Limited Space Antenna

Short of real estate? This might help!

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With the coming of the summer doldrums, and band conditions being what they are, I found the need to expand my area of operations to another, primarily 80 meters. At the same time, I didn't want to lose the capability that I already had on 20 meters. It is a very good band from this part of the world, but with more activity for us during the daylight hours than the evening.

After dusk 80 meters showed an excellent potential for sporadic DX as compared to 40 meters, which is congested, to say the least, making my QRP operations virtually impossible.

What to do? The size of my roof only permits me the basic real estate necessary for a 20-meter dipole antenna—the noise element being a major factor, a vertical was out. So, with that in mind, I finally resolved my problem with the use of loading coils, in the same manner that is used with verticals.

Cramped for space? This little gem will surprise you. It's a dipole that is resonant at 3.5 MHz and 14 MHz, with the capability of being used on all bands from 3.5 MHz through 50 MHz with the aid of an ATU.

L2 and L3, the 3.5 MHz stubs, may be placed in almost any position.

You should note that **Fig. 1** shows a typical installation convenient at the time. Other configurations are certainly possible.

The T-bars were used for a now-vacant clothesline, and gave a tilt benefit through which the direction of fire is accomplished. An added bonus is that extending the length of L2 to 18 feet, 8-1/2 inches, and joining it with the end tip of L3 provides a loop that is flat on 14 MHz. A radical approach to loop configurations—an asymmetrical triangle?

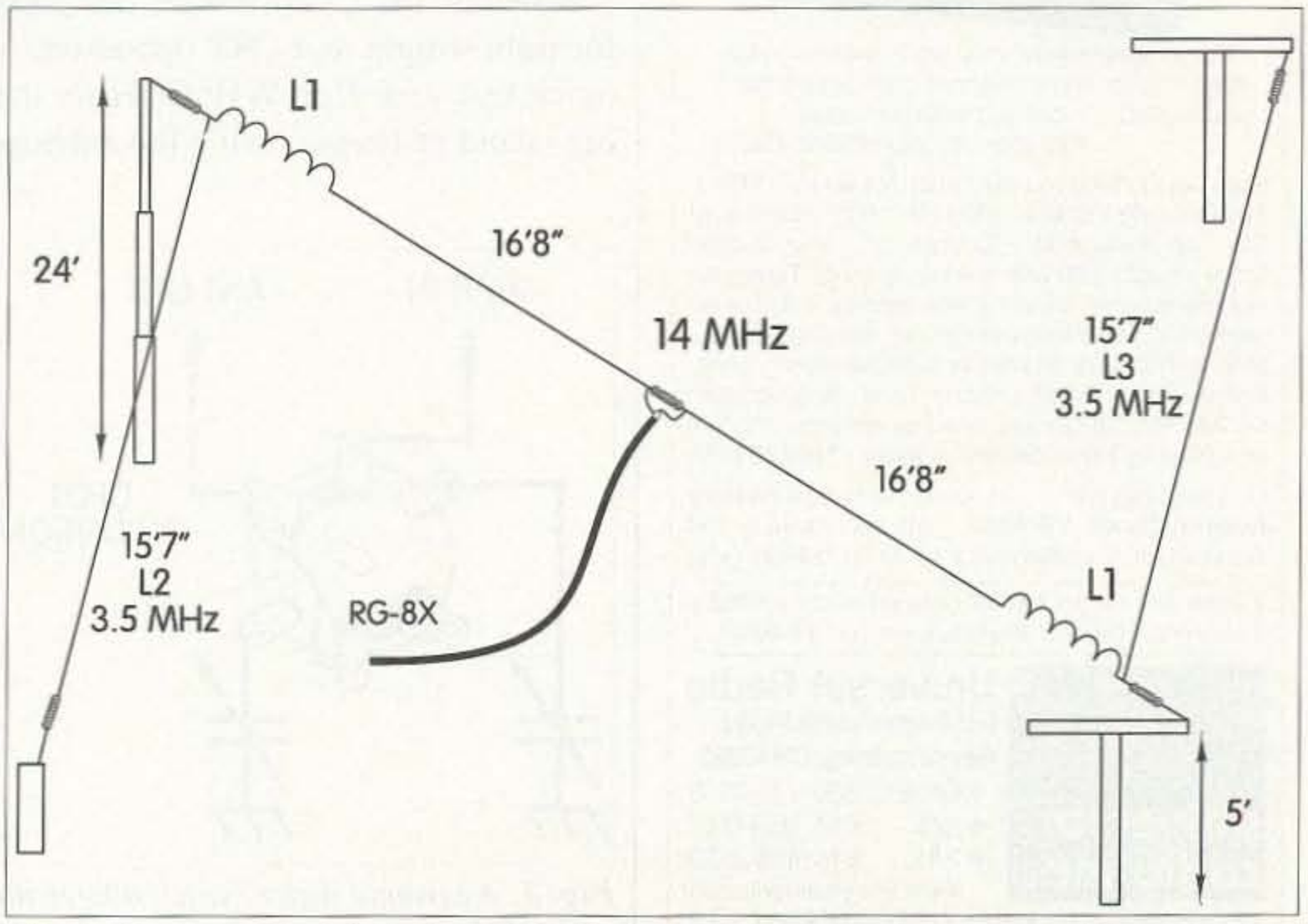

Fig. 1. *One possible orientation of the limited space antenna.*

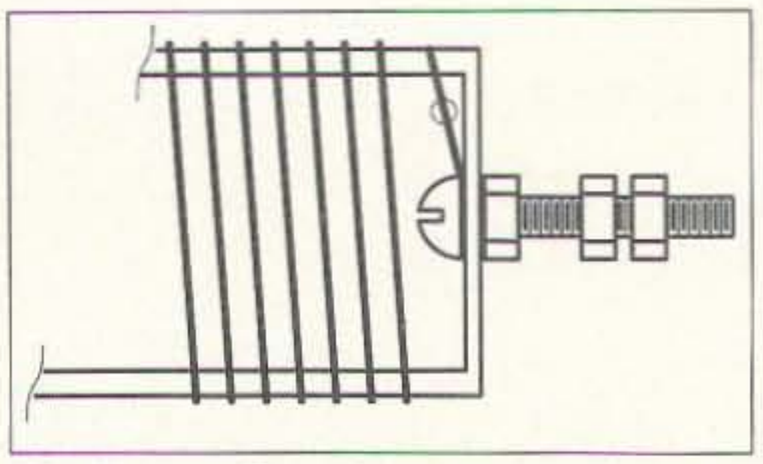

***Fig. 2.** A small machine screw-and-nut assembly provides coil strain relief.*

This antenna will also tune with the aid of an ATU from 3.5 MHz through 50 MHz. L2 could be attached with a quick disconnect. When not needed, the wire simply is balled up at the 15 feet, 7 inches mark and tied off. Nope! You don't need to cut the wire to maintain a resonant condition. Just ball it up tightly, and tie it off as a dipole.

Coil construction

The construction of both coils is straightforward. They were wound on plastic pill bottles that have a diameter of 11/16 inch. The coils are close-wound for a length of two inches, or 85 turns.

Referring to **Fig. 2**, you will note that screws were placed at each end. This was done to reduce any strain on the coils' windings. You can use any type of nonconductive form as long as the diameter requirements are met. A good coat of shellac is recommended as protection against the elements.

Note that the L1 coils were designed for light weight and QRP operation. A quick test with Ken WH6CQH on the big island of Hawaii using the antenna in the dipole configuration revealed that the coils can sustain a power level of 50 watts. By the way, Ken was involved with a pileup from Europe, NA, and SA, and he gave me a "five by three" off the side of his beam, indicating that the wire is radiating. A further test in the loop configuration with Mario IK2IQP in Trieste, Italy, provided me with a five-nine and we held it for 25 minutes. 7J4ACS, Far East NCS, gave me a five-nine from the back of his beam, and the coils didn't even get warm, So it's back to four watts QRP, hi, with plenty of overkill.

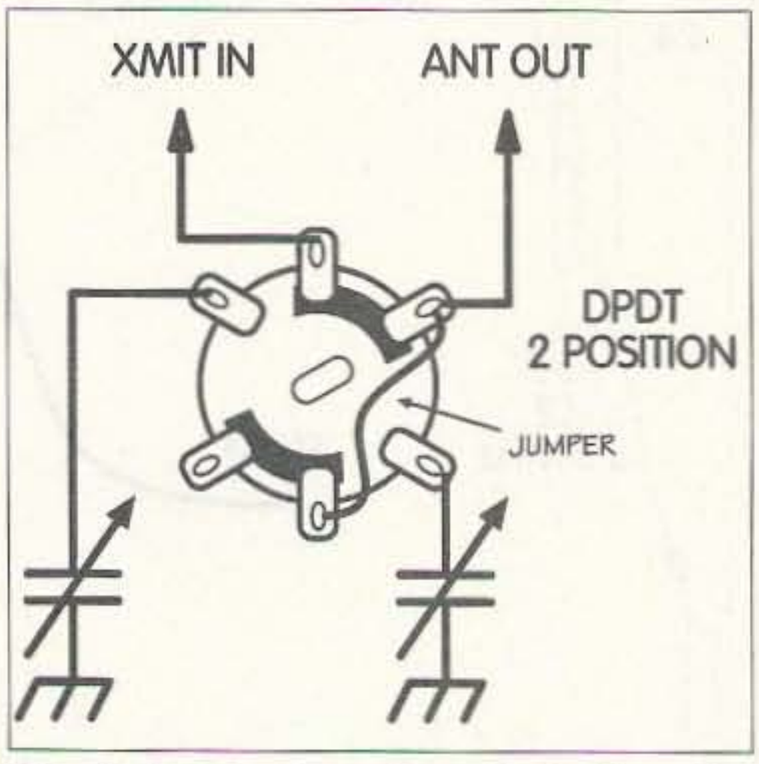

***Fig. 3.** A ceramic wafer switch allows the ATU to be easily bypassed.*

Tips

My ATU is a Ten-Tec 291. It has an excellent range and has been modified so that it can be switched out of the line. This is ideal for antenna experimentation, and for checking line resonance. As noted in **Fig. 3**, a good-quality ceramic wafer switch is recommended. A recent test with some commercial ATUs revealed that if, say, 20 watts were introduced, and an ideal SWR, and power out indication were observed, you may find that only about 200 milliwatts is actually leaving the ATU. They make excellent dummy loads.

I also use an MFJ SWR analyzer both for checking line resonance and for ATU adjustments to prevent interference. I have a simple home-brew switching unit to kick in the analyzer, but many good quality commercial units are available. You have to ensure that the loss is not more than 0.2 dB and that isolation is at least 60 dB to prevent damage to the analyzer.

As an afterthought, I was wondering what would happen if the RG-8 coax was replaced with 300-ohm line. If you try this, would you please drop me a line? Keep 'em resonant, folks. 73

30 feet #24 enamel wire
2 plastic pill bottles, 1-1/16" diameter
85 feet speaker wire
RG-8/X mini coax, any length

***Table 1.** Parts list.*