PVRC Newsletter
April 2021

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 – Dan K2YWE

You may have noticed that the competitive environment has become tougher with the effects of pandemic restrictions. These effects most notably include an increase in average BIC time and modified operating conditions and rules for multi-ops. Even before the pandemic effect, remote operation has been growing and being embraced by more contesters. PVRC members have responded to all those effects and challenges and kept the club in the forefront of competition both individually and as a club. What the membership has been doing is clear from looking at contest results and participating in the many online chapter meetings and the PVRC reflector, but what have the officers been doing besides their share of contesting?

PVRC officers meet every two weeks and communicate between meetings as needed. They customarily take on tasks in addition to the day-to-day work required by their individual offices. Here is some of what they have accomplished thus far this year:

- Held a successful Galactic online gathering (N4GU)
  Thanks to K8LF for helping to organize and MC and to all the presenters

- Facilitated the change of Southwest VA and Colonial chapter chairs
  Appreciation to NR4C and AF2T for their past efforts and thanks to K8LF and NZ6T for stepping up.

- Changed from a paid outside Resident Agent to a qualified PVRC member volunteer (AA3S)
  Thanks to AA3S for the idea and taking on the job.

- Updated the PVRC homepage, including adding a link to the PVRC Scholarship (K4NTO and N3QE).
- Updated the PVRC Trophy Room (W3MMM)

- Investigated cost and features of available conference services with large audience capability. Chose to continue GoToMeeting as the best affordable tool for PVRC use as an adjunct to free Zoom and others.

- Organized a meeting of all chapter chairs and officer to exchange ideas on March 30

Here is what we are working on now:

- Improving the PVRC Olympics for next season

- Making available PVRC recruitment resources easier to find
  Including a speakers list for outreach activities

- Recognizing the valuable contribution of members with less than top scores

- Facilitating and aggregating member contributions when WRTC sponsor options become clear.

- Adding more resources links the website and bringing old ones up to date
- Creating a consolidated chapter meetings calendar editable by chapter chairs

- Planning for the next PVRC reunion

Our focus has and will continue to be on PVRC being member driven. Let me or the other officers or your chapter chair know if you have suggestions on how to make the club better. We work for you.

73, Dan K2YWE

PVRC Officers:

President:	K2YWE	Dan Zeitlin
Vice President:	N4GU	Mike Barts
Vice President:	AA3S	Doug Hart
Secretary:	N3QE	Tim Shoppa
Treasurer:	W3MMM	Jay Horman

Trustees:

K3MM, N3OC, K2AV, K7SV, W3LPL, N3KN, N4ZR, W2RU, W3LL

PVRC Charter Members (all SK):

W3GRF, W4AAV, W4KFC, N0FFZ, W4LUE, W7YS, VP2VI/W0DX, W3IKN, W4KFT

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Remembrance Celebration for Marty W3YOZ (SK) – Dan K2YWE

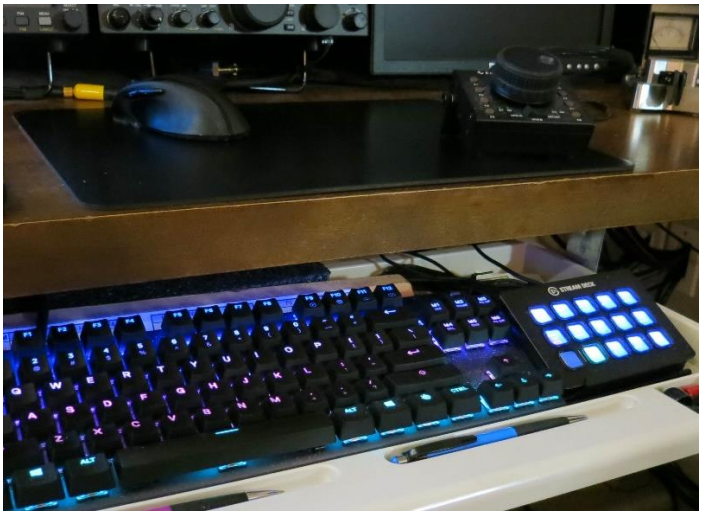
I attended a small remembrance gathering for Marty W3YOZ at his Churchton property waterfront park. It was wonderful hearing and telling stories about Marty. His ashes were spread on the water according to his wishes.

PVRC members attending were W3XOX, W3IDT, W2GPS, N3HMW, K8JW, WR3Z and K2YWE. Photos by K2YWE and WR3Z.

Using the Elgato Stream Deck in a Contesting Application – Ed N3CW

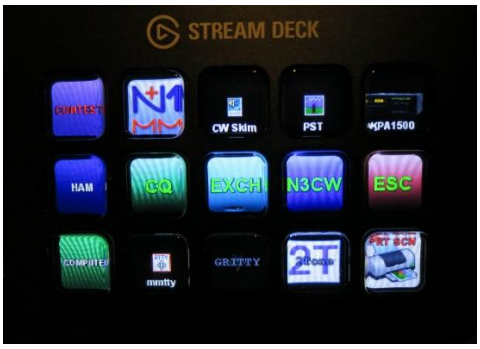
This article is meant to introduce the Elgato Stream Deck as a contesting tool, and to generate contesting community interest in using it. Presented here are a couple screen setups I am experimenting with. It is hoped that other contesters will take a look at the capabilities of the Stream Deck, and further develop new ways of applying its capabilities for contesting.

The Elgato Stream Deck is essentially a small, backlit keyboard which uses programmable keys to launch various actions and keyboard shortcuts. Unique backlit icons and key actions can be assigned to each key. It is available in 32 key, 15 key, and a six key mini version. The 15 key seems to be just the right size to sit alongside my standard computer keyboard without taking up too much valuable real estate. The Stream Deck can be seen below to the right of the keyboard.



Part of my key programming allows me to “nest” many different layouts, so I am not limited to just 15 keys. For example, I have one layout for contesting, one for some of my general computer applications, one for audio/video applications, one for N1MM keyboard shortcuts, etc. There is a very-easy-to-use programming utility that one downloads from the Elgato site, and this allows the user to select from many different key actions, including calling up Windows applications, assigning keyboard shortcuts, calling up different websites, start/stop recordings, and many others. The user can then assign or design his own backlit icon for each key.

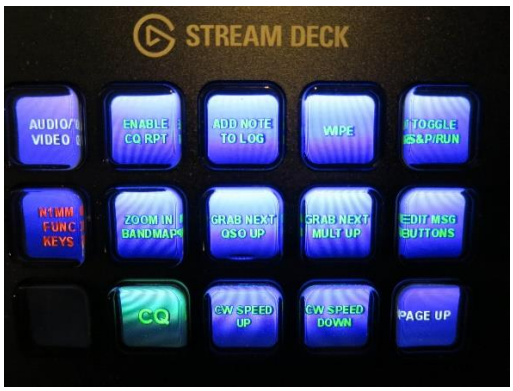
Here's a look at a few screens that I have set up to initially explore the Screen Deck's capabilities for contesting? One screen shows me the contesting-related applications I use the most and having these so easily called up by a button push has been easy.



The three buttons on the left call up different screens. Shown above is my Contest screen, which shows some frequently used related applications, such as the KPA1500 remote utility, N1MM, and CW Skimmer. The middle row buttons with green text duplicate some N1MM function keys, but I may move these to another screen in the future. Using the Elgato utility, it is very easy to delete or copy and move buttons from one screen to another.

I have also programmed a screen for some often-used N1MM keyboard shortcuts, and this represents a very good example of just how useful the Stream Deck can be. For those who use N1MM, there are many keyboard shortcuts, some of which the operator can remember. Many use a cheat sheet of some sort, but usually there are some N1MM actions that just can't be remembered quickly enough to use during the heat of a contest. By programming some keys to initiate various N1MM keyboard shortcuts, the operator has them available at just the push of a button.

Shown below is a screen I quickly set up to give me some actions to test during a few upcoming contests. I have already found that I am really using a couple of these buttons a lot, such as the callsign wipe and the up/down keyer speed. So what may have taken two or three keyboard key pushes can now be done with one button push. I should note that in reality the text and icons and colors on the screens are not distorted as my camera makes them appear. I am just beginning to explore ways to use this unique device, but so far I have found that process interesting and fun. I am looking forward to spending more time experimenting with the Stream Deck.



New QTH, New Shack - and the AB-577 is Raised! Dave W3MAM

When the decision was made to move from our Glen Burnie townhouse, the long-term planning for a new ham shack and antenna set up began. My wife and I searched for properties across the bay bridge for months. There was very little inventory and lots of competition.

Our property requirements were fairly modest and simple: enough land so that I did not have to listen to a neighbor's phone conversation, a small, one level home for ease of cleaning, maintenance and to accommodate any future mobility challenges and no HOA! With our daughter and her family having settled in Grasonville, we targeted that area. Eventually, a suitable property popped up. We were aggressive and asked for a showing the very next morning. We were the first of 8 showings on the first day on market. The property "checked" all our boxes and an offer was made. A second competing offer was also submitted. Ours was the better of the two and our offer was accepted.

This was November of last year. I spent the winter carving out a space in the back of the detached 20' x 36' garage to turn into a ham shack. The rear portion fit the bill and over many weekends and some evenings, I ended up with a nice, finished off 12' x 16' room. Concurrent with the shack build out, I had been exploring simple tower options. I do almost all home and car repair myself and I wanted a tower/antenna combo which would allow me to maintain without outside help. Several PVRC members had touted the pros of having an AB-577 Army Portable Mast, AKA Rocket Launcher. Eventually, one became available and I grabbed it.

Tom K3AJ and I waited for signs of spring and more importantly, waited for my flooded property to dry up (Eastern Shore properties hold water a while – who knew?). While we were waiting for a suitable day, Tom had given me a shopping list for various hardware items: pear links, braided cable, turnbuckles, duckbill anchors, crimp sleeves, etc., which I purchased from E-Rigging.com.

My intention was to prepare as much as possible in advance, so that the day that Tom arrived, we could make the best use of time to raise the mast. To that end, I prepared a simple pad for the launcher to sit on. A pressure-treated 2"x4" form for a net 24" square

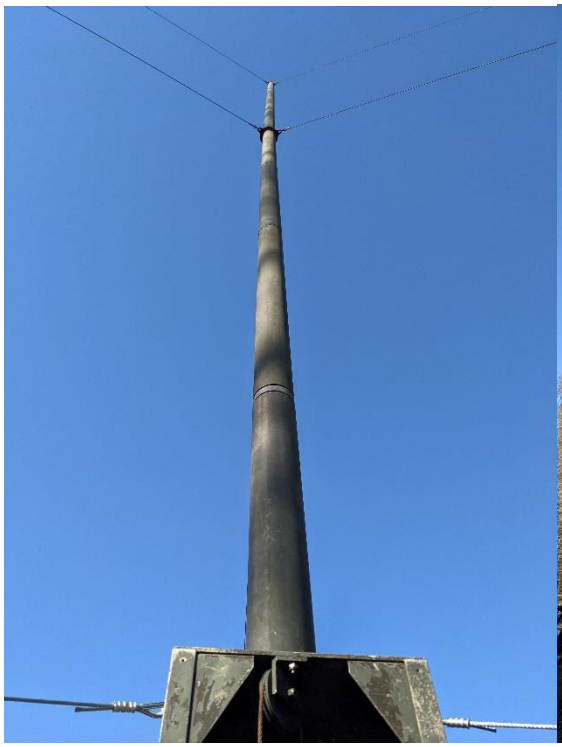
pad. I removed the sod, placed the frame on the dirt, and scraped here and there to make the frame perfectly level. Then, I placed one layer of driveway stone inside the frame, followed by 3 bags of stone dust. After each bag, I moistened the stone dust and tamped as hard as possible. The last bag was more than needed. Excess was screeded off and one final exercise of moistening and tamping.

The other pre-preparation was to layout the guy locations. Using the Army manual as a guide and the Army layout rope which came with the launcher, I located the guys in an arrangement that kept them out of the way as much as possible.

The nice, dry day finally arrived and Tom K3AJ and I went to work. I had “inventoried” the launcher guys in advance to verify that they were long enough. Tom had directed me to purchase cable and hardware to use for new lower guys to the launcher frame instead of the Army guys. I can now see the wisdom in this, as these guys are tighter and stouter than the Army guys would have been.

The ground anchors were going to be duckbills from Westech Rigging Supply. Tom was familiar with these, having installed them for Pete N4ZR’s set up. Pete loaned us his drive rod for setting the duckbills. It worked perfectly. Pear links, shackles, huge turnbuckles and cables were installed. Tom taught me how to crimp the aluminum sleeves onto the braided cable, using his crimpers.

The launcher frame was set up and guyed by lunchtime. After lunch, we started raising tubes; the first four tubes were raised, which allowed us to establish the mid-guys, using the original Army cables and tensioners. Then those four tubes were lowered and what would be the top tube (highest) was put in the elevator with the top guys pre-attached. With plenty of shared cranking duties, we raised all 8 tubes.



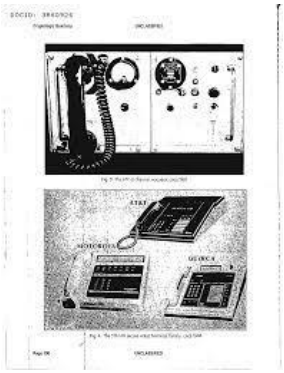
With the entire assembly now in the air, Tom and I focused on guy tension and the vertical “plumb” of the mast. With the AB-577, it is possible to have a “curve” in the mast, which can be corrected with guy tension. I’m happy to say that Tom’s eye and my eye generally agreed, and adjustments were made.

As of this writing, the launcher is in the air, awaiting its antenna. It took Tom and I about 5 hours to accomplish the raising. I have a Force 12 C3S which will go on top, along with one or two pulleys to accommodate 80M and 40M wires running to nearby trees or perhaps in inverted V configurations. I have an Alpha-Delta DX-EE fan dipole which I used at the townhouse which may now be cannibalized for the greater good!
Having been off the air since November 2020, the return to contesting is within sight

PVRC’s Meeting Place 1948 – 1950 - Frank W3LPL

WAR Transmitter building, Jones Point, Alexandria VA

Among other things, the transmitters for the Roosevelt-Churchill secure voice circuit were in that building. *Editor’s note – I'm pretty sure I've bicycled by that old building, near the Jones Point Lighthouse and the Wilson Woodrow bridge. Not sure if it survived the new bridge construction. K3TN*



The Story of an Ugly 432 MHz Low Pass Filter – Barry K5VIP

This project was motivated by an article written by Paul Wade W1GHZ, in 2019: “432 MHz Transverter for an SDR”. Part of Paul’s article described a low pass filter for 432 MHz. I wanted to build a 432 low pass filter for my Elecraft XV432 transverter because I found the transverter had significant harmonic output after I got my new spectrum analyzer. Unfortunately, Paul’s filter required winding tiny coils and used chip capacitors which I didn’t have. It also used a very well-made printed circuit board which I couldn’t possibly reproduce. So, I found another way to implement the filter.

I used 1/32” sheet Teflon and 3/4” wide flat brass plate to make two parallel plate capacitors and straight #12 solid copper wire to make the inductors. I used the internet to find calculators which helped me determine how big the plates of the capacitors needed to be and how long the wires needed to be to give the required inductance. The plates to make a 10 pF capacitor needed to be 0.67797 square inches which is a 3/4” by 29/32” piece of brass with a hole in the middle for the #6 nylon screw to hold everything together. I calculated that the wires for the inductors need to be 1” for 15 nH and 1.5” for 27 nH. I used a piece of single sided glass epoxy pc to which I mounted two female N-type RF connectors and the parallel plate capacitors. Then, I soldered the three wires as required between the RF connectors and the capacitors to create the inductors. There were three iterations of the 27 nH inductor because it was hard to mount the inductor to the two capacitors and keep its length correct. Between each iteration of the 27 nH inductor there was a round of testing with the antenna analyzer and the spectrum analyzer. The third time was a charm, and I got the results I was shooting for.

The following are pictures and tests results for Paul’s filter. Pictures and test results for my filter follow Paul’s.
This is the schematic for the filter in Paul’s article:

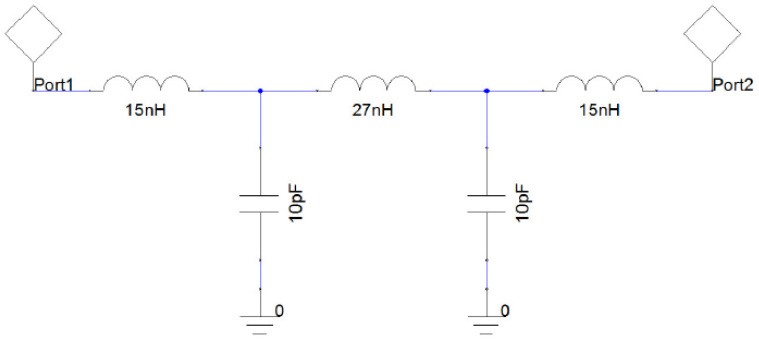
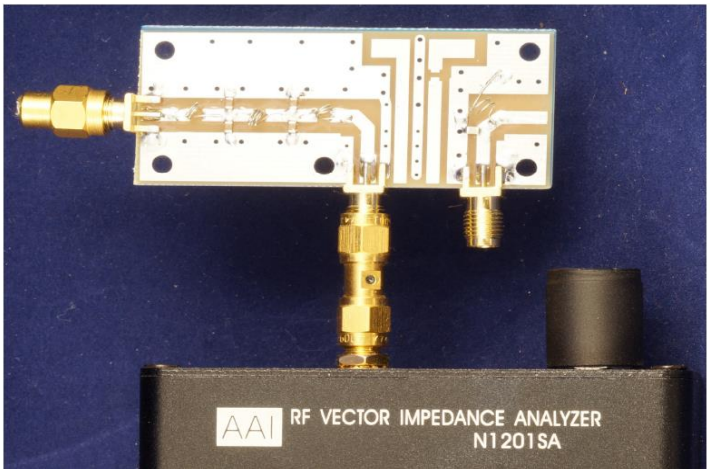


Figure 10 – Schematic diagram of 432 MHz Low-Pass-Filter

This is a picture of Paul’s implementation of the filter above (note the very small inductors and chip capacitors):



This is the SWR curve for Paul's filter (note that his SWR reading is the same as mine and the shape of the SWR curve is the same):

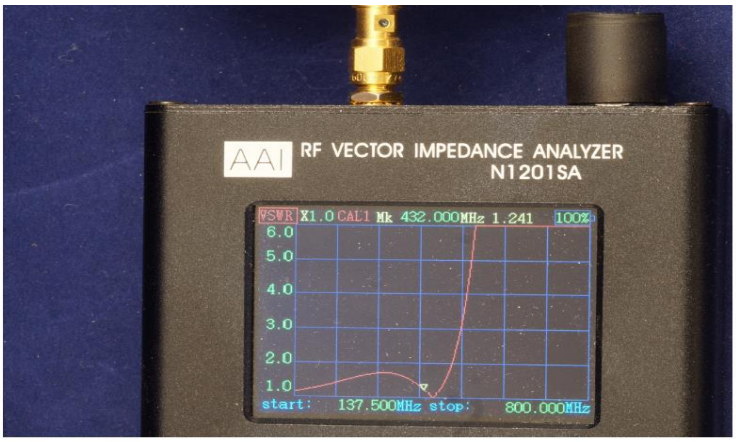
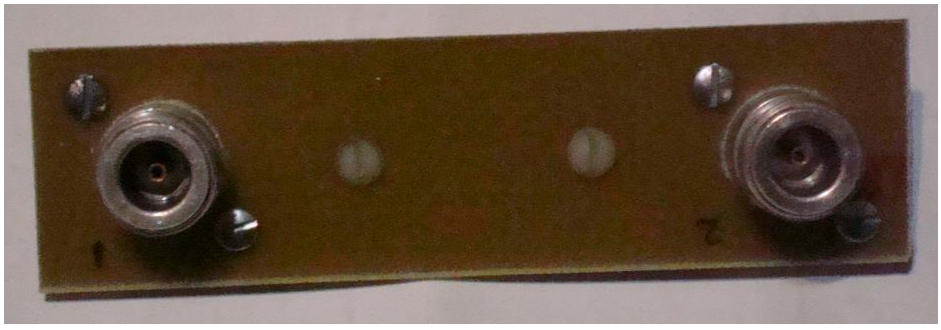
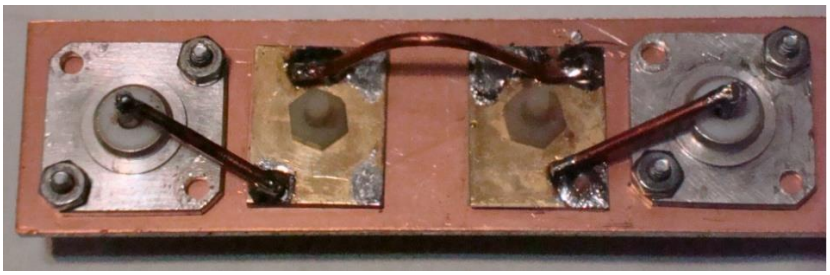


Figure 12 – Measuring VSWR of Low-Pass-Filter with 50-ohm termination using Antenna Analyzer

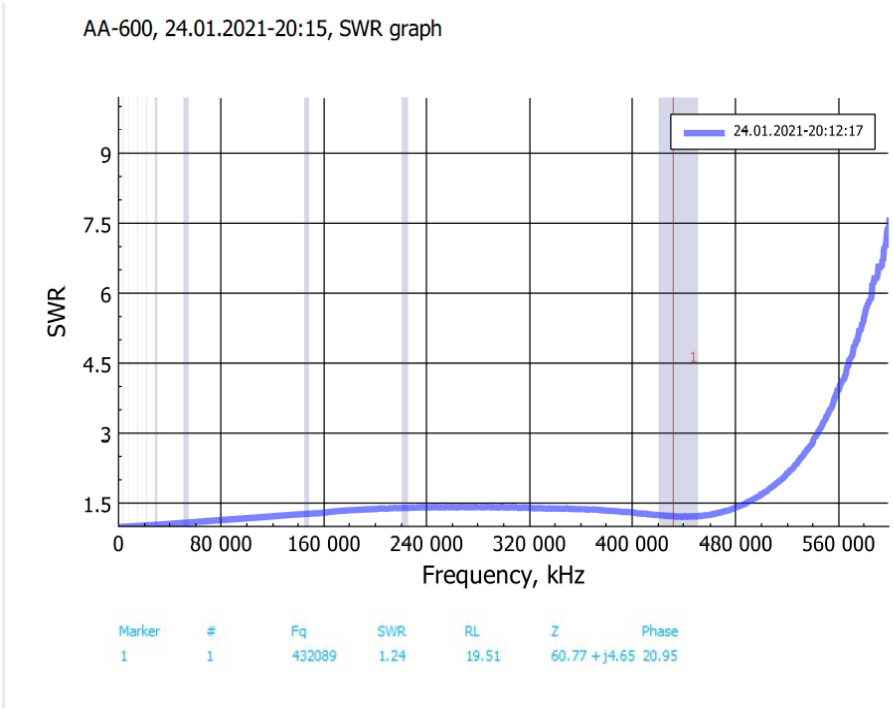
K5VIP – 432 Low Pass Filter (Front)



K5VIP – 432 Low Pass Filter (Back)

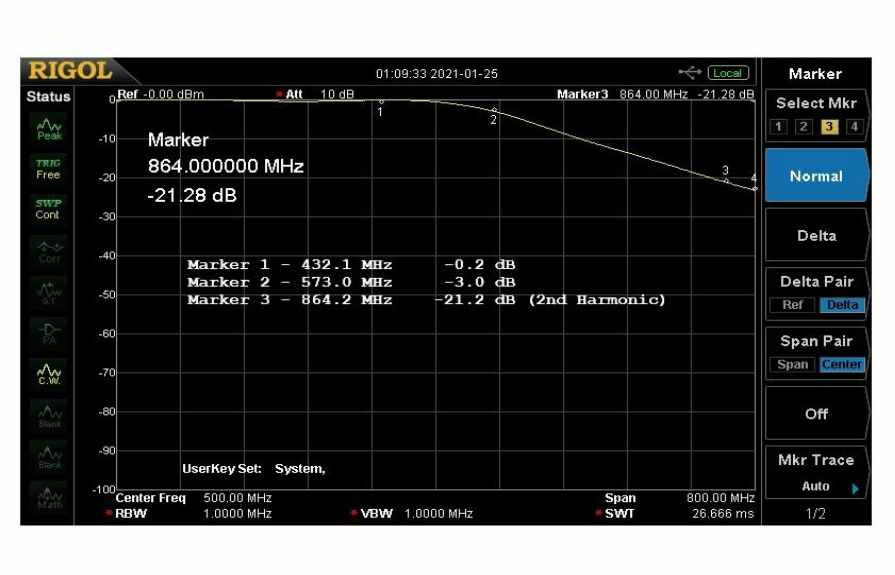


SWR plot of 432 MHz low pass filter (built 23 – 24 Jan 2021)



SWR measured with Rigexpert AA-600 Antenna analyzer at the input of filter, and a Bird 50 Ohm dummy load at the output of the filter.

Spectrum Plot of 432.1 MHz low pass filter (built 23-24 Jan 2021)



Spectrum measured with Rigol DSA815 – TG Spectrum Analyzer with tracking generator.

Fred AI3Z's Impressively Engineered Spud Launcher

Earlier in the year, the center insulator/balun in my off-center fed dipole (Windom) began to show high SWR on 80, 30 and 17M – even at 100w. That generally means it is time to replace that unit and since that antenna had been up for many years and spliced and patched numerous times before, I figured it was time to replace the entire antenna.

I decided to go with a heavy duty 3kw Buckmaster design that DXEngineering sells. The center insulator/balun is beefy and heavy – good for longevity (especially occasionally running on RTTY on 80M in contests) but required me to do something I'd meant to do for years but kept putting off: getting a rope in the trees directly above the insulator to support it.

The wire is up at about 45 – 50' and the next higher usable branch was at about 75 feet. I'm normally a sling shot/sinker launcher kind of op, but I decided this would be a good time to try a pneumatic "spud launcher." I put out the call on the PVRC reflector and Fred AI3Z quickly came back with the offer to borrow one of the units he has built out of old fire extinguisher bottles.

No, this isn't it.

No worries about the PVC tube exploding using this bad boy!

Fred and I met in Severna Park, he showed me how to use it and supplied a fishing reel and tennis balls with weights and swivel connectors. I got home, pumped it up to about 60 PSI, dropped in a tennis ball, squinted upwards and WHOOOOMP the tennis ball slowly went up and over the right limb in the right spot and came all the way back down!

That first try made me cocky – instead of using the fishing line to pull up some intermediate string, I tried to immediately pull up the rope and of course snapped the line. I wound some more line on, pumped it up again, one more WHOOMP and exact same success. Pull up the string, pulled up the rope, on the air again.

I ended up buying the unit (Fred threw in the reel and the tennis ball) and Fred does periodically make more and sell them - email him if you are interested.

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Meet the PVRCer! Zory KB3VQC

Previous Calls: None (First licensed in 2011 and received all 3 ham 'tickets' within 10 months). Trained by the Navy as an Electronics Tech and flew as a crew member (during the Viet Nam-era) on military aircraft as a Radioman, Communicator, Navigator. After obtaining a couple of graduate degrees, continued my Navy career as a member of the Medical Dept.

QTH: Homes in Rockville and Columbia, MD, and in the Luray, VA area (with "little pistol" ham stations at all locations). Most Contestin' done as a guest at Multi-op stations (including Alan WA3EKL, Tom K3AJ) Ben and Grant K3CCR, with Tim(N3QE and others in Poolesville, and at the National Electronics Museum (K3NEM)

PVRC Chapter: Laurel

Favorite Contest (and Why): CQ RTTY WPX - Lots of DX activity, and it usually is continuous and fast action

Least Favorite Contest (and Why): CW Tests - My CW speed is still not adequate for contesting

Favorite Parts of Ham Radio other than Contesting: Operating Special Events (e.g., 'W2W', twice a year, commemorating the D-Day Landing, and the Pearl Harbor Attack), and other Event' from the Electronics Museum (including the "Enigma Revisited" event, and the "50th Anniversary of the Apollo-11 moon landing celebration"); and Boy/Girl Scout ham-related operating; and in the 'School Ham Clubs Round up", all from the National Electronics Museum's ham station (K3NEM); also Operating (on the 'Armed Forces Day' Weekend) in the "Cross-Band exercise" from the site of the Navy's original NSS HF Station in Annapolis; \I have also participated regularly at the Electronics Museum in their Field Day operations, and with the PVRC/ W3AO Field Day operations.

Speaking on ham radio-related topics (e.g., bio-effects and human responses to exposure to RF energy, …)

I am an ARRL VE (and also a VE with the Laurel VEC); have been active in RACES/ ARES in MD, and in the Shenandoah Valley, and with MARS; am currently VP of the ham club at the Nat. Electronics Museum (ARCNEM); have been a Board Member of the Page Valley Amateur Radio Club (PVARC) in the Shenandoah Valley; and have served on the Scholarship Award Selection Committee of the Foundation for Amateur Radio (FAR); … I have also had the pleasure of cataloging/ archiving the QSL cards which recently helped the K3NEM/ ARCNEM at the National Electronics Museum achieve ARRL "Honor Roll" status, and work toward 5B-WAS

.

Favorite Things to do other than Ham Radio: Stamp (and first day of issue stamped envelopes/ FDCs) and Coin (and banknote) Collecting; Slowly completing the interior of the Log Home I am building in the Shenandoah Valley (and also operating/ managing/

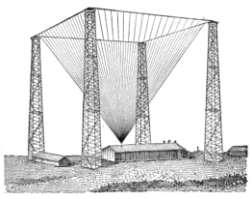
maintaining the vacation rental cottage ("Cardinal Cottage") that I own in the Luray area); Teaching and performing BioMedical Research (@ Johns Hopkins U); consulting on infection control associated with the use/ reuse of medical devices, … Also, underwater photography, cave diving, amateur astronomy.

Anything Else: I certainly appreciate (and have greatly benefitted from) all the coaching/ mentoring I have received from PVRC members, including Alan (WA3EKL), Pat (K0OO), Rol (K3RA), Ted (WA3AER), Bob (ND3D), Frank (W3LPL), Tim (N3QE), Dan (K2YWE), Tom (K3AJ), Tyler (K3MTR), and many others. Thanks also to my lovely partner of many years who knows me as chronically 'sleep deprived' (especially as I follow the 'gray line' as it passes over other portions of the globe), and still encourages (and at times tolerates) my many (and varied) interests. However, she **has** admitted that she was initially suspicious when I informed her that I was 'planning to spend the night "contesting" with the guys but began to better understand when I proudly displayed my 5M plaque and Olympics medal!

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	3185	WS6X	2493	K4WNW	2004	KU1T	1501
W3UR	3153	K5RT	2447	W0YVA	2001	N4ZR	1491
W3LPL	3138	W2GG	2436	N3KN	1990	K3WC	1430
K4CIA	3116	N4TL	2406	K5RJ	1961	N3HBX	1428
N2QT	3085	K5VIP	2400	N3KS	1906	N3AIU	1415
W4PK	3038	K1GG	2397	N3ND	1867	N8II	1390
N4MM	2981	N4GG	2377	W3FOX	1816	W8AKS	1390
W3DF	2952	W4VIC	2357	W3KB	1815	W4PRO	1377
WX4G	2934	W3OA	2344	K4EU	1795	KF7NN	1377
K1HTV	2924	W2YE	2334	W3DM	1791	W9GE	1364
K2PLF	2903	WA2BCK	2316	K3SX	1772	AK3E	1348
K5EK	2900	K1ZZI	2312	KE4S	1758	KM3V	1319
KG7H	2881	W3YY	2297	N4GU	1738	ND3F	1319
N3NT	2871	N3RC	2294	W2CDO	1729	N1SZ	1317
W0VTT	2863	W2GPS	2255	N4XYZ	1720	N3MK	1317
N4DB	2850	KA4RRU	2234	W4GP	1710	NR4M	1317
W3LL	2840	NW4V	2219	K4QE	1685	K4ZA	1313
W3KX	2800	K3TN	2212	NE3H	1668	WA3EKL	1204
K3WA	2796	K4FJ	2211	K3WI	1652	KG4USN	1199
KG4W	2789	N4ZH	2188	W3UL	1627	N3RR	1199
K1AR	2754	K1EFI	2180	K3AJ	1616	W3NRJ	1188
AB3CV	2705	K2BA	2153	K3KY	1606	N3OC	1183
N3MN	2657	N3QE	2147	KE3X	1588	W3US	1118
WB3AVN	2655	W3TN	2125	K3STX	1579	K3IXD	1090
W4FQT	2622	W3MR	2114	NA1DX	1564	N3COB	1049
N3KK	2575	K3PU	2107	N3AO	1527	W3OU	1046
W3BW	2550	N4JQQ	2080	WB2ZAB	1522	W4ZV	1046
K4SO	2499	W3GG	2071	AA4FU	1519	K4ZW	1038
K3JT	2495	N4NW	2068	K4HQK	1518	NE3K	1036
N4QQ	2494	AA4NC	2061	WB4DNL	1506	K4VX	1021



Membership News – Tim N3QE

So far in 2021, PVRC has added 4 new members. Please welcome them:

At the January Southwest Virginia chapter meeting, Jim NA4J was voted in. Jim has made notable efforts in several contests including ARRL DX CW and Russian DX.

At the February Virginia Metro chapter meeting, John KD4IZ was voted in. John has been on the air recently in the K1USN Slow Speed Tests (SST's).

At the February downtown DC chapter meeting, Connor KC3PRO was voted in. Connor (son of Ken KE3X) has been on the air in ARRL DX CW, ARRL DX SSB, and the Russian DX contests.

At the March North Carolina East chapter meeting, Carl W8WZ was voted in.

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 2021	
+ North American SSB Sprint Contest	0000Z-0400Z, Apr 4
+ JIDX CW Contest	0700Z, Apr 10 to 1300Z, Apr 11
+ OK/OM DX Contest, SSB	1200Z, Apr 10 to 1200Z, Apr 11
+ Yuri Gagarin International DX Contest	2100Z, Apr 10 to 2100Z, Apr 11
+ YU DX Contest	0700Z, Apr 17 to 0659Z, Apr 18
+ ARRL Rookie Roundup, SSB	1800Z-2359Z, Apr 18
+ Helvetia Contest	1300Z, Apr 24 to 1259Z, Apr 25

Editor's Last Word – John K3TN

Thanks to Dan K2YWE, Barry WR3Z, Ed N3CW, Dave W3MAM, Frank W3LPL, Barry K5VIP and Zory KB3VQC 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, screen shots of new contest software, or brief writeups on station improvements or contest war stories, send them in any format to jpescatore at aol dot com.

From the PVRC Treasurer – Dan K2YWE

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.

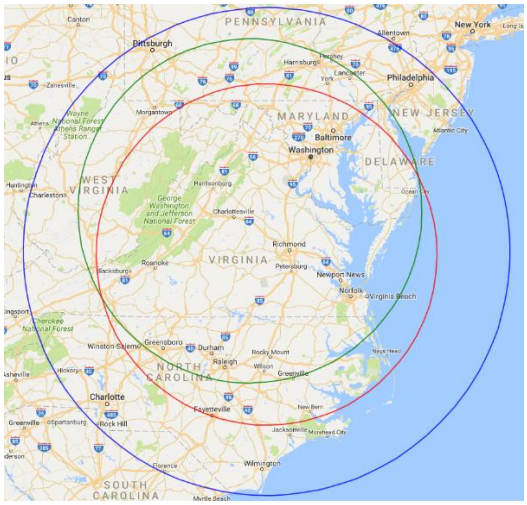
Direct donations to PVRC via Credit Card or PayPal may be made by clicking this "Donate" button and clicking the next Donate button that appears on your screen:

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.



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

Red: ARRL HF Circle
175 mile radius
Around 37.43168N,
77.858482W

Blue: CQ HF Circle
250 mile radius
Around 37.43168N,
77.858482W

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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DX Engineering Makes Spring Maintenance a Breeze!

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Coaxial Cable Assemblies

These low-loss cable assemblies are available in standard lengths with DX Engineering's revolutionary patented PL-259 connector. Use the online Custom Cable Builder at DXEngineering.com to build assemblies made to your exact specs. DX Engineering's coaxial cable is also available by the foot or in bulk spools.

DX ENGINEERING

Weatherproofing Kits

DX Engineering kits make it simple to protect your coaxial connections from damaging moisture. They include self-fusing 3M Temflex 2155 Rubber Splicing Tape to create a strong barrier followed by 3M Vinyl Electrical Tape for added UV protection. Choose from Super 88 Premium tape, Super 33, or economical Tartan 1710. Each kit will weatherproof 6 to 10 double connections. Also available are kits that include 3M tape and self-adhesive weatherproofing material. **Enter "Weatherproofing" at DXEngineering.com.**

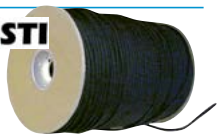
DX ENGINEERING

DX Engineering Clamps and Hardware

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.**

Guy Line Ropes

MASTRANT ANTENNA GUYING · PHILLYSTRAN · STI



Choose from non-conductive, non-stretching Mastrant ropes for wire antennas, supporting Yagi booms and elements, and guying verticals and antenna masts; Synthetic Textile Industries' double-braided, decay- and mildew-resistant Dacron/polyester ropes; and high-performance Phillystran guy lines made from Aramid fiber with a strength-to-weight ratio five times greater than steel.

DX ENGINEERING · ERICO · ALPHA DELTA COMMUNICATIONS INC. · GC

Grounding and Lightning Protection

Don't let spring storms zap your station. DX Engineering carries the gear you need to protect your investment, including Georgia Copper flexible copper grounding straps, lightning and surge protectors from PolyPhaser and Alpha Delta, Erico copper-bonded ground rods, and an array of DX Engineering gear: coaxial cable grounding brackets, universal copper grounding clamps, radio RF ground plane kits, and more. **Enter "Grounding" at DXEngineering.com.**

plasticase NANUK PROFESSIONAL PROTECTIVE CASES · RigExpert

RigExpert Analyzer and NANUK Case Combos

In the field, an antenna analyzer is especially at risk for weather and shock damage. We've paired select RigExpert Antenna Analyzers with perfectly sized NANUK equipment cases. Each case is filled with cubed, sectioned foam for custom configuration. Available separately or in combos. **Enter "Analyzer Combo" at DXEngineering.com**

Jet-Lube SS-30 Pure Copper Anti-Seize Lubricant

JET-LUBE

No station is complete unless it's well-stocked with Jet-Lube, a Ham's best friend. Use it on taps, lugs, aluminum tubing joints, copper grounding, and virtually anywhere you need excellent electrical and RF conductivity. Safe for aluminum, copper, tin, bronze, steel and galvanized hardware, it prevents oxidation and corrosion, and its superior anti-seize properties make it a must-have when making metal-to-metal connections. **Enter "SS-30" at DXEngineering.com.**

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Array Solutions Lightning Arrestors
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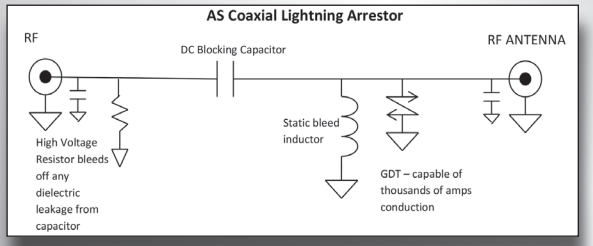
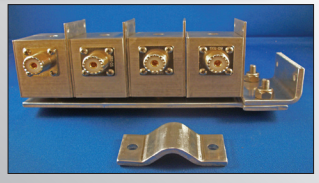
AS-300 Series arrestors are known for their reliability and performance. They feature easy mounting to plates, ground rods with our stacking bracket and also a convenient screw lug. The stacking bracket can be used on plates as well to save precious room in arrestor enclosures.

- Available in SO-239, Type-N, and 7/16 DIN
- connectors
- DC blocked, DC pass is available as a custom option
- Unique static bleed system with a UL approved Gas Discharge Tube, also ITU K 12 tested. This system usually prevents the GDT from ever firing unless a direct hit is taken. Saves your radio from static build up on large antennas.
- Models available for 3 kW, 5 kW, 10 kW and higher, details on website. Lower power available.
- FM low power broadcast model AS-303D FM
- Model AS-309H high-power single wire or ladder line arrestor, also DC block with static bleed
- Control line Arrestors for 8, 12, and 16 wires – 65V sparkover.
- Models for HF, VHF to UHF – Extremely low loss and Low VSWR

AS-303U

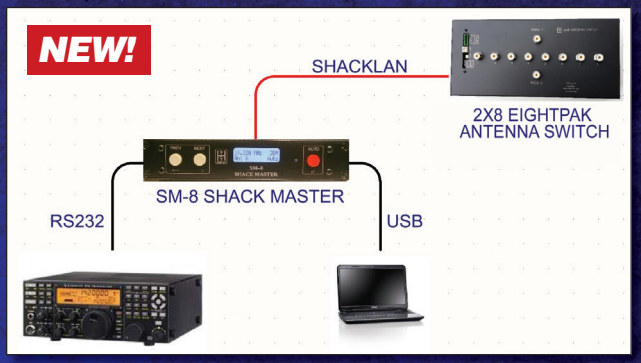




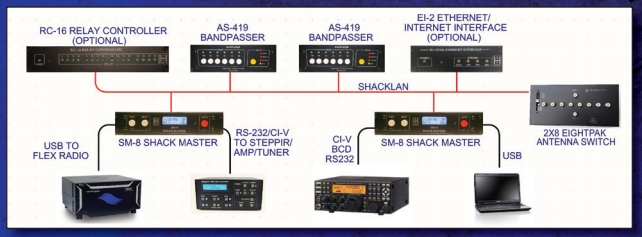
Hamation Station Automation

Hamation remote and Local Station Control products allow you to automatically or manually select antennas, bandpass filters, and control accessories. Accessories can be StackMatches, Antenna switches, antenna phasing systems, SteppIR controller, turning radios on and off, etc. All of this can be done directly from the Ethernet as well!

Wiring are simple phone cables that daisy chain to all the devices. Wireless control is also available to your tower-located switches. Call us to learn how to set up simple or complex systems. Below is a simple basic system that can switch antennas as you change bands. We can interface to any radio CAT port, not just RS232.



A more complex system could be a SO2R contest station as shone.



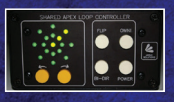
The Shared Apex Loop Array™!

Capture the whole band or the whole HF spectrum at once with the Shared Apex Loop Array 2nd Generation. Can be remote controlled over the internet or in your station. 8 directions of directivity.

The Shared Apex Loop Array™ is a revolutionary receiving antenna that will change the way that you listen to the radio! The patented design provides performance in a size and over a wide range of frequencies that will please both the rag-chewer and DXer alike.

Three models to choose from:

- AS-SAL-30 - optimized for VLF, BCB, 1.8-10 MHz
- AS-SAL-20 - optimized for BCB, and 1.8-30 MHz
- AS-SAL-12 - optimized for 3-30 MHz



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Switches for Six Antennas

5kW - DC to 6m

RATPAK – 1x6

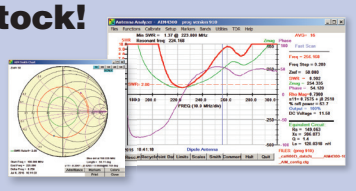
Choice of Multiple Controllers

SIXPAK – 2x6

VNAuhf Back in Stock!

Vector Network Analyzer

5 kHz -1.3 GHz **$1295**



StackMatch

The original, not the imitations. For phasing 2, 3, 4 and even 6 antennas. Also it can be used to combine vertical and horizontal polarized antennas to diminish fading.

PowerMaster II

RF Power and SWR meter. Couplers for 3 kW, 10 kW or higher available for HF/6 m. VHF and UHF couplers for 1.5 kW. You can connect up to 5 couplers to the display to monitor RF power on different TX lines.

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• 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-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-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-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-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-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-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

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

ID-5100A Deluxe

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-4100A | *VHF/UHF Dual Band Digital Xcvr*

• Compact, Detachable Controller for Flexible Installation • DV/FM Near Repeater Search Function • Apps for iOS™ and Android™ devices • Wireless Operation with VS-3 & UT-137 Bluetooth® Headset & Module • MicroSD Card Slot

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-R30 | *Digital/Analog Wideband Xcvr*

• 100 kHz to 3.3 GHz Super Wideband Coverage • P25 (Phase 1), NXDNTM, dPMRTM, D-STAR Mode • 2.3" Large LCD Display & Intuitive User Interface • MicroSD Card Slot for Voice & Data Storage • USB Charging & PC Connection

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

This device has not been approved by the F.C.C.

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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) • This device has not been approved by the FCC.

FT-991A | *HF/VHF/UHF All ModeTransceiver*

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

Rugged Construction in an Ultra Compact Body • Stable 100 Watt Output with Efficient Dual Internal Fans • 32-Bit IF DSP Provides Effective and Optimized QRM Rejection • 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 Reliable Output Power • Real Dual Band Operation (V+V, U+U, V+U, U+V) • 2-inch High-Res 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*

• Massive heatsink guarantees 80 watts of solid RF power • Loud 3 watts of audio output for noisy environments • Large 6 digit backlit LCD display for excellent visibility • 200 memory channels for serious users

FTM-7250DR | *C4FM/FM 144/430MHz Dual Band*

• 50 Watt Mobile • System Fusion-II Compatible • Operates Advanced C4FM Digital & Conventional FM Modes • 3 Watt Powerful & Clear Audio with Front Speaker

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 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-3DR *C4FM/FM 144/430 MHz Xcvr*

• 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 • Simultaneous C4FM/C4FM Standby • 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

FT-60R | *2M/440 5W HT*

• Wide receiver coverage • AM air band receive • 1000 memory channels w/alpha labels • Huge LCD display • Rugged die-cast, water resistant case • NOAA severe weather alert with alert scan

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