

The Difference Between Loading Coils and Traps, Also Self- Resonant Traps

A movie poster for 'The Great Escape' featuring Sean Connery, Donald Sutherland, and Lesley-Anne Down. The poster is dominated by the title 'The Great Trap' in large, bold, yellow letters with a black outline. Below it, the words 'Loading Coil' and 'Mystery' are also in large, bold, yellow letters with a black outline. The background shows a man in a top hat (Sean Connery) holding a cigar and a match, and another man in a top hat (Donald Sutherland) with an eye patch. A woman in a leopard-print dress (Lesley-Anne Down) is visible in the background.

The Great Trap

Loading Coil Mystery

1978: Sean Connery. Donald Sutherland, Lesley-Anne Down

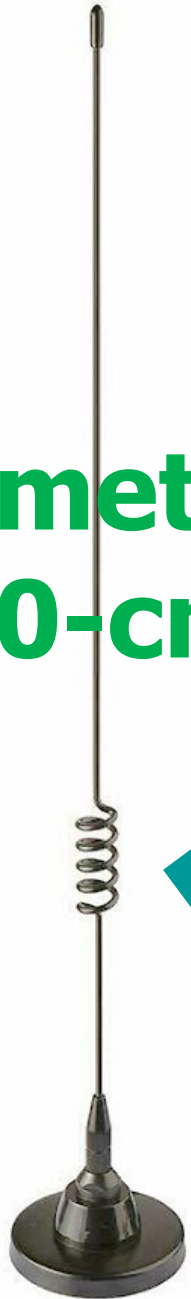
A Star Trek Enterprise ship is shown in the upper left quadrant, flying over the Earth. The Earth's horizon is visible at the bottom, with a bright sun or star in the background, creating a lens flare effect. The text is written in a white, cursive font.

Traps & Loading Coils
Differences / Similarities
Still Undiscovered
Country

w6nbc.com/slides

*I did not fully
understand*

2-meter
70-cm



**Loading
Coil
or a Trap**



Loading Coils



**Just a Plain Coil
to add inductance
to make a short
antenna work on a
lower frequency**



**A Full-size
32 ft. 1/4
wavelength
whip**



*Important
Single-
Band
Device*

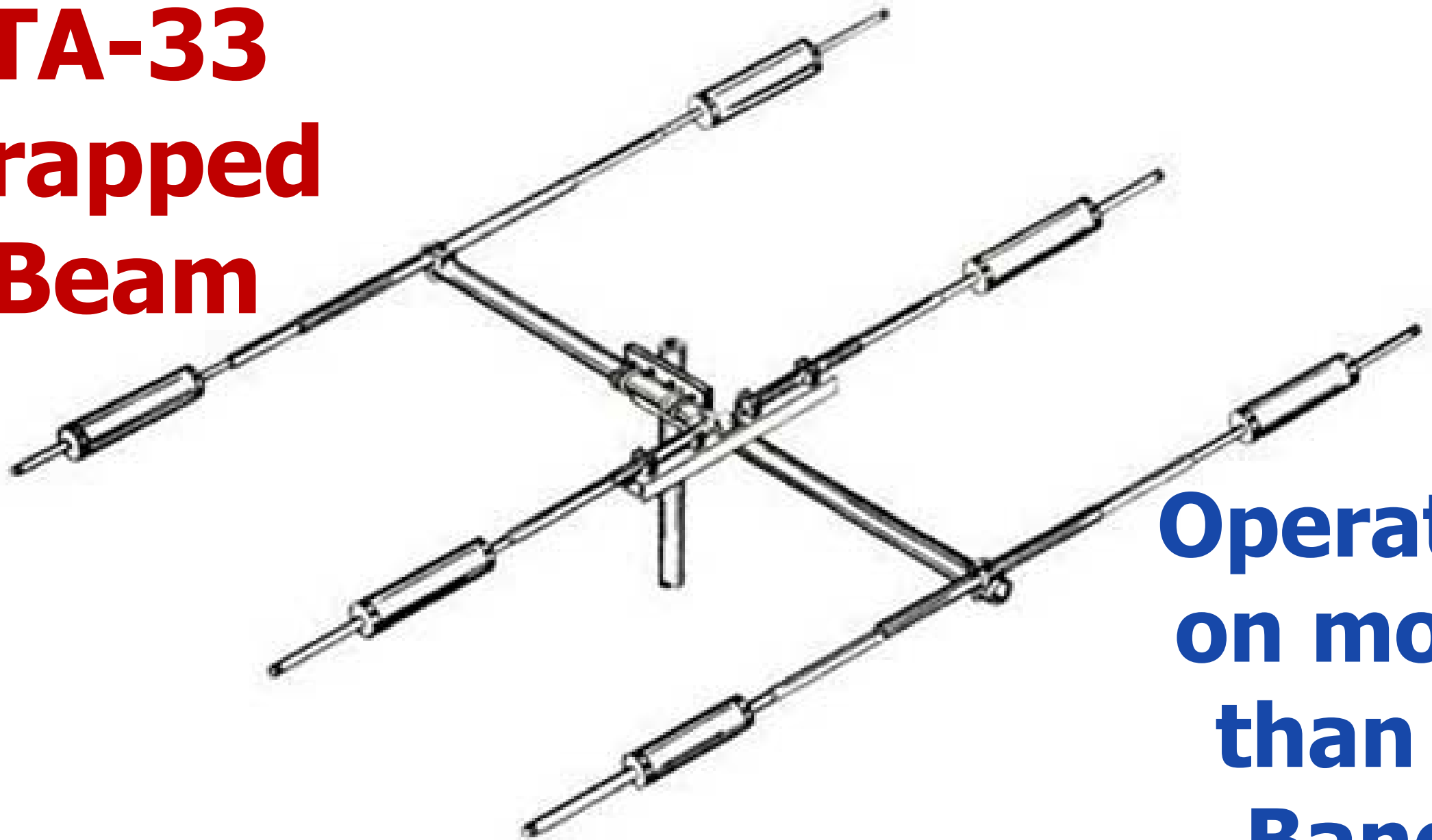


Loading Coil

Traps

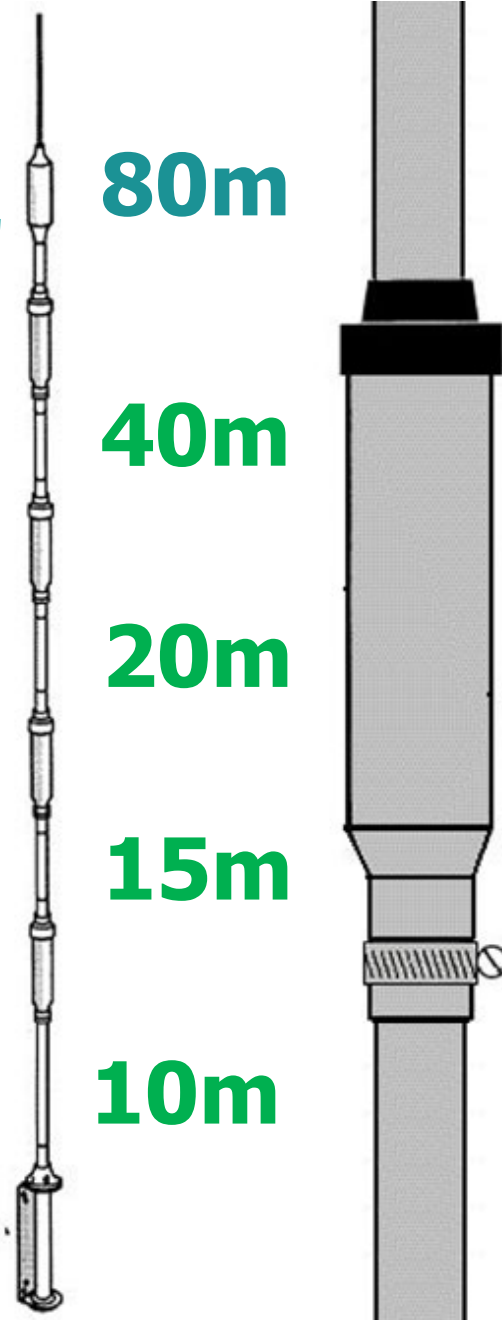
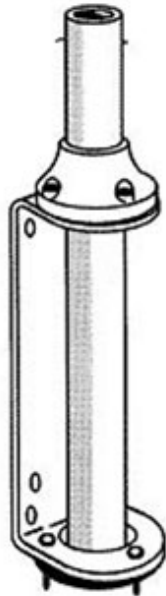
Trap

TA-33 Trapped Beam



**Operates
on more
than 1
Band**

Multi-Band Device

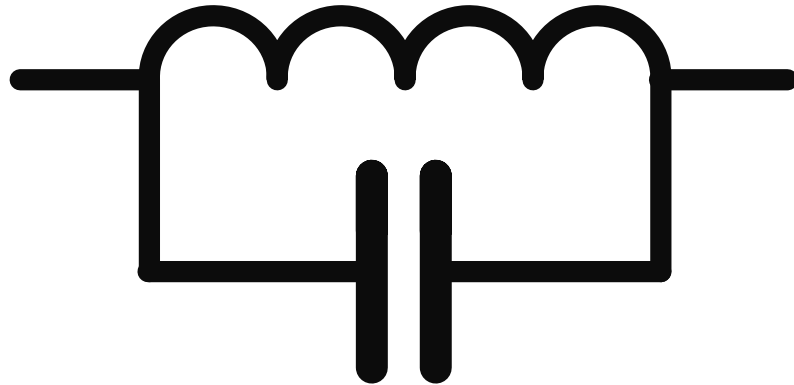


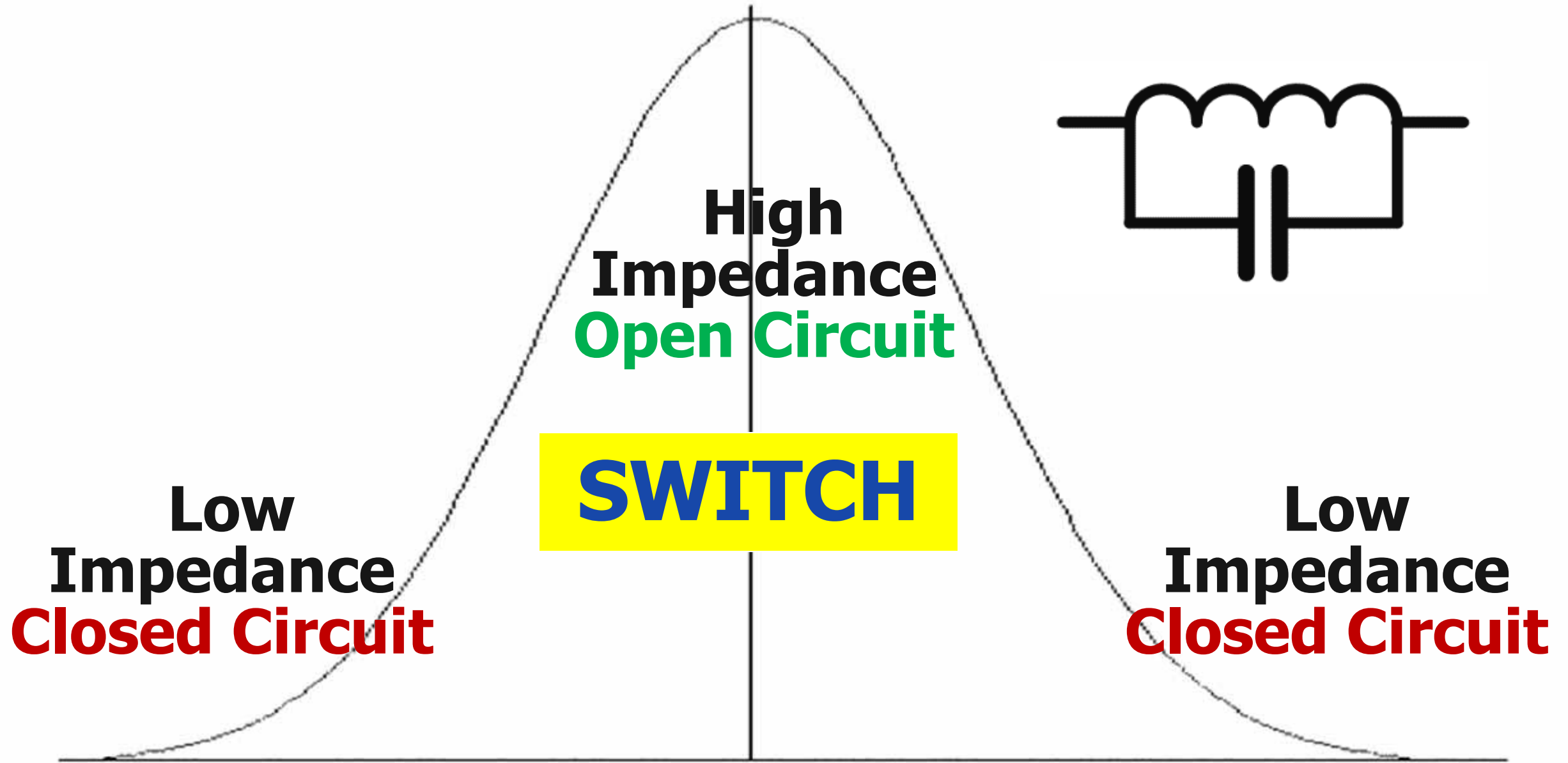
**5BTV
Hustler
Multi-
Band
Trapped
Vertical**

Electrically

ATraping Coil

Is just a Plain Coil
in Parallel with a Capacitor





Trap Resonant Frequency $f = 1/2\pi\sqrt{LC}$

OPEN

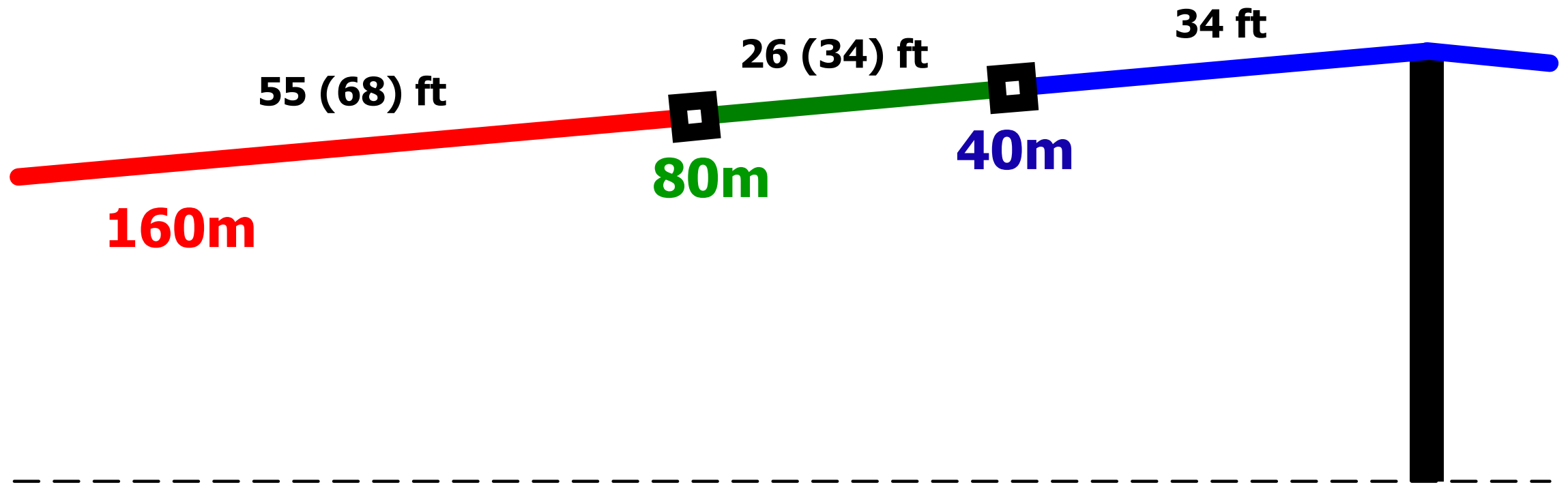
Only the inner dipole works



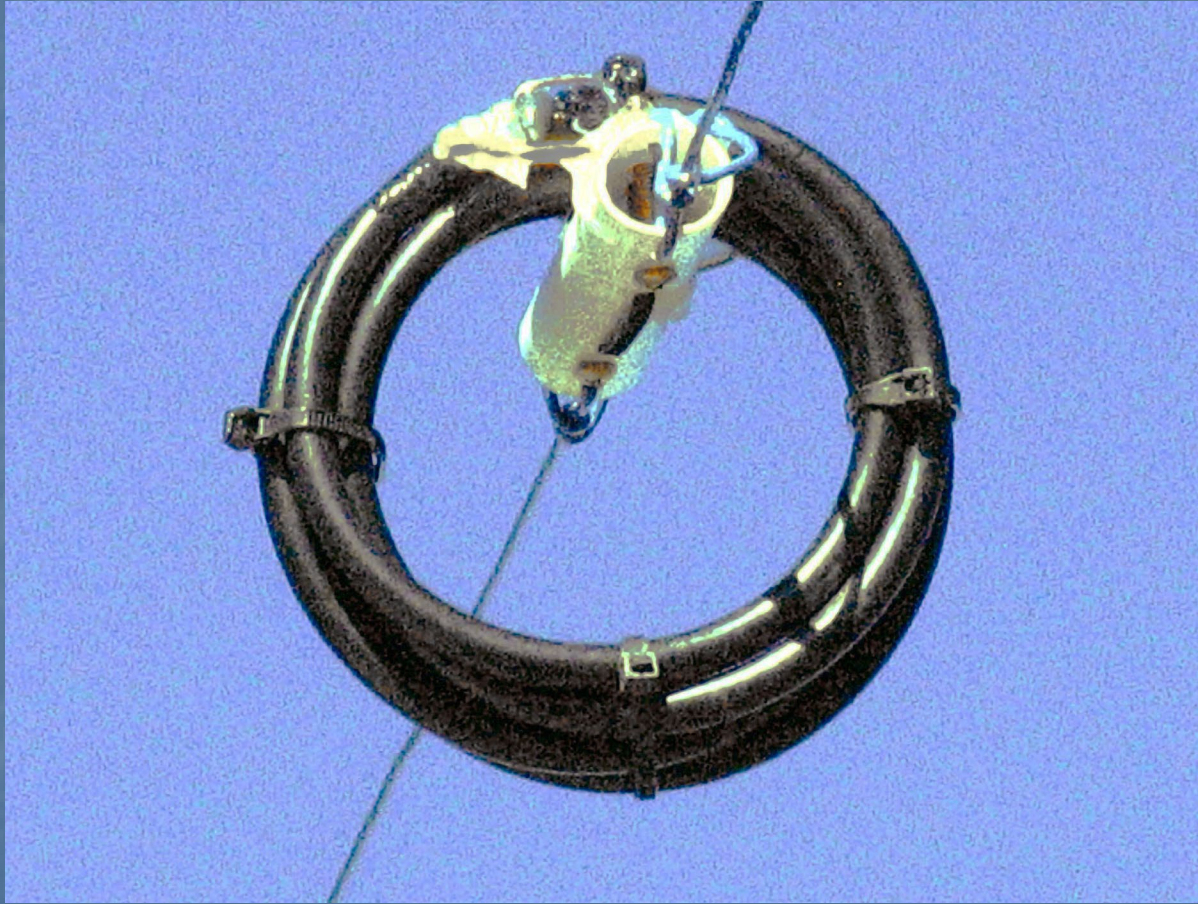
CLOSED

The whole dipole works

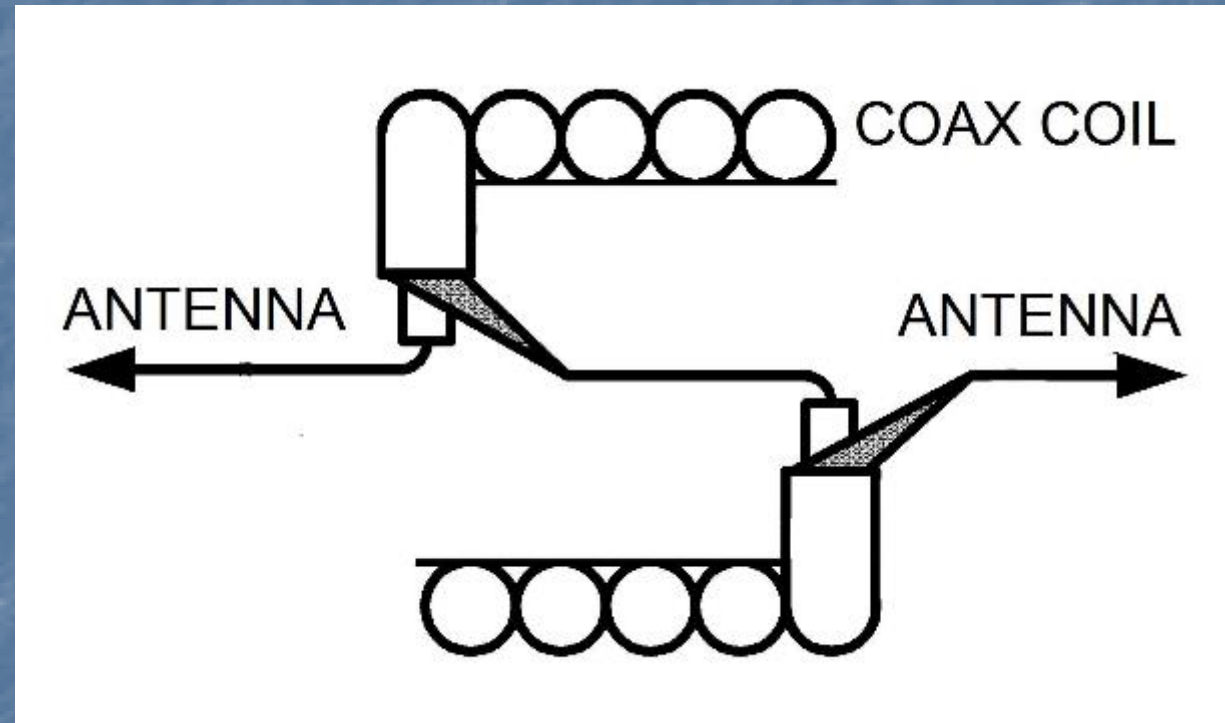
Tri-Band Inverted V



Traps Made of Coax



Parallel L & C From Coax



Outside of Coax is L
Inside of Coax is C In parallel

Scramble Wound Trap



Coaxial Trap Design

Design Parameters

Frequency: mHzForm Diameter: inchesCoax Diameter: inchesCapacitance: pF/footSelect coax
cable type

Units

- Metric
 British

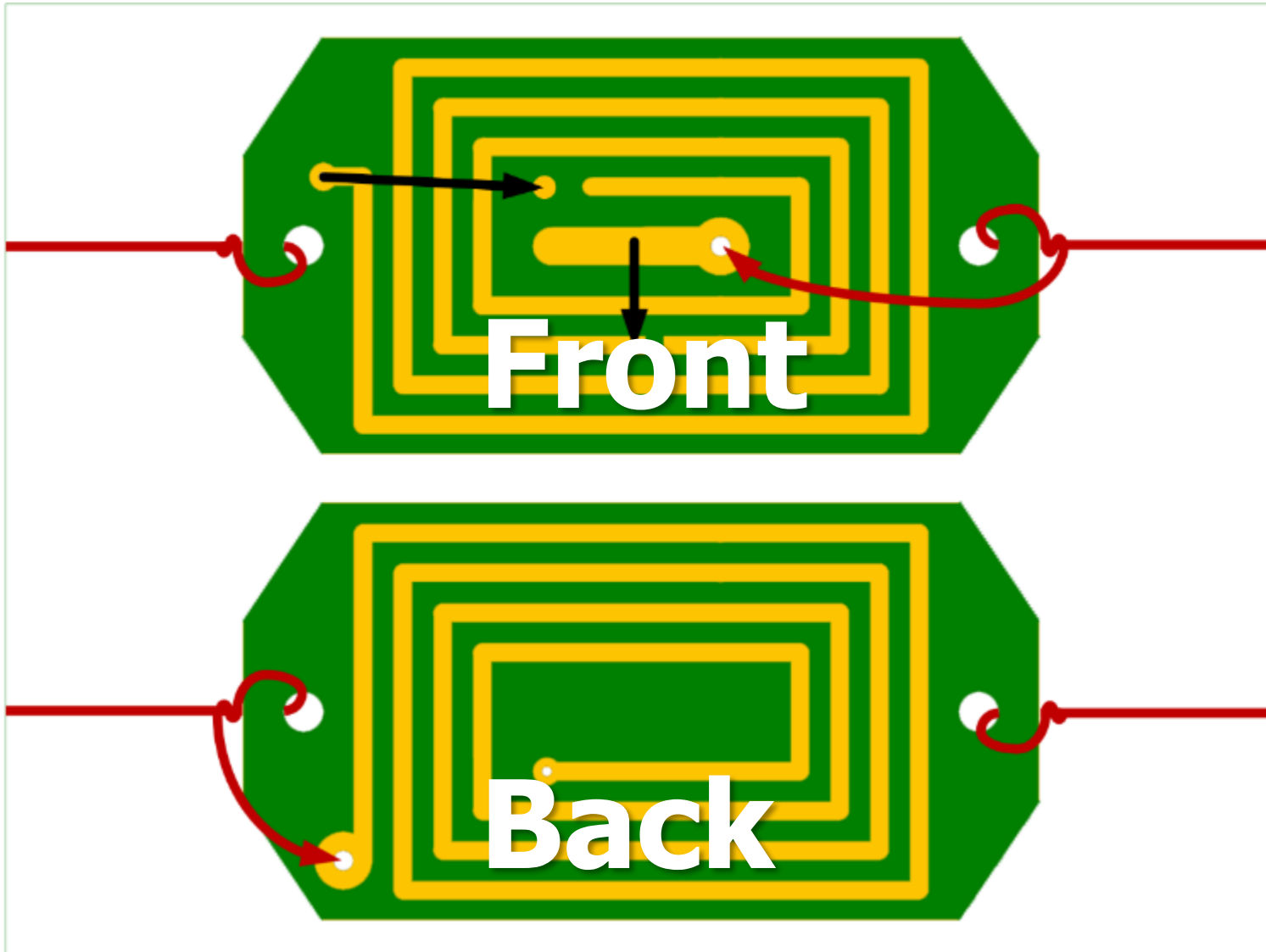
Calculated: Turns: L: uH
Coil Length: inches C: pF
Coax Length: inches X: ohms
End Sensitivity: kHz/inch
Turn Sensitivity: kHz/inch
Length/Diameter:

Coaxtrap.zip

Trapqsl.net/ve6yp/

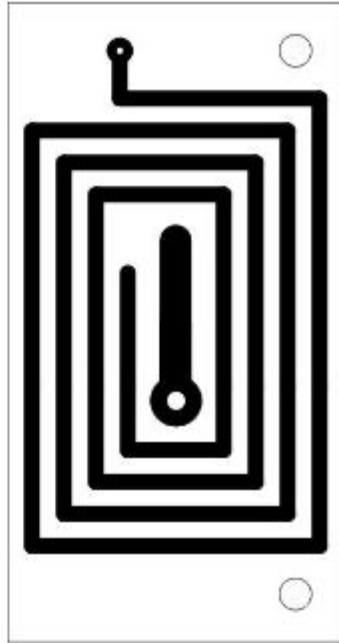
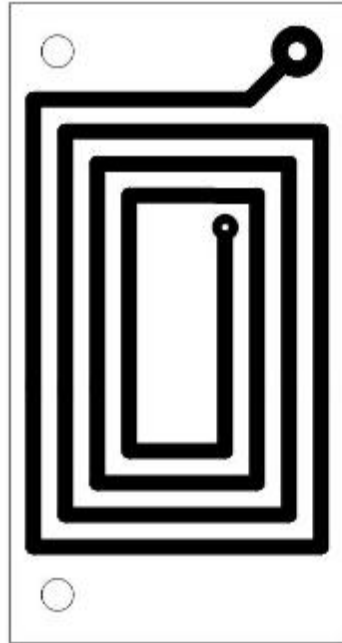
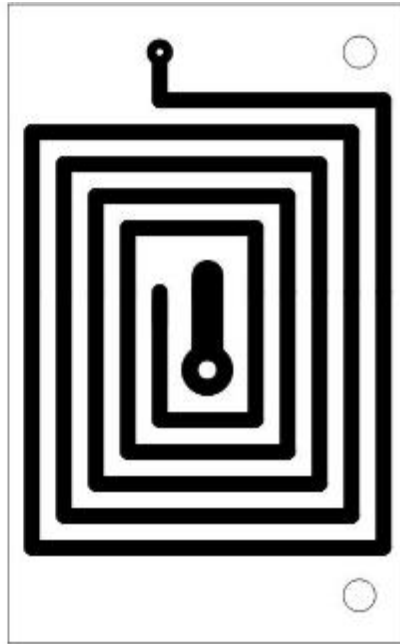
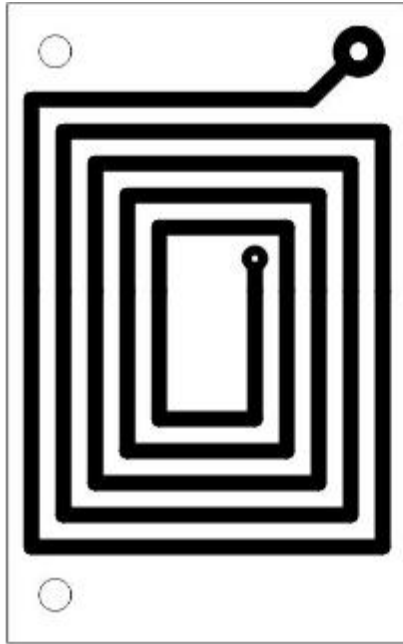
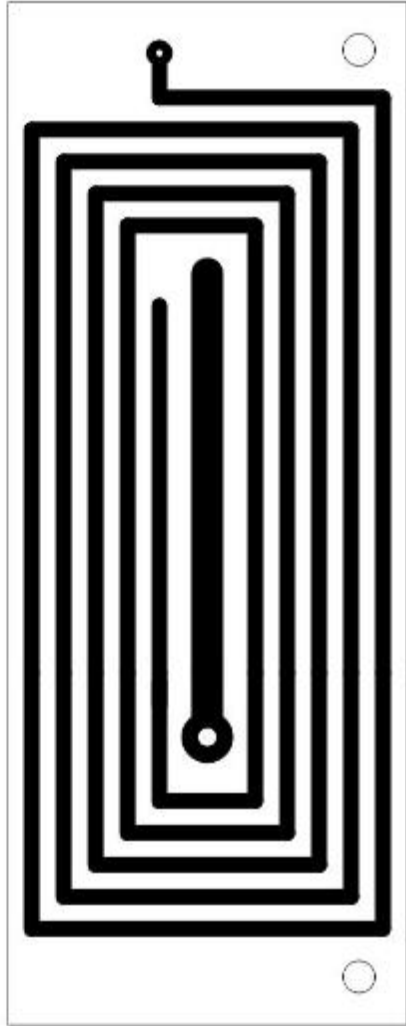
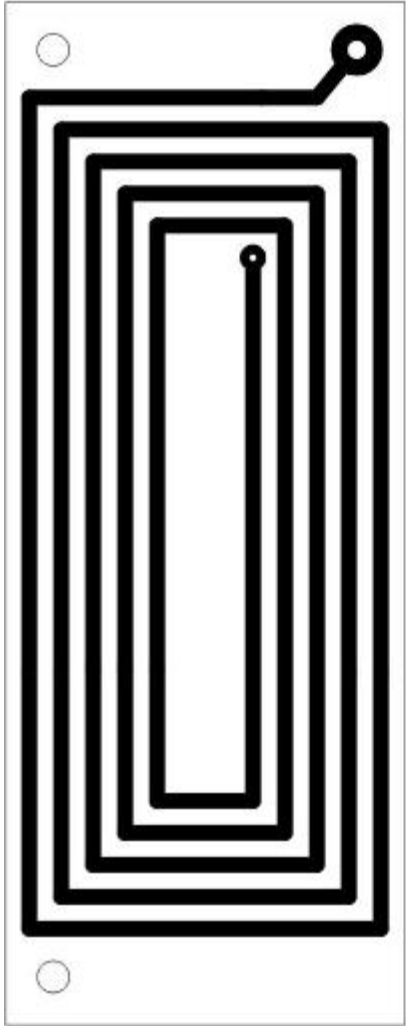


PCB TRAPS: L & C



**Inductance:
PCB Coil(s)**

**Capitance:
Back-to-Back
PCB Stripline**

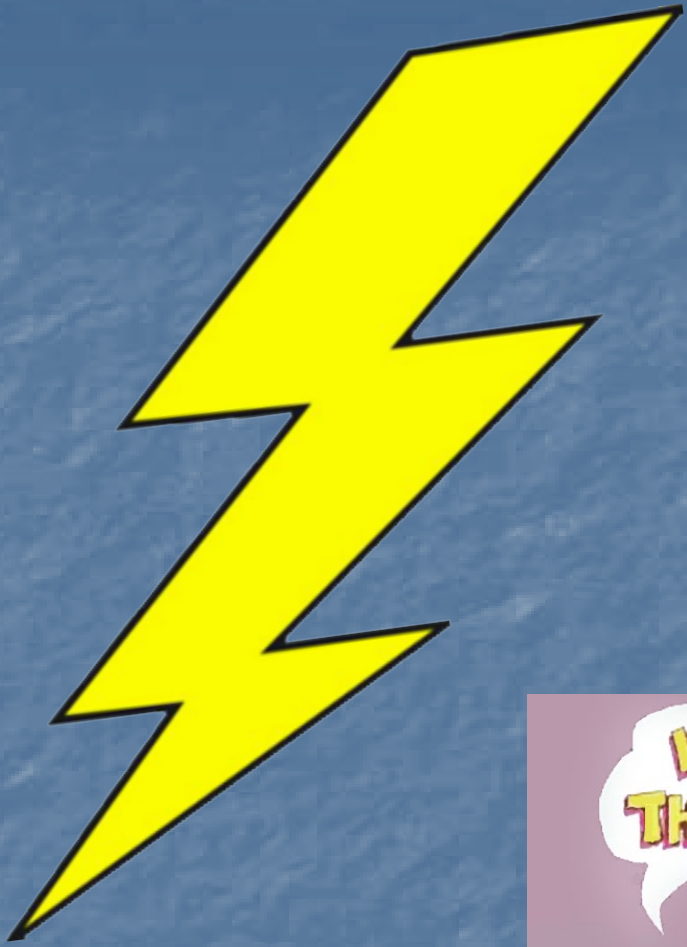


PCB etching patterns

**3 boards
cover all
HF bands
down to
40m**

**I thought that was
all all I needed to
know about traps**

But still a Mystery



**My 2m/70cm coil
has to be a trap**

It works 2 Bands

**But where's
the
capacitor?**



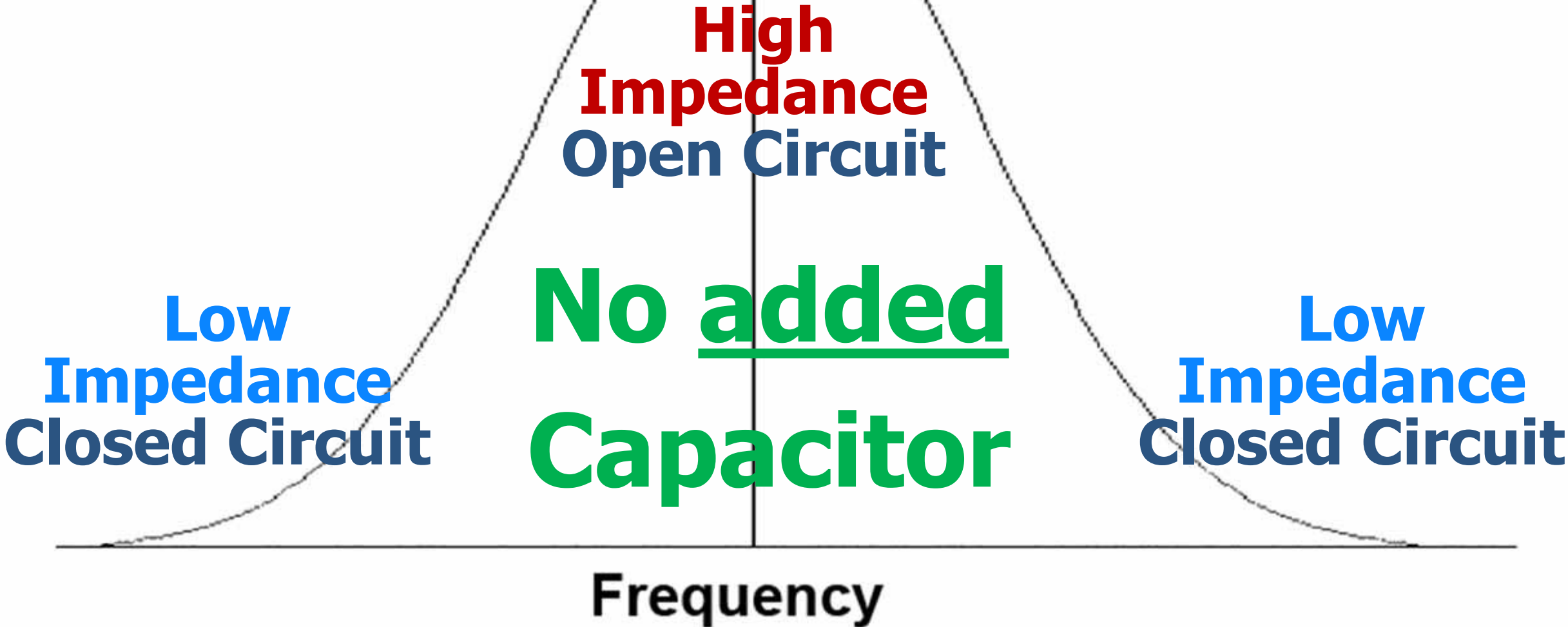
A diagram of a coil with four turns. The turns are represented by overlapping circles. The top and bottom turns are connected to terminals, indicated by two vertical lines. The text 'Coil Inductance' is written in red on the left side of the coil. The text 'Inter-turn Capacity' is written in orange on the right side of the coil. The text 'Plain coils are ALSO TRAPS at ONE particular frequency' is written in green and blue across the center of the coil.

**Coil
Inductance**

**Inter-turn
Capacity**

**Plain coils are ALSO TRAPS
at
"ONE" particular frequency**

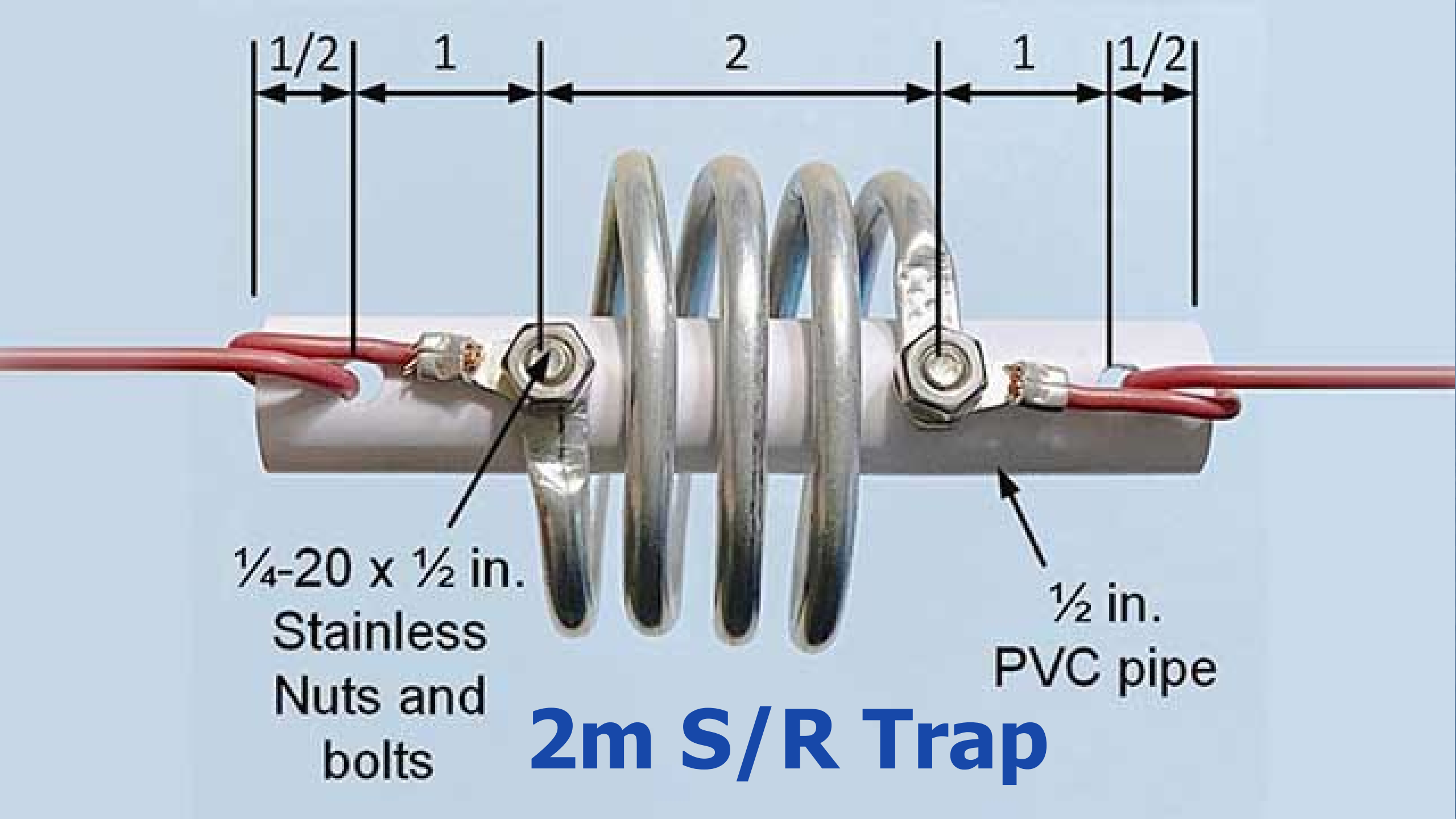
Self-Resonant Frequency



Designing a 2m-70cm-6m + S-R Trapped Dipole

Pick a Set of Coil Parameters Specifically for S-R

- A Diameter
- A Number of Turns
- A Turn Spacing -- Length
- **That Creates Self-Resonance**



1/4-20 x 1/2 in.
Stainless
Nuts and
bolts

1/2 in.
PVC pipe

2m S/R Trap

<https://www.teslascientific.com/products/coil-resonant-frequency-calculator/>

Enter the Coil Length, Coil Diameter, and Number Of Turns		
Coil Length	2	Inches ∨
Coil Diameter	2	Inches
Number Of Turns	4	
Conductor Length	25.133	Inches ∨
Resonant Frequency	140.127	Megacycles/sec ∨



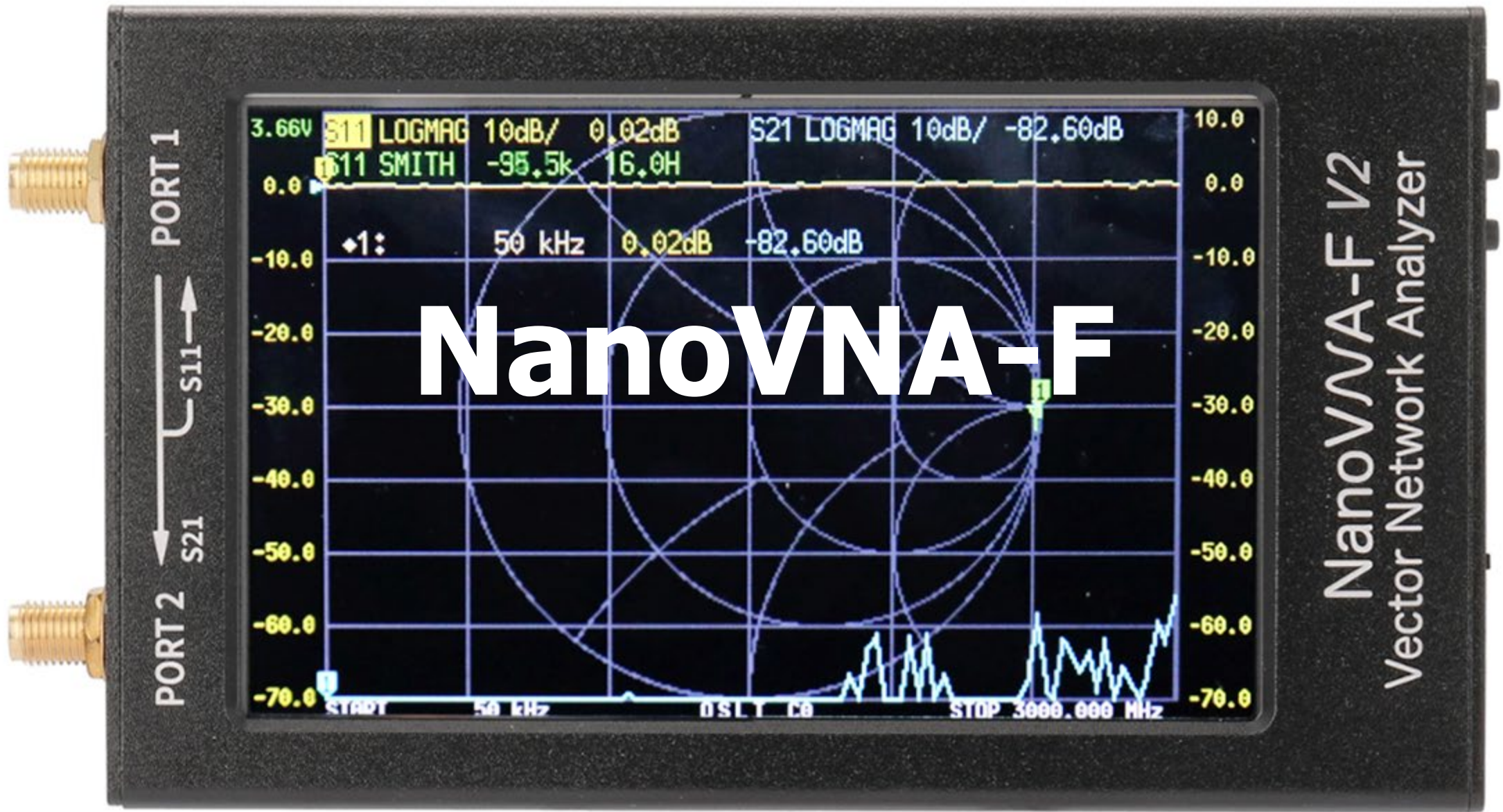
**“Dip”
Coil**

“Tweak” the trap





**Trap "dips"
At the
Self-Resonant
Frequency**



S21 Thru 2-port measurement



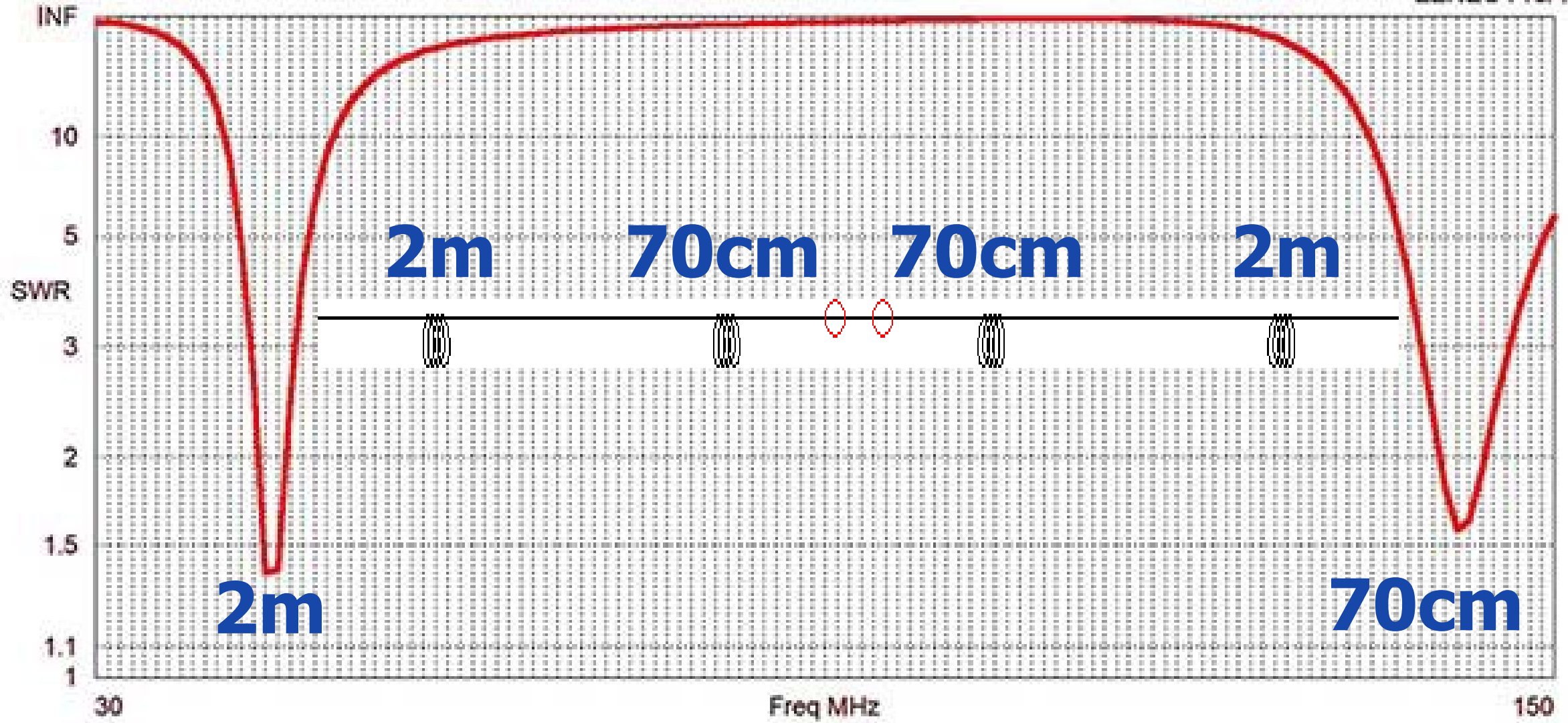
**70cm S-R
Trap**

With 1 Pair of (70cm) Traps



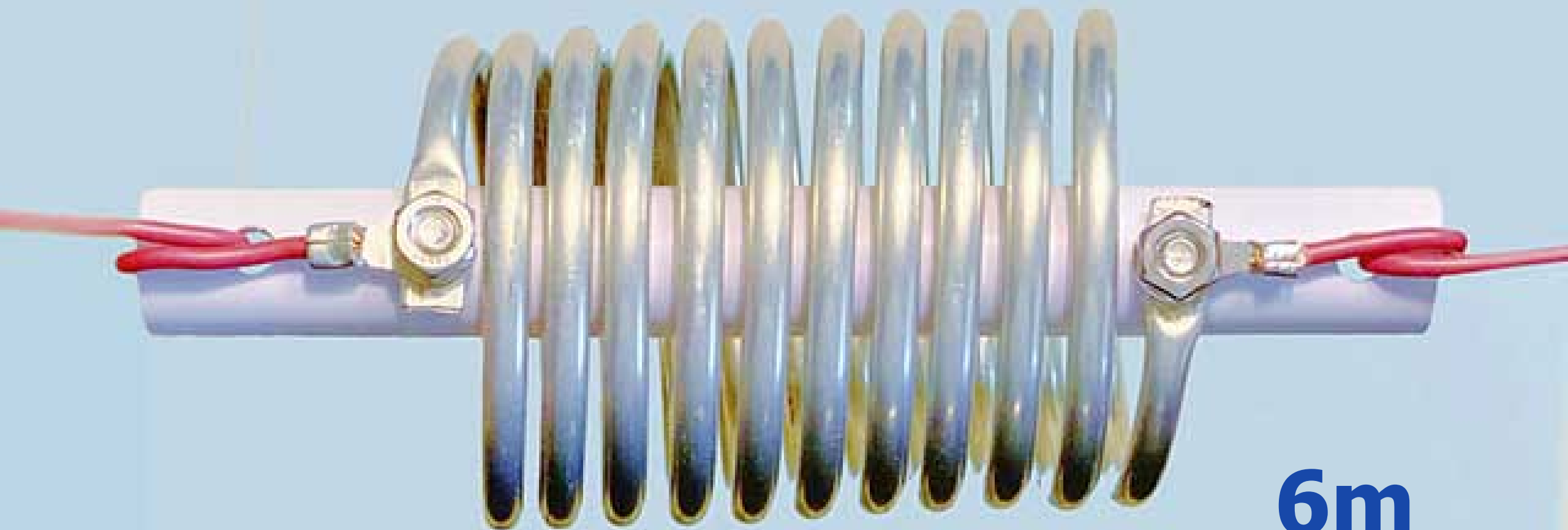
← 70cm →

← 2m →



Adding

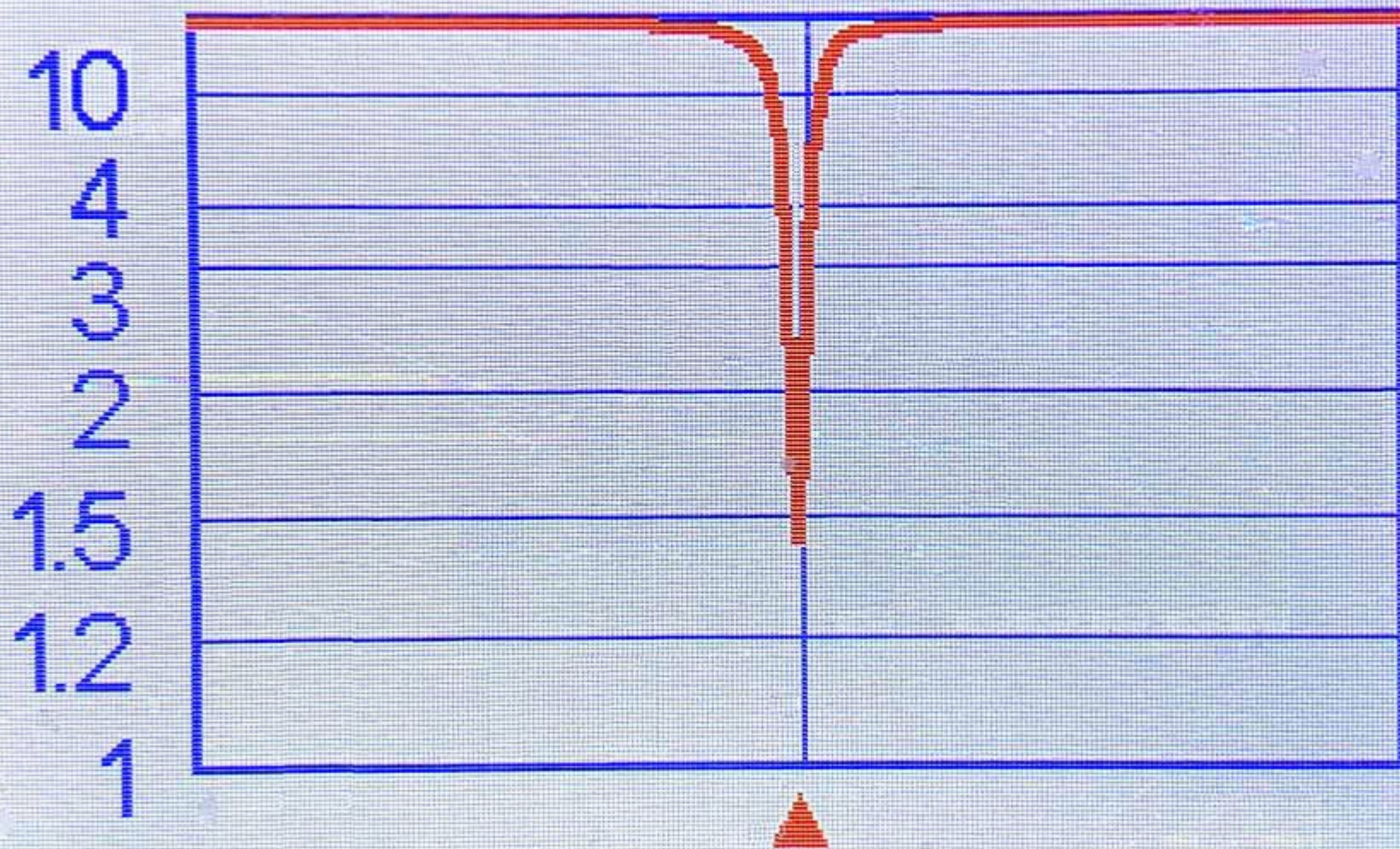
Other Bands



**6m
S-R Trap**

SWR

52 000 ± 25 000 kHz



70cm, 2m, 6m, X m

Disguised

Flagpole

A vertical antenna structure is shown on the left side of the image. It consists of a central metal pole with a spiral coil of metal wire wrapped around it. A lock is visible on the pole. The background is a plain, light-colored wall.

In Development

10m/6m/2m/70cm

Coaxially-fed

1/2 Wavelength

No-radial

Free-standing

**18 ft. Vertical
or Flagpole**

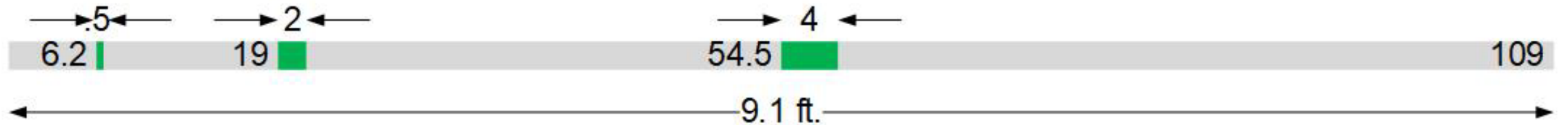
**2 in.
DX
Aluminum
Engineering**

**Max-Gain
1 3/4 in.
Systems
Fiberglass**

In Development

**1/2 of 18/20 ft. Vertical
or Disguised Flagpole**

Feedpoint



Lower Bands

At Lower Frequency

- S-R Traps may be too large or heavy

Band	Turns	Coil Length in.
70-cm	1	0.5
220 MHz	2	1
2-meters	4	2
6-meters	13	6.5
10-meters	30	15
15-meters	42	21
17-meters	50	25
20-meters	68	34

At Lower Frequency

- **Lower efficiency coils**
- **Smaller, closer-together windings**
- **Larger diameter coil**

40/80/160 Meter Coil-loaded Inverted V Dipole Antenna

KGØZZ

www.amateurradio.bz

40 M
35' 10" (10.922 m)

KGØZZ

80 M & 160 M
Adjust Lengths
For Desired Frequency

160 M Coils
1-1/4" PVC Pipe (43 mm O.D.)
123 Turns
18 Gauge (AWG) Magnet Wire

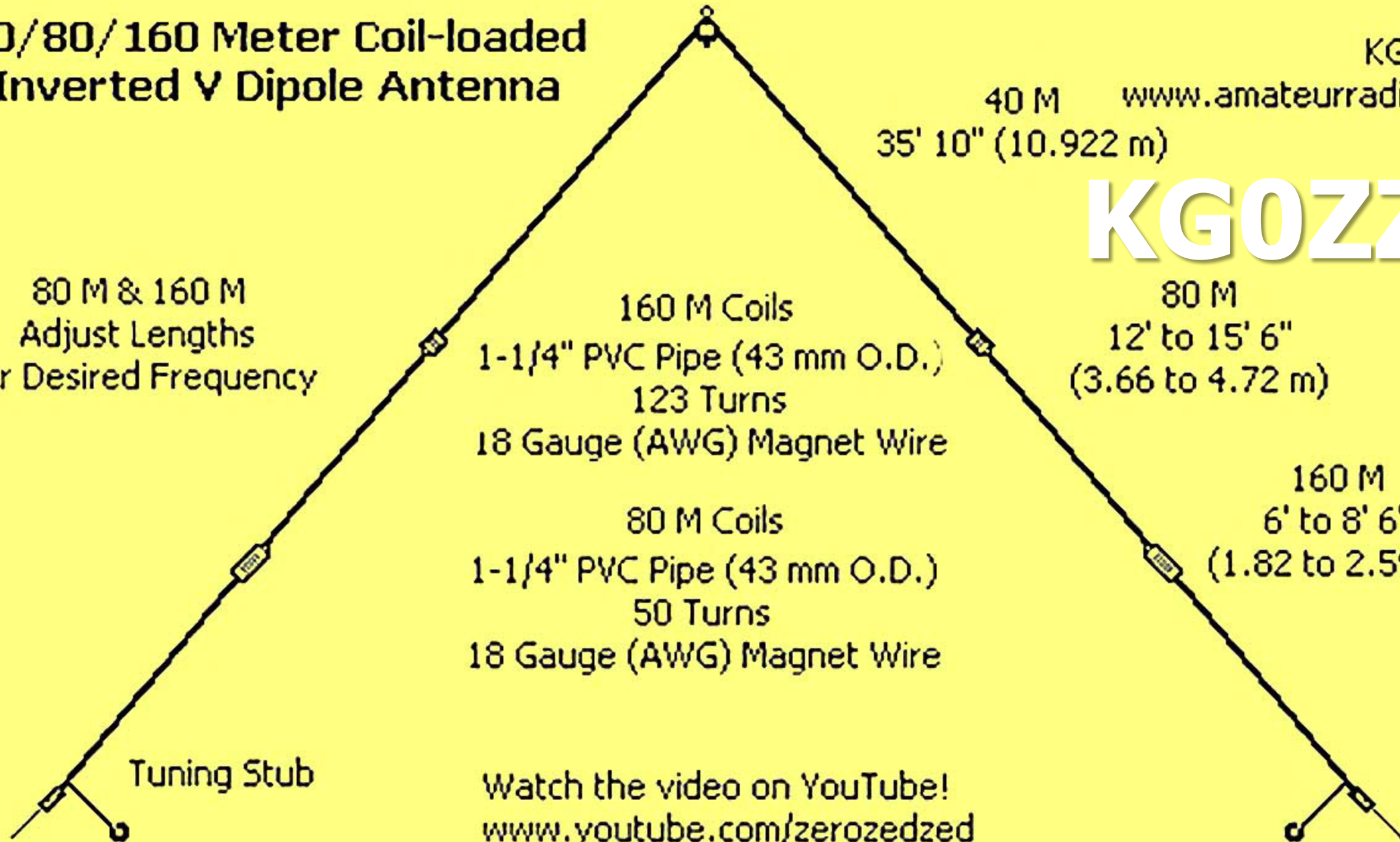
80 M
12' to 15' 6"
(3.66 to 4.72 m)

80 M Coils
1-1/4" PVC Pipe (43 mm O.D.)
50 Turns
18 Gauge (AWG) Magnet Wire

160 M
6' to 8' 6"
(1.82 to 2.59 m)

Tuning Stub

Watch the video on YouTube!
www.youtube.com/zerozedzed





KG0ZZ
www.amateurradio.bz

KG0ZZ

www.amateurradio.bz

160m

80m

40m

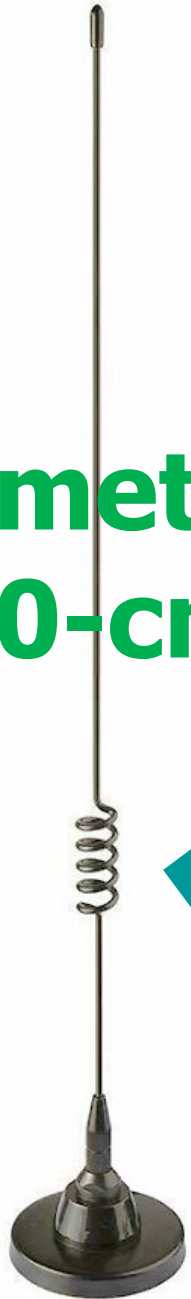


<https://www.teslascientific.com/products/coil-resonant-frequency-calculator/>



So What is it?

2-meter
70-cm



**Loading
Coil
or a Trap**



DØGGY



w6nbc.com

**w6nbc.com
/slides**



**w6nbcmail
@gmail.com**

"That's all Folks!"