

1.8 - 21 MHz Magnetic Loop

Peter Parker VK3YE

(c) 2003-4

Solder all
connections

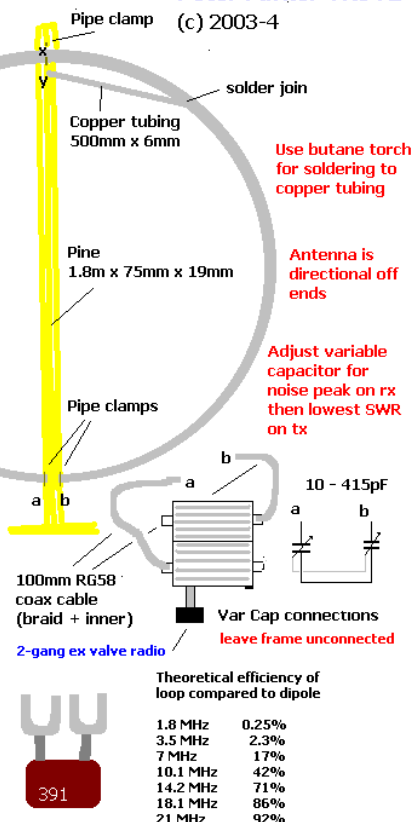
Q is high -
adjust every
few kHz

Do not touch
loop when
transmitting

Connections

- a. variable capacitor
- b. variable capacitor
- x. RG58 coax outer
- y. RG58 coax inner

For 80 & 160m connect capacitors across a & b. Use about 390pF for 80m & 2100pF for 160m. High voltage silver mica capacitors (wired in parallel to obtain the required capacitance) are ideal. Soldered connection is best, but I used self-tapping screws and terminal lugs.



What to expect

Magnetic loops are a compromise antenna and performance will be down on a full-size wire antenna, particularly on the lower HF bands. If built properly, expect the following results at QRP power levels: (i) 80 metres - contacts up to a few hundred kilometres, (ii) 40 & 30 metres - single hop contacts up to about 1000 km, (iii) 20 metres - contacts up to about 3000 kilometres with the occasional DX. The variable capacitor won't spark if transmit power is kept down (10w is fine).

80m: comparison with full-sized wire antenna

During the 80 metre 55B 2004 VK/Trans Tasman contest the indoor loop was compared to an inverted-L approx 30 metres long installed in an RF-quiet suburban park. The results are as follows.

	Inverted-L (outdoors)	Magnetic Loop (indoors)
Operating time	1hr 50 min	2hr 20 min
No contacts	57	36
Avg contacts/hr	31	15
Contacts		
VK2	15	8
VK3	20	17
VK4	1	1
VK5	8	5
VK6	1	1
VK7	2	4
ZL1	2	0
ZL2	4	0
ZL4	4	1
Percent outside VK3	65%	53%
Percent VK6/ZL	19%	6%

Notes: (1) A Yaesu FT-817 transceiver running 5 watts was used in both tests. (2) The inverted-L was 11 metres above the ground at its highest point and had an average height of about 7 metres. (3) The magnetic loop was positioned on a coffee table in a ground floor apartment and had an average height of 1.5 metres above ground. (4) The receive noise level was much higher indoors and some contacts were undoubtedly missed because of this. (5) Band conditions were estimated to be somewhat better than average.

160m experiments

Though its efficiency is a fraction of one percent on 1.8 MHz, results can still be worthwhile. On AM you can expect local AM contacts up to approx 10-30km. On 55B expect more range; 300km is the best DX so far, but interstate contacts may be possible on CW. On receive the antenna is quieter than outside wire antennas and its directionality can be an advantage.

Note: for all these tests the loop was used indoors, inside a ground floor flat in a noisy RF location.

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