Product Review & Short Takes Columns from *QST* Magazine

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Product Reviews

Alinco DJ-X2000 Wide Range Scanning Receiver

Short Takes

Electric Radio Antenna Tuning Meter

Alinco DJ-X2000 Wide Range Scanning Receiver

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Field and Regulatory Correspondent

It's often useful to have a second receiver available to supplement your primary amateur transceiver, and this is never more evident than when you're out in the great outdoors and relying on expendable power sources. The battery capacity of your transceiver could then be conserved, as you can switch that radio off while not actively engaged in two-way communications.

Even without the need to maximize your capabilities to communicate on the ham bands, though, the tremendous variety of radio listening possibilities delivered by a wide range receiver has an allure all its own. Lately, an impressive amount of frequency agility and an ever-increasing number of novel features have been finding their way into easily transportable packages.

Quite a Handful

Alinco's DJ-X2000 wide range handheld communications receiver certainly covers a mind-boggling swath of the RF spectrum—from 100 kHz up to about 2150 MHz—in all of the common modes. (Some 800 MHz frequencies and images of these frequencies are blocked in US versions.) The unit is compact; with its rubber duck antenna attached it could easily pass for one of Alinco's current VHF/UHF handheld transceivers.

I suppose it's understandable that many knowledgeable radio enthusiasts view a radio such as this with a fair amount of skepticism. Most wouldn't believe a handheld communications receiver would be capable of providing an acceptable level of performance over such a broad frequency range. I must admit that I began this evaluation with just such preconceptions.

A Quick Starter—Right Out of the Box

The DJ-X2000 was apparently engineered with ease-of-operation in mind. I charged up the included EBP-37N NiCd battery pack, attached the antenna, pressed the big orange power button and was greeted by a sign-on routine that began with a preset (but user re-programmable) message. This was followed by a series of beeps, and then twin VFO displays popped up on the screen. Intu-

itively, I punched in 1-4-5-.-4-5-ENT, and was immediately rewarded with the morning chatter of local hams on the W1AW repeater. I was up and running with no "manual" intervention!

Next, I decided to explore some non-ham frequencies. I keyed in 1-.-0-8-ENT (1080 kHz) at just the right instant to catch the top-of-the-hour Morse code "V" time signal of Hartford's WTIC-AM. After listening to the news—and finding myself fairly impressed with the quality of the audio delivered by this small radio—I hit 9-5-.-7-ENT and landed on Shakira's "Whenever, Wherever" program on WKSS-FM. Hmmm, this sounded tinny

Bottom Line

The Alinco DJ-X2000 is a feature-packed multimode "dc-to-daylight" communications receiver in a remarkably easy-to-tote package.

(and anyone who's even casually familiar with the work of this female radio host will know that "tinny" does not describe her melodic vocal presentation). I dug up the lightweight stereo headphones that came with my portable CD player and plugged them into the 'X2000's external speaker jack. The sound quality through those was markedly better—and in *stereo*! A while later, while exploring the menus, I ran across a selection that allows you to set the reception tone to "high" or "low." Wide FM sounds *much* better in the low tone setting.

I found basic operation of the DJ-X2000 remarkably easy. To access any frequency in its range directly, you simply key in the digits and push ENT. Tuning can also be accomplished by twisting a top-mounted encoder knob or by manipulating an UP/DOWN toggle switch on the left side panel.

The volume and squelch are digitally controlled. A SQL/VOL toggle switch is positioned near the top of the left side panel. Pressing it near the SQL legend briefly brings up a numeric indication of the current setting—"S16," for example. The UP/DOWN toggle or the encoder dial can then be used to adjust the squelch threshold. Setting the volume is similar—just press the toggle near the VOL legend and then use either one of those same controls to adjust the audio output level. The volume level is graphically depicted by a bargraph scale near the left edge of the display window and, as is the case with the squelch, briefly appears in the display as a numeric value—"V22," for example. There are 32 available settings for each of these, so there's sufficient resolution to set just the right amount of volume or squelch.

As delivered, the mode and tuning step size are automatically switched to settings appropriate for the range of frequencies that you're tuning. The AM, LSB, USB, CW or the narrow or wide FM modes and the step size can also be manually selected. There are an amazing *23* available choices for the tuning step size and—in the unlikely event that none of those fit your particular requirements—you can even make up one of your own! The minimum tuning step size is 50 Hz; the maximum is 500 kHz. While in the VFO mode, a 1-MHz step rate can be

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Joe Bottiglieri, AA1GW   Assistant Technical Editor

Table 1
Alinco DJ-X2000, serial number T000617

Manufacturer's Claimed Specifications	Measured in the ARRL Lab
Frequency coverage: 0.1-824; 849-870; 894-1432 MHz; 1504-2150 MHz.	As specified.[1]
Modes of operation: FM, WFM, AM, SSB, CW.	As specified.
Power requirements: 0.15 A at 10-16 V dc with external source, 0.3 A at 4.8-7.2 V dc (with battery packs).	0.27 A (maximum volume, no signal), tested at 6.0 V dc.
Size (HWD): 5.9×2.2×1.1 inches; weight: 11.3 ounces.	
CW/SSB sensitivity (10 dB S/N): 0.1-5 MHz, 0.6 µV; 5-900 MHz, 0.5 µV; 900-2150 MHz, 1 µV.	Noise floor (MDS): 1.0 MHz, –125 dBm; 3.5 MHz, –126 dBm; 14 MHz, –134 dBm; 50 MHz, –135 dBm; 144 MHz, –131 dBm; 222 MHz, –132 dBm; 432 MHz, –127 dBm; 902 MHz, –118 dBm; 1240 MHz, –111 dBm; 2150 MHz, –95 dBm.
AM sensitivity (10 dB S/N): 0.1-5 MHz, 1.5 µV; 5-900 MHz, 1.0 µV.	AM test signal modulated 30% with a 1-kHz tone, 10 dB (S+N)/N: 1.0 MHz, 1.1 µV; 3.8 MHz, 0.85 µV; 53 MHz, 0.38 µV; 120 MHz, 0.51 µV; 146 MHz, 0.61 µV; 440 MHz, 0.88 µV.
FM narrow sensitivity (12 dB SINAD): 5-900 MHz, 0.5 µV; 900-2150 MHz, 2 µV.	FM narrow, 12 dB SINAD: 29 MHz, 0.16 µV; 52 MHz, 0.16 µV; 146 MHz, 0.25 µV; 222 MHz, 0.23 µV; 440 MHz, 0.37 µV; 906 MHz, 1.2 µV; 1296 MHz, 2.8 µV.
FM wide sensitivity (12 dB SINAD): 5-900 MHz, 2.0 µV (stereo reception); 900-2150 MHz, 4.0 µV.	FM wide, 12 dB SINAD: 100 MHz, 1.6 µV.
Blocking dynamic range: Not specified.	CW mode: 3.8 MHz, 70 dB; 14 MHz, 71 dB; 50 MHz, 74 dB; 144 MHz, 72 dB; 222 MHz, 81 dB; 432 MHz, 88 dB; 902 MHz, 57 dB*.
Two-tone, third-order IMD dynamic range: Not specified.	CW mode dynamic range and third-order intercept point:
Second-order intercept point: Not specified.	–1.8 dBm.
FM adjacent channel rejection: Not specified.	20-kHz channel spacing: 29 MHz, 35 dB; 52 MHz, 35 dB; 146 MHz, 35 dB; 440 MHz, 36 dB; 906 MHz, 42 dB.
FM two-tone, third-order IMD dynamic range: Not specified.	20-kHz channel spacing: 29 MHz, 35 dB*; 52 MHz, 35 dB*; 146 MHz, 35 dB*; 440 MHz, 36 dB*; 906 MHz, 42 dB*; 10-MHz channel spacing: 52 MHz, 64 dB; 146 MHz, 76 dB; 440 MHz, 67 dB.
Squelch sensitivity (threshold): Not specified.	At threshold: SSB, 14 MHz, 0.09 µV; FM, 29 MHz, 0.09 µV; 52 MHz, 0.10 µV; 146 MHz, 0.12 µV; 440 MHz, 0.40 µV; 906 MHz, 1.5 µV.
Audio output: 0.1 W into 8 Ω at 10% THD (at internal speaker terminals).	0.09 W into 8 Ω (maximum output at external speaker jack).
IF/audio response: Not specified.	Range at –6 dB points, (bandwidth): CW: 269-4071 Hz (3802 Hz); USB: 269-4061 Hz (3792 Hz); LSB: 270-4060 Hz (3790 Hz); AM: 228-2650 Hz (2422 Hz).
Spurious and image rejection: Not specified.	IF rejection: HF, 62 dB; VHF, 69 dB; UHF, 74 dB; Image rejection: HF, 58 dB; VHF, 71 dB; UHF, 14 dB.

Frequency (MHz)	Dynamic Range (dB)	Intercept Point [2] (dBm)
3.8	41*	–64
14	43*	–69
50	43*	–70
144	43*	–66
432	43*	–62
902	57*	–33

Except as noted, all dynamic range measurements were taken using the ARRL Lab standard spacing of 20 kHz.

*Measurement was noise-limited at the value indicated.
[1]Sensitivity degrades below 500 kHz and above 2000 MHz.
[2]Third-order intercept points were determined using noise floor reference.

temporarily enabled for more rapid frequency excursions.

The radio employs an extensive system of menus and submenus for controlling nearly every operation. In the case of mode selection, for example, changing the setting begins with a touch of the F (function) key, followed by a press of the MODE/1 key. A line-item list of available choices pops up on the screen (the six modes and the "auto" setting, in this instance). Selecting the mode is then just a simple matter of turning the encoder or rocking the UP/DOWN toggle until an arrow cursor is positioned next to the desired choice. The new setting is established with a press of the TF/ENT key. If a selected parameter requires further refinement, the key press brings up a submenu.

The DJ-X2000's menu control con-

figuration reminds me of the dropdown toolbar menus used in most *Windows*-based computer software.

But Does It Scan?

And *how*, it does! The 86-page *Instruction Manual* extensively documents three distinct scanning types: "Dual VFO," "Memory" and "Scan Programming." The scan resume condition can be set to "Busy," "Stop" or "Timer," and the pause duration in the Timer mode can be varied from 1 to 12 seconds. The scan rate seems to be somewhere in the neighborhood of 30 channels per second. The scan does hang for a fraction of a second when moving between bands.

With 2000 standard memories (50 banks of 40 channels each), I've got to believe that the DJ-X2000 provides enough memory capacity to satisfy all but the most fanatic of scanning enthusiasts. For me to fully describe the wide variety of scanning and memory management features provided in this receiver would be a daunting task. Alinco seems to have all of the bases covered—and then some!

I found the procedure for programming the DJ-X2000's standard memories somewhat confusing. You begin by entering the VFO mode and setting the desired frequency, mode and step size. (CTCSS tone and attenuator settings can also be stored.) Next, you select a specific bank (A through E), bank number (0 through 9), and then a memory channel (0 through 39) within that bank. At that point, you press the TF/ENT key. You'll be prompted to enter an alphanumeric memory name up to 8 characters long. The characters are selected using the encoder, and then entered—or deleted—with the UP/DOWN toggle switch. Upper and lower case letters, numbers and an extensive collection of symbols are available. Once you've completed that step, a press of the TF/ENT key stores the information and returns the radio to the VFO mode. Gaining proficiency with this procedure took patience and practice. The trickiest part for me was accessing the desired bank and channel. Thankfully, *Windows* programming software for this receiver is available free-of-charge on the Alinco Web site. An optional PC interface cable—the ERW-4C—is required, however.

US versions of the DJ-X2000 come pre-programmed with a few popular short-wave broadcast, HF utility, military, commercial and public safety frequencies. Memories can be scanned, banks can be linked for multiple bank scanning and specific memory channels can be locked out of a scan. You can even program in a frequency or group of frequencies that you want excluded from VFO or Scan Programming scans.

In addition to the standard memories, the DJ-X2000 also has 20 separate Scan Programming (PMS) banks. Each of these can be set up with a lower frequency limit, an upper frequency limit, a mode type, a tuning step size and an alphanumeric title. US versions come with a few of these programmed, as well. You'll find a sampling of popular US "service" frequency ranges, including Citizens Band, FM broadcast, AM aircraft, UHF military aircraft, NOAA Weather Radio, public safety, police/fire, ambulance/hospital, Family Radio Service, medical, federal and seven VHF and UHF ranges commonly assigned to police agencies. The PMS banks, as is the case with the standard memory banks, can be "linked" for multi-bank scanning.

It's important to point out that all of the sample frequencies that are programmed into this receiver at the factory—standard and PMS—are "volatile." A complete microprocessor reset will permanently clear them (…and yes, I did find this out the hard way). Fortunately, a "Clone" feature is included. I was able to convince a local Alinco distributor to allow me to clone our unit with his display model. (A cable with $^3/_{32}$-inch male mono phone plugs on each end is all that's required.) Lesson learned: If you like the collection of preloaded frequencies, limit any microprocessor resets to "SYSTEM" resets; a "FULL" reset will wipe the memory slate clean.

An "Auto memory write" feature is available in the PMS mode. This system will scan through the range of one of the PMS banks and automatically store active frequencies into a pre-selected standard memory bank. This is an ideal way to find activity rapidly when in new, unfamiliar territory. Of course, further listening or later research will be required to determine whether the collection of frequencies that the system gathered contains any interesting "hits."

A "Priority channel" feature is also included. When this system is activated, a specified memory will be automatically checked for activity at a regular time interval. A menu setting allows you to vary the check interval between 1 and 20 seconds.

The DJ-X2000 offers tone squelch and can scan for the tone in use on signals it receives. Thirty-eight CTCSS tones are supported. An innovative aspect of this particular system is that it can be set up as a *reverse* tone squelch. In this mode, the receiver will squelch any signal it receives that includes the tone that it's set up for, and let all other signals through.

Digital code squelch (DCS) and trunked radio system tracking capabilities are not included.

Listen Up!

I was genuinely surprised to be able to receive a decent number of HF amateur and MF short-wave broadcast signals using just the included rubber duck, but—as you might expect—it's not exactly a killer antenna for HF use. My ability to receive signals in this range improved significantly when I attached a $^1/_4$-λ 2-meter antenna to the BNC antenna connector. I found that the best antenna for short-wave and HF listening turned out to be a few feet of hookup wire (I soldered some light gauge insulated wire to the center pin of a male BNC connector). Outdoor ham antennas—even short dipoles—seemed to deliver far too much signal for this rig, and invariably resulted in overload. This was the case even with the radio's two-stage attenuator set to the "high" setting (attenuation is approximately 20 dB in high and 10 dB in low). The Alinco-supplied rubber duck antenna seemed to work just fine for VHF, UHF and casual low frequency listening, and even worked okay for pulling in nearby AM broadcast stations.

Overall, I was reasonably satisfied with the performance of this receiver throughout its range, but you should use the numbers in our Lab data table to help you set your own expectations. Sensitivity measurements in all of the available modes (we typically check these at points in or around the ham bands, at 1.0 MHz for the AM mode and 100 MHz for wide FM) are actually pretty decent. The majority of the sensitivity numbers posted by the DJ-X2000 meet or surpass even some of those we've observed on recently reviewed fixed-station wide range communications receivers.

The ability to handle weak signals in the presence of stronger signals, however, is not one of the DJ-X2000's strong suits. The CW mode two-tone, third-order IMD dynamic range figures (we measure these on the ham bands) are nearly all down in the low 40s. For casual short-wave and HF utility listeners, this might not be a major concern, as genuinely "crowded" band conditions—such as those we often experience in the ham bands—are not nearly as common.

Folks intending to put this unit to work for monitoring local VHF and UHF frequencies will want to peruse the FM two-tone, third-order IMD dynamic range figures. The 10-MHz offset numbers are actually not too bad—they're within the range of what we've encountered on some of the multi-band FM handheld transceiv-

ers we've reviewed. The close-in (20-kHz offset) FM 2T3O numbers and the FM adjacent channel rejection—both mostly down in the mid-30 dB range—point to potential for trouble, though. This radio runs into difficulty rejecting interference when in the presence of strong signals on a neighboring frequency or frequencies (think "urban RF environments"). The two-stage attenuator can often be helpful in these situations.

An Orchestra of Bells and Whistles

So far, we've considered the DJ-X2000's abilities—and limitations—as a conventional communications receiver. But what sets any product apart from its peers are its "extras"—those bells and whistles that help it transcend mere usefulness and elevate it into the realm of neatness, or even coolness. Alinco has made an obvious effort to pack the DJ-X2000 with a whole slew of unexpected features, and several of them qualify as neat or cool.

Perhaps the one I consider most welcome is a handy front-panel button labeled HELP. This feature provides abridged—but sufficient—on-board text assistance that will guide you through the majority of programming operations. This is terrific for those who need to reprogram the radio when out in the field—or for those who have temporarily misplaced the printed instructions (as many of us are occasionally wont to do).

A very nicely implemented feature that's available in the VFO mode is the "Channel Scope," which will generate a plot of the relative signal strength over a portion of spectrum and display it on the LCD screen. A press of the SRCH button on the left side panel of the radio brings up the dot-matrix scope display. While the scope field is small—only about $3/4 \times 1/8$-inch—it's made up of over 300 dots. The scope image it renders looks great and the feature is very useful for spotting nearby band activity.

When you activate the Channel Scope, the receiver audio will mute for a second or so as a sweep routine samples the signal strength at each tuning step increment in the range. The scope can be set up to display either 7 or 40 steps, and is centered on the receive frequency. The system can be programmed to make a single sweep, to repeat the sweep automatically every 10 seconds or to sweep continuously. The continuous mode mutes the receive audio. Tuning the VFO when in the automatic or single sweep modes will mute the audio for a fraction of a second on each frequency step.

Are you monitoring an interesting or suspicious communication and don't hap-

pen to have a tape recorder handy? The DJ-X2000 can digitally record audio for later playback. The recording can be paused and restarted as desired and can store up to 160 seconds of audio. I played with this feature extensively and found the recordings to be universally clean, crisp and ready for transfer to more permanent storage media. Unlike some digital recording systems I've encountered, the recording is retained when the power is shut off. You can even activate a built-in microphone for non-radio audio recording.

Want to estimate the radiation pattern of an antenna? A simple field-strength measurement feature is included. In the "Meter display mode," the rate of a beeping sound and a seven-step S-meter provide an indication of the relative signal strength. In the "Set level mode," a buzzer will sound if the field strength exceeds a preset value. The meter is not calibrated and the sensitivity varies with respect to frequency, but this feature could be useful for making casual assessments of a radiation pattern.

The DJ-X2000 can be set up to tune instantly to strong near-field signals, and can pull double duty as a frequency counter. This "Flash tune" feature can be utilized in one of two ways: The received audio from a nearby signal can be played over the speaker, or the frequency of that signal can be displayed. It works in the range from 50 to 1300 MHz, and may be useful to experimenters and homebrewers for radio tune-up and calibration purposes. Alinco is to be commended for incorporating some useful test equipment into this receiver.

The *Instruction Manual* makes reference to the detection of "bugs" as the intended application for a few of this radio's extras. The rate of occurrence of such references might prompt the reader to wonder whether the product is targeted at people in the security trades (or those with unhealthy levels of paranoia, perhaps). Nevertheless, a "Transweeper" feature does, indeed, detect low-power wireless microphone devices within about a 5-meter range of the radio.

Activating Transweeper causes the DJ-X2000 to emit an audio beeping sound. If a nearby transmitter picks this sound up on its microphone and transmits it over the air—and if the receiver is tuned to that transmitter's frequency—DJ-X2000 will use the time delay between the RF and audio information to "range" the distance between itself and the "bug." A notable limitation is that a specific frequency, a range of frequencies or a collection of likely frequencies must be determined in advance. (The Flash tune frequency counter feature might be useful for mak-

ing this determination.) A scale in the display provides an approximation of the distance (from 1 to 5 meters) and arrow indicators show whether the distance to the target is increasing or decreasing. I experimented with this using my H-T. While this could very well be a useful feature, my results were inconsistent. As is clearly stated in the *Instruction Manual*, room acoustics and variations in the mike/receiver orientation can confuse this ranging system. But it was entertaining to play with!

With some calculation, you can program a time at which the radio will turn either on or off. While the manual titles the section that describes this feature "Setting the clock," the DJ-X2000 doesn't include a conventional time-of-day clock. The user can program the radio to turn on or off from 30 minutes to 24 hours (in 30-minute increments) after the feature is enabled. This is an either/or proposition, though. Let's suppose you wanted the radio to turn on at 8 AM, and that you were setting up the feature at 11 PM. You would set the on timer to 09:00, as that corresponds to the length of time from when you are activating the feature to when you want the radio to switch on. While this feature could allow you to use the radio as an alarm clock, for catching a scheduled transmission or for shutting off the radio after you've fallen asleep, it's not nearly as handy as it could be. A conventional time-of-day clock, with the on-off times settable as times-of-day, would be much more useful—and more convenient to set up.

A "Sound pickup" feature allows you to use the built-in microphone, along with a connected earphone, to put the DJ-X2000 to work as a sound amplification device. The built-in microphone is sufficiently sensitive, but this feature would be even more useful if the rig had an external microphone input jack. You could then plug in a directional mike—perhaps one mounted on a parabolic dish—to enhance your long-range eavesdropping capabilities.

How it Handles

Control of the basic functions quickly became routine. While many may still prefer that volume, squelch and tuning be handled by dedicated rotary controls, it is becoming increasingly common for these to be relegated to a single knob and/or pushbuttons. The volume and squelch control arrangement on this receiver is one of the best digital implementations I've encountered.

All of the buttons are rubber-coated and easy on the fingers. The front keys do not resist very much when pressed, however. I found it easy to activate them unintentionally while handling the

radio. I made ample use of the keypad lock feature. Overall, though, I was quite satisfied with the ergonomic layout and operational feel of the DJ-X2000.

Those in the market for a handheld "dc-to-daylight" communications receiver are sure to find the DJ-X2000's masterful blend of novel features and adequate performance tough to resist.

Manufacturer: Alinco Inc, Shin Dai Building 8F, 1-2-6 Doujimahama, Kita-ku, Osaka 530-0004 Japan. Alinco's US distributor is ATOC Amateur Distributing LLC, 23 S High St, Covington, OH 45318; 937-473-2840; fax 937-473-2862;

alinco@alinco.com; **www.alinco.com**.

Manufacturer's suggested retail price, $835. Typical current street price, $500. List prices of selected optional accessories, ERW-4C PC interface cable, $39.95; EDC-36 filtered automotive dc power cord, $24.95; EDH-16 dry cell battery case, $12.95. █ST█

Going Once, Going Twice . . .

Solicitation for Product Review Equipment Bids

[In order to present the most objective reviews, ARRL purchases equipment off the shelf from dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review, Short Takes or New Products columns.—*Ed.*]

The ARRL-purchased equipment listed below is for sale to the highest bidder. Prices quoted are minimum acceptable bids, and are discounted from the purchase prices. All equipment is sold without warranty.

ICOM IC-756PROII HF/6-meter transceiver, serial number 01164 (see "Product Review," Feb 2002 *QST*). Minimum bid: $1990.

ICOM IC-R3 communications receiver, serial number 01372 (see "Product Review," Feb 2001 *QST*). Minimum bid: $275.

Kantronics KAM XL multimode communications processor (see "Short Takes," Mar 2002 *QST*). Minimum bid: $265.

Kenwood TH-F6A triband FM handheld transceiver, serial number 30500061 (see "Product Review," Dec 2001 *QST*). Minimum bid: $260.

Ranger RCI-5054DX 6-meter mobile transceiver, serial number TIY00796 (see "Product Review," Mar 2002 *QST*). Minimum bid: $195.

WiNRADiO WR-1550i computer-based communications receiver, serial number 107620 (see "Product Review," Jan 2002 *QST*). Minimum bid: $365.

Yaesu FTV-1000 6-meter transverter for the FT-1000MP, serial number 10040047 (see "Product Review," Feb 2002 *QST*). Minimum bid: $595.

Yaesu MARK-V FT-1000MP HF transceiver with YF-115C 500-Hz CW filter, serial number 0F020049 (see "Product Review," Nov 2000 *QST*). Minimum bid: $2080.

Yaesu VL-1000 Quadra HF/6-meter linear amplifier, serial number 0K220026 (see "Product Review," Jan 2002 *QST*). Minimum bid: $2650.

Yaesu VR-5000 communications receiver, serial number 0K030164 (see "Product Review," Jun 2001 *QST*). Minimum bid: $500.

Sealed bids must be submitted by mail and must be postmarked on or before June 1, 2002. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, clearly identify the item you are bidding on, using the manu-facturer's name and model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. Please include a daytime telephone number. The successful bidder will be advised by telephone or by mail. Once notified, confirmation from the successful bidder of intent to purchase the item must be made within two weeks. No response within this period will be interpreted as an indication of the winning bidder's refusal to complete the transaction. The next highest bidder will then have the option of purchasing the item. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding the final price or the identity of the successful bidder. If you include a self-addressed, stamped postcard with your bid and you are not the high bidder on that item, we will return the postcard to you when the unit has been shipped to the successful bidder.

Please send bids to Bob Boucher, Product Review Bids, ARRL, 225 Main St, Newington, CT 06111-1494.

STRAYS

Thanks to the hard work of several Michigan ARRL officials, the state is now sporting a new Amateur Radio license plate. Shown at the January ceremony in the office of Secretary of State Candice S. Miller are (left to right): Ed Hude, WA8QJE, State Government Liaison; Sandy Mondro, KG8HM, ACC; John Lewandowski, WD8R, EC Macomb County; Secretary Miller; Section Manager Richard Mondro, W8FQT, and the plate's de-signer, Randy Love, WF5X, Assistant Emergency Coordinator Oakland County. While they were there, the hams took the opportunity to discuss Amateur Radio involvement with government agencies and public service. At the right are the original design and the new one that shows the Mackinac Bridge.

JAMES MCRAY   GEORGE RACE, WB8BGY

From April 2002 QST © ARRL

Electric Radio Antenna Tuning Meter

The Antenna Tuning Meter from Electric Radio is one of those devices that has the potential to make life on the air a bit more pleasant for everyone. After all, who hasn't experienced the pain of finding oneself on the National Tune-Up Frequency? You know what frequency I mean. It's the frequency at which your radio is tuned at the very moment when another ham decides it's time to tweak his or her antenna tuner on the air. *Every* frequency is the National Tune-Up Frequency, or so it would seem.

Besides generating ill will and bad karma, blatant on-the-air tuning isn't particularly gentle to your transceiver. This is especially true if you are running a vintage rig with tube finals. One answer for the considerate operator may be the Antenna Tuning Meter.

Built Like a Battleship

The Antenna Tuning Meter is blessed with a level of craftsmanship and durability that is rare among Amateur Radio products today. The housing is heavy-gauge aluminum; you could probably drive a truck over the Antenna Tuning Meter without denting it. Better still, this little unit is RF tight, which is good considering its purpose.

The front of the Antenna Tuning Meter is plain and functional.
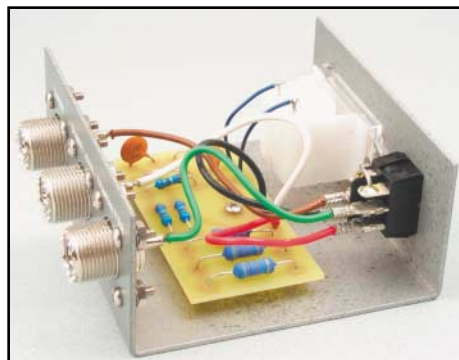
An interior view of the Antenna Tuning Meter reveals a clean, uncluttered layout.

There is a thin "null meter" and a rocker switch labeled TUNE and OPERATE. The rear panel sports three SO-239 coaxial connectors labeled DUMMY LOAD, TRANSMITTER and TUNER.

Using the Meter

Connecting the Antenna Tuner Meter is straightforward (see Figure 1). One cable attaches to the dummy load of your choice; the other coax goes to your transceiver and the remaining cable connects to your antenna system via your tuner.

Toggle the TUNE/OPERATE switch to the TUNE position. Now the dummy load is connected to your radio. Place your rig in transmit (either key-down CW, AM or FM—any mode that will give you a stable output) and increase power until you see a $1/3$ scale reading on the null meter. Now simply adjust your antenna tuner for a zero (or as close as you can get to it) reading on the null meter.

The nifty aspect of all this is that you are setting up your antenna tuner for the best match to your radio without polluting the airwaves. For example, if you use 100 W to obtain a usable indication on the null meter for tuning purposes, the Antenna Tuning Meter is actually radiating only *25 mW* to the antenna tuner. The Antenna Tuning Meter only samples a tiny amount of RF to do its job; the rest is dissipated in your dummy load. Chances are you'll be able to drive the null meter to $1/3$ scale with much less power, so the amount radiated to the antenna will be reduced even further. QRPp operators will tell you that you can still be heard with milliwatts of power, and this is true, but tuning your antenna system with the Antenna Tuner Meter is much better than blasting the band with 100 W.

When you've finished tuning, switch the Antenna Tuning Meter to the OPERATE position and you're good to go—as long as your maximum power does not exceed 100 W. You may see some meter indication when operating (I did), but that is due to stray RF pickup within the meter itself.

Conclusion

If you use a manual antenna tuner and you want to keep a low profile while tuning your antenna system on the air, the Antenna Tuning Meter is worth considering. Your fellow hams will thank you—and so will your radio.

Manufacturer: Electric Radio, 14643 County Rd G, Cortez, CO 81321-9575; tel 970-564-9185; **er@frontier.net**. *$49.95 plus $4.95 shipping and handling.*

Figure 1—Connection diagram for the Antenna Tuning Meter.

Dummy

Antenna Tuner

Transceiver

Antenna Tuning Meter

Steve Ford, WB8IMY   *QST* Editor