FBK portable mini tuner

tunes symmetric/coax/longwire antenna's between 1.8-50MHz

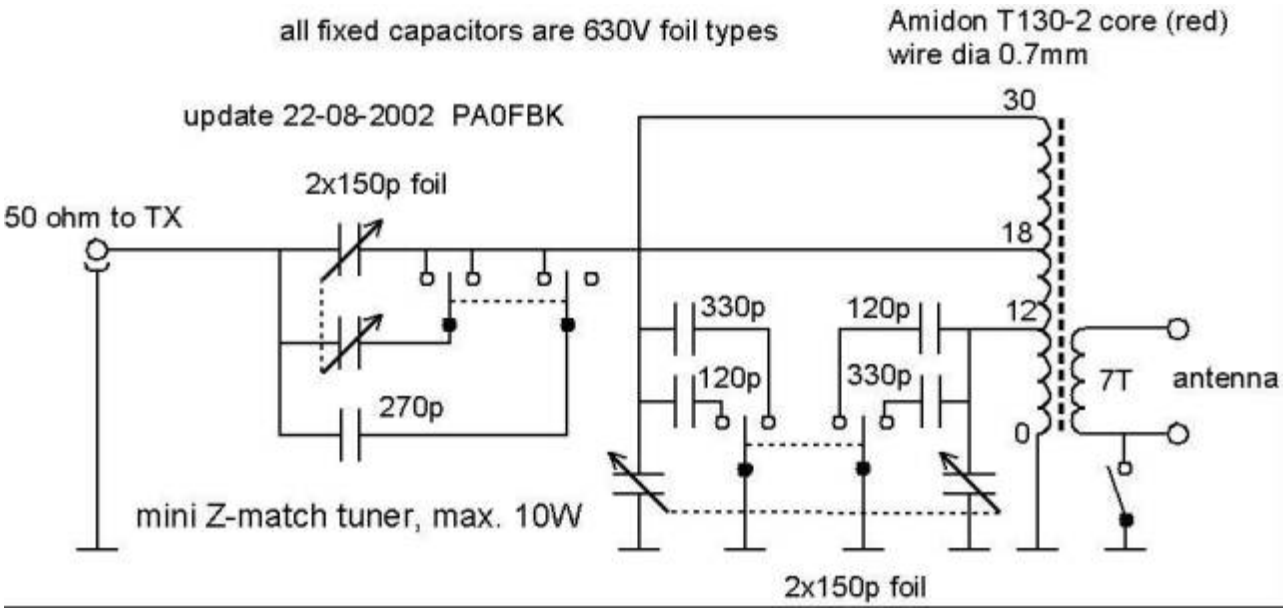
When possible it is always preferred to use a full sized antenna, especially when using low powered portable transceivers as for instance the FT817. Most simple solution is to use a halve wave dipole and using a 50 ohm coax line to the set. Direct coupling of the dipole to the coax line works ok, of course you can use a 1:1 balun for optimal balancing and to prevend radiating of the coax feeder, but how important is this for 5W output power? Difficult for this system is that for every band you need another dipole and the swr depends on the antenna hight and surroundings, so you are always busy to change the dipole lenght.

Therefore I looked for another simple portable system and found following combination:

A dipole of 2x16m (splitted) loudspeaker wire of 0.35mm square (is about 0.65mm dia) and a 10m symmetric feeder line of the same (not splitted) loudspeaker wire, this antenna is tuned by a mini tuner with the Z-match principle.

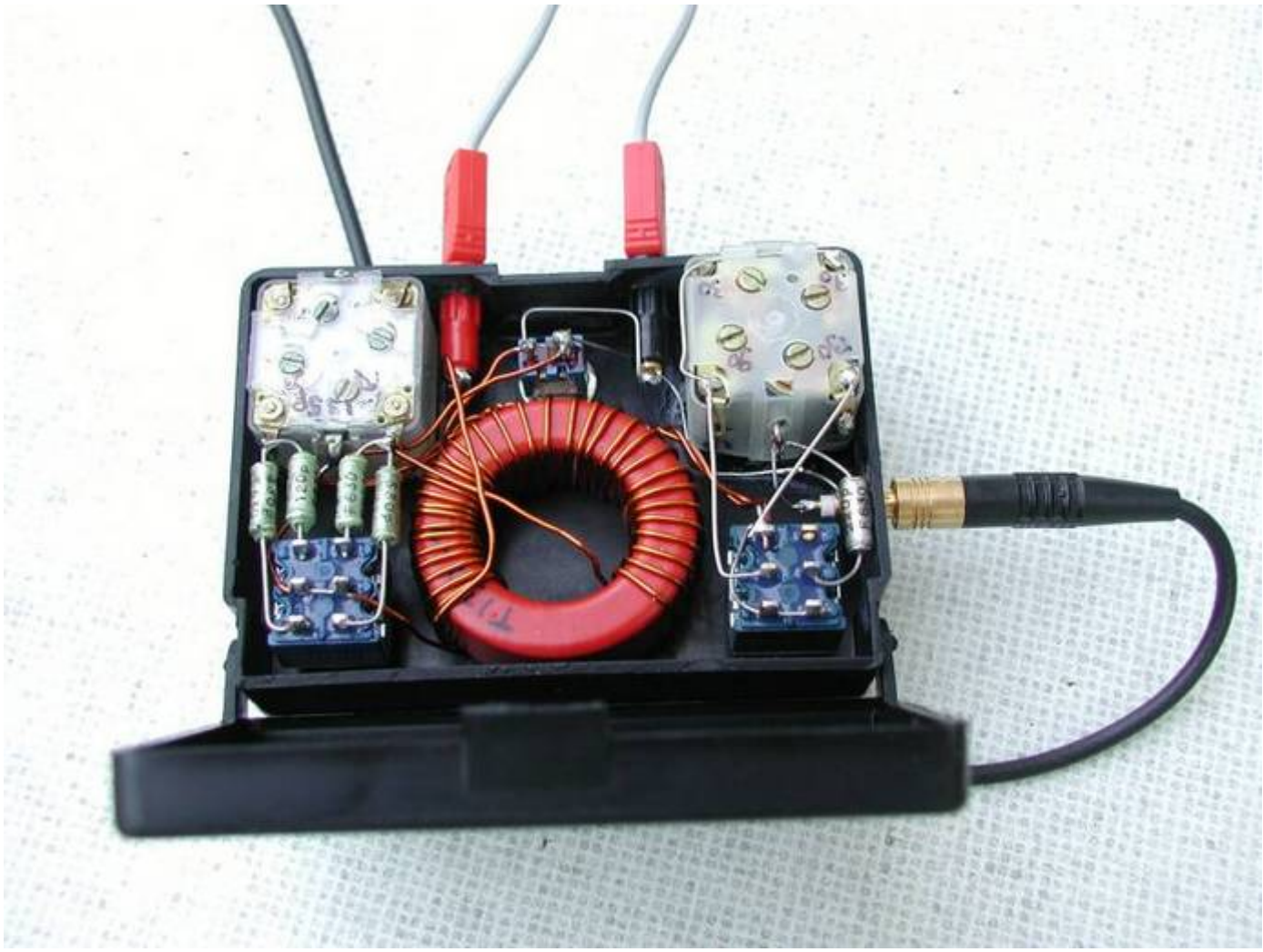
The (not splitted) loudspeaker feeder line behaves as a balanced line with about 120 ohm impedance, the loss is somewhat larger as 300 ohm line, but you will not notice this when using max. 10m of this line. This antenna system is tunable from 6m to 180m (minimum and maximum frequency depend strongly on the used tuning capacitors!), I use it portable with a 5m fibre-glass telescopic fishing-rod in the middle and 10m thin kite-line at each dipole end to ground. The result is an inverted V antenna, the centre at 5m and the ends at about 1.5m above the ground. For transport the complete antenna with feeder line is wound on a small kite-line reel (15cm dia). The telescope fishing-rod is about 1m long, so it is possible to transport the complete HF station by bicycle, hi.

Here the diagram of my tuner



the Z-match principle has the big advantage that switching of the inductor is not necessary between the different bands,

this saves place in the tuner. The primary winding has 30 turns with taps at 12 turns and 18 turns. For tuning lower than the 80m band, extra capacitors can be switched in parallel to the tuning capacitors. Notice that both switches must have 3 positions, the middle postion is a "not connected" position. Also coax fed antenna's or long wire can be tuned by switching one end of the output winding (7 turns) to ground. More info about z-match tuners you can find



Inside the tuner, the 33mm Amidon core is the largest part. Notice the 630V fixed foil capacitors (four left, one right). Probably you can also use ceramic capacitors, mostly they have lower voltage rating, so try itout. The two antenna connectors are 2mm dia, the 50 ohm connector to the FT817 is an SMB type, coax is 3mm RG174. The 7 turns of the output winding must be wound at the ground part of the primary winding, as indicated in the diagram.

Of course you can use the tuner with other QRP transceivers than the FT817, I think that max. 10W should be possible, this depends on the used tuning capacitors (I used two very small foil capacitors from portable medium wave receivers, 2x150pF each). Also the impedance of the antenna on the used band is important, so it is possible that on one band you can use 20W and on another band only 10W. The Amidon powder core will give no problem, it is recommended for more as 100W. So when using larger tuning capacitors with more distance between the plates, you can also build a 100W version of this tuner (use larger wire diameter and be aware that the loss in the core increases with antenna impedance and frequency).

IC706/FT817 portable whip antenna

Another nice antenna is very suitable for owners of an IC706 or FT817, but of course it is also usable with other transceivers and receivers. With this antenna you can be QRV everywhere within a few minutes, for instance you are on business-trip in a hotel room or perhaps you are on holidays at a camping place. Still you can be QRV in a few minutes on all ham-bands from 80m to 6m and even on 2m.

What do you wish more?

On top you see the whip antenna, covered with black shrink-foil. Next under you see the telescope whip and below you see the counterpoise wire, wound on a plastic kite-line reel.

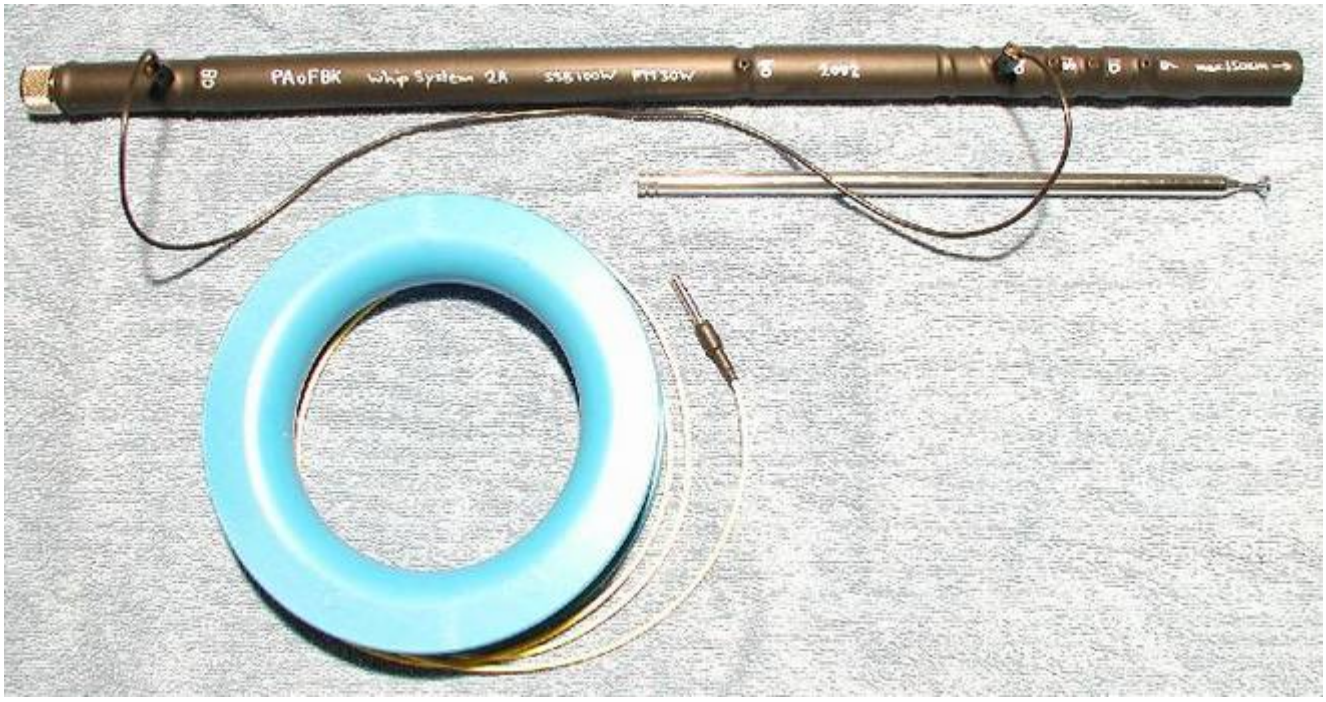
Nice drawing or not? It was a lot of work, but the result may be seen, is my opinion. The antenna is mounted directly at the back of the set, by means of a PL 90-degree corner connector.

Some more description about this antenna: I used a piece of a fibre glass fishing rod for the lower part of the antenna (length A=450mm). The black circles are 2mm female connectors. Using a wire of about 50cm with 2mm male connectors on each site you can shortcircuit the not used inductors starting from the 80m connector to tune to the other bands. The antenna will also work on the 30/17/12m bands by connecting to the next lower band and then shove in the telescope some more. For instance for 17m the shortcircuit wire is connected between the 80m and 20m connector. Because the telescope is shoved in some more now, the efficiency of the antenna will be worse, but it works!

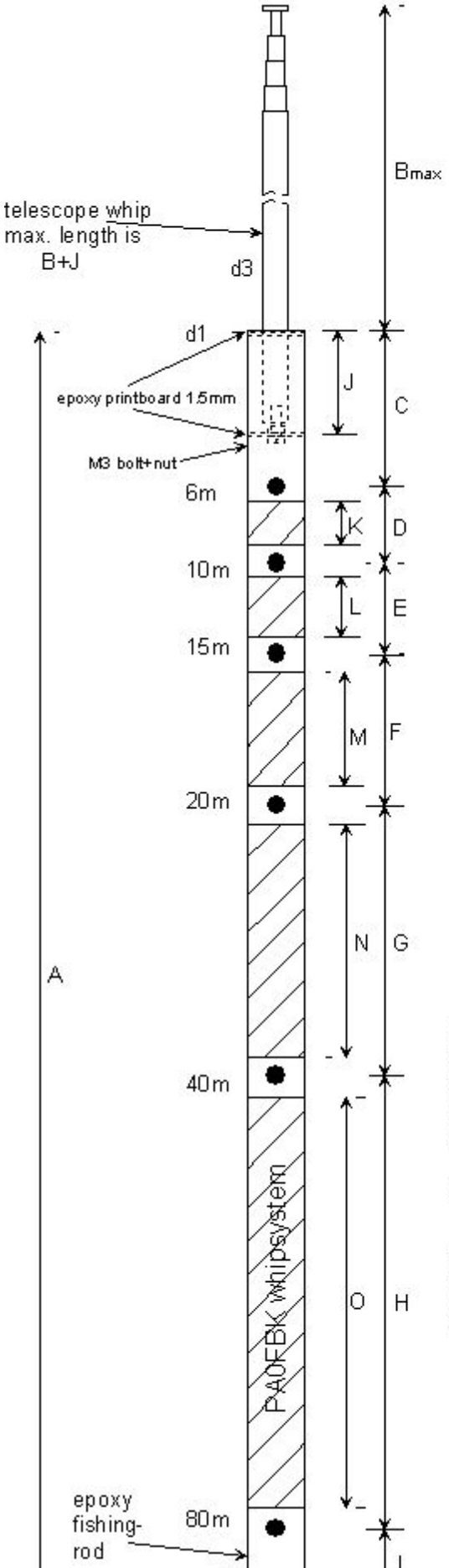
And if you don't have another antenna you can also tune this antenna to the 2m band as 5/8 wave antenna, use the 6m connector and tune to lowest swr.

Latest news: The antenna is also usable on 70cm, connect to the 6m connector and tune to lowest swr with the telescope length.

Finetuning to minimum swr is possible by shoving in and out of the telescope. The max. length of this telescope is about 1.50m, I bought it somewhere at a ham market. The number of turns is designed so that maximum length of the telescope is available at the lower part of each band, this will give the optimal efficiency. You will see that the length of the telescope is dependent on the surroundings, in house the length will be less to achieve the optimal swr. I used 0.75mm dia copper wire for the inductors, therefore the antenna is usable for 100W SSB power. The number of turns can be seen in the table above, there is no space between the turns.


PA0FBK
Whip System 2A
2002

PA0FBK portable whip system 6-10-15-20-40-80m last update 19-03-2002



A	450
B	1465
C	60
D	19
E	15
F	19
G	90
H	206
I	38
J	25
K	9
L	8
M	13
N	65
O	190
Kn	8
Ln	10
Mn	19
Nn	83
On	240
d1	16
d2	18
d3	8
d4	0.75
P1	100
P2	35

all dimensions in mm
d1 , d2, d3 is diameter
d4 is diameter of used copper wire
n is number of windings
P1 is max. power SSB, P2 is max. power FM

portable whip directly connected to set (IC706, FT817),

for optimal (transmit)radiation use counterpole wire,
layed out on ground
(ca. 0.8x 1/4 wavelength), example for 40m: 0.8x1/4x40=8m