Practical Peter G3UCA Goes P

Using his simple and practical approach, Peter Sinclair G3UCA enjoys working both mobile and portable. In t good ideas on how you can make your own outdoor Amateur Radio operating more efficient.

Having decided he wanted to enjoy portable and mobile operating Peter Sinclair G3UCA decided to organise himself, and the necessary equipment to obtain the best results. He aims to encourage you to do the same!

When I decided to do some mobile/portable operation, the first thing I had to do was to provide a suitable mount onto which I could fit either mobile whips or a short mast to hold up dipole antennas. I was fortunate in obtaining a suitable mount and after some modification this became the basis of the antenna system which I'm describing here.

The decision to fit the home brewed bracket, see illustrative drawing **Fig. 1**, using the bolts - which hold the tow ball to the tow bracket, **Fig. 2 and 3**, - was taken as this would provide a very good earth to the car body. Firstly, I removed the original bolts and fitted some longer types.

The tow ball was then re-fitted permanently. When I wish to use the bracket, it just slots over the protruding bolts, being retained with two star washers and two additional nuts. (see photos and drawing in Fig. 1).

My mobile whips are mounted onto the left hand side of the bracket using a 'gum boil' style mount, inset **Fig. 4**. This provides a very stable mount and also a very good earth which is necessary for efficient mobile operation.

I use Pro-Am whips for mobile working in motion, and home brewed versions (centre loaded) for portable operation. These are approximately 2.74 metres (9ft) long and are usually one to two S-points up on the Pro-Ams on 3.5 and 7MHz.

Incidentally, I've made a full set covering the bands from 1.8 to 28MHz. The articles are based on an article by **G3TSO** which appeared in *Radio Communications* and also the now defunct *Ham Radio Today*.

Antenna Analyser

My preferred method to tune the whips is by means of an MFJ antenna analyser model MFJ-259B. But you could use a Grid Dip Oscillator (whoops showing my age there!) or an f.e.t. (gate dip) oscillator.

The analyser is connected to the base of the 'gum boil' mount using the same coaxial cable which will eventually go to the rig. The resonant frequency and feed point impedance is then read off the analyser's display.

In practice the whip top section is adjusted to bring the resonant frequency into the portion of the band on which you wish to operate. By tuning the frequency of the analyser a graph can be plotted showing the 2:1 points, i.e. the usable portion of the band before re-tuning of the whip top is required. (As an example on 7MHz the lowest s.w.r. I could obtain was 1.5:1, with a feed point impedance of 20Ω).

Now comes the all important step! I fit a toroidal matching transformer directly onto the base of the gum boil mount using a back-to-back male PL259 connector, **Fig. 5**. Next, I re-connect the coaxial cable to the other side of the transformer.

Then, by switching the transformer to 20Ω (other tappings would have to be tried if you did not know the feed point impedance) I now get a perfect match into the 50Ω coaxial cable and into the rig. The s.w.r. then read 1:1 and the rig produced full power. Unfortunately however, the toroidal transformer I use is no longer available. It was made by LAR, but similar ones can be home made (see diagram) and other makes are available.

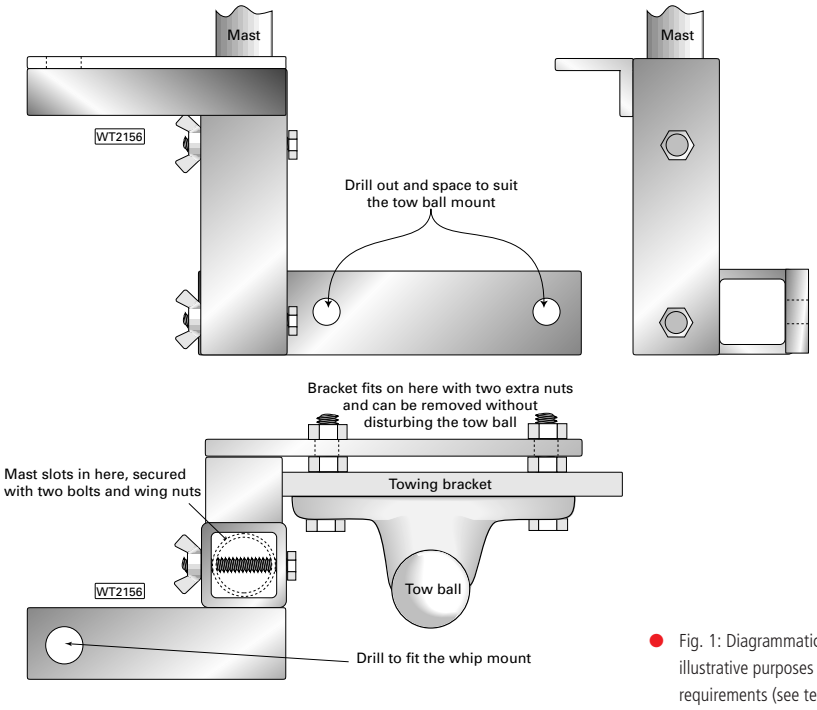

Fig. 1: Diagrammatic drawing of the home-brewed mast mounting bracket. Shown for illustrative purposes only, actual sizes will depend on vehicle, material to hand and individual requirements (see text).

Second Mount

We now come to the second mount on the bracket which is a welded square section, shown in both photos, Fig. 4, which will allow a 25mm (1 inch) square aluminium section mast to slot inside. I also have three 1.525m lengths with a round section riveted into one end. These all slot together making a 4.575m free standing mast, **Fig. 6** and **7**.

Each section is secured together with a bolt and wing nut, (see Fig. 6). The base section has two bolts and wing nuts. Next, 228mm down from the top section I drilled a hole and again fitted a bolt and wing nut. This allows me to slot in a 1.22m length of broom handle which holds the centre of the dipole. It's free to rotate in any direction allowing the dipole to be positioned in any direction relative to the position of the car.

The total height of the system above ground level (a.g.l.) is as follows: Mount above

ortable and Mobile!

he article he provides some

ground 305mm + three sections of mast at 1.525m = 4.9m and the broom handle (less part inside mast) = 1.07m, totalling 5.95m. This is very close to the recommended height for Near Vertical Incidence Skywave* (NVIS) propagation on 7MHz.

*I won't go into NVIS propagation in this article as it has already been well documented in the Amateur Radio press.

Dipole Centre

The method of fitting the dipole centre, **Fig. 8**, to the broom handle is to first cut a flat onto it, and then drill two holes and again secure with bolts and wing nuts. I fit bullet connectors onto the ends of the 7MHz dipole which enables me to extend it to 3.5MHz if required.

I have used the 7MHz dipole at this height on many occasions and can consistently put a 5&9 plus signal from my portable station located near Preston in Lancashire to all parts of the UK.

When the dipole is removed I can fit a light weight rotator (made for TV antennas on a caravan) to turn a small 144 or 430MHz beam antenna. The whole system works extremely well in practice.

Matching Transformer

The toroidal matching transformer has appeared in the internationally appreciated Technical Topics, compiled by **Pat Hawker G3VA** in *RadComm* on at least two occasions and also in articles in the (as mentioned) now defunct Ham *Radio Today*. The original is attributed to **9M2CP** in an article in *RadCom* in July 1972.

So, there you have it...now that the weather is getting better, perhaps I've persuaded you to build your own version, get out and do some portable operation? If you do...you'll be surprised how quiet the background noise is once you get away from the computers, TV and vacuum cleaners, etc.

It's a whole new (much quieter) radio world out there. Try it for yourself...you won't regret it!

pw

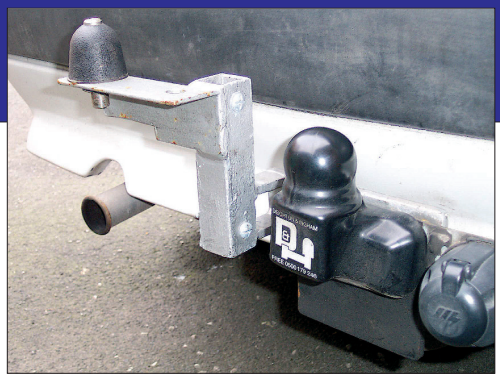

Fig. 3: The tow ball was then re-fitted permanently. When G3UCA wishes to use the bracket, it slots over the protruding bolts, and is retained with two star washers and two additional nuts (see text). The G3UCA mobile whips are mounted onto the left hand side of the bracket using a 'gum boil' style mount (top left). It provides a very stable mount and also a very good earth which is necessary for efficient mobile operation (see text).

Fig. 2: The decision to fit the bracket using the bolts - which hold the tow ball to the tow bracket - was taken by G3UCA as this would provide a very good earth to the car body (see text).

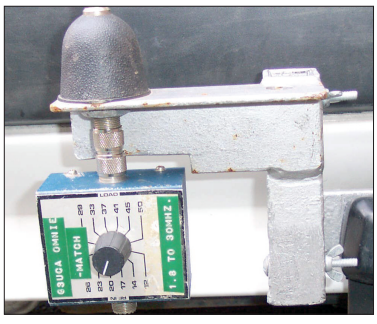

Fig. 5: Peter G3UCA fitted a toroidal matching transformer directly onto the base of the 'gum boil' mount, using a back-to-back male PL259 connector (see text).

Fig. 4: The second mount on the bracket which is a welded square section, allowing a 25mm square aluminium section mast to slot inside (see text).

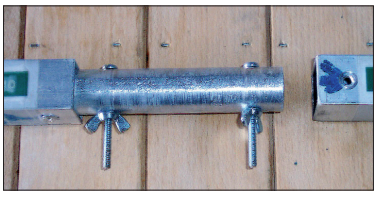

Fig. 6: Three 1.52m lengths with a round section riveted into one end. These all slot together making a 4.6m free standing mast (see text).

Fig. 7: The home-brewed antenna system and coiled up dipole. Also seen are the slot-in-tube sections. (See text for suggestions on the assembly).

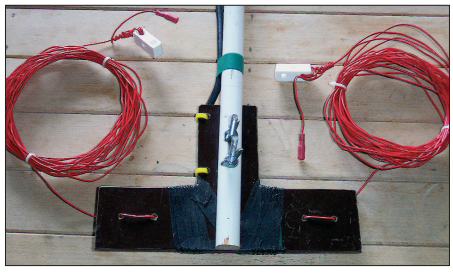

Fig. 8: Close-up photograph of the dipole centre assembly (see text).