The ORC Newsletter

Official publication of the Ozaukee Radio Club, Inc. Email all contributions to the editor, Bill Shadid, W9MXQ (newsletter@ozaukeeradioclub.org). Permission to reprint articles published in any issue is granted provided the Author (as shown in the article) and the Ozaukee Radio Club Newsletter are fully credited in any publication.

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From the President

de: Bill Greaves, K9GN

Field Day '24 experiences and memories can be provided by many – mine are highlighted by clear weather for Friday afternoon setup of four stations, kickoff Saturday at 1:00pm with about 12 volunteers, intermittent rain Saturday punctuated with nearby lightning requiring complete shutdown for a few hours, clear sailing for QSOs into Sunday up to the 1:00pm end time and take down until about 4:00pm. While I worked 40m phone with Nate Seidler KC9TSO, ORC Field Day Chair, Nate accounted for 99.5% of our QSOs! Others will more fully report on ORC FD operations and results. I did find the June meeting program by Ken Boston W9GA, Gary Sutcliffe W9XT, and Pat Volkmann W9JI a very useful and fun presentation in preparation for field day. Also, thank you to Paul Martis W9PEM for operating a new digital station and Mike York AE9MY for operating the GOTA (Get On The Air) station as well setting up and operating the generators powering the entire field day site.

A calendar reminder for Thursday, August 15th, when the ORC will be having a STEM activity demonstrating ham radio outside next to the West Bend library. Last month the ORC and the STEM Committee donated a number of ARRL amateur radio books to the library.

The day after the STEM activity in West Bend will be the setup for the Lighthouse QSO event on Friday, August 16th, in Port Washington. The International Lighthouse Lightship Weekend is normally held on the 3rd weekend in August. ORC participates with this LEFROG amateur radio club annual event.

The Club membership will gather on Wednesday, July 10th both in-person and on zoom at 7:30pm, with Meet-and-Greet at 7:00pm, at the Grafton Senior Center or on zoom. The program for the meeting will be **"Repeater Receiver Voting Process/Operation"** by Gregg Lengling W9DHI. See you at the meeting.

73,

Bill K9GN

A Message from the Editor
Newsletter Table of Contents

de: Bill Shadid, W9MXQ, Newsletter Editor

Please note Club President, Bill Greaves, K9GN, on Page 1 for his monthly message. Especially note K9GN's comments on the 2024 ARRL Field Day.

Check out the 2024 Ozaukee Radio Club Field Day event in an article written by Gary Bargholtz, N9UUR, with some picture layout assistance, working with Gary, by your Editor. I think we gave a good view of the event. Gary will have results at a future meeting and those numbers will be in an upcoming Newsletter for posterity. Thanks, Gary!!

Chuck Curran, W9KR, has a nice article on his experience restoring a Sprague TO-6 Capacitor Checker.

Don Zank, AA9WP, and Stan Kaplan, WB9RQR, monthly columnists are back with their popular columns on Ozaukee County ARES and Computer Corner Columns, respectively. AA9WP, as he describes it, has some Ranting to do. It is an interesting article. WB9RQR talks about a book, "***Wiring Simplified***," that we may want in our personal library.

What is happening in the next month on the bands, you ask? Gary Sutcliffe, W9XT, gives us a looking at "On the Air Activities!" for July and early August. Do you think things on the bands slow down in Summer? Maybe a little – but check Gary's column for some interesting things to do. One item in particular is one that I try and do in a clean sweep on SSB, CW, and Digital. I have done so for the past several year. Take a look and see what that even might be!!

Bill Shadid, W9MXQ, your Newsletter Editor, discusses a 1960 last gasp attempt to promote the AM Mode in an HF Transceiver that you may never have heard of. Check out the Gonset G-76 Transceiver – and see why it was not really a transceiver as we know it.

Want a bargain?? Check the many listings in this month's Classifieds Column.

Tom Trethewey advises us of regional Upcoming Events.

Check out Ken Boston, W9GA, and his Secretarial report or the Ozaukee Radio Club June 2024 meeting for your review.

Finally, check out information on next week's meeting, and more, from Jeananne Bargholz, N9VSV. Jeananne also gives us a window on upcoming programs. Check out the Swag pages as well!!

Need help to get your thoughts on paper for an article? That is what the Editor does!! Let me know how I can help you. newsletter@ozaukeeradioclub.org

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Onward To the Newsletter

The Ozaukee Radio Club
2024 ARRL Field Day Experience

de: Gary Bargholz, N9UUR

Well, it's over, except for putting it all away!

Thanks to all those who made Field Day happen this year.

The Thursday night tower trailer pullers, the Friday and Saturday set up folk, the operators, and especially those who stayed to take it all down!

I'm still sorting through the scores and Bonus points, hopefully have a report at our meeting on July 10th.

We actually disconnected all the antennas, cranked down the towers and shut the generators down late Saturday night due to the storms that passed through. Safety first of course. But we had a nice gathering under the pavilion to watch it pass by.

We sent out Post Card Invitations to new HAMS inviting them to come see and operate Field Day and had 36 people sign our visitor log. We even had one sign up as a new Club Member.

And of course, thanks to Mike York, AE9MY, and John Thielen, WA9KNY, for keeping the generators humming, but mostly for Breakfast Sunday Morning!

Following on the next page are some pictures taken by N8UUR, WØNG, W9XT, and perhaps others not identified.

Enter Here!!

Aerial View

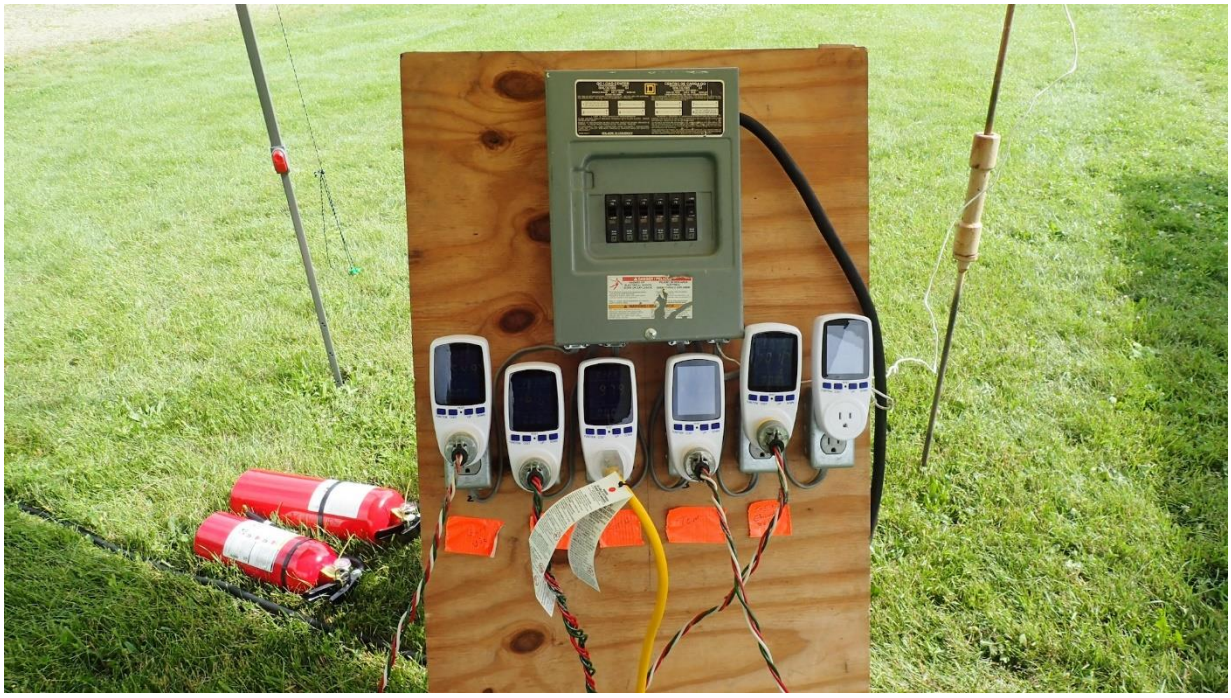
The Pavilion

Information Desk

Strategy Session – In the Pavilion
(or just eating)

Beam Going Up!!

Solar Panels next to GOTA Station



Power Distribution and Safety Gear

On the Bands!!

20-Meter Operations Trailer

Time for Questions

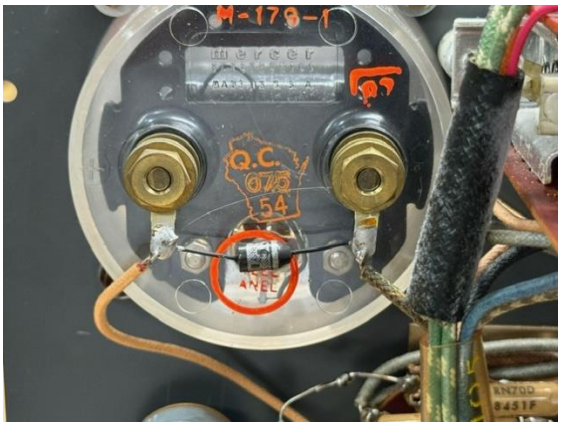
VHF and UHF Operations

Thanks to all who participated and to all those who participated elsewhere and credited Ozaukee Radio Club!!

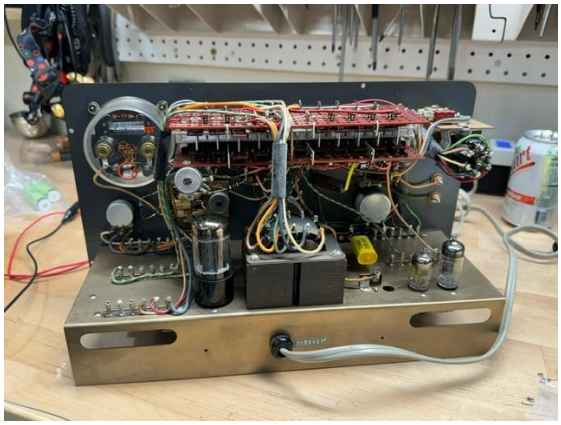
Sprague TO-6 Capacitor Checker

de: Chuck Curran, W9KR

Above is a front view of a Sprague TO-6 Capacitor Checker, I bought it on eBay, for something to do. It was in excellent physical condition, but needed some electrical work, specifically capacitor replacement. It was rated at being good for checking, mica, tubular, disc ceramic and electrolytic caps. What caught my attention was that it could measure and display leakage current on electrolytic caps and has a 0-600 VDC internal power supply.



The above picture shows the rear of the meter, with a Quality Control inspection stamp. Please note it is in the shape of the State of Wisconsin, with some letters followed by 54. Who remembers the Sprague plant at the intersection of Beech & 6th Street, in Grafton, WI? Might this have been made there in 1954? I finished my freshman year in college and got a summer job there in the summer of 1967. No test equipment was made there in 1967, mica caps, disc ceramic, and thick film integrated circuits, which is where I worked. Thick film integrated circuits parts were used for Polaris missile components, and juke boxes, Seeburg was one customer, can't remember the others. No idea if the Polaris parts were actually installed in the missiles or for other gear used in manufacturing.



Above is a view of the back side of the equipment with cabinet removed.

Repairs finished, all new tubes and caps installed.

Above is an electrolytic cap leakage test in process, using a 1955 80 mfd @ 450 VDC filter cap removed from my EF Johnson Viking Valiant Transmitter.

Below shows leakage current, which started at 22 ma. After 30-40 minutes this 69 year old electrolytic ended the test with meter setting at 6 ma full scale and actual leakage at .5 ma!

W9KR

Editor's Notation . . .

Where did I put that soldering iron????

OZARES: Ozaukee Amateur Radio Emergency Services

de: Don Zank AA9WP, OZARES Emergency Coordinator, aa9wp@arrl.net

Rantings

Every few years or so the topic of how relevant amateur radio is appears on the EmComm Google discussion group.

Back in 2022, Mike KM5BOR started on topic wondering why would states and large city governments call on amateur radio operators for emergency communications. The states and large cities have vast communication resources available. They maintain, control, and operate these resources. Amateur radio operators cannot compete, if that is the right word, or provide additional resources in this environment. So, his question was, how to keep amateur radio relevant? He didn't have the answers, he was just asking.

Some of the replies focused on the skill set of amateur radio operators. The accepted assumption is that hams can fix anything and solve any problem that arises. This is kind of a reach because the skilled communication engineers employed by the states counties, and cities are unable to maintain, program, and operate their equipment.

Others said the focus should be on the smaller and rural areas. The rural areas lack the resources of large cities and counties. This response ignores the fact that rural areas also lack a sufficient number of amateur radio operators. Especially operators that can respond to a communication emergency. They are further hindered by the distance between the operators and an area of disaster.

73 replies covered a gamut of responses. But one that supplied an important answer was from Wayne, N1WR, "...*we need to keep on pressing the League to upgrade and modernize their basic support for ARES."*

Recently, in June 2024, Duane WB9RER posed this statement: *The primary trend working against Amateur Radio providing emergency communications is that the Amateur Radio population is rapidly aging and it's becoming increasingly difficult to rely on Amateur Radio Operators to turn out in an emergency.*

The statement is prefaced by noticing the number of advanced communication technologies, including *Starlink*, *as a low earth orbit satellite system that provides Broadband Internet Access, Iridium a medium-speed data and voice via Low Earth Orbit satellite network, and FirstNET, the First Responder Network Authority.*

The replies covered the normal range of expected responses. *Cell phones don't have communication capabilities everywhere, they can be overloaded, and cell phone towers can collapse in a fire or a hurricane.* Well, the technologies pointed out by Duane, don't use cell phone service or towers.

All those new technologies can fail as if no ham has never had a radio failure, antenna failure, or power supply failure. Recently the ionosphere "failed," and basic statewide and national nets were difficult or impossible to hold.
From the IARU Emergency Telecommunications Guide:
https://www.iaru.org/wp-content/uploads/2020/01/emcommguide_1sept2016.pdf

Amateur Radio operators have been a communication resource in emergencies ever since there has been radio. To the agencies they serve, amateurs are their immediately available communication experts. Amateurs have the equipment, the skills, and the frequencies necessary to create expedient and efficient emergency communication networks under poor conditions.

Communication experts? I wonder how that is defined. An expert at setting up microwave systems, an expert at passing traffic, an expert on digital communications, an expert on antenna building, an expert at programming radios, an expert on fixing power supplies, an expert at managing people, an expert on hf/vhf communications. There are very high expectations from a volunteer group of operators.

Add in the ARRL task book and guidance for all ARES operators. Section Emergency Coordinators and county Emergency Coordinators and you have a full-time job.
Marvin, VE3VCG added another message on June 21, titled the EMCOMM CONUNDRUM.

"*Amateur Radio EmComm irrespective of what aspect is being discussed suffers from the same problems as the rest of the hobby. At the top of this list, in my opinion, is the confused message which new HAM's might be getting about where EmComm actually fits in the hobby and, to a larger extent, in the larger world of Professional Emergency Response agencies. The need for amateur radio volunteers is not being clearly defined or well expressed.*

The overall barrier to entry into the EmComm part of the hobby, becomes increasingly apparent, when reading various threads where even those involved seem to disagree on how Amateur Radio volunteers actually fit into an overall emergency response plan."

In my view, amateur radio emergency communications are like the Wild, Wild, West. Every section and county has its little world they operate in. And they operate the modes and technologies they want to operate with. If it isn't too late, it is time for the ARRL to step up and provide some leadership to the ARES program. They copyrighted the term Amateur Radio Emergency Services for a reason. Now let's get moving on it.

OZARES Repeaters:

- **147.330 MHz (+ Shift) (127.3 PL)**
  - **FM Mode Only**
- **443.525 MHz (+ Shift) (114.8 PL)**
  - **FM Mode Only**

ORC Repeaters are On the Air Awaiting Your Call:

- **146.97 MHz (- Shift) (127.3 PL)**
  - **FM Mode Only**
- **224.18 MHz (- Shift) (127.3 PL)**
  - **FM Mode Only**
- **443.75 MHz (+ Shift) (127.3 PL)**
  - **FM & Fusion (C4FM) Modes**

THE COMPUTER CORNER
No. 316: Wiring Simplified

de Stan Kaplan, WB9RQR, 715 N. Dries Street, Saukville, WI 53080-1664
wb9rqr@gmail.com

Wiring Simplified is the title of a non-ham book that many hams will probably want on their shelves. The one I have, the 46th edition, is based on the 2020 National Electrical Code (NEC), and the authors state that the next edition (not yet out as of this writing) will be based on the 2023 NEC Code. Published since 1932, this book or its predecessor editions has been used as a standard by thousands of the contractors, electricians, and homeowners in the USA today, all seeking to measure whether their proposals will be in conflict with or in accord with NEC requirements. The book will also be of use to hams who wish to troubleshoot or make minor changes in our shacks for our convenience, or for those of us who want to make sure that what we now use is safe and effective and within current standards. Given the heightened awareness on safety brought by our recent ORC meeting speaker Dave Ellison (W7UUU), it would probably be good for all of us to refresh safety standards with a book like this. Not a large volume (256 pp. Including a Glossary and Index), it is worth a cover-to-cover read. After all, we hams are all home users, if not homeowners, and we need to be at least cognizant of safety when we plug our rigs into the wall outlet, even when using just a QRP rig!

The book is divided into four parts. I. The first three chapters are the basics – background needed to understand the practical, safety and legal considerations in wiring decisions and practices. II. Chapters 4 through 7 deal with wires, circuits, and grounding, including the latest on fault circuit interrupters. III. Chapters 8 – 15 are on installing service equipment and wiring, including a chapter on modernizing outdated wiring systems. IV. The last part (Chapters 16 through 19) deals with special wiring situations and projects. Here you will find a discussion of typical motors used in homes and farms, telephone and doorbell wiring, computers and home networks, and even simple troubleshooting of home switches, receptacles, lamps, and other home equipment that doesn't work as it should. A good glossary and an index finish the volume off.

At under $20 for the current edition, it is worth the cost and worth the reading to keep yourself up-to-date with the subjects, and you don't have to be an electrician to benefit from the reading effort. Get yourself a copy. Happy Computing!

On The Air Activities!

de Gary Sutcliffe, W9XT

Another Field Day is in the books. This might be one of the worst I have participated in as far as weather goes. It is not unusual to have thunderstorms during the weekend, but having tornado warnings in nearby counties was a bit worrisome.

Radio conditions seemed pretty decent on HF. We didn't have any solar flares to wipe out the bands. Sporadic E (E_s) was poor, but that has been poor all season. We got some decent openings on 15 meters, but 10 and 6 were unproductive.

Eighty meters was interesting. It was very noisy after the storm, as you would expect. I picked up an FT-710 at Dayton. I was looking for a more portable rig, and the discounts that weekend were too hard to pass up. I used it in the CW station. The DSP noise reduction was impressive, and I was able to make more contacts than I would have expected.

Then, around 3:30 AM, it was like a switch was turned off, and the noise disappeared. It was extremely quiet, especially for the summer. I worked many stations on the West Coast. It is rare to work the West Coast on 80 meters on Field Day, and it is not all that unusual to work none on 40 meters. It was maybe the best 80 meter conditions in any FD I attended. We had three times as many contacts on 80 as we did last year.

Activity seemed really down, at least on CW. We were down about 350 contacts from last year. Part of this can be explained by the two lost hours during the storm. The lack of a 10 meter opening didn't help either. Maybe some QSOs were lost due to rotor problems on the beam. It would only rotate clockwise. A big thanks to those who helped fix it!

But the hourly rates were down. Last year, we averaged about 58 CW QSOs per hour for the whole event. This year, we only had five or six hours over 50. We had only one hour of a rate over 60. Mark, **KD9NOO** had an hour with 66 QSOs on Sunday morning. Great job, Mark!

Another clue of low activity was that it was easy to find clear frequencies to call CQ on. In past years, I sometimes had to go above the FT8 frequencies to find a free frequency. I don't think I had to go above .055 on any band this year.

Was the overall activity down across the country? Maybe the hot weather in the eastern half of the US reduced activity. Doesn't anyone do CW anymore? The ARRL changed the rules during COVID-19 to make it easier to operate from home. Those are now

permanent. Did a lot of former FD ops just stay home, with no extra skin in the game for setup, etc., and get on for only an hour or two? Time will tell.

I hope everyone had a good time participating at FD. It is the biggest ORC club event, and more members should participate.

Thirteen Colonies Special Event

If you are prompt in reading the newsletter, you have a few more days to see if you can work the special event stations in the states that were our original colonies. Details are in last month's newsletter. Let me know if you got your clean sweep!

Olympic Special Event Stations

The 2024 Summer Olympic Games will be held in Paris from July 26 through August 11. There are often special event stations on the air from participating countries during the Olympics. They are not usually publicized well ahead of time, so you might mostly find them by tuning around or seeing them spotted on the DX spotting networks. The only one I found so far on an Internet search was TM2024JOP.

Keep an eye out for callsigns with 24 or 2024 or a call using a suffix with Olympic or some abbreviation of it.

New WSJT/FT8 Version

There is a new WSJT release candidate version, WSJT-X 2.7.0-rc5. This is a beta WSJT release, so don't download it unless you can put up with and report any bugs. Usually, general releases of WSJT updates occur a few weeks or a month after the release candidates.

The big new feature is a mode called SuperFox. This allows DX stations to make QSOs faster. It will use a larger bandwidth (1512 Hz) than the standard 50 Hz used by FT8. From what I understand, this will not have the reduced power per QSO like when they have multiple streams. This is good. Sometimes, I see a DXpedition going to multiple streams, and the signal strength is divided between the streams, and they get too weak to copy.

Another feature ensures the authentication of the DX station. Occasionally, miscreants would create an FT8 stream adjacent to the real DX and sign the DX station's call sign. You would think you worked the real one but didn't.

A big upcoming DXpedition to Jarvis Island announced they will use the SuperFox mode. You will need to upgrade your copy of WSJT to work them digitally. Use the release candidate unless the general release is out by then.

The Jarvis DXpedition web page has an FAQ on using SuperFox/SuperHound. It gives a good introduction to the mode. It even has an audio clip, so you know what it sounds like if you happen to tune across a station using it.
https://jarvisisland2024.com/operating/super-fox-mode

More about this DXpedition in the DX section.

LOTW

ORC members who chase DX or ARRL awards are probably aware the ARRL websites got hacked on May 11. Many ARRL services were unavailable as they worked through the problem. One of the most popular services is the Logbook of The World. It allows stations to confirm QSOs electronically without the expense and time of mailing paper QSL cards.

There was a lot of concern that the LoTW database was compromised. Like many DXers, a large number of my rare DX contacts are only confirmed on their servers. I have uploaded about 174,000 QSOs and have over 100,000 confirmations. The operators of many of those QSOs are Silent Keys, and the logs are probably lost. It would have been devastating to have something you worked on for decades wiped out by hackers.

The ARRL assured us that the database was safe, but they wanted to ensure their systems were safe before exposing it to the outside world. So, it took a long time before it was restored.

The ARRL didn't give out a lot of information about the cyber-attack. That is not unusual according to those who deal with such things because their comments can aid the attackers.

The ARRL opened up LoTW on July 1. It was a huge relief to the users. There is a massive backlog of QSL records that need to be processed, and it will take a while to get through it. They are asking users with large numbers of QSOs from contests or DXpeditions to hold off for a while. I have about 500 QSOs I need to send in, but I will wait a week or so until things start to get back to normal.

A month and a half is a long time to wait for QSO confirmations these days, but I remember my early days when it could take years to get that card from PO Box 88, Moscow, via the bureau. I guess the delay is not so bad.

Central States VHF Society Conference

Those interested in weak signal VHF operating will attend the CSVHF conference on July 25-28. The event has a lot of activities, including programs, a Saturday night banquet, some family events, antenna gain testing, displays of rover stations, preamp noise figure and gain testing, and the usual social opportunities. Some of the best technical programs I have seen, either ham or professional, have been at this convention.

This conference location moves around. I try to attend when it is within a one-state radius. The last one I visited was in La Crosse a couple of years ago. It is in Cedar Rapids, IA, this year, so I plan to attend. I will also present a program on the effects of height and local terrain on 6 meter antennas. **W9GA** is also planning to attend.

DX

The big DXpedition on the horizon is to Jarvis Island. The United States owns this island and is a national wildlife reserve. Getting permission to land on nature preserve islands is often very difficult because of worries about disturbing the wildlife there.

A recent development in DXpeditions is the RIB, or Rig In a Box. These are self-contained units with a radio, power supply, amplifier, and an RF link back to the operators on the boat or to the Starlink satellites. One or two people can land on the island, set up antennas and a generator, and the station is quickly on the air. There is a 900 MHz link back to the boat for CW and SSB operation. The digital modes can be operated by remote operators anywhere in the world via satellite.

The significant advantage of RIBs is minimal environmental impact, which probably played a big part in getting permission to operate on Jarvis. The operators don't have to set up tents for operating and sleeping, etc., for a large group. They only need to send a person once a day to refuel the generators. They even have a landing craft for these that would make the US Marines proud.

The call sign for the Jarvis operation will be N5J. The planned dates are August 5-17. The Palmyra & Jarvis Islands are number 18 on the DX most wanted list. The last operation there was in 2016. The last time six meters was on the air from there was in 2000. Some of the low bands have never been on digital. I need them on digital and four HF bands.
As mentioned above, they will be using the new SuperFox FT8 mode. This mode is not really compatible with regular FT8, so they will use special frequencies. Check their web-site for the list.

Contests

July is a pretty quiet month for contests. The big one is the IARU HF World Championship. This year, it starts on July 13 at 1200Z (7:00 AM local time on Saturday morning). Usually, it is the same day as the South Milwaukee Hamfest, but not this year.
You send a signal report and your IARU zone. We are in Zone 8. Work everyone on 160-10 meters (no WARC bands). You can enter single mode, either CW or SSB or mixed mode. You can work other stations once per band/mode. The number of points per QSO depends on whether it is in your ITU Zone, the same, or on a different continent. Check the rules. Multipliers are the number of ITU zones worked plus HQ stations worked.

IARU stands for the International Amateur Radio Union. Hams are not members. The national organizations are members. For us, it is the ARRL. It is the RSGB for Great Britain, REF for France, etc. Often, the different member organizations will operate

headquarter stations for this contest. Frequently, they have HQ in the suffix of the calls. The call sign for the ARRL will be NU1AW. Work the HQ stations, as they are multipliers. The CQWW VHF Contest is on July 20 and 21. This is a six and two meter contest only. I only recently "discovered" this contest. I operated it last year and was surprised at the activity. There are several categories, so read the rules to pick the one you want to compete in. Send your grid. Signal reports are optional.

Also competing for your attention on July 20 is the NAQP RTTY contest. There are separate CW, SSB, and RTTY events, each held twice a year. I mention them each time, so there is little reason to go into it deeply here. You send your name and state. Work stations again on new bands. Multipliers are states and Canadian provinces. The CW event is on August 3. The NAQP lasts only 12 hours, so you can operate the RTTY NAQP on Saturday and the VHF contest on Sunday.

That wraps up July. Enjoy your summer!

W9XT's DXpeditions, Contests, and Events for July and Early August 2024 follows on the next page . . .

W9XT's DXpeditions, Contests, and Events for July and Early August 2024

W9XT's DXpedition picks for July and early August 2024					
QTH	**Dates**	**Call**	**Bands**	**Mode**	**Link/notes**
Jarvis Island	Aug 5-17	N5J	160-6	C/S/D	https://jarvisisland2024.com

Modes: C = CW, S = SSB, D = Digital (may include RTTY)

W9XT's contest picks for July and early August 2024					
Name	**Start**	**Length**	**Bands**	**Mode**	**Link**
IARU	July 13	24 hours	HF + 160	CW SSB	https://www.arrl.org/iaru-hf-world-championship
CQWW VHF	July 20 1800Z	27 hours	6 &2M	CW, Phone, Digital	https://www.cqww-vhf.com/rules.htm
NAQP RTTY	July 20 1800Z	12, op-erate 10 max	HF	RTTY	https://ncjweb.com/NAQP-Rules.pdf
NAQP CW	Aug 3 1800Z	12, op-erate 10 max	HF	CW	https://ncjweb.com/NAQP-Rules.pdf

Dates/Times in UTC. Subtract 6 hours from UTC to get local (CST). HF = 80, 40, 20, 15, 10 Meters

W9XT's operating & event picks for July and early August 2024			
Event	**Dates**	**Details**	**Link/notes**
Thirteen Colo-nies	July 1-7		http://www.13colonies.us
South Milwaukee Hamfest	July 6	American Legion Post in Oak Creek	https://www.arrl.org/ham-fests/south-milwaukee-arc-swapfest
CSVHF Confer-ence	July 25-28	Cedar Rapids, IA	https://www.2024.csvhfs.org/

Vintage Amateur Radio

de: Bill Shadid, W9MXQ

As I look back on my personal ham radio history, there are many radios that I have never owned and some that I have never even seen and touched. Those include several models from Hallicrafters – the SX-88 Receiver or their television sets from the 1950's. One model from Collins I have admired from afar is the KW-1 AM/CW Transmitter. Hammarlund and National have models that fall into that category as well. Many 1960's home market Japanese and British radios fall into that category as well.

One radio that I have never owned or seen is the Gonset Model G-76 HF+6M AM/CW Transceiver. This radio was very attractively styled and was designed for full coverage of the 80-10-meter bands – plus a reasonable accommodation for 6-meters. I will explain that 6-meter accommodation a bit later.

There are some unique aspects to this radio that would not be immediately evident to a ham used to radios today. But first, here is a picture of the Gonset G-76:

Gonset G-76 HF+6M Transceiver (Gonset Model 3338)

Rigpix.com

Release of the G-76 on the market, in 1960, was actually only a few months after the game changing Collins KWM-2 SSB/CW Transceiver. What makes this so unique is that Gonset's G-76 was not an SSB Transceiver – it was designed as a plate modulated AM Transmitter that incorporated a separate Receiver. I have to say that "transceiver" as is used the way we think of that term today, is not that way with the Gonset G-76. It is correct

to call the unit a receiver and a transmitter in the same cabinet. The only shared circuitry, other than power supply circuitry, is the fact that the AM Modulator Driver stage is used as the speaker audio amplifier in receive. Beyond that, the only thing the receiver and transmitter have in common is the antenna! But, in keeping with its single package design, I will use the term, “transceiver” to discuss its features. Remember also – Gonset referenced it as a “transceiver.”

The technology of the separate receiver and transmitter in the same cabinet was known at the time. Examples were common and included offerings from Heathkit, Hallicrafters, and others. However, some of the most popular radios of such radios were from the same Gonset that produced the G-76. Ham radio licensees of my vintage (licensed in 1964) recall local emergency communications using Gonset AM Communicators for 6-meters, 2-meters, and even 220 MHz band in at least one model. Examples (each available in both 6-meter and 2-meter versions) are shown below:

Gonset Communicator

Gonset Communicator II

Gonset Communicator III

Gonset Communicator IV

While these “Communicator” models were well known in emergency communication circles, they were used for general communications as well on both VHF bands. In fact, in the 1960’s, while still living in my parents’ house while going to college, I worked my first DX on VHF – 6-meters. I had my 6-meter Gonset Communicator III model and its 6-watts output on AM driving a half-wave dipole up about five or six feet above ground. From my Central Illinois location, I answered a Cuban station calling CQ – and talked to the fellow for a few minutes. In those pre-FM days, most of us around town were using Gonset Communicators of one version or another. Allied Knight-Kit, Heathkit, Hallicrafters, Clegg, and others also had competing VHF AM transceivers.

The purpose of the above review of Gonset VHF gear was simply to give you an idea if the company's roots. Returning to the G-76 Transceiver, it had a form factor not unlike the Collins KWM-2:

- Collins KWM-2 Front Panel Outside Dimensions – 14-3/4" Wide x 7-3/4" High
- Gonset G-76 Front Panel Outside Dimensions – 12-5/8" Wide x 5-1/8" High

The G-76 was a bit more compact than the KWM-2 but kept a similar balance of dimensions (form factor).

The G-76 used a single 6DQ5 as its Power Amplifier Tube. That tube, in turn, was modulated by a pair of 6DQ6B Tubes. Power expectations for the final amplifier are as follows:

Mode	Power Input	Calculated Power Output
AM	100	70
CW	120	90

Users of modern Linear AM Modulation in their SSB Transceivers do not see the plate efficiency of the Class C final amplifiers of the time.

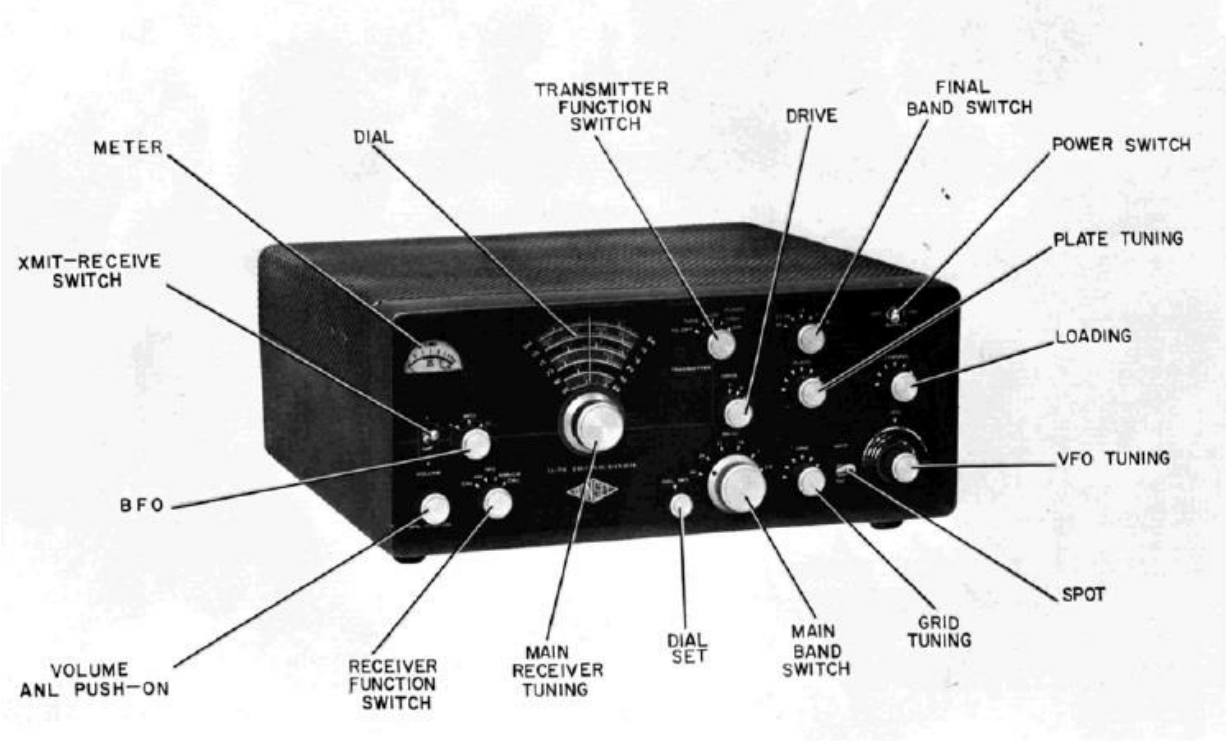
The final amplifier and modulator tubes used in the G-76 were popular at the time. Specifically, look at Hallicrafters' use of the two tubes – but not the same filament voltage, necessarily:

Hallicrafters Model	PA Tubes	AM Power Output	SSB Power Output	CW Power Output
HT-44	2x – 6DQ5	15 (Carrier)*	100	100
SR-150	2x – 12DQ6**	N/A	80	60

- (*) The HT-44 being primarily an SSB/CW Transmitter, used Linear Modulation for SSB. It had a resting carrier output of 25 watts with a carrier level of up to 100 watts at full modulation. "Linear Modulation" generally lacked the audio punch and fidelity of a plate modulated carrier, like used in the Gonset G-76.
- (**) The 12DQ6 and 6DQ6 tubes are identical in performance. The only difference is in the filament voltage.

Hallicrafters and Gonset were early users of Television Horizontal Sweep Oscillator tubes for RF amplification. Later users of this technology were Swan, Drake, National, Galaxy (WRL), and others. Yaesu and Kenwood from Japan and KW Electronics from the United Kingdom, among others, also jumped onto the "sweep tube" bandwagon. Heathkit was an early user of the technology but ended up with more traditional transmitting tubes, such as the 6146 series. My personal feeling is that properly used sweep tubes offered performance at least equal to tradition offerings of traditional tubes focused on RF service.

The layout of the front panel of the G-76 (as illustrated on the first page of this article) is pretty straight forward. Check this illustration from the Operating Manual that Gonset provided with the radio:



Gonset G-76 HF+6 Meter Transmitter / Receiver (Transceiver)

Gonset Company

Most controls are pretty easy to understand. We will cover only the basics, leaving the details to a user of the radio, following the Operating Manual Instructions.

- The BFO control is most useable for CW operation and setting the preferred listening offset. In addition, it is calibrated for Upper Sideband (“U”) and Lower Sideband (“L”) to indicate proper setting as appropriate for the band in use. The G-76 has an excellent SSB receiver.

- The Receiver Function Switch has an interesting design in that it has four positions, left to right, of CAL – AM – SSB/CW – CAL. Note the two operating positions (CW and SSB/CW) can easily switch to the internal 100 kHz Calibrator without switching past a different mode. So, when switching to the left CAL position from AM leaves the receiver in AM mode. In similar fashion, switching from SSB/CW to the right CAL position would leave the receiver in SSB/CW mode.

- The Main Receiver Tuning is the control for the Receiver frequency – and does not control the frequency of the Transmitter. The readout is a nicely design V-

Arc, above the tuning knob.

- Look to the lower right corner of the panel to see the Transmitter VFO Tuning. This control, calibrated but not to the degree of detail present in the Main Receiver Tuning, sets the frequency of the Transmitter.

- Just to the left of the left of the Transmitter VFO Tuning is the SPOT control that, when pressed, sends out a low level transmit signal that can be heard in the receiver. The VFO Tuning would them be rotated until heard in the receiver – so the transmitter would be sending on the same frequency the receiver is tuned.

- Notice two Band Switches. One is the MAIN BAND SWITCH along the bottom row, large knob, just to the right of center. The other Band Switch is on the upper row of controls – to the right of center – and it is the FINAL BAND SWITCH. This second band switch handles the switching of the Pi-Network output circuit. These tuned circuits also are involved with the front end of the receiver.

  This kind of multiple band switch circuitry was not common and is almost never seen today. It occasionally appeared, however, in the completely different receiver vs. transmitter circuitry in the days of AM/CW radios. While inconvenient in what we expect today, it is kind of an understood issue with a separate technology receiver and transmitter in the same cabinet.

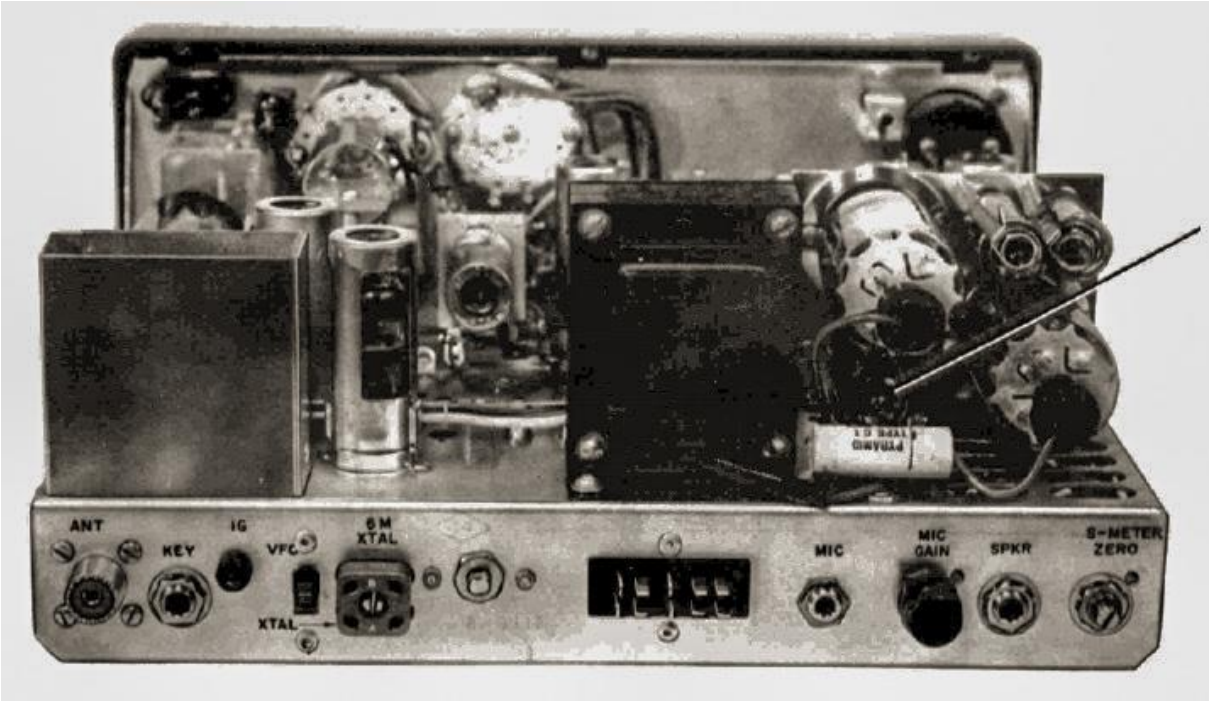
- The VFO for the Transmitter section of the radio controls frequencies in the 80-10 meter bands – but does not cover transmit frequency on transmit for 6-meters. Transmit frequency on 6-meters is by crystal control only. The socket (on the rear panel) can, however, accept input from a six meter VFO.

- The TRANSMITTER FUNCTION SWITCH controls several transmit features. On this switch, the user can select a position to listen only and remove power from transmit only tubes to, for instance, save battery power in a mobile or portable operation. This switch also covers AM Power – 20 or 100 watts or engages CW power of 120 watts (input power). There is also a TUNE position for convenience when tuning the transmitter. That TUNE position allows grid current to show on the meter. All of the traditional controls for tuning a vacuum tube radio are present for grid tuning, drive level, plate, and load controls.

- From the point of view of a collector, 65 years after the introduction of the Gonset G-76, it is refreshing to see a heavy duty toggle switch (front panel in the upper right hand corner) to turn the main AC power on and off. This means that there is no delicate add-on switch contacts to an existing wafer switch or potentiometer to fail and become impossible to replace. Even after 65 years, a toggle switch is available and easy to replace.

As you would expect, the rear panel of the radio is much simpler in layout. Presented there are the antenna connector, power connector (see reference to power supplies later

in this article), and crystal / external VFO connections for 6-meters. Also clearly noted are the Key Jack for a Morse Code Key, the Microphone Jack, and a Speaker Jack. Note that there is no internal speaker in the Gonset G-76. There are Microphone Gain and S-Meter Zero controls available on the back as well. Finally, there is a pin jack to allow constant measurement of grid current.



Gonset G-76 HF+6 Meter Transmitter / Receiver Rear Panel
Gonset Company

One can see the two 6DQ6 (V14 and V15) modulator tubes just to the right of the just right of center Modulation Transformer (T8). Not visible from this view is the 6DQ5 Final Amplifier (V3) – mounted horizontally, in the opposite direction to the modulator tubes.

The Gonset G-76 was equipped to install an optional 100 kHz Calibrator. Over the years I have found that many such options were never purchased by the original owner. In my case, I would merely copy the circuit and make my own calibrator. Finding the rather unique 100 kHz crystal these days is not so easy – but possible. The complicate band structure for different classes of license did not exist then, so we did not have multiple divisions on the band that are easily accessed (or avoided!!) with highly accurate frequency control systems.

I want to draw your attention, below, to the G-76 Block Diagram. If you look at the diagram, all items to the right of the top center shown Antenna are the Receiver section of the radio. All items to the left side of that same Antenna symbol are the Transmitter section. Check V13, just to the right of center along the bottom. That is the Audio Out / Modulation Driver tube. As such, this receiver audio output tube is also used as the Driver tube for the Modulation System in the transmitter. This kind of circuity was common in radios that

are basically a separate Transmitter and Receiver in the same cabinet, as referenced earlier in the article.

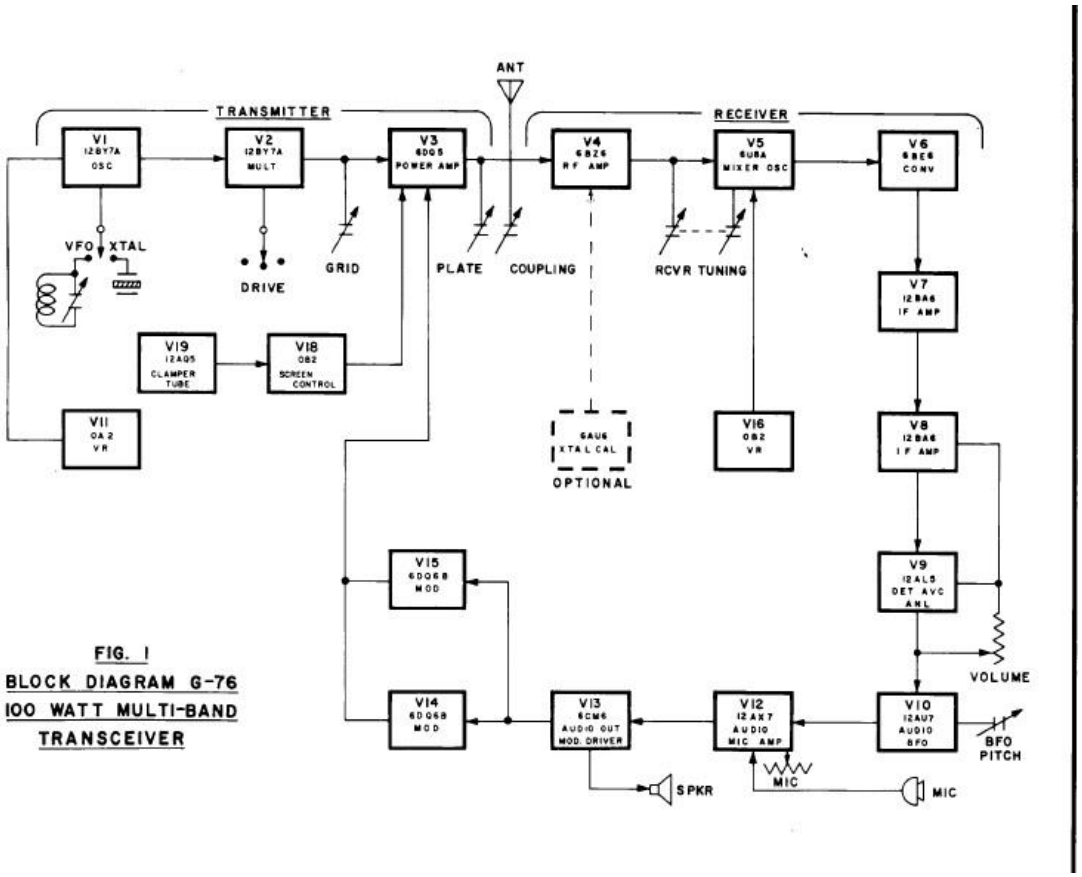


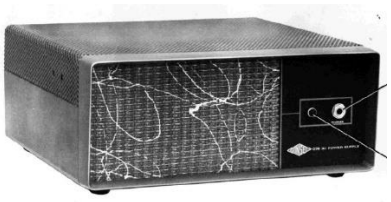
FIG. 1
BLOCK DIAGRAM G-76
100 WATT MULTI-BAND
TRANSCEIVER

Gonset G-76 Block Diagram

Gonset Company

The Gonset G-76 was offered with two optional Power Supplies:

- Model 3349 Gonset G-76 AC Power Supply with Speaker
  - 120 VAC, 60 Hz, AC Input
  - Connection provided for the internally mounted speaker
- Model 3350 Gonset G-76 DC Power Supply
  - 12 VDC Automobile Battery Input



Gonset Model 3349 AC Power Supply
Gonset Company

Gonset Model 3350 DC Power Supply
Gonset Company

Here is a picture, for which I regrettably cannot find credit information, of the Gonset G-76 Transceiver. This shows the G-76 in a scene with its matching Model 3349 AC Power Supply/Speaker. This unit has seen some use as evidenced by a few chips in the leading edges of its cabinet bezel and the rusting mounting screws on the front panel meter. Like many radios that were frequently used in mobile service, the G-76 is not easy to find in pristine condition.

Gonset G-76 Transceiver with the Gonset Model 3349 AC Power Supply/Speaker

Gonset made an attempt to replace the G-76 with a SSB Transceiver (a true transceiver) in the form of the GC-102 in about 1962 (at least announced by then). This 80-10 Meter transceiver never saw much more than prototype production. But they do appear from time to time on the market. There was also an announcement of a call called MSB-1 SSB/CW Transceiver that never materialized.

From what I can find from old advertisements in ***73 Magazine***,™ There was some hype on the GC-102. Take a look at this advertisement in the magazine for the GC-102 and the matching GSB-201 Linear Amplifier. That amplifier outlived most other Gonset products and is still relatively common if you want one. The GSB-201 started as a four place 811A Triode Amplifier and eventually evolved to using four UE572B Triodes for 1,500 watts input.

73 Magazine™ advertisement for the GC-102 Transceiver and the GSB-201 Linear Amplifier

73 Magazine
https://www.virhistory.com/

If you look carefully you will notice a pedestal below the GC-102. That is the bolt-on AC Power Supply. The styling look also went into the GSB-201 Linear Amplifier – but that

was just interior space for the amp – not dedicated to its power supply. In my opinion, this was a unique look. Note in the above magazine advertisement that the automobile installation – where any such pedestal is absent. There must have been a DC Power Supply but information on that seems to have vanished. Both AC and DC Power Supplies are mentioned in the above advertisement.

I am going to repeat some information included in a previous article on Gonset products. I want to remind readers again that the Gonset Company was founded by Faust Gonsett in the 1950's. Mr. Gonsett used a slightly shortened spelling of his name in the Gonset company name. He went on in the marketplace and his name appears in many different companies and products. He was a major factor, later in his life, with the development of the Sideband Engineers SBE SB-33 and SB-34 Transceivers – the first of the long lived hybrid radio design where a solid state transceiver used a vacuum tube driver and final amplifier. You saw those in several designs, including extensive product lines from Yaesu and Kenwood. And, also from Hallicrafters in their hybrid FPM-200 and FPM-300. Actually, the very limited production Hallicrafters FPM-200 probably predates Mr. Gonsett's work – but that point perhaps is due a bit more study. That hybrid design was included in the limited production Gonset GC-102, described above.

It is later years, Gonset Company became a part of Young Spring and Wire Corporation. They listed their address in Burbank, California, but that may have just been the Gonset factory. Young Spring and Wire Corporation was also listed in Archbold, Ohio. I can attest as a ham at the time, that the Young Spring and Wire Corporation owned Gonset through many years of operation. Having many interests (some noted here), I am not sure of the place of Mr. Gonsett in the later years of the company.

A special thanks go to Bob, W9DYQ, for his proof reading and his assistance in article development.

Thank you for reading my articles. Remember that I am open to questions and comments at my email address, W9MXQ@TWC.com. Please share your experiences with the Gonset G-76 with me.

Notes:

[1] Much of the documentation for his article came from back issues of 73 Magazine, which seems now to be in the public domain. Also, when you see "Gonset Company" in the credit of a picture, it means it has been taken from Gonset product literature of the day or product Operating Manuals. Other credits are as shown.

W9MXQ

Classified Advertising
For Sale & Wanted Items
Ozaukee Radio Club Members
de: Bill Shadid, W9MXQ

We recently received a donation from Bob Johnson following the spring SwapFest and some of the items are very nice with some being new. I thought we should give the membership the first chance on these prior to the Fall Swapfest. Here it is! You must pick up your selections at my home and leave the payment for our Treasurer, Gary Bargholtz.
Contact Person: Tom Ruhlmann, W9IPR

1. **Heathkit** CM1073 Automotive Tune-up meter. New & unopened ($40)
2. Signal Generator, square and sine wave, 0.1 to 10 volt output, 20 to 200K output, no brand ($10)
3. **VIZ** audio generator, square and sine wave, 0.01 to 10 volt output. 20 to 20K outputs. ($20)
4. **Simpson** model 1329 0-100 microampere 4”x5” panel meter, (2 each) NEW ($5 ea.)
5. Charger for 3 AAA NiCd batteries w/3 cells. New & unopened ($3)
6. **Black & Decker** 400 watt 12 VDC to 120 VAC inverter New & unopened ($10)
7. **Schmacher** 200 watt 12 VDC to 120 VAC inverter New & unopened ($7)
8. **CenTech** small digital VOM New & unopened ($5)
9. **CenTech** complete VOM with temperature probe mdl 37772 New & unopened ($18)
10. **RCA** RF signal gen
11. erator, solid state,wr-50B, with crystal oscillator and sweep functions as well. ($25)
12. Also, there is a complete **Cleveland Institute** solid state circuits course from the 80’s including the various lessons, experiments, parts, and an oscilloscope in good condition and in the original box. Complete ($30)

Classified Advertising for Ozaukee Radio Club Members is a members only feature. (Members may post for non-member friends, however.) Contact advertiser for details. The Newsletter Editor has no knowledge of any sale items (unless he is the seller!!)..

Ozaukee Radio Club is not responsible for any purchases and cannot be involved in any buyer/seller agreements or disagreements – all sales are final other than what you work out between the buyer or seller.

Advertisements will be accepted up to the 10th of the month before Newsletter publication.

Upcoming Events

de: Tom Trethewey, KC9ONY

7/06/2024 – Oak Creek, WI – South Milwaukee ARC Swapfest
https://southmilwaukeearc.org/2024/05/15/wi9sm-2024-swapfest/

8/10/2024 – Racine, WI – Racine Megacycle Club FreeFest
http://w9udu.org/

8/24/2024 – Baraboo, WI – Circus City Amateur Radio Club Swapfest
http://yellowthunder.org/?page_id=66

9/07/2024 – Cedarburg, WI – ORC Annual Regional Fall Swapfest
https://www.ozaukeeradioclub.org/

9/20/2024 – Milwaukee – HRO Superfest,
ARRL Wisconsin State Convention September 20th and 21st
https://www.hamradio.com/

9/22/2024 – Belvidere, IL – ChicagoFM Club Radio Expo 2024
https://chicagofmclub.org/cfmc-radio-expo-2024/

10/19/2024 – Lancaster, WI – Hidden Valleys Amateur Radio Club Hamfest
1st Annual FREE Hamfest
https://www.kc9kq.net/hamfest/

3/16/2025 – Jefferson, WI – Tri-County Amateur Radio Club Hamfest
https://www.w9mqb.org/SwapFest/

4/26/2025 – Cedarburg, WI – Ozaukee Radio Club Spring Swapfest
https://www.ozaukeeradioclub.org/

Ozaukee Radio Club minutes of membership meeting. 6/12/2024

De: Ken Boston, W9GA, Secretary

The monthly ORC meeting occurred at the senior center as we have returned to live in-person meetings, along with a streaming version held via Zoom. ORC Pres Bill K9GN began the meeting at 7:30 PM, a go-around was conducted. Zoom attendees were also in attendance and were also introduced.

Program:

A short overview of the ORC planning was presented by Ken W9GA, declaring class to be 3A, and giving a quick outline of the park, and station placement. This was followed by a more detailed presentation by Gary W9XT and Pat W9JI on the practice of SSB phone operation in a contest environment, with specific methods used in operating at the ARRL sponsored Field Day. They explained the use of headsets/boom mikes/footswitch and the usage of a popular logging program. They simulated a number of QSOs in examples and critiqued the operating practices.

50/50 Raffle: This was won by W9JI; winning an award of $17.00

Scholarship Auction: WB9RQR auctioned off an HP laptop, Don K9MOI got it for $20.

Committee reports: [no report from Tech committee]

President: Bill K9GN comments that the Bylaws committee will be meeting via the net to consider developments. Also mentioned our club has a 60th anniversary banner, to display at Field Day.

1st VP: Jeananne N9VSV informs us that the next program will be by W9DHI, Gregg, on repeater control systems in use by ORC; calendar is nearly full for programs on into 2025,

RPT VP: TECH: Tom KC9ONY: has found a team who are available to climb and replace the broken antenna at the Port Washington site. Cost is $200/hr. for an estimated 4 hours to perform the work. A new antenna is in the $200 range, so cost is >$1000 to repair. The use of wireless cameras for surveillance was also explored.

Treasurer: Gary N9UUR: provided statements and were reviewed. Gary consolidated funds at Horicon Bank; IE; Scholarship MMA funds were moved to the General funds MMA [separate line item]; funds were moved from General, Repeater and checking to a new [opened] $10K CD; Scholarship CD was renewed. The fund transferal was authorized via a motion made by WB9RQR, 2nd by K9QLP and passed by vote of the body. It was discovered that our legal name was incorrect! A copy of our original article of Incorporation was obtained, leading to the correct name of Ozaukee Radio Club *Incorporated.* The Horicon Bank accounts were then corrected, our state of WI tax certificate was corrected and out Federal 501c3 certificate is being corrected. Gary further made a motion to reallocate $1500 from the Repeater fund [line item] to the repeater budget for pending repairs;

it was 2nd by K9QLP and passed. A $50.00 donation was made to our ARRL Foundation Scholarship in honor of Michael Behlen WD9FQW, Silent Key.

STEM: Pat W9JI: wants to remind us that the Ham Radio demo is set for August 15 at the West Bend Library.

Secretary: Ken W9GA: minutes are up on remailer, and in newsletter; W9MXQ moved , K9QLP 2nd to accept with minor corrections, motion passed.

OLD business: N9VSV mentions 'National night out' coming up in early august [6th], and typically has a Ham radio presence. W9KEY notes that WWVB is off air, so clocks tied to that source are not reset. N9UUR notes ARRL, through ARDC, is making up to $25K grants to clubs for the appropriate outreach projects. ORC will need to consider finding a potential new repeater site, as our location at a property owned by Sandy W9BTN could possibly be unavailable in the future.

NEW business: K9QLP reminds members of the plaque that ORC won in 2020 for winning the WIQP, and this plaque has been considered to be a travelling plaque, to be lent to a current high score in that event by a member.

Adjournment: WB9RQR moved to adjourn, motion carried; time end was 9:15 PM. There were 19 in-person attendees, 16 zoom attendees.

Respectfully submitted;

Kenneth Boston, W9GA, Secretary

This Month's Meeting: July 10, 2024 - 7:30 PM

Program: "ORC Repeater Receiver Voting Process/Operation"

Presented by: Gregg Lengling, W9DHI

de: Jeananne Bargholz, N9VSV

July's program is another in the continuing "State of the Repeater" series! Gregg Lengling, W9DHI will present a behind the scenes tour of the ORC Repeater Receiver Voting Process and Operation. Interested in what goes into a multi-site repeater system and how it works? Then this program is one for you! Gregg, an ORC member, is a retired Engineer specializing in 2-Way radio. He says "experimenting and building is my main focus of ham radio and been doing it since Boy Scouts Troop 61 W9BSO back in the 1960's."

Upcoming Meeting Programs:

August: Bill Shadid, W9MXQ – The End of the Line – the Drake TR5 Transceiver
September: To Be Determined
October: Project Night ** with presenters
Paul Martis W9PEM
Bill Shadid W9MXQ
Pat Volkmann, W9JI
Gary Sutcliffe, W9XT
John Livingston, WE9F
Fred Schwierske, W9KEY

November: Stan Kaplan, WB9RQR – Building a Crystal Radio
December: Gary Sutcliffe, W9XT – Digital Modes
2025:
January: Annual Meeting/Election of Officers and Trivia (if time allows)

Call for 2025 Programs

We are fortunate to have many talented people in our club, many of whom have shared their knowledge through a presentation. Programs can be on any ham radio-related topic.

Please consider sharing some of your experiences with the rest of us. If you have an idea and would like some help putting a program together, contact me or anyone on the board.

I am thinking about adding another Project Night for a program on the 2025 programming calendar and would appreciate your input. Would you be willing to talk about a project or something special in your shack? Contact Jeananne, N9VSV
1stvp@ozaukeeradioclub.org

ORC Meeting Agenda

10 July 2024

1. 7:15 – 7:30 PM
   Check-In and Introductions
2. 7:30 PM Call to Order:
   President Bill Greaves (K9GN)
3. Announcements, Bragging Rights, Show & Tell, Upcoming Events, etc.
4. Gregg Lengling, W9DHI,
   ORC Repeater Receiver Voting Process/Operation
5. President's Update:
   Bill Greaves (K9GN)
6. 1st VP Report:
   Jeananne Bargholz (N9VSV)
7. Repeater VP Report:
   Tom Trethewey (KC9ONY)
8. Secretary's Report:
   Ken Boston (W9GA)
9. Treasurer's Report:
   Gary Bargholz (N9UUR)
10. Committee Reports
11. OLD BUSINESS
12. NEW BUSINESS
13. Adjournment

Ozaukee Radio Club Swag Spot

de: Jeananne Bargholz, N9VSV

Our Newsletter Editor had the brilliant idea to include space for our club merchandise and contacted me about making it so. Starting with this issue, and continuing without commentary unless needed, you will find our club merchandise listed in every newsletter.

Tumbler – Front

Tumbler - Back

Tumbler Caps

Personalized Polar Camel 20oz Tumbler
$33.00 (with standard cap) $36.00 (with slider cap)
9 colors available: black, red, royal blue, teal, purple, dark gray navy blue, maroon, and green. The font is standard; all you need to decide is "just callsign" or "name and callsign." If "name and callsign," then name on line one or on line two?

Name Badge
$10.00
Magnetic "clasp;" one size fits all
The font is standard.

Personalized Cap
Khaki cap is 100% Cotton w/Velcro closure: $33.00
Navy Blue cap is 65%/35% Polyester/Cotton w/plastic snap closure: $30.00
(When limited stock of the blue hat is gone, we will offer a blue that is identical to the Khaki style.) Font is standard; all you need to decide is name on line one or on line two?

We have an ordering option on our Webpage that includes PayPal costs:

https://www.ozaukeeradioclub.org/index.php/orc-gear

This is a great option if you don't attend meetings regularly – or just contact me and save those costs. If you DO attend meetings somewhat regularly, just contact me at and let me know what you want. You can pay me for your items at the next meeting.

Questions? Ready to order? Contact me at:

1stvp@ozaukeeradioclub.org

I'm also in the roster.

Remember!!

Always remember how we got here.

4 July 1776

The Back Page

This Month's ORC Meeting
Hybrid In-Person/Zoom Meeting
10 JULY 2024

Program:
Gregg Lengling, W9DHI
Voting Process/Operation

7:00 PM – Doors Open

7:15-7:30 PM – Zoom Check-In

7:30 PM – Meeting Begins

NEXT MONTH
Hybrid In-Person/Zoom Meeting
14 AUGUST 2024

Program:
Bill Shadid, W9MXQ
The End of the Line – the Drake TR5 Transceiver