



Meetings are held on the 2nd Monday of each month at 7:00 pm at the Knox County Chapter of the American Red Cross Annex 300 North Mulberry Street Mount Vernon, OH 43050



K8EEN Repeater: 146.790. MHz (600KHz with PL of 71.9 Hz)  
K8EEN-R Echolink Node: 809800  
K8EEN Repeater: 444.600 MHz (+5 MHz with PL of 71.9 Hz)

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## Get your free copy of *A Field Guide to Simple HF Dipoles*

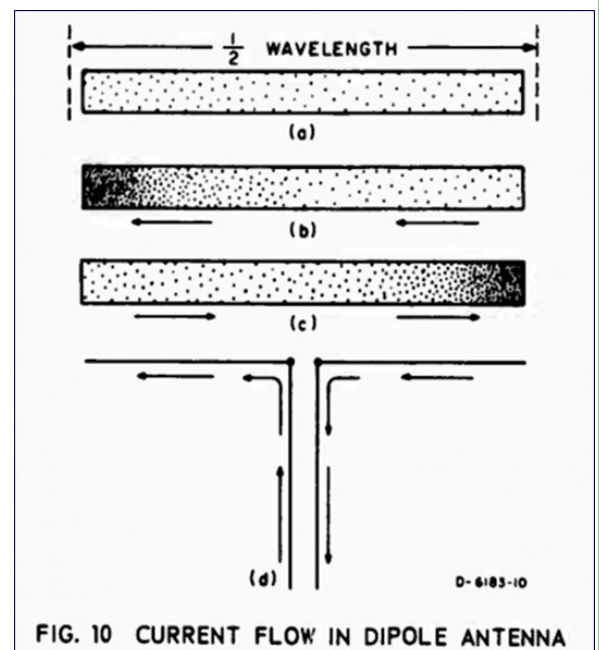
by Dan Romanchik, KB6NU

A link to *A Field Guide to Simple HF Dipoles*: <http://www.dtic.mil/dtic/tr/fulltext/u2/684938.pdf> was posted to reddit recently, and I liked this document so much that I thought I would share it with you. It was originally written for the military, but is now available for free from the Defense Technical Information Center.

The preface to this document reads:

“Under project Agile, Stanford Research Institute has supplied several teams to assist operating personnel in improving the performance of field radio networks. In this work, it has been observed that U.S. military and civilian antenna manuals often contain misleading information regarding the operation of field antennas and tend to be overly complex. Consequently, this guide has been prepared to assist in training personnel concerned with the construction of simple HF antennas in the field.”

I must say that *A Field Guide to Simple HF Dipoles* does this very well. It not only explains how dipole antennas work, it also does a very good job of describing the basics of radio waves and propagation. And it does this without getting overly technical.



“A Field Guide” continues on page 2

**The Field Guide reads:**

"Electric current in a conductor consists of the flow of small particles called electrons. Figure 10(a) represents a dipole with electrons in it. When the transmitter is turned off, the electrons distribute themselves evenly throughout the dipole, as shown. All electrons repel each other and try to get as far from each other as possible; that is how they achieve the uniform distribution shown in Figure 10(a). When the transmitter is turned on, the electrons flow back and forth from end to end as shown in Figures 10(b) and 10(c). First the electrons flow to the left and crowded at one end as shown in Figure 10(b). Second, since the electrons repel each other, they push off to the right and get crowded together at the other end, as in Figure 10(c)."

It then uses this description to talk about voltage and current distribution along a dipole antenna:

"The difference between voltage (volts) and current (amperes) in a dipole is also illustrated by Figs. 10(b) and 10(c). You can see that the maximum flow of current is going to be in the middle of the dipole. An observer at the center of the dipole would see the electrons rush past, first one way and then the other. The center is the maximum current point. Very little current flows near the end of the dipole; in fact, at the extreme ends there is no current at all for there is no place for it to go. However, at the ends of the dipole, there is a great change of voltage; when the electrons are densely packed, this represents a negative voltage, and when there is a scarcity of electrons, it represents a positive voltage. Thus you can see that the voltage at each end swings alternately positive and negative. An end of the dipole is a maximum voltage point."

A Field Guide to Simple HF Dipoles is packed with all kinds of goodies like this. Download it <http://www.dtic.mil/dtic/tr/fulltext/u2/684938.pdf> right now.

When he's not building dipoles or teaching ham radio classes, Dan blogs about amateur radio, writes exam study guides [www.kb6nu.com/study-guides](http://www.kb6nu.com/study-guides), and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him about your experiences with simple HF dipoles at [cwgeek@kb6nu.com](mailto:cwgeek@kb6nu.com).

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**July Meeting Minutes  
July 9, 2018**



Frank, KC8EVS called the meeting to order at 7:00 pm.

There were 16 MVARC members present.

May Meeting Minutes accepted: Motion by Scott, N8SY and seconded by George, KE8HGE.

Treasurers Report presented by Terry, KI8N. Motion to accept by Scott, N8SY and Seconded by Bill, KD8WHQ. Motion passed to accept Treasurers Report. For club finance specifics please contact Terry, KI8N.

**Repeaters:**

Don, W8PEN, reported the 146.79 repeater is working.

The 444.6 repeater at Knox County Hospital is working.

**Mesh:**

Don, W8PEN, reported Mesh network is working but has a couple of issues he is working on. Terry, KI8N questioned if there was still a plan to put a Mesh node on the water tower. Don wants to but has to enlist a certified climber to perform the install and the weather has not cooperated. Don has nodes and equipment available to loan if installed and operational 24 hours a day. Contact Don for more information.

**ARES:**

Bill, KD8WHQ reported four states have ARES Connect running. Each club member needs to register and the link can be found on the Ohio Section ARRL web site: [www.arrl-ohio.org](http://www.arrl-ohio.org).

Each member is responsible for inputting their own data regarding ARES related activities: i.e.; Sunday evening nets, club meetings.

**Old Business:**

Frank, KC8EVS discussed upcoming 2018 club events and the need for coordinators to assist. These events are the normal activities the club participates in:

**August 9 - 11:** Dan Emmitt Special Event Station August – Terry, KI8N coordinating. Presented operating schedule, QST submitted and QRZ page updated. Still need to develop a certificate and method for distributing. Still need event operators either from home or the Red Cross Training Center station.

**August 25:** Ohio QSO party may try to operate from a location such as the fairgrounds if there is enough interest. Frank, KC8EVS and Don, W8PEN to determine location and interest. Decided two transmitters would be the maximum on air.

**September 8:** Ohio State Parks on the Air – Plan to operate from Mohican State Park at the Gorge. Event scheduled 10am to 6pm.

Terry, KI8N still working on updating MVARC equipment list for insurance purposes.

### **New Business:**

Motion made to send \$150.00 to Apple Valley Property Owners Association for allowing us to operate Field Day at the ball fields and for their setting up the large tent.

Don, W8PEN discussed buying new lawn chairs for field day operation. The existing chairs are breaking and he only has a couple left. Item was tabled until closer to next year's field day activities and planning.

Barry, N8PPF was concerned about club expenses and club finances. Discussion over amounts in accounts cleared the issue.

August 4 is the Columbus Hamfest and Ohio Section Conference. The OH SSB Net will also hold their semiannual meeting at 11am. Information is listed on the Ohio Section web site. Noted that at 9am there is a forum regarding Fusion DR2.

Short discussion about the COTS radio (Icom dual band) at Knox Community Hospital and the plans the hospital has to return it. Intent is not to have MVARC involved in this activity.

Scott, N8SY talked about DMR and any interest. He noted there are 89 DMR repeaters connected, 22 D-Star, and 38 Fusion repeaters. Some Fusion repeaters are interconnected to DMR via a C-Bridge. He noted DMR is prevalent in Ohio but not so in other surrounding states.

Barry, N8PPF mentioned the upcoming IARU contest and ability to work DX.

50/50 Drawing won by Don, KB8QPO and donated to club.

### **Adjournment**

Motion to adjourn by Greg, W8DOH and seconded by Don, KB8QPO. Motion passed and meeting adjourned at approximately 7:45 pm.

Terry Windsor, KI8N  
MVARC Secretary/Treasurer

**By Dan Romanchik, KB6NU**

Amateur radio bloggers love to write about the demise of amateur radio. To wit, we have:

K0NR's Is the Internet destroying amateur radio?

<http://www.k0nr.com/wordpress/2017/11/internet-destroying-amateur-radio/>

N0SSC's Millennials are killing ham radio

<http://n0ssc.com/posts/583-millennials-are-killing-ham-radio>

PE4BAS' Is FT-8 damaging amateur radio?

<https://pe4bas.blogspot.com/2018/04/is-ft8-damaging-hamradio.html>

NZ0T's Did Joe Taylor K1JT Destroy Amateur Radio?

<http://www.ei5di.com/jt.html>

Of course, none of these posts are really saying that the internet, millennials, or FT-8 has killed amateur radio. What they are saying is that all of these are changing amateur radio as we know it. Well, duh, the way we live our lives changes every day. Why should amateur radio be any different?

For example, Bob, K0NR, discusses how the operation of remote stations is changing the game of DX. Can you really claim that you worked a DX station if you rented time on a super station? I've written about that topic, too.

<https://www.kb6nu.com/dx-advisory-committee-wants-to-put-the-screws-to-remote-operation/>

There has also been much written about how FT8 is changing the amateur radio game. One blog post <https://ve7sl.blogspot.com/2017/10/160m-ft8-end-of-era.html>, talking about the effect of FT8 on 160m operation, even goes so far to say that this is the "end of an era." On DX World, the results of the poll, "FT8 – Damaging to Amateur Radio?" (<https://dx-world.net/yes-or-no-a-poll-on-ft8/>) show more than half of the respondents think that FT8 is damaging amateur radio.

I specifically used the word "game" in the previous two paragraphs because that's exactly what's changing. The physics of amateur radio certainly isn't changing. Our transmitters are still generating electromagnetic waves like they have been for decades, and on the HF bands anyway, those radio waves are bouncing off the ionosphere just as they have been for more than the past 100 years.

What's changing is the human component. By that I mean what's changing is how we think people should participate in the hobby. The hams that are complaining that the internet or millennials or FT8 is killing amateur radio are really just complaining that people aren't participating in amateur radio the way they want them to participate.

Here's where we talk about millennials. In his blog post, Sterling, N0SSC, suggests that setting up remote stations is one way to engage young people. He writes, "I believe that remote operating, and other internet-assisted means of ham radio operation, are critical to youth engagement."



He's also big on an idea he calls "ham radio hackathons." He writes,

"A hackathon isn't a coding competition. It's explained well in this Medium article

<https://medium.com/hackathons-anonymous/wtf-is-a-hackathon-92668579601>

It goes even further than that, not limited to coders and engineers, but open to thinkers, doers, philosophers, system engineers, math people, teachers, students, artists, stakeholders... anyone with an interest in solving a problem with technology."

I support both of these ideas, but I think that millennials (and, to be fair, it isn't just millennials we're talking about here, but any newcomers to the hobby) need to step up and get these things going. I don't think it's my job to try to get kids interested in amateur radio. I don't even know if that's really possible. What I can do, however, is be there to encourage and support kids (and anyone else that expresses a sincere interest in amateur radio).

For example, I'm not sure how fruitful it would be to set up my station to be remotely operable and then saying to some kids, "Hey, come and operate my station." What I think would be more fruitful is to say to a kid, "Hey, come help me set up my remote control station, so that we both can use it." Then, it turns into a learning situation, and we both gain from the exercise.

The same kind of thing has to happen with ham radio hackathons. The motivation has to come from the ground up, not the top down. I do hope that this idea gets off the ground, though, and I'm standing by, ready to support this effort however I can.

I think that millennials (I'm really getting tired of that term, by the way) need to grab the bull by the horns and take amateur radio in the direction they want it to go. Feel free to kill amateur radio as we know it. Make it better!

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When he's not trying to figure out how to save amateur radio, Dan builds stuff, blogs about amateur radio at KB6NU.Com, teaches amateur radio classes, and operates CW on the HF bands. Look for him on 30m, 40m, and 80m. You can email him about what you think is killing amateur radio at [cwgeek@kb6nu.com](mailto:cwgeek@kb6nu.com).

**By Don Russell W8PEN**



Welcome folks. I have an interesting project for you club members that enjoy mixing the old with the new. How about: Building your own ladder line?

Used to be that ladder line was fairly cheap compared to say, coax. Ladder Line is currently selling for about \$25 to \$35 per 50 feet. Price approaches \$40 in some stores. That is not too bad and likely worth purchasing.

Ladder Line has a number of advantages too, plus a few problems. One of biggest advantages of ladder line over coax is that ladder line has very low loss when compared to coax. We are talking much less than one db of loss per 100 feet of ladder line vs 2 or 3 db loss for 100 foot run of RG-8x (about the cheapest coax available). Even if the SWR on the line is very high, feed line loss is very low. High SWR on RG-8x coax is a disaster! This is why one of the easiest antennas to build for ham radio HF bands is an antenna cut for the lowest frequency used and fed with ladder line into a tuner. Easy all band doublet.

There are two disadvantages when using ladder line. One is that when installing ladder line, one must keep the ladder line a couple of inches away from any metal. This means no taping directly to a tower leg, which is common when using coax. The other disadvantage is that you must use an antenna tuner, which may wipe out any savings you get by installing ladder line in the first place.

However, when possible, I prefer ladder line. Coax is okay for single band antennas and there are ways to use coax with multi band antennas, such as the fan dipole I described last month. Or using a multi band window antenna that I have mentioned frequently in this column.

But if I am out in the field and have a clear drop to the station, I will choose ladder line over coax most of the time.

In the old days, hams made their own ladder line out of wire and treated wood. Back then, the impedance of home made ladder line was around 600 ohms. Hams would run their home made ladder line into a home brewed balanced antenna tuner, which did not need a 4:1 balun. This made a very effective station.

I wanted to try my hand at making my own ladder line. Here is how I did it:

First, you need some kind of material to act as spacers for the ladder line. As I mentioned, old timers used wood. Hams that make their own now often use 1/2 inch pvc pipe. In my opinion, even a small length of 1/2 inch pvc pipe makes the ladder line too heavy when you need about 100 spacers for a 50 foot run.

I decided that I would use plastic coat hangers that I found at Walmart, \$8 for 18.. The coat hangers are a bit over 1/4 inch in diameter and when cut into 1-3/4 inch pieces makes 15 spacers per coat hanger. I will be using spacers every six inches on my home made ladder line, so I need 102 spacers and 100 feet of wire. This equates to using seven or 8 coat hangers.

I used a small tubing cutter to cut the coat hangers into 1-3/4 inch pieces. Since this is just experimental for now, I used some #24 wire that I had in the garage. My experimental ladder line is about 10 feet long. If and when I built the ladder line for true operation, I will use #14 wire.

Since this is experimental, I decided to see how much RF my home made spacers might absorb. I filled a coffee cup with water. Put the spacers and coffee cup into my microwave and set the timer for 2 minutes. When done, the water was boiling. The spacers were still cool to the touch. These spacers are excellent as they do not conduct any RF.

After cutting all the spaces, holes will need to be drilled. One hole per side at the ends of each spacer. These holes should just fit the wire. There are two options for drilling holes. One is to make them very slightly bigger than the outside diameter of the wire. Doing so will make it easy to slide the spacers onto the wire, however, some glue will be needed to secure the spacer to the wire. The other option is to drill the hole size to "just fit" the wire. This might eliminate the need for glue, but will make it much harder to slide the spaces up the wire. And you may still need a bit of glue if the spacers slip a bit on the wire.

To continue, slide each spacer on the wire. The spacers should be about six inches apart. If you are gluing the spacers to the wire, I would suggest doing five or ten feet at a time. Hot melt glue guns should be excellent for this, or some other quick drying glue.



Pictures are of the coat hanger and the finished product. Again, this is experimental with #24 wire. Larger wire should work much better. But, if you are QRP, #24 wire would be light weight and work just fine.

Is making your own ladder line worth the work? Depends. If you have plenty of surplus wire, then the answer would be yes indeed. If you have to buy the wire, then the answer would certainly be a toss up simply because of the work involved vs cost.

At Lowes, a 500 foot roll of #14 stranded is \$45. Add the cost of coat hangers for the spacers and you can make your own 250 foot length of ladder line for under \$60. That would be 24 cents per foot. But it is a lot of work. Plan on it being an all day and part of tomorrow project! #14 solid wire is a bit cheaper but harder to store or work with. Would probably be okay for a permanent antenna installation though. 250 feet of Commercial ladder line at \$25 per 50 feet would cost \$125. That is a big difference if you have a long run. This is the cheapest price I have seen for commercial ladder line and was using #18 stranded wire. You would probably want to buy better stuff.

As a side note, the spacers can be used for things other than ladder line. Looking back at my article in last months newsletter, I can see using these home made plastic spacers to home brew a three or four band fan dipole. Just cut the spacers longer and add enough holes for each wire that you run. Maybe I will try that next and report on my results.

73 all. See you at the meeting.



# August, 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>5</b> 9:00 pm ARES Sunday Night Net On K8EEN <b>KC8BB – Bill</b>	<b>6</b>	<b>7</b>	<b>8</b> 5:00 pm Dinner at Southside Diner	<b>9</b>	<b>10</b> 10:00 am Breakfast at Hardee's	<b>11</b> 9:00 am Breakfast at Barb's Diner Columbus Road
<b>12</b> 9:00 pm ARES Sunday Night Net on K8EEN <b>W8PEN – Don</b>	<b>13</b> <b>7:00 p.m.</b> <b>MVARC</b> <b>Monthly</b> <b>Meeting -Red</b> <b>Cross Annex</b>	<b>14</b>	<b>15</b> 5:00 pm Dinner at Southside Diner	<b>16</b>	<b>17</b> 10:00 am Breakfast at Hardee's	<b>18</b>
<b>19</b> 9:00 pm ARES Sunday Night Net on K8EEN <b>KE8HGE –Michael</b>	<b>20</b>	<b>21</b>	<b>22</b> 5:00 pm Dinner at Southside Diner	<b>23</b>	<b>24</b> 10:00 am Breakfast at Hardee's	<b>25</b> <b>Ohio QSO</b> <b>Party</b>
<b>26</b> 9:00 pm ARES Sunday Night Net on K8EEN <b>KE8HNF – Louie</b>	<b>27</b>	<b>28</b>	<b>29</b> 5:00 pm Dinner at Southside Diner	<b>30</b>	<b>31</b> 10:00 am Breakfast at Hardee's	<b>1 Sept</b>
<b>2</b> 9:00 pm ARES Sunday Night Net On K8EEN <b>KC8BB – Bill</b>	<b>3</b>	<b>4</b>	<b>5</b> 5:00 pm Dinner at Southside Diner	<b>6</b>	<b>7</b> 10:00 am Breakfast at Hardee's	<b>8</b> 9:00 am Breakfast at Barb's Diner Columbus Road
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