The GARzette

The Official Newsletter of the Gwinnett Amateur Radio Society

June 2025 http://www.gars.org/ Volume 52, Issue 6

Inside

www.GARS.org

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TechFest
Gwinnett Amateur Radio Society

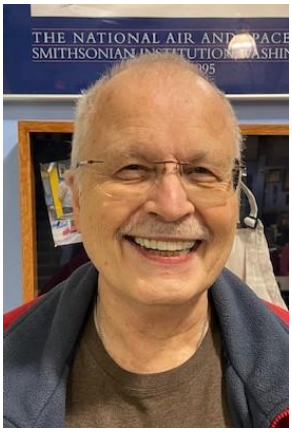
GARS January Exhibition of the Technical aspects of Amateur Radio
Held at the Gwinnett County Fairgrounds

The next TechFest is January 31, 2026

GARS Meeting: GARS Ice Cream Social at Yellow River Park
Tuesday June 10, 2025 at 7:00 PM

President's Message

From the President…



Here comers June and there is a lot going on in June.

But first lets talk about what happened in May.

The Dacula Memorial parade is one of the GARS yearly events where we provide the logistics to be sure the parade goes off without a hitch. There were at least 23 members that turned out to help. A big THANK YOU to all who helped – especially Dallas who took over as the Chairman while Earl is not available. I was going to help too, but managed to break a bone in my hand and the cast needed to stay dry – so I was a fair-weather person this year and it turned out to be dry anyway, so I lost out on it this year.

So back to June activities …

The EAA 690 Aviation group is holding a summer Camp and is asking for volunteers to show kids the ins and outs of ham radio including how to solder. It is being held on June 17th at the EAA Hanger and Joel WA4HNL is looking for some help. There is an entry in our groups.io with more information.

Field Day is coming on June 24 & 25 and for this year we are holding GARS activities at the Yellow River Park. This is a new location this year and being such may have additional set-up issues we didn't run into last year. So everyone is welcome to come in the morning of the 24th to help get things ready for our Field Day operations. We are planning on being a 8A (8 operating stations all on backup power). We are also hoping to have a GOTA (Get on the Air) station so bring along any non-hams and let them experience what we all enjoy making contacts.

As always, our June meeting is an Ice Cream Social held at the Field Day site (Yellow River Park). This year is special because Ed Henderson is going to bring his grill and we are going to have a potluck dinner before the meeting. Sign up for what you can bring for everyone to share – there is lots of open items in the list – and this is a good time to eat and enjoy the park before we have a brief meeting and then enjoy the ice cream! The link to sign up is listed later on in this GARzette and also on our gars.org web site. See you there.

73,

Bob – K4CQO
Club President / GARZette Editor

GARS Repeaters and Other Communications

2 Meter Repeaters	6 Meter Repeater	
147.075(+) MHz Tone 82.5 147.255(+) MHz Tone 107.2	53.110 (-1 MHz) No Tone	6M Operational in Buford 147.075 Operational in Snellville 147.255 Operational in Snellville 224.580 Operational in Grayson 442.100 Operational at Goshen Springs Rd, Norcross 442.325 Operational in Buford 444.525 Operational in Snellville
1.25 Meter Repeater	**Other Resources:**	
224.580(-) MHz Tone 100.0, 1.6 MHz Offset	APRS	
70 Cm Repeaters	144.390 -- 1200 Baud W4GR	
444.525(+) MHz Tone 82.5 442.100(+) MHz Tone 100 442.325(+) MHz Tone 100	D-STAR (WD4STR)	
	145.060 + (1.4 MHz) 440.550 + (5 MHz)	Link remote receivers being added

Notable Web Links

Ham Radio Glossary: https://noji.com/hamradio/glossary.php a very comprehensive listing provided by Noji Ratzlaff KNØJI. On his site there is also a lot of information about getting started in ham radio.

Need Help – Let GARS Elmers answer your questions

Send an email to elmers@gars.org with the subject listing the area (like Antennas, Repeaters, Digital, DMR etc.) of your query to get to GARS Elmer volunteers.

About the GARzette

The *GARzette* is the official monthly newsletter of the Gwinnett Amateur Radio Society, serving its members and other persons interested in the advancement of the Amateur Radio art.

Original articles, art, and photos are invited and encouraged. Previously copyrighted submissions cannot be accepted for reprinting unless permission from the appropriate publisher is provided in writing along with the information being submitted. If reprints are from publications allowing their unrestricted use, please include a copy of the printed permission contained in the publication.

If possible, bring your articles to the monthly meeting in Microsoft Word or rich text (.rtf) or text or HTML format or by e-mail to editor@gars.org. Artwork can be accepted in most any graphics format and can be submitted via e-mail to the same address. Alternate means of submittal can be arranged when necessary.

In keeping with the Amateur Radio spirit, permission is hereby granted for the reproduction of The *GARzette* articles by other Amateur Radio club newsletters provided that proper credit is given to the individual author and *The GARzette*.

The GARzette is published each month with the assistance of Karen KI4HPP and Kyle W4KDA who print copies for distribution at meetings, etc. and Dave Bruse, W4DTR, who distributes the newsletter electronically.

Deadline for submissions is the 28th of each month for inclusion in the following month's issue.
For additional information view our Website at: http://www.gars.org [PS— Articles to publish in the GARzette, either written by GARS members or published elsewhere, are always welcome. —Ed.]
Newsletter Email: editor@gars.org Editor: Bob Hoffmann, K4CQO

GARS Meetings & Workshops

GARS Meetings and Workshops are held in-person at the EAA 690 Hangar, 690 Airport Rd, Lawrenceville, GA 30046.

Meetings and Workshops are OPEN to all, feel free to share your invite with others.

When GARS meetings are available on **Zoom** the **login** info will be posted to http://www.gars.org prior to the meeting.

GARS Meetings Schedule (second Tuesday @ 7:00 PM): (these are the presentations)

- June 10 – Ice Cream Social – Yellow River Park
- July 8 – Amateur Radio on board the International Space Station (ARISS) – Ralph Pickwick, KJ4CNC
- August 12 – Operating Etiquette – VHF/HF, Rag Chew vs Contest – Various Speakers

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Workshop Schedule (third Tuesday @ 7:00 PM): (these are the Hands-on Workshops)

- June 17 – Field Day Preps, Configure the Logging and Network PCs
- July 15 – Amateur Radio on board the International Space Station (ARISS) – Ralph Pickwick, KJ4CNC
- August 19 – Operating Etiquette – VHF/HF, Rag Chew vs Contest – Various Speakers

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GARS Meeting – June 10, 2025
June Ice Cream Social & Cookout

GARS' June 10th meeting is our annual Ice Cream Social at Yellow River Park, also the site of Field Day. This year we will be grilling burgers and dogs, so we'd like you to come early, bring a spouse or friend, and enjoy a summer cookout.

The grill will be going at 6:00, with the meeting and ice cream to follow. To know how many people to cook for, we need everyone to signup; and also bring drinks, sides, or supplies. Please go to our registration page at **Perfect Potluck** to signup and indicate what you'll bring. Here is the link: www.PerfectPotluck.com/INBS3411 or go to perfectpotluck.com and search for the event under coordinator name: Edwin Henderson. You can use the password "GARS" to log in.

GARS Workshop – June 18, 2025

This is a GARS workshop to do the final preparations for Field Day.

Elmers are always present at the GARS Workshops. Feel free to bring your questions to the Workshop. If your project is small enough to bring to the meeting, let us know in advance so we can bring tools, test gear, etc.

GARS would like to thank Tom Crowley KT4XN for his presentation on low cost HF rigs and kits presentation.

GARS Happenings

20 Years ago in the June 2005 GARzette:

- The discussion about Field Day emphasized it was to demonstrate how amateur radio supports emergency services
- There was an Amateur Radio Week recognition in Gwinnett including a photo – nice!

You can always browse the GARzette archive at http://www.gars.org/newsletters. 73, Bob, K4CQO, GARzette Editor


The GARZETTE

From the President's Desk

Health and Wellbeing – Sandy Jackson, KJ4DRO

Look for this resource on Email (https://gars.org/contact/) and use it as a means to convey information about a GARS family member or Silent Key notification.

Net Managers Corner

Monday Night 2 Meter "Want, Swap, Sell, and Information Net"

GARS NEEDS MEMBERS TO SERVE AS NET CONTROL STATIONS!

GARS is a great Amateur Radio service club with the membership and awards to prove it. Our club is very busy and active, and we use the Monday night net to get timely information out to our members. Weekly participation is needed to make our net function well. There is only a small group of very dedicated people who make the net happen each week, and we need more members to volunteer to serve as Net Control Stations (NCS) on a rotating basis.

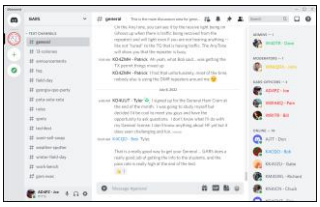
Out of almost 300 members, there are only five operators who serve as the NCS for the GARS net every Monday night. In no particular order, they are:

Ray – N4GYN David – KA4KKF Kevin – W4KIB Bill - WD4AMC Chuck – KK4TKJ

As GARS Net Manager (Chuck KK4TKJ), I would like to have more volunteers to fill NCS positions. I do plan and post the schedule months in advance. Any conditions will be accommodated that you as a rotating NCS need to place on the scheduling of your duties. If your plans change, I can make adjustments for the schedule to work, and I will make those changes happen as soon as I am notified of a problem. As Net Manager, I also send out reminders each week to let the NCS scheduled know he or she is NCS for the next Monday night net. In short, serving as a rotating NCS is a small duty but a great contribution to the club. The "Want, Swap, Sell Information Net" begins promptly at 19:30 every Monday night and runs about 30 minutes. As a scheduled NCS, you will request the assistance of a volunteer alternate NCS each time you have Net Control. Your simple duties will be to tune in to the GARS repeater, read the script, take a few notes and forward the information to me for record keeping.

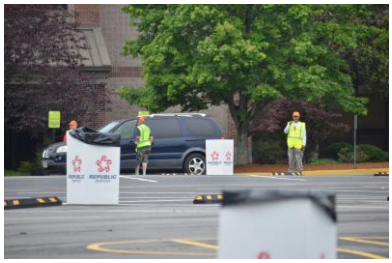
Please lend a hand and contact (Chuck) via Email (Click Here to Email our Net Manager) to help support the effort that makes GARS the great club that it is. See you on the Nets!

Don't forget about our Discord utility for GARS announcements, news, activity spotting and more. See http://www.gars.org top of the home page. This is a sample of Discord. →



Dacula Memorial Parade – GARS

Pictures provided by Richard Kitz KM4SWL



Dallas N4DDM:

To all and BCC to all the volunteers,

I'd want to thank all of those who stepped up to help... I think we covered all things we were tasked to do and had lots of fun and team building along the way...Yes, I leaned heavily on David, Eddie, Richard, Rick, Ralph, Steve, Glen, and others to help...

Clearly this was a TEAM effort...

Plus I got lots of help from Earl when he had a few minutes to chat by phone, email and text...

Jim KQ4RNA:

While this was only my first year working (at least a little bit) at the parade today, it is probably still safe for me to say that Earl was likely missed. Thoughts to him and his family.

With that, I do want to give a big shout out and kudos to Dallas. He stepped up; and while things may not have gone as well as he may have thought they should have, or maybe there were some bumps along the way, he did well today. WE got it done. We should all give Dallas some kudos and credit for his efforts. He tackled it; and from my perspective, it seems like his effort, the overall effort was a success. David crushed it too.

It was a great parade again this year; AND the rain held out for us too!

Thanks, Dallas and to all those that came out to help.

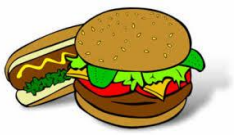
GARS Field Day June 28 – 29, 2025

ARRL Field Day is an annual amateur radio (ham radio) event organized by the **American Radio Relay League (ARRL)**, typically held on the **fourth full weekend of June** in the United States and Canada. It's one of the largest and most popular operating events in amateur radio. Field Day provides hams:

Emergency Preparedness Exercise:
It simulates emergency conditions, where participants set up temporary transmitting stations in public places, often using alternative power sources like generators, solar panels, or batteries. The goal is to test their ability to operate under emergency conditions.

- **Public Outreach:**
  Many ham radio clubs use Field Day as a way to demonstrate amateur radio to the public, local officials, and the media. It's a chance to showcase how amateur radio can function when other communication systems fail.
- **Contest Element:**
  Operators try to make as many contacts as possible with other Field Day stations during a 24-hour period. Points are awarded for various types of contacts, power sources used, and public interaction.
- **Community and Fun:**
  Field Day is also a social event. Clubs camp out, host barbecues, and spend time enjoying the hobby together. It's often a mix of serious radio operations and casual enjoyment.

GARS Field day will be at Yellow River park, 3232 Juhan Road, Stone Mountain 30087



The **ICE CREAM SOCIAL** will be at the Yellow River park on June 10th meeting is our annual Ice Cream Social at Yellow River Park, also the site of Field Day. This year we will be grilling burgers and dogs, so we'd like you to come early, bring a spouse or friend, and enjoy a summer cookout.

The grill will be going at 6:00, with the meeting and ice cream to follow. To know how many people to cook for, we need everyone to signup; and also bring drinks, sides, or supplies. Please go to our registration page at **Perfect Potluck** to signup and indicate what you'll bring. Here is the link: www.PerfectPotluck.com/INBS3411 or go to perfectpotluck.com and search for the event under coordinator name: Edwin Henderson. You can use the password "GARS" to log in.

Current Field Day GARS Volunteer Members:

- Dallas N4DDM has stepped up to be our Field Day Chairman
- Kevin W4KIB will be our Antenna Captain (Needs Volunteers/Helpers)
- Jeff AB4HF stepped up to be our Safety Officer (100 Points)
- Ralph stepped up to do the Solar Battery contacts (100 Points)
- Harold KI4FPR will bring the GARS Trailer
- Pam KJ4RYB Hospitality Greeter at the ARRL Table (Supplies are in the GARS Trailer)
- Kevin K4GTR will lead the networking of the PCs and the Remote Receive Antenna cables
- Mark N7GRB to capture the ARRL Message (100 Points)
- Ed W4BSR stepped up to cook BBQ for our Saturday Main Meal
- Bill WR1TR is to bring and set up the 6m/10m Hex Beam antennas

Station Captains:

- VHF/UHF(Free Transmitter) - Kevin K4GTR
- Satellite - (Free Transmitter) Open (100 Points)
- 10m/75m SSB - Glen W3WWT
- 40m SSB - Dallas N4DDM
- 80m/15m Digi - Open
- 40m Digi - Open
- 20m Digi - Open
- CW - Open
- 20m SSB - Open
- 15m SSB - Open

The Basics

I is for Current

de: Bob Schmid, WA9FBO

We use the symbol "I" for current, such as when writing Ohm's Law (I = E/R) or referring to "IR drop" or "I^2R loss". There's no "i" in "current", so where did that symbol come from?

French physicist André-Marie Ampère, after whom the unit of electrical current is named, developed Ampere's Law in 1820. It mathematically described the magnetic force between two electrical currents and created the new science of electrodynamics.

Ampère needed an instrument to measure electricity for his experiments, so he used an instrument that contained a compass. It was the forerunner of the galvanometer, which in turn was the forerunner of the ammeter. These instruments measure charge flow, which Ampère called "*intensité de courant*" (current intensity). He gave it the symbol "I", which still remains with us.

Coax Impedance

de: Bob Schmid, WA9FBO

Coaxial cable is interesting (Figure 1). If its characteristic impedance (Z_0) is 50 ohms, for example, that means it's 50 ohms *at any length*. How can that be? When a run of coax is very short compared to the wavelength of the signal, we can model it as a resistor, inductor, and capacitor connected as shown in Figure 2 (conductance G represents leakage).

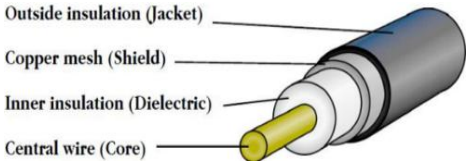


FIGURE 1 - COAXIAL CABLE CONSTRUCTION

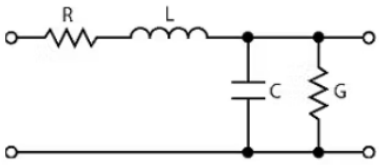


FIGURE 2 - ELECTRICAL MODEL

That's called the **Lumped Model**, and it applies when the frequency is low (such as audio) or the run is short (a few inches at VHF or a few feet at HF).

On the other hand, when the length of the coax approaches or exceeds the wavelength of the signal, we regard R, L, C, and G as spread out continuously along the cable. That's the **Distributed Model**, and we visualize it as a long chain of tiny circuits—think Figure 2 repeating over and over. For this model we apply transmission line theory, not just Ohm's Law. Reflections, standing waves, and impedance matching become important.

When an AC signal is applied, it doesn't just jump to the end. Instead, a wave travels down the line. At each infinitesimal step, the inductance resists the change in current and the capacitance resists the change in voltage. The balance between L and C determines the voltage-to-current ratio of the wave traveling down the cable, which defines the cable's characteristic impedance.

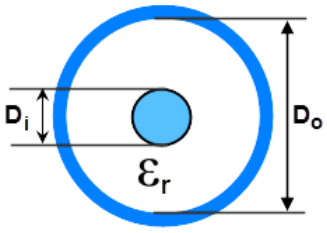


FIGURE 3 - COAXIAL CABLE CROSS-

Construction-wise (Figure 3), the impedance is set by the diameter of the inner conductor, the diameter of the outer conductor, and the dielectric constant of the inner insulation (which affects the cable's capacitance).

What matters most is what happens at the end of the cable. If the wave hits a mismatch (like an open

or short), it reflects back toward the source, messing things up. But if the end of the cable is connected to a perfect match (like a 50-ohm resistor), then the wave gets fully absorbed with no reflections. That means the source sees a steady, smooth power flow, just as if it were connected directly to a 50-ohm resistor. And that's true *no matter how long* the cable is, as long as there's no reflection from the far end.

Why did 50 ohms and 75 ohms end up being common coax impedances? Standardization: 30 ohms (favored for high power) and 60 ohms (favored for high voltage) gave way to a compromise of 50 ohms. And 77 ohms, attractive due to low signal attenuation, became 75 ohms so manufacturers could use a standard wire size.

What about the "RG" nomenclature, such as RG-8 or RG-58? The term stands for "Radio Guide", which started in the 30's as the U.S. military developed specifications for coaxial cable used in radio and radar systems. The numbers were catalog page numbers and don't represent anything specific like impedance or diameter. The military dropped the RG system long ago in favor of more precise Mil Spec standards, but it's still used by industry, hams, and hobbyists.

To sum up, coax isn't just wire—it's a finely tuned transmission line with an impedance baked in by design.

New Upgrade License Letter 1964

Vintage Amateur Radio

de Bill Shadid, W9MXQ

As this series of articles moves along, they very often remind me of personal experience with the various pieces of equipment of the same model that have been a part of my amateur radio experience with the pieces chronicled in the article. After all, I generally do not write about equipment I have not used. In fact, in most cases the equipment featured is in my possession as the article is being developed.

The disconnect with the articles comes from article focus on an individual product or manufacturer. The fact is, when I became licensed in 1964, that was not reality. Some companies were known for Receivers, some for Transmitters, some for Amplifiers, and some for accessories. There were companies like Hallicrafters and Collins that did both. But, for most of the history of Hallicrafters they were best known for their Receivers. At the same time, companies like E. F. Johnson were known for their Transmitters, Amplifiers, and Accessories. It was interesting to see how Johnson, for instance, would show their products in a ham station setting with a National, Hallicrafters, or Collins Receiver.

My first station fit the norm for the time – 1964 – with separate brands from the Transmitter and Receiver technology leaders – at least as I interpreted technology leadership at the time! My station included an E. F. Johnson Viking Valiant Transmitter and a Hammarlund HQ-170AC Receiver.

Johnson Viking Valiant Transmitter (left)
Hammarlund HQ-170AC-VHF Receiver (right)
Hammarlund S-200 Speaker (center)

W9MXQ Collection

The station above is my recreation of that station from 1964. Most things are as they were then except that the Hammarlund HQ-170AC in this picture is the final model of that radio and is designated as model number HQ-170AC-VHF. That later version was identical to the HQ-170AC in my original station except that it added a high gain receiver converter and pre-amplifier covering the six-meter and two-meter bands.

The circuitry for the time was noteworthy in that it used the then relatively new RCA Nuvistor[1] ultra-miniature vacuum tubes. While the “VHF” model was very impressive in the 1960’s, it would not hold a candle to todays VHF receiver front ends. The HF part of radios of the day, while inferior to today’s offerings, had many good traits and can be used in non-competitive[2] communications.

The Hammarlund HQ-170 series Receiver was in near final form (HQ-170AC) when I purchased mine, brand new, in the 1960’s from Klaus Radio, Inc., in Peoria, Illinois. Klaus was a full range amateur radio equipment dealer at the time. They remain today as an electronic parts and appliance distribution business. The receiver was ham bands only (the bands allocated to ham radio at that time) with coverage of the 160, 80, 40, 20, 15, 10, and 6-meter bands. So, no general coverage short wave – that

feature being assigned to its sister radio, the HQ-180 series, that was essentially identical in coverage. (The HQ-180 series had no provision for VHF coverage.) Here are the model breakdowns of the HQ-170 series radios:

- HQ-170 Receiver
  - Introduced in 1958.
- HQ-170C Receiver
  - Same as HQ-170 but included an optional clock on the front panel.
- HQ-170A Receiver
- HQ-170AC Receiver (same as above but included a clock on the front panel)
  - Same as HQ-170A but included an optional clock on the front panel.
  - This is the one I had in 1965.
- HQ-170A-VHF Receiver
  - The VHF model is very rare, today.
  - I do not think these were ever shipped in this form from the factory. That is, without the optional clock.
- HQ-170AC-VHF Receiver
  - Same as HQ-170A-VHF but included an optional clock on the front panel.
  - The VHF model is very rare, today.
  - This is the one in my collection now.

To be sure, there were other subtle changes with the release of the "A" version of the HQ-170. One that is immediately noticeable is the front panel color which became a darker gray. This is very obvious in my collection which includes an HQ-180C Receiver that is colored identically to the HQ-170. The darker color is nearly identical to the gray used in the Collins S-Line as can be seen in this picture (next page) of my HQ-170AC-VHF as used at W9MXQ in the Hammarlund Hullabaloo a year ago. The Hammarlund Hullabaloo is a Special Event focused on using Hammarlund Radio Company radios and accessories.

Notice the Hammarlund and Collins in near matching colors. This color change helped the dated extra-large packaging of the Hammarlund look more modern – it truly looked sleeker than its HQ-180 predecessor even though it was exactly the same front panel – with a slightly different lettering pattern as compared to the original.

Hammarlund HQ-170AC-VHF used as a separate Receiver with a Collins KWM-2 Transceiver. Also seen is the Collins 312B-5 Remote VFO for the KWM-2. The 312B-5 was merely in place because it had an internal speaker connected to both the KWM-2 and the HQ-170AC-VHF. They worked surprisingly well together owing to the Collins rig's feature set allowing antenna switching and muting for a remote/separate receiver[3]. The Collins 516F-2 Power Supply is out of site, behind the transceiver. You can also see the Electro Voice EV-638 (with EV-428 PTT Base) Desk Microphone.

W9MXQ Collection

The different versions of the HQ-170 were essentially identical in performance other than the included converter and pre-amplifier for enhanced 6-meter and added 2-meter coverage in the VHF models. The "A" models differed in that they had a solid-state power supply and constant filament voltage (both in receiver power on and power off state) for V2, the First Mixer, and V12, the High Frequency Oscillator. Hammarlund receivers were well known for being unstable unless allowed 30 minutes, or even more, to warm up. The solid-state power supply and the "always on" V2 and V12 circuits helped to mitigate that issue. Still, vacuum tube radios required warm-up and such radios in my use are allowed over an hour to warm-up and stabilize before I use them. ALWAYS!!

The most attractive feature of the HQ-170, way back to its introduction in the 1950's was its use of a Product Detector. Unlike Hallicrafters and National at the time, Hammarlund was looking to the future and the need for a detector more suitable for Single Sideband (SSB) reception. The HQ-170 series offered superior AGC performance to that provided by direct competitors like the Hallicrafters SX-101 and the National NC-300. To be sure, this was soon corrected by Hallicrafters in the later versions of the SX-101 (the Mark III version) and the updated National NC-303. Collins had also been an early user of a Product Detector in the 75A-4 Receiver, vintage 1955 (predating the Hammarlund HQ-170 as originally released).

In early 1964 I had been ready to take my Novice test and get on the air. To that end, and in preparation, I had acquired a used Heathkit DX-20 Transmitter, locally, as the third owner of this radio used by a new Novice. To go with it, I had a trusty Hallicrafters SX-110 but soon acquired a Hallicrafters SX-101 Receiver. As the story unfolded, I did not get my Novice license, did not take well to the SX-101, and moved toward getting my General License. It was that General License that triggered the purchase of the used Viking Valiant Transmitter and the new Hammarlund HQ-170AC (with the SX-101 used as a trade). That pair greeted the arrival of the General License – WA9MXQ (later leading to the vanity, "W9MXQ" call.) That is why you hear me identify the Valiant and the HQ-170AC as my original station.

The Valiant had been the transmitter owned by my then long time – and still – very good friend, Gary Frankeberger, WA9BJU. Gary is still WA9BJU and is active on the bands from Central Illinois and Arizona. Before getting my license, I use to admire Gary's Valiant and when one became available, I snapped it up and never regretted it. Gary used his Valiant with a Hammarlund HQ-100 Receiver – which I believe he still has. His Valiant, however, is long gone.

The Valiant that now duplicates my original station comes from a local ham friend here in Southeast Wisconsin, John Schroeder, KB9BPM. John had acquired it from a well-known Johnson Restorer, Chuck Hurley, K1TLI[4]. It is an incredible restoration that takes the radio from a good used radio to a piece of artwork!

Here are the accessories that I used with the Valiant and HQ-170AC back in the 1960's. These very accessories are still with me today – just as I bought them "back in the day." For some reason they just never left! They are in use right now in the setup of the Valiant and the HQ-170AC-VHF.

Dow Key Antenna Switching Relay
See description, below, for notes about how this is connected.
Mr. Carlson's Lab© on YouTube™

Turner 254C Hi-Z
Ceramic Microphone

Amphenol
80-MC2M 2-Pin Offset Mic Connector
W9MXQ Collection

The left picture shows the Dow Key Antenna Relay. The relay is mounted to the RF Output connector with a double female Barrel Connector. The blue and gray wire pair go to the receiver mute connections present on the Eight-Pin Octal System Socket Connector on the back panel of the HQ-170AC Receiver. The green and black wire pair go to the 120 VAC Antenna Switching connector on the back of the Valiant transmitter. When the Valiant goes into transmit mode, it puts 120 VAC on that wire pair. Look again at the picture (which is actually from the back of a Johnson Viking II Transmitter). The connector arrangement on the Valiant is the same. See at the right edge of the picture what looks like a crystal plugged into the socket? Johnson transmitters had a crystal socket used in these locations with 120 VAC present at transmit. Users had two choices.

1. If we had an old defective crystal we would remove the cover, remove the interior crystal components, put a hole in the top of the old crystal case, install the wires through the hole and to the crystal terminal holes, then close up the crystal case. That is what has been done in this picture.
2. Alternatively, we would take two finishing nails (small enough diameter to fit into the crystal socket) and solder one of the 120 VAC relay lines to each of the two pins. Insert the pins into the socket and you were “ready to rock and roll.” Protect the exposed solder connection with “spaghetti” tubing.

My temporary installation for this article did not include covering the open terminals. If you do this, keep your hands away. Check my warning toward the end of this article. Be careful. Also, beware of the barrel connector mounted relay. This was common, but it was not good for the relay – only good for a quick test installation. Commonly, I mount such relays hanging off a short length of RG-8 coaxial cable. That serves to mechanically isolate the relay from the radio chassis and also tends to isolate this noisy relay from the chassis metal – which makes it louder than it already is!

While not easy to find operational today, a major attraction (to me) on the Valiant Transmitter are its Mercury Vapor 866A Rectifiers in the High Voltage Power Supply of the transmitter. The picture at the left shows the pair operating under load with the full-wave rectifier circuit. The “electric blue” glow is bright (this is not a time exposure) and ripples with the keying of the transmitter on CW or with modulation on SSB. On AM, they just glow brightly. The more current drawn the brighter they flash.

Often these very efficient rectifiers (approaching he efficiency of a solid-state rectifier/diode) are replaced by more plentiful (and more dependable) 3B28 rectifiers. They are more often replaced with diodes as there is no significant voltage increase as with most diode replacement of tube rectifiers.

W9MXQ

I measure Valiant Transmitters as being early or late models and this one is an early version. This is based on my own parameters. I feel that early Valiant Transmitters have their screen voltage adjustment on a large ceramic resistors with two slider contacts accessible at the underside of the right

rear corner of the chassis. The cabinet need to be removed to make the adjustment.

- One slider to set screen voltage on the triple-6146 final amplifier tubes
- One slider to set screen voltage on the double-6146 plate modulator tubes.

Later Valiant Transmitters have the same adjustments but with high wattage potentiometers mounted on the right rear side of the chassis – accessible via holes in the outer cabinet. The cabinet did not need to be removed to make the adjustment.
Remember, this article is more about the particular/individual Valiant and HQ-170AC-VHF radios in my shack than about the E. F. Johnson and Hammarlund product line and the place for these radios in it.
There is a particular secret about the Valiant in this article. On its way to Schroeder, KB9BPM, this transmitter was dropped. Not severe, mind you as no damage was done to the chassis. Two areas of damage were present:

- The meter was cracked. (I might add, the Holy Grail of a Johnson Transmitter!!)

Look to the left side of the meter and see that a chip is missing from the crystal. The meter on any Johnson transmitter is worth its weight in gold. They are virtually unobtainium and to some collectors perhaps worth more that the cost for a complete transmitter with a good meter.

I am fortunate in that I have found a replacement – good as new. I have yet to install it, however.

The picture shows what appears to be a missing section of the meter crystal. However, that is not the case. The damage is a crack, not a missing section.

- The 866A Rectifier Tubes were shattered.

The Mercury Vapor design of the 866A hints at one of the issues with this tube – it contains mercury. A shattered tube means that mercury could be present somewhere on the chassis. In instances where the base of the tube survives (which is usually does as it is generally a plastic or phenolic piece) and the “drop” was directly on the bottom (on the transmitter’s feet, which it was), the mercury collects in the socket. In such a case, the mercury can be easily collected and removed.

These kinds of issues – the presence of stray mercury – are just one of many dangers if working with older radios. Remember that mercury is very toxic and must not be handled.

Using this station in QSO is a treat. AM stations collect around several places in the HF Spectrum. See the chart on the next page. The QSO’s that I remember were considerably different from what we do today on SSB – but still do on typical AM QSO’s – were much more of a round table with several stations in a single contact as if sitting around a table and taking their turn to talk. There was usually one member of the “circle” who would invariably remember the order of the circle and keep everyone on track. It was unlike today’s directed nets – although they existed as well. Nets such as MidCARS, eCARS, SouthCARS, etc. existed then as now.

Check this chart about where to find AM on today's bands.

AM Frequencies (in MHz) As suggested by the ARRL	
160 Meters:	1.885, 1.900, 1.945, 1.985
75 Meters:	3.825, 3.870 (West Coast), 3.880, 3.885
40 Meters:	7.290, 7.295
20 Meters:	14.286
17 Meters:	18.150
15 Meters:	21.285, 21.425
10 Meters:	29.000-29.200

As you can see on the bandswitch, in the early days of the Valiant's marketplace, 11-meters was a ham band. That had ended by the time I received my first Valiant in 1964.

CW operation was much as it is today except for a very high percentage of operators on CW as compared to Phone. The CW band segments were filled with conversational CW that are generally gone today. Semi-break-in, popular along with QSK (full-break-in) today was around but not common. When I had my first Valiant – and with the one I have today, I still switch to transmit via the transmit toggle switch on the lower right front of the transmitter. It would be easy to use the PTT circuit in the Valiant to be triggered by a foot switch – but actually I rarely use the Valiant on CW today as that mode is so much easier on modern radios. Actually, the very next generation of transmitters after the Valiant made use of semi-break-in.

Good friend, Gary Drasch, K9DJT, and I enjoy a common heritage in that we had the same first radios as General Class operators. Here is Gary, at age 13, at his attractive Valiant and HQ-170C station. Also see the Johnson Matchbox Antenna Tuner. Where I had used the Turner 254C Microphone, Gary used the Astatic D-104 with the PTT Stand. We returned to common ground with the Vibroplex Original bug. We did not discuss it, but I believe I had (and still have in my shack) that same world globe!

K9DJT and I recently discussed our next transmitter. As if staying on the same path, we moved to a Hallicrafters HT-37 Transmitter to replace our Valiant models. To some degree we missed the obvious move of the market to SSB from AM – hindsight being 20-20, we should have started with the HT-37 – the days of the Valiant were already dated!

It is interesting how power is measured today (PEP Output) and how that relates to mid-range transmitters of the 1960's, like the Valiant, when power was defined as a maximum of 1,000 watts DC input to the final amplifier (simply stated). The Valiant ran 200 watts input in Class C, for about 75% efficiency. That translated to 150 watts output, or 600 watts PEP. Only 375 watts AM DC output, such as provided by the Johnson Viking 500, translated to a full 1,500 watts PEP – today's limit. 1960's transmitters such as the Johnson Desk Kilowatt running a full 1000 watts input would show 750 watts output, or 3000 watts PEP!! A big controversy in the amateur radio AM crowd to this day. Stay tuned for the article for more details. I wonder how many of today's SSB users know of, or remember, the defined 4x advantage in PEP power of SSB over AM (reference).

A closing warning – and typical of most of the radios I detail in my articles. These radios are dangerous with 300+ volts in the receivers and 300 to thousands of volts in transmitters and amplifiers.

HIGH VOLTAGE WILL KILL YOU!! LIKE IN DEAD!! NO RETURN!! DO NOT PASS GO AND DO NOT COLLECT $200!!

A special note of thanks to my proofreader, Bob Bailey, W9DYQ. Bob is a lot more than a proofreader as he often adds commentary that makes it into the article. Bob and I both own numerous pieces of Hammarlund equipment. Between the two of us, however, I believe that only I have any E. F. Johnson gear. Many comments herein are subject to opinions that W9DYQ and I hold and believe. You experience may differ – and if they do, I would like to hear from you for further discussion.
I sincerely appreciate that you read my articles. Remember that I am open to questions and comments anytime at my email address, W9MXQ@TWC.com.

Credits and Comments:

[1] Reference https://en.wikipedia.org/wiki/Nuvistor for details of the RCA Nuvistor Vacuum Tube.

[2] A Hammarlund HQ-170AC or HQ-170AC-VHF Receiver would not be a good choice to run in the CQ World-Wide DX Contact as it plays out, today, for example. The same performance limitations would apply to even less technically stressful operations, such as Field Day. On the other hand, a casual QSO or checking into a traffic or technical net is quite pleasurable with the same radio – or any vintage radio.

[3] An included feature in transceivers to allow for including a separate receiver was not uncommon in the time of the Collins KWM-2 and still is in transceivers to this day. Most notable of transceivers that are contemporaries of the KWM-2 with this feature were the Drake TR-3 and TR-4, the Hallicrafters SR-150, and others. Check your vintage transceiver instruction manual for details.

[4] John Hurley operates a restoration business called E. F. Johnson Radio Restorations. Check out his restoration examples at https://johnsonradioresto.com/.

GARS Membership

New Members in May
James Lawrence (KQ4VUA)
New Members: 1
Total Members as of June 1, 2025 349

Join GARS members for our:

- weekly lunch bunch at 11:30 AM most Fridays
- weekly breakfast gathering at 8:00 AM most Saturdays

Friday weekly gatherings are held at the Chilli's at:

947 Lawrenceville Suwanee Rd
Lawrenceville, GA 30043

Saturday weekly gatherings are held at the Cracker Barrel at:

75 Celebration Dr
Suwanee, GA 30024

Birthdays in June

Mark Bell (N7GRB)
Harold Brown (KI4FPR)
William Carmichael (NV4Q)
Hope Collier (KO4PVM)
John Davis (WB4QDX)
Christopher Fowler (K4FH)
Jim Gaffney (K4YNA)
Cara Guidry
James Hinkle (AG4ON)
Fisher Londono (W4LON)
Jim Marchand ( )
JD Masters (KQ4ELD)
Rick Morris (KD4VOJ)
Nasser Nasab (KR4CKV)
Brian Page (N4TRB)
Michael Ray (KO4SSU)
Charles Roberts (K4HFO)
Ron Rogers (WW8RR)
Ken Schroder (KC4SR)
Donald Seder (K9ROV)
Barry Sharp (N4CS)
Evelina Silva (KO4FQI)
Bill Van Duynhoven (KE4TVA)
Courtney Wagner (KN4GZI)
Kathy Wasden (KW4SDN)
Blaine Wasden (W4SDN)

GARS MEMBERSHIP

Your current GARS membership status is shown in the monthly newsletter e-mail towards the bottom of the message. To become a GARS member, or to renew your GARS membership, please visit our website – www.gars.org/gars/membership/. To make changes to your GARS membership (moved, new e-mail address, new phone number, etc.), please contact the Membership Chair at Email (https://gars.org/contact/) with any changes to your Membership information.

Membership Chair: Karen Albritton, KI4HPP **Committee Members**: Dave Bruse, W4DTR

ARRL MEMBERSHIP

To update your ARRL membership information, please visit their website - http://www.arrl.org.

MAINTAIN YOUR LICENSE

You can update your Amateur Radio license information with the FCC at their website for free - https://www.fcc.gov/wireless/universal-licensing-system. License renewal is subject to the $35 FCC fee.

Donating to GARS

Your GARS donation can be used for a certain purpose by donating to one of these funds:

- GARS SK Memorial Fund for Education (to remember and honor Silent Keys);
- GARS Scholarship Fund (Administered by the ARRL for awarding scholarships);
- GARS General Fund (any club purpose).

GARS has joined these rewards programs (a portion of every purchase you make through these merchants may be donated to GARS):

- Kroger Community Rewards program.

For more information on how to sign up for these rewards programs, or to donate to GARS, visit

https://gars.org/gars/donations-to-the-club

GARS on Social Media

Discord Request:
https://gars.org/discord

Groups.io:
https://gars.org/groups.io

Visit GARS on Facebook:
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Follow GARS on X:
https://x.com/GARS_Hams

Join GARS on YouTube:
https://gars.org/youtube

GARS Mail Address:

GARS
P.O. Box 492531
Lawrenceville, GA 30049

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 Chuck McCord, Net Manager KK4TKJ

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 Neil Derryberry, Elmer Manager WD4NET

 Edwin Henderson, TechFest Chair W4BSR

Open Winter Field Day Chair

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 Kyle Albritton, W4KDA

 John Davis, WB4QDX

 Bill Cherepy, WB4WTN W4GR Trustee

GARS Meeting Minutes

GARS – MEETING May 13, 202

Opening Meeting: Meeting open at 7 PM or 1900hrs by Vice-President Richard Kitz KM4SWL Introduction of all present were conducted and general meeting information as to emergency exit and including exit procedures to leave hanger and avoid aircraft which have priority. New hams and visitor were noted and plus first timers.

Birthday Acknowledge: As published on Gars website.

Treasurer Report: Was given by our Vice-President Richard Kitz to those present at the meeting.

Membership Report: We have 350 member of Gars and 35 were present at the meeting.

Programs: Tom Crowley KT4XN gave an excellent presentation and physical display of various low cost or cheap ham radios. Kevin Scott Program Manager K4GTR assisted in displaying the various radio so all could see as were introduced by Tom.

Education:

VE Status: April 2025 Exam was canceled as it was Mothers Day.

Upcoming Events: June 10,2025 meeting and ice cream/cookout at Yellow River Park. Sign up is request for attendance and to bring item for cookout at perfevtparty.com password gars. Ed

Henderson W4BSR will be our cook.

June 17 will be Aviation Summer Camp at the hanger and need volunteers to help teach soldiering.

June 28-29,2025 will be our Field Day event. Volunteers needed for various duties.

New Business: None

Closing: 8:45 PM or 2045 hrs.

Workshop Minutes – May 20, 2025

Brief Summary:

As usual, the workshop was a combination of discussions about the week-before's presentation and GARS Elmers helping others learn about ham radio and helping with any questions they have.

Events – GARS and others

ARRL CONTESTING INFO

From ARRL Contest Calendar

> For more information click the links <

January 2025
1 Straight Key Night
4 Kids Day
4-5 RTTY Roundup
18-20 January VHF

February 2025
10-14 School Club Roundup
15-16 International DX – CW

March 2025
1-2 International DX– Phone

April 2025
13 Rookie Roundup – Phone

May 2025 (no ARRL Contests)

June 2025
7-8 International Digital Contest
14-16 June VHF
21 Kids Day
28-29 Field Day

July 2025
12-13 IARU HF World Championship

August 2025
2-3 222 MHz and Up Distance Contest
16-18 10 GHz & Up – Round 1
16-17 EME - 2.3 GHz & Up
17 Rookie Roundup – RTTY

September 2025
13-15 September VHF
13-14 EME - 2.3 GHz & Up
20-22 10 GHz & Up - Round 2

October 2025
TBD Collegiate QSO Party
11-12 EME - 50 to 1296 MHz
20-24 School Club Roundup

November 2025
1-3 Nov Sweepstakes–CW
8-9 EME - 50 to 1296 MHz
15-17 Nov Sweepstakes–Phone

December 2025
5-7 160 Meter
13-14 10 Meter
21 Rookie Roundup–CW

For more information:
http://www.arrl.org/contest-calendar

HAMFEST CALENDAR

[Please confirm the status of a Hamfest before making plans to attend]

07/12/2025 - Cullman Amateur Radio Hamfest
Location: Cullman, AL
Type: ARRL Hamfest
Sponsor: Cullman Amateur Radio Club
Website: http://cullmanarc.com

07/18/2025 - 07/19/2025 - Milton Ham Fest
Location: Milton, FL
Type: ARRL Hamfest
Sponsor: Milton Amateur Radio Club
Website: http://miltonarc.org

08/16/2025 - 08/17/2025 Huntsville Hamfest, ARRL Alabama State Convention
Location: Huntsville, AL
Type: ARRL Convention
Sponsor: Huntsville Hamfest, Inc
Website: http://hamfest.org

08/23/2025 - TarcFest
Location: Tampa, FL
Type: ARRL Hamfest
Sponsor: Tampa Amateur Radio Club
Website: http://www.hamclub.org

09/06/2025 - Dalton Swapfest
Location: Dalton, GA
Type: ARRL Hamfest
Sponsor: Dalton Amateur Radio Club, Inc. (W4DRC)
Website: https://www.qrz.com/db/W4DRC

09/19/2025 - 09/20/2025 Gadsden Hamfest 2025
Location: Gadsden, AL
Type: ARRL Hamfest
Sponsor: Gadsden Amateur Radio Club
Website: http://k4jmc.com

10/03/2025 - 10/04/2025 Hamfest Chattanooga 2025
Location: Ringgold , GA
Type: ARRL Hamfest
Sponsor: Chattanooga ARC & North Georgia GMRS Network

10/10/2025 - 10/11/2025 Melbourne Hamfest, ARRL Florida State Convention
Location: Melbourne, FL
Type: ARRL Convention
Sponsor: Platinum Coast Amateur Radio Society
Website: https://pcars.org/wp/melbourne-hamfest-2025/

10/10/2025 - 10/11/2025 NOARC Annual Hamfest
Location: Crestview, FL
Type: ARRL Hamfest
Sponsor: City of Crestview Florida
Website: https://w4aaz.org/noarc/hamfest-2025/

10/18/2025 - Savannah Hamfest and Swapmeet
Location: Savannah, GA
Type: ARRL Hamfest
Sponsor: Coastal Amateur Radio Society

For more information: www.arrl.org/hamfests-and-conventions-calendar

When searching by division, remember some states adjacent to GA are in different divisions: Southeastern: GA, AL, FL Delta: TN Roanoke: NC, SC

GARS Events Calendar for 2025

TechFest	February 1 2025
Winter Field Day	January 25-26 2025
Dog Show Fundraiser	March 26-30, 2025
Spring Technician HamCram	March 29-30, 2025
Georgia QSO Party	April 12-13 2025
North metro area Fox Hunt	April 2025
Memorial Day Parade	May 26 2025
ARC/KARC Hamfest	June 7 2025
Field Day	June 28-29 2025
Summer General HamCram	July 26-27 2025
Fall Technician HamCram	September 2025
JOTA	October 2025
Stone Mt. Hamfest	November 1-2 2025
Holiday Party	December 2025

GARS Recurring Calendar

- 2nd Tuesday of the month at 7 pm (except December)
  Monthly Club Meeting
  690 Airport Rd, Lawrenceville, GA 30046
- 3rd Tuesday of the month at 7 pm (except December)
  Monthly Workshop
  690 Airport Rd, Lawrenceville, GA 30046
- 3rd Sunday of the Month at 3 pm
  GARS Ham Exam Session
  690 Airport Rd
  Lawrenceville, GA 30046
- Every Monday at 7:30 pm: GARS Want, Swap, Sell, and Information Net on the GARS 147.075 MHz repeater
- Every Monday at 8:30 pm: ARES Training on the GARS 147.075 MHz repeater
- Every Friday at 11:30 am, GARS Lunch at Chilli's
- Every Saturday at 8:00 am GARS Breakfast at Cracker Barrell

GARS Calendar for June 2025

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
1	2 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	3 **7:00 PM Exec Meeting**	4	5	6 **11:30 AM Lunch at Chili's**	7 **8:00 AM Breakfast at Cracker Barrel**
8	9 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	10 **6:00 PM Potluck Cookout 7:00 PM Meeting Yellow River Park**	11	12	13 **11:30 AM Lunch at Chili's**	14 **8:00 AM Breakfast at Cracker Barrel**
15 **3:00 PM Ham Radio Exams, EAA 690 Hangar**	16 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	17 **7:00 PM Workshop Meeting EAA 690 Hangar**	18	19	20 **11:30 AM Lunch at Chili's**	21 **8:00 AM Breakfast at Cracker Barrel**
22	23 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	24	25	26	27 **11:30 AM Lunch at Chili's**	28 **8:00 AM Breakfast at Cracker Barrel** **Field Day Yellow River Park**
29 **Field Day Yellow River Park**	30 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**					

More information about the above calendar events can be found on GARS.org

Local Ham Radio Exams & Meetings

GARS Ham Radio Exams

GARS Exam Sessions are held the 3rd Sunday of the month

Preregistration is REQUIRED
Doors open at 2:45pm, exams start promptly by 3:00pm
For more information and to preregister, please visit https://gars.org/exams/

GARS VE-Team
VEC: W5YI-VEC
EAA 690 Hangar
690 Airport Rd
Lawrenceville, GA 30046

GARS VE Team Leaders
E-mail: exams@gars.org.

May 2025 Results

The GARS VE Team exam session results from May 18th.

2 Went from no license to Extra:

- Hugh J Lanier - KZ4TJ
- David Unsworth - KZ4TG

1 Upgraded to General:

- Nasser Nasab - KR4CKV

7 Received their Technician license:

- Charles A Bussey - KR4EBB
- Rachel A Buzzerd - KR4EVA
- Keith T Davis - KR4EAU
- Jacob Hart - KR4EAO
- Gregory Pressley - KR4EAG
- William S Skidmore - KR4EAY
- Christopher P Snowden - KR4EBF

Special thanks to the Volunteer Examiners who made this exam session possible:

N4MPC – Pat De Loe
KK4TKJ – Chuck Mc Cord
KC2FDU – Elmer Gappi
KM4SWL - Richard Kitz
NG4H - William Beguhn
WS3V - William Rudd

Thanks & 73, Chuck Mc Cord (Co-CVE)

Local Ham Radio Exams

In order to find an exam session near you, please visit http://www.arrl.org/exam_sessions/. Contact the information in the listing for further information.

Local Ham Radio Meetings

In order to find a local Ham Radio Club meeting near you, please visit http://www.arrl.org/find-a-club. Contact the club for meeting information.

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Mugs provided by Will Carson KZ4HV -- $9.99 for 11 oz, $11.99 for 15 oz.

In order to have your ad included, contact editor@gars.org. Current ad prices per year are:

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1/2 page	$150
Full page	$200

For swap items, post and see items on GARS groups.io (https://groups.io/g/GARS).

Ready to take your Ham Radio Exam?

Go to https://GARS.org/exams/ to learn more, and to register for an upcoming exam session.