

# The *Microvolt*

June 2020

**The Northern Utah WebSDR**

Omnidirectional antenna

- The "main" antenna used for HF reception:



May 2020  
Utah Amateur...  
Meeting

## 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 2020 Board

President: Morris Farmer, AD7SR	801 278-4966
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Program Chairperson: Mary Jelf, KG7QNG	385 347-7900
Imm. Past President: Clint Turner, KA7OEI	801 566-4497

### Committee Chairpersons and Members

Bookseller: Rick Gregory, KG7GOW	801 582-7783
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>.

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>

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Or call 801 539-0852



# The Microvolt

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## Latest News

### June On-Line Meeting

After much discussion at the May 21st UARC board meeting and after assessing the risks and toll already sustained by members of our ham community, the UARC club officers voted to cancel the UARC Field Day event scheduled for June 27-28 near Payson Lakes, Utah.

The ARRL has responded to inquiries regarding Field Day with the following: “Due to the unique situation presented this year, this can be an opportunity for you, your club, and/or group to try something new,” ARRL Contest Manager Paul Bourque, N1SFE, said. “Field Day isn’t about doing things the same way year after year. Use this year to develop and employ a new approach that is in line with the current circumstances.” Additional information on the ARRL Field Day can be found on the ARRL website:

<http://www.arrl.org/news/field-day-2020-a-time-to-adapt>

Even though events and venues are closed or cancelled not all is lost and hams, being a rather clever and resilient group, will find ways to participate in Field Day this year. The program for the June UARC meeting will be about ways to prepare for and participate in the 2020 ARRL Field Day event while maintaining a level of social distancing. Presenters for this meeting will be Tom Kamlowsky, WA7ZRG, and Clint Turner, KA7OEI.

Please join us for the YouTube virtual meeting on June 11th at 7:30PM a link to the UARC YouTube channel is provided below and when visiting the

channel please be sure to look for and press the “Subscribe” button. Go to:

<https://www.youtube.com/channel/UC-zXimUZAog6eyBcU8tj4rg>.

The June 11 virtual meeting will begin at the normal UARC meeting time of 7:30 P.M. We will try to have the stream going by 7 P.M. to work out any technical problems.

If you would like to be able to *interact* (e.g. ask questions of the presenters), read the instructions at [utaharc.org/youtube](http://utaharc.org/youtube).

— Tom Kamlowsky, WA7ZRG

### Our Cover

Our cover this month features images from the May on-line meeting about remote software-defined radios (SDRs) and, in particular, the Utah SDR near Corinne. The presenter was our past-president and repeater engineer, Clint Turner, KA7OEI, a part of whose image can be found in the upper right hand corner. The main upper image is the main antenna at the Corinne site, a wide-band omnidirectional antenna with gain! The lower image shows where various open SDRs are located around the world. The tower to the left supports a large Yagi which provides gain to the east.

### More About Field Day Possibilities

UARC won’t be holding a large group event this year for the nationwide Field Day operating event. However it will be possible for members to contribute to a UARC score by participating alone

or in small groups. To submit your results at the end of the event you will need to fill out a form called the “summary sheet.” This year there will be a space in the summary sheet for you to enter the name of a club. If you make some points, going mobile (entry class C), going portable (class B), operating from your home station (Class D), or using your home station on emergency power (Class E), you can fill in the name of a club of which you would like to claim to be a supporter. (Of course we hope it would be Utah Amateur Radio Club.) That name will then be listed with each individual entry when all the results are published in the December issue of *QST* magazine and on line. According to a very recent change in rules, an aggregate score for each club will also be calculated and published. This makes it possible for clubs to compete even though each one may not have a single group entry.

Field Day is generally considered a mostly HF event, but even Technicians can contribute. Repeater contacts (except for satellites) do not count but simplex contacts do. Contacts with the same station on different bands also all count. And the end of June is a good time for the Sporadic E propagation mode on 6 meters and 10 meters. These bands often open unexpectedly for strong signals on short-hop paths. It can happen at any time of day or night.

There will be lots more tips given on the coming (on line) UARC meeting, so look for opportunities to get in on the fun.

## More Cancellations

Cancellation of various amateur radio related events continues due to the Corvid-19 pandemic.

**HamCom Colorado:** Last month we announced the coming Rocky Mountain Division, also known as HamCon Colorado. This month we must announce that it has been canceled, or more accurately, postponed for a year.

**Steak-Fry:** UARC’s annual steak-fry in Big Cottonwood Canyon has been canceled. This appears to be the first time that has happened since sometime in the 1960’s.

## Contributors Needed

There are a lot of interesting things going on in ham radio along the Wasatch Front, and we would like to be able to report about them here in *The Microvolt*. However, we frequently just don’t hear about them, so we need to hear from you.

Have you recently acquired a new piece of equipment? Why don’t you let our members know how you liked it and what its good and bad features are? Maybe you participated in a public service event that went well. We would love to hear about that. We would even love to hear about one that went badly but left the group with valuable lessons.

If you don’t like to write, you are always welcome to give us a phone call. Your (sometimes) friendly editor would be happy to write down the details. Your experiences could be valuable and enjoyable to others.

## How Long Will My Battery Last?

Have you ever wondered how long the battery you use for portable operation could be expected to last, or how much capacity is required to guarantee you will stay on the air for the length of a public service event? We overheard on one of the nets that there is a convenient on-line calculator that will help answer these questions. It gets a little complicated with the different duty cycles of, say, single sideband or CW compared to FM.

The magic URL for the calculator is:  
[http://www.4sqr.com/Battery\\_Capacity/index.php](http://www.4sqr.com/Battery_Capacity/index.php).  
Check it out!



## Be Careful Adding an “S” to SWR

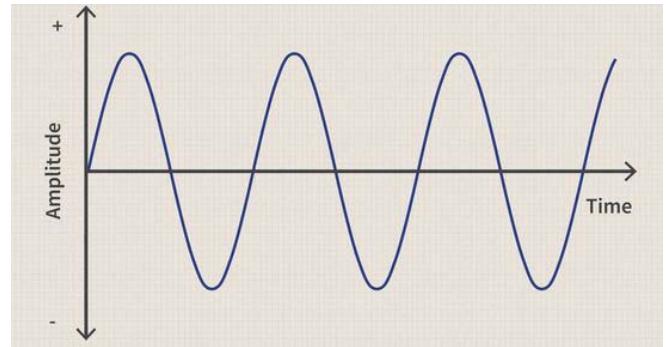
Whenever we hear someone saying something like “I just can’t get my SWRs down on 40 meters” we groan a little bit and start suspecting that the speaker is an escapee from the Citizen’s Band in disguise. That “s” on the end just doesn’t belong. But why quibble about semantics? Why be so fussy? Well, the problem more than just not liking to hear S’s. It is that the speaker probably has no idea what an SWR is. Hams have generally prided themselves on knowing how things really worked. We thought it might be worthwhile to take a little space to explain what an SWR really is. At first glance it’s a pretty strange phenomenon.

Back in the early days of radio people noticed a strange behavior in some feedlines. When they measured the RF voltage at different points along the line, they got different readings! And it wasn’t just a nice slow decline because some power was dissipated in the feedline, but it went up over some parts of the line and down in others. (In those days almost all feedlines were balanced open wire lines, so it wasn’t hard to make the measurement.) The variation was huge, with the high voltage points being several times the low voltage points, and some of the high voltage points even being several times as high as the voltage the transmitter was delivering!

This was something quite different from what you would expect from a line carrying AC or DC power. If you plugged a long extension cord into a wall outlet and used it to power your electric lawnmower, there should be about 120 volts at the plug and it should be very close to that at any point along the cord all the way out to where the load is. There might be a slow drop, but not any dramatic change. (If the drop *is* dramatic, you probably need a heavier extension cord!) So why can an antenna feedline be so different?

An interesting feature of the feedline that shows large ups and downs is that the changing voltage

makes a familiar pattern. To see the pattern you need to plot voltage against distance along the line and look at the resulting graph. It shows a *sinewave*, the same pattern a single frequency AC or RF voltage makes if you plot voltage against time.



The pattern called a Sine Wave

Most of us have seen this shape either as a trace on an oscilloscope, in an illustration in a trigonometry class, or in an ARRL study guide. This is the pattern a radio wave makes in the air if you could freeze it and make it visible. The distance between successive peaks is the wavelength of the signal.

So the folks studying their feedline back in the early radio days realized that the pattern was that of a wave, but now the horizontal axis was not time but *distance* along the line. This pattern was just like a radio wave, but it was stationary. It was a *wave that stands still*, hence the name *standing wave*.

Assuming the feedline is long enough to have multiple peaks and valleys, the ratio of the highest voltage along the line to the lowest voltage is the *standing wave ratio* or SWR. Because it’s voltage that we are measuring, it is sometimes called VSWR. However we should get the same result if we measured current instead of voltage. But, it turns out, the peaks in current correspond to the troughs in voltage and vice-versa.

More study and a lot of math showed that the phenomenon of standing waves was caused by reflections of the signal at both ends of the line. Somehow, power could be moving simultaneously both to the load (usually the antenna) and back toward the source. At some points along the line, the voltage peaks of the two signals always come together and add, creating a high voltage point. At others the positive peaks of the forward signal and the negative peaks of the reflected signal arrive together and partially cancel each other out, thus creating a low-voltage point.

Does it make sense that positive peaks going both directions always find each other at the same points along the line? It should. If you ride Trax, our light rail system, you have probably noticed that if trains are running on time, the northbound and southbound trains of one line almost always pass each other near certain stations and hardly ever pass each other at other points. If they always started at exactly the right times and ran at exactly the same speeds in different parts of the line, they would always pass at the same places. Similarly, if the frequency of the signal in our feedline is stable, the voltage (or current) peaks and valleys will stay in the same place.

We have probably all learned that the reflections at the load are the result of a mismatch between the characteristic impedance of the feedline and the impedance of the load (usually an antenna). If a feedline were infinitely long, there would be no reflections and our feedline would have no peaks

and valleys of voltage. So the trick is to make the antenna look just like an infinite feedline would. That look is what we call “characteristic impedance” of the feedline. It is mainly determined by the inductance of the conductors per unit length and the capacitance per unit length between them.

There are many wives tales about reflection and SWR, for example, that the reflected power is always wasted. M. Walter Maxwell, W2DU, published a wonderful series of articles in *QST* magazine from 1973 to 1976. It continues to be available in book form as *Reflections, Transmission Lines, and Antennas*. I would recommend it highly to anyone who wants to dig further into SWR and its significance.

But, back to the issue of that controversial “S.” The numeric SWR is simply the ratio of the highest voltage along the transmission line (if it were long enough to a full high-low-high cycle) to the lowest. It doesn’t matter if you measure it in milivolts, kilovolts, or the glubstrong units used by folks in the Pinwheel Galaxy, it is still the same ratio. I think our friends over in the CB world think that SWR is a unit like volts or amps. It is not. It is a *ratio* and ratios have no units. We say “the current is 10 amps” or “the power is 7 watts,” when we get to SWR it should be “the SWR is 3:1 *period*.” Even if the SWR is 100:1, if it’s just one measurement, it’s just *one* SWR.

Help us educate those who need it.

## More News

### Meeting Programs Needed

We are having some trouble scheduling monthly club meetings for the fall season. In all likelihood, we will still be meeting electronically rather than in-person. Some would-be presenters are put off by this idea, but in several ways it’s really easier

than traveling to a meeting room, figuring how to work with the room’s audio and video facilities, and then standing up for an hour or so to deliver your message. Instead, you can sit comfortably at home and show your visual material via familiar equipment. There are ways for the attendees to ask questions and they may be easier to understand

than when shouted across a large room. We will be happy to help anyone understand how the electronic system works and how to use it.

If you have attended a particularly good presentation somewhere other than at UARC, and the presenter might be willing to present to UARC, our Program Chairpersons would like very much to hear about it. Let them know the details. Their contact information is on our inside front cover.

Also contact them if you would like to give a presentation of your own or if you have a topic that you would like to see addressed. We would like to know what topics are of particular interest to our members.

## Field Day Waivers

ARRL has announced some changes to Field Day rules for 2020 only. With one month to go before 2020 ARRL Field Day, June 27 - 28, the ARRL Programs and Services Committee (PSC) has adopted two temporary rule waivers for the event:

**1) For Field Day 2020 only, Class D stations may work all other Field Day stations, including other Class D stations, for points.**

**Field Day rule 4.6** defines Class D stations as “Home stations,” including stations operating from permanent or licensed station locations using commercial power. Class D stations ordinarily may only count contacts made with Class A, B, C, E, and F Field Day stations, but the temporary rule waiver for 2020 allows Class D stations to count contacts with other Class D stations for QSO credit.

**2) In addition, for 2020 only, an aggregate club score will be published, which will be the sum of all individual entries indicating a specific club (similar to the aggregate**

**score totals used in ARRL affiliated club competitions).**

Ordinarily, club names are only published in the results for Class A and Class F entries, but the temporary rule waiver for 2020 allows participants from *any class* to optionally include a single club name with their submitted results following Field Day.

For example, if Podunk Hollow Radio Club members Becky, W1BXY, and Hiram, W1AW, both participate in 2020 Field Day — Hiram from his Class D home station, and Becky from her Class C mobile station — both can include the radio club's name when reporting their individual results. The published results listing will include individual scores for Hiram and Becky, plus a combined score for all entries identified as Podunk Hollow Radio Club.

The temporary rule waivers were adopted by the PSC on May 27, 2020.

ARRL Field Day is one of the biggest events on the amateur radio calendar, with over 36,000 participants in 2019, including entries from 3,113 radio clubs and emergency operations centers. In most years, Field Day is also the largest annual demonstration of ham radio, because many radio clubs organize their participation in public places such as parks and schools.

Due to the COVID-19 pandemic, many radio clubs have made decisions to cancel their group participation in ARRL Field Day this year due to public health recommendations and/or requirements, or to significantly modify their participation for safe social distancing practices. The temporary rule waivers allow greater flexibility in recognizing the value of individual and club participation regardless of entry class.

ARRL is contacting logging program developers about the temporary rule waivers so developers can release updated versions of their software prior to Field Day weekend.

## Member of the Month

### Mark Wilson, KC7VZS

By Linda Reeder, N7HVF

This month we are featuring Mark Wilson, KC7VZS. Mark has been in amateur radio since 1994 when he obtained his Technician license. During this time Mark was working for a company called Simplex. Mark had a coworker, Tony Vaqider, who got Mark interested in amateur radio. Mark worked for Simplex for eight years but hasn't seen Tony in 20 years.

Mark obtained his General class license in April of this year after taking Morris Farmer's (AD7SR) General amateur radio class. He plans on taking Morris's Extra class in January of next year.

Mark's favorite thing about amateur radio is communicating with people at a long distance. Mark often talks via the Intermountain Intertie to Jason Howard, KB7UMY, in Boulder City, Nevada. Jason is building the new stadium for the Las Vegas Raiders football team.

Mark worked for Wilson Engineering with his father for 30 years. He likes building electronic equipment and is involved in a project integrating a Raspberry Pi into larger projects. Mark had his own company called Cad-Cam Graphic. He has designed and built computers and also sold and manufactured computer designs. When Mark retired he sold his business. Unfortunately, that company went out of business.

Mark and his wife, Pat, have two girls and one boy. Mark and Pat have adopted other children including a son living in Alaska and another son living in Nevada. Mark is the only family member in amateur radio.

Mark is a lifetime member of UARC. He is also a member of the Road Runner club in Las Vegas, Nevada. Mark enjoys woodwork and fishing. He is involved in genealogy and is a missionary at the

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Riverton Family Search Library.

Mark, we wish you the best in all of your endeavors.



Mark Wilson, KC7VZS