

# Prototype Small Transmitting Loop

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# Introduction

- Inspired by WA4MNT presentation
- Could I make a “mag loop”
- Could I measure it
- Could I make contacts with it

# Project Phase 0

- Internet review
- Run numbers in loop calculators
- What's in the garage?
  - A box of 3/8 soft copper tube
  - A length of 1/4 soft copper tube
  - Misc PVC pipe and fittings
  - Parts, purchased a year earlier, for capacitor

# Project Phase 1

- Build PVC pipe frame
- Install main loop (56 inch dia)
- Fabricate and mount feed loop (11.2 in dia)
- Explore loop resonance using fixed value capacitors

# Indoor Testing



# Project Phase 2

- Decide to optimize for 30m band
- Build and install variable capacitor prototype
- Build stronger support base

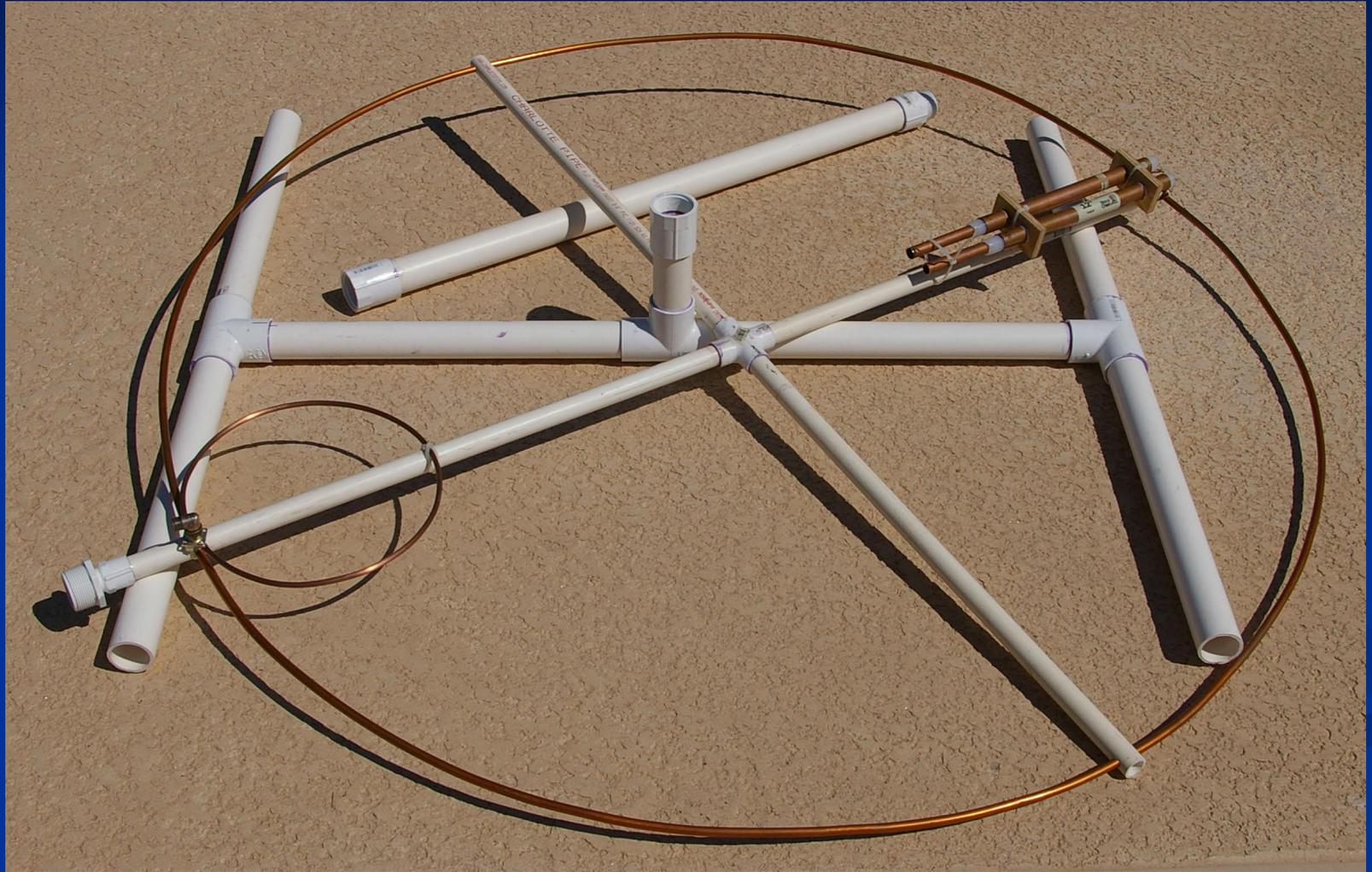
# Variable Capacitor



# Project Phase 3

- Move outside
- Evaluate TX performance
- Attempt QSO

# Initial Test Configuration



# Initial Test Configuration



# Problems with Initial Test Configuration

- Resonant frequency temperature dependent
- Very sensitive to moisture.
  - Took half a day to dry out after rain
- Frequent capacitor adjustment required
- SWR “runaway” at 100W
- Only usable on 30m band

# Project Phase 4

- Discard plywood capacitor supports
  - Wet plywood isn't a good high voltage insulator
- Fabricate new plastic capacitor supports
  - Plastic from kitchen chopping board.

# Results with Revised Capacitor

- Resonant frequency temperature dependent
- Insensitive to moisture
- Frequent capacitor adjustment required
- SWR stable with up to 100W continuous
- Only usable on 30m band

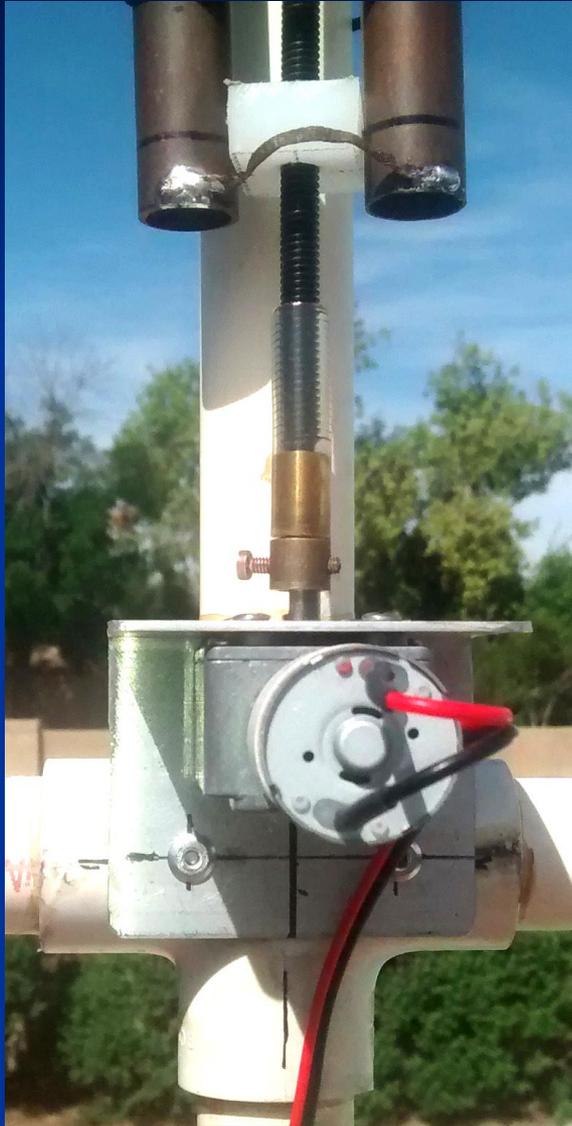
# Project Phase 5

- Add capacitor motor drive
- Change from feed loop to gamma match

# Capacitor Motor Drive

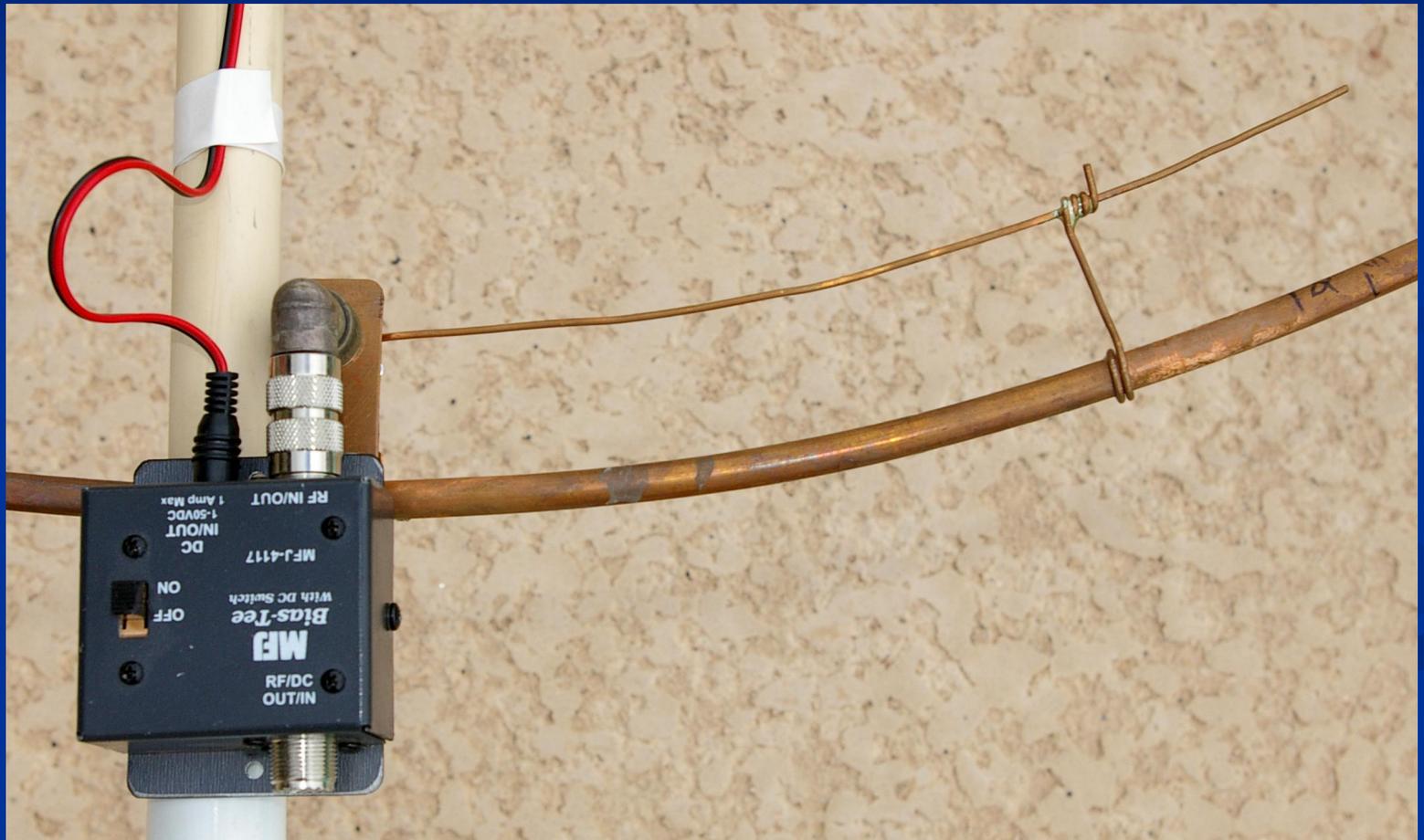
- 9 rpm 12 volt DC motor
- 1/4 inch nylon jack screw
- Custom drive nut (more chopping board)
- Power via coax with pair of Bias T
- Ground isolated 12 variable PSU
- Center off, 2 pole 2 way, momentary switch

# Capacitor Motor Drive



# Gamma Match

- Gives good match on 30m and 20m



# Gamma Match

- Still in development



# Does it Work?

- First QSO 8/26/2015
- Last QSO 4/20/2016
  - Stopped use after storm damage
- 30m:
  - 201 QSO
  - States worked/confirmed 48/47
  - DX worked/confirmed 17/15
- 20m:
  - 13 QSO
  - States worked/confirmed 11/9
  - DX worked/confirmed 2/2

# What's left to do?

- Complete repairs of storm damage
- Optimize gamma match for 20m and 30m
- Replace thin braid links
- Explore use on higher bands
- Weather protection
- Quick band change

Questions?

# Some Answers

- Left cap 113 pF max, 35 pF min
- Right cap 102 pF max, 40 pF min
- Series combination 66 pF max, 30 pF min
- Time to tune 14.076 to 10.138 – 11 minutes
- With gamma match - SWR better than 1.15:1
- DX worked on 30m:  
CO, DU, EA8, JA, K, KH6, KL7, KP4, OE,  
TG, VE, VK, XE, YB, YV, ZF, ZS.