Short CIRCuits

June 2020

SERVING CENTRAL ILLINOIS AMATEUR RADIO SINCE 1921

IN THIS ISSUE

From The President

by Rick Suhadolc N9CKL

The Covid -19 Virus continues to be battled in our community. New Electronic testing machines developed for the Military have been reported in RF and Microwave Magazine. The testing only takes 5 minutes using a biosensing field effect transistor (BIO FET) device that include advanced nanocarbon materials, which have already been proven effective on the detection of SARS, EBOLA and ROTAVIRUS.

"While Bio-FET applications are an attractive next-generation platform for highly selective and ultra-sensitive virus detection, major limitations have been attached to the sensitivity of device structures and large-scale manufacturability of the semiconductor materials utilized. Since these biosensor systems rely on semiconductor materials, inefficiencies could be addressed by applying advanced nanocarbon semiconductor materials, such as nanocrystalline diamond and graphene oxide. A Bio FET biosensor is comprised of a semiconductor channel, which connects the source and drain terminals, with a amphiphilicity (selectively hydrophobicor hydrophilic) chemical resistance." By Adam Khan CEO of AKHAN Semiconductor from Microwave & RF Magazine June 11, 2020.

Historically this new type of nanocarbon material has been costly but now it can be manufactured in batch quantities. Originally developed for optical sensor /detector systems in Army aviation systems.
The new test machines should be able to provide tests in minutes at hospitals, schools, work and other locations. Maybe a COVID saliva swab will become common entry requirement everywhere we go?

Rick

N9CKL

A New Antenna

Article by Tom Planer KJ9P

A few months ago, I described a six wire 80-meter dipole build. Complete with pictures. No pictures for this article as the construction is essentially the same. Construction materials are different however. The size of the wire used for this build is #14 Awg.

This build is a six conductor, flat cage 20-meter dipole. It will replace the vertical single wire 20-meter dipole now at the top of the tower. I started the build yesterday. One half of the antenna. Today I finished it and it is ready to hang. Tomorrow morning?? Maybe. A simple project, really. Just tipping the tower and putting the Flat cage in place of the single wire dipole. So, why?

Quite a number of years ago, In the Fundamentals of Antennas chapter of the first ARRL antenna book I bought, Thirteen Edition, Fifth Printing, 1980 there is information on the "mass" of the antenna and the enhanced receive characteristics gained by increasing the mass of the wire used. Reading more, the band width is increased also.

What I have found, through experimentation, and Grant's antenna modeling, is that not only is the receive characteristics improved, the band width of the antenna is improved. The very first build was a 75-meter Inverted Vee Dipole. This antenna is about the fifth or sixth iteration of that philosophy.

The last build, about five weeks ago, was a six wire Flat Cage 40-meter dipole. I designed that antenna using the 468 standards for building a dipole. What I discovered was that the resonant frequency, for a six wire "Flat Cage" dipole, was about 5.5% lower than what I had expected. Thus, the length of a dipole using this approach is shorter.

An unanticipated benefit, in addition to what I "hear" of enhanced receive signal strength is the versatility of this build.

My tower is 60' tall with an aluminum mast extension which brings the tower height to 70 feet. The maximum allowed in the Town of Normal, IL. The build was 66' long and left the bottom of the antenna only a few feet above ground. I really wanted a 40-meter vertical dipole.

The bottom of the antenna, only a few feet off the ground, would have created a safety hazard for someone even as short as I am. So, what to do? Hanging it in a slope configuration was the answer. So, with the top at 70' the bottom is about 26' off the ground.

So, because the resonant frequency was too long for 40 meters, the Heath Kit 2060A manual tuner was put into play. 40 meters tuned up fantastically! So, because of my empirical engineering degree I sought out to "see" just what other bands may be benefitted. Of course, 15 meters was the next band to explore. A given really. It was.

Well then, 30, 20, 17, (we did 15 already) 12 and 10 were all examined. With the exception of 12 meters the antenna was able to be loaded on these bands. 12 meters was out of the question.

At the time, I had an 80-meter vertical antenna hanging from the tower. Yep, you guessed it. I tried loading the antenna on 80 and the result was, not only did it load, the logging and confirmation of contacts on LoTW was at least equal to that accomplished with the 80-meter vertical. So well, in fact, that I have since taken the 80-meter vertical down.

That led to an Excel spreadsheet playing "What If". Mathematically, the new constant for a six wire, 4" on center, Flat Cage dipole antenna is 442.6. So, another "Proof of Concept" project was required.

I plan on submitting the design to the next ARRL homebrew antenna contest. So, a test proof of

concept is required for this approach to a very versatile antenna. Who knows? I might just gain 12 meters.

What I did was to use the philosophy of my experimentation to build a 20-meter dipole to replace the single wire 20-meter dipole now hanging at 70'.

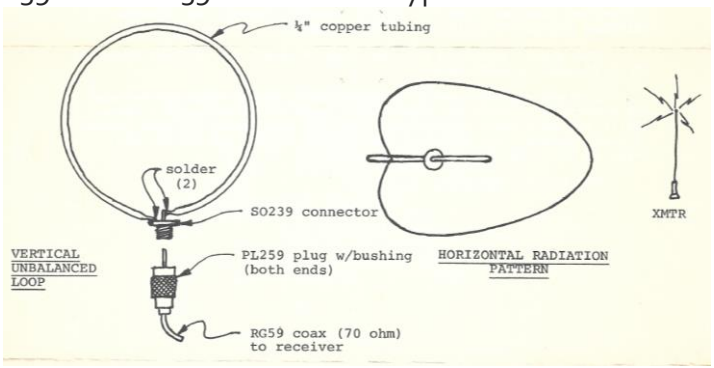
So, stay tuned to this monthly publication for the resulting discoveries with the versatility of this build.

DF Loop Antenna

Article submitted by Rick Sudaholc N9CKL

This is the simplest of DF loops with no ambiguity of direction. It has but a single direction of maximum signal and a single null.

It is made from an 18 to 20 inch length of ¼" copper tubing, which is bent into a neat circle. The ends are flattened for about half an inch perpendicular to the radius. Connect one end to the inner conductor of an SO239 and the other end to the ground of the SO 239. The SO239 is the chassis type coaxial connector.



Approximately 57 inches of RG59 coax is used to connect he loop to the receiver, with the proper coax plugs attached.

A suitable handle for the "Simple Snoop" may be made of ½" ID copper tubing or ¾" ID copper tubing, about 8 inches in length. The copper tubing is soldered to the moveable ring of the PL259 plug and then attached to the SO-239 of the "simple Snoop".

HOW TO USE

The "Simple Snoop" is held by hand out the window a few inches above the car roof. With the loop held out the window, the receiver is tuned to the desired signal. Rotating the loop will cause the signal to vary. Maximum signal is in the plane of the loop, in the direction of the ungrounded end of the loop. Minimum signal is in the same plane, but in the reverse direction of the grounded loop end.

When the received signal is weak, maximum signal is used for direction finding. When the signal becomes strong, the sharper minimum signal, or null side, may be used. The signal received via the loop is about 25% of that received by a standard 1/4 wave whip.

A field strength meter tuned to the 2 meter band can be used as a receiver. There are also other types of directional finders which are much more complicated than this one shown. On some directional finders, the null and the maximum signal are on the flat side of the loop instead of off the ends.

Frank WB9ODG

AM Beast

Article by Dennis Mills KE9UA

I thought maybe you might add my latest AM boat anchor project to the next newsletter and I included some phots of the "AM BEAST" as I'm going to call it.

Just a little information first, this was probably made by an engineer/ham op who worked for Thordarson Electric Transformers in Chicago, Il and built in the late 40's of maybe around 1951 when AM and CW were the only modes of ham radio. I was awe struck at the outstanding construction and layout of this as each separate deck starting at the bottom that has the HV rack and some real serious heavy transformers and chokes and then the next stage up is the modulator deck and also several large and heavy transformers. The next stage is a VFO exciter stage and the transformers are much smaller here and this operates from 80M to 10M. The last top stage is the RF deck using a pair of 4E27/5-125 final

tubes and a plug in "link" coupled RF tank coil and above this is a dual variable capacitor matching network that feeds the balanced line (ladder line) out to the antenna. The modulator deck uses a pair of 811A tubes in push pull configuration.

I can barely just move the power suppl deck around on a sheet of cardboard in the garage and cannot even lift the light end! It's that heavy. Plate voltage for this transmitter is 3750 VDC @ 500MA of plate current. Makes lots of RF.

Ed, Kc9GF helped me go after this up and over into Hobart, IN where it was setting in an outside storage shed for many, many years and I'm going to take each deck apart and clean and repaint each part like it was from the factory and rewire each stage with new modern wire as all the wiring in this is the very old cloth covered wire from the 40's. I found this really cool manual printed by Thordarson for hams and several complete AM/CW transmitters in this for the homebrew ham and all the parts list and complete schematic diagrams and a layout diagram available for just 15 cents!

The previous owner of this I purchased this from is not a ham and claimed this was only in storage for a couple of years.....yam right and looks like it was under water for some time. I included a brand new HV transformer that is the twin to what I have in the HV power supply deck and this has two HV windings rated at 500MA each and one is 3750VAC out and the lower HV is 3120VAC and if you use just one winding then the total current rating of this HV transformer is doubles to one full amp at 375-VAC.

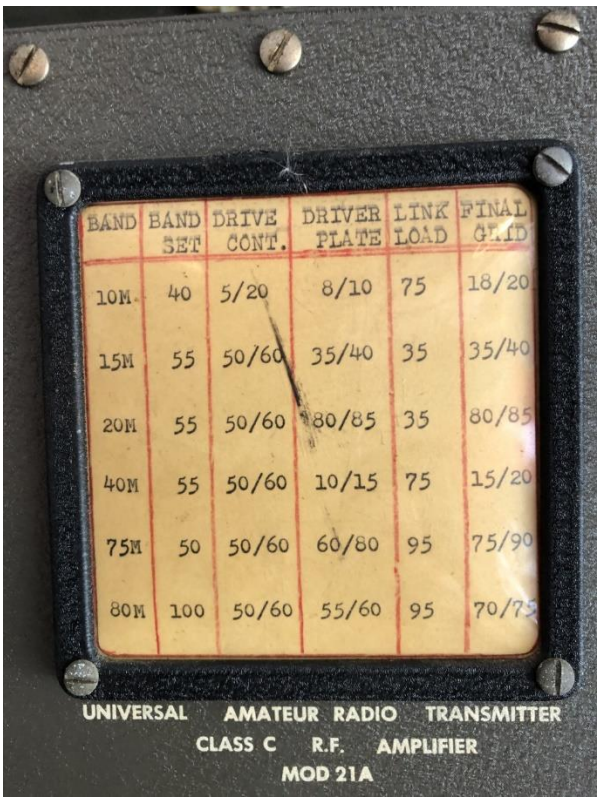
Ed will confirm that this rack panel has some serious transformers in it and very; very heavy. A true "Boat Anchor" AM transmitter.

I bet I can make the house lights dim when I get this going as it all runs from 115VAC only with no choice of either 115 or 220VAC.

I had found a brand new HV transformer that just sold on eBay that was the exact same brand and model as the one in this transmitter and took photos of the tag to show the HV ratings and this power transformer has both a 3750 VAC CT and a 3120 VAC CT windings and both rated at 500MA each and if you only use just one winding like this one has been wired then the current rating is doubles to one (1A) full amp of current at 3750VAC.

73,
Dennis KE9UA


UNIVERSAL TRANSMITTER EXCITER MODEL 14
EXCITER POWER SUPPLY
MODULATOR



Buzz Sleuthing

Article by Jeff Lovell KC9QQM

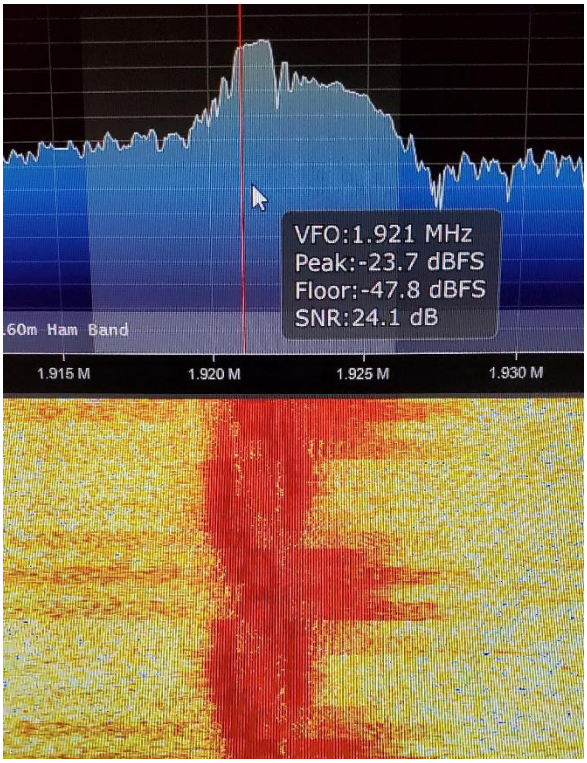
Back a few months ago, we had our front tree removed which was the anchor for the L section of the 160m inverted L. I then routed it to the back yard. It was around this time the background noise on 160m for our Sunday morning net had increased dramatically from what I remembered it before I moved it.

It is a 60hz buzz with other components in it. After hardly hearing anyone this last Sunday's 160m net (5/31), I decided to dig into it.

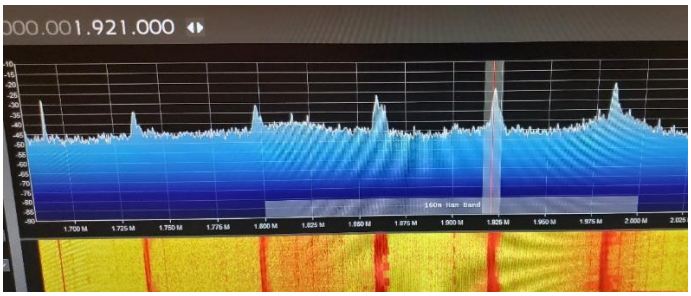
This is the noise level as seen on my Icom IC-706mkii;

And actually most of the time it was peaking at the 20 over 9 mark. Since I currently don't have any SLA or other gel cell battery available, I pulled the battery from my truck. Eliminating the house was the first step. Connecting the radio to the battery and leaving everything else as it was still resulted in the high level buzz.

Before I started turning off breakers, I wanted to see what this buzz looked like through my little RTL-SDR dongle using Sharp SDR software. The noise was at -23db and had an interesting shape;



Also looking around part of the band I saw it was reoccurring every 60 khz or so;



That in itself is an indication that the noise is manmade and probably coming from a switch mode power supply. Now the fun part. I turned each breaker off one by one and noted on some paper what I turned off and what the noise level was on the Icom as I had it on the whole time with the volume up.

After turning off everything in the house but the den and downstairs outlets, I still had the noise. Turn off that last breaker and wow, S7 noise with no buzz!

So then, I unplugged each item on my desk and elsewhere in the room and the bedroom till it went away....and the prize goes to.....my treadmill!!! I guess up till around February or March I had been leaving it unplugged when not in use and for whatever reason I had plugged it in and left it in.

Now rather than just plug everything back in and turn all the breakers on, I thought I would do it piece by piece and breaker by breaker to see if there was anything else adding noise to the mix that was below the level the treadmill was adding.

I found 2 other devices upstairs in my living room that added noise that I could detect. First was my laptop and power supply that I have dedicated for the TV upstairs. It was adding a low rumbling sound. The other was my 50" Visio smart TV which added a low tone of about 2khz.

Happen to have 2 of those snap on ferrite core to get rid of common mode noise and they seem to have done the trick.

It might not be the easiest things to do but if you have a noise issue, take some time to track it down!!

73
Jeff
KC9QQM

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Central Illinois Radio Club
http://www.qsl.net/w9aml/
Bloomington, Illinois

You received this message because you are subscribed to the Google Groups "Central Illinois Radio Club" group.
To unsubscribe from this group and stop receiving emails from it, send an email to centralillinoisradioclub+unsubscribe@googlegroups.com.
To view this discussion on the web visit https://groups.google.com/d/msgid/centralillinoisradioclub/DM6PR01MB4716C750319C66BAC2E694E4DA9D0%40DM6PR01MB4716.prod.exchangelabs.com.

AREA NETS

Tuesday 8:30 P.M. 28.450
CIRC Open 10 meter Net

Tuesday 9:00 P.M. 146.940 (156.7PL)
CIRC Open Net

Thursday 8:00 P.M. 28.450
Vertical polarization is encouraged but not required

Sunday 08:15 A.M. 1.915
Open 160 meter AM net

If you are wondering where all the nets are, it was brought to my attention that many of these are no longer in operation. I have left the ones the CIRC handles directly.

If you want another net listed, please send me an email directly and please verify it is a current net and I will add it to the list.

Jeff KC9QQm

Kc9qqm@gmail.com

AREA EXAM DATES

Following is the schedule for W5YI-VEC Amateur Radio exams for the year 2018. At the Community Room of the Bloomington Public Library located at the intersection of E. Olive St. and S. East ST. Entrance off of S. East St.

Please bring two forms of identification. You must have an FCC issued FCC Registration Number (FRN) or Social Security Number. We cannot administer a test without your FRN or SSN. You will need a copy of your Current license plus any CSCE you want to apply.

2020 dates;

7/18 TBD 11/4

Exams' in Morton are held at the Morton Public Library, 315 West Pershing at 12:00 Noon the third Saturday of even numbered months and. Sep 21 (Superfest),

CIRC Meeting
Fourth Wednesdays of the month at 7:00 p.m. at the American Red Cross
1 Westport Dr.
Bloomington, IL 61704

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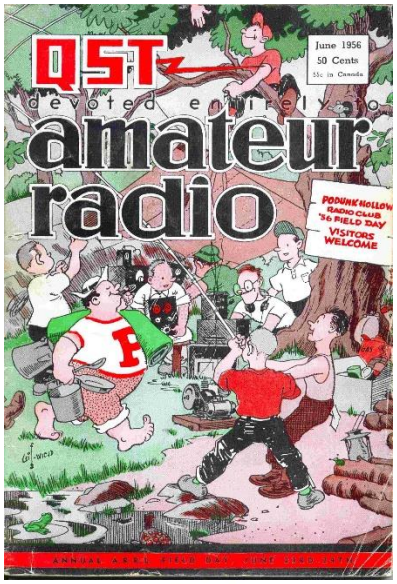

Calendar of Events

Daily Coffee Klatch Monday thru Friday
**** The weekly Coffee Klatch has been moved to the 146.94 repeater for the time being. Remember the new PL is 156.7hz *****

9:00 a.m. at Dairy Queen Veterans at Cub's
XYL's Join the OM's Monday and Friday

Weekly 10 Meter Net
Every Tuesday evening at 28.450 MHz- at 8:30 p.m.

Weekly 2 Meter Net
Every Tuesday evening on the 146.940-repeater at 9:00 p.m.

Weekly 6 Meter Net
Every Thursday evening at 50.135 MHz at 7:00 P.M.

Weekly 160 Meter AM Net
Every Sunday morning at 1.915 MHz at 8:15 A.M.

CENTRAL ILLINOIS RADIO CLUB
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WEB PAGE
HTTP://WWW.QSL.NET/W9AML/

President: Rick Suhadolc (N9CKL)
Vice-President: John Payne (AC9TN)
Secretary: Keith Hanson (AC9S)
Treasurer: Greg Kellermen (KC9WVR)
Member at large: Grant Zehr (AA9LC)

Newsletter Editor: Jeff Lovell (KC9QQM)

The CIRC is a not-for-profit ARRL special service club whose purpose is to advance the service of Amateur Radio. Located in Central Illinois, the CIRC and its members welcome all to use the 146.94 repeater and to attend club meetings.

75 Meter HF Traffic handling nets

NET / TIME	FREQ khz
NORTH CENTRAL PHONE NET	
M-F 7:00 A.M. central time	3912
ILL. PHONE NET	
M-F 4:45 P.M. central time	3857
SUN. 8:00 A.M. central time	3940
ILLINOIS SIDEBAND NET	
M-SAT. 6:00 P.M. central time	3905
75 METER INTERSTATE SIDEBAND NET	
DAILY 0100 UTC	3985
ITN INDIANA TRAFFIC NET	3910
DAILY 1230 UTC	OR
2200 UTC	3912

Short CIRCuits

P.O. Box 993
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