

Alinco DX-70T Transceiver

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Product Review Editor

The availability of compact HF transceivers has fueled a resurgence in the popularity of mobile operation the past several years that really took off when rigs like the Kenwood TS-50S and the Ten-Tec Scout 555 left the starting gate. Full-featured transceivers for HF that are smaller than the 2-meter FM rigs of just a few years ago have captured the imagination of the ham on the go. Despite precious little room in today's vehicles to install *any* radio gear, these tiny radios have opened up the world of HF mobiling to practically everyone. Pop one of the many low-cost HF mobile antenna systems on your trunk lip, bumper or roof and you're on the air!

Now, Alinco has weighed into the fray with its DX-70T compact transceiver, an attractive package that offers not only 100 W on HF but 10 W on 6 meters! It's a multimode rig, too: SSB, CW, AM and FM are available at the touch of a front-panel button. The radio also can be used for digital modes (RTTY, AFSK, FAX and SSTV) via connections to the microphone jack. The DX-70T is Alinco's first outing in the HF transceiver arena.

This is a radio for those who take their hobby on the fly, and we reviewed it primarily in that context: Our DX-70T spent a *lot* of time on the road! The radio accompanied one of our reviewers on a more than 5,300-mile road trip from Connecticut to Texas and back, including a tour along the Blue Ridge Parkway in North Carolina and Virginia. He worked more than 250 stations on the DX-70T—all but a handful while mobile and most on SSB or FM—and he particularly enjoyed the rig's portability.

What It's Got

The ability to separate the front panel from the radio "body" makes it easier to mount than one-piece models and sets the DX-70T apart from compact competitors like the TS-50 and the Scout. To install the "control head" and the radio in separate locations requires the optional EDS-4 accessory cable, which we did not have for this review. Depending on how far away you mount the radio



itself, you also might need the optional EDS-5 microphone extension cable, since the jack is on the radio proper, not on the front panel. Given this adaptability, you should be able to find space in nearly any vehicle to install this radio, a real plus for those cars where the driver's seat more closely resembles a cockpit. The rig's size also makes it convenient to move from one vehicle to another, a real plus if you operate mobile from more than one vehicle, or if you travel a lot and frequently use rental vehicles.

Some reviewers expressed concern about the seeming "fragility" of the small-gauge wiring harness between the "control head" and the radio. Even if you don't plan to mount them apart, you still need to detach the face to connect or disconnect the microphone. While no one encountered any problems with the wiring, a couple of reviewers complained about the cramped quarters available to unscrew the mike connector, which is slightly recessed. The microphone itself is lightweight and comfortable to handle. It includes **UP** and **DOWN** buttons to control tuning and other modes, including some scanning functions.

For added fun, 6 meters is standard on the DX-70T. While conditions on that band during the review period were not spectacular, one reviewer did fire it up on SSB from his home (in FN31), feeding a six-element Yagi at 30 feet to work stations in the Greater New York City area with good reports. Later, mobiling in Texas, the same reviewer managed to snag two more stations during the September VHF QSO Party using a bumper-mounted quarter-wave antenna. Another reviewer who made several local and regional contacts on 6-meter SSB said he got excellent audio reports using the speech proces-

sor and the stock hand-held microphone. Their only wish was for more power on 6 meters.

Besides the other expected features—like general coverage receive, two VFOs, lots of memories and IF shift—the DX-70T includes some nice touches. In addition to your operating frequency, the busy but still easy-to-read backlit window displays mode, noise-blanker, AGC, RF attenuation/preamp, VFO and filter status, RIT offset, memory channel and S reading or RF output. Major front-panel controls are prominent enough that you don't have to divert your attention from road to radio every time you tune or make adjustments, a definite driving advantage. The main tuning dial and the audio, squelch, RIT and IF shift controls flank the display window; just below are the **MODE** switches and dual-function buttons for RF and noise blanker, filter choice and AGC, and high or low-power selection and tune. The DX-70T also includes—standard—the EJ-26U CTCSS tone encoder to access 10-meter and 6-meter repeaters. The user selects the desired CTCSS tones using DIP switches on the bottom of the rig. A convenient chart is permanently affixed to the bottom plate, so you don't need to refer to the instruction manual for the proper DIP switch settings unless, of course, you install the set under the seat.

Also standard on this little radio: narrow filters for CW, SSB and AM; the ability to receive CW from either the upper or lower side; full break-in on CW and separate antenna ports for HF and 6 meters. Additional niceties include a preamplifier, memory scanning and adjustable CW sidetone and offset. A top-firing speaker provides plenty of audio at reasonable quality—especially

The Bottom Line

The DX-70T, Alinco's first HF transceiver, is a welcome mobile traveling companion or second rig at home. It covers HF and 6 meters and offers loads of standard features, including a detachable front panel, narrow CW and SSB filters, a preamplifier and a CTCSS tone encoder.

Table 1**Alinco DX-70, serial no. T00-765****Manufacturer's Claimed Specifications**

Frequency coverage: Transmit, 1.8-2; 3.5-4; 7-7.3;
10.1-10.15; 14-14.35; 18.068-18.168; 21-21.45; 24.89-24.99;
28-29.7; 50-54 MHz. Receive, 0.15-30 and 50-54 MHz.

Size (width, height, depth): 7.1×2.8×9.1 inches; weight: just under 6 pounds.

Modes of operation: LSB, USB, CW, AM and FM

Power requirements: Receive, 1.0 A max; transmit, 20 A max.

Receiver

SSB/CW sensitivity (bandwidth not specified, 10 dB S/N):
0.5-1.8 MHz, 1 μ V (−107 dBm); 1.8-30 MHz,
0.25 μ V (−119 dBm); 50-54 MHz, 0.15 μ V (−123 dBm).

AM sensitivity (10 dB S/N): 0.5-1.8 MHz, 10 μ V;
1.8-30 and 50-54 MHz, 2 μ V.

FM sensitivity: Not specified.

Blocking dynamic range: Not specified.

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

Third-order input intercept: Not specified.

Second-order intercept point: Not specified.

FM adjacent channel rejection: 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 at 10% THD into 8 Ω .

IF/audio response: Not specified.

Spurious and image rejection: >70 dB.

Transmitter

Power output: HF SSB, CW, FM: 100 W, high; $\approx$ 10 W, low.
AM, 40 W, high; $\approx$ 4 W, low. 50 MHz SSB, CW,
FM: 10 W, high; $\approx$ 1 W, low. 50 MHz AM: 4 W, high; $\approx$ 0.4 W, low.

Spurious-signal and harmonic suppression: HF: 50 dB or more
(except 45 dB on 10 MHz band). 6 meters: 60 dB or more.

SSB carrier suppression: 40 dB or more.

Undesired sideband suppression: >50 dB.

Third-order intermodulation distortion products:
Not specified.

CW keying characteristics: Not specified.

Transmit-receive turnaround time (PTT release to 50%
audio output):

Composite transmitted noise: Not specified

*Blocking dynamic-range measurements were made using 100 kHz spacing instead of the ARRL Lab standard signal spacing of 20 kHz because of AGC effects. Two-tone, third-order IMD dynamic range measurements were made at 20 kHz spacing. Blocking dynamic range measurements and some two-tone third-order dynamic range measurements were noise limited at the values shown.

**Noise-limited at the value shown.

Measured in the ARRL Lab

As specified.

As specified.

Receive, 0.7 A; transmit, 14.7 A; tested at 13.8 V dc.

Receiver Dynamic Testing

Minimum discernible signal (noise floor) with 500-Hz IF filter:

	<i>Preamp off</i>	<i>Preamp on</i>
1.0 MHz	−126 dBm	−130 dBm
3.5 MHz	−131 dBm	−138 dBm
14 MHz	−129 dBm	−136 dBm
50 MHz	−138 dBm	−140 dBm

10 dB (S+N)/N (signal 30% modulated with a 1-kHz tone,
9-kHz [wide] filter):

	<i>Preamp off</i>	<i>Preamp on</i>
1.0 MHz	2.6 μ V	1.6 μ V
3.8 MHz	1.6 μ V	0.6 μ V
50 MHz	0.7 μ V	0.5 μ V

For 12 dB SINAD:

	<i>Preamp off</i>	<i>Preamp on</i>
29 MHz	0.8 μ V	0.26 μ V
50 MHz	0.23 μ V	0.16 μ V

Blocking dynamic range with 500-Hz IF filter:*

	<i>Preamp off</i>	<i>Preamp on</i>
1.0 MHz	123 dB	125 dB
3.5 MHz	127 dB	129 dB
14 MHz	123 dB	126 dB
50 MHz	126 dB	125 dB

Two-tone, third-order IMD dynamic range with 500-Hz IF filter:

	<i>Preamp off</i>	<i>Preamp on</i>
1.0 MHz	88 dB**	88 dB**
3.5 MHz	93 dB	90 dB
14 MHz	84 dB	92 dB
50 MHz	91 dB	86 dB

	<i>Preamp off</i>	<i>Preamp on</i>
1.0 MHz	+5.8 dBm**	+2.0 dBm**
3.5 MHz	+8.4 dBm	−2.9 dBm
14 MHz	−2.9 dBm	+1.9 dBm
50 MHz	−1.6 dBm	−10.8 dBm

+55 dBm, preamp off; +52 dBm, preamp on.

$\geq$ 75 dB at 20 kHz channel spacing.

$\geq$ 73 dB at 20 kHz channel spacing.**

S9 signal at 14 MHz: preamp off, 146 μ V; preamp on, 50 μ V.

At threshold, preamp on: FM, 29 MHz, 1.2 μ V or less; 52 MHz,
0.3 μ V or less; SSB, HF, 2.5 μ V or less; 52 MHz, 0.6 μ V or less.
2.5 W at 10% THD into 8 Ω

Range at −6 dB points, (bandwidth)

CW-W: 227-1401 Hz (1174 Hz); CW-N: 475-1100 Hz (625 Hz)

USB-W: 301-2566 Hz (2265); USB N: 727-2175 Hz (1448 Hz)

LSB W: 251-2375 Hz (2124); LSB N: 502-2000 Hz (1498 Hz)

AM W: 210-2820 Hz (2610 Hz); AM N: 206-1430 Hz (1224 Hz).

IF rejection $\geq$ 72 dB; image rejection, $\geq$ 81 dB.

Transmitter Dynamic Testing

HF SSB, CW, FM power output: Typically 114 W, high; 13 W,
low (varies slightly from band to band). HF AM power output:
Typically 48 W, high; 9 W, low. 50 MHz SSB, CW, FM power
output: 11 W, high; 1 W, low. 50 MHz AM: 5 W, high; 0.7 W, low.

Worst case, 56 dB at 3.5 and 10.1 MHz. Meets FCC specifications
for equipment in its power output class and frequency range.

As specified. >60 dB for HF.

>60 dB.

See Figures 1 and 2.

See Figure 3.

S9 signal, $\approx$ 8 ms.

See Figures 4 and 5.

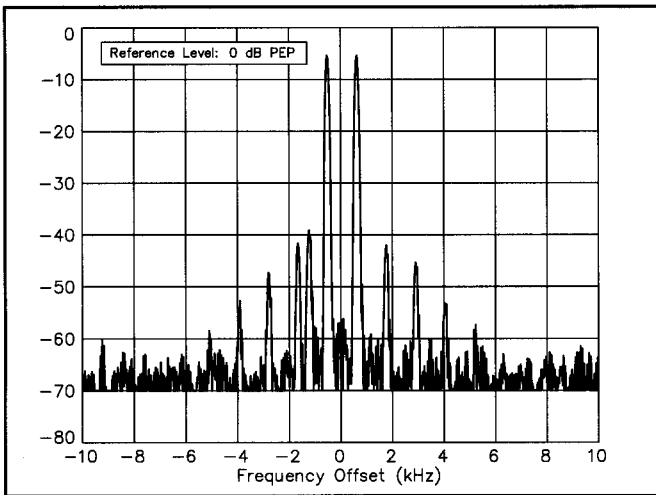


Figure 1—Typical VHF spectral display of the DX-70T transmitter during two-tone intermodulation distortion (IMD) testing. Worst-case third-order product is approximately 42 dB below PEP output. The fifth-order product is approximately 46 dB down. The transceiver was being operated at 10 W PEP output at 52 MHz.

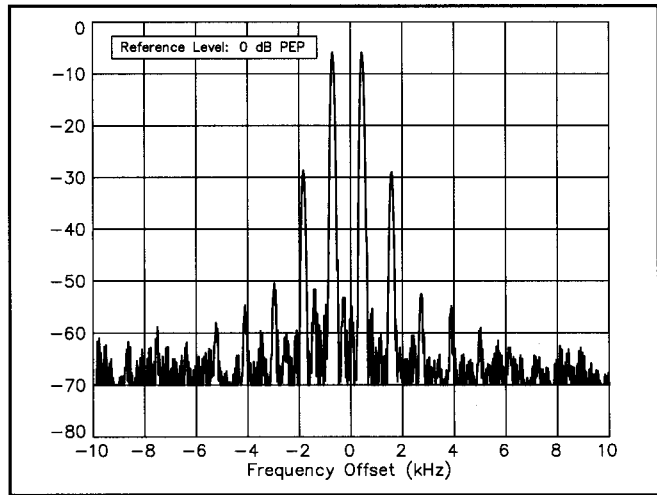


Figure 2—Worst-case HF spectral display of the Alinco DX-70T transmitter during two-tone intermodulation distortion (IMD) testing. Worst-case third-order product is approximately 29 dB below PEP output. The fifth-order product is approximately 51 dB down. The transceiver was being operated at 100 W PEP output at 14.2 MHz.

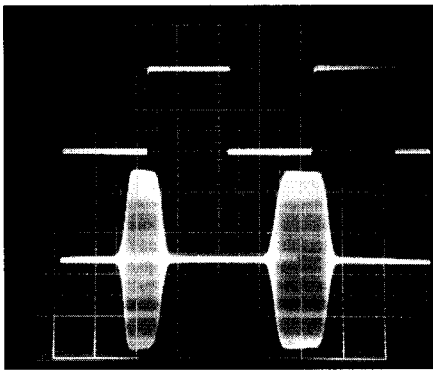


Figure 3—CW keying waveform for the DX-70T in the semi-break-in mode. The upper trace is the actual key closure; the lower trace is the RF envelope. Horizontal divisions are 10 ms. The transceiver was being operated at 100 W output at 14 MHz.

for a small radio—even in a noisy vehicle. A rear-apron external-speaker jack doubles as a headphone jack, but you need to use an attenuator adapter with headphones to keep from blowing out your 'phones or your hearing! (One reviewer lamented the lack of a separate headphone jack as "very inconvenient for home use, and just about impossible for mobile.") The cooling fan is efficient and quiet, so much so that one reviewer at first didn't even realize it had one.

Using the DX-70T

As with most new rigs, the level of sophistication has risen to the point that you really can't get away without reading the instruction manual at some point. (I found I needed it immediately, to determine how to go from semi-break-in CW to full-break-in.) Overlooking for the most part the "rough

spots" in the translation to English from Japanese, the reviewers rated the manual as adequate. It's compact enough to carry along with the rig, and it even includes some tutorial-style "exercises." The manual starts out with the basics in each area, then directs the reader to related, advanced features. But even with the best manual, operators should expect a learning curve, and the reviewers found themselves quickly becoming familiar with routine functions on the DX-70T.

A front-panel **MULTI FUNCTION** knob—about half the size of the main tuning knob—is just below and to the left of the display window. It stands out enough to be vulnerable to clumsy fingers, a pitfall common during mobile operation when you're trying to keep the vehicle on the road. A tiny, white **MF SEL** button determines the **MULTIFUNCTION** knob's purpose in life, but most of the

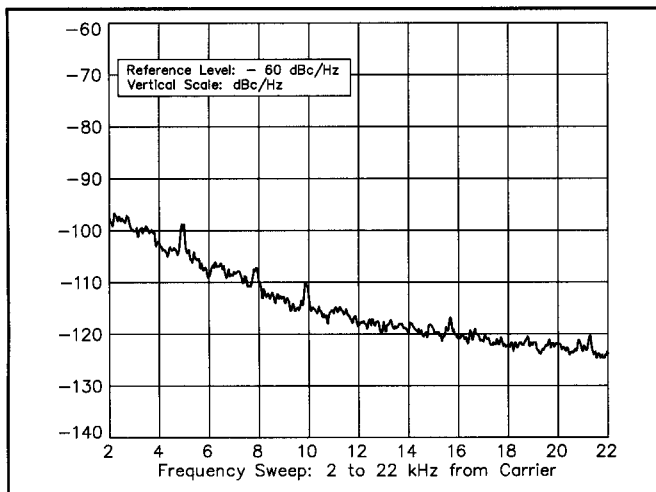


Figure 4—Spectral display of the DX-70T transmitter output during composite-noise testing. Power output is 10 W at 50.2 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

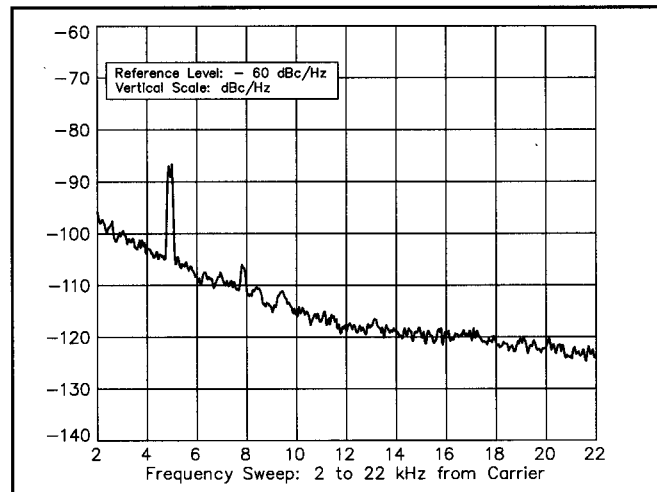


Figure 5—Spectral display of the DX-70T transmitter output during composite-noise testing. Power output is 100 W at 14 MHz. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 2 to 22 kHz from the carrier.

time, you'll use it change frequencies or bands quickly. You also use this control to select one of the 100 memories.

The RIT is easy to engage and *almost* handy—if you don't mind toggling through several other functions (including transmit offset) on the **RIT** button to turn it off and don't care if the RIT only offers maximum excursions of just ± 1.4 kHz. The DX-70T offers a quick offset mode. Press and hold the **SPLIT** button above the main tuning knob, dial in your split (eg, 5 kHz) and presto, you're there!

One front-panel control you'll use repeatedly on the DX-70T is the **FUNC** button, just below the concentric **AF** and **SQL** controls. This button accesses the second tier of the dual-function buttons and proved to be both a blessing and a curse for the review team. Several reviewers griped that the AGC, noise blanker and speech processor should have been primary functions. One team member noted the light blue panel lettering for the second-tier functions was hard to read. (Primary function lettering is white.)

As it is, you first push the **FUNC** button, then the button for the specific function. For example, you push the **FUNC** button, then the **FILTER/AGC** button to change the AGC action from fast to slow. (However, you cannot disable the AGC on the DX-70T). Similarly, you push the **FUNC** button, then the **RF/NB** button to turn the noise blanker on or off. However, *that* proved to be a mere academic exercise for most review team members, who felt the noise blanker worked almost as well *off* as it did *on*! Since a solid noise blanker is essential for HF mobile work, we investigated further.

A check in the ARRL Lab seemed to confirm suspicions that the noise blanker on the DX-70T was pretty ineffectual, so we obtained another DX-70T from a local supplier to see how it performed. After its noise blanker checked out the same as the first, we called Alinco, who asked us to return the transceiver for servicing. Alinco said it "updated" the noise blanker in our unit by replacing some components to increase the attack time. The "improved" noise blanker did work somewhat better against ignition noise, but, as one reviewer put it, "not as effectively as I would like.... I can still lose weak signals in the noise." He also said the noise blanker now seemed to introduce some distortion on signal peaks. However, another reviewer said the noise blanker "worked well" and removed all the ignition noise from his vehicle.

This experience conforms with the manufacturer's somewhat cryptic explanation. Alinco said the noise blanker "may not work effectively when the radio is installed in certain vehicle models"—suggesting that

ignition noise may be vehicle-specific—and that the noise blanker "may not work for all kinds of noise." The company offered to take care of DX-70T noise-blanker problems case by case.

While most reviewers agreed the noise blanker left a bit to be desired, opinions were more divided on how well the available selectivity enhancers worked on the DX-70T. Although most testers found the wide and narrow filters a real plus, one felt there was little difference between the 1 kHz and 500 Hz positions in CW and that the IF shift didn't do much. Another felt the 1 kHz "narrow" position in SSB was "way too narrow" for optimum intelligibility, while a third thought the same filter cut back the audio level too much. These discrepancies might have a lot to do with what you're used to in the home shack. If you're accustomed to the filter performance common in upper-end radios, the DX-70T might disappoint you.

The receiver seemed plenty sensitive, even using typical mobile HF antennas. If you're trying to pull out a weak one, a preamplifier is available via the **RF/NB** button to augment sensitivity. The same button also toggles through a 'zero' position (preamp off) and two levels of attenuation, down to -20 dB. Help is available on SSB transmit, too, in the form of a speech compressor. On-air reports indicated the compressor gives a needed boost without sounding obnoxious. You use a setup menu to turn on the speech processor (and to adjust several other modes and functions). One reviewer who put the DX-70T on 20-meter SSB found the radio performed admirably in the face of strong signals, even with the preamp on. Another tester even used the DX-70T for a downlink receiver for the RS-10/11 satellites and reported it worked very well.

For mobile CW operators like me, the DX-70T's standard narrow filter and full break-in are welcome amenities, but the rig does not have a built-in keyer. On-air reports and Lab testing indicated clean keying both in QSK and in the default semi-break-in modes (see Figure 3). The rig's keying relay in QSK was judged excessively noisy and distracting by the CW operators on the team, but "road noise" might cover it up in some vehicles. You can pick one of three semi-break-in delay settings or an "auto" delay setting which is supposed to track sending speed. It works, but the initially exorbitant delay could be disconcerting. Once the rig "figures out" how fast you're sending, though, it adjusts accordingly.

Some radios are finicky, but the DX-70T seemed to handle a couple of common adversities with aplomb. I ran the set from a marine battery that hadn't been topped off for

awhile. Despite the fact that the key-down voltage soon dropped off to around 11.5 V, my CW signal still sounded OK on the other end—no "chirp"—although the display flickered perceptibly and the power output waned. Another reviewer found the set was less fussy than most solid-state rigs about getting an exact 50- Ω match at the antenna terminal: it put out full power where some rigs would start throttling back as the SWR climbed. By the way, if you're into QRP or want to conserve power during battery operation, the front-panel **H/L** switch lets you drop the output power to approximately 10 W on HF and approximately 1 W on 6 meters. Using an internal switch, you can limit high power on HF to 50 W.

The DX-70T works with its own matching, optional EDX-1 manual antenna tuner or one of the competitors' automatic ones, according to the manual. The mobile mounting bracket is an optional accessory. The DX-70T does have a flip-down bale to tilt it up for desktop use.

OK, But Would We Buy One?

Everyone enjoyed using the DX-70T, but the mediocre noise blanker in the DX-70T kept us from giving this little radio higher marks overall. As one team member saw it, "The rig always worked as expected and didn't exhibit any unusual quirks." Another found it "easy to use, once I got used to the layout of the controls and the display." (As I stated earlier, every radio has a learning curve.) A third called it "a great little rig" and "very user friendly." Noted deficiencies aside, the DX-70T offers some real advantages for mobile HF operating—size, detachable front panel, standard filters—with all modes on 6 meters thrown in as a bonus! (One reviewer said his wife liked the fact that the DX-70T took up far less room on the passenger side than his regular mobile rig.) Considering it's in the same price class as radios offering fewer features, the DX-70T certainly warrants a close look for all who enjoy taking their hobby along for the ride.

The suggested retail price for the DX-70T is \$1439, but recent specials and coupons have brought the street price down to the \$1000 range. As usual, check with your favorite dealer for current pricing. The optional EDS-4 accessory cable extender kit is \$44. *Manufacturer:* Alinco Electronics Inc, 438 Amapola Ave, Unit 130, Torrance, CA 90501; call 310-618-8616; fax, 310-618-8758.

Thanks to Glenn Swanson, KB1GW; Clem Paskus, K1EM; Norm Bliss, WA1CCQ, and Pete Budnik, KB1HY for their help in preparing this review by putting the DX-70T through its paces.