

# The Link

Newsletter of the Durham FM Association

December 2019



Next Meeting is Tuesday, December 3rd, 6pm, at Bullock's BBQ.



## President's Corner

### Connecting With Others

Last month, I wrote to you about solving problems. This month, I'd like to focus on another aspect of our hobby: being communicators and making connections. Whether it is a DX contact on HF, a local repeater contact or even simplex, our hobby is about communication. Making the communication happen is both a technical feat, but also a human one of having something interesting to say. Our local Saturday morning Have Another Meal breakfasts are a great example of this sort of connection.

Our December club meeting is another. Rather than having a formal presentation, the main event will be conversing with those around you, and, with our ham new years resolutions, making plans for interesting projects for next year. In addition to your meal, the club will also provide a meal for one guest, so please bring a spouse, friend, or colleague, so we can connect with them as well.

In addition to making internal connections, the club will also be reaching out a hand to those in need in our community through charitable giving. If you are able, please bring a toy for our Toys for Tots drive. You will also have an opportunity to joining the club in donating money to support those struggling with homelessness and food insecurity.

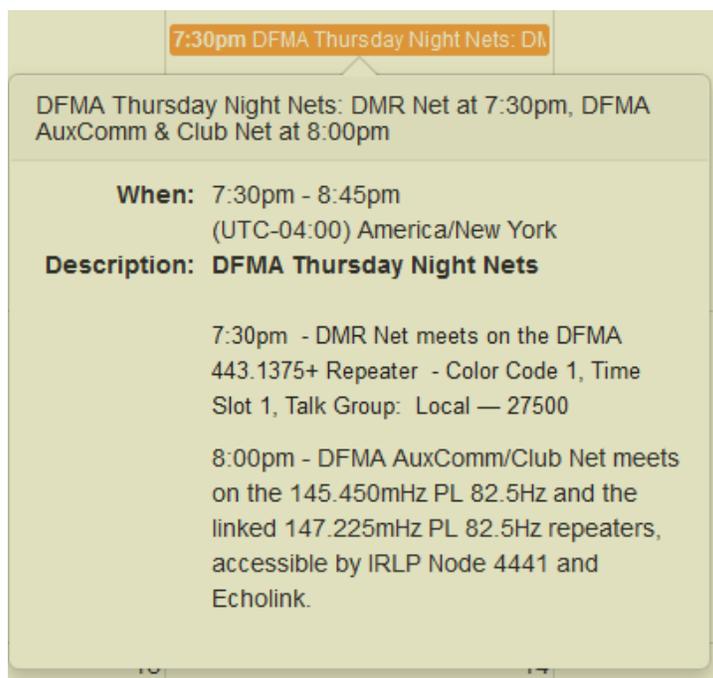
73,  
Jack

## DFMA DMR Net Announcement update on Groups.io Calendar

Per board discussion regarding changing the DFMA DMR to precede the DFMA AuxComm & Club Net and also Charles KN4PTU at this morning's Saturday breakfast mentioning Jack's most recent conversation with him, I've updated the [groups.io](https://groups.io) calendar as shown below.

Rather than having separate announcements go out for two nets on the DFMA repeaters on the same night, I thought it best to simply merge into one announcement as shown below.... Perhaps this might increase more participation in both nets...

This updated announcement should (with co-operation of the [groups.io](https://groups.io) calendar gods :-):-)) start going out on Wednesdays for 1 day notice of the Thursday net.



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### Message from your editor

I try to give you an informing and interesting newsletter. It becomes difficult when I'm not given any articles and I have to scrounge the internet. This issue contains articles and features from the Rochester club's RARA newsletter and also from the Raleigh club's Exciter newsletter. Thanks to both of them.

## 2019 Field Day Rankings

At long last, the rankings for Amateur Radio Field Day 2019 have been published by the ARRL. Despite the lousy propagation and the 4,000 point drop compared to our score from the year before, we did an outstanding job!

Here are our standings overall, also in regional and power categories:

Overall - #4 out of 3,112 entrants in the USA and Canada

Roanoke Division- #2 out of 251

North Carolina Section- #1 out of 92

QRP Power Level- #2 out of 290

The top 5 stations, with callsign, point total, category and section are:

W3AO 32,356	14A	MDC
K6EI 21,065	9AB	SCV
W4IY 18,252	9A	VA
W4EZ 17,135	9AB	NC
N6HC 17,082	5A	LAX

Thanks to the work of so many members of the DFMA and OCRA, for building, operating and supporting our continued phenomenal success as a premier Field Day operation. A lot of planning goes into this, and a lot of intelligent adaptation when things don't go as planned. Best of all, we manage to have fun with it!

Field Day is an ongoing experiment. We have tried changes over the years to try and improve our score every year, and to see what works or does not work on a 24 hour operation of a temporary setup.

We have proved that we could reach #2 nationally at the QRP power level, which gives us the 5X multiplier. I have had discussions with the boards of both clubs, at the recent OCRA membership meeting, and with most of the band captains. The experiment we want to try this coming year is to increase our power level. If we run up to 150 Watts of output power, we would have a multiplier of 2X. We also would be allowed to use fossil-fuel powered generators to recharge our batteries.

One of the main reasons for this, is that this would give the phone stations a better chance to be heard. Most of our new members, who are not fluent (yet) in CW, often sign up for phone ops at Field Day. It is very frustrating for them to call repeatedly and not be heard. We'd like to make it a more enjoyable experience for them. The CW crew likes the idea because they can grab a frequency and hold it to make runs, rather than just hunt-and-pounce. The same is true for the

other modes. Digital most likely will not have to run more than 20-25 Watts, as that is more than sufficient to be heard on PSK31 and FT8.

So we will try this experiment this coming year, and see how it goes. I will point out that W4IY edged us out using this power level. The CW ops believe they can certainly increase contacts by 2.5 X or more to make up for the lower multiplier, I believe that would hold true for the other modes also. Also, in a real-world disaster communications event, we would not be running at QRP levels anyway.

I look forward to our planning this coming year to continue our excellent performance and most of all, make it fun for everyone involved!

73,

Dave Snyder, W4SAR

## Upcoming Hamfests

### 01/11/2020 | W4NC First-Fest

**Location:** Winston-Salem, NC **Type:** ARRL Hamfest **Sponsor**

Forsyth Amateur Radio Club **Website:** <http://W4NC.com>

### 03/13/2020 | Charlotte Hamfest

#### ARRL North Carolina Section Convention 2020

**Location:** Concord, NC **Type:** ARRL Convention **Sponsor**

Mecklenburg Amateur Radio Society **Website:** <http://www.charlottehamfest.org>

### 04/11/2020 | Raleigh Hamfest, ARRL Roanoke Division Convention RARSfest

**Location:** Raleigh, NC **Type:** ARRL Convention **Sponsor**

Raleigh Amateur Radio Society **Website:** <http://rarsfest.org>

Thanks to RARA (Rochester Club) for the following article. Sorry for the small print, but technical issues prevent me from enlarging without great difficulty

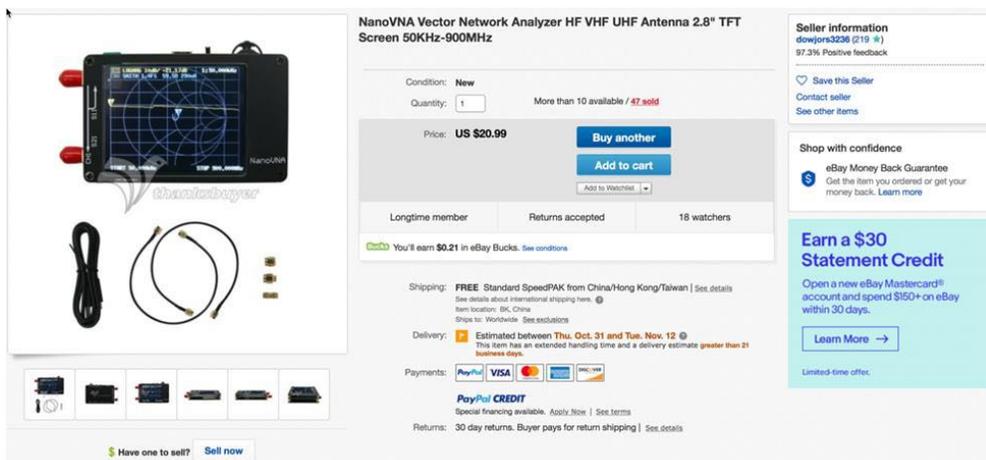
Text

## NANOVNA - TOY OR TOOL?

KARL HEINZ KREMER - K5KHK

For the last few months, a new product has been showing up more and more on eBay and various Chinese online retailers: The nanoVNA.

It comes in different configurations and in different colors. What is common is that the price is well below what one would expect to pay for a VNA - or Vector Network Analyzer. Is it any good, or is it just another toy that one buys, plays with for a few hours and then puts on the shelf to never be touched again? Here is one of the cheaper listings on eBay.



**NanoVNA Vector Network Analyzer HF VHF UHF Antenna 2.8" TFT Screen 50KHz-900MHz**

Condition: **New**  
Quantity: 1 More than 10 available / 47 sold

Price: **US \$20.99** Buy another Add to cart Add to Watchlist

Longtime member Returns accepted 18 watchers

**Shipping:** FREE Standard SpeedPAK from China/Hong Kong/Taiwan | See details  
Item location: BK, China  
Ships to: Worldwide See restrictions

**Delivery:** Estimated between Thu, Oct. 31 and Tue, Nov. 12  
This item has an extended handling time and a delivery estimate greater than 21 business days.

**Payments:** PayPal VISA MasterCard Discover American Express

**PayPal CREDIT** Special financing available. Apply Now | See terms

Returns: 30 day returns. Buyer pays for return shipping | See details

**Seller information:** dowjors3236 (219 #) 97.3% Positive feedback  
Save this Seller Contact seller See other items

**Shop with confidence:** eBay Money Back Guarantee Get the item you ordered or get your money back. Learn more

**Earn a \$30 Statement Credit**  
Open a new eBay Mastercard® account and spend \$30+ on eBay within 30 days. Learn More → Limited-time offer.

I've seen prices range from \$17 to \$100 and depending on the vendor, the case is either black or white, and might have a gecko on it. As far as features go, some come with a built-in battery, other have to be powered by a USB-C connector. Some come with SOL (short/open/load) calibration targets, others don't have these required accessories. Sometimes it's not even clear what you get when you order. What you get is not necessarily reflected by the price. Mine came without the battery and the calibration targets. I already had SOL targets for my antenna analyzer so that was not a big problem. I also found a matching battery on amazon.com, and after soldering it and fixing it double-sided sticky tape, you would not even know that it was not part of the original device. A word of warning however, especially when it comes to the cheaper offerings: Always check the recent ratings of the seller, and if something looks like it is too good to be valid listing, it's probably somebody trying to scam you.

Here is what it is: The nanoVNA is "palmtop" 2 port VNA that covers 50KHz to 900MHz (there are software versions that extend the upper limit even further), it

has a touch screen that asks for a stylus (or fingers much smaller than mine), and it offers up to four "traces" or curves at a given time.

When you look at the device, it's a pretty simple construction: It's basically a sand-



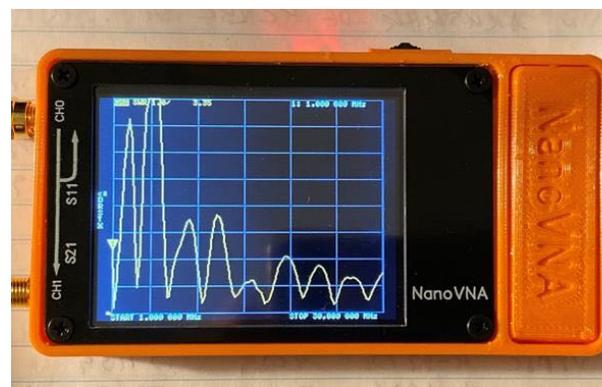
wich of two aluminum plates, the display and a PCB open on the sides. There is also a rocker switch that exposed to the elements and fat fingers. I decided to 3 print a case for it.

Using a VNA is not quite like taking a measuring tape or figuring out how long a piece of wood is... It takes a bit a learning curve. Fortunately, there is a lot of online knowledge that one can tap into. Here is a three part series that explains what a VNA is, how to calibrate the nanoVNA and how to perform measurements:

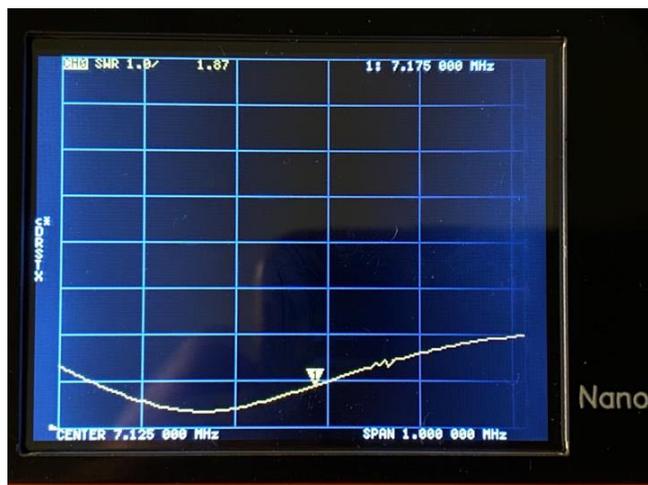
<https://hexandflex.com/2019/08/31/getting-started-with-the-nanovna-part-1/>

By now there are also a number of great YouTube videos that show how to get started with the nanoVNA.

I ran a test on my end-fed halfwave antenna.



This is in line with what I figured out with my antenna analyzer. Here is the graph zoomed into the 40m band:



You can place cursors and read e.g. the SWR value at a specific frequency (SWR of 1.87 at 7.175MHz in the picture).

Using a VNA as antenna analyzer does not even scratch the surface of what a VNA can do. Here are four traces that describe a BCI filter that eliminates interference from AM broadcast stations:



I've only spent some limited time with this new tool (yes, it is a tool, and not just a toy). There are a lot of things it can do, and there is a pretty active community online that is adding functionality and creating "extensions" like computer software that can run the VNA while tethered to the computer and is adding functionality that is not available in the on-board software .

The whole project is open-source - both the hardware and the software designs are published on GitHub (<https://github.com/ttrftech/NanoVNA> - with various clones). It's actually pretty interesting to see how the hardware is implemented.

The nanoVNA is not competing with "grown up" VNAs from HP, RS or other well known manufacturers of test equipment, but it definitely allows me to add a new tool to my workbench, and when it comes to designing and verifying the performance of filters, it will be great to have it available.

Since I started to write this article, a number of new videos and blog articles have been posted, which is not surprising for a relatively new product. Your best chance of getting something that is up to date and uses current software is to search on your own. Type "nanoVNA tutorial" into Google or YouTube's search and see what comes up. As far as keeping up to date is concerned, the designer of one of the clones, the nanoVNA-H, just hinted that there might be new hardware out in a month or so that incorporates early feedback from users.

Thanks to the Raleigh club's Exciter newsletter for the following

## Interesting websites & misc info

**Engineering presentation about grounding.**

[https://www.youtube.com/watch?time\\_continue=1&v=SaHKCbXGSGk](https://www.youtube.com/watch?time_continue=1&v=SaHKCbXGSGk)

Thanks to WA4OSS for sending this to the Exciter

**VOACAP Online HF Predictions (Amateur Radio)**

<https://www.voacap.com/hf/>

**City lights in Korea and Japan.**

The [pskreporter website](#) shows band activity for digital modes. I noticed that in the Display options you can turn on and off "Hide City Lights".

I left the city lights on and zoomed in on Korea and Japan and did this screen capture.



ClubLog lists North Korea as the most needed entity in the world

Nicely formatted DX Calendar

<https://dxnews.com/calendar/>

**Plug and Play replacement LEDs.** This company has replacement bulbs for the types used in radios, type 47, 51 . Search for BA9s & BA7s LED Bulbs. They are \$3.95 each.

<https://www.superbrightleds.com/>

**More Led bulbs at Parts Express.** These are a little more then a dollar each.

<https://www.parts-express.com/63-volt-warm-white-t3-1-4-bayonet-led-lamp-for-mcintosh-5-pack--070>

-136 <https://www.parts-express.com/12-volt-t10-wedge-led-warm-white-lamps-5-pack--070-138>

**There is a lot of Tektronix history at this website.**

<https://vintagetek.org/>

They also have original TEK manuals for sale.

**FlexRadio and Raytheon** will develop new HF radio based on the Flex-6000.

<https://hackaday.com/2019/09/05/ham-radio-company-wins-big/>

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## **FCC changed the license classes in 1951**

In 1951 the FCC totally revamped the license classes for radio amateurs. Prior to 1951 three classes existed, A, B, and C. In 1951 the FCC changed the licensing structure into six classes: Novice Class (a new introductory class), Technician Class (a new class for VHF and UHF advancement), Conditional Class (for people unable to be tested

in front of an FCC examiner - formerly class C), General Class (formerly class B), Advanced Class (formerly class A - but no new advanced class licenses were granted after December 31, 1952 until the introduction of incentive licensing in 1968), and the Amateur Extra Class (the new top -level class.) Read all about it at this website.

[http://www.w6ze.org/Heathkit/Heathkit\\_079\\_VF1.pdf](http://www.w6ze.org/Heathkit/Heathkit_079_VF1.pdf)

Too big antenna project. Some contesters or DXers would say that is impossible. When you look at the pictures make sure you look at the last two. <http://w6dsr.com/LP1005AA/index.html>

The AWA museum in Bloomfield, NY was the subject of an article in the Owl Light News.

<https://www.owllightnews.com/owl-light-outings-a-wireless-museum-and-a-wine-tasting-too/>

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Here is your editor's contact info for contributions to the Link. Also, I am starting a classified section, so if you have items that you want to sell or give away or are looking for an item, just write your ad and send to me.

**Martin Brody, KA5JUJ**     [martin@brody1.com](mailto:martin@brody1.com)     **919.260.0632**

## Minutes of Last Club Meeting

### Durham FM Association (DFMA)

**DFMA Meeting – 11/05/2019** – Dan, KR4UB, Secretary

**Location:** Bullock's Bar-B-Cue, Durham

**Attending:** KR4UB, Dan; N2XZF, Paul; WA4AHR, Dewey; KV4ZR, Loren; W4SAR, Dave; KD4YJZ, Karen; WB4ROI, Henry; NC4CD, Charlie; N8BR, Bill; W4BOH, Wilson; KM4IWI, Bill; KF4LJZ, Linda; KA4AVM, Sue; WB4YYY, Jim; KM4MBG, Jack; KA1HPM, Nick; KN4SVO, John; WA2JLW, Roy; KX4P, John; NA4VY, Dave; WA4UJM, Wally & Susan; KM4LKN, Detlev; KN4PTU, Charles; KF4PAB, Lenore; KB4OT, Jim; KN4VXB, Aurora, Robbie & David; KF4NTC Bob & Renu; KW4XL, David & David Jr.; KE4UVJ, Don; KU4GC, Dee; KW4KZ Chuck & Mary; KJ4VWG, Sam; Guest: John Book

A total of 39 attending, with 32 of them currently licensed hams.

**President:** Jack opened the membership meeting at 7 pm with introductions, followed by announcements.

### Announcements:

Jack began the announcements first by reiterating the club's dire need for additional volunteers to distribute the workload for ongoing responsibilities including DurHamFest.

Dee reminded all of the upcoming December 3rd annual Christmas dinner for members plus one guest. This dinner is in the spirit of gathering and giving thanks. He encouraged all to contribute in some way, whether it be to the Toys for Tots, donations to the Food Bank of NC, the Durham Rescue Mission, or other preferred charity. Toys should be unwrapped; or if wrapped, the gender and age range of the gift should be noted.

### REPORTS

**Vice President** – Jimmy, KF4KHU absent due to illness.

**Treasurer** – Lenore, KF4PAB provided the treasurer's report. There are 115 members with dues current.

**Secretary** – Dan, KR4UB, gave additional details on the OCRA Christmas dinner (as documented below).

**Repeater Manager** – Charlie, NC4CD reported on the Hoover Rd storage building replacement. After making a preliminary inspection of the material stored at Hoover Rd, much of it is obsolete and can be disposed of, thus permitting a smaller size replacement building. Volunteers, preferably those who have a pick up truck or trailer are needed to help with the disposal of obsolete material. Charlie plans to offer a tour of the Hillsborough repeater site for those interested on Friday, November 8th.

**AuxComm EC** – Shawn, K4CTD absent.

**Field Day & VE Coordinator** - Dave, W4SAR reported that Field Day results will be available later this month. A VE session starting at 7:15pm is planned for the OCRA November meeting.

The OCRA Christmas Dinner will be held at the same Hillsborough Exchange Club location on December 9th. To keep the price low as possible at \$20.00 for each adult meal and \$5.00 per child (12 years & under)

the amount of food ordered for the new caterer (Hope Valley Diner) must closely match and be for those who pre-pay in advance.

Dan KR4UB, followed up with additional detail and encouraged those planning to attend to pre-pay at the meeting. Additional details including the menu, deadlines for pre-payment and PayPal buttons to facilitate credit card payments are available on the [OCRA web site](#) home page.

**Presentation of the DMFA “Lid” Award** - The DFMA LID was last presented by Jack, KM4MBG to Jimmy, KF4KHU for his generous gift to the club of the new Optoma projector and for his IT work to upgrade and maintain the DFMA website.

**Door Prizes** - Door prize winners selected from the attendee sign in sheet by a random number generator program were as follows: Flashlight - John Book, 1st time attendee; Socket Set - Detlev, KM4LKN; and Project Box - Paul, N2ZXF.

**Program:** The program presentation was by John, KX4P on the restoration of a Collins KWM-380 transceiver. John first gave away a number of “Dots & Dashes”, the official publication of the Morse Telegraph Club, Inc.

The presentation kicked off with a short video of a CW contact using the KWM-380 along with an iambic keyer to a South America station. John also mentioned a KWM-380 restoration article published in August 2019 QST, noting that one who has worked on, and also operated that radio extensively would reveal a lot more about the KWM-380.

John then recounted the history of his unit, noting that it was a 1980 purchase from a total run of around 1600 KWM-380s manufactured from 1979 to 1983. This radio was considered to be the crowning design achievement by founder Art Collins (1909 - 1987) given the level of sophistication incorporated into a 1979 era design. The unit uses a PLL synthesizer VFO with an accuracy of 10Hz with no drift. It covers the ham bands from 160 to 10M and produces 100 watts of transmit power. The design uses no tubes, and contains 6kHz filters for voice, 1.7kHz for RTTY and 360 and 140Hz filters for CW and weighs approximately 50 pounds. The radio sold for 6000 dollars in 1979 and in today’s currency would sell for 30,000 dollars. Given the price of the unit, it was probably bought by very few hams and it was speculated that many of these units were used for HF communication in embassies around the world.

There was considerable discussion after the presentation. Wilson, W4BOH noted that his 1947 Collins radio is in fine working condition and more than adequate for ham use today.

**Meeting adjourned at 8:30 pm.**

## Minutes of Last Board Meeting

### Durham FM Association (DFMA)

**DFMA Board Minutes** – 11/19/2019 – Dan, KR4UB, Secretary

**Location:** 1920 Front Street, Durham

**Attending:** (y) Jack, KM4MBG - president; (n) Jimmy, KF4KHU - vice president; (y) Lenore, KF4PAB - treasurer; (y) Dan, KR4UB - secretary; (y) Charlie, NC4CD - repeater mgr; (n) Shawn, K4CTD - AuxComm; (n) Dee, KU4GC; (y) Dave, W4SAR - Field Day; (y) Martin, KA5JUJ Link Editor; At-Large Board Members: (n) David, KW4XL; (y) Paul, N2XZF; (n) Chuck, KW4KZ; (y) Karen, KD4YJZ.

**President** – Jack, KM4MBG called the meeting to order at 7 pm with the call for officer reports.

### REPORTS:

**Vice President** – Jimmy, KF4KHU unable to attend. Jack, KM4MBG reported the program for the December meeting Christmas Dinner will be the ritual reading of resolutions from last year and asking each ham to report on their accomplishments and resolutions for the next year. Jack will present a program at the January meeting.

**Treasurer** – Lenore, KF4PAB provided the treasurer's report. There are 115 members with dues current.

**Secretary** – Dan, KR4UB - The minutes for the 11/5/19 Club Meeting was approved. Jack, KM4MBG made note that the freshly baked batch of cookies by XYL Jean and brought to the meeting by Dan was worthy of note and encouragement to all to attend a DFMA board meeting.

**Repeater Manager** – Charlie, NC4CD gave a 6m repeater work session progress report. Paul, N2XZF and Charlie found that the 440 & 220mHz radios and the 6M transmitter are OK, but the receiver has low sensitivity. Paul noted that low band GE Master IIs came from the factory set up for 1 of 6 possible frequency splits and a mismatch with the frequency to be used could be a root cause. Charlie noted possible fixes include adding an ARR pre-amp or locating another receiver board from a Virginia source. All DFMA repeaters are currently functioning OK except for a brief interruption of internet service that occurred at the Hillsborough site caused by a contractor digging in the area. A work session will be planned to clean out the Hoover Road storage building.

**Auxcomm** – Shawn, K4CTD unable to attend.

**DurhamFest** – Jack, KM4MBG announced that no one has signed up for overall coordination of DurHamFest. A decision will be made at the December meeting regarding cancellation of 2020 DurHamFest.

**Field Day Coordinator** - Dave, W4SAR reported the combined 2019 OCRA/DFMA Field Day achieved a point standing of #4 in the nation out of 3112 participants, #2 in the ARRL Roanoke Division, #1 out of 92 in North Carolina and #2 out of 290 operating in QRP class. This was an excellent result given propagation conditions.

Dave further reported on a discussion at the last OCRA meeting on running higher power (up to 150watts) at next year's Field Day. The change under discussion is in part due to expected poor propagation conditions again in 2020 given the 11 year solar sunspot cycle and, to help out in overall Field Day satisfaction in making contacts. Bruce, N1LN noted that higher power would allow the CW stations to run and hold frequencies which typically makes more contacts and others commented that higher power would be especially helpful on the phone frequencies. In this higher power class, field day rules gives a 2x point multiplier (versus the 5x multiplier for running 5 watts) and allows the use of fossil energy generators to recharge batteries. Higher power handling bandpass filters will be required. Planning for the 2020 Field Day will begin in January.

### **NEW Business:**

A motion was made and passed by unanimous vote for DFMA to sponsor a 2019 NC QSO Party award for a cost of \$50.

A motion was made and passed by unanimous vote for December annual Christmas dinner to be free for members plus one guest. This meeting is in the spirit of the gathering and giving thanks. All are encouraged to contribute whether it be to the Toys for Tots, donations to the Food Bank of NC, the Durham Rescue Mission, or other preferred charity. Toys should be unwrapped; or if wrapped; the gender and age range of the gift should be noted.

Jack, KM4MBG brought up the following new business items for discussion:

- With Jimmy, KF4KHU current illness, temporary help is needed to provide interim support in keeping the DFMA website current.
- He has been contacted regarding a suggestion to reschedule the DFMA DMR net to be held either before or after the regular Thursday night DFMA Auxcomm/Club net to encourage more participation on the DFMA DMR repeater. After some discussion it was felt that having the shorter DMR Net begin at 7:30PM followed by the longer running Auxcomm/Club net at 8pm would be the best option.
- The club needs to have a discussion regarding the future of the DFMA MCU considering the lack of volunteers to maintain the vehicle and recurring cost. This discussion will also need to address an alternative to the accommodations it provides for Field Day.

The meeting was adjourned at 8:15 pm.