

## Mad Dog Coils MDC Mutt – User Guide

The MDC Mutt is a 56:1 transformer (UNUN) designed to be used as a key matching circuit component of a portable end fed half wave (EFHW) antenna. The ferrite core along with 1.25 mm diameter enamel copper windings wound in auto-transformer configuration and the 100pf compensation capacitor can handle 100 watts digital modes. The feed point is via a BNC socket and has stainless steel connection points for an antenna wire and optional counterpoise wire. These components are mounted on a 3D printed winding plate.

### Wire add-on options:

Classic Wire multiband - Resonance on the 40, 20, 15 & 10 meter bands. There is approximately 20 metres of BNTechGo silicon 20 gauge wire with 6 windings (1.5 uH inductor) at the 2 metre point which lowers the resonance slightly for the lower bands but significantly for the for the 10 metre band (Approx 1 MHz). This compensation coil is helpful for radios without an antenna tuner for operating on the lower part of the 10 meter band.

80 Wire Multiband - Resonance on the 80, 40, 20, 15 & 10 meter bands. There is approximately 22 metres of BNTechGo silicon 20 gauge wire with 95 windings (108.6 uH inductor) at the 20 metre point which tunes in a portion of the 80 metres band.

WARC Wire multiband - Resonant on the 30, 17 & 12 meter bands. Approx 13 metres of BNTechGo silicon 20 gauge wire with 26 windings at the 12 metre point providing 10.5uH of inductance to tune the 30 metre band.

NOTE: Silicon wire will not last forever. Over time the silicon jacket will crack and separate in places. Eventually the wire will need to be replaced.

### Installation/Setup

There are two recommended ways the antenna can be used for quick portable setup. In each case the coax feed-line is recommended to be at least 14 metres (50 ft) long with a common mode choke at the transceiver end of the coax. Coax less than 14 metres will have an effect on the antenna designed resonant frequencies. If the choke balun is close to the MDC Mutt then a counterpoise wire approximately 5-10% of the antenna length should be used. If a counterpoise is used it is connected to the MDC Mutt at the terminal marked C.

1. Sloper: the MDC Mutt should be as a minimum 1 meter (3.3 ft) off the ground and the antenna wire running up to a squid pole or tree branch (suggest minimum of 5 meters off the ground, preferably greater than 8 meters). The wire is connected to the MDC Mutt at the terminal marked A.
2. Inverted V: the MDC Mutt should be as a minimum 1 meter (3.3 ft) off the ground (and the wire running up to a squid pole or tree branch at the centre point of the antenna (ideal height around 6 meters) and then down to around the same height as the MDC Mutt at the far end of the wire. The wire is connected to the MDC Mutt at the terminal marked A.

### Notes:

- There are other configurations that will also work which are the inverted L, inverted U (half square), vertical and straight horizontal. Do not use angles in the wire that are less than 90 degrees.
- All EFHW antennas become more efficient when farther from the ground or adjacent metal objects.
- All antennas behave differently at different locations and in different configurations.
- The MDC Mutt is designed for portable use and is not to be left out in the elements full time.
- The 20 gauge wire is light weight so it is recommended that when the antenna is setup to have a small amount of slack in the wire to reduce stretching or even breaking.

### Tuning

For the Classic, tuning is performed by shortening or lengthening the fold back section of wire at the far end of the antenna. Increase the fold back amount (Shorten antenna) to raise the resonant point or reduce fold back amount (lengthen antenna) to lower the resonant frequency. The different setup options will affect the resonant points for each band so it is recommended to tune for what will be your regular setup configuration. The Classic wire comes tuned for the lower portions of the 40, 20, 15 and 10 metres bands. The WARC wire has excellent tuning on the 30, 17 and 12 metres bands and should not require any adjustment. The 80 wire can be used without a tuner on 40, 20, 15 and 20 meter bands and a small portion of the 80 meter band around 3.6 MHz but due to the inductor the bandwidth for 80 is very narrow. A tuner/matching unit will need to be used for 80 meter full band usage.

### Wire Winding

The Mutt winding plate is designed so that the wire can be wound in figure 8 pattern. The figure 8 winding helps so that the wire does not to develop kinks.

### Test results

Tests were carried out with a 17m (55.77 ft) length of RG58 coax with the common mode choke 60 cm (23.6 inches) from the transceiver. For the sloper configuration the MDC Mutt was at 1.5 meters (5 ft) off the ground and the wire at the far end was 8.5 meters (28 ft) above ground. The inverted V configuration has the ends 1 meter (3.3 ft) above the ground and the centre at 6 meters (19.7 ft) above ground.

### SWR results for MDC Mutt with Classic wire

Freq MHz	Sloper	Inverted V
7.100	1.4	1.5
14.200	1.3	1.1
21.200	1.4	1.1
28.100	1.2	1.7
28.400	1.7	1.7

### SWR results for MDC Mutt with 80 wire

Freq MHz	Sloper
3.600	1.6
7.100	1.7
14.100	1.4
21.200	1.2
28.500	1.6

### SWR results for MDC Mutt with WARC wire

Freq MHz	Sloper
10.100	1.3
18.100	1.4
24.900	1.3

## Specifications

### MDC Mutt:

Power Rating: SSB:150 W, CW: 125 W, AM/FM/Digital: 100 W

Weight: 230 grams

Hardware: Bolts and wing nuts are stainless steel.

Ferrite: Type 43 from Mouser electronics part 2643251002

Windings: Enamel copper 1.25mm diameter auto-transformer, total 15 turns, tap point at turn 2 (56:1)

Capacitor: TDK 100pF ceramic disc (blue cap) 3Kv

Feed point: BNC socket

### Classic Wire :

Weight: 160 grams      Wire: BNTechGo silicon 20 gauge

Length:

- Full length of wire used : 20.48 meters (806.3 inches)
- Start of wire to the compensation coil : 2.1 meters (82.68 inches)
- Compensate coil 6 turns on a 31mm pvc pipe (1.5 uH), total wire length 63 cm (24.8 inches)
- From coil to end of antenna 17.3 meters (681.1 inches)
- Fold back wire 45 cm (17.72 inches)

### 80 Wire :

Weight: 160 grams      Wire: BNTechGo silicon 20 gauge

Length:

- Full length of wire used : 54.42 meters (2142 .52 inches)
- Start of wire to the 80 meter inductor coil : 19.96 meters (785.83 inches)
- Loading coil 95 turns on 47mm OD pvc pipe (108.6 uH), total wire length 16.99 meters (668.9 inches)
- From coil to end of antenna 2.05 meters (80.73 inches)
- Fold back wire 12 cm (4.72 inches)

### WARC Wire:

Weight: 140 grams      Wire: BNTechGo silicon 20 gauge

Length:

- Full length of wire used : 15.3 meters (602.36 inches)
- Start of wire to coil : 11.85 meters (466.54 inches)
- Loading coil 26 turns on a 31mm pvc pipe (10.5 uH), total wire length 2.74 meters (107.87 inches)
- From coil to end of antenna 70 cm (27.56 inches)
- Fold back wire 6 cm (2.36 inches)

### Warning

The end of the antenna and antenna terminal has a high RF voltage when transmitting. When fed with 100W, the RF voltage will be around 500V. Do not touch the antenna terminal or ends of the antenna while transmitting.

### Warranty

Products manufactured and sold by Mad Dog Coils are warranted for 1 year from the date of purchase. Customer pays for shipping of replacement product. Mad Dog Coils shall not be liable for any incidental or consequential damages which may result from a defect. This warranty does not extend to any products which have been subject to the misuse, neglect, accident or improper installation. It should be noted that the Mad Dog Coils products should only be used in accordance to our specifications and within our stipulated intended use. All details of intended use are detailed in this document that is shipped with the product. We accept no liabilities for such uses outside of our intended use and stipulations.

I hope you get many years of use and enjoyment out of your Mad Dog Coils product.

Marty VK4KC, the Mad Dog.