Microvolt

Monthly newsletter of the Utah Amateur Radio Club

June 2026

Creating Interest

From your early years you've been fascinated by the ability to communicate wirelessly, whether that's from listening to broadcast radio, watching TV through its rabbit ears, or talking with a friend by a pair of walkie-talkies. And now, you're fairly excited about the craft of amateur radio, but what caught your attention, the utility, the hobby, or something else? Back in "the day" most were introduced to the *hobby* of amateur radio, but today it's more likely the *utility* that gets noticed. So, now that you've been hooked, how do you lure others into the sport?

Cover – Creating interest

Once we become immersed in the world of amateur radio, it's only natural for many of us to want others to share the excitement. We've also learned by experience that coaxing, reminding, and pushing a person to get licensed simply does not work, and often has the opposite effect. Setting up a ham radio demo, class, or other ham radio event rarely arouses interest in the normal person; often a heavy investment with little return. So, how does one go about getting more people interested enough in ham radio to get licensed?

Attract instead of preach

The solution lies in ***attracting them***, not *pushing them*. They have to ***want*** to get involved, and that means ***they need a reason*** to even go there, and that reason is seldom ham radio itself. The two biggest reasons people get into amateur radio are *utility* and *hobby*. The hobby side of amateur radio often attracts people without much convincing, so this discussion focuses on the utility side.

- Set up an event that features something besides ham radio, but that uses ham radio incidentally (as a secondary activity), to showcase how it's operated to solve an interesting problem. People are **interested in problems**, because each gets them thinking of how they might approach it. Then, people like seeing **how you go about solving it**. And if that solution includes ham radio, suddenly you've got their amateur attention, possibly in a way they haven't thought of.
- Set up a preparedness fair, in which you present classes on food storage, water collection, sanitation, emergency handyman skills, communication, and sheltering in-place. During the communication and shelter-in-place classes, you can demonstrate how to use various forms of communication to either keep current with events or to request assistance. And while you're attempting to request assistance, you can **show how effective amateur radio is over other forms**. This approach tends to generate a lot of questions.
- Help with a CERT class, which should focus on the seven major ideas outlined by FEMA. During the Organization portion, you can demonstrate that runners can be given orders by Incident Command to be sent to the Triage team. The runners rush to the Triage team in ten minutes, deliver the orders, receive requests and questions about procedure from the Triage team, run back to Incident Command in ten minutes, receive answers to the requests and questions, return to Triage team in ten more minutes, only to find that the victim only had 25 minutes to live, and the running took 30 minutes. However, if both Incident Command and the Triage team had ham radios, their communication would have been **almost instant**, potentially saving the victim's life.

Tell them stories

Your family sets out on a two-vehicle road trip. About 170 miles into your vacation and no bars on your phone, your vehicles become separated by traffic. Your vehicle, which is a few cars in back, encounters a fork in the road. Take the right or the left? You've brought your FRS walkie-talkies, and try to communicate, and you know the one in the other vehicle is on, but nobody answers. Using ham radio, **you can demonstrate how to solve this problem**.

Finally

In the end, if a person says **No** to amateur radio, then drop it and let it be. From that point on, let your example be the only invitation they see; don't try and keep ham radio in their face, and don't ever mention it. Let them casually see you enjoy your hobby without you trying to pressure them into attending any ham activity.

And if they start showing interest, don't suddenly pounce on them like a used car salesman. Give them brief answers to their questions, and leave the "they don't know what they don't know" attitude out of the conversation. Most of all, set a good example of kindness and genuine friendliness.

Microvolt editorial staff

Editorial – Be agreeable

In concert with the quest to present a welcoming and inviting presence, we will occasionally encounter a *Negative Norman*. Inconceivably, that sour puss could very well be you.

When you're approached by people who say something contrary to what you want to hear, or do something that doesn't precisely meet your approval, it's often easier to point out their seemingly incorrect thinking than to try and see things from their perspective. Instead, agree with others at every opportunity. Avoid telling them they're wrong, if at all possible. For example,

- Person asks, ***Should I go to Center Street to help them?***
- But rather than say, ***No, I need you over at 100 North Main Street.***
- Instead say, ***That's a great idea, but I could use your help more on 100 North Main Street.***

  (Say ***Yes*** instead of ***No***)

- Person asks, ***Is my radio offset correct?***
- But rather than say, ***No, it needs to be 600 kHz.***
- Instead say, ***Try setting it to 600 kHz.***

  (Turn your answer into a positive comment by avoiding a **Yes** or **No** answer altogether)

- Person asks, ***Do you need any help?***
- But rather than say, ***No, but thanks for asking.***
- Instead say, ***Thanks for asking! I believe I've got it under control.***

  (Be grateful for the help or idea ***and*** avoid using the word ***but*** to point out additional facts. People are quick to pick up on your ***but*** exceptions, as this next extreme and silly example illustrates)

- Person asks, ***Do you like my hat?***
- But rather than say, ***I do, but you have something in your teeth right here.***
- Instead say, ***I do like your hat! By the way, you have something in your teeth right here.***

  (In this silly example, complete the affirmation without reservation, ***I do like your hat!*** Then, start another, unrelated topic if you need to, ***You have something in your teeth...***)

Yes language is an art form that seldom comes naturally, and often takes some practice. Family members, friends, and hams, tend to be good, well-meaning people who want to feel like their portion of the discussion or situation is valuable and worthwhile. Your acknowledgment of that contribution can mean the difference between them feeling very small and worthless, and them feeling motivated to further help and improve, and contribute even more.

When we assume that people are ***intelligent***, and recognize that they ***mean well*** by trying to do and say good things, it becomes a little easier to see their perspective and acknowledge their contribution to the situation. This applies to emergency communication, radio talk, and everyday conversation. The more non-negative you sound, the more others are attracted to you and want to be around you and listen to you, and *the more you'll command their respect*.

Anything to add? Email ***editor@utaharc.org***

Letters to the editor

Dear Editor:

I've calculated the lengths of a pair of 40-meter dipole wires I want to install, and the numbers seem pretty close to others I've found online. Like many of them, I plan to use a center insulator to mate the dipole wires to the coax. But how do I measure the wire lengths for the dipole, from the point where the wires cross, including the loop through the center insulator, or the length of the entire wire?

Jason in Salt Lake City

Dear Jason:

Great question, Jason. Your dipole element is measured from the straight, flat part of the wire extending from the center feed point to the farthest reach of the end insulator. The small segments you use to tie the element to either insulator will be largely inconsequential. While it seems reasonable that the signal will need to travel the entire wire length, the fact is much of the signals in the “folded-back” sections will cancel by the same action.

The real answer is that the lower the target frequency, the less it matters. Let's see just how much "less" means, using two examples:

- One-quarter-wavelength (one half of a dipole) for 10 meters : 234 ÷· 28.40 MHz = 8.24 ft = 8 ft 3 in
  - ◊ Cut off 4 inches each side : 8 ft 3 in - 4 in = 7 ft 11 in = 7.92 ft
  - ◊ New resonant frequency : 234 ÷· 7.92 ft = 29.54 MHz (**1.14 MHz difference**)
- Let's try with 40 meters : 234 ÷ 7.20 MHz = 32.5 ft = 32 ft 6 in
  - Cut off 4 inches each side : 32 ft 6 in - 4 in = 32 ft 2 in = 32.17 ft
  - New resonant frequency : 234 ÷· 32.17 ft = 7.27 MHz (**0.07 MHz difference**)

So, the bottom line is, whether or not you count the length from the element to the nut can affect 10 meters a lot more than it can 40 meters.

Dear Editor:

I’m new to ham radio, and I understand that there are several different kinds of ham radios I could get, like a handheld radio or a desktop radio. So, what kind of radio should I get to start out with?

Lynn in Cottonwood Heights

Dear Lynn:

Congratulations on becoming part of the amateur radio community! The kind of radio you should purchase or acquire can be a handheld radio, a mobile radio, or a base (fixed) station radio, like you said. If you want a unit while out hiking or casually strolling the neighborhood, a handheld might be best for you. If you need one in your vehicle, a mobile radio might be more appropriate. If you want something more powerful, and you can leave it in one place, then a base station might be your choice.

Then again, if you purchase a handheld radio, that can double as a mobile radio as well, by connecting it with the proper coax leading out to a roof-mounted antenna, for example. Likewise, a mobile unit can double as a base station by removing it from your vehicle and powering it with a battery or power supply on your desk, while connecting it to an antenna mounted on your home roof.

Dear Editor:

Can I listen to shortwave radio using my HF radio?

Braden in American Fork

Dear Braden:

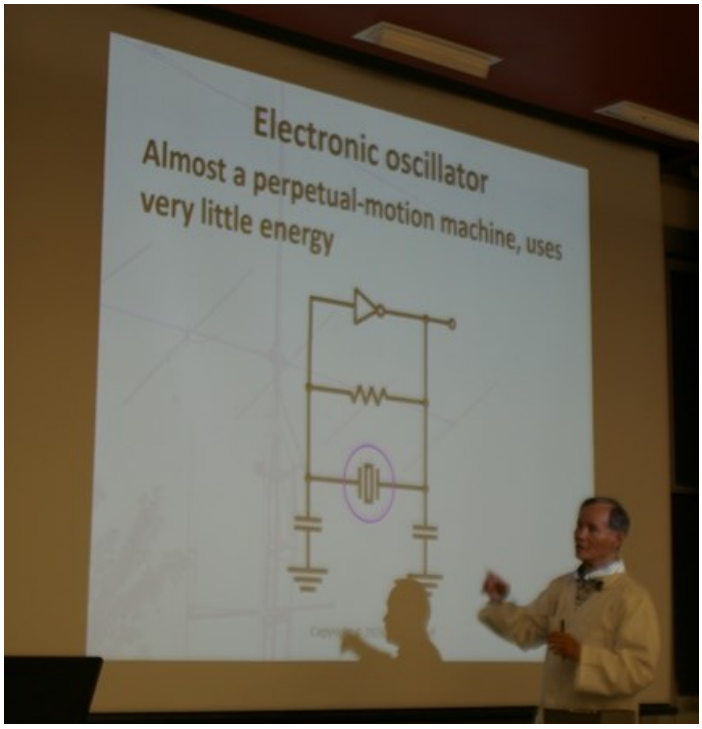
Most modern HF radios support what’s known as *General Coverage*, which means, among other things, that the radio can receive shortwave frequencies, and not just amateur frequencies. So, depending on your model, yes.

Send your questions to ***editor@utaharc.org***

Club news

Noji Ratzlaff KNØJI was at it again, this time in the May 2026 club meeting, presenting a discussion on the piezoelectric effect and how a crystal oscillator works. He not only explained their relevance to amateur radio, but actually demonstrated how to use the piezoelectric effect to make sparks strong enough to light a small fluorescent bulb using everyday stress.

You can see the meeting video here, thanks to James KK7AVS. In fact, you can view past many club meeting presentations on our YouTube channel.



2026 Summer Field Day

Believe it or not, Field Day is approaching! Once again, we plan to descend on our usual place near Payson Lakes and get on the air from ***noon Saturday 27 June through noon Sunday 28 June 2026***, and invite you to join us. Details on how to get to our site are on the club website. We're still in need of your help, so if you have time or an RV to spare, please contact anybody in the UARC leadership and let us know!

2026 UARC Steak Fry

The annual UARC Steak Fry will take place this year ***Saturday 18 July 2026*** at **Murray Park, Pavilion #1**, 420 E 5300 S. We can start setting up as early as 4:00 pm, but ***dinner is served at 5:30 pm***. We bid a fond farewell to the dilapidated picnic tables, broken trip-hazard pathways, and scary restrooms of the Spruces, which have served us for so many years. Cost is $15 per person.

Fall 2026 UARC Potluck

You and your family are invited to a potluck dinner 6:30 pm Thursday 10 September 2026 at the Salt Lake County Facilities Management Cafeteria, 2001 S State St, room S1-100. Details are posted on our website. We'll have announcements and door prizes, but no presentations or speeches.

For your information

Field Day 2026

The annual 2026 Field Day will take place from noon Saturday 27 June through noon Sunday 28 June 2026 at Payson Lakes. We're looking for volunteers to help with setting up and running the stations. We can also use your help with the antennas and other gear.

UARC 2026 Steak Fry

The annual ***UARC Steak Fry*** will be held this year 5:30 pm on Saturday 18 July at Murray Park, Pavilion #1, 420 E 5300 S. Those helping with setup can arrive starting 4:00 pm.

License courses

Salt Lake:

Technician : Tuesdays

General : Tuesdays 7:00 pm to 9:00 pm

147.160+ MHz (127.3 Hz tone)

Orem:

Extra : 5 Tuesdays, 6:00 to 9:30 pm

14 Jul, 21 Jul, 28 Jul, 04 Aug, 11 Aug

Visit **psclass.orem.org** to register ($10)

Orem City EOC, 56 N State St, 2nd Floor

HamStudy.org account required

*This course will **not** be live-streamed*

Email **nojiratz@hotmail.com** for info

Eagle Mountain:

Technician : 5 Thursdays, 7 to 9 pm

14 May, 21 May, 28 May, 11 Jun, 18 Jun

Email **ki6oss6365@gmail.com** to register (free)

Eagle Mountain City Hall, 1650 Stagecoach Run

Exam sessions

Salt Lake County:

- Email Garth Wiscombe W7PS **w7ps@arrl.net**

  29 Jun, 27 Jul, 31 Aug, 28 Sep, 26 Oct

Utah County:

- Wed 17 Jun 7:00 pm : **Provo** : **signup**
- Sat 20 Jun 10:00 am : **Eagle Mtn** : **signup**
- Sat 27 Jun 10:00 am : **Strawberry** : **signup**
- Wed 15 Jul 7:00 pm : **Provo** : **signup**

Club repeaters

Farnsworth Peak : 146.620– MHz (no tone)

Scott Hill : 146.620– MHz (no tone)

Lake Mountain : 146.760– MHz (no tone)

SDRs and beacons

Northern Utah WebSDR : **sdrutah.org**

KK7AVS SDR : **k7xrd.club**

N7RIX SDR : **sdr.n7rix.com**

K7JL beacon 28.2493 MHz

HF remote and club transceiver stations

If you'd like to learn how to get started using the remote stations, visit the **HF Remotes link** on **the club website**:

https://user.xmission.com/~uarc/HFRemote.html

How you can help!

Email **uarc@xmission.com** to reach the club leadership. Email **editor@utaharc.org** to add content.

Spotlight – Craig Gaines K3CDG

From Neighborhood Prep to HF: My Journey into Amateur Radio

My introduction to amateur radio started close to home. My wife, Nicole, has served as our neighborhood's Emergency Preparedness coordinator for many years. In the summer of 2025, she asked if I would be willing to step in and help. As part of that effort, she found a ham radio preparation class hosted by Orem City and encouraged me to attend. I agreed, and that decision quickly turned into something much bigger than I expected.

I attended my first class in September, taught by Joe Costello (WH6QV). His enthusiasm and practical approach immediately sparked my interest in amateur radio. At the end of the session, he recommended using HamStudy.org as a primary tool for preparing for the license exam, along with supplemental learning from YouTube.

I took that advice seriously. The very next day, I dove into online videos and began working through practice questions on HamStudy. After several hours of focused study, I felt ready, and the following day, I passed my Technician exam, receiving my first callsign: KM7CKN. Encouraged by that success, I repeated the same process and, within a week, passed my General exam as well.

By December, I decided to push further and pursue my Amateur Extra license. This time, the material required more effort and persistence. After a couple of attempts, I passed the exam just after Christmas. Shortly thereafter, I applied for and received my vanity callsign: K3CDG.

Another piece of advice I received early on was to join a local club. Through Joe, I discovered the Utah Valley Amateur Radio Club (UVARC) and became a member. Around the same time, I connected with a colleague through the Sheriff's Office who introduced me to Utah County Amateur Radio Emergency Service (UCARES). Through that connection, I met Gavin Grow K9GKG, who helped me get started with equipment, including programming my first handheld, the Baofeng UV-5R for local UHF/VHF use.

As I built out my shack, I added a BTech UV-25x4 and eventually turned my attention to HF. I purchased a Yaesu FT-891 and quickly discovered that antennas would be my biggest challenge. After several months of trial and error, I settled on a Radioddity HF-009 for my current setup. I'm still working toward a permanent multi-band antenna solution for the shack.

HF operation has become a major focus for me, particularly programs like Parks on the Air (POTA) and digital modes such as FT8. While I clearly see the value of amateur radio in emergency communications, I've also come to appreciate it as an incredibly rewarding hobby.

With over 30 years in law enforcement, I've seen firsthand how chaotic emergency situations can become. Amateur radio offers a way to stay prepared, build practical skills, and contribute meaningfully when it matters most, all while enjoying the learning process along the way.

Craig is a member of UARC, UVARC, and UCARES, among others.

– 73, Craig

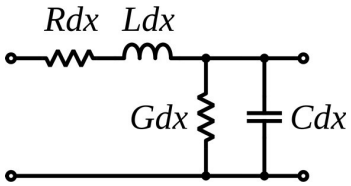
Tech Corner – How coax is 50 ohms

Some time ago, I read a blog question posted by a young man who recently purchased some coaxial cable. And because he was planning to use it for ham radio, he made sure that it was listed at ***50 ohms***.

But when he received the cable and measured it with an ohmmeter, he found that it read like an open circuit between the center conductor and the shield. He measured the shield from one end to the other, and then the center conductor the same way, and they were dead shorts, nearly zero ohms, as expected. But, when he measured the resistance between the center conductor on one end and the shield on the other end, it still showed infinite resistance, instead of 50 ohms. He was ready to return the coax, but thought he had better ask about it first.

What the young ham discovered was correct, if his coax was in good shape. But if that's the case, then where do we get this notion of ***50 ohms impedance for coaxial cable***?

The following diagram generalizes the appearance of almost any transmission line, such as coax, in which ***Ldx*** is the inductance per unit length and ***Cdx*** is the capacitance per unit length:



The cable does indeed exhibit some resistance, labeled ***Rdx***, but that value tends to be rather small, typically less than a third of an ohm for 100 feet of RG-8X and less than a tenth of an ohm for 100 feet of LMR-400, for example. The conductance, labeled ***Gdx***, is the reciprocal of the huge resistance between the center conductor and shield, so tends to be very small, in the order of micro-siemens per foot. The generalized equation for transmission line impedance is defined as

$$Z = \sqrt{\frac{R + sL}{G + sC}}$$

in which ***s*** is the imaginary unit and frequency, or ***j2πf***. If ***R*** and ***G*** are as small (effectively zero) as we believe, then the frequencies (the two s variables) cancel, and the equation resolves to Z_o, known as the ***characteristic impedance***:

$$Z_0 = \sqrt{\frac{sL}{sC}} = \sqrt{\frac{L}{C}}$$

For example, given that RG-8X cable exhibits 0.077 µH/ft and 30.8 pF/ft, the Z_0 for RG-8X = √[(0.077 µH/ft)/(30.8 pF/ft)] = **50 ohms**.

But because the cable resistance and conductance values are so low, the frequency values cancel, meaning this characteristic impedance holds, ***regardless of frequency***. In real-life, however, cables do have an upper usable frequency limit. RG-8X can by used to about 1.0 GHz and LMR-400 can be used to about 6.0 GHz, for example.

Because the coax inductance and capacitance are the result of cable geometry, the characteristic impedance can also be defined by

$$Z_o = \frac{138 \times log_{10}\left(\frac{D}{d}\right)}{\sqrt{\varepsilon_r}}$$

in which **D** is the inner diameter of the outer conductor, **d** is the diameter of the inner conductor, and $\boldsymbol{\varepsilon_r}$ is the relative permittivity of the dielectric material.

And now you know how coaxial cable has a characteristic impedance of 50 ohms.

Noji Ratzlaff KNØJI

Strays – Your amateur radio milestones

Back in medieval days, long before our familiar American green mile markers, Europeans often indicated distances to or from localities by tall stones with numerals carved into them. These ***milestones*** helped travelers know that they had reached another mile in their journey to a town.

Today, we use the term *milestone* to indicate one of many successful achievements while progressing toward a larger goal. In the world of amateur radio, one can check off several accomplishments toward the target of becoming licensed, the goal of all the courses, studying, and examinations. But are there other long-term goals to reach after getting your ticket? And if so, what milestones should you reach on your own journey?

On one hand, you shouldn't feel pressured into achieving any sort of milestones at any stretch of your radio path. Then again, I have a few suggestions for those who feel sufficiently driven to reach some goals, depending on their interests and interest levels.

Operating proficiency

One of your most important goals is to become proficient at radio operation. This means operating like you know what you're doing, and that takes practice. Here are some possible milestones:

- Learn how to speak into the microphone
  - How close to place your mouth and how loud
  - How to call out and how to close the QSO
  - When to say your call sign
  - How to ask for a signal check
  - How to give a signal report
- Talk with a stranger
- Check into a net
- Become acquainted with the terminology
- Learn to manually program your radio
- Serve as Net Control for a net
- Learn how to manipulate your radio
  - Operate simplex, repeater, and reverse
  - Upgrade your antenna and battery
  - How to scan, monitor, and orient
- Teach another person all of this

Technical proficiency

If you're interested in the technical hobby, you might want to become versed at it:

- Learn the educational aspects
  - Electrical knowledge
  - Radio spectrum knowledge
- Upgrade to General or Extra
- Build an antenna
- Submit a *Microvolt* article
- Teach a ham radio course

Your amateur radio milestones will depend on your personal goals, and will likely differ from those of others. So, what milestones are appropriate for your own goals?

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We encourage you to submit original pictures (highest resolution), articles, software and hardware descriptions, appropriate humor, and responses to editorials. Email the content, pictures attached, to the editor at **editor@utaharc.org**

The **Utah Amateur Radio Club** was organized under its present name in 1927, with its beginnings dating back as early as 1909, then becoming affiliated with the American Radio Relay League in 1928. UARC is a 501(c)(3) non-profit organization and holds a club station license with the call sign ***W7SP***, a memorial to Leonard "Zim" Zimmerman, amateur radio pioneer in the Salt Lake City area.

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, room 2230.

Club membership is open to anybody interested in amateur radio; a current license is not required. Dues are $20 per year. Send dues to club secretary James Bennett, 4960 W 5400 S, Kearns, Utah 84118. Send address changes to **kk7avs@gmail.com**

Tax-deductible monetary contributions are gladly accepted. Send directly to club treasurer Shawn Evans, 1338 S Foothill Dr, #265, Salt Lake City, Utah 84108-2321. For in-kind contributions, please contact **uarc@xmission.com** to make arrangements.

UARC maintains the 146.620– and 146.760– repeaters, which are administered by the UARC Repeater Committee. Direct comments and questions to any committee member. The 146.760– repeater is on IRLP node 3352.

Call the **UARC Ham Hotline** at **801-583-3002** for amateur radio information, including club, testing, meeting, and membership information. Leave a message, and we'll make an effort to return your call.

2026 UARC Board

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For-late breaking news listen to the UARC Information Net, Sundays at 8:30 pm on 146.620– or visit the announcement page.

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