

IRCA Technical Column

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The Wellbrook K9AY Antenna: A User's Review by John Bryant, Stillwater, OK, May 2000

The Wellbrook K9AY Antenna consists of two chassis mounted in substantial plastic boxes: the Operator's Unit and the Antenna Head Unit. The user supplies the necessary wire loops, mast, lead-ins, etc. to create the complete classic "Christmas tree-shaped" dual loop right angle pair of K9AY antennas. The Operator's Unit provides a rotary Nulling Control and a five position rotary switch for changing beam-direction of the antenna through the four cardinal points and an omni-directional setting which engages both loops. This latest model of the Operators Unit also includes a toggle switch for engaging/disengaging the low noise amp and a small red LED indicating whether 12 vdc. power is applied to the unit. The rotary switch (instead of two toggles), the switching capabilities of the amp and the LED are all welcome additions to what was already a user-friendly product.

ANTENNA CONFIGURATION

My current installation of the Wellbrook K9AY employs an imported black telescoping fiberglass mast produced by German radio amateur, DK9SQ, which rises to 33 feet when fully extended. I have installed nylon/cotton clothes line guys at mid-mast height and my loops, which are equilateral with 28 feet per side, are attached at the 26 ft. height of the mast. The Antenna Head Unit is mounted approximately three feet off the ground. My grounding system is composed of ten 18 in. long metal rods surrounding the base of the mast in two concentric rings. The outer ring is about three feet in diameter. My grounding situation here in Oklahoma is very good, with the rods going directly into moist clay soil. I erected the loops parallel to my two 500 ft. long Beverage antennas, which run approximately 90 degrees to each other. This was primarily done so that I might compare, as nearly as possible, apples to apples and oranges to oranges between the two antenna systems. I should note that the beverage wires run no closer than 75 feet to the K9AY and I maintain both ends of the beverages in a grounded condition while using the K9AY. I do not believe that there is any significant coupling between the two antenna systems.

GENERAL OPERATION AND EFFECTIVENESS

Wow!!! I am deeply in love with the Wellbrook K9AY! After five months of use, I am still continually amazed at the directional capabilities of the antenna, especially on the broadcast band. Despite my now rather extensive experience with this antenna, I still find it hard to believe that an antenna that can be fit in a 30 foot cube of space can perform SUBSTANTIALLY better than 500 foot terminated Beverages on medium wave. It does. While Wellbrook make no claims of directional characteristics at much above the broadcast band, I can usually detect mild directional characteristics as far as the upper extent of the 60 Meter band - 5.100 MHz. The directional characteristics on 90 meters - 3.3 MHz - are quite pronounced, being clearly evident on signal after signal.

LONG WAVE

I am not really an expert at DXing low frequency signals. I loaned the K9AY to Bill Bowers, one of the leaders of the North American "lowfer" hobby, for about two weeks so that he might evaluate that aspect of it. He was quite impressed and has reviewed it in the June 2000 Lowdown, the journal of the LWCA. While the antenna was at Bill's, we spent a couple of hours making front-to-back ratio measurements on both MW and long wave. Since my interests are primarily in MW and SW right now, I left my notes on long wave for Bill's use. However, we were achieving nulls of about 20 dB quite easily. A CAUTION: We were measuring these "nulls" on Non-Directional Beacon channels; there was usually another beacon in the "null" of the dominant beacon. I would guess that the absolute nulls were running more nearly 30 dB. In any case, though, the directional characteristics on long wave were very significant and enabled us to hear two separate NDBs on the same channel quite well, when they separated by either 90 or 180 degrees of azimuth. I would guess that any "lowfer" who chases NDBs and who has not yet experienced DXing with a true cardioid pattern antenna will feel that he has an entire new hobby as soon as he tries this K9AY.

MEDIUM WAVE

My primary interest in the K9AY antenna is for use in DXing international medium wave signals from the North American NW Coast during my visits there in the summertime. There, we use 1000 to 1500 ft. Beverages to DX MW signals from across the Pacific. These long antennas limit our choice of DXing sites rather severely, since we must find property which is accessible for a specific distance back from the beach and yet is an isolated enough location that tourists and local people won't stumble into the antennas. This spring, both Guy Atkins and I tested the Wellbrook K9AY while at our favorite Washington State DXpedition site. We independently concluded that this version of the K9AY performs at virtually equal levels on medium wave when compared to 1000 ft. Beverages that we normally use there.

Except for the 10 day DXpedition to coastal Washington, my MW DX testing of the K9AY antenna has involved attempting to DX Mexican and other Latin American signals from my home in central Oklahoma. From this location, Latin America spreads out over almost 180 degrees of the horizon with the Leeward Islands in the Caribbean bearing about 100 degrees from me and upper Baja California bearing west at 270 degrees. Since I am almost 1000 kilometers from the Mexican border, most of my local dominant signals are from various outlets in the central part of the United States. Unfortunately, many US stations are almost perfectly "off the back side" of my box loop antennas, making a Latin-directed MW hobby very difficult from here. In my area, most channels on the lower half of the dial are dominated by regional and national clear channel U.S. stations. Using the K9AY antenna, I can receive clear reception from at least one Latin signal on almost all of these frequencies during the early morning and early evening DX time periods. On many frequencies in the "low band" I have multiple Latin signals previously masked by 50 KW US stations. In essence, the cardioid pattern of the K9AY has given me an entirely new lease on MW hobby life here in Oklahoma. Now, if it could just grow hair on my head....

I have not DXed domestic medium wave stations since the early 1960s. However, I suspect that people who do and who have a even a small suburban lot to erect the "corner-of-the-yard" version of the K9AY are going to throw away their Viagra prescriptions and get back to a REAL hobby. An electronically rotatable cardioid pattern that works on MW and takes up very little real estate..... WOW!

While the antenna was at Bill Bowers' shack, I made quite a few front-to-back measurements on MW, using Bill's W-J HF-1000 with an outboard meter accurately calibrated in dB. Even at mid-day, it was difficult to find a signal which was "alone"(having no weaker signal in the null of the dominant.) I did manage to find three singleton stations in the low band and measured nulls in the 25 to 30 dB range. However, my guess is that there is still some residual energy from secondary stations or even adjacent channel stations that partially infilled the theoretical null. In truth, no matter the accuracy of the instrumentation, I don't think that its possible to realistically measure the depth of a null on MW in central North America outside of a giant Faraday cage. What counts for me is that I hear LOTS of stations, EASILY, that I could never hear before.

SHORTWAVE

I mentioned previously that the directional characteristics of the antenna are noticeable all of the way to 5.100 MHz. I must say, though, that the terminated Beverage antennas, which are aimed directly at my favorite Tropical Band targets, prove to be superior to the K9AY on most occasions. However, since my Oklahoma beverages are over 500 feet long and require significant portions of the cow pasture in which I live, the fact that the Wellbrook K9AY works almost as well as my beverage array is really quite remarkable. In fact, the K9AY is the first antenna, other than the beverages, on which I can successfully DX the very unusual signals from Indian regional stations which may be heard here with great difficulty for about 30 minutes at dawn and dusk during the winter half of the year. Except for the Beverages, no other antenna, active or passive, has done as well as the K9AY at detecting these signals. In fact, the K9AY often "hears" the Indian signals as well as does the beverage array. The only difference is the K9AY tends to hear more band noise on these frequencies than does the very narrowly directional beverage. On the international shortwave bands above 5 MHz, the K9AY performs very well. It tends to be a very quiet antenna and does, I understand, offer some possibilities of nulling local noise even on these frequencies.

What I have not done yet, nor to my knowledge has anyone else, is cut a set of loops to the proper length to operate well on 60 meters. It is my understanding that the largest circumference loop that should be used for a particular frequency is 0.25 of the wavelength. For 60 meters, that would be about 49 feet or about 16 feet per side. My loop and most of the others currently in use are almost double that circumference. I look forward to some experimentation with smaller loops late this summer. Even using the oversized loops as at present, I likely would abandon my Beverages entirely, even for shortwave, were it not for my interest in the DXing the very difficult weak long-range signals from the Indian Subcontinent on the lower bands. I certainly don't expect to use my beverages here in Oklahoma for MW DXing in the future. I never thought that I'd say that.

THE "ULTIMATE" K9AY ANTENNA SYSTEM?

My use of the Wellbrook K9AY antenna here in Oklahoma rather closely models my use in the Pacific Northwest. In both cases, the DX signals of interest come from about 180 degrees of the horizon, while

interfering signals almost all come from the back-side half-circle. Given that the deepest null of a cardioid pattern is fairly narrow, I began wondering if having four loops (eight directions) with one antenna for each 45 degrees of azimuth would be useful in real DXing situations. Despite laying myself open to further charges of obsessive/compulsive disorder, I figured that the additional cost would be worth it, if I could benefit from the additional directional choices at least ten percent of the time. Andy Ikin of Wellbrook was kind enough to provide me with an Operators Unit that can control two separate Antenna Head Units... one for each two loops. (All four loops are mounted on the same mast, making a nice Christmas tree.)

My only formal test of the 8-way vs. the 4-way system consisted of two pre-dawn hours DXing Mexican MW stations from here in central Oklahoma. I checked 12 different frequencies, most below 1000 kHz. Of those 12, having a choice at 45 degrees was a significant advantage on nine of the channels. The three where it "was not an advantage" were all stations which so dominated their frequencies that they were totally dominant through 135 degrees of azimuth or so.

On the 9 channels where the 45 degree choice made a difference, it was ALWAYS the advantage of achieving a more complete null on the dominant signal to be able to hear the desired signal more clearly. It also seemed that this extra nulling capability was the most useful when trying to ID a station in the very worst pile-ups.

Assuming that the stations were evenly distributed around the horizon, the above leads me to believe that the extra two loops would make a difference on about 40% of my DX targets. In subsequent months, that 40% to 50% has proven to be the case. GOOD ENOUGH FOR ME.

My findings make sense for people who DX MW, with the dense pile-ups coming from all angles of the compass. The cardioid pattern has a fairly sharp null and a very wide, more than semi-circular peak. I would guess that lowfers who DX NDBs would also find the extra nulling control an advantage, though I don't know by how much.

OTHER NOTES

Both Bruce Portzer and I noticed a distinct directional "peak" in sensitivity while on our DXpedition. This was quite unexpected. The published horizontal (or azimuthal) sensitivity patterns of the K9AY antenna indicate a broad, even front lobe of almost 270 degrees of azimuth mated to a very sharp vee-shaped rearward null. That matches what we were hearing, except on weak signals which were otherwise in the clear. Sometimes, these stations were significantly stronger on just one wire. Since the wires were only 45 degrees apart in azimuth, that really shouldn't have been happening. This effect was most noticeable on the 5 or so Russian long wave stations that we logged. Whether this was a unique effect of our superb ground plane or beach-front location, or whether this peak has been missed by DXers who are limited to only four directional choices, we had no way to determine. As other DXers with four-loop arrays gain experience, we should all be alert to this phenomenon.

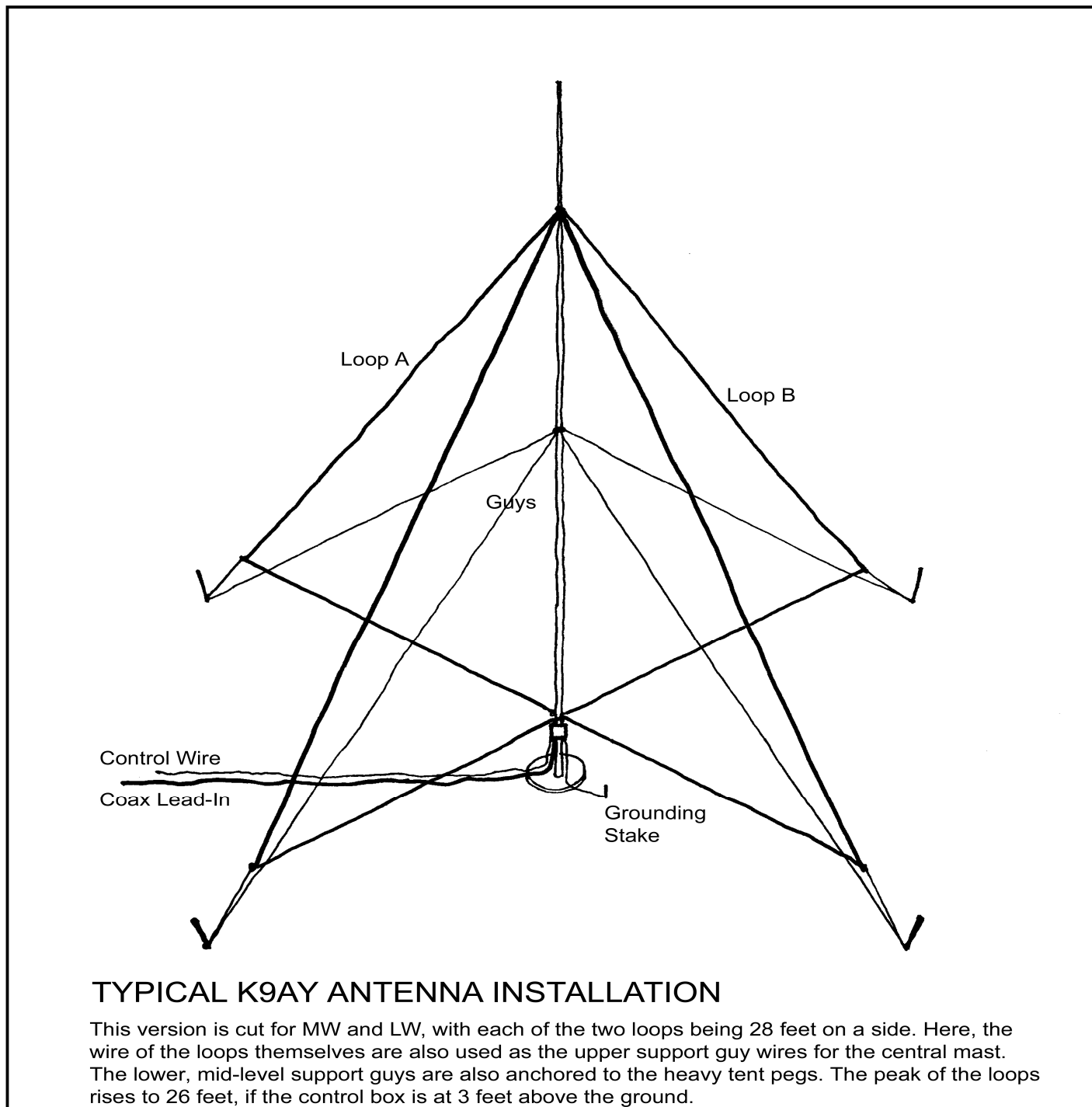
Concerning the 4-loop array coupled with the DK9SQ antenna mast: the extra weight and downward tension from the extra two loops has caused my telescoping fibreglass mast to partly re-telescope during two of our storms here in Oklahoma. I had no such trouble when I had only two loops of 20 gauge wire up. After having the same thing happen the first night on the Washington coast, I secured each joint of the telescope with a stainless steel hose clamp. Problem solved.

I should also note that the experience with K9AYs at the Newfoundland DXpeditions, while good, do not appear to have been quite so wonderful as mine. My guess is that differing ground conditions may be to blame. The ground plane in Oklahoma was excellent: very moist clay. The ground in Washington was even better: Sandy soil completely saturated with brackish water. Ground conditions at the site in Newfoundland are a mixture of dry sandy soil and rock, as I remember. I am unsure whether the K9AYs in Newfoundland were amplified, as is the Wellbrook version. The Wellbrook amplifier seems to not be needed much when doing domestic/Mexican DX here in Oklahoma, but it made a world of difference in hearing weak trans-Pacific signals on the Washington Coast. Also, Jean Burnell noted that their 2500 foot beverage was always superior (on MW) to any other antenna for the direction in which it was pointed. I'm sure that is true. I don't ever expect to entirely give up my addiction to beverage antennas. When I have the opportunity to string out at least 1500 or more feet of wire toward an area of interest, I'm certainly going to do so. Unfortunately, those opportunities are very rare, even here in the world's largest cow pasture.

CONCLUSION

The K9AY antenna as produced by Wellbrook Communications is a marvelous antenna for medium and long wave DXing. Even though I have not used a K9AY antenna cut for shortwave frequencies, my medium wave version is second only to my 500 foot beverage antennas when DXing the Tropical Bands. The

Wellbrook units are very well built and appear to be optimized for the needs of serious DXers. I recommend the Wellbrook K9AY enthusiastically and without reservation.



The only current source for the Wellbrook version of the K9AY Antenna is from the manufacturer:
Wellbrook Communications
Wellbrook House, Brookside Road,
Bransgore, Christchurch, Dorset
BH23 8NA. UK.

Tel. 01425 674174 (International: +44 1425 674174) URL <<http://www.wellbrook.uk.com>>
The proprietor of Wellbrook is Andy Ikin and he is one of the "good guys": e-mail
sales@wellbrook.uk.com
or aikin@globalnet.co.uk

The DK9SQ telescoping mast may be obtained in North America at:
<http://www.bright.net/~kanga/kanga/dk9sq.htm>