PVRC Newsletter
January

Newsletter Editor: John K3TN jpescatore@aol.com
Website: http://www.pvrc.org
Meeting Info: http://www.pvrc.org/chapters.htm
Facebook: https://www.facebook.com/groups/PotomacValleyRadioClub/

President's Letter – Bill K3WA

I am overjoyed and somewhat overwhelmed to have been elected as President of the Potomac Valley Radio Club (PVRC) – the premier US contesting club. Thank you for this honor. I look forward to meeting as many of you as I can, as soon as I can.

First of all, I'd like to thank Doug, AA3S for his leadership as PVRC President. He leaves his presidency after leading countless contest wins and major technical improvements.

So, who is K3WA? I was licensed in 1956 at the age of 13. My first call was KN2SLL and then K2SLL. I discovered contesting early in my ham life. I wondered why there were so many stations on the air on select weekends. I didn't want to miss out on the fun. My first "official" contest was the CW sweepstakes in 1962 at the Treasure Island, CA Navy Electronics training school club station, K6NCG. One of my classmates was Ken Clark, one of PVRC co-founder Vic W4KFC's sons.

The next 31 years moved me all over the world. I contested from Alaska, Japan, Greece, Hawaii, and multiple locations on both sides of the USA. What fun! The downside was that I was never able to live in any one place long enough to put up a competitive station.

I retired from the Navy in 1992. In 1994 I found myself in Herndon, VA. I joined PVRC in 2002, soon moved out to West Virginia with enough land to put up towers and actually was able to win some contests for WV and even for the 8th call district.

In 2008 I fully retired and moved to the Mid-West. Bought some land, put up some towers and beverages and totally emersed myself in and enjoyed competitive contesting. I was also very active in the Society of Midwest Contesters (SMC).

Ten years later it became time to downsize. As a result, I chose to return to PVRC-land and moved to North Carolina. The downside was that I wound up in a HoA with only a flagpole for an antenna. The big upside was that I was back and active in PVRC once again. And I'm happy to be here.

I'm the Chairman of the NC Chapter, was PVRC VP for two years, and the secretary for one. Please feel free to reach out to me if you have thoughts on making PVRC even better.

Now, let's put our smiles on, turn on and tune up our stations, find a contest, and have fun!

GO PVRC! 73… Bill K3WA

PVRC Officers:

President:	K3WA	Bill Axlerod
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Newsletter Editor: John K3TN jpescatore@aol.com

PVRC Website: http://www.pvrc.org

PVRC Meeting Info: https://www.pvrc.org/pvrc-chapters/

PVRC on Facebook: https://www.facebook.com/groups/PotomacValleyRadioClub/

Mark Your Calendar: PVRC 2026 Galactic Lunch Zoom – Jerome K8LF

This annual event is the only gathering for all PVRC members worldwide: **Saturday February 7th 2026 12 Noon.** Detailed info will be put out on the PVRC email reflector and the February newsletter.

This year will start with comments from the 2026 PVRC Officers, followed by two great presentations and ending with a PVRC wide round table.

See you all at Galactic Lunch 2026.

73 Jerome K8LF

Bob W3IDT and Family Visit PI4C

In November 2025, my wife, daughters Miriam (“Mim”, K3MIM) and Adriana (“Annie”, “Ani”, K3ANI) and I spent up to three weeks in the Netherlands and Germany for two family ceremonies and some additional side trips.

In the Netherlands, we went to a small museum to see the “Fokker Monument”, a tribute to the roughly 20 Fokker Aircraft Company employees, including my father, who was an aeronautical engineer, killed by the Nazis.

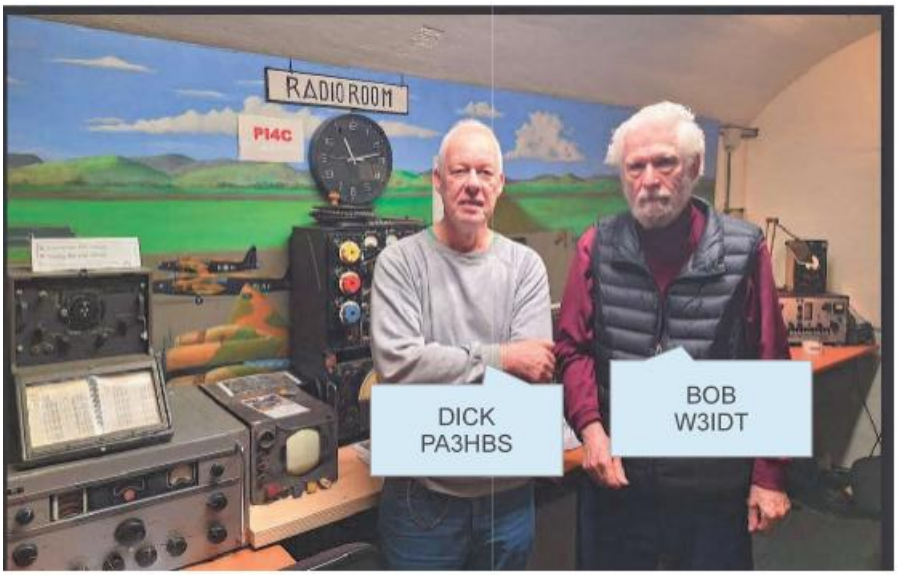
FOKKER MONUMENT

The museum's website does not even mention the Fokker Monument. Once I learned of its existence, it took weeks to locate.

The museum specializes in World War II communications equipment used on Allied aircraft and that used by the Dutch resistance to smuggle crew members from downed Allied aircraft back to England. The director gave us a lengthy personal tour of the museum.

The museum has a “radio room”, an amateur station, PI4C, which is devoted to restoring and using such aircraft communications equipment.

PI4C Radio Room



PI4C Primary Radio

Their current operating activities use a WW2 RAF Wireless Operators table, complete with R1155 receiver and T1154 Transmitter.

This equipment was used in the latter part of the war for long distance Morse-code communications between Bomber Command Group Headquarters and aircraft in the air.

We had a delightful hour or so discussion with Dick, PA3HBS, one of the PI4C operators.

All pictures by K3ANI, who also took a video of their racks of restored and to-be restored World War II communications equipment, shown at the December PVRC Maryland Metro Chapter and the PVRC Northwest meetings.

Revisiting A Simple and Coherent FT8 Solution – Alan WA3EKL

Bob N6TV's article in the December newsletter caught my attention because I thought as he did for a number of years, always asking myself how am I going to be able to transmit to a station sitting at 2950 on my waterfall when my filter was only 2.7KHz or 2700 Hz.

After some testing I found that my transmit power begins to dramatically fall off if I attempt to transmit above 2650 on my waterfall. My receiver has no trouble hearing all the way up to and including 3000 Hz but I cannot transmit there. Then I finally realized I was misinterpreting the meaning of a 2.7KHz wide filter. The filter "does not" filter from zero Hertz to 2700 Hertz. The filter simply has the ability to pass a signal that is 2700 Hz wide. Do you understand the difference?

The numbers you see across your WSJTX waterfall are audio frequencies in Hertz that are being added to some basic RF frequency that is being transmitted. Let us use the common 40 meter FT8 frequency as an example. In your WSJTX setup you can set the bottom of your frequency band; the lowest audio frequency you want to transmit at.

If I set my lower bandwidth to 200 Hz then I cannot transmit at 3000 Hz because 200 + 2700 = 2900, the top of my band. If I set the bottom to 400 Hz then 400 + 2700 = 3100 and I will be able to get reasonable power out at 3000 Hz.

I still can hear down to 200 but I won't see the signal on my waterfall because my monitors are not wide enough.

I have found attempting make contacts with stations below 300 and above about 2700 is more difficult than in between these two frequencies because the vast majority of stations who go there believe they will get more contacts, being at the band edges, when in fact their chances are less because everyone's SSB filters are limiting their output power at both ends. I usually set my lower limit to 200 Hz and don't transmit above 2650 Hz or below 300 Hz. Besides if someone is at 3000 Hz or better you should not be transmitting on their frequency anyway. The best chance of getting that station is to transmit between 300 Hz and 500 Hz at the lower end of the band. Ask me why.

Here comes the cat out of the bag. On WSJTx suppose you hold down the CTRL key and put your arrow in the middle of the band and left click. Both red and green goal posts are at the same point in the center of the band at about 1500. Now you call CQ and at the end of transmission when the transceiver goes into receive what happens? At what point on the waterfall numbers does your receiver start listing. Most people think the receiver starts at the bottom of the band and moves from left to right or another way of saying it the receiver starts at the lowest frequency and moves to the highest frequency.

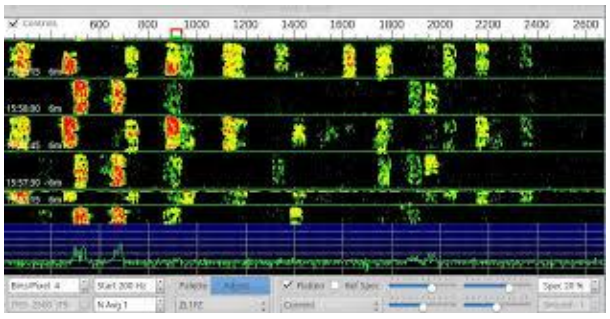
Well, that is not quite correct unless Joe Taylor has changed it from the beginning. Here is what actually happens and this knowledge will net you more contacts especially if you are S&Ping. Whereever the Green Receive Goal post is sitting as soon as the transceiver goes into receive the green gold post moves "one" goal post to its left, then it moves to the right and on to the top of the band, swings around the back of your monitor, and starts at the bottom of the band and continues moving Right, higher in frequency until it gets back to where it started. Ah Ha.

So, if a station is calling CQ in the middle of the band the best chance of getting him is 1 to 4 goal posts above him to the right. The worst place to call him is 1 to 4 goal posts to the left below him, because his receiver is going to go through all the stations above him plus all the stations below him before he gets to you! If the station is near the top of the band, go to the bottom of the band.

One more thing to remember. You don't know how large the window that shows the decoded calls is on the other station's computer. Many times the first decoded call signs scroll off the top of the screen and the station never sees those calls. If you call too close to the bottom of the band you might be one of those calls especially if you have a big signal. That is why I suggested 300 Hz to 500 Hz above.

Now you know our secret. Go PVRC!

73, Alan WA3EKL



2025 ARRL SS – Initial Observations of Text to Speech – Rick N0YY

For those familiar with N1MM and voice keyer integration there are several approaches. First is the creation of .wav files that are then embedded in the Function Keys for message and response generation. Second is using macros (embedded computer commands) to access the messages held in a radios voice keyer message files. (In the case of the K4 there are 8 storable messages.) And there is an evolving third approach. Using a process called Text-to-Speech (TTS) where you can type callsigns, words, numbers, etc. and the computer will "voice" them with a trained voice.

Voice keyers are not new. Creating .wav files to voice contest exchanges has been around for years. But the issue was that you needed to voice unique .wav files for each contest exchange. Voicing callsigns and serial numbers were a bit cumbersome to ensure that character spacing "sounded" right for the information being exchanged.

Several text-to-speech platforms have been built by individuals for their personal use very successfully. They had their voices cloned using third-party AI services. These intrepid designers developed large libraries of callsigns based on Super Check Partial callsign databases. They developed bulk processing algorithms to trim spacings between characters to make natural sounding responses for contest exchanges. But much of that was not ready for individual use.

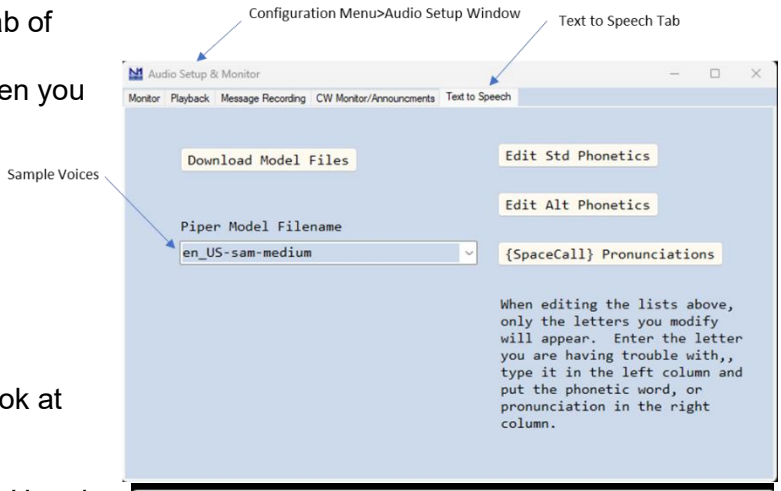
The thing that caught my attention was that N1MM had embedded an application description that allowed a user to create a text-to-speech utility for contest exchanges. Piper TTS was introduced by Kari, OH2XX with some early work that yielded very good sounding audio clips for contest use. That generated a lot of interest by the N1MM users and as it matured a team of users worked together to put together a "how-to" set of instructions for using the Piper TTS model for contest exchanges.

The application notes developed are surprisingly easy to download and begin the learning process of how text-to-speech can be used for voice contest exchanges. The application is downloaded and 27+ trained voices, that are selectable, are used to generate contest messages accessed by the Function Keys. The text-to-speech process creates .wav files "on the fly" as opposed to the previous process which creating a library of pre-designed .wav files that were then used for structured messages for each different contest.

Tom, N1MM and his team of wizards recognized the value of this approach and worked the magic necessary to make it available to the community. A new tab was added to the Audio Setup Window called Text to Speech which provides a detailed description of the required sequence of actions necessary to bring this function to life.

As I prepared for my entry into the 2025 ARRL Sweepstakes SSB I decided now was the time to go beyond canned messages in my radio to support the voicing of callsigns and serial numbers. This was another of my "science project" efforts that was discussed last month.

You start by going to the Configuration tab of N1MM. Then selecting the Audio Setup Window. The screen looks like this. When you select the Text to Speech tab this is the window. Here you see several things:



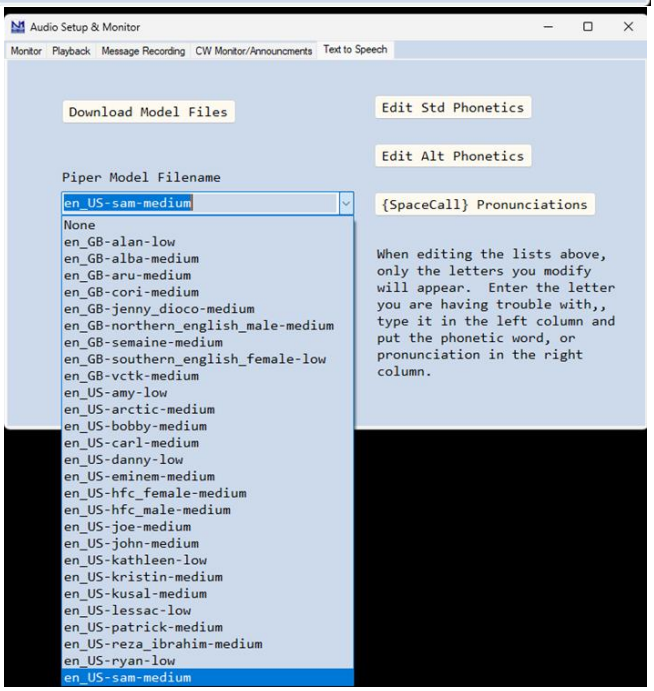
- Download Model Files
- Piper Model Filename
- Editing existing words, phonetics, and establishing custom “words”

I’ll show you some examples when we look at my Function Key implementation.

I mentioned the available trained voices. Here is a list of the voices included in the Piper TTS Filenames.

I chose Sam – the bottom name - for my “experiment.

With that you are ready to start creating your contest exchange messages.



It is important that you read the entire Text-to-Speech section within the Audio Setup Window.

https://n1mmwp.hamdocs.com/setup/audio-setup-window/

There are descriptions of all the variable parameters to tailor the various voice models to your personal preference. It is important to play with the parameters to better understand how “traditional” speech can be tailored to become a “contest exchange”.

Here is an example of my Function Key messages as an example of the macros and other phonetic examples that are adjustable for each individual voice:

```
# ARRL SS SSB Function Key File
#
####################
#   RUN Messages
####################
#
F1 CQ, {TTSPARMS 0.7, 1.0, 0.5} {TTS CQ  Sweep Steaks, Norway ZeeRoh Yankee
Yankee, Norway ZeeRoh Yankee Yankee, Sweep Steaks.} {SPOTME}
F2 Exch, {TTS Numbur.. {SpaceNR}, Uniform, Norway ZeeRoh Yankey Yankey, Six Seven,
??? Vurginya.}
F3 TNX, {TTSPARMS 0.8, 1.0, 0.5} {TTS Thanks, Norway ZeeRoh Yankey Yankey.}
F4 N0YY, {TTSPARMS 0.6, 1.0, 0.5} {TTS Norway ZeeRoh Yehkey Yehkey.}
# Replace "-" with "!" if youare using voicing of callsigns
F5 His Call, {TTSPARMS 0.8, 1.0, 0.5} {TTS {ICAO !}}
F6 Ur Call?, {TTSPARMS 0.8, 1.0, 0.5} {TTS Your call, again.}
F7 QSL/Roger, {TTSPARMS 0.8, 1.0, 0.5} {TTS QSL.}
F8 Agn, {TTSPARMS 0.8, 1.0, 0.5} {TTS Again.}
F9 NR, {TTSParms 1.0} {TTS Numbur. Numbur.}
F10 Prec,{TTS Precident. Precident.}
F11 Check,{TTSParms 1.0} {TTS Chec. Chec.}
F12 Sec,{TTSParms 0.8}{TTS Sekshun. Sekshun.}
#
####################
#   S&P Messages
####################
#
F1 S&&P CQ,{OPERATOR}\Cq.wav
F2 Exch, {TTSPARMS 0.7, 1.0, 0.5} {TTS Numbur.. {SpaceNR}, Uniform, Norway ZeeRoh
Yankey Yankey, Six Seven, ??? Vurginya.}
F3 TNX, {TTSPARMS 0.7, 1.0, 0.5} {TTS Thanks, Norway ZeeRoh Yankey Yankey.}
F4 N0YY, {TTSPARMS 0.7, 1.0, 0.5} {TTS Norway ZeeRoh Yankey Yankey.}
# Replace "-" with "!" if youare using voicing of callsigns
F5 His Call, {TTSPARMS 0.8, 1.0, 0.5} {TTS {ICAO !}}
F6 Ur Call?, {TTSPARMS 0.8, 1.0, 0.5} {TTS Your call, again.}
F7 QSL/Roger, {TTSPARMS 0.8, 1.0, 0.5} {TTS QSL.}
F8 Agn, {TTSPARMS 0.8, 1.0, 0.5} {TTS Again.}
F9 NR, {TTSParms 1.0}{TTS {SpaceNR}. .  {SplitNR}.}
F10 Prec, {TTSPARMS 0.8, 1.0, 0.5} {TTS Uniform. Uniform.}
F11 Check, {TTSPARMS 0.8, 1.0, 0.5} {TTS Six Seven. 67.}
F12 Sec, {TTSPARMS 0.8, 1.0, 0.5} {TTS Vurginya.  Victor Alpha.}
```

A little walk-through is in order. I will assume that most are familiar with how to set up Function Key messages for CW. Once programmed they are part of the Enter-Sends-Message (ESM) keystrokes that exchange messages and log the contact. That is exactly what is happening here. But there are differences, yet those differences are the same kind of differences you do when you program N1MM Function Keys for a RTTY contest!

The first thing you probably notice is that I don't know how to spell or have some other delusion. This is where we all return to our elementary education when we were exposed to phonetics - how we sounded out words so we could read. This is exactly the same – but a bit backward.

First let's consider the goal. This is a contest. We want to exchange information as though we are speaking into a microphone. But there are different dialects, different intonations, etc., that we need to recognize so we can make the Text-to-Speech process create a word the way you would speak it. For example: You want to send a message asking for a repeat of the other station's section. When you type Section into the function key message and play it back does it sound right? Maybe, depending on the voice you chose. For me I needed to find a way for it to sound "more like me". I substituted Sekshun for a "better" sounding conversion of TTS to what I "wanted to hear". Similar with Virginia – it did not sound "right" so I played with phonetic elements to get Vurginya which sounds and flows much better – to MY ears. Remember we are trying to optimize readability and intelligibility of what we chose to "speak". And it will take a lot of tweaking but you want it to be as close to you as possible.

The second thing you notice is all of the {bracketed} items. These are the macros that do the right text-to-speech conversions. Some of them are how fast you want the message to be "said". Too fast and you lose intelligibility and readability, too slow and you are too inefficient in the exchange.

The translator is very smart! Do you want to voice the other station's call as Kay Three Zed Oh or do you want it to be Kilo Three Zulu Oscar. The first is a "simple" response to the letters entered. If you identify it as {TTS {ICAO!}} then you get his call (!) using the ICAO Alphabet – Kilo Three Zulu Oscar. You can spend a lot of time working on all of these details when you set up your Function Keys!!!

What I learned, ***based on my implementation*** of Piper TTS, was it did not fit the high rate of the first hours of SSB Sweepstakes. It was "too slow" for high-rate S&P and insertions. BUT it was outstanding for voicing other station's callsign and serial numbers only a bit too slow. The integration with N1MM was very good. I'm not giving up but want to learn from other user's implementations and how they have improved on my observations.

To be honest, when the Sunday afternoon rates slowed, Piper TTS worked well. I am considering this to be a work in progress. The tug-of-war on priorities is do I do all the tweaking on the parameters of the pre-canned voice I chose or do I bite the bullet and do the voice training for my own voice and then work on the detailed tweaks. This is where I need insight from other implementations. There are valuable lessons to be learned because you could tell that there were many Piper TTS implementations being used in the contest.

Be aware that there are already N1MM instructions for creating a trained voice based on YOUR VOICE! I've not done that yet, but if there is a lull in weekend contests or a house full of family for Thanksgiving and Christmas, I will jump in. But I hope to share observations and findings with other users to help better understand the implementation alternatives.

Text-to-Speech is an important station automation tool. It removes variability from the processes used. The speech cadence is consistent, responses are predictable; both of which are important as you integrate solutions to high performance contesting with operations that include SO2R, 2BSIQ, and others where interleaving voice communications with two or more radios become more predictable and easier to integrate.

The challenge is to find a way to make it sound like you, and not sound robotic, and how you speak as you expand beyond solutions for sounding the same for a 48 hour contest as your voice tires or a tool to be used as you fix a busted exchange while the computer continues to call CQ.

PVRC 160 Meter DXCC Standings – Frank W3LPL

Below are the 160M DXCC totals for PVRC members, transcribed from the ARRL DXCC data as of the 20th of each month or so. Thanks to Frank for the data each month to make this a regular feature. Please report any omissions or errors to Frank.

CALL	DXCC	CALL	DXCC	CALL	DXCC	CALL	DXCC
W8LRL	344	N1LN	223	WA2BCK	151	W4HZ	119
W4DR	339	WS6X	221	N5JB	151	K0GD	115
W4ZV	339	W4NL	214	N3QE	150	K3OSX	114
W3UR	322	W3YY	213	K3TN	149	K5RJ	114
W3LPL	317	N4MM	212	N4GG	145	N3MN	114
K4CIA	306	K3WA	211	N3KK	144	W3MR	114
K4ZW	305	K5RT	209	W3BW	141	KA4RRU	113
N2QT	287	K3JT	207	W4JVN	141	K1KO	112
W4PK	287	K1GG	200	W4VIC	141	W3UL	112
K3SX	286	W3GG	200	W2YE	138	NA1DX	111
K4SO	283	N4DB	192	W4YV	138	N3HBX	110
KG4W	280	K4FJ	192	K5VIP	134	N3IQ	110
K6ND	269	N3OC	182	AA4NC	132	W3XY	110
N3NT	264	K3WC	177	N3MK	131	W3NRJ	108
W3DF	256	K4RG	177	KM3V	131	W4ZYT	108
K5VRX	256	K2PLF	174	N0YY	129	W3KB	107
W3KX	255	K3AJ	174	N3KS	129	N4NW	105
AB3CV	250	W3IP	173	N3RR	129	W3TMZ	104
N1EK	248	W4FQT	172	W0YVA	129	W3EKT	102
WB3AVN	247	N4PY	170	K3XA	128	KN4KL	102
WX4G	243	N4XX	169	W4NF	123	WA3EKL	101
KG7H	242	N4QQ	168	K1BZ	122	KE4S	101
K1HTV	239	K4XD	168	W2GG	121	N3AF	100
W3LL	239	K3KY	166	N3ND	121	K3TZV	100
K5EK	236	K3RA	160	N4TL	121	KC4D	100
K3SWZ	235	NR4M	160	K2BA	120		
K1AR	234	N3RC	156	W4PRO	120		
K4XL	232	N3UA	156	AE3T	119		
W0VTT	226	N8II	153	N4DJ	119		
		W2RS	152				

Membership News – Steve NC4SW

Chapter leaders please remember to complete the Meeting Attendance Report. Members can check and update their roster details via the Roster Lookup.

Upcoming Contests – from WA7BNM

January 2026

+ ARRL RTTY Roundup	1800Z, Jan 3 to 2400Z, Jan 4
+ North American QSO Party, CW	1800Z, Jan 10 to 0559Z, Jan 11
+ Hungarian DX Contest	1200Z, Jan 17 to 1159Z, Jan 18
+ North American QSO Party, SSB	1800Z, Jan 17 to 0559Z, Jan 18
+ ARRL January VHF Contest	1900Z, Jan 17 to 0359Z, Jan 19
+ CQ 160-Meter Contest, CW	2200Z, Jan 23 to 2200Z, Jan 25
+ REF Contest, CW	0600Z, Jan 24 to 1800Z, Jan 25
+ BARTG RTTY Sprint	1200Z, Jan 24 to 1200Z, Jan 25
+ UBA DX Contest, SSB	1300Z, Jan 31 to 1300Z, Feb 1

RED – scores count towards PVRC 5M Awards or Challenge Program

Editor's Last Word – John K3TN

Thanks to N0YY, WA3EKL, K8LF, W3IDT and W3LPL for contributions to this issue of the PVRC newsletter. Happy New Year to all!

The quality and usefulness of the PVRC newsletter depends on contributions from members. If you have photos from club meetings, screenshots of new contest software, or writeups on station improvements or contest war stories, send them in any format to jpescatore at aol dot com.

From the PVRC Treasurer – Ted WA3AER

PVRC has chosen not to implement an annual dues requirement. We depend on the generosity of all our club members to finance our annual budget. In addition, active PVRC members are expected to participate and submit logs for at least two PVRC Club Competition contests per year.

When contemplating your donation to PVRC, each member should consider the benefit you are receiving from PVRC and its many opportunities for your personal growth in our wonderful hobby, then donate accordingly.

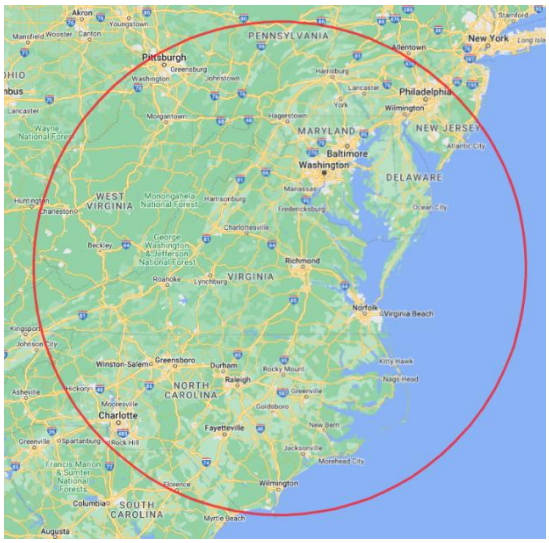
Direct donations to PVRC via Credit Card or PayPal may be made by clicking this "Donate" button and clicking the next Donate button that appears on your screen:

Donate

Donations to PVRC are not tax deductible

Eyeball QSO Directions

The latest info on local club meetings and get togethers will always be sent out on the PVRC reflector and posted on the PVRC web site.



Now a Word From Our Sponsors

PVRC doesn't ask for dues, but the Club does have expenses. You can also support the Club by buying from the firms listed who advertise in the newsletter!

Celebrate the New Year with New Gear!

Depend on DX Engineering for the easiest ordering, the friendliest help from experienced hams, and the industry's fastest shipping of more than 30,000 products.

We're adding items every day! Here are just a few:

- Icom IC-7300MK2: The upgraded model of the beloved IC-7300
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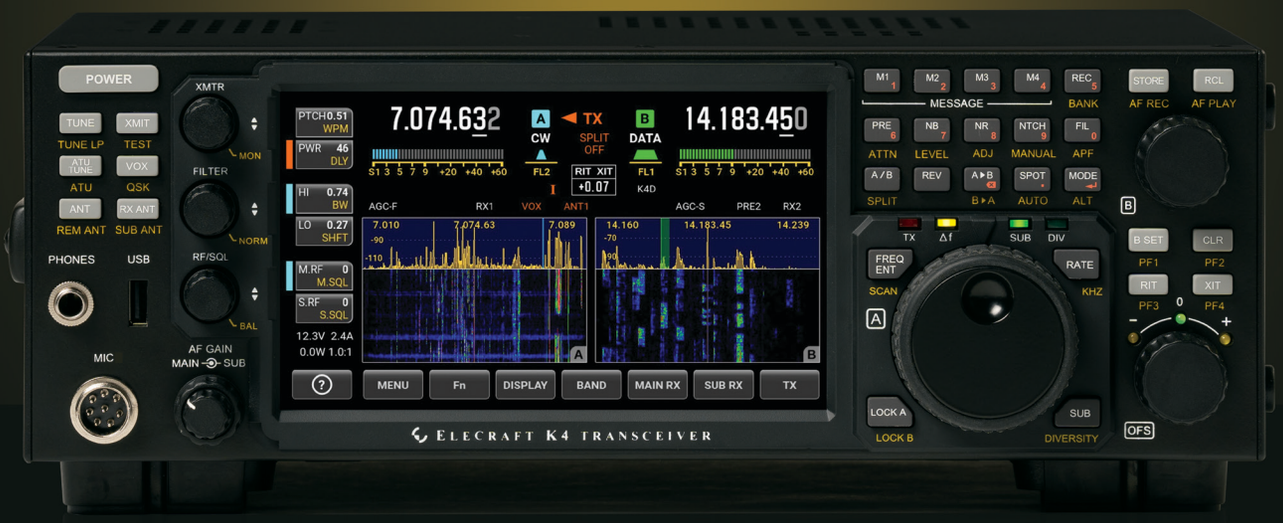
ELECRAFT K4

High-Performance Direct-Sampling SDR



A direct-sampling SDR you'll love to use

Our new K4 transceiver harnesses advanced signal processing while retaining the best aspects of the K3S and P3. It features a 7" touch display, plus a rich set of dedicated controls. Per-VFO transmit metering makes split mode foolproof. Band-stacking registers and per-receiver settings are versatile and intuitive. Control usage information is just one tap away thanks to a built-in help system.

Modular, hybrid architecture adapts to your needs

The basic K4 covers 160-6 m, with dual receive on the same or different bands. The K4D adds diversity receive, with a full set of band-pass filters for the second receiver. (Thanks to direct RF sampling, there's no need for crystal filters in either the K4 or K4D.) The K4HD adds a dual superhet module for extreme-signal environments. Any K4 model can be upgraded to the next level, and future enhancements–such as a planned internal VHF/UHF module–can be added as needed.

Single or dual panadapter, plus a high-resolution tuning aid

The main panadapter can be set up as single or dual. Separate from the main panadapter is our per-receiver *mini-pan* tuning aid, with a resampled bandwidth as narrow as +/- 1 kHz. You can turn it on by tapping either receiver's S-meter or by tapping on a signal of interest, then easily auto-spot or fine tune to the signal.

Comprehensive I/O, plus full remote control

The K4's rear panel includes all the analog and digital I/O you'll ever need. All K-line accessories are supported, including amps, ATUs, and our K-Pod controller. The USB display output supports its own user-specified format. Via Ethernet, the K4 can be 100% remote controlled from a PC, notebook, tablet, or even another K4, with panadapter data included in all remote displays. Work the world from anywhere–in style!

K4 KEY FEATURES

- Optimized for ease of use
- Modular, upgradeable design
- 7" color screen with touch and mouse control
- ATU with 10:1+ range, 3 antenna jacks
- Up to 5 receive antenna sources
- Full remote control via Ethernet

The K4 interfaces seamlessly with the KPA500 and KPA1500 amplifiers

'The performance of their products is only eclipsed by their service and support. Truly amazing!' **Joe - W1GO**

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IC-9700 | *All Mode Tri-Band Transceiver*

• VHF/UHF/1.2GHz • Direct Sampling Now Enters the VHF/UHF Arena • 4.3" Touch Screen Color TFT LCD • Real-Time, High-Speed Spectrum Scope & Waterfall Display • Smooth Satellite Operation

IC-7760 | *HF150MHZ All Mode Transceiver*

• New Design-Remote Control Head & Separate RF Deck • Dual Independent Receivers, Spectrum Scope & Waterfall • 200 Watts Output 100% Duty Cycle • Flexible Remote Operation Capabilities

IC-7300 | *HF/50MHz Transceiver*

• RF Direct Sampling System • New "IP+" Function • Class Leading RMDR and Phase Noise Characteristics • 15 Discrete Band-Pass Filters • Built-In Automatic Antenna Tuner

IC-7610 | *HF/50 MHz All Mode Transceiver*

• Large 7-inch color display with high resolution real-time spectrum scope and waterfall • Independent direct sampling receivers capable of receiving two bands/two modes simultaneously

IC-R8600 | *Wideband SDR Receiver*

10 kHz to 3 GHz Super Wideband Coverage • Real-time Spectrum Scope w/Waterfall Function • Remote Control Function through IP Network or USB Cable • Decodes Digital Incl P25, NXDN™, D-STAR • SD Card Slot for Receiver Recorder

IC-PW2 | *HF-50 MHz 1kW Linear Amplifier*

• 1kW Output Full Duty Single Operator Two Radios (SO2R) • Built-in Automatic Antenna Tuner • Detachable Controller with Touch Screen Display • 2x6 Automatic Antenna Selector - 2 Radio Inputs & 6 Antenna Connections

IC-705 | *HF/50/144/430 MHz All Mode Transceiver*

• RF Direct Sampling • Real-Time Spectrum Scope and Waterfall Display • Large Color Touch Screen • Supports QRP/QRPp • Bluetooth® and Wireless LAN Built-in

IC-7100 | *All Mode Transceiver*

• HF/50/144/430/440 MHz Multi-band, Multi-mode, IF DSP • D-STAR DV Mode (Digital Voice + Data) • Intuitive Touch Screen Interface • Built-in RTTY Functions

IC-2730A | *VHF/UHF Dual Band Transceiver*

• VHF/VHF, UHF/UHF simultaneous receive • 50 watts of output on VHF and UHF • Optional VS-3 Bluetooth® headset • Easy-to-See large white backlight LCD • Controller attachment to the main Unit

ID-5100 AD

VHF/UHF Dual Band Digital Transceiver

• Analog FM/D-Star DV Mode • SD Card Slot for Voice & Data Storage • 50W Output on VHF/UHF Bands • Integrated GPS Receiver • AM Airband Dualwatch

IC-V3500 | *144MHz FM Mobile*

• 65W of Power for Long Range Communications • 4.5 Watts Loud & Clear Audio • Modern White Display & Simple Operation • Weather Channel Receive & Alert Function

ID-50A | *VHF/UHF D-STAR Portable*

• High Visible LCD with Backlight Function • Find Nearby Repeaters with the Built-In GPS • Easy D-STAR Settings for Beginners • Voice Recorder Function • Share Pictures in DV Mode

IC-V86 | *VHF 7W HT*

• 7W OutputPower Plus New Antenna Provides 1.5 Times More Coverage • More Audio, 1500 mW Audio Output • IP54 & MIL-STD 810G–Rugged Design Against Dust & Water • 19 Hours of Long Lasting Battery Life • 200 Memory Channels, 1 Call Channel & 6 Scan Edges

IC-T10 | *Rugged 144/430 MHz Dual Band*

• Disaster Ready - Excellent Fit for Your Emergency Bag • Loud Audio - New Speaker Design • Long Bettery Life - Up to 11 Hours • FM Broadcast & Weather Channels

ID-52A | *VHF/UHF D-STAR Portable*

• Bluetooth® Communication • Simultaneous Reception in V/V, U/U, V/U and DV/DV • Enriched D-STAR® Features Including the Terminal Mode/Access Point Mode • UHF (225~374.995MHz) Air Band Reception

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FTDX101MP | *200W HF/50MHz Transceiver*

• Hybrid SDR Configuration • Unparalleled 70 dB Max. Attenuation VC-Tune • New Generation Scope Display 3DSS • ABI (Active Band Indicator) & MPVD (Multi-Purpose VFO Outer Dial) • PC Remote Control Software to Expand the Operating Range • Includes External Power With Matching Front Speaker

FTDX10 | *HF/50MHz 100 W SDR Transceiver*

• Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz IF Roofing Filters Produce Excellent Shape Factor • 5" Full-Color Touch Panel w/3D Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier w/3-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SCU-LAN10)

FT-991A | *HF/VHF/UHF All Mode Transceiver*

Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 Inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO

FTDX101D | *HF + 6M Transceiver*

• Narrow Band SDR & Direct Sampling SDR • Crystal Roofing Filters Phenomenal Multi-Signal Receiving Characteristics • Unparalleled - 70dB Maximum Attenuation VC-Tune • 15 Separate (HAM 10 + GEN 5) Powerful Band Pass Filters • New Generation Scope Displays 3-Dimensional Spectrum Stream

FT-710 Aess | *HF/50MHz 100W SDR Transceiver*

• Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res 4.3-inch TFT Color Touch Display • AESS: Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner

FT-891 | *HF+50 MHz All Mode Mobile Transceiver*

Stable 100 Watt Output • 32-Bit IF DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to a PC with a Single Cable • CAT Control, PTT/RTTY Control

FT-3185RASP | *Heavy-Duty 85W 2M FM Transceiver*

• Massive Heatsink Ensures Reliable 85W RF Power • Super-DX Function Increases Receiver Sensitivity & Weak Signal Reception • 221 Memory Channels • Large 6-Character Alpha-Numeric Display

FTM-150RASP | *2M/430MHz FM True Dual Band Xcvr*

• Dual Receivers Allowing (V+V, U+U, V+U, U+V) Operation • 55W VHF & 50W UHF • Heavy Duty Heat Sink w/Funnel Air Convection Conductor • Front & Main Body Speaker for 6W High Quality Audio

FTM-510DRASP *C4FM/FM 144/430MHz Dual Band Xcvr*

• New Super-DX & ASP (Audio Digital Signal Processor Unit) • True Dual Bank Receive (V+V/U+U/V+U/U+V) • C4FM/C4FM Digital D-D Dual Receive • 2.4" High-Res Full-Color Touch-Panel Display • Wireless Operation Capability with Optional Bluetooth® Headset

FTX-1 Optima | *HF/50/144/430MHz All Mode SDR Xcvr*

• Detachable Field head For QRP SOTA/POTA Adventures • Attach Field Head to SPA-1 For 100 Watts (Base Operations) • SPA-1 Includes Internal HF Antenna Tuner • SSB, CW, AM, FM and C4FM Digital

FTX-1 Field | *HF/50/144/430MHz All Mode SDR Xcvr*

Compact QRP SOTA/POTA Xcvr (8.4"W, 3.5"H, 2.2"D) • 6W (5W for QRP) • Includes 6400mAh High Capacity Li-ion Battery • SSB, CW, AM, FM and C4FM Digital • 10W of Power w/External Power Supply • Upgradable to 100W with Purchase of SPA-1

FT-70DR *C4FM/FM 144/430MHz Xcvr*

• System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Huge 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging

FT-5DR

C4FM/FM 144/430 MHz Dual Band

• High-Res Full-Color Touch Screen TFT LCD Display • Easy Hands-Free Operation w/Built-In Bluetooth© Unit • Built-In High Precision GPS Antenna • 1200/9600bps APRS Data Communications • Supports Simultaneous C4FM Digital • Micro SD Card Slot

VX-6R | *VHF/UHF Dual Band Hand-Held*

• Big-Radio Features in a Compact Package • Wide-band Receiver Coverage for Catching All the Action! • 900-Channel, 24-Banks Memory System • Outdoor-Ready Features including Waterproof Rating • Smart Search Automatic 31-Channel Scanning/Loading System

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