From: http://www.k4mtr.org/antennas.html

DCTL Antenna (tnx WA6QBU!)

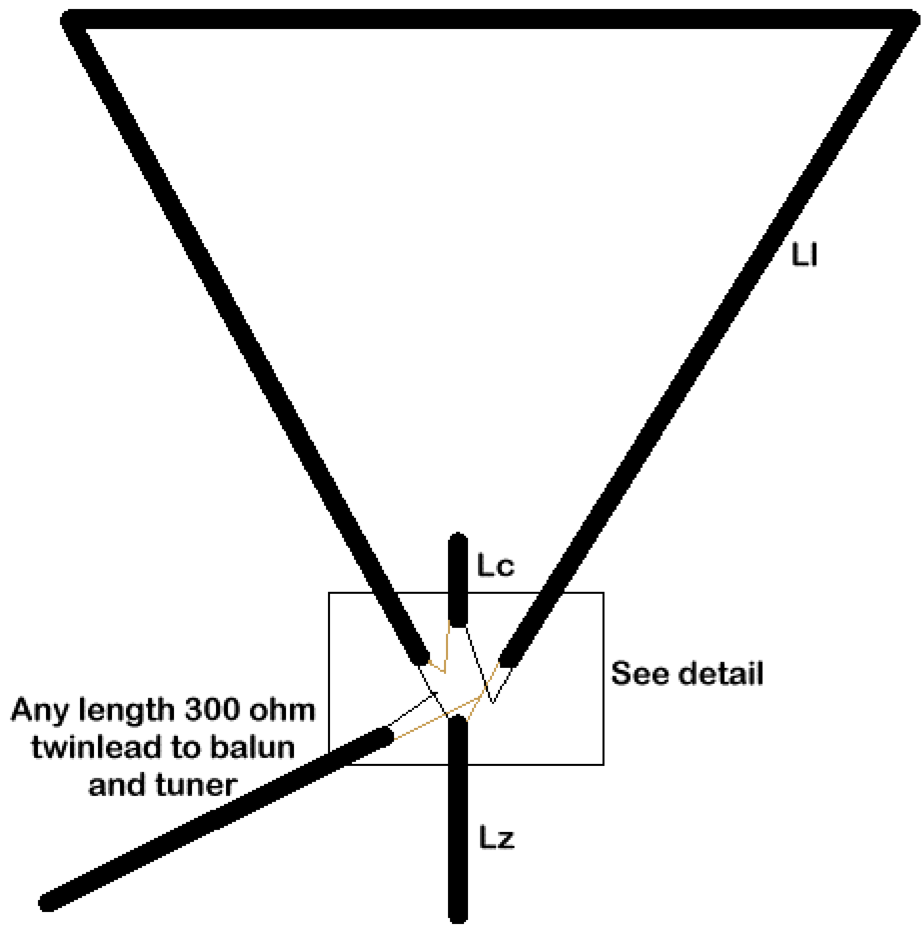
Think that effective antennas can't be had in limited spaces? Everything is a compromise?

What if I told you I worked the world on a rain gutter? OK, so it wasn't so efficient. Better than nothing. But now, I've discovered the DCTL, the Distributed Capacitance Twisted Loop. It is an inexpensive, effective, ***resonant*** alternative that can fit in a 8' tall by 12' or so wide space (like a wall, or balcony), even on 80 meters. 160 meters from an apartment? SURE!

Here are the details.

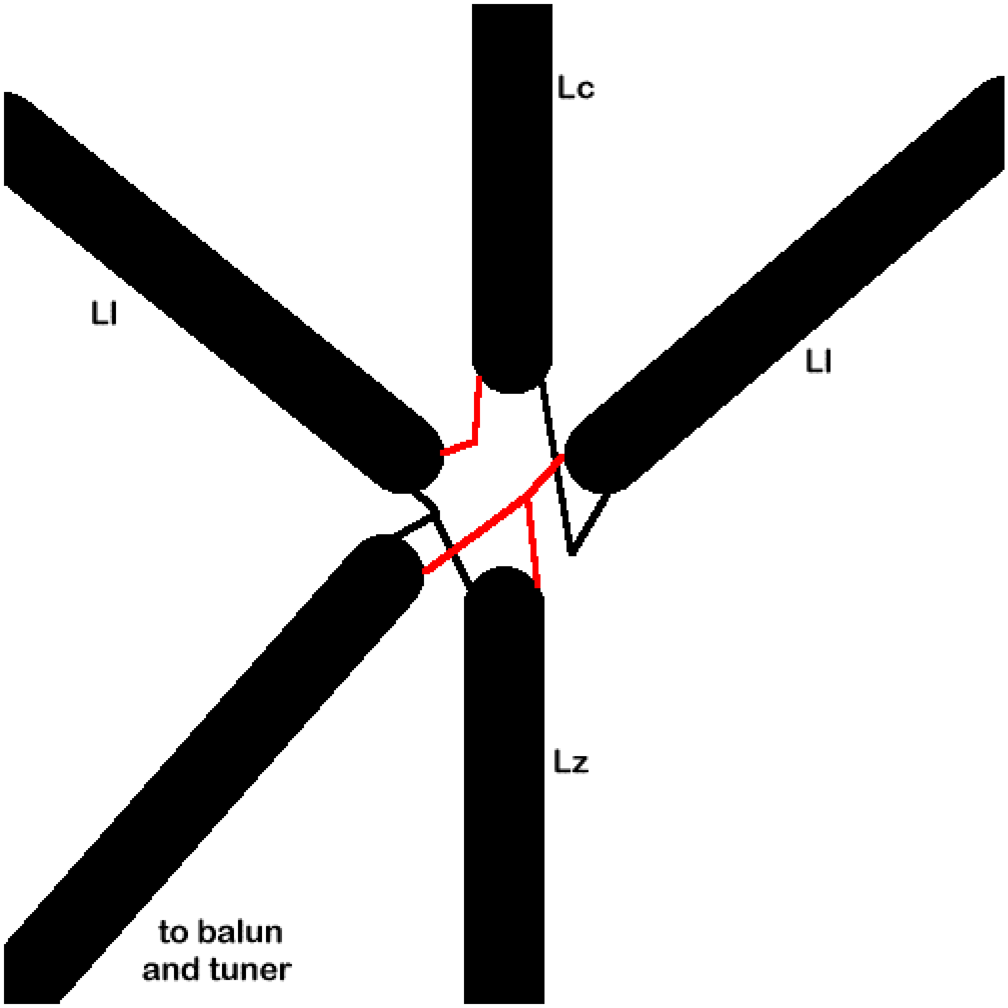
The DCTL was developed by Jim McLelland, WA6QBU, and was published in CQ and 73 Magazines in mid and late 1994. The construction material couldn't be simpler -- good ol' 300 ohm twinlead. (Dimensions here are for the 80m version, tables and formulas follow at the end.)

Using a 28' length of twinlead, the opposite wires are connected to a shorted 4' 6" stub of 300 ohm twinlead. The remaining two ends of the 28' twinlead connects to an open capacitive stub, 30" in length, also made of 300 ohm twinlead. Let's save a couple of thousand words and see a picture ...



Now this gives you an overall picture of the antenna. Lz has a shorted end, while Lc is left open on the non-connected end. The critical part is in the connections. Each "side" of twinlead is in a different color, and the connections are shown below. The Ll (large loop) connection , properly made, puts a "twist" in the twinlead of 1/2 turn. These diagrams assume that NO twisting is made in the twinlead, and what the resulting connections look like. Use an ohmmeter to ensure you are NOT connecting the same wires! Use heat shrink or other GOOD insulating material -- the voltages and heat can get very very high at the junction points. Good soldered connections are also critical.

Here is the detail of the connections:



Why, if the antenna is resonant, is a tuner required? Well, it's not. But your usable bandwidth (2:1 swr points) is pretty narrow, at 1/100th of the design frequency. So, adding a tuner stretches it out a bit, in a fairly reasonable fashion. I have had no trouble with a Kenwood AT-50 in covering the entire 40 meter band. If your tuner requires a 50 ohm coaxial input (like mine does) you can use a 6:1 balun in line.

Trimming the open capacitive stub 6" will raise the resonance point approximately 100 kHz for 80/75 meters.

Here are the formulas:

The total length (Ll and Lz, or Lt) = 130 / F(MHz)
The shorted stub (Lz) = 27 / [(2xF(MHz))-2]
Loop length (Ll) = Lt-Lz

Capacitive tuning stub (Lc) = 24 x (1 / [F(MHz)/2]**2) *(Note: Capacitive stub becomes pretty useless above 30m, in fact the whole antenna gets pretty darn small!)*

Remember, adding the capacitive stub lowers the resonant frequency!

Play around with it. I have one on 40m, and I love it. Make no mistake. Contesters have used this antenna effectively! This isn't an antenna for sissies ...

Here are some pre-calculated dimensions. Remember that the total loop length can be divided by three (in a delta configuration) or four (in a square configuration) to give you an idea on space required.

Band	*Freq.*	*Lt*	*Lz*	*Ll*	*Lc (to lower resonant freq. by 100 kHz)*
160	2.0	65' 0"	13' 6"	51' 6"	24"
75	**4.0**	**32' 6"**	**4' 6"**	**28' 0"**	**6"**
40	7.3	17' 10"	2' 2"	15' 8"	1 3/8"
30	10.15	12' 10"	1' 6"	11' 4"	1"
20	14.44	9' 0"	1' 0"	8'	1/2"