



PVRC Newsletter

March 2020

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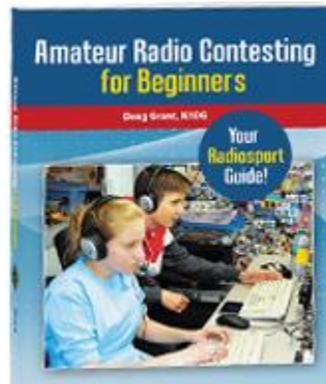
Meeting Info: <http://www.pvrc.org/chapters.htm>

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

President's Letter – Tom K3AJ

Trivia question – when is the last time the President's Letter was a book review? No, I don't know either. This month I am pleased to review a terrific new book.

Amateur Radio Contesting for Beginners **Doug Grant, K1DG**



This is a brand-new title from the ARRL. I was very excited to see it, as any tool to help us encourage, mentor and develop new contesters supports one of the most important things we can do as individuals and as a club.

Doug's resume and accomplishments as a contester are without question, and he matches that background with great skill as a writer. His style is easy to absorb and engaging. The text is massively supported with pictures and graphics.

The topics covered are thorough indeed and hit all the right areas. Everything the beginner wanted to know but was afraid to ask is in here. Topics like understanding contest exchanges and multipliers, how a typical contest QSO progresses, running vs. pouncing, what the typical categories of entry are, logging software and how to submit a log are examples of the real basics. But there is also a lot of information on contesting strategies, station set up, ergonomics and similar contesting topics that even intermediate contesters could benefit from. Equipment selection, performance and

FrostFest Selfies



From Bob K4NTO: Booth babes Tim N3QE and Mike N4GU, joined by Tom K3AJ at the PVRC table.



From Dan K2YWE: The Galactic Lunch crowd

Contesting 1929 Style – Or Just Having Radio Fun - Bruce WK3A



1929 #27 Parallel Triode Tubes

I built this little gem a few weeks ago. I had just retired in October and it was one of those things I had thought about for a long time, but never actually got to it. After taking the transmitter to the January PVRC Meeting in Annapolis this week, a lot of curiosity and questions came up – the big one was “why do something like this”? Another was “where is the crystal?” My guess is that Frank W3LPL had posted something on the reflector a year ago about this “Bruce Kelly Memorial Contest” and to listen for strange signals. I jumped right in on it but unfortunately modern rigs can’t compete but do help with the other ops scoring.

Since was a kid I’ve always been fascinated since I was about tubes and the like, so I promised myself to get something going. I remember Dad and I taking **all** the tubes out of the TV and going to the drug store and putting them in that huge strange looking tube tester device. Sometimes successful, sometimes not finding a problem. Then voila, the kid opens the cabinet and a brand new 6JE6 for \$5.95 appears.

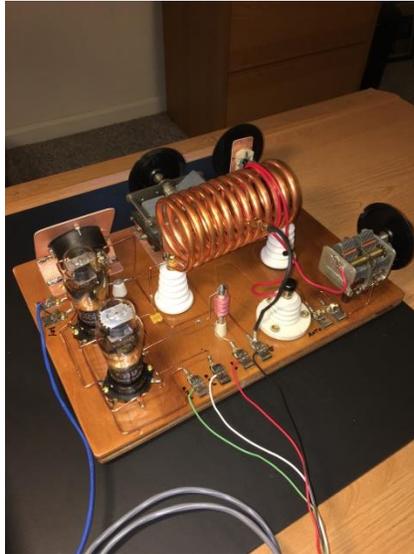
Over the years I had collected pieces and parts like everyone else, someday to homebrew something. Gee, why wait until you were 65, Bruce? So, away we went digging through the junk box, scavenging eBay, digging in the National Electronics Museum junk, and finally some good pieces from Dan K2YWE. Oh yeah, unfortunately the power supply was to be modern. Mouser Electronics did their part, too - and yeah, the local ACE hardware was visited a bunch of times. There is 10 feet of ¼” ice maker copper tubing in that 80M tank coil.

I missed the real contest for this rig, the Bruce Kelly in November, but I did make it by two slim days ahead for the Linc Cundall Memorial contest. The Kelly is for pre-1929 rigs and the Cundall is for 1950 and earlier, so guys with the WWII surplus stuff can compete. The transmitter had not been connected to the antenna yet, but I had tweaked it quite a bit on a dummy load to get it sounding right, and some sort of power out of it - a huge 2.6 watts. The power oscillators are not terribly efficient so 30% -40% is about it. It runs 40 ma or so at 250 volts.

Since it is damn hard to QSY this thing, running is the way to go, and the very first CQ “AWA” resulted in a very first QSO with NJ station. Wow, the thing actually works! After a few more QSO’s, I started to get a bunch of calls, little did I know that Dan K2YWE had

spotted me and a short but exciting run developing. Who would have guessed? When the band “dried up” around 10:30 I got tired of the straight key - it had been 15 years since I used one of those, I ended up with 13 QSO’s, and the best DX was Minnesota for 1034 miles @2.6 watts.

So, if you hear something sounding funny on the bands give them a call, hopefully their rig works well enough to keep the OO reports from rolling in. Answered a call a few years ago on 80M and it was a guy who made a transmitter out of parts from a broken CFL lamp and a 3.551 crystal. What a strange tone that rig had. I was getting pretty much 559’s and a couple of 577’s – what’s a 577?



Careful where you touch - it's got me once already!

Matt KB3IKC Racking Up Points at K3AJ during WPX RTTY – Bob ND3D



“A Family Affair – The R. L. Drake Story” – from KB6NU Blog



I was never owned a Drake, but I used to drool over their ads in QST as a Johnny Novice ham and they were ubiquitous in contesting for many years. Hue K7HUE posted a review of what looks like an interesting book by KB9AT about the history of the R.L. Drake company on KB6NU's blog [here](#).

Central Virginia Chapter Meetings and Presentations – Geo N4UA



On 19 Feb 2020, the Central Virginia chapter held an extended session at the Lynchburg Red Cross building. The advertised topics were Morserunner/N1MM+ integration, code readers, particularly CW GET, and the use of local skimmers in contests.

Knight, NJ4Q, gave an excellent presentation on setting up and operating Morserunner from N1MM. In attendance were NN4RB, N8AID, W4WWQ, K4CUE, N4NQY, N3AC, KC4D, WD4KQI, K4YCR, N3CW, N4UA, K4XL, W4JAM and W4PK.

Rick NN4RB next showed the details of getting CW GET up and running. Finally, Mark N2QT showed pros and cons of setting up a local skimmer, including a short discussion of locating the line between Assisted and non-Assisted operation.

PVRC Contest Award Sponsorships – Dan K2YWE

One of the ways in which PVRC contributes to the well being of radiosport is by sponsoring major contest awards. Below is a list of the awards our club is sponsoring this season. They were the same last year:

ARRL Sweepstakes:

- SO LP Phone Atlantic Division
- SO HP CW Roanoke Division

ARRL International DX Contest:

- SO HP CW North America

ARRL June VHF Contest

- SO HP Atlantic Division
- SO HP Roanoke Division
- SO LP Atlantic Division
- SO LP Roanoke Division

CQ WW RTTY Contest - World Club

CQ WPX RTTY Contest -World Club

CQ WW DX Contest SSB - SOAB EUROPE High Power

CQ WW DX Contest SSB - SOAB USA High Power

CQ WW 160 CW - Single Operator Assisted USA Zone 5

You will see that the mix is:

- CW-3, PH-3, RTTY-2
- HP-7, LP-3
- HF-8, VHF-4
- SO-10, CLUB-2
- USA/NA-9, WORLD-2, EU-1

The officers annually review the club’s sponsorships and occasionally make adjustments, with trustee concurrence, that they believe are in line with the best interests of the membership and the contest community as a whole. Some PVRC plaque sponsorships have become a tradition. Choices are limited when changes are considered, as first refusal is given to the previous year’s sponsors. Award sponsorship expenses this year were in budget at \$840. We expect some moderate escalation next season.



Master.dta File Editor Tool – John K3TN

If you run your own skimmer, or just like to hack N1MM, I ran across VE3NEA freeware tool to edit the .dta file used in N1MM for the SuperCheckPartial – info [here](#).

KC0W did suggest one use: as an alternative to a history file for small contests, like the PVRC reunion, to highlight members.

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](#)

March 2020	
+ ARRL Inter. DX Contest, SSB	0000Z, Mar 7 to 2400Z, Mar 8
+ Stew Perry Topband Challenge	1500Z, Mar 14 to 1500Z, Mar 15
+ North American Sprint, RTTY	0000Z-0400Z, Mar 15
+ BARTG HF RTTY Contest	0200Z, Mar 21 to 0200Z, Mar 23
+ Russian DX Contest	1200Z, Mar 21 to 1200Z, Mar 22
+ CQ WW WPX Contest, SSB	0000Z, Mar 28 to 2359Z, Mar 29

Editor’s Last Word – John K3TN

Thanks to Bob K4NTO, Dan K2YWE, Bruce WK3A, Bob ND3D and Geo N4UA contributions to this issue of the PVRC newsletter.

Fresh new sunspots are showing up – maybe next spring 10m and 15m will be at least back in the menu, if only as appetizers or dessert if not yet the main course. Part of my spring cleaning has been donating some of my unused gear to PVRCers that are mentoring young contesters. If you have some worthy young hams in mind, or equipment to donate – let me know, I'll put a notice in the newsletter. Let's see how many CKs of 20 (besides the University club stations!) that we get to show up in Sweeps this year!

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.

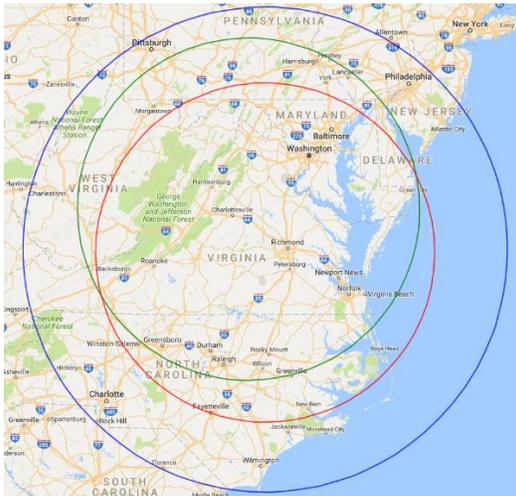
Direct donations to PVRC via Credit Card or PayPal may be made by clicking this "Donate" button and clicking the next Donate button that appears on your screen:



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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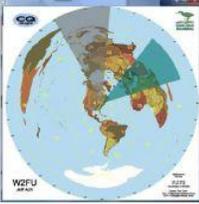
- USB and wireless relay controls
- Utilizes your existing antenna switches



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DXE-AS25G



DXE-MASTLOCK

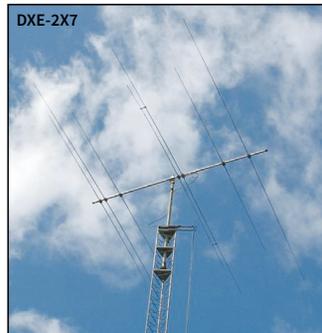


DXE-SSGC-2P

DX ENGINEERING

Tower Accessories

Upgrade your towers with DX Engineering designed and manufactured accessories. These include Advanced Design Thrust Bearings (for 2" and 3" O.D. masts); Tower Accessory Shelves; the Mastlock, which locks your tower mast in position for worry-free antenna maintenance; and stainless steel Genius Clamps for mounting round tubing and pipe members perpendicular or parallel to each other. We also carry guy and antenna support rope, tail kits, mast kits, hardware and more. Enter "Tower Accessories" at DXEngineering.com for complete details.



DXE-2X7



DBO-OB10-5M-P

DX ENGINEERING

Yagi Antennas

Elevate your contesting prowess with a high-performance HF Yagi antenna. Our lineup includes DX Engineering's own 20/15/10M Skyhawk™ and 17/12M Skylark™; rugged EAntenna Yagis exclusively offered in North America by DX Engineering; and more than 65 elite directional Yagi and log cell Yagi antennas German-engineered by OptiBeam. Enter "Yagi" at DXEngineering.com to find antennas, Yagi stacked systems and other accessories.

OPTIBEAM



DX Engineering's Amateur Radio Blog for New and Experienced Hams. Visit OnAllBands.com for information you can use to improve your on-air experience.



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Towers

Make DX Engineering your go-to source for proven antenna towers. Choose from Rohn/American Towers, including Rohn G-Series guyed towers and Amerite 25 Series bracket towers; lightweight freestanding aluminum towers from Universal; and packaged tower kits from TBX, which come with rotor plate, top plate, hardware pack and top section steps. Enter "Tower" at DXEngineering.com to view your options.



Coaxial Cable and Tool Kits

DX Engineering low-loss cable assemblies are available in standard lengths with our patented PL-259 connector. Use the online Custom Cable Builder at DXEngineering.com to build assemblies to your exact specs or purchase by the foot or in bulk spools. Plus, get everything you need to prep and install soldered, crimp-on or Snap-N-Seal® connectors on your coax. Complete kits include cable strippers, grippers, replacement blades, braid trimmer, cable shear and carrying case. Individual tools also sold separately.

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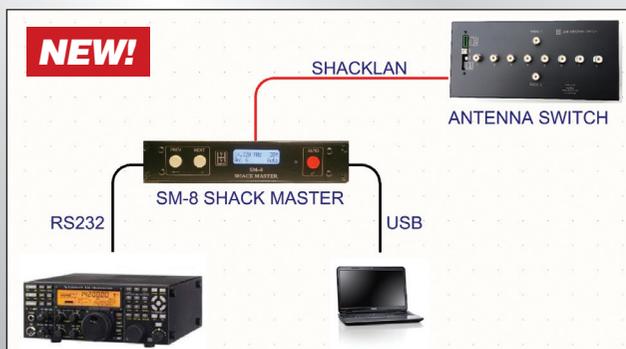
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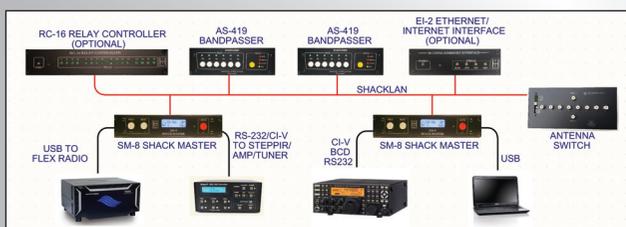
Hamation Station Automation

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

Lower prices than the competition's equivalents, most modern design, and strongest warranty in the market!



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.

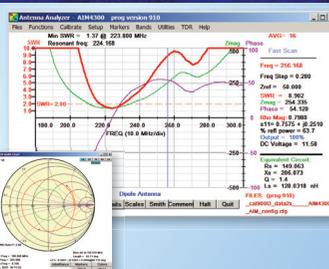
Frequency coverage:

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 Contesters' 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

ID-51A PLUS2

VHF/UHF D-STAR Portable

• RS-MS1A, free download Android™ application • New modes for extended D-STAR coverage • Terminal Mode & Access Point Mode allow D-STAR operation through Internet • DV & FM repeater search function • Dplus reflector link commands



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- Super Sharp "Roofing" Filters • High Performance Yaesu Custom- designed 32-bit Floating Point DSP • True Analog Meter Precision



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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INSTANT SAVINGS



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

- World's first dual TFT display • 200W output on all bands
- ± 0.1 ppm 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)

Call For Special Price!

\$40
INSTANT SAVINGS



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

Call For Special Price!

\$250
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

Call Now For Low Price!

\$700
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)

\$25
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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\$50
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

Call For Special Low Price!

\$300
INSTANT SAVINGS



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

Call For Special Low Price!

\$50
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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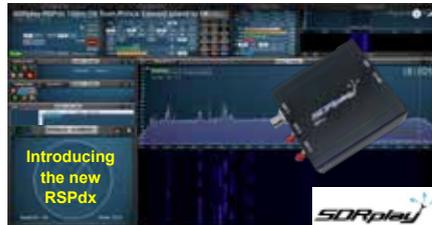
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TX-455

- 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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