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## Dual Beam I-Pro

h.f. multi-band antenna reviewed


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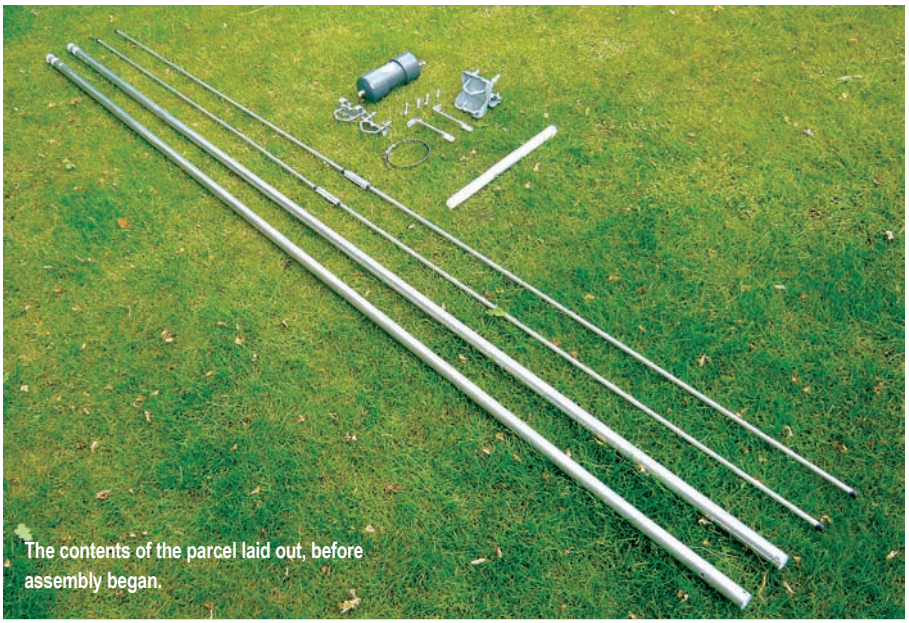
Dave says “The experience has been both pleasurable and rewarding!”

# The Dual Beam I-Pro h.f. multi-band antenna

**Dave Mason G3ZPR is a busy man – and he thinks antennas are taking over his life! This time he looks at another I-Pro antenna system.**



The contents of the parcel laid out, before assembly began.

**Antennas are gradually taking over my life! There always seems to be another type, shape, size or ‘Just the one you’ve been waiting for’ that does everything for everyone with no space, at no cost – and probably no results!**

Well, testing antennas is what I’m here for. I’m willing to put them to the test in my location to see if they fit my garden and my pocket and give the results claimed for them by their designers on behalf of *PW* readers.

Absolute fairness is required when carrying out any antenna evaluation exercise. It requires the most thorough testing, with the reviewer (me) being prepared to take into consideration the likelihood of totally different results in a different location to mine and at a different time in the sun spot cycle. As this article will show – even the season has a marked effect on results and nature’s beauty may be quite unhelpful to to the poor reviewer!

Conditions can often be frustrating, making it necessary to repeat tests at different times, paying homage to propagation and Antipodean time with the hope that perseverance will pay off and the antenna under test will show it’s merits.

Such is the case with the Dual Beam I-Pro from the Pro Antennas Stable. This is designed solely as a fixed station antenna so there is no opportunity to tour it around as with a mobile or portable design. The conditions are fixed – as in my back garden – so, here we go!

## Well Packed

The elements of the dual beam come well packed in a rigid cardboard tube together with an accompanying box for the smaller components. Everything arrived in good condition. The list is as follows;

4 x 35mm M6 stainless set screws
6 x M6 Nylon insert stainless nuts
6 x M6 stainless backing washers
1 x Galvanised mast head support bracket
1 x Pre-drilled GRP rod Centre support insulator
2 x Matching transformer connection bars
1 x Pro Antenna matching transformer
1 x Stainless clip to secure matching transformer
2 x End element securing brackets
2 x 3/8in Alloy elements with plastic end caps
2 x Pre-drilled 1in diameter main element sections and Assembly Instructions.

## Tools Required

The tools required for the assembly are two 10mm spanners or a single 10mm spanner plus 10m socket and wrench. One 15mm spanner and a plain screwdriver. Self-amalgamating weather-proofing tape and *pvc* insulating tape.

## The Antenna Described

The Dual Beam Antenna is described as a “Non-resonant design requiring an internal or external antenna tuning unit (a.t.u.) for the 14 to 28MHz bands (20 to 10m) operation and an external a.t.u. for the 40m and 30m coverage. A rotator should be used to take advantage of the directional properties.”

The antenna should be mounted at a height of at least 9m a.g.l. to clear surrounding buildings. The design has an upper power limit of 400W peak envelope power (p.e.p.) but the user is also cautioned not to exceed the power handling capacity of the a.t.u. in use.

## Good Quality Materials

The materials used are of good quality to provide good resistance to weather and corrosion. Aerospace alloys are used for the elements with good corrosion resistance and all fixings are of stainless steel. The heavy gauge steel mast head support bracket is galvanised and will accommodate mast sizes from 1.5 to 2in.

## Standard Of Engineering

Good engineering ensures that the parts actually fit together with no rough edges or swarf from the cutting and drilling processes of manufacture. Thought has also gone into the transformer design and its housing and

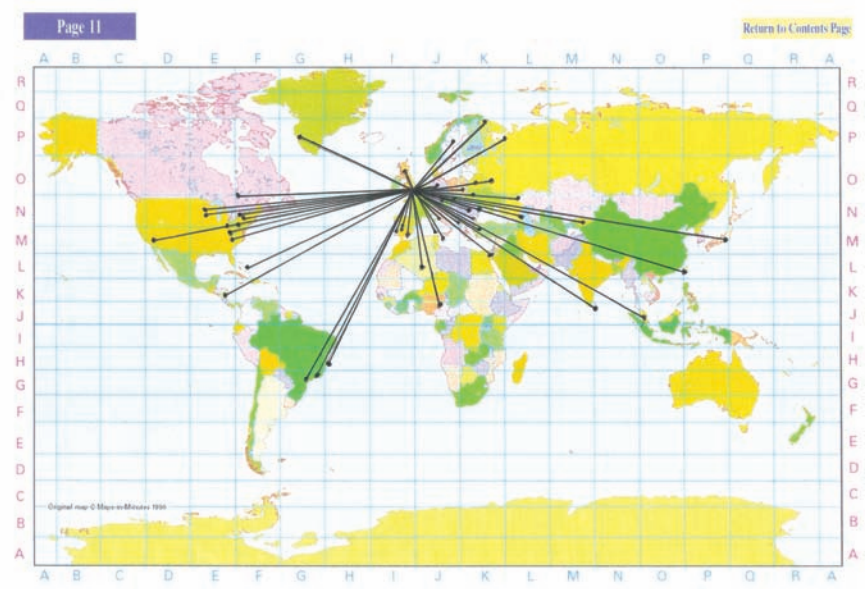



**Fig. 1: Chart showing a summary of the practical 'on air' tests.**

so, it's fully sealed and weatherproofed with good mechanical connections to the driven elements.

Simplicity of design and assembly have made the whole device easy to construct. And although assistance would have been helpful in the assembly, I found it be essential for the final erection.

Clear instructions are provided for the construction and I was taken step-by-step through the process. The first task was to fit the two connection bars to the matching transformer. A caution is given to ensure that the back nut is held with one spanner while tightening the locking nut with the other spanner.

Care also needs to be taken in ensuring these pre-formed bars are correctly oriented when fixed or they will not align with the element fixing points.

The GRP central insulating rod is then passed through the clamping section of the mast head support bracket, the alloy centre being centralised in the boom clamp. The clamp **must not** be tightened at this time.

**A close up view of the central insulating rod, matching transformer and rotator in their final positions.**

The two main 1in dipole sections can now be fitted using only the outermost two bolts (35mm M6) and the prepared matching transformer then attached using the innermost bolts.

The end capacity elements are then fitted to their respective ends of the horizontal sections and their fixing brackets located between white tape markers.

The central square alloy component of each end element must show the slotted side outermost. All parts must then be leveled symmetrically, locking up each bolt in turn.

If a rotator is to be used – the stub axle is fitted and rotator assembly attached. Detailed instructions are provided for alignment.

**Note:** I had to make sure that I didn't forget to attach your coaxial feeder to the antenna using a PL259 Plug into its SO239 socket **prior** to raising the completed assembly. Weatherproofing of the connection with self-amalgamating tape is important too and I suggest leaving a loop of coaxial cable before taping it to the mast. This loop should allow for the full rotation of the rotator).

## Erecting The System

My advice to anyone owning the antenna that you should be be sure to have competent assistance for this part of the process! At my home QTH I used six of my ex War Department 5ft sections to make a 30ft mast. the antenna was fixed and the entire assembly raised with the help of fellow club member **Sean Metcalfe 2E0CMT**, and clamped to a well buried pole (i.e. my wife **Vivienne's** washing line post).

A minimum coaxial feeder length

**Carl Kidd G4GTW comments:** Many thanks to **Dave Mason G3ZPR** and *PW* for the review opportunity.

Dave has provided a thorough and comprehensive review that will be a great reference document to the *PW* reader considering investing in a Dual Beam Pro. Dave's multi sectional 30ft mast support does demand additional installation help. This may sound a little daunting to a single hander. It's worth mentioning that the Dual Beam Pro is extremely light weight, (4kg) TV antenna brackets and masts are proving to be perfectly adequate fixings. Very reasonable installation costs can be offered by domestic TV aerial installers. For 95% of the year my own Dual Beam Pro is fixed pointing east and west. This provides me with a wide coverage of countries and perhaps once or twice a year I bother to rotate it to the south to occasionally work South Africa.

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**The Dual Beam Pro Specifications**

| | |
|---|---|
| Turning radius required: | 2.5m |
| Overall span of main rotatable element: | 5.0m |
| Overall span of end elements: | 2.5m |
| Total weight including support bracket and centre feed transformer: | 4.0 kg |
| Upper power limit: | 400W |
| Dual Beam Pro price: | £219.00 |
| P&P: | £8.99 |

of 20m is prescribed which, together with the low losses on the transformer, helps to bring the standing wave ratio (s.w.r.) down to acceptable levels. Any excess feeder should be coiled up at the transceiver end. The use of high specification 50Ω cable will always pay off.

Garden conditions, trees, etc., can radically affect performance and my particular location suffers from a magnificent oak tree. Whilst this is on adjacent parkland it's canopy overhangs three properties and the Local Authority considers it's beauty over-rides any effects it may have on my property – so, I have to live with it. It's considerably higher than the antenna on the mast – but the rotating elements of the antenna just cleared the tree. (This could have an adverse effect on performance).

The Dual Beam is bi-directional (as with any dipole antenna). As a beam it has the advantage of covering 360° within 180° so making all directions available within a half rotation. A polar diagram is include in the instructions to help the purchaser understand this effect.

## Getting Started

Getting started, I coupled the antenna as advised – via a Z11 automatic a.t.u. (a.a.t.u.) – to a Kenwood TS-570D running 100W. My trusty DX-70TH was being fitted into a case for some serious portable work – so it was having a well earned rest.

I had a quick run through the bands, checking the s.w.r. and power (firstly without an a.t.u.) with results ranging from 1.2:1 to 5:1. Then I repeated the exercise with the a.t.u. and found the results to be very acceptable with the s.w.r. ranging from 1.2:1 to 2.5:1. This is in line with the designer's comments that "*it's normal in use to see an s.w.r. on your feeder and this is why the antenna is described as requiring the use of an a.t.u.*".

Sean tightens the final bolt.

## On The Air

Once I got on the air it didn't take long to get a very respectable list of QSOs. Despite this it's always necessary to consider the propagation predictions to avoid wasting time on a band that's not open.

My on the air test periods included very early mornings, very late nights and specific slots during the day. Remember – if you want to work them, you've got to chase them!

The tree on the left of the photograph towers to twice the height of the beam.

## Antenna Performance

The antenna's directional properties and gain gave me a real problem and I then began to suspect the effect of the trees on the null point. I seemed unable to identify any perceptible change in signal irrespective of beam heading. Discussions with those 'of greater wisdom than I' seemed to favour the theory that the very close proximity of the trees to the antenna was affecting the directional properties.

The branches were scattering the incoming signal sufficiently to give the impression that the antenna was behaving as an omnidirectional device. I had no other precedent to guide my thoughts on this matter, save to say that I have witnessed the performance of an identical antenna in an unobstructed location where the directional properties were quite clearly demonstrated.

Not withstanding my comments – the results clearly showed that this antenna is an excellent design. It will fit in most back gardens, with an impressive performance easily out-performing my Comet Vertical and good enough for an Amateur in any location. I have worked more countries during the brief evaluation exercise than any other comparable period and enjoyed every moment. Most of the 'pile ups' were eventually broken – even if it did take some patience!

## The 50MHz Bonus

I was given to understand that the Dual Beam could also be used on the 50MHz (6m) band. Apparently, at 50MHz, the antenna exhibits a clover leaf radiation pattern typical of a 1.5 wavelength dipole.

While the Designer makes no claim for 50MHz band in his specification – I just had to put it to the test! A 'sked' was set up with a friend and test calls made using both s.s.b. and f.m. modes. The s.s.b. test gave only a fair report – but the f.m. QSO attracted an excellent report. The antenna exhibited a directional property on 50MHz.

## The Final Words

Now for the final words! The judgment of any antenna must be based upon its performance. No device can be everything to everyone, we must each consider our own location, cost and what's acceptable to our neighbours and the Local Authority.

My verdict on the Dual Beam would be that it is an excellent performer. It gives a better signal/noise ratio and a performance edge against wire dipoles and verticals by its polarisation. It's ability to be steered – helps to sort out the station you want from others crowding around the same frequency. The antenna is also reasonably priced and could well be an answer to short gardens and community acceptability.

I always favour the Map method of illustrating the countries worked during the tests, a picture speaks better than 1000 words and so include it here (**Fig. 1**) for your consideration.

I am obliged to the designer of this antenna for the opportunity to review it. The experience has been both pleasurable and rewarding.

**Dave G3ZPR** ●