

## The Uniden HR-2510 10 Meter SSB / CW / FM Transceiver

BY DAVE INGRAM\*, K4TWJ

**W**hat's this? A new 10 meter transceiver that actually fits in today's compact cars and sports an attractive price tag to boot? Sure enough, and Uniden's new HR-2510 is sure to capture the hearts and interest of 10 meter devotees everywhere. It is a genuine fun rig you can mount in a car with its supplied bracket, slide into an open corner at home, or slip into a small tote bag for traveling.

This 25 watt output transceiver covers 28.000 to 29.700 MHz with SSB, CW, AM, and FM operations; built-in SWR bridge; semi-break-in CW; RIT; noise blanker; and more. The receiver's sensitivity of .25 uV is quite adequate, and when 10 is open as it has been recently, 25 watts can work plenty of DX. In fact, my first week's worth of QSOs while using the HR-2510 was all DX! With sunspots increasing every day, a little rig like the HR-2510 is loads of fun.

I'm sure that many amateurs will recognize Uniden's name from their popular Bearcat® scanners, cellular telephones, and other electronic items. The HR-2510 is their first serious entry into the amateur radio field. I would say they will watch its progress as a measure of consideration in producing additional amateur radio gear.

### General Overview

The compact HR-2510 is enclosed in a black and dark gray cabinet measuring 2½" H x 7¼" W x 11"D, and weighs roughly 4 pounds. The front LCD readout is amber color, with selectable bright or dim backlighting. Its left side includes bar-graph metering, and the right side indicates frequencies. A stout internal speaker is mounted on the bottom, and a healthy heat sink on the rear is flanked by connectors for antenna, power, and accessories. Rather than using regular ½ inch phone jacks, Uniden's 2510 has one nine-pin Molex socket for connecting a key, external speaker, and auto PA speaker. Switching from internal to external speaker and/or connecting a key thus



Uniden's new HR-2510 is a compact, all-mode 10 meter transceiver with a sensitive receiver and 25 watt output transmitter.

involves replacing one "accessory" plug with another (supplied) plug wired to your speaker and/or key.

The transceiver draws less than 1 amp of current during receive and only 4 to 5 amps during transmit. Those low-power consumption figures are appealing in several respects. You can enjoy some fairly long mobile operating stints while parked in a shopping-mall lot, for example, without totally draining a car's battery. An inexpensive and low-current AC supply also mates perfectly with the rig for home or portable use.

The receiver's overall sensitivity, selectivity, and audio quality strike me as surprisingly good, especially considering its low cost. Its "S" meter is a bit on the stingy side, but that's not serious—only truthful. The RIT control covers roughly a 6 kHz span, which is perfect, but new amateurs must remember to center-position the control for receiving and transmitting on the same frequency. An RIT

"off" switch is not included. I suggest placing a small drop of red fingernail polish on that knob's pointer as a "mental reminder." Additional HR-2510 details and specifications are shown in Table I.

Amateurs interested in self-contained portable operations can put together some clever systems using the HR-2510. Visualize, for example, home-fabricating a slip-in metal bracket for holding the transceiver and a 5 amp rechargeable VCR-type battery. Add a carrying handle and whip or ducky antenna plus a mike clip, and you have a "midsize handheld" that will literally work the world. Imagine using that setup on a mountaintop or while relaxing on a warm southern beach. Now that's living!

We also understand KA8PGJ in Dayton interconnected his HR-2510 and 2 meter transceiver for remote base operation on 10 meter FM. A simple one-transistor interface was used between each unit's squelch-voltage terminal and a basic

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COR circuit. By now he has probably worked all continents on a handheld.

## A Front Panel Tour

A convenient means of familiarization with any new transceiver involves trekking through its front-panel controls and their operation in a step-by-step manner. Using that technique, let's start at the 2510's left top area and proceed to the right bottom while pausing for a few descriptions along the way.

First, several "behind the panel" aspects are noteworthy in the transceiver's mode switch. CW operations, for example, include a built-in sidetone that tracks with the rig's volume control. Its semi-break-in operation is quite smooth (no clattering relays at all!), and the preset delay time returns to receive mode after 1 second of "key-up." If desired, the front "TX" button can override that function for manual T/R switching.

A group of nine pushbuttons is mounted on the front panel's left side. One button steps through the meter's functions for selecting RF output, modulation, SWR, and calibration modes. An adjacent front control is used in conjunction with the SWR function for calibrating and measuring SWR in the usual manner. Another pushbutton adjusts the microphone gain—press it in for low or release it for high. That may initially seem a bit compromising, but it is actually quite convenient. Another interesting feature is the 2510's "Beep" button. When pressed, a brief tone is added at the end of each SSB transmission. You've probably noticed many operators using that toning method during contests. It's becoming quite popular, and it may be a real boon for Novices.

Frequency coverage is divided into four band segments which are step-selected by the 2510's "band" pushbutton (see Table I for frequency ranges). The main tuning knob is also lightly detented for easy and positive mobile use. It thus has the "feel" of a 2 meter FM rig rather than "free wheeling." Three tuning rates are step-selected via a front button—10 kHz, 1 kHz, and 100 Hz. A small cursor appears under that selected digit in the transceiver's LCD readout. I found the 1 kHz speed ideal for general band tuning and operating, and switched to the 100 Hz speed only for fine-tuning DX stations. I should also mention the 2510's front "memory channel" buttons and mike up/down switches likewise operate only in 10 kHz steps—not too good for SSB, but perfect for fast QSYS and operating 10 meter FM. The international calling frequency on 10 FM is 29.600 MHz, with other channels "stacking" up the band to 29.700 MHz in 10 kHz increments. Popular repeater outputs are every 20 kHz (29.620, 640, 660, etc.). Their inputs are usually -100 kHz (29.520, 29.540, 29.560, etc.). Transmit offsets are not in-

General	
Frequency Range	Band A—28.0000–28.4999 MHz Band B—28.5000–28.9999 MHz Band C—29.0000–29.4999 MHz Band D—29.5000–29.6999 MHz
Microphone	500 ohms Dynamic, w/PTT and Channel up and down
Speaker	8 ohms, 3 W
Operating Modes	CW, USB, LSB, AM, FM
Display	Backlit LCD
Display Items	Frequency, Channel #, Meter, Meter Mode, TX, Band, VFO Span
Size	7.32" x 10.35" x 2.44"
Weight	4 lbs. 3 oz.
Transmitter	
Frequency Stability	± 300 Hz Nominal, (at 25° C, 5 minutes after power on)
Output Power	CW 25 W Nominal USB/LSB 25 W PEP Nominal AM/FM 10 W Nominal
Spurious Harmonic Emissions	- 50 dB Nominal, all modes
Carrier Suppression	- 55 dB Nominal, USB/LSB Modes
Unwanted Sideband Suppression	- 45 dB Nominal, USB/LSB Modes
Power Consumption (No Modulation, PTT Depressed)	AM/FM 3 A Nominal USB/LSB 0.8 A Nominal CW 5 A Nominal (Key Down)
(Max. Modulation) Microphone Input	AM/FM/USB/LSB/ 3 A Nominal
CW Key Voltage/Current	1 mV Nominal for 50% AM Modulation 8 VDC, 10 mA
Receiver	
Sensitivity for 10 dB S/N	AM .5 μV Nominal CW/USB/LSB .25 μV Nominal
Sensitivity for 20 dB S/N	FM .5 μV Nominal
Adjacent Channel Selectivity	70 dB Nominal (10 kHz Spacing)
Max. Audio Output	4 W Nominal
RF Gain Range	55 dB Nominal
RIT Range 1	± 3 kHz Nominal
"S" Meter Sensitivity at S9	100 μV Nominal
Image Rejection Ratio	65 dB Nominal
Power Consumption, No Signal	500 mA Nominal
Power Consumption, Max Audio	1000 mA Nominal

Table I—Technical specifications of the Uniden HR-2510.

cluded in the 2510, so some fast button presses fill the void. It works. I keyed several repeaters and then switched to their output and heard my squelch tail. Honest!

Both RF and AF gain controls are included on the 2510's front panel, so reducing sensitivity when nearby stations are exceptionally strong is a snap. The unit's squelch also works on all modes, so you can leave the rig quietly monitoring for band opening and be pleasantly alerted when DX conditions are good. The rig's noise blanker is pushbutton-selectable and not level-adjustable, but it works like a champ. Uniden really "has their act together" on that feature. It even reduces power-line noises!

While the 2510 has an impressive-looking front panel with 20 controls, its use of muted colors is very beneficial for mobile installations. Flashy rigs catch evil eyes. The 2510 blends with the dash in many modern cars, and it's small enough to fit into those open tray areas in many center consoles.

## Circuitry Overview

Briefly studying any transceiver's block diagram always reveals its inner beauty, so let's take a closer look inside the HR-2510. First, I will point out that fig. 1's diagram is slightly simplified for discussion. The original filled two large pages. There is a substantial amount of circuitry in this little rig. Let's begin with the receive path.

An incoming signal from the antenna moves through the SWR detector and the low-pass filter, and then "taps off" and goes up to the RF amplifier (a 2SC1647L transistor is used). It moves through the 10 meter bandpass filter to the receive mixer, where it is downconverted to 10.69 MHz. Notice the noise blanker's amplifier, detector, ALC, and gating switch above the IF filter section—impressive for a low-cost rig. The signal continues through the bandpass filter to the IF amplifier (notice "takeoff" for the AGC section), then continues to the AM or SSB detector. Finally, the detected sig-



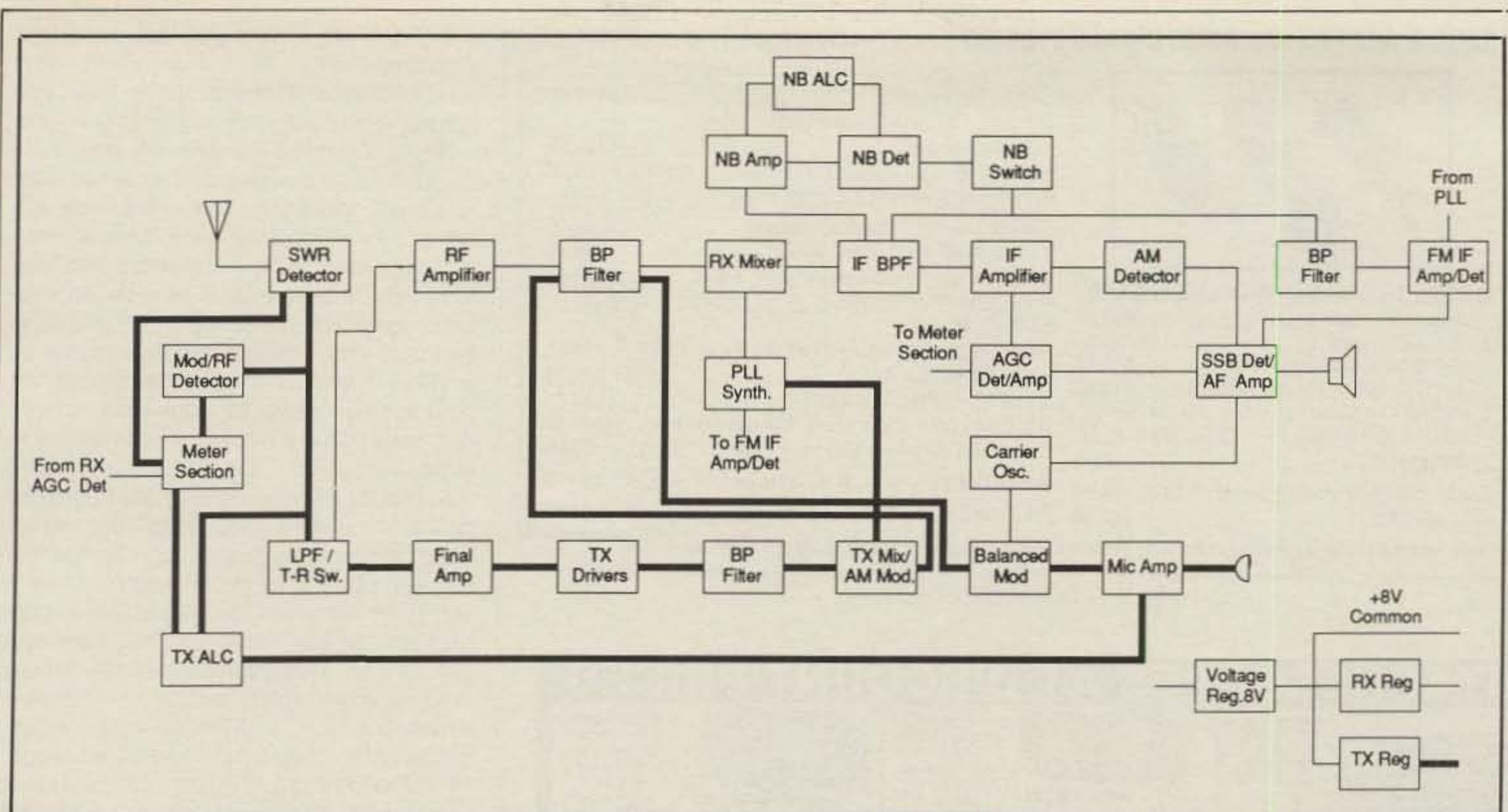


Fig. 1—Simplified block diagram of the Uniden/President HR-2510. Light lines are receive paths, while dark lines are transmit paths. See discussion in text.

nal moves through the AF amplifier and power amplifier to the speaker.

The 2510's transmit path begins at the microphone, goes through the mike amplifier, to the balance modulator, and through the bandpass filter. It then continues "down" to the transmit mixer, through the bandpass filter and TX drivers, then to the final (a hefty MRF477 transistor) through the low-pass filter, and to the antenna. Notice the TX ALC section "tapping off" the RF output and "going back" to the mike amp. This design improves the average SSB output to increase "talk power." The PLL synthe-

sizer block below the RX mixer contains the HR-2510's microprocessor control, "divide by N," PLL, and digital rotary encoder (main dial) sections. The rig's 50 preprogrammed memories are stored in the microprocessor and accessed by the mike's up/down buttons. Each memory is spaced and fixed in 10 kHz steps (example: 28.500 = 1, 28.510 = 2, etc.) Any selected memory can be tuned (but not reprogrammed) to a desired frequency (like 28.503) with the main tuning knob.

Several of the HR-2510's transistor types seem more "CB-oriented" than "KenYaeCom popular." However, I con-

sider that a natural design concept for this 28 MHz rig. Many of today's CB sets are impressive performers. Shaping factor details on the bandpass filter were not available, but its on-the-air performance is very good.

### On-The-Air

Although the Uniden 2510 is a 25 watt output transceiver, it makes an impressive account of itself on the air. Indeed, my first few days' contacts were all DX—even while mobile! I started off working northern Europeans on SSB, and then switched to FM on 29.600 and contacted several southern Europeans. Five of the world's six continents were also heard and worked on CW. I even ran a string of JAs from my car parked in the driveway. I used the HR-2510 during the 1988 CQ DX contest and honestly could not believe the super results. I even worked a good bit of "rare DX" (and a couple of new countries) right through pileups. What a blast! Ten was flourishing with good equinox-type excitement and everyone was having a ball. If you have not been on 10 meters recently or if you are a new Novice hesitant about operating HF bands, now's the time for action! Cycle 22 is doing great, and the next few years should be even better!

The 2510's selectable tuning rates take some getting accustomed to, but they are a snap to use afterwards. One button press changes from "coarse" or 1 kHz steps to "fine" 100 Hz steps. Two button pushes are then used to "jump



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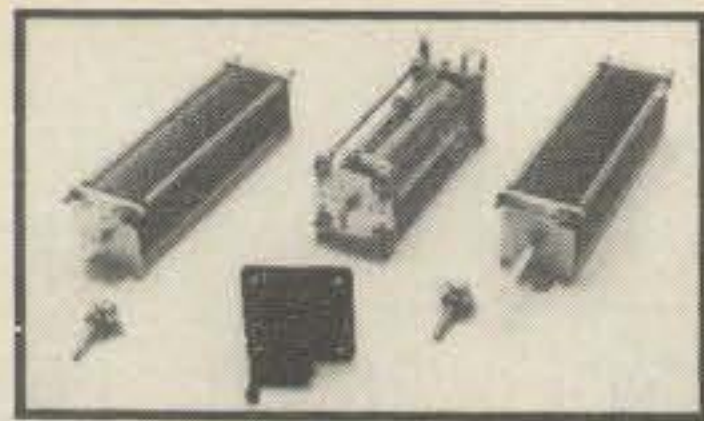
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over" 10 kHz tuning and returning to 1 kHz steps. The dial's cursor indicates your choice of steps to make selection easy and obvious.

Some of the 2510's favorable points are its good noise blanker, all-mode squelch, and SWR metering. These features are perfect for a "go anywhere" transceiver. It's easy to use, but I suggest new (Novice-enhanced) amateurs ask an old-timer for some guidance in initial setup. Listen to your transmitted SSB signal on another transceiver and determine the best speaking level for your voice. Check to assure you are transmitting and receiving on the same frequency, and then note that proper RIT setting with red fingernail polish. It makes a good "reminder" when band action is high and you change the RIT setting, and forget to return it to center. If an old-timer is not available, contact an "aged" amateur on-the-air and ask for honest-opinion assistance on how your audio sounds and its frequency. Amateurs are a friendly and helpful group. After those getting-started steps, listen to others until you feel confident (anxious?), and then get cracking on some fun DXing. It's great!

A couple of the 2510's less favorable points also warrant mention. First, its accessory plug with prestripped wires for an external key and speaker should be connected and/or covered with tape to avoid accidental shorts (the wires are affixed to the 2510's accessory plug). Second, there is no speech processor or provisions for keying an external linear amplifier. The rig "gets out" fine without speech processing, and problems of "overcompression" are avoided. You can also rig your own mike-energized switching for a big amplifier, if desired.

As designed, however, the 2510 assures new amateurs/Novices make few unnecessary mistakes—a very important consideration for first-time success. It is a clever approach to getting on the air and having fun. The 2510 is also an ideal second rig for old-time amateurs. You can use it in the den or car with few reservations or problems. Uniden has a good reputation for quality electronic equipment, and the 2510 is backed with a one-year limited warranty.

## Conclusion

All aspects considered, Uniden has done a good job on production of the HR-2510. The transceiver is a neat traveling companion with an attractive price tag rather than a lot of frills. Combine it with a mobile whip on the car and a short wire antenna like Radio Works' new "in tree vertical" for portable use, and you are set for fun almost anywhere and anytime. For more information contact President, Amateur Radio Division, 4700 Amon Carter Blvd., Fort Worth, TX 76155 (telephone 317-842-2483).