

**NOW IN
ITS 80th
YEAR!**

Practical WIRELESS

Britain's Best Selling Amateur Radio Magazine



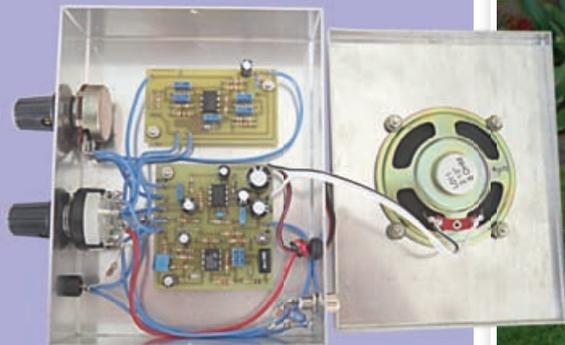
The Eagle

Latest transceiver from
Ten-Tec reviewed



Practical Way

Building a Z-match tuner



Design Peak

Peak and band-pass filters



Reviewed

The I-Pro Home

Multi-band antenna

A Practical PIC Project
The PW PIC Battery Voltage Monitor



The I-Pro Home Multi-Band Antenna

Dave Mason G3ZPR uses his h.f. operating skills to evaluate the latest antenna from the design desk of Carl Kidd G4GTW.

The I-Pro Home is yet another innovative concept from Carl Kidd G4GTW who clearly understands that types, shapes and sizes of antennas are important issues for many Amateurs. Acquisition of a rig is fairly easy – but when it comes to the antenna there is an extensive list of criteria to be considered.

When looking at the fully constructed I-Pro Home antenna, I can see similarities with other I-Pro antennas. In fact, it's something between a large version of the I-Pro Traveller and a the Dual Beam Pro on its side.

Regular readers will note close resemblance of text in this review with that of the previous review of the Dual Beam Pro (*PW* September 2011). This is inevitable as many component parts and materials are common to both antennas.

Each antenna, however, has its individual merits and is designed to suit different requirements. The I-Pro Traveller is portable, the Dual Beam a base station steerable beam. So, what are the merits of the latest antenna from Carl? Let's take a look.

The Elements

I'll start by looking at the elements of the antenna, which come well packed in a rigid cardboard tube together with an accompanying box for the smaller components. These comprise;

- 4 x 35mm M6 stainless set screws
- 6 x M6 Nylon insert stainless nuts
- 6 x M6 stainless backing washers
- 1 x Galvanised base support bracket
- 1 x Pre drilled GRP rod centre joining section
- 1 x GRP base insulating rod and 28mm plastic sleeve spacer
- 2 x Matching transformer connection bars
- 1 x Pro Antenna matching transformer
- 1 x Large screw clamp 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 dipole sections
- 1 x Centre support arm bracket
- 1 x 1in x 16in alloy tube centre support arm

Assembly instructions.

Tools & Materials Required

Next, I'll look at the tools and other materials required; Two 10mm spanners or single 10mm spanner plus 10mm socket and wrench. One 13mm spanner and a plain screwdriver. Additional materials required; Self amalgamating weather-proofing tape, pvc insulating tape. Also required is a 1.52 to 1.82m (5ft to 6ft) ground post to which the antenna is to be fixed. (The supplied 'V' bolts are suitable for 37 to 50mm (1.5-2in) metal tube).

Coaxial Cable Feeder

A good specification coaxial cable should be used with a minimum length of 20m, any excess may be coiled neatly at the equipment end. It should be terminated with a PL259 plug at each end.

Carl has calculated total line loss for this antenna using 20m of RG213 and RG58 types as follows; RG213 - 40m/4dB, 30m/1.5dB, 20m/1.0dB, 17m/0.83dB, 15m/0.87dB, 12m/1.27dB, 10m/1.4dB. For RG58, the losses are: 40m/6dB, 30m/2.14dB, 20m/2.0dB, 17m/1.3dB, 15m/1.4dB, 12m/1.73dB, 10m/2.0dB.

The Design

The I-Pro Home is another of Carl's non-resonant designs requiring an internal or external antenna tuning unit (a.t.u.) for the 14 to 28MHz (20 to 10m) bands operation and an external a.t.u. for the 7 and 10MHz (40m and 30m) coverage.

The design has an upper power limit of 400W peak envelope power (p.e.p.) –



Although tall, the antenna tends to 'disappear' against any garden background.

but the user is cautioned not to exceed the power handling capacity of the a.t.u. in use.

Good Quality

Materials used are of good quality to provide good resistance to weather and corrosion. Aerospace alloys are used for the elements and all fixings are of stainless steel. The mast to ground post fixing bracket is of heavy gauge steel (galvanised) and will accommodate mast sizes from 37 to 50mm (1.5-2in).

Standard Of Engineering

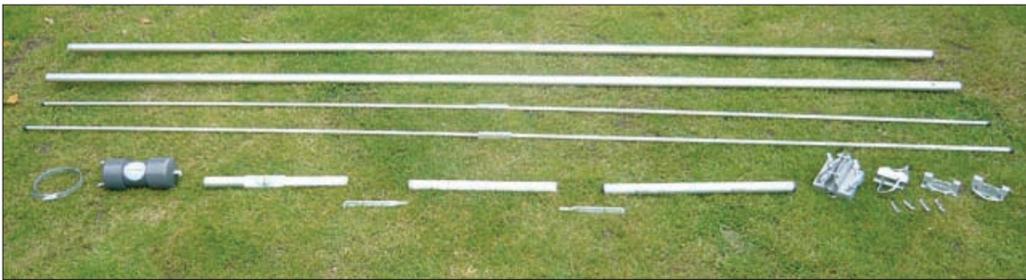
So you might ask, what's the standard of engineering? Here I can only repeat the comments I used to describe that of the I-Pro Dual Beam – the parts actually fit together with no rough edges or swarf from the cutting and drilling processes of manufacture. The transformer design and its housing, is fully sealed and weatherproof with good mechanical connections to the driven elements.

Simplicity of design and assembly have made the whole device easy to construct single-handedly. No assistance was needed in raising and clamping to the ground post. (Not supplied).

Step By Step

Step-by-step instructions are provided for assembling the antenna. **Note:** A caution is given to ensure that the back nuts of the transformer connection bar bolts are held with one spanner – while tightening the locking nut with the other spanner. Take care with these pre-formed bars to ensure they are correctly oriented when fixed or they won't align with the element fixing points.

The two 25mm (1in) diameter main



The contents of the tube and the small box as they arrive in the post.



Two spirits levels to make sure the support pole is truly vertical when it's embedded in the ground.

vertical sections should be joined at the centre on to the pre-drilled GRP rod using only the outermost two bolts (35mm M6 size) – making sure that the uppermost section is the one fitted with a blanking plug.

The prepared matching transformer is then attached using the innermost bolts ensuring that the **red** terminal is fitted to the upper element. (The Pro Antennas logo should appear upright).

The 25mm diameter centre support arm is then clamped to the back of the GRP rod insulator, so that it runs behind the transformer and the large screw clamp clip fitted to secure the two components. **Note:** This should clamp over the thicker part of the transformer at the SO-239 end. Here, I would advise all of the centre assembly bolts are initially only lightly tightened and that they're fully tightened as a final task in the assembly.

The end elements can then be fitted. To assist with this I knocked a wooden peg into the lawn and secured the centre assembly to it with a rubber bungee to maintain it in the vertical position. One of the end elements was then fitted, by positioning its clamp between the pencil marked rings at approximately 6mm from the tube ends with the 'U' bolt coming up through the clamp. When secured the second element was fitted in the same way. All parts must then be



A close-up of the 'potted' balun.

levelled symmetrically, locking up each bolt in turn.

A suitable ground support post should next be set into the ground at the chosen point making sure that there's sufficient ground clearance to attach guys and that these will clear the rotation of the lower element should you require to do so. The post should be at least 600mm (2ft) into the ground – and preferably more depending on the nature of the ground. It should also be at least 900mm or so (3ft) from ground level to the lower element. Take time to ensure this post is truly vertical (see picture).

The GRP base support rod has an alloy sleeve at one end, it is this end which should be clamped into the base bracket.

The feeder can then be fitted and the whole joint weatherproofed with the self-amalgamating tape. The feeder can then be taped with pvc tape to the support arm. I decided to fit guy lines in the prescribed way. I used three 6m lengths of nylon cord – fitted just above the central support arm, two trailing in the direction of the arm and the third line braced against the feeder.

Erecting The System

The I-Pro Home is light enough to single-handedly lift into position. The lower end element should be turned

Company
Pro Antennas

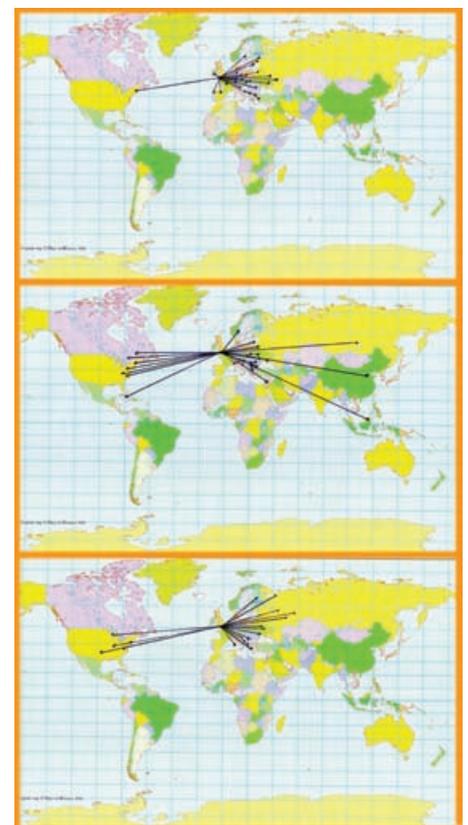
Product
The I-Pro Home antenna

Pros
Once again Carl has produced a winner. The antenna does what he claims for it – and the QSO maps and chart clearly demonstrate how well that's achieved

Cons
I can't think of any!

Cost
£229 plus £8.99 p&p

Contact details:
Pro Antennas,
3 Forsythia Close,
Hedge End,
Southampton,
Hampshire SO30 4TP.
Tel: (01489) 789960,
E-mail:
sales@proantennas.
co.uk
Website:
http://www.proantennas.
co.uk/



The areas of the world worked by Dave G3ZPR using the review antenna showing from the top: the 7 and 10MHz bands, then the 14 and 18MHz bands above the 21, 24 and 28MHz bands.

to an acceptable position for your own convenience in the garden and the clamp secured. (The antenna is **not** directional). Then secure the guy lines. As my feeder was in two lengths it was convenient for me to insert my Z11 automatic antenna tuning unit (a.a.t.u.) where the sloping feeder reached the ground and the second length routed to the shack.

On The Air

For the on the air tests I used the Kenwood TS-570D running 100W. With the help of my friend and fellow club member **Phil Ciotti G3XBZ**, we carried out a run through the bands, checking the standing wave ratio (s.w.r.) and power levels using an internal antenna tuning unit (a.t.u.) on 14 to 28MHz (20 to 10m) with results ranging from 1.2:1 to 1.5:1. A further check with Phil's Kenwood TS-440S resulted in 1:1 across the same range.

The tests were then repeated with the TS-570D with the addition of 10MHz (30m) and 7MHz (40m) with my external Z11 a.t.u. and using the Kenwood SW2100 s.w.r./power meter. The results were very acceptable with the s.w.r. ranging from 1:1 to 1.5:1. 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." And from my point of view, you can also expect there to be variations between internal rig a.t.u.s!

The Results?

From the first 'switch on' this antenna was 'bringing them in!' Indeed, I soon found out that if I could hear them I could work them! This was refreshing from my QTH where I don't enjoy the best aspect for propagating south or north-west.

However, it wasn't long before I realised that I needed to be selective of the stations I worked or there would be too many of the same country – so the selective hunt began. One thing is clear, you can only work stations that are there and, in spite of improving conditions, there are still periods of very low activity.

On one occasion I went to the shack to check the level of activity and found the c.w. end of 14MHz virtually silent. While checking the log a G/portable station called. I responded – only to find the location was within 32km (20 miles) of me. We enjoyed a lengthy chat (about 40 minutes) and then signed off.

The rig remained on in silence while I completed the log when another station called on the empty frequency. I replied and was delighted to work a station in



Phil G4XBZ, took his rig along to see how the I-Pro Home antenna worked when two rigs were tried in the same location.

Beijing. This was a first for me as I had never before worked a Chinese station!

The chart shows a summary of the practical 'on air' tests; QSOs per band are shown along the bottom line Total QSOs: 85. Both A1A (c.w.) and J3A ('phone) modes have been used for these tests.

The Final Comments

Next, my final comments. The 'I-Pro Home' is well produced, easy to assemble and erect, doesn't seem to be affected by the close proximity of house walls, trees, etc., and still performs. This design works and there's is no doubt in my mind with respect to the performance of the product.

Once again Carl has produced a winner. The antenna does what he claims for it – and the QSO maps and chart clearly demonstrate how well that's achieved. The chart closely reflects the available activity per band during the test period and its close relationship to the propagation predictions. Three conveniently grouped maps have been produced to show the performance of the seven bands.

Because I have tested most of the Pro Antenna range my expectations are high. My inspection standards, however, remain consistent. As per my usual style for these reviews, I've not made direct comparisons but I can only say that I could easily be tempted to replace my existing main station antenna with the I-Pro Home. Sadly, there are more antennas than cabbages growing in our garden just at the moment and my wife may well have a different view on this!

My thanks to Carl G4GTW, the designer of the antenna for the opportunity to review it. It has been a pleasure. Dave G3ZPR.



Dave G3ZPR, lifting the completed antenna up onto the supporting ground post.

The Dual Beam Pro Specifications

Vertical section length	5m
Overall span of top and bottom elements	2.5m
Total weight including support bracket and centre feed transformer	4.5kg
Upper power limit	400W

Carl Kidd G4GTW

comments: I would like to take the opportunity to thank Dave the reviewer for his very comprehensive overview of my product. The market offers many base fed verticals and it is commonly known that the performance will be closely related to how much work goes into the systems grounding and at the very least 4 x $\lambda/4$ wave long wire radials should be installed. My centre fed approach offers a complete system with no dependency on the use of radials or grounding. The design also utilises low-loss capacity end loading over the lossy trapped/loading method. This is very liberating and allows for a very quick efficient installation and although the product is focused as a home base antenna, I have enjoyed great results using it portable.

Carl G4GTW