

# The *Microvolt*

November 2023



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## Prologue

**Publication:** *The Microvolt* (USPS 075-430) is the official publication of the Utah Amateur Radio Club, Incorporated, 3815 S 1915 E, Salt Lake City, UT 84106. 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 James Bennet, 4960 W 5400 S Kearns UT 84118.

Deadline for submissions is the 24th of each month prior to publication. Reprints are allowed with proper credits to *The Microvolt*, UARC, and authors. Changes in mailing address should be communicated to the Club Secretary: James Bennet, 4960 W 5400 S Kearns UT 84118.

**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 usually 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: James Bennet, KK7AVS, 4960 W 5400 S Kearns UT 84118. 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.

**Ham Hot-Line:** The Utah Amateur Radio Club (UARC) has a Ham Hotline, 801-583-3002. 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 2023 Board

President: Marvin Match, KA7TPH	801 328-3641
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## Committee Chairpersons and Members

Bookseller: Rick Gregory, KG7GOW	801 582-7783
Historian: Ron Speirs, K7RLS	801 904-3587
License Trustee: Brett Sutherland, N7KG	801 298-5399
Repeater Engineer: Clint Turner, KA7OEI	801 566-4497

## Late Breaking News

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>

## 2024 UARC Steak Fry, July 20, 2024

The annual UARC steak fry is now July 20, 2024 (not July 13) so as not to conflict with the ARRL Rocky Mountain Division Convention in St. George.

## Writing for *Microvolt*

We encourage you to submit original pictures, articles, book reviews, software and hardware descriptions, nuggets of humor and responses to editorials. Photographs in the highest resolution are best. Send plain text without embedded pictures but labeled to correspond to pictures. E-mail the editor: [microvolt@utaharc.org](mailto:microvolt@utaharc.org).

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Or call 801 539-0852

## Latest News

### UARC Meetings

UARC meetings are held on the second Thursday of each month except for July (annual steak-fry) and August (vacation). Meetings are held in the “Warnock Engineering Building” on the campus of the University of Utah. Watch the UARC website for the room and topics.

We encourage attendance of the live meeting, but we will also do our best to stream the meeting live on UARC’s YouTube page:

<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.

Tim Duffy K3LR of DX Engineering will present antenna grounding and bonding. The November meeting will be devoted to election of new officers.

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### Our Cover

Power supply KK7JEV, gobox N7JZU, eclipse KK7IKR.

### Photo Credits

Elmers K7RLS, Desert camp KI7MTI, Desert eclipse KK7IKR

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### License Classes

#### Utah County:

No new classes until 2024.

#### Salt Lake:

**Technician:** Not until 2024. E-mail [KI7MTI@gmail.com](mailto:KI7MTI@gmail.com) to sign up.

**General:** KK7AVS 147.16 MHz, positive offset, tone 127.3, every Tuesday 7 PM – 9 PM.

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### Local Beacons, SDR

K7JL: 10 watts, 28.2493 MHz CW, continuous Sandy.  
 KK7AVS: SDR 33 cm, 70 cm, 1.25M 2M 6M 10M 20M 40M, Kearns, <http://k7xrd.club>.

Northern Utah WebSDR, <https://www.sdrutah.org>

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### Call for New Club Officers

#### November Meeting

It’s the time of year to consider electing new club officers. A nominating committee formed by the board is charged with finding at least one candidate for each position. The consequences of not doing so will be familiar to any of those following contemporary politics. During the November in-person meeting, nominations for will be accepted for additional contenders. These will be published in the December Microvolt along with short, non AI-generated biographies. Voting occurs at the December in-person meeting.

A good campaign needs frequency-to-frequency canvassing, social net campaign rallies and lawn signs. You can accept PAC funds. Form your election committee now.

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### Waves of Friendship

#### KC7FMW Missie Van Campen

In the quiet comfort of my recliner, I paused for a moment before immersing myself in the world of the Crossroads K7XRD social net. It was a time for reflection, a chance to contemplate the profound impact that Ham radio had on my life since I rekindled my passion for it in 2018. What began as a hobby had evolved into a source of service and, more importantly, friendship.

The pivotal moment arrived in 2020 when our region experienced a significant earthquake, a seismic event that sent shock waves through our community. It was then that the importance of Ham radio in emergency communications became vividly apparent. It compelled me to take action, to run nets, and to ensure that our connection remained steadfast in times of need.

However, when I initially ventured back into the world of Ham radio in 2018, my motivations were twofold. I had a deep desire to contribute to emergency communications, but I also longed for the camaraderie and friendships that this community had to offer.

The friends I’ve met through Ham radio and the Crossroads net have proven to be some of the most remarkable people I’ve ever had the privilege of knowing. Whether through the airwaves or in person, their presence has left an indelible mark on my heart.



Linda Reeder, in particular, had a significant role to play. She introduced me to this captivating hobby nearly 30 years ago. Reflecting on this, I couldn't help but think, "That's insane," as I recognized the profound influence she had on my life. My heart swelled with gratitude towards Linda for her guidance and the path it set me on within the realm of radio communication.

Of course, there are other extraordinary individuals I've had the honor of meeting along this journey. Although I can't mention everyone, a few names stand out. Hal, whom I met last summer during one of our gatherings, made a lasting impression. My neighbor, Taylorsville Tom, has been a steadfast companion on this Ham radio voyage.

Mike, a cherished friend since I reignited my passion for the hobby, was there from the very beginning. He guided me through the setup of my first antenna, a memory etched in my heart, especially as it occurred just before my father's passing. And then there's James, whose unwavering support and assistance eased our transition into our new home.

These Ham radio friends, old and new, hold a special place in my heart. I wanted to take a moment to express my gratitude to each and every one of you. Even if I'm not on the air every day, you bring something incredible to my life, and I consider myself blessed to know you. You are, without a doubt, awesome.

## Operating During an Eclipse

### The Hallmark of Lunatics

It's not as if many amateurs need much of an excuse to get on the air - but if there happens to be a coincidence where the selenitic orb occludes the disk that is the physical manifestation of Ra, you can be sure that someone will locate a transmitter in its shadow.

Such was the case with a group that ventured into the desert west of Delta Utah in mid October: Tim (KK7EF), Bret (KG7RDR), Sam (KJ7AXQ) and his son, plus Clint (KA7OEI) and Collin (KK7IKR) drove, drove and drove some more, finding themselves in a clearing at about 6200 feet, plopped down tents, erected masts, strung wires, and endured many hours of scenery, good weather, star-filled skies (and looking through a large telescope) and, of course, the partial disappearance of the sun.



The amateur radio aspect of our effort was transmit-only: A custom-built transmitter emitting 3-10 watt signals on the 80, 40, 30, 20, 17, 15, 12 and 10 meter bands simultaneously - the frequencies being precisely held with a Rubidium-based atomic reference so that our frequencies - known with milli-Hertz precision - could be later analyzed to discern the Doppler shift that resulted from the sun-induced undulations of the ionosphere.

For all of this we set up three HF antennas. The main antenna - for 80, 40, 20, 15 and 10 meters - was a full-wave horizontal delta loop, about 280' circumference at about 30' and fed with a 4:1 balun - an antenna designed for those frequencies as transmitter simultaneity precluded the use of a tuner: At 80 and 40 meters the VSWR was about 3.5:1, but the robustness of the transmitters allayed mismatch concerns and short feed-line meant that losses were negligible. For 30 and 12 an 80 meter end-fed half wave was used - not a great match, but it worked well, and for 17 meters a portable loaded dipole at 10' did its magic of radiating into the ether.

The signals transmitted included FST4W - similar to WSPR (and also by K1JT) - chosen for its ability to track Doppler shift and be received as a very weak signal, and these signals were reported by dozens of stations located across the world indicating that everything worked well. In addition to the FST4W signals, two auxiliary signals - at lower power levels - were also transmitted, IDing every 10 minutes in Morse: One with a GPS-timed phase-shift modulation and another, still weaker, unmodulated signal to be used for continuous tracking of absolute frequency for additional Doppler and signal strength analysis.

We weren't the only ones out in the field: similarly-equipped stations (except for the two auxiliary signals) were operating from Colorado, Nevada, Washington near Moab, Santa Fe, and Costa Rica: all of

these using GPS-based frequency references.

Meanwhile, in California, Utah, Nevada, New Mexico, Colorado and many other places across the U.S. and world were receive stations - also GPS-referenced - receiving these signals. At several of these locations real-time recordings of all of HF were made allowing the post-analysis of any signal between LF and 30 MHz that fell on the antenna, including time stations, AM broadcast, shortwave, amateur and many others. With each minute of recording taking 7.7 GB of storage, it will take time to analyze and process this data - plus it will be preserved to allow the possibility of deeper analysis.

## Ham Radio to the Rescue

### Mike McAnish KI7MTI

It was a long drive from Salt Lake City to Millard County, but on Friday the 13th of October I made the trip in the comfort of an air-conditioned vehicle with plenty of liquids to keep me well hydrated. On Monday, the 16th, I contemplated an even longer trip by foot with very little water and a few oranges to sustain me.

Friday's trip was uneventful. As I drove along a rather busy "Loneliest Road in America" west of Delta, I saw scores of individuals and groups setting up camp along the highway. Many had telescopes already set up in anticipation of the Annular Solar Eclipse the next morning. "I sure hope the hordes don't move into the area where I plan to camp," I remember thinking.

As I turned off the highway just west of Skull Rock Pass, I noticed several encampments, but the road leading to my destination was little more than a rocky two-track, which kept the less-adventurous solar sojourners close to the highway. In less than a mile, the camps became few and far between. "Ah, what luck".

I had planned to set up camp at Fossil Mountain, which was "ground zero" for the path of the sun during the eclipse. I camp regularly in the West Desert, but had never been to Fossil Mountain. The guide-books I was using showed roads well-marked by signage. However, those books were published in the mid-90s, and now, there were no signs for guidance. Therefore, I set up camp several miles to the north at where I thought was Fossil Mountain.

A friendly mountain biker knew the area well, and pointed out Fossil Mountain in the distance. "Oh, great!" I thought. "That's not too far away!" Well, distances on a tree-less plain can be difficult to gauge,

so it turned out that I was about seven miles north of where I wanted to be.



Saturday morning was devoted to gazing at the sun and working DX. The first station I contacted on 10 Meters was India! That was followed by two contacts with Toronto stations, a station each in South Carolina, Illinois, Missouri, Indiana, then an Alberta station where the operator was mobile, transmitting on 25 watts! After a break to do some hiking, I worked several other US stations before my batteries abruptly died.

Sunday was a great day for DX on 10M! I worked Spain, Bulgaria, Lithuania, Norway, Belgium, and Poland and several more states. I decided that a long hike while allowing my battery pack to recharge made sense, so I headed up into the Confusion Range. Boy! The bleak eastern face of the mountain hides the beauty of the canyon in the back! I only wish I'd started up sooner since there was little daylight left for navigating the pathless way back.

As dusk enveloped the countryside, 10 meters was all but dead. There were strong stations transmitting from Hawaii and New Zealand, but my 100 watts was no match for the powerful players piling on each other for the chance to work those stations. Ah, just as well; I needed to make supper and get to bed.

Tomorrow, as they say, is another day. After a great night's sleep, I awoke as "rosy-fingered dawn" was chasing the last of the stars from the sky. I decided that I'd make breakfast and get an early start on my trip to Fossil Mountain rather than spend time chasing DX. I had no idea at that time that I'd be making the most important QSO of my trip later that day.

I packed some water, fruit and energy bars for what I expected would be several hours of pleasant fossil hunting. However, on one section of road, I lost momentum and got bogged down in sand. "No worries" I thought as I got out the jack and shovel. There was plenty of flat rock that I could use to make a road and

“I’ll back that truck right outta there!” Ha! Famous last words. Three attempts later, and I was no closer to getting my truck loose from the grip of that fine sand.

With no cell service and unable to get through to the Notch Peak Repeater due to the mountainous terrain that was blocking my signal, I decided that my only recourse would be to try making contact on 10 meters. I turned on my radio and immediately heard a QSO between a South African and South Carolinian station. I broke in, announcing “Priority” and giving my call sign. Both stations responded. I quickly explained my plight and the South African station bowed out, leaving the South Carolinian ham to call the Millard County sheriff’s office.

Acting as the go-between, Chad Womack, K4MTA relayed messages between the Millard Sheriff and me. Chester Peugh, NK9Y in Illinois also heard my priority call, but was unable to hear the SC station. He also called the sheriff and was relaying messages.

At times, there was a bit of confusion, especially when both stations were talking over each other! However, communications between the sheriff’s department and me were successful and about two hours later, Deputy Travis Allred showed up and pulled me out of the sand trap. He said he had studied for his ham license, but didn’t pursue it diligently. Seeing how amateur radio worked for handling emergency traffic, he decided to study for his license with renewed vigor.

After a hearty dinner and a good night’s sleep, I returned to Fossil Mountain but parked about a quarter mile away from where I got stuck the day before. Based on my finds, I’ll go back to the area, but next time I’ll add some traction mats to my emergency supplies.

## 2023 Elmers

### The Editor

It’s definitely sexist, but I couldn’t come up with a name that doesn’t sound condescending<sup>1</sup>. 15 members braved raspberries from UARC’s assembled throng and presented their projects.

### WA7JOS Chuck

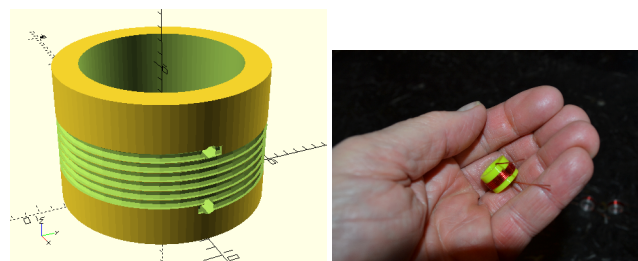
Showed a current/voltage monitor for his RV system less costly and with the same features as a commercial one. He also showed the PETG 3D printed

<sup>1</sup>In 1927 there were 58 girl babies named Elmer per million, by 1975 this had dropped to 3 per million, probably for good reasons [www.babycenter.com](http://www.babycenter.com)

choke for the 6 meter Leamington beam and a few of the printer’s failed attempts (see October Microvolt cover).

### KI7NNP Jed

Presented some early results from 3D printed coil forms and attempts to improve on ARRL’s single layer coil equation.



### N7QXV Dan

Presented how he got construction permits from Holiday city to put up a tower in his back yard. It turned out this was quite easy as the permit person was also an amateur and easy to work with. Total cement is 2.5 cubic yards, a good part of a small mixer truck. The presentation was on-line through Zoom, a first with the new AV system. We heard from the 10 meter net that 3 cubic yards were poured.

### KD7NZA Doug

Presented his Harbor Freight gobox<sup>2</sup> complete with a Yaesu 891 and ICOM 5100. Ready to go with an external battery and orange in color so he can find it in an emergency.



### K7HSR Scott

Decided to do outdoors to indoors in a grand way, drilling holes in brick, a specialty box with lightning arrestors, and wonderfully adequate ground straps.

<sup>2</sup>“gobox”, *noun*, colloquial expression for transportable radios with spaces for snacks, pencils and ICS forms



The key to the installation? His wife picked the box color.

**KK7JEV Sam, K7AIS Stan**

Nothing attracts attention like a Jacob's ladder but Sam and Stan built a power supply for portable rigs capable of pushing out lots of power. Construction was well done and it even works! (see the cover)

**KN6KRB Michael**

Built a really low-cost keyer connected to his QRP transceiver. He demonstrated the Morse code A-Z at about 7 WPM, my full legal limit.

**KA7OEI Clint**

Showed off his kit for the annular solar eclipse. His setup records the entire HF spectrum (to 30 MHz) for 6 hours and transmits on each ham band. The transmitter frequency synthesizers are driven by a rubidium atomic clock for accuracy and stability. Synchronization with other stations is through GPS time (see page 4).

**N7JZU Gary**

Presented his 2½ person gobox complete with colorful lights, multiple transceivers, SWR and antenna tuner powered by a Goal Zero 1000X (another 31.68 pounds). There's lots of well arranged cabling, sufficient light, the right mix of equipment (see the cover).

**NJ3RI Jeri**

One handed a battery box with a 30 Ah LiPo battery, USB output, ammeter and appropriate connectors for running a large telescope (an escapee from the Salt Lake Astronomical Society?).



**KA7TPH Marvin**

Showed off a section of his new aluminum tower and a beautifully machined hinge segment so he doesn't have to crawl up 40' of very thin tower to run wires and then fix them.



**KI7MTI Mike**

Built a 10 meter Mag loop antenna mounted on plastic with his laser cut call sign.

**KI7POR Vicki**

Her multi-meter doesn't have a continuity tester so she built her own. She has no fear of snakes, toads or other vertebrates but fears circuits. Two transistors, a few resistors and a speaker and it worked the first time - when was the last time that happened?




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**Right radio, wrong hemisphere**

From a recent e-mail solicitation an appropriate mis-translation: "IP68 Waterproof Two War Radio".

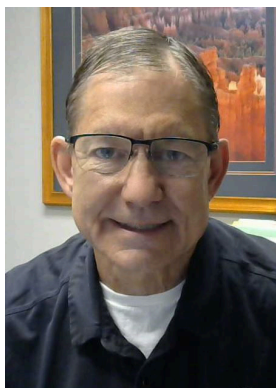
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## Member of the Month

### Michael Hughes K7UTA



This month we feature Michael Hughes K7UTA. Michael grew up in Los Angeles, California and was exposed to radio communications at a very young age. Michael's older brother was a truck driver and had a CB radio. Michael and his brother would play around with this and also communicated with each other on walkie talkies.

Michael met his wife Jennifer on line and decided to go skiing in Utah where he met Jennifer in person. Michael decided to move to Salt Lake City and he and Jennifer got married and had two children, Cassie and Drew. Michael and his wife are bee keepers. For 19 years Michael worked for the Hogle group and now works for the Community housing service, a non-profit for affordable housing where he has worked for 6 years as an operator.

When Michael moved to Salt Lake City he joined the Avenues Community Emergency Response Team (CERT). It just so happens that they had a partnership with amateur radio operators. For 15 years Michael's group would have a booth at the avenues state fair. The amateur radio group had a booth next to Michael's group. However, there is another group that were responsible for Michael getting in to amateur radio. Judi Short who works for the Gigal gardens met Michael and he helped her. Michael is a member of aboard that works to preserve them. Judi's husband Wade Jones was the amateur radio operator K7UTE. He invited Michael into his ham shack and showed him all his equipment and let him talk on the radio. Michael was really impressed. Wade convinced Michael to get his amateur radio license.

In 2022 Michael took the technician class that James Bennet KK7AVS and Michael McAinsh KI7MTI were teaching on Monday nights. Michael said that

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James and Michael are great teachers really helping him with his studies. He is very grateful for their help.

Michael received his technician license on August 12 2022 with call sign KK7JNF. In October that same year he obtained his general license and wanted a vanity call in honor of his dear friend Wade Jones, now a silent key. Michael asked for the call sign K7UTA got it. Michael's wife Jennifer and their son Drew are thinking about getting their amateur radio licenses and Michael is working on-line studying hard to get his extra class license.

Michael is now building his very own ham shack. He was so impressed with Wade's he wants to build something like it.

Michael is new to amateur radio. He said there is so much to learn about the hobby and is looking forward to learning all he can. Michael is also participates in marathons. Michael is interest in gardening, wood working and bee keeping. Michael is also serving on the Avenue's Community council. Michael we wish you the best in all of your endeavors and we wish you the best in getting your extra class license.

73 N7HVF Linda Reeder