BY BILL ORR, W6SAI

RADIO FUNdamentals

THINGS TO LEARN, PROJECTS TO BUILD, AND GEAR TO USE

Déjà Vu All Over Again

In the January 1996 issue of *CQ* I described my full-wave 14 MHz dipole. Since then I've had modest success with it (considering how rotten 20 meters has been of late). I've also heard from readers who are having good luck with the antenna.

Among the letters was one from Richard Bell, WA4BNO. He pointed out that another version of this antenna appeared in the November 1957 issue of *CQ*, nearly 40 years (and four sunspot cycles) ago. The 1957 antenna (fig. 1) consisted of a two-wire flat-top fed at a high-current point by a 450 ohm line. It was designed by Bob Perthel, W9MWD. The flat-top consisted of two No. 16 wires spaced four inches apart by homemade plastic spreaders. Bob was able to use the antenna on 40 and 15 meters, and Richard reports that he could work those bands also with my antenna design, but he required an antenna tuner to do it.

So two versions of the antenna exist—one with coax feed and the other with ribbon feed. Take your choice!

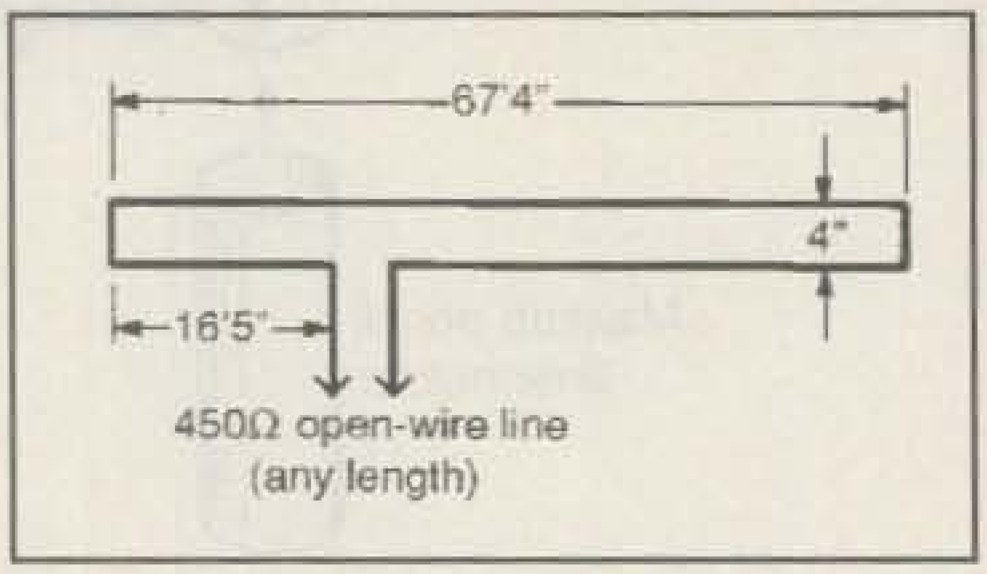

Fig. 1– Full-wave folded antenna for 20 meters by W9MWD (1957).

W6PYK's 160 Meter Backyard Vertical

Antennas for the 160 meter band are a problem unless you are blessed with plenty of real estate. One solution, which a lot of amateurs use, is to go straight up—that is, use a vertical antenna. Once again antenna size is a limiting factor. Not many amateurs have room for a 130 foot vertical and the attendant guy wires!

Paul Scholz, W6PYK, designed a nifty 160 meter vertical for a small backyard. He used it in the early 1980s when he was living in Kentucky. The antenna is shown in fig. 2. Paul's was top-loaded, about 36 feet tall. He used a push-up pole-type TV mast for the vertical. The top loading consisted of four guy wires, each 44 feet long, evenly spaced around the mast. The ends of the guys were tied off to 4 foot ground stakes.

In this design the radial wires are bent back upon themselves in the shape of a "Z" to form a rough square. Each wire is about 126 feet long. The wires do not touch the ground, but are held a few feet in the air by wood stakes.

The base of the vertical is insulated from the ground by mounting it on a square piece of 2 inch lumber. It is held in place by several nails driven into the board around the base.

The antenna is resonated to frequency (1.85 MHz) by means of a small loading coil. This base inductor is placed between the antenna and a 4:1 step-up balun. This matches the approximate 10 ohm fedpont impedance of the antenna to the coax line. The base inductor is a 15 microHenry coil, and about 10 microHenries of it are used to effect a match.

The elevated radial system effectively disconnects the antenna from major ground losses. Paul noticed no change in SWR from dry to rainy weather. Because of relatively low ground loss, antenna Q is quite high. The 2:1 SWR bandwidth is about 40 kHz.

Paul reported excellent results. With 100 watts he worked into Europe, South America, Japan, and the Marshall Islands. That's not bad at all for a compact, backyard vertical antenna!

The Switching Power Supply (The Early Days)

Changing one DC voltage to another level, or changing DC to AC, has always been a problem. In the early automotive days this was accomplished by charging and discharging an inductor and later by the spark coil. These devices boosted a low DC voltage (6 to 12 volts) to a much higher interrupted (or alternating) voltage that would fire spark plugs in a gasoline engine.

In the early '30s, with the advent of 6 volt tubes, the car radio became practical and improved switching power supplies using a magnetically driven double-pole, single-throw switch to provided interrupted DC which could be stepped up, rectified, and used for plate voltage for the radio's tubes. An early version of this plug-in switch, or vibrator, was called an "Elkonode" (fig. 3). Later models of car radios used full-wave rectification and a full-wave "interrupter" to provide high-voltage DC. This was termed a "nonsynchronous vibrator" (fig. 4).

Upon application of battery voltage, the flexible reed of the vibrator was pulled towards a contact. This produced a pulse of voltage in one-half of the transformer primary winding. At the same time, the magnet coil was short-circuited by the contact, allowing the reed to swing back and touch the other contact. This caused a pulse of voltage in the other half of the primary winding. Simultaneously, the magnet coil was energized, causing the cycle to repeat itself. An approximation of a sine wave appeared in the secondary winding of the power transformer. This action took place at

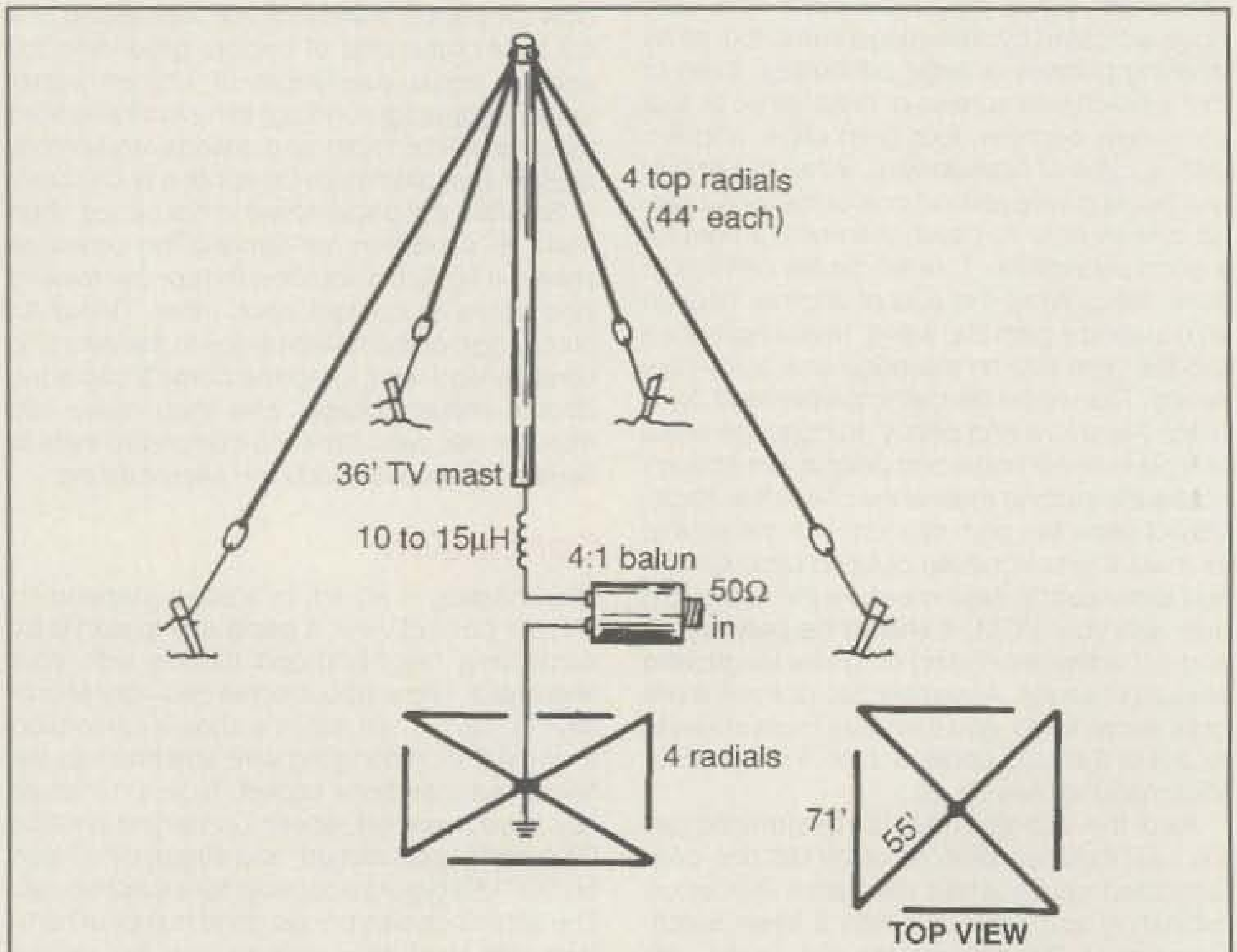

Fig. 2– Compact 160 meter vertical at W6PYK.

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