



No. 4: Antennas and Low Sun Spot Counts



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As much as we hate to admit it, 10 meter conditions have been rotten. Instead of sunrise to sunset contacts across the ponds east to west, we hear only some weak north-south dx and a few weaker U.S. stations (from the U.S. perspective, of course). Occasionally during the day, the band will open a little for east-west skip. So, what kind of antenna is best for these conditions?

The answer depends on another big question: what kind of operating do you want to do? Let's look at three main answers: a. I want to work my local chapter and friends. b. I want to work those super weak signals, c. I'll take whatever I can get whenever I can get it. Each answer suggests some different antennas.

Local: Local chapters of 10-10 and other area communications are still wide open on 10 meters. That is because they are primarily point-to-point. (Note: we habitually call this ground wave, but usually it is not. Ground waves (or "surface" waves, as some call them) peter out on 10 very quickly. Just as on VHF, our elevated antennas look directly at each other: that is point-to-point.) Since most established hams have horizontal antennas, a vertical can be a disadvantage unless everyone is very close. Up to half the signal gets lost due to cross polarization.

The basic local antenna is still the dipole. If possible, make it rotatable, even if by hand, and as high as you can get it. Aluminum rod or tubing about 16' long, fed with coax at the center on a single mast works quite well.

If you live on the fringe of your local group, consider a simple 2-element beam, either fixed to point at the group or rotatable. The commercial HF5B is a typical compact multi-band design with a wide forward lobe (to catch everybody in the group) and modest front-to-back ratio. Since there is little trouble from QRM, the modest F-B ratio actually lets you hear someone off the back of the beam better than a station with a large beam designed to suppress virtually everything off the backside.

You can build a 2-element Yagi from supply store parts. If you are into building antennas, you might want to consider other designs for the fun of it. The Moxon rectangle, a wire beam, has about the broadest forward lobe and excellent rear suppression, but a little less gain. The X-beam is a bit tricky to set up, but is quite compact (a square under 10' on a side). Linear loaded Yagis can cut the element length from 16 to 12 feet. And the ZL-special can be built from 300-ohm parallel line (TV ribbon) on a light frame or suspended at its ends and fed with coax. If any readers are interested in these designs, I'll present some details in future columns. Meanwhile, look at any of the antenna books to gather some basic ideas.

Weak Signal Work: Much of the weak signal work done on 10 during sun spot lows is via backscatter, that is, by bouncing signals off the edge of the ionized layer, as weak as it is. That same layer, weakly hovering over the tropics, is responsible for the north-south skip that appears while the east-west path is too weak to support communications. So many 10-10ers point their beams south (or, if in the southern hemisphere, north) and listen carefully.

For the best results on backscatter and very weak skip, an antenna with the maximum forward gain is best. Again, the front-to-back ratio is unimportant, since there is no QRM. (However, few hams want the antenna just for sun spot lows, so they do pay attention to front-to-back ratio.) A long Yagi is perhaps best among the aluminum antennas. If designs are optimized, the gain depends on the boom length, so the longer the better (if you can support it).

Some wire antennas are capable of excellent gain, even if bidirectional. The extended double Zepp is over twice as long as a dipole, but narrows the beam width and has gain over the dipole. Dipoles (that is, antennas fed in the center) of a full wavelength can be set about a quarter wavelength apart and fed 180 degrees out of phase for additional gain. So too can EDZ dipoles (1.25 wavelengths long). These antennas usually (but not always) require parallel feeders and an antenna tuner. But the materials are cheap. Run the wires east to west for north and south lobes. For sun spot low backscatter and transequatorial skip, a fixed wire beam is not a bad choice. Again, if there is any reader interest, I'll provide more details in future columns.

Anything I Can Get: For general operation, use what you have and be patient. First, learn the band's habits. When do the openings occur? In what directions? How long do they last? Then plan your operating accordingly. Second, be sure your receiver is quiet so you can hear what there is. Early synthesized rigs are noisier internally than the preceding generation of crystal-mixing rigs. Direct-digital synthesis in today's rigs still leaves some noise on 10. That's why Ten-Tec offers both synthesized and crystal-mixing rigs and why some hams hang onto their old Drakes, TS-520s, and so on. The antenna is part of a system, not a solution to everything.

Third, plan your antenna for long term use, not just for the present lull in apparent activity. If you have room for antennas and like to build, have fun with experimental designs. But also plan the main system for the day when the sun spots return. (And, although we 10-10ers hate to admit it, that planning may involve operation on other bands, too.)

Finally, use your antenna! Very often a band is only as dead as the operators sitting around complaining about it. Listen to 10 on contest weekends to discover its true potential. Contesters (inadvertently) QRM each other on a supposedly dead band. Vertical or horizontal, your antenna will do you no good if everyone thinks the band is dead without checking. Find net frequencies, especially the daily 10-10 nets, and listen. If you cannot hear the NCS, request a relay check-in to find out if anyone is in the right place to hear you. Try some "CQs" near frequencies that used to be active. Make your presence known. . .of course, within the boundaries of good operating practice. 10 meters is more open than you think.

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