



PVRC Newsletter

January 2020

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 – Tom K3AJ

Taking a Position

From time to time, the officers of PVRC are approached (sometimes by members, sometimes by others outside of PVRC) to engage in advocacy by taking a position on some regulatory issue as an organization and filing comments in the related FCC proceedings. It is also conceivable that we could take an advocacy position with the ARRL or some other group. While there is nothing in the PVRC bylaws that would specifically prohibit us doing so, the current officer team has so far decided to refrain from that kind of action. We have spent a lot of time debating this matter and thought it would be appropriate to share some of the thinking behind this to the membership.

First and foremost, our mission and purpose are to promote excellence in radiosport through competition, helping our members improve their knowledge and skills and helping to develop new contesters - all while fostering camaraderie among our membership and just plain having fun! While as individuals, we all have (and as a club we encourage our members to have) diverse interests within amateur radio beyond contesting, contesting is the sole focus of PVRC as an organization. Since we are not a general interest amateur radio club, we believe that advocacy is, in most cases, beyond that scope.

Of course, we understand that regulatory actions that might seriously impact our ability to operate successfully during contests for some specific reason might warrant our involvement. Perhaps some action proposed by the ARRL or some other organization would directly impact contesting. But we have set a pretty high bar in terms of how direct that impact would have to be and so far, none of the matters brought to our attention have crossed that threshold.

A secondary consideration is that we believe we should only take an advocacy position if there is a very strong consensus on the part of the membership in support of that position. In some past cases where we have been approached to take a position, it became obvious that there was not such a consensus among the membership.

The current team of officers, therefore, will only consider engaging in advocacy when there is a clear and specific potential impact to contest operations and a strong

consensus among the membership exists. We would not take any advocacy position without consultation in advance with the Trustees. To be clear – these considerations reflect the thinking of your current officers and are not meant to imply that this creates policies which the future leadership of PVRC would be obliged to follow.

We strongly encourage our members to inform themselves regarding regulatory matters impacting any aspect of amateur radio and to take action as they see fit. We would suggest first taking the time to understand the position that the ARRL has taken as our national organization and advocate and consider working with your divisional director if you wish to influence ARRL's position. Of course, as a citizen you have the right to file your individual comments directly with the FCC as you see fit.

73 and Go PVRC!
Tom K3AJ
President, PVRC

PVRC Election Results – Tim N3QE

In the November-December 2019 PVRC Elections, 148 members took the effort to research and vote on a ballot listing 18 candidates for officers and trustees. They also voted on a bylaw amendment that changed the way trustees are elected.

Officers elected for 2020:

President: Tom Valenti K3AJ
Vice President: Mike Barts N4GU
Vice President: Jay Horman W3MMM
Secretary: Tim Shoppa N3QE
Treasurer: Dan Zeitlin K2YWE

Trustees elected for 2020:

Trustee: Guy Olinger K2AV
Trustee: Ty Stewart K3MM
Trustee: Don Daso K4ZA
Trustee: Brian McGinness N3OC
Trustee: John Kanode N4MM
Trustee: Pete Smith N4ZR
Trustee: Bud Hippisley W2RU
Trustee: Bud Governale W3LL
Trustee: Frank Donovan W3LPL

The bylaw amendment changing the way trustees are elected was approved with an 87% **FOR** vote by participating members.

Happy New Year, PVRC'ers!

TK0C CQ WW CW Operation Video Online – via CQ-CONTEST



The TK0C team has produced and posted a cool video of their multi-single operation in the recent CQ WW CW contest – look [here](#).

PVRC 2020 Galactic Lunch at Frost Fest – Jerome K8LF

This is another reminder the 2020 PVRC Galactic Lunch which will be held February 1st at Roma's. I would like to create a list of those expecting to attend.

Please Email me [here](#), Jerome K8LF by Jan 24th at if you expect to attend. I will send out a list of RSVP attendees on Jan 24th. The dining room at Roma's fits 53 people.

Date: February 1st, 2020 at 12 Noon

Location: Roma's 7240 Bell Creek Road in Mechanicsville, VA

You can order any of the lunch specials for \$8.95 plus tax and tip. Each lunch item includes a non-alcoholic cold drink. You can also order off the regular full menu which includes Gluten Free, Seniors Menu, Pizza, Salads, Wraps, Subs, and more. Something for everybody. Everyone pays for their own meal, so there is no need for advanced menu choices or payment. There is also a bar for those who wish it.

IMPORTANT: Roma has two locations in Metro Richmond, so go to the correct one at **7240 Bell Creek Road in Mechanicsville** and not the location on East Williamsburg Road. The restaurant is about 5 miles from Frost Fest and is an easy connection to I-295 at Exit 37 for your trip home. If you have attended the Galactic Lunch in the past, this is the same location.

Amateur Radio club in North Pole – Jim W3FA

Trivia: Did you know there is an Amateur Radio club in North Pole, Alaska? Arctic Amateur Radio Club KL7KC

Currently, no country owns the North Pole. It sits in international waters. The closest land is Canadian territory Nunavut, followed by Greenland (part of the Kingdom of Denmark). However, Russia, Denmark and Canada have staked claims to the mountainous Lomonosov Ridge that runs under the pole. Details [here](#) and [here](#).

H0H 0H0 - That's the Canadian postal code for the North Pole, a reference to the area's most famous mythical resident, Santa Claus.

No one actually lives at the North Pole. Inuit people, who live in the nearby Arctic regions of Canada, Greenland, and Russia, have never made homes at the North Pole. The ice is constantly moving, making it nearly impossible to establish a permanent community.

PVRC Officers:

President:	K3AJ	Tom Valenti
Vice President:	N4GU	Mike Barts
Vice President:	W3MMM	Jay Horman
Secretary:	N3QE	Tim Shoppa
Treasurer:	K2YWE	Dan Zeitlin

Trustees:

K3MM, N3OC, K2AV, K4ZA, W3LPL, N4MM, N4ZR, W2RU, W3LL

PVRC Charter Members (all SK):

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

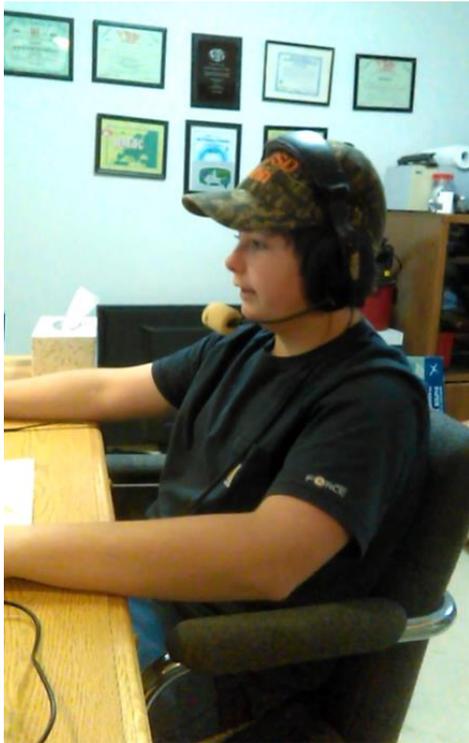
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Youth on the Air from W4RN in ARRL 10M – Mike W4RN



John N0JSD running 'em on phone at W4RN in the ARRL 10M test.

Laurel Chapter Recognizes Zory Glaser KB3VQC 5M Point Milestone



At the recent holiday luncheon jointly held by the PVRC Laurel Chapter, and the Laurel Amateur Radio Club (LARC), PVRC Chapter President, Doug Hart AA3S (R) presented Zory Glaser KB3VQC (L) with his PVRC 5M recognition plaque

DC Area Holiday Dinner Festivities – Dan K2YWE



Mechanically Accelerated Low Band Array – Hank K3YDX



CTRL-Click on the image to see a very clever way to accelerate launching those electrons from your lowband array.

Central VA Chapter 5M Medallion Award Winners – Ken K4XL



At a recent weekly meeting of the Central Virginia Chapter, 5M "upgrades" were awarded. Left to right in the photo, Ed Goss N3CW and Ken Grimm K4XL received their 10 Million and John Mann W4JAM received his 15 Million medallion. Sam Leslie, W4PK (not pictured) was awarded his 30 Million medallion.

NE3H@W3LL for CQ WW CW – Bud W3LL



Joe NE3H is a new add to the W3LL team. He drove 1-1/2 hours down from PA.

Annapolis Chapter November Meeting – Dan K2YWE



W2OK	K3LU
N3HMM	W2GPS
AE3D	W3YOZ
K3NDM	NA1DX
WK3A	K3RA
KD4D	KW2A

2018-2019 Chapter Awards Tally

Olympic Medals (G-S-B)	99
5M Progress Awards (1-4M)	27
5M Plaques	9
5M Endorsement Plates (5M-150M)	52
new Top Gun Perpetual Trophy (K3MM)	1
new SS Chapter Perpetual Trophies	3
President's Leadership Awards	5

CWops 10th Anniversary QSO Party

In January 2020 the [CWops](#) organization will be celebrating its 10th anniversary with a month long QSO party with CW activity on all the HF contest bands. Qualifying QSOs for non-members must be made with members, while members can work anyone. There will also be many special club and one-off celebratory calls active and these will also count.

Full rules and much more are to be found [here](#).



Membership News – Tim N3QE

PVRC did not add any new members in the latest reporting period.

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

Upcoming Contests – from [WA7BNM](#)

January 2020

+ ARRL RTTY Roundup	1800Z, Jan 4 to 2400Z, Jan 5
+ North American QSO Party, CW	1800Z, Jan 11 to 0559Z, Jan 12
+ North American QSO Party, SSB	1800Z, Jan 18 to 0559Z, Jan 19
+ CQ 160-Meter Contest, CW	2200Z, Jan 24 to 2200Z, Jan 26
+ REF Contest, CW	0600Z, Jan 25 to 1800Z, Jan 26

Editor’s Last Word – John K3TN

Thanks to for contributions to the first PVRC newsletter of the new decade to Jerome K8LF, Jim W3FA, Mike W4RN, Zory KB3VQC, Dan K2YWE, Hank K3YDX, Ken K4XL and Bud W3LL.

I held off on sending out the newsletter so we could get the election results in. I’ve got travel planned for January so may miss out on some of the NAQP action this time around. If I can get everything together in time, I may be able to sneak in the CW test – always one of my favorites.

Frank W3LPL has pointed out some Cycle 25 sunspots made their appearance in 2019, so 2020 could and should be the start of the new cycle. When will we see 10 meters with wall to wall DX signals most of the day??

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](mailto:jpescatore@aol.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:



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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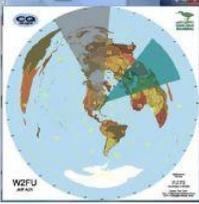
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Select-8 Wireless Remote Coax Switch

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Start the New Year with Great Products from DX Engineering!



RF-KIT RF2K-S Amplifier

DX Engineering is the exclusive North American retailer of RF-KIT's powerful new RF2K-S solid-state linear amplifier, featuring full legal limit capabilities across 160 through 6 meters. It comes with updated fast PIN diode switching, 1,500W RF power output, low-noise speed-controlled fans, internal antenna tuner, and dual LDMOS devices. Available as a kit. Fully assembled model has not been approved by the FCC and may not be offered for sale or lease, or be sold or leased, until approval of the FCC has been obtained. Enter "RF-KIT" at DXEngineering.com to learn more.



DSP Noise Eliminating Speaker

Give your base station a serious upgrade with the new bhi NES10-2MK4 DSP Noise Eliminating Speaker. This compact unit features noise cancelling capabilities from 8 to 40 dB, significantly improved signal to noise ratio, and eight levels for filtering QRM/QRN. Enter "bhi" at DXEngineering.com for their full lineup of speakers and DSP devices.



AlexLoop Walkham Premier Portable Magnetic Loop Antenna

DX Engineering is pleased to now offer the upgraded model of the widely acclaimed lightweight, transceive QRP magnetic loop antenna by PY1AHD, Alexandre Grimberg. Ideal for HOA restricted areas or for traveling Hams, the low-profile antenna (collapsible for transport in an included 16.1" x 10.6" x 3.5" carrying bag) features lightning-fast tuning of frequencies between 6.95 MHz and 30 MHz, ultra-discreet installation, and low-loss gold-plated PL-259 connectors. Available with or without built-in manual tuner. Enter "AlexLoop" at DXEngineering.com for further details.



Complete Telescopic Fiberglass Tubing and Cam Lock Clamp Kits

These kits make it easy to set up a reliable temporary antenna mast at home or in the field. They feature durable, smoothly telescoped fiberglass tubing collapsible to either 4 or 7.5 feet for convenient transport. Sections are secured in place with easily adjustable cam lock clamps. Available in heights of 15, 25, and 46 feet. Enter "Cam Lock Kit" at DXEngineering.com for complete specs.



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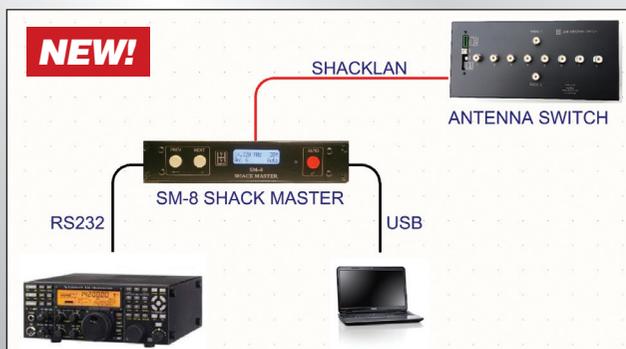
Professional Grade Equipment from Array Solutions



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 chains 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 shown.



JK Antennas Are Now Sold by Array Solutions

High Quality HF Antennas for the Contester and DXER. We Focus on Quality and it Shows in Everything We Do. Call or email for antenna systems.



RatPack Remote Antenna Switch

Six antenna remote switch with rotary switch controller. Push button controllers available. HF and 50 MHz. Power rating 5 kW CW.

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.

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.



OM Power Amplifiers, The New RF Power Benchmark!



OM Power Amplifier Sales Program

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OM10C amplifier combiner

The automatic amps can drive an antenna switch of up to 10 antennas and select up to ten bandpass filters applies to all automatic models

OM4000HF	Manual 160-10 m 4 kW
OM4000A	Automatic 160-10 m 4 kW
OM4000HF MARS	MARS and Commercial HF
OM2500HF	Manual 160-10 m 2.5 kW
OM2500A	Automatic 160-10 m 2.5 kW
OM2000+	Manual 160-6 m 2 kW
OM2000+ MARS	MARS and Commercial HF
OM2000A+	Automatic 160-6 m 2 kW
OM10C Combiner	Combiner for two OM amplifiers
OM10C 4000HF MARS	Two OM4000HF manual tuned amps and combiner package
OM10C 4000A MARS	Two OM4000A automatic tuned amps and combiner package

OM4000A - OM4000HF OM2500A - OM2500HF

The A-series are automatic band change amplifiers.

The HF-series are manual band change and tuning amplifiers.

OM4000: 4 kW SSB and CW, 3 kW RTTY, AM and FM

OM2500: 2.5 kW SSB and CW, 2 kW RTTY, AM and FM

OM2000A+ - OM2000+

The **OM2000A+** is the lightest and smallest 2000 W fully automatic HF/6 m power amplifier in the market. Its manual tuning version, the **OM2000+**, is our affordable unmatched best-seller.

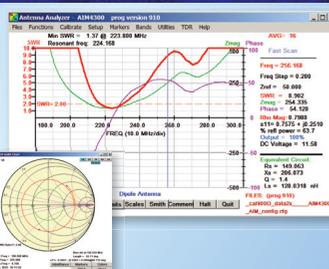
Frequency coverage:

Amateur bands 1.8 - 29.7 MHz including WARC + 50 MHz

Power output: 2000+ W in SSB/CW on HF bands, 1500 W in RTTY
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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



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



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 Software Defined Receiver

• 10 kHz to 3 GHz Super Wideband Coverage • P25, NXDN™, dPMR™, D-STAR Mode • Large Dot Matrix LCD Display w/ Quick Spectrum Scope • SD Card Slot • Remote Control Function



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-7700 | HF/50MHz Transceiver

The Contester's Rig • HF + 6m operation • +40dBm ultra high intercept point • IF DSP, user defined filters • 200W output power full duty cycle • Digital voice recorder



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



IC-R30 | Digital/Analog Wideband Xcvr

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



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-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

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FTDX3000 | 100W HF + 6M Transceiver

- 100 Watt HF/6 Meters • Large and wide color LCD display • High Speed Spectrum Scope built-in • 32 bit high speed DSP /Down Conversion 1st IF



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-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



FT-857D | Ultra Compact HF/VHF/UHF

- 100w HF/6M, 50W 2M, 20W UHF • DSP included • 32 color display • 200 mems • Detachable front panel (YSK-857 required)



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-100DR | C4FM FDMA/FM 144/430 MHz Xcvr

- Power Packed System Fusion Transceiver • High Audio Output Power • Rugged Powerful Transmitter • Integrated 66ch High Sensitivity GPS • 1200/9600 APRS Data Communications



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 Flash-light, 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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TS-990S | 200W HF + 6M Transceiver

- World's first dual TFT display • 200W output on all bands
- ±0.1ppm TCXO ensures both high stability and reduced power consumption • Triple 32-bit DSP's dedicated to main/sub receivers and band scope • Main receiver employs full down conversion, new mixer & narrow band roofing filters • Third order intercept point (IP3) +40dBm for highest level of RX performance (main receiver)

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TM-D710G | 2M/440 Dualband

- V+V/V+U/U+U operation • Built-in GPS • Built-in TNC for APRS & DX-Cluster operation • 50W 2M & UHF • 1,000 memories • Dual receive • Green or amber backlight colors • Latest APRS firmware w/new features • Sky Command II remote functions

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INSTANT SAVINGS



TS-480SAT/HX | HF + 6M Transceiver

- 480HX 200W HF & 100W 6M (no tuner) • 480SAT 100W HF & 6M w/AT • Remotable w/front panel/speaker • DSP built-in

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INSTANT SAVINGS



TS-890S | HF/50MHz Transceiver

- Receive performance on a whole other level from narrow bandwidth roofing filters that only full down conversion can provide • CW Morse code decode/encode possible with stand-alone unit • 150dB Blocking dynamic range (BDR) • Expanded touch operation scope • Kenwood Sky Command® II Support • Remote operation achieved without host PC Direct remote-control function (KNS)

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INSTANT SAVINGS



TM-V71A | 2M/440 DualBand

- High RF output (50W) • Multiple Scan • Dual receive on same band (VxV, UxU) • Echolink® memory (auto dialer) • Echolink® Sysop mode for node terminal ops • Invertible front panel • Choice of green/amber for LCD panel • 104 code digital code squelch • "Five in One" programmable memory • 1000 multifunction memory

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INSTANT SAVINGS



TH-D72A 2M/440 HT w/extended RX

- 5W TX, RX 118-524 MHz, VxU, VxV, UxU
- APRS w/built-in 1200/9600 TNC • Built-in GPS, Built-in USB, digipeater • Echolink® compatible, • Mil-Spec STD810

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\$300
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TS-590SG | HF/50MHz Transceiver

- Equipped with 500 Hz/2.7 kHz roofing filter as standard • ALC derived from TS-990S eliminating spike issues • Antenna output function (shared with DRV connector) • CW - morse code decoder function • Improved 1st mixer • New PFB key with multi-function knob • New split function enabling quick setting • LED backlight with selectable color tone

\$25
INSTANT SAVINGS



TM-281A | 2 Mtr Mobile

- 65 Watt • 200 Memories • CTCSS/DCS • Mil-Std specs • Hi-quality audio

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INSTANT SAVINGS

TH-D74A 2M/220/440 HT w/D-STAR!

- D-STAR compatible • APRS ready w/built in GPS • Color weather station information • Built-in KISS mode TNC • High-performance DSP voice processing • Standard compatibility for Bluetooth

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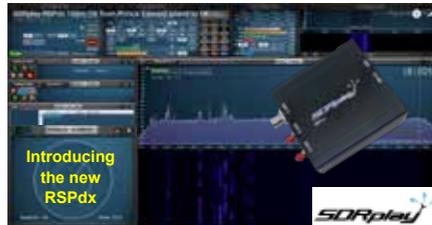
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TX-455

- 55' freestanding crank-up • Handles 18 sq. ft. @ 50 mph • No guying required • Extra-strength construction • Can add raising and motor drive accessory • Towers rated to EIA specifications • Other models available at great prices!



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218XATC-PL-(length) RG8x (240UF) w/PL259 Connectors Each End. Weather-Proof Heat Shrink Tubing.

- Stranded Center Conductor.
- 95% TC Braid + bonded 100% Foil Shield.
- Very Flexible, Light Weight, and Smaller than RG8 sizes.
- Non-Contaminating-UV Resistant-Direct Burial-Black Jacket.



233/2-G4-(length).

- Unique design (Nickel Grommets 4" Spacing) allows for easy attachment to a vehicle's body or truck bed to create a "ground-plane".
- Good option as a "buss-bar" in the shack.
- 1/2" wide tinned copper 38x48x8/384 10ga 53 Amps.
- Stocked in 1.5', 3', 5', and 10' foot lengths.

ZUMspot-kit



ZUMRadio

ZUMspot is an advanced radio module kit. When paired with a Raspberry Pi and the MMDVM software it becomes a small and efficient multi-mode digital hotspot.

- Supports D-STAR, DMR, System Fusion, P-25 and NXDN
- Open source software (MMDVM) and hardware design
- Onboard LEDs to show status (Tx, Rx, Mode)
- 1.3 inch OLED screen
- Mounts cleanly on all current Raspberry Pi's including Pi Zero

The ZUMspot Kit Package Includes:

- ZUMspot RPi UHF board and antenna fully assembled and tested
- Pi Zero WH (Wireless With Header Installed)
- Nylon standoffs
- Pre-imaged 16 GB MicroSD card with Pi-Star software
- 1 Year warranty

Available exclusively from all HRO locations!

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