

PVRC Newsletter

November

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 – Doug AA3S

With the Thanksgiving Holiday occurring in November it is a good time to reflect on what we are thankful for if we have not reflected on that recently. What radio-related items come to mind? The various in-person get-togethers that PVRC has had this year? Beating your previous best score in a particular contest? Getting back on the air after a long time or after repair of equipment? Working an all-time-new-one on DX?

Whatever it is that stands out in your memory for 2023 and PVRC, please submit some photos with a sentence or two description (or no photo) and maybe we can have a collage of PVRC 2023 noteworthy items for our December 2023 Newsletter.

Club Competition – Doug AA3S

The ARRL Sweepstakes has been an important must-win contest since PVRC's beginnings in 1947. The brand-new larger circle for ARRL contests allows many more participants for the clubs that compete with us. If our newly qualified participants do not enter their Sweepstakes points for PVRC then we can expect to lose (think FRC or SMC). **DOUBLE 5M POINTS for this year's Sweepstakes!**

November has four 5M contests, *one has no circle*. Use our [5M calendar](#) to start your planning for these!

ARRL SS CW	ARRL/CQ 250-Mile Circle	2023-11-06	7	Final Scores
WAE RTTY	PVRC Members Worldwide	2023-11-12	7	Final Scores
ARRL SS SSB	ARRL/CQ 250-Mile Circle	2023-11-20	7	Final Scores
CQWW CW	ARRL/CQ 250-Mile Circle			

If you have tips for scoring big in these contests, please post on our Reflector!

I can't find any State QSO parties in November that have Club Competitions that PVRC could win. If you know of any, please let the rest of us know on our Reflector!

Year

Category	Club	Score	Entries
Unlimited	Potomac Valley Radio Club	12,228,356	195
	Minnesota Wireless Assn	5,409,052	115
	Yankee Clipper Contest Club	5,318,568	92
	Frankford Radio Club	5,274,264	93
	Society of Midwest Contesters	5,273,674	107

Year

Category	Club	Score	Entries
Unlimited	Potomac Valley Radio Club	13,589,630	246
	Frankford Radio Club	5,847,978	88
	Yankee Clipper Contest Club	5,525,326	79
	Minnesota Wireless Assn	5,481,890	115
	Society of Midwest Contesters	4,829,368	95
	Florida Contest Group	3,183,438	51
	Northern California Contest Club	2,395,360	54

Dot dot dot

Year

Category	Club	Score	Entries
Unlimited	Potomac Valley Radio Club	15,972,015	285
	Society of Midwest Contesters	7,152,794	137
	Minnesota Wireless Assn	4,648,284	114
	Yankee Clipper Contest Club	4,366,306	83
	Frankford Radio Club	4,334,800	61

Sweepstakes Info:

List of ARRL sections - [here](#) Remember: new RAC sections mean 85 for a Sweep!

Call History files –AZ Outlaws file [here](#) (2020) N1MM site has a 2021 file [here](#).

Log Due Dates – 7 days after contest: November 13th for CW, November 27th for SSB.

A pretty good N1MM+ Function Key file for SS CW

F1 RUN CQ,<ss> {MYCALL} {MYCALL}
 <ss>
 F2 Exch,#~B * 69 MDC
 F3 TU,TU *{CLEARRRIT}
 F4 {MYCALL},*
 F5 HIS Call,!
 F6 QSO B4,B4 *
 F7 NR,# B
 F8 ?,?
 F9 NR?,NR?
 F10 CK?,CK?
 F11 Sec?,SEC?
 F12 Wipe,{wipe}

F1 S&P CQ,<SS> ** <ss>{CLEARRRIT}
 F2 EXCH,#~B * 69 MDC
 F3 SEC,MDC
 F4 {MYCALL},*
 F5 HIS CALL,!
 F6 CK,69



Figure 1. U.S. Area Participants in CW and Phone Sweepstakes Contests for 2000, 2005, 2011, 2015, and 2020

PVRC at the CARA Fest – Ed N1EK

Pete N4ZR and Ed N1EK represented PVRC at the Carafest in September. They had about 25 conversations with visitors and were able to encourage several inactive PVRC members. Several PVRC stalwarts stopped by, along with several new hams who learned about radiosport.



PVRC Bling (1) – Mark N2QT

N3MN and N2QT met K4XL at his favorite eating place to award Ken with his latest PVRC Olympic medal. We toasted him and his silver medal with our choice of libations!



Alan Knight, AA4FU: A PVRC Hero – Bill K3WA

PVRC has become the prominent radio sport club in the United States. Since our inception in 1947 many well-known contesters have emerged as PVRC heroes. From contesters like Vic W4KFC, Len W3GRF, and Ed W3AU to many of today's members, many have become luminaries in the radiosport world.

Some of our heroes are formidable operators who win their share and more of contests. Others build and operate contest superstations. Yet others make their mark as educators and cheerleaders introducing fellow hams into radiosport and mentoring their rise in the radiosport community. Many of these heroes are well known and get elected to the Contest Hall of Fame. But not all PVRC heroes are well known. Alan Knight, AA4FU, is one of them.

PVRC is a large club, with over 1,000 members. PVRC does not run itself. There's no AI system yet that can organize, operate, and support all the activities a radiosport club like PVRC needs. Fortunately, we have members who step up, donate their brainpower, time, and energy to helping all of us. And most of them are not well known.

Do you have a 5M certificate or plaque on your wall? Is the 5 million award incentive program important to you? In either case, did you know that Alan, AA4FU, is the PVRCer behind the scene who first developed the program and has administered the 5 million award program for all these years?

This month, the Current and Past Presidents and the over 1,000 members of the Potomac Valley Radio Club awarded Alan Knight AA4FU with a **Certificate of Gratitude** in recognition of his long-term efforts in establishing and maintaining the five Million Award incentive program. Starting with his suggestion for the initial 20 For 20 programs, designed to get a record number of PVRC'ers on the air, Alan was a one-person task force who made everything happen. He personally invested the time-consuming input data collection of individual member's contest results from diverse sources for about 30 contests each season, made the calculations to determine each member's standing, and tabulated and shared the results with the PVRC membership.

Alan made the needed adjustments as the 20 for 20 programs morphed into the Five Million incentive program. He designed, implemented, and continually updated the user-friendly search tools that keep PVRC users intimately involved with their competitive standings and individual progress. Doug Hart, AA3S, PVRC's current President, presented this award at the PVRC-NC Chapter meeting on 7 September 2023.



PVRC Bling (2) – Mark N2QT, Jim N3JT, Jerome K8LF

It was great to present 3 of the Olympic medals and a 5M plaque at the local Lynchburg Amateur Radio Club meeting. It was fortuitous that the medals had arrived just before I was to present on Contesting and Awards. There are still more medals to hand out!)

Congratulations to NN4RB for 5M and a medal, and W4WWQ and W1IE for medals.

L-R W4WWQ, NN4RB, W1IE and N2QT

73 Mark N2QT



Little known fact – the PVRC medal matches my pajamas **and** my eyes! - Jim N3JT

The three Colonial Capitol PVRC chapter members who received medals in the 2023 Olympics: Don N4DJ, Jerome K8LF and Rob KK4R.

All 2023 medals have been shipped. Some went direct to members and some to chapter chairs to distribute. – Jerome K8LF



A Different Form of Contesting Over the Radio – ARRL Letter

Using Amateur Radio to Play Chess

10/20/2023

Playing chess using amateur radio? The concept may have begun in 1912 when a group of college students from Case Western Reserve University (CWRU) wanted to challenge chess players at The Ohio State University (OSU). Though the official origin is still debated, clippings from a 1912 issue of The Case Tech, one of CWRU's former student newspapers, reveal that the challenge was made when the CWRU Wireless Club procured a Morse code transceiver.

Faculty Advisor to the Case Amateur Radio Club, W8EDU, David Kazdan, AD8Y, said there are no official records of the match, so the challenge was re-proposed this year by the [Case Amateur Radio Club](#). With the with the help of [OSU's Amateur Radio and RF Club](#), W8LT, the game was on. It started on September 26 as a round-robin tournament with other schools and is now moving into an elimination phase. The setup is the same as any chess game except the players are in different locations. Chess moves are relayed over the air either by voice or Morse code.

CWRU started the tournament strong with a win against Rensselaer Polytechnic Institute (RPI), but they lost the long-anticipated game against OSU. W8LT President Arvcuken Noquisi, KE8MXF, said the tournament is a series of test games to determine the best way to incorporate amateur radio into what is now referred to as HAMCHESS.

"Now we are using EchoLink through a Cleveland, Ohio, repeater with algebraic chess notation relayed by voice," said Noquisi. "In the future, each chess team will determine what method works best for them based on skill level and participation."

Noquisi added that blending the school's chess and amateur radio clubs makes for a great campus experience and opportunity for community involvement. W8EDU President Adam Goodman, W7OKE, said collegiate amateur clubs are still recovering from the COVID-19 pandemic, and HAMCHESS is a great way to reenergize amateur radio clubs and involve other college organizations.

In 1945, the United States and the USSR squared off in a radio chess tournament using CW. In the 1980s, Chess and Amateur Radio International, a club with more than 200 members, used 20-meter SSB in a match between five US players and five players in Oceania, a geographical region spanning the Eastern and Western hemispheres.

Today, more than a dozen college amateur radio and chess clubs are participating in HAMCHESS events. College and university radio clubs, including those participating in the chess tournament, regularly network with each other through the [ARRL Collegiate Amateur Radio Program](#).



Radials for Ground Mounted $\frac{1}{4}$ wave Vertical/Inverted L – Alan WA3EKL

How many ground radials do you really need? This article will focus on the practical, not the theoretical antenna on a computer screen in some antenna program.

The simplest answer to the above question is it depends on the soil the antenna is setting on. This article will allow you to determine the number of radials you actually need with a simple SWR meter.

First a little background information on coax or feedlines. If the length of the feed line, per the velocity factor of the line, is $\frac{1}{2}$ wavelength or a multiple of $\frac{1}{2}$ wavelength then the impedance of the antenna will be accurately reflected back to the transmitter regardless of the impedance of the feed line. Since most of us will be using 50 ohm coax feed line to feed our verticals and inverted L's, let's go with 50 ohms and make multiples of $\frac{1}{2}$ wavelength from antenna to transmitter per the velocity factor of your particular coax. $492 \times VF / \text{Freq in MHz} = \text{Length in feet of a } \frac{1}{2} \text{ wavelength for that line.}$

If you search the internet long enough you will find that an "Inverted L" antenna has almost the same radiation pattern as a straight vertical for all practical purposes. Remember we are talking practical here.

Next the most optimal impedance for a vertical is at about 36 ohms "practically speaking." A dipole is 72 ohms. Droop down the ends of an inverted V and its impedance becomes 50 ohms. Droop the ends down to two verticals and the feed point impedance becomes close to 36 ohms. Let us call 36 ohms the magic number for a practical, efficient, optimal impedance, vertical antenna.

If you were to feed the most optimal vertical with a 50-ohm impedance feed line you will get $50/36 = 1.38$ to 1 SWR. That is the best you can get and the most optimal efficiency point. It will also be the broadest bandwidth point. I know because I found that out with much testing. The question becomes how do we get to this optimal efficiency point practically speaking?

Some soil can be a very good absorber of RF energy and not a reflector. Metal radials reflect RF energy. Then common sense would dictate the more radials you have, the more metal you have around or near the base of the vertical or inverted L, then the more RF can radiate from the vertical or L. But how long and how many radials are needed to reach the optimal efficiency point practically speaking?

We have all been taught that the radials must be $\frac{1}{4}$ wavelength long. There are many sites that strongly disagree. $\frac{1}{8}$ wavelength radials are quite sufficient if you have enough of them. Here is something I did learn in my research. Suppose you start with a measured current of 1 amp at the end of each radial that you have already laid down; assuming you have driven a ground rod at the end of each radial. If you double the number of radials you would think more current would appear at the ends of each radial because the system has become more efficient. However, the exact opposite happens. If you double the radials you must double the length of all radials in order to get the current down to 1 amp at the ends again.

We are going to use 1/8 wavelength radials for practical purposes. We will start by attaching a 1/2 wavelength of 50-ohm coax to the vertical. The center conductor goes to the vertical and the shield goes directly to the radials. There will be no matching networks at the base of the vertical or antenna tuners needed in this installation!

Now lay down four 1/8 wavelength radials around the antenna. Do radials have to be perfectly straight? No. Can they zigzag to fit into a space? Yes. Can they curve to fit. Yes. Can they go so far and when they run into a tree or shed can they go around the obstruction and keep on going on the other side to their end? Absolutely yes. Do they need to be perfectly spaced apart? No.

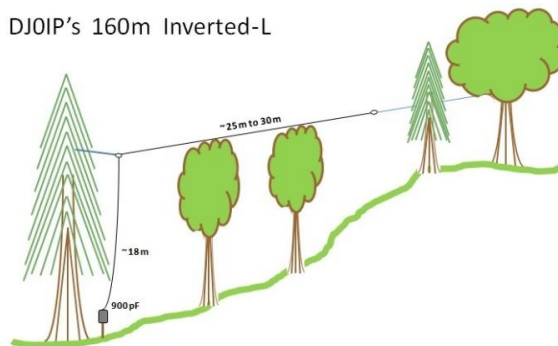
With the 4 radials laid down measure the SWR at the end of your 1/2 wavelength feed line. It will probably be above 4 or 5 to 1 because the impedance of the vertical with 4 radials is 200 to 250 ohms or more. As you continue to lay down radials the SWR will reduce to a point where the SWR will be 1 to 1. This is because the antenna impedance has now reached 50 ohms with the number of radials it took for your particular soil. However, you have **not** reached the optimal efficiency point yet. Continue laying down radials until the SWR goes back up to about 1.3 to 1. At that point adding additional radials will not change your SWR. This is important. You have reached your “practical optimal efficiency point” for that vertical or L antenna over that soil.

However, you are **still** not done yet! Rain and snow will change the soil moisture and will cause your SWR to change with soil moisture content. By adding maybe 4 to 5 more radials will in most cases eliminates that problem. I had to add 5 more radials on my sandy/clay soil to stop the soil moisture effect on my 160-meter Inverted L. I added two more radials for good measure. It took 28 to 30 radials to achieve the optimum efficiency point. I have thirty-seven 75 foot radials around my 160 meter inverted L antenna.

From everything I have researched, when you hit that practical optimal efficient point in order to get one more dB at the receiving end you must double the length of your radials and double the number of radials you have laid down. To me that is a waste of bank account, a waste of backache and a waste of good operating time.

Lay those radials down in the Fall after the last mowing and allow the freezing / thawing soil and gravity to pull those wires down into the grass and into the soil so next Spring the grass will completely cover them!

DJ0IP's 160m Inverted-L



PVRC DXCC Challenge Standings – Frank W3LPL

Below are the DXCC Challenge 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
W4DR	3203	W3BW	2554	N3KN	2028	WB2ZAB	1522
W3UR	3179	N4TL	2553	W3IP	2016	AA4FU	1519
W3LPL	3170	N4QQ	2541	W3FOX	2002	K4HQB	1518
K4CIA	3137	K5VIP	2506	W0YVA	2001	K1RH	1508
N2QT	3106	WS6X	2493	K5RJ	1961	KU1T	1501
W4PK	3038	W4VIC	2489	N3KS	1906	N3AIU	1487
N4BAA	3009	W3OA	2460	K4EU	1871	W8AKS	1466
W3DF	2991	W2GG	2436	N3ND	1867	N3HBX	1428
N4MM	2987	N4GG	2407	W3XY	1865	WA3EKL	1420
WX4G	2973	WA2BCK	2377	KM3V	1849	N8II	1390
K1HTV	2964	N3RC	2371	K3AJ	1818	W4PRO	1377
K4SO	2954	W2YE	2334	W3KB	1815	W9GE	1364
K5EK	2949	K0GD	2314	W3DM	1791	AK3E	1348
N3NT	2929	K1ZZI	2314	W2CDO	1776	N1EK	1338
W3LL	2928	W3YY	2297	KE4S	1758	KG4USN	1337
W0VTT	2922	K4WNW	2278	N3OC	1749	NR4M	1332
W3KX	2908	K3TN	2269	N4GU	1738	W3NRJ	1325
K2PLF	2903	KA4RRU	2256	K4QE	1726	ND3F	1319
KG7H	2896	NW4V	2219	N4XYZ	1720	N1SZ	1317
K1AR	2872	K4FJ	2214	W4GP	1710	K4ZA	1313
K3WC	2865	W3MR	2201	KF7NN	1698	N3RR	1199
N4DB	2855	K1EFI	2190	N3MK	1674	W4NF	1181
AB3CV	2853	N4ZH	2188	NE3H	1668	K4NTO	1130
K3WA	2832	N4JQQ	2173	K3WI	1652	K3IXD	1090
KG4W	2820	K2BA	2153	N4ZR	1651	NE3K	1073
K3RA	2685	N3QE	2147	K3STX	1647	N3COB	1049
WB3AVN	2669	W3TN	2130	W3UL	1637	W4ZV	1047
N3MN	2657	K3PU	2107	WB4DNL	1620	W3OU	1046
K5RT	2656	KN4KL	2079	K3KY	1606	K4ZW	1044
K1GG	2636	W3GG	2071	W3US	1604	K4VX	1021
W4FQT	2622	N4NW	2068	KE3X	1588		
N3KK	2575	AA4NC	2061	NA1DX	1579		
K3JT	2560	K3SX	2056	N3AO	1527		

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](#)

November 2023	
+ Ukrainian DX Contest	Cancelled for 2023
+ ARRL Sweepstakes Contest, CW	2100Z, Nov 4 to 0300Z, Nov 6
+ WAE DX Contest, RTTY	0000Z, Nov 11 to 2359Z, Nov 12
+ OK/OM DX Contest, CW	1200Z, Nov 11 to 1200Z, Nov 12
+ North American SSB Sprint Contest	0000Z-0400Z, Nov 12
+ ARRL Sweepstakes Contest, SSB	2100Z, Nov 18 to 0300Z, Nov 20
+ CQ Worldwide DX Contest, CW	0000Z, Nov 25 to 2400Z, Nov 26

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

Editor’s Last Word – John K3TN

Thanks to N2QT, N3JT, WA3EKL, N1EK, K3WA, K8LF and W3LPL for contributions to this issue of the PVRC newsletter.

The K3TN super-station K3S and KPA-1500 are vacationing in Watsonville CA for the foreseeable future. I hope the radio gods have been kinder to everyone else as we enter Sweepstakes season!

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](mailto:jpescatore@aol.com).

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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.

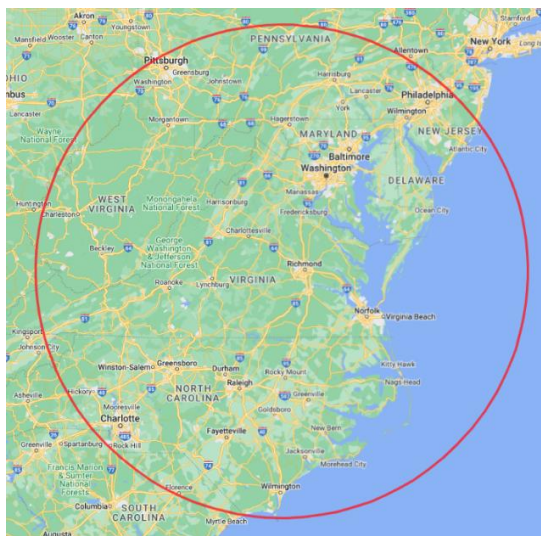
Direct donations to PVRC via Credit Card or PayPal may be made by clicking this "Donate" button and clicking the next Donate button that appears on your screen:



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!



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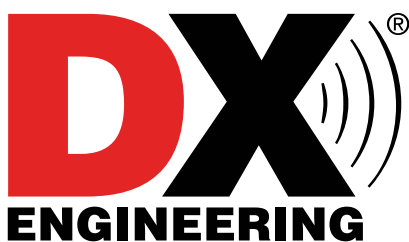
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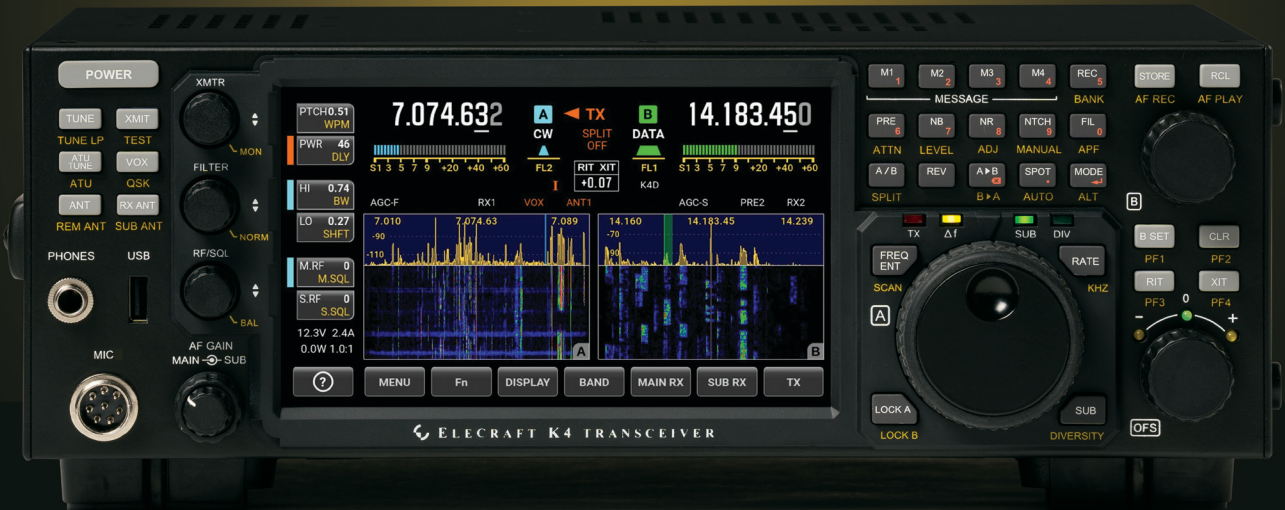


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High-Performance Direct-Sampling SDR



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-718 | HF Transceiver

• 160-10M** • 100W • 12V operation • Simple to use • CW Keyer Built-in • One touch band switching • Direct frequency input • VOX Built-in • Band stacking register • IF shift • 101 memories



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



IC-7851 | HF/50MHz Transceiver

• 1.2kHz "Optimum" roofing filter • New local oscillator design • Improved phase noise • Improved spectrum scope • Dual scope function • Enhanced mouse operation for spectrum scope



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-2300H | VHF FM Transceiver

• 65W RF Output Power • 4.5W Audio Output • MIL-STD 810 G Specifications • 207 alphanumeric Memory Channels • Built-in CTCSS/DTCS Encode/Decode • DMS



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-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-V86 | VHF 7W HT

• 7W Output Power 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-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-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

NEW



IC-T10 | Rugged 144/430 MHz Dual Band

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



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-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

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



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-500DR | C4FM/FM 144/430MHz Dual Band Xcvr

- Front Firing Acoustically Enhanced Speaker System • True Dual Band Operation, C4FM/C4FM Digital D-D Dual Receive • 2.4" High-Resolution Full-Color Touch Panel Display • Built-in High Precision GPS Receiver • Wireless Operation Capability with Optional Bluetooth® Headset

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



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

- All New User Operating Interface-E20-III (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel Can Be Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset



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