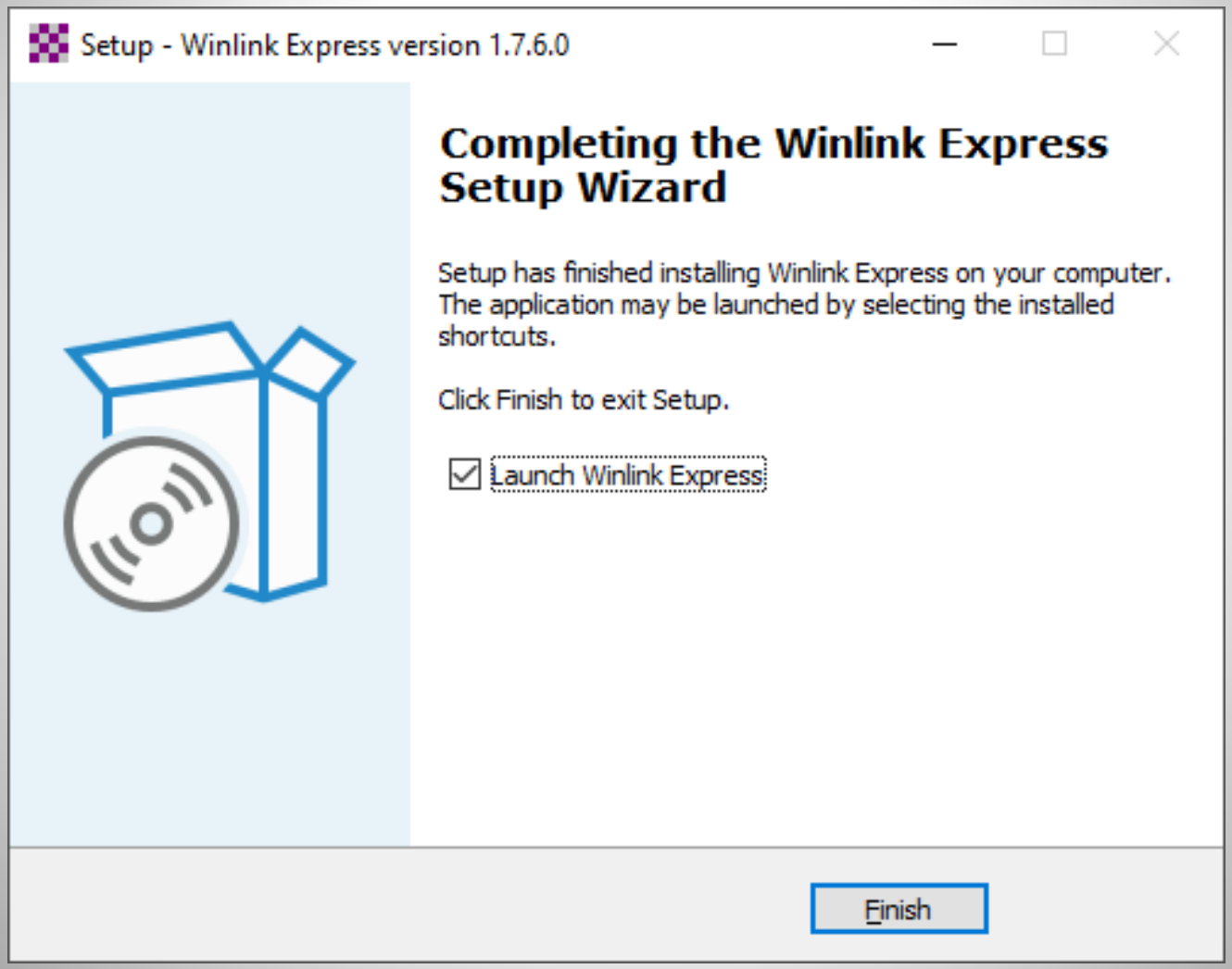
Default folder will be C:\RMS Express



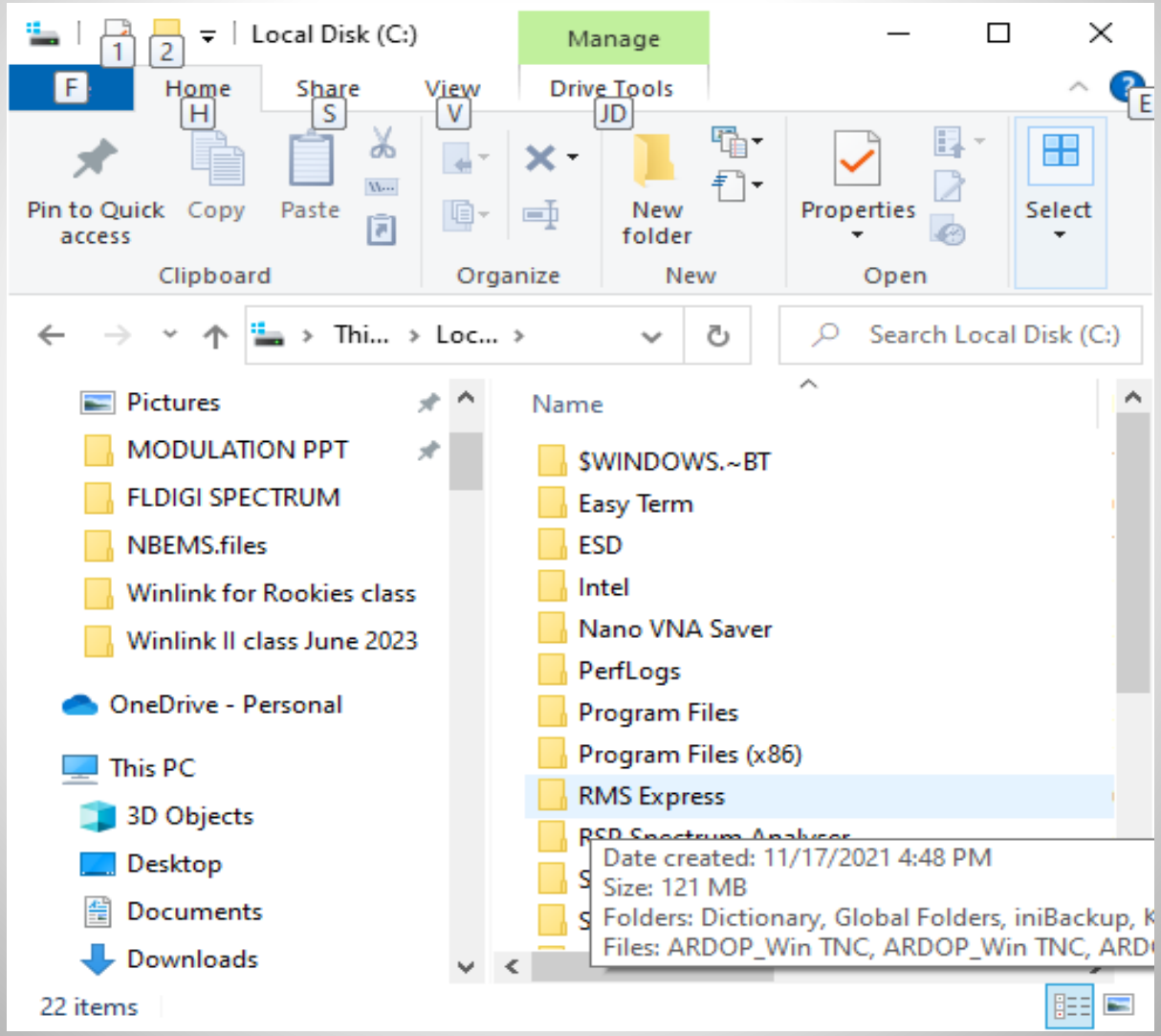
Click on Install



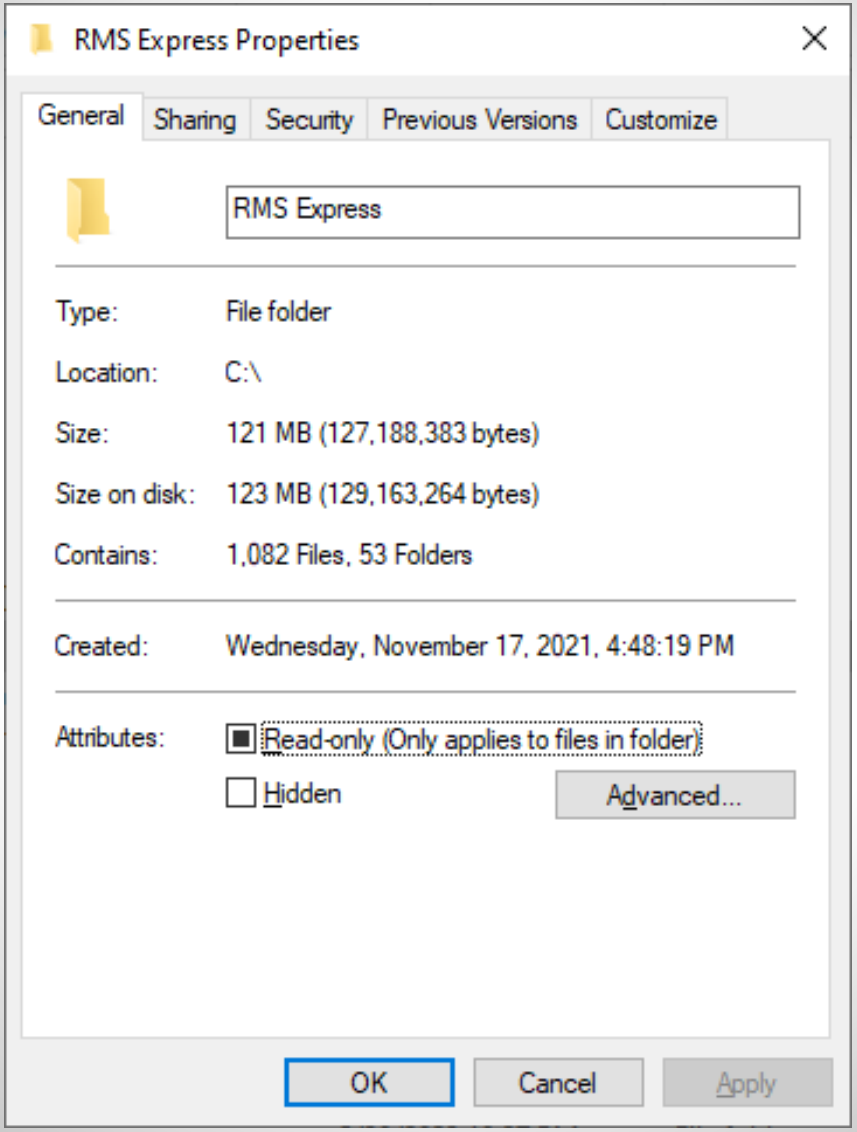
Click Finish and Launch



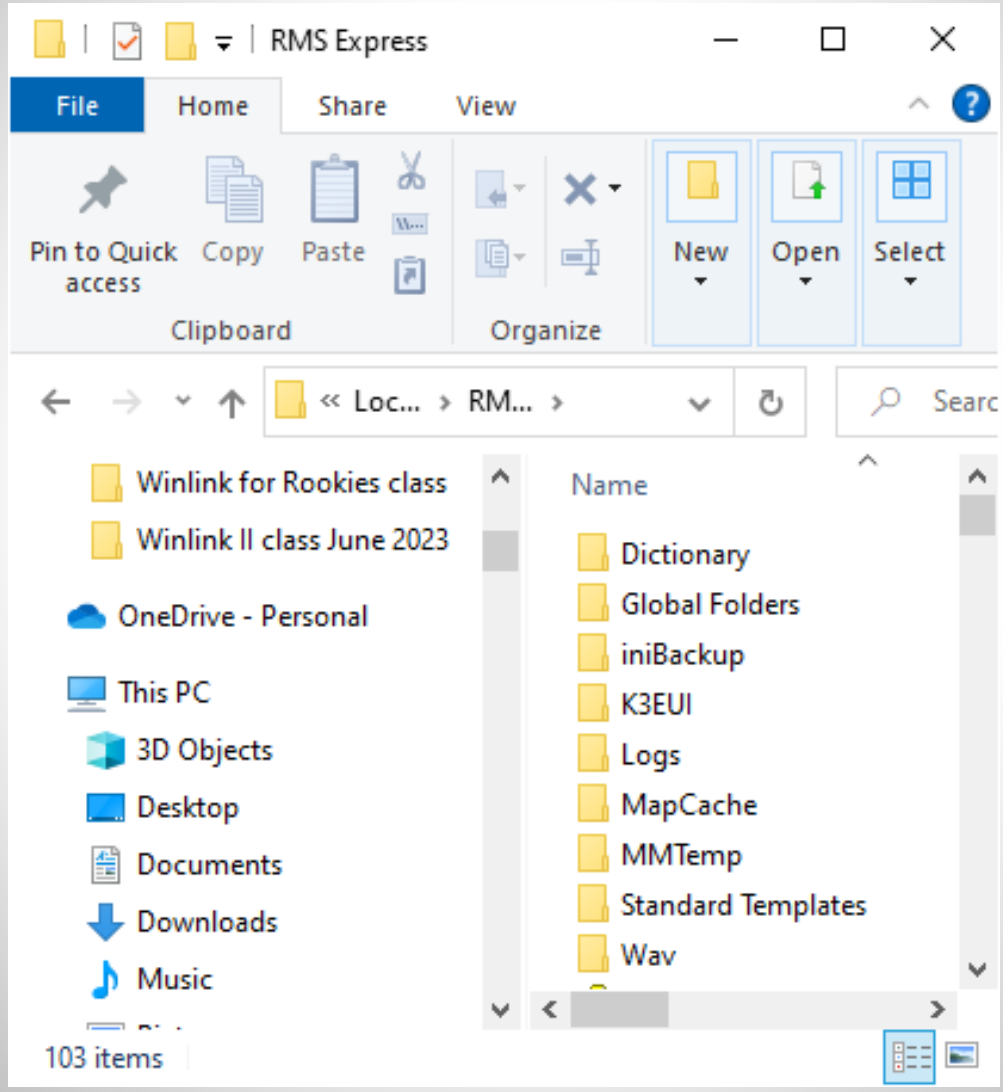
New folder created on local C drive
RMS Express (121 MB for me)



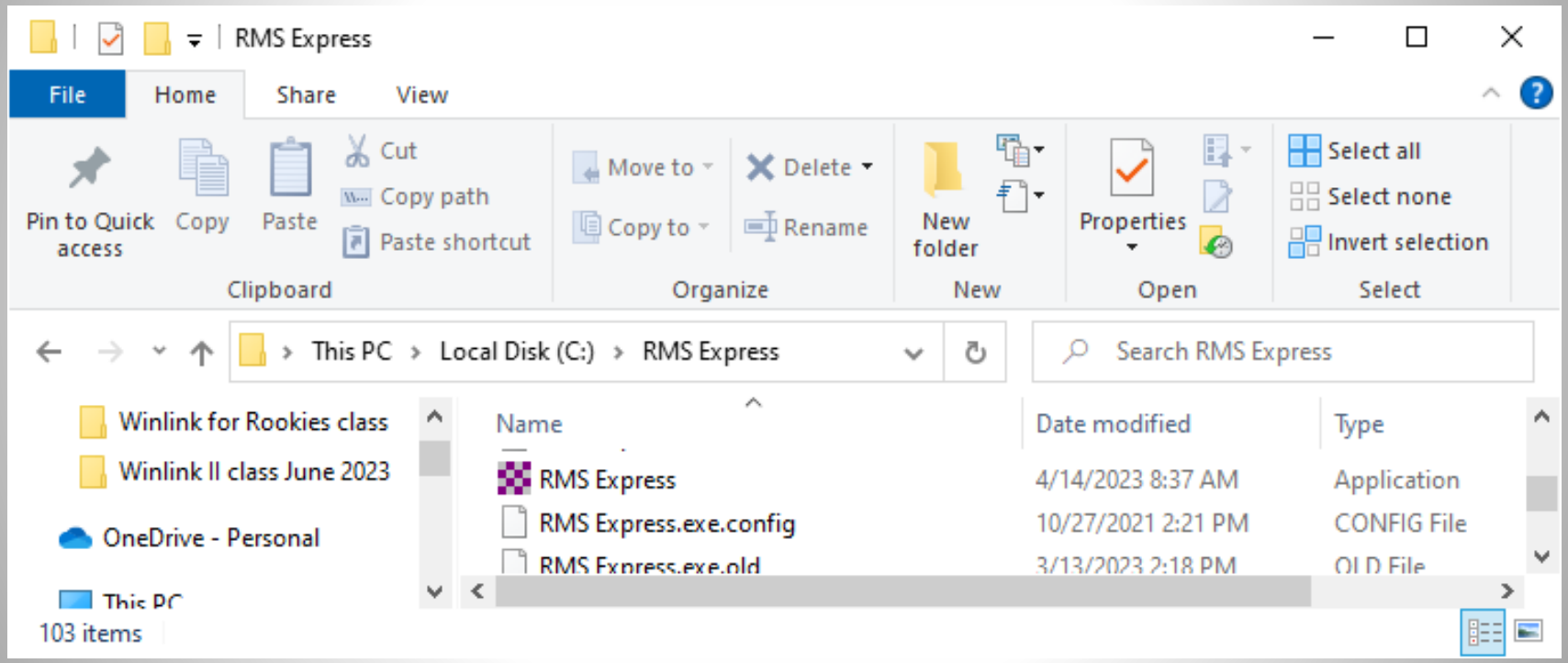
1082 files in 53 folders



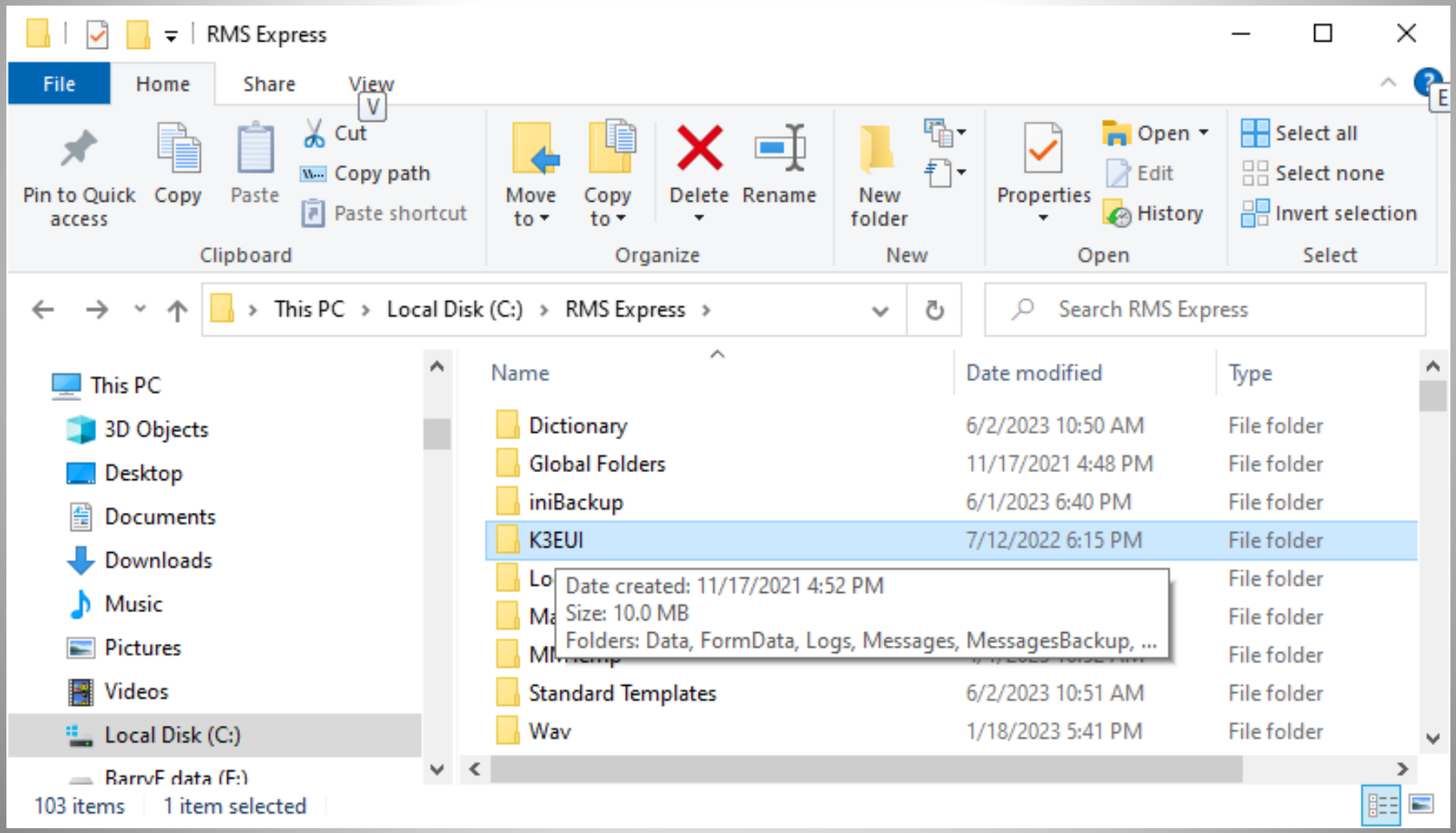
RMS Express has many folders and files



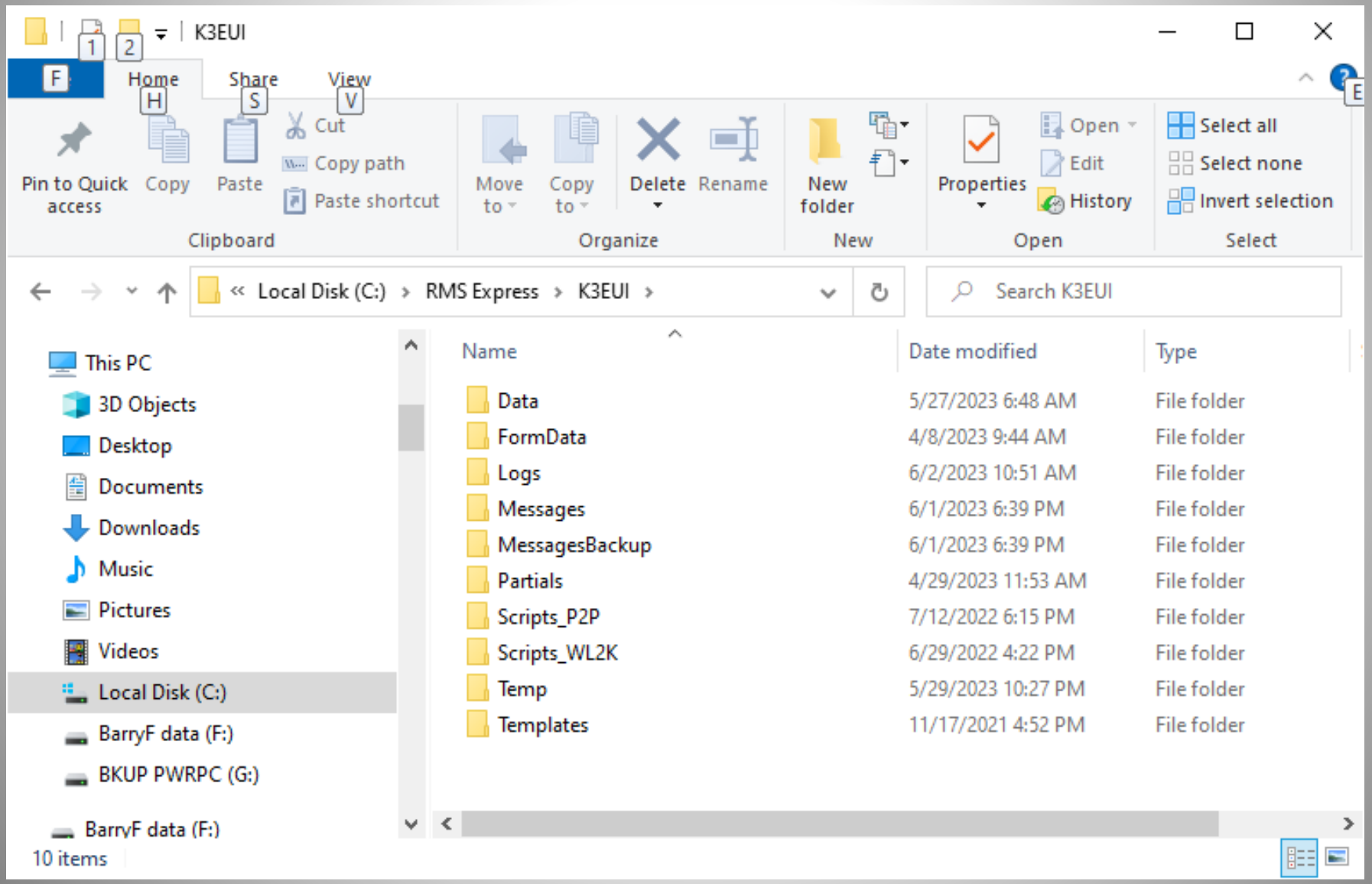
The Application is called **RMS Express**



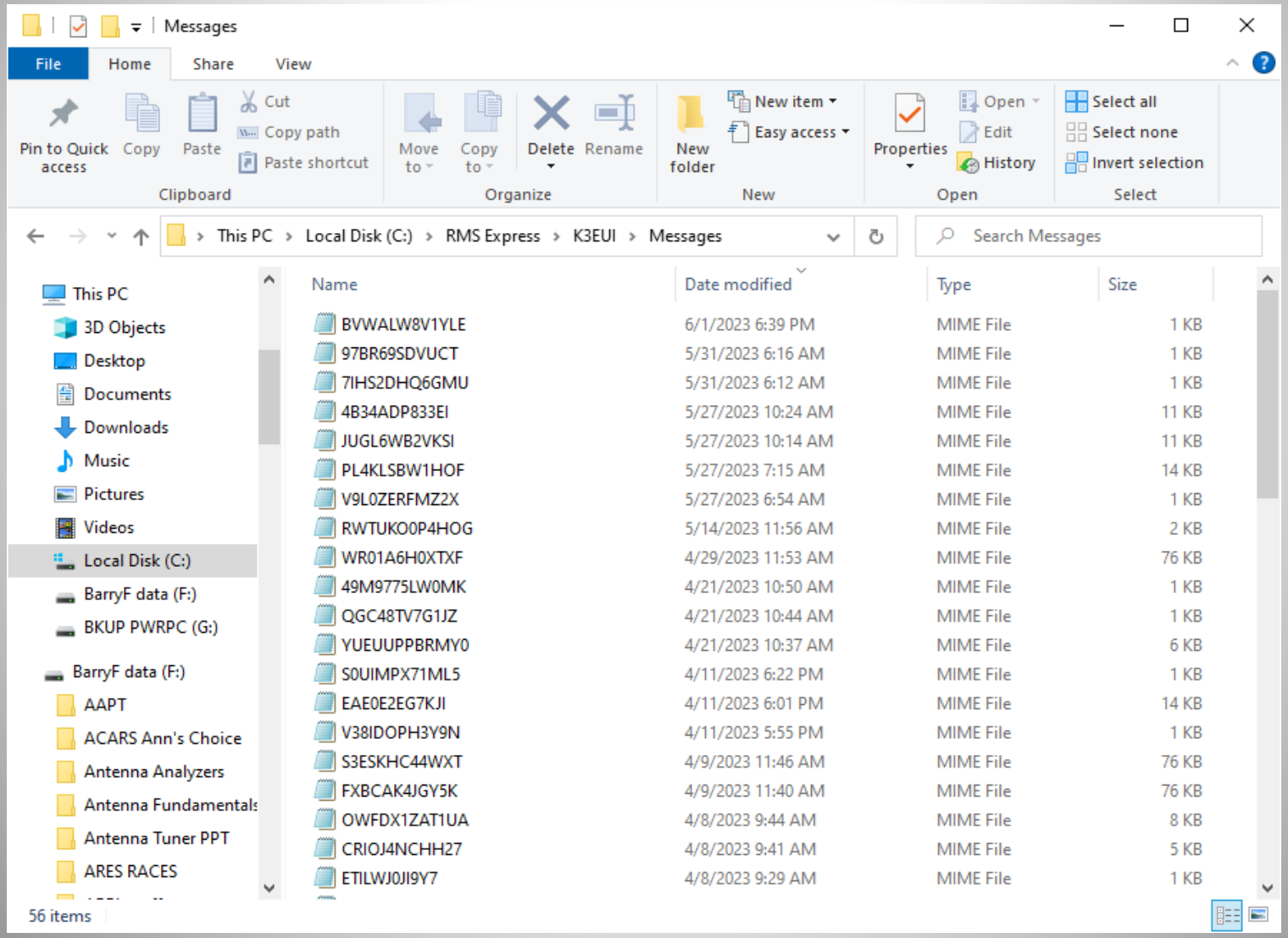
Open the folder with [YOUR call]



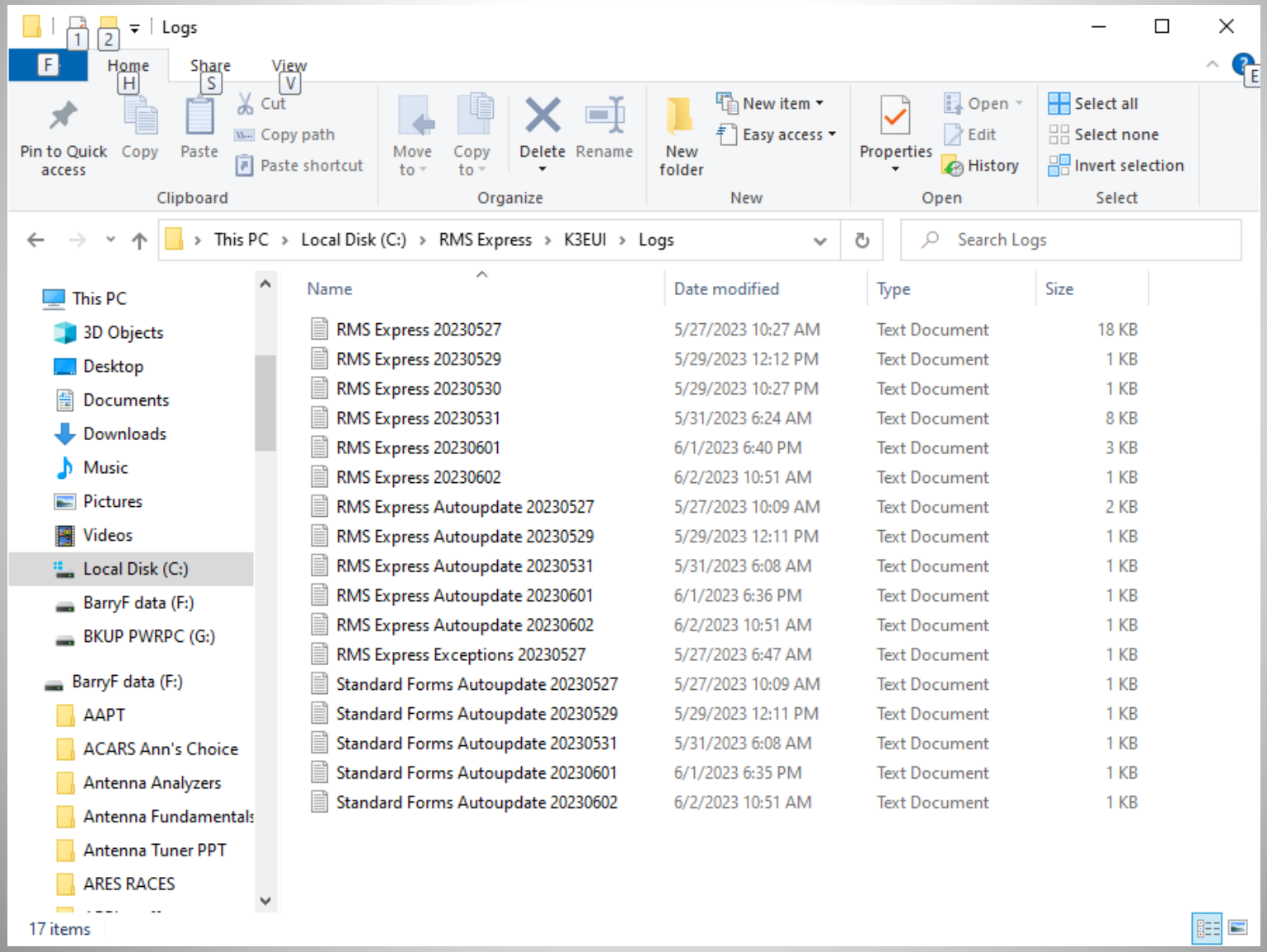
Folders inside [YOUR CALL] folder
note the **MESSAGES** folder



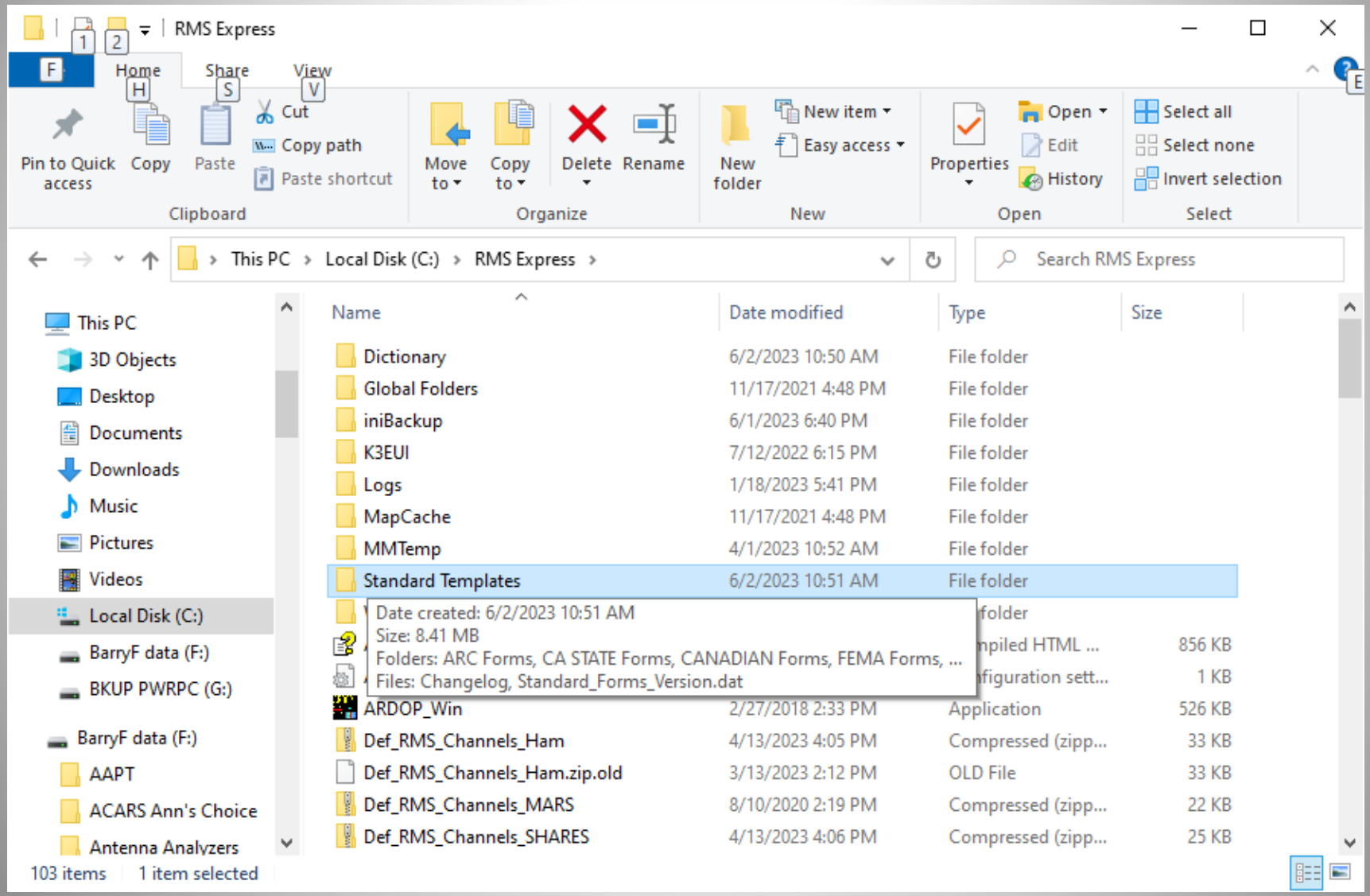
Inside MESSAGES folder
your messages are stored here



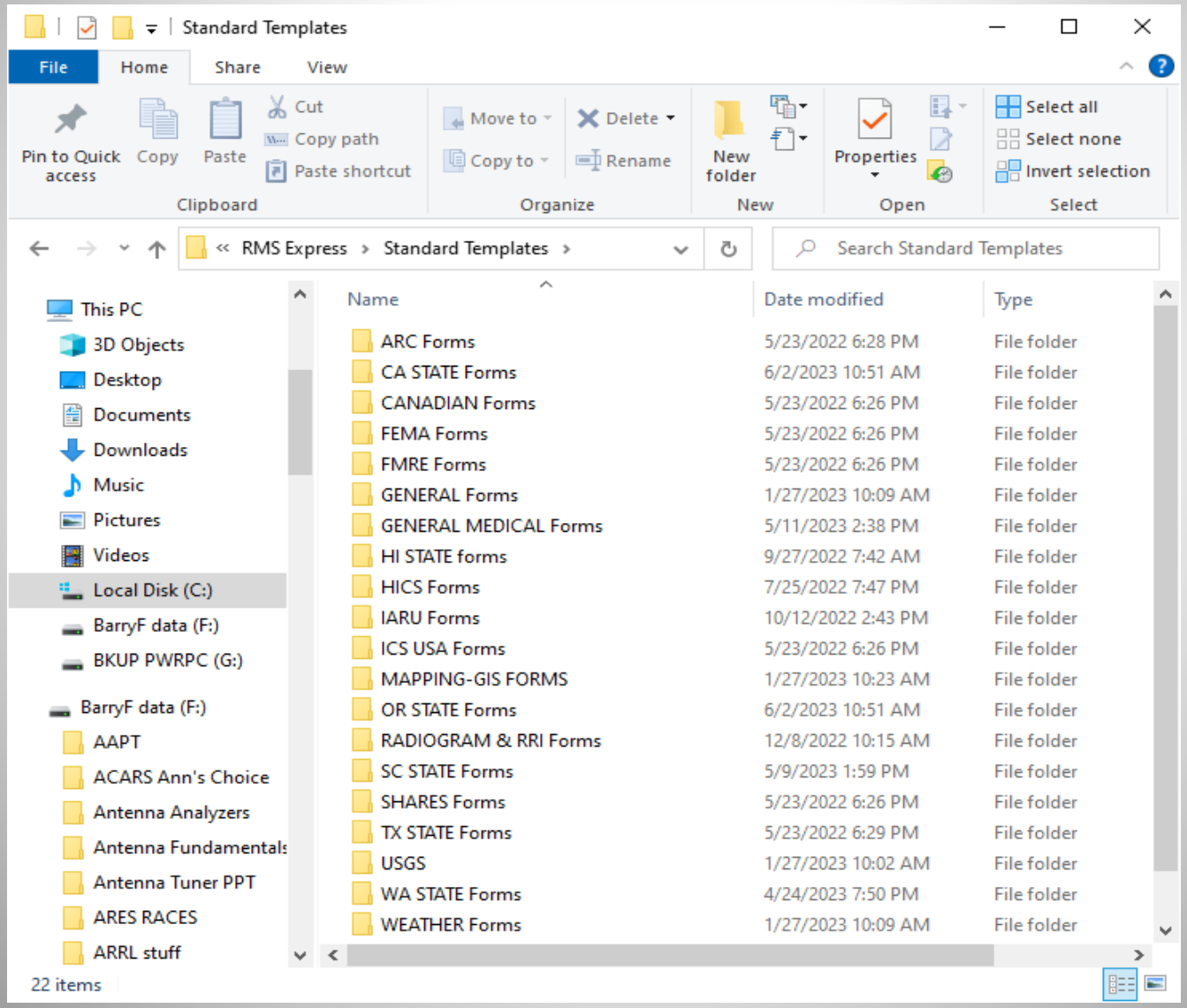
Inside LOGS folder



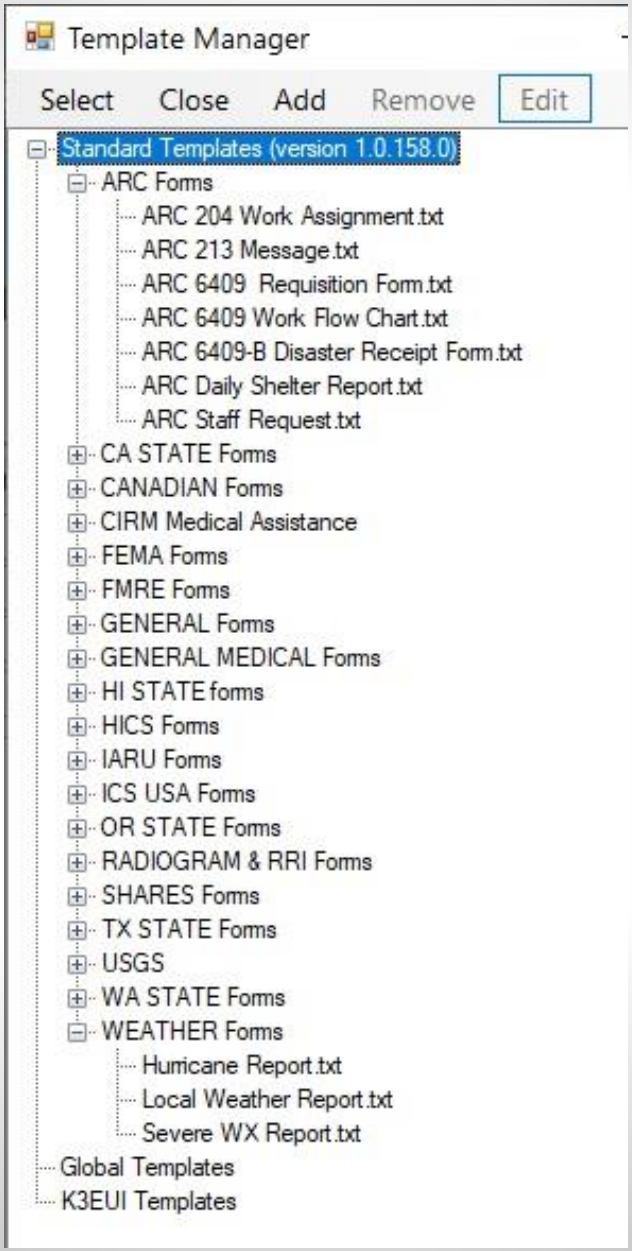
Look inside **Standard Templates**



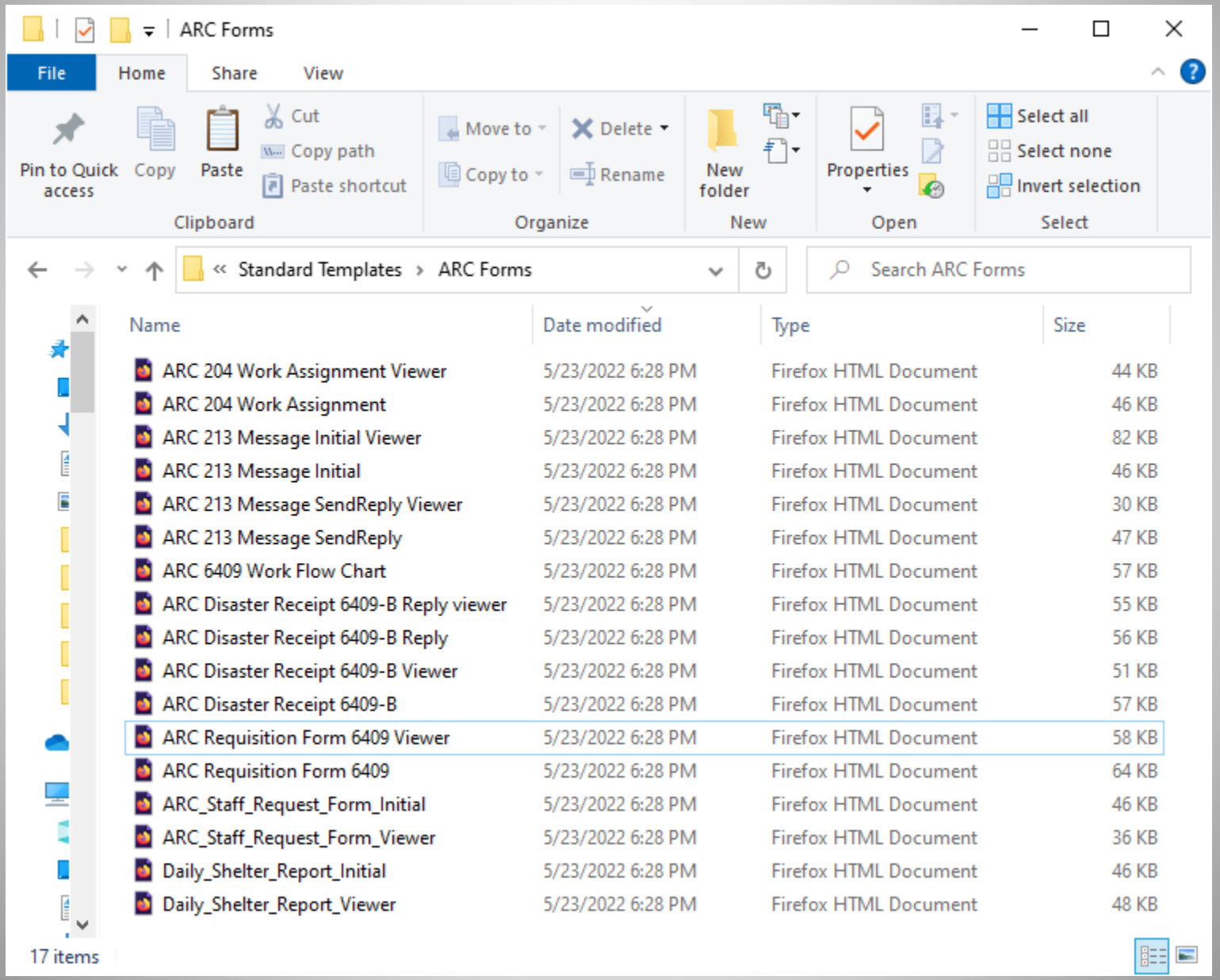
Standard Templates: often updated everyone using Winlink has these



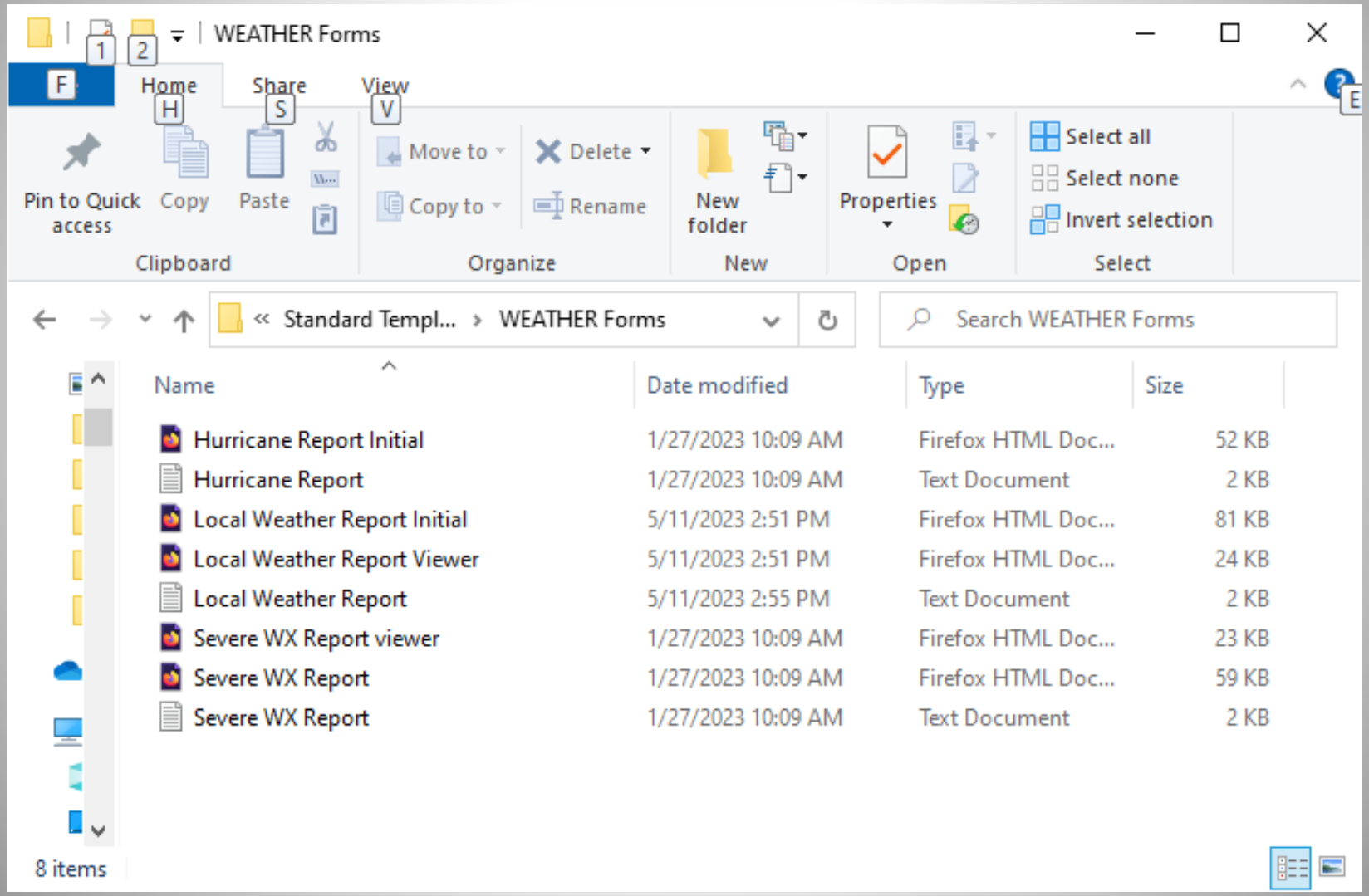
Templates are available and updated regularly



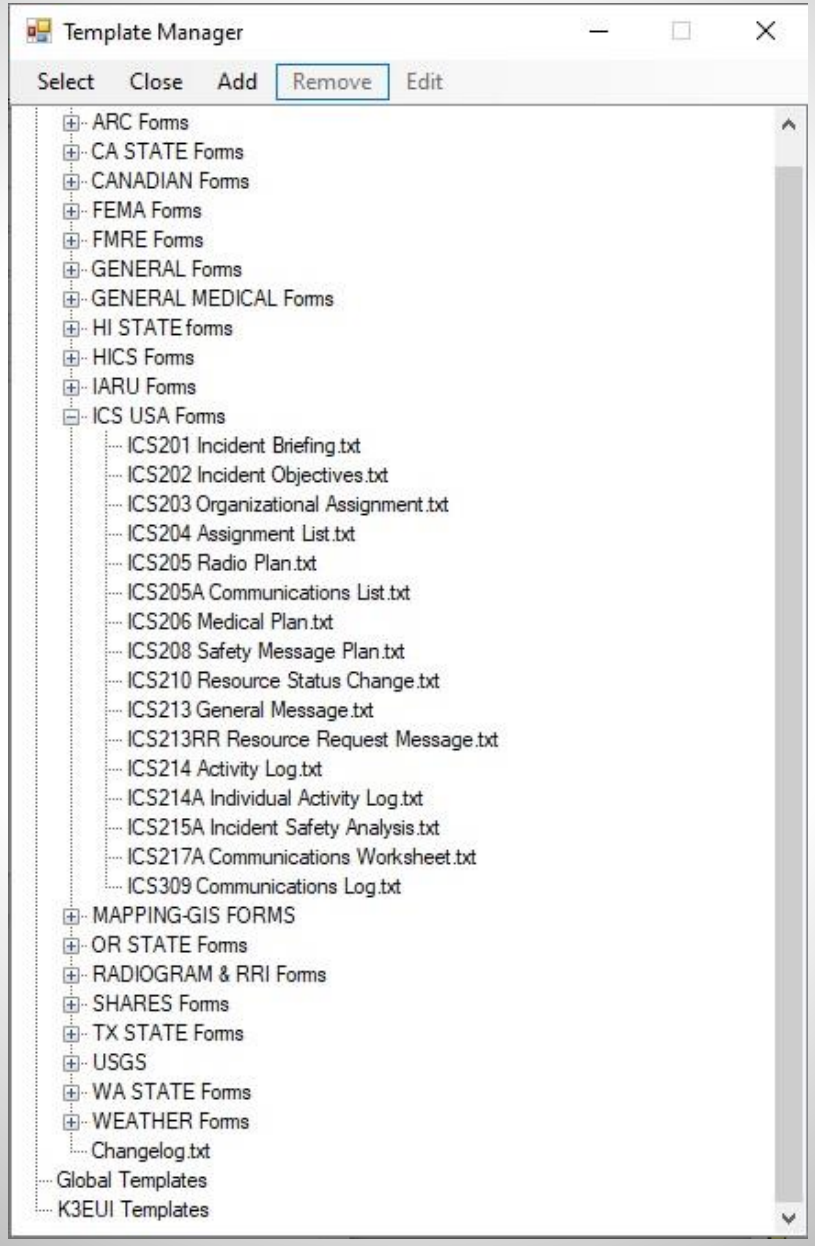
American Red Cross forms



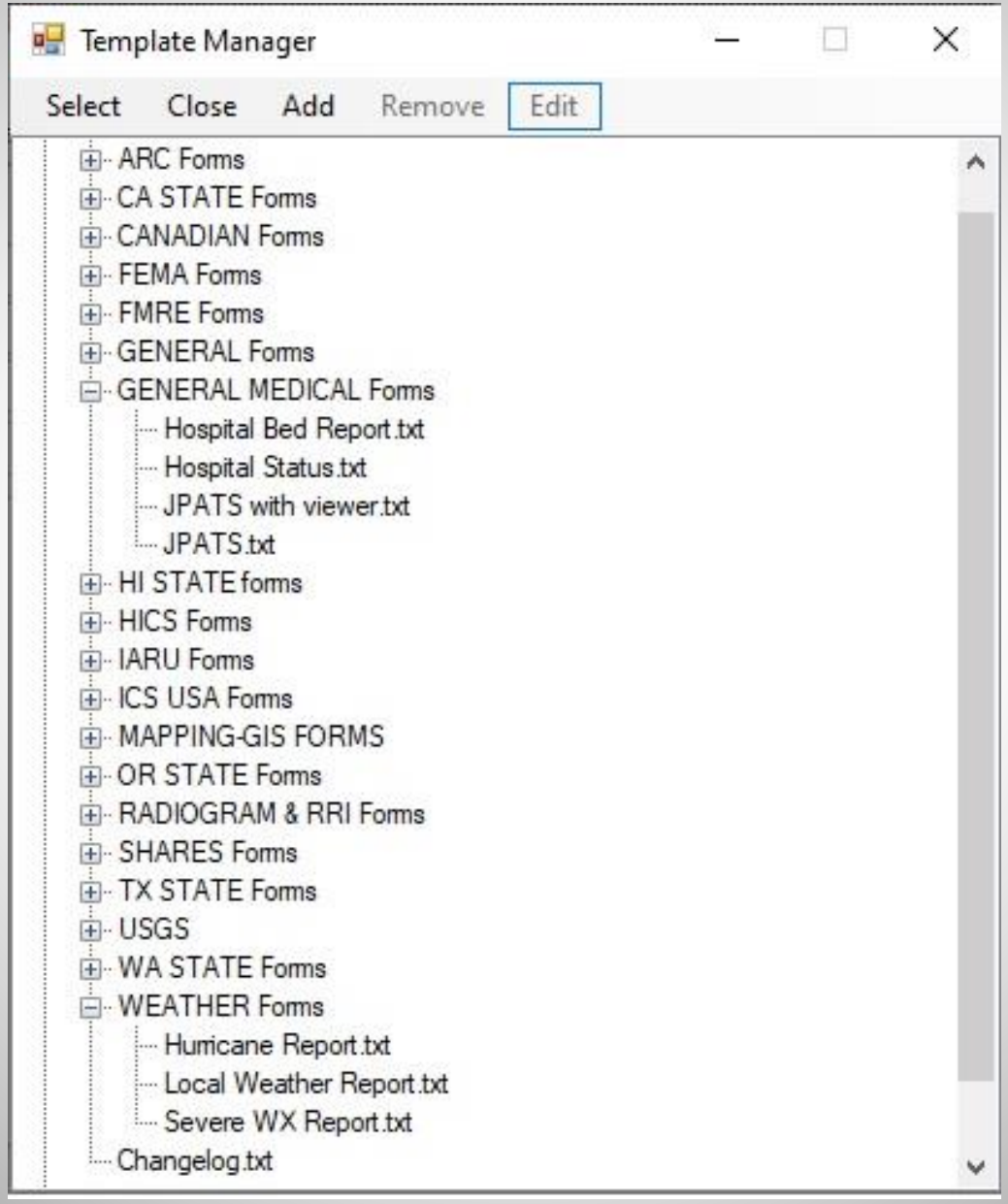
Weather Forms



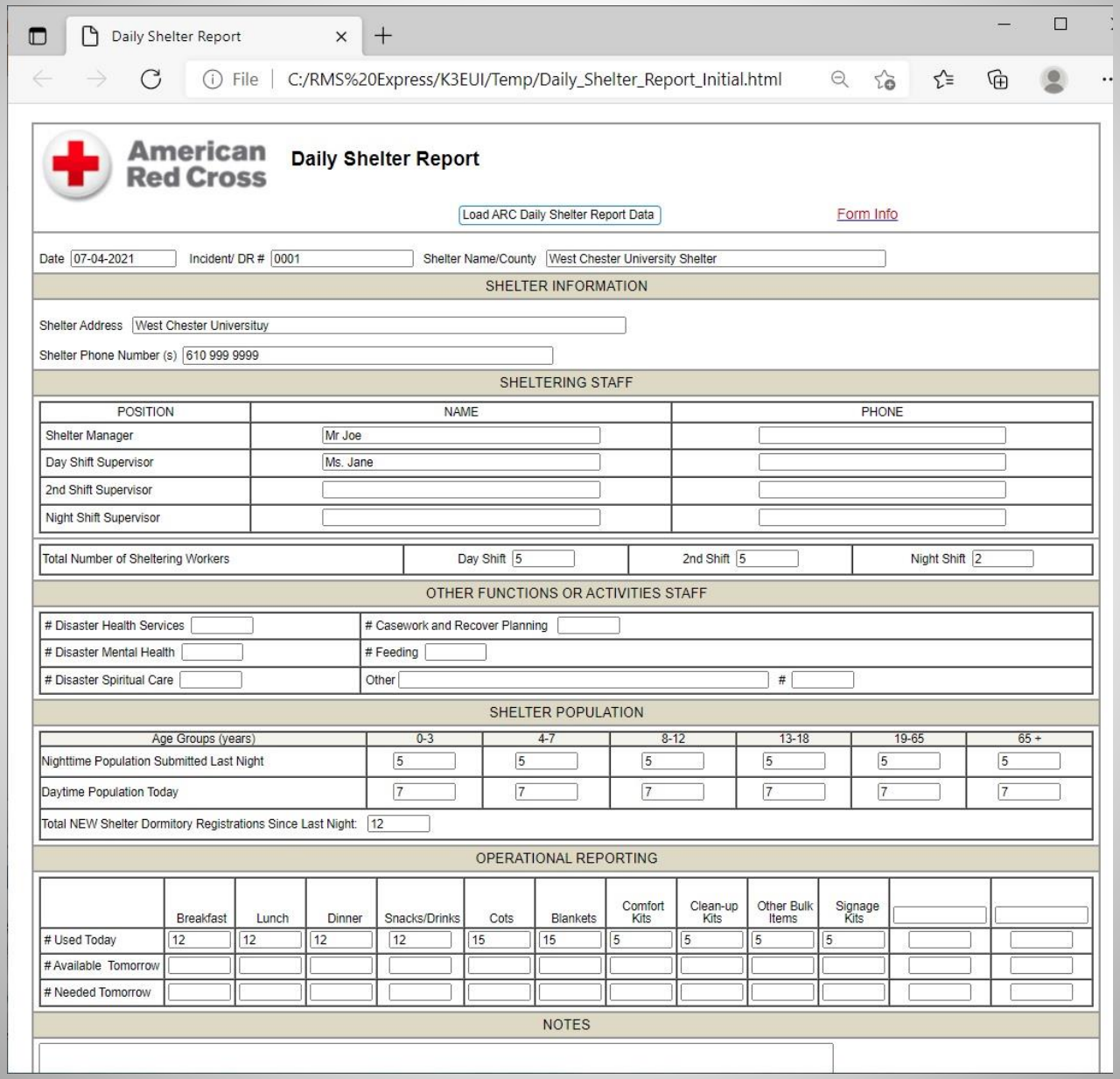
ICS Templates



Medical and Weather Templates



American Red Cross Daily Shelter Report



Daily Shelter Report

File | C:/RMS%20Express/K3EUI/Temp/Daily_Shelter_Report_Initial.html

American Red Cross

Daily Shelter Report

Load ARC Daily Shelter Report Data Form Info

Date 07-04-2021 Incident/ DR # 0001 Shelter Name/County West Chester University Shelter

SHELTER INFORMATION

Shelter Address West Chester Universituy

Shelter Phone Number (s) 610 999 9999

SHELTERING STAFF

POSITION	NAME	PHONE
Shelter Manager	Mr Joe	
Day Shift Supervisor	Ms. Jane	
2nd Shift Supervisor		
Night Shift Supervisor		

Total Number of Sheltering Workers	Day Shift 5	2nd Shift 5	Night Shift 2

OTHER FUNCTIONS OR ACTIVITIES STAFF

# Disaster Health Services	# Casework and Recover Planning
# Disaster Mental Health	# Feeding
# Disaster Spiritual Care	Other #

SHELTER POPULATION

Age Groups (years)	0-3	4-7	8-12	13-18	19-65	65 +
Nighttime Population Submitted Last Night	5	5	5	5	5	5
Daytime Population Today	7	7	7	7	7	7

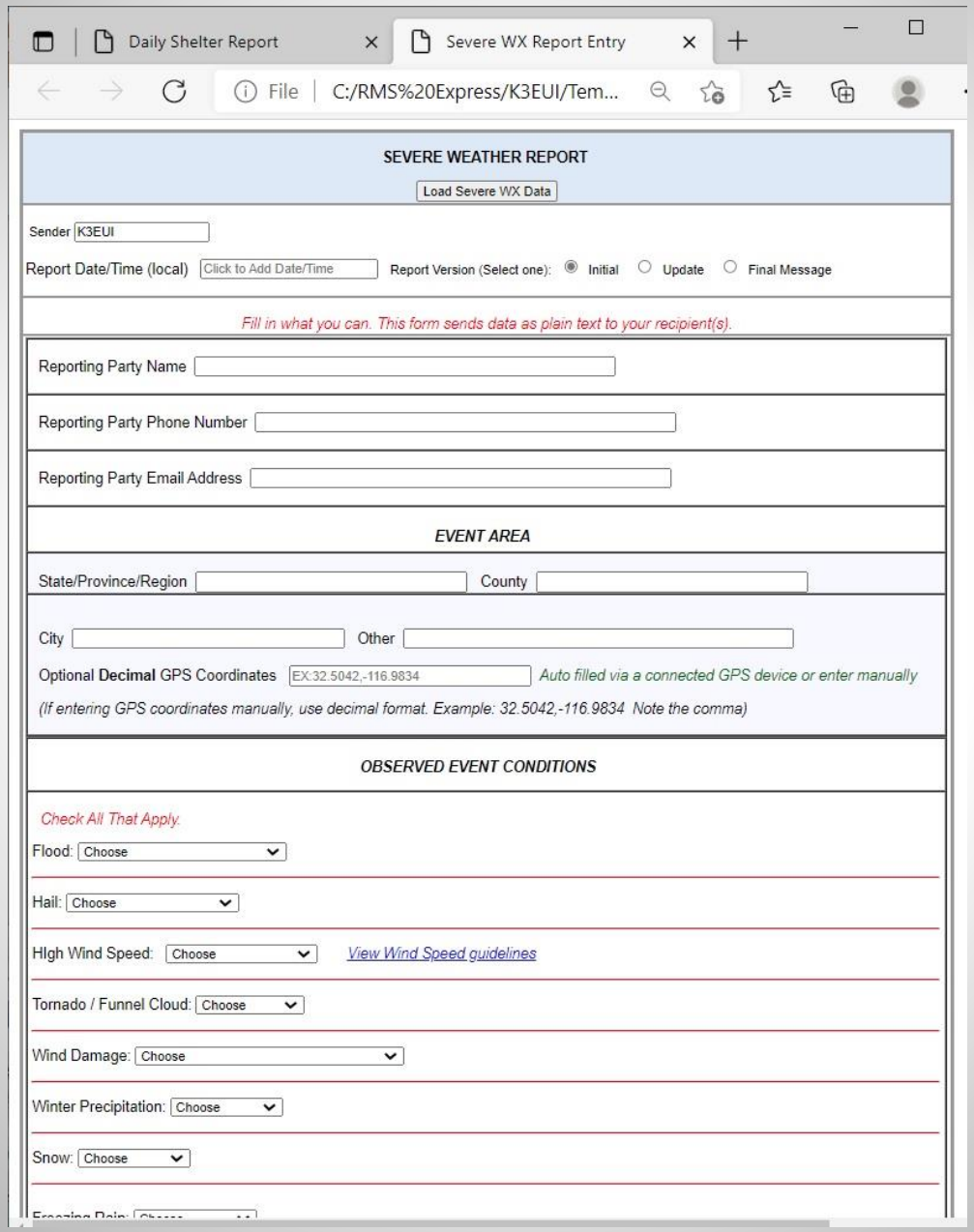
Total NEW Shelter Dormitory Registrations Since Last Night: 12

OPERATIONAL REPORTING

	Breakfast	Lunch	Dinner	Snacks/Drinks	Cots	Blankets	Comfort Kits	Clean-up Kits	Other Bulk Items	Signage Kits		
# Used Today	12	12	12	12	15	15	5	5	5	5		
# Available Tomorrow												
# Needed Tomorrow												

NOTES

Severe Weather Report



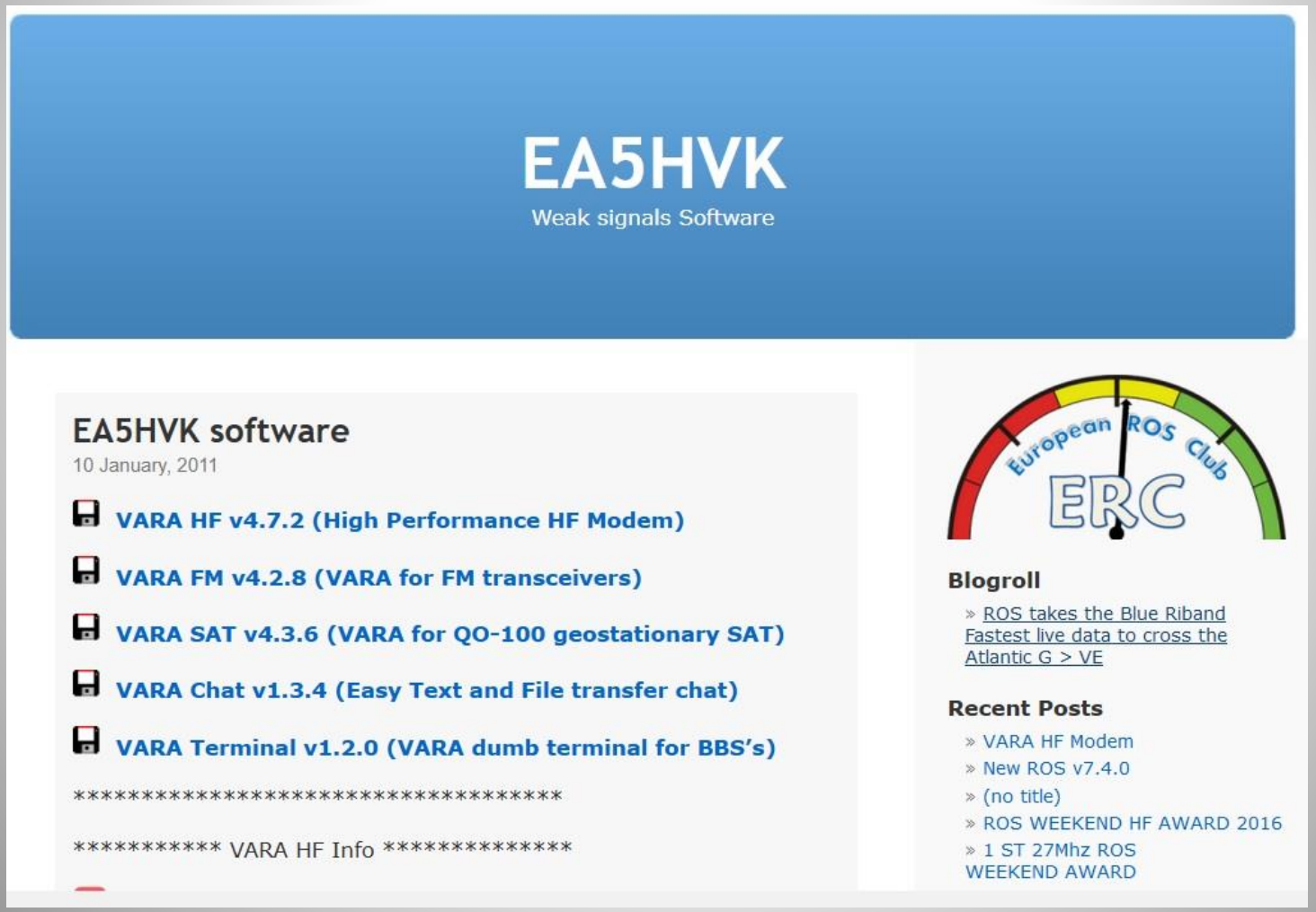
Now it is time to download and install the VARA HF modem

So how do you get VARA HF modem software?

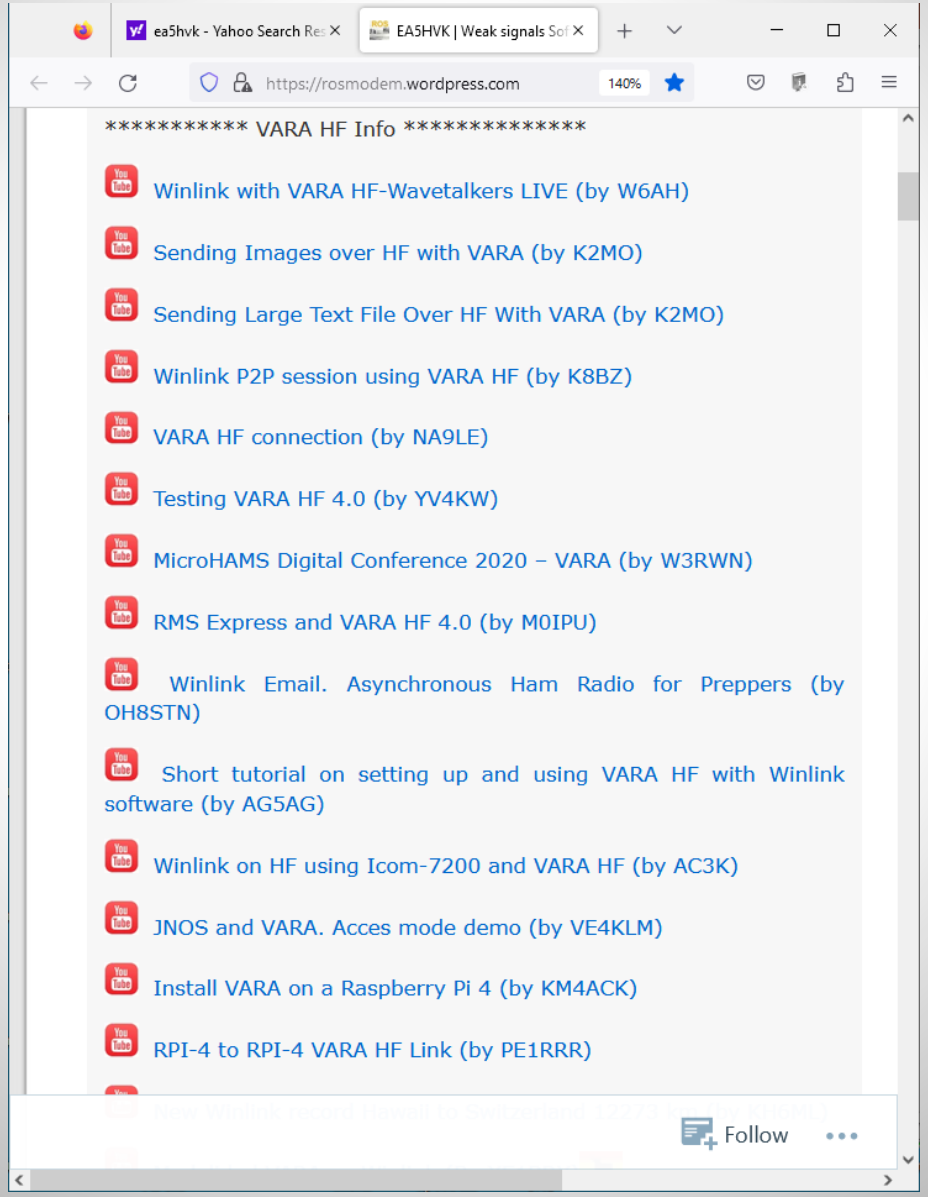
VARA HF and VARA FM

EA5HVK software

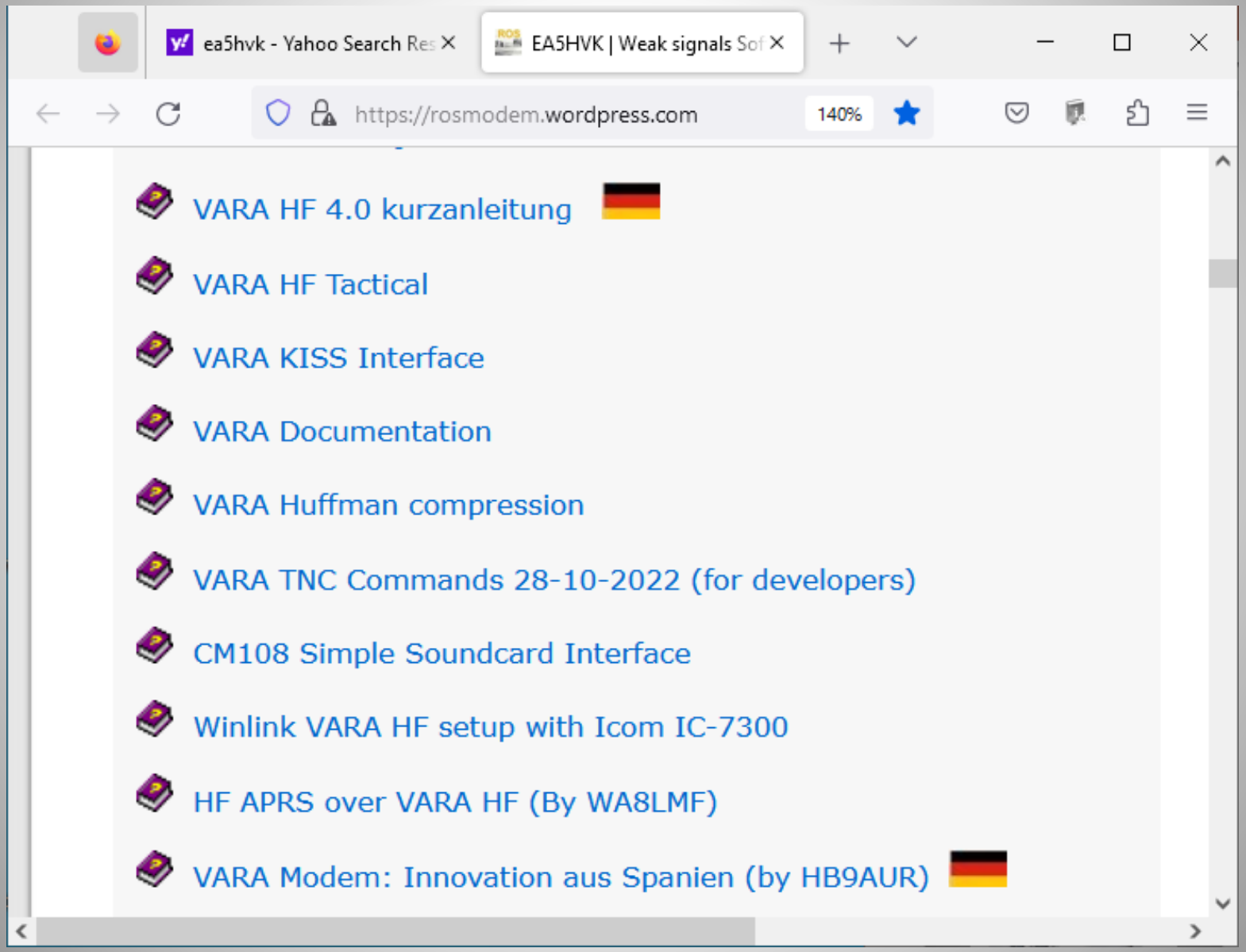
https://rosmodem.wordpress.com/



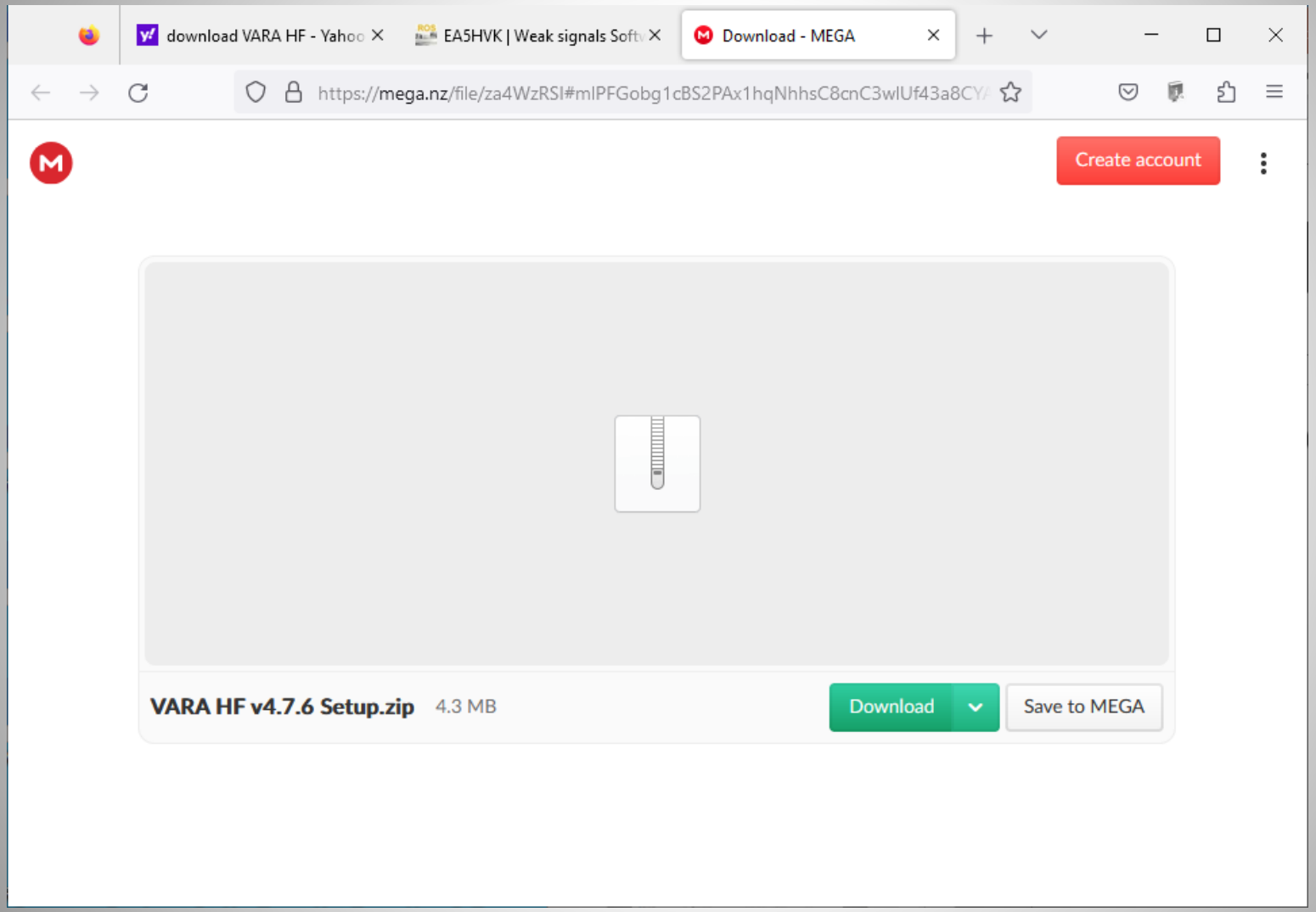
Youtube videos may be helpful



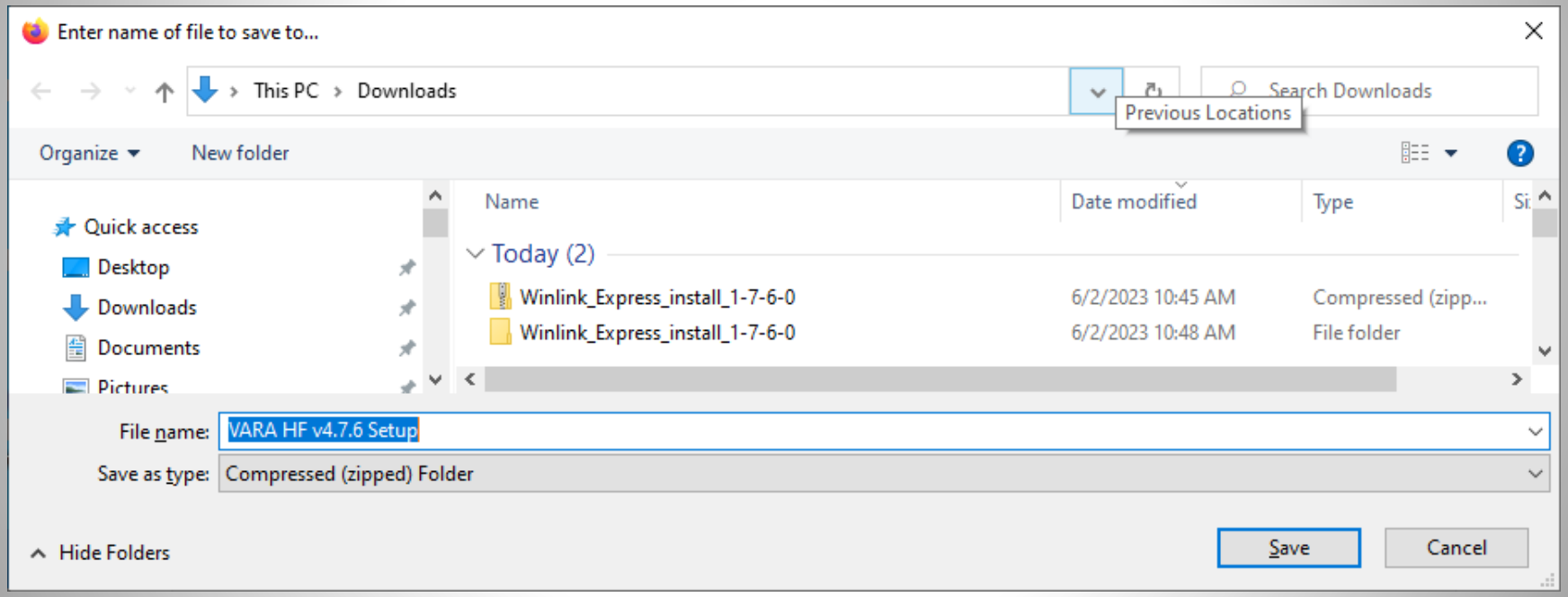
Pdf files - good resource



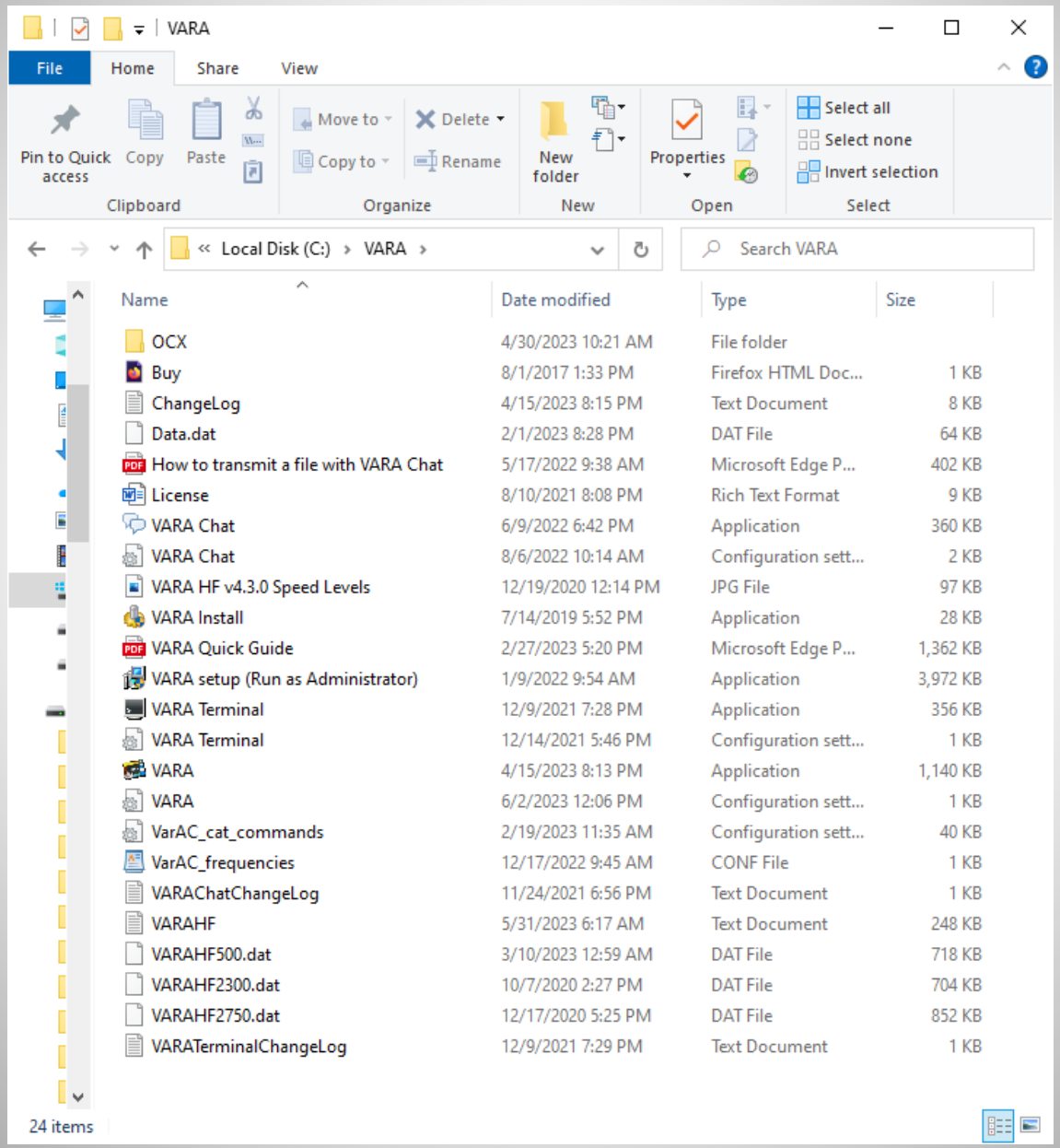
Download VARA HF



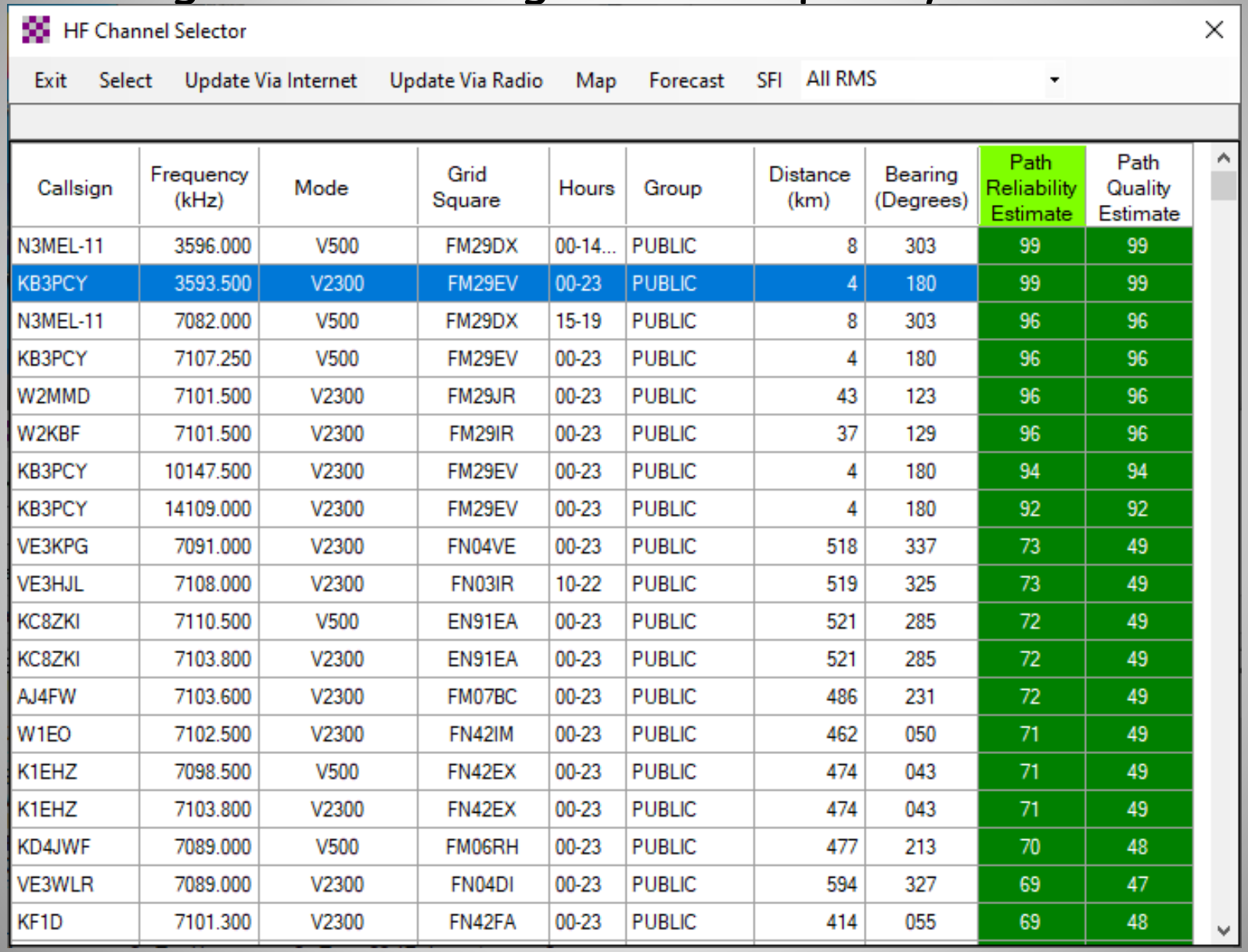
Default folder on C drive



VARA folder on your C drive



VARA HF SSB **Gateways**: 500 Hz or 2300 Hz BW hang out on a designated frequency and mode



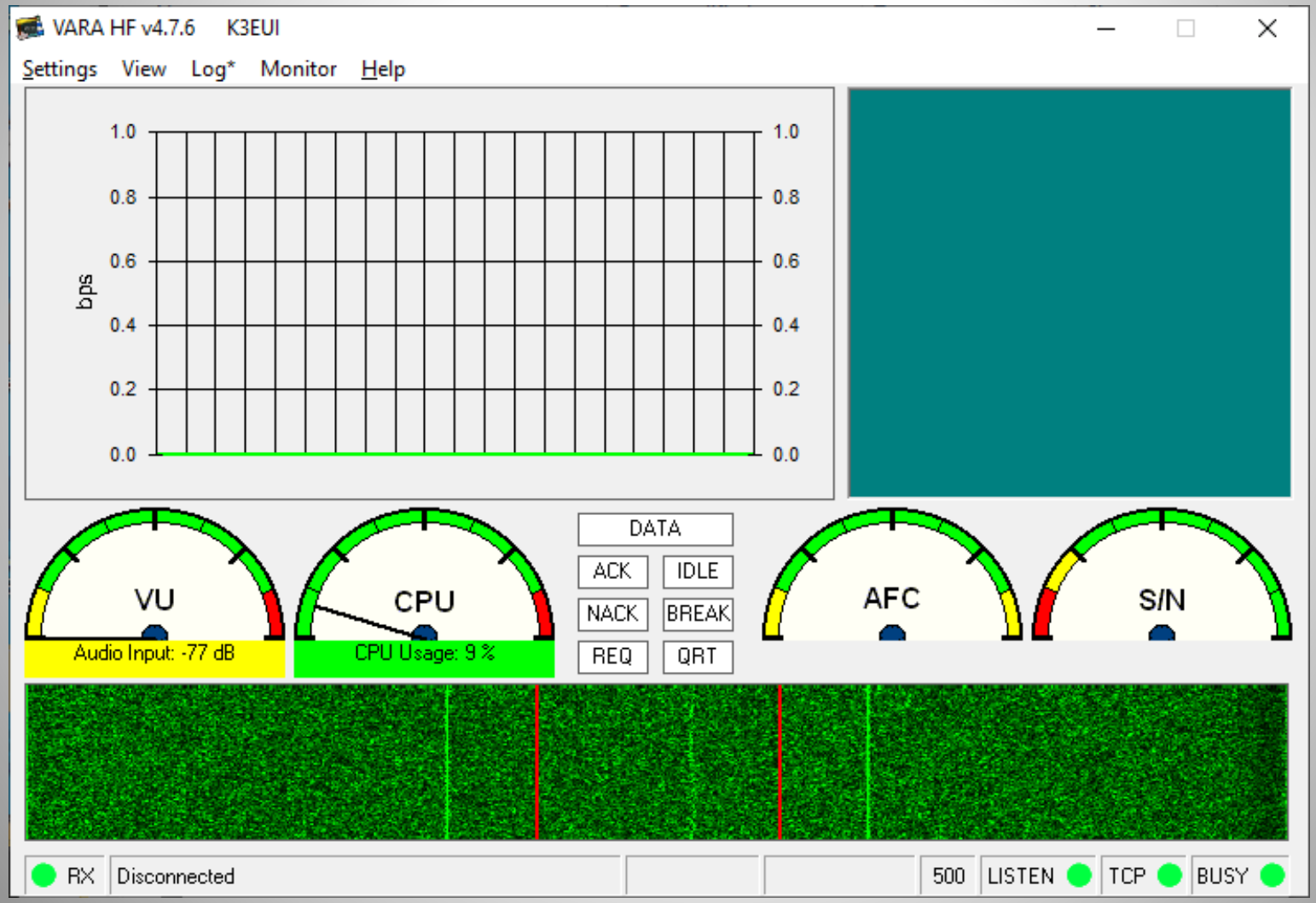
Callsign	Frequency (kHz)	Mode	Grid Square	Hours	Group	Distance (km)	Bearing (Degrees)	Path Reliability Estimate	Path Quality Estimate
N3MEL-11	3596.000	V500	FM29DX	00-14...	PUBLIC	8	303	99	99
KB3PCY	3593.500	V2300	FM29EV	00-23	PUBLIC	4	180	99	99
N3MEL-11	7082.000	V500	FM29DX	15-19	PUBLIC	8	303	96	96
KB3PCY	7107.250	V500	FM29EV	00-23	PUBLIC	4	180	96	96
W2MMD	7101.500	V2300	FM29JR	00-23	PUBLIC	43	123	96	96
W2KBF	7101.500	V2300	FM29IR	00-23	PUBLIC	37	129	96	96
KB3PCY	10147.500	V2300	FM29EV	00-23	PUBLIC	4	180	94	94
KB3PCY	14109.000	V2300	FM29EV	00-23	PUBLIC	4	180	92	92
VE3KPG	7091.000	V2300	FN04VE	00-23	PUBLIC	518	337	73	49
VE3HJL	7108.000	V2300	FN03IR	10-22	PUBLIC	519	325	73	49
KC8ZKI	7110.500	V500	EN91EA	00-23	PUBLIC	521	285	72	49
KC8ZKI	7103.800	V2300	EN91EA	00-23	PUBLIC	521	285	72	49
AJ4FW	7103.600	V2300	FM07BC	00-23	PUBLIC	486	231	72	49
W1EO	7102.500	V2300	FN42IM	00-23	PUBLIC	462	050	71	49
K1EHZ	7098.500	V500	FN42EX	00-23	PUBLIC	474	043	71	49
K1EHZ	7103.800	V2300	FN42EX	00-23	PUBLIC	474	043	71	49
KD4JWF	7089.000	V500	FM06RH	00-23	PUBLIC	477	213	70	48
VE3WLR	7089.000	V2300	FN04DI	00-23	PUBLIC	594	327	69	47
KF1D	7101.300	V2300	FN42FA	00-23	PUBLIC	414	055	69	48

VARA HF SSB Speed Levels & Modulation Type
wide 2300 Hz and **narrow** 500 Hz

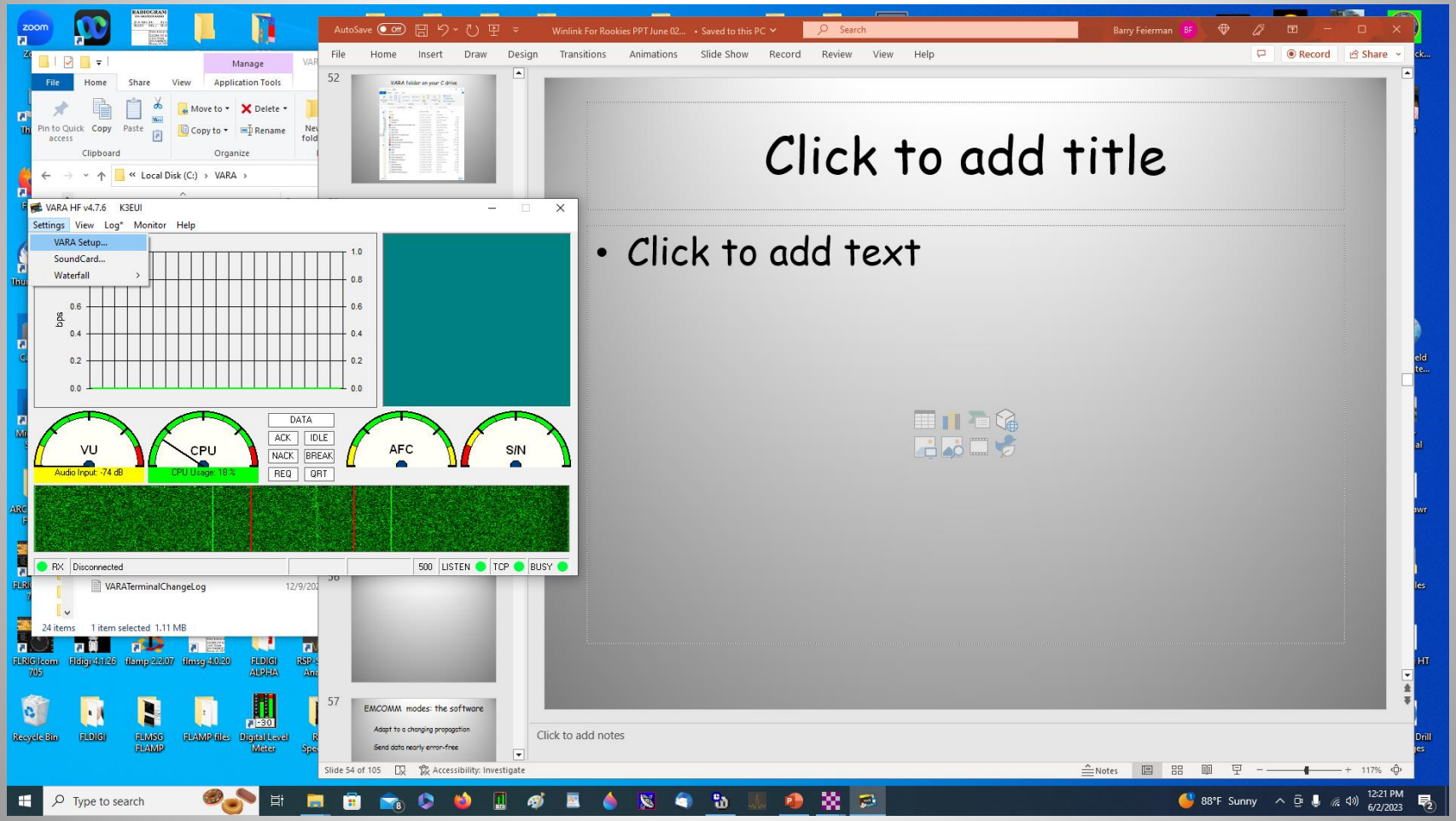
VARA HF v4.0.0
Speed Levels

	VARA HF 2300				VARA HF 500			
Level	Symbol Rate	Carriers	Mod.	Net Rate (bps)	Symbol Rate	Carriers	Mod.	Net Rate (bps)
1	23	32	FSK	18	23	11	FSK	18
2	47	16	FSK	41	47	11	FSK	41
3	47	16	FSK	82	47	11	FSK	61
4	94	16	FSK	175	94	2	BPSK	88
5	94	3	4PSK	270	94	2	4PSK	177
6	94	4	4PSK	363	94	3	4PSK	270
7	94	6	4PSK	549	42	11	4PSK	441
8	94	8	4PSK	735	42	11	4PSK	588
9	94	10	4PSK	922	42	11	4PSK	705
10	42	49	4PSK	2011	42	11	8PSK	884
11	42	49	4PSK	2682	42	11	8PSK	1060
12	42	49	4PSK	3219	42	11	16QAM	1286
13	42	49	8PSK	4025	42	11	32QAM	1543
14	42	49	8PSK	4830				
15	42	49	16QAM	5872				
16	42	49	32QAM	7050				

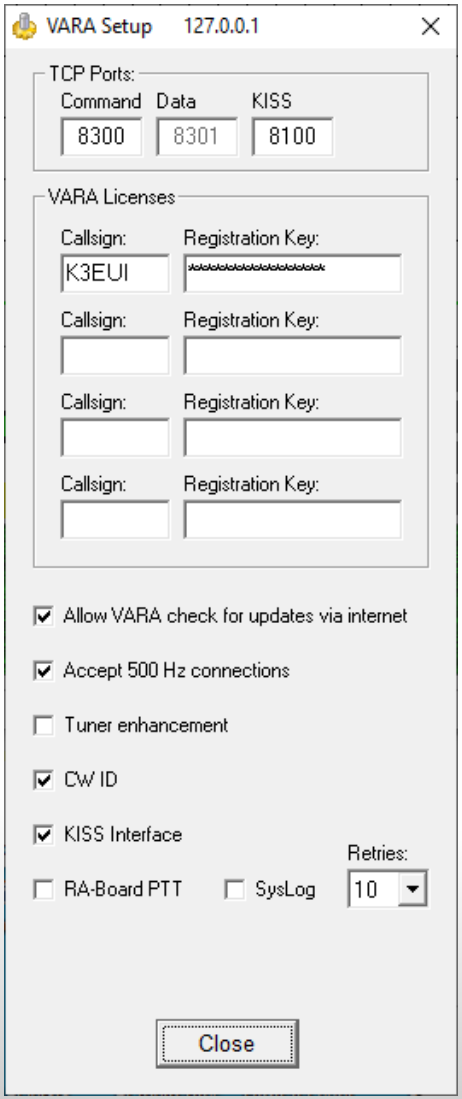
Your VARA HF modem
how your sound card talks to your radio



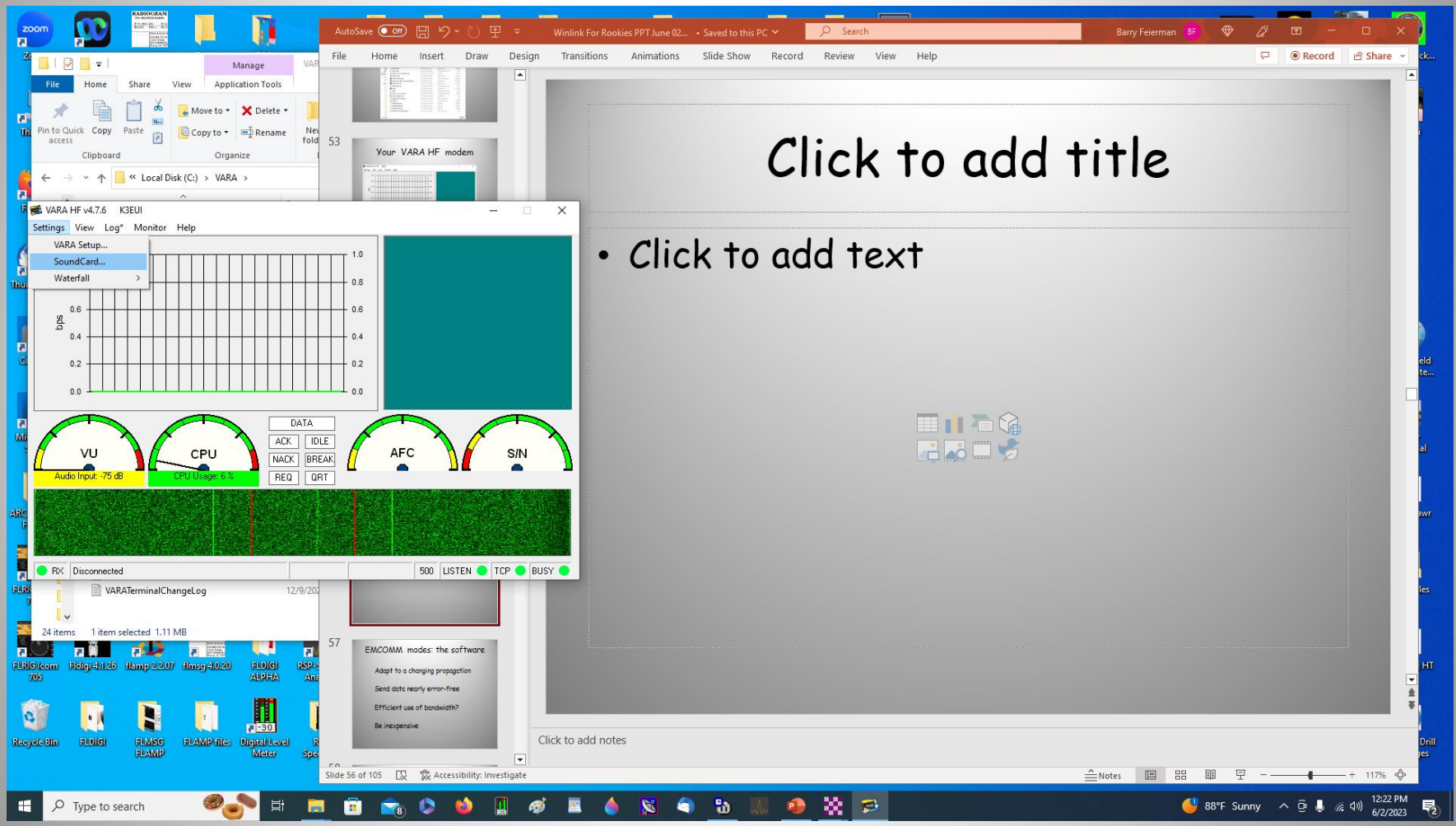
Choose VARA Setup



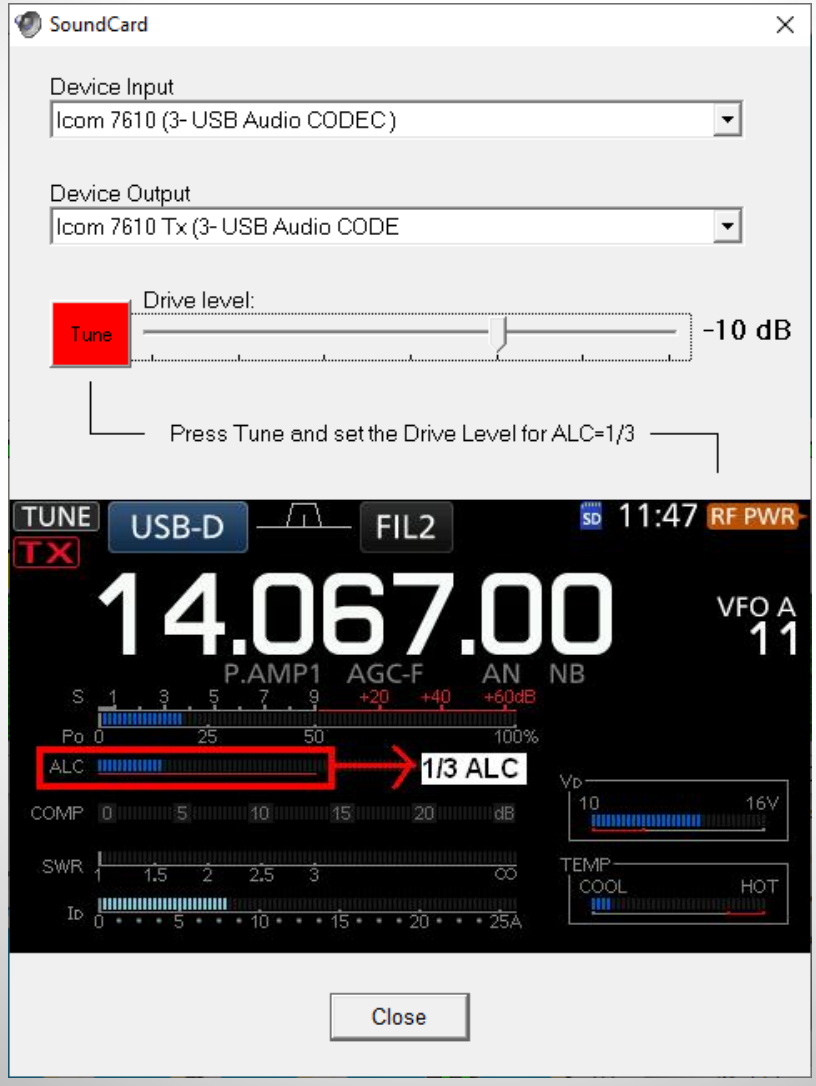
Fill in or use defaults enter your Registration Key



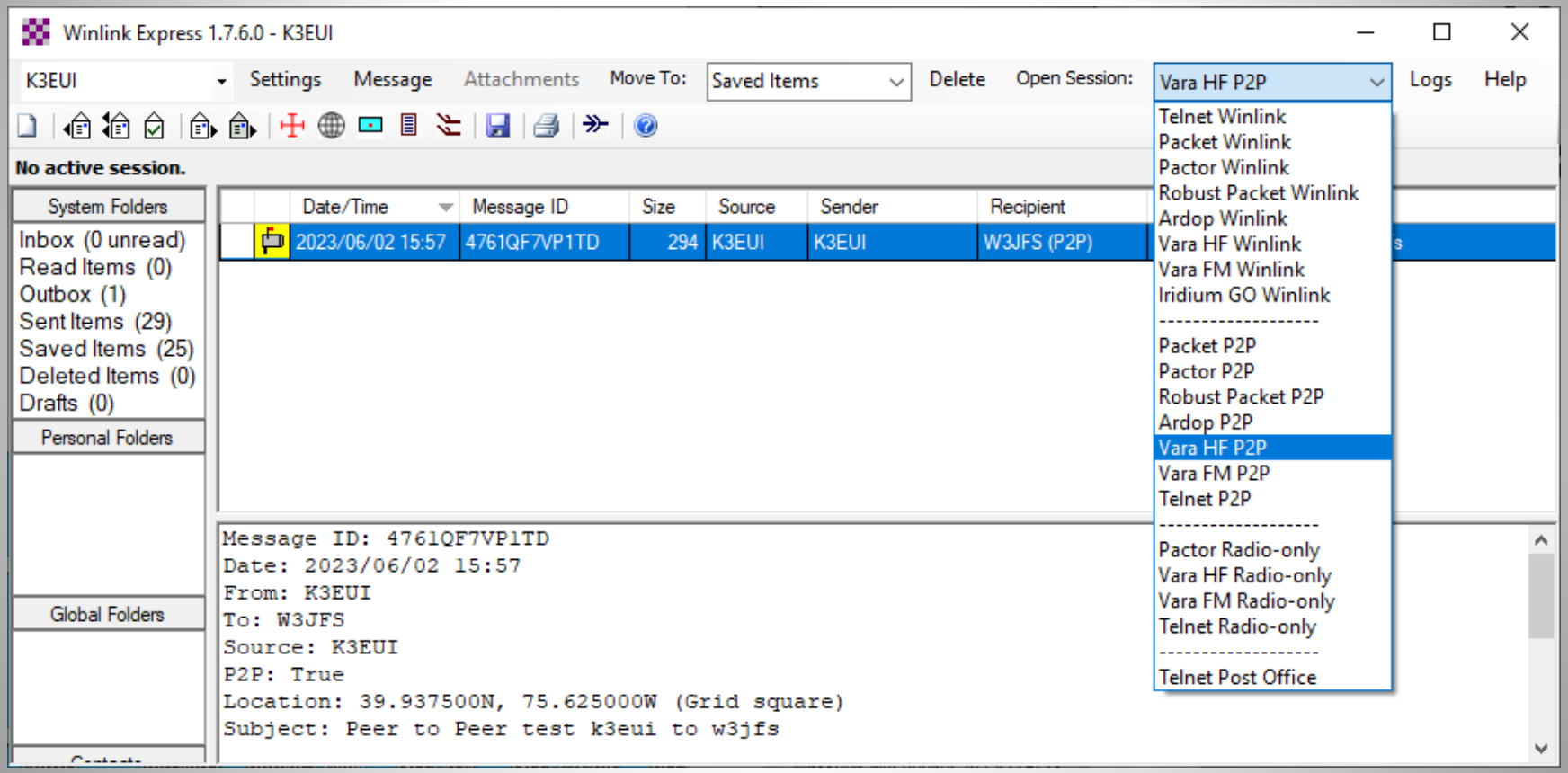
Choose Sound CARD



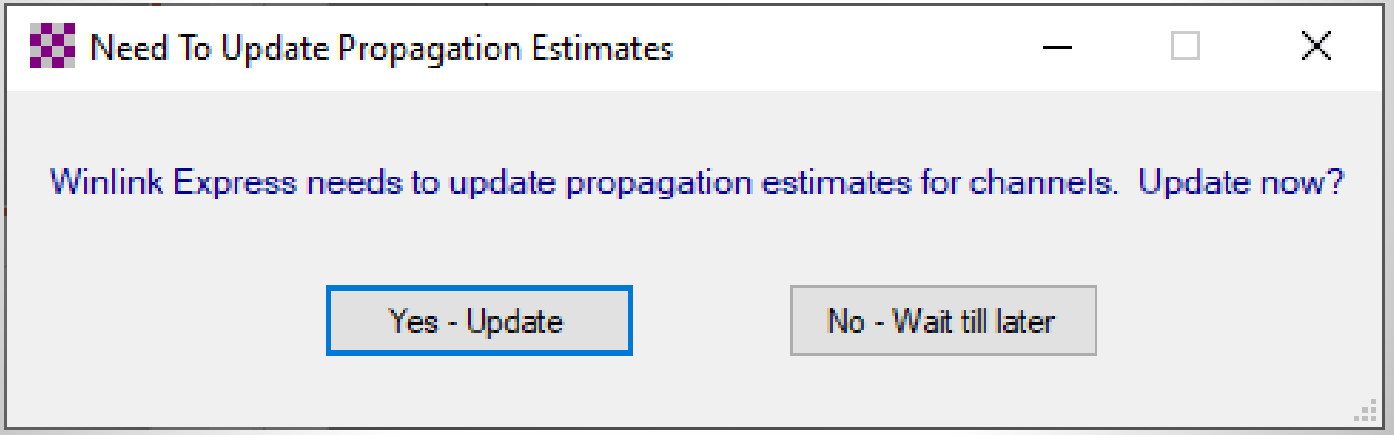
Pick your sound card
Set (audio) Drive Level for power output



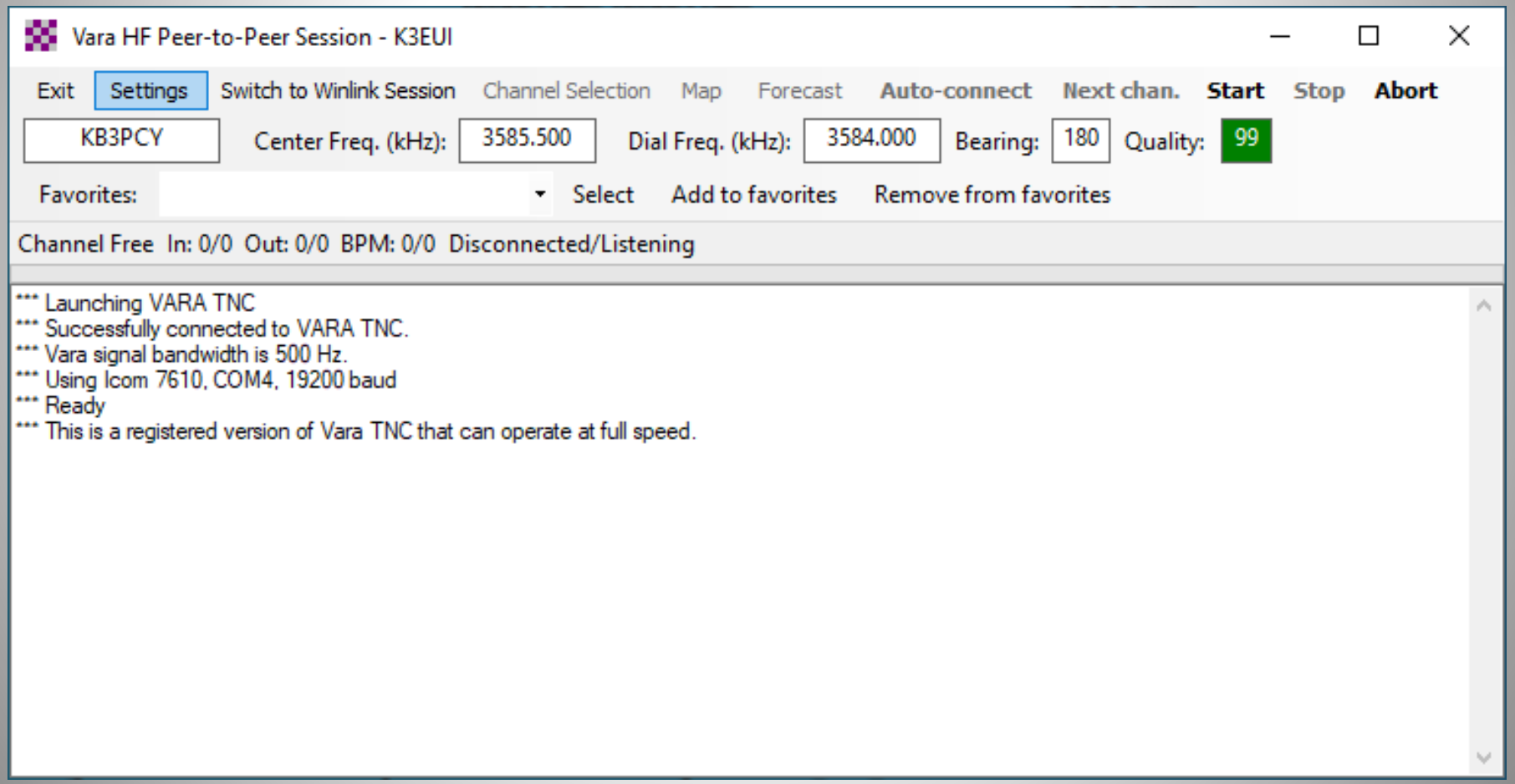
Open a VARA HF "SESSION"
CHOOSE VARA HF
Winlink (Gateway) or P2P (any ham)



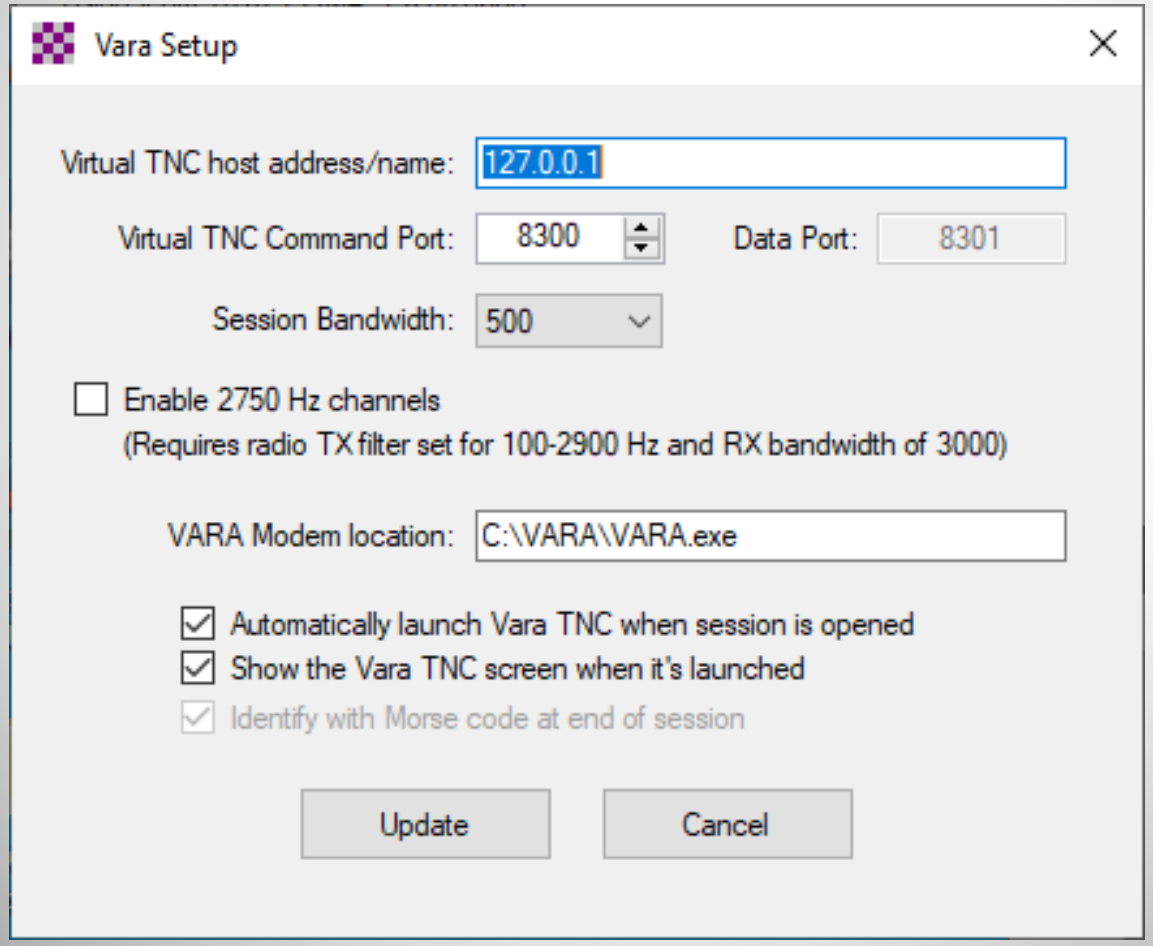
It may ask you to UPDATE propagation files: say yes



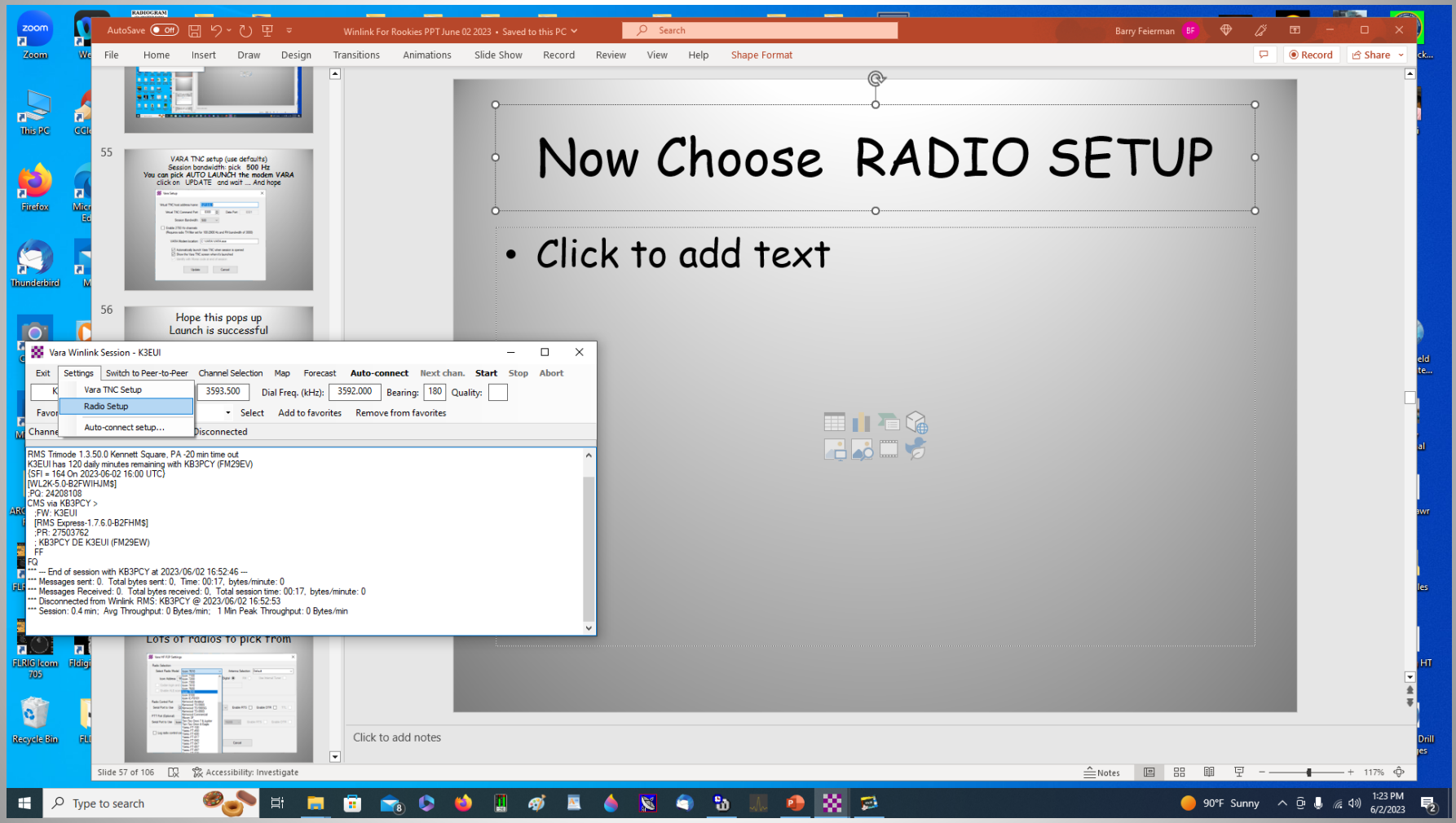
Winlink Setup for VARA HF
Pick VARA TNC setup first



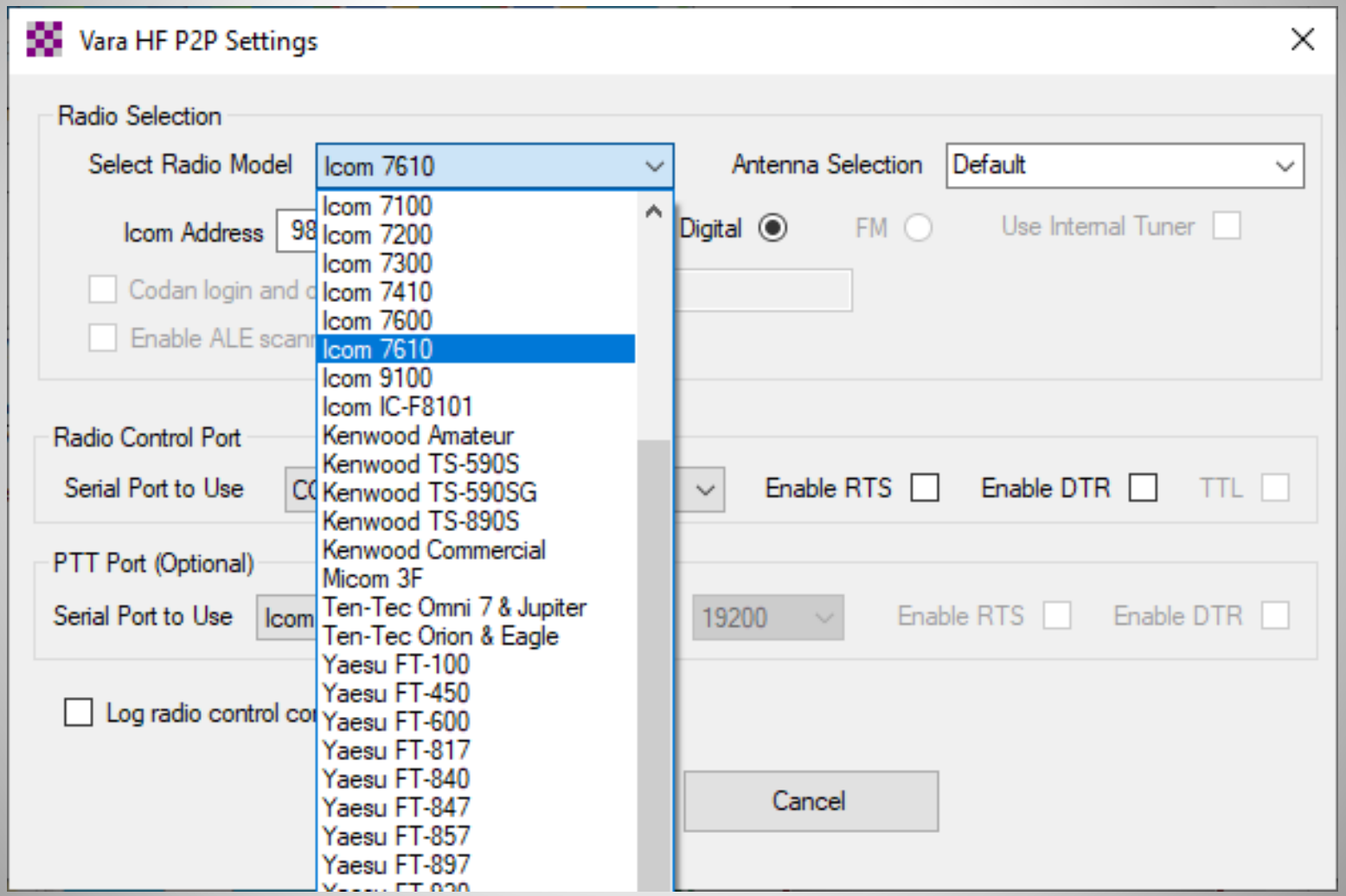
VARA TNC setup (use defaults)
Session bandwidth: pick **500 Hz**
You can pick AUTO LAUNCH the modem VARA
click on UPDATE and wait …. And hope



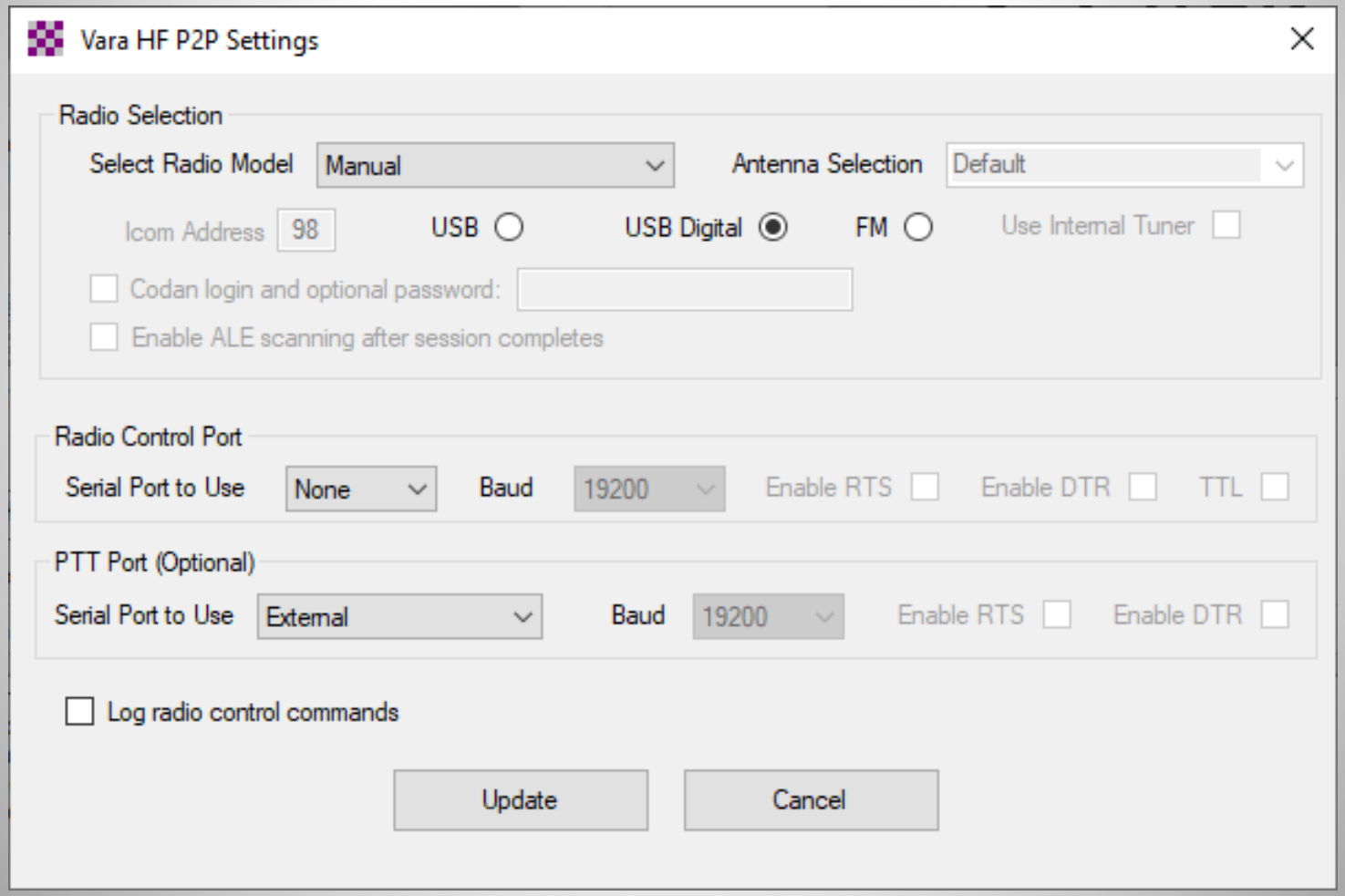
Now Choose RADIO SETUP



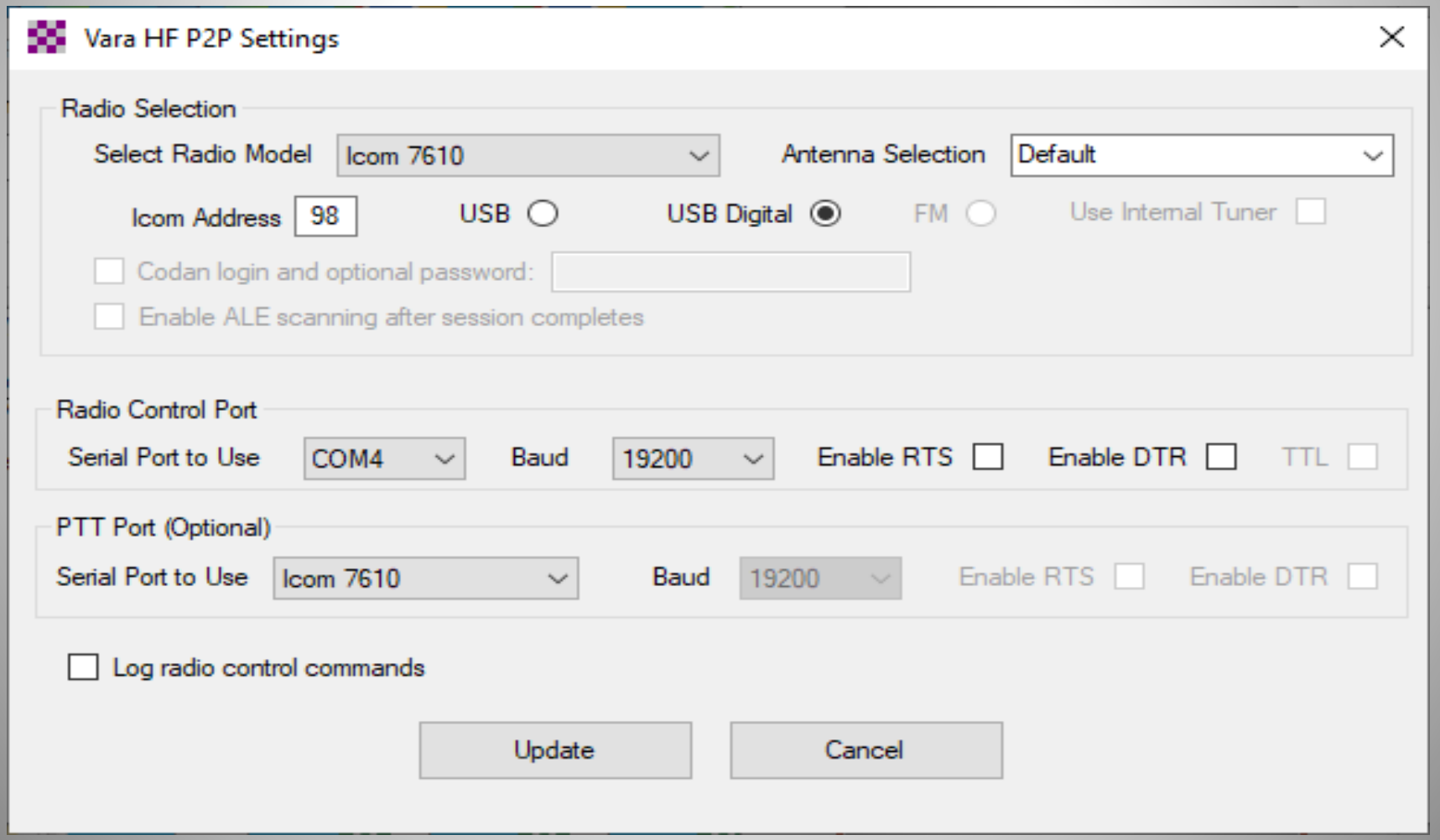
Lots of radios to pick from IF you want the app to control the radio's VFO and xmit (PTT) via a COM port



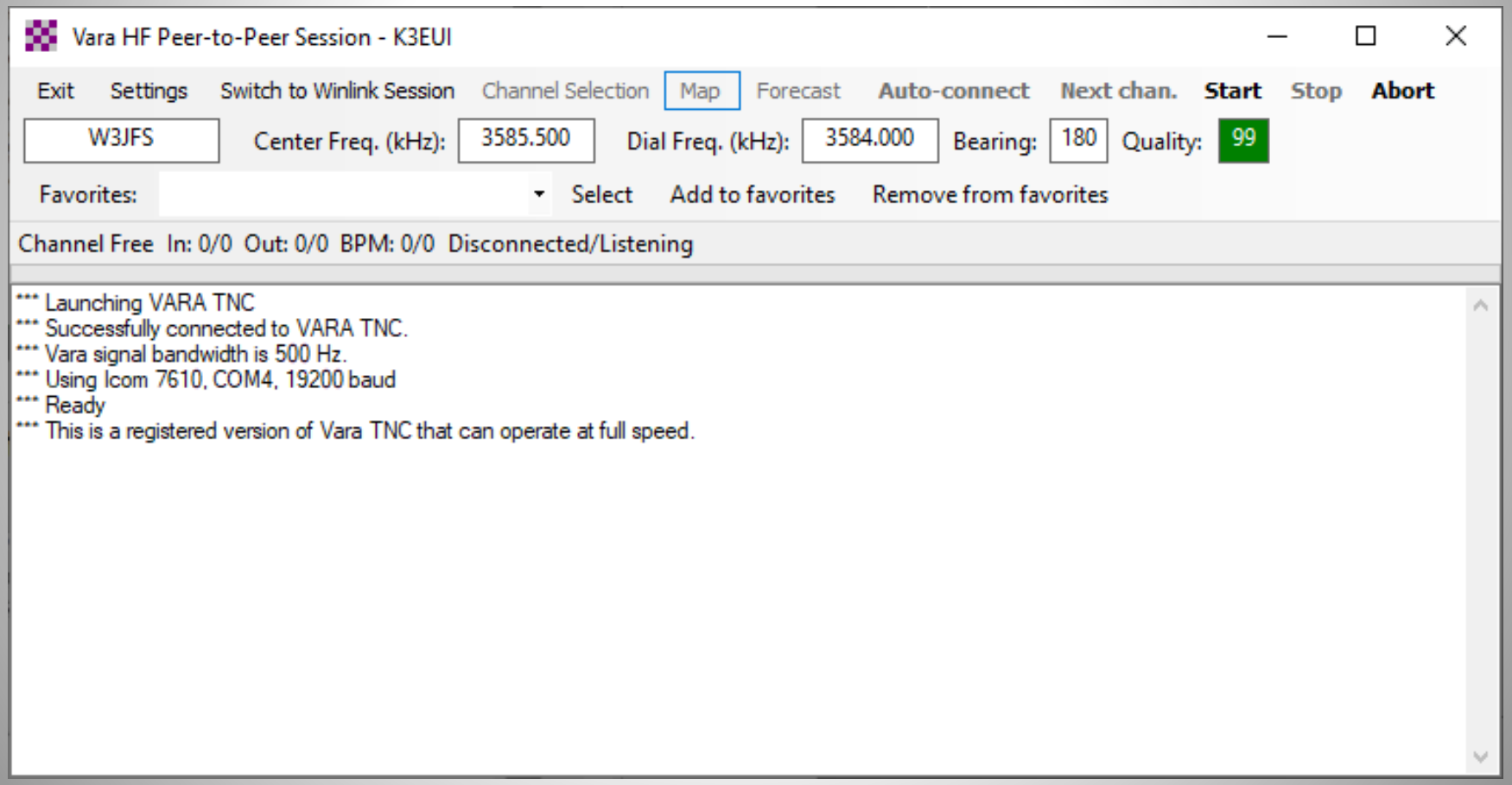
One choice: no CAT
choose Manual and no COM port



Pick CAT (software controls radio's VFO) and PTT (send) options under RADIO setup PRESS Update (and hope)



Launch is successful



Typical Error messages

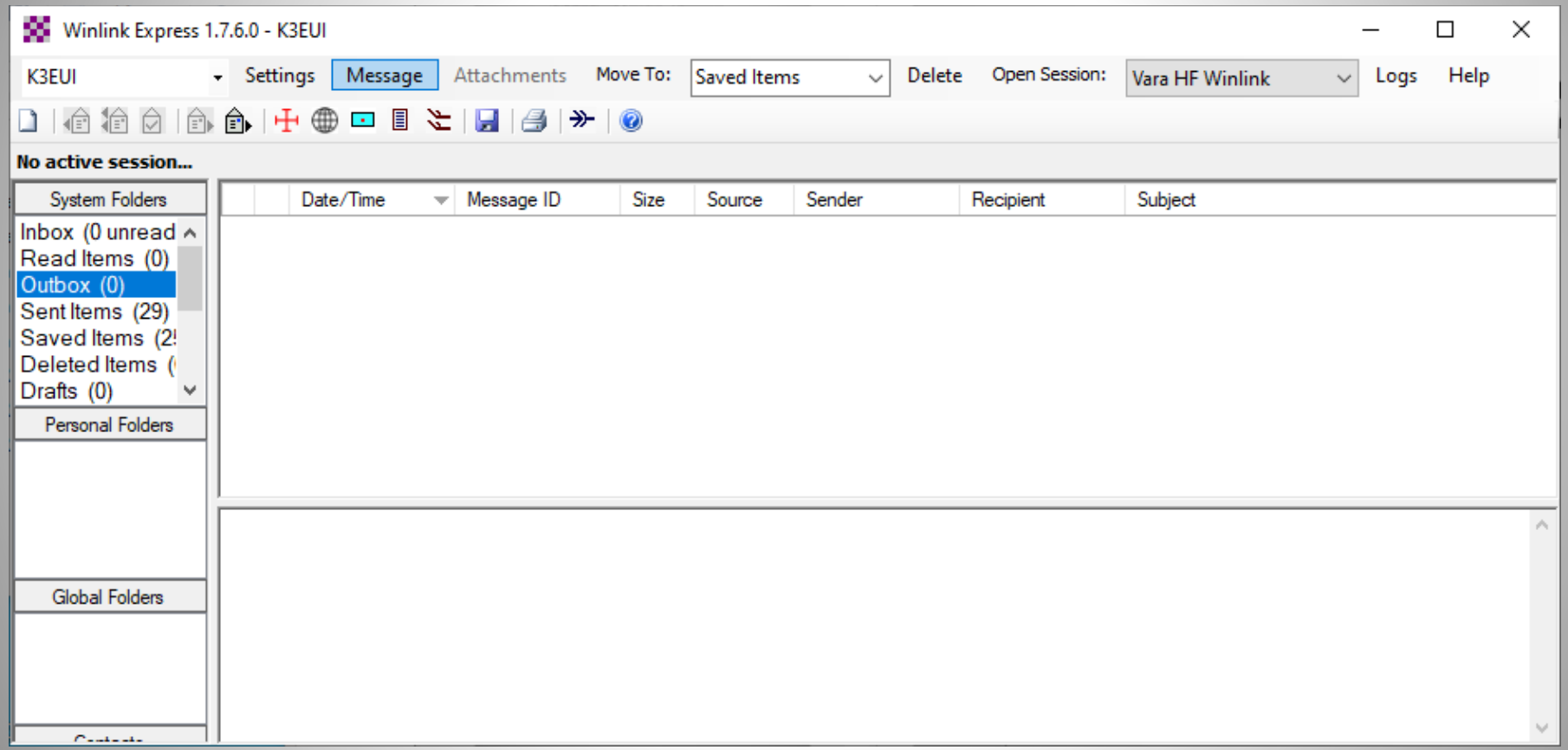
COM port not available

Wrong sound card

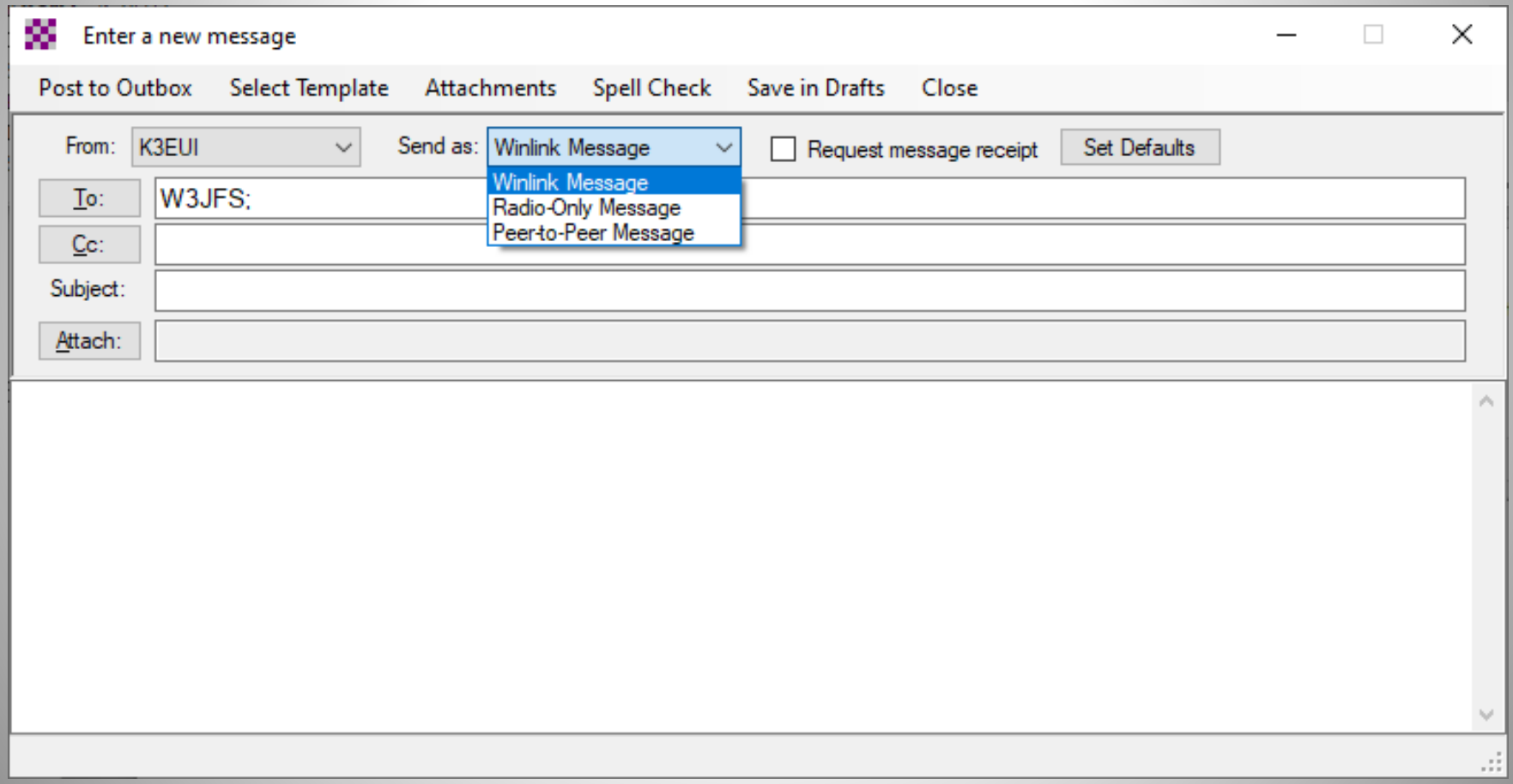
Baud rates wrong choice

Etc.

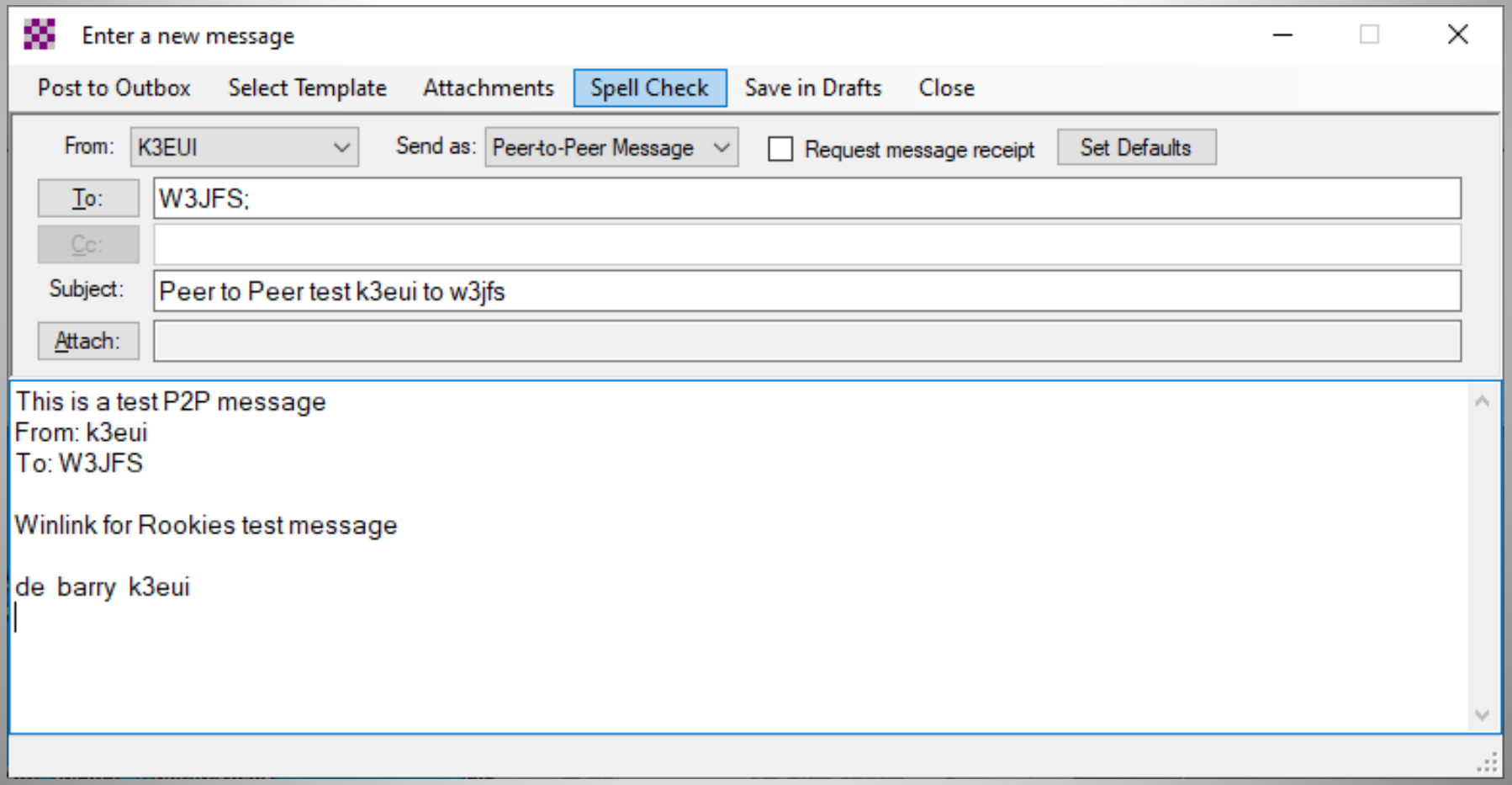
How to create a NEW MESSAGE choose Message in main window



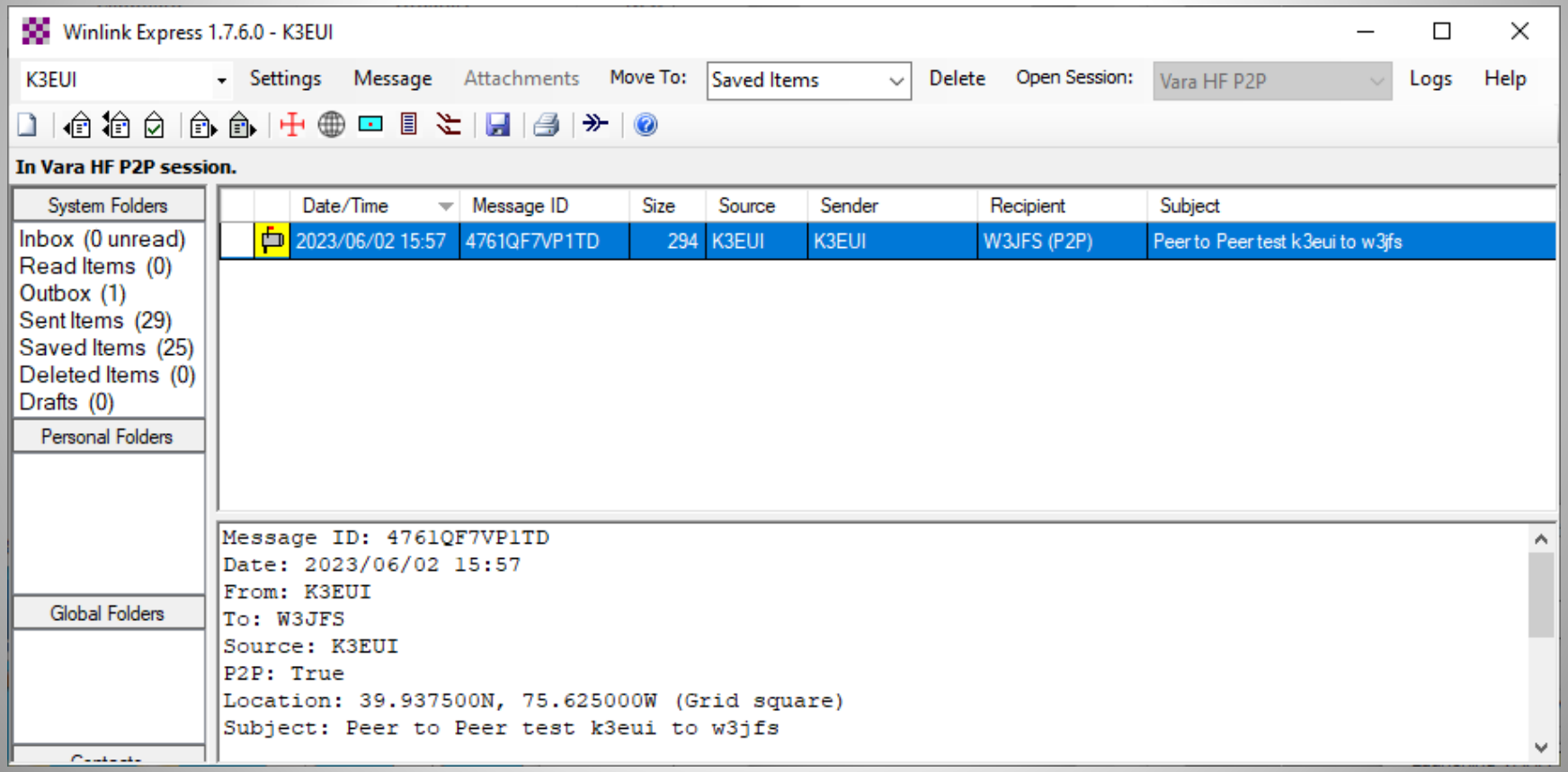
Pick Send as:


Enter a new message
Post to Outbox
Select Template
Attachments
Spell Check
Save in Drafts
Close
From:
K3EUI
Send as:
Winlink Message
Request message receipt
Set Defaults
Winlink Message
Radio-Only Message
Peer-to-Peer Message
To:
W3JFS;
Cc:
Subject:
Attach:

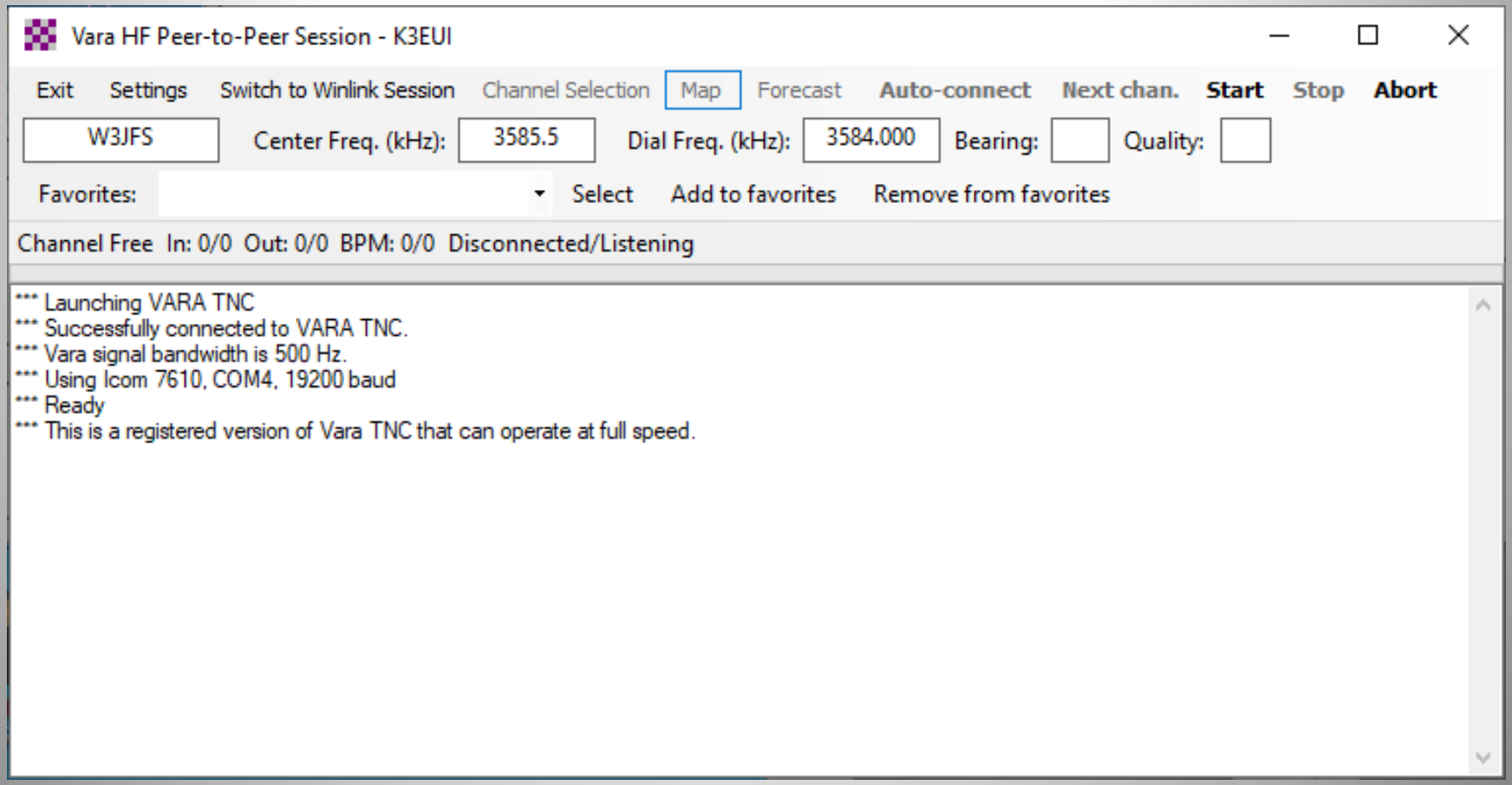
Create a new message
Pick: P2P or Winlink (to Gateway)
then choose **Post to Outbox**



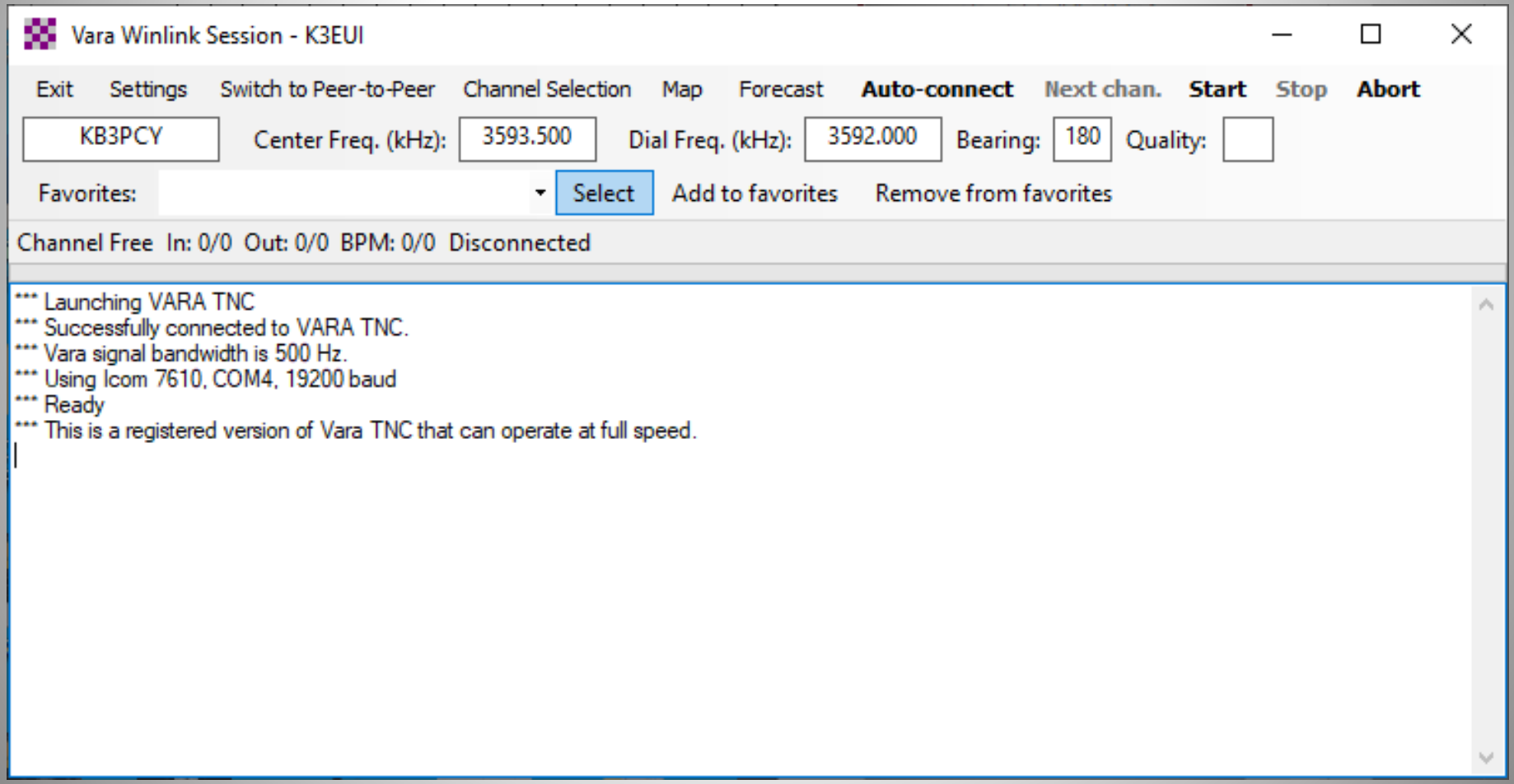
Message will appear in **OUTBOX**
check that it is **P2P** mode if you are not sending to a GATEWAY



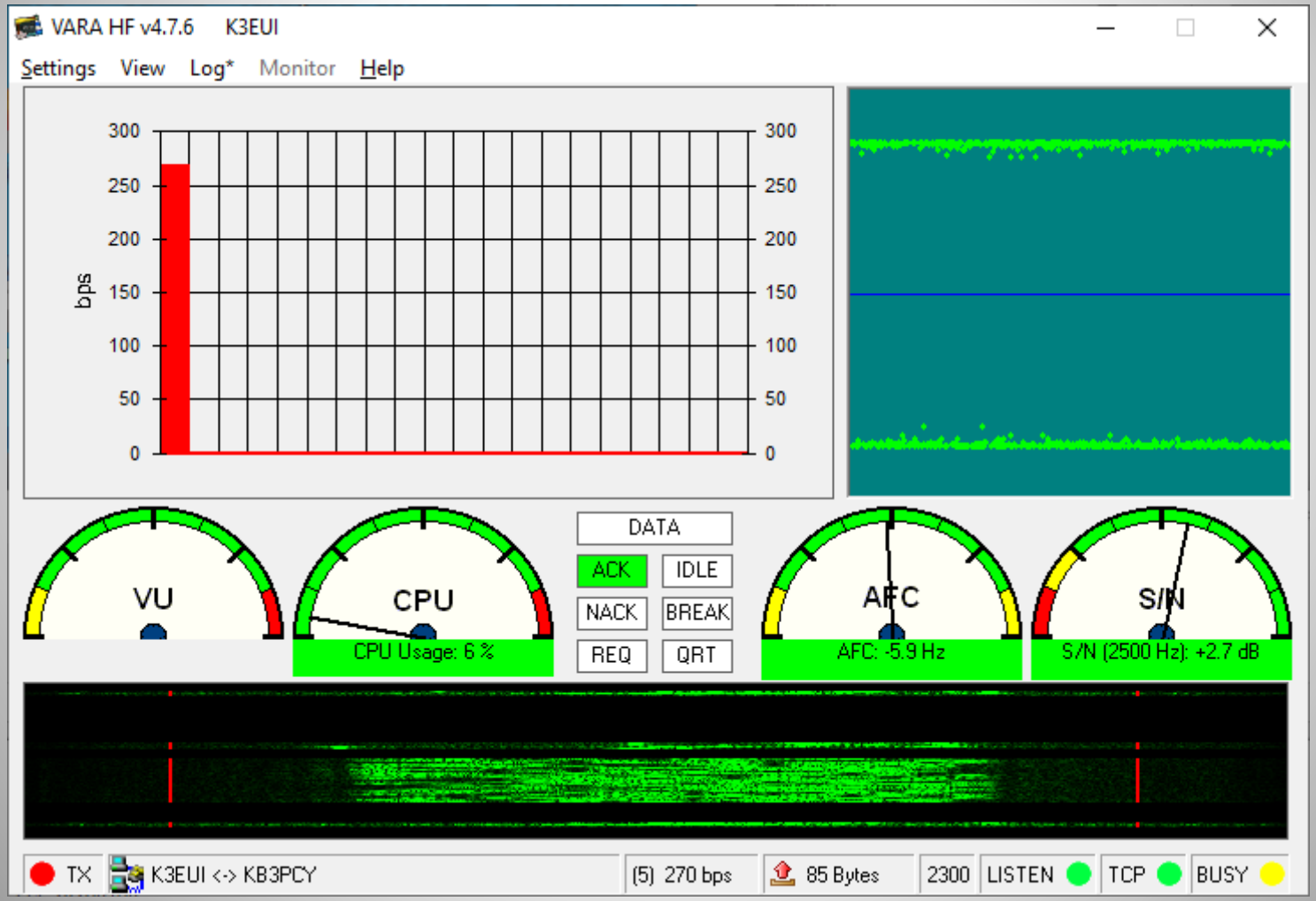
Choose RADIO destination CALL sign (link) ham call in P2P session
Pick a clear frequency
Center = VFO + 1.5 kHz



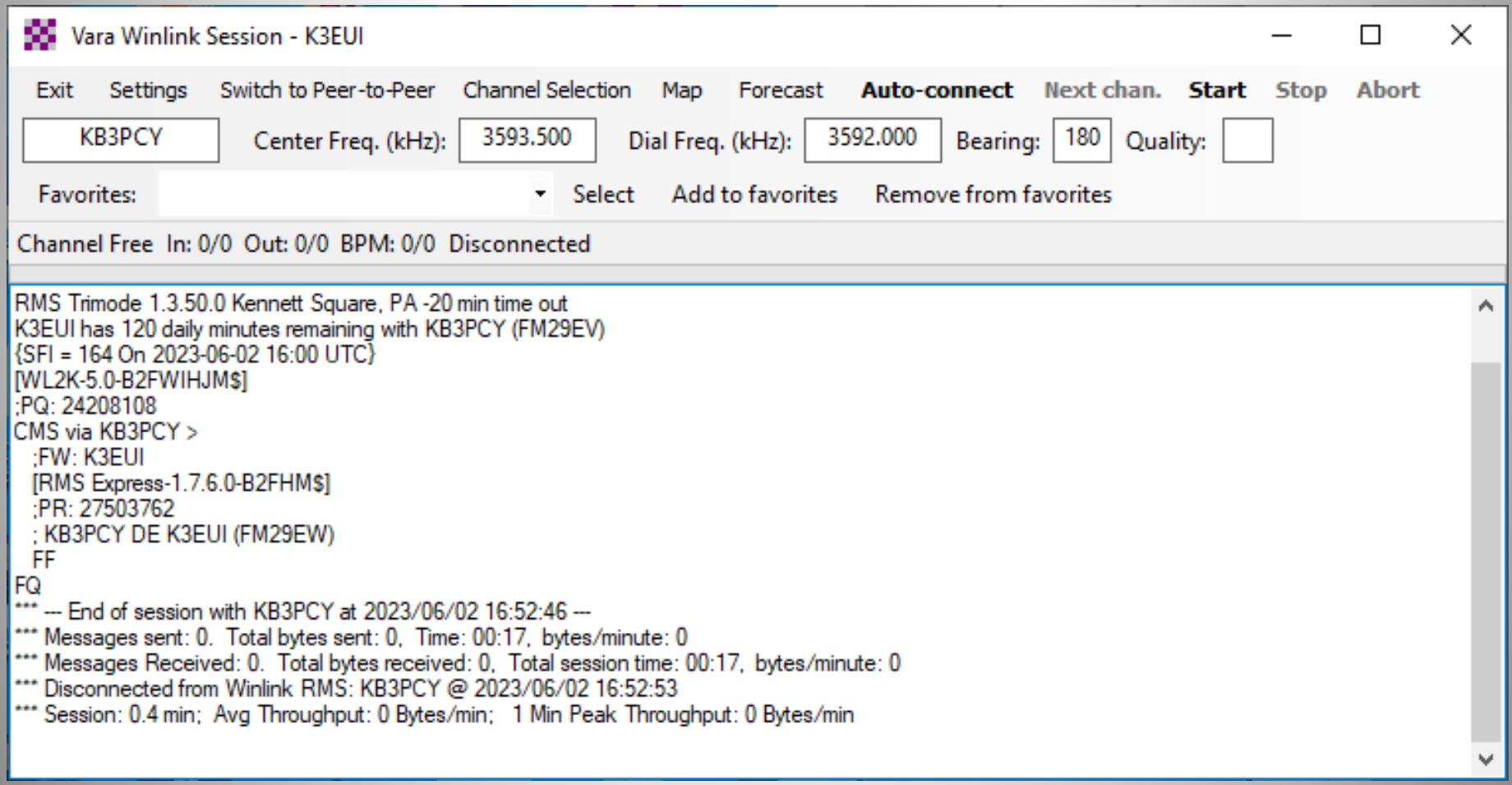
A "link" begins when you press **START**
and negotiates with "handshaking"
here is a link to neighbor: kb3pcy (Gateway)



Signals on 80m were moderate and message was sent



When you are successful summary of contact



VARA FM options
on
VHF and UHF

wider bandwidth available
on 2m and 70cm

VARA Narrow = 3 kHz
VARA Wide = 5.8 kHz

Winlink's VARA FM 4.0 VHF/UHF

WIDE BW (6 KHz) needs 9600 baud pins

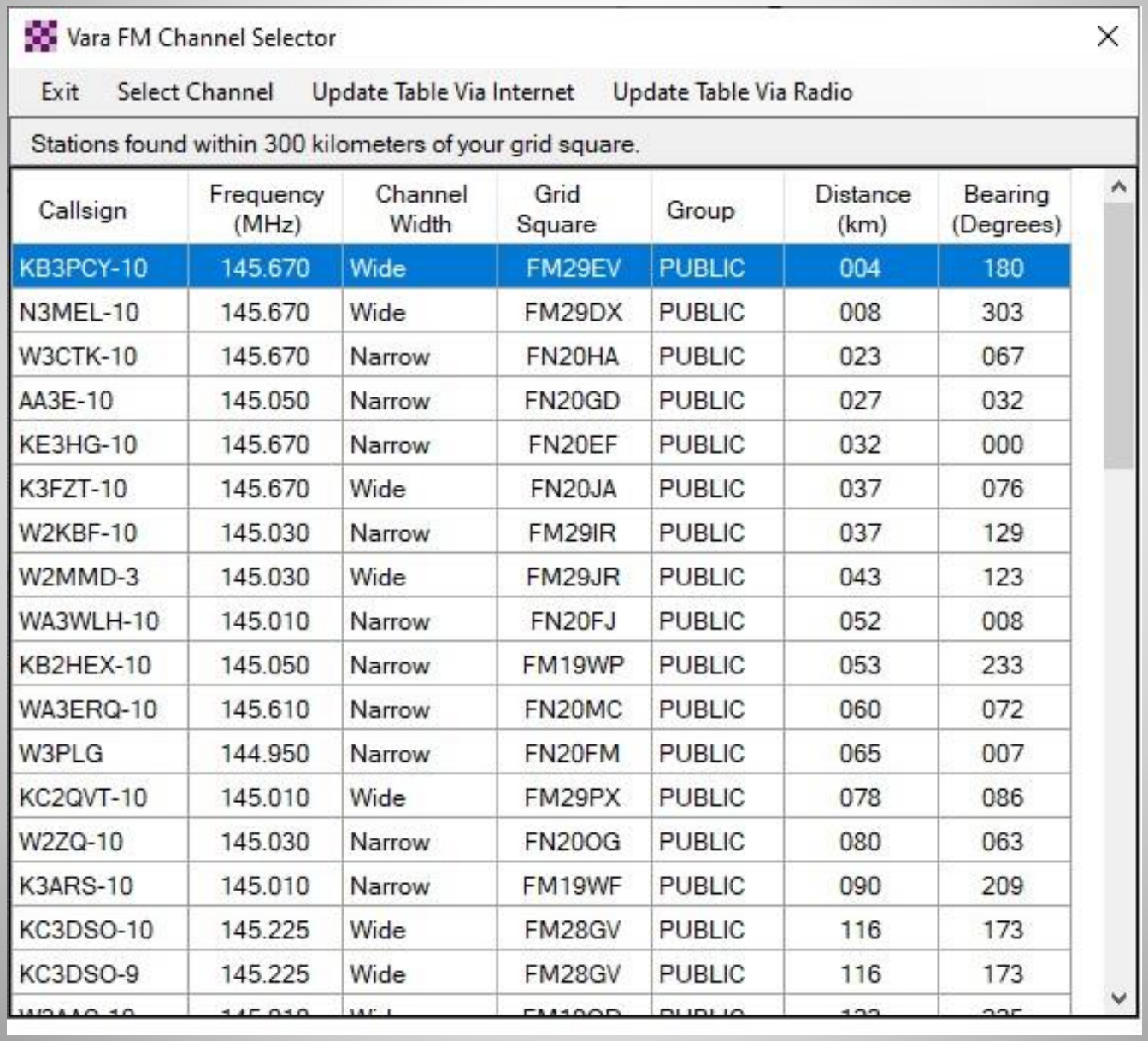
NARROW BW (2 kHz) uses 1200 baud pins

VARA FM v4.0.0
Speed Levels

	VARA FM WIDE				VARA FM NARROW			
Level	Symbol Rate	Carriers	Mod.	Net Rate (bps)	Symbol Rate	Carriers	Mod.	Net Rate (bps)
1	42	14	4PSK	566	42	14	4PSK	549
2	42	29	4PSK	1188	42	29	4PSK	1181
3	42	58	4PSK	2390	42	58	4PSK	2390
4	42	98	4PSK	4040	42	58	4PSK	3188
5	42	98	4PSK	5387	42	58	8QAM	4252
6	42	98	8QAM	7185	42	58	16QAM	5668
7	42	98	16QAM	9580	42	58	32QAM	7087
8	42	116	16QAM	11340	42	58	64QAM	8505
9	42	116	32QAM	14144	42	58	64QAM	9567
10	42	116	64QAM	16932	42	58	128QAM	11162
11	42	116	64QAM	19003	42	58	256QAM	12750
12	42	116	128QAM	22102				
13	42	116	256QAM	25210				

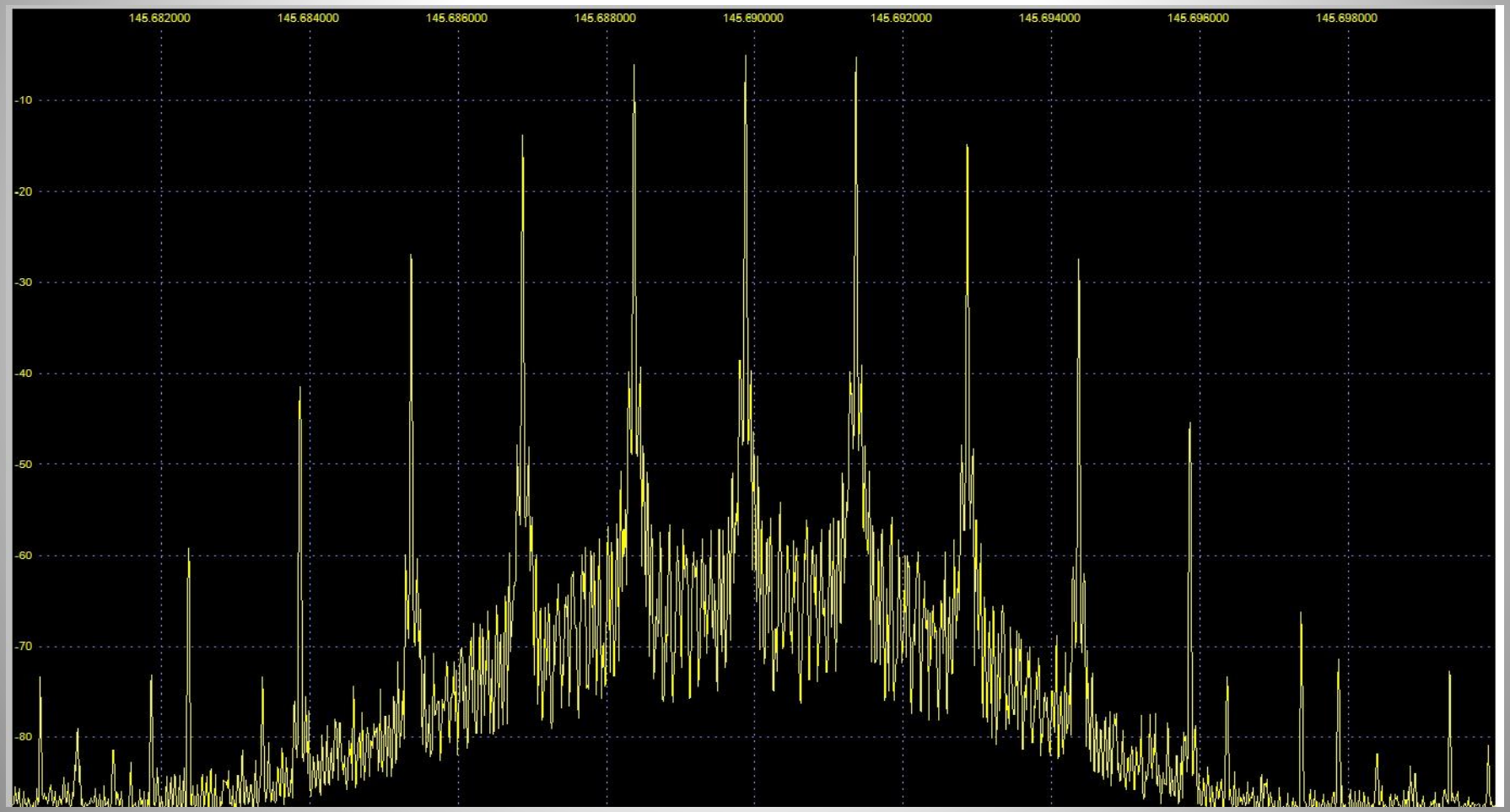
VHF VARA FM GATEWAYS - 2 meters

Gateways monitor their frequency 24/7

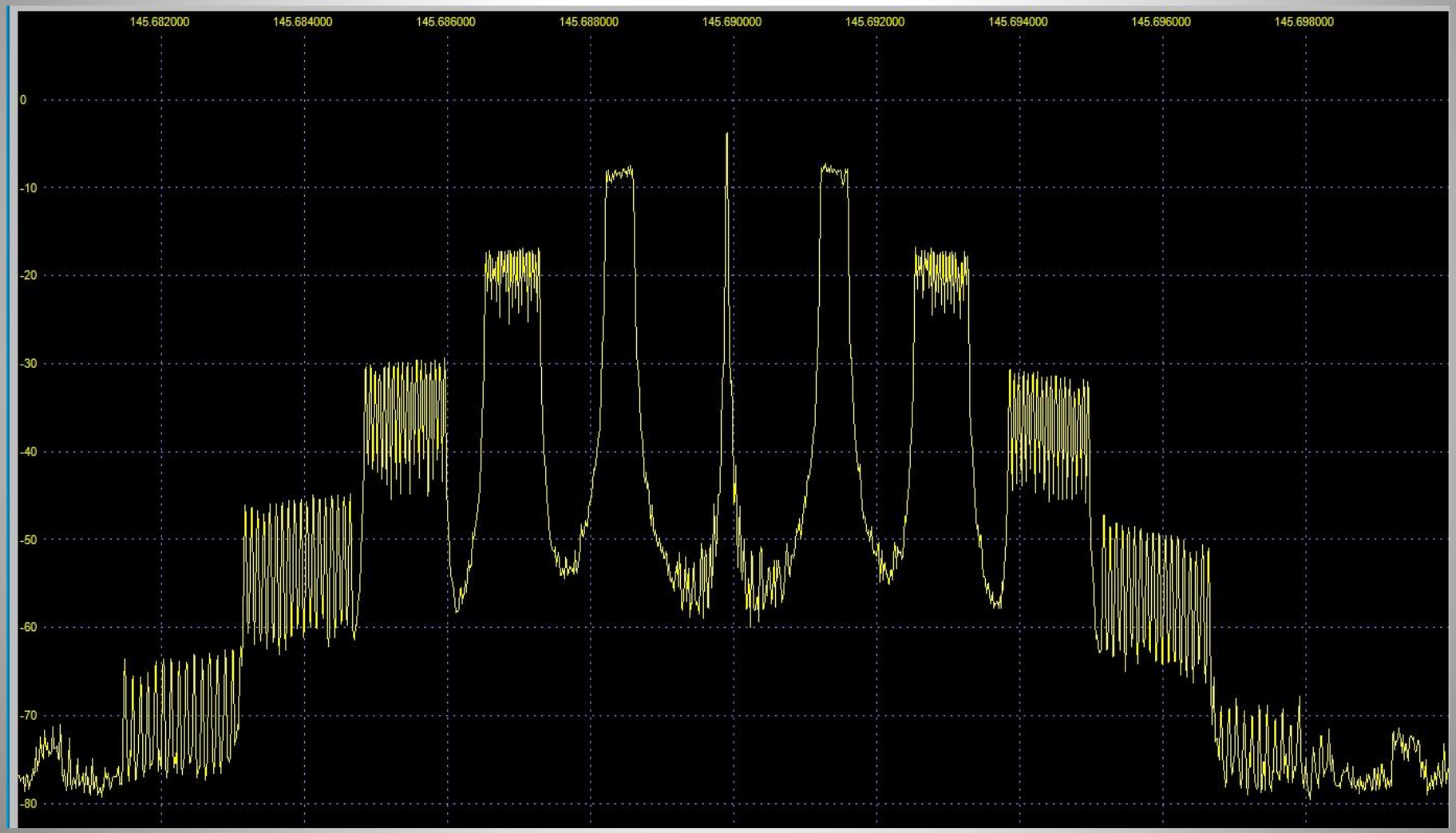


Callsign	Frequency (MHz)	Channel Width	Grid Square	Group	Distance (km)	Bearing (Degrees)
KB3PCY-10	145.670	Wide	FM29EV	PUBLIC	004	180
N3MEL-10	145.670	Wide	FM29DX	PUBLIC	008	303
W3CTK-10	145.670	Narrow	FN20HA	PUBLIC	023	067
AA3E-10	145.050	Narrow	FN20GD	PUBLIC	027	032
KE3HG-10	145.670	Narrow	FN20EF	PUBLIC	032	000
K3FZT-10	145.670	Wide	FN20JA	PUBLIC	037	076
W2KBF-10	145.030	Narrow	FM29IR	PUBLIC	037	129
W2MMD-3	145.030	Wide	FM29JR	PUBLIC	043	123
WA3WLH-10	145.010	Narrow	FN20FJ	PUBLIC	052	008
KB2HEX-10	145.050	Narrow	FM19WP	PUBLIC	053	233
WA3ERQ-10	145.610	Narrow	FN20MC	PUBLIC	060	072
W3PLG	144.950	Narrow	FN20FM	PUBLIC	065	007
KC2QVT-10	145.010	Wide	FM29PX	PUBLIC	078	086
W2ZQ-10	145.030	Narrow	FN20OG	PUBLIC	080	063
K3ARS-10	145.010	Narrow	FM19WF	PUBLIC	090	209
KC3DSO-10	145.225	Wide	FM28GV	PUBLIC	116	173
KC3DSO-9	145.225	Wide	FM28GV	PUBLIC	116	173

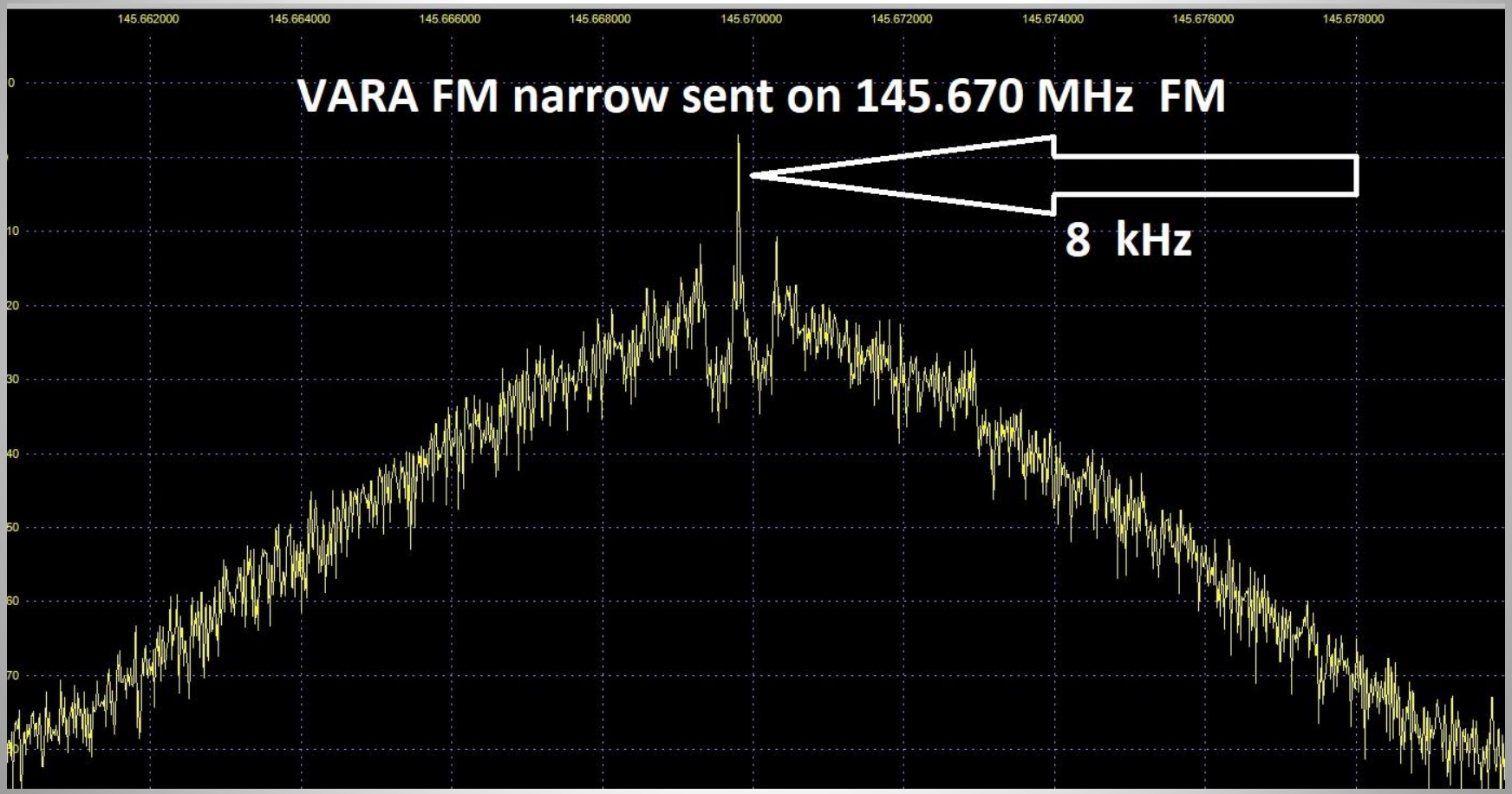
FM modulated by a single pitch sine wave at 1500 Hz results in multiple sidebands and large bandwidth (**16 kHz**)



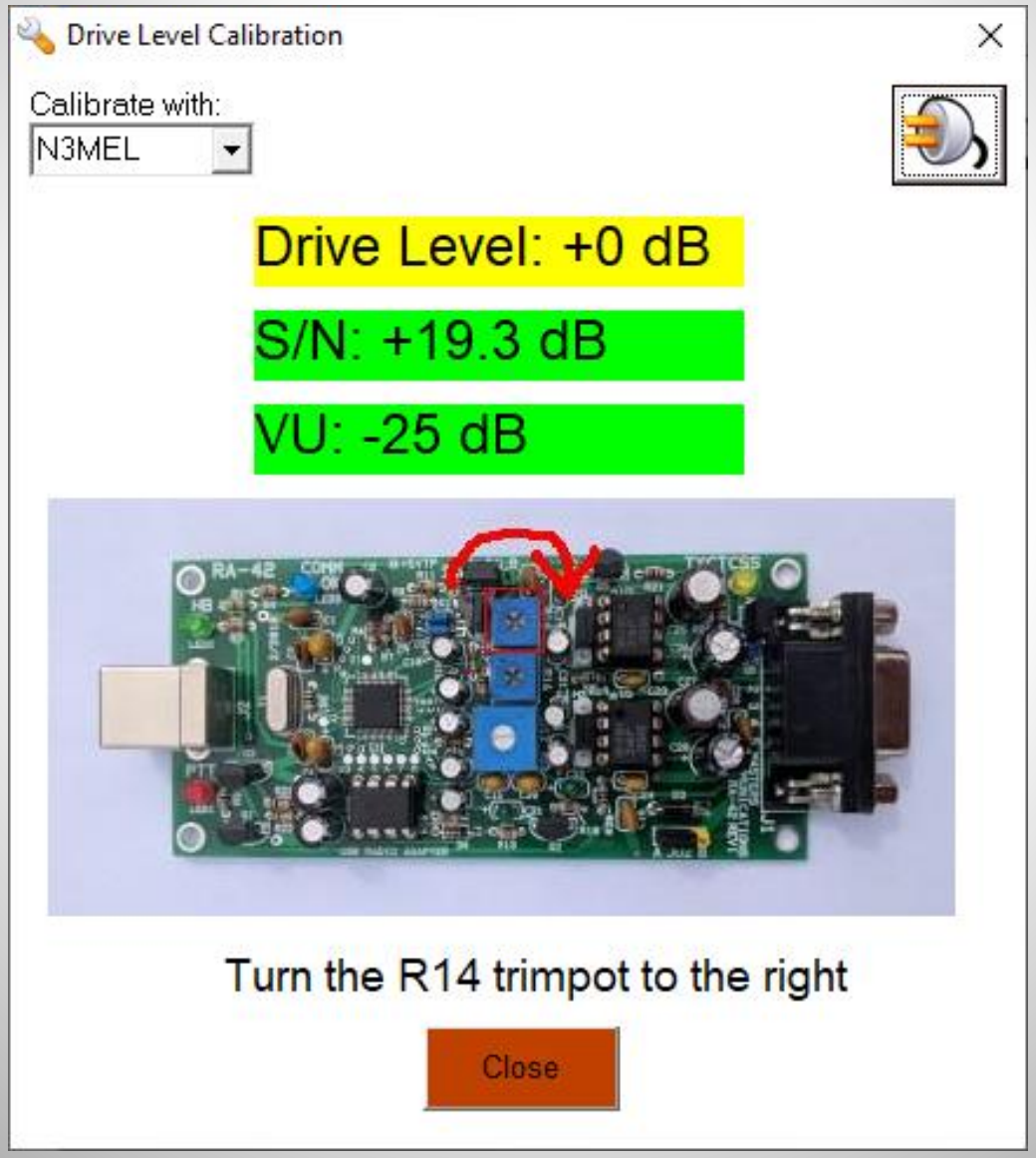
THOR 22 sent by FM (16 kHz)
78 wpm and very easy to tune in



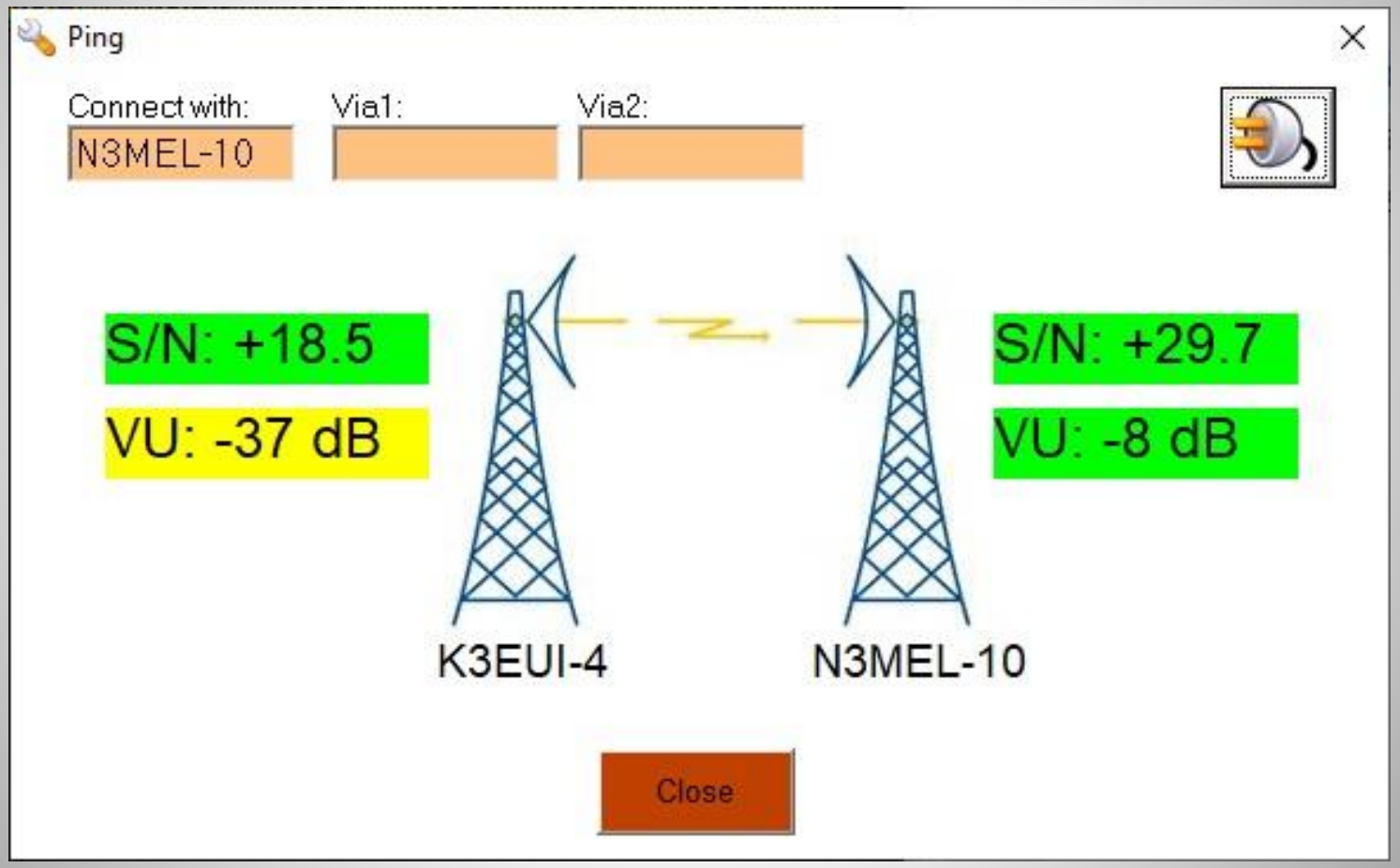
VARA sent by FM on 2m



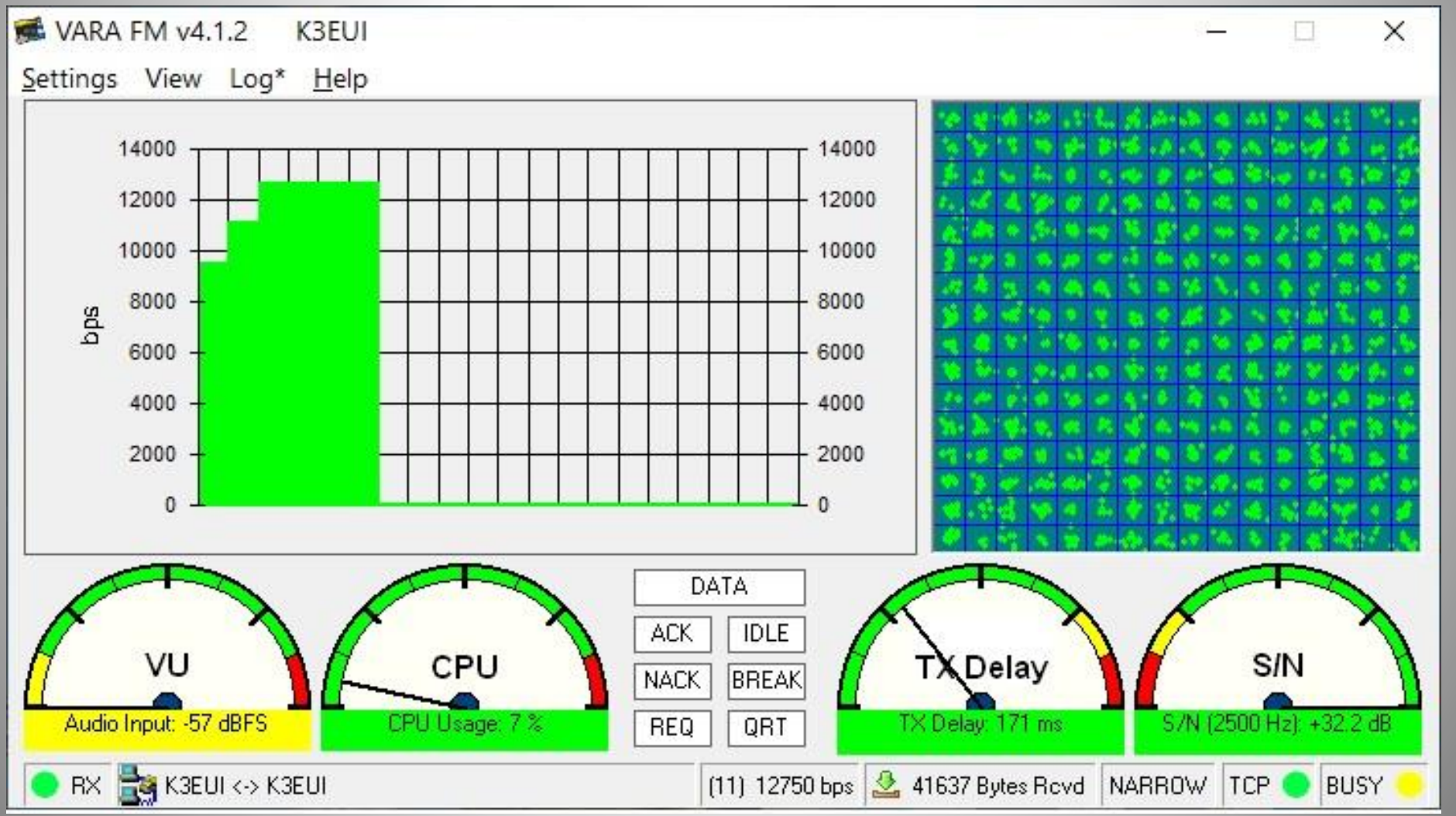
Calibrate:
AUTO TUNE your TX audio with another station



PING shows the S/N to another station



Sample Rx Window VARA **FM**
note speed level 11 = 12,750 bit/second



Time for a Coffee Break and Questions

Modulation Methods

AM and CW are

amplitude shifts

RTTY, Olivia, Thor, MFSK, FT8

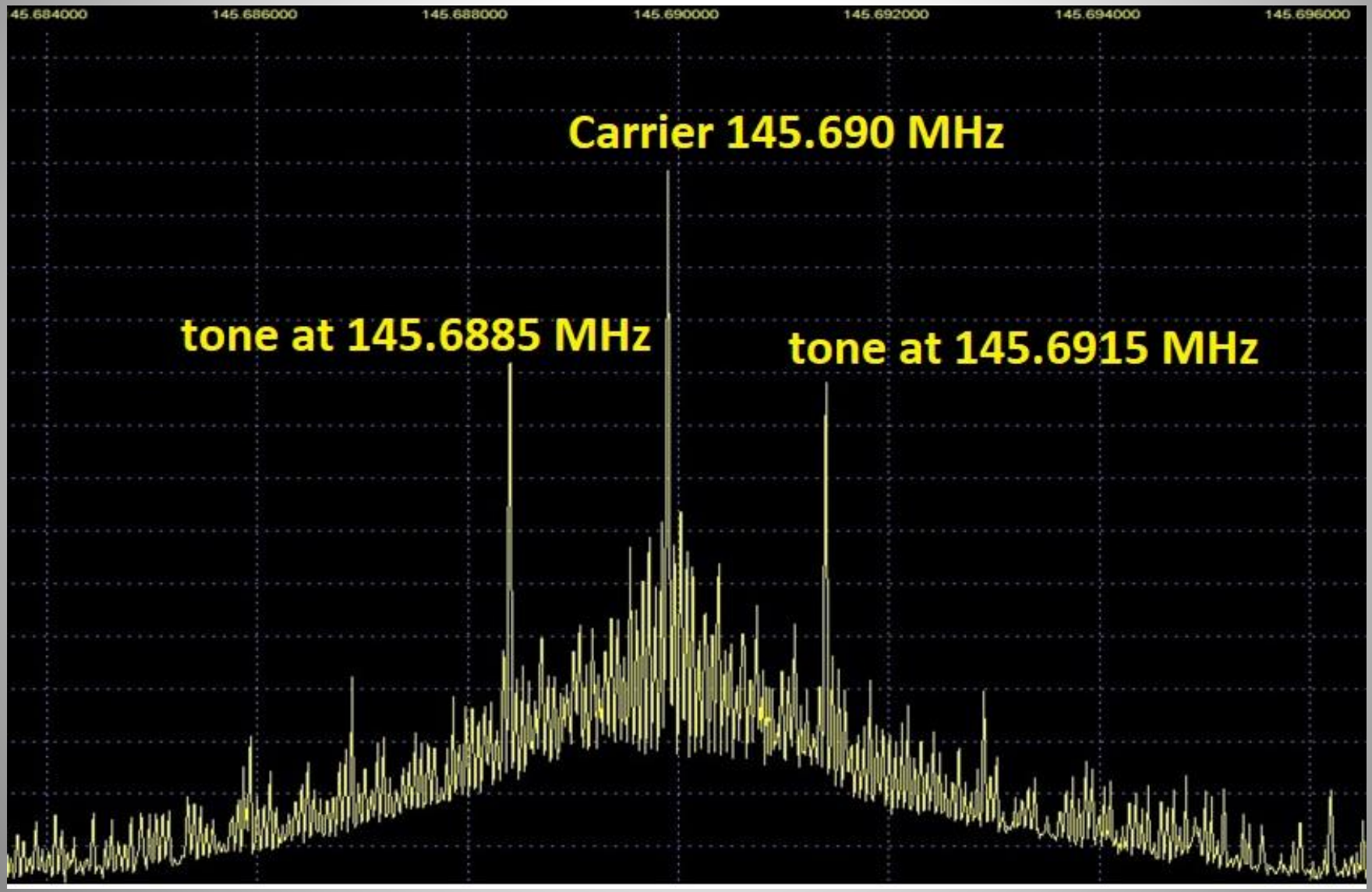
frequency shifts

(constant amplitude)

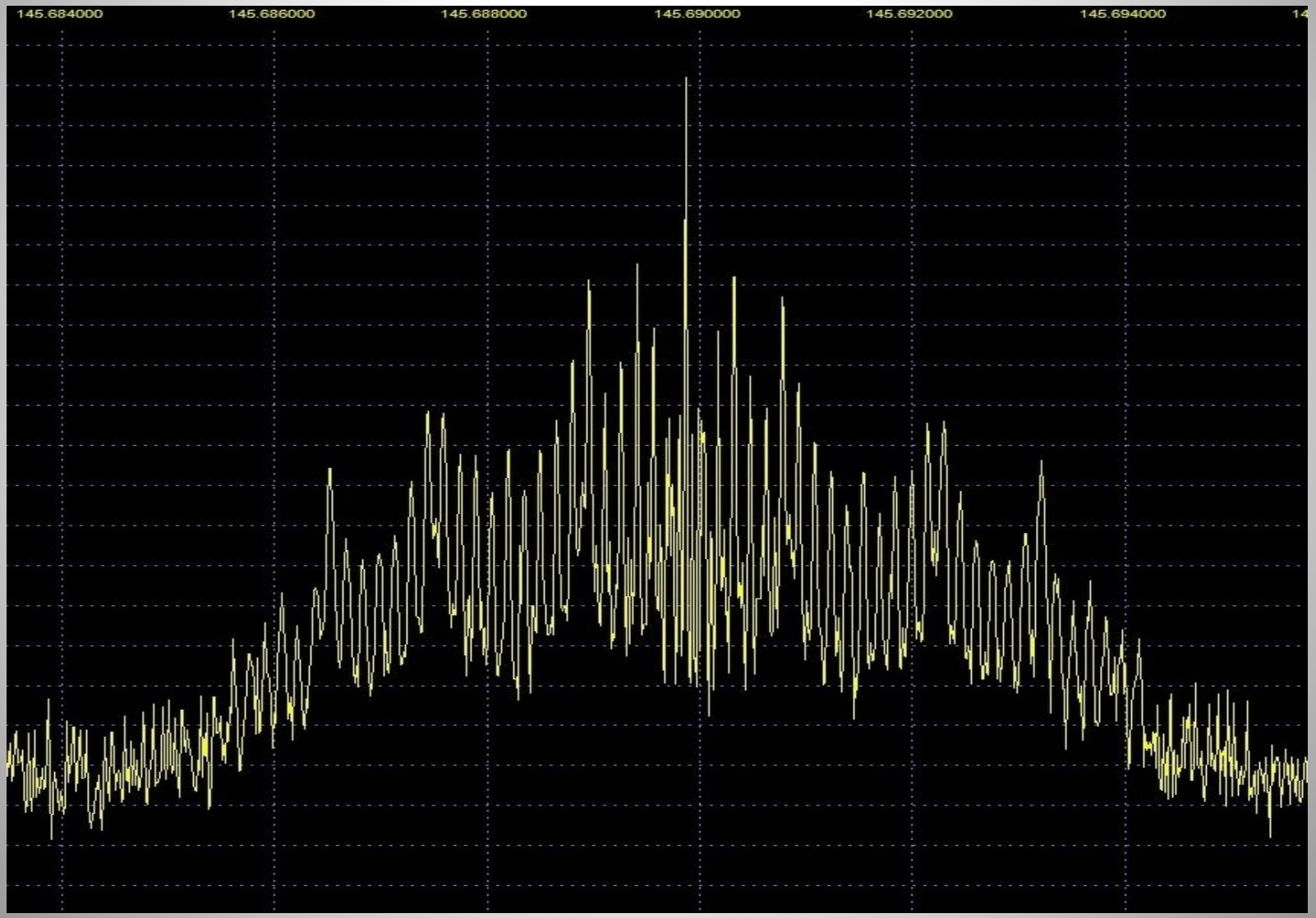
PSK, VARA, 8PSK, and MT63

phase and amplitude shifts

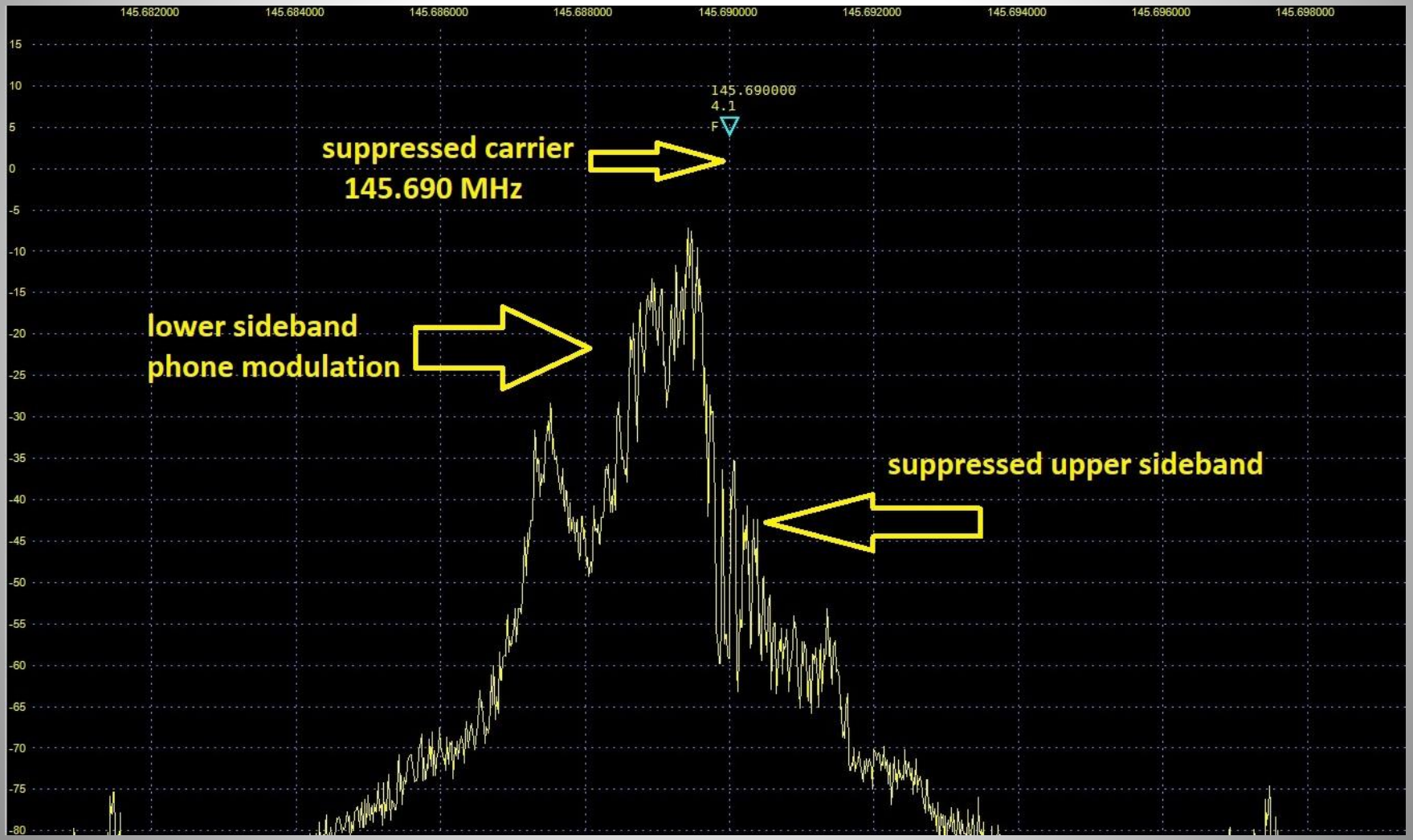
AM modulated by 1500 Hz audio sine wave
CARRIER + USB + LSB => **3 kHz bandwidth**



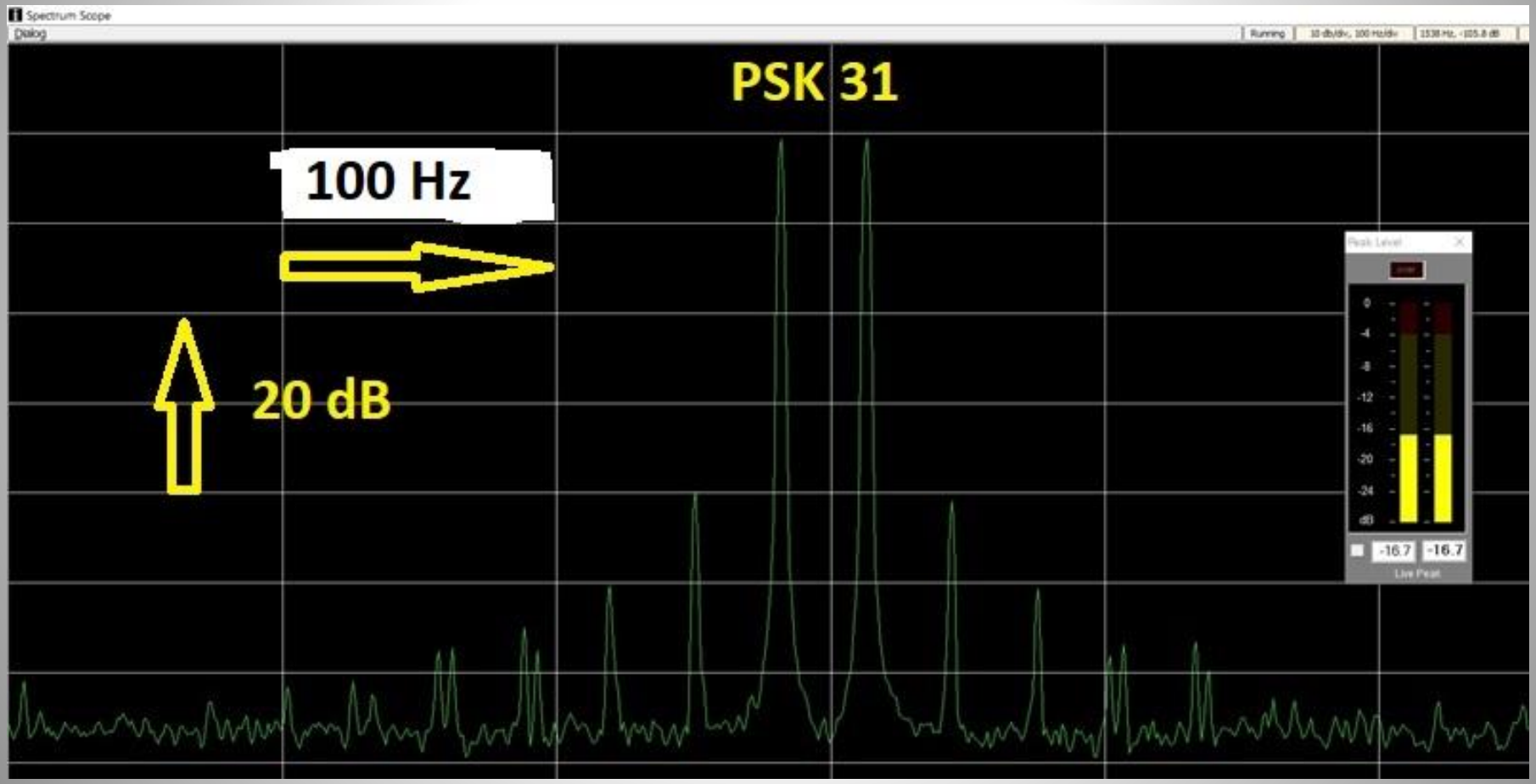
AM Human Voice wastes spectrum (8 kHz)



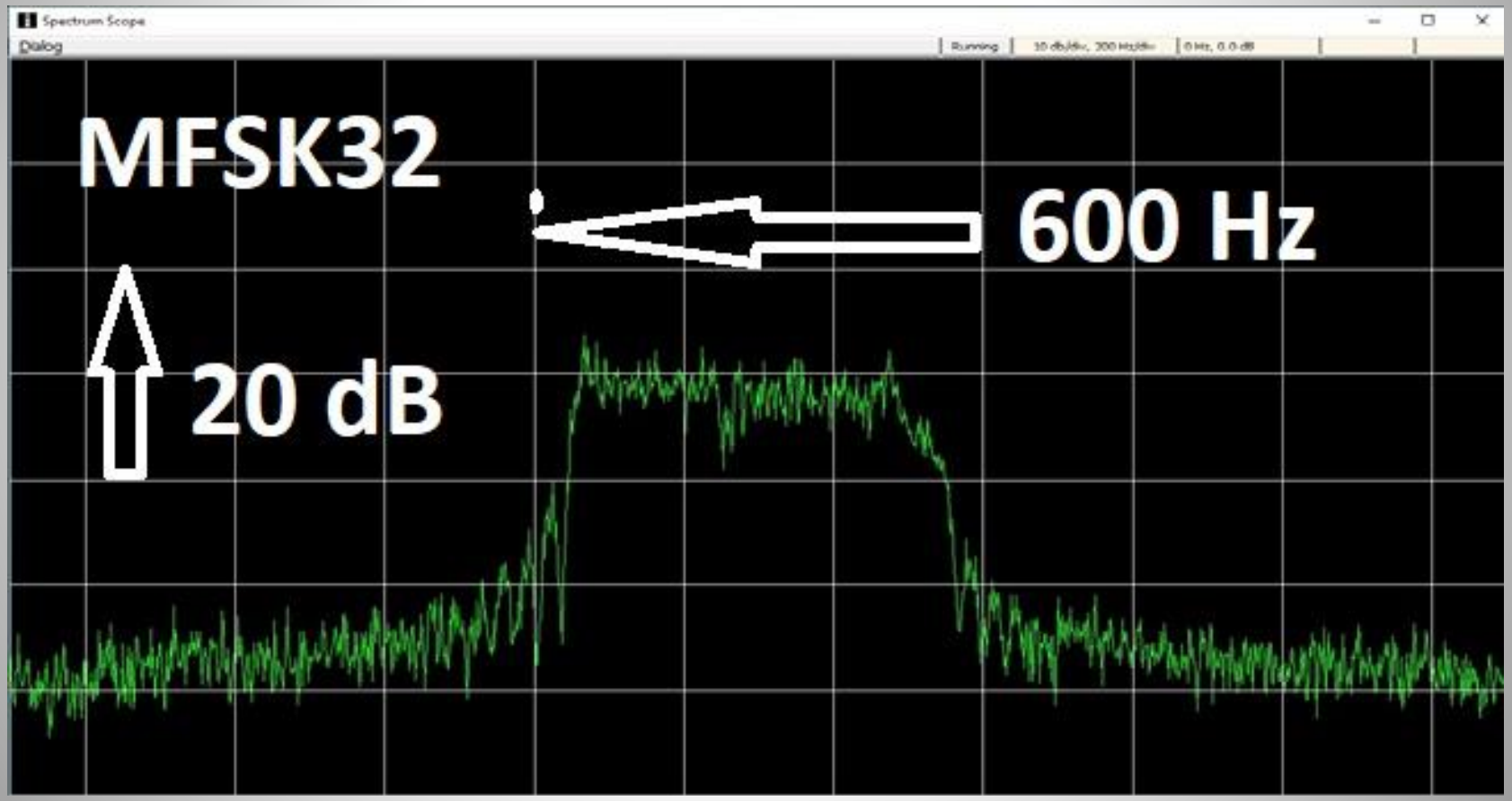
SSB – human voice spectrum (2-3 kHz)



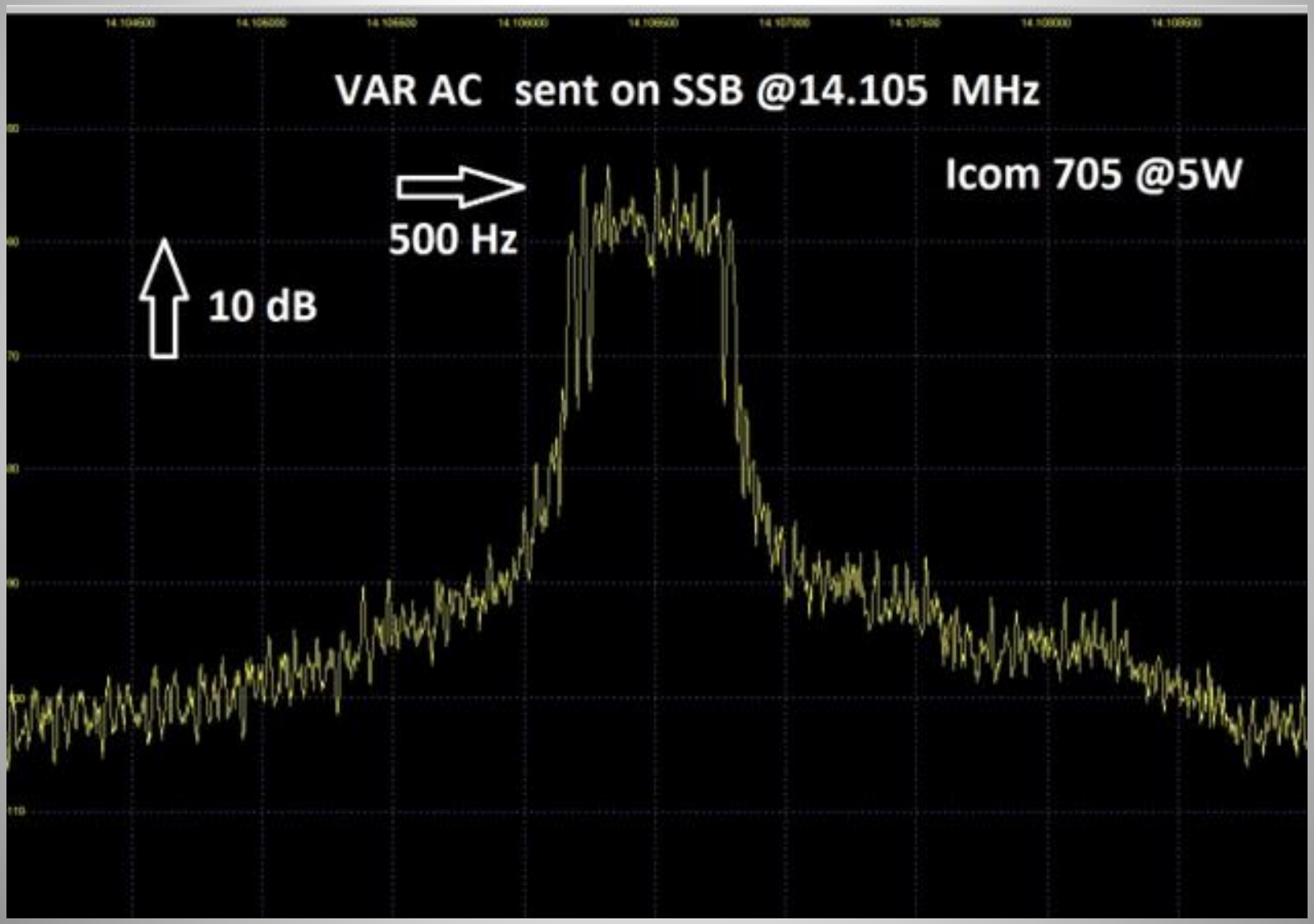
BPSK31 sent by SSB
Efficicient use of spectrum (60 Hz BW)
but too slow 50 wpm for EMCOMM



MFSK32 - 120 wpm, 600 Hz wide
a popular traffic mode on 80m NVIS paths



VARA HF SSB 500 Hz wide



Sound CARD history

How do we inject SOUND
into the radio
to convey a message?

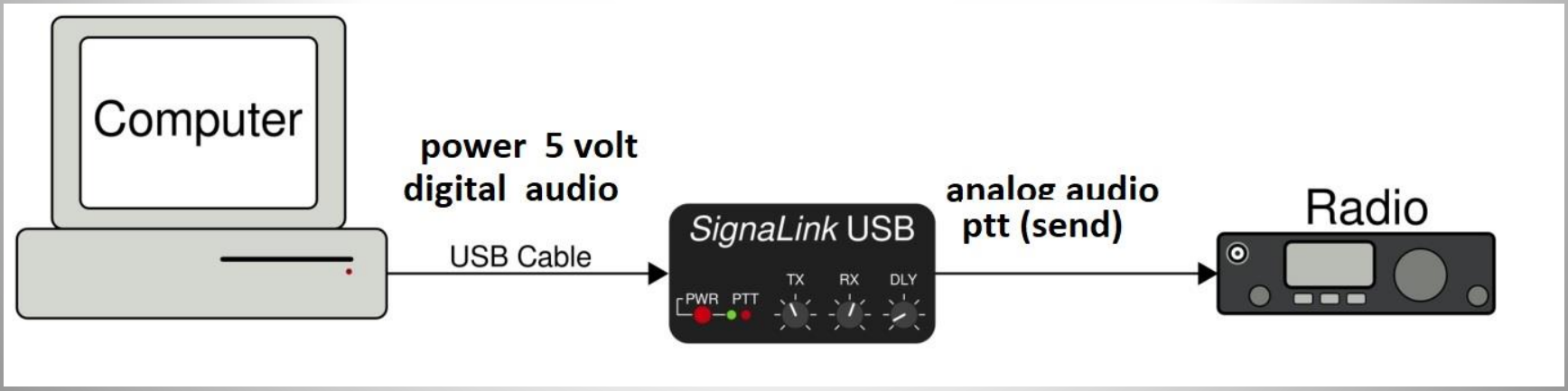
Interface Requirements

Goals: set proper RX and TX levels,
provide a means to SEND (PTT)
avoid RF feedback

Optional Rig Control (CAT)

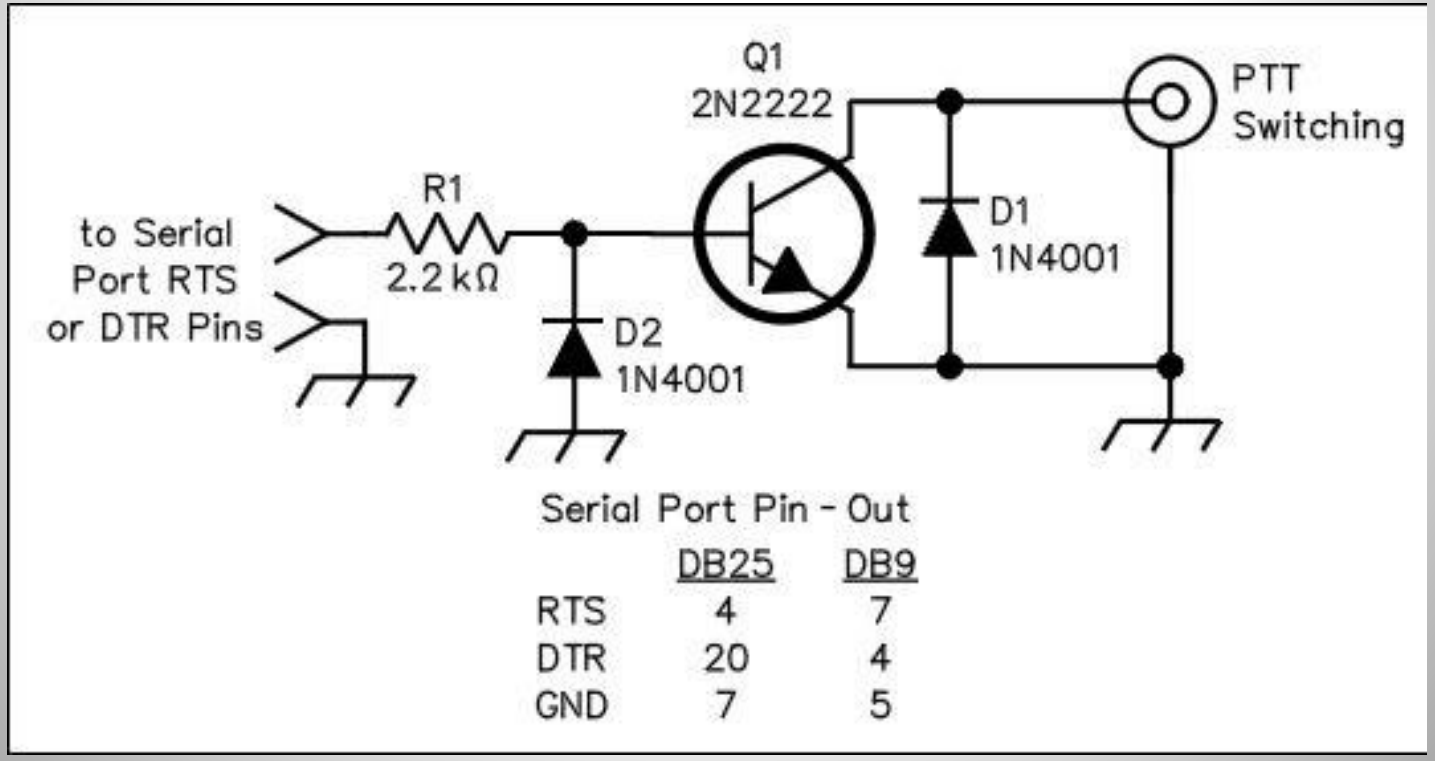
Typical setup with external sound card
digital - usb cable to computer
analog - audio cable to radio

advantage: PTT by VOX (no COM port)



Simple PTT (send) Circuit using a serial **COM port**

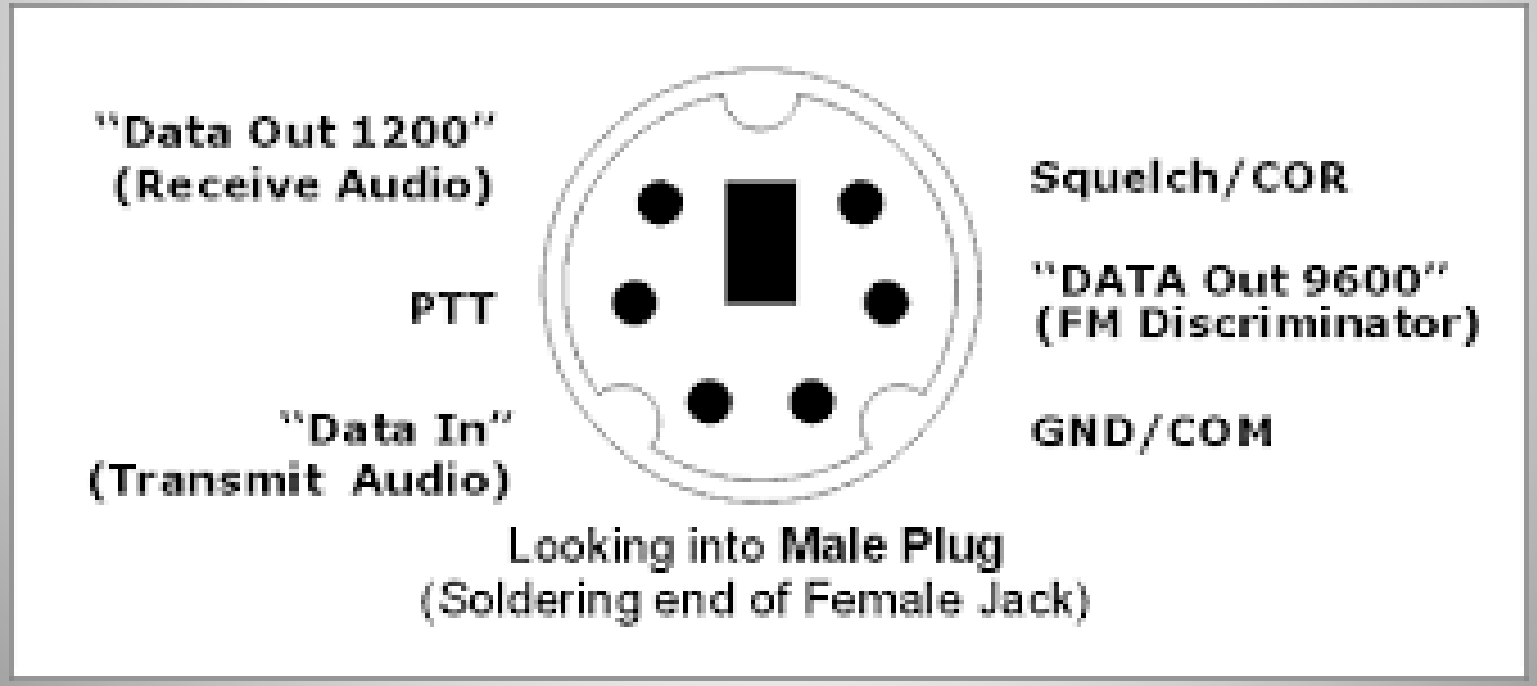
Positive voltage on pins (RTS or DTR) grounds the PTT switching circuit



Serial Port Pin - Out

	DB25	DB9
RTS	4	7
DTR	20	4
GND	7	5

6 pin "MINI-DIN" port
common on all dual-band FM rigs
one TX port
one PTT port
TWO RX ports: 1200 or 9600 baud
9600: FLAT audio
1200: processed audio



Complete Winlink/NBEMS FLDIGI station

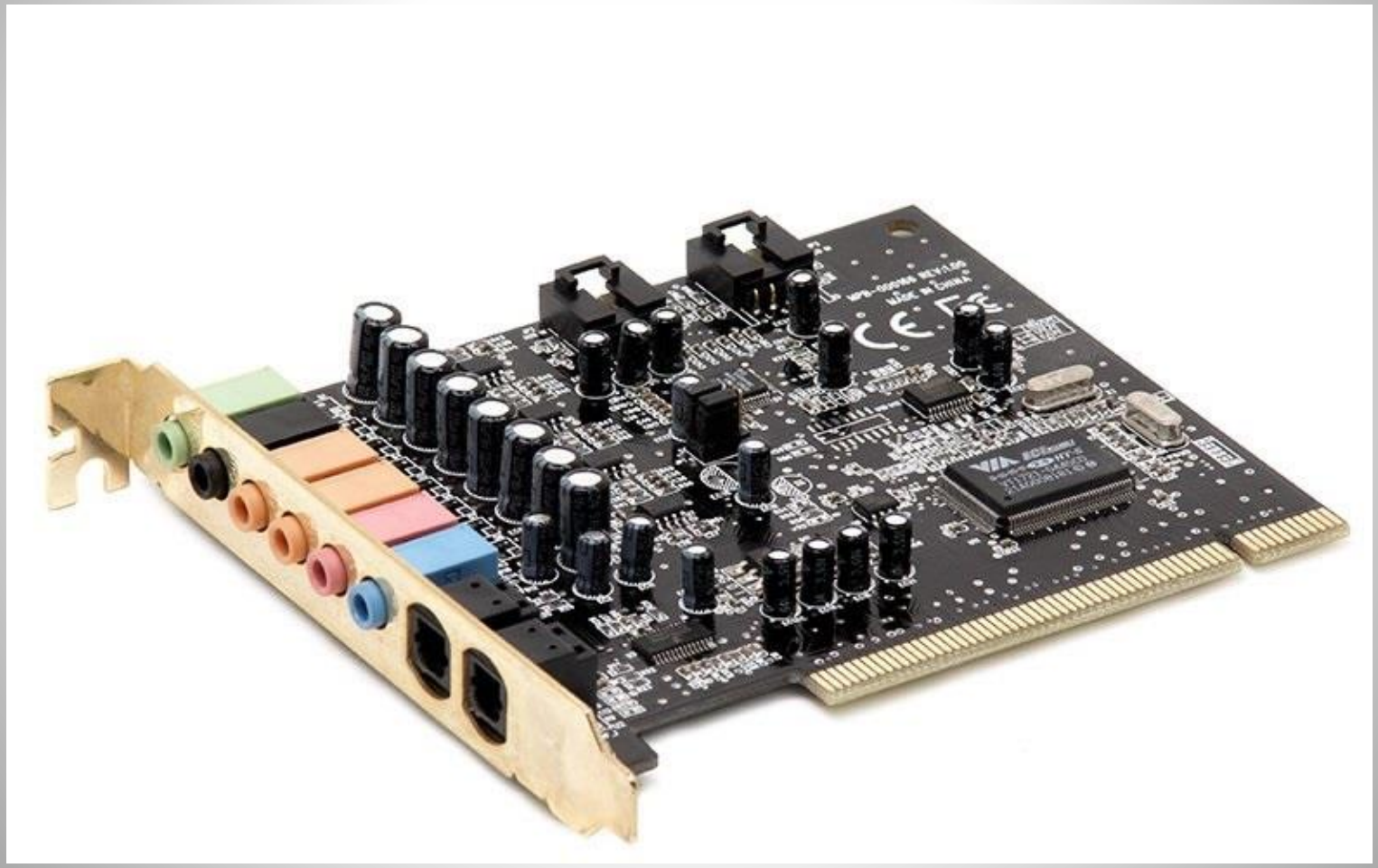
Icom 706MIIG (HF/VHF/UHF) SSB-FM

USB-serial converter COM port PTT and CAT (rig control)

SignaLink usb audio and HF antenna tuner

Pactor III TNC for HF Pactor 3 and VHF PACKET

Sound Cards (for older desktops) 1990's



Tigertronics - SignaLink (no COM port)

USB sound card: power from usb 5 volts
Has its own VOX circuit for PTT and Delay (hang time)
Rx and TX audio level adjustments

SignaLink – rear connections

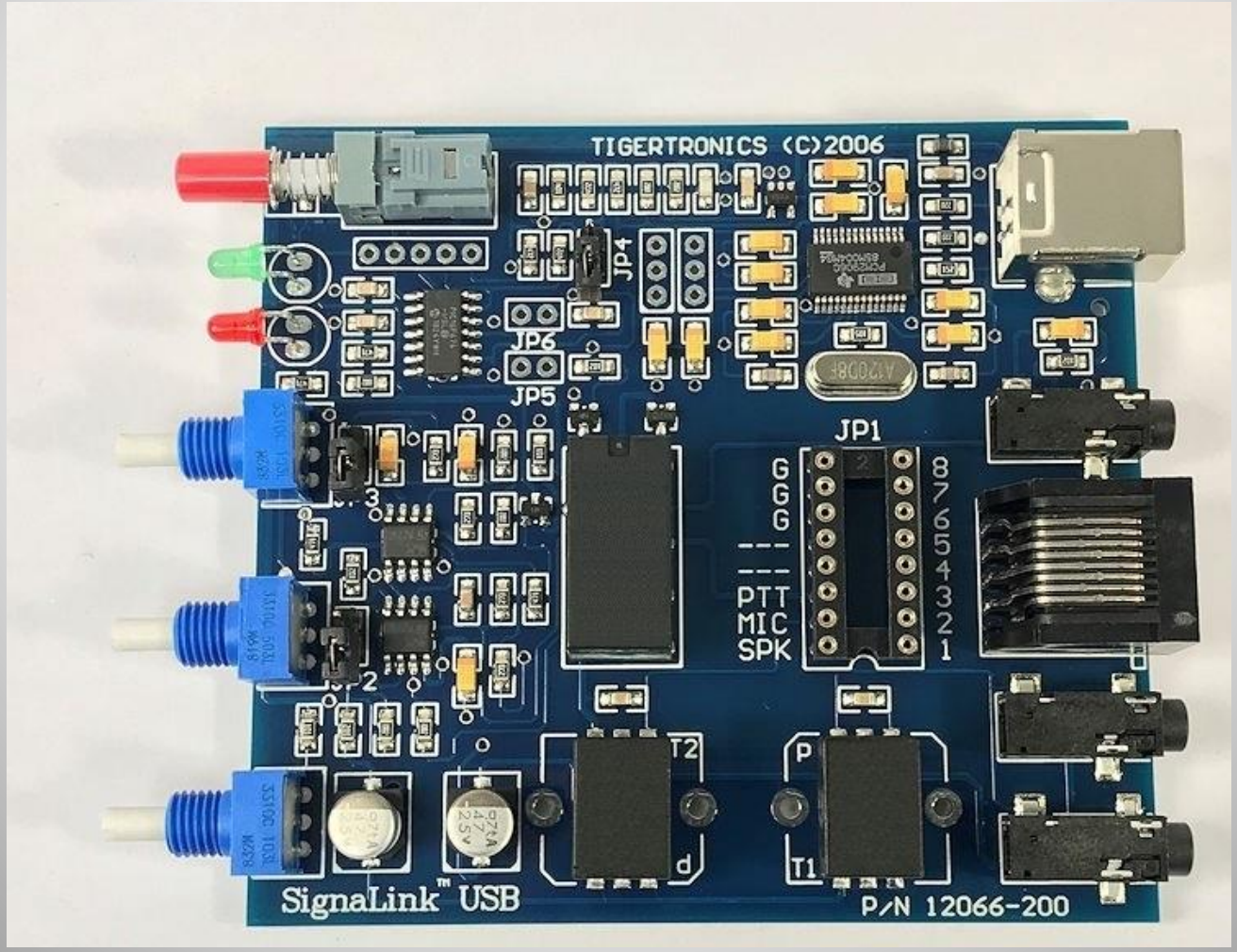
USB power and digital audio to computer

Radio Cable: RJ-45 to specific plug for radio model

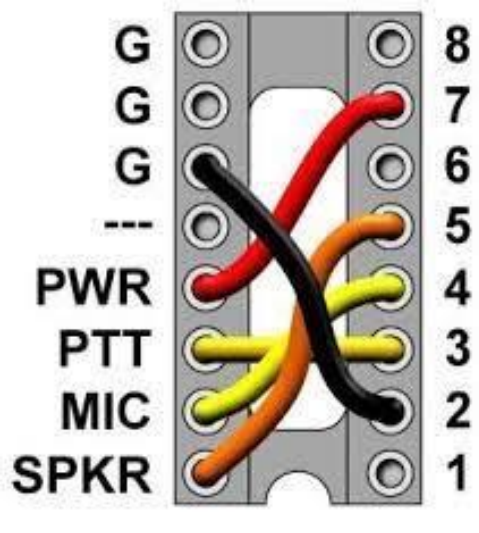
MON jack - listen to your **TX audio** in headphones

SignaLink post 2018

newer transformers – higher audio response range > 3 kHz
better voltage regulation
still MONO only - Tx/RX - Left channel only



SignaLink connects to variety of radios via Jumper block to set function of pins 1-8



Signalink SLCAB13K Cable Diagram			
RB RJ45 Pin		Kenwood ACC2	Function
1	----------	12	TX Audio Gnd
2	----------	8	PTT Gnd
3	----------	4	RX Audio Gnd
4	----------	13	PTT (Mic Active)
5	---///---	NC	
6	----------	9	PTT (Mic Muted)
7	----------	11	TX Audio
8	----------	3	RX Audio

Masters Communications a high-end sound card

USB audio - getting smaller and smaller
MIC input and HEADPHONE output
VOL control, MONO/STEREO

Rigblaster "interface" (needs external sound card)
Transmit: L/R/both channels with isolation transformer
VOX or Com Port for PTT (send)
TX audio plugs into ANY radio's **microphone** jack

Rigblaster "Advantage"

USB based sound card – very low noise

plugs into any MIC /speaker port, or DATA port

1 **COM port** for: PTT, Rig Control, CW keying, FSK RTTY

TX PTT via VOX or COM port (toggle switch)

Individual GAIN knobs: Tx, Rx, VOX hang time

Other popular sound cards

Many modern rigs have built-in sound cards