

On-screen scoring information is another outstanding feature. Doctor DX is, after all, a contest simulator/trainer. Complete statistics are displayed in real time and include countries/zones worked per band, aggregate countries/zones worked, number of QSOs, points, and total score. Your contact rate, in QSOs per hour, is also given as an indication of your relative skill—at one point I was clipping along at 136 QSOs per hour while working a string of JAs on 15 meters. This detailed information allows you to compare your operating skill with that of others and to measure the improvement in skill that comes with practice.

You may also use the scoring information to participate in the AEA awards program. As in the real world, you can earn AEA-CC for 100 DX countries worked, AEA-AZ for contacting all 40 zones, 5-band AEA-CC, or be admitted to the AEA Honor Roll for working 250 DX countries or more. A special coding system generates a checkmark figure that verifies your achievement—no QSLs are required! In addition, AEA plans to publish a list of the high-scoring stations in their magazine ad each month.

This single program is incentive to buy a C-64. I know it's tough to believe that a piece of software could so realistically simulate amateur radio, but it does. You absolutely must hear it—a few times I caught myself reaching up for a knob to tweak!

I could talk myself blue trying to convince you that this product is the most exciting thing I've seen in my eleven years as a ham, but it isn't the same as experiencing it yourself. My final advice? Buy this program now!

For detailed information on Doctor DX, contact *Advanced Electronic Applications*, PO Box C-2160, Lynwood WA 98036.

**Perry Donham KK2Y
73 Staff**

BILAL ISOTRON 40

When the box arrived in my office last Wednesday, I remember thinking: "Even Ralph Bilal couldn't fit a 40-meter antenna into a package only 33" x 6½" x 3"... why, that's smaller than the boxes most model airplanes come in!"

Ralph had promised to send me the latest version of this Isotron 40, a small, versatile antenna designed for limited spaces such as apartments, condos, campers, and the like where it is almost impossible, for either legal or physical reasons, to put up a full-sized antenna. It's also recommended, from the standpoint of size alone, to serve as an emergency, mobile, or portable antenna that can be used in motel rooms, at a disaster site, or even bracketed to the bumper of an automobile.

"All well and good," I thought, "but does it work?"

Unpacking

On Friday, after work, I took the box out of the trunk of my car and carried it into the workshop, wondering if I'd be able to get it on the air before dark. When I opened the box, the first thing I noticed was the neat packaging job done by Bilal. There were two plastic bags containing hardware—good quality, plated hardware or aluminum hardware, depending on the use. I wondered if there was enough to go around; it has been my experience in the past to be shortchanged on nuts, bolts, and washers. But not this time, as you'll see.

Each component or group of components was neatly wrapped and protected

with brown paper and packaging tape. There were four pre-drilled and bent aluminum plates, one with an SO-239 UHF connector and a small standoff insulator already mounted on it; there was a 31" length of clear plastic tubing, partly wound with #12 insulated wire, with a nice foot-long lead and terminal soldered in place, and a piece of clear plastic tubing about 20" long, pre-drilled with holes; there were a couple of pieces of Lucite® with holes in them, a piece of 1"-square aluminum tubing, and several other, smaller pieces that I couldn't immediately identify. Nothing elaborate or fancy, either—just plain vanilla—and good old-fashioned workmanship. I began to believe that when Ralph Bilal told you something, you had better believe it. My confidence was increasing by the moment.

Assembly

The instructions include diagrams, step-by-step assembly comments, and a final tune-up procedure. After reading and rereading the instructions (something I seldom do because the drawings are clear, but in this case the antenna components seemed so different in size and shape from anything I had ever seen before that I figured that I had better read them carefully), I began the assembly. Surprisingly, it went smoothly and without any problems at all: a new first for me! Everything fit into place and all the holes lined up perfectly with no bending, binding, or mismatches anywhere.

Good heavens! So that's what this thing looks like! (See photo.) I couldn't imagine anything that ever looked less like an antenna! Oh, well, Ralph has been at this for over five years, so I had better trust him. He knows more about this thing than I do.

The "far" ends of the parallel rods were pre-drilled to accept typical TV-mounting hardware, and the hardware itself was included: U-bolts, washers, nuts, and plates of good, plated quality. Even the plastic bar had a dowel inserted in one end for reinforcement—the result of experience and cut-and-try engineering.

The instructions suggested mounting the antenna on a short length of 1¼"-diameter TV-mast tubing, and I just happened to have a five-foot length in the garage. I mounted the Isotron "antenna" to the TV mast with the help of my XYL who held things straight while I tightened the clamps. After all was square and aligned, I did the final tightening of the hex nuts, and there it was! Clearly, something different.

The weight was negligible and the wind loading laughable. Gosh, this thing could fit on top of almost any chimney bracket, on a mast alongside a trailer, or even in the shack in the middle of the floor! Yep, that's what I did. I happened to have a military-surplus wooden tripod that had been used to mount a transit. The short length of TV mast exactly fit into the central collar, so I set it up in the shack (read spare bedroom) between the beds. A ten-foot piece of RG-8/U was enough to reach the operating desk and B&W coaxial switch mounted there.

Tune-Up and Operation

Here is where things usually begin to go very wrong, with my usual luck, and I had little confidence that this ugly duckling would ever be a swan in spite of Ralph Bilal's confidence. Nevertheless, only 45 minutes had elapsed between opening the box and carrying the contraption to my shack... sort of a new record for me. There it sat on its tripod, daring me to fire up the rig and see what would happen. Okay, here goes.

Wow: signals—and quite loud, too! Putting the rig on the lowest possible output power, just enough to get a vswr reading, I was astonished to get a reading of below 2:1, and by careful adjustment of the small, parallel "tuning" plates attached to the upper and lower "diamond" plates, I was able to get a reading of below 1.5:1 at 7025 kHz. That is better than the standard trapped vertical I had been using was able to give me. I switched back and forth between the vertical (roof mounted, with 12 radials) and the Isotron 40, noticing that the QRN was appreciably lower on the Bilal antenna, whereas the received signals were not much if any different in strength. Once again, I was impressed with this little critter. Now if it would only transmit, I'd be happy.

Proof of the Pudding

Rather than timidly call a CQ, I decided to be brave and answer someone else. After all, if he didn't come back to me it wouldn't be my fault—or as disappointing—as if I had called and been found wanting. Okay, let's see... here's a good strong signal at 7031 kHz... KU1G... nice CW... there, he's signing...

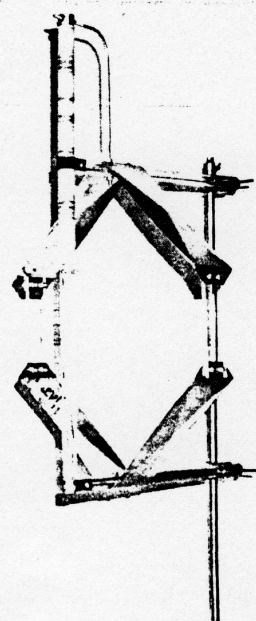
KU1G KU1G, de W1XU, W1XU, K.
W1XU de KU1G; R, R, Tnx call OM; ur sigs 599, 599 hr in Monroe, CT; name is John. Hw copy? AR. W1XU de KU1G, K.

Wow! 599 in Connecticut! Well, maybe that's just an exception. Let's finish here with John and try another.

At 0020Z (twenty after seven, local time) I heard WX4L calling CQ. A quick shout and he came back: 559 in Gaffney, South Carolina. Name is Ed. Well, that is more reasonable, I thought, but still, all the way to South Carolina on an indoor "lump" ain't too shabby!

Next, I called Steve K4CXJ in Nashville, Tennessee, and we compared antennas. The trapped vertical gave me a 569 with QSB and the Bilal Isotron gave me a 569 with no QSB! The band wasn't great, but it was active.

Along about twenty before 9 I heard Bill K2SVC in Ithaca, New York, and he gave me a 599 with some QSB. A quick comparison showed the outdoor vertical at S9



The Isotron 40.

and the indoor Isotron at S8. Not bad, I'd settle for that any day.

After signing with Bill, I worked Jim KX8E in Highland, Michigan. Jim said I was 599 there and claimed very little if any difference between the vertical and the Isotron. It was obvious that the band was improving and that the mid-range stations were skipping in loudly.

I wonder if I ought to try a "local" to see what happens, I thought. There was Paul KB1MJ/BS with his brand-new Extra-class ticket on 7024 kHz. Giving Paul a quick call, I got a 589 from him. He was down a bit, I thought, but the 569 I gave him was still a good report. When he told me he was running 20 Watts to a home-brew station (not just a transmitter), I perked up. It seems that Paul actually loves to build gear, and his receiver is about 9 months along in development... with a few more to go until he is satisfied. The keying was very nice, home-brew, of course, and Paul said he made the paddles, too!

The transmitter was a combined solid-state vfo with a tube final. Nice. I suggested to Paul that when his station was completed to his satisfaction, maybe he ought to write it up for a magazine... hint, hint! Let's hope he does.

Well, it was getting late; maybe a couple more and then to bed. Tuning around, I discovered Frank VE2GG in Dorval, Quebec, on 7021 kHz. He came right back to my call: "599, OM." He was about a 589 at my station. Comparing antennas, Frank mentioned to me that the Isotron was S9 + 10 dB, whereas the outside antenna was only S9 + 5 dB! Here, the Isotron actually put out a better signal than the regular antenna! Probably skip angle, etc., but who cares? The performance of the Isotron 40 is just plain phenomenal.

My last QSO of the evening was with Chuck N8FNZ in Detroit. He gave me a 589 and I gave him a 579 at 0354Z, six minutes before eleven o'clock local time. Chuck was using his new Icom 751 and a dipole, sloping toward the east.

Well, time for hitting the sack soon, so I signed with him after a pleasant rag-chew and switched off the rig. Well satisfied with the evening's work, I decided to try SSB on Saturday morning. After all, with 75 Watts output, CW is a lot easier to cut the mustard than phone, I realized, so phone would be the final proof I needed to see if the Isotron was really an antenna.

On Saturday morning at 9:50 local time, I heard W3DWI calling CQ. His signal was loud and I wanted to call him, but I had not changed the setting of the antenna to adjust it for lowest vswr up here on phone. Nevertheless, I decided, what the heck; I'll just call anyway; no harm if he doesn't hear me. A short two-by-two, and Ed in Chambersburg, Pennsylvania, came right back with a 57 report... very little QSB... nice steady signal. We exchanged the usual information and had a pleasant half-hour chat right in the midst of the Saturday morning QRM.

When the QSB took me almost out, I switched over to the outside antenna and was able to finish the QSO. So—we found out that under poor conditions, the outside BIG antenna is a bit better than the small (tiny) indoor one. Well, what's so surprising about that? That's what one would expect... but I was still very satisfied with the Isotron 40. Ralph hadn't lied to me yet; he hadn't overstated his performance figures; the antenna worked just as he said it would. Not only that, I firmly believe that if the Isotron 40 were placed at the same height as my vertical and outdoors, it would work equally well! That's a lot to say, but I think it is a true statement... and I'm going to prove it soon.

Later, after a long weekend of testing

the antenna (during which time, nearly 100 stations were worked on phone and CW), a pattern became quite clear: Under good conditions the Isotron 40 nearly equalled the much higher outdoor vertical. Under poor conditions, it was nearly three S-units poorer. On the average, the Isotron was only one to two S-units down compared with the vertical.

It will be desirable to mount the antenna outdoors at the same height as the vertical for further comparisons. I strongly believe, based on tests so far, that it could be almost as effective as the vertical.

Other stations contacted in the US were K4JE (589), W4LRD (579), and W2JUF (579). During the European Field Day, we worked the following foreign stations using the Isotron 40: ON7AR/P (589), G3WKX (589), DL0ET (559), DL0OS (379), DL0AU (559), G4GXK (579), DK0TU (599), DF0CN (599), PI4RT? (599), and GM3USL (599). Later, I heard NQ6E in San Francisco, and Bob gave me a 569. Of course everyone knows that all contest reports are not exact, but at least the antenna can work DX without a terrific disadvantage.

Many times my signal would be S8 on the Bilal antenna and S9 on the vertical. In only one case, reported before, was the Isotron better than the vertical.

Almost every station contacted in the US and Canada was very interested in knowing more about the Isotron. One operator even said he was going to buy the 80-meter version after hearing what the 40-meter version could do. So, there you have it, fans. Try one for yourself and see what you think.

Theory of Operation

The Isotron antennas may be capacitive hats on a loading coil... because that's what they appear to be electrically. However, there is a large radiating surface (according to Ralph) that would seem to make the Isotron antennas the equivalent in surface area to full-size antennas. This does not imply that the "capture area" of the Isotron is the equivalent of the larger antenna, however. In spite of the small size (31" x 18" x 12", approximately), it appears to be radiating quite efficiently—something that I had not thought possible with merely a loading coil with capacity hat as a radiator of rf energy.

The claimed bandwidth between 2:1 vswr limits is 200 kHz, according to Ralph's measurements. I was able to verify this approximately by swinging between roughly 7050 and 7250 kHz without retuning the antenna. However, for really critical work, it would be best to retune the antenna when moving from the low end CW portion to the high end SSB portion of the band.

Ralph mentions the fact that it is necessary to be very careful in adjusting and tuning the antenna because the surround-

ings can affect its impedance drastically. He gives some good counsel in the instructions about this, and several recommendations to follow in case tuning up is a problem. An rf noise bridge or similar device to help tuning is strongly recommended when setting up the Isotron for best performance.

Other Antennas by Bilal

Ralph Bilal can furnish a 160-meter Isotron, an 80-meter version, and a 20-meter version also. I would like to say that the one that looks most interesting to me is the combination 80/40 Isotron—actually two antennas, tuned to the bands, mounted back-to-back on a single mast, and fed with two separate feedlines. Living as I do in a home that rests in a small clearing in the woods, that would really solve my antenna problem. I have used a chimney mount for several different verticals and small beams, so I think it would be very practical, simple, and nearly ideal in my location to solve the problem with the Isotron system.

Conclusion

I really like the Isotron 40 and am going to be very interested in trying out the other versions to see if they perform as well on their respective bands as this one does on 40 meters. Certainly the price is reasonable, considering what you get: the 160-meter version that stands only 5 feet high and weighs only 12 pounds (smaller than most two-meter beams) for \$149.95 plus shipping; the 80-meter version at 4 1/4 feet and 7 pounds at \$63.95; the 40-meter at 31 inches and 4 pounds for \$52.95, and the 20-meter Isotron, on special sale at \$39.95, measuring only 21 inches and weighing in at a mere 3 pounds. Finally, the 15-meter version at 21 inches and 2 pounds, goes for \$32.95. All of these must have shipping costs added, varying between \$3.50 and \$8.50.

The 80/40 "Special" Isotron comes for only \$110 plus \$8.50 shipping cost, and there are also 15-meter and 10-meter versions for hams, as well as an 11-meter version for CB.

For your own Isotron, whatever it may be, call or write to the Bilal Company, S.R. 2, Eucha OK 74342; (918)-253-4094. Tell Ralph that 73 sent you, with a strong recommendation. Reader Service number 477.

Jim Gray W1XU
73 Staff

BARKER & WILLIAMSON'S AP-10 PORTABLE ANTENNA

Nothing that simple will ever work.

That was my first thought on viewing the Barker & Williamson AP-10 Portable Antenna. I had seen ads in ham publications from B & W but had always just glanced at them.

Now, however, for the first time in 15 years, I was faced with living in an apartment. I had changed jobs and moved from Ohio to Wisconsin, and I discovered that our new apartment complex allowed absolutely no outdoor antennas.

My father (K8MC), a veteran DXer of many seasons, had purchased the B & W antenna for me as a Christmas present. He did his best to convince me that this was better than no antenna at all. I decided to give it a try. It was either that or face the unpleasant withdrawal symptoms associated with lack of exposure to Morse code.

The antenna had arrived in a neat little box with all of the parts inside. The parts included a 22 1/2-inch whip which telescoped to 57 inches, coils for 10 meters through 40 meters (including 30 meters), a wire counterpoise, coax, and assorted screws and bolts. (We've heard that the AP-10 will load on 2 and 6 meters without additional hardware. —Ed.)

Also included was a very clearly written instruction booklet. Then again, the antenna was so simple that the instruction booklet necessarily was very basic and well written.

Assembly time was about 5 minutes and required only a screwdriver and a pair of pliers. To a seasoned DXer and this second-generation ham, it seemed too good to be true.

Not content to wait until I returned to Wisconsin, we put the antenna on the air at my father's old homestead in Ohio. Since the weather was a little nasty outside, we decided to clamp the antenna to a wooden table in the ham shack.

To make a long story short, the antenna worked. It's true we didn't work any exotic country on the first try, but our CQ calls produced solid contacts on 40 meters with hams in several east-coast states.

Since both of us use antenna tuners for all of our antennas, the B & W indoor whip was run through an MFJ tuner with 1000-Watt capacity. The swr was virtually a flat 1:1:1.

Upon arriving back in Wisconsin, I began to have second thoughts about the antenna loading up properly with my Triton 4. After all, that was a rugged antenna tuner we'd used in Ohio. However, my worries evaporated when I tuned the little whip attached to a wooden dresser in the bedroom with my DenTron Jr. Monitor tuner. Swr could be adjusted down to 1.4:1 throughout the CW portion of the 40-meter band. I called CQ and worked stations from Colorado to New York that first evening.

Summoning up all of my courage several evenings later, I attached the 20-meter coil. The swr on this band could be adjusted to 1.1:1, and I worked stations from California to New Hampshire.

Of course, I was very pleased and surprised by this kind of performance from a little indoor whip. In addition, I felt confident this little B & W product would keep me on the air even in the apartment-complex environment.

Needless to say, there are some compromises and shortcomings one faces up to when using this kind of antenna. You can't put out a booming, dominating DX signal, and you don't always get 599 signal reports. In addition, I have not tried the whip on SSB because I work 100% CW. I'm sure the results on voice transmissions would be disappointing with all of those 1-kW (and 5-kW, too, I suspect) signals on the air.

Working with this antenna on CW is very similar to working QRP. It takes a little more effort to hear the incoming signals and a little patience when transmitting, too. However, the proof is in the pudding, and the B & W whip has proved it can keep me on the air. Unless the bands are totally quiet, I can QSO just about any time I want to.

For example, I have worked 30 states on the 40-meter band, including California, Oregon, Utah, and Maine. While signal reports are not always good, the fact still remains that hams in those places actually heard me well enough to QSL.

The 20-meter band has been even better, and I've actually worked a little DX. I have QSL cards from Haiti, France, and the Virgin Islands. I have many more cards from all over the United States.

While I'm not saying the B & W model AP-10 antenna should be considered as a primary station radiator when better gear can be installed, I am saying that it apparently does the job it was designed to do. It keeps hams in my situation on the air. I'm grateful, because I'd hate to face those horrible symptoms of withdrawal brought on by the lack of exposure to Morse code.

For further details, contact Barker & Williamson, 10 Canal Street, Bristol PA 19007.

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WHAT DO YOU THINK?

Have you recently purchased a new product that has been reviewed in 73? If you have, write and tell us what you think about it. 73 will publish your comments so you can share them with other hams, as part of our continuing effort to bring you the best in new product information and reviews. Send your thoughts to Review Editor, 73: *Amateur Radio's Technical Journal*, Peterborough NH 03458.