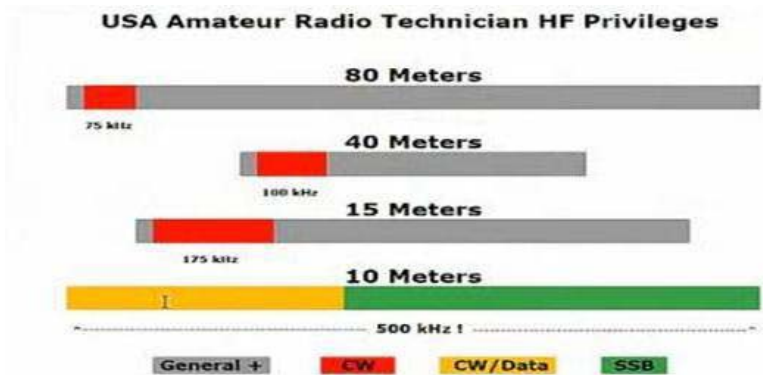


The *Microvolt*

April 2022



What is Winlink

- Worldwide system for sending e-mail via radio.
- Provides e-mail from almost anywhere in the world.
- Entirely supported and operated by amateur radio volunteers (Amateur Radio Safety Foundation, Inc.).
- Winlink Express software is the preferred client application.
- Adopted for contingency communication by many government agencies.
- Used by infrastructure-critical NGOs such as International & American Red Cross, Southern Baptist Disaster Relief, DHS Tiered AT&T Disaster Response & Recovery, FedEx, Bridgestone Emergency Response Team, etc.

Prologue

Publication: *The Microvolt* (USPS 075-430) is the official publication of the Utah Amateur Radio Club, Incorporated, 632 S. University Street, Salt Lake City, UT 84102-3213. It is published monthly except August. Subscription is included with club membership at \$20 per year. Single copy price is \$1.50. Periodicals postage paid at Salt Lake City, Utah. Postmaster: send address corrections to *The Microvolt*, c/o Tom Kamlowsky, 4137 Clover Lane, Salt Lake City, UT, 84124-2711.

Deadline for submissions is the 24th of each month prior to publication. Submissions by email are preferred (k7hfv@arrl.net), but other means including diskettes and typewritten submissions can be mailed directly to: Gordon Smith, 632 University St., Salt Lake City, UT 84102-3213. Reprints are allowed with proper credits to *The Microvolt*, UARC, and authors. Changes in mailing address should be communicated to the Club Secretary: Tom Kamlowsky, 4137 Clover Lane, Salt Lake City, UT, 84124-2711.

Club: The Utah Amateur Radio Club was organized under its present name in 1927, although its beginnings may date back as early as 1909. In 1928, it became affiliated with the American Radio Relay League (club #1602) and is a non-profit organization under the laws of Utah. It holds a club station license with the call W7SP, a memorial call for Leonard (Zim) Zimmerman, an amateur radio pioneer in the Salt Lake City area.

Meetings: The club meets each month except July and August. The meetings are held on the second Thursday of the month at 7:30 PM in the University of Utah's Warnock Engineering Building, generally in room 1230 or 2230, sometimes in 2250 or 105.

Membership: Club membership is open to anyone interested in amateur radio; a current license is not required. Dues are \$20 per year, including a *Microvolt* subscription. *The Microvolt* and membership cannot be separated. Those living at the same address as a member who has paid \$20 may obtain a membership without a *Microvolt* subscription for \$12. Send dues to the Club Secretary: Tom Kamlowsky, WA7ZRG, 4137 Clover Lane, Salt Lake City, UT 84124-2711. Let the Secretary know if you prefer the electronic edition of *The Microvolt* instead of the printed version.

Contributions: Monetary contributions are gladly accepted. Send directly to the Club Treasurer: Chuck Johnson, 1612 W. 4915 S. Taylorsville, UT 84123-4244. For in-kind contributions, please contact any board member to make appropriate arrangements.

Repeaters: UARC maintains the 146.62- and 146.76- repeaters. The repeaters are administered by the UARC Repeater Committee. Comments and questions may be directed to any Committee member. The Lake Mountain repeater (146.76-) is IRLP node 3352. Instructions for IRLP use are on the club website.

Ham Hot-Line: The Utah Amateur Radio Club (UARC) has a Ham Hotline, 583-3002. Information regarding Amateur Radio can be obtained, including club, testing, meeting, and membership information. If no one answers leave your name, telephone number and a short message on the answering machine, and your call will be returned.

UARC 2022 Board

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Treasurer: Chuck Johnson, WA7JOS	801 268-0153
<i>Microvolt</i> Editor: Gordon Smith, K7HFV	801 582-2438
Asst. <i>Microvolt</i> Editor: Rick Asper, AC7RA	801 865-1693
Program Chairperson: Rian McKee, KF7QGY	801 548-1084
Program Chairperson: Mike McAinsh, KI7MTI	385 246-3981
Imm. Past President: Clint Turner, KA7OEI	801 566-4497

Committee Chairpersons and Members

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Historian: Ron Speirs, K7RLS	801 904-3587
Field Day Chair: (To be determined)	
License Trustee: Brett Sutherland, N7KG	801 298-5399
Repeater Engineer: Clint Turner, KA7OEI	801 566-4497
Autopatch Engineer: Gordon Smith, K7HFV	801 582-2438

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IRLP Information

For information on using the club's IRLP node on the 146.76 repeater, check <http://www.utaharc.org/irlp>. UARC Members may get the required prefix code by asking the club Secretary.

For late breaking news listen to the UARC Information Net Sundays at 21:00 on 146.62 or set your browser to: <http://user.xmission.com/~uarc/announce.html>

We are grateful to the management of XMission, our Internet Service Provider (ISP), for the donation of this Web-Page service.



For account information go to:

<http://www.xmission.com/>

Or call 801 539-0852



The Microvolt

The Official Publication of the Utah Amateur Radio Club, Salt Lake City, Utah
Volume 65, Issue 4, April, 2022

Latest News

April (Online) Meeting: “Tricks, Tools, and Techniques For Soldering”

Some of us might think that once we have bought a transceiver, plugged it into a power supply, and connected it to antenna, we're done. Sadly, this illusion probably won't last long and in a short time a need will come along to do *soldering*. Maybe it's the need to connect a feedline to an antenna, putting the proper connector on a power supply plug, or your transceiver came in kit form and needs to be assembled.

Soldering is neither so complicated and difficult that it should never be attempted by an amateur, nor so easy everyone can expect perfect results the first time. But whatever the immediate need, there is a correct kind of solder, a correct iron, and a correct tool or two beyond that as well as a correct technique.

Our coming UARC meeting, to be held on-line at 7:30 P.M., on Thursday evening, April 14. Our main presenter for the evening is Robert Gunnell, KI7FUJ. For many years he ran the electronics store called “Rayelco.” Sadly, a fire took this resource off the map a few years ago. Today, Robert is an owner and President of Standard Supply Company, a parts distributor that has been in business longer than many of us have been alive. Many of us remember how helpful the late Ray Larsen, W7NMK, was, as we looked for the parts we needed for our stations.

Robert will be able to tell us most of what we need to become reliable solderers. How elaborate a

setup do we need for ham radio? What kind of solder goes with what kind of job? How can we guarantee that our joints will hold up longer than a day? These are the kinds of questions whose answers can be enormously helpful in ham radio.

In addition, our new *Beginners' Corner* will feature information about how to behave on nets, and how to get the most value from them. They can be good for getting information, for practice in handling emergency traffic, or for sending a message of your own off to a distant recipient. There can be good and bad ways to behave on a net, so it's good to know which is which before you get a reputation.

You can find the club material on YouTube by going to:

<https://www.youtube.com/c/UtahAmateurRadioClub>.

From there, look for the feature that is marked “live.” The meeting should commence at 7:30. There should be some chatter on the channel by about 7 P.M. and you can connect in that period to make sure everything is working.

UARC meetings are held on the second Thursday of each month except for July (annual steak-fry) and August (vacation).

Our Cover

Our cover this month steals a bit of material from both last month's principle presentation, but also from our new *Beginner's Corner* feature.

Paul Plack, AE4KR, in giving the Beginners' Corner feature, pointed out that Technicians often don't make good use of the ten-meter band, and the reason may be a common misunderstanding. Your editor has heard Technicians say, "the 10-meter sideband segment for Technicians is so tiny that it's really not worth bothering with." Nothing could be further from the truth! Our ten-meter band as a whole is dramatically larger than any other HF allocation. It's 1700 kHz wide, which dwarfs its nearest competitor, 80 meters, which is just 500 kHz wide. Also, the 200-kHz segment that gives voice privileges to Technicians is the most heavily used portion of the band.

At the March meeting, Paul gave us a graph of HF frequencies that might give us a feel for how generous the 10-meter allocations for Technicians are. Paul continues to hold a weekly 10-meter net. It begins on Wednesday evening on 28.345 MHz, upper sideband. After check-in and

a round of giving everyone a chance for a transmission, those with a General Class (or higher) licenses move to a frequency above 29 MHz and try communicating on FM. Paul hopes to establish a repeater somewhere in that part of the band.

The rest of the cover shows Ryan, KF7QGY, the presenter of last month's main program, and a long list of the uses for WinLink.

Utah County License Classes

Noji Ratzlaff, KN0JI, tells us that a number of in-person license classes will be offered during 2022. Each course will cost \$10. Register at:

<http://psclass.orem.org/>.

License Class	Day	Dates	Times
Extra	Five Tuesdays	Jul 12 Jul 19 Jul 26 Aug 2 Aug 9	6:30-8:30 PM MST
Technician	Four Tuesdays	Sep 20 Sep 27 Oct 4 Oct 11	6:30-8:30 PM MDT

These are homework courses; you'll be expected to complete an assignment (and email me the results) by the start of every class period, even the first one. No course textbooks are required. Then again, these courses will be casual, hands-on, and fun for those who remain awake.

Please contact Noji (nojiratz@hotmail.com or 801-368-1865) with any questions about the courses.

Where Does the “Static” Come From?

I hear a lot of people telling other operators on the air that they have a lot of “static” on their signals. Is it really static electricity? The weather is clear and it isn’t likely that the other operator is spending a lot of time rubbing some plastic against wool. So where would static electricity come from?

Well, it turns out the noise is coming from your own receiver, or, if you’re working the other operator through a repeater, it is most likely being generated in the *repeater’s* receiver.

If you want to hear the noise your receiver generates, just tune to an unused frequency, and open your “squelch” control all the way. Then you might want to ask yourself, “Where does all that racket come from?”

The RF and IF amplifiers in a modern FM receiver have a nearly incredible amount of gain. Unlike signals in the AM family (e.g. Single Sideband) we don’t have to worry about amplifying too much, because we really don’t care about any varying amplitudes getting distorted. In fact, we would like to absolutely get rid of any amplitude variations.

But we still haven’t answered the question of “where does the noise come from?” Well, it’s coming from the antenna terminal on the radio. Any bit of matter whose temperature is above absolute zero (–273 degrees Celcius) makes noise. It’s just a little tiny bit, but the receiver is going to amplify it. It isn’t static, it is “thermal white noise.”

But is it really practical to amplify *that* much? Let’s do a little arithmetic.

A typical commercial communications FM receiver is often specified as giving us a 12 dB

signal to noise ratio with as little as 0.3 Microvolt of signal at the antenna terminals.

And how much power would that be? Well, we can use the formula $P=E^2/R$. In other words, to get the amount of power that our receiver needs to produce usable audio is three tenths of a millionth of a volt times itself divided by the resistance of the antenna input, which is usually 50 ohms. The result is 0.0000000000000018 of a watt! That seems like an outrageously large amount of amplification, but, in fact, something very close to it is available in almost any serious FM communications receiver. And that’s enough to bring the thermal noise up to watts of audio.

So, the noise isn’t static at all. It’s thermal white noise that exists in just about every object we encounter that is somewhere near room temperature. Over the years we have learned to amplify a weak signal *a lot* and convert it to audio we can hear.

We let the amplitude of the incoming signal smash into the output limits. That is, there’s a high and low limit to how much voltage an amplifier stage output can swing. As the signal gets stronger than the receiver’s limits, the noise becomes a smaller part of the total signal and when that happens the noise just seems to go away. We say that *quieting* is in effect.

This is very different from the processing we do on an A.M. signal, either full carrier or single sideband. The FM receiver can let incoming signals “hit the rails” and wipe out most AM components in the process. The AM receiver, on the other hand, almost always has an “automatic gain control” (AGC) that prevents signals from hitting the rails and wiping out the modulation in the process. In this case, various atmosphere noise can be heard, and some of it may well be “static.”

A Cheap 10-Meter Propagation Alarm

By Paul Plack, AE7KR

With sunspots increasing, and this year's E-Skip season already hinting at starting, it's easy to miss the fun of sudden 10-meter band openings. One easy, cheap way to stay aware of openings uses something you may have sitting in a box in the garage – an old, programmable, analog FM police scanner.

Cheap scanners used to be common, but became obsolete when public service agencies transitioned to trunking systems and digital modulation. These days, they don't even bring interest at swap meets. But nearly all these scanners covered what used to be known as “VHF Low Band,” 25-50 MHz. The bottom of that range is HF — they can scan 10 meters!

They won't do SSB or CW, but they receive FM signals above 29 MHz remarkably well. I've been surprised to hear the squelch opened on the scanner pictured, a Realistic PRO-2023, by a conversation on an east coast repeater. One day, it stopped on a CQ from a PY2 in Brazil on 29.3 MHz simplex! And if the top end of the band is open, the SSB and CW segments are likely doing even better.

All that's needed is to program a few commonly-used FM frequencies, adjust the volume and squelch, and leave it scanning 24/7. When the band opens, signals may be full quieting, even indoors, and even on the scanner's telescopic whip antenna. Here is a list of the frequencies I have programmed in mine:

29.30 Simplex (DX)
29.50 Simplex (N. America)
29.60 Simplex (N. America)

29.52 Repeater Input
29.54 " "
29.56 " "
29.58 " "

29.62 Repeater Output
29.64 " "
29.66 " "
29.68 " "

My scanner also covered six meters, so I added 52.525, the primary FM calling frequency. My PRO-2023 didn't allow skipping unprogrammed channels, so I added some frequencies a second time to fill up the 20 available channels. If you're in the Salt Lake Valley, your scanner may catch the FM portion of the Salt Lake 10-Meter Net, Wednesdays between 8:30 and 9:00 PM local time.

If you want to use a better antenna with your scanner, find an adapter like the one shown. It's usually described as allowing a PL-259 plug to connect to an RCA jack, but if it's long enough, it will also fit the "Motorola connector" on old scanners. That's the same jack found on many older car radios. If your scanner uses a BNC connector, that adapter is also easily found.

Now, search those boxes in the garage, and find that scanner. They called us hoarders! We were just planning ahead for Cycle 25!



Typical Scanner from the Radio Shack Days



Adaptor from UHF-family coax to phono plug

Spring is in the Air From ARRL Club News

Spring is in the air and on the air for all of us with the ham radio bug. That means that hamfests are happening and for the first time in a couple of years, hams are starting to come out and meet others. Like Rip Van Winkle, many feel like they are waking from a long nap. The idea that we can meet people in person seems so foreign. It's important to follow health guidelines and you must do only what is safe for you. If you can, get

out and participate in a hamfest. I know that I love to browse a good flea market. Public service events are happening, and there is always the opportunity to activate a park or a mountain top.

The fun of amateur radio, at least to me, is the idea that I can get with a few of my friends and go out on a Saturday morning and work from a spot that we have not worked from before.

Member of the Month

Jack Dolcourt, WA0 PFC

By Linda Reeder, N7HVF

This month we are featuring Jack Dolcourt, WA0PFC. Jack got interested in amateur radio when he was in high school. He was living in Denver, Colorado, at that time and it was his friend, Rod Chatman, W9SL, who got Jack interested in amateur radio. Rod was teaching amateur radio classes at the University Of

Colorado. Jack said that Rod was a great teacher. Jack received his Novice license in 1966.

After Jack got his Novice license he put his call letters in the back window of his red Karmann Ghia (a Volkswagen product). Jack's Novice call sign was WN0PFC. (Back in those days they put the letter "N" in Novice call signs.) Then, when he upgraded, his call sign became WA0PFC, which

is still his call sign today. One year later he got his Tech and General licenses. Then, when Jack was 18, he obtained his Advanced license. Finally, 15 years ago, Jack got his Extra Class license. He believes he timed that one just right because the Extra Class license exam was changing. There were going to be a lot more questions than the exam he took.

Two days later, his wife, Joyce, had their first son, Bram.

It was Rod Chatman who got Jack interested in two-meter A.M. Back then, two-meter F.M. had not become popular in most parts of the country. Jack had to build his own equipment. He assembled a Heathkit "Twoer" for two meters. A similar kit for six meters (called "The Sixer") also existed. The two (and a "Tenner") were often referred to as "The Benton Harbor Lunch Boxes."

Jack said he wasn't into six meters very much. He had to built amplifiers and a tripler for 432 MHz. Jack did lots of building UHF and VHF equipment during his high school and college years. They had two station radios they called "boat anchors" because they weighed 50 pounds.

A doctor named Rod Chatman let Jack work with him in his laboratory for two summers. It was a blood lab at the University of Colorado. Jack attended medical school at the University of Colorado. Jack and Rod have maintained their friendships through all of these years. Rod Chatman is now a silent key. He died in California.

Jack became a doctor at the University of Utah.

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He worked with new-born babies who had problems at birth. Jack worked there from from 1980 until 2019 when he retired. Jack received a Dean award for his continuing medical education. There is always something new to learn because of the new technology.

Jack's wife, Joyce, WD4CFE, has her General license. Joyce told Jack that she would get her General license if he would learn how to play Bridge. Well, she did her part. Now she is waiting and waiting for him to do his part. They have two boys, Bram, KB7WVV, and Cameron KC7BWZ. Jack said Bram and their three grandchildren live in Detroit, Michigan, where he is an emergency medical doctor. Cameron lives in Salt Lake.

Jack spends a lot of time on his HF rig chasing DX. He complains to his wife about how bad the sunspots are but Jack says the cycle is slowing improving. Jack is a member of UARC. He enjoys attending the meetings. He loves baking bread.

Jack, thanks for letting me interview you.

