



# 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.

ORC Repeaters on 146.97 (-127.3PL), 224.18 (-127.3PL), 443.75 MHz (+127.3PL) - Callsign W9CQO  
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April 2022

Number 4

## From the President

de Pat Volkmann, W9JI



Preparations have been completed for the resumption of in-person meetings at the Grafton Senior, starting with the April meeting. I joined the Technical Committee (Gregg W9DHI, Tom KC9ONY, Gary N9UUR) for a practice meeting at the Senior Center during March. We successfully ran a hybrid meeting, with a number of ORC members assisting in the Zoom audience. There was some chaos at first, but things quickly settled down. The new camera and microphone worked well, as reported by the Zoom attendees.

If you are planning on joining us at the Senior Center, just show up. The doors will open about 7 PM and the meeting will start at 7:30. Zoom invitations will be sent out the day of the meeting, just click the link to join. At the end of the meeting, I will hand off the Zoom controls to one of the co-hosts. This will allow the group to continue to chat on Zoom after the meeting, as we have been doing.

Stan tells me that he has plenty of donated items, so we will have an auction. Be sure to bring your money! If you are joining via Zoom, you must make arrangements with a friend in the room to bid for you. Your friend must they pay for the item and take it with them. Stan also tells me that he has LOTS of stuff, so DON'T bring anything to be auctioned off. Stan will let us know when it's OK to bring items for the auction again.

The Swapfest is coming up at the end of this month, on April 30th. This is an indoor event, so it will be held rain or shine. Tom, KC9ONY, has been busy getting things organized and spreading the word about the event. (See Tom's Swapfest Report in this Newsletter, page 4.) Like every event, there is a lot of preparation to be done. We always need volunteers to help with things both the day before and the day of the event. Watch the reflector for announcements asking for volunteers. Yes, we do need your help!

I'm looking forward to seeing everyone again, both at the Senior Center and in the Zoom meeting.

See you at the meeting.

Pat Volkmann, W9JI

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## **A Message from the Editor Newsletter Table of Contents**

de Bill Shadid, W9MXQ

See Club President, Pat Volkmann, W9JI, right on Page 1, where he announces a return to in-person meetings. Do you remember how to find the Grafton Senior Center?

Check out Tom Trethewey, KC9ONY, on Page 4, as he talks about the upcoming ORC Spring Swapfest. Along with that, a copy of the Swapfest Flyer is the very last page of this month's Newsletter.

Get ready for spring weather in Wisconsin with Don Zank, AA9WP, on Page 7 as he talks about Weather Spotter Training. Ever wondered how to change your password in Linux? Well, Stan Kaplan, WB9RQR has your back, starting on Page 5. See Gary Sutcliffe, W9XT, as he outlines the coming month in his On The Air column on Page 22.

Whew!! There is a lot in here from a lot of authors this month – speaking of authors, check out a Book Announcement on Page 9, starring our resident book author, Gary Drasch, K8DJT, and the Second Edition of Ham Radio is Alive and Well.

Here are the Table of Contents/Previews of this month's Newsletter Edition . . .

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Coming Soon to a Newsletter Near You . . .



### Two Collins 3-Series S-Line Stations back on the air at W9MXQ

Subject of an upcoming ORC Newsletter Vintage Amateur Radio Article Series

>> With the matching Collins 30L-1 Linear Amplifier <<

What are you working on? We are looking for and we accept radio stories and adventures for articles in the Ozaukee Radio Club Newsletter.

Contact Bill Shadid, Editor, at [Newsletter@OzaukeeRadioClub.org](mailto:Newsletter@OzaukeeRadioClub.org)

Need help to make your article jump off the page?

Contact Bill Shadid, Editor, at [Newsletter@OzaukeeRadioClub.org](mailto:Newsletter@OzaukeeRadioClub.org)

Onward To the Newsletter

# The ORC Spring Swapfest is Back!

de Tom Trethewey, KC9ONY  
Chairman, Spring Swapfest 2022  
[swapfest@ozaukeeradioclub.org](mailto:swapfest@ozaukeeradioclub.org)

After a two-year absence due to the pandemic, the Ozaukee Radio Club's 42<sup>nd</sup> Spring Swapfest has returned! Once again, we will be at the Ascension Columbia St. Mary's Expo Center on the grounds of the Ozaukee County Fairgrounds in Cedarburg. Saturday, April 30, 2022. 8:00 AM to Noon.

I attended the Jefferson Hamfest on March 27, 2022. This was the first hamfest of the year since the West Allis Amateur Radio Club cancelled their Midwinter Swapfest normally held in January. The attendance was fantastic, perhaps due to pent up demand and folks wanted to finally get out. I'm hoping that our Swapfest will also have a good attendance.

This year, we are fortunate to have a special guest. John Kruk, N9UPC, National Sales Manager, Yaesu System Fusion Product Specialist, Amateur Division of Yaesu USA will have a table and indicated he will have items to display and discuss. If you are a Yaesu and/or Fusion fan, why not come on out and see John? While you are there, look around at the other tables and see if there is something you might need to purchase.

Need some adapter, coax, power cables, or antennas? Tower Electronics from Green Bay, WI will be joining us as they have for many, many years. Now's the time to get that item without having to order online.

As of this writing, there are plenty of tables and advanced tickets available. Past history indicates that many orders come in the last two weeks, with a large number of folks waiting until the week of the Swapfest. Don't wait, get your orders in now!

See the Swapfest Flyer – it is the last page of this Newsletter. Or use this link:  
[https://www.ozaukeeradioclub.org/downloads/fall-swapfest/2022\\_Fall\\_Swapfest\\_flyer.pdf](https://www.ozaukeeradioclub.org/downloads/fall-swapfest/2022_Fall_Swapfest_flyer.pdf)

I will be at the April 13<sup>th</sup> meeting, the first in-person meeting in years. You can buy advance tickets and tables there as well. Advance tickets are Double Stub meaning you have an extra chance at winning a door prize or the grand prize.

Again, don't wait, get them now! If you can't make the Swapfest, please consider purchasing a ticket anyway, as this is a fundraiser for our club.

# THE COMPUTER CORNER

## No. 289: Changing the Password in Linux

de Stan Kaplan, WB9RQR, 715 N. Dries Street, Saukville, WI 53080-1664

[wb9rqr@gmail.com](mailto:wb9rqr@gmail.com)

It is really easy to change your password in any version of Linux, and it is considered good practice to do so from time to time. Rather important, though, don't reuse passwords or rotate them. Just change them to something new each time and don't use an old password from one machine in another machine if you have several. Also note that Linux will not let you simply change case. If your password was Jim3linux it will balk at your attempt to change it to Jim3LINUX or JIM3linux. Jim44linux will, however, work as a valid change from Jim3linux. Make it at least 6 characters. All these caveats are aimed at making your new password unique and not easily guessed, even by someone who knows you, even if they knew your old password.

One other caution. Make sure you type carefully and write down your new password immediately. I admit to being cavalier about this once, and it at least cost me some time. I changed the password and promptly lost the slip of paper recording the new one. Furthermore, none of the permutations I tried seemed to work! There was no remedy but to re-install Linux in the machine. Fortunately, it was already a new installation, and no irreplaceable files were lost. Be careful to write down your changes! Also be cautious with typing in the intended case. Case does matter. An upper case 4 is a \$ while an upper case = sign is a + sign. The letter y is not the same as the letter Y!

To change the password, first open a terminal. In the latest versions of Linux Mint Cinnamon, just click on the tray icon labeled \$ \_ and a terminal will open on your desktop. As shown below in the box, type in the word "passwd" (no quotes) directly after the ~\$ prompt and press the Enter key.

```
stan@LOROSH: ~$ passwd
Changing password for stan.
Current password:
New password:
Retype new password:
passwd: password updated successfully
stan@LOROSH: ~$
```

On a new line, **Changing password for** (user.) will appear, followed by a new prompt asking for **Current password:** on the next line. Type it in, followed by a press of the Enter key, *but note what you type will NOT echo to your screen*. If you typed the old (current) password correctly, a new prompt will appear: **New password:** Type in the new version and press Enter. Again, it will not echo to your screen. Another prompt will appear: **Retype the new password:** Repeat typing the new password exactly and press Enter. If your second typing of the new password was identical to the first and it is legal in every respect, the final prompt will show: **passwd: password updated successfully**.

Almost instantly, a new terminal prompt will appear on the next line indicating readiness to accept your new terminal command.

That is all there is to it. You can just type Exit or exit or EXIT followed by the Enter key to exit the process, or just click on the X box in the top right corner of the terminal box. Change your password at least once a year. But take it from me, record the new password on paper immediately, and do not lose your recording. Stash a copy in your safety deposit box! Happy Computing!

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## ORC Repeaters are On the Air – Awaiting Your Call . . .

- 146.97 MHz (- Shift) (127.3 PL)
- 224.18 MHz (- Shift) (127.3 PL)
- 443.75 MHz (+ Shift) (127.3 PL)



# OZARES: Ozaukee Amateur Radio Emergency Services More Weather Spotter Training

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



Last month the topic was the Weather Spotting Training sessions being offered this spring by the Milwaukee National Weather Office. Again, the session for Ozaukee County will be on Tuesday, April 19 at 6:30 pm at the Pavilion located at the north end of the Ozaukee County Fairgrounds in Cedarburg.

If you cannot make this meeting or another or you just are a weather nerd there is a great website to learn about the many aspects of weather, storm spotting or other geoscience topics. This is the MetEd website and is part of the Comet® program University Corporation for Atmospheric Research (UCARS) community programs. The website URL is:

<https://www.meted.ucar.edu/index.php>

The courses are self-paced so low pressure. Training opportunities include SKYWARN® Spotter Training Course which is a basic introduction course to weather spotting. Role of the SKYWARN Spotter course will cover all types of weather that, since they are vital to the weather office, are reportable. These two courses cover the basics for weather spotting.

For a more in-depth dive into convective or thunderstorm weather, the severe weather conditions more common in Wisconsin, check out the SKYWARN Spotter Convective Weather Basics. One subject covered in this course is how to recognize various types of severe weather clouds. Cloud types that you would learn to recognize include towering anvils, overshooting tops, mammatus clouds, updrafts, and virga. An important aspect of the cloud training will cover on how to identify similar looking clouds or tornado-like clouds. Tornado-like clouds include dust devils, water spouts and funnel clouds.

Of course, keeping you and your family safe in severe weather is job one. In OZARES we do not do storm chasing. Chasing storms, especially at night, is dangerous and a completely different subject. Recognizing and reporting severe weather conditions at your home or business location is more than sufficient to provide the weather office with ground truth or confirmation of weather conditions. The MetEd program offers a course in keeping safe during severe weather entitled, what else, Spotter Safety. The course covers the ACES concept. ACES stands for **A**wareness, **C**ommunication, **E**scape Routes, and **S**afety Zones.

The MetEd site provides training courses on many other weather topics besides weather spotting. Subjects for the courses range from basic understanding of weather,

aviation weather, fire weather, climate, hydrology, and flooding, and understanding radar and radar signatures. The length of time required to complete a class may range from less of an hour to 24 hours and some of the University Support courses are open ended.

So, if you are interested in weather, please check out the MetEd website. The courses come at ham's favorite price of \$0.00. Just your time and efforts.

Although this is a month late for their March Madness volunteer recruitment program, CoCoRaHS, the Community Collaborative Rain, Hail and Snow Network organization, <https://www.cocorahs.org/> is looking for volunteers to provide weather reports. Reports are measurement of the precipitation types of rain, snow fall and hail. The reports are submitted on their website every morning.

Some simple equipment is needed, such as a ruler to measure snow fall and size of hail stones. A rain gauge to measure rain fall, costs about \$48, is preferred for accurate measurements.

Check out the cocorahs.org site above or <https://www.weather.gov/mkx/cocorahs2022> for more information.

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## Emergency Communications Nostalgia

de: Bill Shadid, W9MXQ



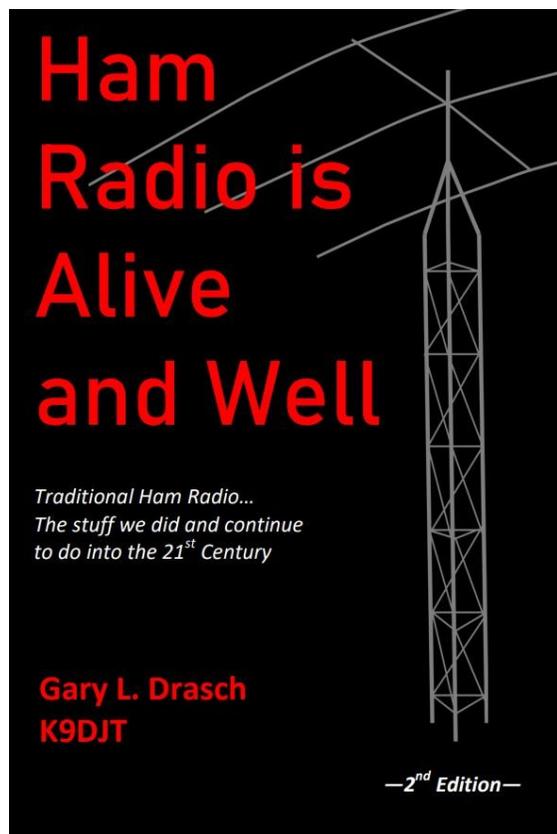
Gonset Communicator III. 2M AM Transceiver (actually, more properly called a Transmitter – Receiver as there were no common components other than the power supply and cabinet.

This unit, or one like it, was used by W9MXQ (then WA9MXQ) for mobile emergency communications with the Central Illinois Radio Club, Bloomington/Normal, Illinois, in 1965.

Anyone remember when it was required to monitor Conelrad while operating on the air? Remember Conelrad (CD) marks on your radio AM Dial? See Page 29.

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and W9MXQ

## Book Announcement – Ham Radio is Alive and Well, 2<sup>nd</sup> Edition de Bill Shadid, W9MXQ – as discussed with the Author, Gary Drasch, K9DJT



It may be of interest to those who know Gary Drasch, K9DJT, that he has released the second edition of *Ham Radio is Alive and Well*. He refers to his book as an informational story. As many know, Gary obtained his license at the age of 12 and remained active until life got in the way. Although he no longer operated HF, he always made sure to renew his General class license and operated mobile VHF-UHF during the latter part of his career as a sales engineer. Beyond that, he actually thought the hobby died. Well, we all know that didn't happen, and when Gary discovered it was still alive, he wrote about it. Gary not only shares his personal story and journey back into the hobby but also explains how it evolved from the 1960s to now and even adds some tidbits of ham radio history along the way. There's even a chapter on shack heaters! The informational side of his story explains how new technology is now intertwined with most stations along with internet links on how to do it. And that's the main reason for the writing.

He's added things relating to the latest weak signal modes like FT8, MSK144, Q65, and chasing Rox (meteor-scatter). He also discusses other things to do like hunting six-meter grids for the Fred Fish Memorial Award and the role of the "Rover" and "Grid-peditions." I even learned I can do Slow Scan TV (SSTV) by using a software program and a PC connected to my radio. Ham Radio Speak (a glossary) has been updated with several additional terms, one being "Alligator." How about your own Vector Network Analyzer for antenna and transmission line work? Yes, as Gary relates, it's pretty amazing what has taken place in the last few years.



Gary reminded me that the second edition is just that—a second edition. It's basically a refresh of what he wrote almost five years ago with about a ten percent change of content. Statistics have been updated, links are either new or confirmed to still work, and grammar and spelling have been checked using a PC program. What was good before is now great!

# Vintage Magazine Cover Art

de Pat Volkmann, W9JI



Our cover this month is from the April 1925 issue of *The Experimenter*<sup>1</sup>, a Hugo Gernsback publication. As we have discovered in previous issues of this column, Gernsback was a prolific entrepreneur in the world of book and magazine publishing, along with helping to establish the science fiction genre<sup>2</sup>. *The Experimenter* was an evolution of Gernsback's previous magazine, *Practical Electrics*, and in just a few years would become *Amazing Stories*<sup>3</sup>.

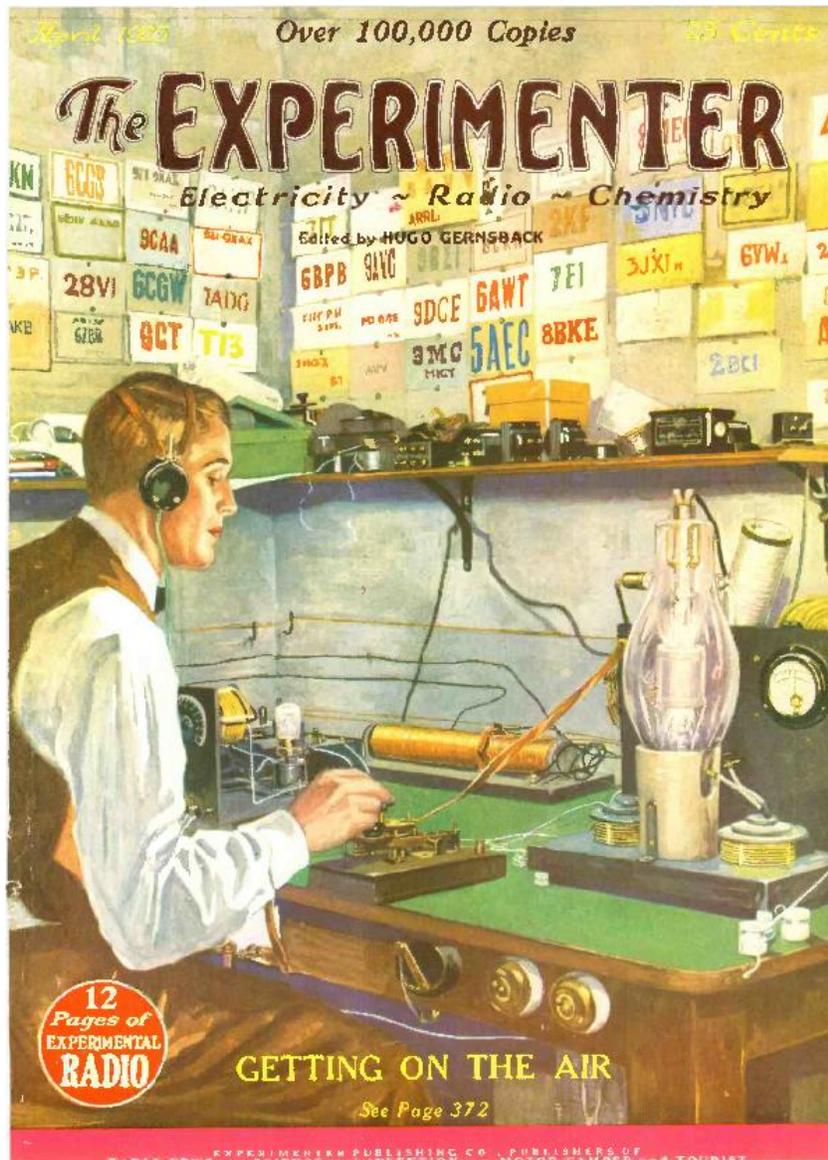
The theme of this issue is "Getting On The Air" and the ham on the cover is doing just that. We see a man pounding away on a telegraph key about a foot from a gigantic transmitting tube. The tube has a slight purple glow with sparks and a flash of light coming from the structure in the center. This is some high-power rig! The shack is littered with typical radio apparatus much of which can't quite be identified.

Unlike most cover art, this is an illustration of a real ham station. In the "Getting on the Air" article on page 372, Mr. Gernsback offers this description:

"We are pleased to present in connection with this short-wave series our cover illustration of a well-known amateur short-wave station. This is amateur station 3BQ, Bon Hill, Victoria, Australia, which has worked many U.S.A. stations. The transmitter is supplied with 1500 volts through an electrolytic rectifier consisting of 104 jars. The tube is a Philips Z4 operated at a normal plate current of 100 milliamperes. The remarkable work accomplished by this station and many similar stations throughout the world should stimulate the interest of our readers in amateur radio."

According to the Wireless Institute of Australia, 3BQ was the first Australian station to work an American ham, making contact with 6AHP in California on 87 meters<sup>4</sup>. The card shown from 6AWT may have been from Bart Molinari of San Francisco. Molinari was the 1924 Hoover Cup winner and, in 1925, Molinari was the first US ham to work Japan. 3BQ and 6AWT could certainly have worked each other.

While this issue of the magazine has a detailed article on building a two-tube regenerative receiver, there was no information on construction of a transmitter. The content of the magazine is wide ranging, including articles on chemistry, magnetism, Ohm's law, wireless power transmission and numerous experiments that can be conducted in the home laboratory. There is also an April Fool's article entitled "Some Speculation on Ether" by Philomath.



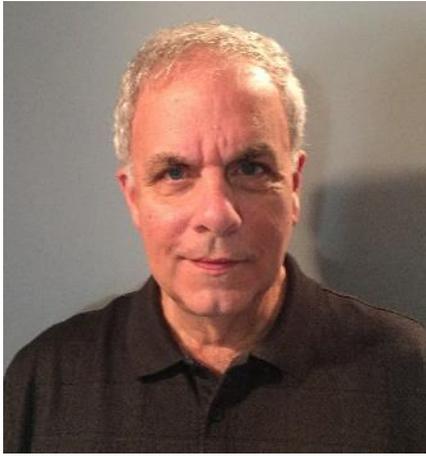
**The Experimenter – April 1924**

**NOTES:**

1. You can find a PDF of this issue and others at: [https://worldradiohistory.com/The\\_Experimenter.htm](https://worldradiohistory.com/The_Experimenter.htm)
2. Britannica, Editors of Encyclopedia. Hugo Gernsback. Encyclopedia Britannica. <https://www.britannica.com/biography/Hugo-Gernsback>
3. THE EXPERIMENTER: Gernsback Publication starting in 1920. (n.d.). Retrieved April 6, 2022, from [https://worldradiohistory.com/The\\_Experimenter.htm](https://worldradiohistory.com/The_Experimenter.htm)
4. Howden, M. (2014, January). Post World War 1 Amateur Radio. Retrieved April 2022, from [www.wia.org.au](http://www.wia.org.au)
5. Codella, C, W2PA, (2021, June 2). DX Records and Shortwave Reflections. Ham radio history. Retrieved April 6, 2022, from <http://w2pa.net/HRH/dx-records-and-shortwave-reflections/>
6. I'm interested in your comments on this article. Please contact me at [w9ji@arrl.org](mailto:w9ji@arrl.org)

# Vintage Amateur Radio

de Bill Shadid, W9MXQ



Many months ago, I did an article on the National Radio Company, Inc., 1964 top line station. That included a beautiful NCX-5 Transceiver, VX-501 Remote VFO, NCX-A AC Power Supply/Speaker Console, NCL-2000 Linear Amplifier, and the HRO-500 Receiver. Subsequent articles took individual pieces of that station and provided additional details. Missing from those detail articles has been what is the cornerstone product in the group, the National HRO-500 VLF and HF Receiver.

The National HRO-500 was part of a limited and elite group of radios focused on both the amateur and commercial market in the late 1960's and into the 1970's. The only two in the same market at the same time and with at least some reference to the amateur radio market were the Collins 51S-1 (sold from 1959 to 1975) and the National HRO-500 (sold from 1964 to 1972). The HRO-500 is the subject of this article.



**National HRO-500 Receiver**

**W9MXQ Collection**

To be sure, Racal, Eddystone, Rhode & Schwartz, Mackay Marine, and others sold radios of this caliber, in this period, but they never seriously addressed the amateur radio market. (Not to mention having a price range beyond the expensive Collins and National products.)

The HRO-500 was made in five production groups with the first production (National Production Lot Series 75) in 1964 and the last being (National Production Lot Series 140) in 1972. This information comes from Jose Gavila, EG5AGV, who goes on with the details of these builds by time period:

<b>National HRO-500 Production Series by Year</b>	
<b>Series</b>	<b>Year</b>
75	1964
88	1966
102	1967
122	Uncertain
140	1972

**EA5AGV**

It has always been known to me (but supported by comments from EA5AGV) that some of the early (Series 75) HRO-500 radios had problems that were addressed as the first series was produced. The radio in my personal collection is a Series 122 unit so well beyond that time period.

Early HRO-500 Receivers had a crank on the main tuning knob as shown here:



**Early HRO-500 with Crank Type Main Tuning Knob**

**RJ4F Collection**

I have used HRO-500 Receivers with the crank dial. It was intended to give the users a convenient way to make large excursions. Later HRO-500 Receivers removed the crank and replaced it with a machined aluminum dial behind the main dial that allowed extra fast excursions. This is similar to the main plastic tuning knob and rear extra fast aluminum tuning knob on the Swan 350, 500, and 700 series Transceivers as well as the

600-R/RC Receivers and 600-T Transmitters. I must add that as an appreciator of this radio's design, I do like the looks of the crank even if it is a bit inconvenient to use.

Let's review some of the radio's specifications. In keeping with marketing at the time, the radio is fairly large and is built like a vacuum tube radio even though it is 100% solid-state. (Well, all solid state except for the pilot lamps!) The pilot lamps draw the majority of power used by the receiver. Here is a review of power consumption:

<b>HRO-500 Power Consumption - Using the Internal Power Supply</b>		
<b>Status:</b>	<b>At Audio Power Level of:</b>	<b>Power Consumption:</b>
Pilot Lamps "ON" (Receiver Running)	50 milliwatts	8 Watts
	2 watts	15 Watts
Pilot Lamps "OFF" (Receiver Running)	50 milliwatts	2.4 Watts
	2 watts	9 Watts

The above is an untechnical review but at the time, high power consumption of vacuum tube radios vs low power of solid-state circuits was often talked about. Obviously, the radio looked better with the lamps on!! Just to be clear, there was a power savings over the HRO-500's predecessor, the HRO-60. That tube receiver drew 115 watts in operation.

The physical characteristics of this low power consumption receiver of the day is 7-5/8" x 16-1/2" x 12-3/4" (HWD). It weighed 32 pounds. It has an internal power supply that ran from a 117/234 VAC or 12 VDC feed.

The radio had sensitivity specifications typical of the day with a rating of 1.0uV for 10 dB S/N. That sounds insensitive for us today. My own tests with my HRO-500 for this article found that any signal I could hear on my Yaesu FTdx-101MP that I could copy on the HRO. In most cases, with equal clarity. Selectivity was particularly good for the day with crystal filter bandwidths built in for 500, 2500, 5000, and 8000 cycles (Hz). Shape factor of the 2500 filter was 2.5:1 – a specification that is respectable today.

In keeping with the HRO-500's period of manufacture, it is built like a vacuum tube radio. It included dozens of germanium transistors and many diodes.



**W9MXQ**

Note that all transistors not mounted to the chassis as a heat sink (Like Q-20 at the upper left corner of the picture to the left) were mounted in sockets (like Q-23 and Q-12 to the right). Today this presents problems with corrosion in so many unsoldered, low current, connections in the radio's signal path.

All the devices in the radio have become difficult to find in today's world. Ironically, while none of the solid-state devices are easily sourced today, virtually all previous National HRO Receivers, clear back into the 1930's, can have any tube sourced and used as a replacement in the old radio. Just one of the many "blessings" of modern technology!

One significant upgrade with the HRO-500 (over earlier HRO receivers) was direct frequency readout. While it was much improved on the immediate predecessor radios (the HRO-50 and HRO-60 models), the HRO-500 was even more direct and simple to read. It was more accurate, too, and was quite linear across its 500 kHz range on each band. Given that the readout remained mechanical it is a tribute to National Radio Company's engineering staff that they managed a system that accommodate a linear mechanism with nearly as linear control of the VFO. Let's look at an example of setting and reading frequency on the HRO-500 dial. For this example, we will be tuning the receiver to a frequency of 7.253.0 KC (kHz). But, before we start, I want to mention that tuning the HRO-500 is different than most radios of the day – and certainly different from what we do today. Once learned, it is straight forward – but it is a bit different from the Collins, Drake, Hallicrafters, Hammarlund, and Swan radios of the day. It is even different from other National radios. Of course, it is understood that the tuning process of any previous HRO series receiver could be referenced in the same way.

Let's do this in steps.

Step 1: Set the bandswitch (BAND MC) to the range that includes the 7.00 MC (MHz) band:



W9MXQ

Note the "BAND MC" switch – lower center in this picture – lower left-hand corner of the Front Panel. In this example the selection is "4.0-10" – which includes the frequency we want to tune.

Step 2: Set the SYNTHESIZER TUNE control:



Three Pictures - W9MXQ

Reference above picture. Tune the SYNTHESIZER TUNE control until the readout over the main tuning dial says "7.0," meaning that the lowest frequency on the range we are tuning is 7.0 MC (MHz). Adjust the SYNTHESIZER TUNE control until the PHASE LOCK light (see at left) is extinguished. The SYNTHESIZER TUNE is now correctly set.

Using the readout window in the upper left-hand corner of the picture above, peak noise in the receiver speaker for maximum by adjusting the PRESELECT TUNE control. There is an arc in this readout window corresponding to each of the five frequency bands selectable with the BAND MC switch.

Now to get on frequency – I have chosen 7.253.0 MC (MHz) – tune the main tuning knob to three kHz above the indicator window showing "250." The radio is precisely tuned to 7.253.0 MC (MHz).

The synthesizer in the HRO-500 takes the place of the heterodyne crystals used in other superheterodyne receivers of the day. In the case of the HRO-500 this amounts to heterodyne frequencies allowing coverage, in 500 KC (kHz) band segments from 5 KC (kHz) to 30 MC (MHz). That is the equivalent of sixty (60) crystals that would do the same work as this synthesizer – with comparable stability. At the time, the HRO-500's one notable competitor – the General Coverage Collins 51S-1 HF Receiver, did the work of the National's Synthesizer using individual crystals. The Collins 51S-1 operated in 1.0 mc (MHz) ranges for a total of thirty crystals.

When you use a radio in what I call the Laboratory Grade<sup>1</sup>, the concept of just “tuning the bands” can become a bit less convenient than the usual SWL or Ham Radio Receiver. But, in my judgement, the HRO-500 is easier to use than the Collins 51S-1, mentioned as one of its competitors in the ham radio field.

There were certainly features in the HRO-500 that were not available in most other top line radios of the day. One is Passband Tuning (reference the PASSBAND TUNE control (right hand center knob on the front panel). This allowed adjustment of the signal through the crystal filter passband of the radio. It also allowed selection on SSB of Upper or Lower Sideband (USB or LSB). The radios that offered this feature were most Drake receivers, starting in 1957 with the 1-A in 1957 and continuing with all top line Drake Receivers right through the last R-8B in 2005. (This feature was oddly absent in the Drake 2-C Receiver.) Collins offered this feature on the 75A-4 then dropped it on the S-Line radios – only returning it with their last ham radio transceiver, the KWM-380. In my opinion, this may well be the single most effective method of fighting QRM on the ham bands.

Another feature of note was rejection tuning (REJECTION TUNE). See the control below (to the left of the PASSBAND TUNE). This feature allowed to specific noise or tones to be notched out of the passband. It is used as a Notch Filter as found on some other radios of the day. Rejection Tuning, as such, was a significant feature on the second version of the Collins S-Line Receivers, starting with the 75S-3.



W9MXQ

For reference – see this upper right-hand quadrant of the HRO-500 Front Panel. This shows the location of the PASSBAND TUNE, and the REJECTION TUNE controls.

Users of Drake radios will find the operation of Passband Tuning to be like what is offered here by National in this receiver.

National offered features in the HRO-500 to play to a wide variety of customers. Many features were not offered at the time on radios focused only on amateur radio. For instance, there was an extensive array of options to remote control many features of the radio. For instance, the radio could be adapted, via rear panel connections, to remote control AF and RF Gain. There were also systems to remotely control AGC and the BFO. Much of this tied to laboratory and/or commercial shipboard use of the radio. Detector stage output was available to feed all manner of special mode decoding. As one would expect, the radio could be muted for use with a companion transmitter. Muting the radio was flexible enough to allow the process to be handled by a contact closure to ground or an application of muting voltage from the transmitter, or control system, to the receiver.

There were two major options that National sold with the HRO-500. One was the HRO-500-TS Speaker Console, and the other was the LF-10 Preselector. They are shown here:



This is a front view of the HRO-500-TS Speaker Console for the HRO-500 Receiver. It is the same height as the receiver and matched it in color.

There is little contrast in colors in this front view, but construction is the same as – and matches – the radio.

The strip along the bottom edge says, “National Radio Company.”

**W8ZR Collection**



**The National LF-10 Preselector  
for HRO-500 Operation below 500 kc (kHz)**

**W8ZR Collection**

The LF-10 Preselector allowed for high sensitivity receive below 500 kc (kHz) on the HRO-500 Receiver. As delivered, the HRO-500 had a documented specification of 25 uV sensitivity below 500 kc (kHz) so serious use of the radio at those frequencies required the use of a front-end amplifier. This was similar to the performance of the Hal-

licrafters SX-117 Receiver on VLF frequencies. The SX-117 required the Hallicrafters HA-10 Low Frequency Tuner/Preselector to be useful at such frequencies. (I must add here that while there is a similarity in concept – the LF-10 / HRO-500 combination far exceeded the performance of the HA-10 / SX-117 on those VLF (Very Low Frequency) bands. The HA-10 had no active devices – it merely provided front end tuned circuits. The LF-10 was a complex unit with active devices in the signal path. (There was a later, LF-10A, unit as well – but I have no information on any extra features, if any, included.)

The particular HRO-500 used for this article has some history. Before arriving with me, it was refurbished and sold to my long-time friend, article collaborator, and article proof-reader, Bob Bailey, W9DYQ. The restorer and seller for this radio was Maximilian Fuchs, of Maximilian Associates, on Swampscott, Massachusetts. Fuchs had been an employee of National Radio at the time of its closure in the early 1990's. Apparently, he purchased considerable inventory of National amateur radio product and parts at the time of the final closing. For many years he advertised his parts for and complete HRO-500 Receivers and the National NCL-2000 Linear Amplifiers. He had other product parts as well – plus documentation on popular products back into the 1930's.

There was at least one successor to the HRO-500 – but it never reached the amateur radio market. That was the HRO-600 that, after a run since 1935, removed the famous PW Dial so recognizable as the main tuning dial on every HRO receiver from the original HRO to the last HRO-500.



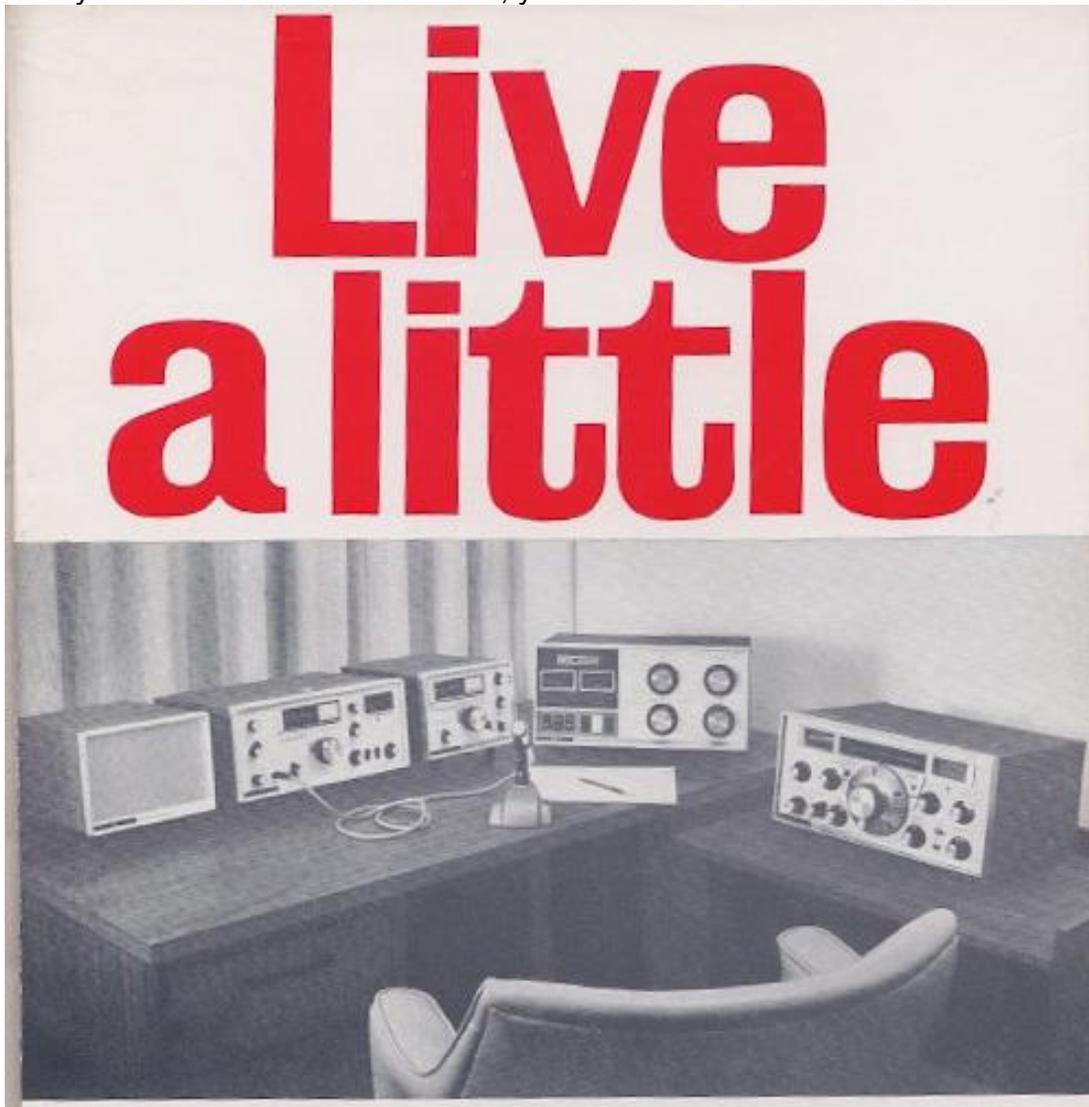
**National HRO-600 Receiver – about 1970**

**W8ZR Collection**

The tuning knob and readout were part of a center panel modular insert. Other systems could be substituted to control frequency in other ways. Perhaps the HRO-600 can be part of a future article.

I cannot close this article without showing some sales and marketing advertisements from National Radio Company during the sales cycle of the HRO-500 Receiver and its stablemates.

First is my favorite – National fan or not, you wanted to sit in that chair!!



### 1964 Display Advertisement – National Radio Company

QST Magazine  
Inside Back Cover – December 1964

The group shown is part for part in the collection at W9MXQ – including that collectable Electro-Voice 664 Microphone and Base. Late in 1964, at the time of this advertisement, the National Radio equipment items and their list prices were:

NCX-A Power Supply/Speaker	\$110	NCL-2000 HF Linear Amplifier	\$585
NCX-5 HF Transceiver (80-10)	\$585	HRO-500 HF Receiver	\$1295
VX-501 Remote VFO	\$225		

To give you an idea how things changed, check part of a brochure and prices from National in 1976 (effective 1 May 1976). The brochure shows two of the products listed in the above advertisement (among other products National was selling at the time):

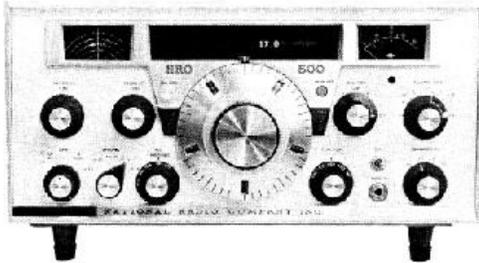
## NCL-2000

Linear Amplifier. A full 10 Db gain. 20 watts in 2000 watts out. Can be driven with one watt. Continuous duty design utilizes two 8122 ceramic tetrode output tubes, designed for both AM and SSB operation. The industry standard for 12 years. Thousands in use all over the world.



*Price: \$1,200*

## HRO-500



The ultimate short wave receiver. This synthesized (phase lock loop) receiver incorporates all facilities for AM, Single Side Band (SSB), and CW reception in all frequencies from the bottom of the very low frequency band (VLF) to the top of the high frequency band (HF). National's "dead accurate" dial means no searching for transmissions. Dial up the frequency and it's there: aeronautical, marine, CB, amateur, military, etc. Continuous coverage.

*Price: \$3,000*

PRICES EFFECTIVE MAY 1, 1976 AND SUBJECT TO CHANGE WITHOUT NOTICE

**National Radio Company, Inc.  
Published Brochure**

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

A special note of thanks to my proofreader, Bob Bailey, W9DYQ. Bob is a lot more than a proofreader as he nearly always adds commentary that makes it into the article.

### NOTES AND COMMENTS:

<sup>1</sup> Radios noted as Laboratory Grade references their focus on experimental and research use – perhaps, but not necessarily, used for fixed frequency use or for monitoring of RF data. Such receivers are not necessarily designed for use in tuning a wide variety of different frequencies but still possessing the ability to work anywhere in a wide spectrum.

© W9MXQ

# On The Air!

de Gary Sutcliffe, W9XT



They say March comes in like a lion and goes out like a lamb. This year it seemed backward as we had some of our best weather of the year earlier in March. Space weather also went out like a lion with a series of solar flares and Coronal Mass Ejections (CME), bursts of plasma ejected from the sun. These clouds of charged particles travel to earth, get caught in the earth's magnetic field, and mess up propagation. We even had a "cannibal CME" where a second CME overtook an earlier but slower one.

While the flares and CMEs meant some poor conditions in late March and early April, conditions were pretty amazing before then. The combination of more sunspots and the ability of FT8 to dig deep into the noise than traditional modes, CW and SSB, has produced some really nice contacts into the challenging path to Asia. Even bands as high as 15 meters have been open until at least 10:30 PM local time into Japan.

One thing that I find interesting since the time we had good conditions during the sunspot cycle 24 to China is the number of Chinese stations on the air. One night I had as many as three BY stations at a time answering my CQs. I probably worked more BY stations in the last month than in the previous 50 years in ham radio.

I didn't work any BY stations 50 years ago. Ham radio was not allowed in China until the mid-1980s. The first station on the air was the club station BY1PK in Beijing. A couple of years after BY1PK first went on the air, I was in China on business and managed to arrange an invitation to BY1PK, but a snafu caused me to miss it. I knew a Canadian ham had visited a few months earlier and was allowed to operate, but no US hams had yet, as far as I knew.

The bands 30 meters through 15 meters have been incredible into Asia in recent weeks. The early morning hours have been good on 30, followed later in the morning by 20 meters, while 15 meters is best around sunset and later.

## Wisconsin QSO Party

Participation in the WiQP by club members was light. The WiQP website shows 446 logs received. I recognized ORC member calls AA9WP, K9DJT, K9QLP, N9UUR, W9KEY, WT9Q, plus my entry. I hope there are a few more.

Based on scores I know about, although we had more points than last year, we did not beat the winning total of last year's event won by the West Allis club. However, their big gun did not operate this year, so we might have slipped by to claim the club competition. If so, we should be receiving a nice plaque this summer.

## 6 Meters Spring Conditions

The spring sporadic E (Es) season will be starting later this month or early May. This propagation mode is believed to be caused by wind shear ionizing metal atoms from meteors. The electrons freed from the atoms refract signals back to earth out to distances of about 1300 miles. These openings can last from a few seconds to hours. Under the right conditions, we can get multiple ionized regions, and multi-hop contacts to other continents are possible.

There have been a few tantalizing tastes of another mode on 6 meters. It is Trans-Equatorial (TE). The ionization level from the sun is higher near the equator. Sometimes the maximum usable frequency (MUF) can reach VHF levels. It can create a chordal path where a signal reaches the F layer. Instead of being refracted back to the ground, it goes horizontally until it reaches the F layer on the other side of the equator. From there it is refracted back down.

PSKReporter has been showing stations in the US working into South America. Unfortunately, the line north usually seems to stop around the middle of Illinois. One day, we had stations around the Illinois state line, stations around Minneapolis, up in Door County, and Michigan calling stations in Chile. It looked as if someone had placed a Faraday cage around SE Wisconsin with nothing heard.

Other times we would get a single decode every 10 minutes or so. Another time Gary, K9DJT, and I called a strong CE2 for over 10 minutes. He would work another station from time to time but mostly CQ'ed in our faces until he faded out.

TE will not get to latitudes this high. The stations north of the very southern states probably had an Es opening they used to get into the TE mode. The isolated decodes we got here every ten or fifteen minutes were probably off a random meteor trail to couple into the TE. We make contacts using more than one propagation mode more often than we realize.

Another VHF event to get ready for is the first major meteor shower of the year, the Lyrids, peaking around April 22-23. Hardcore meteor jockey Gary, K9DJT, says the meteor conditions have already started to improve after the winter doldrums.

## Contests

The next couple of months is quiet on the contest front. April is a big month for state QSO parties, with NE, NM, TX, ND, GA, MI, and FL scheduled. I don't have any recommendations for big contests.

## DX

The April DX scene started on a sour note. The DXpedition to the Central African Republic, TL8AA, had to be postponed. An outbreak of meningitis limited travel in that country. This DXpedition is now scheduled for November 1-30.

A group of Australian hams will activate Norfolk Island under the call sign VK9NT April 14-25. This island used to be pretty easy to work with an active resident ham but has been less common in recent years.

Another Pacific Island operation around that time is to the Austral Islands. A group of mainly US hams will activate TX5N from April 15-28.

Far from the warm tropical islands of the Pacific Ocean is an activation at Svalbard. This is a big operation with five stations using the call sign JW0Z. Svalbard is north of Europe. Being cold and very isolated, it is the site of the Global Seed Vault. Seeds are stored there to preserve the genetic diversity of food crops in the case of a worldwide disaster.

Aland Islands is not super rare, but a group of Polish ops will be there at the end of April. This has been announced as a digital-only operation with the call sign OH0EG.

W9XT's DXpedition picks for April and early May 2022					
QTH	Dates	Call	Bands	Mode	Link/notes
Norfolk Is.	Apr. 14-25	VK9NT	HF	C/S/D	
Austral Is	Apr. 14-28	TX5N	HF+ 160	C/S/D	
Svalbard	Apr. 19-26	JW0Z	HF	C/S/D	
Aland Is	Apr. 22-29	OH0EG	80-15	D	

Modes: C = CW, S = SSB, D = Digital (may include RTTY) HF = 80, 40, 20, 15, 10 Meters

That wraps up this month. Don't forget the ORC Spring Swapfest on April 30!

# Good Stuff – For Sale!!

(Donated by the Nels Harvey family to the STEM Fund)

1. Hustler 5-BTV (10 thru 80 Meter) Vertical Antenna	\$160.00
2. 2 M Cushcraft Ringo Ranger Vertical Antenna	\$20.00
3. 6 M Cushcraft Ringo Ranger Vertical Antenna	\$30.00
4. 70 CM Cushcraft Ringo Ranger Vertical Antenna	\$20.00
5. 70 CM Cushcraft Ringo Ranger Vertical Antenna w/Counterpoise	\$30.00
6. Diamond X-200 Dual Band (2 M & 70 CM) Vertical Antenna	\$40.00
7. Yaesu Screwdriver Antenna on an Indoor Base	\$70.00
8. Kenwood TM-V7 Mobile 2 M & 70 CM FM Transceiver	\$90.00
9. Tektronix 465 100MHz Dual Trace Oscilloscope w/Mobile Stand	\$65.00
10. Oscilloscope Mobile Stands	\$7.00
11. 120 VAC Primary "Variac," 7 Ampere	\$10.00
12. RCA VTVM	\$20.00
13. EICO VTVM	\$10.00
14. EICO Signal Generator	\$35.00
15. Hewlett Packard HP-200CD Audio Generator	\$35.00
16. Astron 35 Ampere Power Supply (Transformer Type)	\$40.00
17. Gessy 20 Ampere Power Supply (Transformer Type)	\$20.00
18. Vista 10 Ampere Power Supply (Transformer Type)	\$10.00
19. Tripp Lite Line Stabilizer	\$10.00
20. Bell & Howell Oscilloscope	\$10.00

For Purchase or Best Offer

**Contact Tom Ruhlmann, W9IPR**

Home Phone: 262-377-6945

Mobile Phone: 262-844-6331

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## Key-Up #2 Results: Ozaukee Radio Club – January 2022 de Ken Boston W9GA

There were 5 submissions total for this running of the exercise:

Station	Contacts	Points
Fred, W9KEY	70	176
Tom, KC9ONY	70	176
Pat, W9JI	15	45
Bill, K9GN	14	40
Gary, N9UUR	13	39

There was a tie for the most points scored between Fred W9KEY and Tom KC9ONY. Certificates will be forthcoming for those who submitted their log sheets.

## Ozaukee Radio Club Minutes of Membership Meeting 3/09/2022

de: Ken, W9GA, Secretary

This ORC meeting was conducted via an online (internet) connection using the ZOOM app. Prior to the meeting start, those members who were able to access the 'waiting room' via phone or computer/webcam were then introduced into the meeting space hosted by Pat W9JI. At that time various audio and video connection issues were addressed for the members before the meeting began.

ORC President Pat W9JI officially initiated the meeting at 7:33 PM, as introductions were recognized when members checked into the meeting, a go-around was not conducted. Bill W9MXQ mentioned that he will be tied up evenings for the next few months, and will be missing meetings, but will be available days; W9XT reminded all of the upcoming WI QSO party on March 13; and W9XT reminded folks of the upcoming QSO TODAY virtual swap meet.

### **Program:**

The program was a detailed history of refurbishing a group of Hickok tube testers presented by Chuck W9KR. He first obtained a Superior TV-11, with some problems, and fixed it up, but felt he needed a better tester, due to the Superior being only an emissions tester. He acquired a Hickok 752, which was a full mutual conductance tester, and refurbished this tester. Later, a Hickok 539C was acquired, and was also refurbished for good operation and appearance. Chuck finished by going through the trials and travails of reconditioning a Hallicrafters SX-62A shortwave receiver.

### **Committee reports:**

2<sup>nd</sup> VP: Bill K9GN reported that ham license classes will resume soon; running on Saturdays at 9AM to noon, details to follow.

Repeater: Gregg W9DHI mentioned a minor problem concerning a blown fuse, which was repaired.

Treasurer: Gary N9UUR is pleased to report that we now have 101 paid members, putting us over budget, and that the club is now under contract for the meeting room in the senior center. The March treasurers' report was accepted; motion made by WB9RQR 2<sup>nd</sup> by W9KR, and carried.

Secretary: Ken W9GA reported the March 2021 minutes will be posted; AB9ON moved, WT9Q 2<sup>nd</sup>, motion to accept and carried.

Scholarship/STEM: Tom W9IPR will be adding a 'for sale' listing of scholarship items in the newsletter; and has had Bill K9GN join the committee.

Tech/streaming: The group has tested the streaming system at the meeting facility [senior center] and all appears ready to perform a Zoom instance at the upcoming meeting. Note: we will not be running an auction at this first meeting back at the senior center.

**OLD business:** W9GA has not correctly reviewed the Key-up logs and asked for some participants to resend logs; Nominations for Awards will be cut-off the end of March, while several nominations have been received, more input is requested.

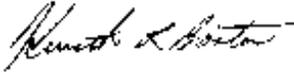
**NEW business:** The field day site for summer 2022 is reserved, and the spring swapfest is due to happen this spring at the end of April; see KC9ONY for tickets and reservations.

**Adjournment:** WB9RQR moved to adjourn, W9DHI 2<sup>nd</sup>, motion carried; time ending was 9:04 PM.

There were 35 attendees.

Following the meeting breakout rooms covering any general topics; were opened.

Respectfully submitted,



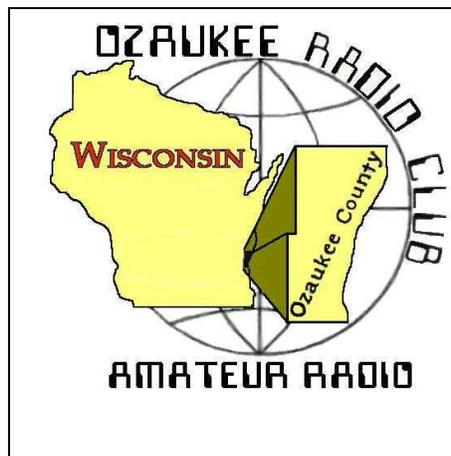
Kenneth Boston, W9GA, Secretary

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## REMEMBER!!!

**2022 Ozaukee Radio Club Spring Swapfest**  
**See Swapfest Article – This Newsletter, Page 4**  
**Saturday, April 30, 2022 – 8 AM to 12 PM (Setup begins at 6 AM)**  
**Columbia St. Mary’s Center – W67N890 Washington Ave., Cedarburg, WI**

**See the Ozaukee Radio Club Website for Details**  
**Flyer is Inserted as the last page of this Newsletter.**



# Upcoming ORC Monthly Meeting Programs

de Pat Volkmann, W9JI

April – Pat Volkmann W9JI – Refurbishing a Classic Amp Ameritron AL1500  
May – Carl Luetzelschwab, K9LA – Latest Update on Solar Cycle 25  
June – Field Day  
July – Field Day Member Reports  
August – Bill Shadid, W9MXQ - Drake Linear Amplifiers – Features and Failures  
September - Open

We need some programs for later in the year. Please consider sharing some of your experiences with the rest of us. Contact Pat W9JI with your program ideas.

## Creating a Presentation

Many of our presenters use Microsoft's PowerPoint to organize and present their information. If you don't have access to or aren't familiar with PowerPoint, there is an alternative. The Open Office package contains Impress, which is similar to PowerPoint. Impress is easy to use and available at no charge. You can check out OpenOffice here: <http://www.openoffice.us.com/>

The monthly program is the highlight of the Ozaukee Radio Club meeting. We are fortunate to have a number of very talented people in our club, many of whom have shared their knowledge through a presentation. Share your expertise and experience with the club. Programs can be on any topic that is ham radio related. Contact Pat Volkmann, W9JI, at [orc\\_pat\\_w9ji@outlook.com](mailto:orc_pat_w9ji@outlook.com) to discuss your idea for a program

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### ORC Meeting Agenda

*April 13, 2022*

- |  |  |
|--|--|
| 1. 7:15 – 7:30 PM – Check-In and Introductions   | 7. 2 <sup>nd</sup> VP Report:<br>Bill Greaves (K9GN) |
| 2. 7:30 PM Call to Order:<br>President Pat Volkmann (W9JI)                             | 8. Repeater VP Report:<br>Gregg Lengling (W9DHI)     |
| 3. Announcements, Bragging Rights,<br>Show & Tell, Upcoming Events, etc.               | 9. Secretary's Report:<br>Ken Boston (W9GA)          |
| 4. Presentation: Pat Volkmann W9JI –<br>Refurbishing a Classic Amp<br>Ameritron AL1500 | 10. Treasurer's Report:<br>Gary Bargholz (N9UUR)     |
| 5. President's Update:<br>Pat Volkmann (W9JI)  | 11. Committee Reports                                |
| 6. 1 <sup>st</sup> VP Report:<br>Ben Evans (K9UZ)                                      | 12. OLD BUSINESS                                     |
|  | 13. NEW BUSINESS                                     |
|  | 14. Adjournment                                      |



**1951 to 1963**

**Conelrad, "Control of Electromagnetic Radiation"  
Replaced by the Emergency Broadcast System in 1963**

**Next ORC Meeting  
Planned Hybrid In-Person/Zoom Meeting  
11 May 2022**

7:00 PM – Doors Open  
7:15-7:30 PM – Zoom Check-In  
7:30 PM – Meeting Begins

The Ozaukee Radio Club presents its 42nd Annual Spring Indoor  
**Amateur Radio, Electronics & Computer**



# SWAPFEST



Saturday, April 30, 2022 – 8 AM to 12 PM (Setup begins at 6 AM)

**featuring TOWER ELECTRONICS!**

Columbia St. Mary's Center – W67N890 Washington Ave., Cedarburg, WI

Talk-in: 146.97 – PL 127.3



Like us on  
 Facebook.com/orcwi

[www.ozaukeeradioclub.org](http://www.ozaukeeradioclub.org)

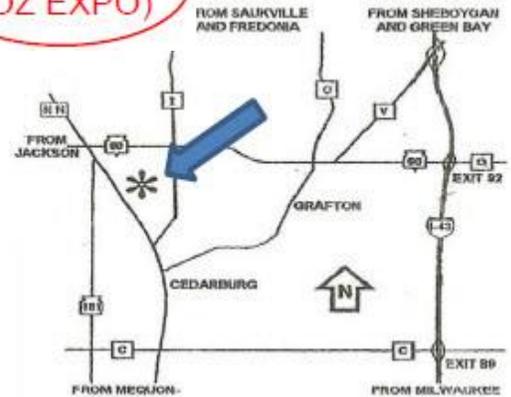


Table Spaces \$10 (All Tables are 6 ft)  
**Buy 1 Ticket & 1 Table... just \$15!**

Use Order Form below, email, or call Tom Trethewey, KC9ONY at 262-421-6351

Email: [swapfest@ozaukeeradioclub.org](mailto:swapfest@ozaukeeradioclub.org)

For Advance Tickets, send check with self-addressed stamped **Business-Size Envelope** to:  
 Tom Trethewey, KC9ONY – W69N905 Evergreen Ct N, #202, Cedarburg WI 53012  
**Admission Tickets just \$5 (Please make checks payable to ORC)**

Company Name: \_\_\_\_\_ Phone# \_\_\_\_\_  
 Contact Person: \_\_\_\_\_ Call Sign: \_\_\_\_\_  
 Address: \_\_\_\_\_ e-mail: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 No. of Tickets: \_\_\_\_\_ X \$5 = \_\_\_\_\_ Electricity: Yes (Add \$5) \_\_\_\_\_ No \_\_\_\_\_  
 No. of Tables: \_\_\_\_\_ X \$10 = \_\_\_\_\_ Total Amount Enclosed: \_\_\_\_\_

**(For Official Use Only)**

Ticket(s) # \_\_\_\_\_ Table(s) # \_\_\_\_\_ Init: \_\_\_\_\_

Date: \_\_\_\_\_ Time: \_\_\_\_\_ Vendor Entrance Used (Circle one): **1** **2** **3**