Ranger Communications RCI-5054DX 6-Meter Transceiver

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Assistant Technical Editor

It's already clear that Cycle 23 will be going down in ham history as the best yet for 50-MHz fans. For years, we younger folks could only stand by and listen quietly as Old Timers reminisced about the incredible worldwide 6-meter openings they witnessed during the peaks of the legendary cycles of the hollow-state age. Now, however, a few of us—bona fide members of "generation solid-state"—have impressive 6-meter cycle-peak DX tales of our own to tell.

Impeccable Timing

Ranger Communications recently added several new transceivers to its Amateur Radio lineup. These include three tabletop/rack-mount transceivers—two for 10 and 12 meters and a single-bander for 10—and a mobile rig for the 6-meter band. The RCI-5054DX 6-meter all-mode, the focus of this review, first hit dealers' shelves last July. Considering the tremendous 6-meter propagation that we've been experiencing over the last several months, it's hard to imagine Ranger's release of this radio could have been timed any better.

The Big Picture

The RCI-5054DX covers 50 to 54 MHz in the SSB, CW, FM and AM modes. Maximum power output is 25 W for SSB, and 10 W for the other modes. Features include 10 memory channels, a relative SWR indicator, an all-mode squelch, a noise blanker/antenna noise limiter, memory and VFO scanning, programmable scan and band limits and transmit/receive frequency offset capabilities (for repeater and split operation).

The '5054 shares faceplate, enclosure and chassis components with Ranger's classic—and somewhat hefty—'2900-series mobile transceivers. A peek under the covers of this new rig, however, reveals a big double-sided glass/epoxy printed circuit board that's rather sparsely populated with surface mount components.

Frankly, there's an awful lot of underutilized space inside this cabinet. It's likely that the conversion to surface mount technology in its most recent products (the changeover occurred within the last couple of years) provided Ranger with a tempting opportunity to decrease overall radio dimensions—and this should certainly be a consideration for companies marketing contemporary mobile equipment. By retaining all of the existing—albeit oversized—exterior components used in the manufacture of some of its earlier radios, though, the company could avoid considerable re-engineering and retooling costs. While most of the other ham radio manufacturers are focusing on ever smaller and sexier packaging, Ranger chose an alternative route. They evidently believe they can lure traditionally frugal ham customers with *functional* styling, but attractive *pricing*. Hmmm…maybe bigger *is* better?

The transceiver's large LCD display is easy to read from most angles. The exception: viewing angles below perpendicular to the screen. From these vantage points the segments essentially vanish. A mounting location on a high shelf or in an overhead console probably won't cut it. Glare and washout can also be a problem—especially in a mobile installation. Keep these factors in mind when choosing a permanent mounting position.

Big frequency digits, a signal strength/RF power/SWR bargraph-style meter and an extensive collection of feature icons appear as black segments on a teal background. The display and key illumination can be set to one of three different levels or shut off entirely.

Front panel controls include the main tuning knob, a small army of pushbuttons and seven rotary controls. The tuning knob—located in the upper left-hand corner—has a detented action (40 clicks per revolution—4 kHz per revolution at the 100 Hz tuning step size). There are also CHANNEL up and down buttons on the top of the included hand mike, and Δ and ∇ buttons on the front panel. Any of these can be used to tune around in the VFO mode.

The available tuning step sizes are 1 MHz; 100, 10 and 1 kHz; and 100 Hz. The step increment is selected via a "shift" key. Each press of the SHF button repositions an arrow cursor under one of the digits in the display. The mike buttons, the tuning knob or the Δ/∇ buttons are then used to increase or decrease the selected digit's value. This arrangement works very well for rapidly hopping around on the band.

The minimum step size for transmit tuning is 100 Hz. A CLR (clarifier) control knob…*all right*, RIT for you purists… allows the receive frequency to be varied anywhere within ±2.5 kHz of the transmit frequency. For the receive and transmit frequencies to match, the indicator on the knob must be set to the 12 o'clock position. It would be handy if the control had a detent at this "zero-offset" setting.

I found the main tuning knob a bit too

Bottom Line

The Ranger RCI-5054DX all-mode transceiver has made gearing up for 6 meters considerably more affordable.

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Table 1
Ranger RCI-5054DX, serial number TIY00796

Manufacturer's Claimed Specifications	*Measured in the ARRL Lab*
Frequency coverage: receive and transmit, 50-54 MHz.	Receive and transmit, as specified.
Power requirements: 13.8 V dc; current consumption not specified.	Receive, 0.30 A; transmit, 4.6 A, tested at 13.8 V.
Modes of operation: CW, USB, LSB, FM, AM.	As specified.
Receiver	***Receiver Dynamic Testing***
CW/AM Sensitivity, 10 dB (S+N)/N: 0.5 μV.	Noise floor (MDS)[1]: 50 MHz –135 dBm AM, 10 dB (S+N)/N, 1-kHz tone, 30% modulation: 53 MHz 0.44 μV
FM Sensitivity, 12 dB (S+N)/N: 0.25 μV.	For 12-dB SINAD: 52 MHz 0.16 μV
Blocking dynamic range: Not specified.	Blocking dynamic range, 20-kHz spacing: 50 MHz 80 dB
Two-tone, third-order IMD dynamic range: Not specified.	Two-tone, third-order IMD dynamic range: 50 MHz 65 dB
Third-order intercept: Not specified.	Intercept: 50 MHz, –37 dBm.
FM adjacent channel rejection: Not specified.	20-kHz offset from 52 MHz, 60 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20-kHz channel spacing, 52 MHz: 59 dB.
S-meter sensitivity: Not specified.	Maximum indication: 52 μV.
Spurious response: IF rejection, 65 dB; image rejection: Not specified.	IF rejection: 112 dB; image rejection, 93 dB.
Squelch sensitivity: Not specified.	0.34 μV at threshold.
Audio power output: 2.5 W, THD and load unspecified.	2.3 W at 10% THD into 8 Ω.
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW: 340-2426 Hz (2086 Hz); USB: 346-2472 Hz (2126 Hz); LSB: 340-2425 Hz (2085 Hz); AM: 389-2252 Hz (1863 Hz).
Transmitter	***Transmitter Dynamic Testing***
Power output: CW, FM, AM, 10 W; SSB, 25 W.	AM, FM, CW, typically 10 W; SSB, typically 26 W.
Spurious signal and harmonic suppression: 60 dB.	Meets FCC requirements for spectral purity.
SSB carrier suppression: 50 dB.	50 dB.
Undesired sideband suppression: Not specified.	37 dB.
Third-order intermodulation distortion (IMD) products:	See Figure 1.
CW keying characteristics: Not specified.	See Figure 2.
Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.	Squelch on, S9 signal, 200 ms. Unit is not suitable for use on AMTOR.
Receive-transmit turn-around time ("tx delay"): Not specified.	SSB, 40 ms; FM, 30 ms.
Composite transmitted noise: Not specified	See Figure 3.
Size (HWD): 2.4×7.8×10.8 inches; weight, 3.2 lb.	

All dynamic range measurements are taken at the ARRL Lab standard spacing of 20 kHz.

[1]500-Hz bandwidth filter not available. Bandwidth on CW is approximately 2100 Hz.
[2]Intercept points calculated using noise floor method.

small for my tastes. For weak signal work, I like to manually tune for activity at the smallest available step size. I'd consider a larger tuning knob a welcome enhancement.

The RF power output level and microphone gain; RIT and RF gain; and volume and squelch are set up as concentric pairs of rotary controls. A six-position mode selector switch stands alone. The inner and outer knobs of the concentric sets and the mode selector knob are nice and big—and that does make them easy to grip, but there's insufficient space between them. It's difficult to make adjustments without accidentally changing the settings of nearby controls. In this instance, I'd gladly trade off some overall knob size for the increase in room between that would result. Perhaps Ranger could look into marketing an optional set of replacement knobs? I'll bet it would be an extremely popular accessory package—and not just with owners of this rig, but for those who have one of the dead-ringer '2900-series radios as well.

Fourteen pushbuttons are arranged in

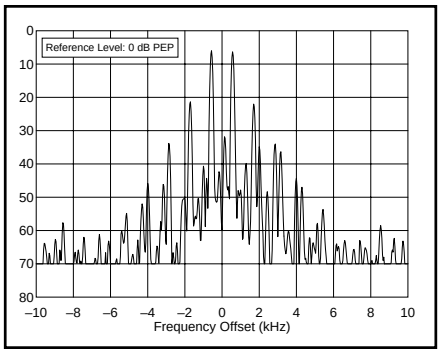

Figure 1—Spectral display of the RCI-5054DX transmitter during two-tone intermodulation distortion (IMD) testing. The third-order product is approximately 22 dB below PEP output, and the fifth-order is approximately 35 dB down. The transmitter was being operated at 25 W output at 50.2 MHz.

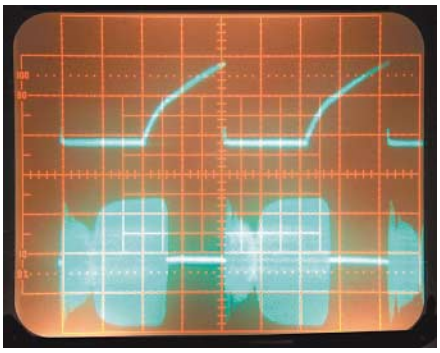

Figure 2—CW keying waveform for the RCI-5054DX showing the first two dits. The equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 10 W output at 50.02 MHz. See text.

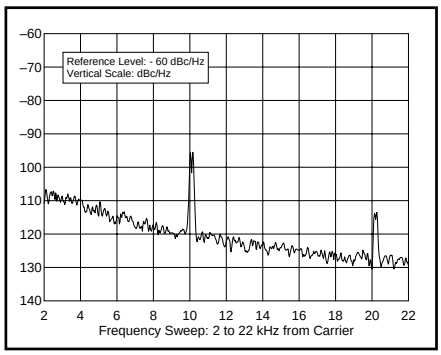

Figure 3—Spectral display of the RCI-5054DX transmitter output during composite-noise testing at 50.02 MHz. Power output is 10 W. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

two rows just below the display window. These white buttons are backlit and translucent, and function legends are printed in black on the surface of each—a particularly nice design feature for nighttime mobile operation. The majority of these keys control just a single operation—another mobiling plus.

Rear-panel jacks include an SO-239 antenna connector, three $^1/_8$-inch mono phone jacks and a flat three-pin dc power socket. The mating dc power cord is about 5½ feet long and fused, in the positive lead only, at 7 A. The phone jacks serve as connection points for a CW key, external speaker and public address speaker. A dedicated headphone jack is not provided. A multi-finned heat sink is attached to the rear apron. An internal speaker is mounted in the bottom cover.

A mike hanger, an adjustable mobile mounting bracket with four large knob-style screws and a handful of associated fastening hardware are supplied.

The 20-page *Owner's Manual*, though brief, is more than adequate. The radio is simple and intuitive to operate, and the programming and operating instructions in the manual text are clearly worded and easy to follow. A pin-out diagram for the 6-pin microphone connector is included, but—unfortunately—a schematic diagram of the radio is not.

Basic Feature Basics

Memories

The '5054 comes up in the VFO mode when the power is switched on. Pressing the MEM key activates memory mode operation. Memory channel one is always initially selected when entering the memory mode. Each subsequent stroke of the key then selects the next higher channel. A press of the MAN (manual) key will return the radio to the VFO mode. The tuning knob, microphone control buttons and the front panel Δ and ∇ buttons cannot be used to step through the memory channels, and the memories are not tunable.

Splits

Split transmit/receive frequency capabilities—for repeater, phone or CW operation—are supported. Split offsets of up to 4 MHz are possible. The memories do not retain the mode, offset value or direction of the split, though. If you decide to use memory channels to store repeater information, you'll have to select the FM mode and activate split operation separately. While the radio is in the split mode, the transmit frequency appears in the display when the transmitter is keyed.

Scanning

The transceiver includes a scan feature that will troll for activity on the programmed memory channels or within a range of frequencies. The scan direction can be set to ascending or descending. The scan will stop on any signal that breaks the squelch, and will remain there until activity ceases for more than two seconds. Facilities for locking specific memory channels out of a memory scan operation are not provided.

The upper and lower scan limits are programmable. These two frequencies also serve as the upper and lower limits of the manually tunable range of the VFO. Once you've changed these setting from their default values, to restore the full 4-MHz VFO tuning range, the upper and lower 6-meter band edges (50 and 54 MHz) must be manually reentered. This is a simple operation, though. This feature is handy when you wish to concentrate your attention on a particular band sub-segment—the bottom 80 kHz or so to listen for CW beacons, from about 50.103-50.250 for SSB activity or within one of any of several different ranges for searching for FM simplex operations, for example. (See *The ARRL Repeater Directory* or visit *ARRLWeb* for the suggested ARRL 6-meter Band Plan).

Noise Blanker/Antenna Noise Limiter

The '5054DX features both a noise blanker and a combination noise blanker/antenna noise limiter. The noise blanker is designed to work on repetitive impulse noise (classic ignition interference). It wasn't effective on the computer hash that's generated by my late-model vehicle. The noise blanker/antenna noise limiter setting worked reasonably well on my particular flavor of automotive electrical interference, but—unfortunately—only in the AM mode.

Public Address

The RCI-5054DX's mode switch includes a PA position. Connect an external speaker to the rear-panel PA jack, and you can use the rig to make door prize announcements at your club's next hamfest, or to get the whole gang's attention at the Field Day site ("Hey, everybody! I worked Western Samoa!"). An undocumented alternative application is to use it for evaluating the change in sound quality when testing substitute microphones—a feature that's typically referred to as a "monitor" function.

SSB Operation

The transceiver can operate in either the upper *or lower* SSB modes (6-meter RTTY, anyone?). Separate RF power output and mike gain controls are provided. The bargraph meter doesn't include a marker for the ALC set point. I received good audio reports with the mike gain control adjusted so that voice peaks hovered at about two-thirds scale when the RF power output setting was set to maxi-

mum. The mike gain control also varies the transmit audio level when operating in the AM or FM modes. The same mike gain setting that I settled on for the SSB mode worked just fine for the other phone modes as well.

The comparatively large (100-Hz) transmit tuning steps are pretty coarse for weak signal work, at least by today's standards. Most contemporary transceivers tune in 10-Hz (or smaller) increments. Although this is usually not a problem when chasing DX and general one-on-one ragchewing, net operation is occasionally an *I'm-as-close-as-I-can-get* proposition. The manual mentions—but doesn't detail—a modification that involves rewiring the clarifier (RIT) control so that it varies both the transmit and receive frequencies simultaneously. This change would come at the expense of independent receive incremental tuning, however. Contact Ranger for additional information.

FM and Repeater Operation

The radio works fine in the FM mode; reports on the quality of the transmit audio were invariably favorable. The '5054DX has one particularly disappointing shortcoming for those who are hoping to use it for communicating through repeaters. Nearly every 6-meter repeater system uses CTCSS tone access to reduce the interference that can result from distant repeaters that share the same frequency pair. (When this band opens up, the whole concept of what constitutes a "distant repeater" goes right out the window!)

The RCI-5054DX does not come equipped with a CTCSS tone encoder. Text in the *Owner's Manual* and Ranger's advertisements for this rig state that an "optional" tone unit can be installed, but it turns out that this is a little more involved than simply popping off a cover and plugging in an accessory board.

Ranger's Web site has a section that provides complete instructions for hardwiring in one of three models of CTCSS units sold by Communications Specialists.[1] One of these is an encode board that generates a single tone. (The specific tone frequency is set prior to installation by bridging a combination of solder-pad jumpers.) The second is an encode/decode board that employs six DIP switches for programming the desired tone. The third—and most flexible alternative—is a tone encoder unit that comes in its own separate enclosure, the TE-32. This model has front-panel toggle and rotary switches that allow quick and easy selection of one of 32 commonly used tones. It sells for around $50. (You should first verify that your favorite 6-meter repeaters are using CTCSS tones that the TE-32 is capable of generating.)

Installation of either of the two encode-only models is fairly easy. DC power, ground and a connection (through a 100 kΩ resistor) to the main circuit board at the base of a surface mount transistor are all that's required. Wiring in the encode/decode board is a bit more complicated. This procedure involves cutting a circuit board trace and making a couple of additional connections. Hooking up any of these boards should be well within the capabilities of hams with moderate soldering skills. It would have been great if Ranger had included CTCSS circuitry in this radio's design, or at least provided a dedicated multi-pin socket on the board or a rear-panel accessory jack for this purpose. Local 6-meter FM repeater operation can be lots of fun, and can sure help you wile away the time between those long-haul band openings.

CW Operation

The mode selector switch on the RCI-5054DX includes a CW position, but—as has been the case with the last couple of Ranger products we've looked at—CW seems as if it's more of an afterthought than a feature. A single CW signal can be heard on both sides of zero beat. As we pointed out in our evaluation of the RCI-2970DX (see "Product Review," Oct 2001), you can verify that you are properly tuned to a CW signal by taking a quick listen for it in the LSB mode. The CW sidetone volume and frequency are fixed.

As can be seen in Figure 2, the CW keying waveform shows considerable distortion during the "make" of each element. While, quite surprisingly, this didn't result in any on-air reports of unusual-sounding keying (it also sounded acceptable to me on a second receiver) it certainly warrants some further investigation on Ranger's part. A second unit we looked at exhibited identical waveform distortion.

Take a Number

Looking over Table 1, you'll notice that sensitivity in the FM mode, which came in at a hot 0.16 μV, is right in line with the best we've measured on recently reviewed transceivers that include 6-meter FM capabilities. The FM adjacent channel rejection (20-kHz offset) fell slightly below par, as did the FM two-tone, third-order IMD dynamic range.

SSB/CW sensitivity—at –135 dBm—came in somewhat short of the running average for this parameter as well, but still manages to equal the 6-meter number posted by a very popular multi-band/multi-mode mobile that we evaluated a couple of years ago. The SSB/CW blocking and IMD dynamic numbers that we measured on this rig were pretty mediocre. All in all, though, I guess this is about what should be expected from an economy-class transceiver.

On the Road with the RCI-5054DX

It was time to give the RCI-5054DX a try on the open road. I temporarily lashed it to the center console of my truck. (Finding a permanent mounting spot for a rig this size in most modern vehicles will likely present some challenges.)

The comparatively low maximum current requirement—under 5 A—makes it tempting to try to power it from a fuse block, vehicle cigarette lighter or dc accessory jack. If you choose to go with any of these connection schemes and end up running into problems with interference to or from your vehicle's electronics, begin your troubleshooting process with a direct power connection to the vehicle's battery terminals.

One of the great things about 6—particularly when you compare it to setting up for mobile operation on the HF bands—is the relative ease of installation and potential efficiency of 6-meter mobile antennas. A full-size $^1/_4$-λ vertical (a very adequate mobile antenna on this, and most other bands) is only around 4$^1/_2$ feet tall. I mounted a whip on an adapter that threads onto my existing through-the-roof NMO connector. A 2-meter $^5/_8$-λ mobile antenna—even mag-mount versions—will also work very well on 6.

Just five minutes after hooking the rig up in the car, I already had three west-coast SSB contacts in the log. Readability and signal reports were good—59 in all three cases—and specific requests for honest critiques on my audio quality were met with universally good comments.

Summing It Up

Admittedly, the RCI-5054DX is unlikely to become the radio of choice among serious VHF contesters—particularly those who have any interest in CW. This radio will get you on the band for casual DXing, net operations, ragchewing and even informal contesting pretty inexpensively, though. With just a few more dollars and a little workbench time, it can even be further accessorized for FM repeater use.

Manufacturer: Ranger Communications Inc, 401 W 35th St—Suite B, National City, CA 91950; 877-536-0772, fax 702-262-0780; **rci@rangerusa.com**; **www.rangerusa.com**. Manufacturer's suggested list price: $329. Typical current street price: $300.

[1]Communications Specialists Inc, 426 W Taft Ave, Orange, CA 92865; 800-854-0547, fax 800-850-0547; **www.comm-spec.com**.