Volume 5, Issue 1

9/2021

the exchange

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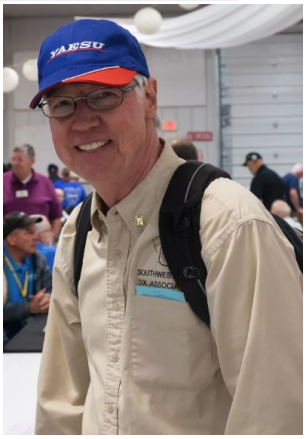
INSIDE THIS ISSUE:

The Prez says…..Tom, NR8Z



Daylight is becoming noticeably shorter with earlier sunsets and later sunrises. The autumnal equinox is less than three weeks away as I write this. That means a number of things are coming like wearing sweatshirts and pumpkin-flavored everything. More important, is that the noise levels and propagation on the lower bands will improve. In anticipation, Bill has stacked this newsletter with information to help you get on or improve your signal on the low bands. He's also covered a number of other topics that are guaranteed to increase your enjoyment of the hobby.

While we can, we'll continue to hold our SWODXA meetings in person. The September meeting will be on Thursday, September 9th at the Marion's in Mason. As usual, fellowship starts around 5pm and the business meeting starts at 6:30pm, you don't have to buy food. Stay tuned to the SWODXA email reflector and the website in case anything changes at the last minute.

Hopefully you made it to the W8DXCC in late August, I was unable to attend. It is a great DX outreach opportunity for SWODXA and, in fact, we had several new members join the club. A tremendous thanks go to Bill, AJ8B and Dave, K8DV, for spearheading the effort. Dave also had responsibility for the Cincinnati Hamfest.

I had some time to operate in the Ohio QSO party from out of state. Though I looked around, I only made contact with one SWODXA club member. Perhaps it was poor propagation or perhaps we could increase our participation in that event. Get out there on the bands and make some RF!

73,
Tom—NR8Z

OCF (Off-Center Fed) Dipole for 80M and 40M

By Carl Luetzelschwab, K9LA

This article is from Carl's website and is a timely article as we move in to the Low Band Season. Reprinted with permission of Carl from www.k9la.us. This was originally published in October of 2019. Thanks Carl!

This month is another break from tradition in that I won't be talking about solar issues or ionospheric issues or propagation. I'll be talking about an antenna. Of course an antenna is an important part of propagation, so I don't feel too bad about writing about antennas! What brought this on was a question about the OCF antenna, and I did a lot of work to understand how this particular antenna works.

Let's assume you want to focus on 80m and 40m CW. What antennas are available? There are many: a length of wire with a tuner, a dipole (or inverted-vee) with traps, a vertical with traps, an 80m dipole with a tuner for 40m, a 40m dipole with a tuner for 80m, and probably a couple others. But we'll look at the off-center fed antenna, as it has the capability of working on two bands (and maybe more – I didn't go any farther than just two bands) with a simple 4:1 transformer at the feed point (no tuner needed).

Let's start with a run-of-the-mill 80m dipole up at 40 feet cut for 3.525 MHz. The resulting length is 133.7 feet overall. The SWR (per 4nec2 – a free antenna modeling software package available from Arie Voors) when fed at the center is at the bottom of the page.

This antenna would work just fine from 3.500-3.600 MHz What about 40m? It's a full-wave on 40m, and will thus have a very high impedance when fed in the center. From 7.000-7.100 MHz, the resistive component of the impedance is around 4100 ohms and the reactance is capacitive around -j1200. That's an SWR of around 90:1, so you would need a darn good tuner to use it on 40m. Here's where the off-center fed dipole can help out. A sketch of this antenna is at the top of the next page.

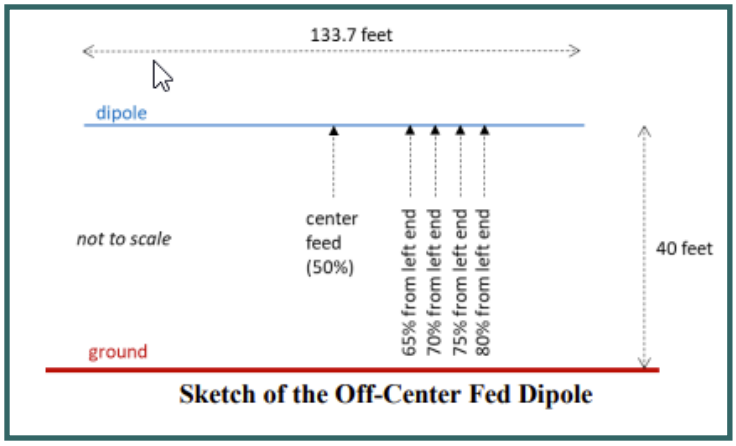
What I'm going to do is move the feed point from the center of the dipole (50%) to four other positions: 65% from the left end, 70% from the left end, 75% from the left end and 80% from the left end.

(cont. on next page)

frequency	impedance	SWR (50 ohm ref)
3.500 MHz	56 – j12	1.28:1
3.525 MHz	58 + j0	1.15:1
3.550 MHz	59 + j12	1.32:1
3.575 MHz	61 + j25	1.62:1
3.600 MHz	62 + j37	1.97:1

Impedances of a Center-Fed Dipole on 80m

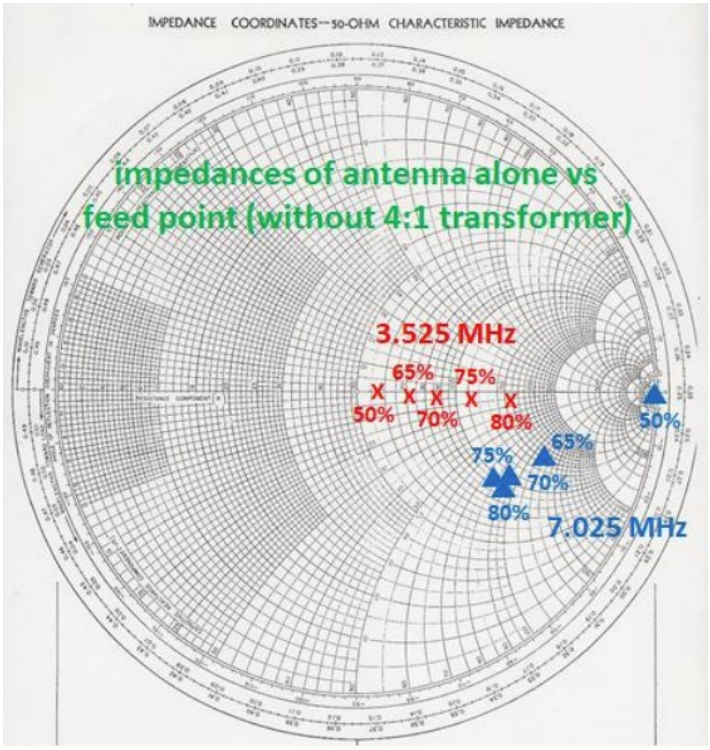
OCF Dipole for 80M and 40M—K9LA (cont.)



Sketch of the Off-Center Fed Dipole

I'll record the impedances on 3.525 MHz and on 7.025 MHz, and plot them on a Smith chart. Then I'll pick out the feed position that will give the best results for duo-band operation using the 4:1 transformer.

After some work with 4nec2, here's the Smith chart with the antenna impedances vs feed point position from the left end (without a 4:1 transformer) at 3.525 MHz and 7.025 MHz.



Antenna Alone

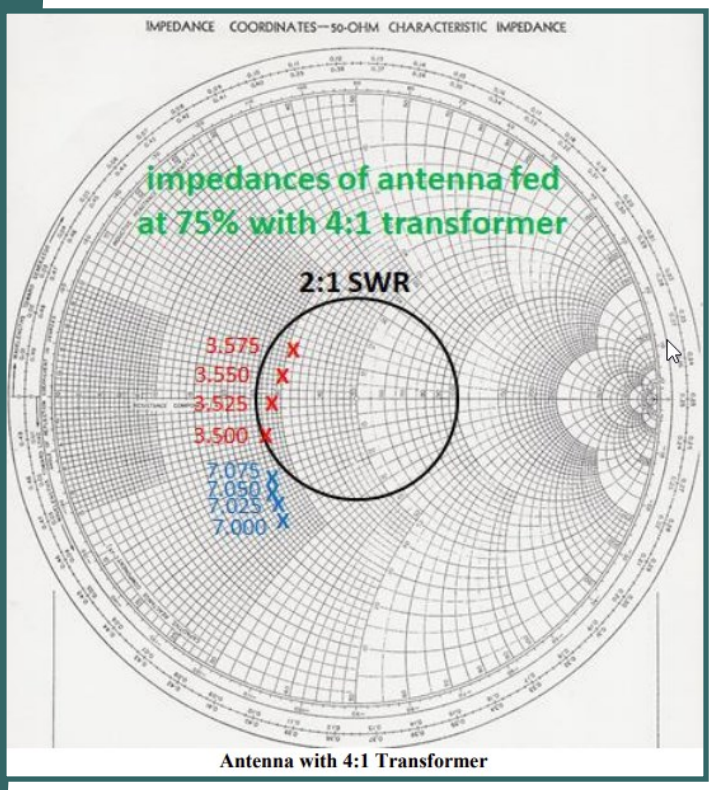
First observation: At 3.525 MHz, as the feed point is moved off-center, the resistive component of the impedance increases from 58 ohms at 50% to 159 ohms at 80% without straying too far from the real axis (small amount of capacitive reactance). Second observation: At 7.025 MHz, as the feed point is moved off-center, the impedance goes from around 4100 – j1200 at 50% (these values come from the first page) to around 100 – j90 at 80%. There is no feed point position where the impedance at 7.025 is near the real axis (no reactance). As a side note, if we go up to the 40m phone band (7.200 MHz and above), the impedance does get near the real axis (to around 120 – j5).

Now we have the impedances vs the feed point position at both frequencies. Ideally we'd like 200 + j0 at both frequencies to use with a 4:1 transformer. But we don't have this luxury, and running various scenarios in 4nec2 indicates the 75% feed point position would be the best compromise. So let's put the impedances at the 75% feed point position through an ideal 4:1 transformer (no loss) and plot them on a Smith chart. (Next Page)

The "good" news is the 80m frequencies are within a 2:1 SWR circle. The "not-so-good" news is the 40m frequencies are just outside a 2:1 SWR circle. But the "kind-of-good" news is the SWR will be just inside a 2:1 SWR circle in the real world due to the expected loss in the 4:1 transformer and in the 50-ohm feedline to the shack (assuming 0.5 dB of loss in the transformer and 1.0 dB of loss in 100 feet of RG-58).

(cont. on next page)

OCF Dipole for 80M and 40M—K9LA (cont.)



Antenna with 4:1 Transformer

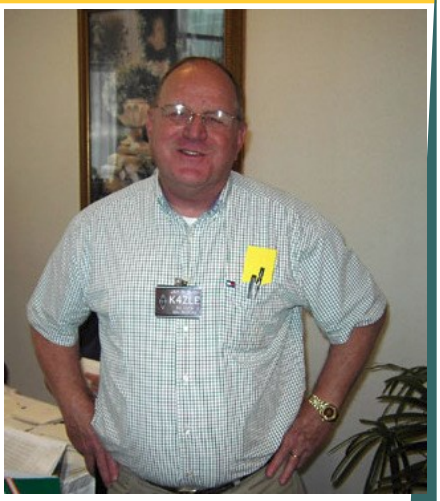
Now let's summarize the results. The off-center fed antenna described in this month's column will work on 80m CW and 40m CW using a 4:1 transformer. The resulting SWR will be marginal to a 2:1 SWR, especially on 40m CW. The results would be better if this was to be used on 80m CW and 40m phone. I would expect the same performance trend of any off-center fed antenna that is designed to work on a frequency and twice this frequency. Somewhat above the exact second harmonic on the second band would give better results.

As for adjusting this antenna (for example, allowing for ground parameters different than what I modeled), the only solution is to lower the antenna to make slight length adjustments and raise it back up. You could also move the feed point position a bit with some difficulty.

Perhaps installing this as an inverted-vee (with the midpoint at the apex and the feed point position 75% from one end). This should allow the angle between the two sides of the inverted vee to be varied a bit and the length of each side to be varied a bit to tune it for best performance on both bands – and I think this should be able to be done from ground level.

T33A Banaba—2013

By Jay Slough, K4ZLE



This article originally appeared in the March/April 2014 of The DX Magazine. This article shows Jays passion for Ham Radio and his reverence for the military. I really enjoyed reading this article again. This was reprinted with Jay's permission.

It was more than a DXPedition, it was an adventure. It was a challenge. It was a learning experience and, probably equally important, it was a mission of mercy. On November 3, 2013, nineteen hardy hams met in Tarawa, Republic of Kiribati to begin a journey they would long remember. We were accompanied by our concierge, Anne Corbett, a Kiribati native with Banaba relations. Without her assistance the activation of T33A probably would not have occurred. Most of the team was comprised of seasoned DXPeditioners and/or contesters. There were a few "nuggets" on the team, but they quickly learned about operating from the "neck of the funnel!"[1] There have only been a bit more than a hand ful of operations from Banaba since the late Jim Smith, VK9JS, activated it 25 years ago as T33JS. Most of those expeditions were much smaller in scope than was T33A and in total netted little over 200,000 QSOs. As a result, T33 stood number 33 on The DX Magazine's Most Wanted list. Our challenge was to put a sizable dent in the demand for this DXCC entity.

Jay, K4ZLE at the monument commemorating the 2nd Marine Division landing on Tarawa on 20 Nov 1943. The Team returned to Tarawa from Banaba on 20 Nov 2013.

Some History and Geography

Banaba was formally known as Ocean Island, and the real Old Timers might have contacted Bob Lusk, VR1L, John Walker, VRIG, or Bill Hempel, VR1N, back when the island was being mined by the British Phosphate Commission (BPC), prior to 1979.

(cont. on next page)

Anne Corbett, our Concierge

T33A—Banaba Island—K4ZLE (cont.)

Today only about 15% of the original phosphate remains, and the island is practically a wasteland of coral pinnacles.

Banaba is a special entity unto itself. While it is part of the island nation of Kiribati, it is a unique geopolitical entity and stands apart from the rest of the country, since it is administered from Rabi Island, which is part of Fiji. The fact that the Rabi Council is involved in Banaba's administration occurred because both Fiji and the former Gilbert & Ellice Islands were under British rule when the decision was made to displace the 2000 native Banabans after WW II. This forced resettlement was done in order to eliminate local resistance while the BPC scraped the island of phosphate. Today approximately 300 native Banabans have returned to live on their home island.

Kiribati consists of 32 flat coral atolls and one raised coral island (Banaba). The International Date Line is bent to the east to place all this island nation in the same day but spanning four time zones. This gerrymandering of the International Date Line causes an anomaly in our world clocks. By definition, a day is 24 hours in length, right? The Line Island Time Zone is 14 hours ahead of UTC, which gives us days that are 26 hours from the easternmost time zone to the westernmost time zone. Banaba itself has its own time zone that places local time 30 minutes behind The Gilbert Island Time Zone (Tarawa).

Kiribati straddles the equator and encompasses an area of 1,351,000 square miles. However, even with all that area the nation's population is only about 100,000. Banaba lies about one degree south of the equator and is only about 3.6 square miles in area. Its highest point, which is the highest point in Kiribati, is only 266 feet ASL. Kiribati has been proclaimed to be in danger of "sinking" into the Pacific Ocean because of rising sea levels. Excluding Banaba, the highest natural land formation in the nation is reported to be 16 feet above sea level (ASL).

The TEAM
l to r; front row - Gerd, DJ5IW, Dom, DL5EBE, Mike, N9NS; 2nd row, l to r – Cliff, KD6XH; Jay, AA4FL; Arnie, N6HC; Bob, WA1F; Ann, WA1S; Axel, DL6KVA; David, N6HD; Al, K3VN; Charlie, W8KK; back row, l to r – John, N7CQQ; Jay, W2IJ; Dave, N1EMC; Ron, WA6FGV; Ricardo, PY2PT; Alan, AD6E; Jay, K4ZLE

On November 5, 2013, after approximately 40 hours on the catamaran M/V Tekinati, an inter-island ferry with no bunking or kitchen facilities, we arrived on Banaba Island. Our 8 tons of radio equipment, humanitarian supplies, food , water (almost 3 tons) along with cooking and refrigeration appliances were off-loaded from the M/V Tekinati and we began to get situated on the island.

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T33A—Banaba Island—K4ZLE (cont.)

Football/Soccer Field antenna farm

Logistics, Setup, and Operation

On November 5, 2013, after approximately 40 hours on the catamaran M/V Tekinati, an inter-island ferry with no bunking or kitchen facilities, we arrived on Banaba Island. Our 8 tons of radio equipment, humanitarian supplies, food , water (almost 3 tons) along with cooking and refrigeration appliances were off-loaded from the M/V Tekinati and we began to get situated on the island.

Although we had cleared everything with the governing council from Fiji and the Kiribati Member of Parliament, we had to first meet with local officials to discuss the housing situation and to obtain permission to use the entire soccer field for one of our sites. After the meeting, we proceeded to have the local "teamsters" move everything from the dock to the prospective sites.

We stayed in the island guest house, Banaba House, where most previous DXpeditions had operated. In its heyday this was probably a first-class facility, but today it is little more than a termite ridden, near-empty shell of a house. One of our team member's leg went completely through the second-story floor and through the ceiling of the room below. Others had their feet, or the feet of their cots, puncture the rotted floor. Of course, there was no electrical service except from our generators. The plumbing was nasty even by the standards of experienced "mountain men"! Plumbing existed, but water for flushing and bathing had to be hand carried and dumped.

(cont. on next page)

More of the Football/Soccer Field antenna farm

Soccer Field stations with Don, DL5EBE & Mike, N9NS in control (Were they really in control ??)

T33A—Banaba Island—K4ZLE (cont.)

It was so hot and humid that before we could dry off after a "shower, we were already covered in perspiration.

Initially the CW site was on the soccer field, about half a mile up the hill from Banaba House. The SSB/ RTTY site was originally set up at Banaba House.

Raising the 160M vertical took a "few good men"

By 2300Z on November 5, 2013 our first contact was made to test the first complete station and we were off and running shortly thereafter. In the next 36 hours we managed to get all six stations at the two sites set up and working. We had everything working except 160 and 75/80m within 24 hours of arrival. It was mentioned earlier that this was an adventure, a challenge, and. a learning experience. The antennas were part of the challenge and learning. Although all the antennas had been used on previous expeditions and tested prior to this trip, we had to do some "MacGyvering" to get them all working. For instance, we had to readjust the capacitive top hats for 160- and 80-meter verticals to achieve resonance or near resonance. On the 80-meter vertical we could not alter the top hat enough to make it play right. After unsuccessfully trying to wind a base coil for impedance matching, we resorted to taking one of the 40-meter 1/4-wave shorted traps and use it as a matching stub. Sometimes it pays to know a little about transmission-line theory!

Propagation was good for about three of the days. Most of the remaining time we experienced marginal conditions with a solar flare, the usual Pacific static crashes, and equatorial midday doldrums. At times echoing and phasing occurring from multi-path propagation made copy a bit of a challenge, even on CW. The six stations were kept on the air following propagation as we experienced it. Complete statistics are available on Club Log. As an aside, we appreciate Club Log making their service available to us and other DXpeditions.

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T33A—Banaba Island—K4ZLE (cont.)

Having that service certainly adds a positive dimension to our hobby, don't you agree? If you do agree, you might show it by donating to it.

Ann, WA1S
Great CW Op and most of the photos came from her too.

Our Goal and QSOs

While we did not meet our goal of 100K, we did make 83,347 QSO's with 22,635 unique call signs. As expected, most contacts were with North American and Central American stations, followed by Asia (mostly JA's). We did not give those areas priority. Their relative physical location and sheer numbers made it impossible for it to be otherwise. We sought other areas of the world, especially Europe, and did our best to make T33 available to all who called.

About halfway through the expedition we decided to swap sites by mode, since we were running almost 2: 1 CW QSO's to SSB/RTTY. At that time, we shifted the SSB operation up the hill to the soccer field and moved the CW operation down to Banaba House. If you look at the numbers, we still had many more CW Q's than phone/RTTY Q's. We were also disappointed in the 160-meter numbers, but it was not because we were not there calling. After more than 12 days we went QRT on Nov 17, 2013 at 0557Z.

A Mission of Mercy

It was also mentioned that this expedition was a mission of mercy. Jay, AA4FL, is a dentist. Can you guess by his call what state he is from? In addition to pulling his share of time on the air, he set up a clinic in the local dispensary. He saw over 60 patients and pulled 165 teeth. That represents just over 20% of the island population! There are no dentists on Banaba and medical care is limited to the equivalent of a RN who does her best to treat the local populace.

We also presented the children of Banaba with 100 pairs of Croc® shoes and a dozen new soccer balls with accessories. We had the soccer field tied up while there, but you can bet it was being used anew after our departure! Additionally, several non-ham local "HF" stations were repaired by some of our techies. Do we dare disclose that at least one was a CB radio?

Jay, AA4FL and local nurse doing Dental Clinic

(cont. on next page)

T33A—Banaba Island—K4ZLE (cont.)

Our Return Trip (and Memories)

After a 48-hour return boat ride to Tarawa, the adventure was not over. For me, personally, arrival on Tarawa on November 20, 2013 was a cathartic experience. I am a former Marine. That date marked the 70th anniversary of the Marines landing there in WW IT. A few years ago, I was part of the T2T expedition. While in Tuvalu, I visited a site where the Marines staged prior to Tarawa. I was born on November 23, 1943, the day our forces secured the island.

After the official 70th anniversary ceremonies, several of us visited the memorial and walked the beaches where mass carnage had taken place 70 years earlier. None of this was considered when planning for our DXPedition was done. It was providential. There are other "connections" between my Marine service and Tarawa, but that is the subject of an article I submitted to the Naval Academy Alumni Association.

The next day we found out that our return flight from Tarawa to Fiji was canceled. As a result, most of us were delayed at least two days in returning home.

Yes, More Than a DXPedition

It was indeed an adventure, a challenge, a learning experience, and a mission of mercy. Truly, we will remember it for a long time. It is our desire and hope that you enjoyed being on your side of the pileup as much as we did being on our side. However, trips like this do not just happen. DXPeditioners spend time away from their families. Not all are retired; so many of them spend time away from work burning precious vacation time so you can put another "ATNO" or band mode in your log.

Very seldom do contributions pay the full cost of these trips, and whether you agree or not, these are not "vacation" excursions taken by a few at the expense of many. Every member of this type trip digs deep into his own personal funds to make them a reality.

There is a lot of work that goes into planning what to take, obtaining equipment, and testing, loading, and shipping tons of material to and fro, while deployed expedition members are usually on rotating shifts, getting little sleep, eating odd food at odd hours, and sometimes contending with an unruly multitude.

If it is a top 50 entity, odds are the environmental conditions are not idyllic either. Even after the Qs are in the log, the work is not over. Someone has to handle the QSL chores. We are not looking for sympathy. We are just pointing our reality.

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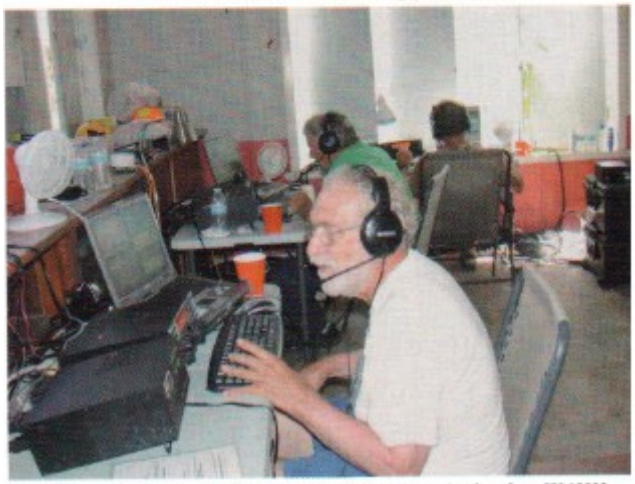
T33A—Banaba Island—K4ZLE (cont.)

Banaba House
Out .333 star rated home away from home



l to r: Rob WA6FGV; John, N7CQQ and Charlie, W6KK (back to the camera) at the Banaba House stations.

Our Thanks

In addition to Anne Corbett, previously mentioned, we'd like to thank Kiribati Member of Parliament Timon Aneri, Dr. Otem from their Ministry of Health, and Ms. Kabo at the CCK for their assistance in getting all the permits and paperwork generated and approved.

We'd also like to thank the sponsors whose logos appear on the QSL card and/or on our website. I hope our sponsors will forgive us for not listing them individually in this article, but if we did, it might be like some Hollywood egomaniacs trying to sound humble at one of their self-aggrandizement awards ceremonies. We do sincerely appreciate all sponsoring organizations. Look over the list. Most of these organizations are heavily involved in making trips like ours possible. More and more, trips to the top 50 entities just would not happen, or would not happen as often, without their support. If you are not a member of at least one of the contributing organizations, perhaps you should consider joining.

Let's not forget the equipment manufacturers who also provided immense support. These are all top-notch suppliers, and most of us use their equipment in our home stations. On operations like ours the equipment is used under less than ideal conditions and their stuff meets the challenge with gusto. Consider buying from them when you upgrade your station.

Finally, to the individual amateurs whose support prior to and after our return, you were also vital in making this sojourn possible and we thank you. We especially thank those who gave on the front end. However, it is not too late to contribute, either by OQRS or directly to our DXPedition treasurer, Cliff, KD6XH.

Where to next? QRX for now; standby one. Our DXPedition leaders hint: "There is always another adventure in the works!"

[1] In US Naval Aviator parlance, a rookie aviator, especially one on his first cruise. As a rookie he is still unproven and unrefined, but like a gold nugget the potential exists to be very valuable!

[2]T33RI, T33T in 1990; T33KKI, T33CS in 1994; T33CW, T33Y, T33RD in 1999; and T33C with various personal calls in 2004.

60 Meters—The Channel Band

By Joe, W8GEX—w8gex@aol.com

Thanks to everyone who worked me on 60 meters from the Bahamas as C6ADX. My logs have been uploaded to LoTW.

COUNTRY UPDATE

Bouvet Island: They are still working on getting another boat.

3DA0 – SWAZILAND Eswatini :
3DA0RU will be in the country formerly known as Swaziland, an operation is planned for October 22, to November 7. They will operate FT8 F/H. QSL direct, (OQRS) bureau and LoTW. https://dxpedition.wixsite.com/3da0ru

Kyrgyzstan ***latest to arrive on 60 m/5 MHz*** **-**
The Union of Radio Amateurs of Kyrgyz Republic (ARUKR) announced that on 4th June 2021, the Kyrgyzstan Telecommunications Regulator made the new WRC-15 Amateur Secondary Allocation of 5351.5 – 5366.5 kHz available to Kyrgyz hams at a maximum power of 100W. Other Secondary allocations made available at the same time were 472 – 479 kHz at 1W, 122.25 – 123 GHz and 134 – 141 GHz both at 100W. Andrea EX0DX / HB9DUR, ARUKR IARU Liaison Officer - The Union of Radio Amateurs of Kyrgyz Republic (ARUKR) http://qrzex.com/
Tks: EX7DY, EX0DX

St. Kitts, Sint Maarten and St Eustatius: By John W5JON - I am planning on spending one whole night on 60m from both Sint Maarten PJ7) and St Eustatius(PJ5).
73—John, W5JON

V47JA - I will again be operating from our Calypso Bay, St. Kitts, West Indies vacation home, from October 4 - 18, 2021, and active on 6-160m, (including 60m}

PJ7/W5JON - Sint Maarten, October 18 - 23, 2021.
PJ5/W5JON - St Eustatius, October 24 - Nov. 1, 2021.

Sao Tome & Principe islands S90K: Dave Beran OK6DJ reports that he plans on an FT8 and CW operation from the island from Oct. 2, to 16. QSL direct to OK6DJ or LoTW, or OQRS. More info on their website at www.cdxp.cz
Best regards, Henk Schanssema, PA2S

An Introduction to Operating on 160m

Carl Luetzelschwab K9LA k9la@arrl.net

(Reprinted with permission of K9LA—This article originally appeared in the November 2006 issues of CQ)

I ran this article last year in this very same issue. Thought it would be timely again!

Operating on 160 meters has always been a challenge. Two of the biggest challenges are the physical size of efficient antennas and noise when receiving. The purpose of this article is to provide appropriate information to address these two challenges, along with general information about other issues necessary to get your feet wet on topband (also known as the Gentleman's Band).

A Short History of 160m

The 160m band has been around for a long time. In the First Edition of the Radio Amateurs Handbook (1926, published by the ARRL), Amateurs had an allocation from 150 meters to 200 meters in wavelength (that ís 2 MHz down to 1.5 MHz). Due to AM broadcast stations and other services, the 160m band was eventually narrowed up to 1.8 ñ
2.0 MHz.

Because of LORAN issues (LORAN is a radio location service), there have been power and frequency restrictions over the years. For example, during my early years in Amateur Radio in northwest Indiana (early 1960s) I could only operate from 1800 to 1825 KHz with a maximum power of 200 W during the day and 50 W during the night. There were similar restrictions in other areas of the country.

Nowadays those of us in the US can operate anywhere from 1.8 to 2.0 MHz at up to 1500 W PEP output. Of course you should always strive to use the minimum power to make the QSO.

The first order of business for an introduction to 160m is to look at the band plan for 160m ñ what frequencies should we use for CW, what frequencies should we use for SSB, what frequencies should we use for AM, etc.

160m Band Plan

Unlike our HF bands, the FCC (Federal Communications Commission) does not regulate 160m with respect to band segmentation by mode. Legally any mode can operate anywhere. But obviously this could cause (and has caused) conflicts.

To impart order to this issue, a Gentleman's Agreement band plan was developed by an ARRL Ad Hoc committee with input from users of 160m. The recommended band plan is shown in Table 1. You are strongly encouraged to adhere to this plan. A little cooperation among fellow Amateurs can go a long way!

With the band plan outlined, a couple comments on where common activities take place is in order. Rag chewing on 160m starts around 1.843 MHz and extends all the way up to 2.0 MHz. There is a lot of spectrum above 1.9 MHz that is relatively lightly used, so you might want to consider moving up there for your rag chewing activities.

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An Introduction to Operating on 160m (cont.)

AM aficionados hang out around 1.885 MHz, and itís an enjoyable side hobby to fix up old radios and put them on the air (I can vouch for this through my efforts with my Viking Ranger II and Drake 2B with a homebrew converter). Finally, most DXing on 160m outside of contests is done on CW in the lower 35 KHz or so of the band. If you want to work DX on 160m, knowing code is almost a must due to CW ís inherent weak signal advantage over SSB and the CW bandwidth letting in less noise (more on this latter aspect in a bit).

Since LSB (lower side band) is normally used on 160m, note that 1.843 MHz refers to the carrier frequency for LSB. The intent here is to keep the side bands at 1.840 MHz and above (since the bandwidth of an SSB signal is about 3 KHz). And there is no segmentation by license class ñ General, Advanced, and Extra class licenses have equal access to the entire band.

When Is 160m Good?

Now that we know where we should operate in the 160m band, the next issue to address is when should we operate, that is, when is 160m good?

If your interest is only for local QSOs (rag chewing, nets, etc), then 160m is good anytime, day or night, summer or winter. And where we are in a solar cycle won't matter, either.

If your interest in 160m is DXing, then there are times, seasons, and phases of a sunspot cycle when 160m is best. Due to excessive daytime D region absorption, 160m is useful for DXing when the path is in darkness or very near darkness. Because of geomagnetic field activity considerations, 160m is best during the winter months and from solar minimum to a couple years thereafter. The latter portion of the previous sentence says now is the time to get on 160m if you're pursuing DXCC or WAZ. We are at solar minimum between Cycles 23 and 24, and the next couple of winter seasons (2006 -2007, 2007-2008, and possibly 2008-2009) should offer excellent opportunities for the DX minded.

(Cont. on Next Page)

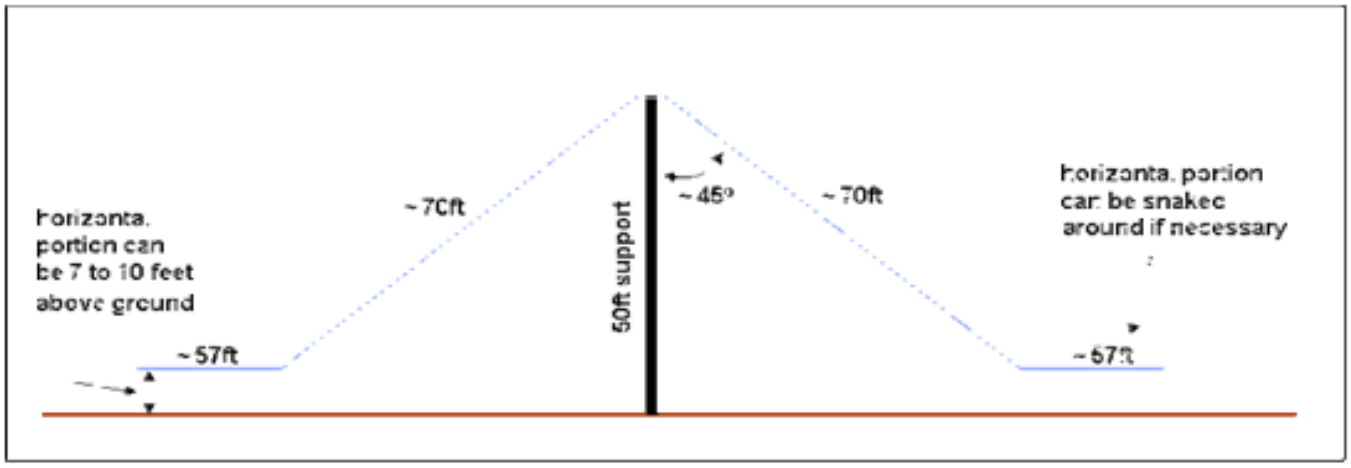


Figure 1 Inverted-Vee Installation

An Introduction to Operating on 160m (cont.)

Simple Transmitting Antennas

As stated in the introduction to this article, the first biggest challenge for operating on 160m is the physical size of an efficient transmitting antenna. The length of a half wavelength dipole at 1.85 MHz is approximately 253 feet (each side would be about 127 feet). That's quite a bit of a horizontal span for those on small lots.

An easy way to overcome this horizontal span requirement is to make the dipole into an inverted-vee. For example, the top of a 50 foot tower or 50 foot support could be used as the center point for the inverted-vee. The sloping portion of each side of the inverted-vee could be approximately 70 feet, with the remaining 57 feet running horizontal to the ground and even snaked around a bit to fit the lot. Figure 1 shows this configuration. This would make an excellent antenna for local activity on 160m (but don't be surprised if you work DX with it the ionosphere can be the great equalizer among different stations).

If your interest is DXing, generally you'll want an antenna that puts more of its energy at the lower elevation angles. Perhaps the simplest antenna to fit this bill is the inverted-L. The total radiator length needed would only be about 127 feet, as this is essentially a vertical antenna operated against ground. A tree could be used to support the vertical portion of the inverted-L, with the remaining length (127 feet minus the vertical portion) sloping down to a convenient support. Figure 2 shows this configuration using a tree for the support. Either buried radials, radials lying on the ground, or elevated radials could be used to provide the ground image for this antenna.

Figure 1 is what I use on 160m, with a pulley in a nice tall tree anchoring the vertical portion and six elevated radials at about 7 feet to keep the deer from running into them.

Noise

The second biggest challenge noted in the opening paragraph (mostly affecting those interested in DXing) is noise and is noise and its impact on the ability to hear weak signals. There are two sources of noise that make receiving on 160m difficult: man-made noise (machinery, appliances, lights, and so forth) and atmospheric noise (static from lightning discharges propagating into your QTH). Figure 3 shows the magnitude of the noise problem (from data in the International Telecommunications Union document Rec. ITU-R P.372-7).

The three curves in Figure 3 are the expected noise from a short monopole antenna in a CW bandwidth (500Hz) in terms of S-units for three noise environments: residential, rural, and quiet rural. This plot should be used as a ballpark guideline, as your mileage may vary according to your specific local conditions. I would expect the noise received by the inverted-L in Figure 2 to roughly agree with the short monopole data in Figure 3, with the inverted-vee of Figure 1 maybe a bit better due to some directivity (see the next section). For the data in Figure 3, I assumed S9 was -73 dBm (50 microvolts) and an S-unit was 5 dB (based on my measurements, this is typical of current receivers).

(Cont. on Next Page)

An Introduction to Operating on 160m (cont.)

In a residential area, the expected noise on 160m in a CW bandwidth is around S7. Wow! Even moving to a rural area only knocks this down to S6. Heading out into the country puts the noise at S3. That S3 value is the level of noise in a CW bandwidth on my OMNI VI Plus using my inverted-L.

The S3 value doesn't sound like much, but remember that the noise floor of a modern receiver is around -130 dBm. Using a signal generator, the S3 value on my OMNI VI translates to about -103 dBm. Thus I am giving up almost 30 dB of hear-ability, which is the difference between my external noise level and my receiver's noise floor when using my inverted-L for receive.

Be aware that the data in Figure 3 assumes you don't have a particularly troublesome local man-made noise source that masks everything else (for example, a noisy utility line). If you do, then you have your work cut out to eliminate it. On a personal note, the most interesting noise source Iive had to find and resolve was an electric blanket used by our neighbors to keep their cat warm.

Simple Receiving Antennas

When you first start out on 160m, you'll probably use your transmit antenna for receive. As you progress with your 160m activities, you may need to work weaker signals that are at or even below the noise level resulting from using your transmit antenna.

This is where low-noise receiving antennas come into play. Regardless of the category of the low-noise antenna, they all work on the same principle ñ increase the directivity of the antenna (make front-to-back and front-to-side ratios larger) to reduce the total amount of noise being received from around the compass. This assumes the arriving noise is not a localized source as mentioned in the previous section. And if there is a noise source in the direction you want to receive, you have a real problem.

The improvement in hear-ability for a given low-noise receiving antenna will generally follow the narrowness of the pattern ñ a narrower pattern will let less noise into your receiver and lower your noise level, and thus will thus allow you to hear closer to your receiver's noise floor. From this consideration, we can make a first-order list of how effective some of the common low-noise receiving antennas will be. In order of least effective to most effective, they are:

- Short Beverage (80m long)
- Elongated terminated loops (EWE, Flag, K9AY, etc
- Standard Beverage (160m long)
- 4-Square (quarter wavelength spacing)
- Long Beverage (300m long)

(Cont. on Next Page)

An Introduction to Operating on 160m (cont.)

Propagation and Predictions

If we look at worldwide electron densities, we'll see that the ionosphere always has enough ionization to refract 160m back to Earth for multi-hop propagation ñ even during the dead of night at solar minimum. Thus the problem on 160m is not with the MUF (maximum usable frequency) it's with the amount of absorption and the resulting signal strength. This was the basic premise mentioned previously in the "When Is 160m Good?" section due to absorption, the best place for 160m RF is in the dark ionosphere.

Now if you've used propagation predictions on our HF bands, you've probably noticed that most of them do not include 160m. There is a very good reason for this is because of the impact of the Earth's magnetic field on three basic propagation parameters. With 160m being so close to the electron gyrofrequency, the magnitude of the magnetic field and the direction of propagation with respect to the direction of the magnetic field modify the amount of absorption incurred, the amount of refraction incurred, and the polarization of the wave(s). This can get very complicated very quickly over long paths, and the proper way to address this rigorously is with full-blown ray tracing software.

Over the years there have been several studies by 160m enthusiasts to come up with a simple method to predict whether 160m is going to be good on a given night. These studies have usually been based on solar flux and K or A indices. These efforts have not met with much success, as they do not consider all the variables that appear to be involved with propagation on 160m, especially events that happen in the lower ionosphere to enable ducting mechanisms and reduce absorption. In general a quiet geomagnetic field seems to be a requisite, but it doesn't appear to be the only requisite.

This all comes down to two simple pieces of advice with respect to propagation on 160m:

1. Use the excellent mapping feature in many of our propagation prediction programs to determine the best times for 160m propagation over the desired path with respect to darkness along the path. Pay particular attention to sunrise and sunset times at your QTH and at the other end of the path for possible signal strength enhancements.

2. Get on the band to check it out in real-time. Watching PackerCluster spots also helps to get a real-time assessment.

Summary

As mentioned several times in this article, 160m is also known as the Gentleman's Band. The current users of 160m would like it to stay that way. So regardless of your operating preference (rag chewer, DXer, contester, digital enthusiast, QRPer, or whatever) please strive to uphold the reputation of 160m.

The advice and solutions offered in this article probably won't get you to the Top of the DXCC Honor Roll on 160m. But they will allow you to sample the challenge and adventure of 160m. Where you go from there is up to you.

(Cont. on Next Page)

The DX Code of Conduct - https://rsgb.org/main/operating/dx-code-of-conduct/

1) I will listen, and listen, and then listen again before calling.
2) I will only call, if I can copy the DX station properly.
3) I will not trust the DX cluster and will be sure of the DX station's call sign before calling.
4) I will not interfere with the DX station nor anyone calling and will never tune up on the DX frequency or in the QSX slot.
5) I will wait for the DX station to end a contact before I call.
6) I will always send my full call sign.
7) I will call and then listen for a reasonable interval. I will not call continuously.
8) I will not transmit when the DX operator calls another call sign, not mine.
9) I will not transmit when the DX operator queries a call sign not like mine.
10) I will not transmit when the DX station requests geographic areas other than mine.
11) When the DX operator calls me, I will not repeat my call sign unless I think he has copied it incorrectly.
12) I will be thankful if and when I do make a contact.
13) I will respect my fellow hams and conduct myself so as to earn their respect.

An Introduction to Operating on 160m (cont.)

160m Tips

The following is a list of tips, slanted toward the DX aspect of operation on 160mn, to help you enjoy your experience on 160m.

Operating issues

- Listen, listen, listen
- Don't call incessantly in a DX pile-up
- Be courteous and uphold the reputation of 160m as the Gentlemanís Band

Propagation issues

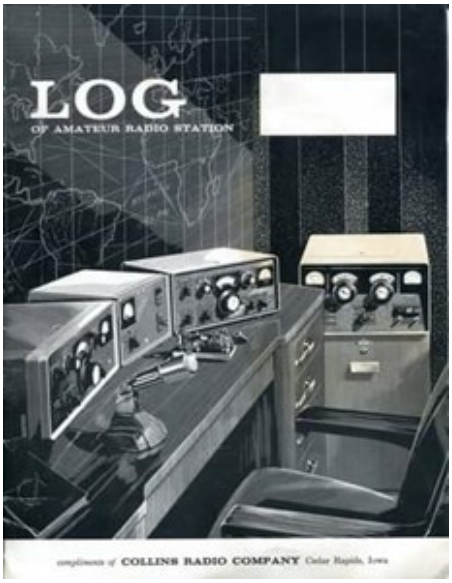
- Know when the desired path is in or very near darkness Pay particular attention to sunrise and sunset times
- Don't shy away from elevated K indices as there may be skewed paths Check paths to the southwest at your sunrise and southeast at your sunset

Collins S-Line Restoration, On Air Operations, and 100 DXCC Entities—Part 1

By Dave, K8DV—k8dv@cinci.rr.com

How many of you remember your early days as a ham and paging through old and new ham radio magazines and drooling over the advertising of equipment you could only dream of? Well I am no different and I can remember although I had access to a nicely equipped ham shack as my dad (KZ4G SK) was a ham and I full access to his equipment and antennas so having a reliable station was not a problem. But none the less I would page through the magazine and dream what it would be like to have some of the radios shown on the pages.

I can remember looking through these magazines as well as visiting the ham shacks of my dad's many friends and the equipment that I always thought was some of the best looking gear and always had great looking advertisements. Although other radios caught my eye such as some of the Hallicrafters, Heathkit, National, and Drake, the one that always the one I stopped and looked at the most, sometimes referred to as "The Grey Boxes" the Collins S-Line they looked like what I thought a radio should look like and just plain ole cool. Not only were they adds cool but I can remember my dad having some Collins logbooks, which were way cool with a great graphic on the front cover of the S-Line, just don't see things like that anymore.



Back this past winter and I had the chance to pick up a Collins S-Line from the daughter of the original owner who has sadly passed away several years ago and the radio had been just sitting there untouched since still hooked up just as if it was ready to be turned on and used. We were able to make the deal and her and her husband met me with the equipment.

(cont. on next page)

Collins Line Restoration—K8DV (cont.)

Back this past winter and I had the chance to pick up a Collins S-Line from the daughter of the original owner who has sadly passed away several years ago and the radio had been just sitting there untouched since still hooked up just as if it was ready to be turned on and used. We were able to make the deal and her and her husband met me with the equipment.

Thought to myself OK, I now own a radio that I always dreamed of (Collins S-Line), now what? I wanted to have a goal for myself after restoring and wanted to pay tribute to the memory of Judy's father K8UKT too. I got thinking about it and besides just putting these back on the air what could I do so I could truly have the experience I always thought about when I was drooling over the advertisements all those years ago. I decided being a DXer and holding DXCC on 9 bands and over 2000 Challenge points, what would be a new DX adventure and decided that I would restore the S-Line and see how long it will take me to work 100 DXCC entities, hoping this will give the feel of old school DXing fulfill the dream that I had as a young ham or what it would be like to have a Collins S-Line of my own. But before I can get to the fun of on-air operations and the DX chase I have go through the restore process. So the story begins:

I decided to start with the receiver the 75S-1 first and get it going. I hooked it up to my variac and brought it up slowly. To my amazement there was noise coming out of the speaker, which is good sign. After rotating switches back and forth I was able to hear the calibrator signal, it was alive, what a thrill!

After getting it to this point I unhooked it and removed its cabinet and decided it was time for a good cleaning, although mostly just a heavy layer of dust, certainly nothing major. I also inspected and found no signs of modification or repairs but was pleasantly surprised to find that this particular 75S-1 had the 500hz CW filter, this was an option and not many have the filter. This thing was pristine under the chassis, I then started checking the tubes and found the crystal oscillator tube 6U8A was shorted, so I found one in my spares and replaced it, all the other tubes checked OK. After cleaning I decided to hook it back up and check it out from on-air signals. I got it all hooked up and put it on 40 meters and although there were lots of signals they all seemed down to me when comparing the same signal on another receiver using the same antenna. I did a quick check on the alignment on 40 and this seemed to be OK, this radio appeared to have never had service done on it other than to install the CW filter.

I then started looking at the schematic that led me to the 3 section capacitor and one of the sections, I temporarily clip in a capacitor across the section that I suspected as bad and the receiver came to life. At this point I got to thinking this is a 60 year old radio I should go ahead and replace all the paper and electrolytic capacitors as I am sure they are questionable. I found a complete kit online and went ahead and order it.

(cont. on next page)

Collins Line Restoration—K8DV (cont.)

Once the kit came in, over a few evenings I was able to replace the 8 capacitors including the 3 section electrolytic which was buried in the back of the radio in the most difficult location.

After getting this done, I also replaced the line cord as it was suffering from being dried out and potential problem, I found a nice grey line cord in my efforts to try and keep it looking original.

Now that the receiver is completed I have set it aside and now it is time to start the

power supply 516F-2 first and then the transmitter 32S-1. After that I will set them up and do some on-air testing and start my quest of 100 DXCC entities using the Collins S-Line.

73,

Dave, K8DV

We have a problem—Please Help

Many of our members are 8th Area Incoming QSL Bureau card sorters. This includes N8DX—Jack, who manages the entire 8th area buro, K8CR—Chuck, the "C" card sorter, AJ8B—Bill, the "N" card sorter, K4ZLE,—Jay the "O" card sorter, K8DV—Dave, the "Q" card sorter, and NR8Z—Tom, the "S" card sorter.

As N8DX points out "With the onset of FT8, the growing amount of unclaimed QSLs at the bureau have become overwhelming to say the least." This is problem for all of the sorters. How can you help? Contact your letter sorter based on their email address at https://arrl-greatlakes.org/8th_bureau.htm. If you don't want to receive cards, let the sorter know. If you do, make sure that you have envelopes on file, the address is correct, and the sorter has sufficient postage. No excuse for a DXer not to be up to date with their card sorter.

N8DX does a terrific job and all of the sorters are dedicated volunteers. Please help them do their job!

Interview with SV1JG—Cliff

I worked Cliff and after reviewing his QRZ.com page, I had to contact him. He agreed to answer some questions and it was then that I learned he was a friend of Joe, W8GEX. You can contact Cliff at sv1jg@sv1jg.gr

AJ8B: How did you first get interested in amateur radio?
SV1JG: From a young age I liked electronics and specifically telecommunications. Near my house lived SV1AI (SK) who had the shack on the roof of his house, where whenever I passed I heard him talking to other radio amateurs. So I learned that in order to become a radio amateur, I had to take an exam. So I found the one and only club at that time (RAAG) and became a member in 1969 if I remember correctly. Because at that time they were preparing a new law for radio Amateurs I had to wait to take exams for 7 years. So I got my callsign in 1977. Of course, I was active all those years from the club station.

AJ8B: Do you have a favorite band or mode?
SV1JG: I don't have a specific band that I prefer, I'm active from 160m up to 13cm. In HF bands I prefer CW. I'm QRV on the satellites and on the QO-100.

AJ8B: What time of day and days do you like to operate?
SV1JG: Usually late at night and early in the morning. I listen to it every day and on the weekends I take part in contests.

AJ8B: Any secrets to your success?
SV1JG: I don't have any secret to my success. If I want to work a rare country I study the propagation and the hours that favor communication.

AJ8B: Any tips that you can share?
SV1JG: Listen, listen, listen before you press your microphone your keyboard or your key!

AJ8B: You have a wide variety of antennas shown on the web page. Do you have any RFI issues or issues with the neighbors?
SV1JG: I have no RFI problem at all. The problem I have is high RF field because my next door neighbor is an amateur too. With good understanding we solve the problems. Hi Hi

AJ8B: Describe what you are currently using:
SV1JG: My main radio in HF is the Elecraft K3 but I have also the ICOM IC-7300 and IC-705. For VHF – UHF – SHF I have the ICOM IC-9700.

My HF amplifiers are the Alpha 99 – the Alpha 374A – the vintage Collins 30S1 and 30L1.

My HF antenna is the Steppir 4 elements, for 80m I use double bazooka and for 160 inverted L. For the satellites I have a pair of 8 elements on VHF and a pair of 18 elements parabeam on UHF made by JayBeam.

(cont. on next page)

Interview with Cliff, SV1JG (cont.)

AJ8B: What advice do you have for those of us trying to break pileups to work DX?
SV1JG: This is a very good question. What I follow in every DXPedition is to find out how the operator of the DXPedition handles the pile-ups.

So I hear the split frequency. Many operators stay and make several contacts at the same split frequency, others change frequency after each contact. Once I understand how to handle the pile-up then I'll decide to call. Only in the second case I mentioned above will I go to a frequency and call. In the first case, I'm looking to listen to the station that answered and then I'll call.

AJ8B: You are a veteran of many DXPeditions. Is there one that really stands out and why?
SV1JG: I've been on several DXPeditions but the best of all was this 2008 at Ducie VP6DX. A very well organized DXPedition, where a team of 13 well-known DXers – contesters worked together flawlessly.

AJ8B: Where are you going next?
SV1JG: Unfortunately due to COVID 19 I have not planned to participate in any DXPedition yet.

AJ8B: What is your favorite contest?
SV1JG: My favorite contest is CQ WW.

AJ8B: Any QSLing hints?
SV1JG: Once we used to QSL for a new country via direct. Now days, it is best to use LoTW if they don't want the QSL.

AJ8B: What coaching/advice would you give new amateurs?
SV1JG: My advice to new amateurs is listen – listen – listen before you transmit .

AJ8B: If I were to stop by for a visit, what local place would you want us to visit?
SV1JG: Athens is a historic city. The visitor must definitely visit the Acropolis and the Archeological

AJ8B: What local food would you want me to try?
SV1JG: In my village, which is 35 kilometres north of Athens , toast mutton is popular. But in Athens try souvlaki or moussaka

AJ8B: Thanks for taking the time to answer my questions. Is there anything you would like to share with us?
SV1JG: I show that member of your club is my friend Joe W8GEX.

(Pics on page 25)

Our DX Friends are saying….

As we have done in previous newsletters, I sent our DX Friends a question and asked for their opinions. The question was "*What do you use on 160M? What plans might you have for 160M?*"

Thanks to our former interviewees for sharing their thoughts.

Hi Bill,

Yes we do have the capability of working on 80 and 160, I run a pair of ALPHA DELTA Slopers for 40,80 &160 meters oriented in both directions which works pretty good on this little rock in the ocean which we call home.

The 160 BAND starts to pick up around November until February for me, we recommend that if anyone needs a contact with 9Y4 land, please email for a sked, we will do any mode you wish.

With that said I recommend for the newcomers just put up what can work for you in your environment and have fun ,after all it`s only radio, THE BEST HOBBY EVER INVENTED .

73

Regards Chris 9Y4D..

Good Afternoon Bill,

A very beautiful afternoon in Port Elizabeth, Eastern Cape South Africa. I do not have a antenna for 80m or 160m.

I am planning to put up a antenna called a ZS6BKW based on a G5RV that covers 80m to 10m, uses 300 ohm tape ..about 13 meters, cannot touch any metal.

Hopefully when its up I can work some SSB and FT8. I will notify you when antenna are up in the air.

73 enjoy the day and week that's left before the weekend

De ZS2EC -Theunis

Hello Bill,

The answer to the question concerning using 60, 80, 160 meters is yes I do. I started operating in 1984 and had a layoff from radio 1995 until 2014 for work and family issues, I had only used verticals until then and my total tally of QSOs on QRZ, EQSL, and LOTW was 2350 approx.

In 2014 I returned but still used a vertical until 2018, then I erected an EFHW 35 meters long approx 10 meters above ground here in London UK. Therefore using the wire on 60, 80, 160 meters my total of QSOs on QRZ, EQSL,and LOTW is, as of 3rd August, 2021, 38,000. My confirmation rate is 25200K

All because of 60,80,120 usage.

Kind wishes,

Doug Goodison—G0LUH

(Cont on page 25)

Pictures from SV1JG

Our DX Friends are saying (cont.)

80M is my favorite band in Winter Season… I am thinking to start the new season with an antenna that gave me very good results when I was in EA5… It is a HyEndFed single band, 40 meters long. In Alicante-Spain I had it placed from the top of 50 meter high building so that I had it installed vertically from the Top of the Building directly to Parking Area.

Now I am waiting to install my 10 meters High Tower where I will install it as Sloper. I hope to have fun again with it. Currently, I live in a rural area and Menorca is not too noisy. This could be a Good Season for me!

From Alicante I worked West Coast usually; I worked Japan and the Pacific area several times with good signal reports. I enjoyed Contest as Mono Band Category.

So for the performance, I'm going to give this antenna a second chance to continue enjoying my favorite winter band …

I hope to see you on 80 M in a few months

73 de Jose EC6DX

"the exchange" in Denmark

OZ2I, Henning Andresen, is one of our contributors. Henning also responds to all of our DX Friends questions each newsletter. Last edition, the question concerned the use of FT4/FT8. The responses were great and Henning asked permission to reprint the responses. Of course I was flattered for the club and gave him permission. Below is the article reprinted in Danish. Thanks Henning!

Hvordan ser vores DX-venner på FT4/FT8?

oversat af OZ2I Henning Andresen

Jeg er af og til gæsteskribent i SWODXA Newsletter (South West Ohio DX Association), og får derfor det månedlige nyhedsbrev tilsendt fra AJ8B Bill, som er redaktør. I nummer 5, april 2021 havde Bill sendt spørgsmål ud til alle hans internationale skribenter. Her bad han om vores korte mening omkring FT4/FT8, og hvilken indflydelse det har haft og stadig har. Svarene er vidt forskellige, og de skribenter, som har svaret, kommer fra 10 forskellige lande spredt over det meste af jorden. Læs her hvordan tilgangen til FT4/FT8 er hos nogle af radioamatørerne i de forskellige lande.

How Do Our DX Friends view FT4/FT8?
Redaktørens spørgsmål til vores anerkendte DX'ere var:

- Hvordan har FT4/FT8 påvirket amatørradio?
- Kan du lide det?
- Bruger du det?
- Er det for "mekanisk"?
- Skal man stole for meget på computeren?

Mange af dem reagerede, og her kan du nyde svarene.

Godmorgen Bill.
Jeg vil gerne besvare dit spørgsmål om FT8.
FT8 er et vidunderligt digitalt program. Jeg har brugt det, siden det kom frem, og jeg elsker det. Ja, det er HF-radio og en PC, der kommunikerer, men det åbner en anden verden for alle, som er interesserede i kommunikation, men ikke har midlerne til at anskaffe en dyr HF-station.
Der er radioamatører derude, der siger, at det ikke er HAM-radio, men alle på denne planet kan ikke købe det dyre udstyr. Virkeligheden er, at FT8 er der, og HAM's bruger det!
Skaberen af dette program tænkte virkelig tingene igennem, da han startede med dette. Første gang med hjælp fra andre HAM's inden for dette felt. Det er fantastisk, når du laver den første QSO på den anden side af planeten. Ja - nogle gange er det lidt kedeligt, men når udbredelsesforholdene er gode, kan du kommunikere med hele verden. Nyd din søndag, ha' en velsignet dag og pas på dig selv.
73 de ZS2EC, Theunis.

The "No-Excuses" 160 Meter Vertical

Stop procrastinating. Build this fun antenna and get on the topband train by John Miller, K6Mm. You can reach John at k6mm@arrl.net.

This is part 1 of a 2 part article. It originally appeared in QST, June 2009. The entire article is available on Johns website, www.k6mm.com. During the past 2 years, I have had an inverted "L" and worked 49 DXCC entities and 49 states. I am in the process of building this vertical and will update you next month. I am changing the design with a better (and quicker) way to handle the windings. (Think 3D Printing) Stay Tuned. This was reprinted with the permission of John.

"My lot size is too small". "I suffer from CCR-itis". "I can't compete with the Big Guns". "I don't have the time. Too complicated". "Too expensive". Sound familiar? It's easy to become a Topband curmudgeon – avoiding putting up a 160 meter antenna because it may be more work than fun. Well, if you're having a difficult time putting a decent signal on 160 meters, here's a possible solution to get you up and running on the "Gentleman's Band", while leaving all those "excuses" behind.

Background

My first exposure to a Helically Wound Vertical (HWV) was Gary Ellingson's 1972 QST article for a 75 meter antenna.1 His unique "no loading coil" approach eliminated the need for guying and produced more equal voltage and distribution resulting in a better radiation pattern. I first tried this antenna design while living in Pennsylvania years ago with reasonable results for local QSOs using low power.

For many years, I dropped the HWV approach in favor of dipoles or inverted-Vs for 80/75 meters, but became interested again when reading about Jack Swinden's (W5JCK) clever "broomstick with a Top Hat" portable antenna design.[2] He used ½ wavelength of wire for a targeted resonance frequency of 3.800 MHz and emphasized the importance of carefully calculating and measuring the # of turns around the antenna. Jack's meticulous attention to construction detail was inspiring, and this became my second homebrew HWV project. My FT-847 at 100 watts with this portable little antenna was a fun combination for field day and short trips. There's always something satisfying about a homebrew antenna that generates memorable QSOs.

Overcoming my Excuses

I'm an avid contester, but had no antenna for 160 meters. In fact, I was a bit cynical about ever being able to put up an effective 160 meter antenna from my rather small California city lot. My NCCC contesting buddies, however, convinced me that I was missing out on some big time fun with the ARRL 160 Meter, CQ 160 Meter, and Stew Perry Topband Challenge contests. No more excuses. It was time for me to get on the Topband Train too.

A review of the literature on 160 meter antenna designs leads to the usual discussion of dipoles, inverted-L's, T's, V's, loops, deltas, and verticals.

(cont. on next page)

The "No-Excuses" 160M Vertical (cont.)

After thinking about my own QTH constraints I found myself revisiting the HWV option and settled upon a design often discussed but not often deployed in the US: a helically wound vertical antenna using PVC tubing.

An early version of this type of HWV antenna for 160 meters was the "rubber duckie" antenna developed by Joe Moraski, KY3F, in the early 1990s. This antenna was constructed using two 10 foot sections of 4 inch PVC pipe joined, two lengths of 140 feet of #18 wire, and wound at 1 turn per inch over each 10 foot section and the wires connected at the center joint. Then a "top hat" of 1/2 inch mesh dry wall screen one foot in diameter and four feet long was added at the top of the antenna.[3]

However it appears that most HWV antennas for 160 meters have been homebrewed in the UK, where the limitations of "small gardens" are common. In 1980, Frank Lee, G3YCC (SK) described his wire-wrapped fiberglass antenna for 160 meters[4], based on an original design by Alan Wells, G4ERZ[5]. More recently, Phil Sidwell, M0VEY, describes his Topband homebrew helical, including a fairly elaborate earth ground system.[6] This type of antenna appears to have gained widespread popularity throughout the UK and Europe.

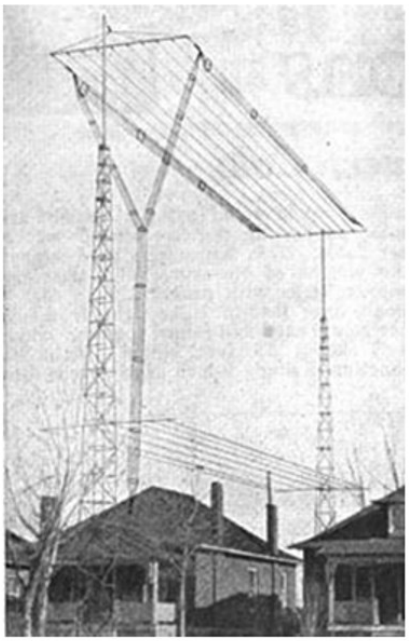
Wire Wisdom

There is no hard-and-fast formula for determining the amount of wire needed to establish resonance in a helical antenna. The relationship between the length of wire needed for resonance and a full quarter wave at the desired frequency depends on several factors. Some of these are wire size, diameter of the turns, and the dielectric properties of the form material. Experience has indicated that a section of wire approximately one half wavelength long, wound on an insulating form with a linear pitch (equal spacing between turns) will come close to yielding a resonant quarter wavelength. Therefore, an antenna for use on 160 meters would require approximately 260 feet of wire, when spirally wound on a support.[7]

Add other possible challenges like narrow bandwidth, poor feedpoint impedance, radiation resistance, efficient top hat capacitance, mechanical constraints, sufficient ground radial system – and you could easily become a Topband curmudgeon. But then you'd miss out on building this fun antenna – which really works!

To try and get a first approximation on a final HWV design, I used modeling software developed by Reg Edwards, G4FGQ.[8]

(cont. on next page)



This is my plan for the 160M antenna for 2021-2022.

Looking for volunteers to assist....

AJ8B

The "No-Excuses" 160M Vertical (cont.)

His program models and predicts the performance of a helically wound vertical antenna, mounted immediately above a ground plane, top- capacitance-loaded with a vertical rod or whip. Enter these variables: height/diameter of the helical coil + # turns & diameter of wire + length/diameter of end-loading rod, and you get back theoretically useful data: ¼ wave resonance frequency, length of wire needed, helix wire pitch, capacitance/inductance data, feed-point impedance and expected bandwidth.

Ver. 1—A Learning Experience

Based on the success of several UK designs, and to test G4FGQ's software, I decided to put together my first 160 meter HWV. I wrapped 20 feet of 1.5 inch diameter PVC tubing with ½ wavelength of #22 stranded wire spaced 0.25 inch apart, and used a 6 foot vertical rod for top capacitance. In short, this proved to be an unacceptable solution: high resonant frequency, very small bandwidth, low feed point resistance, poor radiating efficiency, insufficient mechanical strength, and overall poor performance. But this first version gave me a chance to really think through the construction variables more carefully, and after discussions with other Topband buffs, a better overall design emerged.[9]

Ver. 2—Looking Better

The remainder of this article describes the construction and performance of a very simple but effective HWV antenna for 160 meters. In a nutshell: The antenna is made by telescoping three 10 foot PVC sections together, helically winding it with ½ wavelength of antenna wire, attaching a capacitance hat to the top, and feeding it with a 50-ohm feed line against 8 ground radials. The entire construction can be easily completed in just one day using very simple tools.

Construction

Step 1—PVC Painting

The antenna is made from three 10 foot sections of readily available PVC tubing in three diameter sizes: Top Section = 1 inch, Middle Section = 1½ inches, and Bottom Section = 2 inches. To make this antenna environmentally & stealth friendly, the three PVC sections were spray-painted green by suspending each 10 foot section from two pieces of nylon rope between two branches of a convenient backyard tree. Brown paint would work just as well. Figures 1 and 2 show a PVC section before and after painting. All three 10 foot sections were allowed to thoroughly dry before proceeding (see Figure 3).

Figure 1. PVC Before

(cont. on next page)

The "No-Excuses" 160M Vertical (cont.)

Figure 2. PVC After

Fig 3. Painted PVC Pipes

Step 2. Bottom Section: Coax, Antenna and Ground Connections

The bottom 2 inch PVC section is prepared for both ground and coax connections by drilling the necessary mounting holes. A PVC cap is placed on the bottom of the 2 inch diameter PVC tube, and then, using a felt-tip marker, a circle is drawn around the PVC just above the border between the bottom cap and PVC section. This "marker" ensures that subsequent drilled holes will clear the bottom PVC cap.

Coax Connection: The PVC cap is then removed, and then holes are drilled for the SO-239 connector and 4 attachment screws. The SO-239 hole is centered about 2½ inches above the marker (see Figure 4).

Bottom Antenna Binding Post: One 1/8 inch hole is drilled for the antenna binding post, placed 2 inches above the marker. A red binding post was used for the antenna connection.

Ground Binding Posts: Two 1/8 inch holes are drilled for the ground posts, each placed 1½ inches above the marker. Black binding posts were used for ground connections.

Summary: The 3 binding post holes (i.e., 1 antenna + 2 ground) are placed equidistant from each other around the PVC section. The antenna post and ground posts are staggered by about ½ inch to avoid any possibility of shorting (see Figure 5).

Figure 4. SO-239 Connector

(Cont. on Next page)

Fig 5. Binding Posts & Internal Wiring

The "No-Excuses" 160M Vertical (cont.)

Step 3. Wiring: Coax Connector and Antenna Post

One end of a 4 inch piece of #14 wire is soldered to the center connector of the SO-239. The other end is then soldered to either a spade or ring lug. The wire is then pushed through the prepared SO-239 hole in the 2 inch PVC tube, and the SO-239 connector secured to the PVC tube using only 3 of the 4 mounting holes. The free end of the insulated wire is connected to the inner section of the red antenna post using the spade or ring lug. After securing the antenna post a binding nut, the connection can be soldered (see Figure 5).

Step 4. Wiring: Coax Connector and Ground Post

A 6 inch section of #14 insulated wire is soldered (or crimped) to spade lugs on both ends.

One end is connected on the outside of the PVC to the remaining SO-239 screw and secured to the PVC. The other end of the #14 wire is connected to the closest black ground binding post on the outside of the PVC.

Inside the PVC, another piece of #14 wire is attached between the 2 ground binding posts. This essentially connects both ground binding posts and the coax base together.

Check to be sure the antenna and ground connections inside the PVC are clean and not touching each other. Braided coax, such as RG-58, can also be used instead of the #14 wire for ground post connections. At this point, the SO -239 and all binding posts should be tightened and secured. For extra strength and protection, the binding posts can also be glued to the PVC, both inside and outside (see Figure 5)

Step 5. PVC Mast Preparation and Assembly

The Top, Middle, and Bottom sections are assembled using a high-tech solution: duct tape. I actually used Gorilla Tape10 for wrapping because it uses two layers of adhesive and two layers of fabric backing to make it much stronger than standard duct tape.

First, the 1 inch diameter PVC tubing is shortened from 10 feet to 7 feet 6 inches by cutting off 2 feet 6 inches from one end. Duct tape is then wrapped around the tubes as follows:

For the Top Section (1 inch diameter tube) = Two wrappings. First wrap = 2 inches from bottom of tube. Second wrap = from 9½ to 11½ inches from the bottom of the tube (see Figure 6).

(cont. on next page)

The "No-Excuses" 160M Vertical (cont.)

For the Middle Section (1 ½ in diameter tube) = Two wrappings. First wrap = 2 inches from bottom of tube. Second wrap = from 22 to 24 inches from the bottom of the tube (see Figure 6).

Fig 6. Wrapped With Duct Tape

The 3 PVC sections are then telescoped together. When assembled, the Middle Section will extend 24 inches into the Bottom Section, and the Top Section will extend 11½ inches into the Middle Section. It's important to use enough duct tape to ensure a good fit between the PVC sections (see Figs 7 and 8).

Fig 7. Telescoped

The next step in PVC assembly is to further secure the "joints" with a bolt and nut. The lower joint (between the Middle and Bottom sections) is secured by drilling a ¼ inch hole through both PVC sections about 12 inches from the top of the 2 inch diameter Top PVC section, and using a 3¼ inch bolt, nut, and washer

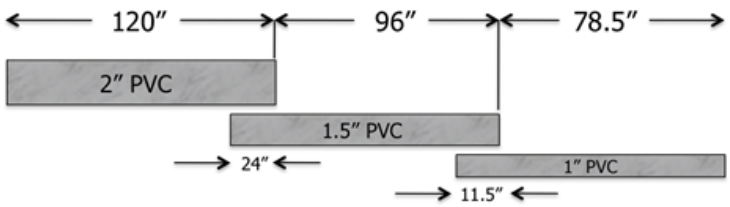


Fig 8. PVC Sections - Overlap

to fasten the sections together.

The middle joint (between the Middle and Top sections) is secured by drilling a similar hole, about 6 inches down from the top of the 1½ inch diameter Middle PVC section, and using a 2¾ inch bolt, nut, and washer to secure the joint.

Top Antenna Binding Post: Similar to the Bottom antenna post previously mentioned, a Top antenna post is prepared by drilling a 1/8 inch hole one inch from the top of the Top PVC section. A red-capped binding post is attached to it, using a nut and glued to secure it. The helically wound antenna wire will be connected to this post, which will also be the antenna- to-capacitance hat attachment point (see Figure 7).—Part 2 in the next Newsletter!

Introduction to KE8MMS, Candace Scott

Thanks to Richard, KC8RP

I met this young lady working at Frisch's back in 2019. Our BCARA group was meeting there for dinner before the meeting. I was among the first to arrive and this young waitress asked how many would be coming and I said 6 or 8 more from our radio club, I'm a HAM she proclaimed, newly licensed tech. She attended one of our meetings and I told her that I had a Yaesu FT-897D radio I would give her when she got her general ticket. This year in June she did it and I gave her the radio.

I met her and her dad and granddad twice at the Indianapolis Hamfest, first in 2019 and again this year. I encouraged her to attend the W8DXCC and to come to out SWODXA meeting.

She is KE8MMS Candace Scott, she was picked to go on the youth DXPedition that got cancelled, but she is still going strong. The radio was donated by Susan Burdick, Rick's, K8WWA, wife. She thought it was a good idea to give that radio to a young ham and a YL. Candace had ham radio in her blood, her dad Ray, N4RAJ, Grandfather Terry, NV8E and her grandmother Susan, KD8FIZ.

She has a heartbreaker for a QRZ photo.
73
Richard, KC8RP

Left Front —Matt—N8NMB, Eric—KG8FE (SK), Jeff—KD8VZD, David—KX8U, Mindi—KC8CKW
Right Front —Thurl—KD8VLU, Richard—KC8RP, Joe—W8JBL, Ray—KE8RMP, Kevin—W8KJ

Club Questions—NanoVNA

I decided to query our members about their use of a NanoVNA. You may recall the email that read "Have you acquired one of the NanoVNA devices? If so, what are your impressions? How are you using it? Is it something we should all have in the shack? "Three members responded. I have those responses below.

Hey Bill,

I have a NanoVNA SAA2N which has a metal case, 4" display and N connectors. I use it frequently to monitor my antennas. Since they're mostly wire strung in trees, they tend to change characteristics frequently. I use the NanoVNA to see how they are doing. I think a Smith chart is a whole lot more useful to understand your antennas than just a SWR meter (return loss). Eventually I will put passive devices on the antennas to bring impedances to a more perfect match. I also hope to use the NanoVNA to build and correct some bandpass filters this winter.

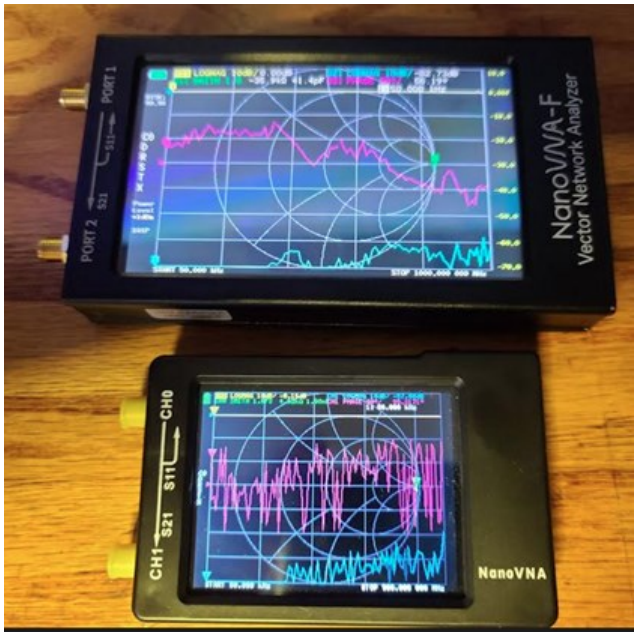
Larry N8QNM

Bill,

I originally bought the NanoVNA, I did not like the tiny size so I bought the NanoVNA-F which from the pictures is larger with the same capabilities. As you can see in the picture I also bought an RF demo board which give you real time examples of the different wave patterns. I bought it on eBay, there are a couple of different models but do the same thing. I plan on getting rid of the smaller one. The bigger unit comes with a nice case.

73

Richard, KC8RP



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Club Questions—NanoVNA (cont.)

Here is a link comparing the NanoVNA to a professional unit (FieldFox)
https://ae5x.blogspot.com/2021/07/1-to-4-ghz-nanovna-2-plus4-vs-keysight.html

Hi Bill,

Yes, I have one of the NanoVNA's as well as other VNA's ranging from single port versions that came out before the Nano (AimUHF) to commercial units (HP 8753B and Firefox). What is amazing about the Nano is how well it works for most ham type testing compared to the commercial units. It does have limitations mostly dynamic range (important for tuning duplexers) and architecture design that makes the Nano unsuitable for measuring crystals.

One concern I have is listening to hams trying to use these things that have no idea about antenna or RF theory. The example I used in a VNA presentation I made several years ago is the ¼ wave vertical antenna. For some reason hams don't want to put radials on verticals. They put up a ¼ wave vertical with one or two radials and check the antenna with the VNA. SWR comes out around 1:1, so they think their antenna is great. Someone tells them they need more radials on the antenna so they install a bunch of them. Measure with the VNA and SWR is poor. Now they think radials are bad. What they don't understand is a ¼ wave vertical with a good ground plane has an impedance around 36 ohms, not 50. The 50 results from losses from a poor ground plane. Their interpretation of the VNA results are wrong.

Here is another example. You can measure inductors and capacitors with the VNA. You wind an inductor and measure it with the VNA. To your surprise it measures as a CAPACITOR! Or, you measure a brand new inductor that says it is 100 uH and it measures much lower. This is were knowing some theory is important. Inductors have a self resonant frequency.

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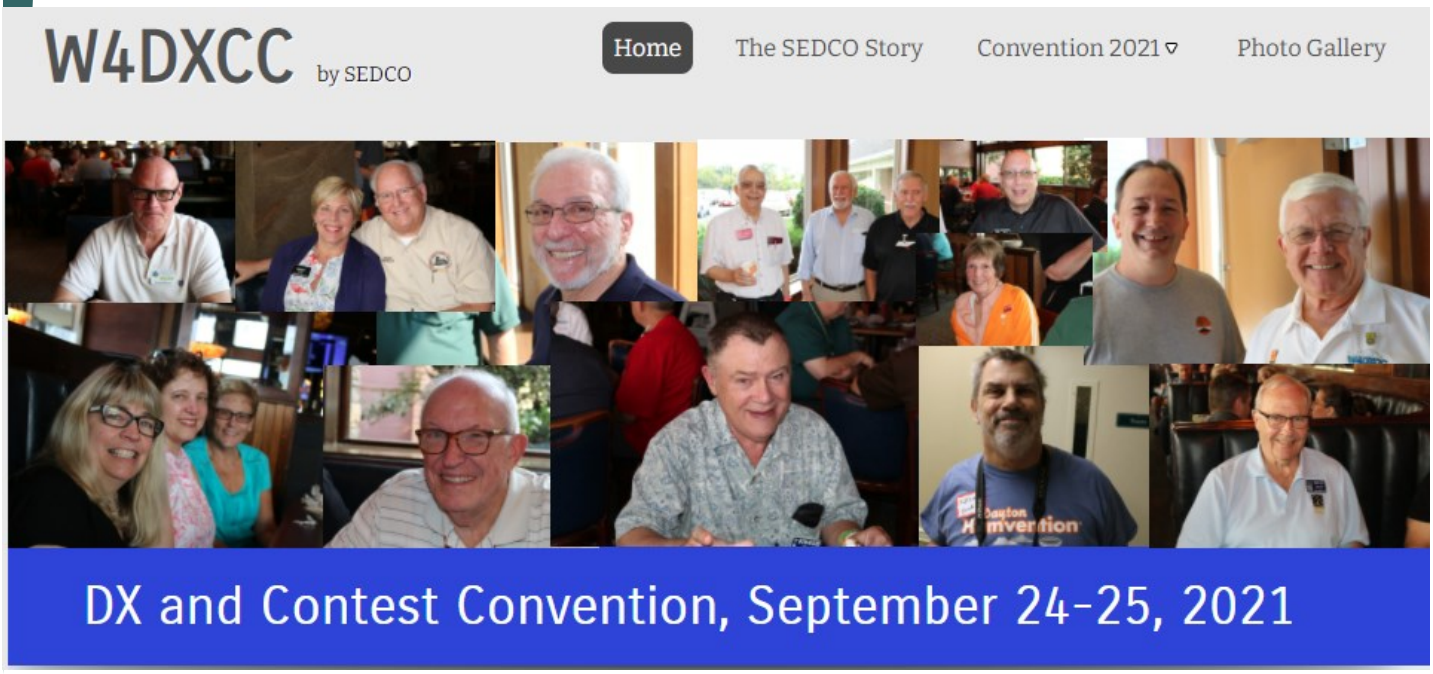

Club Questions—NanoVNA (cont.)

They are no longer inductors as you approach and exceed that frequency. You can measure the self resonant frequency of the inductor on a VNA. I can also measure it with a battery, resistor, and oscilloscope .The other thing to remember is most inductors are measured by the manufacture at a very low frequency. That 100 uH inductor was probably measured at 100 KHz.

I strongly suggest those getting a VNA watch videos on YouTube by guys that know what they are doing such as W2AEW. He has several videos on the NanoVNA and other RF related videos. It also helps if you learn something about the Smith Chart. If you are not willing to learn some theory just get an old SWR meter. How can you tell if a YouTube presenter knows what they are talking about? Check to see if comments have been turned off. If they are turned off my guess is that guy does not know what he is talking about and peopled called him on it. That goes for any YouTube video be it about electronics, home repairs, or repairing cars.

Some other tips on the NanoVNA. Calibration must be done each time you use the device. You can store calibration files as long as you use the same setup. Calibration is done at the measuring plane. That could be the connectors on the device, at the end of a cable, or at the measuring plane of a fixture you built to hold a device under test. BEFORE calibration set the frequency range to be in the spectrum of interest. These things can measure from KHz to a few GHz. Calibration is done over a limited number of data points. If you calibrate over the entire frequency range you have a limited number of data points so only a few are available in the frequency range of interest. For example, if measuring a 2-meter antenna limit the frequency range to 140 to 150 MHz. Now all your calibration points will be in the range of interest.

Be careful of how you connect devices under test. This is more important as you get into VHF and above. Using alligator clip leads to measure something at VHF is just going to give you incorrect data from stray capacitance and inductance.

There are clones of the NanoVNA being sold. I have no idea what is the real Nano vs a clone. I think the one I have is a clone it has N connectors on it. There are web sites that discuss the clones. I have no idea if the clones are better or worst than the one being sold by the guy that developed the NanoVNA.

Mike
W8RKO

Increase Your CW Speed with Wordsworth

Train Yourself to Comprehend Morse Code in your Head using Fldigi.

By George Allison, K1IG.

This originally appeared in the July 2021 edition of Solid Copy, the monthly newsletter of the CWOPs organization. I have been asked many times about ways to increase your CW speed. I found this article helpful. This was reprinted with the kind permission of the author and the CWOPs organization. (www.cwops.org)

CWOPs Editor's Note:

This article is a reprint of the original article by George K1IG that appeared several years ago in QST. Reprinted with permission, May 2017 QST; copy- right ARRL. He will have a second article in a future issue of Solid Copy that will include some lessons learned along with some follow up material. Have you tried Wordsworth? Send your feedback to K1IG at k1ig@arrl.net.

We've always been taught to think with words, but to process CW in our heads, we're taught to think letter by letter. We have to change the way we think to match the decoding process. High-speed opera- tors who copy CW in their heads at speeds faster than 60 words per minute (WPM) have learned to process CW by hearing entire words.

Although it may seem impossible to process entire words, this is how you learned to read. You learned the alphabet and the associated sounds of the letters, and then you began to form them into words to understand them.

Wordsworth: Prerequisites, Tools, and Process

Wordsworth is a method of learning to scan CW. It's an adaptation of the Farnsworth method, which sends individual letters at high speed, with lots of space in between to enable comprehension. In Wordsworth, complete words are sent, instead of individual letters. Thus, we process a "word's worth" of information.

Wordsworth addresses two obstacles of high-speed head copying - ear training and comprehension. Ear training gives you the ability to recognize words at high speed by sending the words in rapid bursts. This is a prerequisite for the Wordsworth method, and you should be at a Farnsworth letter speed of at least 25 WPM before you begin with Wordsworth. Comprehension is taught by giving you enough time to understand each word in context so you can form complete sentences and thoughts.

To use Wordsworth, you'll need a word processor to edit text files and Fldigi1 to send the code generated from those files. Do not, of course, connect your computer to your transmitter during training - the practice is just for you, not for everyone on the bands!

Once you have your practice text in hand, the Wordsworth process is:

1) Use your word processor to edit out the characters you don't want to hear (e.g., apostrophes, parentheses, and exclamation points.)

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Increase Your CW Speed with Wordsworth (cont.)

2) Use the "Find and Replace" function of your word processor to insert the necessary spaces between words (shown in Table I), which is determined by how much silent time you want between words. (Note that the spaces required are not always a linear function; the number of spaces is determined by how Fldigi computes time.)

3) Copy the revised text and paste it into Fldigi's send window (see Fig 1).

4) Adjust Fldigi to your desired speed, hit the Tx button, then look away from the screen and start listening.

Table 1
Number of Spaces Needed Between Words

WPM	1 Second	2 Seconds
20	3	8
25	4	10
30	6	12
35	7	14
40	8	16
45	9	18
50	10	20
55	11	22
60	12	24
65	13	26
70	14	28
75	15	31

Practice Techniques

Your initial speed should be at least 20 WPM, or about 5 WPM faster than you usually copy, whichever is higher.

You have to get used to hearing the words in short, fast bursts. Increase the speed until you can no longer visualize, but you can understand the shortest words (e.g., the, and, for). Visualizing may be the hardest habit to break after years of hard-copy training.

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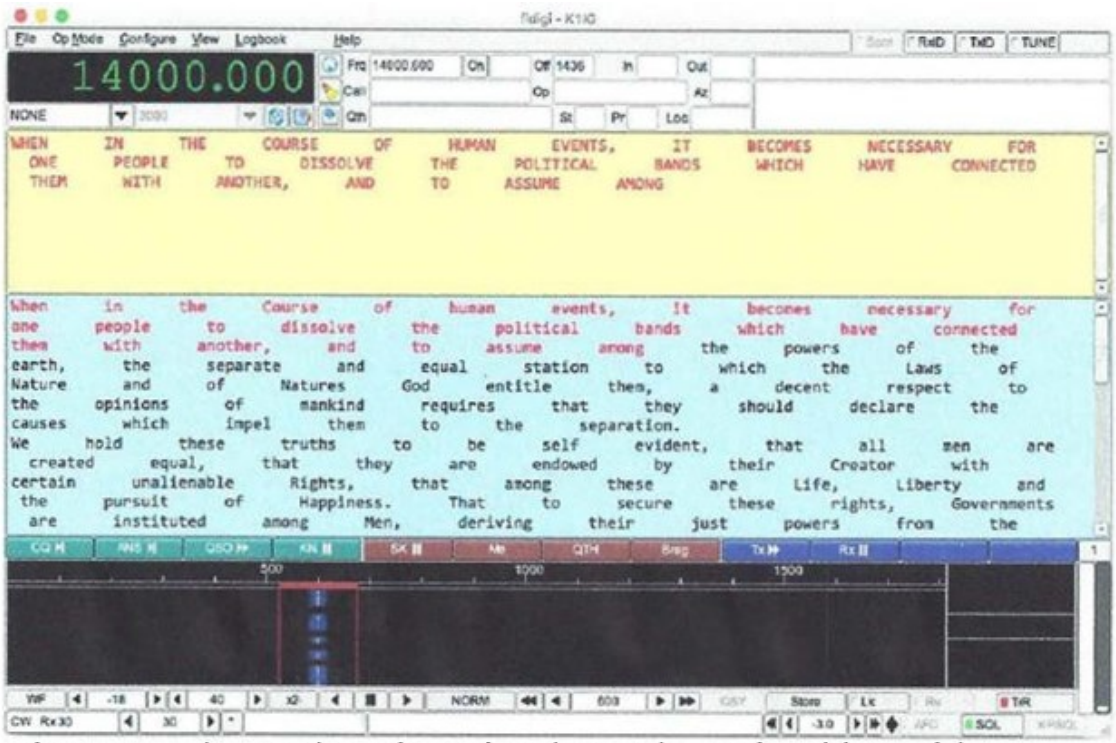

Figure 1 - The Declaration of Independence in *Fldigi*, with 12 spaces separating each word. At 30 WPM, this yields 2 seconds of silence between the words.

Increase Your CW Speed with Wordsworth (cont.)

Let your brain do what it knows how to do; let the words construct themselves in your head.

Don't try to count dits and dahs, either. Focus on recognizing entire words, and use context to help you. It can help to focus on the tempo and rhythm in the text. For instance, telling the difference between the letters B and D when sent by themselves at 40 or 50 WPM is difficult, but the difference between "webbed" and "wedded" is very noticeable when you hear them as part of a string of text.

It can take 5 or 6 minutes of listening before even the little words start to pop into your head, so be prepared to spend at least 20 minutes at each session. If your mind wanders, don't stop; refocus and continue copying. It's okay to look at the Fldigi screen now and then to verify your comprehension, or to see what gave you trouble.

Experiment with speed and spacing. If you're not getting anything, slow the transmission speed until you can hear those short words. If you can understand words here and there but can't get the context, the transmit speed is okay, but you need to increase the word spacing. Two seconds of spacing is actually a long time; you'll probably be able to reduce to 1 second once you start understanding the words.

After a few sessions at your optimum learning speed, you should be hearing words and understanding some of the context. When you think you're at about 75 - 80% comprehension, reduce the word spacing by one or two spaces, and see how you do. When you're down to about 1/2 second of word spacing, try increasing the transmission speed by 8 to 10 WPM.

Table 2 shows how the word spacing affects the effective speed of the text.

Table 2 Spacing's Effect on Speed

Spaces	Effective Speed
1	100%
2	93%
3	86%
4	81%
5	76%
6	71%
7	68%
8	64%
9	61%
10	58%
11	56%
12	53%

For example, sending text at 30 WPM with 12 spaces between the words yields an effective speed of 16 WPM, or 53%.

It may be several weeks until you can comprehend full sentences. Once you can understand text at medium speeds with only a single space between words, comprehension will carry over to higher speeds. You'll then find that your biggest limitation is ear training, which you can practice using the common words found in Table 3. Text from on-air contacts can also be helpful for training.[2, 3, 4]

Conclusion

If you're doubtful of your ability to recognize entire words, remember that you're probably already doing it with at least two words - "CQ" and your call sign. You can do this with all the other words too. It will take dedicated practice, but your brain already knows how the process works -let it do what it knows how to do.

(cont. on next page)

Increase Your CW Speed with Wordsworth (cont.)

Notes

1. Fldigi is available at www.w1hkj.com/.

2. Learn CW Online (lcwo.net) provides text and call sign training.

3. The CW Academy at the CW Operators' Club (www.cwops.org) has MP3 and WAY files that can be set up for Wordsworth training.

4. Andy, KB10lQ, has written Perl scripts (available at https://sourceforge.net/projects/boiq-k1ig-wordsworth/?source=directory that generate lists of characters or QSO words for import into Fldigi.

Table 3: Common QSO Words

Two-Letter Words									
73	88	BK	CL	CO	OE	DX	EL	ES	FB
HI	HR	IS	MY	OM	OP	TU	UR	VY	WX
YL									
Three-Letter Words									
ABT	AGE	AGN	ANT	BTU	CPY	CUL	GUO	HW?	PKT
PSE	PWR	ORM	ORN	ORP	ORO	ORS	ORT	ORX	ORZ
OSB	OSL	OSO	OSY	QTH	RIG	RPT	RST	TKS	TNX
XYL	YRS								
Four or More Letters									
BEAM	LONG	LOOP	NAME	RUNS	TEMP	TEST	VERT	WATT	WIRE
YAGI	DIPOLE								

Author's Note: I've learned of an easier way to generate practice code for Wordsworth that doesn't need a word processor or Fldigi. The online CW Generator tool can take a text file and automatically add more time between words. Being an online tool, it works with just about any browser (including smartphones and tablets), so it's not dependent on your operating system, and it can automatically remove odd characters that can't be sent in Morse code.

To use it with Wordsworth, follow these steps:

1. Set Pitch and Volume to whatever is comfortable for you; I use 600 Hz for pitch and 80 for volume.
2. Set Character speed and Farnsworth speed to the speed you want to use. Both these numbers should be the same.
3. Click on the "Advanced timing" but- ton and set Inter-word space — Length to the time you want be- tween words. The length is in milli- seconds, so for a one second spacing, set the Length to 1000.
4. Copy and paste your text in the Translate a Message box. If the text has odd characters that can't be sent, you'll see an error message that shows you what the characters are; click the Clean Up button to automatically remove them.
5. Hit the Play button and start listening.

Pioneers of Physics, Mathematics, and Electronics

In December of 1970, I sat for my Novice exam and then waited and waited and waited. My OM, K8DWE (SK), decided that I should not be wasting time, but should continue my education. He would take me to the library and we would get a book or two on the early experimenters, scientists, and inventors. Then I was required to essentially write a "book report" on the person in question. 20 years later, I could still recall facts from those reports when we were talking about Henry, Faraday, Ohm, Gauss etc. So, I thought it would be cool to feature a bit about each of our "founding fathers" in each edition. I hope you enjoy! Let me know either way. (By the way, cards from the Little Print Shop arrived before the ticket did: WN8IQN)

William Gilbert – Physician[1]
1544 – 1603

William Gilbert was an English physician, physicist and natural philosopher. He is remembered today largely for his book De Magnete (1600).

A unit of magnetomotive force, also known as magnetic potential, was named the Gilbert in his honor.

Gilbert was born in Colchester, England and was educated at St John's College, Cambridge. After gaining his MD from Cambridge in 1569, he left to practice medicine in London and travelled on the continent. In 1573, he was elected a Fellow of the Royal College of Physicians. In 1600 he was elected President of the college. He was Elizabeth I's own physician from 1601 until her death in 1603, and James VI renewed his appointment.

His primary scientific work was De Magnete, Magneticisque Corporibus, et de Magno Magnete Tellure (On the Magnet and Magnetic Bodies, and on the Great Magnet the Earth) published in 1600. In this work, he describes many of his experiments with his model Earth called the terrella. From these experiments, he concluded that the Earth was itself magnetic and that this

was the reason compasses point north (previously, some believed that it was the pole star (Polaris) or a large magnetic island on the north pole that attracted the compass). He was the first to argue, correctly, that the center of the Earth was iron, and he considered an important and related property of magnets was that they can be cut, each forming a new magnet with north and south poles.

The English word "electricity" was first used in 1646 by Sir Thomas Browne, derived from Gilbert's 1600 New Latin electricus, meaning "like amber". The term had been in use since the 13th century, but Gilbert was the first to use it to mean "like amber in its attractive properties".

(cont. on next page)

William Gilbert—(cont.)

He recognized that friction with these objects removed a so-called "effluvium", which would cause the attraction effect in returning to the object, though he did not realize that this substance (electric charge) was universal to all materials.

"The electric effluvia differ much from air, and as air is the earth's effluvium, so electric bodies have their own distinctive effluvia; and each peculiar effluvium has its own individual power of leading to union, its own movement to its origin, to its fount, and to the body emitting the effluvium."
— Gilbert 1893

In his book, he also studied static electricity using amber; amber is called elektron in Greek, so Gilbert decided to call its effect the electric force. He invented the first electrical measuring instrument, the electroscope, in the form of a pivoted needle he called the versorium.

Gilbert argued that electricity and magnetism were not the same thing. For evidence, he (incorrectly) pointed out that, while electrical attraction disappeared with heat, magnetic attraction did not (although it is proven that magnetism does in fact become damaged and weakened with heat). Hans Christian Ørsted and James Clerk Maxwell showed that both effects were aspects of a single force: electromagnetism. Maxwell surmised this in his A Treatise on Electricity and Magnetism after much analysis.

Gilbert's magnetism was the invisible force that many other natural philosophers seized upon, incorrectly, as governing the motions that they observed. While not attributing magnetism to attraction among the stars, Gilbert pointed out the motion of the skies was due to Earth's rotation, and not the rotation of the spheres, 20 years before Galileo (but 57 years after Copernicus who stated it openly in his work De revolutionibus orbium coelestium published in 1543). Gilbert made the first attempt to map the surface markings on the Moon in the 1590s. His chart, made without the use of a telescope, showed outlines of dark and light patches on the Moon's face. Contrary to most of his contemporaries, Gilbert believed that the light spots on the Moon were water, and the dark spots land.

Gilbert died on 30 November 1603 in London. His cause of death is thought to have been the bubonic plague. He was buried in his hometown, in Holy Trinity Church, Colchester. His marble wall monument can still be seen in this Saxon church, now deconsecrated and used as a café and market.

[1]https://en.wikipedia.org/wiki/William_Gilbert_(physician)

SouthWest Ohio DX Association (SWODXA)
Club Fact Sheet

Who We Are: *SWODXA* is comprised of active DX'ers and contesters with a deep passion for all aspects of Amateur Radio. We welcome everyone who is interested in joining our club to please contact us. *SWODXA* members are active in all facets of DX and Contesting. We also travel to, and fund various DXpeditions all over the world. *SWODXA* sponsors the annual DX Dinner held on the Friday evening of Hamvention weekend in Dayton, Ohio. In addition, *SWODXA* members moderate the Hamvention DX Forum. *SWODXA* is proud sponsor of the prestigious *DXPedition of the Year Award*.

DX Donation Policy: The policy supports major DXPeditions that meet our requirements for financial sponsorship. Details are available on the website at: https://www.swodxa.org/dxgrant-application/ and elsewhere in this newsletter

Club History: The Southwest Ohio DX Association (SWODXA) is one of the country's premier amateur radio clubs. Though loosely formed in mid-1977, the club had its first formal organizational meeting in August of 1981 where Frank Schwob, W8OK (sk), was elected our first President. While organized primarily as a DX club, SWODXA members are active in all aspects of our hobby.

Requirements for Membership: We welcome all hams who have an interest in DXing. It doesn't matter whether you're a newcomer, or an old-timer to DXing; everyone is welcome!
Visit http://swodxa.org/member.htm

Meetings: The club meets on the second Thursday or each month alternating locations between at Marions Piazza on Kingsridge Dr. in Dayton, OH or Marions Piazza in West Chester. (Check the website) Members gather early in the private room for dinner and then a short business agenda at 6:30 PM, followed by a program. If you enjoy a night out on the town with friends, you'll enjoy this get together. Meeting attendance is NOT a requirement for membership.

Club Officers: Four presiding officers and the past president (or past VP) make up the Board of Directors The current roster of officers are: President Tom Inglin, NR8Z; Vice President Kevin Jones, W8KJ; Secretary Mindi Jones, KC8CKW, and Treasurer Mike Suhar, W8RKO.

Website: We maintain websites at www.swodxa.org and www.swodxaevents.org managed by Bill, AJ8B. These sites provide information about a variety of subjects related to the club and DXing.

SouthWest Ohio DX Association (SWODXA) DX Donation Policy

The mission of SWODXA is to support DXing and major DXpeditions by providing funding. A funding request from the organizers of a planned DXPedition should be directed to the DX committee by filling out an online funding request.
(https://www.swodxa.org/dx-grant-application/)

The DX Grant committee will determine how well the DXPedition plans meet key considerations (see below). If the DX Grant committee recommends supporting the DXPedition in question, a recommended funding amount is determined based on the criteria below. The chairman of the committee will make a recommendation at the general meeting on the donation.

Factors Affecting a DXPedition Funding Request Approval

DXPedition destination	Website with logos of club sponsors
Ranking on the Clublog Most Wanted Survey	QSLs with logos of club sponsors
Online logs and pilot stations	Logistics and transportation costs
Number of operators and their credentials	Number of stations on the air
LoTW log submissions	Bands, modes and duration of operation

H40GC	H44GC	ZL9HR	XX9D	HK0NA	FT4TA
KH1/KH7Z	EP2A	FT5ZM	C21GC	VK9WA	NH8S
K4M	CY9C	VK9MA	PT0S	FT4JA	YJ0X
6O6O	VP6D	TO4E	XR0ZR	VP8STI	VP8SGI
W1AW/KH8	K1N	3D2C	VK0EK	S21ZBB	E30FB
ST0RY	TI9/3Z9DX	VK9MT	K5P	9U4M	TX3X
VU7AB	3Y0Z	3C0L	TX7EU	CE0Z	3C1L
TI9A	3D2CR	3B7A	K9W	VU7RI	6O7O
C21WW	CE0Z	T30GC	T30L	D68CCC	W8KKF/WP5
K5D		T33A		CY9C	