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Title: Dual-Band Operation with a 33-Foot Vertical
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Hints and Kinks

DUAL-BAND OPERATION WITH A 33-FOOT VERTICAL

One of the more popular antennas for use on the 40-meter band is a quarter-wavelength vertical fed against a suitable radial system. It has long been recognized that this antenna also makes an efficient low-angle radiator for the 20-meter band, offering a gain of a dB or two over a shorter quarter-wave monopole. A typical feed system for two-band operation is shown in Fig. 1. A relay, controlled from the operating position, allows the coax to be connected directly to the antenna for 40-meter operation or through the L-section network for 20-meter operation. The base impedance of the antenna on 20 meters is approximately 1000 + *j0* (see reference 1). The reactance values for the L network are easily calculated by using these data and *Handbook* formulas.

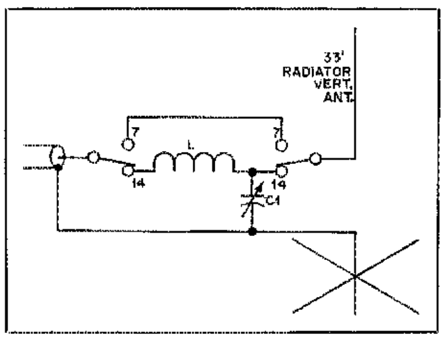


Fig. 1 — Antenna relay for operating antenna on 7 or 14 MHz.

Shown in Fig. 2 is a network that is presently used at the base of the writer's dual-band vertical. The significant departure from the system shown in Fig. 1 is that no relay is required. Operation of the modified network (Fig. 2) is easily understood if it is compared with the simpler L network of Fig. 1. The value of C1, the shunt capacitor, is the same in each network. The reactance of this capacitor at the lower band, 7 MHz, is about 450 ohms. Because this is high when compared with the low base impedance of 35 + *j0* of the antenna, it introduces an insignificant mismatch. The inductor of Fig. 1 has been replaced with a series-tuned circuit. This element has the same net inductive reactance at 14 MHz as does the inductor of Fig. 1. However, the resonant frequency of the series circuit is 7 MHz. Hence, the base impedance of the vertical is unaltered by the L1-C2 combination on the 40-meter band.

An iterative approach was used for adjustment of this network. Battery-operated QRP transmitters were used with an rf resistance bridge, allowing all measurements to be done on the roof where the antenna is located. The tap on the inductor was set for near maxi-

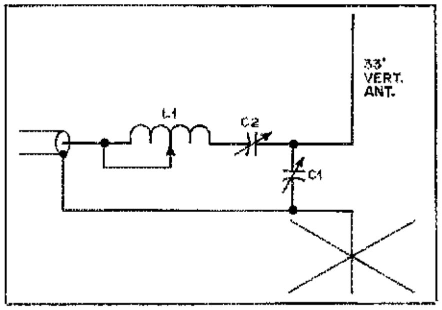


Fig. 2 — Modified L network for dual-band operation.
C1 — 5-80 pF air-variable capacitor.
C2 — 20-300 pF air-variable capacitor.
L1 — 5 mH (maximum) air core.

mum inductance and 7-MHz energy was applied to the bridge. C2 was tuned for minimum VSWR. Then 14-MHz energy was applied and C1 was tuned for minimum VSWR. The match at 14 MHz was poor, initially. The tap on the coil was then moved toward lower inductance. C2 was again adjusted at 7 MHz and C1 was tweaked with 14-MHz excitation. About six iterations of this kind yielded a good match on both bands. The tuning network is housed in a watertight metal box, a requirement of special significance in Oregon. The antenna itself is bolted in a chimney mount with plastic tubing used to insulate the radiator from the mounting brackets. The plastic tubing was the type normally used with golf clubs and is available in most sporting goods stores.

This matching method is undoubtedly not new, although this writer has found no written reference to the application. Using the data for base impedances of vertical radiators presented by Laport (see reference 1), several other cases were studied. The general conclusion reached was that a suitable network could be found to match any practical radiator simultaneously on two bands. It is not necessary that the radiator be resonant on either of the two bands. In the general case the adjustment procedure will not be as straight-forward as that used with the writer's antenna. — *Wes Hayward, W7ZOI*

1) Laport, E. A., *Radio Antenna Engineering*, McGraw-Hill, New York, 1952.

GALVANIC ACTION AND GROUNDS

Whenever two dissimilar metals are in contact, there is a strong possibility of galvanic corrosion. In the presence of moisture a battery is formed, and the more active metal is destroyed. For example, if copper ground radials are connected to a galvanized tower, a copper-zinc battery is formed and the zinc galvanizing is rapidly eaten through.

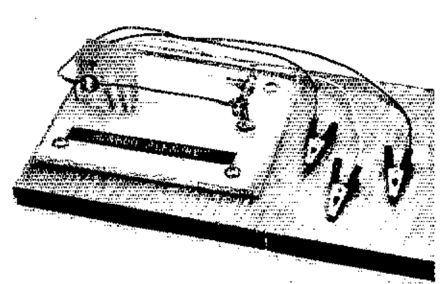
This process can be stopped by introducing a "sacrificing anode" of a more active metal such as aluminum. Bury an old chassis or cooking pot after connecting it to one of the tower legs with a short length of wire. The aluminum will corrode instead of the tower.

Periodically, check the condition of the aluminum and the connections. Faulty connections might become a source of TVI. — *Paul Zander, WB6GNM, ex-WA8JCM*

SUNDAY, AND NO WAY TO PADDLE

As I put the finishing touches on my Accu-Keyer on a Sunday afternoon, I was still without the needed paddle. Radio supply stores were closed and there was a lack of money, anyhow. What was the alternative? In desperation, the junk box was raided. All the necessary material to make a paddle was found.

The treasures included some Plexiglas from an old storm window. Super Glue became the bonding agent. A plastic ice scraper was used as the base.



The WD8BDQ keyer paddle.

What resulted from my effort was a thing of pleasure. Here is a picture of the original contraption. It is easy to operate and quite satisfactory at most keying speeds. With equipment prices so high these days, it may be worth making a similar unit for your keyer. I was so pleased with mine that I built another (including a case) for use as my permanent keying mechanism. — *Craig V. Iansiti, WD8BDQ*

REMOVING TRANSISTORS FROM PC BOARDS

In order to rapidly remove transistors from pc boards with a minimum amount of damage to the boards, three tools are required. They include a low-heat 20-watt soldering iron, a desoldering bulb, and curved or needle-nosed pliers.

Here is the technique. Place a soldering bridge across two elements of the transistor, using the two closest foils. With the pliers gently pull the transistor while applying the