

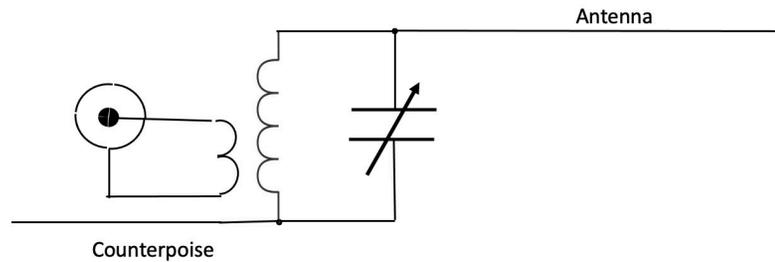
End Feds

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www.OCFMasters.com

History

- Early End Feds (~1930s on)
 - Single Band
 - Tuned Xfmr Matching Network
- Multi-Band End Feds
 - Many Low power portable
 - Transformer Based
 - All Wound INCORRECTLY!
 - Why? Tradition!
 - Conterpoise - Maybe



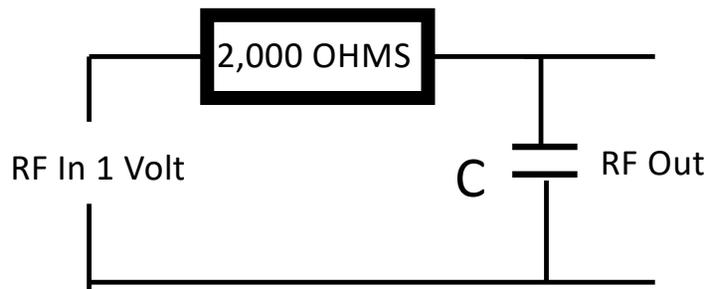
Wound Incorrectly?

This is the same wire on the core – unwound.

What are wires wound together often called?



- A "gimmick capacitor!"
- 11.12 pF to be precise.



- @20MHz $X_c = 750$ Ohms
 - RF Out = 0.27 Volts
- @30MHz $X_c = 500$ Ohms
 - RF Out = 0.2 Volts
- @50MHz $X_c = 350$ Ohms
 - RF Out = 0.15 Volts
- High Frequency response is limited by Capacitive Load on Secondary



Solution

- Don't wind low Z (impedance) primary over of a high Z secondary.
- Wind it over the low Z part of the coil – the middle.



- Because there is less coupling in the middle the leakage inductance is lower
- Smaller cap is needed to compensate for the lower leakage inductance
- 56pF vs. 100pF across the connector.

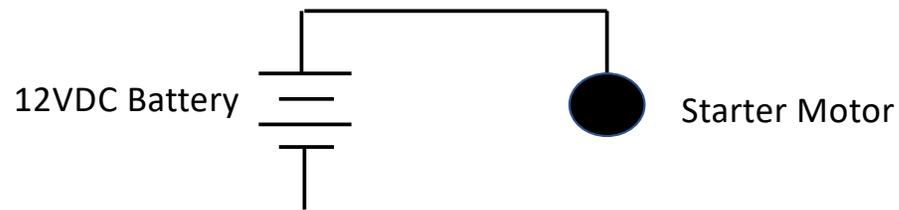
What is the impedance of an end fed?

- Center Fed Dipole $\frac{1}{2}$ wave dipole ~ 40-75 Ohms
- OFF Center Fed Dipole 20-33% ~ 200 Ohms use 4:1 balun
- As you move towards the end the impedance goes up.

Transformer Ratio	Impedance (ohms)	Length (ft) 3.73MHz/7.15MHz	Length (λ)
9:1	450	109 / 57	0.417
16:1	800	110.1 / 57.5	0.420
25:1	1250	113.4 / 59.2	0.432
36:1	1800	117.3 / 61.2	0.447
49:1	2450	120.4 / 63	0.460
64:1	3200	122.4 / 64	0.467

Use 36:1: Less reactive

Electric Circuits



Will this start the car?

Field Around a Dipole

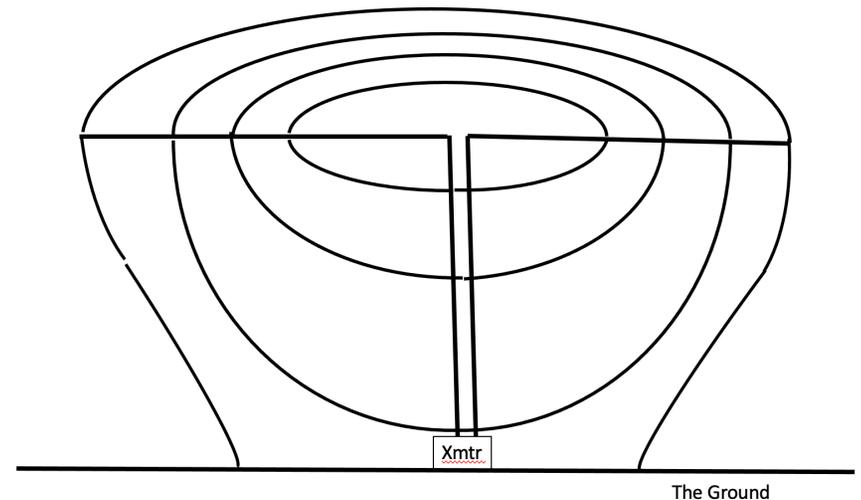
What happens if we take one wire away?

Where will the current go?

Do you believe the ads that say nothing else needed for an end fed?

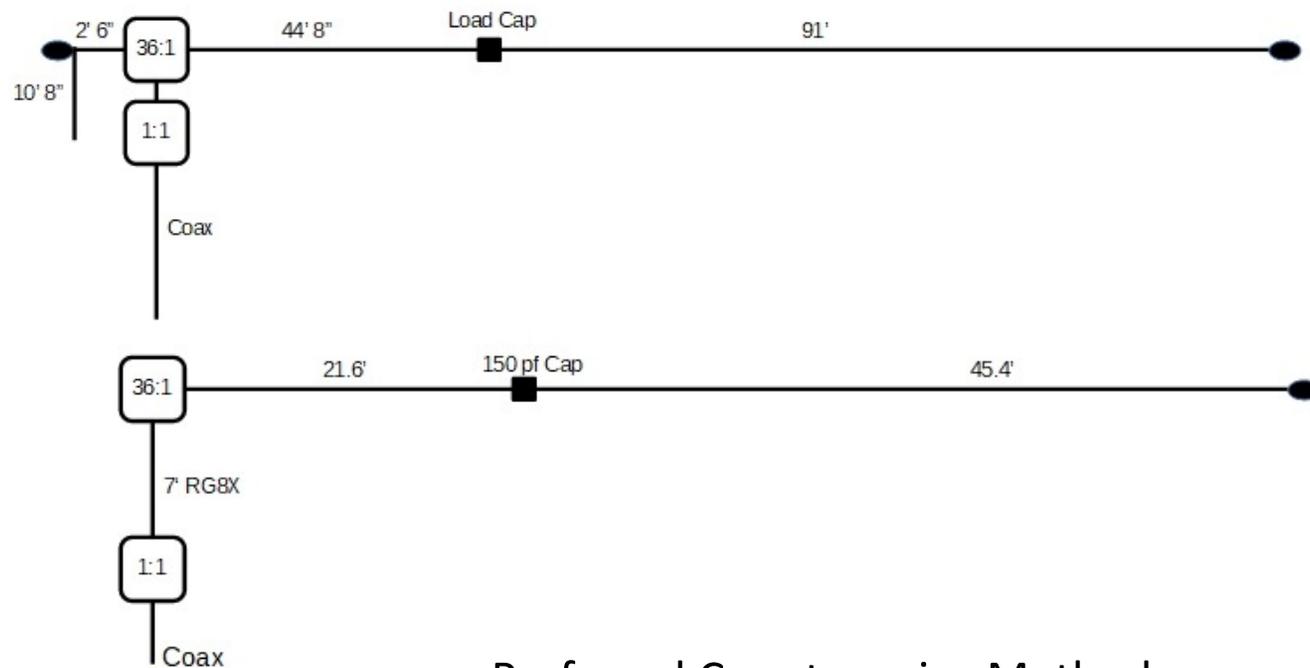
If you do, then I have a bridge in Brooklyn you would be interested in purchasing!

Antennas Without Counterpoise Will Find One: coax, tree, rig, you!



Counterpoises for End Feds

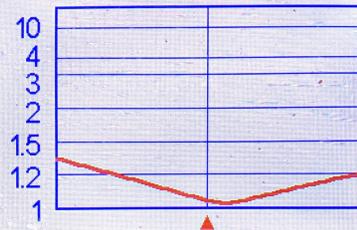
- High End Impedance enables a short counterpoise $.05\lambda$, 13' 2" for 80M, 7' for 40M
- Antenna will work without load cap but 40M SWR will be better with it.



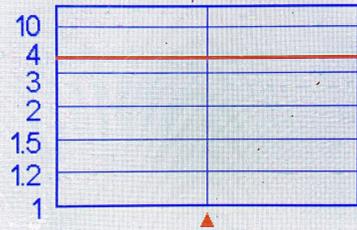
Preferred Counterpoise Method

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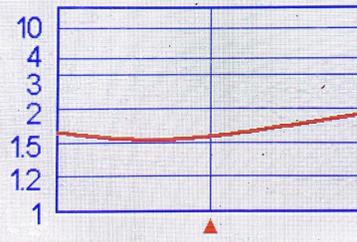
SWR 7 150±150 kHz



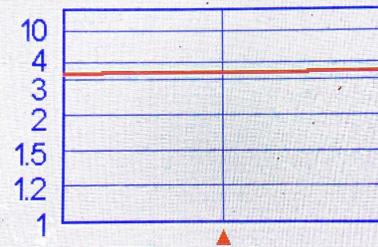
SWR 10 125±25 kHz



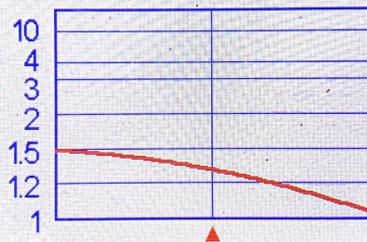
SWR 14 175±175 kHz



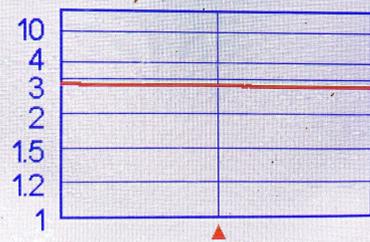
SWR 18 118±50 kHz



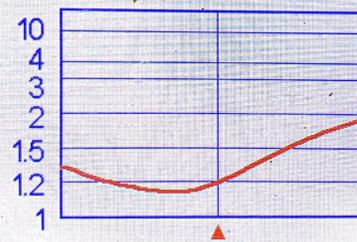
SWR 21 225±225 kHz



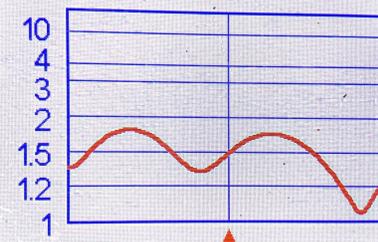
SWR 24 940±50 kHz



SWR 28 850±850 kHz



SWR 52 000±2 000 kHz



Improving the ARRL 40M End Fed

- 36:1 transformer - 12 turns on the Secondary
- 2 turns on the Primary over Center of Secondary
- Solder one end of Secondary to the shield/ground side of SO-239 or BNC coax connector.
- Create a 7 foot piece of RG-8X with PL-259 on one end and PL-259 or BNC on the other to match Transformer connector.
- Purchase or make a 1:1 UNUN, instructions at OCFMasters.com
- To tame 40M SWR place 120pF 21.5' from Transformer