

Product Review Column from *QST* Magazine

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Cushcraft R7 Multiband Vertical Antenna

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Cushcraft R7 Multiband Vertical Antenna

Reviewed by Mark J. Wilson, AA2Z

Building on the success of the five-band R5 half-wave vertical,¹ Cushcraft has added two more bands, tweaked the design a bit, and come up with an even more popular antenna. Dubbed the R7, the new antenna covers seven bands—10, 12, 15, 17, 20, 30 and 40 meters. Although Cushcraft's engineers added more bands, they managed to maintain the traits that made the R5 so popular:

- It's a half-wave antenna, so no ground radials are necessary.
- It's easily handled by one person. At 22.5 feet and 12.3 pounds, the R7 is only about five feet longer and four pounds heavier than the R5.
- It's easy to assemble, requires little tuning and breaks down into a small package for portable operation.

age for portable operation.

Construction

The R7 arrived in a 51 × 7.5 × 4-inch box that went straight from the UPS truck to the back of my car for transportation to a Field Day site in New Hampshire. Several of us worked on assembling the antenna, and it went together in less than an hour. All parts were present and accounted for. The R7's traps are preassembled, preadjusted and clearly labeled, so antenna assembly largely consists of plugging the tubing together in the right order, making a few measurements and tightening stainless-steel hose clamps. This antenna is built to last; all hardware is aluminum or stainless steel.

Cushcraft deserves a lot of praise for the R7's eight-page assembly manual. Its part lists, illustrations and step-by-step instructions are clear, concise and easy to follow, making assembly a joy. There's even a sec-

tion entitled "Helpful Hints" to help you troubleshoot common problems and get the best performance from the antenna.

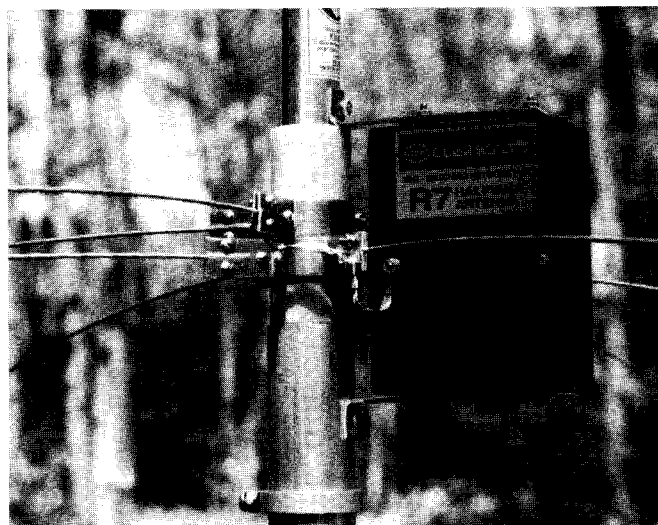
It's quite a trick to squeeze seven bands into 22.5 feet of antenna. As shown in the photos, construction is similar to that of the R5. The traps consist of coils wound on insulated forms and capacitors made from aluminum tubing. There are seven 49-inch counterpoise rods at the antenna's base (up from four rods on the R5). Like the R5, there's a broad-band, no-tune matching network in a plastic box at the feed point. The box has an SO-239 connector for the feed line.

According to Cushcraft engineer Joe Reisert, W1JR, the traps and matching network have been improved to decrease loss. Joe also says that the base section and traps have been redesigned for greater strength. The traps (and therefore most of the weight) are nearer the top of the antenna than the base. Yet Joe told me that the R7

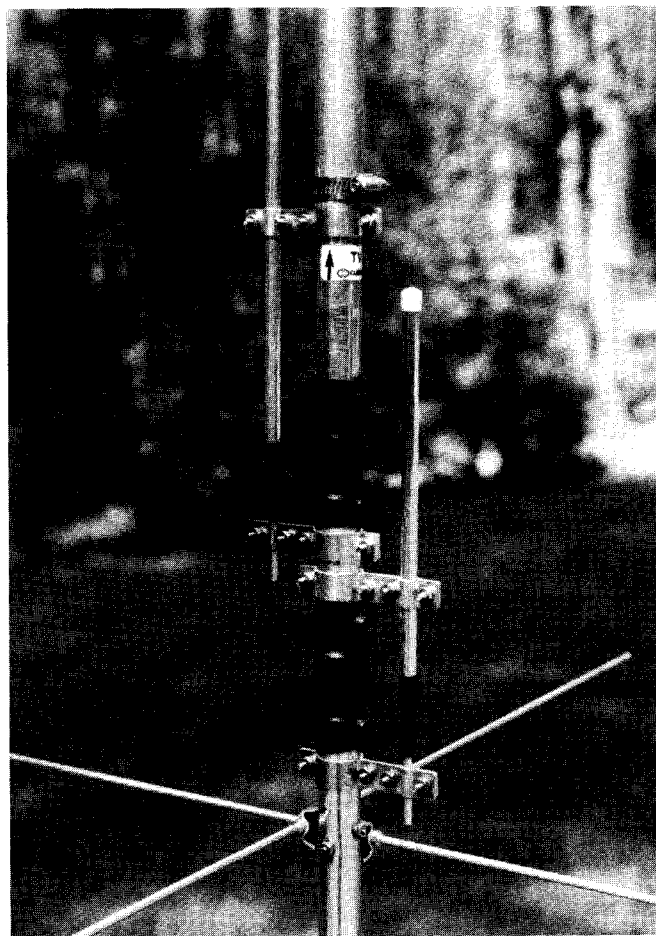
¹Reviewed in October 1990 QST.

Table 1
Cushcraft R7 Multiband Vertical Antenna

<i>Manufacturer's Claimed Specifications</i>	<i>ARRL Evaluation</i>
Frequency of operation: 10, 12, 15, 17, 20, 30 and 40-meter amateur bands.	As specified.
Power rating: 1800 W PEP.	Tested only to 1500 W.
2:1 SWR bandwidth: 10 m, 2 MHz; 12 m, 100 kHz; 15 m, 450 kHz; 17 m, 100 kHz; 20 m, 150 kHz; 30 m, 25 kHz; 40 m, 75 kHz.	See text.
Height: 22.5 ft.	
Weight: 12.3 lb.	
Wind load: 2.25 sq ft.	



The black box at the R7's base contains the matching network.



Typical R7 trap construction. Coils are wound on insulated forms, and capacitors are made from aluminum tubing.

Vacation Portable with the R7

The review of the R5 vertical (October 1990 *QST*, p 39) was based largely on my using it on a week's vacation to Prince Edward Island that summer. My family and I fell in love with the island and decided to go back the following year. When the R7 became available, it was the obvious choice to take along: It offered coverage of my favorite nighttime band, 40 meters, and a band that I hadn't explored enough from home, 30 meters, in an antenna not significantly bigger than the R5.

When the R7 arrived we packed the box, along with a Kenwood TS-850S and other necessities of life, into the back of the Subaru wagon and headed northeast toward VY2-land. On arriving at our rented cottage overlooking the Northumberland Strait it took just an hour to assemble the antenna and to mount it on two five-foot sections of TV mast strapped to a metal fence post. Then we discovered Murphy had come along as an unwelcome guest: It didn't work! At the transmitter end of 150 feet of RG-8M coax, the SWR was practically infinite on 40 meters and gradually dropped, though it was still awful, as we went higher in frequency—symptomatic of a short at the antenna end of the feed line. But the feed line checked out OK.

Fortunately, Cushcraft doesn't believe in sealing its matching unit shut and labeling it, "No user-serviceable components inside." With the cover off and after some poking around I spotted the problem: A hair-thin wire hidden under one of the toroids was causing the short. On removing the extraneous wire and reassembling the matching unit, we were in business. Moral: Don't take a factory-sealed carton on a trip without first checking what's inside! (You'd think I'd know that by now. . . .)

Conditions weren't as good as the year before but we still had a great time, making hundreds of QSOs over five days of casual operating with 100 watts. Being able to use 40 and 30 meters was a real blessing, given the depressed MUF. The highlight of the operation was trading honest S9 signal reports with Australia on 30 meters. I resolved on the spot to pay more attention to this band in the future!—David Sumner, K1ZZ

is so strong, you can pick up the assembled antenna at the base, hold it horizontally and shake it without hurting anything. I tried it; he wasn't kidding!

Installation

According to the manual, the R7 should be installed about five feet above the ground and 25 feet from surrounding objects on a mast 1.5 to 1.75 inches in diameter. You'll probably want to use a mast that's more like seven or eight feet tall to get the antenna's counterpoise rods high enough that people can't walk into them.

Assembled to the dimensions in the


manual, the review R7 matched Cushcraft's published SWR curves fairly closely on most bands. In most parts of the 10, 12, 15 and 17-meter ham bands, the SWR is 1.5:1 or less. According to the specification table, the 2:1 SWR bandwidth is 150 kHz on 20 meters, but the SWR curve suggests that the R7 will cover most of that band with an SWR under 2:1. My antenna agreed with the SWR curve—the SWR exceeded 2:1 only near the top band edge. On 30 meters, the review antenna resonated somewhere below the amateur band. On 40 meters I used the CW setting; minimum SWR occurred near the bottom of the

band, rather than at 7040 kHz as shown in the chart. It only took three tries to move the 30-meter resonance point to the middle of the ham band and shift 40 meters up by 30 kHz or so. The internal antenna tuner in the transceiver I used had no trouble flattening the SWR to keep the transceiver happy across each band.

Performance

For the New Hampshire Field Day operation, we had the choice of two antennas—the R7 and a 50-foot-high, 120-foot-long dipole fed with open-wire line. It was interesting to switch back and forth between the two antennas. Sometimes signals were louder on the dipole, sometimes they were louder on the R7, and sometimes it didn't much matter. On 40 and 30 meters, the dipole was usually better—often by a couple of S units—but I had no problem working plenty of stations with the R7 and a 100-W transceiver. Although conditions weren't particularly good, I had no trouble working DX stations on 20 and 17 meters when I wasn't chasing Field Day points.

Cushcraft has done a good job with the R7. It's an excellent solution for someone who's looking for a low-profile home-station antenna that works well on 40 through 10 meters. Although the R7 is no substitute for a tower-mounted Yagi antenna, this 22.5-foot vertical that requires no radials will provide hours of enjoyable hamming for the many operators who can't erect a directional antenna. It's ideal for portable operation because it easily breaks down into a small package, and you don't have to worry about a radial system or finding trees for supports. Although the list price is \$510, R7s are routinely advertised in *QST* for less than \$400. That's not a bad price for a convenient-to-use, good-performing seven-band antenna.

Manufacturer: Cushcraft Corp., 48 Perimeter Rd., Manchester, NH 03108, tel 603-627-7877. 

New Products

VIDEO TAPES

□ Gordon West, WB6NOA, of Radio School, has VHS videotapes for club meetings and ham classes. In the first, *CQ Field Day*, he takes a fun, 30-minute look at Field Day, in a tape that features hints and examples of different types of operations.

A second tape, called *Ham Class*, is an one-hour demonstration of West's teaching techniques—and use of humor—with tips on how to arrange for a classroom, how to organize a weekend or regular class, and working with your volunteer examiner team.

Each tape retails for \$22.95, including shipping. Radio School, Video Education Division, 2414 College Dr, Costa Mesa, CA 92626.

CW TRANSCEIVER KIT

□ The TRFT-500 Backpacker I is a compact single-band transceiver kit that's easy to build and convenient to operate. Based on the Optimized QRP Transceiver designed by Roy Lewallen, W7EL (see the 1992 *ARRL Handbook* pages 30-37, or August 1980 *QST*, page 14-19), it can be used for rugged backpacking or business "briefcasing." Choose from 80, 40, 30, 20, 17, 15 or 10-meter coverage. All main operating controls are on the front panel, and the rig features 100% solid-state electronic

switching and full break-in (QSK) CW with no relays; RIT with center-detent control; separate spot switch; 6:1 vernier tuning; a 50, 100 or 200-kHz VFO; front-panel switchable wide, CW wide or CW narrow filtering; audio gain control that also adjusts sidetone volume; variable transmit output from 2 watts to QRPP; and SWR protection for the final transistor. The rig requires just headphones or a speaker, a key and 12 V dc at 300 mA. It measures 2.5 × 6.5 × 5.5 inches, with ample room inside to build in a keyer or other add-ons. Retail price: \$139.95 plus \$4.50 s/h. Bill Hickox III, K5BDZ, Tejas RF Technology, 17 S Briar Hollow, Suite 101, Houston, TX 77027; tel 713-840-8600, fax 713-840-8608.