The GARzette

The Official Newsletter of the Gwinnett Amateur Radio Society

February 2024 http://www.gars.org/ Volume 51, Issue 2

Inside

www.GARS.org

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TechFest 25
Gwinnett Amateur Radio Society
GARS January Exhibition of the
Technical aspects of Amateur Radio
Held at the Gwinnett County Fairgrounds

GARS Meeting: DIY PCB Layout Using KiCAD – Kevin Scott K4GTR
Tuesday February 13, 2024 at 7:00 PM

President's Message

From the President…

As I create **my last President's article** for the club newsletter, I cannot help but think of the privilege and fun being part of a GARS team helping to lead GARS club to betterment and prosperity. I look forward to assisting the next team in the same rewarding way as a director in the club. I know that everyone will do well and has the best intentions to see the Gwinnett Amateur Radio Society Club prosper.

Our **second TechFest at the Fairgrounds** went well and I saw a lot of smiling faces, where folks were engaged with the exhibitors and having fun seeing and learning about the different technologies and even discovering a future interest. This was another year of award-winning chili for everyone to sample. Congratulations to our Chili Cookoff winners! They are: 1st place Chris Fowler (left) and 2nd place Paul Kelly, W4KLY (right). Congrats fellas. **With all that chili to sample, WE ALL WON!**

To see some of the fun everyone had at the 2024 GARS TechFest, look in our GARS Groups.io photo album: **2024 GARS Tech Fest - January 13**

Sadly, we did not have a **Winter Field Day** again this year. We need someone to coordinate this activity and to work the checklist of tasks it takes to partake in WFD. Next year hopefully, as we have refined our planning and executing of our TechFest, we can get someone to take on this role of Winter Field Day Chairman, and the club can come together for some wintertime operating fun.

Coming up is our annual fund-raising effort – **the Dog Show.** This activity rewards us in a monetary way that allows to keep a healthy club treasury, including the enjoyment of some extra luxuries, such as: food and drinks we have at Field Day, TechFest and other functions. The tasks are easy and our rewards benefits GARS all the way around. Please respond to the requests for help as they come in and help us perform these tasks more easily. Mark your calendars for **March 27th – 31st** and sign up here: **Dog Show Volunteer List**

The **2024 Officer Elections** will come up this week at our February General meeting. And per our bylaws, the slate of officers up for election will be posted within this newsletter. Please see this list of volunteers (see **GARS Nominated Officers for 2024**) and give them your support by coming to our meeting and voting.

As you may have been aware, the **Lilburn elementary school conducted an ARISS activity** this past week. The school went all out in making this quite the event with decorations, dedications, personalities, and of course, the children with their questions to the ISS. Astronaut Jasmin Moghbeli was so fantastic to listen to as she answered the children's questions with age-appropriate comments and humor. (Note too, the school came up their own mission patch.) Many thanks go out to Daryl Young (K4RGK) and Ralph Pickwick (KJ4CNC) who did a wonderful job with the technical setup and execution of the operations for this ARISS contact. Thanks as well to Earl Whatley (AF4FG), Kevin Igarashi-Ball (W4KIB), Paul Kelly (W4KLY) and Tom Crowey (KT4XN) who also helped with setup, operations and post educational activities as well.

Zoomed meetings coming back. We have looked into broadcasting our General meetings with the Zoom platform again. So, hopefully, the setup and implementation of the required equipment will go well. Bear in mind, with this process, we have to mix the audio and video, balance these signals, and then send it onto the computers, for the zoom transmissions, all the while we feed this to the meeting room public address system as well. With these zoomed meetings, we may have to limit the interaction aspect with the zoomed audience. Zoom is a courtesy to our membership and relies on our volunteers that will bring this into being. So please be patient and understanding as we implement this.

It has been a real pleasure serving the GARS Club as President for the last three years. I will step down with many fond memories and a sense of accomplishment that we all experienced with this team. I am fortunate to be surrounded with all you dedicated, fun and hardworking folks of the Gwinnett Amateur Radio Society club.

73,

Joe Biddle, AD4PZ

Club President

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 (Offline for Maintenance)	6M Currently down 147.075 Operational in Snellville 147.255 Operational in Snellville 224.580 Operational in Grayson 442.100 Operational at Goshen Springs 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	Link remote receivers being added
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)	

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.

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

- February 13 - DIY PCB Layout Using KiCAD – Kevin Scott K4GTR
- March 12 – Antenna Modeling – Lee Johnson N4WYE
- April 9 – TBD

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

- February 20 – DIY PCB Layout Using KiCAD – Kevin Scott K4GTR
- March 19 – Antenna Modeling – Lee Johnson N4WYE
- April 16 – TBD

GARS Meeting – February 13, 2024
DIY PCB Layout using KiCAD

Kevin Scott, K4GTR, is presenting the current circuit layout capabilities using KiCAD. He will also talk about the inexpensive places to have your circuit layout produced.

GARS Workshop – February 20, 2024

The workshop will be focused on using the KiCAD package for circuit design. Having your laptop with you is a plus.

Besides KiCAD questions, feel free to bring any ham related questions you have including equipment setup and usage. We typically have 5 or more Elmers at each Workshop.

GARS would like to thank Kevin Scott, KA4GTR, for explaining how components have shrunk and the corresponding circuit boards along with the equipment and mechanisms used to solder them to the circuit boards.

GARS Happenings

20 Years ago in the February 2004 GARzette:

- GARS re-issued the concern of Broadband over Power lines interference with FEMA
- There is an article about the Domino Digital Mode – digital chat mode on HF
- There is a list of 17 reasons to join GARS – and they still ring true

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


The GARZETTE

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.

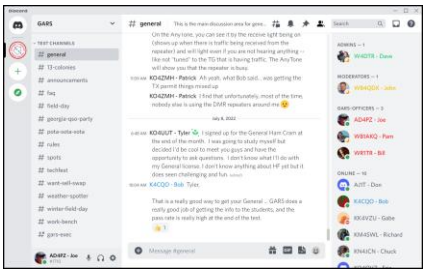
Out of almost 300 members, there are only five operators who serve as the NCS for the GARS net every Monday night. In no particular order, they are:

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 (https://gars.org/contact/) 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. →



GARS TechFest 2024

The GARS TechFest is a FREE annual event specifically geared towards amateur radio enthusiasts.

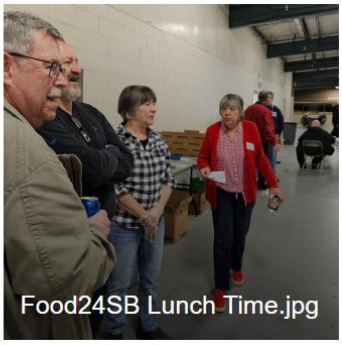
The Chili cook-off winners

Cook-off winners: **1st Place** - Chris Fowler K4KH , **2nd Place** - Paul Kelley W4KLY;

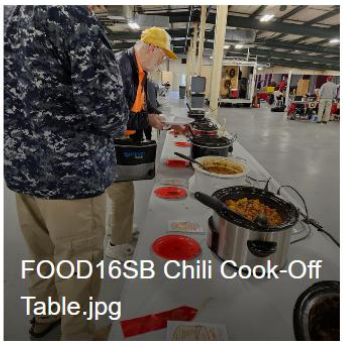
with Joe Biddle AD4PZ, GARS Pres, and David Adcock KA4KKF, TechFest Chairman.

These are pictures commemorating the event


Food25SB Food Court.jpg

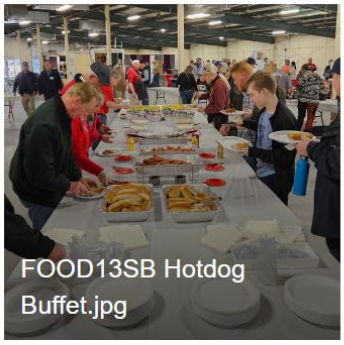

Food24SB Lunch Time.jpg

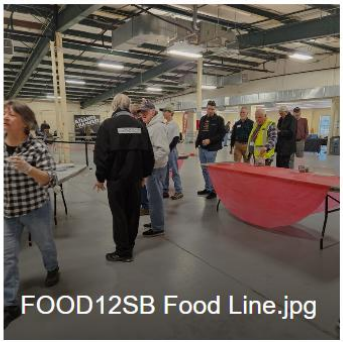

FOOD17SB Chili Cook-Off Table.jpg


FOOD16SB Chili Cook-Off Table.jpg


Food21SB Lunch Time.jpg

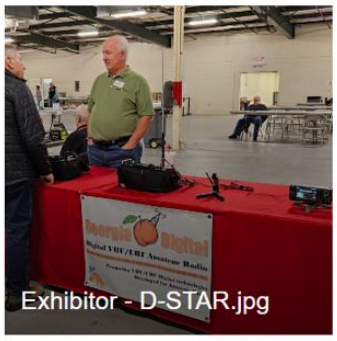

Food20SB Lunch Time.jpg


FOOD13SB Hotdog Buffet.jpg


FOOD12SB Food Line.jpg

Exhibitor -Gwinnett ARES.jpg


Exhibitor - GA POTA.jpg


Exhibitor - D-STAR.jpg


1GARS Table.jpg

NFARL at TechFest – Kit Building & Forums

NFARL - North Fulton Amateur Radio League

Lee N4WYE presented the NanoVNA and Antenna Modeling forums to 53 TechFest attendees.

Kit Building Team 2024	• Fred Ackley W4FRA • Bill Cobb K4YJJ • Wayne Garber KE4WYU • Lee Johnson N4WYE • Ted Macklin K4MPM	• Mike McCarthy KQ4EFL • Clyde McClain AK4TL • Wayne Padgett KC4HCJ • Steve Randall KO4VW • Mike Riley KN4OAK

- 50 Kits, 10 Elmers, 60 Smiling Faces, Life Time of Memories

On behalf of the North Fulton Amateur Radio League, I want to acknowledge and thank the TechFest 2024 team for making the event a real success for our club. This event is a real Gold Mine for the younger Hams! We ran out of both kits!

The preparations by GARS were great, the tables and chairs in place and we had a pretty good spot for traffic. The morning started off a little slow, but by lunchtime, we had a bit of a queue. By the end of the day we had ran out of both Code Practice Oscillator and FM Radio kits for a total of 50 kits. Most of the kits worked initially but a few that required a little “expert” troubleshooting. Each participant got one-on-one attention, and most had never soldered. I was amazed at how fast the younger ones picked up the skill, and got their kits completed. Several of them even built multiple kits.

Thank you all, you made it a most successful event, and I know we will pick up a few new members as a result!

Lee Johnson N4WYE, NFARL Activities Chair.

Upcoming Georgia POTA in April

Second Annual Georgia Parks on the Air Event (April 6-7, 2024).

There is no doubt that “Parks on the Air” is one of the fastest growing sectors of the ham radio hobby. ARRL launched the idea back in 2016 with its “National Parks on the Air” program, focusing on hams with portable radio setups doing field operations in more than 400 national parks across the country. When that event ended, a small but dedicated group of hams decided to continue the program, enlarging it to not only national parks, but thousands of other state and federal parks, with the current total in the U.S. at almost 11,000 official locations. Outside of the U.S., over 100 countries and DX entities have affiliated “Parks on the Air” programs. And the entire POTA program is backed up by an extensive array of awards and certificates that provide an inexhaustible assortment of metrics to gauge one’s accomplishments.

In just a few short years, nearly 15,000 hams have become POTA “activators,” conducting field operations with a wide variety of setups. POTA activators include not only ARES-like hams who enjoy the challenge of self-sustained portable operations, but campers, hikers, outdoor enthusiasts, mobile operators, and families. On top of this, over 40,000 hams have joined the ranks of “hunters,” those who seek out contacts with activators. Importantly, the POTA program has been particularly attractive to younger hams and those new to the hobby, helping to assure the future popularity of ham radio generally.

As part of this groundswell of enthusiasm, hams in several states launched special events to activate many of their state parks during a designated weekend. Sensing that Georgia’s active and enthusiastic hams would appreciate a similar opportunity, in 2023 some hams from across the state launched the first annual “Georgia Parks on the Air” event. Although there are over 200 POTA locations in the state, the event focused on a distilled set of 50 state parks, with the objective of having hams fan out across the state to activate all 50. The result was a resounding success. Of the 50 listed parks, 48 were activated, with 109 activators making nearly 20,000 contacts with over 4000 hunters! And the feedback was overwhelmingly positive: “One of the best radio events ever!” “Great fun – do it again.” “Involved a bunch of new hams and they loved it!”

Having exceeded expectations in 2023, the plan is for an even bigger and better event in 2024. The number of designated locations has been increased to 52, adding two new parks that were recently added to the POTA registry: Stone Mountain Park and Centennial Olympic Park. Several changes were made to the awards categories, including now separate classes for “rovers” and single-park activators, and recognizing a new category for QRP activators. There are also new bonuses available, including not only bonuses for “repeat offenders” but also for first-time activators and those who make contact with the two newly added locations. Overall, there are now five categories of awards for activators, as well as awards for in-state and out-of-state hunters. And, as last year, everyone who registers will receive a certificate of participation. Furthermore, the process of submitting logs and receiving awards has been greatly automated, making it even easier for everyone to join the fun.

Since the event, like the POTA program generally, is intended to be casual and relaxed, the rules are simple and designed to be accommodating to hams of all stripes. The rules allow participation by anyone who can set up a radio at a park bench, in an RV, in a vehicle, in a cabin, or in any other way imaginable as long as the setup is within the confines of a listed park. The rules themselves, along with other helpful information, are available on the event’s website: https://gaparks.org.

GARS members have several parks within short-driving distances, and there is no limit on how many people or clubs can activate any given park. If a park has multiple hams operating there, all one need do is to follow the usual practices of spreading out a bit, coordinating bands and modes, and generally make sure the operations don’t bump into each other. Having said that, though, a large part of the fun of the event is setting up at parks on either Saturday or Sunday to be the sole activator. It is still early in the 2024 process, so only a few parks have activators already signed up. The signup list is available

is also available on the event's website.

For those who are already POTA devotees, this is another event to add to the catalog of POTA accomplishments. For those who are new to the program, this is a completely perfect chance to give it a try, either by joining those already doing an activation, or by being bold and trying it alone. For ARES operators, the event provides other venues to practice and perfect portable operations. In fact, it's hard to imagine anyone for whom the 2024 event won't be a great way to jump on the air.

For any questions, feel free to contact any of the organizers at info@gaparks.org.

ARRL Membership now free for Students

ARRL Board Approves Free Membership for Students.

The Board authorized a new, free ARRL membership for students. For decades, ARRL has offered a reduced dues rate for young hams, currently priced at $30 per year. At this meeting, the Board established a new option for a no-cost Associate membership for full-time students aged 21 and younger.

GARS Nominated Officers for 2024

February each year, GARS has its officer elections. In the February meeting (2/13/24) any additional nominees can be provided and the present members will vote for the GARS officers. The current list of nominees:

- President – Kevin Igarashi-Ball, W4KIB
- Vice President – Alex Kowalchuk, AK4AM
- Treasurer – Glen Wendt, W3WWT
- Secretary – Bill Hawkins, WR1TR
- Program Manager – Kevin Scott, K4GTR

Making a Transceiver - Cubic Astro 103

Vintage Amateur Radio

de Bill Shadid, W9MXQ

One of the last of what we refer to as the large post-WWII American manufacturers to design and market amateur radio equipment was Swan Manufacturing. It is true that they did not come on the scene until the 1950's, but still they were once one of the largest, if not the largest manufacturer of amateur radio equipment. They survived into the 1980's and went through name changes. During their time as Swan Electronics and were acquired by the conglomerate, Cubic Corporation. That led the former Swan operation into military electronics where they exist to this day making communication products as a part of Cubic's many operations. Some of those Cubic communication products lend their roots back to the Swan product line, even now.

The point that Swan was once one of the largest, if not THE largest, producer of ham radio equipment in the United States comes from Ray Grenier, K9KHW, retired Sales Manager of the Amateur Electronic Supply (AES) chain of stores[1]. Ray noted that at one time Swan products accounted for the major portion of the new product warehouse space at the AES anchor store in Milwaukee, Wisconsin. For the most part, Swan was known for making equipment that focused on SSB. In some models, Swan radios did reasonably well on AM as well. All had the capability to operate on CW – but CW was an afterthought on most Swan branded models. Like Collins transceivers, KWM-1 and KWM-2 models, CW was difficult without a Remote VFO because there was no way to adjust the offset between receive and transmit to get the most comfortable receive tone. To be fair, unlike Collins, there was at least a reasonable CW offset built into Swan models. This acceptable offset was also present in other popular transceivers of the day – such as those from Drake in the TR-4 Series and later the TR7.

This article will not cover a complete story of the many models and ham radio market segments where Swan focused[2]. Instead, it will present a story of one of the last products the company marketed to the amateur radio community – and an attempt to save it from oblivion. That last model was the Cubic Astro 103 HF Transceiver, introduced in 1981.

Cubic Astro HF SSB/CW/RTTY Transceiver (included WARC Bands)

W9MXQ Collection

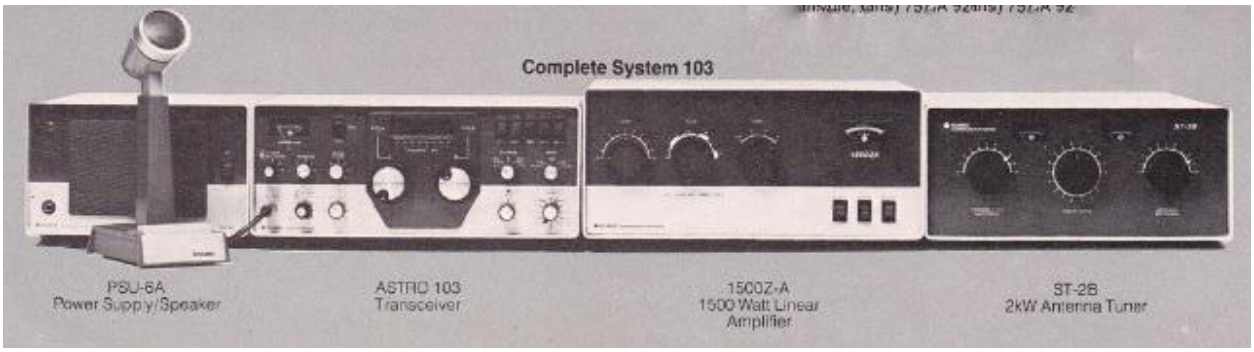
Swan's corporate owners for many years, Cubic Corporation, attempted to jump start the lagging technology in the Swan product line in the late 1970's by acquiring CIR Industries. CIR, with its state-of-the-art digital line of radios, would soon see that technology included in the Swan radio product lineup.

By 1981 and the introduction of the Cubic Astro 103, pictured above, Swan had changed its marketing name to Cubic. The 103 was an improved model of the original concept, the Swan 102BX and the

identical but Cubic branded 102BXA. The Astro 103 is about the size of the Collins KWM-2. Some of its important specifications are:

- All Solid State 160 through 10-meter band operation – including the 30-, 17-, and 12-meter WARC Bands (but not the later 60-meter band). Suitable band overlap to allow for MARS operation.
- Provision for feeding antenna line and mute for an external receiver.
- Two discrete PTO (Permeable Tuned Oscillators – variable inductor tuned) for frequency control – with separate selectable VFO operation possible. The Two PTO units could be selected with the PTO MODE switch:
  - **A** – Transceive on the A (left) PTO
  - **RX A TX B** – Receive on the A (left) PTO and Transmit on the B (right) VFO
  - **B** – Transceive on the B (right) PTO
  - **RX B TX A** – Receive on the B (right) PTO and Transmit on the A (left) VFO
  - **EXT** – External Frequency Control (details later in this article)
- Transmitter with 235 watts input (nominal 100-watt output) final amplifier.
- Industry leading QSK CW with operation rivaling or exceeding market leader QSK transceivers from Ten-Tec.
- SSB, CW, and RTTY dedicated modes included. Optional 400 Hz Narrow CW and RTTY i-f filter. CW output pulse waveform shaping front panel selectable.
- Cascaded 9 MHz 8-Pole and 13.8 MHz 8-Pole filters producing continuously variable 600 Hz to 2700 Hz operation i-f bandwidth.
- Continuously variable AGC in addition to I-F Sensitivity and RF Gain controls to allow for maximum receiver sensitivity control.
- Military Grade Glass Epoxy Circuit Boards throughout – in keeping with Cubic's military communication business – which exists to this day.

Cubic also produced a line of accessories for the Astro 103 Transceiver that included:



Left to Right

Cubic PSU-6A Power Supply/Speaker – Astro 103 HF Transceiver Cubic 1500ZA Linear Amplifier – Cubic ST-2B Antenna Tuner

Cubic Sales Brochure – Cubic Astro 103

As the early 1980's progressed, it appeared that reduced advertising was showing a decline in interest in the amateur radio product line from Cubic. Four of us with experience in the radio broadcast and point to point communication equipment industry were extremely impressed with the performance of the Cubic Astro 103, and felt that there remained a strong market for the products. At the time, I worked with Fred L. (Ted) Bailey, W9DYQ[3], two other fellows in the industry, and a potential manufacturer in Bloomington-Normal, IL, in a study of the possibility of manufacturing these radios under license. Time goes by and now I am left as the only survivor of that team with the others having passed away many years ago.

By the 1980's the Japanese manufacturers were moving ahead, technically, of their American counterparts. While Ten-Tec and by now the Astro series from Swan/Cubic have perfected QSK CW to a high order of performance – far ahead of their rather klutzy Japanese competition – the other parts of the transceiver experience were scoring significant performance points for Icom, Kenwood, and Yaesu.

An important area of study for an updated Astro 103 (which we affectionally referred to as our "Astro 105") was to utilize PLL oscillators in place of the Astro 103's PTO variable frequency oscillators. While very stable for the technology being used, the Astro 103 offered less frequency stability than the PLL VFO's in the Japanese competition. Some breadboarding was done and even tested in an R&D radio we used for our tests.

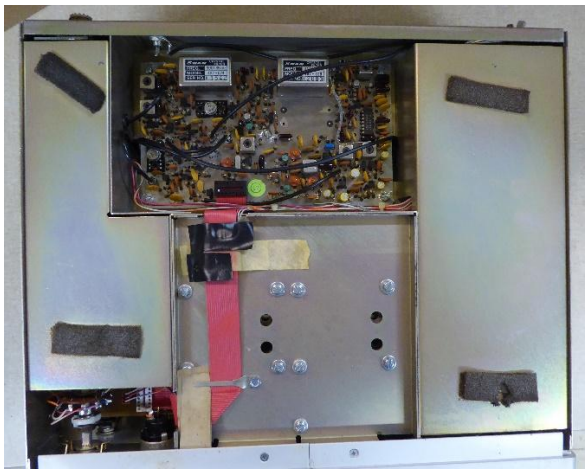
As it turns out (and learned only somewhat later), we were working on technology planned for the never produced Drake TR8 Transceiver, the successful but short-lived Drake RV75 Remote VFO for the TR7, TR7A, and TR5 Transceivers, and the soon to be released (at the time) Ten-Tec Omni V Transceiver. To be fair in this analysis, the Collins KWM-380 HF Transceiver was released with this technology in 1980 – but at a price that kept it away from the main-stream in the amateur radio market.

Also coming on stream was the automatic antenna tuner – in its infancy in the early 1980's but available none the less as external and built-in accessories in many Japanese radio models. Like the other American manufacturers, we looked at available third-party automatic antenna tuners and how to perhaps integrate them into our radio. This is as done later by Ten-Tec and their work to integrate LDG tuners within their transceivers and to provide seamless control of the devices as if they were designed into the radio.

An area of concern with upgraded technology in frequency generation was receiver noise. Some of the quietest receivers on the market – even compared to today's radios – were free running VFO's and crystal heterodyne frequency mixing schemes. To this end, we worked with PLL oscillators to replace the PTO oscillators but kept the crystal mixing scheme. Ten-Tec used this same concept with the later Omni V transceiver that utilized a PLL based VFO but kept crystal mixing and was known for its quiet receiver.

The mechanical considerations of the radio design were well satisfied with the Cubic Astro 103 with its Cadmium plated, yellow chromate conversion coated, carbon steel chassis, shields, and painted top and bottom covers. Large scale integration in circuitry had already been seen in Japanese equipment but seemed to be cost prohibitive to the volumes we perceived as attainable for the product. So, we stayed with generally available active devices.

The interior of the transceiver is cleanly planned as shown below:



R&D Cubic Astro 103 HF Transceiver at W9MXQ
Top View (front Panel at Bottom) on the left
Bottom View (front Panel at Bottom) on the right

Some interesting notes apply here. The Cubic Astro 103 owes much of its design to the initial Swan Astro 102BX. However, one of the biggest differences between the two is the appearance of the 30-, 17-, and 12-meter WARC bands on the Astro 103. The picture above, left, shows at the right side, the Preselector Board. At the rear of that board, you can see a smaller daughter that includes the three added bands. (In this view, you can also see an experimental linear amplifier switching board that covers the rear of the three added band preselectors.) Note that bottom shields – left and right sides – do not appear in the transceiver at W9DYQ. They are on both transceivers at W9MXQ.

The picture above, right, at the back (top of picture) shows the Exciter Board with the two SSB filters that are cascaded in use – providing for a continuously variable 600 to 2700 Hz bandwidth. Looking carefully at this board shows an open place below the right-hand filter in this picture. Cubic offered a 400 Hz CW / RTTY filter for that location that provided better shape factor than the cascaded filters could provide at that bandwidth. Cubic was focused on good CW performance in this radio.

Above is a beautiful example of the Cubic Astro 103 HF Transceiver in use at W9DYQ. This Astro 103 is equipped with the optional 400 Hz dedicated CW /RTTY filter in the 13.2 MHz i-f. In operation, this filter, in receive, is in cascade with the 9 MHz SSB filter.

Below are a pair of Cubic Astro 103 HF Transceivers at W9MXQ. The top unit is the R&D unit from the 1980's when the analysis was being made. The bottom unit is the regular operation radio. The power supply to the left is the Swan PSU-6 – identical to the Cubic PSU-6A except for the paint scheme. The regular operation unit on the bottom is also pictured at the opening of this article with its own Swan PSU-6 Power Supply/Speaker Console. That unit and the one from W9DYQ are remarkably close in serial numbers.

Cubic Astro 103 HF Transceivers at W9MXQ

W9MXQ Collection

Cubic had a relatively unique feature in the Astro 103 model that was never developed with any accessory. When describing the use of the PTO MODE Switch, above, the EXT position was identified. The relates to the EXT LO (External Local Oscillator) connection on the rear panel – on the Cubic Astro 103 pictured at the beginning of the article:

When the PTO MODE is in the EXT position, the signal from the two PTO units is no longer connected to the radio. That allows the injection of a signal from an external oscillator that was not supported by any Cubic product. As described in the Astro 103 Owner's Operation Manual, a proper signal can be injected trough EXT LO connector on the rear panel. The manual describes this signal as being:

For LSB	For USB and CW
$f_{LO} = F_{CARRIER} + 9.0000$ MHz	$f_{LO} = F_{CARRIER} + 9.0033$ MHz
f_{LO} is the Injected Signal Frequency – keep level at 0 dBm	

Experiments with the R&D unit in the 1980's showed that an external oscillator could effectively replace one or both of the PTO's. Programming one of the many oscillators available these days could easily substitute for transceiver or separate receive and transmit – and allow for today's stability requirements even for digital data modes[4].

One final comment is about the unique marketing philosophy of Cubic at the time. There were essentially two radios that preceded the Astro 103. Those were the non-WARC Band Swan Astro 102BX and Cubic Astro 102BXA. Those two were identical except for brands name (Swan vs Cubic. Respectively) and cabinet color (black vs beige, respectively). Here are the two of them for review:

Swan Astro 102BX HF Transceiver

Cubic Astro 102BXA HF Transceiver

These transceivers are electronically identical.

Cubic Corporation offered a program where for a fee they would convert a customer's Swan Astro 102BX or Cubic Astro 102BXA into a full specification equivalent Cubic Astro 103 – even to the point of a new Cubic Astro 103 front panel. But, as you know about collectors, there are always ways to spot the changed unit. If the unit was a Swan Astro 102BX, the unit retains the black cabinet covers, has a back panel that is unique to the 102BX and 102BXA, and retains its 102BX Serial Number Label. If it was a Cubic Astro 102BXA, the unit retains its back panel that is unique to the 102BX and 102BXA and its 102BXA Serial Number Label. A converted Swan Astro 102BX or a Cubic Astro 102BXA lacks the ability to accommodate an external receiver[5].

Astro 102BX and 102BXA Back Panel
W9DYQ

Astro 103 Back Panel
W9MXQ

A note about the EXT MOD connector – this is in parallel with the microphone jack and allows for such external modulation as from an AFSK sound generator for RTTY or other digital mode.

As is history now, the idea of proposing a manufacturing program for the Cubic Astro 103 and the associated accessories and other Astro transceiver models never came together. It was not for the lack of trying but the cost realities for such a low volume enterprise, the necessary marketing costs to re-invigorate the name, and other related factors left this as a very pleasant exercise with good ham radio friends. Even my friend Bob, current W9DYQ. and I only began discussing it in recent years. But we both now keep our Cubic Astro 103 Transceivers alive and well – and on the bands. In fact, we just found, together, a parts-only unit that will hopefully improve some readout problems for W9DYQ's Astro 103 and provide the optional CW filter for the main Astro 103 at W9MXQ – and a few other parts we can use to keep our radios running in top shape.

In closing this month's Newsletter, I want extend appreciation to the Ozaukee Radio Club for my receipt of the President's Award for helping to produce a great club newsletter. That award also went to fellow long-time writers, Gary Sutcliffe, W9XT, and Stan Kaplan, WB9RQR. Writing has its own rewards, but recognition is certainly welcome and appreciated. I also appreciate being awarded recognition in an International Goodwill Award for these Vintage Radio Articles and the subsequent spreading of the name of the Ozaukee Radio Club in areas far removed from Southeast Wisconsin.

I appreciate that you read my articles. Remember that I am open to questions and comments anytime at my email address, W9MXQ@TWC.com.

A special note of thanks to my proofreader, Bob Bailey, W9DYQ. Bob is a bit more than a proofreader as he often adds commentary that makes it into the article. That is truer than ever this month as we shared stories on our "Astro Experience."

Credits and Comments:

[1] This was input received in a personal conversation with Ray Grenier, K9KHW, who for many years was the Sales Manager of the Amateur Electronic Supply (AES) chain of stores. He was at the anchor store and main warehouse for the firm. The AES name is now absorbed into Ham Radio Outlet (HRO) (http://www.hamradio.com). Their store in Milwaukee, Wisconsin, is one of the largest HRO stores.

[2] This is the first of several articles on Swan and especially Cubic radios carrying both the Swan and Cubic names. Previous articles have chronicled older models such as the Swan 350 and 500 Transceivers, the Swan 750cw Transceiver, as well as the Swan 600-R / 600R Custom Receivers and 600T Transmitter. The new series will delve into the acquired CIR Astro Transceiver line, the Swan Astro Line, and the final Cubic Astro Line products.

[3] The call, W9DYQ, his now held by Ted's son – my long-time friend, fellow collector, and proofreader of these articles. Robert L. (Bob) Bailey, W9DYQ.

[4] An ideal example of such an oscillator would be the Elecraft XG3 Programmable Signal Generators or the KKmoon KY6800 DDS Dual-channel Function Signal Generator. The KKmoon KY6800 was used to make a general test for writing this article.

[5] The Cubic Astro 103 unit at W9DYQ is, as you can tell from the above, a converted Astro 102BX. In fact, its serial number plate identifies it as so. Also, noting the above comments about bottom shields, the Astro 103 at W9DYQ does not have bottom shields nor does it show evidence of a way to mount them. Did the Astro 102BX not have such shields? The investigation continues!

W9MXQ

GARS Membership

New Members in January

Clay Hamilton (KE8IWD)
Earnest Moodie (KQ4MKS)
Pamela Stallings
Don Pace (KQ4LWU)
Linda Pace
Douglas Papciak (KI4VDU)
Barry Sharp (N4CS)
ROBERT WHITE (KQ4NUQ)

New Members: 8

Total Members as of February 1, 2024
361

Join GARS members for our:

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

Both weekly gatherings are held at The 5 Spot at:

The 5 Spot restaurant
555 Progress Center Ave, Lawrenceville, GA 30043

Birthdays in February

Marvin Atherton (KG4FHB)
Susan Brack
Shari Branson
Nancy Curdy (KQ4EBZ)
Michael Curtis (KK4WWB)
Kimberly Fodero
Tom Forkner (KQ4EWO)
Eddie Foust (WD4JEM)
Paul Francis (KG4HCX)
Bob Hensey (K4VBM)
Sandy Jackson (KJ4DRO)
Suzy Jones (KK4MWC)
Eva LaBerge (N4OCO)
Bruce Lindsey (K0GNB)
Edward Lodden (KX4KL)
David May (KK4SWN)
Carlton McPherson (WA4ZUW)
Aaron Morris (KG4ALB)
Don Pace (KQ4LWU)
Steven Richardson (N4STR)
George Sensibar (W9RR)
Lori Silva (KK4NFW)
Luann Smith
Lee Stone (KT4LS)
Emily Wagner (KN4GZJ)
Sharon Willet (KM4TVU)

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 – http://www.gars.org. 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

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

GARS on Social Media

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

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

Visit GARS on Facebook:
http://gars.org/facebook

Follow GARS on Twitter:
http://gars.org/twitter

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

GARS Mail Address:

GARS
P.O. Box 492531
Lawrenceville, GA 30049

Officers

 Joe Biddle, President AD4PZ

 Alex Kowalchuk, Vice President AK4AM

 Bill Hawkins, Secretary WR1TR

 Pam Meridy, Treasurer WB1AKQ

 Kevin Scott, Program Manager K4GTR

Managers and Committee Chairs

 Karen Albritton, Membership Chair KI4HPP

 Dave Bruse, VE Team Leader W4DTR

 David Adcock, Webmaster, Field Day Chair, TechFest Chair KA4KKF

 Ralph Pickwick, Education Chair KJ4CNC

 Earl Whatley, Apparel Manager AF4FG

 Bob Hoffmann, GARzette Editor K4CQO

 Eddie Foust, Repeater Chair WD4JEM

 Mike Weathers, WAS / DXCC QSL Card Checker and Historian ND4V

 Chuck McCord, Net Manager KK4TKJ

 Steve Back, Technical / RFI Advisor WB2OGY

 Dallas Mellichamp, Workshop Leader N4DDM

 Sandy Jackson, Health and Wellbeing KJ4DRO

 Kevin Igarashi-Ball, Multimedia Chair W4KIB

 Dallas Mellichamp, Georgia QSO Chair N4DDM

 Neil Derryberry, Elmer Manager WD4NET

Open Winter Field Day Chair

Directors and Trustees

 John Davis, WB4QDX

 Rick Cobb, N4XYY

 Kyle Albritton, W4KDA

 Bill Cherepy, WB4WTN W4GR Trustee

GARS Meeting Minutes

Gwinnett Amateur Radio Society – MEETING 1/09/2024

There were 44 in-person attendees

President Joe Biddle (AD4PZ) opened the meeting at 7:00 p.m. and closed the meeting at approximately 8:35 p.m.

New hams and visitors: Joe (AD4PZ)

- First time visitors recognized.
- Upgrades recognized.
- Introductions all around.

Treasurer Report: Joe (AD4PZ)

Education: Ralph (KJ4CNC)

- ARISS Amateur Radion in the International Space Station - contact at Lilburn Elementary the week of February 5th. No specific date set yet . The ARISS event will be live streamed.
- The computer museum in Roswell will have an ARISS contact sometime this summer.

VE Team: Bob (K4CQO)

- This Month we had 1 upgrade to General, and 1 Extra.
- Techfest is coming up.

ARES: Larry AB4NX

- ARES is making improvements on the trailer.
- Mark (N7GRB) gave an update on the hospital networks and encouraged GARS members to get involved.

Programs: Kevin (K4GTR)

- December – Holiday Party
- February – Part 2 of series on surface mount technology
- March – Antenna modeling.
- Any new radio related items are welcome. Contact Kevin (K4GTR)

Apparel: Earl (AF4FG)

- We have a new item. A full zippered hoodie for $35. In red only.

Techfest:

- At county fairgrounds the second weekend of January.
- Volunteers needed for setup and cleanup.
- Come and partake.

Executive Elections: Earl (AF4FG)

- Elections will be held at the February general meeting.
- Anyone interested in being on the ballot for a GARS officer position, contact Earl.

Other: Joe (AD4PZ)

- The repeater was down for a time the morning of the 9th but is back up.
- Winter Field Day – We did not have a coordinator but you can go to the Winter Field Day web site and join a group. Winterfieldday.com.

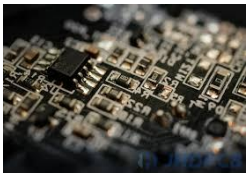
Program: Surface mount technology with Kevin (K4GTR)

Minutes prepared by club secretary Bill Hawkins (WR1TR).

Workshop Minutes - January 16, 2024

Number in Attendance: 11

Workshop Topic: Soldering Surface Technology (SMT) Devices



Presenter: Kevin Scott K4GTR

Brief Summary: A few of us braved the freezing temperatures for this Workshop.

Kevin brought in two soldering stations, each with a video camera and monitor that makes a cost effective microscope for SMT work. Kevin coached the art of soldering SMT and leaded parts and used the microscope to inspect their work and explained how improve their skills to avoid cold solder joints, insufficient solder and preventing solder bridges. Kevin also talked about the importance of using the correct size solder (smaller diameter) and adding flux especially for SMT devices. Also using smaller size solder wick when working with SMT device as less heat is needed.

Dallas brought in some show-n-tell SMT boards to show that high density TQFP (Thin Quad Flat Pack chips with ~200 pins) can be removed/transplanted to other boards several times using hot air, low temp solder, and a standard soldering iron with the aid of a 10x microscope. All without damaging the chips or the boards.

Phil Smith K4PWS the winner of the TechFest Grand Prize (Yaesu FT-710-FIELD) made a guest appearance to pickup his new rig just in time for Winter Field Day.

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

Events – GARS and others

ARRL CONTESTING INFO

From ARRL Contest Calendar

> For more information click the links <

2024	**January**
1	Straight Key Night
6	Kid's Day
6-7	RTTY Roundup
20-22	January VHF Contest
	February
12-16	School Club Roundup
17-18	International DX – CW
	March
2-3	DX Contest -- SSB
	April
21	Rookie Roundup – Phone
	May
	No planned contests
	June
1-2	International Digital Contest
8-10	June VHF
15	Kid's Day
22-23	Field Day
	July
13-14	IARU HF World Championship
	August
3-4	222 MHz and Up Dis Contest
17-18	10 GHz & Up – Round 1
18	Rookie Roundup – RTTY
24-25	EME - 2.3 GHz & Up
	September
14-16	September VHF
21-22	EME - 2.3 GHz & Up – Rnd 2
21-22	10 GHz & Up – Wknd 1
	October
19-20	EME - 50 to 1296 MHz
21-25	School Club Roundup
	November
2-4	Nov. Sweepstakes - CW
16-17	EME - 50 to 1296 MHz
16-18	Nov. Sweepstakes - Phone
	December
6-8	160 Meter
14-15	10 Meter
22	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]

02/09/2024 - 02/11/2024 Orlando HamCation, ARRL Florida State Convention
Location: Orlando, FL
Type: ARRL Convention
Sponsor: Orlando Amateur Radio Club
Website: http://www.hamcation.com

02/17/2024 - Ham Fest
Location: Brooksville, FL
Type: ARRL Hamfest
Sponsor: Hernando County Amateur Radio Association
Website: http://www.hcara.org

02/17/2024 - Highlands County Amateur Radio Club Hamfest
Location: Sebring, FL
Type: ARRL Hamfest
Sponsor: Highlands Amateur Radio Club

02/22/2024 - 02/24/2024 The Positive Impact of Amateur Radio on Human Spaceflight: 40th Anniversary Conference
Location: Merritt Island, FL
Type: ARRL Convention
Sponsor: ARISS-Amateur Radio on the International Space Station
Website: http://www.ariss.org/overview.html

02/24/2024 - Dalton Hamfest
Location: Dalton, GA
Type: ARRL Hamfest
Sponsor: Dalton Amateur Radio Club
Website: https://www.qrz.com/db/W4DRC

03/08/2024 - 03/09/2024 54th Annual Playground ARC Hamfest
Location: Fort Walton Beach, FL
Type: ARRL Hamfest
Sponsor: Family Eye Care, NWFL Ham Radio
Website: https://w4zbb.org/hamfest-2/

03/09/2024 - Flamingo Net Flea at U. of Miami
Location: Coral Gables, FL
Type: ARRL Hamfest
Sponsor: Flamingo Net
Website: http://FlamingoNet.8m.net

03/16/2024 - 49th Annual Stuart Hamfest, ARRL Southern Florida Section Convention
Location: Stuart, FL
Type: ARRL Convention
Sponsor: Martin County Amateur Radio Association
Website: http://www.stuarthamfest.com

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 2023

TechFest	January 13 2024
Winter Field Day	January 27-28 2024
Spring Technician HamCram	March 23-24, 2024
Dog Show Fundraiser	March 5-6 2024
Georgia QSO Party	April 13-14 2024
North metro area Fox Hunt	April 2024
Summer General HamCram	April 2024
Memorial Day Parade	May 27 2024
ARC/KARC Hamfest	June 1 2024
Field Day	June 22-23 2024
JOTA	October 2024
Fall Technician HamCram	September 2024
Stone Mt. Hamfest	November 2-3 2024
Holiday Party	December 7 2024

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
- 2nd Sunday of the Month at 2 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 The 5 Spot
- Every Saturday at 8:00 am GARS Breakfast at The 5 Spot

GARS Calendar for February 2024

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
				1	2 **11:30 AM Lunch at The 5 Spot**	3 **8:00 AM Breakfast at The 5 Spot**
4	5 **7:30 – 8:00 PM 2M Net**	6 **7:00 PM Exec Meeting**	7	8	9 **11:30 AM Lunch at The 5 Spot**	10 **8:00 AM Breakfast at The 5 Spot**
11 **2:00 PM GARS Ham Radio Exams, EAA 690 Hangar**	12 **7:30 – 8:00 PM 2M Net**	13 **7:00 PM Meeting EAA 690 Hangar**	14	15	16 **11:30 AM Lunch at The 5 Spot**	17 **8:00 AM Breakfast at The 5 Spot**
18	19 **7:30 – 8:00 PM 2M Net**	20 **7:00 PM Workshop Meeting EAA 690 Hangar**	21	22	23 **11:30 AM Lunch at The 5 Spot**	24 **8:00 AM Breakfast at The 5 Spot**
25	26 **7:30 – 8:00 PM 2M Net**	27	28	29		

Local Ham Radio Exams & Meetings

GARS Ham Radio Exams

Second Sunday of the month ** Beginning in March, GARS will march to the 3rd Sunday of the month **

Preregistration is REQUIRED
Doors open at 1:45pm, exams start promptly by 2:00pm
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.

January 2023 Results

The GARS VE Team had a great exam session on **January 14th**.

3 New Technicians
- Seraiah Israel: KQ4NWP
- Brooklyn M Schnupp: KQ4NXI
- Rohan Kansal: KQ4OBA

1 Upgrade to Extra – Scott A. Granholm: W4WEL

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

W4DTR - Dave (CVE)
K4CQO - Bob (CVE)
AB4QQ - Russell
AF4FG - Earl
W4SHT - Lynn
WB2OGY – Steve

The GARS VE Team had a great exam session at **TechFest**.

2 New Technicians
1 New General
2 Upgraded to General
1 New to Amateur Extra
1 Upgraded to Amateur Extra

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

W4DTR - Dave (CVE)
K4CQO - Bob (CVE)
KK4TKJ - Chuck (CVE)
AB4QQ - Russell
KD4UYP - Brian
KM4FMW - Donna
KQ4DWZ - Douglas
NV4Q - Bill

Thanks & 73,
Dave Bruse, W4DTR (CVE)
GARS Exam Team Leader

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.

GARS Supporters

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

Business Card	$50
1/4 page	$125
1/2 page	$150
Full page	$200