Ham 113 – HF Equipment, What You Need

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1. This article is to fulfill a specific request, which is an excellent idea. List Ham Equipment for HF.
2. Radio: *ICOM 7300*

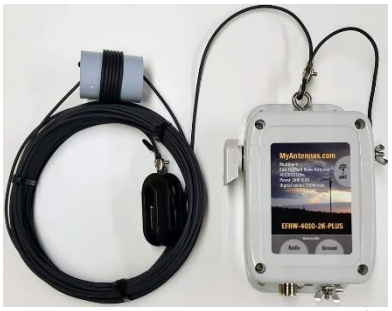
   a. The transceiver has great performance, is easy to use, and is price competitive.
   b. Why not something else? (1) More Evergreen Hams use this than any other.
   c. (2) TARC emergency response uses them. It is simply great.
   d. A tremendous advantage of using a common radio is support and trading skills.
   e. The radio is small and light enough to use portable or mobile.
   f. It transmits 160m – 6m on all modes.
   g. The touch-screen, software-defined radio (SDR) can be software updated. It is a computer with an antenna.
   h. At 100 W, the power draw is 21 A at 13.2 volts.

3. Power Supply: *Linear 35 Amp, not adjustable.*
   a. For HF, low noise is critical. 1 to 2 S-units difference will mean no contact.
   b. Noise made me quit using my switched-mode supply.
   c. It is not technically possible to eliminate the noise.
   d. A linear supply has smooth wave-forms, huge transformer, is heavy, is pricier, but it is inherently quieter on RF. Ambient noise is quieter.
   e. Adjustable voltage is not recommended, since mis-setting can destroy a radio.
   f. The radio needs 21 A, so the supply needs 25A continuous.
   g. My VHF/UHF radio draws 13A. Using a single power supply requires 35A continuous.
   h. My supply is Astron RS-35M.

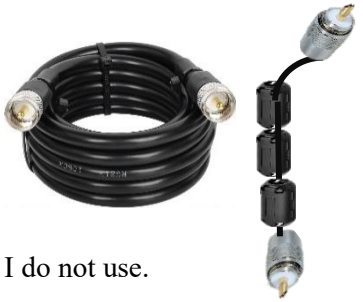
MHz	λ-m	λ/4-ft
50 - 54	6	4.5
28.0 - 29.7	10	8.3
21 - 21.45	15	11.15
14.0 - 14.35	20	16.7
7.0 - 7.3	40	33.0
3.5 - 4.0	80	63.8
1.8 - 2.0	160	

4. Antenna 1: *20-meter dipole*
   a. Dipole is simple, inexpensive and works. 20-meter is best day or evening long distance band.
   b. The antenna consists of two-16.7’ long, AWG 12 / 14 insulated stranded wires.
   c. Solder one end of each wire to the coax connector.
   d. Connect the return side of coax connector to an earth-grounded wire.
   e. Keep the return side parallel to earth for coupling.
   f. Raise the end of the radiator to improve angle or gain.

5. Antenna 2: *EFHW (End-fed half wave) 40-10 meter.* Yes, you need both.



   a. This antenna has little to no gain. It is for emergency, portable, multi-band use.
   b. The antenna uses ~66’ of 12 / 14 AWG stranded insulated wire. Insulate end.
   c. Use a UNUN transformer with 49:1 to 64:1 turns ratio on a ferrite core.
   d. A counterpoise of 0.05λ (.05*40m=6.6’) connects to UNUN opposite the antenna
   e. Compensation coil of ~1.5µHy is 6-Turns on 1.25” OD PVC. Put 78” from feed.
   f. Its purpose is to lower resonant point on higher frequency bands.
   g. All parts can be ham-brew or purchased. I have done both.
   h. *MyAntennas.com* model EFHW-4010-2K-Plus system is very good.
   i. For just a transformer, use MEF-130-2K-Plus or MEF-130-LP.
   j. Chameleon also makes a decent antenna. They have an extensive deployment kit.



6. Coax: *RG-213/U*
   a. RG-213/U is a lower-loss, high-quality, relatively-stiff coax.
   b. RG-8X is small diameter, but high loss. So, use it for less than 25’.
   c. Run separate coax from each antenna to the radio, typically 25 - 50’ each.
   d. A short 3’ RG-8X jumper aids connection to the radio.
   e. Coax switches are high-loss devices, up to 1 dB. I do not switch antennas often, so I do not use.
7. Noise & Lightning Protection: *Connect to earth ground system. Important*

   a. Ground the top coax connection to antenna for DC. The counterpoise returns RF.
   b. If over 20’, run a second path (>6 AWG) to a different ground rod.
   c. Put 5-ferrite beads on the coax below EFHW counterpoise. Use at least 3 on dipole.
   d. Use lightning arrestor below beads and a second one at end of coax before entering building.
   e. Place at least three 8-ft ground rods 17’ apart. Bond them together. Bond to utility ground.
   f. For ground > 5Ω, use concrete to backfill rods and around conductors. Bury more conductors.
   g. I use the same protection system for my attic antennas, since it lowers the noise floor.
8. These are the fundamentals. More bands, digital modes, and other antennas open new worlds.
9. Life is good. Enjoy!