

Portable HF Station for Emergency Operations

By Andy Palm, N1KSN

In the course of selling a base station rig, I took in partial trade an Alinco DX-77T HF transceiver with a matching LDG AT-11MP autotuner. The DX-77T is an "entry-level" HF radio with an excellent CW keying envelope that comes with a 500 Hz CW filter as standard equipment. It's internal fan, audio and key jacks on the front panel, front-firing speaker, and a minimum of bells and whistles immediately made me think "portable station." Additionally, the mated AT-11MP tuner can be powered from the rig's accessory jack, with its tuning cycle triggered from the rig's TUNE button. As an added benefit, the tuner has a cross-needle power and SWR meter built in.

Just as for my portable VHF station, I chose for it's housing an MTM "Case-Gard" sportsman utility dry box, Model SPUD7-35 (the "35" is the orange color). However, unlike the VHF station, I needed a second case for a battery and power management equipment. Alinco provided threaded holes for mounting the rig in a mobile mount, but they never made a mobile mount for it! This meant that I had to fabricate a mount from 2 x 1/8" aluminum angle with some sheet cork to protect the radio. I made 1 x 1/16" aluminum straps (again with cork sheet) to hold the autotuner firmly to the top of the rig.

Since the clearance behind the rig was less than that recommended by Alinco for good ventilation, I mounted two small muffin fans (blowing outward to match the internal fan's airflow) on the rear heatsink. Luckily, the heatsink had been drilled and tapped for some kind of fan mount (also probably never made), so this wasn't too hard to do. I also built an LM317 voltage regulator circuit in a small box to keep the fan voltage at 9.5v. This should make them last longer, plus they are a lot less noisy. The power connections for the radio and fans are done with Anderson Powerpoles brought to the front of the case to a Red-Dee-2 power distribution fixture (1 in, 3 out) which in turn connects to an in-line 20A fuse.

For CW operations I mounted a CMOS IV keyer (powered with internal batteries) to the right side of the box with a fabricated bracket (aluminum angle and cork again) and screwed a covered GHD paddle on the box floor to the right of the rig. Also to the right of the rig is the RF outlet, a "UHF" through-wall barrel connector supported by a fabricated aluminum angle bracket. A mic hanger is on the left side.

The original tray that came with the case was cut down so that it would slide snugly into the space above the autotuner. The tray provides a space for accessories (straight key, balun, folding headphones, RG-8X jumper, pens, etc.) and helps keep the rig and tuner stable during transport. It must be removed during operation for good ventilation. There is room between the equipment for a logbook, zip-lock bag with manuals, and a homemade laminated quick-reference card for the rig. I can also use accessories like the homebrew LED station lamp and DC meter made for the VHF station.

As mentioned earlier, I used a second identical case (except for its color) for power. This box holds a Group 24 80 Ahr AGM sealed lead-acid battery with a dual-fused cord. This battery was purchased from Batteries Plus and is normally used in electric wheelchairs. It has flush 10mm bolt terminals. (Do not discharge or recharge such a battery in a closed box, as there is a chance for battery out-gassing. Such batteries are fine to store in a sealed box, however.)

Mounted to the box walls around the battery are an SEC 1223 power supply, a West Mountain Radio Super PWRgate/charger, and a W4RRY Battery Booster 23A. This last unit converts lower DC voltages to 13.6v for more reliable rig operation off a battery. Anderson Powerpoles are used for maximum flexibility in configuring connections. If AC power is available, the AC supply can power the rig and recharge the battery at the same time. If AC power goes out, there is a seamless transfer to the battery.

Accessories for the power box include a short 10mm wrench (too short to contact both battery terminals at once), spare fuses, an LED voltage monitor, and AC and DC extension cords. The battery is so heavy that a folding hand truck is also considered a very necessary accessory. The DC extension cord is used to connect the power box to the rig and fans.

The portable HF antenna I use is a multiband dipole with 44' legs and about 30' of 300 ohm TV twin lead as a feedline going to a 4:1/1:1 switchable Elecraft balun and coax jumper. The antenna center connector is homebrewed from styrene sheet and stainless and nylon screws. The antenna radiators are made from unzipped speaker wire which I like as it doesn't kink and is inexpensive and easy to find. The antenna is supported by telescopic fiberglass poles anchored by large metal spikes with plastic or wood spacers that fit inside the pole bases. I have several poles ranging in height from 10 to 28 feet. I use heavy duty fishing snapswivels and crimp terminals for the antenna hardware.

One limitation of the DX-77T is that from the front panel you only have two power level settings. The high level is set at either 50 or 100 watts with an internal switch. My setup is for 10 and 50 watts and I'm quite satisfied with that choice. The station has been tested at home and in the field and has performed well.

While on vacation in Vilas County I operated literally in a field for a few hours, working CW on 30 meters and phone on 60 and 80 meters, including the Sunday evening Wisconsin ARES/RACES net on 3.9775 MHz. This was with the center of the antenna at only 19 feet and the ends at 9 feet (accounting for pole droop). I was a bit surprised at how far the 60m contacts were (Kentucky and New York State) until I realized that the antenna is close to a resonant dipole on sixty! The 80 meter performance proves that NVIS works, as I could be heard well on the Wisconsin net.

Descriptions for Pictures

Box 1. This view shows the station rig box with the accessory tray installed for transport. The keyer, paddle, and RF jack are on the right. The DC power connections for the rig and fan come out to the left of the rig under the mic hanger. The fan voltage reducer is positioned in front of and below the radio for this picture. The rig and tuner mounting hardware can just be seen on the left side.

Box 2. In this view you see the power box, with the 80 Ahr battery, power supply (on the right), Super PWRgate/charger, and voltage regulator. The AC and DC extension cords are stored on top of the battery for transport. A DC cable with large alligator clips on one end can be seen on the box floor. Other accessories fit in a small tray in the box cover. The weight of the battery stretches the concept of "portable."