

The EVENT HORIZON OF DX TS-990S

Dual TFT Display & Dual Receiver HF/50 MHz Transceiver



The main receiver has an IP3 in the +40 dB class, and the sub-receiver is the already famous TS-590S receiver. Capable of receiving two signals at once, on different bands. 7-inch and 3.5-inch color TFT displays allow displaying of independent contents. Simplification of complex operations at a glance. Make no mistake, this is not a toy. Finally a serious tool is available for getting the very most from your hobby - of course it's a Kenwood.

- Covers the HF and 50 MHz bands.
- High-speed automatic antenna tuner.
- USB, Serial and LAN ports.
- Various PC applications (free software): ARCP-990 enabling PC control, ARHP-990 enabling remote control, and ARUA-10 USB audio driver.

- Clean 5 to 200 W transmit power through the 50 V FET final unit.
- Built-in RTTY and PSK.
- Three Analog Devices 32-bit floating-point arithmetic DSPs.
- DVI output for display by an external monitor (main screen display only).



Scan with your phone to
download TS-990S brochure.

KENWOOD

Customer Support: (310) 639-4200
Fax: (310) 537-8235


www.kenwood.com/usa



ADS#27415

EchoLink® Ready



TM-V71A

With the Kenwood TM-V71A you have a choice of where you want your speaker, on the top or on the bottom of the radio. Simply remove the faceplate and flip the main body, then reattach the face, it's that simple! Yet another Kenwood 1st, this dual band transceiver has ten dedicated EchoLink® memory channels as well as EchoLink sysop-mode operation. EchoLink connection to your PC via the optional PG-5H cable kit is easy with no expensive interface needed.

EchoLink® is a registered trademark of Synergenics, LLC. For more information please see: www.echolink.org.

KENWOOD

Customer Support: (310) 639-4200
Fax: (310) 537-8235



Scan with your phone to
download TM-V71A brochure.



Large dual color amber or green thirteen segment LCD.



www.kenwood.com/usa



ADS#27515

Escape with the TM-281A

On or off the road, Kenwood's TM-281A is a mobile radio you can always count on.



As tough as nails, this MIL-STD-compliant transceiver delivers powerful performance, excellent audio clarity, and a host of advanced features. It offers superb operating ease day or night thanks to the large backlit LCD and illuminated keys. So the next time you take off, take the TM-281A.

KENWOOD

Customer Support: (310) 639-4200
Fax: (310) 537-8235



Scan with your phone to
download TM-281A brochure.

www.kenwood.com/usa



ADS#27615

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Far Circuits – www.farcircuits.net	A-12
Force 12/InnovAntennas – www.Force12Inc.com	A-13
Hagerty Radio Company – www.WA1FFL.com	A-16
Ham Radio Outlet – www.hamradio.com	A-6, A-7
HamTestOnline – www.hamtestonline.com	A-18
Hy-Gain – www.hy-gain.com	A-5
Kenwood USA Corporation – www.kenwoodusa.com	A-i, A-ii, A-iii
MFJ Enterprises – www.mfjenterprises.com	A-2
Mosely Electronics – www.mosley-electronics.com	A-15
Palomar Engineers – www.Palomar-Engineers.com	A19
Pro.Sis.Tel – www.prosistel.net	A-18
Radio Club of JHS 22 NYC – www.wb2jkl.com	A-17
S & G Engineering – www.w8AFX.com	A-12
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MFJ-989D Tuner \$409⁹⁵

Legal-limit antenna tuner has AirCore™ inductor, 500pF air variable capacitors, fast-tune crank, high voltage balun, 3" meter, dummy load, ant. switch.

MFJ-1778 G5RV \$44⁹⁵

Efficient, all band G5RV antenna is only 102' long, has 32.5' ladder line matching section ending in an SO-239 for feedline. Operate 80-10 Meters with tuner. 1500 Watts.

MFJ-260C Dry Load \$39⁹⁵

300W VHF/HF Dry Dummy Load handles full load for 30 seconds. Derating curve to 5 minutes. SWR below 1.1:1 to 30 MHz. 1.5:1 from 30-650 MHz. MFJ-264, \$74.95. 1.5kW load.

MFJ-270 Surge Protect \$19⁹⁵

Safeguard your expensive equipment. Shunts to 5000 Amps of peak impulse current harmlessly to ground. SWR less than 1.1:1, less than 0.1 dB loss. Use to 1000 MHz, 400W PEP.

MFJ-4245MV 45A PS \$149⁹⁵

Switching power supply. 45A surge/40A continuous. 9-15 VDC out. 85-260 VAC in. Low ripple, highly regulated. 5-way posts, cig lighter, quick connects. 5 lbs, 7/8" Wx4 1/4" Hx 9 1/2".

MFJ-868B Giant Meter \$149⁹⁵

Largest HF+6M SWR/Wattmeter in the world has 6.5" diagonal scale. 20/200/2000W ranges.

MFJ-281 Speaker \$12⁹⁵

Get speech fidelity you never knew existed! 3" speaker, 8W, 8 Ohms impedance, 6' cord, 3.5 mm mono.

MFJ-108B 24/12 Clock \$21⁹⁵

Read both UTC and local time simultaneously. BIG 5/8 inch digits! Solid brushed aluminum frame. 4 1/4" Wx2Hx1D".

MFJ-259C Analyzer, \$299⁹⁵

World's best selling antenna analyzer covers 530 KHz to 230 MHz, LCD, SWR and impedance or SWR bargraph, analog meters, signal generator, freq counter.


MFJ-269C Analyzer, \$399⁹⁵

Upgraded MFJ-269C has all features of MFJ-259C plus 415-470 MHz, 12-bit A/D converter, characteristic impedance 0-600 Ohms, coax calculator, parallel equivalent R/X.


MFJ-225 Analyzer, \$299⁹⁵

Plots graphs on MFJ graphical analyzer. Two-port VNA measurement. Display/print on PC using IG-miniVNA freeware. DDS frequency control. 1.5-179.9 MHz


MFJ-949E Tuner \$189⁹⁵

More hams use MFJ-949E tuners than all others in the world! Large 3" cross-needle SWR/Wattmeter, 8 position antenna switch, dummy load, Match any antenna 1.8-30 MHz.

MFJ-929 AutoTuner \$229⁹⁵

Compact 200 Watt IntelliTuner™ tunes any unbalanced antenna *ultra-fast!* 20,000 Virtual Memories, Antenna Switch, Efficient L-network, Matches 6-1600 Ohms from 1.8-30 MHz.

MFJ-16XX HF Sticks \$14⁹⁵

Rugged, sleek 6-40M mobile HamTenna™ antennas, \$14.95 each band. 250 Watts, 7' extended, collapse to about 4 feet for storage. Quickly screws into any 3/8-24 female mount for quick band changing. 60-75M, \$19.95.

MFJ-1702C Ant Switch \$39⁹⁵

2-position antenna switch has center ground, auto grounding of unused position, 2.5 kW PEP and works to over 500 MHz. Lightning surge protection. SO-239 Connectors. MFJ-1704, \$79.95. 4 positions.

MFJ-392B Headphones \$24⁹⁵

Perfect for Ham Radio and shortwave listening -- SSB, FM, AM, data and CW. Super lightweight (8 oz.) padded headband and ear cushioned design. Each earphone has own volume control. 3.5mm/1/4" plugs, 9' cord.

MFJ-4275MV 75A PS \$259⁹⁵

Switching power supply. 75A max/70A cont. Great for ALS-500M solid state amp. Adjustable 4-16 VDC. Input 110/220 VAC. Battery charger. 10.5 lbs.

MFJ-1026 Noise Cancel \$199⁹⁵

Wipe out interference! 60 dB null. SSB/CW/AM/FM. BCB to lower VHF. RF sense T/R switch.

MFJ-461 CodeReader \$89⁹⁵

Decodes and displays Morse code on two-line high-contrast LCD. Just hold close to receiver.

MFJ-1724B Mobile \$24⁹⁵

World's Best Selling 2Meter 440 MHz magnet mount antenna has 3.5" magnet, 19" stainless steel whip, handles 300 Watts, 15 feet coax.

MFJ-969 Tuner \$229⁹⁵

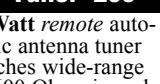
World's only 6-160 Meters 300 Watt AirCore™ Roller Inductor antenna tuner gives you absolute minimum SWR. 3" cross-needle meter, true peak reading meter, dummy load, 8 pos. antenna switch.


MFJ-993B AutoTuner \$269⁹⁵

Select 300 Watts (6-1600 Ohms) or 150 Watts (6-3200 Ohms) with the world's only dual power automatic tuner. 1.8-30 MHz, 4:1 current balun, LED lighted cross meter, backlit LCD, more!


MFJ-993BRT Tuner \$299⁹⁵

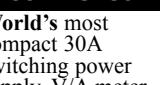
300 Watt remote automatic antenna tuner matches wide-range 6-1600 Ohms impedances 1.8-30 MHz. Handles 300W SSB/CW. Tough, durable, weather-sealed, includes power injector.


MFJ-915 RFI Isolator \$29⁹⁵

Prevents unwanted RF from traveling on your coax shield into your expensive transceiver. Prevents stray RF that cause painful RF "bites" and erratic operation. Heavy duty weather protected PVC is 2Wx5H inches. 1.5 kW. 1.8-30 MHz.


MFJ-4230MV 30A PS \$89⁹⁵

World's most compact 30A switching power supply. V/A meter. 4-16 Volts, adjustable. 5Wx2 1/2" H x 6 inches, 3 pounds! Selectable input voltage 120/240 VAC.


Antenna Window Feedthrough Panels
Bring your antenna cables into your hamshack without drilling holes through walls!

Place in window sill, close window. High-quality pressure treated 3/4" thick wood, edges sealed for all weather conditions. Teflon® SO-239s for HF/VHF/UHF antennas, ceramic feed-thru insulators for balanced line/random wire, ground post all on stainless steel in/out plates.

MFJ-4416B BattBoost \$159⁹⁵

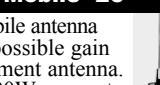
Keep mobile rig operational. Boosts low battery voltage. Up to 25 Amps. 7 3/4" Wx4Hx2 1/8"."


MFJ-557 CodeOsc/Key \$39⁹⁵

Practice sending Morse code. Telegraph key, code oscillator, speaker on heavy non-skid steel base. Volume/tone controls. Use 9V battery.


MFJ-1728B Mobile \$26⁹⁵

5/8 wave 2M mobile antenna gives maximum possible gain of any single element antenna. 1/4 Wave 6M. 300W, magnet mount, 12' coax, 53" whip.


MFJ-225 Analyzer, \$299⁹⁵

Plots graphs on MFJ graphical analyzer. Two-port VNA measurement. Display/print on PC using IG-miniVNA freeware. DDS frequency control. 1.5-179.9 MHz


MFJ-962D Tuner \$319⁹⁵

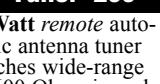
Compact roller inductor antenna tuner handles popular Ameritron AL-811H/811 amps. AirCore™ inductor, 3" Cross-Needle meter, 6-position antenna switch, 800W SSB PEP output.


MFJ-998 AutoTuner \$699⁹⁵

Full 1500 Watts SSB/CW. Digital and analog SWR/Wattmeter, 12-1600 Ohms from 1.8-30 MHz, built-in antenna switch, auto amp bypass.


MFJ-1786 Hi-Q Loop \$419⁹⁵

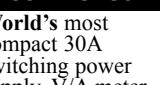
10-30 MHz Super Hi-Q loop, remote control. 36" dia. all welded construction, butterfly tuning capacitor. ABS plastic housing. MFJ-1788, \$499.95. 7-22 MHz.


MFJ-918 4:1 Balun \$24⁹⁵

High-permeability ferrite beads on high-quality RG-303 Teflon® coax. True 1:1 current balun/center insulator. 2" diameter by 6" long. 14 gauge stranded copper wire. Handles 1.5 kW 1.8-30 MHz.


MFJ-4035MV 30A PS \$149⁹⁵

19.2 lb. transformer delivers 35A maximum, 30A continuous. 1-14 VDC out, 110 VAC in. Highly regulated, 1% load regulation. 1 mV Ripple. 5-way binding posts, quick connects.


MFJ-434B VoiceKeyer \$199⁹⁵

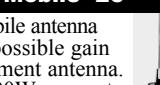
Saves voice by saving five frequent phrases in memory. Speaker/amplifier.


MFJ-564 IambicPaddles \$69⁹⁵

Deluxe Iambic paddles. Tension/contact spacing adjustments, steel bearings, precision frame, non-skid feet. Chrome or Black.


MFJ-1729 Mobile \$39⁹⁵

Ham radio's most powerful magnet mount dual band 2M/440 mobile. Get whooping GAIN. 300 Watts, 27.5" stainless steel whip, 12' coax.



www.mfjenterprises.com

MFJ Ham Shack Essentials

MFJ-259C 530 KHz to 230 MHz World's most popular analyzer

World's most popular antenna analyzer is new and improved. Now covers 530 KHz to 230 MHz!. Super easy-to-use -- Read antenna SWR, complex impedance, return loss, reflection coefficient. Determine velocity factor, coax cable loss in dB, length of coax and distance to short or open in feet. Read inductance in uH, capacitance in pF. Large two line LCD screen and dual meters clearly display your info. Built-in frequency counter, signal generator, charger circuit, battery saver, low battery warning...

MFJ Antenna Tuner



MFJ-949E
\$189.95

More hams use MFJ-949s than any other antenna tuner in the world! Does it all! 1.8-30 Mhz, 300 Watts, full size peak/average lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load. Highly efficient air inductor, 1kV air-variable tuning capacitors. QRM-Free PreTune™, scratch proof Lexan front panel. 3/Hx10%/Wx7D inches.

30A Switching Power Supply



MFJ-4230MV
\$89.95

MFJ-4230MV, the world's most compact switching power supply has a meter and adjustable voltage. Just 5Wx2½Hx6D inches, it weighs only 3 pounds!

MFJ Dual Display 24/12 Hour Clock



Read both UTC and local time simultaneously, huge 5/8" digits! Compact 4½Wx2Hx1D inches.

MFJ 300W True 4:1 Current Balun



MFJ-913
\$29.95

Transform 200 Ohms to 50 Ohms. SO-239. Transmission line transformer construction, low permeability ferrite cores.

MFJ-269C 530 KHz - 230 MHz MFJ-225 1.5-180 MHz continuous plus 415-470 MHz, 12-bit A/D Two-Port Graphic Analyzer

MFJ-269C is a super MFJ-259C that adds 415-470 MHz and 12-bit A/D converter that gives you much better accuracy. Complex Impedance Analyzer reads series parallel equivalents and magnitude and phase. CoaxCalculator™ gives line length from electrical degrees and vice-versa for any frequency, Velocity Factor, coax loss in dB. Use any characteristic impedance 10-600 Ohms for more accuracy when using different coax. Has LCD log SWR bargraph, N-connector.



MFJ G5RV Antenna

The famous G5RV antenna is the most popular ham radio antenna in the world! An efficient, all band antenna only 102 feet long has 32.5 foot ladder line matching section ending in SÖ-239 for your feedline. Use as Inverted Vee or Sloper with just one support. With a tuner operate all bands 80-10 Meters, 160M with ground. Handles 1500 Watts. Ceramic end and fiberglass center insulators.

MFJ-1778

\$44.95

World's Largest SWR/Wattmeter



MFJ-868B
\$149.95

MFJ-868B is the World's Largest HF+6M SWR/Wattmeter! It has 6.5" diagonal scale with three 20/200/2000W power ranges. Peak/Avg.

MFJ ClearTone™ Comm. Speaker



MFJ-281
\$12.95

Brings out speech fidelity you never knew existed! 3" speaker handles 8W, 8 Ohms impedance, six feet cord with 3.5 mm mono plug.

Lightning Surge Protector

Safeguard equipment. Shunts to 5000A peak impulse current harmlessly to ground. SWR<1.1:1, <0.1 dB loss. Use to 1000 MHz, 400W PEP.

MFJ-270
MFJ-270

\$19.95

MFJ IntelliTuner™ Automatic Antenna Tuners

300/150 Watt IntelliTuner™



MFJ-993B
\$269.95

Select 300 Watts (6-1600 Ohms) or 150 Watts (6-3200 Ohms) with the world's only dual power automatic antenna tuner. 1.8-30 MHz, 4:1 current balun, LED lighted cross meter, backlit LCD, 20,000 virtual antenna memory system, more!

MFJ 1500W True 4:1 Current Balun



MFJ-919
\$59.95

Like MFJ-913 but handles legal limit. Sturdy cube shaped heavy duty weather housing, 3½Wx3½Hx2½D inches.

MFJ Dual Band 80/40 Meter Dipole



MFJ-17758
\$89.95

Short 85' long dipole antenna is full-size on 40M and has ultra-efficient end-loading on 80M. 1.5kW.

In the field, MFJ-225 is a completely self-contained handheld graphing analyzer. On the bench it becomes a full-fledged two-port (S21) machine teamed with your PC. Using powerful IG-miniVNA freeware, run detailed data analysis and print stunning color-graphic plots! Back-lighted 3" LCD graphic display. Make fine adjustments using full-screen SWR bargraph, vivid swept displays for SWR, impedance, return loss, phase angle, more. DDS generator.

MFJ-225
\$299.95



MFJ Dry Dummy Loads



MFJ-260C
\$39.95

MFJ-260C is housed in a perforated metal housing with an air-cooled, non-inductive resistor that will handle a full 300 Watts for 30 seconds. Silk-screened derating curve to 5 minutes. SWR below 1.1:1 to 30 MHz, 1.5:1 from 30 to 650 MHz. 21/4Wx21.4Hx7D inches.

MFJ-264, \$74.95.

Like MFJ-260C, handles 1500 Watts for 10 seconds, 100W for 10 min.

MFJ Antenna Switches



MFJ-1702C
\$39.95

MFJ antenna switches have a center ground position, automatic grounding of unused positions, lightning surge protection, handles 2.5 kW PEP and works to over 500 MHz. Better than 60 dB isolation at 300 MHz and 40 dB at 450 MHz. 50 Ohms. Less than 0.2 dB insertion loss and SWR below 1.2:1. MFJ-1704, \$79.95. Like MFJ-1702C, but with four positions.

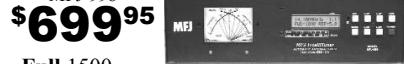
Hi-Permeability Ferrite Bead Balun



MFJ-918
\$24.95

High-permeability ferrite beads on high-quality RG-303 Teflon® coax. 1:1, 2" diameter by 6 inches length. 1.5 kW 1.8-30 MHz. Center insulator.

1500 Watt IntelliTuner™



MFJ-998
\$699.95

Full 1500 Watts SSB/CW. Digital and analog SWR/Wattmeter, 12-1600 Ohms from 1.8-30 MHz. Ultra-fast, safe automatic tuning. Built-in antenna switch, automatic amplifier bypass protects your amplifier. Field upgradeable software.

Dealer/Catalog/Manuals

Visit: <http://www.mfjenterprises.com> or call toll-free 800-647-1800

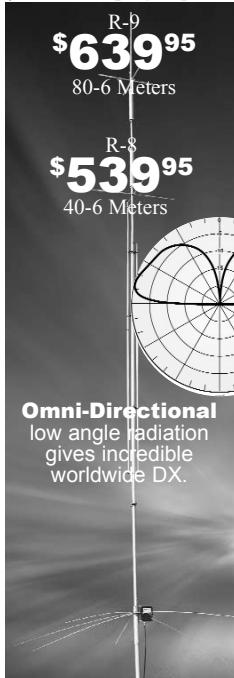
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New! Cushcraft R9 . . . 80-6 Meters



Omni-Directional
low angle radiation
gives incredible
worldwide DX.

80 Meters... No Radials... 1500W

Cushcraft's world famous R8 now has a big brother!
Big Brother R9 now includes 75/80 Meters for local
ragchewing and worldwide low band DX without radials!

It's omni-directional low angle radiation gives you
exciting and easy DX on all 9 bands: 75/80, 40, 30, 20,
17, 15, 12, 10 and 6 Meters with low SWR. QSY
instantly -- no antenna tuner needed.

Use full 1500 Watts SSB/CW when the going gets
tough to break through pileups/poor band conditions.

The R9 is super easy to assemble, installs just
about anywhere, and its low profile blends incon-
spicuously into the background in urban and coun-
try settings alike.

Compact Footprint: Installs in an area about the
size of a child's sandbox -- no ground radials to bury
with all RF-energized surfaces safely out of reach.

Rugged Construction: Thick fiberglass insulators, all
stainless steel hardware and 6063 aircraft-aluminum tubing
is double or triple walled at key stress points to han-
dle anything Mother Nature can dish out.

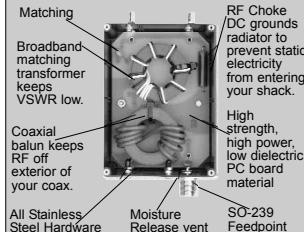
31.5 feet tall, 25 lbs. Mounting mast 1.25 to 2 inches.
Wind surface area is 4 square feet.

R8, \$539.95. Like R9 antenna but less 75/80 Meters.

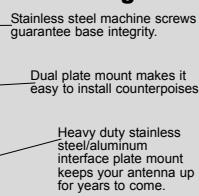
R-8TB, \$79.95. Tilt-base lets you tilt your antenna
up/down easily by yourself to work on.

R-8GK, \$56.95. Three-point guy kit for high winds.

Matching Network



Super Rugged Design



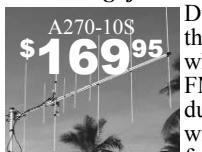
Cushcraft 10, 15 & 20 Meter Tribander Beams

Only the best tri-band antennas become DX classics, which is why the Cushcraft World-Ranger A4S, A3S, and A3WS go to the head of the class. For more than 30 years, these pace-setting performers have taken on the world's most demanding operating conditions and proven themselves every time. The key to success comes from attention to basics. For example, element length and spacing has been carefully refined over time, and high-power traps are still hand-made and individually tuned using laboratory-grade instruments. All this

attention to detail means low SWR, wide bandwidth, optimum directivity, and high efficiency -- important performance characteristics you rely on to maintain regular schedules, rack up impressive contest scores, and grow your collection of rare QSLs!

Cushcraft Dual Band Yagis

One Yagi for Dual-Band FM Radios



Dual-bander VHF rigs are the norm these days, so why not compliment your FM base station with a dual-band Yagi? Not only will you eliminate a costly feed

line, you'll realize extra gain for digital modes like high-speed packet and D-Star! Cushcraft's A270-6S provides three elements per band and the A270-10S provides five for solid point-to-point performance. They're both pre-tuned and assembly is a snap using the fully illustrated manual.



Cushcraft Famous Ringos Compact FM Verticals

W1BX's famous Ringo antenna has been around for a long time and remains unbeaten for solid reliability. The Ringo is broad-banded, lightning protected, extremely rugged, economical, electrically bullet-proof, low-angle, and more -- but mainly, it just plain works! To discover why hams and commercial two-way installers around the world still love this antenna, order yours now!

Free Cushcraft Catalog
and Nearest Dealer . . . 662-323-5803
Call your dealer for your best price!



MA-5B 5-Band Beam Small Footprint -- Big Signal



The MA-5B is one of Cushcraft's most popular HF antennas, delivering solid signal-boosting directivity in a bantam-weight package. Mounts on roof using standard TV hardware. Perfect for exploring exciting DX without the high cost and heavy lifting of installing a large tower and full-sized array. Its 7 foot 3-inch boom has less than 9 feet of turning radius. Contest tough -- handles 1500 Watts.

The unique MA-5B gives you 5-bands, automatic band switching and easy installation in a compact 26-pound package. On 10, 15 and 20 Meters the end elements become a two-element Yagi that delivers solid power-multiplying gain over a dipole on all three bands. On 12 and 17 Meters, the middle element is a highly efficient trap dipole. When working DX, what really matters are the interfering signals and noise you *don't hear*. That's where the MA-5B's impressive side rejection and front-to-back ratio really shines. See cushcraftamateur.com for gain figures.

Cushcraft . . . Keeping you in touch around the globe!

Visit www.cushcraftamateur.com

Cushcraft
Amateur Radio Antennas

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hy-gain® Antennas and Rotators

HF Verticals



Work amazing DX with these extremely low radiation angle omnidirectional antennas. All self supporting, 1500 Watts PEP SSB, low SWR. Heavy duty, slotted, tapered, swaged, aircraft quality aluminum tubing. Stainless steel hardware. Two year limited warranty.

AV-680, \$549.95. 9 Bands: (6,10,12,15,17,20,30,40, 80 Meters). 26 ft., 18.5 lbs. Our most popular vertical now has 75/80 Meters! Lets you work exciting DX with a low 17 degree radiation angle! Easily mount on decks, roofs, patios. No ground or radials needed. Extra wide 2:1 SWR bandwidths. Each band tunable. Auto bandswitching, handle 1.5kW, 80 MPH wind survival, low 2.5 sq. ft. wind surface. Aircraft aluminum tubing, stainless steel hardware.

AV-640, \$449.95. Like AV-680 less 80M. 25½', 17½ lbs.

AV-620, \$349.95. Like AV-640 less 40M. 22½' / 10½ lbs.

AV-14AVQ, \$189.95. (10, 15, 20, 40 Meters). 18 ft., 9 lbs. Classic AV-14AVQ uses same trap design as famous Hy-Gain Thunderbird beams. 3 air dielectric Hi-Q traps with oversize coils give superb stability and 1/4 wave resonance on all bands. Automatic bandswitching.

AV-12AVQ, \$139.95. (10, 15, 20 Meters). 13 ft., 9 lbs. Lowest priced automatic bandswitching tri-band vertical! Uses Thunderbird beam design air dielectric traps for extremely hi-Q performance in limited space.

AV-18VS, \$119.95. (10,12,15,17,20,30,40,80M). 18 ft., 4 lbs. Hy-gain's lowest priced vertical gives you 8 bands. Easily tuned to any band by adjusting base loading coil.

See our website for even more hy-gain vertical antennas!

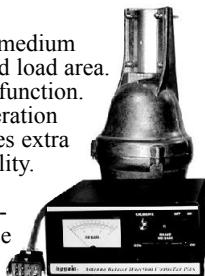
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HAM-IV . . . \$649.95

The most popular rotator in the world! For medium communications arrays up to 15 square feet wind load area. New 5-second brake delay! New Test/Calibrate function. New low temperature grease permits normal operation down to -30 degrees F. New alloy ring gear gives extra strength up to 100,000 PSI for maximum reliability. New indicator potentiometer. New ferrite beads reduce RF susceptibility. New Cinch plug plus 8-pin plug at control box. Dual 98 ball bearing race for load bearing strength and electric locking steel wedge brake prevents wind induced antenna movement. North or South center of rotation scale on meter, low voltage control, max mast size of 2½" inches.

HAM-VI, \$749.95. For medium arrays up to 15 sq. ft. wind load. Like HAM-IV but has new **DCU-2 Digital Rotator Controller**. Just dial in your beam heading or let your computer control your antenna.

HAM-VII, \$799.95. Like HAM VI but with **DCU-3 digital controller** with six programmable memories.



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\$449.95



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Push a memory button or dial in your



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V2R, \$109.95. 2-Meter vertical has two *in-phase* 5/8 Wave collinear radiators for exceptional high omnidirectional gain. It has two sets of quarter wave radials that decouple radiator from mast. Covers 138-175 MHz. SO-239, handles 500 Watts, 9 feet.

V4R, \$109.95. UHF vertical. Like V2R but covers 400-475 MHz. Type N, handles 500 Watts, 4 foot.

V42R, \$169.95. Dual band covers 144/440 MHz bands. Two 5/8 Wave collinears.

VB-214FM, \$99.95. 14-element 2-Meter FM beam antenna provides exceptional front-to-back ratio and maximum obtainable gains.

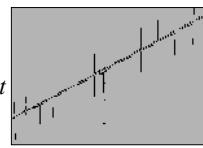
VB-23FM, \$49.95. 3-element.

VB-25FM, \$59.95. 5-element.

VB-28FM, \$89.95. 8-element.

Threaded stub for feedpoints. Accepts up to 2 inch mast.

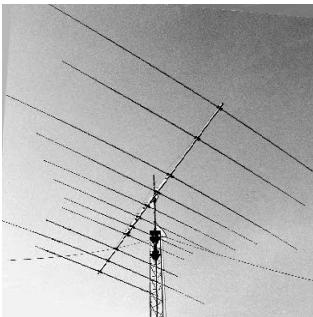
DB-2345, \$89.95. Dual band 144 (3-elements) 440 (5-elements) MHz.



HF Beams

Hy-gain beams are stronger, lighter, have less wind surface and last years longer. Why? Hy-gain uses durable toolied components -- massive boom-to-mast bracket, heavy gauge element-to-boom clamps, thick-wall swaged tubing -- no failures!

TH-11DX, \$1199.95. 11-element, 4.0 kW PEP, 10,12,15,17,20 Meters. The choice of top DXers. With 11-elements, excellent gain and 5-bands, the super rugged TH-11DX is the "Big Daddy" of all HF beams!



Features low loss log-periodic driven array on all bands with monoband reflectors, BN-4000 high power balun, corrosion resistant wire boom support, hot dipped galvanized and stainless steel parts.

TH-7DX, \$899.95. 7-Element, 1.5 kW PEP, 10,15,20 Meters. 7-Elements gives you the highest average gain of any Hy-gain tri-bander! Dual driven for broadband operation without compromising gain. SWR less than 2:1 on all bands. Combined monoband and trapped parasitic elements give you an excellent F/B ratio.

TH-3MK4, \$499.95. 3-Element, 1.5 kW PEP, 10,15,20 Meters. Gives most gain for your money in full-power, full-size *hy-gain* tri-bander! Impressive gain and a whopping average front-to-back ratio and still fits on an average size lot. 95 MPH wind survival.

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For large medium antenna arrays up to 20 sq. ft. wind load. Choose **DCU-2 digital controller** (T-2XD2) or **analog control box** (T-2X) with new 5-second brake delay and new Test/Calibrate function. Low temperature grease, alloy ring gear, indicator potentiometer, ferrite beads on potentiometer wires, new weatherproof AMP connectors plus 8-pin plug at control box, triple bearing race with 138 ball bearings for large load bearing strength, electric locking steel wedge brake, N or S center of rotation scale on meter, low voltage control, 2½" max. mast.



T-2XD2, \$899.95. Taitlwister with **DCU-2 digital controller**.

T-2XD3, \$949.95. Taitlwister with **DCU-3 digital controller** with six programmable memories.

AR-40, \$349.95. For compact antenna arrays and FM/TV up to 3.0 sq. ft. wind load. Dual 12 ball-bearing race. Fully automatic.

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beam heading or let *Ham Radio Deluxe* (or other program) control your DCU-3. Your antenna automatically rotates precisely and safely to your desired direction.

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- Optional FFT-1 Supports AF-FFT Scope, RTTY/PSK31 Encode/Decode, CW Decode/Auto Zero-In • Full Color 4.3" TFT Display



FT-450D | A100W HF + 6M Transceiver

- 100W HF/6M • Auto tuner built-in • DSP built-in • 500 memories • DNR, IF Notch, IF Shift



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-2900R | Heavy-Duty 75W 2M FM Transceiver

- Massive heatsink guarantees 75 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 Tcxvr

- Power Packed System Fusion Transceiver • High Audio Output Power • Rugged Powerful Transmitter • Integrated 66ch High Sensitivity GPS • 1200/9600 APRS Data Communications • Voice Guide and Recording Function • Optional FVS-2 Required • Digital Group Monitor (GM) Function • Digital Clock & Timer Functions



FTM-400DR | 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-1DR | 144/430 5W Digital Transceiver

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FT-2DR | C4FM/FM 144/430 MHz Tcxvr

- Analog/C4FM Dual Monitor (V+V/U+U/V+U) • System Fusion compatible • 1200/9600 APRS Data Communications • Integrated 66ch High Sensitivity GPS • Wide Band Receiver • Snapshot Picture Taking Capability With Optional MH-85A11U



VX-8DR | 50/144/220/440

- 50/144/220/440 • 5W (1W 222 MHz) • Bluetooth optional • Waterproof/submersible (3' for 30 min) • GPS APRS operation optional • Li-ion Hi-capacity battery • Wide band Rx



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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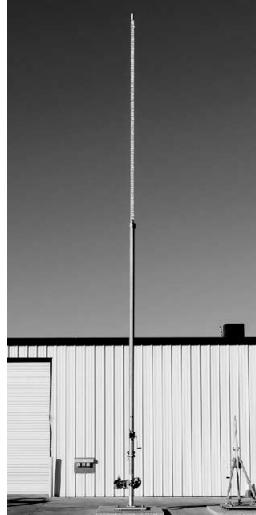
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Model #	Height Max.	Height Min.	Sections	Weight lbs.
MA-40	40'	21' 6"	2	242
MA-550	55'	22' 1"	3	435
MA-550MDP*	55'	22' 1"	3	620
MA-770	75'	22' 10"	4	645
MA-770MDP*	75'	22' 10"	4	830
MA-850	85'	23' 6"	5	943
MA-850MDP*	85'	23' 6"	5	1130

All towers will handle 10 sq. ft. of antenna at 50 mph winds. *These towers require purchase of MCL-100 or RMC-10000.



TX-SERIES FREE-STANDING CRANK-UP TOWERS

Model #	Height Max.	Height Min.	Sections	Weight lbs.
TX-438	38'	21' 6"	2	355
TX-455	55'	21'	3	670
TX-472	72'	22' 8"	4	1040
TX-472MDP*	72'	22' 8"	4	1210
TX-489MDPL	89'	23' 4"	5	1800

All towers will handle 18 sq. ft. of antenna at 50 mph winds. *This tower requires purchase of MCL-100 or RMC-10000.



HDX-SERIES HEAVY-DUTY CRANK-UP TOWERS

Model #	Height Max.	Height Min.	Sections	Weight lbs.
HDX-538	38'	21' 6"	2	600
HDX-555	55'	22'	3	870
HDX-572MDPL	72'	22' 8"	4	1600
HDX-589MDPL	89'	23' 8"	5	2440
HDX-689MDPL	89'	24'	5	3400
HDX-5106MDPL	106'	24' 3"	6	3850

All towers will handle 30 sq. ft. of antenna at 50 mph winds. HDX-689MDPL rated at 60 sq. ft. of antenna at 50 mph winds.

HDX-5106MDPL rated at 35 sq. ft. of antenna at 50 mph winds.



Disclaimer: Customer is responsible for obtaining all local city or county building permits. Customer must arrange for tower to be removed from truck on delivery.



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Whether building a dipole or erecting a beam, check with Universal for all your antenna needs. Amateur antennas from \$25 up are available. Brands carried include: Comet, Cushcraft, Hustler, Alpha-Delta, COMPACTenna, Maldol, MFJ, Hygain, Diamond, MP, Surmen, Par, Hy-Power and Larsen.

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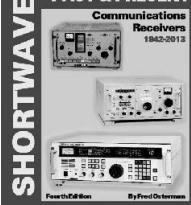
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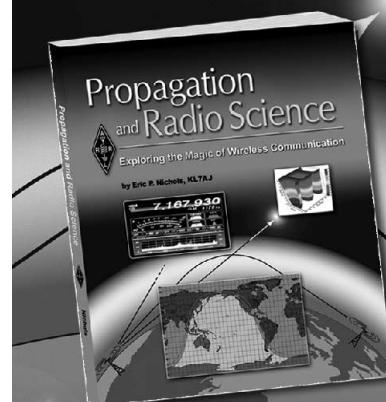
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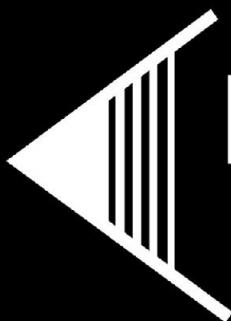
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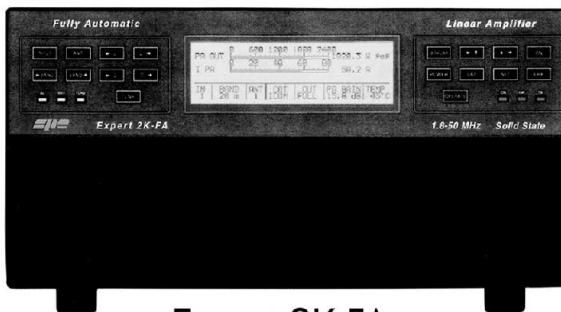
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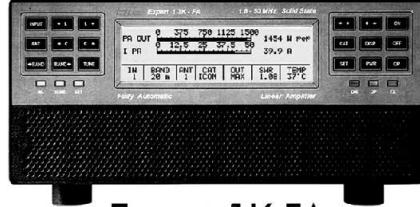
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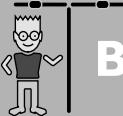
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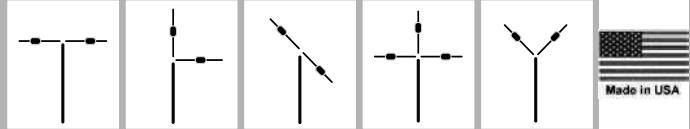


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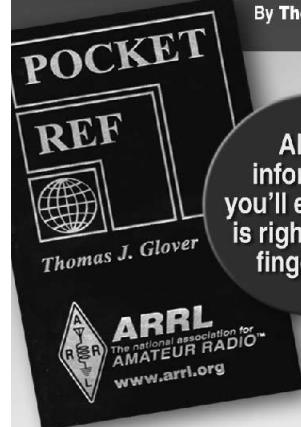
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By Thomas J. Glover



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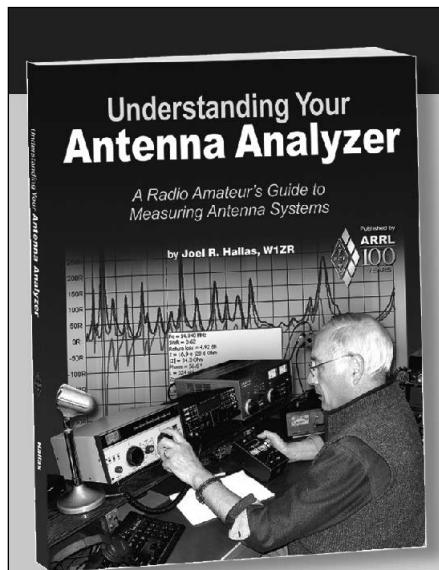
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- Making Antenna Measurements
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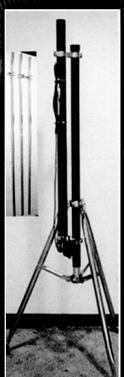
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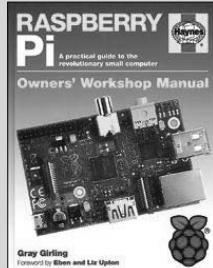
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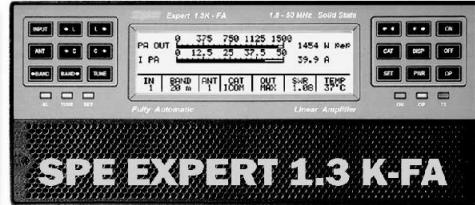


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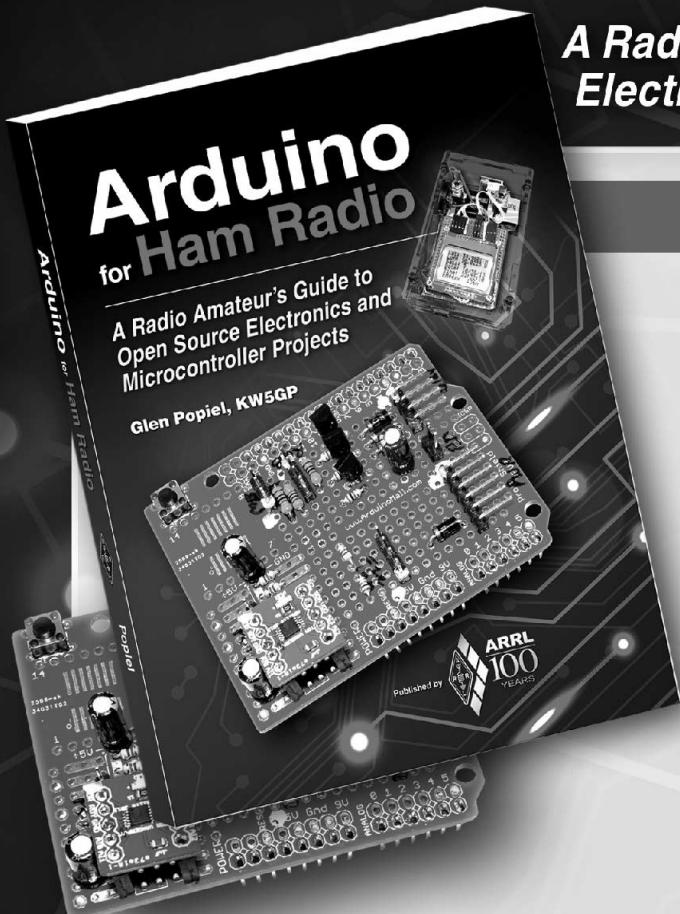
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Arduino for Ham Radio

A Radio Amateur's Guide to Open Source Electronics and Microcontroller Projects



By Glen Popiel, KW5GP

The Arduino has become widely popular among hobbyists and ham radio operators. Hams are exploring these powerful, inexpensive microcontrollers, creating new projects and amateur station gear. With its Open Source model, the Arduino community freely shares software and hardware designs, making projects easier to build and modify.

Arduino for Ham Radio introduces you to the exciting world of microcontrollers and Open Source hardware and software. It starts by building a solid foundation through descriptions of various Arduino boards and add-on components, followed by a collection of ham radio-related practical projects. Beginning with simple designs and concepts and gradually increasing in complexity and functionality, there is something here for everyone. Projects can be built quickly and used as-is, or they can be expanded and enhanced with your own personal touches.

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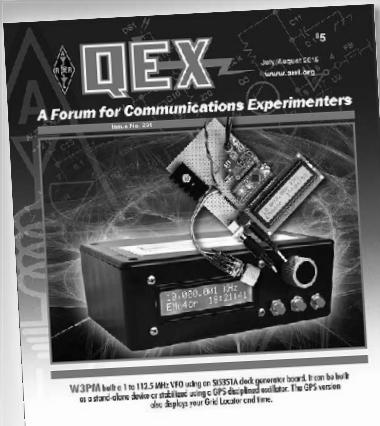


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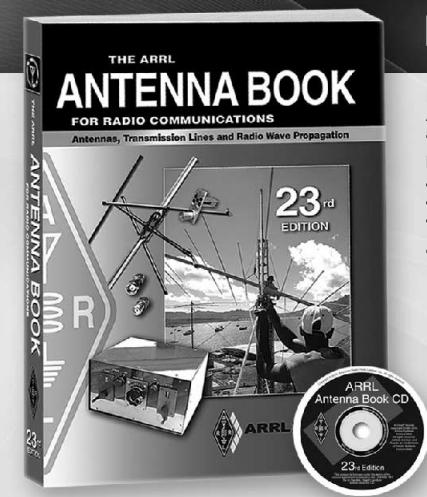


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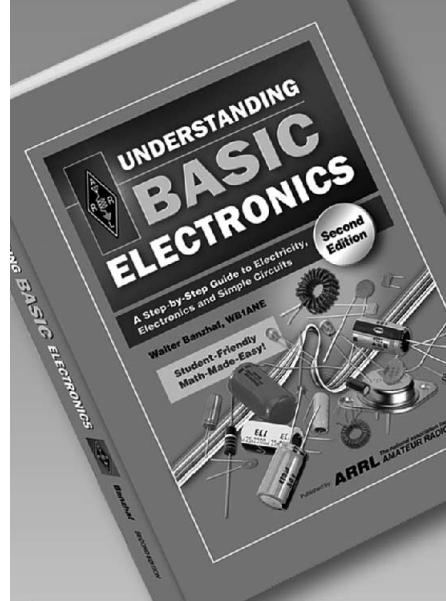


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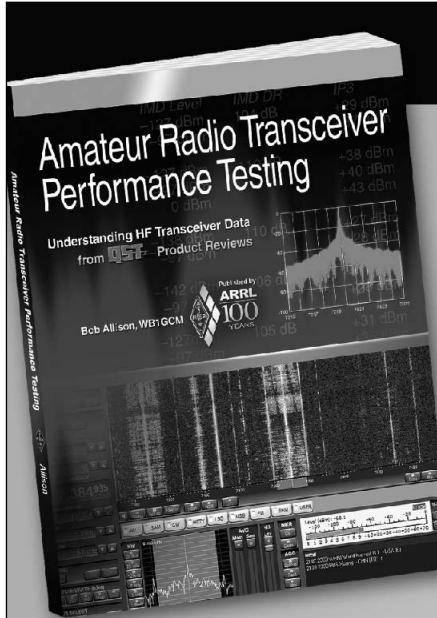
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Amateur Radio Transceiver Performance Testing

Understanding HF Transceiver Data from QST Product Reviews

By Bob Allison, WB1GCM

QST's monthly "Product Review" column has long been the most-read section of the magazine. That's not surprising, as most radio amateurs are interested in reading about the latest station equipment, and product review testing helps operators make informed decisions based on their needs.

Amateur Radio Transceiver Performance Testing explains in detail the performance data tables from QST Product Reviews, providing a valuable resource for Amateur Radio operators who are looking to purchase a transceiver. It discusses how published laboratory data relates to actual performance, how each major test is performed, the significance of each test, and what the numbers mean. You'll gain a better understanding of the extensive testing ARRL performs, technical terms and parameters presented in Product Review, and develop the capability to reach your own conclusion about which HF transceiver is best for you.

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