

Help with the old TET and newer TET-Emtron Beams.

Whether you have bought an older TET beam, a second hand TET-Emtron beam, or just want to refurbish your own because it has either become faulty, or you want to give it a birthday because it has been up for years and never been touched. This will help to guide you with the checking procedures and a few dos and don'ts that I have helped people with over the years.

Also I will explain how they work, the tuning and adjustment that can be done.

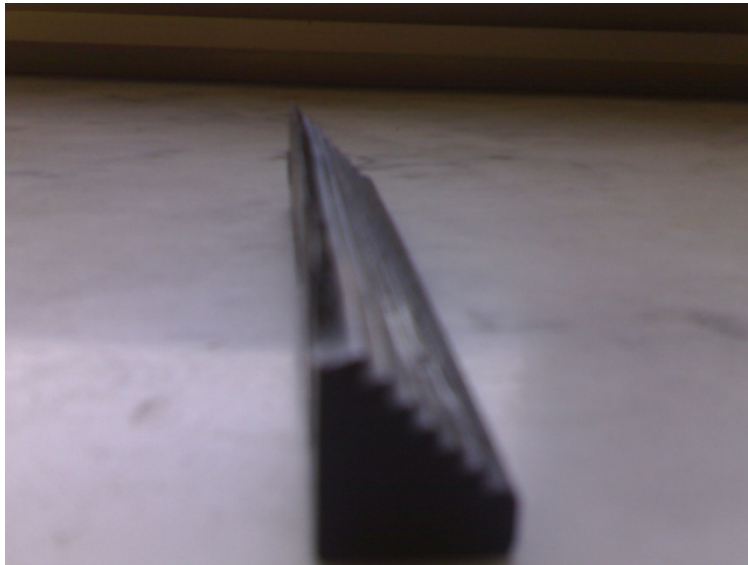
And a big thank you to the amateurs over the years who have sent me photos of parts and manuals. I could not have learnt all of this without them.

My aim is not to cover specific models, as I don't even know them all yet, but I will try to cover everything about the antennas that could go wrong. Hopefully what I write is clear, but if not, and what I write doesn't make sense, or could be written better, or is inaccurate, please inform me and I will make the necessary changes.

I will start at the mast clamp and work my way through the antennas.

Boom to Mast Clamp.

The first clamps were a serrated block that looked like this:-



They were wedged under the U-bolts against the boom. They were also used under every element. Very fiddly.

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The next were joined together to form a block:-



Not as fiddly, and also used under each element.

It was then changed to a one piece plate and v-block which is specially extruded for TET-Emtron:-



U-bolts were also upgraded to M8 stainless and it seems a very strong combination.

(Part number is:- TE-BMK)

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Booms.

At some stage some of the booms were 40mm. This is not all clear to me yet. Most of the booms were and still are 48mm. Some had end caps, but most did not.

Element mounts.

These have changed a fair bit over the years. Originally they were two bits of 12 x 12 aluminium box. These tended to allow flex in high winds which ended up cracking the plastic insulators. You will notice in the following photo that the U-bolts are rusty. All the hardware used and supplied today is stainless steel.



They could also break:-



This was then changed to a hollow rectangular box. It was 50mm x 25mm(or 2"x 1") wide. You can use this idea to upgrade the older antennas. The stainless U-bolts(part 095) I supply are made to fit this.



Main and Sub Elements.

On the earlier TET's the main elements were 22.2mm(7/8") . These were later changed to 25.4mm(1"). Their insulators were BR22 and BR25. I now use a fibreglass reinforced insulator which is stronger and replaces the BR25, and have a sleeve that can bring it down to 22.2mm.

The sub elements are now 22.2mm and used to be swaged down on the ends and drilled out to fit the traps. Trap pipe sizes were 15mm and 14.7mm.

The swaging is now gone and there is now a sleeve which allows for a 15.88mm(5/8th) trap tube.

Traps.

Now the important part.

The traps have always been much the same as they are now. The 35mm outer aluminium tube and the trap caps have basically always been the same size. The only difference is:-

1. The first caps were thin and sometimes cracked between manufacture and the customer receiving them. They had 'TET' written on the end of them.
2. Rudy then had them made thicker, with 'EMTRON' on the end, and that is how they were when I got them.
3. When this stock ran out, I went to my plastics manufacturer, and he recommended making them out of a different elasticised material which could expand and contract in the sun. These caps have 'TET-EMTRON' on them, and will fit all models of the antennas.

The wire is 1.8mm pure soft aluminium wire which you can wind a coil with and it does not spring out of shape. The stainless screws squash and hold the wire against the aluminium pipes so there is good energy transfer, minimal loss and little corrosion.

Each trap is individually tuned in the factory by sliding the internal pipes(at the same time) and changing the internal capacitance of the traps, changing both resonances(10 and 15 metres for example) at the same time. Then the wires are locked in place with screws to the pipes.

Troubleshooting and Repairing.

This article is for the tri-band traps. The quad-band traps require extra attention.

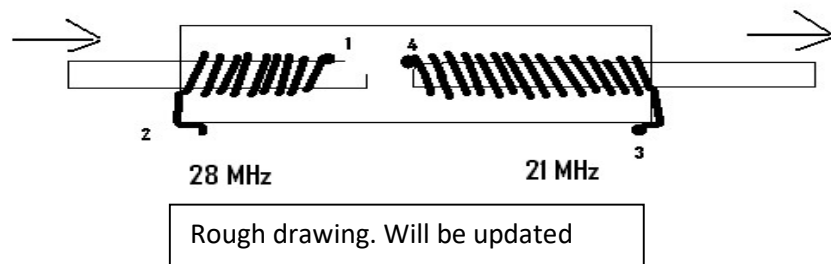
There are many problems that can happen to the antennas, lightning strikes, broken wires, corrosion, etc, but they are all fixable. I will try to explain these as simply as possible. The problem will 99% of the time be with the radiator. Look there first.

A few rules:-

1. If there is good continuity across a trap then there is nothing wrong with it. You don't need to fix anything, although if you want to pull it apart and clean it that is fine.
2. The reflector and directors have little to do with SWR. A reflector or director trap could fall off and there would be little SWR change.
3. You can only change the resonance of the traps by adjusting the internal tubes. This is for 10m and 15m only(general tribander). 20m is changed by adjusting the 12mm tip. I have heard lots of stories of (well meaning) mates who have convinced the antenna owner that elements need to be lengthened, shortened, re-drilled and cut with a hacksaw only to find that something else was the problem.

Bad SWR.

If the SWR goes bad, use a multi-meter and check for continuity across the trap. You can also check the internal element pipe to the trap cover and that will tell you which end of the trap the problem is. For example, if 10 metres is still good but 15 metres and 20 metres are poor, then the problem will be in the second half of the trap, probably screw 3 or 4. If all the bands are not working, then the problem will be in the first half, in either screw 1 or 2.



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So here is what you can do to pull the traps apart, check and clean them and re-furb them.

1. Slide the trap cap off the suspected end. They may be tight, but you can stretch them a bit with a flat screwdriver.
2. Undo the screw on the outer cover which holds the wire down. Is this wire broken, or does it have corrosion under it?
3. Pull on the pipe and the coil will come out.
4. Undo the internal screw and gently prise it up out of the way.

You will now either see a broken wire or corrosion under the wire.

If the wire is broken, I have seen some photos of rough fixes using copper crimps, but this will only bring on corrosion later on. I can send you the wire you need in an envelope for only a few dollars. If you wind the same amount of turns on the bobbin the resonance will be about the same.

If the problem is white corrosion, then gently clean it off using a green plastic scourer or fine sand paper, NOT STEEL WOOL, as it impregnates the aluminium.

Intermittent SWR.

If the SWR changes with wind movement, it could still be one of the above problems. Check whether the SWR jumps are on all three bands or just one or two.

Carbon Tracks.

This can happen when you get a small touch of lightning, or when moisture gets into a high voltage point during high power. The high voltage “tracks” across the plastic surface and burns it, leaving a black trail of carbon. At high power the voltage then finds it an easy path and it gets worse.

A telltale sign this is the problem is when at low power(or with an analyser) the SWR is OK, but as you turn the power up the SWR increases or jumps.

The most common places are either in the screw hole or under the trap cap where the exiting wire is close to the pipe. Some examples below.

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HB35c Director centre.



Trap pipe showing where the arcing took place.



End Tips(outside of traps).

These aluminium tubes are generally between 11.7mm and 12.7mm in size, depending on vintage. They adjust 14 mHz to where you want it in the band. You would only ever need to adjust the driven element ends. As stated earlier, the reflector and director affect the resonance little.

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Summary.

That's about it. As I get more information I will revise this paper and add to it. Any suggestions and questions wanted.

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15/3/25.