QSO'er

Volume 40, Issue 6
October 2026

Special Hamfest 2026 Edition



QSO'er
October 2026 | Volume 40 Issue 6

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QSO'er

A publication of the
Fox Cities Amateur Radio Club
P.O. Box 2346
Appleton, Wisconsin 54912
www.fcarc.club

Your FCARC Officers

President— Mike Moore (WI9MMM)
Vice-President— Andy Lawton (AJ9L)
Treasurer— Donna Mendyke (KC9THF)
Secretary— Gene Wall (KE8KWF)
Membership Coordinator— Karen Thorne (WB9ZNA)
Technical Director— Larry Peterson (WA9TT)

Members At Large
Mike Miller (KD9KHQ)
Laurel Eihusen (KD9AJT)
Joel Kasper (WI4WD)

On the cover: This photo taken by Gene Wall (KE8KWF) is of the FCARC Hamfest 2025. The 2025 Hamfest was the biggest and undeniably the best Hamfest in club history. The 2026 Hamfest on November 8, 2026 is shaping up to top the sucesses of the 2025 Hamfes.

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Message From the Editor

The Future of the Club Is In Your Hands
By Gene Wall (KE8KWF)
FCARC Secretary and QSO'er Editor



It's an exciting few months for the club. After wrapping up several successful public-service events, we shift gears to our annual hamfest on November 8. The number of volunteer hours that have gone into planning this event is too many to count at this point, and if I start listing the names of everyone contributing to the process, I'm sure to forget someone. Needless to say, the hamfest is another example of why every member of our club is important to our future. You can read more about the hamfest and our amazing sponsors in this edition of the newsletter.

There is still one more area where we need as much input from our members as possible. The committee that is refining the club's strategic plan is seeking your input on what the club should be doing and "look like" in the future. We are in a position with both talent and treasure where we can redefine the services we provide to our members and the community. The strategic planning committee has created a short survey that we ask all members to complete. The survey seeks to collect as much input on where YOU think the club should go in the future. To take the survey, navigate to the page on our club website or scan the QR code below:

https://fcarc.club/blog/membership-survey

The committee thanks you for your time and values your input.

Since this is the Hamfest 2026 edition of the newsletter, I would like to give one more push for this event before I sign off. The Hamfest planners have put a lot of time and effort into making this year's event even better than last year's phenomenal experience. Volunteers are still needed in a variety of areas, from setup and cleanup to sales staff in the kitchen and VEs for testing. We recognize that you may not have time to offer for any of these areas; however, sharing this event with your friends and showing up to check out the vendors is also appreciated and encouraged.

That's all for this month from me. I look forward to seeing you on November 8th at the Hamfest!

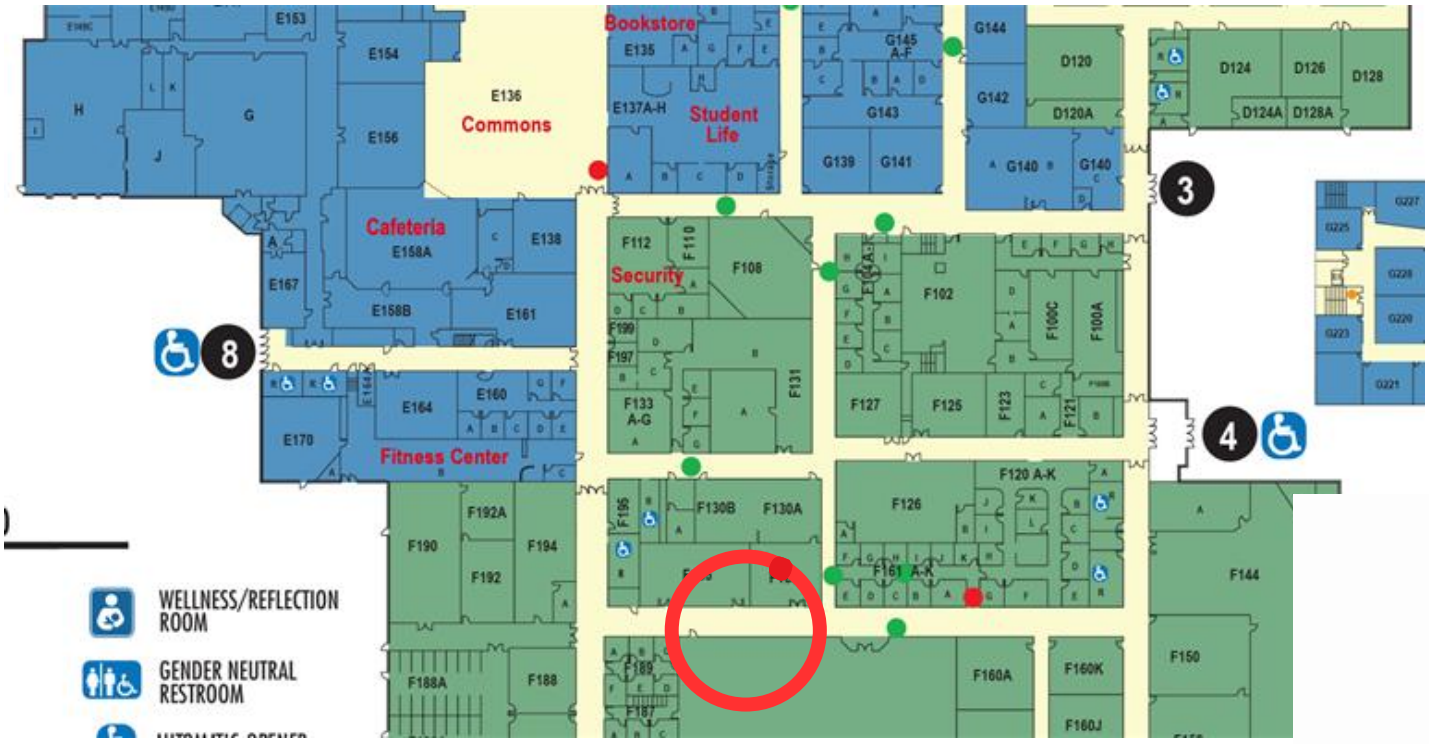
73,

Gene

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Fox Valley Technical College Campus Map





Fox Valley TECHNICAL COLLEGE
Knowledge That Works



We hold our General Membership meetings at

Fox Valley Technical College
Room F108. Enter through Door 3
or Door 8 for easiest access.

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FOX CITIES AMATEUR RADIO CLUB W9ZL

2026 HAMFEST

NEW VENUE LOCATION! Sunnyview Expo Center

Presented by: Fox Cities Amateur Radio Club W9ZL (FCARC)

An ARRL Special Service Club

Talk-In on the wide area **146.76 pl 100** repeater

Sunday
Nov. 8th, 2026

Time
8:00 AM to 2 PM

500 E. County Rd Y
Just off Interstate 41 at Hwy 76 Exit
Oshkosh, WI 54901

ADMISSION:
$10 per person

VE TESTING
Testing Begins at 9 am

***Amazing* RAFFLE PRIZES**
Raffle Drawings at 1:30 pm!

FOOD & BEVERAGES

PRESENTATIONS

Flea Market Table
1 table & 2 chairs
$15

- Admission per person $10
- Electricity Cost $5 Extra
- Free Wi-Fi

Commercial Vendor Booth
Includes 4 tables & 2 Chairs
$50

- Vendors will be admitted at 6:00 AM
- Vendors-only loading zone on North side
- General Admission and Sales begin at 8:00 AM

To Reserve a Table or Get Information:
Contact: Carol Young, Hamfest Chairperson

920-915-8960

W9PIO2024@gmail.com

Directions from Green Bay

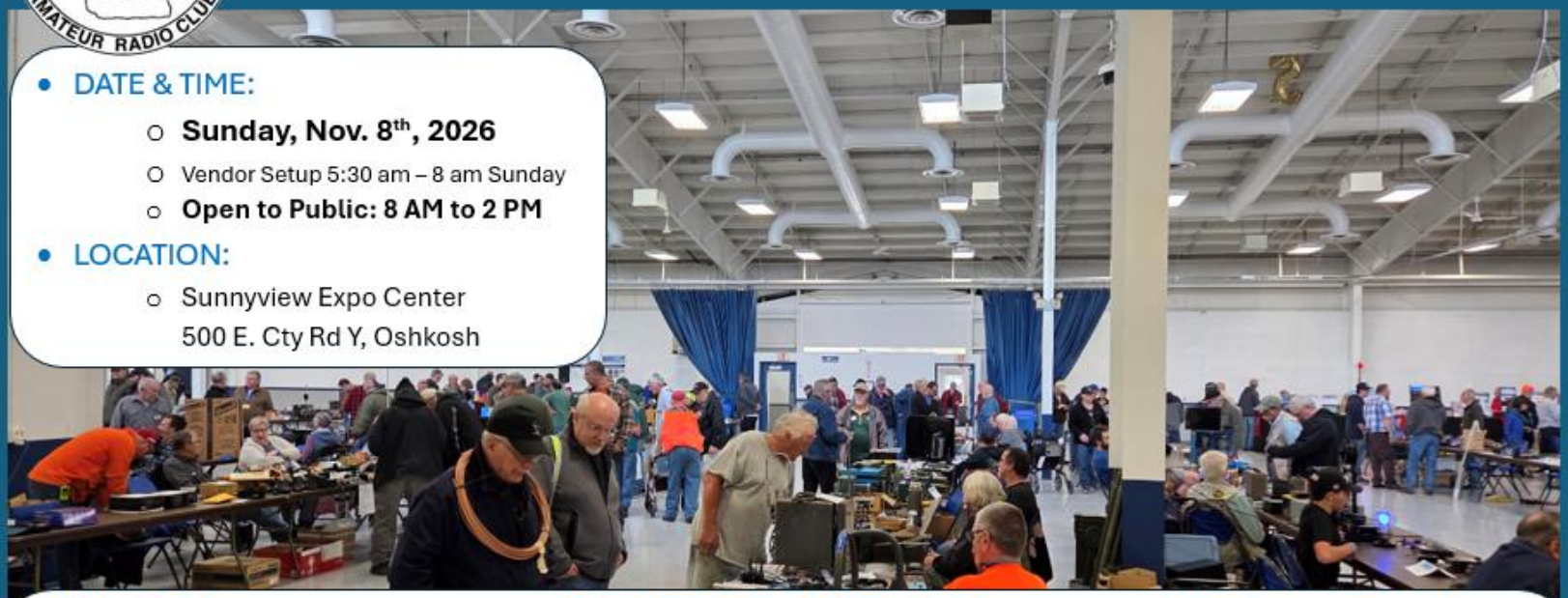
- Take I41 South
- Take Exit 124 (Hwy 76/Jackson St)
- Take a left onto Hwy 76/Jackson St and go south 1 mile to the first stop light (County Road Y)
- Take a left onto County Road Y and go about a 1/4-mile

Directions from Milwaukee

- Take I41/ Hwy 45 North
- Take exit 124 (Hwy 76/Jackson St)
- Take a right onto Hwy 76/Jackson St and go south 1 mile to the first stop light (County Road Y)
- Take a left onto County Road Y and go about a 1/4-mile

Sunnyview Expo Center is on your left

FCARC 2026 Hamfest
PRE-EVENT LOGISTICS & GUIDE



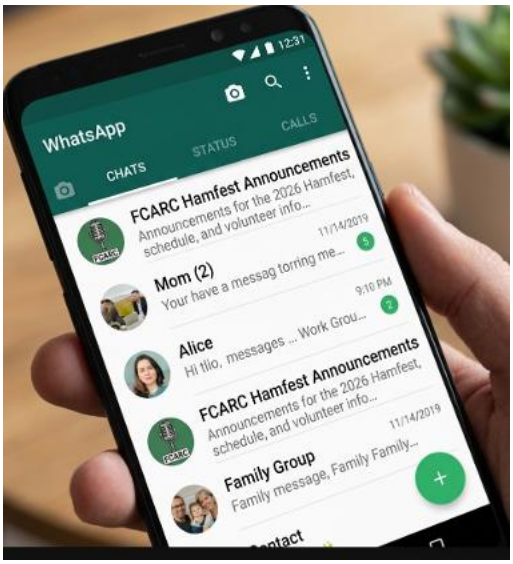
- **DATE & TIME:**
  - **Sunday, Nov. 8th, 2026**
  - Vendor Setup 5:30 am – 8 am Sunday
  - **Open to Public: 8 AM to 2 PM**
- **LOCATION:**
  - Sunnyview Expo Center
    500 E. Cty Rd Y, Oshkosh

- **ADMISSION:**
  - General Admission $10
- **VE TESTING & PRESENTATIONS:**
  - VE TESTING: South Wing End Room
    - Begins at 9 AM
  - PRESENTATIONS:
    - Begin at 9 AM
    - For More Info: fcarc.my.canva.site

- **VENDOR SETUP INFORMATION:**
  - **Setup begins at 5:30 am and Ends at 8 am**
  - Enter through back doors of building (follow vendor setup signs)
  - Unload items and move vehicles to front entrance parking lot
  - Vendors leaving hamfest, pull vehicle to back doors and Exit the back doors.
  - Questions: Go to Information Table

- **AMENITIES & TALK-IN**
  - Food Concessions On-Site
  - **Talk-In: 146.76 pl 100**
- **QUESTIONS:**
  - Visit Information Table Located at front entrance by Raffle Area
  - Contact: Carol (920) 915-8960

Download WhatsApp on your smartphone to receive push notifications regarding scheduled events, raffle winners, and other announcements. Use the link below to join the Hamfest 26 Announcement community. You may leave the group at any time.



Why Join Our Hamfest WhatsApp Channel?

- **Live Updates: Instant notifications for schedule changes and upcoming forums.**
- **Prize Alerts: Find out right away if your ticket is drawn in the raffles.**
- **Direct & Convenient: All important event updates sent straight to your phone.**

View the Hamfest booklet by scanning the QR code below.

https://fcarc.club/hamfest-booklet

SEE US AT FCARC HAMFEST '26

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Per the organization's bylaws, a quorum was achieved. There was a quorum with a total number of 32 in attendance. Mike Moore (WI9MMM) called the meeting to order at 7:03 pm. Roll call was taken by all members in attendance.

The Elmer of the Evening: An Elmer was not required due to not having any new members present.

Committee Reports

1. Secretary – Gene Wall (KE8KWF) – Nothing significant to report.
2. Treasurer – Donna Mendyke (KC9THF) – Donna provided a summary of the clubs current financial position and offered members to review any of her records.
3. Membership Coordinator – Karen Thorne (WB9ZNA) – Karen reported that there has been one new member who completed an online application since the last meeting.
4. Technical Director – Larry Peterson (WA9TT) – How are VHF/UHF bands labeled?
    a. Option 1: 6 meters, 2 meters, 1.25 meters. 70 centimeters.
    b. Option 2: 50MHz, 144MHz, 222MHz, 440 MHZ.
    c. Option 3: Band A, Band B, Band C, Band D
5. Members at Large – If any member has an idea for a program that you can give or would like to see, please speak to Mike Miller (KD9KHQ), Laurel Eihusen (KD9AJT), and Joel Kasper (WI4WD).

Special Committees

1. Repeater Committee – Andy Lawton (AJ9L) – The 443.650 MHz repeater needed to be reset this week. The Wires X software for the W9ZL room was updated to the latest version.
2. Website Committee – Alex Fraundorf (N9LEX) – The Wisconsin POTA statistics are updated on the website.
3. License testing – Rick Kosiorek (WJ9K) – The next, and last, testing for the year will be at our Hamfest. Registration is at 9:00 am.
4. Public Information – Carol Young (W9PIO) – If anyone would like anything advertised on TV or radio, please send it to her. She also told the story about a contact she has had for a Ham who is planning on moving to Oshkosh. This contact came about by Carol advertising on QRZ.

Special Business

1. Youth Net – Mike Moore (WI9MMM) – We still want to get the youth net up and running. The net is simply kids talking to kids.
2. FCARC Survey – Terry Schilling (N9AOT) – Terry talked about the survey that was posted on the club website to gather ideas on the future of the club. Right now, participation in the survey has been low. The survey will be open until December 1, 2026.

New Business

1. None.

Old Business

1. Hamfest – Carol Young (W9PIO) – Carol demonstrated the online Hamfest booklet. She provided an overview of the layout of the tables and vendors that are currently expected to attend. Additionally, Carol summarized the financial report, both current expenses and projected profits. Finally, Carol announced that next year the Hamfest coordinator will be Tony Mach (AB9IO).
2. Christmas Pot Luck – Memorial Park in Neenah. More details will be published at a later date. The format will resemble the pot luck from last year.

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Meeting Minutes
(continued from previous page)

3. Build Day – According to Mike Moore (WI9MMM), we will do a build day on March 20, 2027. The project will be a 2-meter ladder line Slim Jim antenna.
4. Otto Grunski Runski – September 26, 2025 – Gene Wall (KE8KWF) – Gene thanked the members who supported the run. The club support was appreciated by the city of Menasha and the Menasha Parks and Recreation Department.
5. St Joe's 5K/10K Run – October 3, 2026 – Rod Roller (K6ROD) – Rod received good reviews of our support for the run. Next year we hope to have a few more volunteers to fill all of the key positions along the route.

Technical Questions/Topic – None.

Show and Tell –

1. Terry N9AOT – Terry shared a 1994 Radio Shack catalog in his shack. He also gave away amateur radio books that he found while cleaning up his shack for anyone who would like them.

Program – Mike Miller (KD9KHQ) facilitated the presentation of a video on the history of Heathkit.

Adjourn at 8:35 pm

Minutes Prepared by-
Gene Wall (KE8KWF)

Reviewed by-
Mike Moore (WI9MMM)

Net Control Operators Needed

Scheduling for the 2027 net control roster is now underway!

- Current Net Control Operators: Please reach out to the point of contact listed below for each net you host to confirm your participation for 2027.
- Interested in Becoming a Net Control Operator? We are always looking for new volunteers! If you'd like to step up or learn more, please reach out to the respective net contact below.



2 meter net	Jon (KC9TFM)
70 cm net	Rod (K6ROD)
1.2 meter net	Dave (KB9RPH)
System Fusion Net	Mike (KD9QHQ)
SSTV	Larry (WA9TT)

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Building With PVC

by Mike Moore (WI9MMM)

Most hams that have talked to me know that I have a great love of PVC. In my world, PVC exists at the corner of “cheap” and “easy” - but it does come with a few limitations. This article is my attempt to capture some of my lessons learned while experimenting with PVC as a field expedient building material. In life, there are many “temporary fixes” that become permanent solutions just because they keep working. PVC is a great “starter material”, but it is definitely is not your long term solution for everything. PVC becomes brittle with age and will let you down down at a most inopportune time.

PVC's suitability as a building material really depends on the application. PVC as the boom on a tape measure Yagi-Uda antenna... it will last a lifetime. PVC as a form for a tuning coil – like on a Wolf River Coil... it will last until you try to drive too much power through the coil and overheat the assembly.Otherwise, they last a lifetime.

So... where are the limitations? These show themselves when we want to use longer lengths of PVC. Even Schedule 80 PVC bows in 10 foot sticks. When you try to use two sticks spliced together, the bow becomes significant. Does this mean that you are limited to a single 10 foot length? No. But it does mean that you will be building at heights less than 20 feet – unless you want to use guy lines.

My first antenna mast was made of PVC. No surprise there. As mentioned, I learned that two PVC sticks of the same size PVC coupled together was, essentially, a spaghetti noodle. So I went for Plan B. I put 10 feet of 1” PVC inside 10 feet of 1-1/4” PVC. I reinforced the top of the 1-1/4” PVC with a repair coupler (like a normal coupler but without the center ring) to make sure that the top would not split under wind loading. I drilled through holes at 2-1/2 feet down and 5 feet down and used a clevis pin to set the overlap of the two sticks of PVC – and therefore the height of the antenna.I bolted the 1-1/14” PVC to a post on my deck railing using U-brackets. It lasted three years until I was able to get an aluminum mast at a reasonable price. There were a few times where I actually lowered the mast from 17.5' to 15', but they were few.

But PVC doesn't stop there.For the base, I chose to use a bulkhead flange and a 45° Wye fitting – installed with the Wye pointing downward.My initial antenna was a ¼ wave ground plane – so my coax ran down the center of the PVC and out the Wye fitting.After breaking that antenna (trying to pound ice off of the mast), I switched to a ladder line slim Jim and just zip tied it and the coax to the PVC. That lasted until the weather seal on my DIY SO-239 connector failed. Then I just bought a commercial antenna.

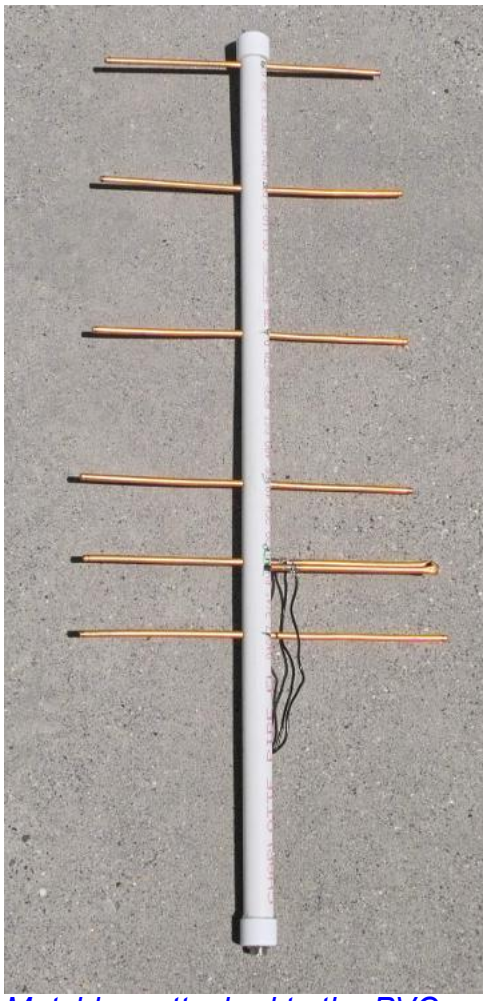
Oh... and the ¼ wave ground plane was built on a 4” PVC test cap. I mounted it to the top of the 1” PVC mast using a 4” to 1” adapter flange.



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Right about now, you should be seeing where this is all coming together. :-) The pieces already exist. How will you adapt them to suit your needs?

- 1” PVC fits well within 1-1/4” PVC.
- 1-1/2” fits inside 2”, but the fit is rather loose.
- If you want to mount something to the side of the PVC mast, you can cut about 30% off the back of a Tee fitting and it will snap onto the PVC pole. Use hose clamps to secure it in place, if necessary. The same is true of a coupler if you want to make a fancier pole adapter.
- There are internal PVC couplers, if you would like to make your own sectional poles. Having made them... I don't recommend it. The PVC still bends and bows. It isn't near as cool as I thought it would be.
- You can reinforce PVC with PVC. At this point, you may want to consider using chain link fence top rail. It comes in 10 foot 6 inch and 21 foot lengths.
- The PVC primer softens the surface PVC and causes it to swell a bit. This is handy knowledge if you want to use a coupler as a reinforcing sleeve in the middle of a stick of PVC. I reinforced the through holes on my PVC mast.
- You can widen the PVC slightly with a heat gun. Wear gloves! Insulated leather gloves are best. Use a form of some sort. PVC has a good memory and will return to its original diameter while it cools without a form. Wood forms work well.
- Narrowing PVC is more difficult than widening.You can thin the walls sometimes.Usually, too much material is too much material. Slot cuts can work in some applications. I usually go with a smaller insert and use bushings.



Matchbox attached to the PVC pipe picnic table mount
Image downloaded from *WB3GCK*

- PVC and CPVC are not the same thing. If you are going to play with both, buy the universal glue.
- PVC glue can be thinned with actetone.
- Nitrile gloves are your friend.
- I have bent the tooth of a 7-1/4” power miter saw cutting PVC. When using power tools, cut slower than you think you need to – for safety.Wear safety glasses. The chips go everywhere.

I do love PVC. It's cheap enough that when I make a mistake – note that I didn't say “if” – I can shrug it off and move forward. Ham Radio is an every evolving hobby for most Hams, so not everything needs to be permanent.Getting rid of my PVC mast was NOT a significant emotional event. It was way more of a “What will I turn these into now?” kind of event. So, be fearless. Build something. Reach out to us on the club website or Facebook if you would like to discuss your idea

Image of yagi antenna above downloaded from https://wb3gck.com/2026/03/14/a-simple-portable-vertical-for-20m-15m/

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Three Ways to Tame a Surge

How many voltage surge protectors are there around your house and ham shack? Probably more than you think. They provide cheap insurance for everything from power supplies and radios to computers and appliances.

There are three common types: gas discharge tubes (GDTs), transient voltage suppressors (TVSs), and metal oxide varistors (MOVs). They serve the same purpose, but operate in very different ways. Here's the interesting part: none of them actually makes the surge disappear. So where does it go, how do these protectors deal with it, and how do you choose the right one?

Gas discharge tube

Of the three, the GDT may be the easiest to visualize. It contains two electrodes separated by a small gap and sealed inside a ceramic or glass enclosure containing gas. Normally the gas is an excellent insulator, so almost no current flows.



When the voltage across the GDT becomes high enough, the electric field accelerates free electrons in the gas. Their collisions with gas molecules knock loose still more electrons, producing an avalanche that rapidly makes the gas conductive (Fig. 1).

Something interesting happens after the GDT fires. A device rated to spark over at, say, 230 V does not clamp at 230 V. As current increases, the discharge develops into an arc, and the voltage across the GDT falls to only a few tens of volts. Unlike the TVS and MOV, which clamp the surge voltage while conducting, a GDT transitions to a low-voltage arc state.

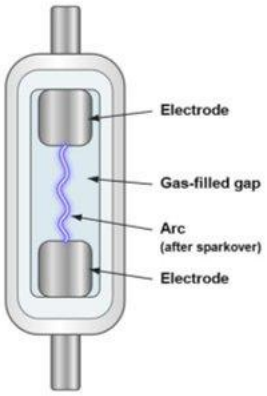


Figure 1 - Gas discharge tube after sparkover.

Once formed, the arc requires much less voltage to sustain than to start. The normal power source may therefore continue supplying current after the surge is gone, a condition called *follow current*. AC zero crossings help extinguish the arc; DC circuits require more care.

Lots of current. GDTs excel at handling very large surge currents. Even small devices may have pulse-current ratings of thousands of amperes for brief, specified surge waveforms. This makes them useful for lightning-induced surges on communications lines and in coaxial antenna protectors.

Sparkover voltage. Datasheets commonly specify both DC and impulse sparkover voltage. With a slowly increasing voltage, the GDT may fire near its nominal rating. A fast-rising transient, however, can climb much higher before the ionization avalanche develops fully and the GDT fires. For this reason, a GDT is sometimes paired with a faster TVS diode.

Low capacitance. GDTs have another advantage that's especially important at RF: very low capacitance, typically on the order of a picofarad. Combined with high insulation resistance, this lets a GDT sit across an RF line with little effect on the signal.

Failure mode. A GDT is designed to survive repeated surges, but it isn't indestructible. A severe surge, or repeated surges, can damage the electrodes and change the GDT's sparkover

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voltage. In extreme cases it can fail open or shorted. A shorted GDT takes the circuit out of service; an open one leaves it operating without surge protection.

Transient voltage suppressor

The TVS, also known by the trademarked name TranZorb™, is based on silicon semiconductor diode technology. It is usually connected across the protected circuit and normally conducts almost no current.



When the voltage across the TVS rises high enough, avalanche breakdown occurs and the device begins conducting heavily. The resulting current clamps the voltage across the protected circuit. Unlike a GDT, the TVS doesn't transition into a low-voltage arc. It retains substantial voltage while carrying surge current, so it dissipates some surge energy as heat.

A TVS is closely related to a Zener diode. Both use semiconductor-junction breakdown but are designed for different jobs. A Zener is generally intended for continuous operation as a voltage regulator or reference, while a TVS is optimized for large currents and substantial power for a very short time. You might think of the TVS as a power Zener built to take abuse rather than provide a precision voltage.

Paired with a GDT, the GDT handles the large surge current while the faster TVS limits the voltage before the GDT fires.

Three important voltages. TVS part numbers often contain a voltage, as in MPTE-15 or ICTE-15. It's easy to assume that a 15 V TVS clamps at 15 V, but it doesn't necessarily. Datasheets normally specify three important voltages: *stand-off*, *breakdown*, and *clamping*.

The *stand-off voltage* is the highest normal voltage at which the TVS remains essentially off, except for a small leakage current. At the *breakdown voltage* it begins conducting a specified test current. As surge current increases, the voltage rises further, eventually reaching the specified *clamping voltage* at a specified current. Thus, the voltage in the part number doesn't tell you what the equipment will actually see during a surge.

I-V curve. Rather than switching abruptly at one voltage, current rises rapidly through the knee of the I-V curve as voltage increases (Fig. 2, blue curve). The clamping voltage therefore depends partly on the surge current.

Power handling. TVSs can have large peak-power ratings, but even a device rated at 1500 W cannot dissipate 1500 W continuously. The rating applies to a specified short surge waveform lasting only a fraction of a second. Pulse duration, repetition, and cooling time all matter.

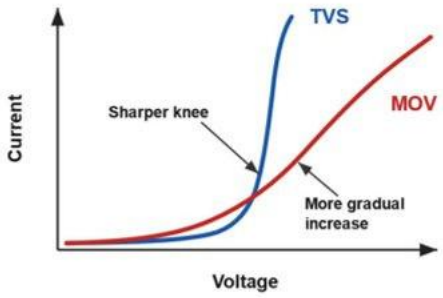


Figure 2 - Simplified I-V curves for a TVS and MOV.

Speed. A TVS responds extremely quickly because there's no gas discharge to develop. The avalanche process itself occurs in less than a nanosecond, although package and wiring inductance also affect circuit performance. This is one reason connections to the TVS should be kept short.

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Capacitance. Like other semiconductor junctions, a TVS has junction capacitance. Depending on the device, this can be hundreds or even thousands of picofarads and may load or detune an RF circuit. Low-capacitance TVSs are available for RF and high-speed data applications.

Unidirectional or bidirectional. A unidirectional TVS is commonly used across a DC circuit. Bidirectional TVSs protect against either polarity and are useful with AC or bipolar signals. Part-number suffixes often distinguish the two, but the conventions vary, so check the datasheet.

Failure mode. Too much surge energy can overheat and damage a TVS, commonly resulting in a short circuit. With a fused or current-limited source, this can remove power from the equipment rather than subject it to continued overvoltage. A TVS can also fail open, however, leaving the circuit operating normally but without its surge protection.

Metal oxide varistor

The MOV may be the surge protector you own the most of. MOVs are widely used in plug-in surge strips, power supplies, appliances, and whole-house surge protectors.



MOV stands for metal oxide varistor, with *varistor* meaning voltage-dependent resistor. The common MOV is made primarily from zinc oxide and other metal oxides formed into a ceramic disk. The material contains tiny zinc-oxide grains whose boundaries create the MOV's unusual electrical behavior.

At normal voltage, an MOV has very high resistance and conducts little current. As voltage rises, its resistance drops dramatically and current increases. This gives the MOV a strongly nonlinear I-V curve. Unlike a GDT, it doesn't fire and form an arc; unlike a TVS, its action doesn't depend on a single semiconductor junction.

Clamping. Like a TVS, an MOV doesn't switch on at one exact voltage. Its clamping voltage depends on surge current, so datasheets specify voltage at particular test currents. During a large surge, the equipment may see considerably more than the MOV's nominal rated voltage.

AC or DC. An MOV is inherently bidirectional, behaving about the same with either polarity. This makes it especially convenient for AC power-line protection.

Surge current. MOVs can handle large surge currents for their size, but only briefly. Ratings may include maximum surge current and energy, in joules. As with the TVS, these ratings apply under specified conditions and don't mean the MOV can continuously dissipate that much power.

They wear out. A large surge can damage an MOV in a single event, while repeated smaller surges can gradually degrade it. Its characteristics may change, leakage current may increase, and eventually its protection may be lost. A surge strip can therefore continue supplying power even though its MOV protection has failed.

Failure mode. An overstressed MOV can fail shorted and draw enough current to become dangerously hot. For this reason, MOVs used across AC power lines are commonly combined with a thermal disconnect that removes the MOV from the circuit if it overheats. This is why a surge protector may have separate "power" and "protected" indicators: the outlets can still have power after the protection is gone.

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Why so many MOVs? With their gradual clamping and limited life, MOVs may sound less attractive than TVSs or GDTs. But they are inexpensive, small, bidirectional, and able to handle substantial surge energy. For AC power-line protection, that combination makes them hard to beat.

So… where does the surge go?

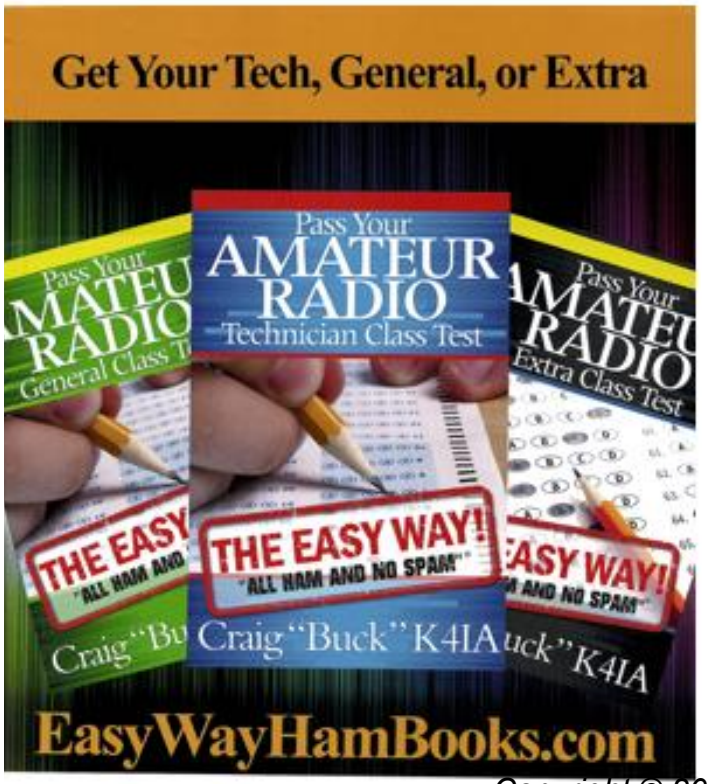
We said earlier that these devices don't make the surge disappear. They can't destroy energy. Some surge energy is dissipated as heat in the protector itself, some in the source and circuit impedance, and a GDT may divert much of the surge current through a low-impedance path to ground. The protector's job is to control the voltage and route surge current away from the equipment.

A TVS, for example, clamps by drawing current, causing voltage to be dropped across the source impedance. That includes wiring, connectors, the power source itself, and any current-limiting circuitry. Without some source impedance, enormous current could flow and destroy the TVS.

Three different personalities

Our three surge protectors have different personalities. The GDT is almost invisible during normal operation and can divert enormous surge currents once it fires, but is slower to respond to a fast-rising transient. The TVS is extremely fast and clamps to a more predictable voltage, but handles less surge current than a GDT. The MOV falls somewhere in between: inexpensive, compact, bidirectional, and able to handle substantial surge energy, but it degrades with use.

Those differences determine where each works best. GDTs are well suited to large surges such as those induced by lightning. TVSs provide fast protection close to sensitive electronics, while MOVs are well suited to AC power-line protection. Sometimes the best protection uses more than one type.





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The Signal Within the Signal: Understanding CTCSS and DCS

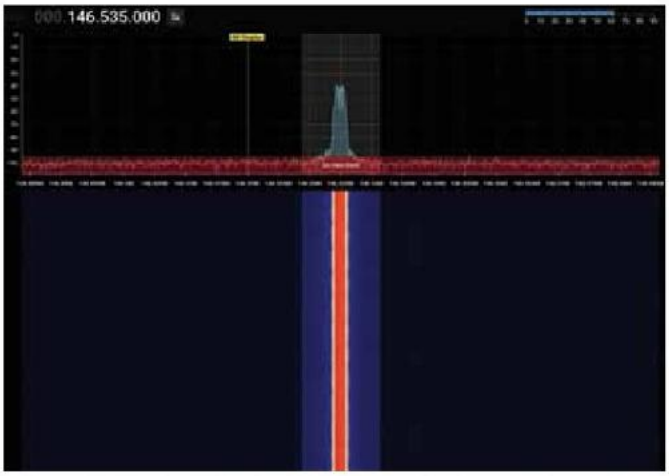
These important systems can be difficult for new hams to understand. This article will guide you through what CTCSS and DCS are, how they work, and how you can employ them in your communications.

Wayne Greene, KB4DSF

In the 1950s, Motorola set out to solve a problem. Radio frequencies were a limited resource, and multiple land-mobile radio users often had to share the same frequency. Geographic separation could allow different groups to reuse a frequency, but their radios could still receive transmissions intended for someone else. Motorola's solution for this was called *Private Line*, or *PL*. The transmitter sent a subaudible tone along with the operator's voice. A receiver configured for that same tone would open its squelch only when the expected tone was present. Today, we know the generic form of that technology as *Continuous Tone-Coded Squelch System*, or *CTCSS*. Motorola's later product was called *Digital-Coded Squelch*, or *DCS*. The phrase *PL tone*, which you'll sometimes hear hams use, is misleading. Adding CTCSS or DCS to a signal does not provide any privacy. What it does is limit who you will hear on a shared frequency. It does not necessarily limit who can hear your transmissions, however.

CTCSS

When transmitting using CTCSS, a subaudible tone rides along on your transmission while you are pressing the PTT button. Most amateur radios provide for 50 tones ranging from 67 Hz to 254.1 Hz. While it is unlikely you will hear these tones, you can easily see them when using a software defined radio (SDR), SDR software, and audio editing software such as Audacity. With the SDR and its software, you can see an obvious difference of a carrier signal with no CTCSS tone and one with a CTCSS tone, and you can see the tone is transmitted during the entire period the PTT is pressed. Audio editing software can be used to determine the tone frequency.

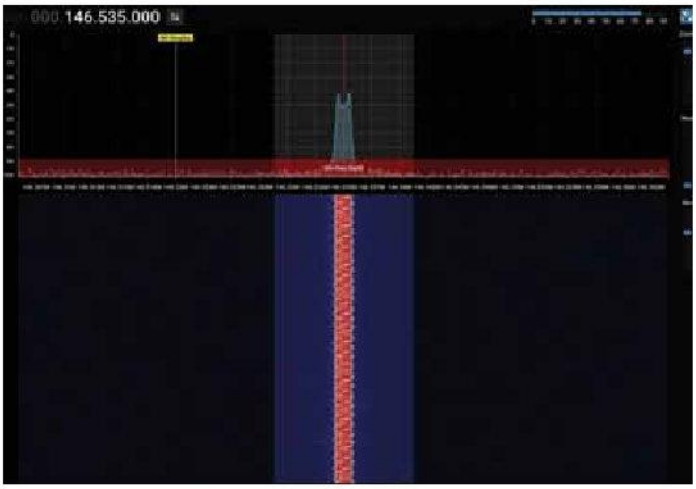


This carrier signal at 146.535 MHZ shows a significant difference from the open carrier signal shown at upper right on the next page. This one is carrying a CTCSS signal within it. Notice the broader shape of the signal in the spectrum and waterfall views. This is a signal within a signal.

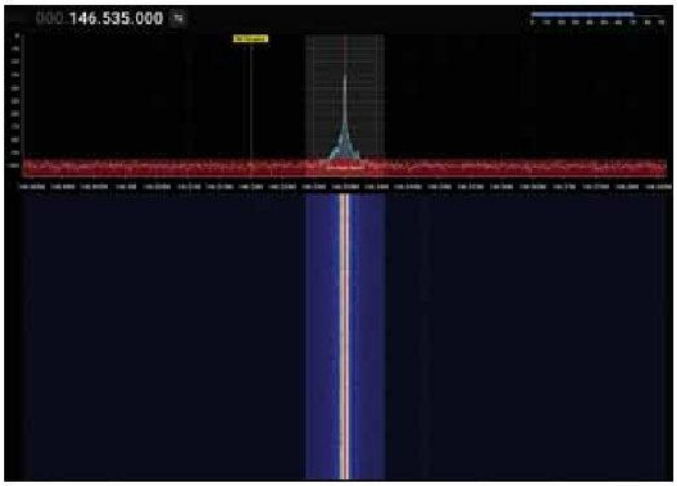
Learn More on September 22

If you'd like to learn more about how to use SDR and audio editing software to inspect the signals from your radios, join me for the September 22 session of On the Air Live at 8 PM Eastern. Registration is required and can be accomplished on the ARRL Learning Center at learn.arrl.org.

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An SDR image of a carrier signal at 145.535 MHz with a DCS applied. The DCS looks quite different from CTCSS. The two peaks in the spectrum view actually "dance" as their frequency shifts to represent the binary 0s and 1s of the bitstream. The "barber poling" of the signal in the waterfall view represents the frequency shifts of the DCS signal.



An SDR Image of an open carrier signal at 146.535 MHz without any CTCSS or DCS signals.

DCS

DCS is similar to CTCSS in that a signal is transmitted the entire time the PTT is pressed, but it differs in that it is not an audio tone. Rather, the radio transmits a binary data bit stream at about 134.4 bits per second. When using an SDR, you can not only see the difference in a carrier signal transmitting without DCS and with DCS, but you can also see a difference between what CTCSS and DCS look like. CTCSS looks like a static signal while DCS has an obvious "dance" between its signal peaks. That dance represents the changes between the 0s and 1s in the bitstream. Most amateur radios provide for 104 DCS codes.

There are two main ways to use either CTCSS or DCS: *Tone* or *Tone Squelch*. Understanding the difference between each is essential in order to effectively use either.

Tone

When using Tone, you program your radio to transmit a certain CTCSS tone or DCS signal. Any user with a radio that has its receiver programmed with the same tone will hear the transmission. The most common use of Tone is with repeaters. As repeaters are typically set in a high location, they can be bombarded with RF noise on the repeater's receive frequency. If the repeater's receive does not have a CTCSS tone or DCS bit stream programmed, it will repeat all of the noise it hears. Thus, it is common for repeaters to have a CTCSS or DCS programmed. Anyone who wants to access the repeater must use the same tone or bit stream. It is kind of like a key that unlocks the repeater for use. In fact, see the March/April 2020 issue for the article "Tones: The Keys that Unlock Repeaters," for a more detailed explanation of how these tones work.

Using Tone is not the best solution for a group of users operating simplex, though. Imaging someone transmitting on a frequency of 146.52 MHz and a CTCSS of 131.8 Hz. Any radio with its receive set to the same tone will open its squelch, allowing the user to hear the transmission. I believe this is where most amateur operators get confused, though, because a radio with no tone programmed on receive will also hear the transmission. Users with their receive set to a different tone will not, however. Further, radios with only their transmit programmed with a tone will hear any transmission regardless of whether the transmission carries a tone — any tone. The best way to use CTCSS or DCS in a group simplex communication is to program for Tone Squelch.

Tone Squelch

Tone Squelch simply means programming a radio's transmit and receive with a CTCSS or DCS. This configuration allows a group of users to communicate with each other without hearing communications from others on the same frequency. Remember, this doesn't provide a layer of privacy. Any radio with no tone programmed on the receive will hear the transmission of any radio even if it is transmitting with a CTCSS or DCS. Tone Squelch also does not prevent anyone else from transmitting on the same frequency. If you have your radio programmed for Tone Squelch using a CTCSS of 131.8, you will not hear anyone transmitting with no tone or a different one. This could mean when you transmit, you could inadvertently transmit on top of someone who was already transmitting. Fortunately, most amateur radios use some form of indication, likely an LED, letting the user know a frequency is in use. If operating with Tone Squelch, pay attention to the indicator to make sure no one is transmitting before using the frequency.

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N9AOT Shack Cleaning Sale

Contact Terry for information on availability for each item listed below.

Item	Asking Price
2 Meter Ringo Base Antenna	$20
MFJ 941 300 watt Tuner	$45
Yaesu FT-2000 with Heil Mike	$800
Dentron Clipperton V 2 meter Amp (tube is weak)	$300
Signal Link USB with TGR-SL-CAB6PM Din Cable	$60
Yaesu 818	$550
Mirage B2528G 144-148 Amplifier	$250
2 meter base antenna (never used)	$50
Shark RF Hot Spot	$60
Easy Hang Sling Shot	$40
40 Foot Self-Supporting Tower	$200
48 Foot Self-Supporting Tower	$250
Ham 2 Rotor	$75
10 meter to 20 meter Log Periodic	$300
6 meter Ringo Base Antenna	$40
10 Element 222 mHz Beam	$20
48 inch VHF/UHF Base Vertical (may be a Comet, but not sure)	$25
Ten Tec Centurion 1300 Watt Amp, one tube good, one not so good	$400
Icom AT 120 Remote Antenna Tuner (as is, not tested, inside clean)	$100
Micom-2 Remote Antenna Tuner (as is, not tested, inside clean)	$100

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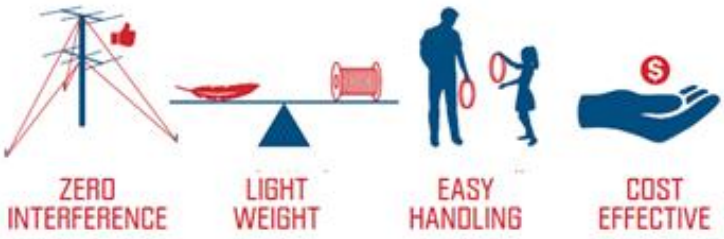
RIGblasters
RIGrunners
DC Power

Battery Analyzers
Audio Ware
Powerpole Cables

Custom Power Cables
Custom Battery Boxes
More for Hams

MASTRANT
ANTENNA GUYING

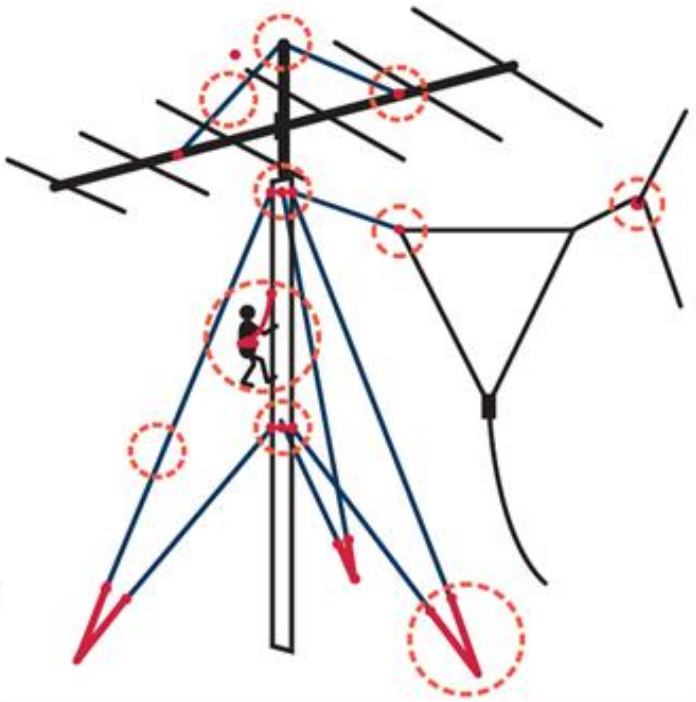
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HOW?
• CHOOSE APPROPRIATE GUYROPE
• CALCULATE LENGTHS
• THINK ABOUT IT • DO IT
• REGULARLY CHECK IT

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HamThings





HamThings is owned by club member Chris N9CVR. We sell Fuse Blocks and VHF/UHF antennas.

Talk to Chris, good on QRZ, or HamThings.com,
Use promo codes W9ZLCLUBPRICE and W9ZLHANDDELIVER

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https://hamradio.goldmedalideas.com/

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AVAILABLE POLO SIZES: S - 6XL

PRICE PER POLO: $34.00



PC61 Port & Co™ Essential Tee

AVAILABLE TEE COLORS:

BLACK, APPLE RED, TRUE ROYAL, OXFORD HEATH, STERLING GREY, WHITE

AVAILABLE POLO SIZES: S - 4XL

PRICE PER POLO: $56.00

WOLF RIVER COILS LLC

Silver Bullet Antenna

From the guys who brought you misfit coils, Wolf River Coils LLC now has misfit collapsible whips.

102 inch collapsible SS whips $15.00 or 3 for $40

213 inch collapsible SS whips $25.00

Now that Wolf River Coils LLC has incorporated a CNC Milling machine for coil production their supply of misfit coils is dwindling as we no longer create a misfit. So if you ever wanted to purchase a misfit SB1000 or SB Mini now is the time because when they're gone, they're gone.

SB1000 sells for $20.00 and the SB Mini sells for $15.00.

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Social Saturday

November 7, 2026
9:00 am

Mark your calendars for our next FCARC Social Saturday! We're gathering at Golden Corral for good food, great conversation, and classic ham radio fellowship.

Whether you want to talk shop about your latest antenna project, debrief from recent club events, or simply catch up with fellow operators over a great meal, this is the perfect relaxed environment to connect. Family members and anyone interested in amateur radio are always welcome to join us—the more, the merrier!

Bring your appetite and your best radio stories. We look forward to seeing everyone there!

Golden Corral
1169 North Westhill Blvd.
Appleton, WI 54914

FCARC Club Gear

On sale now at http://www.jse-repair.com

Contact Jeff on his website for information on items that you don't see but would like. He stocks and makes a wide variety of POTA clothing and flags, hats, club shirts, and radio covers.



Next FCARC Ham Exam

November 8, 2026 (at the FCARC Hamfest)

In the South Wing Entrance Doors, we are holding in-person ham radio license exams. Enter the South Wing Entrance Doors at 9 am. You will receive an email from the FCC after testing on how to pay them for your license. You will need two forms of ID at least one of which must be a picture ID. All candidates must use their Federal Registration Number (FRN). No SSN's accepted per the FCC.

Email addresses are **REQUIRED**. If you are upgrading, please bring a printed copy of your license for the VE's to verify your current license level.

Location: Sunnyview Expo Center, 500 E. County Rd Y., Oshkosh, WI (Just off I-41 at Hwy 76 Exit)

Cell phones must be silenced and put away during exams. Non-cell phone calculators are permitted. Programmable calculator memories must be cleared and are subject to examination by a VE. If you fail an exam you may take a different version, time permitting, but you will be charged another $15. If you are successful, you may take the next element during that session with no charge.

If you have any questions concerning FCARC Exams or to preregister contact Rick Kosiorek at (920) 809-1010 or WJ9K.mail@gmail.com.

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FCARC Lending Library
Chris Reitz, N9CVR
Head Librarian



The FCARC lending library is a repository of references, equipment, and supplies that club members are willing to loan out to other club members. If you would like to borrow an item from the lending library contact the owner and arrange to borrow the item. If you have something you would like to list in the lending library, contact Chris Reitz (N9CVR) to have your item listed.

Library Catalog

Current As Of 10/31/26

Item	Make	Model	Owner	Notes
Coax / Powerpole crimper			N9CVR	contains all required tools for crimping
Power Meter	Diamond	SX-200	KD9UHZ	
RF Preamp	Ameco	PT-3	KD9UHZ	
Manual Antenna Tuner	MFJ	MFJ-945E	KD9UHZ	
TDR pulse generator	-	-	N9CVR	For Time Domain Reflectometry
TDR potentiometer	-	-	N9CVR	For finding characteristic
75m/40m NVIS dipole	-	-	N9CVR	Requires a tree or pole and some open
2m/70cm tape measure yagi			N9CVR	Portable, directional antenna. SO-239
offset attenuator	KC9ON		N9CVR	for fox hunting
20ft fishing pole			N9CVR	Good for portable installations where
misfit 213in whip	Wolf River Coil		N9CVR	Misfit whip - skinniest section
Microbit v2 (x2)	BBC	Microbit	N9CVR	USB/Bluetooth Microcontroller with
Antenna Analyzer	MFJ	208	WI9MMM	2m Only Antenna Analyzer
2m mobile radio	Yaesu	FT-1500M	N9CVR	2m / Analog FM / 50W + WX.
Code Practice Oscillator	Pacific Antenna	CPO	N9CVR	From club build day. There are 3 in my

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Ham Humor

If you know, you know.





Ham Radio Trivia

1. **What is the maximum propagation distance of 2-meter signals to stations lying beyond the horizon?**

a) 10 miles / 16 km b) 25 miles / 40 km c) 115 miles / 185 km d) Well over 500 miles

2. **The Kenwood TS-520 was first made in what year?**

a) 1946 b) 1951 c) 1973 d) 1999

3. **In WW2 the ham's built what were called "Razor Blade Radios" to listen to radio broadcasts. What brand and type did they most typically use for their unique properties?**

a) Wilkinson sword blade b) Gillette blue blade
c) Gillette brown blade d) Schick double edge blade

4. **What kind of propagation would you most likely use to work someone on 80M or 160M on the other side of the world at your sunset and his sunrise?**

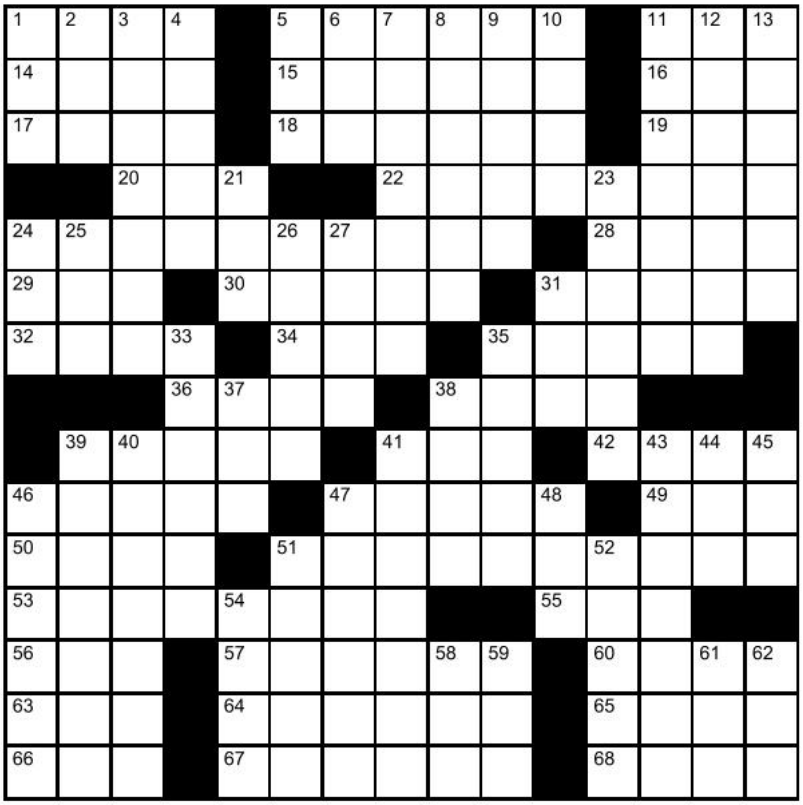
a) greyline b) short path c) long path d) groundwave

1. d) Well over 500 miles | 2. c) 1973 | 3. b) Gillette blue blade | 4. c) greyline

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by Chris Codella, W2PA

Prizes



Across

1. A6 dignitary
5. A ham does it every 10 years
11. CW approx.
14. Twenty one hundred time
15. Made up (for)
16. Icom xcvr name part
17. Five score since '45
18. VO1 ATC locale
19. Term. label
20. Experiment place
22. Some retirement sums
24. Upgraded 67-across
28. Small, medium or large
29. Director Howard
30. Next Elecraft rig?
31. Worked All follower
32. Creative spark
34. Apr. addressee
35. Speaks or moves with lightness
36. With 38-across, a more difficult 17- or 67-across
38. See 36-across
39. Ease
41. W9 area net
42. Bid place
46. Molecule parts
47. Kind of cycle
49. W6 to VO1 dir
50. Alka-Seltzer sound
51. Worked All follower
53. Window, so to speak
55. Overload ctrl. ckt.
56. 17-across unit (abbr.)
57. Excite
60. Portal site
63. Downed
64. Parallel partner
65. Give up
66. Young OM
67. Worked All follower
68. Angular subj.

Down

1. Dipole current node location
2. Early polar-exploring ham Don
3. Slope
4. A radio restoration process, among others
5. Part of RCC
6. Flight board abbr.
7. Perplex
8. Make beloved
9. Pipsqueak
10. Newfangled rcvrs
11. Designate, as an ORS or OBS, say
12. Coats in metal
13. Coin flips
21. Zero on a res.
23. Wagnerian heroine
24. Prefix with -band
25. Grounder
26. Cook Islands prefix
27. Minute opening
31. Inp. imp.
33. Spkr. drivers
35. KH6 island
37. "___ alive!"
38. W3 metro. area
39. W4 metropolitan area
40. Amplified
41. Feedline pipe
43. Paddle peddler
44. Sig. catcher
45. C on A1
46. Attraction
47. XE state bordering W7
48. Genetic inits.
51. Shift 6
52. Bumper sticker word
54. Low frequency
58. Five-dit word
59. Triple dit
61. Log file type
62. Milligig?

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Get On the Air With the FCARC



FCARC Repeaters

Frequency (MHz)	Offset	Tone	Remarks
145.33	- 0.600 MHz	100	Yaesu System Fusion
145.69	Simplex		Yaesu System Fusion Analog Node
146.76	-.600 MHz	100	
146.76	-.600 MHz	107.2	This is a receiver station at Oneida Heights.
443.65	+5.000 MHz	100	

FCARC Member Repeaters

Frequency (MHz)	Offset	Tone	Remarks
224.5	-1.6	100	1.25 m repeater owned by WJ9K
1282.2	-12	146.2	23 cm repeater
442.475	5	146.2	70 cm repeater owned by AJ9L
442.175	5	100	70 cm repeater owned by WJ9K

FCARC Nets

Net Name	Frequency	Schedule and Extra Information
2-Meter	146.76	Wednesdays at 8:00 pm. Coordinator: John (KC9TFM)
2-Meter Digital	145.33	First Tuesday of the month at 8:00 pm. You can also use the FCARC's Fusion Room 40216, the W9ZL room. Coordinator: Mike (KD9QHQ).
2-Meter SSTV	146.76	Second Sunday of the month at 6:00 pm. Coordinator: Larry (WA9TT)
70 cm	443.65	Last Tuesday of the month at 8:00 pm. Coordinator: Rod (K6ROD)
222 Net	224.5	2nd Tuesday of the month. Coordinator: Dave (KB9RPH)
6-Meter	52.55	Third Tuesday of the month. Coordinator: Larry (WA9TT)

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FCARC Club Calendar

November 2026

3 - 2 meter digital net 8 pm (KC9THF)
4 - 2 meter net 8 pm (KE8KWF)
7 - Social Saturday 9 am & Fox Hunt 7:30 am
8 - HAMFEST & Amateur Radio License Exam
8 - 2 meter SSTV net 6 pm (KB9YUC)
9 - Board of Directors meeting 7 pm
10 - 220 Mhz Monthly Net 8 pm
16 - General Membership Meeting 7 pm
17 - 6 meter net 8 pm
18 - 2 meter net 8 pm (K6ROD)
24 - 70 cm net 8 pm (KB9AIT)
25 - 2 meter net 8 pm (N9TNW)

December 2026

1 - 2 meter digital net 8 pm (KD9QHQ)
2 - 2 meter net 8 pm (WI9MMM)
5 - Social Saturday 9 am & Fox Hunt 7:30 am
8 - 220 Mhz Monthly Net 8 pm
9 - 2 meter net 8 pm (WA9TT)
13 - 2 meter SSTV net 6 pm (WI9MMM)
14 - Board of Directors meeting 7 pm
16 - 2 meter net 8 pm (AJ9L)
21 - General Membership Meeting
(Memorial Park, Neenah) 7 pm
22 - 6 meter net 8 pm
23 - 2 meter net 8 pm (KE8KWF)
29 - 70 cm net 8 pm (KC9THF)
30 - 2 meter net 8 pm (KC9TFM)

January 2027

2 - Social Saturday 9 am
5 - 2 meter digital net 8 pm
6 - 2 meter net 8 pm
10 - 2 meter SSTV net 6 pm
11 - Board of Directors meeting 7 pm
12 - 220 Mhz Monthly Net 8 pm
13 - 2 meter net 8 pm
18 - General Membership Meeting 7 pm
19 - 6 meter net 8 pm
20 - 2 meter net 8 pm
26 - 70 cm net 8 pm
27 - 2 meter net 8 pm

February 2027

2 - 2 meter digital net 8 pm
3 - 2 meter net 8 pm
6 - Social Saturday 9 am
8 - Board of Directors meeting 7 pm
9 - 220 Mhz Monthly Net 8 pm
10 - 2 meter net 8 pm
14 - 2 meter SSTV net 6 pm
15 - General Membership Meeting 7 pm
16 - 6 meter net 8 pm
17 - 2 meter net 8 pm
23 - 70 cm net 8 pm
24 - 2 meter net 8 pm

March 2027

2 - 2 meter digital net 8 pm
3 - 2 meter net 8 pm
6 - Social Saturday 9 am
8 - Board of Directors meeting 7 pm
9 - 220 Mhz Monthly Net 8 pm
10 - 2 meter net 8 pm
14 - 2 meter SSTV net 6 pm
15 - General Membership Meeting 7 pm
16 - 6 meter net 8 pm
17 - 2 meter net 8 pm
23 - 70 cm net 8 pm
24 - 2 meter net 8 pm
31 - 2 meter net 8 pm

April 2027

3 - Social Saturday 9 am
6 - 2 meter digital net 8 pm
7 - 2 meter net 8 pm
11 - 2 meter SSTV net 6 pm
12 - Board of Directors meeting 7 pm
13 - 220 Mhz Monthly Net 8 pm
14 - 2 meter net 8 pm
18 - World Amateur Radio Day
19 - General Membership Meeting 7 pm
20 - 6 meter net 8 pm
21 - 2 meter net 8 pm
27 - 70 cm net 8 pm
28 - 2 meter net 8 pm

Calendar items in red require membership participation or volunteer support to make the event happen.

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Crossword Solution From Page 23.



Submit your ideas for content, contributions, or items for sale for future editions of QSO'er to Gene Wall (KE8KWF) at ke8kwf@gmail.com. There are no special formatting requirements. All ideas are welcome. Together, we can make our newsletter a useful addition to your shack.

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FOX CITIES AMATEUR RADIO CLUB, INC.

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Membership Application

Date _____ ☐ New member ☐ Renewal

☐ Full / Associate / Retired ☐ Student

Call Sign _____ License Class _____ ARRL Member? ☐ Yes ☐ No

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Address _____

City _____ State _____ ZIP _____

Email _____

$20.00	_____	Full, Associate (non ham), Retired
$10.00	_____	Student School_____
Free	_____	New Ham (FCARC VE certificate required)
$5.00 each	_____	Additional Family Members
	_____	Donation (Optional)
Total	_____	

My Family Member is Joining or Renewing:

☐ New member ☐ Renewal

Call Sign _____ License Class _____ ARRL Member? ☐ Yes ☐ No

Name _____ Phone _____

Email _____

☐ New member ☐ Renewal

Call Sign _____ License Class _____ ARRL Member? ☐ Yes ☐ No

Name _____ Phone _____

Email _____

Note: Family members must reside at the same address

Note: Please see the treasurer for an ARRL dues form. Our club will receive a portion of those dues if you sign up or renew through us.

Fox Cities Amateur Radio Club, Inc. is a 501(c)3 non-profit corporation.
Your contribution supports our community service and public safety activities.
All donations are tax-deductible to the fullest extent of the law. Please consult your tax advisor.

Treasurer Use:

Amount Paid $_____
Check # or method of payment _____
Paid through 12/31/_____
Date Deposited _____

QuickBooks Updated _____
Website Updated _____
HamClubOnline Updated _____

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