



The GroundWire

Dryer News

Why I am a Ham.

by Paul Dryer, KD5IVP

I was fortunate to have parents in technical fields. Mom was a registered nurse, Dad, a physicist. About age two, I was given a harmonica which started my love of music, and Dad let me play with this big black box, a Hallicrafters S-28 short wave receiver and a set of USMC headphones. Radio and music have been with me my entire life. That old radio was placed next to my bed, the antenna terminal clip led to the window screen, for most of my childhood, and young adult life. I remember laying in bed listening to Radio Moscow, Habana, Family Radio, Deutche Vella, and hundreds of spy stations at the height of the cold war. I would write those stations and receive wonderful things from around the world. I still have a hand typed Radio Moscow programming guide! . Back then, ham operators patched phone calls, from our service men to their families, and I could listen in. The whole world could be traveled with that radio without leaving my bedroom. Mysterious sounds, some intelligent, but not voices, could be heard and marveled at, but never explained. Radio, to me, is the closest thing to mental telepathy we have. Somehow, that old S-28 could decode invisible signals from around the globe. I eventually had to get inside it and my Dad taught me enough fundamentals to figure it out, but never completely. To this day, it's all still 'theory'. That old radio led to kit building, CB radio back when we needed CB licenses, hi-fidelity audio, and antennas anywhere they would fit. I'm still an avid shortwave listener. Back then; I never cared much about transmitting.

Fast forward.....

Allie Dryer, my oldest daughter, KD5IVO, at age eleven had a science fair project due. Her project was called "The Electromagnetic Spectrum". We challenged each other to get our Amateur Radio Licenses to help with her project. We both learned code, and passed the Novice, code, and Tech exams in one sitting. Allie built a crystal set, driven through a music amplifier, as part of her science project and went on to win a gold medal at the regional level! A dozen years later, I'm still listening to shortwave, developed a love of Morse Code, antennas, and probably the best attribute to Amateur Radio, the people. More than a hobby, it's a fellowship, the best in the world! That's why I'm a ham.

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What is it??

Send your guess to info@swdcarc.org.
Winner will be revealed next month.



ANSWER: Alinco DXR8T (it is just a receiver folks)
February Winner is Floyd Rodgers (KC5QBC)

Here is April's mystery ... What Is It??



Pink Shirt Club



To be a member of the SWDCARC Pink Shirt Club, you must first buy a pink radio from MTC in Paris. Then you have to ask Billy (KB5ZZW) to order you a shirt.

Beacon Fun!



On Saturday, March 24, 2012, several stations took advantage of an opportunity to check out their 80m receive equipment and capabilities in preparation for the **“on foot” 80m Fox Hunt scheduled for 9am Saturday, April 14, 2012 at the Baseball complex of Valley Ridge Park in Cedar Hill’s Lake Ridge addition.**

It was down to the wire for Jerry, KB6OJE, who was putting his loop together when I stopped by on Saturday morning after breakfast to assist with bringing the antenna to resonance. Jerry’s loop looks to be very competitive with a very deep null broadside to the antenna. We should all be so lucky!

The 1-hour cycle started with the 4-watt transmitter at 11:41 am, a little earlier than I expected but that is what happens when you use a low-resolution mechanical timer to kick things off. It works and I didn’t have to learn a new skill set in a week to make it happen so we will go with it for now. I look forward to getting with Richard Baker, N5KXA, in the near future to work on a PIC-type controller for the beacon in the future.

Texan Bill, N5TXN, was hearing the little 4-watt beacon with his short wave receiver, as was Barry, K1BSM. Jimmy, KB5WIO, was working on getting his Doppler system running but had a connector problem so he had to resort to using his HT tuned to 3580 AM where he was able to hear the smaller 30-milliwatt transmitter with ease.

As these transmitters run on the TV color burst frequency of 3579.545 KHz, interference from older TV’s in a neighborhood can occur when the signal is near the noise floor. That’s just what happened with Floyd, KC5QBC, who was listening from Lancaster.

It was a great test and opportunity to determine if the final transistor was going to be able to stand up to the challenge of running for over an hour continuously. I had added a significant amount of copper sheeting to the existing heat sink and it seemed to make a difference. My first test some weeks ago resulted in the final approaching nearly 160 degrees Fahrenheit, but today’s test resulted in a final transistor not even reaching 100 degrees Fahrenheit. Mission accomplished!

If you have not started working on your loop or other portable directional antenna, don’t wait to the last minute! I will be happy to assist with the assembly and tuning but I cannot make you join in with the fun and fellowship! Just email me and lets get something scheduled!

I will be happy to put the beacon on the air if you need to test your system – just let me know and we can schedule a time that works best. Ain’t doing radio fun?

73,

John KB5NJD

Ham Of The Year ... or at least 9 month



Floyd Rodgers (KB5QBC, the excited looking one on the right) finally receives his HAM OF THE YEAR award from SWDCARC President Scott Crappa (KE5NLK, who just woke up, on the left) at the March meeting. With Floyd's schedule, this was the first meeting he has had the opportunity to attend. Way to go Floyd, HOTY 2012.



The five simple steps to designing a short, base loaded vertical on the band of your choice.

As I have recently been designing, building, and testing suitable yet concealed antennas for use with the 80m fox transmitters, it has occurred to me that this is a topic that is rarely covered in study guides and when it is covered, it is limited to discussions of resonance where $X_C = X_L$. While this is a key concept in antenna design, it gives no useful procedures for designing and building a useful antenna. Even the most ambitious new ham that chooses to open up the ARRL handbook and search for details on solving the problem of winding loading coils, for example, is bogged down with theory. Do not get me wrong – theory is good. Theory is VERY good and VERY important but for the inveterate tinkerer it is sometimes best to “just do it” and learn from the school of hard knocks.

My goal here is to give you procedures and mechanics for designing a *short* (less than $\frac{1}{4}$ l), base loaded vertical. If you are designing a center loaded or top loaded vertical that uses a coil, these procedures wont apply. I will write about those procedures in a separate article in the future.

Consider the problem: We want to build an antenna for 20 meters but is limited to using #18 wire for the antenna element and cannot make the antenna longer than 10 feet. A typical quarter wave vertical on 20 meters is about 16 feet so our situation requires a short, loaded vertical. Let’s make some calculations...

Step 1: Find the surge impedance (Z_{surge}) of a piece of #18 wire in free space that is 10 feet long.

This is a simple calculation. Simply “plug and chug” with a calculator.

$$Z_{\text{surge}} = 60 \left[\ln \left(\frac{4h}{d} \right) - 1 \right] \quad (\text{Eq 9-14})$$

where

h = antenna height (length of transmission line)

d = antenna diameter (transmission-line diameter)

and where values for h and d are in the same units

The key to remember here is that the units associated with heights and diameters need to be the same. We have a 10-foot radiator, which is equivalent to 120 inches and we are using #18 wire, which is 0.0403 inches in diameter (http://en.wikipedia.org/wiki/American_wire_gauge). Plugging in the values, we find the surge impedance to be **354 ohms**.



Step 2: Determine the type and amount of reactance that you are trying to cancel.

Short antennas exhibit what is known as capacitive reactance (X_C) and require an inductor (loading coil) of equal but opposite reactance to have a net reactance of 0 ohms. Long antennas exhibit inductive reactance (X_L) and require a capacitor of equal but opposite reactance in series with the feed line to result in a net of 0 ohms reactance. When $X_C = X_L$, the antenna is said to be at resonance. Note that resonance does NOT necessarily imply low SWR. This is a very common misconception.

$$X_C = \frac{Z_{\text{surge}}}{\tan t} \quad (\text{Eq 9-16})$$

where t = the electrical length of the vertical in degrees
(24 meters is 53.5°).

Capacitive reactance is found by the ratio of surge impedance (354 ohms) and the tangent of the electrical length of the vertical in degrees. The unknown here is the electrical length in degrees. There are several ways to find this value but the easiest “estimation” is to divide the actual antenna height (10 feet) by the $\frac{1}{4}$ l length (16 feet) and then multiplying that by 90 (degrees). $10/16 = .625 \times 90 = 56.25$ degrees. There are more accurate means of making this calculation but this answer gets you close enough.

Simply plug in the values of surge impedance and electrical length, ensuring that your calculator is set to degrees (NOT RADIANS!) and you should get **237 ohms** of capacitive reactance after rounding up. This is specific for this length and diameter of the antenna element.

Step 3: Determine the value of inductance required to cancel 237 ohms of X_C .

We have already established that resonance is where $X_C = X_L$. This means that if we have 237 ohms (-) of capacitive reactance, we need **237 ohms (+)** of inductive reactance to net 0 ohms of reactance. Before we make a calculation, we need to make a decision: what center frequency on 20m do we want? In the interest of fairness, let’s pick the middle of the band since we really don’t know what our operating interests are yet. We will select 14.150 MHz. With this info, plug in what you know:

$$L = \frac{X_L}{2\pi \times f}$$



L = the inductance in microHenries required the cancel the reactance

F = the frequency in MHz

X_L = the previously determined value of 237 ohms (+)

2p = twice the value of Pi, 3.14159

If your calculations are correct, you should get **2.7 microHenries** of inductance as being required to be equivalent to the required value of inductive reactance.

Step 4: Design the coil

Designing the coil requires its own set of calculations. These calculators are easily achieved using calculators on the web.

This site is one that I found first and have used it before: <http://ecosse.org/jack/radio/software/newcoil3.html>

There are a couple of decisions to make, specifically how long and what diameter of a coil you want to use. Simply plug in your values and click *design*:

Inductance	Diameter	Length	Turns	Wire
microHenries	inches	inches	number	UK SWG
2.7	3	3	7	1
<input type="button" value="Model"/>	Required	Required	<input type="button" value="Design"/>	Suggested
Results of design calculation for: Length = 3 Diam = 3 Inductance = 2.7 No of turns = 7.22 Max wire diam (inch) = 0.375 Suggested SWG 1(0.3 inch) Length of close wound coil (in) = 2.1				<input type="button" value="Clear Values"/>

You need **7 turns**.

Maximum efficiency of a coil seems to be realized when diameter to length is less than 1:2, respectively.



For this example, I chose a 3-inch X 3-inch coil, sizes that are easy to find coil forms for, either as cardboard tubes of plastic pipe. You can also make this coil as an air core coil, without a form, but using stiff solid wire. Air core coils work very well and improve efficiency by improving the Q-Factor (a discussion for another time). Keep in mind that if you change the wire size, you need to rerun the calculations, as that value is important in determining the surge impedance (step 1).

After you have wound your coil, connect it at the bottom of your wire antenna and hang the top end of the wire, using an insulator, from a tree branch, maybe 11 feet off the ground. Connect the bottom of the coil to the center conductor of your coax and the braid to your ground rod AND RADIAL SYSTEM. Verticals require radial systems so don't skimp here. Maybe that's yet another topic to write about in the future.

¼ l verticals have a characteristic maximum impedance of 36.6 ohms. Higher impedances are generally indicative of losses. With 16 ¼ l radials, your feed point impedance is probably somewhere around 12-15 ohms, not including the loss resistance from the coil.

Step 5: Match the coax to the feed point impedance for minimum SWR.

There are a number of ways to match this 12-15 ohms at the feed point to a 50-ohm coax. In my opinion, the easiest method to accomplish this is the hairpin match. The hairpin match is basically a small coil, usually air core and about 1-inch in diameter with about 14 turns of insulated, solid wire. This coil is connected between the base of the resonating coil and the ground connection. Yes, it looks like a dead short; in fact it is a dead short at DC. RF sees this coil as a transformer. Adjusting the spacing between the turns, even grossly misforming the coil, allows for transformation adjustment and you can usually get a 1:1 SWR with this arrangement.

Hopefully this has given you some insight into how resonators can be designed for simple vertical antennas and finally matched to coax for use on the air. These types of lessons used to be learned on a Saturday afternoon in the backyard with an elmer. That's exactly how my elmer did it. Hopefully you too will go outside and experiment a bit and learn something new. Maybe this is a learning opportunity for the kids as well, if you have them.

*Thanks to ON4UN for the use of the formulas from his low band DX book.

73 and see you in the pile up,

John KB5NJD

Financial Report ... March 2012



March-12	Income	Expense	Balance	Petty Cash
General Fund				
Beginning Balance 3/1/12			\$1,832.96	
INCOME/EXPENSE				
Dues Income-2012	\$62.50			
Shirt & Cap Order # 3	\$11.00			
Transfer From Matl. Property				
Tranfer Petty Cash income				
TOTAL INCOME	\$73.50			
EXPENSES				
TOTAL EXPENSES		\$0.00		
TOTAL INCOME/EXPENSE	\$73.50	\$0.00		
Ending Balance 3/31/2012			\$1,906.46	
Special Events Fund				
Beginning Balance 3/1/12			\$0.00	
INCOME/EXPENSE				
Trans from General Fund				
TOTAL INCOME	\$0.00			
EXPENSES				
TOTAL EXPENSES		\$0.00		
TOTAL INCOME/EXPENSE	\$0.00	\$0.00		
Ending Balance 3/31/2012			\$125.14	
Material Property Fund				
Beginning Balance 3/1/12			\$2,248.93	
INCOME/EXPENSE				
Dues Income-2012	\$62.50			
Transfer from General Fund				
TOTAL INCOME	\$62.50			
EXPENSES				
Telephone Pymt. 01Mar.		\$39.70		
Argent Opentracker+ Ck. 2009		\$233.75		
Transfer to General Fund				
TOTAL EXPENSES		\$273.45		
TOTAL INCOME/EXPENSE	\$62.50	\$273.45		
Ending Balance 3/31/2012			\$2,037.98	
March Balance	\$136.00	\$273.45	\$4,069.58	

2012 Board Members

President

Scott Crappa (KE5NLK)

Vice-President

Ben Barber (K5NEB)

Treasurer

Mike Harang (K5MMH)

Secretary

Jerry Keltner (KB6OJE)

Directors

Paul Dryer (KD5IVP)

Lester Wong (K5ITO)

Rick Ellis (KJ5UY)

Committee Positions

Repeater Trustee

Johnny Roberson (KJ5LB)

Newsletter Editor

Bill Ellis (N5TXN)

Web Master

Bruce Holt (KG1BAH)

MN²

Monday Night Net

Net Time 8:00PM

147.060(+) Primary
444.500(+) Alternate

Minutes of Board Meeting ... March 6, 2012



The meeting was called to order by Scott, KE5NLK at 6:32 pm.

Invocation was given by Bill, N5TXN.

Executive Board members present: Scott, KE5NLK, Paul, KD5IVP, Ben, K5NEB, Mike, K5MMH, Rick, KJ5UY and Jerry, KB6OJE.

Club members present: John, KB5NJD, Richard, N5KXA, Bill, N5TXN.

Guests: None

Minutes: Motion to approve by Rick, KJ5UY; Motion 2nd by Paul, KD5IVP. Motion passed.

Treasure Report Motion to approve by Paul, KD5IVP; Motion 2nd by Ben, K5NEB. Motion passed.

COMMITTEE REPORTS

Repeater: Both were working on 6 March 2012.

VE Session: None last month.

EOC: Paul, KD5IVP, reports that DeSoto will be having a drill next month. Don, K5DEW, and Paul, KD5IVP, are making a communications plan for the city of DeSoto.

Membership: No new members.

Net: Rick, KJ5UY reports there were 16 check-ins last night.

Web: It is up and running, and Bruce, KG1BAH, will be making some corrections when he returns..

Groundwire: It is on the web, looks good and had some good articles this month.

OLD BUSINESS

- Ham Com – Paul, KD5IVP made motion for club to spend up to \$1000 for experimental projects at Ham Com. Rick, KJ5UY, 2nd the motion and it passed.
- Head for the Hills – Nothing new to report.
- A group of Amateur Radio Operators that have launched Balloons may be the April program.

NEW BUSINESS

- Repeater Controller – Current repeaters are S Coms and are over 10 years old. There was discussion about possibly replacing them and Richard, N5KXA, agreed to look into repeater controllers for the Club.
- Tom, KE5GKK – Ben, K5NEB, reports that he is improving and he walked on the bars twice today.
- Ben, K5NEB, made name tags for all paid members and passed them out to those present at the Board meeting.
- Jerusalem Market Place – Windsor Park Baptist Church is having their Jerusalem Market Place April 5 – 7 (Thur, Fri, & Sat) and the Club has agreed to provide parking assistance for the event. We will be needing 5 to 6 people each evening. Contact Paul, KD5IVP, if you are able to assist.
- APRS – There was much discussion on the Club getting some APRS units ready and in the Club inventory. Mike, K5MMH, made a motion to order 6 tracker kits to be assembled as our program for March. Rick, KJ5UY, 2nd the motion and it passed. Mike, K5MMH, is to contact the vendor about getting them here in time for the meeting.

PROGRAM: Assembly of the APRS tracker kits. This will be a hands on project...learn about soldering and kit components and assembly.

Motion to Adjourn was made by Rick, KJ5UY, at 7:30 pm.

The meeting was called to order by Scott, KE5NLK at 6:30 pm.

Invocation was given by Floyd, KC5QBC.

Minutes: Motion: Ben, K5NEB; 2nd by Jimmy, KB5WIO. Approved? Yes

Treasure Report: Motion: Ben, K5NEB; 2nd by Johnny, KJ5LB. Approved? Yes

COMMITTEE REPORTS

Repeater: Both repeaters are working.

VE Session: There were no VE sessions so far this month. Gene, KE5PKZ, scheduled to take tonight. Congratulations to Gene for he passed the Extra Class exam.

EOC: Cedar Hill & DeSoto EOC Radio Officers have been invited to the Fire Chiefs meeting on Wednesday, 21 March. Johnny, KJ5LB, Cedar Hill EOC Radio officer has been notified to come by EOC and pick up Radio on Tri-Cities dispatch frequencies.

Membership: Received an application from Bryan Cooley, KF5GRN and Barry McCoy, K1BSM. Their applications will be brought before the Board at its next meeting for approval.

Net: There were 16 check-ins last night.

Web: It is up and running. Club officers names need updating.

Groundwire: Is on the web for all to read and enjoy.

OLD BUSINESS

HAM COM – At the last board meeting, Paul, KD5IVP, made a motion for the club to spend up to \$1000 for experimental projects at Ham Com. Rick, KJ5UY, seconded the motion and it passed. Because of the amount, it needs the approval of the General Membership. Paul, KD5IVP made the same motion as at the board meeting and Lester, K5ITO 2nd the motion. The motion passed.

Head For The Hills – There is a meeting scheduled for 28 March with the Rotary Club. This will be the first meeting SWD-CARC representatives have attended. Mike, K5MMH & Jerry, KB6OJE will attend the meeting. This years ride is scheduled for Saturday, May 12th. If you are able to assist this year, please send an e-mail to Jerry, KB6OJE, or Mike, K5MMH and let us know if you have a preference on assignment.

Balloon Launch – Lester, K5IRO, is trying to get a representative from a local club that has done some balloon launches previously to make a presentation to our club, possibly as the April program. Before we get into planning to do a balloon launch we want to learn more of what is involved.

NEW BUSINESS

1. **HAM OF THE YEAR** – Floyd, KC5QBC, was presented the HOTY award. This was the 1st meeting he has been able to attend because of school classes.

2. **Jerusalem Market Place** – Windsor Park Baptist Church is having their Jerusalem Market Place April 5 – 7 (Thur, Fri, & Sat) from 5:30pm til about 9:00pm

and the Club has agreed to provide parking assistance for the event. We will be needing 5 to 6 people each evening. Contact Jerry, KB6OJE, at KB6OJE@arrl.net if you are able to assist.

3. Ben, K5NEB, reports that Tom, KE5GKK, is feeling better and walked 10 yds or so today.

4. Ben, K5NEB, has made name tags for the paid members. He asked Mike, K5MMH, for an updated list so he can get everyone a tag made.

5. Richard, N5KXA, is looking into repeaters in case one of ours goes down.

6. John, KB5NJD, reports that there will be a HF Fox Hunt on 80m on 14 April at Valley Ridge Park in Cedar Hill. Frequency 3578-3582 depending on mode used on your receiver. This Saturday, 24 March, from 12 noon til 1:00pm there will be a 4w transmission testing the Fox. You are encouraged to listen for it and make any adjustments to your antenna during that time.

PROGRAM: Mike, K5MMH, had those present to be assembling the Open Tracker Plus kits. There were quite a few involved in soldering the part...many this was their first time to do any soldering.

ADJOURN: Motion by Paul, KD5IVP.