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I must confess to being more than a little confused when the latest portable antenna arrived for review, direct from China. The legend on the small zip around, compact, 'handbag' sported the embroidered legend of JPC-7. The antenna inside was in fact the JPC-12 a ground mounted, 100W maximum vertical.

The confusion didn't stop there, the component parts looked to be too small to provide a decent sized, meaningful antenna and only weighed around 1.4kg in total. To add to the confusion the foreign language handbook wasn't in Mandarin or Cantonese ...not that I can read either. I discovered later with the help of a friend, that it was written in basic every day keyboard Chinese.

Translation efforts proved very limited, as my friend from Hong Kong doesn't understand any technical terms. The handbook is cunningly designed for more than one model of antenna. It's difficult when you don't understand Chinese and don't understand that to read about either of the two models, you simply turn the book over and start reading from the other end.

If All Else Fails...

Despite my maxim 'If all else fails read the handbook', it was relatively simple to assemble the antenna without it. I was staggered to discover that from small beginnings it turned out to be twice my height, quite impressive.

Just for fun I later timed the assembly from opening the bag, planting the antenna and plugging in the coaxial cable (not included). My record was 4 mins 26 seconds, against the handbook quote of 3 minutes. Resonating and matching certainly takes more time.

I've experienced many mobile and compact antennas over the years and way back reviewed the original Buddipole, when it was still available as an online DIY project. The concept of this antenna is much like the single-ended Bud-Stick that was produced later. Most sections of the standard Buddipole are 55cm each and their Mini version reduced to 28cm. This compares to the JPC masts at 35cm.

Looking through the package I recalled my basic physics and the sage advice of the Old Timers of my boyhood radio club. Experience has taught me that the junction of dissimilar metals is not a good idea unless you're deliberately looking to create a high resistance or a diode effect. Such things weather badly and must be kept very clean. This antenna uses 10mm studding bolts and brass alloy threaded sockets. There's plated stainless, plated steel, manganese steel, aluminium and more. Engineering wise, the metal parts are of a good standard and fit together extremely well on the flush faces

Of course, it's a portable antenna and realisti-



The JPC-12 Vertical Antenna

Richard Constantine G3UGF takes an in-depth look at this range of new portable antennas from China.

cally unsuitable for anything other than a temporary setup as it stands. Never throw it back in its bag and forget it, when it's been out in the wonderful wet British weather.

From the Ground Up

Starting from the ground up literally, the 25cm earth spike is curiously light in weight, but of course this is a portable antenna so weight or lack of it, is important. Part of it isn't electroplated so as to give better contact with the ground. I quickly realised not to hammer it into the ground to prevent damaging the exposed thread.

Perhaps a flush socket design as against an exposed thread would have been better. I discovered the best way to achieve a reasonable result was to attach the base-connector unit and/or the first of the four anodised alloy tubes and push down hard. Alternatively, to use a rubber tent peg hammer on the socket end of a tube and not the exposed ground spike thread.

It's worth noting for those like me that enjoy mixing and matching various antenna parts from different systems, in the vain hope of achieving the 'holy grail' of compact antennas, that this antenna is not compatible with others. It uses

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Photo 1: QRP on the Yorkshire Wolds. **Photo 2:** JPC-12 outdoors. **Photo 3:** Coil close up. **Photo 4:** ARRL Antenna Handbook 1964 (Reproduced by kind permission of ARRL, copyright retained.)

a 10mm thread system and not the ubiquitous American, 3/8th UNC threaded antenna parts and mounts we came to know in the CB boom.

However, if you want to make up other mounts or play around, 10mm threaded bar and bolts are common fare at the local DIY emporiums. A mirror mount type bracket or G clamp with a 10mm bolt spring easily to mind

Attaching the loading coil section is straightforward, so too is the 2.5m, ten section, stainless telescopic whip. I was concerned that the combined weight of these two components at around 280 grams would make the antenna unstable. However, in round terms it's balanced out by the weight of the base connector unit that feels heavy on first handling. I can't decide whether this is a happy accident or good design.

The complete assembly is reasonably stable and certainly unobtrusive for a typical campsite. For hill topping, carrying some ground pegs and para cord is advisable as the coil/whip assembly certainly attracts some windage.

The package includes a single counterpoise made from ten-strand ribbon cable. It attaches by means of a ring connector between the ground stake and the base/connector tube. Unlike the thin, separate, spaghetti wires provided with some other portable antennas, it's one single strip 2.64m in length and 1.2cm wide. The handbook says it's 10m.

Perhaps lost in translation it actually means it's a quarter wavelength on the 10m band and therefore harmonically related only to the non-WARC bands. That said, when on the ground the single counterpoise that's incidentally handling 50% of the RF, becomes de-tuned anyway. This means its length isn't that critical. I was tempted to split the wire but vowed to make more like it for better results. Attaching more wires with a similar surface area at this point does improve things and can make matching easier on favourite bands but has not much effect on expanding the narrow bandwidth of the system. With a single wire counterpoise, carry a compass. It can help to point the RF towards a favoured direction.

This proved great for directing my signal to PY on 15 metres, or was it just that band conditions improved a little bit after I moved the wire, something to play with?

Note to self: Must make more grey counterpoise wires, not as garish as other colours or as discreet on a campsite as my green ones and less of a trip hazard in the early hours!

I was intrigued to know what was in the heavy sealed base unit. Does it perhaps contain a balun or an UNUN? Metering through showed no sign of a short circuit and therefore unlikely to contain



a balun. I was guessing that it might contain ferrite rings to tame any RF on the coax feedline, so asked the question of the manufacturer. The reply came back in Chinese. The non-technical translation came out as being the presence of "3 metal bars". From this I take it that my second guess was correct. Indeed, the coax proved RF docile under test.

Now for the Loading Coil

They do say there's nothing new under the sun. Immediately I unpacked it, this antenna jogged my memory of a DIY design in an old ARRL antenna handbook; back in the day when everyone made everything. I've always meant to build one but now I don't need to bother, see **Photo 4**.

Assembled, the coil sits at around one third of the total antenna length. Accepted wisdom is that it should be higher at around between 40-60% in order to maximise current distribution. It would be interesting to see what adding two more threaded tubes would do in terms of radiation and matching.

The translated handbook says that the 33 turn, silver-plated wire loading coil is wound on a Nylon former. The former is most likely moulded, not 3D printed, but the material makes me think of it. Unlikely to be pure Nylon because this can absorb water and is not good for antennas. At 45mm in diameter it's a good size in terms of maximising Q factor and better than some of the competition. An add-on coil with no tapping slider is said to be available to extend the antenna's use to 80m, subject to the use of longer counterpoise wires. Thus far, I haven't found a stand-alone 80m inductor available online.

Perhaps I'll find out in **Part 2** of this review (next month). Yes, there's more to come from this antenna system...



Mounted on a slider and using modern materials to maximise contact pressure, matching is achieved by means of a manganese spring steel contact. Longevity is an unknown quantity at this stage. It looks pretty resilient to me. Kept clean (with a contact burnisher, not sandpaper!) and with care it should last a long time. I wonder if you can buy a spare contact. On close inspection, it looks to be very much an easily replicable item.

The loading coil is short-circuited from the top down, not engaged from the bottom up as I originally guessed. There's a silver mark for the 40m band near the top and a lower gold mark for the 20m band.

40m and 20m markings are guidelines. Instructions say that on 20m the whip section needs to be reduced by 20cm. Of course, fine tuning is a movable feast when you factor in

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each individual portable location and ground characteristics into the equation. 30m isn't marked or listed, but it's somewhere in between the other tapings.

You also have to be careful that the spring contact only touches a single winding. To help, it's notched in the centre. Being a compact antenna on the lower bands, bandwidth is narrow. The quick way to match it is with one of the new pocket analysers, but is achievable by first maximising a received signal followed with a VSWR meter on transmit. Good matching is critical.

What I didn't know until the manufacturers kindly sent me the English version of the instructions is that for 15m, the coil is removed. The four lower rods remain and only seven sections of the whip plus 10cm of the next section are to use for resonance on 15m.

For the 10m band, the telescopic antenna is connected directly to the base alone. It's fully extended, less half the top section (fully extended for 11m, methinks). Reading this was my eureka moment. Of course, it's simple! From 15m to 6m, including WARC bands, it becomes a straightforward ground-mounted quarter wave. Why didn't I think of that before?

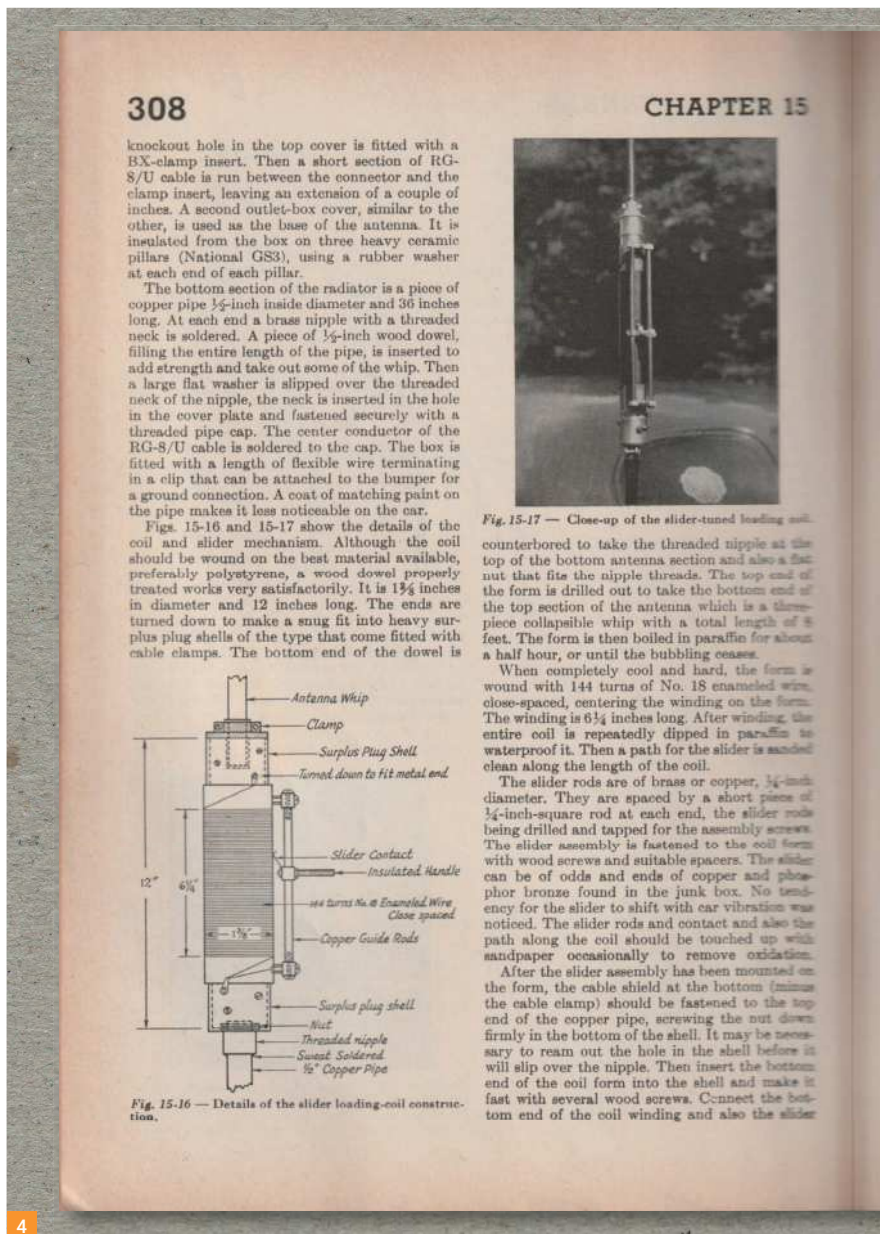
Matching this antenna changes with every change of location and ground condition. 1.1:1 or better is achievable on 40m as the specifications state. That is, given some time fiddling and fine tuning, damp ground and a decent earth. I've also experienced locations where this and anything better was difficult without the aid of an external tuner. Not ideal for QRP where every watt counts.

The manufacturer states that 1:1 is possible from around 30m-6m but as yet I've never quite achieved that across the whole range. The higher in frequency you go the easier it becomes to find a decent match but I still go back to the need for additional counterpoises or better earthing to get good results.

That said, from an initial trial as supplied, in a quiet RF location, clear low angle takes off on G3UNC's campsite in East Yorkshire; 5 watts of CW produced good contacts all around Europe from Sweden to Spain, with very little effort on 40m. I prefer to make live contacts with real people because data hasn't really floated my boat, as yet. Nevertheless, I do think that this type of antenna lends itself very well to data contacts and WSPR, if larger antennas are not practical.

What do I think of it?

Over time the market for small, compact antennas has grown to offer a range of options and cost. Several have become costly to make and ship, especially those using high-end components, and include extras such as optional brackets, connectors, adapters coax and cases, etc.



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knockout hole in the top cover is fitted with a BX-clamp insert. Then a short section of RG-8/U cable is run between the connector and the clamp insert, leaving an extension of a couple of inches. A second outlet-box cover, similar to the other, is used as the base of the antenna. It is insulated from the box on three heavy ceramic pillars (National GSS), using a rubber washer at each end of each pillar.

The bottom section of the radiator is a piece of copper pipe 3/8-inch inside diameter and 36 inches long. At each end a brass nipple with a threaded neck is soldered. A piece of 3/8-inch wood dowel, filling the entire length of the pipe, is inserted to add strength and take out some of the whip. Then a large flat washer is slipped over the threaded neck of the nipple, the neck is inserted in the hole in the cover plate and fastened securely with a threaded pipe cap. The center conductor of the RG-8/U cable is soldered to the cap. The box is fitted with a length of flexible wire terminating in a clip that can be attached to the bumper for a ground connection. A coat of matching paint on the pipe makes it less noticeable on the car.

Figs. 15-16 and 15-17 show the details of the coil and slider mechanism. Although the coil should be wound on the best material available, preferably polystyrene, a wood dowel properly treated works very satisfactorily. It is 1 3/4 inches in diameter and 12 inches long. The ends are turned down to make a snug fit into heavy surplus plug shells of the type that come fitted with cable clamps. The bottom end of the dowel is



Fig. 15-17 — Close-up of the slider-tuned loading coil.

counterbored to take the threaded nipple at the top of the bottom antenna section and also a flat nut that fits the nipple threads. The top end of the form is drilled out to take the bottom end of the top section of the antenna which is a three-piece collapsible whip with a total length of 8 feet. The form is then boiled in paraffin for about a half hour, or until the bubbling ceases.

When completely cool and hard, the form is wound with 144 turns of No. 18 enameled wire, close-spaced, centering the winding on the form. The winding is 6 1/4 inches long. After winding, the entire coil is repeatedly dipped in paraffin to waterproof it. Then a path for the slider is sanded clean along the length of the coil.

The slider rods are of brass or copper, 1/4-inch diameter. They are spaced by a short piece of 1/4-inch-square rod at each end, the slider rods being drilled and tapped for the assembly screws. The slider assembly is fastened to the coil form with wood screws and suitable spacers. The slider can be of odds and ends of copper and phosphor bronze found in the junk box. No tendency for the slider to shift with car vibration was noticed. The slider rods and contact and also the path along the coil should be touched up with sandpaper occasionally to remove oxidation.

After the slider assembly has been mounted on the form, the cable shield at the bottom (minus the cable clamp) should be fastened to the top end of the copper pipe, screwing the nut down firmly in the bottom of the shell. It may be necessary to ream out the hole in the shell before it will slip over the nipple. Then insert the bottom end of the coil form into the shell and make it fast with several wood screws. Connect the bottom end of the coil winding and also the slider

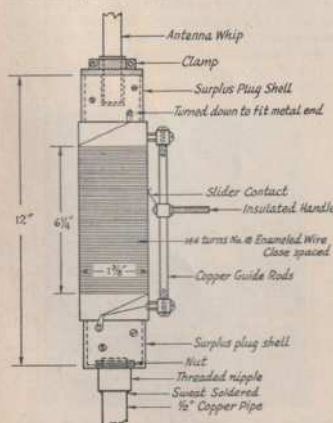


Fig. 15-16 — Details of the slider loading-coil construction.

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From my initial observations and misgivings, I have come to appreciate that this is a very acceptable and unobtrusive device, particularly for operating /P just about anywhere, provided you accept its limitations.

It has a small footprint and is reasonably unobtrusive when erected. I really like that it's compact and lightweight, takes up surprisingly little space when packed, yet assembles into a good size at around 12ft, in old money.

Weatherproofing is minimal. To help with this I've made use of a £1.50 plastic funnel cut to provide a friction fit above the coil. For heavy weather, I'm considering up cycling a plastic drinks bottle with the bottom removed. I just need to find the right one.

I have a few concerns regarding the differing metals but to some extent it's unavoidable. As with almost all of these end-fed verticals,

earthing or counterpoise is key to success. Adding three or four radials to the kit does pay dividends.

In the last few months advertising for this range from China has boomed, online. Traditionally, Chinese products are sold through agents. It can be a case of 'caveat emptor' for the unsuspecting buyer when dealing remotely.

Since receiving this antenna direct, several UK suppliers have taken it up under different branding. While there may be some cost difference buying from UK sources, delivery from stock and the knowledge that reputable dealers support their buyers is well worth it. Price wise at circa £199.00 in the UK, it stands up well against what else is available.

Overall, I like it and I'm using it. I'm also really looking forward to reviewing the JPC-7 dipole - Part 2 coming next month! **PW**

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In last month's review of the JPC-12 vertical I indicated that there was more to come from this range of portable antennas from China, principally in the form of a compact dipole, the JPC-7.

Both antennas are available separately. The dipole package contains four 32cm arm extenders, two for each leg of the dipole, two telescopic whips and two resonating coils for 40-20m. Each version includes some dedicated custom parts unique to each kit variant. Here in the UK they are available as two separate packages.

Expecting to receive a complete antenna, what actually arrived from China was an upgrade kit for the vertical model, not currently available in the UK, and there was no tripod. Confused yet again I made some enquiries. It transpires that the 4m tripod mast is from another source and packaged with the JPC-7 here in the UK, by at least one provider.

The upgrade kit consisted of an additional coil, telescopic whip, two swing arms with thumb wheel screws and washers, the custom-made centre T-piece, screw-in alloy mast connector and a plug-in 1:1 balun with a Velcro type securing strap.

I had hoped that there would be two more of the black anodised alloy mast sections as per the full JPC-7 kit. My intention was to experiment with the original vertical by raising the coil position higher, thereby maximising the current distribution. It was not to be. Digging around I've recently discovered that additional mast sections can now be bought online.

On the upside, the additional coil likely makes it possible to resonate the vertical version on the 80m band, using two coils in series.

Back to the Dipole

While the custom centre piece is reasonably lightweight, each of the chrome steel swing arm connectors is heavy, weighing in at 90 grams each. Add the thumb wheel locking screws and washers, the little 1:1 ferrite balun plus the alloy mast connector and you have over half a kilogram of weight to support before attaching any arms.

Each of the swing arm connectors has two small spigots that locate in each end of the central T-piece. It's a cunning design with 360° matching sockets for the spigots, allowing the user to orientate the radiating elements in almost any direction.

The user can orientate the elements horizontally, vertically and just about anywhere in between. This is a useful feature if it's not practical to raise the system high enough to mitigate the effect of the ground on the radiation pattern.



JPC-7 Compact Dipole Antenna (Part II)

Richard Constantine G3UGF continues his detailed look at this range of new portable antennas from China, with some nice surprises.

Unless you're able to get the horizontal elements of a dipole half a wavelength above ground on the band of choice, it's bound to affect results. Closer to the ground you could easily end up with an NVIS (Near Vertical Incident Skywave) antenna. This is fine if you want to contact relatively close stations but pretty dire for low angle DX. Orientating the arms into a V shape or a slant dipole is worth trying, especially if you're not apparently getting anywhere.

As with the vertical, the loading coils are for 40m-(30m)-20m meaning that for higher bands they are removed. The antenna can then be configured as a full-sized dipole for one band at a time. Initial lengths for each band are similar to the single ended vertical (see last month).

I would recommend doing as I do. Invest in cheap tape measures to keep with each of your portable antenna kits so you never forget one. Also include a laminated tuning chart as a guide, just in case your little 'grey cells' temporarily desert you.

Tripods and Masts

Earlier I mentioned the alloy, screw-in mast adapter. As a photographer I instantly recognised that the custom fitting has been designed to fit

a lighting stand. Conveniently I already had the same one to hand, allowing me to replicate the UK package. Currently, a typical 4m tripod photo/lighting stand costs around £90.00+ in the UK.

Alternatively, low cost 3m painters' poles are readily available from DIY stores. Many have the ubiquitous, coarse 'Acme' thread also found on floor mops and brushes. In many cases the fitting can be quite easily removed; something I've done in the past. Once removed, simply pack the tube and secure the JPC fitting with self-tapping screws. Add some guys and ground stakes and you're in business.

While not as convenient or as tall as tripods, it's one way to keep the cost down with a little ingenuity.

Tuning and Performance

The disadvantage of an antenna that requires to be re-set manually when band changing is that it's labour intensive. Easier done at ground level so a vertical has an advantage over a dipole that requires raising and lowering, possibly more than once for best match.

The manufacturers claim an average VSWR of 1.3:1 or better. I believe that this relates to 10m with the dipole arms in a V shape as I found it

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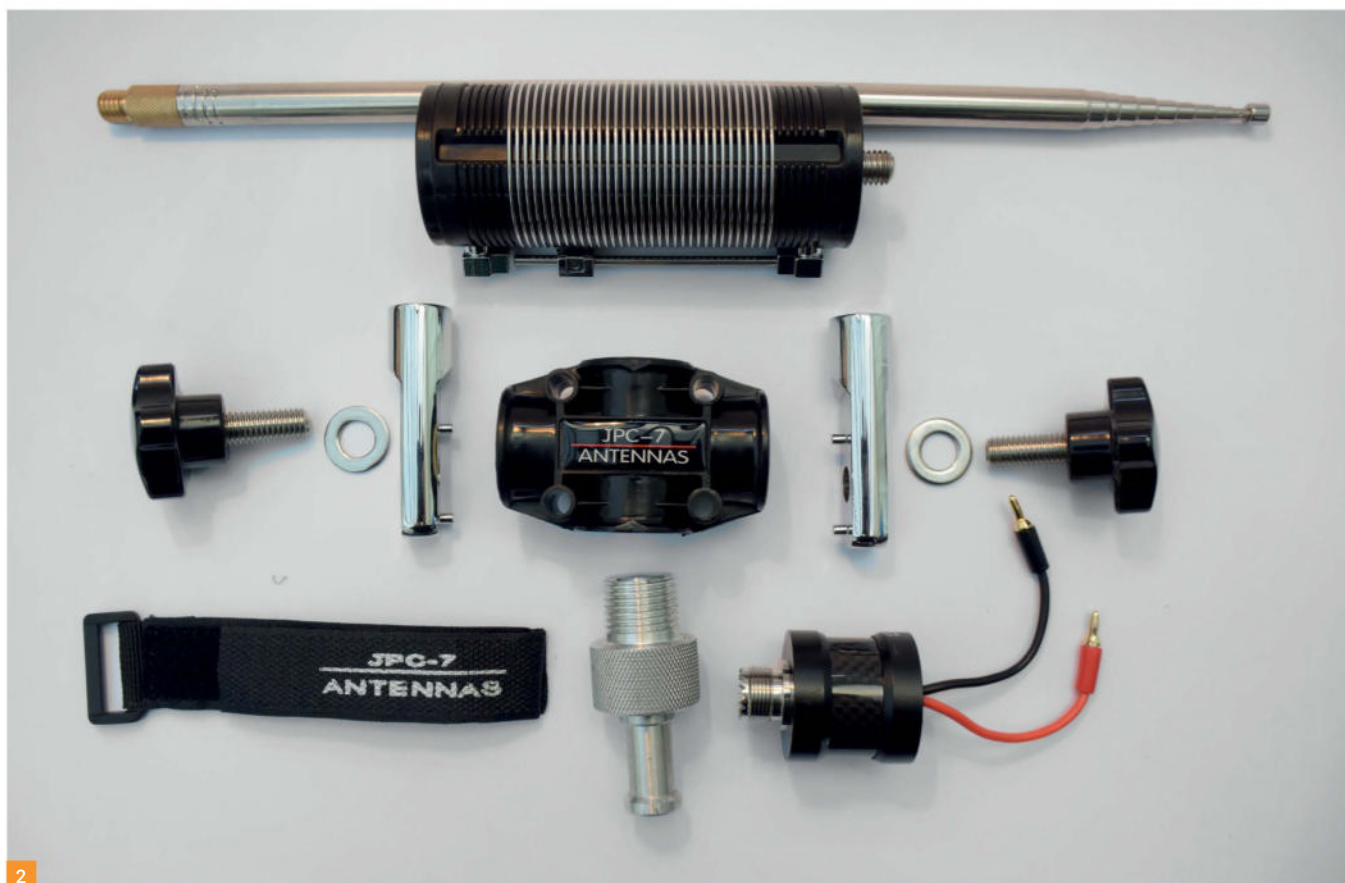


Photo 1: JPC-7 complete kit.

Photo 2: JPC-12 to JPC-7 upgrade kit from China.

Photo 3: Set up as a Horizontal Dipole.

Photo 4: Unique Dipole Centre and balun.

Photo 5: Painters pole ready for modification.

Photo 6: Arranged as a V Dipole.

Photo 7: Dipole + 4m tripod 'Ready for take-off!'

varied with location and was sometimes fiddly to achieve as a horizontal dipole.

That said, a dipole has the benefit of being much less dependent on surrounding ground conditions and has no requirement for counterpoises or radials. While it's not technically correct to say that all of the dipole's RF is 'in the air', I'm sure you get my meaning.

A good place to site this kind of /P antenna is where the land parallel to the elements falls away sharply in the wanted direction. Using this technique where the antenna 'sees' more free space has, from time to time, produced some amazing QRP results on HF.

Final Thoughts

At present the UK offerings fall into two distinct choices, the vertical or the dipole.

Looking back on my experiences with this product over the months I now think that there is scope for UK providers to think more in terms of a mix and match system. That is, purchase the



basic kit of your choice and choose additional bits and pieces, as required. Certainly, owners of the vertical would benefit from a cost-effective initial purchase and the option to purchase an upgrade kit as and when funds permit, which gives the best of both worlds.

For example, it was a revelation to discover that the ground stake supplied only with the JPC-12 vertical can be fitted to one end of the JPC-7

dipole T piece, thereby instantly creating a mount for a vertical.

There is a third socket on top of the T piece and provision to connect the balun or the vertical base unit. This makes an elevated ground plane practical and something else to explore. I'm looking forward to experimenting with 20-6m in this configuration and will be making up suitable radial kits.

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For JPC-12 users the option to purchase additional alloy tubes and raise the vertical's current point is another idea. An optional coil, added to the vertical kit would double the inductance to around $47\mu\text{H}$ for lower bands such as 60m and 80m.

Choose to purchase the matching tripod or fabricate your own. The available professional grade tripod is impressive and definitely well worth the money on its own. It has a multitude of other uses, even if you never own either of the JPC antennas. It's reasonably light in weight to transport, one of the best around. It has wing nuts to lock the sections. The antenna can be rotated and the sections are air cushioned, so won't trap your hand when telescoping. Speaking from past and painful experience, an excellent safety feature.

Note: With the antenna generating a significant head load in a breeze I would not contemplate extending it without securing the tripod base and adding para cord guys. A guy kit maybe? Sometimes I also hang a weighted bag on the base for extra security.

As mentioned in Part 1, have a few reservations, principally longevity and weatherproofing. That said, these antennas cover a wide range of /P activity from lightweight QRP backpacking with the vertical, to country park style activity with either antenna from a car or caravan.

For me the two separate kits are a solid 4 stars for starters with the potential for more with a little ingenuity and imagination, as described.

UK pricing, at time of press taken from ML & S listing:

- JPC-12 Stand-alone vertical, **£199.96.**
- JPC-7 Dipole + 4m tripod, **£339.95.**



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