

PRODUCT REVIEW

Alinco DX-SR8T HF Transceiver



*Reviewed by Mike Corey, W5MPC
ARRL Emergency Preparedness Manager*

For decades Amateur Radio equipment manufacturers have had HF transceivers in their line ups that are designed for operators who are new to the HF bands or have a limited budget for new radios. Alinco's new offering, the DX-SR8T, is their current product designed for this market segment.

The DX-SR8T is a basic, HF only, transceiver that covers the 160 through 10 meter bands (6 meters is not included) and has a general coverage receiver. It is advertised as a "desktop transceiver" but it has a detachable faceplate that makes it suited for mobile operation as well.

The DX-SR8T measures, roughly, 4 × 10 × 10 inches and weighs about 9 pounds. While it does not have the rugged military look and feel of some other radios in this price class it does seem sturdy. The front panel features a large display that measures approximately 3 × 2 inches and is not quite rectangular in shape. There are four knobs on the lower left that control VOLUME, SQUELCH, IF SHIFT and RIT. There are three jacks for MICROPHONE (8-pin round), SPEAKER (1/8 inch) and HEADPHONES (1/8 inch). A cluster of buttons on the right side of the face plate are the multifunction buttons that control most of the rig's other

features. It should be noted that the large VFO TUNING knob, although it seems sturdy, is on a plastic shaft and is not secured by a setscrew. This may cause problems if the radio is used in cold conditions or takes any kind of physical abuse.

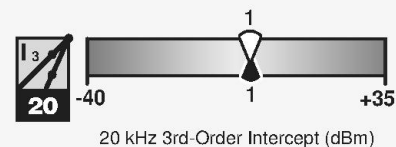
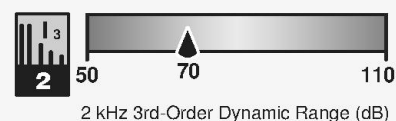
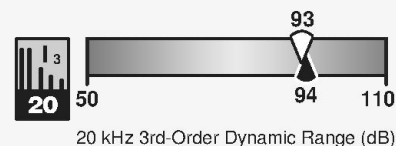
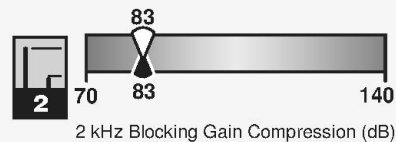
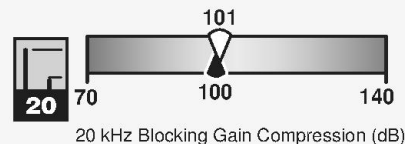
The rear panel is noticeably sparse. There are seven jacks on the back of the radio for ANTENNA, EXTERNAL AMPLIFIER RELAY, ALC, CW KEY, ACC (for the EDX-2 antenna tuner), POWER and GROUND. There are six places on the back that look like they were intended to be jacks, but are covered up. What is unusual compared to other current HF transceivers is that there is no connection for computer control and no accessory jack for a digital mode interface.

The DX-SR8T provides 100 W output on SSB, CW and FM and 40 W output on AM. The power output is not continuously adjustable as it is in most other HF rigs. There are three different power levels that you may choose from. More on this in a bit.

Out of the Box

As with any new radio, the main goal is to get it out of the box and on the air. I borrowed a test devised by another HQ staffer, the "no-manual test." Setting up the radio up was fairly straightforward. I plugged the power cord into the power supply, connected the microphone and key, and hit the

Key Measurements Summary



PR059

Key: * Off Scale
Dynamic range and intercept values with preamp off.
Intercept values were determined using -97 dBm reference

Bottom Line

The Alinco DX-SR8T is a low cost HF transceiver that includes a good selection of basic features for the casual operator. There are a few issues to consider, though, if your interests run to digital modes or competitive activities.

large orange button marked POWER. The large display lit up and showed a frequency on 20 meters. This test was done on the weekend of the ARRL 10 Meter Contest so the first thing to do was change bands... but how? There were no buttons marked for individual bands or UP/DOWN band buttons. Less than 30 seconds into the "no-manual test" I was going to the manual to find out how to simply change bands.

I initially found that the number pad on the upper right of the face plate is used to select the operating band. Each number corresponded to a band, but they are not marked on the radio. I found on the last page of the manual a diagram of the key pad showing the band assignments. It can be copied and kept with the radio. This seemed a bit awkward.

The next issue encountered was the keyer delay on CW. After I had changed bands to 10 meters I tried sending a quick test on CW. The delay was unusually long, about 2 seconds before the radio switched back to receive. Again going to the manual to find out how to go to the appropriate menu setting I found that the default setting is AUTO. The AUTO setting sets the delay automatically, based on what the radio thinks is appropriate for the code speed being transmitted, but 2 seconds is way too long for my on-air use. A quick adjustment changed this to full break-in. You can also manually set the delay in seven steps for semi break-in operation

Okay, so now up to the phone portion of the band. After just adjusting the CW settings I thought I should double check the SSB settings. First the mic gain...but where is the mic gain adjustment? Nothing on the front or rear panels indicated mic gain. I checked the menu settings, nothing there. Okay, back to the manual. The answer was found on page 85. The mic gain is an internal adjustment. To make the adjustment requires the user to remove the cover from the radio and adjust a variable resistor, VR117. Of course the manual clearly states that this is done at the user's risk and any damage due to the adjustment will void the warranty. It is recommended that the user take the radio to an authorized Alinco dealer for assistance unless you are familiar with radio maintenance.

For routine phone operation it isn't likely that you'll need to make regular adjustments to the mic gain, but digital modes are another story. Making the mic gain adjustment this difficult seems completely unnecessary. Mic gain is not the only adjustment that must be made by opening up the radio; beep volume, sidetone volume and power output in the SUPER LOW setting (0.1 to 2 W) are all adjusted internally. It would be nice if there were a hatch on the top of the case that could be quickly opened to make the adjustments

Table 1

Alinco DX-SR8T, serial number M000529

Manufacturer's Specifications

Frequency coverage: Receive, 0.135-30 MHz; transmit, 1.8-2, 3.5-4, 5.3305, 5.3465, 5.3665, 5.3715, 5.4035, 7-7.3, 10.1-10.15, 14-14.35, 18.068-18.168, 21-21.45, 21-21.44, 24.89-24.99, 28-29.7 MHz.

Power consumption at 13.8 V dc: receive, 1 A (max); transmit, 20 A.

Modes of operation: SSB, CW, AM, FM.

Receiver

SSB/CW sensitivity: 10 dB S+N/N, 0.15-1.8 MHz, 1 µV; 1.8-30 MHz, 0.25 µV.

Noise figure: Not specified.

AM sensitivity: 10 dB S+N/N; 0.15-1.8 MHz, 10 µV; 1.8-30 MHz, 2 µV.

FM sensitivity: 12 dB SINAD; 28-30 MHz, 0.5 µV.

Blocking gain compression: Not specified.

Reciprocal mixing (500 Hz BW): Not specified.

ARRL Lab Two-Tone IMD Testing (500 Hz bandwidth)*

Band/Preamp	Spacing	Input Level	Measured IMD Level	Measured IMD DR	Calculated IP3
3.5 MHz/Off	20 kHz	-39 dBm	-132 dBm	93 dB	+8 dBm
		-32 dBm	-97 dBm		+1 dBm
14 MHz/Off	20 kHz	-38 dBm	-132 dBm	94 dB	+9 dBm
		-32 dBm	-97 dBm		+1 dBm
		0 dBm	-27 dBm		+14 dBm
14 MHz/On	20 kHz	-45 dBm	-135 dBm	90 dB	0 dBm
		-39 dBm	-97 dBm		-10 dBm
14 MHz/Off	5 kHz	-62 dBm	-132 dBm	70 dB	-30 dBm
		-51 dBm	-97 dBm		-28 dBm
		0 dBm	-10 dBm		+5 dBm
14 MHz/Off	2 kHz	-62 dBm	-132 dBm	70 dB	-30 dBm
		-52 dBm	-97 dBm		-30 dBm
		0 dBm	-8 dBm		+4 dBm

Measured in the ARRL Lab

Receive and transmit, as specified.

Receive, no signal, default lights, 0.69 A, receive, max volume, max lights, 0.71 A, receive, no signal, no lights, 0.64 A; transmit: 14 A (high), 4.75 A (low), 2.7 A (s-low).

As specified.

Receiver Dynamic Testing

Noise floor (MDS), 500 Hz bandwidth:

	Preamp Off	Preamp On
0.137 MHz	-112 dBm	-113 dBm
0.505 MHz	-126 dBm	-130 dBm
1.0 MHz	-126 dBm	-131 dBm
3.5 MHz	-132 dBm	-138 dBm
14 MHz	-132 dBm	-135 dBm

14 MHz, preamp off/on: 13/10 dB.

10 dB (S+N)/N, 1-kHz, 30% modulation, 6 kHz filter:

	Preamp Off	Preamp On
1.0 MHz	2.0 µV	0.98 µV
3.8 MHz	1.0 µV	0.47 µV
29 MHz	1.0 µV	0.59 µV

For 12 dB SINAD, preamp on: 29 MHz, 0.28 µV

Gain compression, 500 Hz bandwidth

	20 kHz offset Preamp off/on	5/2 kHz offset Preamp off
3.5 MHz	101/92 dB	85/83 dB
14 MHz	100/91 dB	87/83 dB

20/5/2 kHz offset: -86/-65/-60 dBc.

or better still, make these adjustments in a menu setting.

Getting Around the Bands

As mentioned earlier, right out of the box changing bands is not intuitive. There is nothing on the front panel that would appear to be a band selection button. In addition to pressing a digit on the numbered keypad as described earlier, there are a couple other

ways the operator can change bands.

By pressing the M/KHz button you can change frequency either in band steps, 1 MHz increments, 100 kHz increments or 2.5 kHz increments. This can be particularly handy if changing frequencies within a band, especially large bands such as 10 meters.

The frequency can also be changed by direct keypad entry. Pressing the ENT button, then enter the frequency with no decimals,

Manufacturer's Specifications

Second-order intercept point: Not specified.
 FM two-tone, third-order IMD dynamic range: Not specified.
 S-meter sensitivity: Not specified.
 Squelch sensitivity: Not specified.
 Receiver audio output: 2 W into 8 Ω at 10% THD.
 IF/audio response: Not specified.

IF rejection, >70 dB.
 Image rejection: >70 dB.

Transmitter

Power output: SSB, CW, FM, 1 W (s-low), 10 W (low), 100 W (high): AM, 0.4 W (s-low), 4 W (low), 40 W (high).
 Spurious-signal and harmonic suppression: Meets FCC requirements.
 SSB carrier suppression: >40 dB.
 Undesired sideband suppression: >50 dB.
 Third-order intermodulation distortion (IMD) products: Not specified.
 CW keyer speed range: Not specified.
 CW keying characteristics: Not specified.
 Iambic keying mode: Not specified.
 Transmit-receive turnaround time (PTT release to 50% audio output): Not specified.
 Receive-transmit turnaround time (tx delay): Not specified.
 Composite transmitted noise: Not specified.
 Size (height, width, depth): 3.7 × 9.5 × 11.40 inches (including protrusions); weight, 9 lbs;
 Price: \$650.

*ARRL Product Review testing now includes Two-Tone IMD results at several signal levels. Two-Tone, 3rd-Order Dynamic Range figures comparable to previous reviews are shown on the first line in each group. The "IP3" column is the calculated Third-Order Intercept Point. Second-Order Intercept Points were determined using -97 dBm reference.
 †Measurement was noise-limited at the value indicated.
 ‡Composite noise test equipment would not lock onto transmitted signal.

Measured in the ARRL Lab

14 MHz, preamp off/on: +61/+59 dBm.
 20 kHz offset, Preamp 2: 29 MHz, 61 dB†
 S9 signal at 14.2 MHz, preamp off/on, 54.3/20.9 μV.
 At threshold: 14 MHz SSB, 0.14 μV; FM, 29 MHz (preamp on), 0.13 μV.
 As specified.
 THD at 1 V RMS: 0.55%.
 Range at -6 dB points, (bandwidth):
 CW (500 Hz): 474-1154 Hz (680 Hz);
 Equivalent rectangular bandwidth, 733 Hz;
 USB: (2.4 kHz): 175-3082 Hz (2907 Hz);
 LSB: (2.4 kHz): 175-3082 Hz (2907 Hz);
 AM: (6 kHz): 157-1441 Hz (2568 Hz).
 First IF rejection, 14 MHz, 119 dB.
 Image rejection, 14 MHz, 105 dB.

Transmitter Dynamic Testing

SSB, CW, FM, typ 0.6 (s-low), 7.0 W (low), 96 W (high); AM, 0.5 W (s-low), 5.9 W (low), 46 W (high).
 Worst case: 57 dBc, 28 MHz, second harmonic, >50 dB.
 64 dB.
 61 dB.
 3rd/5th/7th/9th order (worst case band): HF, 100 W PEP, -28/-35/-40/-53 dB (10 m)
 6 to 40 WPM.
 See Figures 1 and 2.
 Mode B only.
 S9 signal, AGC fast, 102 ms.
 SSB, 50 ms; FM, 60 ms.
 Test not performed.‡

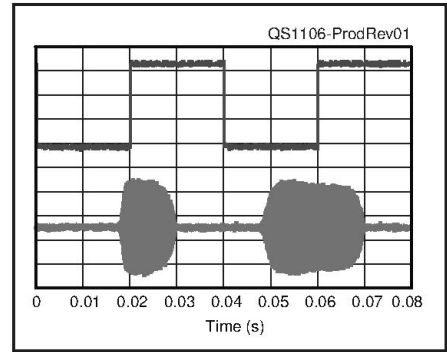


Figure 1 — CW keying waveform for the DX-SR8T showing the first two dits in full-break-in (QSK) mode using external keying and default settings. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. (Note that the first key closure starts at the left edge of the figure.) Horizontal divisions are 10 ms. The transceiver was being operated at 100 W output on the 14 MHz band.

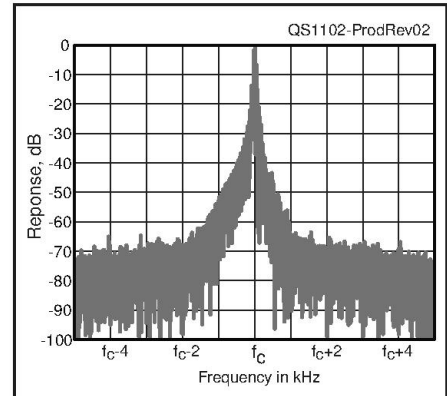


Figure 2 — Spectral display of the DX-SR8T transmitter during keying sideband testing. Equivalent keying speed is 60 WPM using external keying. Spectrum analyzer resolution bandwidth is 10 Hz, and the sweep time is 30 seconds. The transmitter was being operated at 100 W PEP output on the 14 MHz band, and this plot shows the transmitter output ±5 kHz from the carrier. The reference level is 0 dBc, and the vertical scale is in dB.

then press ENT again. The frequency will change but not the mode.

Another way to change bands quickly is by loading frequencies into the memory bank. The DX-SR8T has a very large memory capability — it can store 600 channels in three memory banks. The user can store 10 meter CW in memory 1, 10 meter phone in memory 2, 12 meters in memory 3, 15 meter CW in memory 4, and so on. Doing

this will allow the user to change bands and modes quickly (memories can store mode as well as other data) simply by going into memory mode. Once on a memory channel, tuning can still be accomplished by the main tuning knob.

The DX-SR8T also allows split frequency operation. To set up split mode requires a bit more work than on most radios. You must first set up the receive frequency in

one VFO and the transmit frequency in the second VFO. There is no A=B feature that will automatically set both VFOs to the same frequency. Once the two VFOs are set you leave the radio on the receive VFO. Then you activate split by pressing FUNC and then 5 on the keypad. While this takes a little bit more time than it does in other radios it can still be set up fairly quickly.

As mentioned before the DX-SR8T has a very large memory system. There are also several features that an operator may find useful. Each memory channel can be programmed with several parameters such as frequency, mode, filter, preamp, AGC, tone and noise blanker setting. The memory

system can also be set up to protect memory channels so a channel does not get accidentally overwritten. Split frequency operation can also be stored into a memory channel. This may be handy for using 10 meter repeaters and for common DX calling frequencies. A seven digit alphanumeric tag may be assigned to a memory channel.

Unlike other radios in this price class the DX-SR8T offers more options when it comes to scanning modes. There are five different scanning modes: band, programmed, search, memory and priority. The scanning modes allow the user to monitor activity on memory channels, frequency bands or a range of frequencies.

Power Output

A rather unusual feature on the DX-SR8T is the RF power output control. The RF power is not fully adjustable. This is fairly common on VHF/UHF transceivers but unusual for an HF transceiver. On SSB, CW and FM you can set the power out to HI (100 W), LOW (10 W), or S-LOW (1 W) and for AM HI (40 W), LOW (4 W), and S-LOW (0.4 W). On the 60 meter channels, HI is 50 W.

Lack of adjustable transmit power could present some challenges to the operator. If you want to operate QRP for instance, which is generally considered to be 5 W out, then your only QRP option with this radio is S-LOW, which is nominally 1 W out but can be adjusted from 0.1 to 2 W with an internal control. You would need an external amplifier to get to 5 W.

The power output options will also be a factor when using an external RF power amplifier. Most modern amplifiers that use ceramic tubes typically need 50 to 60 W drive and cannot be driven at 100 W. Driving them with 10 W will produce much less than advertised power out. It is possible to permanently change the HI power output from 100 W to 50 W by soldering an internal jumper.

The DX-SR8T provides relay and ALC connections for use with a linear amplifier but the manual does not give many details on using an external amplifier. If you do intend to use an amplifier with this radio make sure you know how much drive power your amplifier can handle.

This power output scheme will also have to be taken into consideration for digital mode operation, as discussed later.

CW Operation

The DX-SR8T has several features that CW operators will find useful. There is a built in electronic keyer that can be set from 6 WPM to 40 WPM. It can be set to semi or full break-in mode with delay selectable as described previously. During full break-in operation, the TR relay is quite noisy, but

the noise can be minimized by using headphones. Weighting is adjustable.

In the ARRL Lab, Test Engineer Bob Allison, WB1GCM, found that the keying characteristics vary with keying speed. At a speed of 40 WPM, the first dit is slightly shortened and the leading edge of the waveform is nicely rounded. When you lower the code speed, the leading edge of the waveform loses roundness and develops a spike. Below 20 WPM, the power spike becomes more apparent and appears on all dits. This occurs with full or semi break-in with external or internal keying.

The included IF filter seemed to work well during crowded band conditions such as those I encountered during the January North American QSO Party CW contest. I found that the filter was most effective when used with the IF shift. There are also two CW modes to select from, CWU and CWL. These two modes utilize the upper or lower part of the sideband respectively. The DX-SR8T also has an adjustable sidetone and sidetone monitoring feature for CW. The sidetone and CW offset can be adjusted between 400 and 1000 Hz in five steps. The sidetone monitor can be used to properly tune ("zero beat") a received CW signal.

Digital Modes

The manual clearly states that there are no dedicated connections for RTTY. However, if you do want to use the DX-SR8T for digital mode operation you can connect a sound card interface to the radio's microphone and speaker connection on the front of the radio, making AFSK RTTY, SSTV and other digital modes possible. The manual provides microphone pin configuration information and basic instructions on how to set the radio up for use with a sound card interface.

During the review I tried the radio out on RTTY using a homebrewed sound card interface during the 2011 ARRL RTTY Round Up. Setting up the radio, interface, computer and software was pretty straightforward. On receive the built-in IF filter and IF shift seemed to help with the crowded band conditions. There was one problem encountered though. With the speaker jack being used to get audio out from the radio and into the computer it made monitoring receive audio impossible. When headphones were plugged into the headphone jack it shorted the speaker jack and the computer received no audio. This problem can be fixed by using a Y adapter on the speaker jack, using computer speakers, or taking the audio out from the headphone jack and using a Y adapter and headphones.

Another factor the operator must be kept in mind when using the digital modes is that

the RF power out on the DX-SR8T is not continuously adjustable, as discussed earlier. The two digital modes you will likely try when new to HF operation are RTTY and PSK31. On RTTY, where a strong signal is needed for reliable communication, you would most likely select 100 W and for casual operating this would likely be okay. RTTY is a full duty cycle mode, though, so continuous operation at full power might cause the radio to overheat. (The manual does not discuss time limits for high duty cycle modes.)

PSK31 generally works well with lower power levels, so it is common to adjust the RF out to about 35 to 50 W, sometimes less. Using 100 W would be too much and possibly interfere with nearby stations. Using 10 W could work but may not be enough. A 50 W choice would be useful. It may be possible to compensate with the sound card's adjustable output level, depending on the configuration used. Another potential snag for PSK31 operation is that the DX-SR8T has no provision for ALC metering to help you set the drive level for a clean signal.

The PLL Circuit

During lab testing of the radio, Test Engineer Bob Allison, WB1GCM, discovered that the PLL circuit in the DX-SR8T is heat sensitive. While attempting to do the composite noise test on the radio, he observed that after 25-30 seconds of continuous key down in CW mode, a noise appeared on the waveform, making the test impossible to complete. Received signals were also affected with a noticeable warble similar to aurora. This issue, although noticed in CW mode, could cause problems for digital modes such as RTTY and PSK31.

Alinco engineers investigated and informed us that the cause of the problem that air blowing from the fan hits the PLL chip causing a "delicate vibration" and thereby oscillation in the CW carrier. Bob Allison confirmed that the warble is caused by warm air turbulence generated by the fan, which kicks on when the radio warms up. With the fan stopped, Bob could blow air past the fan blades and cause the transmitted signal to warble.

Alinco's suggested fix was to place a small piece of vinyl tape over the PLL chip. To do this though requires not only opening up the radio but removing even more small screws to get to the chip. Bob followed Alinco's instruction and noticed that the observed warble was lessened but not entirely eliminated. According to Alinco, radios currently shipping will have the tape applied.

Other Noteworthy Points

The manual is well written and easily understood. It is definitely written with the new

operator in mind. Throughout the manual it gives exercises for the user to try, practical tips and clear step by step instructions. The last page of the manual has two cut out cheat sheets that provide information on the key pad assignments and the Parameter Setting Mode (Menu).

The radio does have several other features that are found in other radios in the price class and above, including a noise blanker, CTCSS tone encoding/decoding and speech processor. The radio's built-in IF filter, IF shift, BFO reverse and RF attenuator offer the user several ways to tackle bad band conditions and interference. It also has FM capability and a quick offset feature for using 10 meter repeaters.

There are noticeably few optional accessories for the DX-SR8T. Alinco offers the EDX-2 automatic antenna tuner, the EDS-17 extension kit for the detachable faceplate, two optional microphones, and a power cord. Options that are available for other radios in this price class such as programming software, high stability oscillator (TCXO) or DSP noise reduction are not available for the DX-SR8T.

Conclusions

There are several things about the DX-SR8T that could be improved. It would be nice to have the RF power output fully adjustable. This would give the operator more options on QRP, make it easier to use an external amplifier and improve digital mode operation. It doesn't make any sense to have only three power output settings. Likewise it does not make sense to have the user make internal adjustments. These should be made in the menu or there should be easier access to them. The lack of computer control and an accessory jack for digital mode interface connections seems unusual, although not all operators want or need these features. And the bands should be marked on the keypad, but this is a minor point.

That being said there are many features the user will enjoy. Inclusion of IF filters, a redesigned hand mic, and a simplified, straightforward front and rear panel are nice.

A firmware change is available from Alinco's website that adds a menu parameter to swap the functions of the SQL/IF and RIT knobs, moving the RIT knob farther from the TUNING dial. Read the instructions carefully,

as this change is not reversible.

If your main interest is listening on the bands and casual SSB and CW operation without spending a lot of money, then the DX-SR8T deserves consideration. Overall it is easy to see that if you are even marginally serious about contesting, DXing or digital modes this is not the radio for you. Features for those activities and much better receiver performance are available in radios a step or two up in price. Radios in the DX-SR8T's price class are often desirable for emergency communications because of their affordability and ease of use, but this radio is not that easy to use until you have read the manual and gained some experience with it. This radio is functional as an HF transceiver and will get you going on all the popular modes, but it has some quirks and shortcomings that may leave the operator frustrated and wanting more for the money spent.

Manufacturer: Alinco Inc, Yodoyabashi Dai-Bldg 13F, 4-4-9 Koraibashi, Chuo-ku, Osaka 541-0043 Japan; www.alinco.com. *US Distributor:* GRE America Inc, 425 Harbor Blvd, Belmont, CA 94002; tel 650-591-1400; fax 650-591-2001; www.greamerica.com.

TYT TH-UVF1 Dual Band Handheld Transceiver

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We've all seen the new Chinese handheld radios on the market. Most of them are priced lower than their competitors and offer great features. I have been very tempted to buy one, but was not sure how they would perform. Luckily, I was asked to review one of these neat little radios, the TYT H-UVF1, a dual band VHF/UHF handheld.

The TH-UVF1 has a good set of basic features. The dual band handheld works on one band at a time and offers 128 memory channels. Its extended receive coverage includes an FM broadcast band receiver covering the frequency range 70 to 108 MHz, the FM broadcast band in China. The radio also offers scan and priority scan functions, VOX and a voice prompt. To see the complete list of features for the TH-UVF1, visit the manufacturer's website, www.tyt1888.com.

Early versions of the TH-UVF1, including the review radio, included a scrambler function that is not legal for use by Amateur

Radio operators. We understand that this feature has been disabled in current units.

What's in the Box

The box contains several items: the transceiver, a flexible rubber antenna (about 7 inches long) with SMA connector, an owner's manual, a belt clip with strap and a drop-in charger base. The dealer included a car cigarette adapter for the charger base as a special promotion. TYT offers a few accessories, including a speaker/mic, programming cable/software and mobile battery eliminator. The battery eliminator plugs into the auto's cigarette lighter socket and has an adapter on the other end that replaces the transceiver's battery pack. This is the only provision for using an external power source.

The TYT TH-UVF1 has a nice feel. It fits in the hand very well and has a nice weight. It stands almost 4½ inches tall (without the antenna) by 2¼ inches wide. The Li-ion battery is easy to release from the back. The radio case is constructed of a high density plastic, similar to most other radios on the market.

