



*North Fulton  
Amateur Radio League  
NFARL eNEWS*

*January 2020*

*Over 40 Years Promoting  
Service | Friendship | Education | Fun*

[www.nfarl.org](http://www.nfarl.org)



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***President's Corner / John Norris, N4IHV***

Here we are in a very special year, 2020. The last time you would have seen this number comparison would have been 1919.

Not many will remember that period. Think of all that has changed since then. Things seem to be moving like squaring a number.

We are the beneficiaries of amazing advances in technology in our everyday life and especially ham radio. What a time to be alive and experience so many wonderful changes. Think of how many advances have occurred by ham entrepreneurs and where it might go from here. If you dream it, you or someone will probably make it. Let's make our imagination become a driving force for NFARL and watch where it can go.

[The Orlando Hamcation](#) is coming up February 7-9th. I am going to be in Florida for a visit to relatives during that time and plan to make a side trip to Orlando on the 7th. I am looking forward to the visit and hope to see some of you there.

I hope to see you Tuesday night January 21, 2020 at the club meeting.

Thanks,  
John Norris, President  
N4IHV



## January's NFARL Jr. Meeting: VOMs



The very popular NFARL Jr meetings resume at 7 PM on Tuesday, January 21<sup>st</sup>, directly before the regular monthly NFARL club meeting. NFARL Jr is a hands on program for young people interested in ham radio, licensed or not. The students meet in the same building as the regular club meeting but in an adjacent smaller room.

The topic of this month's NFARL Jr. meeting is **Volt-Ohm meters** – what they are, what they do, and how to get reliable measurements from them. Jim Stafford, W4QO, states that he plans to have enough VOMs that each student will have his/her own device to work with.

Please encourage the ham interested young people in your life to this month's NFARL Jr. meeting!

In February, the topic of the NFARL Jr meeting will be **robots!**

### *Some Possible Amateur Radio New Year's Resolutions*

*Chat on the NFARL repeater more often: 145.470*

*Invite a friend to a NFARL club meeting*

*Practice Morse Code!*

*Mark Field Day on your calendar  
(June 27-28)*

*Introduce a youngster to ham radio*

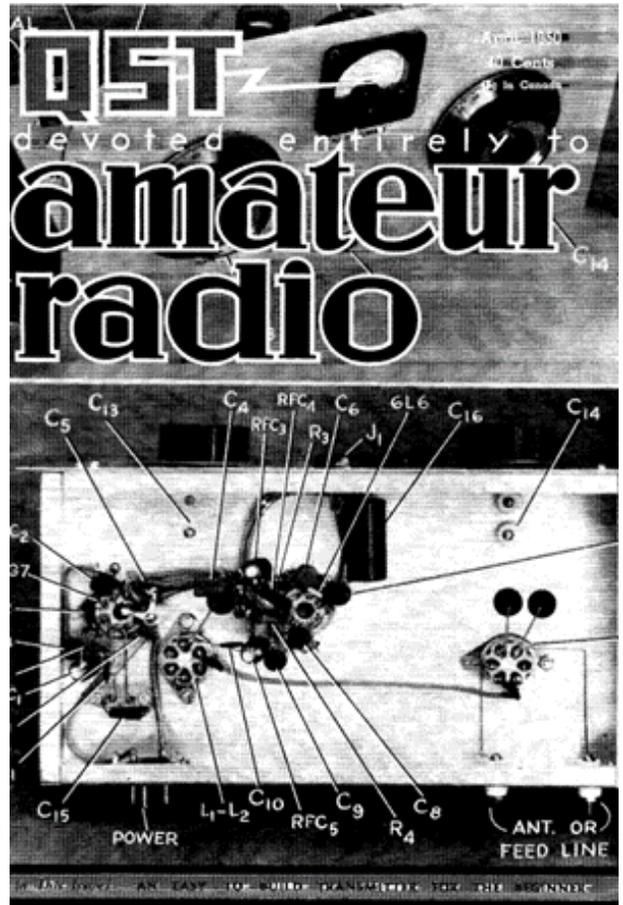
*Contribute an article to eNews!  
(Email [enews@nfarl.org](mailto:enews@nfarl.org))*

## More Stuff from the Ol' Man / Jim Stafford, W4QO

I do like reporting on old stuff which I find in old issues of QST. Many of the things I find are still applicable today or may be of interest from a historical standpoint. This month I'd like to concentrate on a single issue of QST.

I hope you are a member of ARRL because you have access to all of the old issues of QST or, maybe I should say, all the articles from QST from the beginning until this decade. Just go to: <http://www.arrl.org/arrl-periodicals-archive-search> Log in with your member access. If you've not set up an account with ARRL and are a member, then you should do this if for no other reason that access to old articles.

Ok, let's look at this one issue – QST April 1950. I have found this issue particularly interesting and I think you might as well. See the cover at right? There seems to be some kind of construction project pictured. Yes, this is a photo from the project on page 14 entitled: A Two-Stage Transmitter for the Beginner. It describes a two tube rig using a 6AG7 and a 6L6/6V6/6F6 tube for up to 35 watts INPUT. That's the way our power limits used to be described in those days because almost no one had a meter to measure power OUTPUT! Now our rules say OUTPUT because almost everyone has a meter to do just that! All three of the L, V, F tubes were interchangeable in exactly the same socket layout but with different amounts of plate dissipation.



Without going into too much detail on each article (you can look it up, right?), here is the next one I'd refer you to: Coupling Unbalanced to Balanced Lines. Don't you agree that this is still a common question today? Cary, W3OCZ, covers this subject, before there were toroids to make things easier/smaller. I actually have a Heathkit unit that does this with air wound coils which he describes in his article.

There is coverage of Welding Aluminum with a Blowtorch by W3MTE! We'd use a propane torch today but the info is still useful, and you thought this was a modern day technique!

There is an article on Armed Forces Day operation. This was right after WW2 and so there may have been more interest in this but we still have an Armed Forces Day in current times. It's held in May and this year, I worked NSS on two bands. You do this "cross band" so to speak. They are outside the ham bands and they listen inside the ham band to a certain frequency. It's fun and they have special QSL cards they send out. Hmmm, I have not received mine for 2019 as yet. By the way, NSS is the Naval Communication System. [https://en.wikipedia.org/wiki/NSS\\_Annapolis](https://en.wikipedia.org/wiki/NSS_Annapolis) Very interesting!

## ***More Stuff from the Ol' Man (continued)***

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There is a report on scores on the Ten-Meter WAS Contest and the November Sweepstakes. The one you'll want to read, however, is 50 Years of Progress – A Report on Amateur Radio by Larson E. Rapp, WIOU. The sidebar says that they are fortunate to have Mr. Rapp report on this but not all the material can be reported due to national security interests! If you read it, you can probably guess why! Page 48

There is a short piece on building a 2M beam antenna (low cost) on page 52. It's in the column called The World Above 50 Mc. which still appears today. Anyone for a 2M Yagi? Still good stuff!

Not anymore, but there used to be Station Activities from each section, each month. It took up a lot of space and we only wanted to look at our own section. Back then Clay Griffin, W4DXI, who a lot of my friends had met, was the Section Manager for Georgia. David Benoist, AG4ZR, is now and a friend of NFARL. But Clay reported such things as GT Radio Club, AQL, is planning to handle lots of traffic during Engineers Week. Notice how he didn't say W4AQL because at that time, everyone was a W4! The AQL club will be on 7110 kc between April 25th and 30th. Lanier High School, W4PFA, has a new station on 28 Mc with a beam on a 60 foot steel tower (so working with schools is not a new thing, eh?). KSZ is rebuilding with an 813 final (whatever that means – I know what it means – do you?)

Of course, when looking at a real copy of QST from April 1950 you get to see the ads! There is a full page ad by General Radio Co. featuring their VARIAC. In case you do not know, this is an autotransformer that will allow you to output 0 to 130 volts. It lists nine reasons why you need one. I have one or two and I didn't know all these reasons! Lots of ads for televisions. For example, a National Company has a 16" TV for \$189.95. This is over \$2,000 in today's money! And that was "less picture tube". Yikes!

Eldico was advertising their TR-75, a Morse code transmitter that had in input of 75 watts. This is a kit and sold for \$34.95 or \$370 today. Or with TVI components, \$44.95 complete! Interestingly enough, the Astatic Co was offering the D-104 microphone which I think is still available today. Talk about enduring! Burstein-Applebee (a name that caught my eye in 1958) was selling surplus WW2 stuff such as a 6 volt dynamotor. I doubt if most of you have a clue on this one. You shove 6 volts into it and you get out 425 volts at 375 MA! At this level, the input current is 47 AMPS! Great for your tube mobile unit. And at a cost of \$9.88!

Lots of ads for radio schools. Cleveland Institute of Radio Electronics has a full page ad which suggests they can help you get your commercial license from the FCC and earn \$3,000 to \$7,500 per year. Seems like a small amount but that would be \$31,500 to \$80,000 today.

Unfortunately, you cannot get the ads from the archives available at ARRL. So come by and check out a hard copy of April 1950 QST to look at for yourself. Although this issue is not available, you can go to this page to see most of the early issues up through 1949: <https://www.americanradiohistory.com/QST.htm> And there are lots and lots of other magazines from the past on the American Radio History site. Try it!



Join or renew your ARRL Membership on the NFARL Mart by clicking [here!](#)

## **Extra Extra! / From the Extra Class Question Pool**

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New info for Technicians and Generals and a refresher for Extra Class Licensees!



**E2D01 — Which of the following digital modes is especially designed for use for meteor scatter signals?**

- A) WSPR
- B) FSK441
- C) Hellschreiber
- D) APRS

*See answer on the last page!*

## **Contest Corner**

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- 1/18/20 to 1/20/29 [ARRL January VHF](#)
- 2/01/20 [Minnesota QSO Party](#)
- 2/01/20 to 2/02/20 [Vermont QSO Party](#)
- 2/08/20 to 2/10/20 Young Ladies' Radio League [YL OM Contest](#)
- 2/10/20 to 2/14/20 [ARRL School Roundup](#)
- 2/15/20 to 2/16/20 [ARRL International DX— CW](#)

## **We Remember**

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Keith Plossl, K4KRX, became a SK on January 14, 2020.

Keith served as one of NFARL's past club librarians and he designed and built the mobile book cart for the club library.

**K4KRX**



Da Marietta Moose

## ***Amateur Radio inspires roll-your-own projects (Part 1) / Warren Merkel, KD4Z***

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Being a ham isn't just about talking to other people using radios or computers. We all know that cell phones and email make that task trivial and mundane. So, why do we still find ham radio interesting? The technology involved? Sure! The camaraderie? Of course! How about inspiration to create something new, build something you need, or solve a problem you have? You bet! Hams are the first Makers, or home-brew creators. Hams have a long history of inventing new technologies that benefit the Art.

FCC Part 97.1b clearly states under Basis and Purpose that "Continuation and extension of the amateur's proven ability to contribute to the advancement of the radio art". It is our calling! It's part of the deal. For me, ham radio first interested me as another outlet to explore electronics. Our FCC Part 97 license grants us permission to build and operate things that (within the rules) transmit radio signals! So cool!

So you may not think of yourself as an inventor or be able to create something useful or interesting. No problem, you can always build or reproduce something that others have created and still get a feeling of accomplishment. A great way to start learning electronics is to build simple electronic kits. You learn the basics of identifying electronic parts by the tactile method! Truly a hands-on experience. By following the instructions, you're able to assemble something that actually works, and possibly does something useful for you. Or maybe you just learn how to solder things properly. It doesn't matter! You get to create something from nothing.

Where to start? Well, our club is about to introduce a very simple kit that anyone can build with only basic knowledge and simple soldering tools. It's a Code Practice Oscillator (CPO) kit that's perfect for beginners. Jim Stafford, W4QO, cooked it up as a way to teach the young folks how to solder. Young or not-so young, this kit is very easy to assemble and it will be C-H-E-A-P!

Stay tuned for future announcements regarding availability. By the time you read this, a bunch of folks will have already had a chance to build the CPO kit at [TechFest 2020](#). We used it to teach simple soldering techniques. When completed, it flashes an LED and beeps too. What's not to like about that?

Where am I going with this? Inspiration. For the last year, I've been cooking up a project that will be offered as a kit. Inspired by a need to remotely switch my antennas, I first began designing something to solve that problem. But as time went on, the design got more and more complicated.

Wait. Not complicated, just more and more comprehensive.

However, all along I envisioned that this project might be able to be useful to others. That means it should be reproducible. That also means it should be designed using printed circuit boards (PCB) – not just wired up using a prototyping board. Without a PCB, it would likely be a one-off design.

Well, it has been a while since I played around with PCB design software, so that would be a challenge all by itself. I had used the free version of Eagle PCB design software before, but never actually designed something useful. Nor did I get a chance to send the resulting designs out to be manufactured.

## ***Roll-your-own projects (Part 1, continued)***

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All new ground here! A quick Internet search turned up many options, but one viable option looked to be KiCad (<https://www.kicad-pcb.org>). It turned out to be a really good choice, and it is Open Source so it is also FREE to download and use.

A few YouTube videos later and I felt confident that I'd be able to use it successfully to design and create a printed board suitable for my needs. To do justice to this subject, I'll have to write another NFARL eNews article describing the journey to PCB stardom.

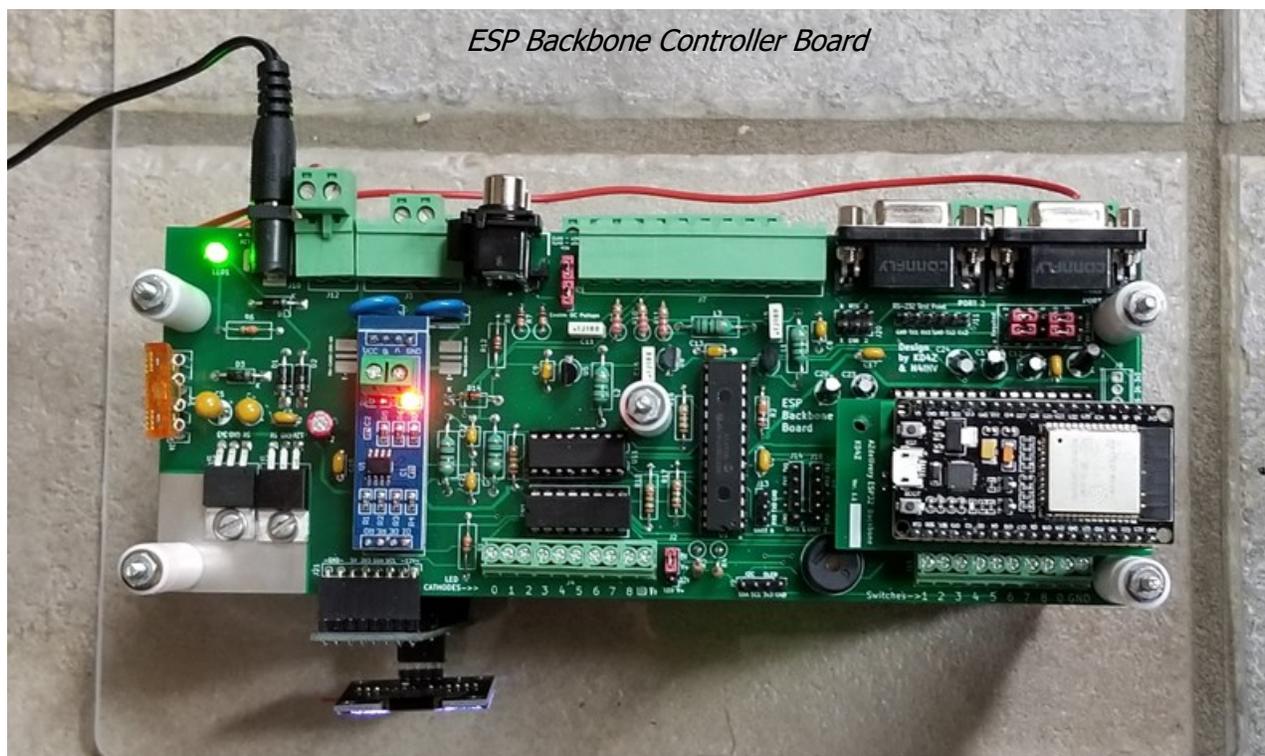
Jumping back to the present, I'll briefly describe what my design turned into. It certainly takes more space than available in this issue, so I'll just touch on the design goals for now which were:

- 1 – Create a specialized device that smartly controls antenna switching systems.
- 2 – It must be remote controllable.
- 3 – It must be programmable by the end-user with an easy to use interface.
- 4 – It must be reproducible so others could make one.
- 5 – It should have a lot of inputs and outputs, making its usability as broad as possible.

Why did I need this thing? I had a problem to solve! John Norris, N4IHV, and I started banging out ideas over lunch (BBQ of course) and many napkin sketches later, a concept was hatched.

Initially, I needed a way to have my antennas disconnect from the station when not needed. I have the ability to remotely operate my HF station via the Internet but to do so, I was forced to keep the antennas connected to the system. Although I have decent surge protection on all coax entering the shack, it seems prudent to have a way to electrically disconnect the feed lines when not in use.

For as long as I can remember, I've been a creator, builder, inventor if you will. This problem needed a solution! I present the ESP Backbone Antenna Controller.



# Roll-your-own projects (Part 1, continued)

The main component of the system is the controller board itself. It provides most of the glue hardware to interface the main processor module to the outside world. There are many inputs and outputs brought out to connectors. Various buffers have been implemented for the RS-232, RS-485 ports and the analog pins. There are also power supply regulators onboard to provide the +3.3 and +5 volt rails.

The small circuit board in the lower right corner is actually a commercially available ESP 32 development module. That's the CPU or processor chip where all of the programming logic is executed. The ESP32 is low-cost system on a chip microcontroller that supports WiFi and Bluetooth. Having WiFi on-board means it can connect to a network to download or serve up information using a simple web browser interface.

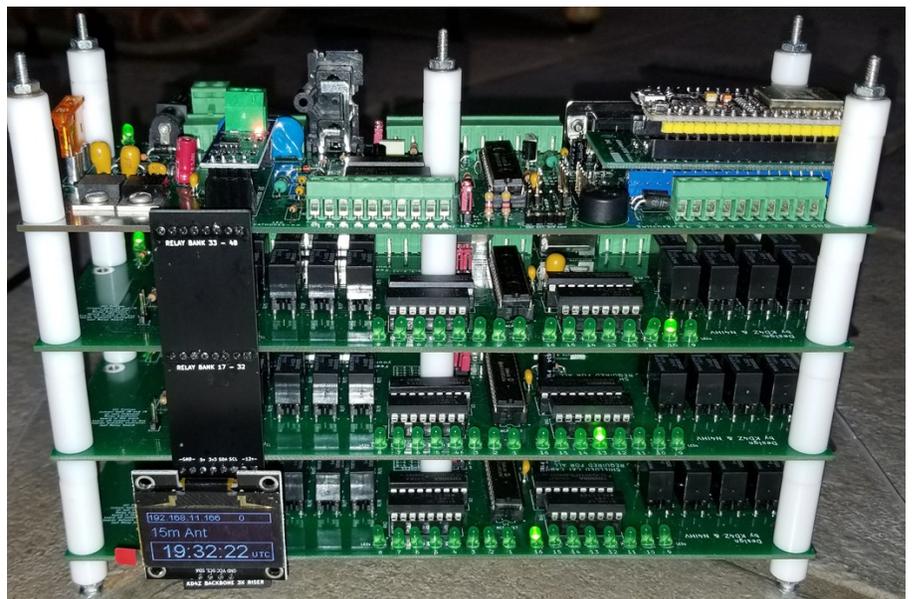
Actually, this board could be described as Software Defined Hardware, if that was a thing. The ESP32 is really a very small computer and, as such, needs a program to define what it actually becomes. An Arduino is another such controller. The interesting thing is that the ESP32 can be programmed using the Arduino IDE, just like the Arduino boards. Programs (aka sketches) are compiled and downloaded into Flash memory on the ESP32 module.



Since one of my goals was to provide lots of outputs, a separate PCB was designed to support expansion. This is the relay expansion board. It contains 16 output relays and a bus controller chip, allowing individual control of each output using only two signal lines. Each relay board can be assigned one of 4 unique addresses. Thus, when stacked up four high, the antenna controller can support up to 64 relay outputs in total.

When three relay boards are stacked with the controller board, it resembles a vacation condo!

That's all for now. Stay tuned for the next installment where I'll describe the software required to make the antenna controller hardware do something useful.



Antenna Controller with 3 Relay Expansion Boards

## ***What Can I Do with Ham Radio? / Mike Riley, KN4OAK***

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I've become accustomed to the fact I'm growing older. It has taken a few years, but I'm beginning to understand that growing older is not a bad thing. One of the discoveries of the obvious that I've happened across is experience is both a good way to gather knowledge and to be entertained. I recognize Ham radio as an area of experience that fits nicely into this scenario.

About a decade or so ago, I started to take time at the beginning of each year to spend time reflecting on how I was doing and what I might do next in my life. Esoteric as this may seem, this has become a habit. Here I am at the beginning of a new year and wondering what I can do next. This caused me to think about how many of the blessings, positive and negative experiences, the ways things I do and such impact my life. One series of thoughts and questions led me to ponder how does this "subject or experience" impact me? So I've started making simple lists which I'm storing in the back of my mind for the moment, to help me take advantage of my learnings in life so far.

Turns out Ham radio is one of the experience areas that I'm enjoying and learning from. I've only been licensed for a short time, but it seems much longer because I feel like participating in the realm has been very rewarding to me. Besides the opportunities to refresh the scientific aspects and knowledge, I'm getting a big kick out of watching and participating in the social and organizational aspects involved as well.

Being nominated and elected as the 2020 NFARL Activities Chairperson is a big deal and honor to me. This opportunity gives me a great platform to see what I can do to help the NFARL club and others by using Ham radio along with other capabilities and skills, to create valuable and enjoyable experiences. So, I've set a goal for myself to identify several critical points or methods in which Ham radio helps me experience and enjoy what I'm doing. I'm undertaking this personal challenge so I can learn ways to help myself and others further enjoy life.

Part of this challenge comes from my belief that I can help the NFARL club have a great year by trying to excel in my role as Activity Chairperson. I look at this role as my opportunity to serve you, the NFARL club members, in providing assistance to you so you are able to enjoy your experience and entertainment from NFARL membership. **In order to make this happen I'm asking you to let us know what might be some of the things you'd like your Ham radio experiences during the upcoming 12-18 months to provide you.** Ask yourself how Ham radio might create benefit to you in terms of knowledge obtained, experiences undertaken, satisfaction received from your effort and participation, in things you do during your routine day or how you envision your planned activities. Let us know so we can give you an opportunity or assistance in enjoying your experiences and learning.

During the next few months the NFARL executive team will be looking for your input to help make your Ham related experiences and NFARL participation valuable. At our January meeting you'll get a chance to participate in a survey organized by Jim Kauffman, W4IU, and the team. Or, you can send an email to any of the club officers to share your ideas and thoughts.

We look forward to hearing from you!

73,  
Mike Riley KN4OAK

# NFARL Upcoming Events and Dates

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- **Every Sunday — NFARES net** - 8:30 PM - 147.06 MHz (+) PL 100  
All licensed hams are welcome, you do not need to be an ARES member!  
Check [NFARES.org](http://NFARES.org) for more information.
- **Every Monday — Tech Talk** - 8:30 PM - 145.47 MHz (-) PL 100  
NFARL's flagship technical based "non check-in" net. The net is always better when using the web based chat room but Internet is not required to join the net.  
Check NFARL Nets [website](http://website) for more information and "how to".
- **Every Wednesday — Hungry Hams Lunch Bunch** - 11:15 AM  
Location: Slope's BBQ, 34 East Crossville Road, Roswell, GA 30075  
Meet with your fellow club members every Wednesday!
- **Every Thursday — YL OP Net** — 8:00 PM - 9:30 PM - 145.47 MHz (-) PL 100  
Check NFARL Nets [website](http://website) for "how to." This is a great opportunity for YL's to get on the radio with other YL's! OM's (guys) are welcome to listen in to this YL net.
- **Every Saturday — Royal Order of the Olde Geezers Breakfast** - 9 AM  
Location: Reveille Café, 2960 Shallowford Road, Marietta, GA 30066 You don't need to be old or a geezer to join this breakfast get-together, everyone is welcome!
- **Second Tuesday — NFARES Meeting** - February 11, 2020, 7:00 PM - 9:00 PM  
Location: Fellowship Bible Church, 480 W. Crossville Road, Roswell, GA 30075  
Check [NFARES.org](http://NFARES.org) for more information.
- **Second Saturday — VE Testing** - February 8, 2020, 10:00 AM  
Location: [Alpharetta Adult Activity Center at North Park](http://Alpharetta Adult Activity Center at North Park)  
13450 Cogburn Road, Alpharetta, GA 30004 NFARL provides amateur (ham) radio test sessions! All exam modules are offered at all sessions. Walk-ins are welcome, no appointment is necessary. For more information please see our [website](http://website).
- **Third Tuesday — NFARL Club Meeting - January 21, 2020, 7:30 PM**  
**NFARL Jr. Youth Meeting from 7-7:30 PM**  
**Social gathering 7-7:30 PM**  
Location: [Alpharetta Adult Activity Center at North Park](http://Alpharetta Adult Activity Center at North Park)  
13450 Cogburn Road, Alpharetta, GA 30004
- **Fourth Tuesday — NFARL Executive Team Meeting** - February 25, 2020, 7:00 PM  
Location: [Arbor Terrace at Crabapple](http://Arbor Terrace at Crabapple), 12200 Crabapple Road, Alpharetta, GA 30004  
Meetings are open to all NFARL members. Space is available on a first arrival basis.  
Please contact the [President](http://President) to ensure available space.
- **Saturday January 18, 2020** from 9 AM—2 PM — [Techfest](http://Techfest) at Gwinnett Medical Resource Center
- **January 25-26, 2020—[Winter Field Day](http://Winter Field Day)!**
- **June 27-28, 2020 — Field Day!**



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## **North Fulton Amateur Radio League**

P.O. Box 1741  
Roswell, GA 30077

[nfarl.org](http://nfarl.org)

eNews can be located online at:  
<https://www.nfarl.org/enews/eNewsIndex.html>

## Club Repeaters

Frequency—Description	P.L. Tone	Location
145.470 (-) EchoLink Node 560686 NF4GA-R	100 Hz	Morgan Falls
147.060 (+) Primary ARES Repeater	100 Hz	Roswell Water Tower
* 224.620 (-) Joint Venture with MATPARC	100 Hz	TBD
443.150 (+)	100 Hz	Roswell Water Tower
444.475 (+)	100 Hz	Morgan Falls
* 927.0125 (-)	146.2 Hz	TBD

\* Currently off the air

**Club Callsigns: NF4GA and K4JJ**

**Extra Extra answer: B** (question E2D01)

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