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Alinco DX-10 10 Meter Transceiver

An inexpensive single-band transceiver for mobile, portable, or home station use.

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A couple of solar cycles ago, my wife, Kathy, KA1RWY, and I each had a 10 meter mobile transceiver in our car. With a base loaded, magnetic mount antenna, our 25 W PEP radios could reach our home station up to 30 miles away. When the band opened, Kathy always attracted DX with her melodious voice and managed to talk to more than 60 countries from her Oldsmobile station wagon. I was grateful to have 10 meters aboard my rickety Mercury Comet.

Many newly licensed Technicians have told me they were attracted to the lure of DX and local communications on 10 meters, but were afraid to invest in an expensive multiband HF transceiver. I've also overheard a few amateurs express their desire for a simple 10 meter mobile radio that comes with a warranty. Alinco's DX-10 can meet the needs of both groups.

But it's...

Yes, *I know* the DX-10 looks like a CB transceiver. It has some of the features you would find on a CB radio, such as an echo chamber and roger beep (that are best left turned off), public address feature, and two-digit CHANNEL display. In other parts of the world, identical-looking transceivers with various brand names and model numbers are marketed as Citizen's Band transceivers.

Regardless of its looks, make no mistake: The Alinco DX-10 is a 10 meter-only multimode transceiver from an established Amateur Radio manufacturer and available through established Amateur Radio dealers. It is one of the few options for an amateur wishing to use 10 meters without the cost of a multiband HF transceiver. I opted to focus on function, not looks.

Overview

The DX-10 covers the entire 10 meter band



ing 28.000 MHz and CHANNEL 60 equaling 28.295 MHz. A separate CLARIFIER knob adjusts the fine tuning of the frequency of each channel ± 10 kHz in steps of 10 Hz, 100 Hz, 1 kHz, or 10 kHz. This tuning arrangement is much different than continuous tuning accomplished with a single knob, as found on virtually all other conventional amateur transceivers.

A Closer Look

Front panel pushbutton functions are: FUNC (function), RB/BP (roger beep/beep), NB/ANL/LOCK (noise blanker/lock), DW/LCD OFF (dual watch; select another frequency to be monitored and the receiver switches between the two/display off), SCAN/SC LIST (scan/scan list), +10 kHz/HI-CUT (bumps the receiver up 10 kHz/high cut audio filter to reduce hiss), COL/TOT (display color/time-out timer), EMG/S/RF (switch to user-selected emergency channel/meter function). From left to right, the knob controls are memory banks A – F, mode, VOL/SQ (volume/squelch), ECHO/TONE, RF GAIN/RF PWR, CLARIFIER, and CHANNEL.

and operates on USB, LSB, CW, AM, and FM. RF power output is 25 W for SSB and 12 W for CW, AM, and FM. There is no subaudible tone function or split transmit/receive feature for FM repeater operation.

The radio has power supply polarity and SWR protection. Current consumption is 6.5 A maximum, requiring a modest dc supply. Included accessories are the Alinco EMS-70 hand microphone, microphone clip, mobile mounting bracket, and mounting hardware.

The DX-10 uses an unusual frequency tuning arrangement. The radio has six memory banks that are preprogrammed at the factory, with each bank covering a span of 300 kHz using 60 memory channels. The banks are selected by the A B C D E F switch on the left side. Channels are spaced 5 kHz apart. For example, memory bank A covers 28.0 to 28.3 MHz, with CHANNEL 01 equal-

Bottom Line

The Alinco DX-10 is a multimode mobile transceiver that provides access for new radio amateurs to the 10 meter band. It is also useful for the seasoned operator looking for a simple, inexpensive mobile transceiver.

The 1/2-inch-high digits on the LCD are easy to read. The meter in the lower right corner of the display can switch between S meter/RF power output and dc input voltage. Momentarily pressing the COLOR button selects one of seven backlight colors. I accidentally found that by double-clicking the COLOR button when the display is pea green, the backlight color will automatically

change every second. Pressing COLOR once more stops this light show.

The rear panel heat sink fins protrude 1.5 inches from the chassis. Connections include an SO-239 antenna jack, 1/8-inch jacks for external speaker and CW (straight) key, and dc power. There is also a mini USB data jack for PC programming with an optional cable, though no programming software was available from Alinco at the time of publication. A 2-inch speaker is located behind the bottom panel of the chassis.

Lab Testing

ARRL Lab testing (Table 1) revealed some good results and some not so good. Let's start with the good. Overall receiver sensitivity is very good. The two-tone third-order IMD dynamic range is only 73 dB at 20 kHz spacing. That's not as good as recent multiband transceivers I've tested, but is adequate for use with a mobile antenna or modest home station antenna. The DX-10 also has very good image and IF rejection. I was pleased to see the wide range of squelch sensitivity, 1 μ V to nearly 7.6 mV. Adjusting the receiver to make it less sensitive is handy in high-noise environments to minimize false squelch openings from noise sources.

The most troublesome finding is the keying waveform and timing. Figure 1 shows a lengthy 120 ms delay from the time the key is pressed to the time RF comes out the antenna jack. Unfortunately, this delay also applies to the CW sidetone heard from the speaker. Press the key and it's a 120 ms pause until you hear what you just sent in the sidetone. With such a delay, sending CW is confusing and maddening for the user unless you turn off the transceiver's sidetone and use an external sidetone.

Figure 2 shows rather wide keying sidebands at 60 WPM, which will interfere with nearby stations if signals are loud enough. Figure 3 shows that close to the carrier the DX-10's transmitted phase noise is higher than most other transmitters I've tested.

I found that receiver audio output reached the 10% THD threshold at 2.3 W. The volume can be increased further, but only with increased audio output distortion. At a comfortable listening volume (1 V RMS), audio distortion is 7%. This level of distortion may cause operator fatigue in a quiet room, but will not be very noticeable while riding in an automobile.

Table 1
Alinco DX-10, serial number A000592

Manufacturer's Specifications		Measured in the ARRL Lab	
Frequency coverage: 28 – 29.7 MHz.		Receive and transmit, as specified.	
Power requirement: Receive, 13.8 V dc \pm 15% transmit, 6 A max; receive, 750 mA max, 350 mA squelched.		At 13.8 V dc: Transmit, SSB, 6.5 A (max), 1.1 A (min); CW, 5.0 A (max), 2.6 A (min); AM and FM, 5.0 A (max), 2.5 A (min). Receive, 560 mA (no signal, max volume).	
Modes of operation: LSB, USB, CW, AM, FM.		As specified.	
Receiver		Receiver Dynamic Testing	
CW sensitivity: 0.25 μ V.		Noise floor (MDS), CW mode, 2.4 kHz filter: 135 dBm.	
AM sensitivity: 0.25 μ V.		10 dB (S+N)/N, 1 kHz, 30% modulation, 6 kHz filter: 0.6 μ V.	
FM sensitivity: 0.50 μ V.		For 12 dB SINAD, 15 kHz BW: 0.2 μ V.	
ARRL Lab Two-Tone IMD Testing (2.4 kHz bandwidth)			
<i>Band</i>	<i>Spacing</i>	<i>Measured IMD Level</i>	<i>Measured Input Level</i>
28 MHz	20 kHz	-135 dBm	-62 dBm
		-97 dBm	-39 dBm
			<i>Measured IMD DR</i>
			73 dB
			<i>Calculated IP3</i>
			+25 dBm
			+10 dBm
Second-order intercept point: Not specified.		28 MHz, +41 dBm. [†]	
FM adjacent channel selectivity: Not specified.		82 dB.	
FM two-tone, third order IMD dynamic range:		67 dB.	
S meter sensitivity: Not specified.		For S9 signal, 4.78 μ V.	
Squelch sensitivity: Not specified.		1 μ V (min), 7.58 mV (max).	
IF/audio response: Not specified.		Range at -6 dB points (bandwidth): CW, 294-2840 Hz (2546 Hz) USB, 309-3998 Hz (3689 Hz) LSB, 328-3980 Hz (3659 Hz) AM, 210-3571 Hz (6722 Hz)	
Receiver audio output: 3 W.		2.3 W @ 10% THD. THD @ 1 V RMS, 7%.	
IF and image rejection: Not specified.		IF rejection, 98 dB; image rejection, 111 dB.*	
Transmitter		Transmitter Dynamic Testing	
Power output: AM, FM, CW, 1 to 12 W (adjustable); SSB, 0 to 25 W (adjustable).		AM, FM, CW, 1.6 – 11.4 W; SSB, 0 – 27 W PEP. Power output was identical at 11.7 V dc.	
Spurious-signal and harmonic suppression: Not specified.		64 dB. Complies with FCC emission standards.	
SSB carrier suppression: Not specified.		USB, 53 dB; LSB, 59 dB.	
Undesired sideband suppression: 80 dB.		USB, 47 dB; LSB, 48 dB.	
Third-order intermodulation distortion (IMD): Not specified.		3rd/5th/7th/9th order: -25/-38/-50/-55 dBc.	
Transmit-receive turn-around time (PTT release to 50% audio output): Not specified.		S9 signal, 123 ms.	
Receive-transmit turn-around time (tx delay): Not specified.		117 ms.	
Size (height, width, depth): 2.0 \times 6.7 \times 9.3 inches including protrusions; weight, 3.1 lb.			
Price: \$280.			
[†] Second-order intercept point was determined using S5 reference.			
*Measurement was noise limited at the value indicated.			

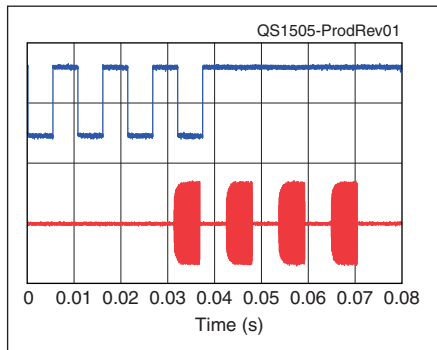


Figure 1 — CW keying waveform for the Alinco DX-10 showing the first two dits in full-break-in (QSK) mode using external keying. Equivalent keying speed is 60 WPM. The upper trace is the actual key closure; the lower trace is the RF envelope. (Note that the first key closure starts at the left edge of the figure.) Horizontal divisions are 10 ms. The transceiver was being operated at 11 W output on the 28 MHz band.

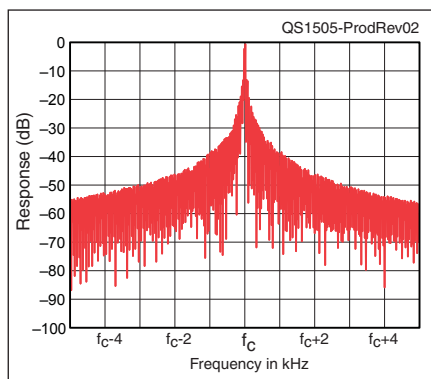


Figure 2 — Spectral display of the Alinco DX-SR9T transmitter during keying sideband testing. Equivalent keying speed is 60 WPM using external keying. Spectrum analyzer resolution bandwidth is 10 Hz, and the sweep time is 30 seconds. The transmitter was being operated at 11 W PEP output on the 28 MHz 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.

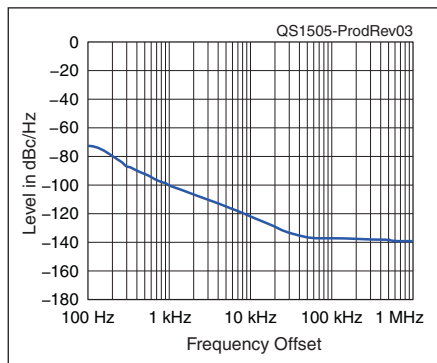


Figure 3 — Spectral display of the Alinco DX-SR9T transmitter output during phase noise testing. Power output is 11 W on the 28 MHz band. The carrier, off the left edge of the plot, is not shown. This plot shows composite transmitted noise 100 Hz to 1 MHz from the carrier. The reference level is 0 dBc, and the vertical scale is in dB.



Figure 4 — Our Ford Fusion had just the right spot for the Alinco DX-10.

plex operation with positive results.

The DX-10's SWR protection worked when I accidentally transmitted into the wrong antenna. The radio stopped transmitting, beeped and displayed 5 HI, warning of high SWR. I couldn't get the built in SWR meter to work. The manual indicates the band control must be set to D and channel 20 selected to activate the SWR meter, but I had no luck.

Going Mobile

Kathy agreed to let me try the DX-10 in her Ford Fusion. An opening in front of the stick shift that is normally used for storage happened to be a perfect place for it (see Figure 4). A 12 V dc accessory outlet provided power to the DX-10, since the 5-foot-long dc power cord provided could not reach the car's battery. I wouldn't recommend using the accessory socket on a permanent basis, but with this particular automobile, it worked, aside from some slight ignition noise crackle. The noise blanker reduced this noise significantly when engaged.

As a mobile transceiver, the DX-10 has more than enough volume from the speaker. The frequency display is at times difficult to read. All display options are rich in color, but low in brightness. Yellow, as an option, would have been helpful. While driving, I found random tuning around the band difficult with the multiple frequency controls. I found it best to leave the fine tuning step set to 100 Hz. For trips around town, I left the frequency knobs alone and talked to Kathy.

Overall, my experience with the DX-10 was favorable and brought memories of the usefulness of 10 meters in a car.

Manufacturer: Alinco, Inc, Yodoyabashi Dai-Bldg 13F, 4-4-9 Koraihashi, Chuo-ku, Osaka 541-0043 Japan; www.alinco.com. Distributed in the US by Remtronix (www.remtronix.com) and available from Amateur Radio dealers.

On the Air with the DX-10

I had an opportunity to try the transceiver on Sunday morning of the ARRL 10 Meter Contest. Band conditions were good and there were plenty of stations to contact on SSB as I tuned the band using my elevated ground plane antenna. The DX-10's 25 W output was enough to contact every station I heard. At one point, in the excitement of calling a DX station, I accidentally turned on the echo chamber and was quickly chided in a language I didn't understand.

After a while, I grew a little weary from turning the multiple tuning controls. Spacing between knobs was sometimes a problem for my large fingers. At times, my index finger would get stuck between two of the concentric controls, with a pinch roller effect. I still had fun, but came to the conclusion that the

DX-10 is not suited for quickly tuning the band during a contest.

On a more casual day, I had a pleasurable time exchanging 10-10 numbers with stations via short skip. Transmitted audio reports were mostly "sounds OK" or "sounds good." I tried AM and FM sim-



See the Digital Edition of QST for a video overview of the Alinco DX-10 10 Meter Transceiver.