



# PVRC Newsletter

## April

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Website: <http://www.pvrc.org>

Meeting Info: <http://www.pvrc.org/chapters.htm>

Facebook: <https://www.facebook.com/groups/PotomacValleyRadioClub/>

### President's Letter – Doug AA3S

#### Continuous Improvement – Your Resolutions?

A couple of months ago you may have made a New Year resolution to repair an outdoor antenna when the weather got better, or made a similar promise to yourself about outdoor radio activity (not the roentgen kind).

Guess what?! Spring is here and that better weather is either at your QTH now or will be very shortly.

Time to examine what needs doing, what parts to order from our PVRC Newsletter sponsors, and borrow or buy the special tool that you'll need but won't know that you need 'til you are balanced on a tree limb well above ground level.

Since it is raining a bit here now, I'll do that outdoor stuff tomorrow or on the weekend or... Next month's President's Letter may be on procrastination, if I get around to it.

Enjoy the rest of your Newsletter!

73, Doug AA3S, PVRC President

#### P.S. Compelling Quote (emphasis is mine):

In PVRC Reflector from Don-W4BBT after the CQ WW WPX SSB: "**First time using assisted mode in SSB** and it was like shooting fish in barrel. All Qs were S&P. I saw call signs from places I had never seen before. **Should have done this years ago...**"



**Club Competition Update -Doug AA3S**

Hope you had fun collecting unusual DX prefixes the recent CQ WW WPX SSB contest (5M) and the Virginia QSOp (2 different club competition awards).

There are two State QSO Parties in April that have club competition awards (plaques...) and offer you an opportunity to keep that award and to be world famous. OK, 'world famous' may be a stretch, but see the February PVRC Newsletter page 3 for more on the State QSO party awards and who gets to keep them if PVRC wins

:

**Georgia QSOp** (April 8 & 9) - 1 point SSB, 2 points CW (once per band per mode), you (non-Georgia) send RS(T) and State, your multipliers are the 159(!) Georgia counties **once per mode**, so your score will be much higher if you do well in SSB and CW (318 possible multipliers!). Rules [here](#), the Georgia website says: "*Note: a MINIMUM of 50 contacts in your log is required to be eligible to win a plaque*". Spotting assistance and SELF-SPOTTING is allowed in all entry categories. You could try running with your self-spot indicating you're out-of-state or calling GA only...)

**Michigan QSOp** (April 15-16) – 1 point SSB, 2 points CW (once per band per mode), you (non-Michigan) send RS(T) and State, your multipliers are the 83 Michigan counties **once per mode**, so your score will be much higher if you do well in SSB and CW. Self-spotting is NOT permitted so consider spotting all Georgia stations you find to increase the enjoyment for all. Rules [here](#).

Be sure to specify your club in your log submission, the sponsor's log submission process may have a pull-down menu for that. Read the rules for every contest even if you think you know them from last year since there may be year-to-year changes.

Hear you in the contests!

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**Flashback Friday: Annapolis Chapter Meeting 2017 – Dan K2YWE**



Left side front to back: KG4USN, K3LU, KD4D (standing) W3YOZ (SK), W3UL, K3ZO (SK)  
Right Side front to back: K000, K3NDM (SK), K0ARR, K0GD, UNK, UNK

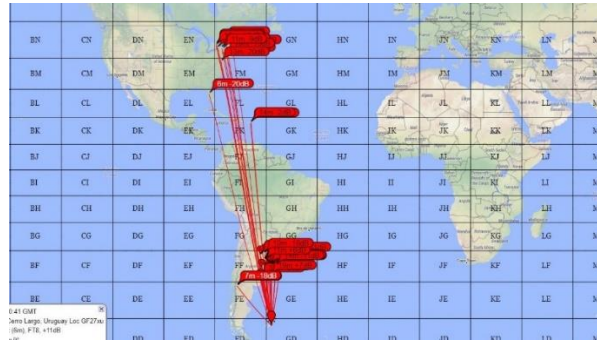
The picture above is from the October 2017 Annapolis chapter meeting. It's significant because three members in the picture have moved to the SK chapter since then: Marty W3YOZ, Barry K3NDM, and most recently Fred K3ZO. We had a moment of silence at our February meeting to fondly remember them. Three others have moved out West but still stay in touch - Rick W2GPS (now K0GD), Elaine N3HMM (now K0ARR), and Pat K000.

**Blue Ridge Chapter March Meeting at Smokin' Willies**



L-R: Mike W3IP, Mike W4RN, Paul K6PS (guest), Tom NC3Y, Dave KE4S, John N4MM, Rick N1RM (standing), Dick N4RA, Pete N4ZR's arms. (K3TN photo)

## Magic Band Bonanza Begins – Frank W3LPL (from the PVRC reflector)



Anyone paying attention to 6 meters recently has noticed unusually frequent 6-meter DX for this time of year. This morning's opening from the mid-Atlantic and New England to the Falklands Islands is just one of many recent reports.

Like many - but not all - above-the-MUF 6-meter propagation reports, the openings are often brief but much more frequent than in recent years because of increased MUFs as we rapidly approach Solar Cycle 25 solar maximum next year.

As we approach Spring - especially from late-April through most of May - enhanced F2 openings will become increasingly frequent and long lasting.

There are increasingly frequent reports of QSOs from various U.S. locations to far distant locations in Australia, New Zealand, New Caledonia, Japan, the countries in southern cone of South America, the Canary Islands and the countries of west Africa, Reunion Island, Mauritius, Rodrigues Island, and many others.

In almost every case, above-the-MUF F2 propagation results from significantly enhanced ionization in the Equatorial Ionization Anomalies located 700 to 1400 miles north and south of the geomagnetic equator.

Only the most southerly U.S. locations (south Florida, south Texas and southern Arizona and far southern California) can propagate directly into the northern Equatorial Ionization Anomaly, the rest of us need a strategically placed sporadic-E ionization patch or rare above-the-MUF F2 enhancement at more northerly latitudes.

The attached map from PSK reporter shows reflections from sporadic-E ionization patches in Florida and the Caribbean and another sporadic-E ionization patch over Argentina that made today's 6 meter opening to the Falkland Islands possible.

K6MIO's classic article "F-Region Propagation and the Equatorial Ionospheric Anomaly" -- available on the World Wide Web -- describes multiple forms of above-the-MUF 6-meter propagation involving enhanced F2 propagation at the Equatorial Ionization Anomalies. Jim's article begins on page 66.

Give 6 meters a try, almost every modern HF transceiver covers 6 meters. A simple indoor or outdoor dipole only 25 feet high or a tuner driving your existing HF antenna will give you a taste of enhanced 6-meter F2 propagation as we approach solar maximum.



## Thoughts on Improving Logging Accuracy – John K3TN

The three biggest factors in maximizing your contest score are operating skills, Butt in Chair time and station quality/reliability. The winners of major contests usually invest time, money in energy in all three; the top 10 or 20 are usually focused on at least two of three.

Over my contesting career, I've almost never hit the time limit in any contest (beyond 4-hour Sprints) and I've never once put up a tower or even more than 2 wires at a time. My top skill is apparently laziness!

To put that more positively, the part about ham radio I really like is operating. I like making QSOs whether contesting, DXing, rag chewing or just working weird callsigns. Actually, I'm kind of the same way with my other major hobby, bicycling. I really just like the part where I'm on the bike turning the pedals, making the scenery move around me. I like to do it efficiently, but I'm not winning any races or tinkering with my bikes a lot.

So, I tend to focus on that first factor, optimizing skills. One skill area in contesting is logging accuracy. This wasn't much of a score factor back in the paper log days but when contest sponsors started accepting logs on floppy disks, Log Checking (LCR) and Unique Busted NIL (UBN) reports and score reductions for busted calls/exchanges or phantom log entries became the norm.

Without trying too hard, you should be able to reduce your score reduction down to 4-5% or lower (below 2% is my goal). If you are already close to that, going much lower isn't going to help you that much competitively but it is a point of pride, and dupes from calls you thought you worked, but really didn't, can also slow you down later in the contest.

In the July/August 2019 NCJ, Doug K1DG wrote the definitive article on accuracy, where he listened to his contest recording for every bust or Not In Log (NIL) – see [“What You Can Learn From Your Log Checking Report.”](#) I won't duplicate Doug's excellent words of wisdom but here are some thoughts on reducing score reduction by increasing accuracy.

NILs are usually the most damaging inaccuracy, as in many contests you lose both the NIL QSO and penalty points worth an additional QSO. Many (seems like close to half) NILs are unavoidable –errors by the station on the other end of the QSO that you have no control over resulted in nothing even close to your call getting logged or they didn't log anything.

Three types of NILs **are** avoidable:

- You are S&Ping, jump on a spot that is a busted call and don't wait for an ID or don't notice their ID does not match the spot. They work you, you log the wrong call.
- You are S&Ping and you were not 100% sure the running station came back to you but the timing of responses line up and you log it without asking for a repeat. They log W9RE, not K3TN, because they worked W9RE and not K3TN
- You are running and someone you work asks for a repeat that you don't catch or just ignore. They don't log the QSO because they aren't sure they worked you.

In all cases, you basically chose rate over accuracy, since there are usually audible and visual cues that should trigger you asking for a check on the callsign of the other station. Asking for fills or hanging around to listen to the next QSO when S&Ping reduces rate a bit but also avoids NILs and busted calls/exchanges.

One way to make hanging around to listen the next QSO less painful: have a function key programmed that copies VFO A to VFO B and turns on stereo listening. Keep S&Ping on VFO A and listen to the running station on VFO B until you verify or correct the call/exchange. Turn stereo off (~ in N1MM) when done.

A few other hints, beyond focusing on listening to what the other op actually sends:

- Get your filters set up to maximize the tradeoff between QRM reduction and intelligibility. This is a very personal choice, experiment in operating events like the weekly CWOps CWTs on CW. Look [here](#) for hints on SSB audio setup from PJ2T.
- Practice, practice, practice – Morserunner is a fun way to keep your code speed up, and it uses real callsigns. But...
- Only send as fast as you are prepared to receive. And...
- Don't be embarrassed to ask for fills!
- Keep your Super Check Partial database up to date, learn how to use N1MM's [Check Window](#) and keep it visible in your logging eyeline.
- **Don't trust spots!** Always wait for the call or start sending CL?
- **Really, don't trust spots** – read the March newsletter article on the NOT SKIMBUSTED telnet filter.
- **Don't trust history files!** If you must use them, always log what you hear.

In the 2015 ARRL DX CW, we did a remote multi-multi from K4VV in VA using my call, and made over 4100 QSOs. Because the history files said K3TN is in MD, over 75 DX stations logged our exchange as MD, even though we sent VA. That included many top 10 calls who lost the Q.

- Keep an eye on the bottom of the N1MM Log window. N1MM will highlight calls that didn't show up in the Check Partial database, and in multi-band contests with fixed exchanges, highlight where you logged different exchanges – like 100 on one band and KW on another. You can fix those on the fly or during a break as long as the contest clock is still running.

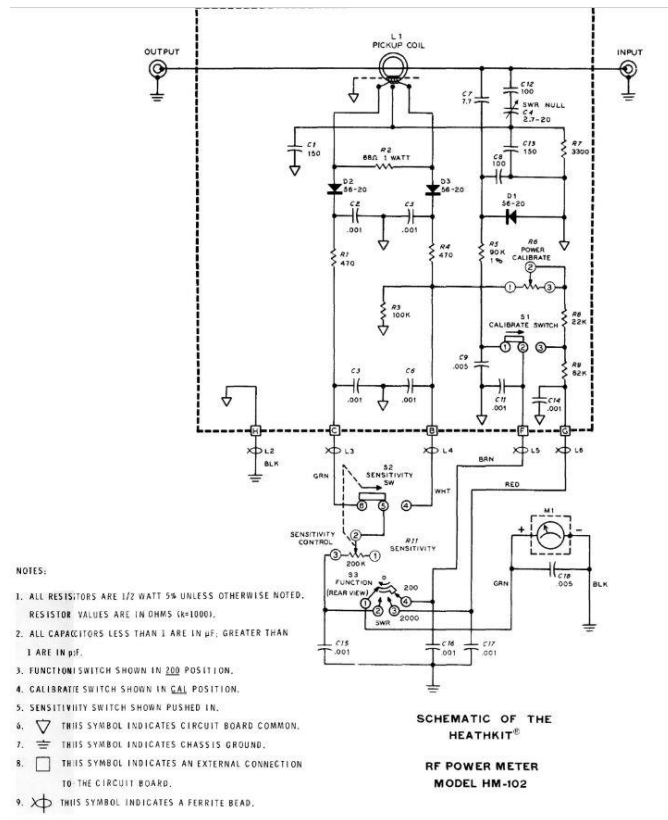
Improving your accuracy may not be the biggest factor in your total score, but it doesn't cost any money and it could be the difference between making the top ten in your category -with the added bonus of maybe seeing your call listed under "Golden Logs!"



Repairing HM-102/HM-2140s; Interfacing CM-500s – Alan WA3EKL

Hello PVRC: Whenever you see something written by me it is because I have learned something or discovered something that I would like to share with all of you. My over all intent is to make this marvelous hobby of ours more enjoyable for all of us. With that said I have two offerings for you.

First is the Heathkit HM-102 “single meter” and the HM-2140 “dual meter” power/SWR meters. These old but robust power/SWR meters over time become inoperative because one or all three diodes go bad on their circuit boards. I have a number of these meters and have repaired my HM-102’s and other hams’ several times. Many years ago, the process was simple. You just changed out the 1N295 diodes and recalibrated the unit per Heathkit instructions. However, in time the 1N295 diodes became obsolete and were no longer produced. If you find the 1N295 then someone is substituting another diode with similar specifications and calling it a 1N295.



We now have a problem. A 1N295 is a “germanium” diode. It has a normal voltage drop across it of 0.3 volts because it is germanium material. Silicon on the other hand has a 0.65 to 0.7 volt drop across it. If you replace the 1N295 with a silicon diode of similar specifications, you can expect your Heathkit Watt meter to read about two thirds of the power of what is actually going through it. Plus, you will not be able to accurately calibrate the meter on both scales and you will run out of adjustment on the higher scale. Hold on to your chair I am not done with the bad news yet, but I have the solution!

NTE109 germanium diodes which were made many years ago are an excellent replacement for the 1N295. I have three that are about 20 to 30 years old in the original packages, never opened, and they all measured 0.3 voltage drop across them. The new NTE109's measure 0.65 volts because they are Silicon diodes not Germanium.

I specifically ordered from an Amazon site some 1N60's which have similar but better specifications than the 1N295 and the site said, "germanium diodes." The 1N60 spec sheets say germanium diode. The site sent me NTE109 substitutes which I sent back and asked for a refund. The site then again sent out the NTE109's. This time I tested one and found the site lied, these were indeed silicon diodes not germanium and I returned them for a refund and got it.

I ordered from another site the 1N60 which in the reviews one person said it was silicon diode not germanium. I tested these diodes which had no markings on them and they tested 0.68 volts; once again silicon diodes. I attempted to return and request a refund and received immediately "your refund is on the way, no need to return the parts." They knew they were false advertising. There are some sites repackaging Schottky diodes which have a 0.2 voltage drop and selling them as 1N34A's or 1N60's.

I called NET and had a great discussion with one of their representatives. The representative said "all germanium diodes were being phased out because the makers of diodes were no longer making germanium diodes, everything was going to silicon. NTE only has two germanium type diodes left." I asked if the 1N270 was one of them. She looked it up and assured me it was germanium. I bought several backups of the 1N270. Guess what; **silicon** again, even though the diode is clearly marked 1N270 on it!

You can find 1N34A, 1N60, and 1N270 all over the internet, especially on Amazon. However, DigiKey and Mouser do not stock these diodes because they consider them obsolete. Don't bother writing to the company that DigiKey gets these diodes from for a quote. I asked them for a quote on the 1N34A and they quoted me a minimal order of 50 diodes at \$5.00 apiece. I thanked them and told them I could find the same diode, 1N34A, quantity of 50 for \$6.95.

The bottom line is you are not going to find germanium diodes anymore. So how do we repair the two above mentioned PWR/SWR meters, so they are still accurate with silicon diodes in them?

I recently repaired an HM-102 and finally found a very easy fix. The HM-102 manual does a very good job of explaining the circuit of the SWR part of the meter. It does a poor job of explaining the power meter circuit. Plus, the schematic of the calibrate switch is confusing. Look at the HM-102 schematic I have provided. On the schematic the calibration switch S1 has terminals 1, 2, 3 with a shorting bar across terminals 1, 2 and the word "calibration switch" above it. Plus, there is an arrow pointing right which would lead you to believe the cal position is to the right or the shorting bar should go between terminals 2 and 3 in the calibration mode. That is totally wrong. When the shorting bar is between 2 and 3 that is the "Normal" position not Calibrate. The switch as shown in the schematic is actually in the calibrate position.



The signal path for the power meter is as follows. The RF voltage that is produced in the pickup coil comes down through D3 and is rectified to DC. It then goes through R4 - 470 ohms, across to and through variable resistor R6, then through R8 - 22k, to R9 - 82K, then finally to the 2000-watt terminal of the Function switch S3. Now back up to the intersection of R8 and R9. That intersection goes through the Normal/Calibrate switch S1 when S1 is in the "normal" position and then to the 200 watt position of the function switch S1. The wiper of S1 goes through the meter to ground.

Therefore we have two voltage divider strings.

- The 2000 watt string consists of; R4, R6, R8, R9 and the meter to ground with R3 - 100k in parallel with the string R6, R8, R9 and the meter to ground.
- The 200 watt string consists of R4, R6, R8 and the meter to ground with R3 - 100k in parallel with the string R6, R8 and the meter to ground.

R6 the variable resistor can affect the calibration of both strings. However, R9 can only affect the calibration of the 2000 watt scale. **R9 is the resistor you need to change** when installing the new silicon diodes. Don't change anything else.

I had ordered the 1N270 directly from NTE Parts direct. They will take orders over the phone. By using the NTE 1N270 I had to replace R9 - 82k ohm resistor with a 51K ohm ½ watt resistor.

I found this value with the following procedure. After you have replaced the diodes, first follow Heathkit's instructions for calibrating the SWR portion of the meter. This is very important and needs to be accurate. Then the power calibration procedure by Heathkit tells you to switch between calibrate and the normal in the 200 watt position and adjust R6 so that both readings are the same. **That will not work; do not touch R6 yet.**

What I did was feed 100 watts that I knew was accurate from my transceiver through the meter to a good 50-ohm dummy load. Then I switched between the 200-watt and 2000-watt positions on the function meter and adjusted R6 until the power reading was the same on both scales. It was somewhere around 70 watts. I didn't care what the value was, only that the value was reading the same on both scales. Then I left the function switch in the 2000 watt position and began reducing the value of R9 until the meter read a true 100 watts on the 2000 watt scale. The magic resistance was 51k. Then I did the Heathkit power calibration procedure, and it was already almost exactly perfect. R6 was a whisker off.

If one of you wants to try to fix one of your or someone else's meter just remove R9, put everything back together except the cover on the main box and solder the new resistor on the land side of the board which is facing you. When you find the correct value for your meter don't bother re soldering it back on the underside. Just put the top on and make sure the calibration is still true and have fun with your new meter. You will probably find it will be very close to 51k ohms if you use the 1N270 diodes from NTE Parts Direct [here](#).

If you need a 51K ½ watt resistor, email me direct.

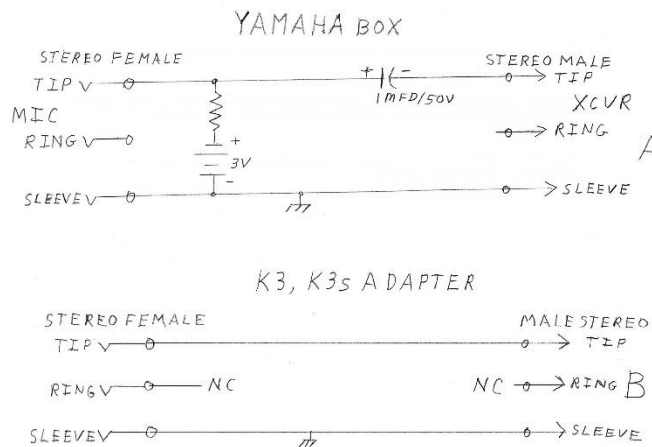
Next the Yamaha CM500 Headsets.

The Yamaha CM500 has gotten some attention lately since we now have a source for their purchase. I have already written some information about them. These excellent headsets have dynamic mics and need a bias or a power source. That source can come from batteries or from your transceiver if your transceiver provides it. The CM500 dynamic mic has a coil in it which required a voltage across it. The Yamaha CM500 uses a stereo male plug on the end of its mic cable. One end of the mic coil is tied to the sleeve or ground of the stereo male plug. The other end of the coil is connected to the “tip” **and** the “ring” of the male plug.

Originally Yamaha provided a small dual AAA battery power pack with the Yamaha CM 500 headsets. That battery pack is no longer offered. Look at the Yamaha schematic and see the Yamaha battery pack box which is easily constructed. Look carefully at the schematic and notice that the ring on both the female and male connectors is not connected to anything. This is why the box works on our radios with or without bias.

However, if you plug the CM500 directly into the back of the K3 mic socket (which is a mono female connector) the mic does not work even if you turn on the bias. The same thing happens if you use an adapter which came with your Heil headsets for a K3 which plugs into the front mic connector. The CM500 does not work because the female inline plug on the adapter like the back of the K3 shorts the “ring” of the CM500 male plug to ground, which is connected to the tip which goes to one end of the coil. Wasn't that smart of Yamaha so you would have to use their battery pack!! But you can easily get around using the battery pack if your transceiver provides mic bias. Look at the Yamaha adapter schematic.

If your transceiver provides mic bias like the K3 or K3s then all you need to do is build an adapter cable between the CM500 and the K3 mic input. See K3 ,K3s adapter schematic. The adapter just takes male and female inline stereo plugs.



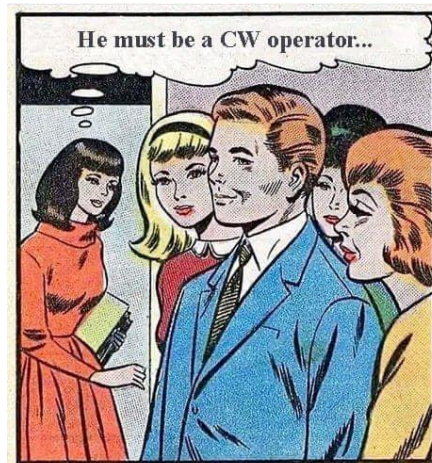
I have an IC9700. It does not provide mic bias and I don't think the IC7300 does either. With the CM500 headset I have to plug the CM500 into the battery pack, then plug the battery pack into my adapter, then plug the adapter into the IC9700 in order to get audio into the IC970 circuits. I haven't looked at the IC9700 schematic to figure that one out yet!!

In addition, my ops and I have had an issue with our breath keying the VOX as have others when using the CM500. Most ops just move the mic farther away from their faces to eliminate the problem. This however reduces the effective superior audio quality or communications effectiveness of the mic. You want the mic close to your mouth so it can precisely reproduce all of your voice for the best clarity. I found the solution!!

Remove the foam wind shield and on the back side of the mic you will find 5 small holes. These holes are what is causing the breath issue. Just cover the holes with a small piece of Scotch 33 black tape and replace the wind shield. Problem solved and you will sound a whole lot better with more punch!

I hope the PWR/SWR meter and CM500 information will help some of you out there.

### The Benefits of Mastering CW – From CW Ops Facebook



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## PVRC DXCC Challenge Standings – Frank W3LPL

Below are the DXCC Challenge totals for PVRC members, transcribed from the ARRL [DXCC data](#) as of the 20<sup>th</sup> 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
W4DR	3200	N4TL	2553	W0YVA	2001	W3US	1506
W3UR	3176	W3BW	2550	K3SX	2000	KU1T	1501
W3LPL	3167	N4QQ	2541	K5RJ	1961	N4ZR	1496
K4CIA	3131	K5VIP	2506	N3KS	1906	N3AIU	1487
N2QT	3106	WS6X	2493	K4EU	1871	W8AKS	1466
W4PK	3038	W4VIC	2460	W3IP	1870	N3HBX	1428
N4BAA	3004	W2GG	2436	N3ND	1867	WA3EKL	1402
N4MM	2987	W3OA	2426	K3AJ	1818	N8II	1390
W3DF	2979	N4GG	2407	W3KB	1815	W4PRO	1377
WX4G	2966	N3RC	2342	W3DM	1791	W9GE	1364
K1HTV	2950	W2YE	2334	W3XY	1768	AK3E	1348
K5EK	2937	WA2BCK	2317	W2CDO	1761	NR4M	1326
N3NT	2929	K1ZZI	2314	KE4S	1758	W3NRJ	1325
K4SO	2928	W3YY	2297	N4GU	1738	ND3F	1319
W0VTT	2922	K0GD	2289	N4XYZ	1720	N1SZ	1317
W3LL	2905	K4WNW	2278	W4GP	1710	K4ZA	1313
K2PLF	2903	K3TN	2253	N3OC	1706	KG4USN	1292
KG7H	2896	KA4RRU	2234	K4QE	1701	K1RH	1291
W3KX	2876	NW4V	2219	KF7NN	1698	N1EK	1217
K1AR	2872	K4FJ	2214	NE3H	1668	N3RR	1199
N4DB	2853	K1EFI	2190	K3WI	1652	W4NF	1105
K3WA	2824	N4ZH	2188	K3STX	1647	K3IXD	1090
KG4W	2820	W3MR	2180	N3MK	1644	NE3K	1073
AB3CV	2793	N4JQQ	2164	W3UL	1637	N3COB	1049
K3WC	2739	K2BA	2153	K3KY	1606	W4ZV	1047
K3RA	2685	N3QE	2147	KE3X	1588	W3OU	1046
WB3AVN	2663	W3TN	2130	WB4DNL	1586	K4ZW	1044
N3MN	2657	K3PU	2107	KM3V	1565	K4VX	1021
K5RT	2632	W3GG	2071	NA1DX	1564		
W4FQT	2622	N4NW	2068	N3AO	1527		
K1GG	2585	AA4NC	2061	WB2ZAB	1522		
N3KK	2575	N3KN	2028	AA4FU	1519		
K3JT	2560	W3FOX	2002	K4HQB	1518		



**Membership News – Tim N3QE**

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](#)**

**April 2023**

+ JIDX CW Contest	0700Z, Apr 8 to 1300Z, Apr 9
+ OK/OM DX Contest, SSB	1200Z, Apr 8 to 1200Z, Apr 9
+ EU Sprint, SSB	1500Z-1859Z, Apr 8
+ Yuri Gagarin International DX Contest	2100Z, Apr 8 to 2100Z, Apr 9
+ Holyland DX Contest	2100Z, Apr 14 to 2059Z, Apr 15
+ Worked All Provinces of China DX Contest	0600Z, Apr 15 to 0559Z, Apr 16
+ YU DX Contest	0700Z, Apr 15 to 0659Z, Apr 16
+ CQMM DX Contest	0900Z, Apr 15 to 2359Z, Apr 16
+ ARRL Rookie Roundup, SSB	1800Z-2359Z, Apr 16
+ North American SSB Sprint Contest	0000Z-0400Z, Apr 23
+ Helvetia Contest	1300Z, Apr 29 to 1259Z, Apr 30

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

**Editor’s Last Word – John K3TN**

Thanks to Dan K2YWE, Alan WA3EKL and Frank W3LPL for contributions to this issue of the PVRC newsletter.

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 [jpscator@comcast.net](mailto:jpscator@comcast.net).



## 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.

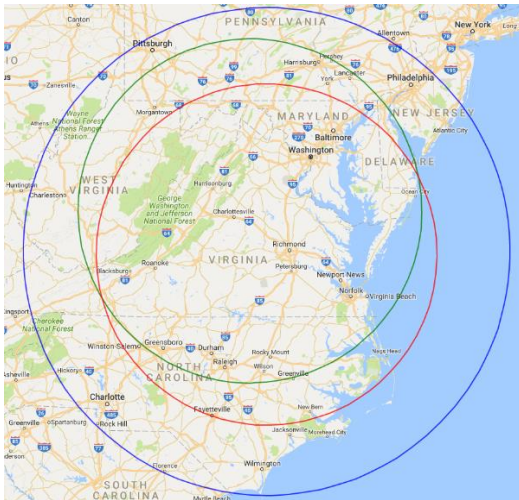
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The latest info on local club meetings and get togethers will always be sent out on the [PVRC reflector](#) and posted on the PVRC [web site](#).



**Green: ARRL VHF Circle**  
175 mile radius  
Around 38.075N,  
78.171W

**Red: ARRL HF Circle**  
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**Blue: CQ HF Circle**  
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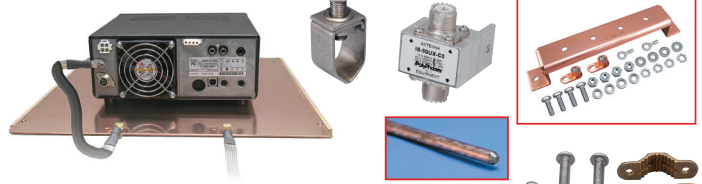
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Tackle your spring antenna projects with high-quality parts. DX Engineering U-Bolt, V-Bolt, Super-Duty and Heavy-Duty Saddle Clamps come in a range of sizes to deliver strong and durable solutions no matter what you're building. You'll also find stainless steel V-clamps; resin support block clamps; Genius clamps that let you create a tower standoff to side-mount an extra antenna; and DX Engineering stainless steel hardware sets. Enter "Clamps" at [DXEngineering.com](http://DXEngineering.com).



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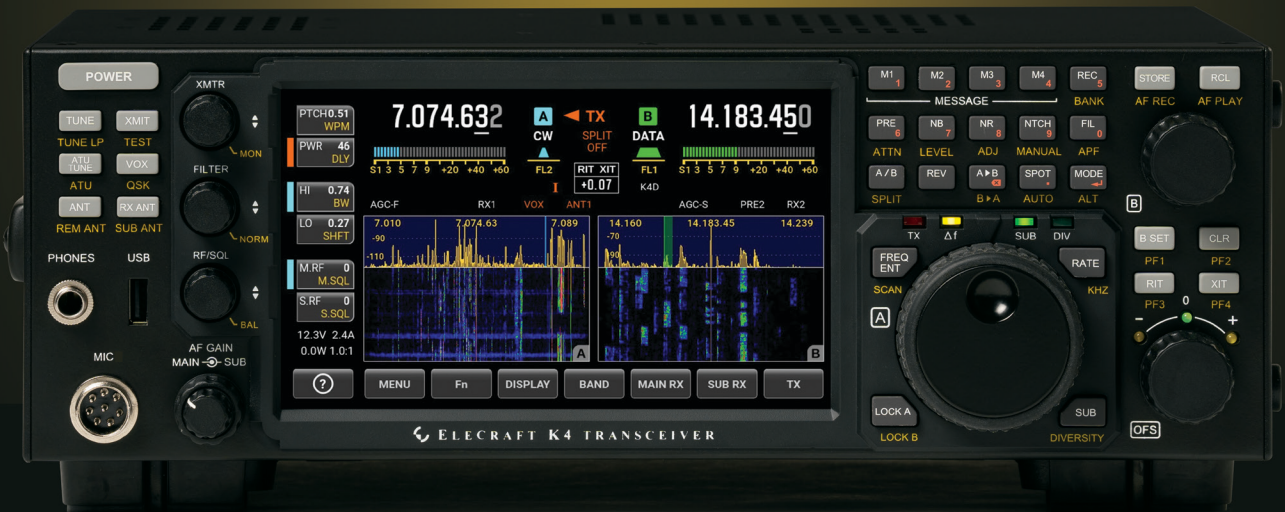
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# ELECRAFT K4

## 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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- 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



## FTM-300DR | C4FM/FM 144/430MHz Dual Band

- 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WIRES-X Portable Digital Node/Fixed Node with HRI-200



## FT-2980R | Heavy-Duty 80W 2M FM Transceiver

- 80 watts of RF power • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users



## FTM-200DR | C4FM/FM 144/430MHz Dual Band

- 1200/9600bps APRS® Data Communications • 2" High-Res Full-Color TFT Display • High-Speed Band Scope • Advanced C4FM Digital Mode • Voice Recording Function for TX/RX



## FTM-400XD | 2M/440 Mobile

- Color display-green, blue, orange, purple, gray • GPS/APRS • Packet 1200/9600 bd ready • Spectrum scope • Bluetooth • MicroSD slot • 500 memory per band

## FT-70DR C4FM/FM 144/430MHz Xcvt

- 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



## FT-65R | 144/430 MHz Transceiver

Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power Within a compact Body • 3.5-Hour Rapid Charger Included • Large White LED Flashlight, Alarm and Quick Home Channel Access



## FTM-6000R | 50W VHF/UHF Mobile Transceiver

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