



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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Volume XLI **January 2023** **Number 1**

From the President de Pat Volkman, W9JI



If you've been reading this column for the last few months, you know the elections for Club officers will be held at the January meeting. In order to run for office or to vote, your 2023 dues must be paid. As of today, we do not have a candidate for Second Vice President. You can nominate yourself or another Club member for Second VP or any of the other positions. If nominating another, that person has to be willing to accept the nomination. Nomination is simple, just let me know that you are interested in an office. We will also take nominations from the floor at the January meeting. You will be able to vote in-person at the Senior Center or through the polling feature on Zoom.

Here is the slate of candidates for office as of January 2nd:

Office	Name	Call
President	Bill Greaves	K9GN
1 st Vice President	Jeananne Bargholz	N9VSV
2 nd Vice President	No candidate	
Repeater Vice President	Tom Trethewey (Incumbent)	KC9ONY
Secretary	Ken Boston (Incumbent)	K9GA
Treasurer	Gary Bargholz (Incumbent)	N9UUR

This month's installment is my last column as President of the ORC, as my three-year term comes to an end this month. In my first column, from February 2020, I wrote "As the new president of the Ozaukee Radio Club I am looking forward to getting know you better and to understand what you want to get out of your radio club." I feel that I have been able to accomplish both of those things over the last three years.

Early 2020 was the time when the Pandemic was gaining steam and we were getting worried about contact with other people. We started meeting on Zoom and learned pretty quickly how to use it. Zoom was one of the ways that I got to know many of you better as we had much more time to talk after the meetings. Zoom continues to be a part of our monthly meetings which are now a combination of in-person and video.

I don't know what the future holds for the ORC, but I am confident that we will adapt to new situations as they confront us. Our Club is full of resourceful, creative, and innovative people who have demonstrated they want to keep the Club going, regardless of the challenges before us.

I will continue to remain involved with the club and I am looking forward to working with the ORC Board as the Past President and as Chair of the STEM Committee. I will also continue to work to find programs for the monthly meetings, at least for the time being. I want to thank all of you for the support you have provided during my tenure, and I ask that you provide that same support and respect to our new officers.

See you at the meeting.

Pat Volkmann W9JI



A Message from the Editor

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de: Bill Shadid, W9MXQ

Please note Club President, Pat Volkmann, W9JI, on Page 1 for his last monthly message. It has been great working with you, Pat. But I know that these pages will be seeing your writing going forward. Upcoming elections are the source of our future leadership team so all please exercise your voting rights and let's get our new leadership team in place! Do you want to serve the club and help make it a success – this is your chance to step up and volunteer.

I am making some order of appearance changes to articles beginning in this issue. A rough guideline for articles' appearance is as follows:

1. President's Message
2. Editor's Message
3. Featured New Author Article
 - This Month – see Paul Martis, W9PEM
4. Operating / "Getting on the Air" Articles
 - Monthly Column – Don Zank, AA9WP - ARES
 - Monthly Column – Gary Sutcliffe, W9XT – On the Air Activities!
5. First Person Articles – Personal Articles from Members on their activities and/or focus within the hobby.
6. How To Articles
 - Monthly Column – Stan Kaplan, WB9RQR – Personal Computers
7. Radio History Articles
 - Monthly Column – Bill Shadid, W9MXQ – Vintage Amateur Radio
8. Minutes of the Past ORC Meeting and Next Month's Schedule

Let me know what you think.

Please remember – repeating from the past:

I am looking for first person articles on your life in ham radio, an event you attended, or an event you led. Do you need help to get published – well, that is why I have the title of Editor. Let me know and we will work together to get your story into print. Contact me at newsletter@ozaukeeradioclub.org.

Enjoy the Newsletter!!

Let's first check out the Table of Contents:

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Onward To the Newsletter

My Adventures

An old HT, a New Weather Station, and Some APRS

de: Paul Martis W9PEM



I've been licensed since 2001 and my first radio was a Kenwood TH-D7A HT that I bought used on eBay. I used that on and off for several years as a regular FM voice HT and occasionally explored the APRS functionality with a serial GPS. I didn't do much with the hobby for a good 15 years or so and recently got back into operating more about 3 to 4 years ago when I decided to finally upgrade my license to General in 2018.

One of the aspects of the hobby I enjoy more recently is refurbishing or revitalizing older gear. I picked up a couple of Kenwood TS-440S/AT units last year, cleaned out the notoriously bad VCO staking material, tuned them up, and got them back on the air after what was probably 20 years of them sitting in someone's basement. I hooked them up to sound card/PTT interfaces and got them running on digital modes like Vara HF, FT8, and JS8Call. Going through that made me wonder what could be done with my original Kenwood HT that was lying around unused.

I never really got tired of APRS - I had a Yaesu FTM-400XDR for a bit a couple of years ago that I liked using in the car with APRS tracking but, again, I went through a lull, and it wasn't being used and I sold that off (looking back now, probably should have held on to it with them being discontinued). So, I asked myself: what else could I do with APRS with that TH-D7A besides letting the world know my exact position? Looking around the map on aprs.fi I noticed a whole lot of weather stations and started researching how those were getting into the system. This is where a great nexus of interests happened in a short time.

All things weather is another one of my interests. I took atmospheric science classes in college and even once considered majoring in meteorology before deciding on electrical engineering. At my last job I was the engineering manager over weather and environmental monitoring systems (weather stations, soil sensors, wireless communications, IoT, etc.). I love knowing and predicting and monitoring the weather and I have a small weather station on my house which provides the real-time stream of information that I crave. So, I wondered: how do I get the data from that station on the air via APRS?

Back to the Kenwood TH-D7A: it has a built-in APRS TNC (so it can decode, and display received APRS beacons/messages) and it can also go into a mode for packet operation. I had used it early on in the APRS mode as I mentioned, but I never explored the packet features. I fashioned up a USB-to-RS232-to-2.5mm TRS cable for the PC jack and I started exploring how the TNC worked. I first managed to get it to work with

the Outpost Packet Message Manager (PMM) Winlink client, connecting up to the OZARES Winlink gateway in Saukville. Side note: Winlink Express only seems to work in KISS mode and the TH-D7A doesn't have a very full-featured KISS mode on the TNC so, despite my many attempts to fiddle with settings, I could never get it to work with WinLINK Express. I got it working with PMM by using the TM-D710 setting and manually starting up the packet mode TNC on the HT. Later I picked up a Digirig Mobile and was connecting to the same RMS gateway with Vara FM, which worked really great.

With solid packet data connections established between the HT and my PC, I started looking at how to use that for APRS. Luckily the same TM-D710 trick used to get for Outpost PMM also worked in the APRSIS32 Windows APRS client. I'm not a super fan of that software as it is pretty clunky in many ways, but I settled on that because I learned that it could generate APRS weather object data from weather station outputs, specifically those using the Cumulus software (Davis, La Crosse, Oregon Scientific), via a specially formatted wxnow.txt file. Now, I don't have one of those weather stations and instead I am using a WeatherFlow Tempest station on my roof. The Tempest is great, but the system is designed around IP connections and web/mobile applications, not serial ports, and PC software. So, what I really needed was a different way to generate that wxnow.txt file with my station's data so APRSIS32 can properly update the weather station object.



I did some digging about how the Tempest outdoor sensor unit communicates with the indoor Wi-Fi hub and stumbled upon a UDP API. Apparently, the hub generates weather data messages in JSON as they are received from the outdoor unit and broadcasts those messages over port 50222 on the LAN to which the hub is connected. Since my PC is connected to the same LAN from my Wi-Fi routers in the house, it was able to monitor these UDP messages. Some snooping with Wireshark confirmed that. I was getting closer but now needed a way to take the pertinent data out of these messages, generate the necessary text strings for the wxnow.txt file, and save that with updated data regularly so APRSIS32 could use that to update the weather station object.

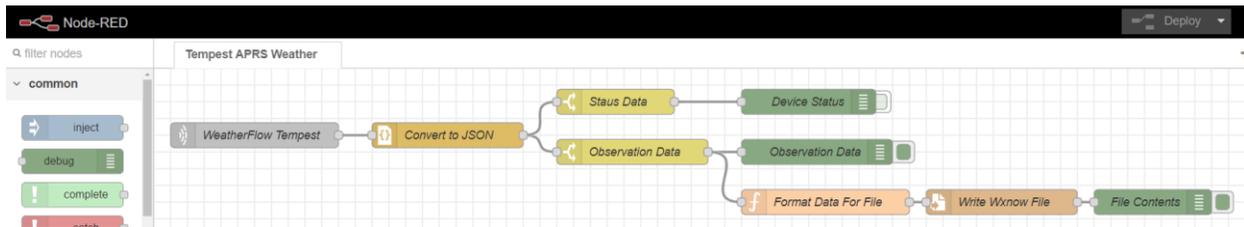
This brings me to a third interest of mine: Internet-of-Things (IoT) and developing code to capture/parse/convert/post/display data, typically from sensors or other connected devices. I've driven the development of multiple commercial IoT systems for different industries during my career and in each case, I found the easiest way to prototype data

messaging systems is through a tool called Node-Red. Node-Red is a visual flow-based programming tool that is perfect for interacting with modern APIs, hardware, and other data sources, and manipulating data. I've run Node-Red on Raspberry Pis, Windows PCs, and various Cloud computing systems. There is actually a pretty active community I discovered along the way (<https://groups.io/g/nodered-hamradio/>) that leverages Node-Red for various ham radio-related projects (often for creating logging/contesting dashboards and for controlling radios/amps/rotators/etc.).

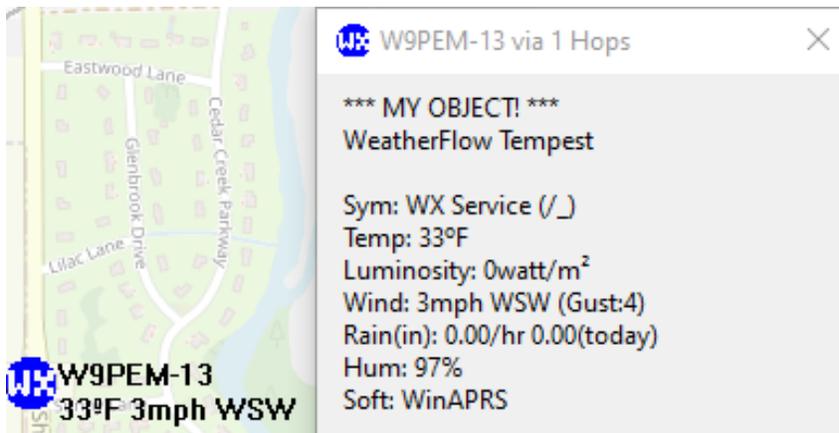
Node-RED

Low-code programming for event-driven applications

In Node-Red each "flow" is triggered when a data source or other input "node" changes (new data received, timer elapses, buttons pressed, etc.). In my case, I have a flow set-up that listens on that UDP port for the Tempest data on the LAN from the hub, looks for specific packets that contain the weather observation data, parses the JSON structure for the specific key/value pairs corresponding to wind direction, speed, gusts, temperature, humidity, rainfall, pressure, and solar radiation. These data points are then formatted in the way that APRSIS32 expects for the wxnow.txt file and the file updated regularly as new data comes on the LAN and triggers the flow. APRSIS32 sees the updated timestamp in the wxnow.txt file and knows it has fresh data to beacon out in a formatted APRS message. Here is an image of the flow:



I have this setup where it can either use the direct aprs.fi Internet connection or, more often, I just use the TH-D7A's packet-mode TNC connected over a serial port to get the messages out. From my QTH around Cedarburg/Grafton, I am able to reliably hit at least 2 digipeaters which relay my RF messages to the aprs.fi system so I can monitor my setup via aprs.fi or other mobile apps. I just have to leave APRSIS32 running along with Node-Red, and I have my weather station data showing up. It even then feeds into the APRSWXNET/CWOP system - you can find it at W9PEM-13. I'll probably move this setup to a Raspberry Pi running Node-Red and have it connected directly to the HT (or some other radio) for a more permanent APRS weather station setup. Here's what it looks like presently within APRSIS32:



It's been fun bringing together these three interests - amateur radio, weather, and IoT - together recently to make this happen. I've learned a lot along the way, and I've grown to appreciate the capabilities of my little TH-D7A HT more and more. It's really cool to be able to simultaneously (well, at least with the same HT hooked up to the PC and by using both bands on the radio - can't RX while TX'ing obviously) 1. monitor local RF APRS messages 2. contribute weather station data (both over RF and the Internet via digipeaters) and 3. connect to the Winlink system over Vara FM. Oh and I forgot to mention I can still use it for my original purpose - FM voice on local repeaters for checking into nets. That HT might be old and outdated, but I'm making the most out of it!



**Kirk goes back in time to 2005 . . .
and finds this amazing piece of vintage electronics . . .
coveted by collectors in his time!!
“Spock – do we still have those ORC Newsletter Archives?”**

OZARES: Ozaukee Amateur Radio Emergency Services
de: Don Zank AA9WP, OZARES Emergency Coordinator, aa9wp@arrl.net



**National Incident Management System
(NIMS) Communication**

The National Incident Management System, or NIMS, was created in 2004 to provide a systematic approach to sharing resources, systems and to “act collaboratively” during threats, hazards, and other incidents. As they put it: “NIMS provides stakeholders across the whole community with the shared vocabulary, systems, and processes to successfully deliver the capabilities described in the National Preparedness System.”

Last month I listed the key principles from the National Incident Management System (NIMS) provided under the Communications and Information Management component. This month we will look at the first principle of interoperability.

This can be defined in two parts:

- Operability - The ability to establish and sustain communications in support of day-to-day mission operations.
- Interoperability - The ability to communicate among jurisdictions, disciplines, and levels of government, using a variety of frequency bands, as needed and as authorized.

But Interoperability is not the ability for everyone to talk to everyone else.

The definition supplied from the Auxiliary Communications Field Operation Guide (AUXFOG) from the Department of Homeland Security is: “Interoperability: The ability of emergency responders to communicate among jurisdictions, disciplines, frequency bands, and levels of government as needed and as authorized. System operability is required for system interoperability.”

Basically, the incident commander, the authority having jurisdiction, first responders, and other government officials must be able to communicate and share information. In the past years, we have watched the vendors of communication equipment, working with first responders, create new technologies for communications. This includes the new FirstNet system: <https://www.firstnet.gov/>

So, what is amateur radio interoperability? Hams talking to hams? Yes, in a sense. Communications must be robust between our locally served agencies, which includes hospitals, the Red Cross, and county public health officials.

Communications with local ARES groups and their respective served agencies must be maintained. This will also include statewide and national ARES groups.

The importance of amateur radio communications can be found in the Wisconsin Field Operations Guide or WI-FOG

https://oec.wi.gov/wp-content/library/2021/WI_FOG_2.3_2021_Final_Full_Size.pdf

Chapter 11. The chapter provides a list of assigned frequencies for each county. Operators in neighboring counties must be aware and capable of operating on their neighbor's assigned frequencies.

Another group that ARES members must be capable of performing interoperable operations with is the Military Amateur Radio Service, MARS. Several times during the year MARS will conduct their COMEX exercises. The exercises emphasize situational awareness, message passing and monitoring on the 60-meter band.

Another is the SHARES, the Shared High Frequency Amateur Radio Emergency Services, a program administered by the Department of Homeland Security's National Coordinating Center for Communications, NCC.

The members and operators of SHARES stations will provide message handling if cell or landline telephones become inoperable.

"SHARES members, 3290 HF radio stations from almost 600 federal, state, and industry organizations participate in this program. SHARES users rely on HF radio communications to perform critical functions, including those areas related to leadership, safety, maintenance of law and order, finance, and public health. This program also provides the emergency response community with a single interagency emergency message handling and frequency sharing system. SHARES promotes interoperability between HF radio systems and promotes awareness of applicable regulatory, procedural, and technical issues."

<https://www.cisa.gov/shares-program-information>

Resources to check out.

National Interoperability Field Operation Guide or NIFOG:

https://www.cisa.gov/sites/default/files/video/NIFOG_2.01_508_FINAL_VERSION_5_11_22_0.pdf

Auxiliary Communications Field Operations Guide or AUXFOG:

[https://www.cisa.gov/sites/default/files/publications/AUXFOG_June_2016_-_508_Reviewed_-_Final_\(2-16-17\)_0.pdf](https://www.cisa.gov/sites/default/files/publications/AUXFOG_June_2016_-_508_Reviewed_-_Final_(2-16-17)_0.pdf)

OZARES Winter Field Day

de: Don Zank, AA9WP

Please join Roland, KB9TMB, John, NO9X and Dave, KD9JYL, and whoever else may show to participate in Winter Field Day, 2023.

The OZARES Winter Field Day operation will be a good test of setting up and operating a field station in winter. This will be more of an ARES exercise than a contest exercise.

Modes of operation will be VHF-FM; WINLINK including 2m FM and HF; and HF phone. They will be testing local simplex VHF connections in the South East District on 146.520. They can be reached on WINLINK using either WI9OZ or NO9X.

- **What:** OZARES Winter Field Day activation
- **Where:** Upper Lake Park (picnic area 1) Port Washington
- **When:** January 28, 2023. 12:00 PM – 3:00 PM
- **Talk-In:** 147.330



© Sarge Speaks Out

On The Air Activities!

de Gary Sutcliffe, W9XT



January is a time for looking back and looking forward. We saw some good things in 2022. The year started in the doldrums of the low sunspot period as the sunspot count increased. At the end, we saw some propagation on the higher HF bands that we had not seen in about six years. It was a long drought!

COVID eased, and we started seeing more hamfests and in person meetings after the shutdown. Of course, as hams we have more ways to communicate than most people, but there is a lot to be said about face to face interaction.

Travel restrictions were relaxed, and we saw an increase of DXpeditions as hams were allowed to travel to more areas of the world. As a serious DXer with 50 years of hunting, many of the new band and mode countries I need will only be activated by DXpeditions.

Looking forward, we can expect propagation to improve on the higher HF bands. I am hopeful that the current cycle might reach the point we get some F layer propagation on 6 meters. The last time we had that regularly was 2000 and 2001.

DXpeditions will continue to rise. Just this month, we will have the #2 and #3 most needed DXCC entities on the air. It is an exciting way to start the year! However, the one thing going forward that concerns me is that ham events like hamfests seem to be disappearing.

Recent Contest and Operating Events recap

Bill, W9MXQ, reported operating the Twelve Days of Christmas event. He got the sweep of all twelve stations three different ways. Bill worked them all on CW and SSB, using a Drake TR5 transceiver running 50 watts. Bill then did it mixed CW and SSB QRP using a Yaesu FT-817ND. Gary, N9UUR, reported working some of the special event stations but did not get a sweep.

The ARRL 10 Meter Contest in December had several ORC members active. Conditions were probably the best in about six years. Bill, W9MXQ, had 278 phone and 37 CW contacts, again with his Drake TR5. Other calls heard were Vic, WT9Q, Fred, W9KEY, Ray, W9KHH, and Don, AA9WP. I'm sorry if I missed anyone.

Fred, W9KEY, thought the conditions were much better than in 2021, even though the late afternoon and evening propagation was down. Operating phone only, he made 418 contacts in 41 states and 47 DX countries. Fred mentioned that contests are a great way to pick up new states and countries for awards. You don't have to operate a contest to win the event. The increased activity brings out stations and countries that are not on

that often, so operate to work on awards. The serious competitors will appreciate your contacts.

Fred also mentioned that in 2022, he added 19 confirmed countries to bring his total up to 197. He is learning that new ones are getting harder to find. That is true, but 2023 will bring many DXpeditions, which will be covered later.

I went mixed mode unlimited, low power in the 10 Meter contest. For the last few years, I went CW only because poor conditions would make SSB extremely frustrating. With better conditions, I would make more contacts by jumping back and forth between modes. My goal was 1000 QSOs, but I ended up about 20 short. About 2/3 were CW because they are worth more points.

HAARP Asteroid Bounce

With only a few days' notice, HAARP announced they would try to bounce low frequency signals off a 500' asteroid that was to pass within about two lunar distances of the earth on December 27. HAARP is the High-frequency Active Auroral Research Program. They do ionospheric research by heating sections of the ionosphere with RF and similar experiments. But with their high-power station, they think they could learn something about the internal composition of asteroids. Unfortunately, according to some of the tin foil hat crowd, they are also doing nefarious things like weather modification. I don't really believe that.

Back in January of 2008, they were bouncing signals off the moon just outside of our 40M band. You could pick them up quite well with just a dipole. It was pretty cool. When they announced that they would try to do it with Near-Earth Asteroid 2010 XC15 and wanted hams to listen and send them reports, I figured I needed to check this out.

They provided some basic information but really didn't offer any advice. Some of the information was kind of cryptic. They mentioned a 30 kHz bandwidth "linear FM" signal along with an eleven-hour window and a frequency. Their website had not been updated in some time and still had information on their upcoming October 2022 experiments and nothing about this test. I did a little investigation and looked up their FCC experimental license. They are authorized to run 3.6 Gigawatts ERP in their 9 MHz allocation. Talk about QRO!

I figured hearing them off the asteroid would be a long shot due to distance and the small size, 500' vs. almost a 2200-mile diameter for the moon. But you never know until your try.

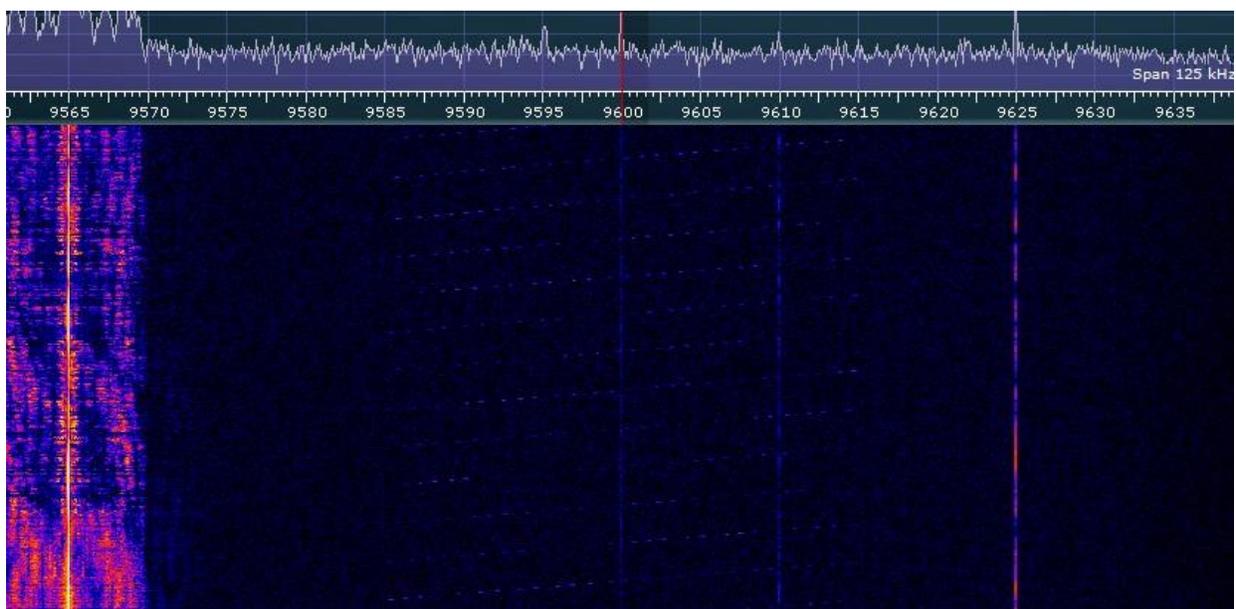
With 3.6 GW, they should be pretty strong on sky wave. During their 40M EME tests, you could often hear a short tone from the direct signal, then 2.5 seconds later, hear a weaker, hollow sounding tone off the moon. So, I figured that if I were lucky enough to hear echoes, it would follow a similar pattern.

When I first got on to listen, it was about 6:00 AM. I was listening on my FTDX5000. There was a Chinese broadcast station on that frequency. After about an hour, they signed off. After that I was still not hearing anything. They were saying they would transmit above and below 9.6 MHz. Where are they changing frequency? If so, how far would they go? So, I decided to fire up my RSPduo SDR that I picked up at Dayton earlier this year. It would have a band scope to look for them, plus I could play around with different modes and bandwidths.

After hooking it up, setting up the software, and figuring out that I was not getting a signal because of a bad cable, I started seeing signals around 9.6 MHz. They were SW broadcast stations, but 9.6 was clear. I left it on, and about an hour later, I started to hear short chirps every two seconds like they said they would. I was able to get a quick screen shot of the spectrum waterfall. By the time I was able to start recording they had faded out. Several hours later, I had the same experience, a quick screen shot but they either faded out or stopped transmitting before I could record the audio.

I thought the whole thing was kind of strange. If HAARP wanted to get help from hams, they should have given out more information. For example, what would be the best way to listen for them? What kind of signal strengths would have been best? If they were only transmitting from time to time, they should have had a way to communicate that.

One thing puzzles me. They transmitted the chirps every two seconds. At the distance to the asteroid, round trip time would be around 5 seconds. That means they would transmit a chirp, then a second chirp before you would receive the first one. It would be more difficult to separate ones from the asteroid from sky wave signals, except, of course, for strength. It would have been easier if they transmitted every 6 seconds or so. I'm sure they had their reasons. That probably would not have been an issue for their big receiving sites in California and New Mexico, but it would have helped out the hams.



HAARP asteroid experiment signals. Notice (above) the faint diagonal lines centered on 9.6 MHz. Those are the short transmission bursts that start 15KHz below and end 15KHz above the center frequency. They are light since they are very weak. The bright band to the left is an AM short wave broadcast station. It is unclear what the line at 9625 actually is.

So, were the signals I heard off the asteroid? Probably not. As you would expect, I don't have a high gain antenna with azimuth and elevation controls for 9.6 MHz. But I figured that my dipoles or 40M Yagi would work reasonably well, at least for sky wave signals from HAARP. But the other signals nearby were much stronger on my 30M vertical. That makes sense since the 30M band is only about 500 kHz above their transmit frequency. But it also has a low take off angle. That is great for distant broadcast signals, but maybe not so much for asteroids high above the horizon.

But maybe they were reflections off Asteroid 2010 XC15. I expected to have a good sky wave signal from the transmitter. But they have large arrays. You don't get 3.6 GW ERP with antennas without a lot of gain, and gain means you take power going in other directions and move it in the direction you favor. Side lobes would reduce the gain in the desired direction. Could that explain little or no sky wave? The short receive periods are what I would expect from signals bounced off it. That would be brief periods with a lot of QSB as asteroid rotation and other effects would hurt or improve the signal coming back.

I also had conversations with other hams who pointed out things like the D layer absorption up in Alaska was very high at 10MHz then. The D layer is what absorbs low frequency signals during the day. It is why we don't hear distant stations during the day on the AM broadcast band. So, it is likely little signal would have reached us. So maybe I actually did pick up a signal that bounced off an asteroid. I guess I will never know.

December Meteor Scatter & Bandwidths

Last month I mentioned the Geminids meteor shower. Activity seemed a bit low, but I picked up a new grid on 6 meters and another on 2 meters, so I considered it a success. I believe Gary, K9DJT, also picked up new grids.

The most common mode for VHF meteor scatter is MSK144, one of the WSJT suite of programs that includes the popular FT8. With FT8, the transmission times are long, and the data rate is low, allowing the decoding of very weak signals. The lower the data rate, the deeper into the noise you can go.

With meteor scatter, the meteor burns up in the atmosphere and creates a trail of ionized gas. The size of the trail depends on the size of the meteor. We bounce our signals off those ionized trails. The length of time this happens depends on the meteor's size and frequency. Larger rocks and lower frequencies result in longer periods the trail can support signal reflection. Some trails are very short, well under one second.

MSK144 transmits with 15 second sequences like FT8 but transmits data much faster. The time to transmit a complete exchange is than a second. So, if a meteor comes through in that 15 second period, a short "ping" will suffice to get the next sequence through. Because the data rate is so high, MSK144 and similar modulation techniques are only allowed on 6 Meters and above.

While looking to work some stations, I came across a station wanting to work scatter on 10 meters. He was using the JT9 Fast mode, another WSJT mode. Its data rate is low enough to be legal on 10M. So, I switched over to JT9 Fast and quickly had a meteor scatter QSO with him in New Jersey.

I'm not terribly interested in 10-meter digital meteor scatter. I have made many meteor contacts using CW and SSB during the ARRL 10 Meter Contests during low sunspot years. Now that we have better conditions, FT8 is a much better mode if you want to make digital contacts on 10 meters.

But this brings up an important point. The current FCC rules on data modes are archaic. They were written when RTTY was the only data mode. They specified the maximum symbol rate we could use, and 45 baud became the ham standard for RTTY. That was fine for the time, but technology has advanced to the point where the old standard is obsolete.

Rather than symbol rate, maximum bandwidth is a better method. Those of you who were involved with personal computers in the early days may have had dial-up to connect to bulletin boards and, later, the Internet. Early modems interfaced our computers to the phone line. The early ones only did 1200 or 2400 baud. Even earlier ones were limited to 300 baud. The bandwidth of a standard telephone voice line limited the speed. Over time new techniques were developed to transmit 56K on the phone lines. The current ham situation is as if you were only allowed to use your 300 baud modem to connect to the Internet, instead of available higher speed ones.

Those technologies could be used on HF if the FCC regulations permitted it. It is interesting to note that the FCC often gives special temporary permission to use higher speed data modes for emergency traffic during hurricanes. The FCC was going through the rule change process when COVID hit. They were essentially shut down. Even though things have opened up, they are way behind, and ham rule changes are not high on the FCC priority list.

Congresswoman Debbie Lesko (AZ) introduced a bill to require the FCC to amend the rules that would allow digital modulation techniques as long as they occupied a bandwidth of less than 2.8 kHz, the bandwidth of an SSB signal. Hopefully, that will pass.

DX

The Crozet Island DXpedition I mentioned last month started on the 24th of December with the call sign FT8WW. Thierry, F6CUK, took a couple of days to set the station up

and put-up antennas. High winds are the norm there, and that slowed progress. He got on Christmas eve our time. I got back from family events and turned on the rig. It was pretty late, and the Europeans were probably in bed, and probably most US DXers were doing Christmas stuff, so the competition was somewhat lighter than you would expect at the start of a DXpedition that so many DXers need.

I was lucky enough to work with him in his first session, which I never expected. He was on 30-meter FT8. Gary, K9DJT, spent a lot of time breaking the pile ups. Here is his story.

Working FT8WW the Hard Way

It is exciting to have DXpeditions active once again. Especially when one is the third most wanted in the world. The downside is that it's a one-man show and if that isn't enough, I wasn't able to hear him while other members of the Greater Milwaukee DX Association (GMDXA) were working him left and right. It's one of the very few times I was actually getting bummed out while attempting to work a DXpedition.

FT8WW was spending the majority of his time on 30m FT8 and I merely decoded him one or two times using my only 30m resonant antenna, a Hustler 5-BTV vertical. Oh, how I regretted not having a 30m beam. Then the thought of using my 20m beam came to mind. I switched to it and lo and behold I started receiving consistent decodes! Things were looking up until I tried matching it with my Elecraft KAT500 automatic tuner. It wasn't happy so I dug out an old Dentron manual tuner that wasn't being used and voila, it worked. I had a 1:1 match. I'm thinking, here we go! I literally called for hours on end over a couple of days with no joy.

Feeling sorry for myself, I began whining to Lyle, WE9R, about my lack of success when he reminded me that the beam wasn't resonant on 30m. Of course, he was correct. I've always been aware that a 1:1 SWR doesn't necessarily mean an antenna is an efficient antenna. It was time to go to plan "B." Having a transceiver with two receivers and selectable antenna connectors provided an opportunity to split my antenna system apart. Without too much effort, I was able to connect the Tri-bander (20m) to ANT-1 and use it as the receive antenna on the "Main" radio. At this point, I connected the 30m resonant vertical to ANT-2 which was selected as the "Sub" radio transmit antenna. Now, operating in split mode, I was able to receive 30m signals using the 20m beam, and transmit 30m signals using an efficient resonant antenna, i.e., the vertical. The next day FT8WW wound up in my log and I into his. HAPPY NEW YEAR to me!

And Happy New Year to you...
73, Gary K9DJT

Fortunately, Gary stuck with it. After watching the Packers trounce the Vikings on New Year's Day, Gary turned on the radio and got him after only four calls. You can't start a year much better than that! Did anyone else work FT8WW?

The FT8WW operation will go on to January 26. Thierry is trying to maximize the number of contacts with DXers needing it for all-time new ones (ATNO), so he has been operating only 20- and 30-meter FT8, and a little CW on both bands. I worked Crozet on 20-meter CW back in 1983, so I have not tried to work them on 20, lest I take a contact away from someone who needs it. He says he will try SSB on the higher HF bands as the number of stations needing him on any band or mode drops.

The best times for us seem to be in the evening on 30 meters. Sometimes he will be copyable in the late afternoon, but the best signals seem to be between about 7:00-10:00 PM local time. In the mornings, the 20-meter long path seems to work best. Long path means pointing your beam in the opposite direction you usually would, southeast in this case. All in all, 30-meter FT8 seems to be our best shot. Only a few of my Wisconsin DX friends have been successful on 20, but a fair number have made a contact on 30.

Thierry is running a version of FT8 called MSHV. It is somewhat like the F/H mode in WSJT with multiple QSO streams, except callers do not change frequency once the QSO begins. Just use the regular mode, and DO NOT SET it for F/H. He is also requesting you start sending TX 2 instead of TX 1. This is because he does not need your grid, and it saves time. So instead of sending "FT8WW W9XT EN53", I would start by sending "FT8WW W9XT -10" when trying to work him. I would also recommend changing TX 4 to RRR instead of RR73. This forces the other station to send a 73. I have been hearing a lot of comments about not getting a confirmation from FT8WW and contacts not showing up on the online search.

Logs are updated periodically, and you can check if you made it by going to the website: <https://clublog.org/charts/?c=FT8WW> and entering your call sign.

Check to make sure the last upload was after your QSO. If it is and your contact does not appear, you probably worked a pirate. Unfortunately, there have been several miscreants pretending to be him. Most of them seem to be on 20 meters.

The website <http://crozet2022.r-e-f.org.news/html> has updates every few days with the English version in blue. There has been some criticism of the operation. It is unfounded. The operator is taking several months to make this trip to operate. He has restrictions on frequencies and operating times but has been making a lot of contacts, averaging over 1000/day. I think he is doing an excellent job.

The biggest DXpedition in a long time will be starting out later this month. It is to #2 most needed Bouvet Island in the South Atlantic. If you draw a line between the southern tip of South America and the southern end of Africa, Bouvet is roughly in the middle

of the line. It is said to be the most distant place from civilization on earth. Even the Astronauts on the ISS are closer to other people.

Since it is so remote, transportation is difficult and expensive. Landing on a rock covered in ice is no picnic. High wind and waves make it more difficult and dangerous. The last two attempts to the island had to be aborted. So, it is not surprising that it is the second most needed DXCC entity.

The team plans to leave from the Falkland Islands about January 14th. It could take as long as two weeks to arrive at the island. Weather conditions will determine how soon they can land and set up. The plan is to operate for 22 days. The large team expects to have as many as 12 stations on the air at peak times. That should give everyone a chance if they are patient, but many things could cut the operation short, so don't wait too long.

This is a very well-organized operation. It is also very expensive, with a budget of \$720,000. Consider contributing a few dollars if you make a contact and want a QSL. It is unlikely that anyone else will be going there for a long time.

The 3Y0J group has a very nice web page. If you plan to try to work them, I suggest you check it out.

<https://www.3y0j.no/>

With the #2 and #3 most wanted entities on the air in January, it is hard to imagine any other interesting DXpeditions, but there are.

Senegal is currently on the air, and Gary, N9UUR, has already worked him, 6W1/WA3DX. The operator will be visiting different areas of Senegal using 6Wn/WA3DX. The last number will change as he operates from different regions of the country. Most of the operation will be FT8, and he will be there until January 20.

A group of Czech ops will activate the Republic of the Congo. The dates are January 6-21. They will be on 160-6 meters, CW, SSB, and digital. This one used to be rare but has become more common in recent years. The lack of propagation on 10 and 12 meters in the last few years should increase interest in this operation. Look for TN8K.

Bob, W9XY, and Ken, K4WW, both friends of mine, will be joined by the famous DXpedition op Nodir, EY8MM, traveling to Ethiopia. The group will operate from the Addis Ababa Institute of Technology, ET3AA. Bob and Ken have made several trips over the last few years to help the students at their radio club station with operator training, station setup, antenna repairs, etc. They are scheduled to be there January 14-21.

Contacts on the low bands from ET3AA have been a problem in previous trips. Getting permission to stay at night has been an issue due to security issues. It is a pretty dangerous place. Very high noise levels have hampered the times they were allowed to op-

erate at night. They hope to get permission to operate at night and hopefully have some quiet conditions on this trip.

A group of Japanese hams will put Palau on the air on January 13-20. Then a second group will take over from January 20-27. Each operator will be using their own T88 call sign.

There are also a bunch of hams planning operations worldwide by themselves in January, often as part of a vacation. I generally don't cover them here unless I have some particular reason. However, if you are active, you might run across one of them.

Contests

January is a busy contest month. The ARRL RTTY Roundup will start the day after this newsletter comes out. It was covered in last month's column. Don't forget, you can't use FT8 this year in the RTTY RU.

January 21 is the start date of the ARRL January VHF contest. The January event is not as popular as the June event, with its chance of good sporadic E propagation on 6 meters, and the September event with its potential for tropo. Rover operation can be down if it is frigid or snow storms are forecast, but it will give you an opportunity to dust off the VHF equipment.

Down on lower frequencies is the CQ 160 Meter Contest. The CW weekend starts on January 28. There is a new rule that is sort of interesting. Noise is a problem on 160 meters, and one solution is low noise receiving antennas. Another solution is to put a remote receiver in a quiet location. The single op assisted category allows the use of a single remote receiver as long as it is located within 100 KM of the transmit location. This is in addition to a receiver at the transmitter site. It will be interesting to see how many stations take advantage of this rule.

Two North American QSO Parties are this month, with the CW version starting at noon local time on Saturday, January 15. The phone version is on January 22. This is a great contest for smaller stations because low antennas can be very effective in working other states. Use low power and send your name and state as the exchange.

Expect to hear a lot of Freds on the NAQPs this month. If a member of a club or famous contester becomes a silent key, others often use his name in their exchange in the next NAQP to honor him. Fred Laun, K3ZO, passed away on January 3. He was a legend in ham radio. Originally from Wisconsin, Fred attended the University of Wisconsin and was instrumental in the university club station, W9YT. After that, he joined the State Department and was stationed overseas in several countries, where he often set up a ham station.

Long-time ORC members will remember Leon Rediske, K9GCF (SK). Leon was one of Fred's college friends, possibly even a roommate at UW. Fred would sometimes be in

Wisconsin during the summer and came out this way to have dinner with Leon. As a W9YT alumnus, I was invited to join them a couple of times. It was a real honor. Fred was also a regular at the Dayton Hamvention®.

I worked K3ZO on phone during the ARRL 10 Meter contest last month. It was always special when you work someone of such prominence, and they remember your name, saying "thanks, Gary" after you give your exchange. Little did I expect last month it would be our final QSO.

Operating Activities

Last month I mentioned the WRTC Award (World Radio Team Competition). It runs the entire month of January, so I am covering it again here. Basically, it is to work special event stations publicizing the WRTC, which will be held in July. Most of the stations you work will have WRTC as their suffix. US stations will be N#W, N9W being the one for our region. I have been invited to be one of the N9W operators, so if you hear the call, it could be me. Check last month's newsletter for details of the award. I think Vic, WT9Q, qualified for the basic award on the first day!

The ARRL will try to repeat the success of the ARRL Centennial operating event held back in 2014. If you were on the air back then, you tried to work the W1AW portable stations as they operated for a week in each state. You also got points for working ARRL members, with higher point values for working hams with special positions in the ARRL.

This time the program is called Volunteers On The Air, VOTA. The idea is to honor hams that volunteer to improve our great hobby. They point out how difficult it is to get people to volunteer these days, including running for club offices, helping out on committees, etc. Sound familiar?

You don't have to do anything special to participate other than operate. Points are based on logs sent into the Logbook of The World. Apparently, you do not even have to use LoTW yourself, but only contacts you make count if the other stations send in their logs. So, if you are not an LoTW user, now might be a good time to sign up. You want to give the station you contact points for working you.

It looks like the details have not been settled. They recommend checking back for updates. From the preliminary schedule, W1AW/0 from Nebraska will appear on January 11 for a week as the first W1AW/# state activation.

<http://www.arrl.org/volunteers-on-the-air>

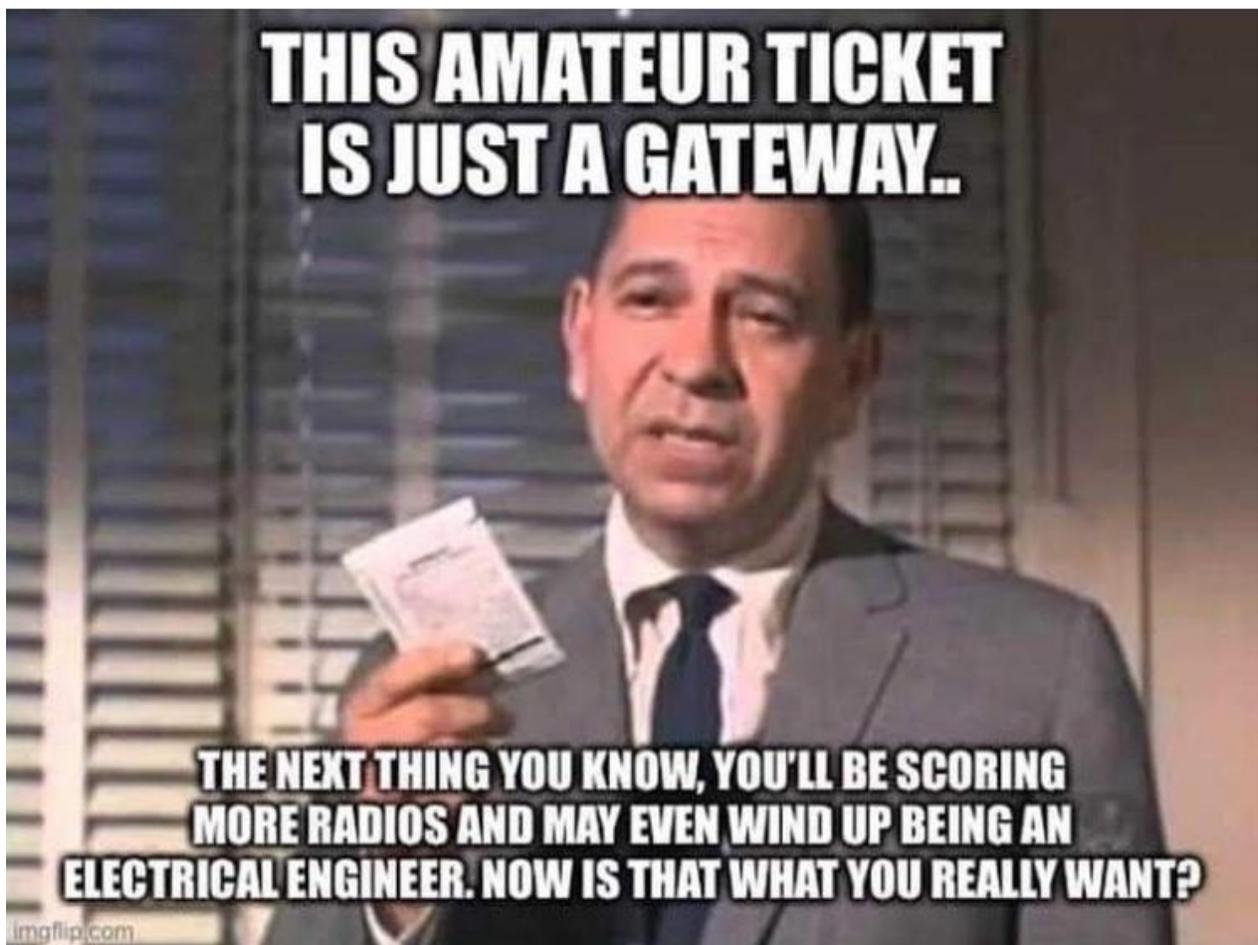
If VHF simplex operation is more your style, check into the Winterheat event running all of January. The goal is to contact stations on designated simplex frequencies on the 2 meter through 33 cm band FM frequencies. You must make the contacts using voice modes, including traditional analog FM or one of the digital voice modes.

You need to sign up for Winterheat. Rules and registration information are at:

<https://hamactive.com/>

The Winterheat event was mentioned by Robert, N9LPQ, in a posting to the ORC email reflector. Let me know if you have an event or contest you would like mentioned.

That wraps up January. With the Holidays over, you may have more time for some on-air operating. There are undoubtedly many things to do on the radio this month. Check my Monthly Activities Chart on the following page.



You have been warned!!

W9XT's Contest, Operating, DXpedition, and Special Event Picks for January and early February 2023

W9XT's contest picks for January and early February 2023					
Name	Start	Length	Bands	Mode	Link
ARRL RTTY Roundup	Jan 7, 1800Z	30, work 24 max	HF	RTTY	https://contests.arrl.org/ContestRules/RTTY-RU-Rules.pdf
NAQP CW	Jan 15, 1800Z	12, work 10 max	HF	CW	www.ncjweb.com
ARRL January VHF Contest	Jan 21, 1800Z	34 hours	VHF	C/S/D	www.arrl.org/january-vhf
NAQP Phone	Jan 21, 1800Z	12, work 10 max	HF	SSB	www.ncjweb.com
CQ 160 Meter Contest CW	Jan 28, 2200Z	48, 30 max	160	CW	www.cq160.com

Dates/Times in UTC. Subtract 6 hours from UTC to get local (CST). HF = 80, 40, 20, 15, 10 Meters. Modes: C = CW, S = SSB, D = Digital (may include RTTY)

W9XT's DXpedition picks for January and early February 2023					
QTH	Dates	Call	Bands	Mode	Link/notes
Crozet	Until Jan 26	FT8WW	30, 20	C/D	SSB on higher bands later
Senegal	Until Jan 20	6Wn/WA3DX		FT8	Different 6W prefixes as he travels
Rep. of the Congo	Jan 10-19	TN8K	160, HF, 6M	C/W/D	https://www.cdpx.cz/
Palau	Jan13-27	T88	HF	C/W/D	Each op has their own T88 call
Ethiopia	Jan 14-21	ET3AA			
Bouvet	~Jan 26-Feb 28	3Y0J	HF	C/W/D	http://crozet2022.r-e-f.org.news/html

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

W9XT's operating & event picks for January and early February 2023			
Event	Dates	Details	Link/notes
WRTC Award	Jan 1-31		https://www.wrtc2022.it/en/wrtc-2023-award-31.asp
ARRL Volunteers On The Air	Jan 1- Dec 31	Just make contacts!	http://www.arrl.org/volunteers-on-the-air
Winterheat	Jan 1-31	VHF simplex	https://hamactive.com/

THE COMPUTER CORNER

No. 298: LINUX 3: EXPLORE AND ORGANIZE

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

OK, you have a fired-up Linux machine, and you are looking at the desktop. The first thing is to organize the desktop itself. You might say, there is nothing to organize. A fresh copy of Vanessa's desktop shows one thing only ... a Computer icon. So perhaps the first thing is to put a couple of working icons on the desktop. Easy as pie! Move the cursor to the tray, click the Linux icon (yep, just where the Windows icon was in a Windows tray) and you see a list of applications, much like in Windows. Pull the slider bar down to Desktop and click it (or just type desktop in the editing space where the vertical bar was flashing) and you will have a menu of Desktop Icons. Select all 5 (Computer, Home, Trash, Mounted Drives and Network). As you select them or deselect them, they will appear and disappear from the desktop, except maybe Mounted Drives if you don't have any. Cool! Leave them all selected for now. You should feel quite at home now, with a trash can on your desktop. Close the list of applications.

Click the Linux icon in the tray again and note the list of application groups on the left – Accessories, Graphics, and so on. Roll your pointer over Preferences and click on Date and Time. Note your region on the map which should include America and Chicago. You might want to deselect Use 24h clock so that time is shown as usual (9:32 PM instead of 2132 PM) in the tray. Select Display the Date if you like (see how it looks in the tray) but not Display seconds unless you really want to do that. Anything you change is reversible, so play until it looks the way you like. Then close Date and Time.

That should give you a good start on getting the feel of things, and you can now explore to your heart's content. But you also need to prepare for doing some work. For example, where do you start to compose letters or articles or just notes of things to do? How about a folder of Documents? Well, there is one of those already, but make it your own – call it MyDocs. Right click an empty spot on the desktop and select Create New Folder. There it is, a new folder named Untitled Folder. It should be highlighted already, so type MyDocs, hit the Enter key and it becomes the new folder's title. Double click it and you are looking at its contents, which do not yet exist. Right click in the folder's empty space and select Create New Document. Click Empty Document and Untitled Document appears with a plain text icon above. Double click it and you are ready to edit Untitled Document which might be a reminder note to yourself to order that turkey for next weekend. Type the note and click File, then Save, then click the x in the upper left corner to close the file. Right click the file and select Rename. Type in Turkey Reminder, or better TURKEY REMINDER! and press the Enter key. You now have a perfectly good reminder note in MyDocs, written in plain text. On the other hand, while this reminder note is hot right now, you will probably want to erase it when you have placed the order. Furthermore, you probably don't want it buried in MyDocs, but rather want it "in your face" on the desktop, so that it bugs you until you do it. So put the arrow on the TURKEY REMINDER! icon in MyDocs, press the left mouse button, hold it down,

then move the mouse to drag the icon out of MyDocs and on to the desktop where you will more easily see it. Release the mouse button and you are done.

How about a nicely formatted letter, using Libre Office? Left click the Start button (the Linux Logo in the tray) and put the arrow on Office in the first column of applications. Roll down to LibreOffice Writer in the right column and click it. The Writer will start a new document, Untitled 1, and you can compose away and learn about a good, flexible editor, fully equal in scope and compatibility with Microsoft's Word. It even looks like Microsoft Word! Compose a few lines, and when done, click on the bar attached to the right of the Save icon (looks like a 3½ inch floppy, third icon in from the leftmost). Select **Save As** and it will suggest Untitled 1 as a title, to be saved in Desktop, MyDocs. Change that name (Untitled 1) to **Letter to Aunt Sue.docx**, click Save, and now it can be read by anyone using MS Word (the .odt format versus the .docx format are beyond the scope of this article ... read about them on your own). Select Use Word 2007-365 Format. Close LibreOffice Writer down and double click MyDocs on the Desktop. In it should appear **Letter to Aunt Sue.docx** if you followed the above instructions. Clicking the .docx file will bring up the file in LibreOffice Writer for reading or additional editing. Not Thanksgiving Reminder, though, on the desktop. That was created in **xed**, a small and lightweight plain vanilla text editor that comes with Vanessa and **xed** will be called up to read or further edit the file if you click on it out on the desktop. However, you can import it into Writer for reading or additional editing, if you like, or changing it to .docx or .doc file format. That is another story, though.

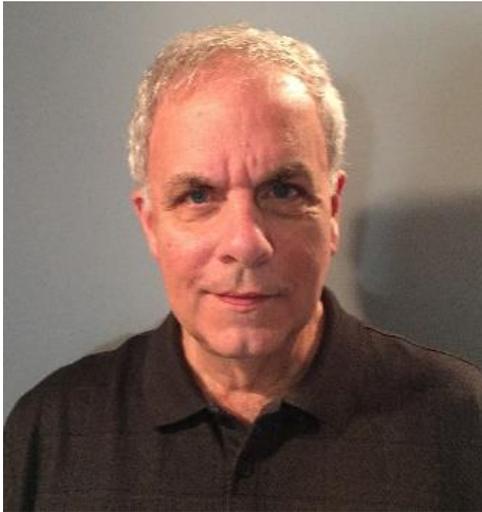
You are well into getting started at this point. A few tips. You can create a folder inside a folder. Thus, you can create a folder named Newsletter Articles inside MyDocs. Further, you can create folders named 2020, 2021, 2022 inside Newsletter Articles. So, organize to your heart's content. And, by the way, folders used to be called directories before Microsoft decided to change the terminology (to muddy up the waters of clarity?). Folders and directories are identical.

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)

Vintage Amateur Radio

de Bill Shadid, W9MXQ



Throughout the time we have used HF in amateur radio as well as for military, embassy service, agency service, or research use, the manufacturers have produced what we will call professional receivers. The major manufacturers in the United States, starting in the 1930's, always had a top line radio that they sold to the aforementioned areas of business. Perhaps the longest in this domestic market was Collins Radio Company.

Collins, always a player in the transmitter market, began to supply product in the commercial and professional market after World War II. Starting with the Amateur Radio market Model 75A-1 (then called the 75A) in 1947, Collins moved the technology into the General Coverage market with the introduction of the 51J-1 Receiver in 1949. The 51J-1 was followed by the 51J-2, then the 51J-3 in 1952, and finally the 51J-4 in 1954, the 51J series made a name for itself as stable and capable designs. The parallel design of the 75A-1 (already mentioned), 75A-2, 75A-3, and 75A-4 Amateur Radio Band (not General Coverage) models. Readers will recall that the 75A-4 gained a great reputation as a stand-alone receiver used with Collins and other brand transmitters, it may be best known as the receiver side of the famous Collins Gold Dust Twins, the 75A-4 Receiver working with the 1,000-watt Collins KWS-1 Transmitter.

This article will cover the successor to the 51J-4 Receiver, the 51S-1, introduced in 1959¹. I can only say that my nick name for this radio is "Collection Perfection,"



Collins 51S-1 Receiver – "Collection Perfection"

W9MXQ Collection

The use of the “S” in the model’s name and an appearance that borrows from the “S” Line radios of the day, the 51S-1 is not related to the 75S-1 Amateur Band Receiver that came out in 1958. Perhaps there were technical similarities due to being developed at the same time, but the 51S-1 was targeting a different market. But, that said, the cabinet size is similar (same size front panel), the knobs were the same, as were meters, general readout appearance, etc. The error of thinking that the 51S-1 was a general coverage version of the 75S-1 is a natural, if incorrect, one.

Below is the radio that developed before the Collins 51S-1, the Collins 51J-4. At over twice the volume of the 51S-1, the 51J-4 was a very capable but very massive instrument. Fellow appreciators of this vintage of equipment will see the similarity of the front panel design of the 51J-4 to the 75A-4 Amateur Band Receiver.



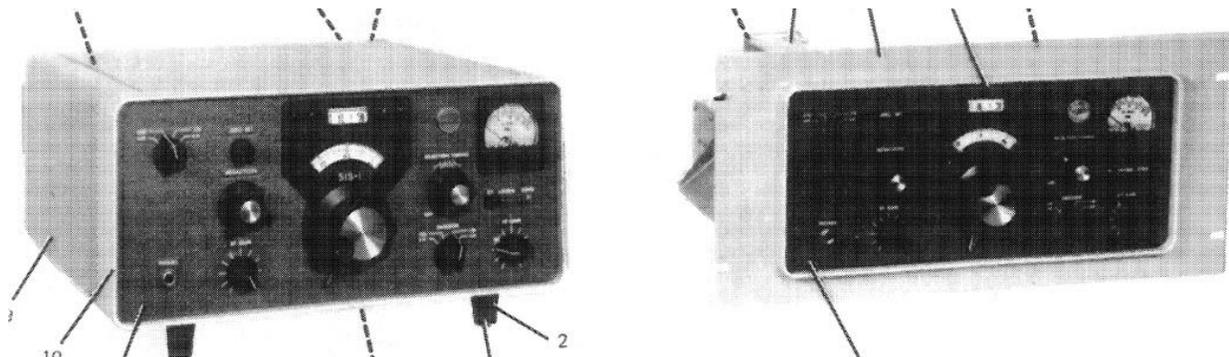
Collins 51J-4 General Coverage Receiver (circa 1964)

RigReference

At 28 Pounds, the 51S-1 is a lightweight compared to its predecessor, the 51J-4, at 43 pounds. Those 43 pounds, however, did not include the optional outer (desktop) cabinet. The 51J-4 (as did its predecessor 51J-1, 51J-2, and 51J-3 models) was standard as a rack mounted radio. My guess would be that the cabinet would add another 20 pounds. The 51S-1 came standard as a desktop unit with a rack mount option available, as shown below.

While not pertinent to this article, it must be mentioned for collectors that the 51J-3 Receivers carried the military R-388 designation while the 51J-4 carried the R-390 designation. There were other features to the R-388 and R-390, depending on the exact mili-

tary contract language at the time of purchase. Also important was that the 51J-4 continued to be built for government contracts for four years into the marketing time of the 51S-1. The 51S-1 was marketed from 1959 through 1975 while the 51J-4 overlapped a bit as it was marketed from 1954 through 1963. Military installations do not necessarily support an immediate acceptance of a new model – and to be sure, the 51J-4 was, and to some degree still is, a competitive radio design.



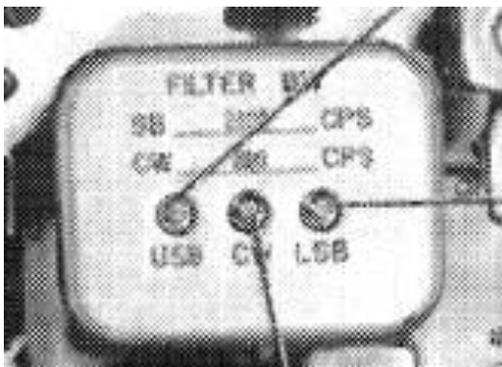
Collins 51S-1 as a Desktop Unit (Left) and as a Rackmount Unit (Right)

W9MXQ – Collins 51S-1 Service Manual²

The Collins 51S-1 is a hands down pleasure to operate and to hear on the HF Bands. I refer to it as “Collection Perfection” because of its smooth audio and effective mechanical filters on AM and SSB. It does use a crystal filter, however, on CW. Bandwidth options that were standard with the radio are as follows:

Mode	3dB down Bandwidth	Optional Bandwidth
AM	5 kHz	6 kHz
USB	2.75 kHz	3.1 kHz
LSB	2.75 kHz	3.1 kHz
CW	800 Hz	300 Hz

There is little documented on the optional bandwidths. Perhaps they were not generally available to buyers off the shelf of the radio – maybe only part of a contract. Note the Filter Box on the top of the 51S-1 Chassis:



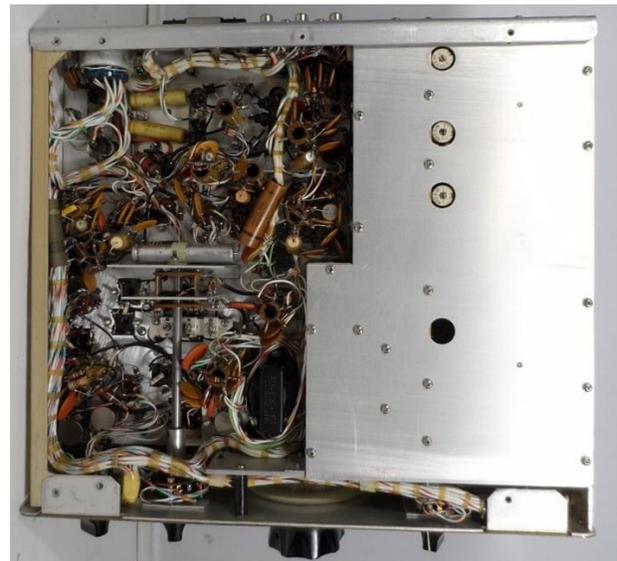
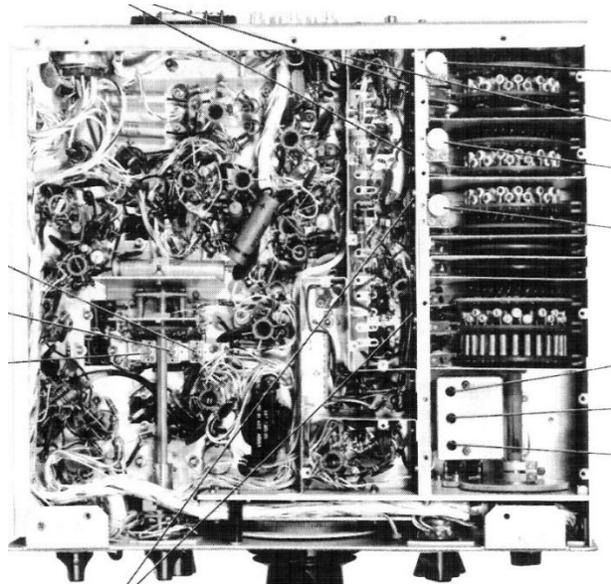
Filters for CW and SSB (LSB and USB) were housed in a “Filter Box” on top of the receiver chassis. Adjustment points were a part of the alignment process. Without a complete understanding of the filters’ operation my suggestion that the user refrain from touching these controls.

W9MXQ - Collins 51S-1 Service Manual

A feature way ahead of its time with the introduction of the 75A-1 and 51J-1 Receivers in the 1940's was the use of heterodyne band (frequency range) crystals mixed with a High Frequency Oscillator and precision Permeably Tuned Oscillator (PTO) for the VFO set a new standard for frequency stability.

The 51S-1 was tuned in 1,000 kHz ranges from 0.2 kHz to 30 MHz. Each range, for a total of 30, includes a crystal with a frequency alignment trimmer. So, 30 independent crystals and trimmers. The 51S-1 in this review is so close in alignment band to band that if the Crystal Calibrator is engaged and the bandswitch is moved through its 30-position range, every band is audible from the lowest to the highest band. Those familiar with the concept involved will understand what I mean – to others, this radio begins to approach the frequency accuracy and linearity experienced in a modern solid-state radio using phase lock oscillators.

For some idea of the design of the bandswitch in this radio, look at this view of the bottom of the chassis:



Collins 51S-1 Chassis – Bottom View

Bandswitch Shield Removed

Bandswitch Shield Installed

W9MXQ

W9MXQ

Collins 51S-1 Service Manual

Collins 51S-1 Photo

In the left picture, observe the detail of the bandswitch on the right side. You can see on the top three visible rotary switch wafers trimmers used for alignment of each band. Lower in the picture you can see one wafer with crystal oscillator trimmer capacitors and below that the wafer holding the individual crystals. If you are wondering how to access all thirty positions, rest easy!! The wafers rotate and individual crystals and trimmers are accessible as the switch is rotated. The right picture shows the Bandswitch Shield installed – protecting the delicate bandswitch.

The tuning of the Collins 51S-1 is a combination of mechanical digital system to get to the band then an analog dial to tune the 1000 kHz span for each band. The system is straight forward and accurate – far easier to use with immediate frequency accuracy when compared to other general coverage receivers of the day using main tuning and separate bandsread dials. Here is a picture of the band setting and tuning setup in the 51S-1:



Collins 51S-1 Receiver

Tuning, Band Set / MHz Dial, and Bandswitch (MEGACYCLES)

W9MXQ – 51S-1 Service Manual

Tuning, as mentioned, on this radio is relatively easy. Note the Bandswitch (MEGACYCLES) knob. That is turned until the left two digits of the mechanical digital readout indicates the 1000 Hz frequency span you want to use. In this case the radio is set to receive in the 7 MHz band – see the “07” in the left, two-digit reading at the top of the readout panel. Now, using the Main Tuning Knob, turn the knob as many revolutions as

necessary to get the proper 100 kHz range you want to tune. Use the finger hole in the Main Tuning Knob for large excursions. You can see here that I wanted the radio to be on the 7 MHz range and tune from 7.1 MHz at the low side of the range. After that, set the main tuning knob, in this example, to “50” so the radio is tuned to 7.150.0 MHz.

Just for reference, check how this can relate from band to band. If the “150’ part of the readout is left in place and the MEGACYCLE switch is turned to “14,” then the radio would be tuned to 14.150 MHz

A major feature of the 51S-1 is what Collins calls, REJECTION TUNING. This is an effective Q-Multiplier that can help with a wide range of noise or the rejection of heterodyne tones. While this control is intended more for the AM station to AM station interference common in the 1950’s through the 1960’s, it works well at different adjustment points on today’s bands to reduce noise. It will reject carriers on SSB stations.



Collins 51S-1 Receiver
REJECTION TUNING is between the Readout and the Signal Meter
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The 51S-1 came in several models, tied to operating voltage, cabinetry, and rear connection array. Those differences were primarily tied to installation realities and not to operating specifications when used as a high frequency receiver.

Check the following chart for a complete list of model differences.

Model Number	Specifics
51S-1	Desk Cabinet, 115/230 VAC, 50 to 400 Hz – 125 watts
51S-1A	Desk Cabinet, 28 VDC Transistorized Power Supply – 4.5 Amperes
51S-1F	Rack Cabinet, 115/230 VAC, 50 to 400 Hz – 125 watts
51S-1AF	Rack Cabinet, 28 VDC Transistorized Power Supply – 4.5 Amperes
51S-1B	Same as 51S-1 but with Rear Mounted Military Connector Box

The 51S-1 and 51S-1A are designed to be desktop mounted or they may be setup with a Collins optional shock mount system base. This was suitable for some aircraft installations. The receiver in all forms require a 4- or 600-ohm speaker or headphone connection to get audio output. The 51S-1B has an added 150-ohm impedance output.

Here is a Collins 51S-1 Receiver mounted on the Collins 350D-5 Shock Mount Assembly:



W9MXQ – Collins 51S-1 Service Manual

The rear panel of the Collins 51S-1 showed connections to the outside world and indicated the radio's flexibility:



Collins 51S-1 HF Receiver – Rear Panel Inset View

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You can see many connections to the interior circuitry including antenna, muting connection for interconnection to a transmitter, IF Output that could feed an SDR in today's world, and a large, 9-Pin "Octal" connector for power input connections.

That 9-pin connector is wired for how the radio is powered. For instance, on the 51S-1 at W9MXQ it is wired for 120 VAC. But with some wiring changed at the connector it could be wired for 240 VC just as easily without making changes inside the radio.

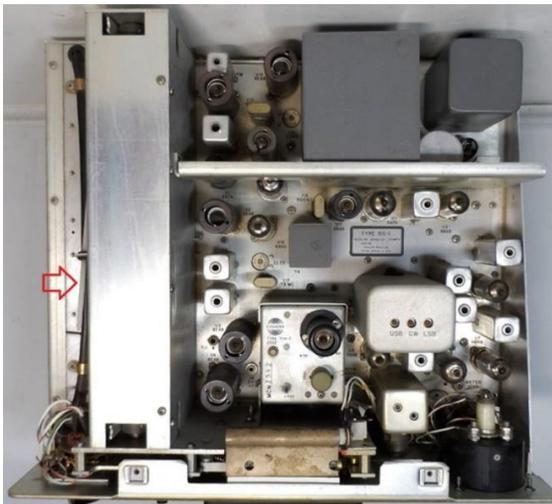
For perspective, here is the entire back panel of the receiver:



Collins 51S-1 HF Receiver – Rear Panel View

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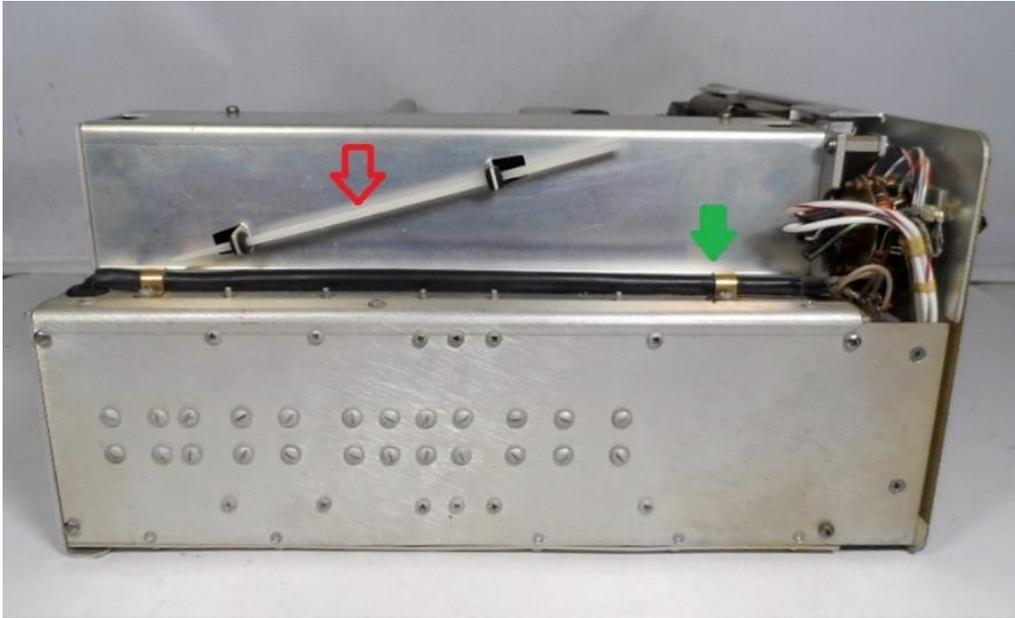
And here is a view of the interior of the radio: (See the red arrow showing the alignment tool included with the radio – almost always missing on a 51S-1 you find today.)



Collins 51S-1 HF Receiver – Top View – Front Panel at the Bottom

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Now see the picture below showing the left side of the radio with a better view of that alignment tool. Again, in this view, note the red arrow for the alignment tool. Now, look at the green arrow for a bit of a surprise:



Left side View – Collins 51S-1 Receiver

Red Arrow for another view of the Alignment Tool. Note the green arrow at the hold down bracket for the black cable – that is the location of a Bristol™ wrench for use in removing front panel knobs. The Alignment Tool is a feature that is often missing but the Bristol™ wrench was unexpected. It was most likely placed there by a previous owner. The Bristol™ wrench is not listed as a part of the radio as originally sold.

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The 51S-1 Receiver is designed to receive, as noted before, on 30 ranges of 1000 kHz wide, starting at 200 kHz. However, the front end of the receiver was designed to work from 2 through 30 MHz. That means that the North American AM Broadcast Band and the 160-meter amateur radio band would have limited sensitivity – as detailed below:

Frequency Range	Mode	Sensitivity
0.2 to 0.5 MHz	AM	20uV for NLT 10-db Signal to Noise/Noise
	SSB/CW	4.0uV for NLT 10-db Signal to Noise/Noise
0.5 to 2 MHz	AM	15uV for NLT 10-db Signal to Noise/Noise
	SSB/CW	3.0uV for NLT 10-db Signal to Noise/Noise
2 to 30 MHz	AM	3.0uV for NLT 10-db Signal to Noise/Noise
	SSB/CW	0.6uV for NLT 10-db Signal to Noise/Noise

W9MXQ – Collins 51S-1 Service Manual

For low sensitivity, below 2 MHz, Collins offered a Preamplifier, model 55G-1:



Collins 55G-1 Preamplifier for the 51S-1 Receiver. The 55G-1 included an internal AC Power Supply plus a speaker for the radio.

KE9PQ

A 55G-1 Preamplifier is desirable but today costs hundreds of dollars due to its very limited availability. A simple homebrew MOSFET amplifier would do the same thing in today's world. As noted, it does include a speaker for the receiver. If you cannot justify the 55G-1 to gain the use of a speaker, I might suggest the Collins 312B-3 Speaker that also matches the Collins S-Line (75S-1, 75S-3, and KWM-2) Radios.

Maybe due to age or original design, or who knows why, I do not like the sound of most Collins Speakers. I have them built into the 312B-3 for this receiver, the 75S-3B Receiver, the KWM-2, and KWM-2A Transceivers. Also, the same speaker unit is in the 312B-4 Console for the 75S-3B / 32S-3 Pair and the 312B-5 Console /Remote VFO units for the KWM-2 and KWM-2A Transceivers. I am more likely to use a repurposed mini-Stereo Speaker or a Heathkit SB-600 or SB-604 Speaker with my Collins gear. Here is a picture of the Collins 312B-3 Speaker:



Collins 312B-3 Speaker Console

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There was also a 312C-1 Rack Mount Speaker, but little information remains on this product. Sometimes accessories are announced but never produced for one reason or another. Similarly, I have never seen the optional bandwidth filters for this radio.

Modern Collins radios – radios that succeeded the 51S-1 – continued as new designs. All of these were in competition with radios from Drake³, Ten-Tec³, Icom³, and Rhode & Schwartz, and Siemens, to name only a few. There were others yet from Kenwood, Radio Shack, Uniden, and Yaesu but they were not of the so-called professional variety.

The story of the Collins 51S-1 Receiver exceeds what can be said in a single installment. Stay tuned for Part 2 of this receiver’s story for other details of this fine receiver and perhaps a further window into the radios like her.

Part 2 will include:

- 51S-1 Significant Operating Characteristics.
- 51S-1 Metering – that is, no simple S-Meter here!
- 51S-1 Appearance – “Hey, your meter face is a different color than mine?”
- 51S-1 Original Competition from domestic (USA) manufacturers.
- 51S-1 Model Variants. “What color would you like your radio to be?”
- 51S-1 Bandwidth Filter Cover variances.
- 51S-1 Early engineering prototype version.
- 51S-1 Successor Collins Models.
- And maybe more....

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

A special note of thanks to my proofreader, Bob Bailey, W9DYQ. Bob is a lot more than a proofreader as he often adds commentary that makes it into the article. Certainly, in any technical article, it is good to have a second person review the thought process.

Notes and Credits:

¹ The Collins 51S-1 Receiver in this article was built in 1968 in the Anamosa, Iowa, Collins factory. Anamosa is about 27 miles east northeast of the Cedar Rapids headquarters for Collins Radio Company (now Collins Aerospace).

² References to the Collins 51S-1 Service Manual are a reference to the Collins Instruction Book, Collins 51S-1/1A/1F/1AF/1B Receiver as received with the Collins 51S-1 in this article.

³ These radios were marketed after the Collins 51S-1 but were likely considered as replacements. As an owner now and over time of some the Drake and Icom competition, it is clear that in many ways the Collins 51S-1 was the equal of its competition even after its product life cycle had ended. Perhaps the area where the 51S-1 was bested by its late competition would be in the area of frequency stability – especially at start-up.



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Ozaukee Radio Club Minutes of Membership Meeting. 12/14/2022

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 2nd V.P. Bill K9GN officially initiated the meeting at 7:47 PM [late because of some technical issues loading the presentation, and a bad computer]; with actual members attending, a go-around was conducted. Zoom attendees were also in attendance and were introduced individually. Bill informed us that the annual dues were coming due very soon.

Program:

Fred KD9IGO gave a presentation on his design process for his antenna project, an 80-meter horizontal loop, in a 4-sided square design, fed with ladder line from a tuner. This antenna proves to be a decent performer on several higher bands, and Fred presented several slides showing SWR performance and side/main lobes for all the higher, harmonically related bands.[40, 20, 10 meters] Fred's system uses an external tuner to match his antenna to his ICOM 7610, due to the wider swings in impedance.

50/50 Raffle:

This was won by Fred W9KEY, winning an award of \$8.50

Scholarship Auction:

Stan WB9RQR held a short auction; included were some fans, computer drive and a coax switch.

Committee reports:

[there were no first or second VP reports and no RPT VP report]

Treasurer: Gary N9UUR handed out balance sheets, ORC has 49 paid members for 2023 so far. The November treasurers' report was accepted; motion made by W9QLP; 2nd by WB9RQR and carried.

Secretary: Ken W9GA reported the Nov 2022 minutes are posted; a motion to accept was made by N9VSV; 2nd by K9GN, and motion carried.

Scholarship/STEM: W9IPR was not present; Bill K9GN made a short report on the recent committee zoom meetings; working up a proposal for local STEM activities and support, including creating some local area scholarships.

Tech committee: W9DHI will arrange to repair the Laptop used for the Zoom link

OLD business:

W9GA has completed our club update at ARRL. Elections of club officers in January 2023, slate of officers: Pres-Bill K9GN; 1stVP-Jeananne N9VSV; 2ndVP-OPEN?; Sec-Ken W9GA; Treas-Gary N9UUR.

NEW business:

N9UUR made a motion that the club dues be increased from \$15 to \$20; motion 2nd by W9GA and carried.

Adjournment:

WB9RQR moved to adjourn, KD9DRQ 2nd, motion carried; time ending was 9:15 PM. There were 18 in-person attendees, 24 Zoom attendees.

Respectfully submitted,



Kenneth Boston W9GA, Secretary



Upcoming ORC Monthly Meeting Programs

de: Pat Volkmann, W9JI

- January – Elections, “The Secret Listeners” video
- February – Open

We really do need some programs for the coming year. I don't have anything scheduled after January. 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 let me know.

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 to discuss your idea for a program.

ORC Meeting Agenda

January 11, 2023

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



**Next Month's ORC Meeting
Hybrid In-Person/Zoom Meeting
8 February 2023**

Program:

Open – Watch for Details

7:00 PM – Doors Open

7:15-7:30 PM – Zoom Check-In

7:30 PM – Meeting Begins