New 600 meter station at WD2XSH/20
Fall 2013

Rudy Severns N6LF, WD2XSH/20

The following is a description of the station at WD2XSH/20 as of November 2013.

Antenna

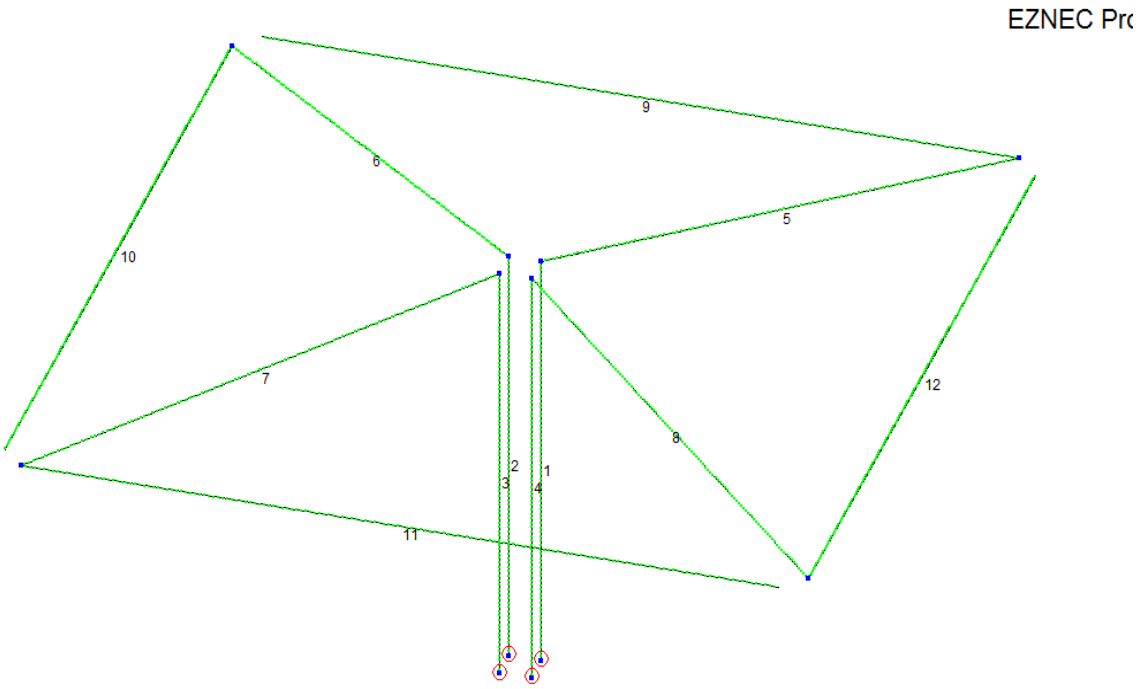

Figure 1, New antenna at WD2XSH.

Figure 1 is a sketch of my 475 kHz antenna. Four of the poles are arranged in a square about 180' apart. The corner poles are about 80' high. In the center is a fifth pole, 93' high. The antenna is just a simple "top-loaded" or "umbrella" vertical. The antenna is self-resonant about 650 kHz with a small inductor at the base to resonate at 475 kHz and provide matching. The antenna and it's supports are described in much more detail in a separate artical "MF Antennas at N6LF/WD2XSH/20".

Station description

Figures 2 and 3 are pictures of the operating position for 630m. The heart of the station is a Kenwood TS 590S which (with a very simple modification) provides 4 mW output on 100-520 kHz. 4 mW doesn't sound like much but when coupled with ENI 1040L linear amplifier I can have up to 500W into the antenna anywhere between 100 and 500 kHz! The TS590S is a good receiver for LF and MF. The use of the TS 590S plus an amplifier and a computer gives me a fully modern station with all the modes (digital, SSB, CW, WSPR, you name it) I might want to try and it was very easy to implement.

Figure 2, Computer and TS 590S.

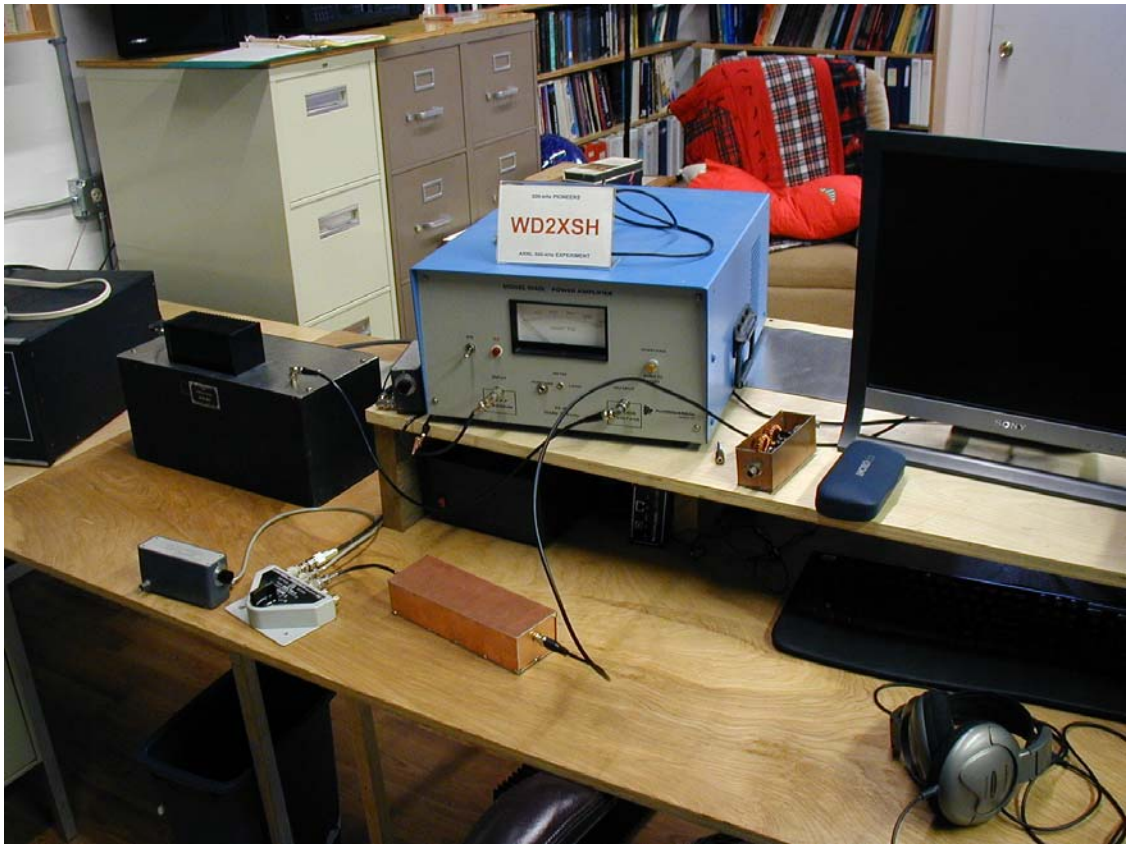

Figure 3, ENI 1040L amplifier and filters.

Figure 4, Close-up of filters

Although the TS 590S and the ENI amplifier made my job much easier, besides the antenna there are other do-it-yourself parts of the station. Figure 4 shows three of the filters I've built. The large filter in the surplus BC375 tuning unit case is the transmit filter. The second harmonic for 475 kHz is 950 kHz and the third harmonic is 1425 kHz. It would be very easy to create BCI problems with the neighbors! So I have built a low pass transmit filter for the output of the amplifier that squelches the BCI. One of the problems with having a very large antenna is the pickup from BC stations. One of the first tests I ran on my new transmitting antenna was to connect the shack end of the antenna feedline to an RF millivoltmeter. I had 120 mV rms into 50 Ohms in the shack! Almost enough to light the station. You don't want to be dumping that level of garbage into the input of the receiver so I designed and built a very narrow bandpass filter, with over 80 dB of attenuation at 550 kHz and up, which is the larger of the two filters shown on top of the transmit filter. That filter is only 30 kHz wide, centered on 475 kHz, so when listening at frequencies below 475 kHz for beacons and such I use the smaller lowpass filter (with the open top). All of these filters are described in detail in a separate article "Transmitting and Receiving Filters for MF at N6LF"

Boat anchors

No LF/MF station would be complete without a selection of WWII Navy LF/MF boat anchor receivers. Figure 5 shows some of my collection. These are all for 600 kHz and down.

Figure 5, Boat anchors at N6LF

From left to right:

1) RAS, MF version of the venerable HRO, National
2) RAK-7, TRF (Tuned Radio Frequency) with a regenerative detector, RCA
3) RBA, TRF, not sure of the manufacturer
4) On the bottom, RBL-6, TRF with a regenerative detector, National
5) On top of the RBL-6, AR 8503, RCA
6) On the shelf above, BC-453, no MF station complete without one!

In addition to the Navy boat anchors I have some Hewlett-Packard instrumentation which can be used for LF/MF reception. These are shown in figure 6. This picture is from my old station at the last QTH but I brought the rack and equipment with me to the new QTH. At the bottom of rack is an HP312B Selective Voltmeter and just above it an HP3586A Selective Level Voltmeter.

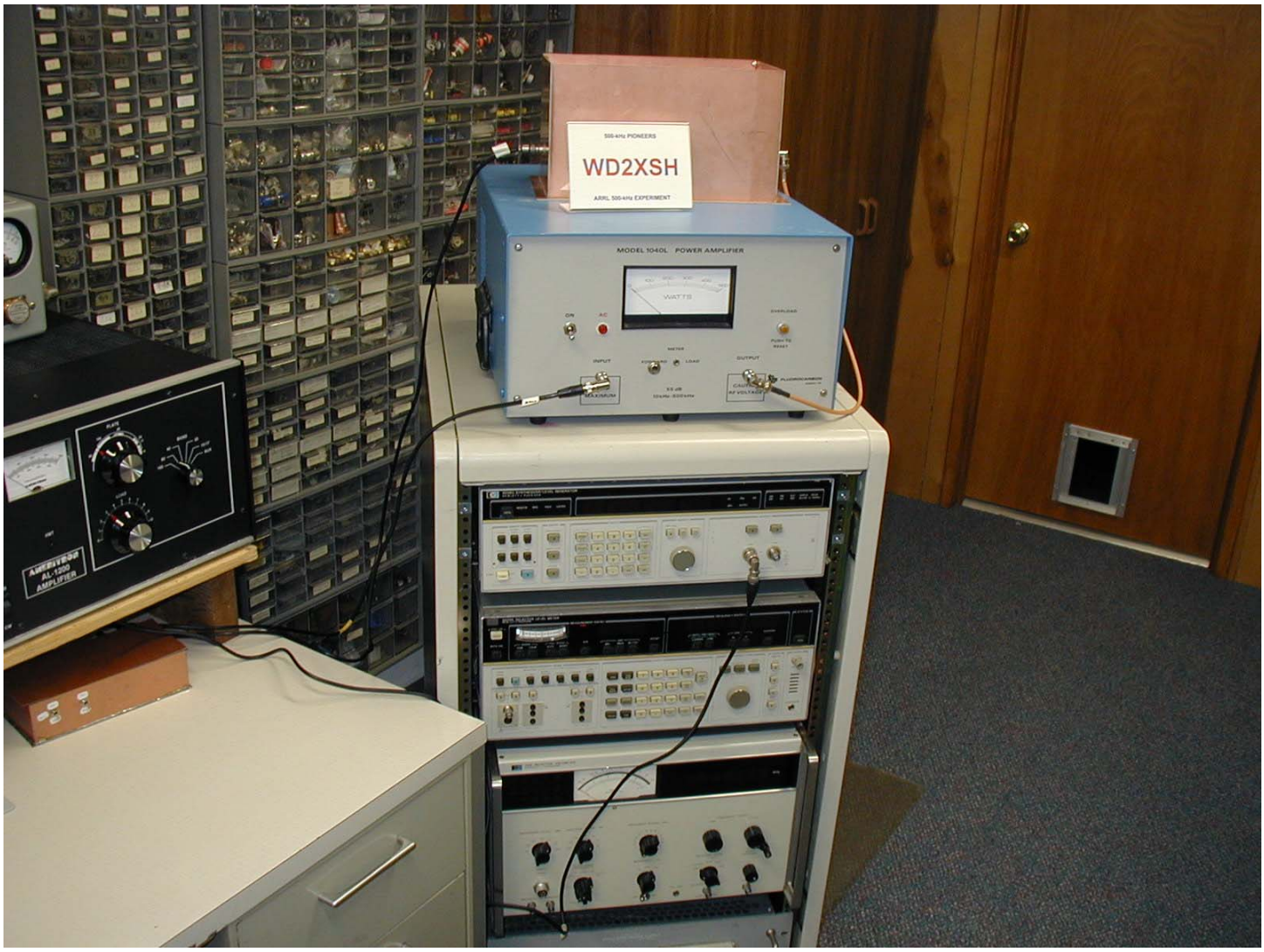

Figure 6, some HP instruments

Station grounding system

One of problems I had to solve was grounding of the station equipment inside the shack. The shack is on a concrete slab and I could have drilled holes through the floor for ground rods directly under the operating position but that area is a long way in from the outer perimeter so the soil is most likely very dry. I'm keeping that option in reserve! What I did was to drive two ground stakes at the outer edge of the slab as shown in figure 7. The rods are at the right and left sides of the photo with #10 wire jumpers to a 10" wide sheet of aluminum.

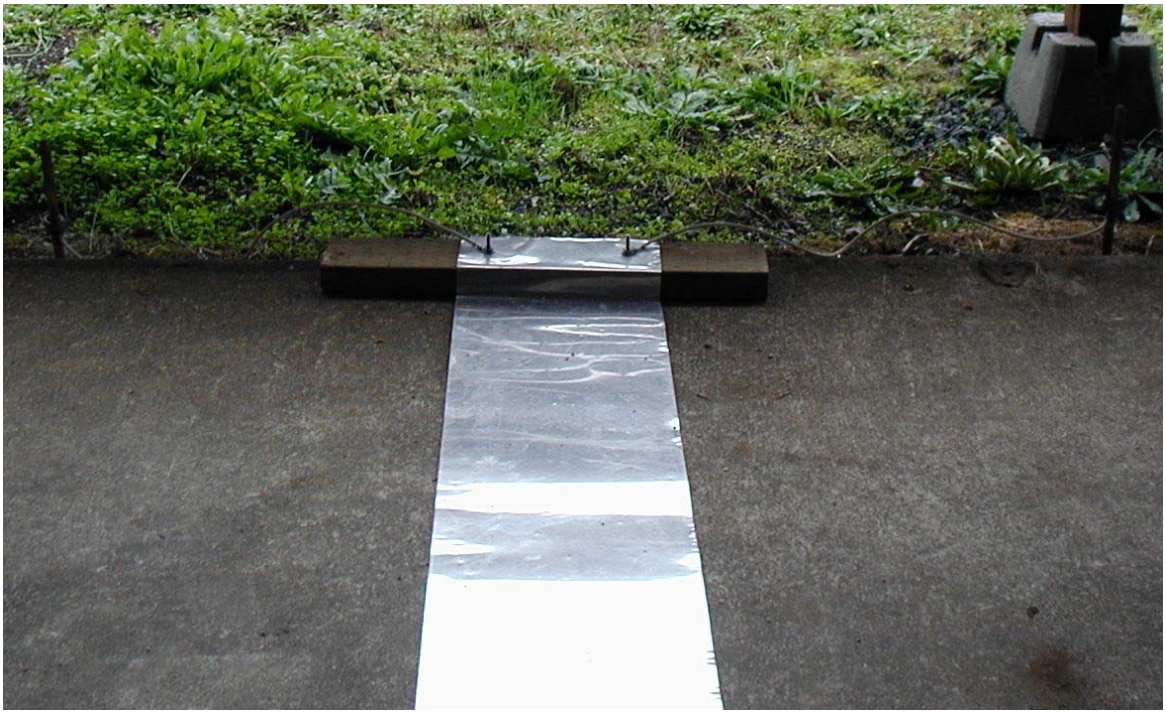

Figure 7, ground rod placement.

The aluminum runs across the floor of the shed and into the building as shown in figure 8

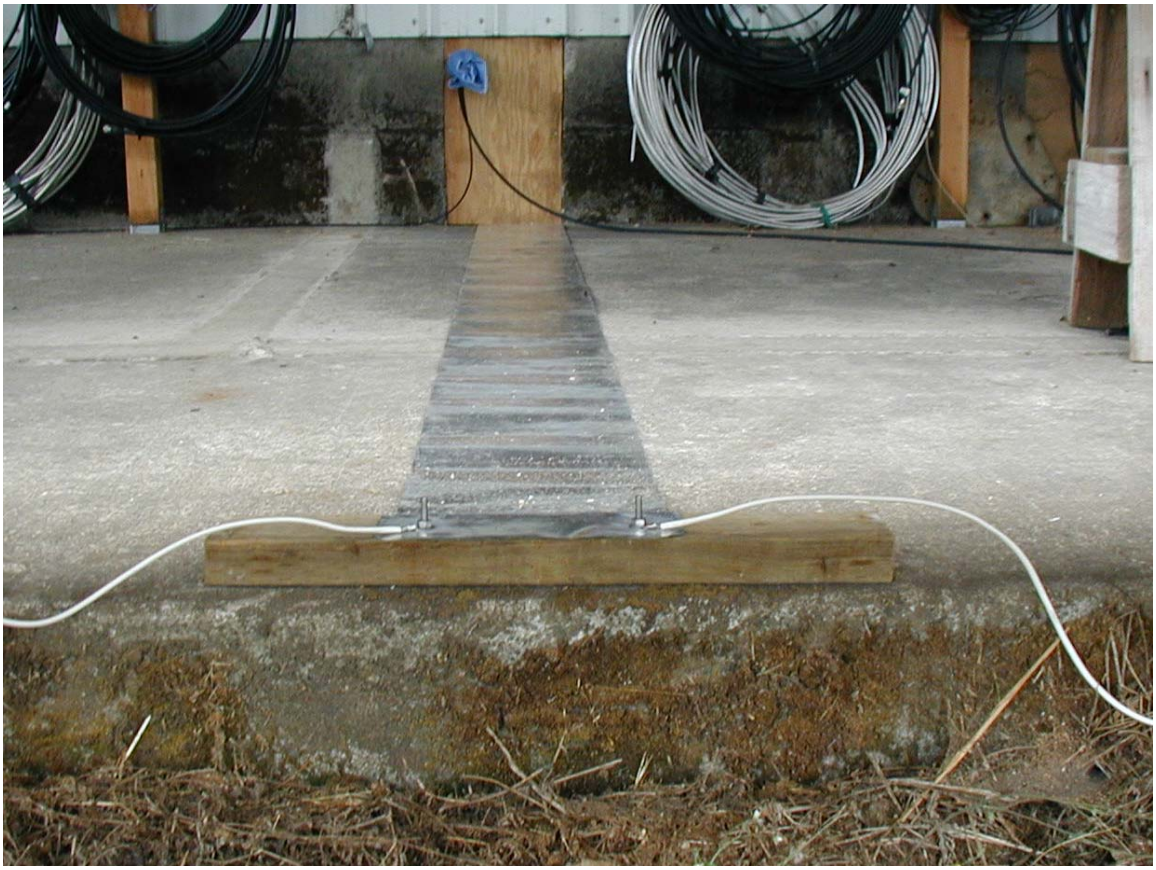

Figure 8, ground sheet to the building.

Figure 9 shows the grounding sheet at the back of the operating position.

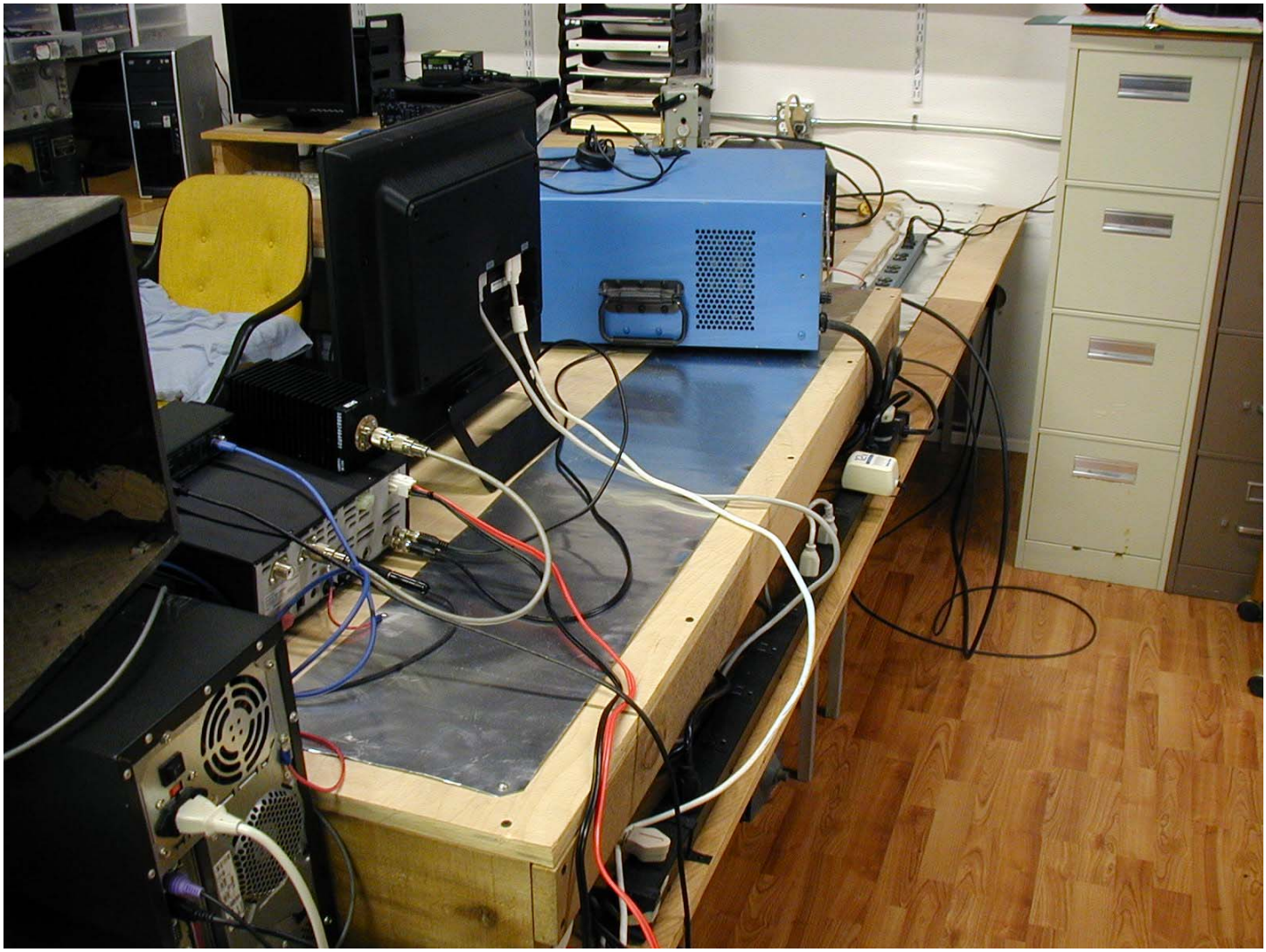

Figure 9, grounding strip inside the shack.

Adding the grounding strip reduced the receiving noise quite a bit. Whether adding ground rods through the floor right at the operating position would help more is an experiment for later!