# The Bilal Isotrons for 40m/80m

## Small antennas for the HF bands

The 80m Isotron antenna.

SPACE SAVER. I had been looking forward to testing the Bilal Isotron HF antenna. I have read about these for some time and given that they have been around for 30 years it was about time that we tested one. Now that Martin Lynch is importing them from the Colorado company it seemed like a good opportunity.

If you are not familiar with the Isotron range, they are small antennas for the 160m-6m bands. When I say small, I *mean* small. The 80m version as tested was only 32 x 16 x 15in (81 x 41 x 38cm) in size. The 40m version was even smaller – 22 x 16 x 15in (56 x 41 x 38cm).

Many people struggle to put out a signal on 80m from a small (or no) garden. With a dipole 132ft long (and even a G5RV 102ft long) it is no surprise that many people just can't get on the band. While a long wire will work, you still need at least 66ft, preferably more.

So an antenna that is less than three feet tall is obviously attractive. But can it possibly work? According to most Isotron users the answer is yes. Look at eham.net and you'll see that the antenna currently scores 4/5. Buyers seem to either love them or hate them – with little in between. While researching my upcoming book on stealth antennas I came across one flat-bound American amateur who uses nothing else but Isotrons. He has them mounted on a pole in his spare room and yes, he makes contacts.

Anyway, back to the test. The antennas supplied were the 40m and 80 Isotrons. You can set these up independently or mount them together on a single mast, fed by one length of coax. The interconnection between the two antennas is by a short length of supplied 300Ω slotted feeder.

There is nothing magical about the design. They use two aluminium capacitor plates top and bottom with a coil mounted between them. This LC combination makes the antenna resonant on a given frequency. There has been discussion on Antennex.com as to whether the coax is actually part of the radiating system. The instructions state that you should avoid lengths of coax that are an exact ¼ wavelength and I think that the coax is involved.

The manual says that the antennas must be mounted on a metal pole, preferably earthed. It can be mounted in an attic or on a balcony, but even if you can't earth the antenna it should still be on a metal pole. The instructions say that if you mount them in the attic you could use the mains earth for your connection, but this seems like a recipe for RFI unless you are running QRP.

The antennas arrived in a very small cardboard box. Opening it revealed the two coils (one for the 80m version and one for the 40m). Also included were the aluminium top and bottom plates, the plastic/nylon insulators that hold the plates apart, plus all the hardware to assembly the antenna. The instructions came as a photocopied booklet, but were quite clear. It took about 30-45 minutes to assemble each antenna. I suggest you read the instructions very carefully and allow some time for mistakes. It wasn't until I went to connect up the coil that I realised that I had put the insulating spacers in upside down. You won't need much in the way of tools – I used a couple of 11mm spanners and a flat-head screwdriver.

The antenna uses two aluminium rods to suspend the resonating coil between the top and bottom capacitor plates. The 80m version also has two small square aluminium tuning plates on rods that can be moved to tune the antenna to the part of the band you are interested in. You are advised not to fit these until the antenna is in position and you have found the natural resonant point, but given that it is designed to operate out of the box at around 3.950MHz (The US 75m band) you may as well fit one or both tuning rods from the start.

Bilal recommends one tuning rod and hat if you wish to operate from 3.675 – 3.8MHz and two if you wish to operate from 3.5 – 3.675MHz.

Once assembled the antenna is quite light (6lbs/2.7kg) and can easily be picked up with one hand. My only complaint was that the edges of the aluminium plates were a little sharp and it might pay to use some emery cloth on these to save cutting yourself.

Once assembled I mounted it on a lightweight 18ft aluminium mast that has been living in my shed since I moved into this property three years ago. This was mounted temporarily in a ground post in the back garden and the antenna was fed with Mini 8 coax.

Without the two tuning rods the antenna resonated at around 4.0MHz – way too high. But putting both tuning rods on, with the small aluminium capacity hats facing down,

the SWR came down to 1:1.8 at 3.610MHz, using an earthed MFJ analyser. The 3:1 SWR bandwidth at this setting was 3.586 – 3.642MHz (56kHz).

It is obviously best to set the antenna in the region of the band that is of most interest to you.

Conditions on a May afternoon on 80m were not too good, but there were one or two SSB signals around. I compared the Isotron with my 132ft OCFD, which actually lays across the roof at about 30ft. I also have an 85ft W3EDP end fed that also goes over the same roof. Both antennas perform about the same on 80m. I live in a typical suburban location and the noise level on 80m is usually S8-S9 all the time.

I found the noise level on the Isotron about 3 S-points lower than on my normal antennas as it was positioned further away from the house. This made listening much easier. In terms of signal strength, signals were generally down about 1-2 S-points on the Isotron.

With the antenna tuned to 3.600MHz my rig's internal ATU was able to find a match at 3.500MHz and 3.700MHz, but couldn't find a match at 3.800MHz. So if you want to try and work the whole band make sure you set the resonant point at about 3.650, and you may need to use an external ATU. Obviously, it is better all round to set the resonant point in the region of the band of most interest to you – SSB, PSK or CW. The fall off as you moved away from the resonant point was quite obvious. While at its resonant point the antenna was at times equal to my other antennas.

A CW QSO with Ray, G3ASG showed that the antenna was OK until QSB kicked in, then it became a bit of a struggle. Switching to the W3EDP made life a lot easier. That evening it was the same story. Contacts with F5VLO, G6NKL, M0KVA and G6UUR showed similar results to the afternoon.

This isn't quite as bad as it sounds as most signals in the evening on 80m are often 59+ 10-20dB, so they become S8-S9 on the Isotron. However, if conditions are marginal the Isotron will lose out. It performed better on CW and PSK31 where absolute signal strength is not as critical.

I passed the antenna to Roger, G3LDI who mounted it at 45ft and compared it with a low-ish 80m dipole at about 25ft. Roger found similar results to me – signal strengths were 10-20dB down with the Isotron and he found it noisier. He worked DO1DTA on 3635 getting a 59 report. Roger then switched to the dipole and received 5-9 plus 20dB.

Later he called CQ on the Isotron. G3OKA gave him 59, coming back to his first call too. Roger then switched to the dipole and he gave him 59 plus 10dB.

If you are looking for a replacement for an 80m dipole you will be disappointed, but if you have no other way of getting on the band it will work well for you, just make sure that you operate as close to its resonant point as possible for the best results.

The 40m Isotron antenna.

**40m VERSION.** I then built the 40m version, which looks very similar, but is slightly shorter. The aluminium capacitor plates are also less wide than on the 80m version and it only has one tuning rod, not two.

I fitted the tuning rod, complete with the small 1.5 inch square aluminium capacity hat and set it in the minimum capacitance position. I put the Isotron on the 18ft mast and found that it resonated out of the box at 7.050MHz with an SWR of 1:1.4. It also showed that it should be possible, by adjusting the tuning arm to resonate the antenna in the CW portion of the band.

I then took the tuning arm off completely and found that the antenna resonated at 7.3MHz, so it looks like you do need the tuning arm on, at least for the UK allocation on 40m.

Tuning arm back on, but with no capacity hat, and I eventually managed to get the antenna resonant at 7.1MHz with an SWR of 1:1. The SWR at 7.000 and 7.200MHz was then 1:2.5.

At the CW end of 40m the antenna was quite lively. Signals that were S9+10dB on the 132ft OCFD/W3EDP long wire were S8 on the Isotron, but then the centre of the dipole is 12ft higher. Some signals were only 1-2 S-points less on the Isotron, and quite a few were identical.

In the SSB portion of the band, my first call was answered straight away by DL60DRC, a special event station in Germany. Other SSB signals were also either equal on the Isotron or down by no more than 1-2 S points.

How the Isotron looks when you unpack the box.

Close up of the tuning rod.

The 40m Isotron didn't strike me as too much of a compromise. If you have no room for a 40m dipole the antenna will get you on the band. Again, if your interests are CW or PSK31 the antenna will serve you well. If you prefer SSB your signals are likely to be down by 1-2 S-points, but you will work the stronger stations.

**CONCLUSION.** The lightweight 40m and 80m Isotrons allow you to get on the bands when you don't have room for a full-size dipole or long wire. Yes, signal strengths are likely to be down a little, but you will be able to operate. It pays to get the antennas as high as possible (a chimney would be ideal if you don't have a mast) and follow the installation instructions carefully to get the best results.

Are they pile-up breaking DX antennas? No. But that's missing the point. With many people living in houses with little or no gardens the Isotrons allow you to continue to enjoy the hobby. Isn't that what it is all about?

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