

Newsletter of the  
Twin City DX Association  
[www.tcdxa.org](http://www.tcdxa.org)

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**Gray Line Staff**

**KØAD  
KØIEA  
KØJUH  
WØBV**



# FT5ZM Amsterdam Island DXpedition Update

Ralph, **KØIR** has been incredibly busy organizing the FT5ZM operation. After reviewing the team's credentials and planning documents, TAAF issued a permit to land and conduct a DXpedition from Amsterdam Island for up to 18 days between the dates of January 15 and February 20 of 2014. Landing, set-up, and take down are included in those 18 days.



The well-known and experienced DXpedition vessel MV Braveheart will board the team in Fremantle, Australia in early January of 2014. It will be a 3800 nautical mile round trip just north of the rough "roaring 40s" of the southern hemisphere. The total time at sea will likely be 16 to 18 days in the 128-foot Braveheart.

The Braveheart will arrive in the port of Fremantle, Australia on January 12, 2014 and be available for the team to board. Fuel and supplies will be taken aboard and port documentation procedures completed. The vessel will sail for Amsterdam Island on January 15, 2014. The sailing time to Amsterdam Island will be 9 days, with an estimated arrival date of January 24<sup>th</sup>.

Landing operations will commence as soon as the sea conditions and weather allow. Once the team is ashore, they will have 18 days to set up, conduct the DXpedition and tear down for departure. The return sail to Fremantle is also estimated at 9 days. The team anticipates being back in Fremantle by February 23, 2014.

Fund raising efforts by Bob, **K4UEE** are making good progress toward the \$400K budget. One eye-opening statistic is the fuel expense. It's estimated that the voyage to and from Amsterdam will consume approximately 70,000 liters (approx. 18,400 gallons) of fuel. You can see how, when all of the supplies are factored in, it's easy to arrive at \$400K of expenses.

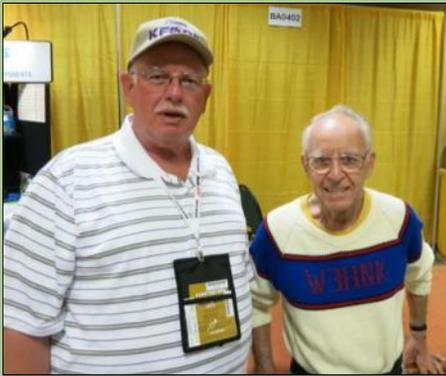


If you have not already done so, please consider making a contribution, now, to this historic DXpedition. Donation info, including information on how your donation can be tax-deductible, can be found at <http://www.amsterdamdxdx.org/donation/>.



# TCDXA at Dayton 2013

Photos courtesy of Dave, KØIEA



Dennis, **KFØQR**(L) meets Joe, **W3HNK**



The TCDXA gang: (L to R) Bob, **WØEK**; Gary, **KØGX**; Keith, **KØKG**; and Dennis.



Dennis compares DX notes with Gian, **IØZY**.



Keith and Dennis meet DXCC legend Don Search, **W3AZD**.



NCDXF officers (L to R) Rusty Epps, **W6OAT**; Glenn Rattman, **K6NA** and Don Greenbaum, **N1DG** pose with Keith and Dennis.



**TCDXA Welcomes  
our Newest Member!**

**Hauns Froehlingsdorf  
KIØGU  
Ramsey, MN**



# Spratly 2013

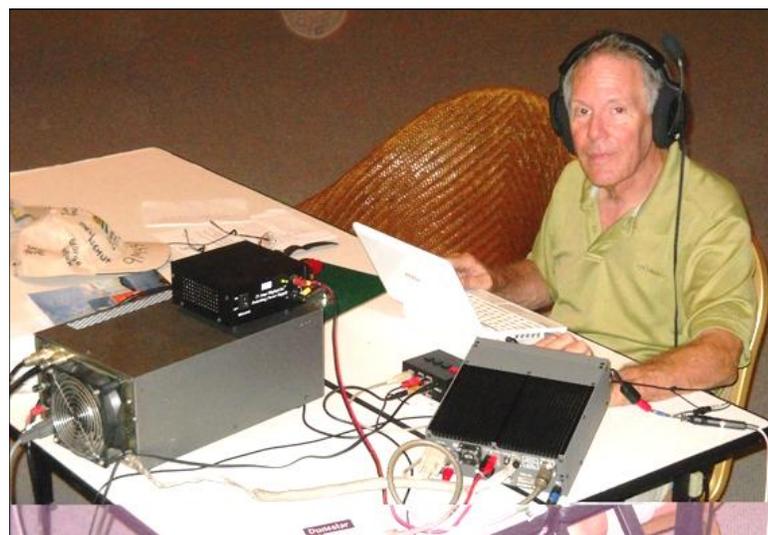
by Tony Wanschura, KMØØ

**This** story actually had its beginning back in 2010. I'd traveled with my wife, Deb, to SE Asia a couple of times, and had come to love that part of the world. I had operated from XU in 2006 and 2007, but during the summer of 2009, with CQWW CW on the horizon, I began to think about a way to combine a vacation in SE Asia with ham radio activity, but from an Oceania location. Not wanting to carry a lot of gear, I searched for a complete rental shack and found one at Langkah Syabas resort near Kota Kinabalu in Sabah (9M6). There, I met Steve, **9M6DXX** and John, **9M6XRO** who helped me put up some low band wires for the contest. I had a great time, and wanted more.

After returning to 9M6 for CQWW CW 2010, I stayed home for a couple of years, but stayed in touch with John and Steve, who generously kept my 9M6 license current. Then, last summer, I received a completely unexpected email from Steve, asking if I'd be interested in joining an expedition to Spratly. It would involve expenses well beyond what I was accustomed to. I actually decided to take a day or two to think about it, but I knew from the beginning that I would be unable to refuse. I don't keep a "bucket list," but this could be a once in a lifetime thing. My time on Spratly would begin in mid-March, but I left for Hanoi on January 8, with a stop in Singapore to leave my K2 with James, **9V1YC**. I planned to travel and visit friends in Vietnam and Thailand, then return to Singapore and to James for the K2 around March 1<sup>st</sup>.

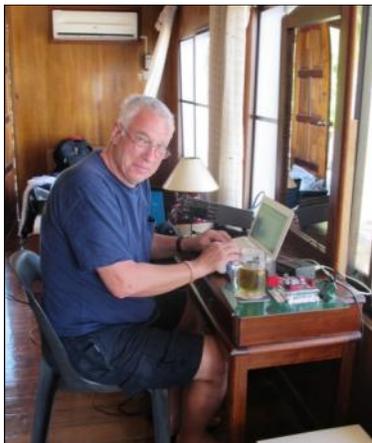
From Singapore, I flew to Kota Kinabalu, the capitol of 9M6. Air Asia's maximum baggage allowance for the flight was 40 kilograms, and, between my K2 and a portion of James's expedition gear, we were so close to the limit that I could not take my clothes bag. My shorts, shirts, and other personal items had to double as packing material for the gear.

I arrived in Kota Kinabalu a week before we would leave for Spratly. Ben, **N6MUF/DJØYI** flew in a day later, and we rented the "family room" (big, breezy, right on the water) at Seaside Travelers Inn, just south of Kota Kinabalu.





Our vertical on the corner of the deck.



Ben operating at Seaside Travelers (9M6).

We bungee-corded an HF6V to the corner of our deck and 10 feet above the water (photo above), ran a few radials, and got our first taste of just how well a simple quarter wave vertical can work close to salt water. Between drinking Tigers, enjoying the food, reading and napping, we each made around 2,200 contacts over five days of casual operating. Yes, it was tough, but I'd do it again!

Our group was led by Steve, **9M6DXX**, and included John, **9M6XRO**, James, **9V1YC**, Don, **G3BJ**, Pista, **HA5AO**, George, **HA5UK**, Ben, **N6MUF/DJØYI** and myself. We assembled in Kota Kinabalu during my stay at Seaside Travelers. While some of the guys knew each other, no one of us had ever met every other member of the team. We held planning meetings over Tiger Lager and delicious southeast Asian food. A few days later, very early on the morning of March 11, we boarded an ATR-72 twin-engine turboprop, bound for Spratly.



Getting ready to depart Kota Kinabalu Airport for Spratly.

The island that we call Spratly is also known as Swallow Reef, or Pulau Layang Layang to Malaysians. Not to be confused with other Layang Layangs in the area, it is only one of the larger of a group of as many as 30,000 coral reefs and islands (of volcanic origin) which dot the eastern and southeastern South China Sea, and are shown on most maps as "The Spratlys." Parts of the island group are claimed by just about every nation in the vicinity, including tiny Brunei. All but a very few of the islands are permanently habitable, but all are important in establishing national boundaries and for staking claims over rich fishing grounds and the oil and gas reserves beneath. Nearly all of these islands are claimed by China, even those that lie much closer to those other nations than to China. Vietnam has been very aggressive in setting up outposts like fortified buildings, docks, fishing ports and heliports on several islands. China, the most bellicose country in its claims, has threatened to seize any competitor nation's ships found in the area. Some Chinese hams felt it was their patriotic duty to extend the hostilities onto the airwaves, but that's another story.



"Our" Layang Layang is a coral island with a large and beautiful lagoon, roughly 300 kilometers northwest of 9M6 and home to an airstrip, a small Malaysian Navy base, several dozen feral cats, correspondingly few birds and a dive resort known worldwide for "wall diving" and viewing of hammerhead sharks. The resort where we stayed and operated from was built years ago by the son of the former prime minister who loved diving, and wanted a place to take his friends. A sea-wall, which encircles the entire island, was built



Bird Island



in the early '90s. Historically, Layang Layang has been a home or nesting place for thousands of birds. This became a problem after the airstrip was built, with birds presenting a hazard to the aircraft. The navy brought in domestic cats, who of course quickly multiplied and began to threaten the very existence of the birds. The navy then built a separate island just for the birds, well out of cat roaming range. A cruise past Bird Island is now a major attraction for visitors.



Our QTH: The Avillion Layang Layang dive resort.

The Avillion Layang Layang dive resort is a pretty classy place, at least by South China Sea standards. Most of us chose double-occupancy rooms at around \$200/person per day. All meals were included, and there were five feeding times per day, structured around dive schedules. In addition to a place to sleep,

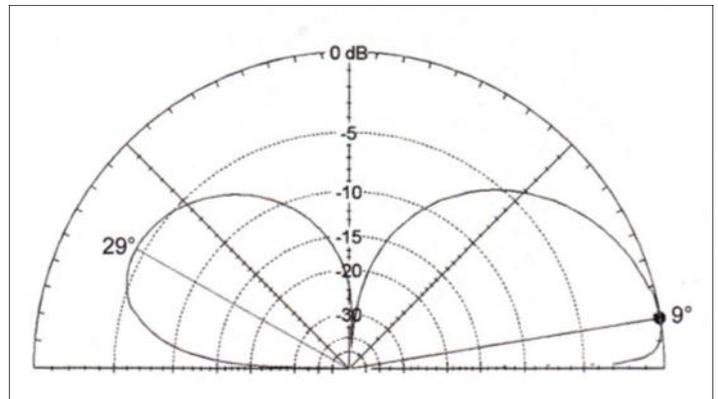


Steve, 9M6DXX assembling one of the verticals *indoors*.

we needed to rent space to operate from. Our only reasonable choice, based on proximity to the sea and distance from the everyday activities of the resort, was a large conference hall, conveniently just a few feet from the lagoon seawall, at a cost of about \$200 each. Measuring about 30x40 meters, the building was *truly* large. We would need only one corner for

our five stations, and we could stay out of the tropical sun by assembling all of our verticals (including the big Titanex) inside, in air-conditioned comfort. And, did we ever appreciate that!

Did I say verticals? Yes. In 2007, the group at **3B7C** ran head-to-head tests comparing quarterwave verticals and vertical dipoles near the sea to 2-, 3-, and 4-element monoband Yagis for various bands mounted at 40 feet, and also close to the water. After many A/B tests, they concluded that, in terms of both receive and transmit performance, there was very little or no difference between the verticals and the Yagis. Later, tests at **4W6A** found that, while a hex-beam at 40 feet could be a little better on short skip signals (like JA), the verticals were consistently a good S-unit better on long skip.



Why is this? The vertical axis radiation pattern shown represents a quarter wave vertical on a beach, in the direction of the water (right) and away from the water (left). Note that maximum radiation in the direction of the water is at a nice low angle of only nine degrees, and is 10db stronger at that angle than over land! That's because the sea is the closest thing you'll find on this planet to a perfect reflective surface. Fortunately for us, that reflective surface was to the north. Although water is fantastic as a reflective surface, it does not provide a good current return, so you can't just drop a ground wire in the water. You still need radials; two per band is adequate, but more is better. We also tried a vertical halfwave dipole on 12 meters, which seemed even better at times than the quarterwave on very long skip signals.

The best location for a vertical is within a quarter wave of the water. Most of our verticals, with the exception of the Titanex, were planted in the rubble-and-concrete seawall, within a few of feet of the la-



goon and just across a concrete path from the station end of the conference hall. The photo, below, shows a typical installation, with the base of the vertical inserted two or three feet into an opening in the stone and coral rubble fill behind the seawall. Sometimes a set of guys was needed; sometimes not. Easy; most of the verticals were a one- or two-man job.



A typical vertical installation. Don makes final tuning adjustments to his HF6V.



Four of the verticals arranged along the seawall.



Titanex tilt base (very handy) and the base tuner.



James and Steve erect the 12m vertical dipole.



But how many hams does it take to erect a Titanex VI160E? Two to push it up, two to pull it up, one for each of the other two guy points, and one to watch the very tip, to prevent it from digging into the ground if anyone else loses control. Then, once we'd worked up a good sweat, it was time to lay down 60 or so quarter-wave radials, and attach the base tuner, which allowed for both 160 and 80 meter operation.

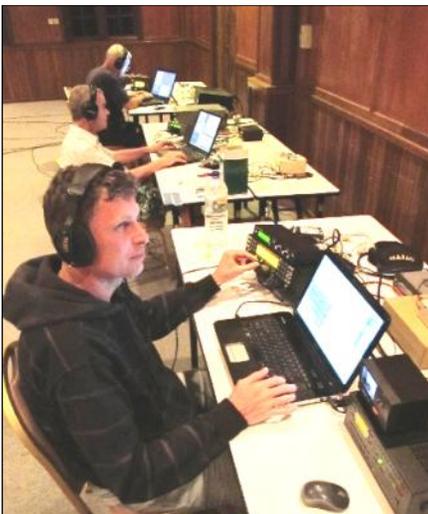
Inside, each station was different; either a K2 or K3, with a Quadra or a KPA500 or a THP HL-1.2KFX. Initially, to ensure that all stations would be manned at the appropriate time of day, we tried a very structured operating schedule, which also rotated us through all of the stations. But, when unlucky Ben went to take over a big pileup at Pista and George's station and sat down to a Hungarian keyboard, the station rotation idea was reconsidered. This and other events made it clear that everyone would be most comfortable using their own radios and computers, whenever possible.



James gets comfortable on 40 meters.



My operating position.



Three of the stations.  
(front to back): George, Don, Ben.

We ran band-labeled feedlines to a central point between stations. Also there, on a table, was a small suitcase of Dunestar filters, one for each band. Any one of us could walk into the shack, go immediately to the table, and see which bands were available. No need to check each station.

We decided that we absolutely needed every station to be active from two hours before sunset until two hours after sunrise, so a team of (usually two) operators was assigned to each. Team members were left to determine their own operating schedules within those mandatory hours. We all really liked this approach. I ended up as a team of one, using my own Netbook computer, K2, and THP amp. My hours could be a bit more flexible, but I still ended up operating nearly all night, most nights. Though I was a team of one, I managed to produce more contacts than any other

team, except one. I felt very good about that.

We covered the remaining hours as best we could. The fact is that daylight operation from that part of the world is just not very productive. Picture, in your mind, what lay to the east of us during our hours of daylight: A huge expanse of water with very few stations to work. Certainly, there were daylight openings on the higher bands, but they were mostly very marginal. We could work the same stations, and more, with better signals, during the mandatory hours. On a couple of nights, the 12 and 10 meter bands burst open in especially spectacular fashion during the hours of darkness.

We tried very hard to please the world on 160 meters. On most nights, though, we had serious atmospheric noise (to S9+20), and by the time the noise began to dissipate, it was often too late for North America. In spite of the noise, John and Don did well to log 1310 QSOs on top band, including 162 North Americans.



Pileups were almost always huge, except during very marginal conditions, when they at least seemed smaller. The question arose of how to handle them. I've always admired DXpedition ops who could tune up or down in a pileup and respond to callers at predictable steps in frequency. I truly wanted to do that, because it rewards operators who are sharp enough to pick up the pattern. With fewer callers this might be possible, but the pileups at Layang Layang created a solid wall of sound. I would usually start by picking off callers at the high end of the swarm, then move to the bottom edge and do the same, and then move back up in frequency, working the stronger callers in between, but I was not very predictable. Some ops like narrow filters in cases like this, but that requires a lot of tuning, and by the time you've moved on to the next station, you've missed half of his callsign. I believe in letting my brain do the filtering. With my passband set to 1000 hertz or so, I could pick out several copyable signals with a wide variety of notes. The more stations I could hear, the easier it was to immediately copy a callsign, and the less tuning I had to do.

With pileups that big, we quickly noticed a difference between radios. Previously, I'd heard reports of pileups on the K3 turning to "mush" when there are many weak stations of about the same strength all close to the same frequency. Our Spratly pileups provided those conditions exactly. It is disappointing to me, as a K3 owner, to have to say this, but the K2 does have a crisper, cleaner sound. Picking callsigns out of the pile on the K2 was noticeably easier and less tiring. I'm not sure why this is, but it's a fact. We also had a few problems with the K3s being configured differently, or filters set up improperly. The lesson: If you're ever part of an expedition using multiple K3s, make sure they are configured as identically as possible, and that everyone has read the operating manual!

There were also big differences in pileup behavior, which created a sort of pileup whiplash, especially when going from working JA to working EU (or vice versa). JA pileups were painfully orderly, while the EU pileups often threatened imminent chaos. So, JA friends, I really don't need to send your callsign 100% or even 75% correctly to have you come back to me. EU friends, if I go back to a certain callsign, I would really like a response only from that station or from a callsign reasonably close. To everyone: Too many of you are in the habit of sending your call 2, 3, or even 4 times without listening in between. This just slows

things down for everyone. I'm almost always ready to answer you after the first time. So, once or twice is enough, and listen briefly in between, please. Give the DX a chance to come back to you.

Our hope, going in, had been for better conditions and 50,000 contacts. We finished with 43,716, while enduring a couple of days of especially awful conditions. Our most productive band was 17 meters, with just under 9,000 Qs, followed by 20, 15, and 12. Fifty percent of our contacts were with EU, followed by Asia (29%) and NA (20%). By country, 23% of our contacts were with JA, followed by 18% USA.



Our last sunset on Layang Layang.

In conclusion, I have to say that, never in my lifetime, have I had this much fun with a radio. This contrasts greatly with the black hole, where I've never had *less* fun with a radio. It was a real privilege and a pleasure to share common tasks and goals with so many really great operators and experienced DXpeditioners. Would I do it again? Yes. I'd go anywhere with these guys.

Good DX! Tony, KMØØ



**The 2013 9M4SLL Team** (left to right):  
Back row: James, 9V1YC; John, 9M6XRO; George, HA5UK; Ben, N6MUF/DJØYI; Steve, 9M6DXX.  
Front row: Tony, KMØØ; Don, G3BJ; Pista, HA5AO.



## KCØSB's "Other" Hobby

A look at how Gary Meyer, KCØSB spends some of his spare time, when he's not playing radio or golf.

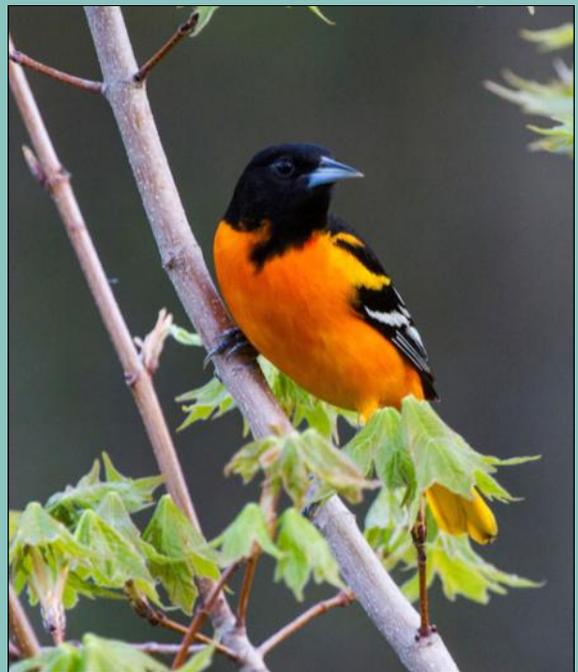
**In** addition to DXing and golfing, Gary has a great passion for nature photography.

Now enjoying full retirement, Gary has more time to spend outdoors, looking for his favorite subjects to photograph. His specialty is bald eagles, followed by a variety of wildlife.

When he's on the road up north looking for photo opportunities, he travels with a Canon 7D and 100-400mm lens on his lap and his Canon D1X and 500mm/2x converter on the seat next to him.

So, when the young black bear appeared, Gary was ready. It was too close for the D1X, so he used the 7D and shorter lens to take the photo. He estimated the bear's distance at twenty to thirty feet. Now that's a close-up!

You can see a collection of Gary's photos at <http://www.garrickmeyerwildlifeprints.com/>





# The MWA Contest Corner

## Selecting a New Contest Radio

by Al Dewey, KØAD



**After** the last contest season, I concluded that it was time to think about a new contest radio. I have historically been a Yaesu guy. My current station consists of an FT2000D, as well as an FT1000 MP MarkV. Both of these are 200-watt radios that allowed me to run the full 150W in ARRL Contests, and to bump things up to 200W when looking for DX outside of contests. Still, I felt I needed to make some improvement on the receiver side. My thinking was that if I had a receiver that could do just a tad better with the really light signals, as well as dealing better with adjacent channel interference, I could up my game a little. I was reasonably happy with my FT2000, so decided to replace the Mark V. Every time I make a major purchase, I do a lot of research, and talk to a lot of people to get their opinion. I also set a top budget of about \$3,500. After investigating, I narrowed my options down to the Yaesu FT3000, the Elecraft K3 and the ICOM 7600.

The FT3000 had just received a pretty decent review in QST. It claimed the same basic receiver as the higher-tier FT5000, which is a real plus. I liked the look of the radio, and, like I said, I have historically been a Yaesu guy. My experience has been that, although there are better radios on the market than Yaesu, the FT radios are always a good value for the money. The specs for the FT3000 were not quite as good as the K3 and 7600, and the band scope seemed kind of small compared to the other two radios. Also, there were a few comments in the on-line reviews that discouraged me a little. Still, the FT3000 was a contender.

I had always been intrigued with the Elecraft K3. The specs for this radio are fantastic. I like the idea of building it from a kit, and personalizing it to my operating requirements. It seemed to be a radio with which you could start small and continually upgrade with new boards and capability. Just about every contester I talked to who has a K3 loves their radio. I had the opportunity to use one during CQWW at **KØIR**, and the receiver was amazing. It had great sensitivity, as well as the ability to deal with adjacent station interference. It's small and easy to travel with. I did have some concern that the User Interface on the K3 might be difficult to get used to – especially during contesting.

I had not thought much about ICOM. However, my good friends **NØKK** and **NØAT** encouraged me to consider the ICOM 7600. The specs compared favorably to the K3. I had used one on Field Day, and it was a good sounding radio with similar performance to the K3. It seemed to be a little easier to use. I had owned an ICOM 746 in the past, so it was pretty easy to figure out how to use it. I liked the size and color of the LCD screen and band scope. While the K3 is a radio with which you select from a long list of options to get what you want, the 7600 comes with everything. There is no real decision necessary about what options, filters, etc. to buy.

In early May of this year, I decided that I would spin the knobs on all three of these radios at Dayton, and make my final decision there. Heading to Dayton, I was leaning strongly toward the Elecraft. Travelling with me to Dayton were NØAT and NØKK. Both Ron and Kirk are ICOM guys, so they encouraged me to seriously consider the 7600. Still, I had an open mind. First stop at Dayton was the Yaesu booth to look at the FT3000. It was a good looking radio, and would look good sitting next to my FT2000. But up close, the band scope did, indeed, look a little small. Also, the FT3000 did not look as “portable” as my other two alternatives. I fleetingly thought about upping my budget to about \$5K and go for the FT5000. But, I decided that was just too much money.



Next stop was the Elecraft booth. It was a busy booth, and the K3 / P3 / KPA500 took center stage. I spoke with the factory rep, and, of course, he was very positive about the radio. However, we sat down and started to price one out. By the time, I had everything I wanted, including the P3 band scope, filters, antenna tuner, etc, I was pushing \$4k in kit form. I have to admit that I was somewhat caught up in the “fun factor” of this radio. To me, it would be a kick to build it and join the fun group of K3 owners, who seem to love their radios.



Checking out the Elecraft K3 at the Dayton Hamvention.

The final stop was the ICOM booth, where I spun the knobs on the 7600. Likewise, the factory rep was very positive about the radio. I really liked the intuitive feel of the radio and the size and clarity of the band scope and overall user interface. Unlike the K3 with its myriad of options, the basic 7600 has everything I need, including filters, antenna tuner, band scope, etc. It would be a simple purchase. NØKK, who was also interested in getting a 7600, and I went to all the dealers at Dayton to find the best price. It turned out that DX Engineering was able to give a bottom-line price, with all the Dayton discounts and rebates of just under \$3,400. Still, I was not quite ready to take the plunge.

On Saturday, I went back and forth between the Elecraft and ICOM booths, and just stood by the radios, playing with the knobs, and trying to picture which one I would feel more comfortable with in a contest. In the end, I decided to go with the ICOM 7600. To some extent, it was an emotional decision. The ICOM just has a better “feel” to it than the K3. In fact, both NØKK and I went back to the DX Engineering booth and ordered one late Saturday afternoon.



My new contesting radio: The ICOM 7600.

A few days after returning from Dayton, both of us had a box at our door containing the new rigs. So far, I have used the 7600 in the WPX CW Contest and ARRL Field Day. I definitely have a LOT to learn about the rig. Because the K3 is such good rig, this was a tough choice for me. But, I’m happy with my decision, and look forward to a lot of contest Qs with my new 7600.

### Field Day – 2013

As I put the finishing touches on this column, ARRL Field Day has just ended. I’m sure there will be some interesting stories from TCDXA and MWA members in the weeks to come, but I thought I would share a few experiences that the NØAT group had up north.

For a number of years, NØAT, NØKK, NØSTL and I have done Field Day in the Park Rapids area at a family-owned resort. It’s a beautiful setting on Blue Lake, with lots of land and high trees to put up antennas. In past years, WØGJ, KØIR, and AE5E have also operated with our group. But, they were not able to make it this year. So, it was just the four of us, plus Kirk’s son Michael, who was a big help during setup and take down. Despite our small numbers, we decided to do 2A with two HF stations, plus a VHF station. We flirted with the idea of 3A, but decided that would be just too much for us four old guys.

The first memorable thing about his year’s Field Day happened before the weekend even started. The storms that hit the Twin Cities on Thursday night (June 19) left both NØKK and NØAT without power. Although Vlad and I were not affected, it made getting out of town a real challenge for Kirk and Ron. By the time we all got up north, got settled in and got the grass cut, it was almost 5pm Friday, with the threat of more weather moving in.

One thing we decided to do this year was to simplify things and go with all wire antennas, instead



of towers and Yagis (except for a small 6-meter beam). This made setup a lot simpler. We put up an all-band Windom (mainly for 80, 15, and 10), a 40-meter delta loop, a 20-meter square loop and a 15-meter zepp. That was it; no aluminum except for 6 meters.

By 7pm, we had the Windom and both loops up. As is our custom, we went into Dorsett for dinner and margaritas at a great Mexican restaurant. When we got back, we set up the stations. Vlad used his magic to get the wireless network going. We thought we were in pretty good shape.

Saturday morning was when Murphy paid us a visit. Somehow, we had gotten our signals crossed and ended up with one less HF rig than we thought we had. We usually bring one radio for each station, plus one back up rig. However, all we had with us were two 7600s and an older ICOM 746, which was to be the backup rig. Also, we only had TWO power supplies. We decided to put the 746 into service on the VHF station, and hoped we could power two radios from the Astron Power Supply. That seemed to work, and we thought we had dodged a bullet.

However, around 11:00am Saturday morning, Ron discovered that the output from his 7600 had dropped to about 5 watts. We tried everything, but nothing worked. It would run full power for about 30 seconds and then drop to 5 watts. We thought about sending Vlad back to Alexandria to get another radio, but it would have been a 4-hour round trip. In the end, we had no choice but to move the 746 into one of the main HF stations and to move Ron's "low power" 7600 onto the VHF station. It turns out that 6 meters was closed most of the weekend and the few signals that we DID hear were able to hear our 5 watts.

As it turned out, the ICOM 746 hung in there and did a good job over the 24-hour period. It's not a 7600, but it served our purpose. With all the storms in the area, the bands were VERY noisy, especially 80 meters. Those 80 meter Qs were hard to make through all the static crashes, but we ended up with about 170 of them. On Sunday, the conditions on 15 were not great. And, 10 meters was all but closed the entire weekend.

Despite all the challenges, we finished with just over 1,800 QSOs. It was not our highest score, but,

given the conditions, and the fact that 6 meters did not open, we were happy with our results. In the end, I think we learned a couple of things this year. First, beams on Field Day are overrated. We felt loud with our loops and they were much easier to put up and take down. Secondly, of course, we learned to double check our equipment lists. Seems like a simple thing, but it 's easy to forget something, even a radio.



Field Day 2013: (left to right) Vlad, NØSTL; AI, KØAD; Ron, NØAT and Kirk, NOKK.

I'm anxious to hear how all the other TCDXA and MWA members did on Field Day this year, especially given the weather.

73, AI, KØAD



Rising MWA radiosport star Cal Darula, **KØDXC** was awarded the prestigious William R. Goldfarb Scholarship at Dayton 2013. Pictured left to right: Gary, **K9MMS** and Betty Hornbuckle (Cal's grandparents); Cal, **KØDXC**; ARRL Foundation Scholarship Committee members Dick Isely, **W9GIG**; Martin Green, **K2PLF** and Jim Fenstermaker, **K9JF**. More info [<here>](#).



## David Willis WØRX

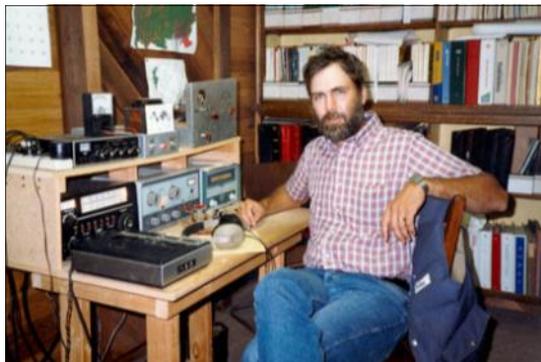
I grew up in Evansville, Wisconsin, which is a small town 22 miles south of Madison. My dad was a pharmacist and was good friends with Sam (Doc) Sorkin. In about 1957, Doc got into ham radio and received the call, **K9KGF** (SK). Doc became my Elmer, and when I was in the fifth grade, he coaxed me into learning the Morse code. Learning the code as a fifth grader was a struggle. But, Doc did not give up on me, and I eventually made it to 5 wpm. In January 1963, he administered the Novice exam to me, and I was issued the call, **WN9HFO**. “High Frequency Oscillator” was ready to go on the air!



My first receiver was a Drake 2B that my dad bought for me. I acquired a Hallicrafters HT-40 in kit form, which Doc helped me put together. I ran an 80-meter dipole from the back of the house to a tree and fed it with 72 ohm twin lead. My first QSO was with Doc, who lived one block away. Talk about DX!

Being a Novice on 80 meters, with only a dipole and at the bottom of the sunspot cycle, did not lend itself to working DX. I remember the night I worked California for the first time. I could hardly believe my ears when he came back to me.

I did get on 40 meters after a few months by hanging 40-meter radiators under the 80-meter wires on the dipole. That brought me to the attention of the FCC monitoring station in Allegan, Michigan. It turns out my crystal was quite active on the harmonics, as well as 40 meters. As a Novice, I worked some 20 states and Canada. All the while, I was studying for my General class exam. I was always mindful that, at that time, the Novice license was not renewable.



WA9HFO

My Elmer continued to help me with my CW, theory and the regulations. I started high school in the fall of 1963. I only had a few months left to get my act together and pass the General class exam. In those days, you had to take the exam at an FCC field office at a time of their choosing. The nearest field office was in Chicago. My parents took me to Chicago for the exam. The exam was scheduled for 10am, and I had to preregister and bring the



confirmation with me. I think the guys were surprised to see a 14-year-old kid come in for the exam. I copied one minute solid, which allowed me to take the written exam. They didn't score the test while I was there, so I had to go home and wait for the results. As it turned out, I had answered enough questions correctly, and my new ticket showed up. I was officially **WA9HFO**, and the dreaded dead-end Nov-ice year was over.

I put up an inverted-V for 20 meters and started working DX. To improve my signal, I came across an article in *QST* describing a two-element beam for 15 meters, using bamboo poles with wires attached and 300 ohm TV feedline. The bamboo poles were mated to a 2x4 ft boom. There was a large flat roof right outside my bedroom window on which I set some old dining room chairs to hold my beam. I was the rotator, climbing out the window to strong arm the beam in the desired direction. After a year of fooling around on the roof, my parents bought me a Mosley TA-33 tribander. The TV-style tower attached to the house was 70 feet tall; extending about 20 feet over the house.

Once my antenna and tower installation was resolved, at least for the time being, I set about to increase my power. There was a plan for an 811A grounded grid amplifier in the 1965 Radio Amateur's Handbook. With my odd job cash, I began collecting the parts. Some of the parts were bought new from Satterfield Electronics in Madison and from Allied Radio in Chicago. At the same time, I bought a Heathkit HG-10 VFO to escape being "rockbound" with a crystal. The day finally came when I lit up the 811A. I spent many hours in the DX "zone," holding on to the VFO knob with my left hand to keep from drifting away, while running the key with my right hand.

One of my 20 meter friends was Werner, **DL6VP** whom I worked many times. In 1966, I was sent overseas to Germany as an exchange student through the aegis of the American Field Service in New York City. That allowed me to meet Werner in person. Werner was a senior engineer with Deutsche Telefunken, and I got a tour of some amazing radio and television transmitting facilities.

In 1967, I graduated from high school and my operating became very sporadic for many years. I was at the University of Wisconsin in Madison from 1967

to 1976, Universitaet Bonn in Germany from 1976 to 1977 and finally Michigan State University from 1977 to 1980. After that, I moved to my current QTH. Apart from a little operating at home during my undergraduate years and some short stints at **W9YT** and **W8SH**, there was not much time for ham radio.

In 1981, I moved to Thief River Falls to establish and build a crop consulting company for CENEX of Inver Grove Heights, MN. The idea of farmers paying for expert agronomic advice tailored to their specific operation was a new one at the time. These days, it's not unusual for a farming operation to spend in excess of a million dollars to plant a crop each year. It sure isn't my grandfather's farming, anymore.

In January of 1982, my wife-to-be visited Thief River Falls to check out the area and to see what I had been up to. During the week that she visited, the temperature did not go above minus 30 degrees Fahrenheit. It was a harsh winter, and I was sure I was doomed to live here alone. But, she decided that she was ready to make a change, and we were married that June.

We live right on top of one of the old beach ridges built by Glacial Lake Agassiz, which formed the Red River Valley about 20,000 years ago. In the years since, we have acquired the 160 acre parcel adjoining to the south. We have a total of 320 acres, of which 175 acres is classified as farmland. It's not particularly good farmland, except for the kind of farm I'm trying to build—an antenna farm!



Being busy with a new job, getting married and moving, I had little time to think about ham radio.



However, I did study and pass the Advanced class exam. After my daughter was born in 1984, I had few resources, so I decided to restore my old Drake 2-B, HT-40 and HG-10 VFO. There was plenty of steel wire around for my first antenna at the new QTH.

This was my station for a couple of years (see the photo on page 13). I rebuilt my old 811A amplifier, put up some dipoles and started working DX again. I went out to the shed and stared at my old TA-33 laying there. "How can I get that in the air" consumed my thoughts. Looking back, if Phase 1 of my ham radio hobby was operating from my parent's home, this was the end of Phase 2, resurrection, rehabilitation and reinvigoration. In early 1987, I started Phase 3, during which I worked over 300 DX entities.

I decided at this point that if I passed the Amateur Extra class exam, I would reward myself with a new rig. I passed the Extra exam, and while visiting my parents in Wisconsin, I visited Amateur Electronic Supply in Milwaukee and purchased an Icom 735 and also an MFJ 422 keyer, mounted on a Bencher paddle. Until this time, I had been all straight key. The 735 was the first rig that had SSB capability. I had never been too excited by phone operation. It wasn't until I "discovered" contesting, that I became interested in SSB.

In 1986, I became self-employed and built my business office in an old pole barn left over by the previous owner. On the roof of the pole shed I put up a multiband Hygain vertical that covered 40 through 10 meters. The combination of the 735 and the Hygain vertical yielded one of my most memorable DX QSOs: a contact with **5R8VT**, Vince Thompson on one of his African operations. Running 100 watts from my first "modern" rig to a vertical on 20 meters, I could not believe it when he came back to my call. There was also a 40 meter QSO with Guy, **FT8XD** on Kerguelen that I remember well.

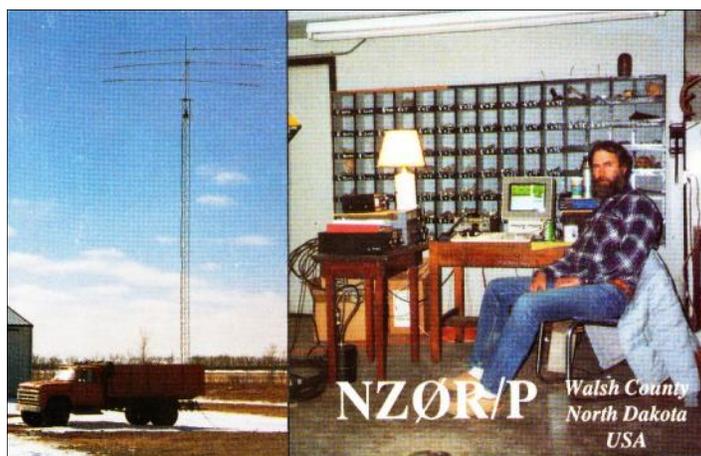
Being on a skinny budget, I bought a 20-foot steel pipe from a local plumbing contractor which I managed to erect on the peak of the pole shed with the TA-33 on top, turned by a glorified TV antenna rotator. The final height of the beam, atop the pole, was 40 feet. The TA-33 joined the Hygain vertical, which I continued to use for 40 meters. That worked for a while, but what about 80 meters? And, until this time, I had never listened to 160 meters. These bands

didn't become important to me until I discovered DX contesting.

Along with my son being born in 1987, it was a watershed year for my ham radio. Having upgraded to Extra class, I exchanged my long time call for a new 2x1: **NZØR**. I then got my venerable TA-33 deployed and acquired a modern radio. Over the next several years, I upgraded my amplifier to an LK-500 "no-tune" version with a pair of 3-500z and an inadequate power supply to run them. The power supply would only allow about 800 watts out. Nonetheless, it was heaven to be QRO. And, it had full break-in capability with a vacuum relay.

Operation on 80 and 160 was achieved by erecting a 20-foot tall antenna support made from 2x4s in place of the vertical on top of the pole shed. I attached a pulley at the top and it became the support for the 160, 80 and 40 meter inverted Vs. It was in 1988-89 that I finally had full 6-band coverage. This is the setup that allowed me to work 300 countries in the 10 years or so that the antennas stayed operational.

In the late 80s, I discovered DX contests. At that time, domestic contests did not interest me. That focus is changing some now. Hearing all that DX on the air over a weekend was a real rush. But, while it was fun, it also made me aware of two things: One, my great antenna farm was not so great and, two, operating from the very northern edge of the Midwest in a DX contest is a serve handicap. In an attempt to spice things up, I tried a couple of things. In 1988, my parents bought a place in Florida. I got on the air down there with an "invisible" wire and 50 watts. Coming from the "black hole" of the northern plains, I didn't think it was possible to work Europe on 80 meters with a 50-foot wire. The other enjoyable ven-



ture was operating from Warsaw, North Dakota. I live only 40 miles from North Dakota and have business clients across the border. I operated the ARRL DX contests from North Dakota in 1991 and 1992. Conditions were pretty fair both years, and in 1992, I made over a million points for the first time.

Through the years, I went along happily operating from home, collecting QSL cards, increasing my country totals and adding stickers to my DXCC certificates. I jumped into the first vanity callsign “lottery” and came out with my first choice of available call signs, **WØRX**. My dad’s profession as a pharmacist suggested the RX suffix. I sold the Icom 735 on eBay, and the remaining antennas came down in an ice storm. In about 2000, I picked up a used Icom 765 on eBay. It has been a fantastic radio, although it’s no longer my main rig.

Phase 4, my current and perhaps final phase in amateur radio, began a few years after the loss of my antenna farm. My business was taking more and more time, while trying to stoke the college funds for my son and daughter. Then, a neighbor, who I previously did not know was a ham, called and asked I’d like to stop by their Field Day setup. I accepted the invitation from Ray, **NØUY**. I also met Art, **KØQL**, who was operating from his setup. Ray let me operate his rig for a while. It was the first time I had seen a small rig like the IC-706, and after several years of absence from CW contesting, it didn’t take long for the old adrenaline to kick in. Ray had to remove me from his chair, after I monopolized it for close to an hour. Both Ray and Art exhorted me to get back on the air. And, with their help, I have done just that.

My antenna plans called for something better. That turned out to be a Skyhawk tribander on 90 feet of Rohn 25G. That was as tall as I could go and keep the guy wires out of the way.

On a beautiful November day, Ron, **AE5E**, helped me put up a 4-element Mosley tribander for 30, 17 and 12 meters. The 160 and 80 meter inverted-Vs moved to the 90 foot tower and the 40 meter inverted-V sits under the Mosley WARC beam.

Ron has a Zerofive 80 meter vertical that really impressed me, so I contacted Tom, **N9ZV** when he advertised a demo for sale. I drove down and bought the vertical from Tom and the Bencher Skyhawk in Illinois. I have been very impressed with the differ-

ence that a vertical makes in DX work. I highly recommend Tom’s products; they’re very well made. For the last 3 years, that has been my antenna farm.

I have upgraded rigs over the last several years. Currently, I’m using a new Icom 7600 and an Acom 1000 amplifier. I’m extremely satisfied with both units. The Acom 1000 is a basic amp, which tunes up quickly and efficiently: no fuss, no muss. For several times the price, you can get the auto tune, 1.5kW versions of Alpha or Acom, which will follow you around as you wander the bands. But, for straight-up dB power and reliability, I don’t think you can do better for the money.

This brings me to future plans. Since there is no more room in the yard, any new antennas will be on the ridge about 800 feet from the shack. Therefore, I will be laying a lot of hardline to that new location. Thanks to Rich, **NØHJZ**, of the MWA for the hardline. I have 120 feet of Rohn 55 ready to go up back there, and the first antenna will be a 4-element 40-meter Yagi. I have also acquired a couple of 5-element 20-meter monobanders and 6-element 15- and 10-meter monobanders. I have started a website, where I hope to put up more pictures and info as I go along. It is [www.wØrx.us](http://www.wØrx.us). If you put 48.076N 96.277W into the search box of Google Earth, it will take you our place.



Skyhawk tribander on 90 feet of Rohn 25G



Zerofive 80 meter vertical.





120 feet of Rohn 55 ready to go up.



Monobanders ready for assembly.

I have really enjoyed amateur radio and I will be forever grateful to Doc, K9KGF (SK) for sticking with me until I got my first ticket and beyond. Not only was he the attending physician at my birth, but he was a friend for life. I lost a great Elmer when he passed away in 1971.

My current DXCC totals are: Mixed 337/328, CW 330/323, Phone 302/295, Digital 139/138, 80m 153/151, and 160 72/71. I do not have 100 confirmed on any of the WARC bands, so lots of fun still to be had.

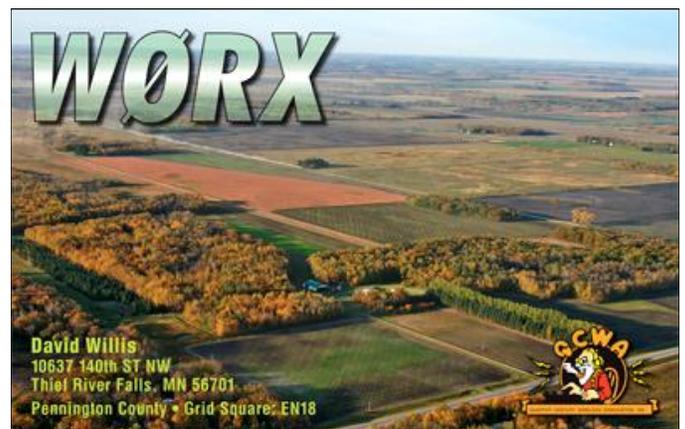
There are a few hams I need to thank for their help. Ray, NØUY is a great friend and really instigated my Phase 4 in ham radio. Art, KØQL and Ron, AE5E have both helped me out with antenna work. Rich, NØHJZ has been a great source for hardline to handle the distances I have to deal with. And Andre, NØF has been a great help sourcing antennas and materials, without having to sacrifice an arm and leg.

Since 1986, I have been self-employed as a crop consultant. My core services provide real-time agonomic advice, tailored to my clients' specific fields. Most of my university training and research was in the discipline of Plant Pathology, so my approach is one of holistic crop health. I pioneered the use of real-time differentially corrected GPS in 1994, applying it to the variable rate fertilizer application technology being developed at the same time. I use LIDAR topographic mapping and satellite imagery to analyze fields, and break them into different management zones for fertilizer application. This allows a precise application of fertilizer in amounts correct for specific parts of a field.

My dad is **KB9CIR**. He turned 90 last December. He is in great health, but does not operate anymore. My wife is **KAØYEA**. She just became a technical service rep at DIGIKEY Corporation. Neither of my kids are interested in radio.

Lastly, CW is music to me. And, even more so, when it exhibits polar flutter and signs with an exotic prefix.

73 - - David, WØRX



# Selecting a Low Band Receiving Antenna from a Personal Historical Perspective

by Dennis Sokol, WØJX

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## Introduction

This is not a “how to” article about installing low-noise receiving antennas for the low bands. Rather, it’s more a strategy discussion about selecting the right kind of low noise receiving antenna for your location, plus some tips that I’ve picked up over more than 30 years of operating on Top Band and other bands, including 80, 40 and 30 meters (my personal definition of the low bands). The learning curve can be steep, and requires trying various types of antennas to find the one that works best for your location. The necessity of using low-noise receiving antennas is extremely important for DXing success on 160 and 80 meters, and to a lesser degree on 40 and 30 meters, where some type of directive receiving antenna to reject QRM is highly desirable. The need for a noise-rejecting receiving antenna is important to most amateurs operating on the low bands, because most of us live in urban or suburban areas where man-made noise levels are high. According to Tom Rausch, W8JI, (<http://www.w8ji.com/noise.htm>), noise levels in urban cities run about 36 db higher, and suburban noise levels run about 20 db higher, than in rural areas. Truly, those hams living many miles from a city center have a huge advantage when it comes to copying weak signals on 160 and 80 meters.



## The importance of receiving antenna directivity

Receiving antennas can be evaluated on the basis of two ratios expressed in db: the Directivity Merit Figure (DMF) and Receiving Directivity Factor (RDF). DMF measures the antenna’s directivity, and is the difference between the forward gain and average gain over the entire back. RDF compares the forward-lobe gain to the average gain of the antenna in all directions. Both a higher DMF and RDF are better for rejecting unwanted signals, including noise. Equally important is the pattern of the receiving antenna, especially the beam width of the main lobe, and the location of the nulls and minor lobes of the antenna. A chart which lists the DMF and RDF of various antennas can be found at the following website: [http://www.hizantennas.com/receiving\\_antennacomparison\\_char.htm](http://www.hizantennas.com/receiving_antennacomparison_char.htm)

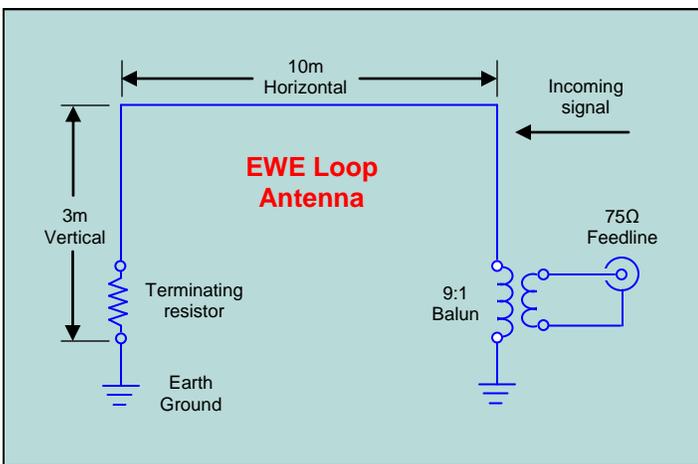
## First attempts at using low noise receiving antennas, from longwire to EWE

From the winter of 1979 through late 1998, my low band DX operations were limited to using a shunt fed transmitting tower, and other transmitting antennas as my receiving antennas. This meant that I had to pay special attention to sunset and sunrise periods, when signals usually peaked, and operate at times when local noise would drop off (usually between 12am and 7am). Even with the limitations of local noise, I was able to work some 160 meter DX from Minneapolis, which was mostly the Caribbean, but also included Australia and New Zealand. Moving to Yankton, South Dakota gave me a slight propagation advantage in addition to being a quieter location. Hence, the first lessons learned were: 1.) There is no substitute for a good, quiet location, and 2.) Knowledge of low band propagation is an absolute must for success. My first attempt at a usable low band receiving antenna was a temporary low, longwire end-fed directly with a piece of 50 ohm coax. It was about



300 feet of electric fence wire strung out at a farm house I was renting in Yankton. It actually heard quite well, and did display a bi-directional pattern, which is typical of un-terminated Beverage antennas. However, for 160 meters, 300 feet is a bit too short to have a good, low angle pattern. So, most of us who live in urban and suburban areas are going to be limited to some form of loop antennas and short receiving verticals.

When I moved into town, I decided to try a horizontal loop antenna about 25 feet off the ground. This proved to be very unsatisfactory, and did little to reject noise. My third try at a low noise receiving antenna was to build a EWE loop antenna, as developed by Floyd Koontz, **WA2WVL**. This antenna,



which is really two phased verticals, promised to improve my receiving situation. However, its potential benefits were nullified by being much too close to the house and to the transmitting antenna. Another limitation to the EWE is that it is a ground-dependent antenna, both at the feed point and at the termination. This means that the antenna's performance varies with the time of year and quality of the ground underneath it. Furthermore, I did not use the proper toroid transformer to couple the antenna to the feedline. This is a critical component for success of any low band receiving antenna. The proper ferrite core must be used to match the antenna to the feedline for efficient signal transfer and minimization of noise pickup.

### A QTH change brings an opportunity to try a real Beverage

A move to Ohio in 1998 provided the opportunity to purchase a home with almost three acres. Bever-

ages were possible in three directions, with lengths of 440 to 500 feet. So, one was put up aimed at 42 degrees. I wound my own transformer, an autotransformer type on a core which I had in my junk box. This turned out to be less than optimum, and was later replaced with a better toroid core of the correct ferrite material. The new Beverage greatly improved my low band receiving ability, and I discovered that a Beverage can be used effectively up through at least 30 meters. A second Beverage aimed at 80 degrees and a third Beverage aimed at 335 degrees soon followed with good results.

In 2004, I decided to try a bi-directional Beverage and purchased the DX Engineering Reversible Beverage system. The system uses 450 ohm ladder line instead of a single wire and produced an immediate improvement in receiving ability in two directions. I found this system to be better than a single wire in the primary northeast direction. Based on these results, two years later, I converted the east 80-degree Beverage to a homebrew two wire system using WD-1A military telephone wire. These two Beverage systems remain in place today. For a very complete description of two wire Beverage systems with construction details, see **W0BTU's** website: [www.w0btu.com](http://www.w0btu.com). Installing these two-Beverage systems taught me many lessons about Beverage construction, feed point transformers, feedlines and receive antenna grounding systems.

Look at your low noise receiving antenna as a *system*, which includes the antenna, matching transformers, feedline, preamplifier and filters, if used. Here is a summary of the lessons learned:

- 1.) Beverage antennas are tolerant as to the type of wire used and even how straight they are. Mine rise up to go over a low roof and driveway and curve a bit without any apparent negative effects. However, I would stick with a solid wire such as #14, as it is very forgiving and can be easily spliced. Antennas constructed with stranded wire, especially if they are under tension, will eventually break, as each strand weakens due to flexing and corrosion, unless copper-clad steel wire is used;
- 2.) The construction of the feed point transformers is very critical;
- 3.) A quality feedline for a receiving antenna is very important for long-term reliable performance;

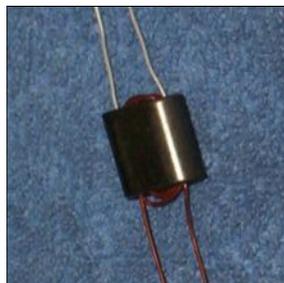


4.) A Beverage antenna (as well as any other ground-dependent receiving antenna) requires an excellent ground at the feed point, and if it is a reversible design, at the termination end; and

5.) A good preamp with excellent dynamic range is a necessity with loops and short antennas.

## More About Transformers, Feedlines, and Grounds

When I started my work with Beverages, toroids with type 75 or type 73 material were the preferred cores for winding matching transformers. From there, pioneers like W8JI began to use Type 73 ferrite beads in a binocular layout, and that progressed to the development of binocular cores using Type 73 ferrite material. These cores, using the correct number of windings, provide an almost perfect match for a wide array of receiving antennas including Beverages, flags, pennants, loops, and matching transformers. The Fair-Rite part number is BN2873000202, and they are readily available from electronic parts supply houses. This core allows the proper transformation ratios with a small number of windings and low inter-winding capacity. See the W8JI website, or ON4UN's book *Low Band DXing* for information on how to wind these transformers. In my experience, using any other type of core is a waste of your time and money. I have standardized on a three-turn primary for my matching transformers, which are all fed with 75 ohm CATV cable. I use 75 ohm cable for a number of reasons: it is significantly cheaper than regular 50 ohm coax, the transformation ratios require fewer turns for high impedance antennas such as pennants and flags and connectors for this type of cable are inexpensive.



Fair-Rite binocular core transformer.

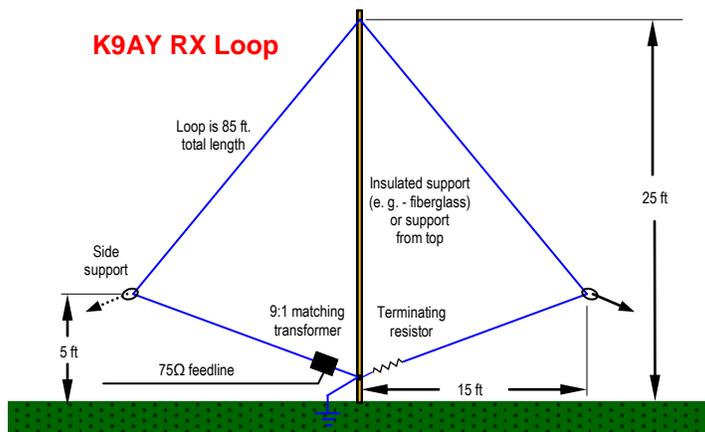
When it comes to feedlines, this is another place where you want to use the very best components. Stay away from big box store RG6 coax, especially if it has a PVC type jacket. The PVC easily cuts, tears, and develops "pinholes." If water gets into it, the aluminum braid will be destroyed in just a few months, turning into a grey powder. The resistance of the shield will go up and the noise levels in your system

will increase. I learned this lesson the hard way, and have thrown out hundreds of feet of this kind of cable. Try to buy cable that has a polyethylene (PE) jacket, and preferably a cable that has a protective sealant inside. Look for Commscope or Belden cable as the most reliable brands. Also, good quality snap and seal compression connectors (not Radio Shack) should be used and weather-proofed.

Grounds are another very important component of low-noise receiving antennas, especially bi-directional Beverages. In my location, I have found that a single five-foot ground rod is insufficient to allow my RX antennas to operate properly. At both the feed point transformer end, and at the termination or reflection transformer end, I use an arrangement of three ground rods perpendicular to the antenna wire. Each 5-foot rod spaced 5 feet from the other, and tied together with at least a #12 solid wire (that's six rods per Beverage). If your reversible Beverage, K9AY or EWE loop is not working properly, the first thing to do is to improve your ground system.

### Back to the Loops!

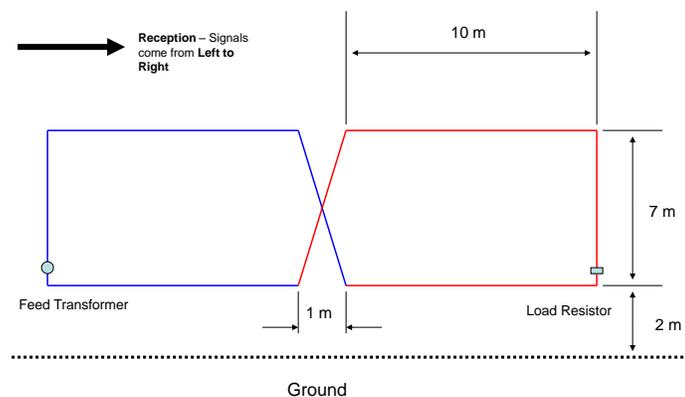
In many respects, the three Beverages did not perform as well as expected, especially to the west and northwest. I decided to try a K9AY loop. The K9AY loop is an array of two vertical wires coupled by a bottom wire, and is ground-dependent. It is very easy to construct and operate. I hung mine from a tree limb, which made it easy to rotate when necessary. However, it never really performed to my expectations on long-haul, weak signals. Although, it seemed to be very useful for some western USA contacts on 160 meters. Perhaps it interacted with my other receiving antennas, or my 80 meter vertical, so I never really used it for serious DX work.



I was still frustrated with my receiving results into Asia and the far Pacific, and was still searching for a better solution, when I ran across an article on the “Double Half-Delta Loop” by George, **AA7JV**. This antenna was developed for the 2009 **TX3A** Chesterfield Island DXpedition, and has almost 3 db better RDF than a single delta or flag loop. See the following websites for more information about the DHDL antenna:

[http://www.iv3prk.it/user/image/..-rxant.prk\\_tx3a.pdf](http://www.iv3prk.it/user/image/..-rxant.prk_tx3a.pdf) and <http://tx3a.com/equipment.html>.

I have always been interested in the flag antenna, and I wrote to George and asked him about revising his design to use two flags instead of two half-deltas. The antenna can be erected in a 60- to 70-foot space. I constructed this antenna in the fall of 2010, and was immediately impressed with how quiet it was compared to my northwest Beverage. This antenna allowed me to work HL5, JD1 and several UAØs on 160 meters, and many other 80 meter DX stations, in the winter of 2010. The major disadvantage is that it was fixed northwest. For the **3CØE** Annobon operation, I reoriented it facing east. However, it is possible to build a switching network to reverse directions. This antenna also is still in place. Interestingly, its receive pattern becomes broadside on 40 and 30 meters, and provides excellent reception in those directions.



WØJX dual flag receive array.

### More Loops to Consider

If I was just starting out on the low bands, the first antenna I would try would be the K9AY loop because it is easy to construct and inexpensive. The next loop to consider is the flag, popularized by Earl, **K6SE** (SK), and the rotatable flag, developed by Larry,

**W7IUV**. See Larry’s website: [www.w7iuv.com](http://www.w7iuv.com) for construction details. This antenna has a very deep rearward notch, which might be very useful for rejecting a noise source off the back of the antenna. I used two flags placed end to end to create my dual-flag array discussed in the previous section. Steve, **WB6RSE**, constructed a rotatable flag and placed it on the roof of his house. This was the only solution he could implement to be able to hear weak European signals.

Lastly, you might want to try a pennant antenna. Pennants are low output, directive antennas that are reputed to be very quiet. Illian, **T6LG**, used a pennant in Afghanistan to give some lucky east coasters that country on 160 meters and many others an 80 meter contact. The disadvantage of the pennant is that it is hard to make rotatable and it has very low output. A high-gain preamplifier is an absolute must. Gary, **KD9SV**, constructed a special 35 db gain preamp for T6LG to use with a pennant.



KD9SV high gain preamp for loops and pennants.

### Searching for the Holy Grail

Low band DXers are never satisfied with their stations, especially the receiving capability. I began to read about the new, multi-element active antennas, such as receive four-squares and circle eight arrays, and how their users were raving about performance on the low bands. I decided to purchase a complete Hi-Z 4-8 Pro electronics package, including eight amplifiers and a control system, in October, 2011. I then began collecting the tubing and various parts I needed to construct the dual, four-square receive system. The antenna system can change directions in 45 degree increments. The antennas are spaced 80 feet on a side





Hi-Z 4-square receive array at WØJX.



Hi-Z 4-square control box.



Hi-Z element mount with active preamp.

and occupy a space with a diameter of 113 feet. I actually finished the installation in January, 2012 by installing only one set of antennas, during an extremely mild

winter. There were some initial teething problems, but after fixing them, the antenna began to show promise. The major issue was poor directivity, and this was traced to interaction with the nearby dual flag antenna, and a 25-foot high flagpole directly behind one of the elements. One of the first DX stations copied on the four-square was **7Z1SJ** in Saudi Arabia. I first heard him only on the four-square and not on the Beverage antenna pointing in his direction. However, an hour later, the 7Z1 was actually stronger on the Beverage, but still copied on the four-square. This demonstrated that the four-square was an antenna system that responds primarily to low angle signals. The front to back ranges from 20 to 35 db, depending upon angle of signal arrival.

The main use of the four-square receive array is as the antenna for the second receiver in my Elecraft K3 diversity receive system. I have either the Beverages or dual flag antenna, feeding the main receiver on 160 through 30 meters. The use of these two antenna sys-

tems, plus diversity reception, has produced a very noticeable improvement in overall receiving ability on the low bands under difficult conditions. Based on my experiences to date, I will install the other four verticals this fall. And, if I had the room, I would upgrade to the circle eight system which requires a 200 foot diameter space to install the antennas, plus at least 200 feet from the transmit antenna!

For those with limited space, HI-Z has two other systems which might prove useful. There is a two-element active receive array, which will produce better results than a K9AY, flag, or EWE; and a three-element system, which will provide directivity in six directions. It fits in a space as small as 40 feet on a side.

I also want to say something about low band propagation. Regardless of the sophistication of your receive antenna system, or the presence of a low noise environment, if you do not have propagation and the infamous “spotlight” is not shining on your location, the best receiving system is not going to copy a signal far below your noise level. At one time, I thought that the spotlight got down as tight as 50 miles. More recently, after talking to several topbanders over the past season, the spotlight diameter is probably 20 miles or less under certain circumstances. That means you might not be able to hear a weak Top Band signal that your friend 20 miles away can copy, using similar equipment under similar noise conditions! Again, knowledge of propagation, which can only be gained over many seasons of operation, is essential to consistent success on the low bands, and especially on 160 meters.

Active receive antenna systems for the low bands continue to be developed, as hams seek the “right” solution to their noise problems. Jim, **W1FV** has developed a three-element active system which fits in a 140-foot space. And, Jim, **K4IQJ** has developed a similar system which uses K9AY loops rather than vertical antennas. And there are people working with the concept of placing an SDR receiver at the base of each antenna element and phasing the audio output of each receiver to null out noise sources. This approach would greatly simplify the installation and adjustment of phased receiving arrays. As the saying goes “you can never have too many antennas for Top Band!”

See you on the low bands! 73,

Dennis, WØJX





## DXers Have a Choice!



**The Daily DX** - is a text DX bulletin that can be sent via email to your home or office Monday through Friday, and includes DX news, IOTA news, QSN reports, QSL information, a DX Calendar, propagation forecast and much, much more. With a subscription to The Daily DX, you will also receive DX news flashes and other interesting DX tidbits. *Subscriptions are \$49.00 for one year or \$28.00 for 6 mos.*

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## TCDXA Treasury Report

March 15, 2013

Submitted by TCDXA Secretary-Treasurer Pat, KØPC

### Income:

Carryover from 2012	3,925.33
2013 dues and donations	3,755.60
Door prize ticket sales	618.00
Refunds and reversals	0.00
<b>Total YTD income</b>	<b>\$ 8,298.93</b>

### Expenses YTD:

Bank service fees	(0.00)
Website	(0.00)
Office supplies, guest dinners and misc.	(140.62)
2012 Christmas party	(474.14)
ARRL Spectrum Defense Fund	(100.00)
NCDXF Donation	(250.00)
MWA Plaque	(75.00)
DXpedition Donation, 3D2C	(250.00)
DXpedition Donation, TT8TT	(251.25)
DXpedition Donation, AHØ/NØAT	(149.00)
DXpedition Donation, 5X8C	(250.00)
DXpedition Donation, 9U4U	(250.00)
DXpedition Donation 9M4SLL	(500.00)
DXpedition Donation, FT5ZM	(1,500.00)
<b>Total YTD expenses \$</b>	<b>(\$ 4,190.01)</b>

Current Checking Balance (11/13/12)	4,007.43
PayPal balance	101.49
Cash on hand	0.00
<b>Total current funds</b>	<b>\$ 4,108.92</b>

## Join TCDXA

Our mission is to raise *Dollars for DX*, used to help fund qualified DXpeditions.

Our funds come from annual member contributions (dues) and other donations.

TCDXA is a non-profit organization, as described in Section 501 (c) (3) of the Internal Revenue Code. All contributions from U.S. residents are tax-deductible.

Becoming a member is easy. Go to <http://tcdxa.org/> and follow the instructions on the home page.

All contributions (including annual dues) may now be paid on our secure site, using PayPal or credit card.



VKØIR  
ZL9CI  
A52A  
T33C  
3B9C  
TX9  
CP6CW  
3YØX  
K7C  
5A7A  
VU4AN  
VU7RG  
VK9DWX

K5D  
VK9DWX  
FT5GA  
3D2ØCR  
E4X  
CYØ/NØTG  
VP8ORK  
VU4PB  
STØR  
3D2C  
3CØE  
TT8TT  
9M4SLL



AHØ/NØAT  
5X8C

K4M  
TX3A  
KMØO/9M6  
YS4U  
YI9PSE  
ZL8X  
4W6A  
T32C  
HKØNA  
7O6T  
NH8S  
PTØS  
FT5ZM

XU7MWA  
S21EA  
J2ØRR  
J2ØMM  
BS7H  
N8S  
3B7SP  
3B7C  
5JØA  
VP6DX  
TX5C  
9XØR  
9U4U

## TCDXA DX DONATION

## POLICY

The mission of TCDXA is to support DXing and major DXpeditions by providing funding. Annual contributions (dues) from members are the major source of funding.

A funding request from the organizers of a planned DXpedition should be directed to the DX Donation Manager, Ron, NØAT, [TCDXA@n0at.net](mailto:TCDXA@n0at.net). He and the TCDXA Board of Directors will judge how well the DXpedition plans meet key considerations (see below).

If the Board of Directors deems the DXpedition to be worthy of support, a recommended funding amount is presented to the membership for their vote. If approved, the TCDXA Treasurer will process the funding..

### Key Considerations for a DXpedition Funding Request

DXpedition destination  
Ranking on *Most Wanted Survey*  
Most wanted ranking by TCDXA Members  
Logistics and transportation costs  
Number of operators and their credentials  
Number of stations on the air  
Bands, modes and duration of operation  
Equipment: antennas, radios, amps, etc.  
Stateside and/or foreign QSL manager

Website with logos of club sponsors  
QSLs with logos of club sponsors  
Online logs and pilot stations  
Up front cost to each operator  
Support by NCDXF & other clubs  
LoTW log submissions  
Previous operations by same group  
Valid license and DXCC approval  
Donation address: USA and/or foreign

To join TCDXA, go to <http://tcdxa.org/>.

