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A Simple High-gain Nondirectional Antenna for VHF-UHF

This month we will discuss how to build, site, and use a nondirectional antenna with a useful amount of gain. It's called the "colinear coaxial antenna" and just for fun, let's coin a name for it right here in *Monitoring Times.* By shortening "colinear coaxial" we can call the antenna, "Coco."

The idea behind the design was first conceived by a gentleman named Franklin, a brilliant communications engineer of early radio days. Therefore, some precursors to the coco are known as "Franklin" antennas.

The "secret" of the gain obtained with the coco antenna is that the signals picked-up by each section of the antenna add together, giving a stronger signal input to your receiver or scanner than you could get with only one section. And, since the antenna is mounted with its length running vertically, each element is exposed to all directions of the compass equally. Thus, the coco is nondirectional. This fact, together with its gain, means that it is a good antenna for general monitoring of signals coming from any direction.

So, Let's Build One!

Take a look at figure one. There you see that you need a number of sections of coaxial cable, cut at the ends so that they may be joined as shown. Keep the connections as short as practical. The antenna segment lengths (A, B, and C) include the length of the connections too.

The A-length and B-length segments are made of coax, as shown, and the C-length segments are made of heavy wire or even of coax cable braid. More A-length segments may be added to the three shown, to give the antennas more gain. Since this antenna is "tailored" to the frequency on which you are going to use it, get the lengths of coax segments to use from table one. Make all measurements carefully.

Solder each connection well, and seal the connection with black electrician's tape. When you tape the joint, do it so that the tape covers the entire "joint," and overlaps the outer insulating jacket of the coax on both sides of the joint.

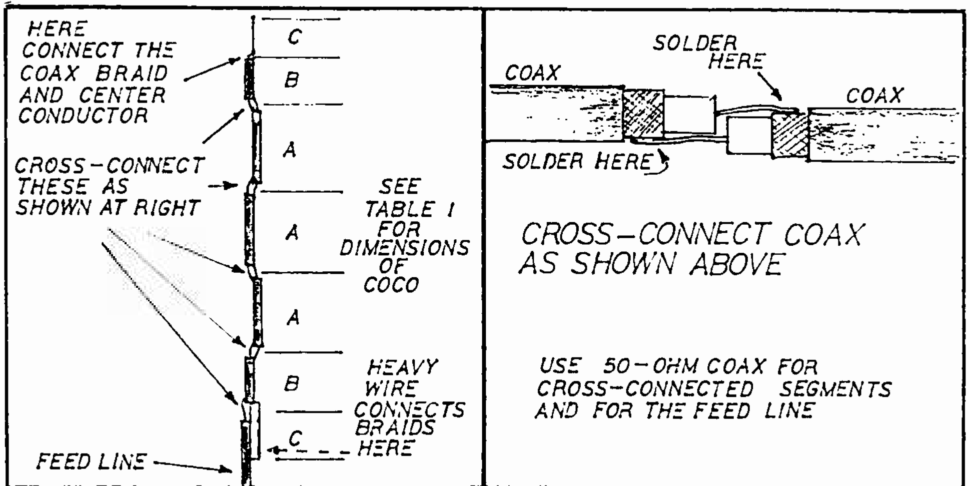

FIG. I. THE COCO ANTENNA. AT THE RIGHT IS SHOWN HOW TO CROSS-CONNECT THE COAX SEGMENTS.

If you plan on mounting the antenna outside, give it a very thorough job of taping, and inspect it now and then for signs of weather damage. If weather damage starts, retape as necessary. Don't put any sealer on the joint before you put the tape on, as some sealers cause serious signal loss.

Some builders put the finished antenna inside a plastic water pipe to protect it. Others say that this degrades the signal. You may want to try to see for yourself, if you think you want more protection against the weather than the tape gives. The pipe must be sealed against moisture. You can mount the pipe at its bottom, and then guy it with light ropes to hold it erect. This means you don't need a tower to put it up. But, without a pipe to support it, you can simply hang the antenna from a tree or pole by a rope attached to its top.

Siting Considerations

The antenna should be mounted in the clear, as much as is possible. To put it next to a metal building would be to shield it from signals on the side closest to the building. To put it on the side of a building which has a metal frame would do something of the same thing. Dry wood, bricks, stone, or mortar are not so detrimental in terms of their effect on the antenna's performance, as is metal. As I almost always recommend, mount your antenna as high and as in-the-clear as is practical.

The antenna may even be mounted inside a wooden house, if you want to drill a small hole to let its length run from one room up to the next, or to the attic. In all cases, keep it well away from wiring and appliances of any kind.

Most VHF-UHF signals are vertically polarized, and therefore the antenna is mounted with its longest dimension in the vertical orientation, to give it vertical polarization too. But it is of interest to note that Franklin's early antennas, from which the coco is derived, were horizontally oriented elements of the legendary "Imperial Beam Antenna."

The Imperial Beam was the antenna which the Marconi Company developed early in this century to provide the British Empire with the first reliable worldwide communication system. If you build the coco, you will be following in very famous footsteps indeed!

RADIO RIDDLES

Last Month's Radio Riddle

Last month I covered a lot of antenna names, and among them were the "lazy-H" and the "lazy-quad" antennas. The riddle then was: "Just what does it mean when we say that an antenna is "lazy?"

Have you ever seen a "lazy-H" antenna? It looked like an "H," right? But the "H" was tilted over 90 degrees to the right, lying on it's side. So, next time you read of a "lazy" antenna, realize that it is called "lazy" only because the antenna happens to look like whatever it is named for (H, J, etc), if that namesake is rolled over on its side to rest a while.

After all, one of the quickest ways that people can get a reputation as being a "lazy bum" is to lie around like a couch potato. Should it be so different for antennas?

In Closing

A while back, a *Monitoring Times* reader wrote in to ask me if I was actually Kurt N. Sterba, a writer who has, in the past written an antenna information column for another radio communications journal, *Worldradio*.

Well, strange as it may seem, my name really is "Clem." And my writing style would seem to be quite different from Sterba's. On the other hand, the name "Kurt N. Sterba" would seem to be a psuedonym designed to bring back nostalgic memories of an antenna design which was once well-known and widely used. I understand that it can still be found at some shortwave broadcasting stations.

How many of you know what that antenna is? I'll give that answer next month, along with the answer to this month's Radio Riddle.

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Table One

DIMENSIONS FOR ANTENNA SEGMENTS

	REGULAR COAX		FOAM COAX		EITHER COAX
Freq.(MHz)	A	B	A	B	C
130	2'6"	1'3"	3'1.2"	1'6.6"	1'10.7"
146	2'2.7"	1'1.3"	2'9.2"	1'4.6"	1'8.2"
160	2'0.4"	1'0.2"	2'6.3"	1.3.1"	1'6.5"
220	1'5.9"	0'8.9"	1'10"	0'11"	1'1.4"
410	0'9.5"	0'4.8"	0'11.8"	0'5.9"	0'7.2"
455	0'8.6"	0'4.3"	0'10.6"	0'5.3"	0'6.5"

TO COMPUTE DIMENSIONS, IN FEET, FOR ANY FREQUENCY

REGULAR COAX: A = 492/Freq(MHz)(.66) B = A/2 C = 246/Freq(MHz)

FOAM COAX: A = 492/Freq(MHz)(.82) B = A/2 C = 246/Freq(MHz)