The GARzette

The Official Newsletter of the Gwinnett Amateur Radio Society

July 2023 http://www.gars.org/ Volume 50, Issue 7

Inside

www.GARS.org

TechFest 25th
Gwinnett Amateur Radio Society

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

CELEBRATING 50 YEARS 1973 2023

Don't forget to support our advertisers at the back of the *GARzette*.

GARS Meeting: GARS Repeaters – David Adcock KA4KKF
Tuesday July 11, 2023 at 7:00 PM

President's Message

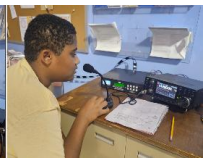
From the President…

Our **June 13 Ice Cream Social / Celebration / June Meeting** was a lot of fun. This tradition of our 'Ice Cream' social came around this year as we, the Gwinnett Amateur Radio Society Club, celebrate our 50th Year of formation. While I personally have not been in GARS for 50 years, I know for my 29 years in the club, this social is something that has always been, and is always rewarding in many ways.

We started with introductions and conducted a short business meeting. Then, some recognitions were given to a few individuals. It was fun to read some GAR'S milestones over the years including asking a few GARS trivia questions. We would later give out many fabulous door prizes.

We then heard from our 2023 Field Day Chairman, David (KA4KKF) about the upcoming Field Day operations and expectations. He explained our needed equipment and some new tips and tricks we would try for a better operating experience.

Then it was Cake and Ice Cream! There was a lot of Ice Cream and Cake – Cupcakes, that is. It was fun to see a few red GARS members faces as folks tried to eat the red frosted cupcakes. They may have been a bit messy, but they were delicious. Did I mention that we had numerous fabulous door prizes that we gave out?? See more of this event at: https://groups.io/g/GARS/album?id=287743



On **June 16th**, several GARS volunteers helped to educate the youth of the **2023 EAA Summer Camp** in the skills area of circuit board component populating and the soldering of a morse code tone producing kit. We also provided an introduction into Amateur Radio, including an On the Air contact experience with a **W1AW/5 Special Event 'Volunteers on the Air'** station in Arkansas. To see more pictures of this, visit: https://groups.io/g/GARS/album?id=287908

Thanks to the GARS volunteers: Earl (AF4FG), Joel (WA4HNL) and myself Joe (AD4PZ).

I felt we had a good **GARS Field Day Event** this year on June 24th, in spite of the lesser than ideal band conditions. The temperatures were pretty moderate and actually kind of cool at night and the early morning hours. David posted the contacts made in an email, but look for them in this newsletter as well.

Be sure to visit the **Field Day Photo Album**: https://groups.io/g/GARS/album?id=287609

Lastly, please visit GARS TUBE on YouTube. Kevin (W4KIB) has taken over our video production/editing department and our recently uploaded GARS Videos benefit from his talents.

Going forward, our videos will continue to be produced at the level of quality and excellence thanks to the initial video set-up Kyle (W4KDA) put in place. Be sure to 'like' 👍 each video and 'subscribe' 🔔 to the channel to ensure you will not miss future uploaded GARS Videos. Visit: https://www.youtube.com/garstube

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)

- July 11, 2023 – GARS Repeaters – David Adcock KA4KKF
- August 8, 2023 – Mobile Radio Installations – Alex Kowalchuk AK4AM
- September 12, 2023 – Favorite Websites
- October 10 2023 - Show-n-Tell, Favorite Ham Projects
- November 14, 2023 - **TBD**

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

- July 18, 2023 - GARS Repeaters - David Adcock KA4KKF
- August 15, 2023 - Mobile Radio Installations - Alex Kowalchuk AK4AM
- September 19, 2023 - Favorite Websites
- October 17 2023 - Show-n-Tell, Favorite Ham Projects
- November 21, 2023 - **TBD**

GARS Meeting – July 11, 2023
GARS Repeaters

Find out what type of hardware we run and where repeaters are located.

How we interface with the county for locations.

GARS Workshop – July 18, 2023

This is a GARS workshop for any Q&A for your Amateur Radio projects and adventures.

Besides setting up connections to the GARS repeaters, feel free to bring along your show-n-tell items and questions. We typically have 5 or more Elmers at each Workshop.

GARS would like to thank the entire Field Day team, especially David Adcock (KA4KKF) for our successful Field Day experience.

GARS Happenings

20 Years ago in the July 2003 GARzette:

- David, KA4KKF was doing Field Day 20 years ago – visit the pictures to see some of the equipment and members of 20 years back
- An announcement of the 60m band becoming available
- An article about ARRL being an affiliate of the Citizen Corps section of Dept of Homeland Security

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


The GARZETTE

Special Election Notice

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.

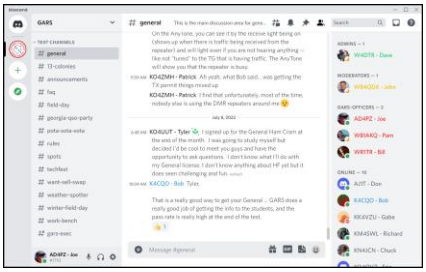
Out of almost 300 members, there are only seven operators who serve as the NCS for the GARS net every Monday night. In no particular order, they are:

Ray – N4GYN David – KA4KKF Kevin – W4KIB Fisher – W4LON 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 Field Day 2023

June 26th The day after Field Day Weekend. Everyone is trying to recover from the long weekend of operating radios. They are putting their gear back on the bench or operating table. Making notes on what went right and what could have been done better. This exercise or contest or event is one of the best known throughout the amateur community. Clubs make it a social, fun event and show off the many facets of amateur radio. A lot of guys will operate from home with 1 operator or 2 or 3 friends. There are some groups that will operate from EOC's or campgrounds, parks.

Our club, Gwinnett Amateur Radio Society and Gwinnett Amateur Radio Emergency Service operated from a county park. We had walkers, cyclist, and people stop by to see what was going on. We operated 8A 100 watts or less. We used bazooka and dipoles and half wave end fed antennas. We also used an extra antenna for receive. The receive antenna was 600 feet from the radio operation area. 25 feet of wire in a vertical position with a 3khz to 30mhz preamp at the base. This fed a splitter for each radio to use. Radios used t/r switches or its own external receive antenna connections. We use N3FJP logging software and ethernet cables from the server to each station's computer. We have found that cables work better and faster than wifi in this environment.

2023 turned out to be a digital and cw type event. SSB was not up to its usual operation. We had a lot of new guys at field day and they ask a lot of questions. This is one operation where people can ask a lot of questions and get a lot of different answers from the old timers. Our band captain's setup their rigs to allow a logger or someone who wanted to listen the ability to do so.

Our club provided Breakfast, lunch, dinner, and ice cream at midnight on Saturday. Sunday morning breakfast was burritos with eggs, sausage, bacon, bell peppers, sauces, and sour cream. Drinks, milk, orange juice and water to top it off.

We had 29 operators on the 8 stations. We made 1575 contacts with the 8 stations. I want to thank all the volunteers that came out and helped setup and tear down. Thank the band captains that brought their equipment out and the cooks, runners, servers, transporters. GARS and ARES members are the best. Planning for next year's Field Day will soon begin again.

David, KA4KKF
2023 Field Day Chairman

Here are the Field Day numbers by mode and operator.

```
CW  contacts for - W4KLY     =   144
CW  contacts for - ND4V      =    39
CW  contacts for - NN4K      =    37
-----------------------------------------
DIG contacts for - KA4KKF    =   159
DIG contacts for - KO4OVZ    =   134
DIG contacts for - WB4QDX    =   118
DIG contacts for - N7GRB     =   100
DIG contacts for - W4RMZ     =    82
DIG contacts for - KO4QBC    =    59
DIG contacts for - W4KIB     =    57
DIG contacts for - KQ4HIR    =    43
DIG contacts for - KQ4EBZ    =    13
-----------------------------------------
PH  contacts for - N4DDM     =   151
PH  contacts for - W4GOP     =    75
PH  contacts for - K4GTR     =    72
PH  contacts for - AD4PZ     =    70
PH  contacts for - AF4FG     =    43
PH  contacts for - WD4JEM    =    37
PH  contacts for - W7ALS     =    34
PH  contacts for - KN4DY     =    24
PH  contacts for - WB8ICQ    =    16
PH  contacts for - KJ4CNC    =    15
PH  contacts for - AJ4ZP     =    12
PH  contacts for - WRITR     =    11
PH  contacts for - KQ4HIR    =     7
PH  contacts for - KA4KKF    =     7
PH  contacts for - W4CWL     =     3
PH  contacts for - N4STR     =     3
PH  contacts for - KO4QBC    =     3
PH  contacts for - W4SHT     =     2
PH  contacts for - W4IGE     =     2
PH  contacts for - ARRL-FD2023 =   2
PH  contacts for - KN4WBS    =     1
```

```
ALL contacts for - KA4KKF    =   166
ALL contacts for - N4DDM     =   151
ALL contacts for - W4KLY     =   144
ALL contacts for - KO4OVZ    =   134
ALL contacts for - WB4QDX    =   118
ALL contacts for - N7GRB     =   100
ALL contacts for - W4RMZ     =    82
ALL contacts for - W4GOP     =    75
ALL contacts for - K4GTR     =    72
ALL contacts for - AD4PZ     =    70
ALL contacts for - KO4QBC    =    62
ALL contacts for - W4KIB     =    57
ALL contacts for - KQ4HIR    =    50
ALL contacts for - AF4FG     =    43
ALL contacts for - ND4V      =    39
ALL contacts for - WD4JEM    =    37
ALL contacts for - NN4K      =    37
ALL contacts for - W7ALS     =    34
ALL contacts for - KN4DY     =    24
ALL contacts for - WB8ICQ    =    16
ALL contacts for - KJ4CNC    =    15
ALL contacts for - KQ4EBZ    =    13
ALL contacts for - AJ4ZP     =    12
ALL contacts for - WRITR     =    11
ALL contacts for - W4CWL     =     3
ALL contacts for - N4STR     =     3
ALL contacts for - W4SHT     =     2
ALL contacts for - W4IGE     =     2
ALL contacts for - ARRL-FD2023 =     2
ALL contacts for - KN4WBS    =     1
=======================================
   Total contacts     =    1575
   - CW  contacts     =     220
   - DIG contacts     =     765
   - PH  contacts     =     590
   = ALL contacts     =    1575
```

The Kenwood TS-900

Vintage Amateur Radio

de Bill Shadid, W9MXQ

In 1971, we saw the first of what would become one of the most successful of the new Japanese entries into the North American market, Trio-Kenwood. For this article, we will refer to them as Kenwood. At that time, Kenwood did not have any established business entity in the United States or Canada. As they took the first steps to become part of this market, they contracted with large North American radio distributor, Henry Radio, to market and distribute their products. To be sure, the Kenwood radios would be found at places other than Henry Radio's three store fronts in the United States, with headquarters in Butler, MO. Kenwood's first HF radio in the North American market was the TS-511S HF Transceiver[1]. But for this article we are going to discuss the second HF radio to be seen here, the TS-900 HF Transceiver, introduced in 1973. The first of the long line of Kenwood "900 Series" Transceivers.

Left to Right

PS-900 Power Supply, TS-900 Transceiver, VFO-900 Remote VFO

Shown with – Left to Right
Kenwood MC-50 Microphone, HS-6 Headphones, Johnson Speed-X Key

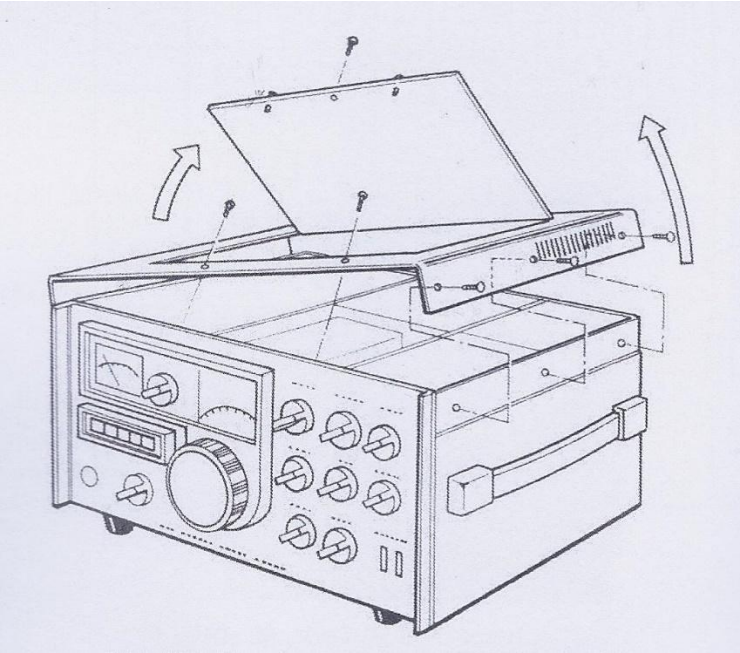
W9MXQ Photo

The 900-Series Kenwood radios would always tend to lead or be equal with features available at the time in ham radio. In the case of the TS-900 that leading-edge technology was incorporated with the use of the VFO-900 Remote VFO – shown above to the right of the TS-900 Transceiver. The VFO-900 could by synchronized with the VFO in the TS-900 – the user did not have to switch back and forth between VFO's while listening to one and the other to make sure they were tuning the same signal.

The VFO synchronizing feature was not offered by any other manufacturer at the time. Certainly not by

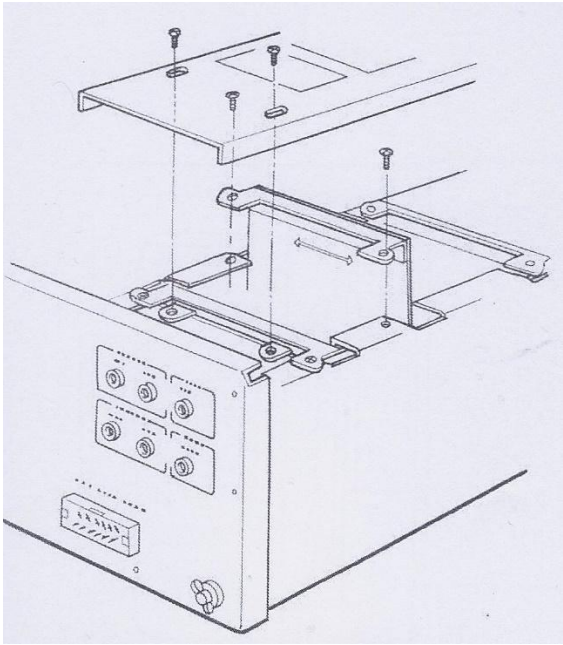
technology leader, Collins, with its KWM-2 Transceiver and 312B-5 Remote VFO. Also, VFO sync is not a feature of the popular Drake TR-4 Transceiver with its RV-4 Remote VFO or any of the other installations that I know about from the time. Perhaps a close second in this feature was the Hallicrafters SR-400 Transceiver with its HA-20 Remote VFO (called a “DX Adapter” by Hallicrafters) that allowed listening to both the radio and the remote VFO signals at the same time.

The TS-900 is a modular design radio with a motherboard connection scheme (see later for details) and plug-in daughter boards. This technology – quite popular in commercial radios to perhaps better support the field repair process – has not survived past this period in most ham radio designs. Knowing that the average ham is not going to have unique daughter board service apparatus, Kenwood designed the TS-900 to be serviceable (for the most part!) without the need for board extenders and/or special tools. To illustrate this technique, note these pictures for daughter board access, removal, and service position:



Here is a picture of the opening of the cabinet. Screws are removed from the top and right side, as shown, to allow the complete cabinet top to open via left side hinges to expose the entire top of the radio.

Kenwood TS-900 Operations Manual.

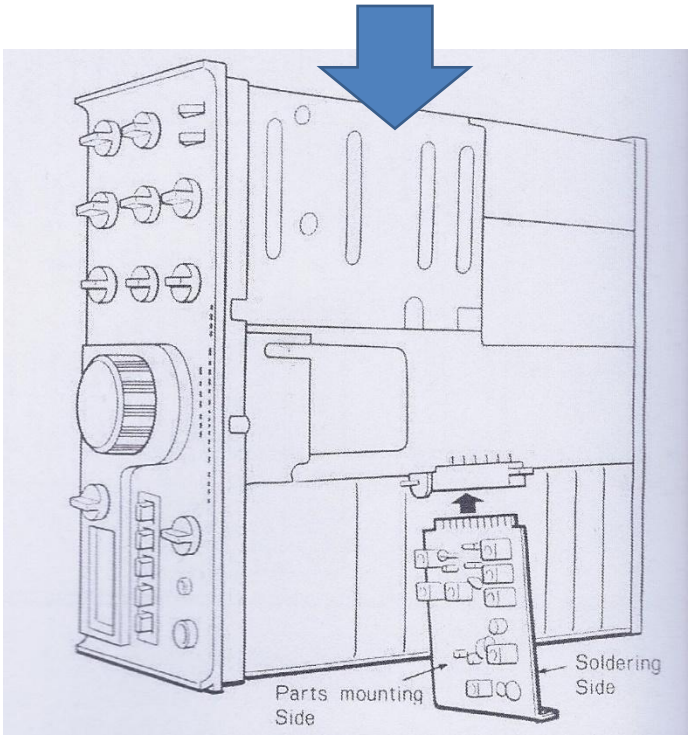


Here is a picture of the removal of top shields (covering the installed daughter boards) for individual board access. Note that each board is held in place with two screws.

As you can see, the above picture and this one shows from the perspective of the front of the radio (above) and from the back of the radio (left).

Kenwood TS-900 Operations Manual.

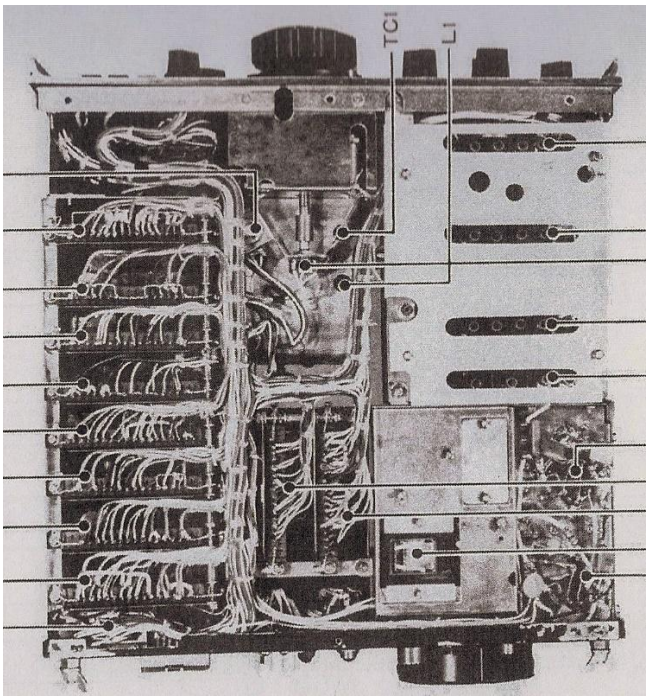
For the next picture, there is an assumption that the user has by now removed the entire cabinet for access to the bottom of the radio. When removing the entire cabinet, be careful that the hinged top is not damaged – as one removes the radio upward out of the cabinet, the offset hinged top can cause the empty cabinet to shift in the direction of the hinged side of the now unrestricted enclosure – be careful!



Once the daughter board being serviced is removed, the radio is turned on its side, as shown, and the board's connector is unscrewed form one side and hinged outward, away from the chassis. The removed daughter board is then re-inserted into the connector to allow it to operate while being accessible. The arrow points to the only area of boards that cannot be serviced in the way described herein.

Kenwood TS-900 Operations Manual.

Mentioned above is the unique "motherboard connection scheme." This is different from the classic printed circuit board motherboard in that it takes the form of a wiring harness instead of a printed board. The construction scheme is shown here in a bottom view of the TS-900 with the outer cabinet completely removed:



This is the TS-900 Bottom View with the front panel at the top of the picture. You can see the wiring harness "motherboard" that allows for the hinging of the PC board sockets for the Daughter Boards to be hinged outward for access while in operation. The boards available for this process are along the left side of this picture, at the bottom half of the center area. However, the i-f related boards at the picture's upper right (with the shield covering them) cannot be serviced in this way.

Kenwood TS-900 Operations Manual.

Innovative as this design was, it did not appear again in Kenwood transceivers of which I am aware. And, while this radio was on the market, its sister offering, the TS-511S[1] used a board to board wired design with wire-wrap connections. However, to be fair, the TS-511S is a different radio all together – not a hybrid design to the extent of the TS-900.

The TS-900 has some interesting operating specifications for the time. In 1973 when this radio was new, there was a power competition going on between the major manufacturers in the market. Check this list . . .

Radio	Final Amplifier Tubes	RF Power Input (Watts)	
		SSB	CW
Collins KWM-2	6146A (2x)	170	160
Drake TR-4	6JB6 (3x)	300	260
Hallicrafters SR-400A	6KD6 (2x)	550	350
Heathkit SB-102	6146B (2x)	180	170
HyGain Galaxy GT-550	6LB6 (2x)	550	360
Kenwood TS-511S	6LQ6/6JE6[4] (2x)	500	300
Kenwood TS-900	6LQ6/6JE6[4] (2x)	300	200
National NCX-500	6LQ6/6JE6 (2x)	500	390
Swan 500cx	6LQ6/6JE6 (2x)	550	360
Yaesu FT-101E/EE/EX	6JS6C (2x)	260	180

Reference individual Operation Manuals for the radios shown.

Some points to note was a push toward higher power in several the above contenders. But remember that RF Power Input is not the major consideration in purchasing a radio. Receiver performance is, however. Reading posted information[3] from the time is pretty much the same for every one of them – all generic such as “better than 1uV sensitivity” and similarly benign statements of selectivity without comments about noise rejection, real world filter performance, etc. For the purposes of this article, however, I can bring personal performance comparisons for all the above, except for the HyGain Galaxy GT-550. The best receiver performers in the above list are the Collins KWM-2, Hallicrafters SR-400A, and the Kenwood TS-900. The others, however, are capable performers that many of my friends and I use and enjoy. The TS-511S is the leader of that second tier. Obviously, such comments are personal and not quantifiable in universal terms.

In a conversation I had with Mark Olson, KE9PQ, I noted his comment that the TS-900 had a different model number outside the USA (and perhaps Canada as well). While Mark did not have details, his comment have some basis in terms of the Kenwood TS-511S in this market that is known as the TS-515S outside the United States (and perhaps Canada) but is actually the same radio except for model markings. I was able to find the following list of models – with only the TS-900 being sold in North America (to my knowledge) in any significant volume:

- TS-900 – Finals are a pair of 6LQ6/6JE6 vacuum tubes.
  - North American Market Version.
- TS-900S – Final is a single 4X150 vacuum tube.
  - Trio Branded so not made for North America.
- TS-900X – Final is a single 6146A/B vacuum tube. (See picture, below.)
  - Japanese home market radio for entry level licensees (or QRP use).
- TS-900D – Finals are a pair of 6146A/B vacuum tubes.

- Unknown market location focus. But did exist in the USA.

The focus of this article, the TS-900, is in my collection. The TS-900D can be confirmed because I temporarily have one that is on loan for writing this article. I have seen numerous pictures of the TS-900X. The lower power versions of Trio-Kenwood transmitters and transceivers – and those of all Japanese manufacturers – were well known in the Japanese market. The TS-900S has been referenced in other places but the use of a 4X150 final amplifier would require an air systems socket and cooling system, such as seen in a linear amplifier. I question its viability in the market for a HF transceiver.

In our North American market, the TS-900 had an extruded aluminum, vertically brushed, clear anodized aluminum front panel – with black silk-screened lettering. Perhaps late versions, but certainly some versions, had a different color. These alternate color versions were also extruded aluminum and vertically brushed but were bronze anodized with white silk-screened lettering. Here is an example:

Kenwood Photo

Left to Right

PS-900 Power Supply and TS-900X Transceiver

(Note "Trio[4]" branding – these were not for the USA Market)

There was a bronze colored VFO-900 – but a picture of one was not found. Note the cooling opening in the right rear of the top cover. This was not present in the TS-900 version. Likely the single 6146A/B final amplifier was cooled differently in the TS-900X than the TS-900. The TS-900 and TS-900D, for which I have experience, were cooled by drawing air up from the bottom of the radio and exiting out the back.

For background, here is what the long history of the Kenwood 900 Series HF Transceivers looks like today:

- TS-900 Transceiver – 150 Watts / 100 Watts Nominal Output – SSB/CW
  - The first 900 series.
  - Hybrid Design – solid state except for 6GK6 driver and 6LQ6 final amplifiers.
  - Introduced in 1973 – 80-10 Meters - WARC Bands not included.
- TS-930S Transceiver[1] – 100 Watts Nominal Output – SSB/CW
  - All Solid State – including Final Amplifier.
  - Internal AC Power Supply becomes a 900 series feature.
  - Introduced in 1982 – 160-10 Meters – First model with WARC Bands.
  - Designated as TS-930S/AT with Internal Automatic Antenna Tuner.
- TS-940S Transceiver[1] – 100 Watts Nominal Output – SSB/CW
  - Introduced in 1985 – 160-10 Meters

  - Designated as TS-940S/AT with Internal Automatic Antenna Tuner.

- TS-950S/SD Transceiver – 150 Watts Nominal Output – SSB/CW
  - Automatic Antenna Tuner becomes standard equipment with this model.
  - Introduced in 1991 – 160-10 Meters
  - Designated TS-950S in standard form.
  - Designated TS-950SD with added Audio Transmit and Receive DSP[2].
  - TS-950S and TS-950SD were the first Kenwood dual receiver transceivers,

- TS-950SDX Transceiver – 150 Watts Nominal Output – SSB/CW
  - Improved ergonomics and audio DSP over TS-950S/SD.
  - Introduced in 1992 – 160-10 Meters

- TS-990S Transceiver – 200 Watts Nominal Output – SSB/CW
  - IF-DSP integrated into the design.
  - Introduced in 2012 – 160-6 Meters
  - This is a current production radio

Beginning with the TS-930S and its all solid-state final amplifier, Kenwood used 24 volts on the final transistors. This higher voltage provided better final amplifier distortion performance. To accommodate this, beginning with the TS-930S, the 900 series radios included an integrated power supply. TS-930 and beyond were not adaptable for 12 VDC operation.

In this time of making radios (1970's), even relatively large equipment like the TS-900 had an option for DC operation from 12 VDC[5]. Here is a picture of the DS-900 that supported 12 VDC operation with the TS-900:

Kenwood DS-900 12VDC Input Power Supply. The large Jones Connector is for connection to the TS-900 Transceiver. See the AC Socket at the upper right-hand corner. In this picture that is shown as 220 VAC – presumably because this picture is for a European version. That outlet would have been 120 VAC in North America – presumably to power the VFO-900 Remote VFO that contained its own internal AC Power Supply (but provided for 12 VDC operation).

Kenwood Photo

The TS-900 Transceiver was a first for Kenwood in a market it later led along with Yaesu. That is, the market for a hybrid transceiver[6]. This hybrid market, started in 1959 by Hallicrafters with the model FPM-200[1] Transceiver, was not populated with other models other than the ground-breaking SBE-33[1], from Sideband Engineers in 1963 and the Hallicrafters FPM-300[1] in 1972. To my knowledge, no other American company offered a hybrid transceiver, or separate receiver and transmitter, that could be defined as hybrid. A past article talked about a hybrid attempt at the market with minimal volume Inoue (Icom) IC-700 Receiver and Transmitter and what may have been, the original Drake TR-5 (not to be confused with the production Drake TR5). However, to the point of this article, Kenwood went on to product a successful line of hybrids in the form of the TS-520 series, the TS-820 Series, TS-530S Series, and the TS-830S[6]. Yaesu also followed with the FT-101Z Series, FT-901 Series, FT-902 Series, and the FT-102. Kenwood and Yaesu also make hybrid transceivers marketed by others – such as Henry Radio Tempo Transceivers and Allied Radio.

Those interested in restoring an older hybrid transceiver are wise to remember that they are getting quite old by now. An initial market TS-900 can now be close to 50 years old. Components tied to alignment of these radios have gotten very brittle and can be severely damaged by even minor adjustment of the receiver and/or transmitter i-f coils. These parts are no longer available in a market of rare radios where even a parts-only unit is protected for possible restoration. If you find a similar old radio that you want to restore, contact this writer for further advice and more information. I may have more pointers that may assist you, depending on what you can or have encountered.

The 900 series Kenwood Transceivers, in general, can be hard to find. Easiest to locate may be the TS-930S and TS-940S models – but exceptionally nice, properly functioning versions of even these are not overly common. Both the TS-930S and TS-940S are heavily supported by third party manufacturers covering several age-related maladies in these aging favorites[8]. The TS-900 is quite rare and can command a high price. When locating a TS-900, be sure to get one with its matching PS-900 AC Power Supply/Speaker. The power supply alone is almost impossible to find. Fortunately, it generally is sold with the transceiver. The VFO-900 is extremely rare. I have only recently found a complete set as you see on page one of this article. So, if you like these radios and see one – grab it!! You may not see another.

I appreciate that you read my articles. A special thanks go to Bob, W9DYQ, for his proof reading. Also, for this article, I owe a debt of gratitude to Mark Olson, KE9PQ, Nationwide Radio[9], for his assistance with this TS-900 HF Transceiver. Remember that I am open to questions and comments at my email address, W9MXQ@TWC.com.

Notes:

[1] Subject for a future article.

[2] The DSP unit in the TS-950SD could be added to a TS-950S by the user. The TS-950SD as delivered from the factory, however, had some unique cabinet marking.

[3] Magazine advertising and manufacturers brochures from the time, applicable operating manuals, etc.

[4] Kenwood used the 6LQ6/6JE6, the 6MJ6/6LQ6, or the 6ME6 – supposedly based on availability. Also, some to note that some 6LQ6 tubes are designated only as 6LQ6 without the 6JE6 or 6MJ6 designation.

[5] Collins also offered a 12 VDC power supply, as did Drake, Swan, Hallicrafters, and everyone else. But Collins was unique if offering also a 24 VDC supply for use of the KWM-2 on an airplane.

[6] Hybrid came to be known in the amateur radio market as a transceiver (or receiver/transmitter separates) where the only tubes were the driver and final amplifier states in the transmitter.

[7] The Kenwood TS-830S is widely known as the best of the hybrid radios with operational features that are effective to this day. A close second is also a Kenwood, the TS-530S or the rare but sought-after TS-530SP. The TS-530 series did not have the array of QRM and interference fighting tools of the TS-830S. However, a notch filter added with the TS-530SP did help in that respect a bit.

[8] Reference https://k6iok.com/ for details of the TS-930S and TS-940S restoration power supplies, LED lighting, and battery backup replacements.

[9] Nationwide Radio <http://nationwide-radio--amp-amp-amp--eq-sales-llc.mybigcommerce.com/>.

W9MXQ ©2023

GARS Membership Information

The following is for the current GARS membership. 81% of GARS members hold ham radio licenses.

GARS MEMBERSHIP COUNTS BY LICENSE CLASS	
License Class	Count
Amateur Extra	127
Advanced	7
General	94
Technician	77
Novice	0
None	0
TOTAL Licensed Members	305

GARS MEMBERSHIP COUNTS BY STATE			
State	Country Code	Count	
GA	USA	360	
VA	USA	5	
SC	USA	3	
FL	USA	2	
ID	USA	2	
TN	USA	2	
AL	USA	1	
NC	USA	1	
TOTAL Members		376	

GARS Membership

New Members in June
Allan Winn (KG6NKU)
New Members: 1
Total Members as of July 1, 2023 376

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 July
Mary Ann Bazain
Becky Bentley (KK4SWI)
Kevin Biddle
Bill Cherepy (WB4WTN)
Bill Cohl (WB2PIH)
Laurel Dickenson (KM4FMP)
Juan Dominguez
Randy Drescher Jr (K4HS)
Steven Francis (KQ4DSI)
Diane Gibson (N3MAD)
Alan Gideon (K5AKG)
Jon Guidry (K5JDG)
Emilee Guidry
Bob Hoffmann (K4CQO)
Frank Hummel (KO4MRQ)
Alan Janssen (K4APJ)
Terry Jones (W4TL)
Brian Jones (KD4UYP)
Paul Kelley (W4KLY)
Cathy Kelley (KN4DML)
Sherwin Levinson (K4SML)
Charlotte Matchette (KE4OSR)
Audrey Mc Elroy (KM4BUN)
Rob Osattin (KI4UTY)
Larry Osborne (WT4XX)
Bill Pierce (K1LP)
Glenda Sandidge
Stephen Schreiman (KJ4MWF)
Mark Vogt (KQ4GEL)
Sid Weaver (N4NQ)
Don Woodward (KD4APP)
William Worona (KQ4AGI)

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

Open Winter Field Day Chair
Open Elmer Manager

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 6/13/2023

The June minute was at Harbins Park with ice cream and cup cakes celebrating GARS 50th year of operation and the upcoming Field Day plans.

Workshop Minutes - June 20th, 2023

Number in Attendance: 21

Workshop Topic: Field Day Preps - N3FJP Logging Software

Presenter: David Adcock KA4KKF

Brief Summary:

David KA4KKFand the Station Captains used this opportunity to get the N3FJP Field Day logging PCs configure. Also discussed was Field Day setup time, station layout, and antenna placement.

Earl AF4FG passed out GARS Field Day T-shirts to those that ordered them.

Bob K4CQO and Mark KN2TOD had a small gathering of folks around the DMR table.

GARS Workshops include Q&A time for Amateur Radio projects and adventures. Feel free to bring along your show-n-tell items and questions. We have Elmers at each Workshop.

Events – GARS and others

ARRL CONTESTING INFO

From ARRL Contest Calendar

> For more information click the links <

2023	January
1	Straight Key Night
7	Kid's Day
7-8	RTTY Roundup
21-23	January VHF Contest
	February
13-17	School Club Roundup
18-19	International DX – CW
	March
4-5	DX Contest -- SSB
	April
16	Rookie Roundup – Phone
	May
	No planned contests
	June
3-4	International Digital Contest
10-12	June VHF
17	Kid's Day
24-25	Field Day
	July
8-9	IARU HF World Championship
	August
5-6	222 MHz and Up Dis Contest
19-20	10 GHz & Up – Round 1
20	Rookie Roundup – RTTY
	EME - 2.3 GHz & Up
	September
9-11	September VHF
16-17	EME - 2.3 GHz & Up – Rnd 2
9-10	10 GHz & Up – Wknd 1
	October
29-29	EME - 50 to 1296 MHz
16-20	School Club Roundup
	EME - 50 to 1296 MHz
	November
4-6	Nov. Sweepstakes - CW
25-26	EME - 50 to 1296 MHz
18-20	Nov. Sweepstakes - Phone
	December
1-3	160 Meter
9-10	10 Meter
17	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]

07/07/2023 - 07/08/2023 - 2023 Milton Hamfest
Location: Milton, FL
Type: ARRL Hamfest
Sponsor: Milton Amateur Radio Club
Website: http://miltonarc.org

07/08/2023 - K4KDI Summer Tailgate 2023
Location: Orlando, FL
Type: ARRL Hamfest
Sponsor: Conway Baptist Church
Website: http://k4kdi.square.site

07/22/2023 - Cullman Amateur Radio Club Hamfest
Location: Cullman, AL
Type: ARRL Hamfest
Sponsor: Cullman Amateur Radio Club

08/19/2023 - 08/20/2023 Huntsville Hamfest, ARRL ALState Convention
Location: Huntsville, AL
Type: ARRL Convention
Sponsor: Huntsville Hamfest Association
Website: http://hamfest.org

08/19/2023 - TarcFest
Location: Tampa, FL
Type: ARRL Hamfest
Sponsor: Tampa Amateur Radio Club
Website: http://www.hamclub.org

10/13/2023 - 10/14/2023 Melbourne Hamfest - ARRL Florida State Convention
Location: Melbourne, FL
Type: ARRL Convention
Sponsor: Platinum Coast Amateur Radio Society
Website: http://www.pcars.org/

10/14/2023 - Flamingo Net Flea at U. of Miami
Location: Coral Gables, FL
Type: ARRL Hamfest
Sponsor: Flamingo Net ARC
Website: http://www. FlamingoNet.8m.net

10/14/2023 - NOARC (W4AAZ) Annual Hamfest
Location: Crestview, FL
Type: ARRL Hamfest
Sponsor: Live Oak Baptist Church, The City of Crestview Florida, Main Street Association Crestview
Website: https://w4aaz.org/noarc-hamfest/

10/21/2023 - MARCIFEST 2023
Location: Bradenton, FL
Type: ARRL Hamfest
Sponsor: Manatee Amateur Radio Club, Inc.
Website: https://www.manatee-arc.org/

10/28/2023 - Wiregrass ARC - Fall Tailgate
Location: Headland, AL
Type: ARRL Hamfest
Sponsor: Wiregrass ARC
Website: http://w4dhn.org

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 14 2023
Winter Field Day	January 28-29 2023
Spring Technician HamCram	March 25-26 2023
Dog Show Fundraiser	March 29-April 2 2023
Georgia QSO Party	April 8-9 2023
North metro area Fox Hunt	April 2023
Summer General HamCram	April 29-30 2023
Memorial Day Parade	May 29 2023
ARC/KARC Hamfest	June 3 2023
Field Day	June 24-25 2023
JOTA	October 2023
Fall Technician HamCram	October 2023
Stone Mt. Hamfest	November 4-5 2023
Holiday Party	December 2 2023

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 July 2023

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
						1 **8:00 AM Breakfast at The 5 Spot**
2	3 **7:30 – 8:00 PM GARS 2M Net**	4 **7:00 PM GARS Exec Meeting**	5	6	7 **11:30 AM Lunch at The 5 Spot**	8 **8:00 AM Breakfast at The 5 Spot**
9 **2:00 PM GARS Ham Radio Exams, EAA 690 Hangar**	10 **7:30 – 8:00 PM GARS 2M Net**	11 **7:00 PM GARS Meeting EAA 690 Hangar**	12	13	14 **11:30 AM Lunch at The 5 Spot**	15 **8:00 AM Breakfast at The 5 Spot**
16	17 **7:30 – 8:00 PM GARS 2M Net**	18 **7:00 PM GARS Workshop Meeting EAA 690 Hangar**	19	20	21 **11:30 AM Lunch at The 5 Spot**	22 **8:00 AM Breakfast at The 5 Spot**
23	24 **7:30 – 8:00 PM GARS 2M Net**	25	26	27	28 **11:30 AM Lunch at The 5 Spot**	29 **8:00 AM Breakfast at The 5 Spot**
30	31 **7:30 – 8:00 PM GARS 2M Net**					

Local Ham Radio Exams & Meetings

GARS Ham Radio Exams

Second Sunday of the month

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.

June 2023 Results

The GARS VE Team had a great exam session today.

1 New Technician:

- Thomas Swehla: KQ4JFX (if you hear him on the air – say “hello”)

1 Upgraded to General

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

W4DTR - DAVE (CVE)
AF4FG - EARL
KK4TKJ - CHUCK (CO-CVE)
K4CQO - BOB
KM4FMW - DONNA
KM4SWL - RICHARD
N4XYY - RICK

Thanks & 73,

Dave Bruse, W4DTR (CVE)
GARS VE 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 you're 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