

The Yaesu VX-7R Handheld Transceiver

Reviewed by Brennan Price, N4QX
Assistant Technical Editor

Yaesu's newest HT, the VX-7R, looks very much like its predecessor, the VX-5R, reviewed by Jay Mabey, NU0X, in the May 1999 *QST*. It is a shade taller and wider, but not so visibly different from the VX-5R that it raises eyebrows upon first inspection. Nevertheless, when I first unwrapped the new HT, there were enough subtle differences to prompt my exploration of this unit. It didn't take long to notice improvements that previous VX-5R users will like.

It Feels More Sturdy

When Yaesu unveiled the VX-7R at the 2002 Dayton Hamvention, a collection of the HTs were displayed in a water-filled case. In fact, both the front panel of the radio and its operating manual tout the VX-7R as "submersible." Handling the radio for the first time, I noticed a few structural enhancements from the VX-5R that would help the HT stand up to water.

The 18 front-panel keys resist just a little when pressed, finally registering with a satisfying click. The keys are larger and more resistive than those on the VX-5R, and these features make frequency entry and programming a snap on the new radio. Also, the microphone/speaker and dc power jacks are plugged by snug, form-fitting rubber caps, obviously resistive to anything on the outside. While these caps, particularly the dc power cap, were at first a little tougher to open than the easy-flip caps on many HTs, it doesn't take long to adapt.

"Sturdy and solid," I thought to myself. "Maybe I need to get with the ARRL Lab and develop a submersibility test." As tempting as it was to throw the thing in the sink and see how it worked when it came out, I held off until I played with the radio some more. It seemed wise to hold the potentially destructive tests off until last.

Turning it On and Tweaking the Settings

As with the VX-5R, the power on/off switch is controlled by a prominent key to the upper left of the front-panel speaker. Frequency entry is a snap; just enter six numbers on the keypad (with leading zero[es] if tuning below 100 MHz). When a frequency in the usual 2-meter or 70-centimeter repeater range is entered, the transmit offset is automatically entered. This Automatic Repeater Shift feature may be

turned off or overridden for machines with nonstandard repeater frequencies or shifts.

Familiarity with the highly detailed (but easy to follow) user's manual soon becomes necessary. Out of the box, the VX-7R is set to dual-band receive mode, and the squelch controls on both VFOs are set very low. Users in high-noise areas may therefore be greeted with a blast of white noise. When this happened to me, I thought, "No problem, I'll change the squelch." But, like the VX-5R, there is no squelch knob. Squelch is controlled via a menu option, the first option that pops up when the menu is activated for the first time.

Working with the Menus

The extensive menu system is accessed fairly intuitively, by pressing the F and 0/SET keys. This is similar enough to the VX-5R. The user can cycle through menu options using the dial at the top of the radio, concentric with the volume knob. What is different—and not at all obvious to the user who has not read the manual—is the procedure for changing a menu setting that is displayed on the screen.

On all menu items, the user cycles through the options using the MAIN and

SUB keys, the same buttons used to switch transmit VFOs and switch into and out of Dual Receive mode. MAIN steps up to the next setting on the list, and SUB steps down. It would have been a nice touch had this somehow been indicated on the case of the HT, but once you read about it in the manual, it becomes easy.

Some menu options, most notably the selection of a CTCSS tone, require the user to press the BAND key before changing the setting with the MAIN and SUB keys. Beyond setting the CTCSS tone (from the new industry standard list of 50) or DCS code (from 104 possibilities), the list of menu items that require this keystroke is beyond the scope of this review. If a user knows the above, he or she can get on the air for most uses.

How Does it Sound?

After everything was set, working through repeaters and on simplex frequencies was a pleasant experience with the VX-7R. Requested reports on the quality of transmitted audio were all positive, and the front-panel speaker was pleasant to listen to.

Users may cycle through four power settings on 6 meters, 2 meters and 70 cm, ranging from 5 W to 50 mW. The United States version of the VX-7R also has limited capability on the 222-225 MHz band, with two power settings of 300 and 50 mW. Yaesu is to be commended for incorporating the 1.25-meter band in this rig; the availability of more equipment should encourage use of this very good band. However, amateurs looking for more than nominal power may be disappointed. At the "high power" setting of 300 mW, I was only able to reliably activate the nearest repeaters. While the 222 MHz capability is nice, the documentation rightly identifies the VX-7R as a "triple-band" HT.

One really neat thing about this rig: it does AM! Not just when receiving broadcast and aircraft signals (which it does well), but when *transmitting* on the 50 MHz band! While any frequency on the band may be chosen for such operation, care should be taken to avoid interference with other modes. The band plan recommended by the ARRL Board of Directors sets 50.4 MHz as an AM calling frequency, with activity scattered about the "all modes" region of 50.3 to 50.6 MHz. The actual usage where you live may be vary; consult your local frequency coordi-



Bottom Line

Those who like the VX-5R will also like the VX-7R. Yaesu has improved the feel and friendliness of its top-of-the-line tri-band HT.

Table 1
Yaesu VX-7R, serial number 2G022193

Manufacturer's Claimed Specifications

Frequency Coverage: Receive, 0.5-30 (AM), 30-59 MHz, 59-108 MHz (WFM), 108-137 MHz (AM), 137-174, 174-222 (WFM), 222-225, 225-420 MHz,¹ 420-470 MHz, 470-729 (WFM), 800-999 MHz (cell blocked); transmit, 50-54, 144-148, 222-225, 430-450 MHz.

Power requirements: 10.0-16.0 V dc;² receive, 0.24 A; transmit, 1.9 A (max, high power).

Size (height, width, depth): 3.5×2.4×1.1; weight, 9.2 ounces.

Receiver

Sensitivity: AM, 10 dB S/N, 0.5-30 MHz, 3.0 μV; 108-137 MHz, 1.5 μV; WFM, 12 dB SINAD, 76-108, 1.0 μV; 470-540 MHz, 0.35 μV; 540-800 MHz, 3.0 μV; NFM, 12 dB SINAD, 30-50 MHz, 0.5 μV; 50-54 MHz, 0.16 μV; 57-76 MHz, 1.0 μV; 137-140 MHz, 0.2 μV; 140-150 MHz, 0.16 μV; 150-174 MHz, 0.2 μV; 174-225 MHz, 0.3 μV; 300-350 MHz, 0.5 μV; 350-400 MHz, 0.2 μV; 400-470 MHz, 0.18 μV; 800-999 MHz, 1.0 μV.

Two-tone, third-order IMD dynamic range: Not specified.

Adjacent-channel rejection: Not specified.

Spurious response: Not specified.

Squelch sensitivity: Not specified.

Audio output: 400 mW at 10% THD into 8 Ω (dc).

Transmitter

Power Output: 50 MHz, 1.0 W high (AM only); 50, 144, 430 MHz, 5.0 W high; 222 MHz, 0.3 W high; 5.0/2.5/1.0/0.035

Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turnaround time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turnaround time ("tx delay"): Not specified.

¹Action Band 1"—mode varies with frequency range within this segment.

²External dc. Battery is 7.2 V.

³For 52 MHz. IF rejection on 146, 222 and 440 MHz was 90, 72 and 91 dB, respectively.

⁴For 222 MHz. Image rejection on 52, 146 and 440 MHz was 88, 63 and 65 dB, respectively.

Measured in the ARRL Lab

Receive and transmit, as specified.

Receive, 0.32 A (max volume, no signal); transmit, 1.6 A, tested at 13.8 V.

Receiver Dynamic Testing

AM, 10 dB S+N/N, 1.0 MHz, 1.0 μV; 120 MHz, 0.56 μV; WFM, 12 dB SINAD, 100 MHz, 0.7 μV; NFM, 12 dB SINAD, 50 MHz, 0.15 μV; 144 MHz, 0.16 μV; 222 MHz, 0.36 μV; 430 MHz, 0.15 μV.

20 kHz offset from 52 MHz, 54 dB, 10 MHz offset from 52 MHz, 86 dB. 20 kHz offset from 146 MHz, 63 dB, 10 MHz offset from 146 MHz, 76 dB. 20 kHz offset from 222 MHz, 61 dB, 10 MHz offset from 222 MHz, 76 dB, 20 kHz offset from 440 MHz, 58 dB, 10 MHz offset from 440 MHz, 65 dB.

20 kHz offset from 52 MHz, 67 dB. 20 kHz offset from 146 MHz, 65 dB. 20 kHz offset from 222 MHz, 65 dB. 20 kHz offset from 440 MHz, 61 dB.

IF rejection, 13 dB;³ image rejection, 44 dB.⁴

At threshold, VHF, 0.09 μV; 222 MHz, 0.3 μV; 430 MHz, 0.08 μV.

690 mW at 10% THD into 8 Ω.

Transmitter Dynamic Testing

52 MHz, 4.8 / 2.4 / 0.84 / 0.1 W. 146 MHz, 5.1 / 2.6 / 1.1 / 0.02 W. 222 MHz, 0.33 / 0.03 W. 440 MHz, 4.5 / 1.9 / 0.8 / 0.02 W.

VHF, 54 dB; UHF, 70 dB. Meets FCC requirements for spectral purity.

Squelch on, S9 signal, VHF and UHF, 70 ms.

VHF, 60 ms; UHF, 70 ms.

nation body to make sure, and listen before you transmit. Our tests were promising. Power in the AM mode is fixed at 1 W.

Like the VX-5R, the '7R has substantially expanded receive capability. With the exception of cellular frequencies, the radio will receive in AM, narrow FM and wide FM modes from 500 kHz to 999 MHz on the MAIN VFO. Reception and transmission on the SUB VFO is limited to the 6-meter band, 137-174 MHz,

and 420-470 MHz. The included rubber-duck antenna, slightly longer than the one that came with the '5R, has a screw-off tip. A loading coil is included for operation on the 6-meter band and reception on lower frequencies. The loading coil works well, but keeping up with it can be challenging to a forgetful amateur like myself.

Memory fiends will not be disappointed. In addition to the 450 standard, programmable memory channels, there are

10 one-touch memory channels, which, when enables, can be handy for rapidly changing frequencies on the fly. Adding other types of memory (such as a "home" frequency for each band) brings the total number of programmable frequencies to over 500.

Bells, Lights and Features, Oh My!

Hams who come from the "simple is good" school of thought will be pleased



Figure 1—The front panel and front cover of user's manual for the Yaesu VX-7R says the radio is submersible. We put it to the test in the ARRL Lab.

with the performance of this radio. That doesn't mean that hams from the "give me lots of neat little features" school are left empty handed. To the contrary, the VX-7R enhances the considerable list of features found on its predecessor. Returning from the VX-5R are such oldies and goodies as the "Smart Search" feature, which will scan for 15 active signals and automatically store them in a memory bank. The graphical Spectrum Analyzer feature returns, and the enhanced LCD dot-matrix display allows for a relative signal strength to be displayed on each peak. The '7R can detect CTCSS tones or DCS codes of incoming signals, and the radio comes equipped with a 1750-Hz tone generator for use with European repeater systems.

The first thing I noticed after the first charge of the battery was the front panel LED. "Oooh, what a lovely hue of blue," I thought to myself. The status LED to the top right of the keypad is called the "STROBE," and the various colors and intensities for the different statuses are programmable. If you prefer orange for transmit and chartreuse for receive, instead of the traditional red and green, you can arrange that.

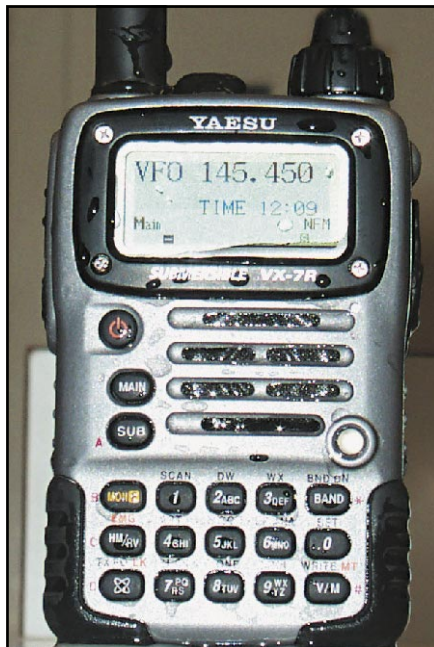


Figure 2—Thirty minutes after being placed in 8.5 quarts of water, the Yaesu VX-7R, water dripping off its chassis, works like new.

The option to install a barometric pressure/altimeter unit is also carried over from the VX-5R. Added is a built-in thermometer, which will not be accurate when the HT is held in a 98.6°F human hand, but works well when standing alone. A time-of-day clock can be set, as can an "alarm" feature. Someone who wants to use the VX-7R as a clock radio can do so; I did so on my July trip to Maine.

Speaking of that trip to Maine, it was a humdinger weather-wise. I made extensive use of the VX-7R's ability to scan NOAA weather channels. Keying F and 3/WX limits the radio to the 10 NOAA frequencies, and scanning can be turned on and off with the PTT switch. The radio can be set to sound an alarm when a 1050 Hz alert tone is detected on an active frequency. Thanks to this feature, I was alerted to severe thun-

derstorm warnings in four different counties on three different NOAA stations.

One thing not held over from the VX-5R is its compatibility with the same rapid charger. While the ac wall adapter sold with the VX-7R is the same as its predecessor, the accessory rapid charger is a different model. Users looking to upgrade will need to buy both items if the charging stand is important to them.

Going for a Swim

Now that I had played with the radio, it was time to put the submersibility claim to the test. Yaesu does not specify a depth and duration in the manual, but its advertisements have indicated that the VX-7R is submersible to 3 feet for 30 minutes

I did not have a 3-foot deep container in which to submerge the radio, but I did find a 10-quart mop bucket in the ARRL maintenance closet. I filled the bucket to the 8.5-qt level, just enough to submerge the VX-7R from base to tip of the non-extended antenna, as shown in Figure 1.

Thirty minutes later, I removed the radio from the water. It powered up immediately, even with water droplets clinging to the case, as shown in Figure 2. While I would not recommend that users of a VX-7R repeat this feat, it does indicate that Yaesu's efforts to fortify the radio have been effective.

A Worthy Successor

At first glance, the Yaesu VX-7R looks much like its predecessor. But within a few minutes, users will begin to discover and enjoy a unique feel and style that is easy to fall for. HT enthusiasts will appreciate the plethora of features, the solid performance on the three main bands, and the modest but welcome capabilities on 222 MHz and 6-meter AM.

Manufacturer: Vertex Standard, 10900 Walker St, Cypress, CA 90630; tel 714-827-7600; fax 714-827-9100; www.vxstdusa.com. \$359.95.

Force 12 Sigma-5 Five-Band Vertical Dipole Antenna

Reviewed by ARRL Staff

The Force 12 Sigma-5 is a vertical dipole composed of a center element with two perpendicular bars, one at each end. The entire assembly is 11 feet tall. The upper and lower T bars are 48 inches wide (24 inches each side). In true dipole fashion, the feed point is located at the middle of the center element, where a printed circuit board receives the feed line. On the board are several relay controlled loading coils, facilitating a direct 50-Ω match. The board, relays, and loading coils are neatly enclosed in a covered styrene tube. A short piece of

feed line (with connector) and the end of 50 feet of relay control line are soldered to the board and wire-tied to a feed point extension bar affixed to the center assembly.

No Tools Required

Our favorite part of the instruction manual says, "Tools required: NONE."

Bottom Line

The Force 12 Sigma-5 offers five HF bands in an easy-to-install package for the ham with limited space.

This happens so infrequently in building anything, including children's toys, that we still felt compelled to have a tool box nearby. We never used any tools, however.

The delivered antenna includes well-labeled parts. After aligning all the parts and matching them up by their letters, the joints are secured with machine screws, lock washers and finger-tightened wing nuts. Factory drilled holes align very well, and there wasn't a single metal burr on any piece of cut tubing. Welded parts and rivets were clean and solid. Assembly is fast. We were done in a couple of minutes.