HamJam 2022/ Mike Riley, KN4OAK & Bill Cobb, K4YJJ

The day started with a bit of fog, but the sun broke through before the event began. It was a harbinger of how things would proceed. HamJam 2022 was full of pre-event uncertainties. We were operating from a new venue. Would the facility provide a satisfactory location for the positive audience experience? The club had lost its “Ham Event” roadside signs. Would the new replacements be available on time? Would we have enough coffee and bottled water on hand for refreshments? Would the person in charge of the “ticket barrel” remember to bring it to the venue? Would the presenters show up? What about the audience? Would they show up?

While the weather didn’t turn out perfect, by all accounts HamJam 2022 turned out to be great! We had a large audience who was engaged in the presentations, three great speakers, and a list of fantastic prizes. As it turned out, there were sufficient coffee and refreshments, too!

We had three fantastic speakers, beginning with Joe Eisenberg, K0NEB. Joe provided a concise overview on what is involved with selecting and building an Amateur Radio related kit from the simple to complex. Great tips and insights were provided. Thanks to Joe for the beneficial information! A special thanks to Wes Lamboley, W3WL for making sure Joe enjoyed his visit to North Fulton.

Next, TJ (Thomas) Hardin, KO4FFA let the audience know about his 2022 DX adventures and his ARISS involvement. While TJ has been licensed for only a few years, he’s on his way to making some impressive DX achievements. TJ and his Dad traveled from the Augusta, GA area to participate in HamJam. We look forward to future Amateur Radio involvement from TJ and his Dad, Thomas Hardin, KO4HKC.

Steve Goodgame, K5ATA, provided the audience an informative overview on efforts Amateur Radio clubs can undertake to increase their involvement and engagement of youth. Steve’s presentation provided a high level of audience engagement, driving lots of questions and helpful discussion. Steve’s effort to participate in HamJam is very much appreciated!

In its 14th year, HamJam 2022 proved successful once gain. Thirty-eight raffle prizes, over 1700 tickets sold, and all proceeds donated back to Youth, Education and Scholarship Activities. HamJam 2022 was successful due to all those who worked behind the scenes to make it happen as well as those who participated in the raffle and live audience. Thank you all for your efforts and involvement! We look forward to seeing you again at HamJam 2023!
HamJam 2023 / continued from page 1

NFARL President John Norris, N4IHV opens HamJam with a review of its history.

NFARL Treasurer John Tramontanis, N4TOL, Vice President Mike Riley, KN4OAK, and HamJam Chairman Wes Lamboley, W3WL chat with a guest at the raffle ticket sales booth before HamJam.

Joe Eisenberg, K0NEB explains the story behind his hat.

HamJam Chairman Wes Lamboley, W3WL, and friends enjoy John N4IHV’s opening remarks.

NFARL President John Norris, N4IHV, and Activities Chairman Steve Randall, KO4VW chat with a HamJam guest.

Craig Bailey, N4CN, Yusef Abd al Rahman, K4KHO, Robert Davis, KJ4AFG and others listening in.
HamJam 2023 / continued from page 2

TJ Hardin, KO4FFV

Ted Macklin, K4MPM asking TJ, KO4FFV a question about youth involvement in Amateur Radio

Fred Moore, N4CLA & Roger McGee, K4RNM

Steve Goodgame, K5ATA

HamJam 2022 audience

Steve Goodgame, K5ATA discussing the importance of creating engagement for youth in activity programs

John Norris, N4IHV expanding on the importance of incorporating Amateur Radio technology into school curricula

You can see more HamJam 2022 photos here: https://nfarl.org/web_galleries/HamJam_2022/
President’s Corner / John Norris N4IHV

NFARL November, 2022 President’s Message

We had an excellent time at the Stone Mountain Hamfest. The Saturday crowd was large and they were buying. We sold a lot from the Gary Bush Estate and provided Freeda Bush a nice sum of received funds. Freeda wants everyone to know she is very thankful for NFARL for help with Gary’s estate. Reflecting on this, I think it is a perfect time for us to celebrate Thanksgiving. It is such a good feeling to see the results of how NFARL helps people. It makes one realize the truth of giving has greater return than receiving. I hope everyone has a wonderful and safe Thanksgiving.

HamJam 2022 was a real success. We had great speakers and amazing prizes. Thanks to everyone who worked so hard to make it possible. A years’ worth of effort paid off and has once again given us the opportunity to give to programs and scholarships for our youth.

Christmas and other year end holidays are almost here and NFARL invites you to our Holiday Dinner Party on December 17, 2022 at our regular meeting place. The event begins at 7:00 PM, food is great and the fellowship will make your evening wonderful. Make your reservations at our web site in the Mart (nfarl.org). We always have a good time together and find out who is the Ham of The Year. The party takes the place of our regular monthly meeting in December. The directions are on our web site.

I thank everyone for participating in our meetings and activities. Without each of you NFARL would not exist.

73,
John Norris, NFARL President
N4IHV

NFARL CPO Kit Update- / Mike Riley, KN4OAK

Have you or someone you know built one or more of the NFARL Code Practice Oscillator Solder kits? If you haven’t, please consider doing so by placing your order on the Mart. For $10.00, you get this fun device that you can share with a child, relative, niece or nephew, or anyone else you choose. They make great Christmas stocking stuffers! Another benefit– you get to be one of the growing population of folks who have purchased one of these kits and you get to help the NFARL YESA fund as well!

We’ve sold nearly 350 of these kits since they were introduced. What a great way to give back to youth education and scholarship activities!. Order your next batch today at: https://nfarl.org/mart/code-practice-oscillator-kit/ so you’ll receive them in time for Christmas giving. If you can pick the kit up at Hungry Hams or another NFARL event, you’ll be able to save the price of shipping. Just mark your order for local pickup when you check out of the Mart.
I hope everyone has their tickets for the 2022 NFARL Holiday Party. If not, go to the NFARL Mart and get them now before it's too late!!!! The party will be held on December 17th at 7:00 PM and advance reservations are required.

Our 2021 event proved to be a fun time. We heard a rumor that Santa’s doppelgänger was present, along with all the others who enjoyed themselves. Someone took pictures to help us remember the event! Make sure you make your reservations and join in on this year’s celebration!

The Holiday Party takes the place of our December club meeting as well. It is when we wrap up our year and start getting ready for the next one. There will be prizes and recognition of members. Come and celebrate NFARL’s 45th year as a club and the coming of the next one. A great meal will be served by the same caterers we had last year. You might even be able to get a go box if there is any left!!! This party is for all members and their families, and even non-members if you’d like to join us, regardless of which faith you choose. Join us for a wonderful time and great fellowship. It will certainly be better if you are there.

The party will be at Preston Ridge Community Center, 3655 Preston Ridge Road Suite 100. Alpharetta, GA 30005. This is the same location our regular Club meetings are held. The event begins at 7:00 PM. Tickets are $18.00 per person and they are available on the Mart: https://nfarl.org/mart/holiday-dinner-party-reservation-2022/. I look forward to seeing you there!!!!!

Steve Randall, KO4VW
Activities Chairman
**November VE Testing / Wes Lamboley, W3WL & Mike Riley, KN4OAK**

We’re happy to note that our November VE Amateur Radio license test session was able to be held at the same physical location as HamJam 2022! This made it easier for all who participated to readily join the HamJam event after completing their test activity. Thanks to the staff at the Preston Ridge Community Center for helping make this happen!

Speaking of test completion, all of the November candidates successfully achieved their test objectives. One candidate, Ray Kasprowicz, used his skill to achieve a “hat trick”! Ray passed his Technician, General and Extra exams!

Please reach out and congratulate these folks when you next meet them!

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<tr>
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<td>Ken Merry</td>
<td>KQ4DED</td>
<td>General</td>
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<td>Ray Kasprowicz</td>
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<td>Steve Haynes</td>
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<tr>
<td>Jeffrey Escoria</td>
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Volunteer Examiners check and score the license exams

**NFARL eNEWS Editor NEEDED- / Mike Riley, KN4OAK**

Beginning in January 2023, our NFARL eNEWS Editor will be taking on some new opportunities. This will cause a significant risk to on-time delivery of the NFARL eNEWS newsletter. As a result, the NFARL Executive Committee is requesting assistance from club members to identify and recommend candidates interested in taking on the eNEWS Editor role. This role is an important part of the NFARL Club operations. The role is supported by several members of the Executive Team to help with the creation and delivery of the monthly newsletter.

If you are interested in understanding what the role entails at a detail level, for the purpose of serious consideration in filling the role, please contact Martha Muir, W4MSA at mamuir@mindspring.com, Stave Randall, KO4VW at KO4HVW@gmail.com or Mike Riley, KN4OAK KN4OAK@nfarl.org at your earliest possible convenience.

Thanks in advance for your consideration in this matter.

73,

Mike Riley KN4OAK
The Tale of the Accu-Keyer

If you are an old-hand CW op you may know of the WB4VVF Accu-Keyer. Or, maybe you don’t. But if you have ever used a paddle to send some CW, then Jim Garrett, WB4VVF, probably had an effect on the way you sent.

Lengthy erudite papers have been written about the nuances of electronic keying. The attributes of VVF keying (sometimes called “Accu-Keying”), Curtis keyer chip keying, Mode A and Mode B keying, etc. are still being debated decades after their creation. The details involve how dots and dashes are completed, whether the keyer has dot and dash memories, how it toggles those, etc. Personally, I think the best version of iambic keying (aka “squeeze keying”) is the one you are used to. You can read about the subtleties on the internet. This article is about the story of the Accu-Keyer – not the technical details.

The Accu-Keyer was published in the August, 1973 QST. At that time, the transition from discrete transistors to rudimentary ICs (integrated circuits) was in full swing. Jim Garrett, WB4VVF, a SSB-only operator, decided to build a keyer using logic ICs - something that to my knowledge had not been done before. Duke Contini, N4SA (sk) was a CW op and collaborated heavily. Jim, Duke and I worked for Martin Marietta in Orlando at that time.

There had been prior keyers to be sure. The first electronic keyer to appear in QST (April, 1940) used vacuum tubes – the transistor had not yet been invented. The author was W2ILE, Harry Beecher. A lot of Beecher’s circuit wound up in subsequent keyer designs.

A milestone keyer was the “TO Keyer,” devised by Jim Ricks, W9TO, working together with Hallicrafters. Hallicrafters offered the keyer for sale – the model was the HA-1. Ricks held a patent for the circuit. Thousands were sold. So many, in fact, that 60 years later they are still easy to find on eBay and at hamfests. The HA-1 is shown in figure 1. Note it says “T. O. Keyer” on the front panel. As with Beecher’s design it used vacuum tubes and was not iambic. It completed dots and dashes and that was it. Connected to an iambic paddle and with both contacts closed, an HA-1 will send a continuous string of dashes, although not by design. Squeeze keying was mostly unknown when the HA-1 entered the market in 1960.

W9TO was generous with his design. He readily gave the schematic to anyone who asked. The schematic was also in the back of the HA-1 manual. Doing research for this article I was surprised to discover the TO Keyer was never described in a published article. I wanted to read the original article – there isn’t one!

Continued on page
I would guess that for every HA-1 Hallicrafters sold, one or more (many more?) were home-brewed. The parts were easy to get and this was the era of DIY ham gear.

Beyond the Accu-Keyer’s ground-breaking use of ICs to implement iambic keying, Jim broke ground in another way. To my knowledge, The Accu-Keyer was the first QST article to offer one or more parts for sale by the author. The article ended with: “A ready-made circuit board is available from the author for a cost of $3.50.” Note, the PCB was available from Jim, not the ARRL.

I wondered at the time and am still a little surprised the ARRL allowed the PCB to be sold by Jim. But that happened and it had a significant financial impact at WB4VVF. Jim went on to sell over 20,000 PCBs and most of the $3.50 price was good-old-fashion profit. You can do the math – that was a lot of money in the mid-1970s.

As publication approached and mindful the PCB offer would be at the end of the article, Jim decided to go out on a limb and have a small quantity of PCBs made. How many? The initial order quantity was “all I could afford to lose,” which was 200 boards. Jim and Duke had a friendly $1 bet that 100 PCBs would/would not be sold by Christmas, 1973 (the QST article would have been in circulation for five months).

Per the norm for QST authors, a proof of the article went to Jim the month before publication (July, 1973). Amazingly, PCB orders started arriving pre-publication! The ARRL staff and friends had seen the article and wanted to build Accu-Keyers. This was a harbinger of the immense popularity the Accu-Keyer would achieve. 100 PCBs were sold long before Christmas. Duke paid off the $1 bet. Forty-nine years later Jim still has the $1 bill.

The Accu-Keyer circuit was debugged and perfected on a breadboard Jim built using hobby board – the kind you can plug components and wires into without soldering. The breadboard was not retained – it was cannibalized for parts shortly before the first two PCBs came about.

The design of the Accu-Keyer PCB and production of the first two examples followed the typical route for roll-your-own PCBs in the 1970s.

Jim laid out the Accu-Keyer PCB on a drafting table at his home, at 4X final size. If you are not an old timer you may have trouble conceptualizing the layout process before personal computers. PCB layouts were made freehand using black tape placed on a Mylar sheet. Placement of the parts and routing of the connections was wholly dependent on the ingenuity of the designer.

The Accu-Keyer board design was simple. It was single-sided and did not use plated thru-holes. The lands did not have nice direct routes with square corners like they do today. Turning corners required bending the black tape as it went onto the Mylar. Jim took the finished 4:1 Mylar sheet to a local photography store and they photo reduced it 1:4 and returned the image as a negative.

The negative was used to expose a photo-sensitive coating on PCB blanks and then a strong etchant was used to dissolve away the copper that had not been exposed. The first two Accu-Keyer
PCBs were made this way in WB4VVF’s kitchen sink. The very first of Jim’s kitchen-sink boards is in my personal Accu-Keyer. It is a cherished possession. The whereabouts of the second PCB is unknown. Yes, I built and own Accu-Keyer S/N 00001. It is the first of over 20,000 examples.

Figures 2 and 3 show my Accu-Keyer, built to Jim’s “instructions” in late 1972. Jim’s instructions: “Here, populate this PCB and see if it works.” It worked straight-away and I’ve used in on the air for 50 years.

As mentioned above, selling Accu-Keyer PCBs became a lucrative business. Flush with “Accu-Money,” Jim used some of the funds to buy a brand-new 1985 Corvette, which immediately became known within the local ham community as the “Accu-Vette.” Jim was sometimes referred to as “Accu-Garrett.” As the years went by, Jim’s friends appended “Accu-“ to the front of nearly anything Jim got involved with. It was all in fun with Jim as amused as anyone.

Accu-collaborator Duke, N4SA, was a ham’s ham. He was an ardent DXer and contester, and was on the air whenever he wasn’t at work. Duke’s contesting led to he and Jim taking the Accu-Keyer a step further, designing one of the first memory keyers, named, of course, the “Accu-Memory.” (QST, August, 1975).

As with the Accu-Keyer, I built Accu-Memory serial number one (if you don’t count the breadboard). I regret it is no longer in my possession. I gave it to W2DNG (later W8RT) (sk) and it subsequently got passed around the North Jersey DX Association. At one point it was in the possession of Howard Wolf, W2AGW (sk). Howard sat on top of the DXCC honor roll for many years, having worked all but one. I’d like to get that Accu-Memory back! Over 4,000 Accu-Memory board sets were sold. The design required three PCBs in addition to an Accu-Keyer board. The three board set was $12 and significantly increased Jim’s Accu-Revenue.

One feature lacking in the Accu-Keyer design was a weight control. The keyer’s TTL logic formed a perfect 1:3 weight ratio between dots and dashes, determined by counting out one or three clock cycles. The 1:3 weighting was hard-wired into the design. Wanting a weight control

Continued on page
(and knowing a lot of other people wanted one) I decided to come up with something.

Jim and I made a friendly bet I couldn’t devise a simple way to add a weight control. Maybe with a major redesign of the keyer’s logic circuits it could be done, but that would be close to an entirely new keyer.

The February, 1978 QST carries my article, which the ARRL decided to publish as a “Hint and Kink,” entitled A Weigh Control for the Accu-Keyer. Jim acknowledged it worked fine. I won the bet. The weight control added two diodes, one resistor and a potentiometer to adjust the weight. None of the keyer’s circuits were modified! That’s as simple as it gets. Figure 4 shows the weight control schematic and caption as they appeared in QST.

My approach followed a predilection of mine for simple analog designs in lieu of digital ones. As an aside, here is one of my favorite stories from my engineering days. An EE working for me proposed a design for a voltage to current converter. It used an A/D converter, microprocessor complete with a few hundred lines of firmware, a D/A converter and a transistor set up as a variable current source. I had the pleasure (his horror) of telling him a resistor did the same thing. This is a true story. Oh, and you don’t have to boot-up a resistor.

So, how did I get the hard-wired clock-counting Accu-Keyer logic circuits to vary their timing? I took the keyer’s dot and dash memory outputs and fed them back to the clock generating circuit. The weight control adjusted the amount of feedback. The feedback slowed the clock down, making dashes and dots longer with respect to each other.

Note in figure 4 the bottom connection is not labeled! This oversight occurred at ARRL. Everyone eager to add a weight control to their Accu-Keyer sent me a letter asking where the bottom terminal connected. A month later a correction was published in QST, but it was buried deep in the magazine and in tiny print. The mail continued.

I got a lot of mail. It cost me many late nights typing replies and buying postage. SASEs were infrequent. Ah, the joys of being a QST author before personal computers and email.

My weight control mail however was nothing compared to the Accu-Avalanche that arrived at WB4VVF. Every one of the 20,000-plus PCB orders was a letter to open, a PCB to place in an envelope, and a check to cash. Many orders did not include an SASE. These required the extra step of hand addressing the return envelope. Mail arrived at Jim’s place in large sacks.

The mailman was curious about what might be going on behind closed doors at Jim’s nondescript residence – well, nondescript except for the 125 foot tower in the **Continued on page**
backyard. In addition to order fulfillment, every technical question and every complaint (bwwaaa...my keyer doesn’t work...why?) came and went via the USPS. The 20,000 PCB sales were not exactly “free money.”

Jim eventually turned over order fulfillment and accounting to one of Duke’s kids, who was happy to have a part-time job. For many years the Accu-Keyer created a lot of work.

The first 200 PCB order was placed with Continental Circuits of Longwood, FL. Continental was a hobby shop in 1973 and struggled with an order that size. Continental eventually went on to supply the 20,000 boards that were sold, although the company must have farmed a lot of that out. The company is still in business, at the same address. It is now PFI Inc. and it can easily fill a 20,000 board order. The Accu-Keyer helped build that company.

It’s hard to fully assess the impact the Accu-Keyer has had over the past 50 years. It revolutionized ham radio keying with the introduction of a simple IC-based iambic circuit. It might be a stretch to suggest it increased CW operating, but it certainly caused an increase in DIY construction. It also became the kernel for a lot of follow-on tinkering and design. To date, there have been 37 QST articles devoted to the Accu-Keyer and Accu-Memory; I suspect that is a record. I wrote “to date” because the Accu-Keyer lives on. A few PCBs were ordered in 2021! No kidding! The Accu-Keyer was in several editions of the ARRL Handbook in the 1970s. Some folks can’t part with geriatric Handbooks (you know who you are) and continue to build projects from the contents.

Jim and I continue to be good friends and recently reminisced about my spinning the brand-new Accu-Vette on a country road and stuffing it into an orange grove. The car had about 100 miles on it. Jim, I and the car survived fine, based on luck rather than any skill of mine. I was the first person Jim let drive it. He thought I knew what I was doing. Good times.
New info for Technicians and Generals and a refresher for Extra Class Licensees!

**E1E04**
Which of the following best describes the Volunteer Examiner accreditation process?

A. The procedure by which VEC confirms that the VE applicant meets FCC requirements to serve as an examiner
B. The amateur operator applying must pass a VE examination administered by the FCC Enforcement Bureau
C. Each General, Advanced and Amateur Extra Class operator is automatically accredited as a VE when the license is granted
D. The prospective VE obtains accreditation from the FCC

See answer on the last page!

The new Amateur Extra-class license examination question pool, effective from July 1, 2020, through June 30, 2024, has been released and is available at the National Conference of Volunteer Coordinators (NCVEC) website. Note the new Technician class license examination question pool is effective July 1, 2022.

Ian NV4C and his team hold license test sessions on the second Saturday of each month. For more information including upcoming test dates, click here.

**Contest Corner**
These are some contests and events besides the “routine K1USN, CWops, and other organizational events” scheduled to occur the near future

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<td>+ ARRL Sweepstakes Contest, SSB</td>
<td>2100Z, Nov 19 to 0300Z, Nov 21</td>
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<tr>
<td>+ CQ Worldwide DX Contest, CW</td>
<td>0000Z, Nov 26 to 2400Z, Nov 27</td>
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<td>+ Ham Spirit Contest, SSB</td>
<td>0600Z, Nov 26 to 0559Z, Nov 27</td>
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<tr>
<td>+ ARRL 160-Meter Contest</td>
<td>2200Z, Dec 2 to 1600Z, Dec 4</td>
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<td>+ ARS Spartan Sprint</td>
<td>0200Z-0400Z, Dec 6</td>
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<tr>
<td>+ ARRL 10-Meter Contest</td>
<td>0000Z, Dec 10 to 2400Z, Dec 11</td>
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<tr>
<td>+ ARRL Rookie Roundup, CW</td>
<td>1800Z-2359Z, Dec 18</td>
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NFARL Upcoming Events and Dates

- **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](https://nfarl.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 (Discord) but Internet is not required to join the net. Check [NFARL Nets](https://nfarl.org) for more information and “how to”. Here’s the link to the NFARL server on Discord web app: [https://discord.gg/spr2a9D](https://discord.gg/spr2a9D)

- **Every Wednesday — Hungry Hams Lunch Bunch** - 11:15 AM
  Location: Slope’s BBQ, 34 East Crossville Road, Roswell, GA 30075
  (770) 518-7000
  **Dining Room is OPEN. Get Take Out if you can’t stay!**

- **Every Thursday — YL Net** – 8:00 PM - 9:30 PM - 145.47 MHz (-) PL 100
  Check NFARL Nets 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 Wednesday — CW CHAT** – 8:00 PM on ZOOM.
  **New meeting link and credentials:**
  [https://us06web.zoom.us/j/84722087419?wd=VlN2d0xvQVhKcDIUL0R4N1hQMTQ2UT09](https://us06web.zoom.us/j/84722087419?wd=VlN2d0xvQVhKcDIUL0R4N1hQMTQ2UT09)
  Meeting ID: 847 2208 7419; Passcode: CW-CHAT

- **Every Saturday — Royal Order of the Olde Geezers “Breakfast”** -
  This informal breakfast group on Saturday mornings is **NOT MEETING IN PERSON** during the COVID issue. A notice will be made when in-person meetings commence again.

- **Second Tuesday — NFARES Meeting** - December 13, 2022 **Presently- Online meetings only.** Check [NFARES.org](https://nfarl.org) for more information.

- **Second Saturday – VE Testing** - NFARL December 10, 2022 session:
  **By reservation only.** See the “Test Sessions” web page for details & registration process. Contact Ian at nv4c.ian@gmail.com for questions / concerns / reservations.

- **Third Tuesday— NFARL Club Meeting** - November & December, 2022, **NO Club Meeting in November or December. HamJam & Holiday Party take their places**

- **Fourth Tuesday – NFARL Executive Team Meeting** - November 22, 2022, 7:00 PM. **Online meeting only** — monitor website and NFARL Groups.io reflector for updates.

- **NFARL Holiday Dinner Party**— Saturday, December 17, 2022— 7:00 PM
  Preston Ridge Community Center, Reservations are required. Make your reservation by purchasing tickets on the NFARL Mart now! [https://nfarl.org/mart/holiday-dinner-party-reservation-2022/](https://nfarl.org/mart/holiday-dinner-party-reservation-2022/) Reservation deadline is December 12, 2022. **Please consider bring a new, unwrapped child’s toy in original packaging for donation to Children’s Healthcare of Atlanta.**
  **Please note the Holiday Dinner Party takes the place of our December club meeting.**

### Contact Us

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<thead>
<tr>
<th>Role</th>
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<tbody>
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<td>Mentors / Elmers</td>
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<td><a href="mailto:k4wit@nfarl.org">k4wit@nfarl.org</a></td>
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<tr>
<td>ARES Liaison and Community Relations</td>
<td>Jim Paine N4SEC</td>
<td><a href="mailto:n4sec@nfarl.org">n4sec@nfarl.org</a></td>
</tr>
<tr>
<td>Repeater Operations</td>
<td>Mike Roden K5JR</td>
<td><a href="mailto:Repeaters@nfarl.org">Repeaters@nfarl.org</a></td>
</tr>
<tr>
<td>Web Master</td>
<td>Bill Cobb K4YJJ</td>
<td><a href="mailto:Webmaster@nfarl.org">Webmaster@nfarl.org</a></td>
</tr>
<tr>
<td>eNews Team</td>
<td>Help Wanted!!</td>
<td><a href="mailto:enews@nfarl.org">enews@nfarl.org</a></td>
</tr>
</tbody>
</table>

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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://nfarl.org/enews-index](https://nfarl.org/enews-index)
Club Repeaters

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

* Currently off the air

Club Call signs: NF4GA and K4JJ

Extra Extra answer: A (question E1E04)

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