NCARC Tri-Bander

Volume 7, Number 10 November 2026

From the NCARC President

Joe Hawley KDØTYU

president@ncarc.co

970-689-0828

We have two events coming up in December, and I hope you'll join us for both. On Saturday, December 5th we'll hold NanoVNA Training, Part 2 at Front Range Community College. Even if you missed Part 1, you're welcome to jump in.

Then on Thursday, December 17th at 6 pm, we'll gather for our holiday party at Señor Rafael's at the Mexican Inn at 804 S Lincoln Ave, here in Loveland. It'll be a good chance to catch up and enjoy an evening together. Thank you for all the ways you support the Northern Colorado Amateur Radio Club throughout the year. I look forward to seeing you at the club meeting this Saturday, November 21st.



NCARC Club Meeting

November 21, 2026

8:30 am Golden Corral opens- breakfast and socialize, **9:00 am** club meeting

In Person and online

Join Zoom Meeting

Join and take notes

Meeting chat link

Meeting ID: 840 7186 9254
Passcode: 155924

You choose what you feel comfortable doing: attend in person or online.

Topic:

The One and Only J-Pole That Works

Chris Kelly, KØPF

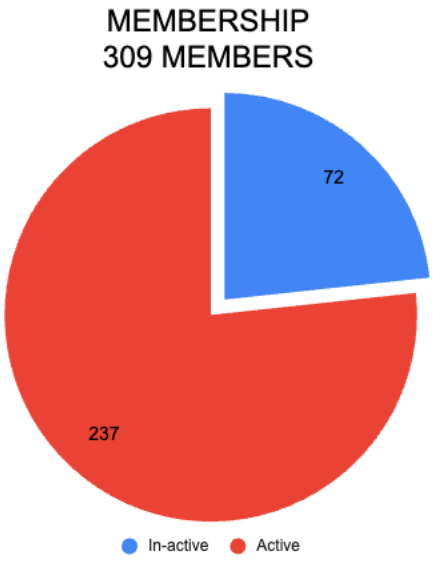
Location:
The Golden Corral
1360 Sculptor Dr, Loveland CO 80537

Treasurer's Report

Pete Robbins WØRCR
treasurer@ncarc.co

Here are some highlights from October:

- **Membership**: We appreciate everyone's patience as we continue to learn the new membership system



Finances

Opening Balance	$15,224.35
Incoming	$666.40
Outgoing	$360.90
Ending Balance	$15,529.85

Income:	**Expenses**
• Membership dues • Hamfest revenue • Event venue refunds	• Event expenses • Storage • Bank fees • Supplies • Licensing

Please welcome our newest club member:

NØMMZ

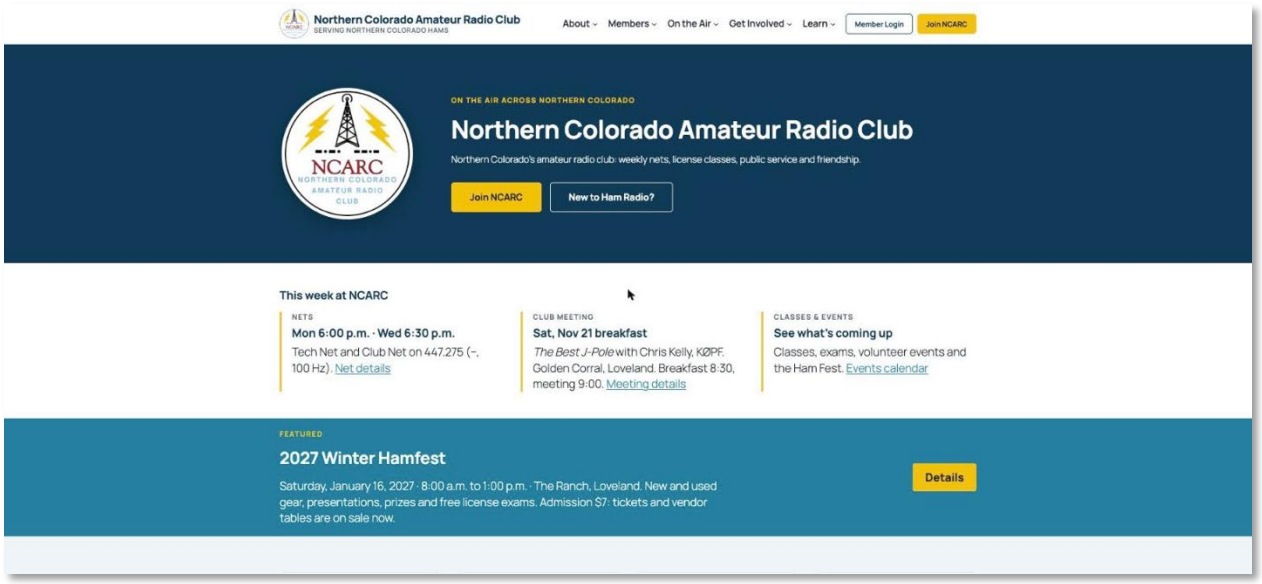
Welcome to the New NCARC Website

By Pete Robbins, WØRCR, NCARC Treasurer

On November 15, the club's redesigned website went live. The address hasn't changed (it's still **www.ncarc.co**) but almost everything else has. The new site was built around a simple idea: it should be the club's front door for people curious about ham radio, and a practical resource for the members of the NCARC community.

The biggest goal was to make information easier to find. Everything is grouped into a few clear sections, and the most-requested information (net times, meeting details, class dates and membership renewal) is right on the home page. Whether you're a longtime member or a visitor discovering ham radio for the first time, what you're looking for should be just a click or two away.

A home page that tells you what's happening



The top of the new home page: the club banner, "This week at NCARC," and the Featured event.

The home page now answers the question we want visitors to know: *what's going on at NCARC this week?* Right below the club banner, a **This week at NCARC** strip shows the weekly net times, the next club meeting (speaker, place and time) and a link to the events calendar. Under that, a **Featured** banner highlights the club's biggest upcoming event. Right now that's the **2027 Winter Hamfest on January 16** at The Ranch in Loveland, with vendor tables on sale online.

A New Weekly Net

By Joe Hawley, KDØTYU

We have a new net that started November 15, 2026: The Fort Collins LDS Emergency Communication Net. It's open to anyone interested in local emergency communications and will have a net control.

The net will be held Sundays, 5:00 pm on the NCARC 447.700 repeater at Buckhorn. If you'd like to join, you're more than welcome!

Hope to hear you on the air!



NCARC Holiday Party!



December 17, 2026, 6:00 pm
Señor Rafael at the Mexican Inn
804 S Lincoln Ave
Loveland, CO 80537

Please RSVP to Joe Hawley (jhawley2@msn.com or 970-689-0828).
A head count is needed to help Santa with gifts and such things!

Link to webpage here: [Hamfest 2027]



NanoVNA Class Part 1 Draws 22 Students

The Northern Colorado Amateur Radio Club's October 24th NanoVNA class brought together 22 students for an informative session led by instructors Joseph DiVerdi KØNMR and Greg Ella NØEMP.

The class covered how the NanoVNA works, how to calibrate it, and how to use it. Participants explored the steps involved in making useful measurements and gained a better understanding of this versatile instrument.

The strong turnout reflected considerable interest in the NanoVNA, and everyone seemed to discover a capability or application that would be useful in their own amateur radio activities.

With so much material to cover, it became clear that another session would be valuable. A follow-up class is planned to continue the discussion and build on what students learned.

Randy Barnett KFØRUW filmed the class, and the recording is expected to become available on the club's website. Watch for updates about the video

Thank you to Joseph and Greg for sharing their knowledge, to Randy for recording the session, and to all 22 students for making the class a success!







NanoVNA Class Part 2

By Joe Hawley KDØTYU

Have a NanoVNA and still aren't sure how to use it? **This hands-on class is for you!** Join us for Part 2 of setting up, calibrating and using a NanoVNA for practical amateur radio applications.

Whether you're new to NanoVNAs or have one sitting on your bench that you haven't quite figured out yet, come learn how to put this powerful little instrument to work!

You'll learn:

- How to set up your NanoVNA
- Proper calibration techniques
- How to make measurements
- Understanding SWR and antenna measurements
- How to use your NanoVNA to troubleshoot antennas and feed lines
- Tips and techniques to get the most from your NanoVNA

BRING YOUR OWN NANO VNA! If you own a NanoVNA, please bring it with you!

Much of this class will be hands-on, and we'll help you learn how to operate your own equipment.

We will also demonstrate the operation of a **larger commercial NanoVNA** so you can see the capabilities of these instruments and how they can be used in the amateur radio station.

WHEN: December 5, 2026, 9:00 AM

WHERE: Front Range Community College
Library Classroom
609 W. Harmony Rd.
Fort Collins, Colorado

Click here to sign up!

Radios, Ridgelines, and Teamwork

Amateur Radio Supports the Never Summer 60K & 100K

By Wayne Hall ADØKE

Sunrise, runners, volunteers, and radio operators prepared for a long day in Colorado's high country.



Before sunrise illuminated the Never Summer Range, volunteer radio operators were already preparing for a long day in the Colorado backcountry.

The Never Summer 60K and flagship 100K are among Colorado's premier trail-running events. Nearly 600 runners took on the courses over race weekend, traversing high-elevation terrain, remote forests, rugged trails, and some of Colorado's most spectacular backcountry landscapes.

The numbers tell part of the story. The mountains explain more. Operators tell the rest. Cellular service is extremely limited or completely unavailable at many locations throughout Colorado State Forest State Park, creating a communications challenge that requires planning, teamwork, and reliable radio operators.

To support race operations, a team of amateur radio volunteers deployed throughout the course. Some operators volunteered for short five-hour shifts, while others remained on station for nearly twenty-four hours. Together, they provided communications support between aid stations, race officials, logistics personnel, and safety teams spread across dozens of miles of rugged terrain.



The Never Summer course traverses remote, high-elevation terrain where reliable communications remain essential

A quick look around any aid station revealed the scale of the undertaking. Hundreds of drop bags, food supplies, medical resources, volunteers, and support personnel had to be coordinated throughout the day and into the night. Reliable communications helped tie those operations together, ensuring information could move when and where it was needed.

For all 12 years of the Never Summer races, Bryan Bibeau, NØBCB, has supported race communications with a portable repeater system that he designed and maintains. The system has become an important part of the event, helping connect operators across the course's challenging mountain terrain. Radios and repeaters connected the course. The volunteers made it work.



Bryan Bibeau's portable repeater system has supported Never Summer race communications since the event's beginning





From sunrise over the Never Summer Range to aid stations operating long after dark, volunteers experienced the event from some of the most remote locations on the course. As darkness settled over the course, operators continued supporting race activities by radio while runners followed headlamps and course markers through the night.

Events like Never Summer demonstrate a side of amateur radio that many people never see. This isn't operating from a comfortable shack at home. It's portable communications in remote locations, working with a team, solving problems, supporting communities, and helping ensure complex events run smoothly.

For many operators, the most rewarding part wasn't the equipment or even the spectacular views.

It was the opportunity to work alongside friends, mentor newer volunteers, learn from experienced operators, and be part of a team supporting something much larger than themselves.

Communications support was provided by Mark NØMTN, Angie NØANG, Paul KFØODD, Jonathan KFØTBK, Noah KFØUBN, Duncan KFØKZT, Jim KFØYNL, Renee KFØYNK, Mike NØTQ, Bill KØUT, Melinda KDØPA, Jeff KØJEF, Ron KØAZA, Paige KEØYAY, Pete WØRCR, Logan WØNCO, Alex, Suzanne, Clayton KC3HDO, Nathan KC3HCJ, and others whose time and effort helped make the event a success.

Thank you to the entire communications team and race staff for another successful Never Summer weekend.

Photos contributed by volunteer radio op*erators and race communications team of 2026*

Interested in Volunteering?

Public service events are one of the best ways to put an amateur radio license to work.

Learn more about upcoming opportunities at https://ncarc.co. No matter your experience level, there's a place for you on a communications team.

Whether it's Never Summer, Blue Sky Marathon, Fall Equinox, Courage Classic, Red Feather Trail Jamboree, or another community event, there are opportunities throughout the year to gain experience, make friends, and discover what amateur radio can do beyond everyday contacts.

Sometimes the best operating position isn't at home. Sometimes it's deep in the Colorado mountains, helping keep a major event connected.



Radio operators remained on station until the course was clear, supporting runners and volunteers long after sunset.

Hamfest 2027 Vendor Table Sales are Open!

Vendor tables are on sale now. Click here to choose and pay for your table through Ticket Tailor. We encourage you to purchase early for the best chance of obtaining your preferred table(s).

Each purchase of a vendor table includes one general admission ticket. If you need additional admission tickets, you can purchase them through Ticket Tailor.

After registering, you'll receive a confirmation letter with your table number and event QR code.

All table purchases include one (1) general admission ticket. Table purchases are as follows:

- $20 for a basic table
- $23 for a power table
- $25 for an outside access (e.g. for antennas) power table
- Admission for each extra person is $7

Hamfest 2027 Sponsorship

Interested in being a Sponsor of Hamfest and NCARC? Click here for information on Sponsorship.

Volunteer at the Hamfest

Hamfest is the club's biggest fundraiser, and it runs on volunteers. Morning shifts leave plenty of time to shop and attend the speaker sessions. Roles include admission doors, the club table (door prizes, memberships and renewals), raffle ticket sales, vendor check-in and session moderators.

Questions? Email hamfest@ncarc.co.

To sign up to be a volunteer, click here: Hamfest Volunteer

Did You Know?

A regular contribution from Bob Schmid, WA9FBO

A Simple Look at Heat Sinking

Keeping your cool

Let's look at the basics of heat sinking—and why it matters. As temperature rises, the life of electronic components falls. The good news is that we don't have to guess whether something will run hot. By treating the thermal path like a simple circuit, we can estimate temperature and see what's really going on.

One important point: heat is generated at the junction inside the device. That means the junction is always hotter than the case—and often by more than you might expect. Even if the outside feels only warm, the inside can be much hotter.

Thermal resistance

We need a way to describe how easily heat moves from one place to another, and that's where thermal resistance comes in. Just as electrical resistance limits the flow of current, thermal resistance limits the flow of heat. When heat flows through a material, a temperature difference develops across it—the greater the resistance, the larger the temperature rise for a given amount of heat.

In a real device, heat doesn't travel through just one layer. It moves from the junction, through the case, into the heat sink, and finally into the surrounding air. Each step has its own thermal resistance, and each one adds a bit more temperature rise along the way.

Thermal resistances are written using the Greek letter theta (θ), followed by two letters that describe the path the heat takes. For example, θ_{JC} means junction-to-case—the first step in the thermal path. Next is θ_{CS}, case-to-heat sink, followed by θ_{SA}, heat sink-to-ambient air. Following this convention, θ_{JA} refers to the entire path—from the junction all the way out to the surrounding air—and is simply the sum of the individual steps: $\theta_{JA} = \theta_{JC} + \theta_{CS} + \theta_{SA}$. The units are degrees Celsius per watt (°C/W).

(Thermal grease, pads, or tape is used to fill gaps in the heat sink surface and improves heat transfer. These materials don't eliminate the resistance, but they reduce it and are included in the case-to-heat sink term, θ_{CS}.)

We find the temperature rise (°C) by multiplying the thermal resistance (°C/W) by the power (W). For example, if a device dissipates 5 W and heat sink A is rated at 10 °C/W, the temperature rise will be 50 °C. If heat sink B is rated at 2 °C/W, the rise is only 10 °C. Heat sink B is better—its lower °C/W rating means less temperature rise.

A familiar way to think about heat

Let's compare a thermal path to something we already know (Fig. 1). On the left is a simple series circuit with a voltage source pushing current through a few resistors. On the right is the same idea, but applied to a thermal path.

In the electrical picture, we often imagine voltage "dropping" as we move from the supply down to ground. But that's just a matter of viewpoint. We can just as easily start at ground and work upward, adding the voltage rise across each resistor until we reach the supply.

A Simple Look at Heat Sinking (continued)

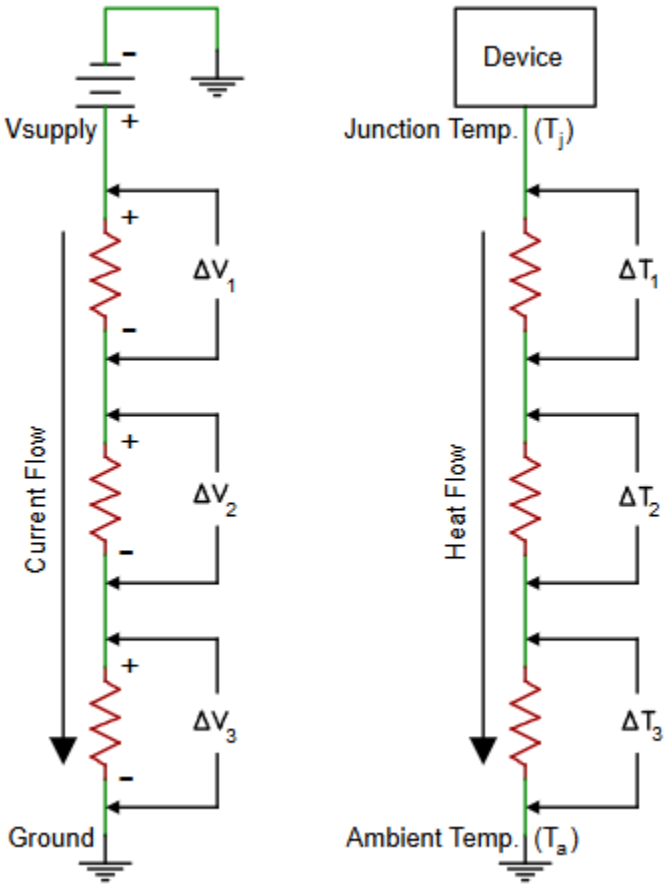


Figure 1- The thermal path can be viewed like an electrical circuit: heat flow corresponds to current, temperature rise to voltage, and thermal resistance to electrical resistance.

The thermal picture works the same way. Heat flows from the hot junction down to ambient, but if we start at ambient and work upward, each thermal resistance, from the heat sink, to the case, and finally to the junction adds a temperature rise. By the time we reach the junction, all of those rises add up to the highest temperature in the system.

(One difference from an electrical circuit is that there's no thermal "return path." Heat doesn't flow in a loop—it simply moves from a hotter point to a cooler one, eventually reaching the surrounding air. In this analogy, ambient temperature acts like a reference point, similar to ground in a circuit.)

Estimating the junction temperature

Earlier we found the temperature rise by multiplying the total thermal resistance, θ_{JA}, by the power dissipation (P). If we add the ambient temperature (T_a), we get the junction temperature: $T_j = T_a + P \bullet \theta_{JA}$. Keep in mind that junction temperature limits matter. Some devices are rated for 150 °C, but many are limited to 125 °C—or even 100 °C. A result that looks acceptable at first glance can still push the device past its safe limit.

Choosing a heat sink

Assume we need a heat sink for a voltage regulator that has a maximum junction temperature of 125°C. The ambient temperature is 25°C (room temperature) and the power being dissipated is 5 watts. We can work backwards to find the total allowable thermal resistance: $\theta_{JA} = (T_j – T_a) / P$. The maximum allowable temperature rise is 125°C – 25°C = 100°C. Dividing by the power: 100°C / 5 W = 20°C/W. So the total thermal resistance—from junction to air—must be 20°C/W or less.

Now look at what's already fixed. The regulator's datasheet specifies the junction-to-case thermal resistance, θ_{JC}, as 3°C/W. The thermal grease (or pad) adds another 2°C/W for θ_{CS}. That leaves: 20 – 3 – 2 = 15°C/W. So the heat sink needs to be rated 15°C/W or lower.

What the heat sink is really doing

It's easy to think of a heat sink as something that "absorbs heat", but what it really does is lower the thermal resistance between the device and the air (θ_{SA}). A bigger heat sink has a lower θ_{SA}. Better airflow lowers θ_{SA} too, and so does adding a fan. We don't store heat; we give it an easier path out.

Free Amateur Radio License Testing Available

The Northern Colorado Amateur Radio Club is committed to helping new and existing amateur radio operators earn or upgrade their licenses. That's why we offer free amateur radio testing sessions by appointment.

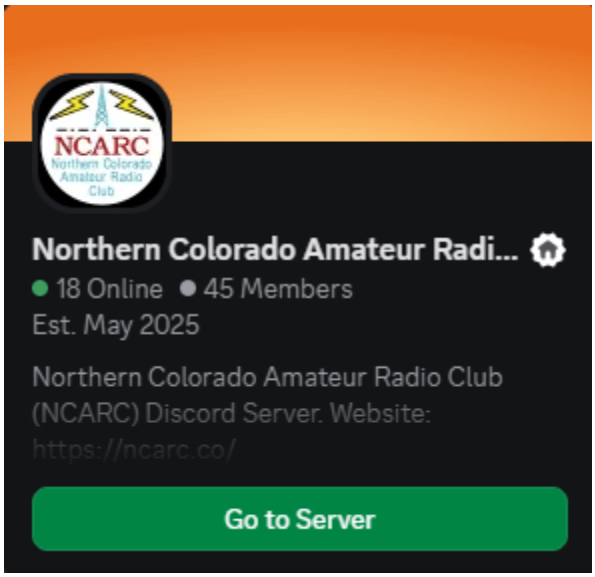
If you are ready to take your Technician, General or Amateur Extra exam, our Volunteer Examiners can often arrange a testing session at a time and location that works for you. We can meet at a local coffee shop, restaurant, community location, or other suitable venue. In some cases, we may even be able to come directly to your home.

We do ask for a few days' notice to coordinate our exam team, but in most cases, we can accommodate testing requests at almost any time.

Whether you're getting your first license or upgrading to the next level, we're here to help make the process as convenient as possible.

For more information or to schedule a test session, please get in touch with the club president Joe Hawley, KDØTYU, at president@ncar.co or 970-689-0828.

Join our NCARC Discord Server!



Upcoming Ham Radio Events

NanoVNA Training Class: Dec 5, 2026, Fort Collins, CO. To sign up click here.
NCARC Holiday Party: Dec 17, 2026, Loveland, CO. RSVP to Joe Hawley
NCARC Hamfest!: Jan 16, 2027, The Ranch, Loveland, CO. More info here.

Weekly On Air Events

Fort Collins LDS Emergency Communication Net: Sundays, 5:00 pm, 447.700
NCARC Tech Net, Mondays, 6:00 pm MT, 447.275 (100 Hz tone)
NCARC Club Net, Wednesdays, 6:30 pm MT, 447.275 (100 Hz tone)

Biweekly Get Together

Martinez-Clarke Luncheon: every other Wednesday, 11:30 am,
(next one Nov 25, 2026) Perkins Restaurant, 2222 W Eisenhower Blvd, Loveland, CO

From the Editor
Ann Donoghue KØARD

Hamfest is just around the corner. It's shaping up nicely and we already have some great speakers lined up. Maybe you'd like to volunteer? It's a great way to meet people and get a feel for Hamfest.