

TCARES - Tuolumne County Amateur Radio & Electronics Society Amateur Radio Club Fall 2025 Newsletter

September 22, 2025



TCARES Breakfast Meeting, June 21, 2025

Greetings - Summer is Over and Fall is Upon Us!

Hello TCARES members and Happy Autumnal Equinox! As always, this quarter's newsletter articles are meant to *teach*, *inform*, and *inspire*! The TCARES club newsletter helps to keep us abreast of the news of interest, along with promoting connection with one another in different ways. Our article authors have put effort into their pieces and we hope you enjoy their contributions, keeping you aware and actively engaged.

We continue to have breakfast meetings at [My Garden Cafe](#), in east Sonora - come join us and connect with other hams! We hope to see you all at the next **TCARES Club Breakfast** meeting on **October 18th**. Many other events are listed on the TCARES club [Calendar](#) (events listed on the right side of the webpage). So, please, come join in on the fun and get connected with other hams!

Coming Up:

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Dates to Remember:

September 27	TCARES Board Meeting
September 27	VE Session
September 27	Intro to Radio Training Class
October 4	Emergency Radio Training Class
October 4-5	California QSO Party
October 10-12	Pacificon
October 16	The Great Shakeout
November	ARRL Contest Calendar
November 15	TCARES Breakfast Mtng
November 22	TCARES Board Mtng
December	ARRL Contest Calendar
December 6	TCARES Christmas Party



BEGINNER
RADIO
CLASS


SEPTEMBER
27 **8:30**

THIS IS A FREE CLASS. Limited to the first 25 people.
 Learn basic radio communications skills with a focus on the General Mobile Radio Service, Family Radio Service and Ham Radio (GMRS/FRS/HAM). Hands on skills training will get you up and transmitting right away, with instructions on emergency communication when **cellphones are down and power outages.**

RADIO CLASS AGENDA

- Types of Radio Services
- Pro and Cons of FRS/GMRS/HAM
- Radio Etiquette
- What is a Repeater?
- How to join a Network
- Common Radio Features
- Use Radio as a Scanner

SCAN

SIGN UP HERE

Mill Villa Club House
18717 Mill Villa Rd
Jamestown CA

<https://tcares.net/event/beginner-radio-class>

Editor's Note

By [Jeff Tolhurst](#)
N6JWT/WRDP326



Fall has Arrived - Happy Autumnal Equinox!

TCARES has had an active summer quarter, with: 1) ARRL Field Day; 2) monthly breakfast meetings; 3) 3 club breakfast presentations (on: a) the Groveland Grind (a LOT happened!); b) the Comm Trailer Show-n-Tell; and c) the VBand CW web app demonstration (Ginger, KM6RFT, rocked on CW!)); 4) a Board Meeting; 5) a VE session; and 6) the Tri-County Ham Picnic in Angels Camp. We continue to be an active club, with lots going on each quarter. Thanks to all, who have joined in on the fun!

We have two training classes coming up (Sept.27th and Oct. 4th), along with the Great Shakeout emergency training activity with our county's Office of Emergency Services (OES), on October 16th. We've gotten excellent feedback from Dore Bietz, OES Assistant Director, on our participation for that event, so let's keep up the good work by TCARES volunteers!

With the weather starting to change, we're enjoying shorter, cooler days, and yet fire season is still upon us. The Camp Fire in Paradise, CA, started on November 8, 2018, and burned for 2+ weeks, so we can't let our radio guard down - keep those batteries charged, with radios, and Go Bags ready! We have upcoming training sessions for beginners, as well as anyone wanting to know how to use a handheld radio during an emergency. See our calendar of events at www.tcares.net for more information.

While staying prepared for emergencies, there are also some wonderful opportunities for radio contesting. The California QSO Party is coming up next month and Mike, W6MVM, would love to have visitors at the Ranch come and operate! More information can be found on www.tcares.net and on the ARRL's Contest Calendar page: ARRL Contest Calendar (<https://www.arrl.org/contest-calendar/>).

Additionally, club elections are coming up this quarter and will be held in November. You will be sent a Nomination Form via email. Either bring it to the next breakfast meeting, in October, or mail it in (address will be on the form). Voting will be in November and newly elected officers will be announced at the Christmas Party in December.

So get ready for more events coming up this next quarter that you can participate in, including: 1) the California QSO Party; 2) Pacificon; 3) The Great Shakeout; 4) TCARES Breakfast meetings; 5) Weekly Nets; 6) VE Sessions; 7) ARRL Contests; 8) Education & Training classes; 9) club elections; and 10) the club's Christmas Party. Enjoy the change of the season and we hope to see you at some of our other events soon! See www.tcares.net for details.

73, jeff

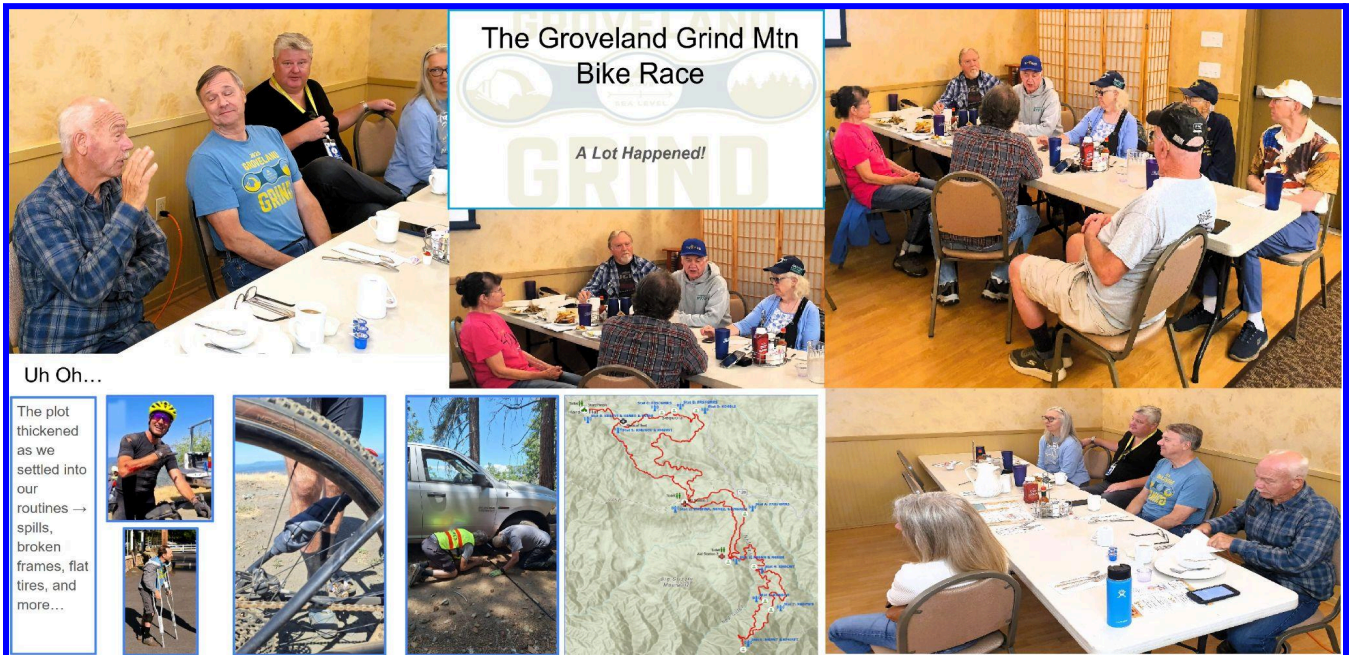
President's Message

by [Mike McGinty](#)
W6MVM



President's Message

[Editor's Note: Mike is out of town and busy with family obligations. The club is running well, however! We'll hear from him in the next newsletter. Safe travels Mike and Maria Ann!]



TCARES Breakfast Meeting June 21, 2025

Antenna of the Month

By Gary W. Johnson
NA6O



Off-Center Fed Dipole (ODF)

Your Mileage May Vary, they say, and that certainly applies to this type of antenna. One way to access many HF bands on a single wire antenna is to feed a dipole off-center. Depending upon how much space you have, it may be designed to cover most of the bands 80 through 10 or 40 through 10 m with a usable match. You might also get it to work on 6 m. An antenna tuner is almost always a requirement since it will only rarely exhibit a low SWR.

Like any horizontally polarized antenna, it helps to mount it as high as possible and height will also change the impedance, sometimes drastically. There are countless designs on the web as well as commercial ones. In this article, we'll look at a typical design (Figure 1) and consider some of the challenges associated with this popular antenna.

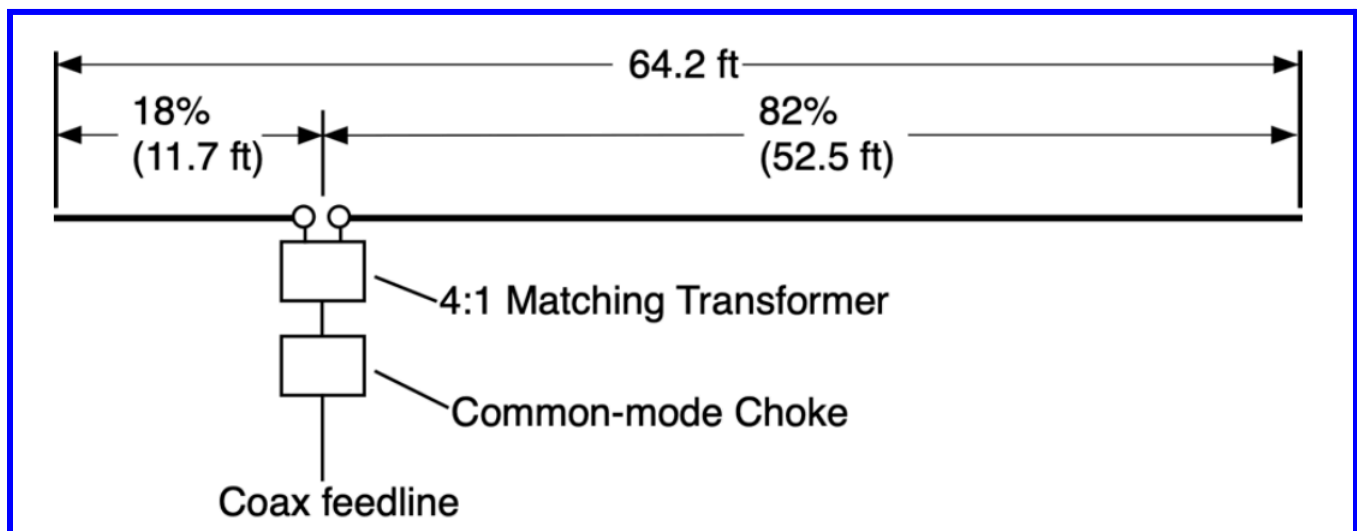


Figure 1: Components of a typical 40 through 10 m OCF dipole.

Recall that any conductor will radiate as long as you can get RF current to flow in it, and where you connect the feedline along a dipole doesn't change the radiation pattern or the gain; it only changes the feedpoint impedance. The only other requirement is that you achieve a decent impedance match at your transmitter in order to transfer maximum power. With the OCF, we adjust both the length and the feed point location until the feed point impedance is roughly the same on most of the bands, starting with the one where the antenna is 1/2 wavelength long.

By "roughly the same," I don't mean 50 ohms, and in fact it's generally around 200 ohms, or perhaps higher, and it's not just a pure resistance. So the first thing we need is a wideband matching device at the feedpoint. A 4:1 impedance transformer is the standard choice.

The second thing we need is a robust common-mode choke on the coax. Because the antenna is highly asymmetrical, substantial common-mode current is guaranteed to flow on the outside of the coax. In other words, the coax becomes an additional element of the antenna. This will cause several problems: Antenna tuning becomes less predictable. High RF voltage may appear in your shack, raising all kinds of havoc. And local noise (RFI) riding on the outside of the coax

will be conducted to the antenna, increasing your noise floor. All of these problems are mitigated by a common-mode choke (which should be a component of nearly every antenna installation).

What kind of SWR might you see? Figure 2 shows data provided by Palomar Engineers for a 40-10 m OCF installed at 30 feet. Assuming you actually get this result, any transceiver with a built-in antenna tuner is likely to match this on all the specified bands. If you're really lucky, it might also match on 80 m, though you may damage the balun/choke if you try to run very high power there. The longer 80 m designs may sacrifice the match on one or more higher bands in exchange for better results on 80. Please note that installation details can affect SWR, sometimes drastically, especially if the wire is close to other objects, near the ground, or bent into arbitrary paths. Adjusting the lengths may improve results. Plan on spending a lot of time with your antenna analyzer.

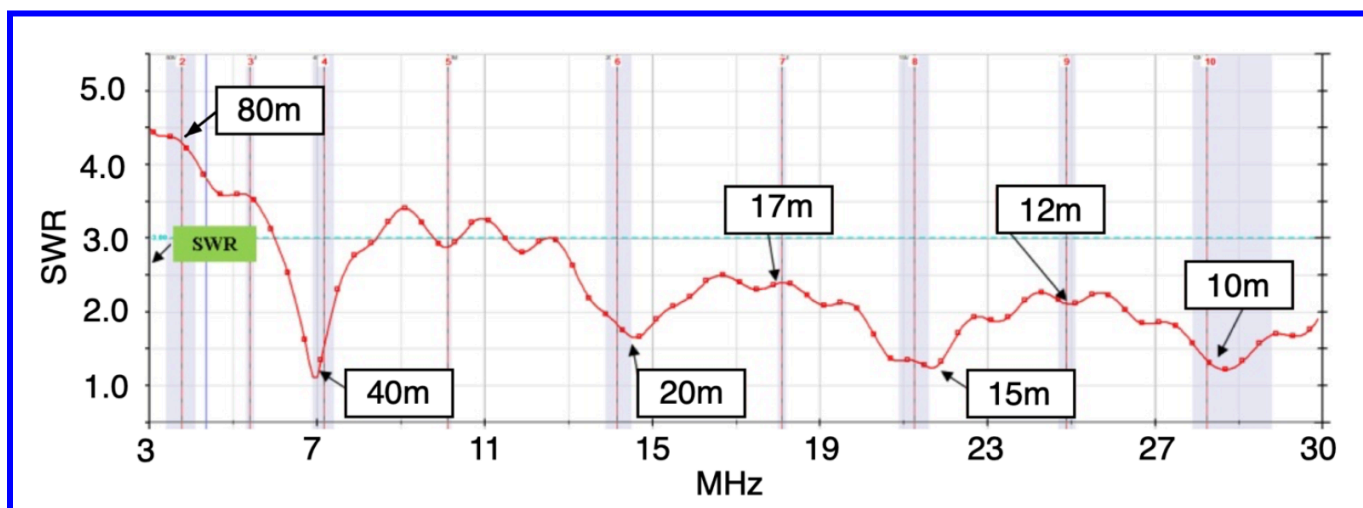


Figure 2: SWR for a 40-10m OCF. Copied from the Palomar Engineers website and edited for readability. It should also work on 6 m. If you're really lucky, you might be able to use this on 80...

Radiation patterns from these all-band antennas can only be described as chaotic. Every band will have a different pattern with higher frequencies consisting of a great many lobes in various directions. Height will of course change everything and as always, higher is generally better. It's fairly pointless to do a lot of simulations, since the results are so dependent upon installation details. This is, after all, a compromise antenna, not a high-gain death-ray.

Finally, there is the choke/balun, a very important component. It needs a 4:1 impedance ratio, which implies a 2:1 turns ratio. It also requires a very high common-mode impedance. This can be achieved with two components, a transformer, plus a choke, or with a single component commonly known as a Guanella current balun. When properly designed, it can handle high power and meets all requirements. Figure 3 shows the schematic for this device. It consists of two common-mode chokes that are driven in parallel and then connected in series at the output.

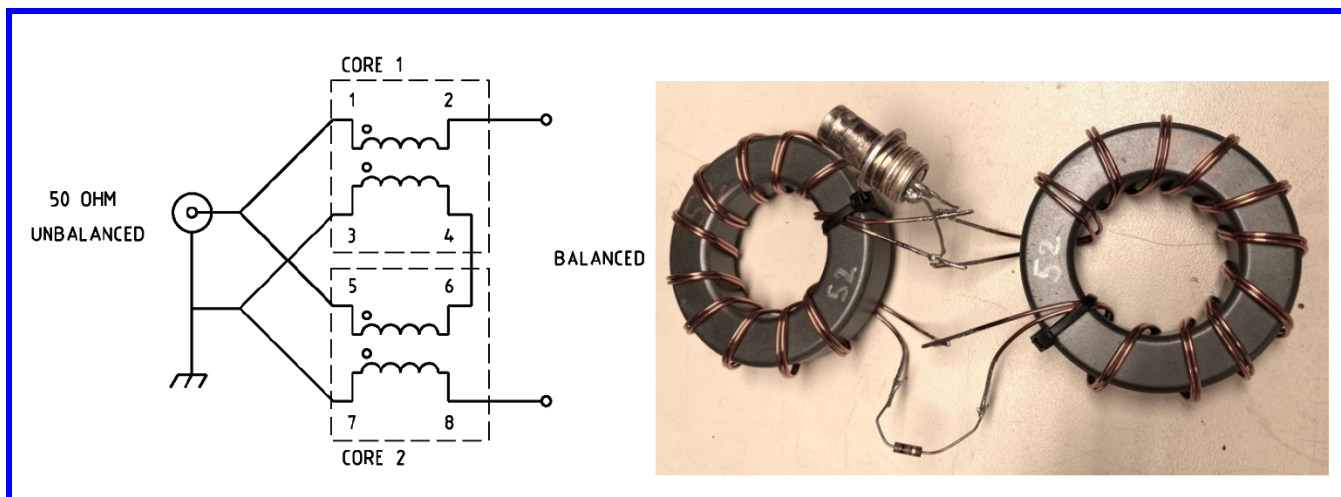


Figure 3: (Left) Schematic of a 4:1 impedance Guanella current balun using two ferrite cores. Copied from the [VK6YSF website](http://VK6YSF.com). (Right) one of my test baluns.

Ferrite core material choice is important. I tested three types (Fair-Rite mixes 52, 43, and 31) and found that the lowest loss (0.20 dB at 30 MHz) was achieved with mix 52. Mix 43 was almost as good and may also be used. All cores are 2.4 inch OD. They may be wound with bifilar magnet wire or PTFE insulated wire, preferably 14 AWG. About 9-11 turns is optimal. The VK6YSF website has some clear fabrication instructions: ([Guanella Current Balun link](http://VK6YSF.com/Guanella%20Current%20Balun)). It should be housed in a weatherproof nonmetallic enclosure, such as a [4x4x4 PVC Cantex box](http://www.homedepot.com/p/4x4x4-PVC-Cantex-Box/202000000), available at Home Depot.

Some OCF users report problems with RF in the shack on certain bands. This is often because of insufficient choking impedance in the balun. An additional common-mode choke can be added, preferably at the antenna feedpoint but further along the feedline may also be helpful. That may also help avoid the flaming balun problem if you attempt to run high power.

To **summarize**, the OCF is likely to give you access to most of the HF bands with just a single wire. The radiation pattern will be random but certainly adequate for ordinary hamming. SWR may or may not be optimal on all desired bands in your particular installation, but with some trimming, it may be satisfactory and compatible with your antenna tuner. Hang it as high as you can and don't be afraid to bend it here and there to fit your yard. And always be sure to use a well designed balun/choke.

Reference: <https://palomar-engineers.com/tech-support/tech-topics/antenna-notes/off-center-fed-dipole-notes>

73, Gary

Formerly WB9JPS, I have been licensed since 1972, and am originally from Illinois. I no longer have a home station due to RFI and other issues. But thank heavens I now have a fabulous remote station, W6SRR, which I share with Ian, W6TCP. I enjoy operating CW especially and have achieved 9BDXCC (total 318, working on 6m) and 10BWAS. I'm a fairly competent contester, member of NCCC, and station engineer at N6RO. Chasing SOTA activations is also in my fun category--I'm a certified Shack Sloth. My website is: <https://na6o.com/>.

Meet Our Members

By [Ginger Rohlen](#)
KM6RFT/WSAP468



Marc Colton, N6NEZ/WRME405, was born and raised in Modesto, California. He had his first introduction to radio in college, when he was doing his student teaching at a high school in Modesto. The Electronics instructor decided to have a Ham Radio class for the students before school. The instructor was using the first Yaesu FT101E. For Marc, "That's where my interest started. I took the class with the students, and I just fell in love with radio. I thought it was the coolest thing. We were making contacts all over the world and I thought it would be a cool hobby to get into." Soon after, Marc became licensed as a General class Ham Radio operator and later obtained a Commercial class license for the 2-way radio. At first, Marc was

thinking radio would be fun to do as a hobby. And yet, "as soon as I started taking that class my mind started working on, how could I do this for a living?" Eventually, in 1976, Marc opened up a little shop in Modesto for CB and 2-way radio. "Those were the days of CB radio, where everyone had CB radio." In the beginning it was a retail store, and customers could come in and pick out CB radios, antennas, or whatever they needed. It developed fairly quickly into a 2-Way radio shop and Marc had sales reps who would go out to the customer's locations including trucking companies, taxi companies, and public safety organizations and he would set up complete systems.

Marc's interest in radio evolved over those years. According to Marc, "What we said in our trade was to expect that every 10 years we were going to go through some kind of a major transformation. Currently it's every five years or less that big changes come along. Technology is moving so fast." Over time, in light of these changes in technology, Marc's company moved from setting up single repeater systems for customers to analog trunking with multiple repeaters tied together. Trunking meant that if one channel was busy, the customer would automatically be pushed to another available channel. "This new technology called trunking was a big evolution in our industry. Eventually analog trunking evolved to digital trunking, and then we began tying sites together digitally. Our main repeater site was on Mt. Oso, and another system on Mt. Bullion, and then on Upper Bear Mtn. and all the sites were tied together through the internet."

Keeping with the times, Marc's company moved from installing regular repeaters to analog trunking, and then 10 years after that, to digital trunking repeaters, and to retail sales of other accessories that came along to enhance the system.

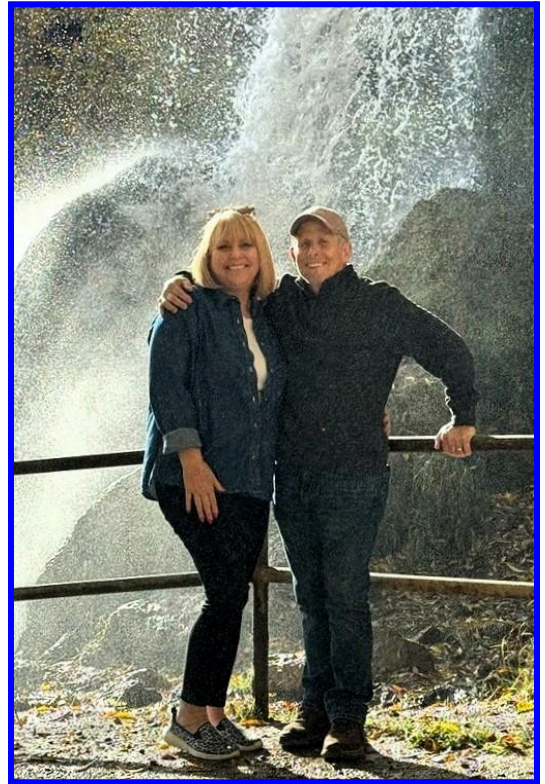
Until Marc sold the company, he always maintained a retail store and a service department with 2-3 technicians employed who did radio repair. This was different from most 2-Way shops, like Columbia Communications for example. One of Marc's biggest projects was building a system up and down California and all the way out to Quartzite, Arizona, for a trucking company. This meant that from Redding, CA, to Quartzite, AZ, operators were able to talk back to their dispatch. Marc says that the industry really changed a lot when cellular phones came out and he calls it "a major shakeup within the industry as far as who was going to use radio and who wasn't." He sees one of the big differences between cellular systems and repeater systems is "the fact that the cellular system is built low level and ground based, close to where the users are that use that system. When fire sweeps through a community, these systems tend to burn up quickly. Our repeaters are on mountaintops and hopefully those mountaintops are kept clear and

fire safe around the transmitters.”

When Marc and his wife, Lori, sold the business and retired, they moved to Arizona and built a home, expecting to live out the rest of their days there. Marc became really involved in his landscape photography, taking in all the beauty of Arizona. They lived there for three years and then decided to move back to California. “We have a daughter, son in law, and three grandsons, in Modesto. We just couldn’t stand being away from them, so we moved to Pine Mountain Lake to be close to them.” Truly, it wasn’t until Marc moved to Pine Mountain Lake that his Ham radio days really began to take off. “Surrounded by all the tall trees, it made perfect sense to get back into it.”

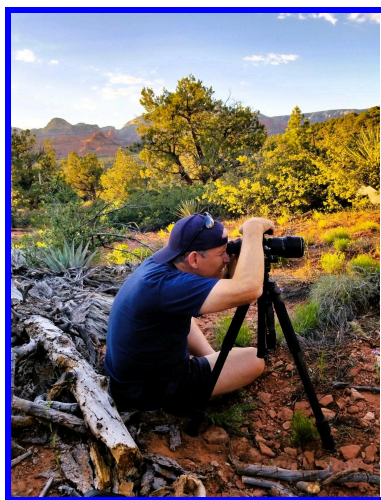
Marc has achieved several awards including the WAS (Worked All States) Award, by having a contact in all 50 states, and receiving documentation in the form of a QSO card, or an electronic confirmation. Marc has an electronic log which has kept track of all the countries he has worked. Currently he has as his main HF base station radio, an ICOM IC-7300. For UHF and VHF he’s got a Yaesu FTM400 DR as his 2 meter, and 440, radio.

Marc uses an Ameritron 1 Kw amplifier and has a VHF/UHF combo antenna on his roof. For HF, Marc has an End Fed Half Wave antenna between the trees. Marc laughs, “If I’d only known what I’d be getting back into when I moved to Pine Mountain Lake, I would have kept so much more of my personal radio gear.” Soon after he moved into Pine Mountain Lake, Marc installed a GMRS repeater nearby, for him and his wife Lori to use for themselves. “We were kayaking and doing different things where we were far apart, and I thought it would be a good idea to have a way to contact each other and keep in touch.” Marc had that up and running for three or four years before the “Tuolumne County GMRS thing got born.”



In 2019, after the Paradise Fire, Alan Thompson, a member of the El Dorado County Amateur Radio club, helped set up the first Neighborhood Radio Watch program in his community. He came and spoke in Groveland. After his talk, there were several people in Pine Mountain Lake who became interested in setting up a Neighborhood Radio Watch program in their area. Marc, as well as two of our TCARES club members, Greg (WA6HNA), and Chris (K6CDP), were part of that group. Along with other interested community members, they met in the park together several times and Marc volunteered to let them use his repeater for the Groveland area. Subsequently, Marc and Chris formed a partnership because they were interested in expanding the project further. “Chris and I formed an association and that’s been great. We’ve been terrific partners on it, and we see eye to eye on everything. We looked at it as

our contribution to Tuolumne County. We asked ourselves, what can we do with radio to help out our county? This was an absolute match for us because I had the technical background and knew how to build repeaters and Chris had the interest. He's been in law enforcement for years and immersed in radio for years as well." When Chris asked Marc if there was any chance they could get a GMRS Repeater up on Duckwall, like TCARES had, Marc said he'd look into it. "Hetch Hetchy donated to us a site on Duckwall Mountain and Moccasin Peak. They definitely wanted to support the Tuolumne County GMRS program! All of our sites are donated space, because these organizations see the value in having this GMRS system that can help the county in the event of an emergency. One step at a time, Marc and Chris have been accessing these repeater sites, and forming agreements with Hetch Hetchy and the different organizations where repeaters are. "Hetch Hetchy gave us a site, Moccasin gave us one. All of our sites are donated space because these organizations see the value in having this GMRS system that can help the county in the event of an emergency." Working together, and with their own money invested, Marc and Chris have put together a robust GMRS radio system to help our county be better prepared to help each other in the event of a Natural Disaster, loss of power or loss of cellphone Service. This includes our very own Hobby Hill GMRS Repeater at Columbia College, which Jeff, N6JWT, was also instrumental in bringing about. In addition, Marc has been helping Greg, WA6HNA, to renovate and maintain the TCARES Repeater System.



"The main reason we put them up was for Neighborhood Radio Watch for fire safety and as emergency backup to the communications system that Tuolumne County might not have in the event of a fire. We always say at the beginning of the nets, "If the cell phones go down, or the power goes out, this gives us all a backup system." If a fire hits, what do we do to be prepared? We're still learning! We're just at the infancy stage! Combine that with the TCARES Educational Committee, that Jeff, N6JWT, heads up, it's a building process. Getting people in the community involved and teaching them about radio, running nets, participating in the nets are all very important to this process." Marc and his wife Lori have substituted as net controls for the Groveland GMRS Net. "With GMRS, we have to do the nets. It's one of the only ways people are going to practice and learn how to use radios."

"Most of the people on GMRS are all using hand-held radios like walkie talkies. Very few people put up base stations. And the difference between a base station and a walkie talkie is pretty significant as far as getting into the repeater and not having the scratchy signal. It's the difference between a 5 watt radio on a little rubber antenna vs. a radio 25, or 50, watts hooked to an outside antenna, there's no comparison. But then on the same token, for GMRS and the emergency aspect of it, it's pretty much on a hand-held. Jeff, N6JWT, would like me to help teach part of the Intermediate Radio class, which is about using hand held radios in an emergency situation. The thing I will be talking about is, "What can you do to enhance the performance of your radio and how to properly use your handheld to make it work better in the event of an emergency?"



Other questions Marc asks himself are, "How can we get more people interested in radio?"

"I'm more active on the Ham radio side of things, but in terms of community donation or helping our community, or making our community safer, I love the GMRS side of things. I see it as more active, or productive, in an emergency. Our whole goal is to get as many people licensed for GMRS, because the more people in the county that we can get involved, the better our system is gonna be." Marc would also love to see more people use the GMRS repeater system more often.

Not only will this help more people to get used to using a radio and become more comfortable with radio but in addition, he sees it as a great resource. It doesn't have to be just for emergencies. "We encourage people, you've got the license, you've got the equipment, use the radio! Taking a hike, going down to the lake, take your radio and keep us posted on what you're doing."

Marc enjoys spending time with his lovely wife Lori and their daughter and grandsons. He also loves to go out and do his landscape photography in the forest and other beautiful places.

In addition, Marc is a member of a band! Marc plays the drums with his high school buddies who have played together for the better part of 25 years. We are so fortunate to have a person as professional, knowledgeable, and generous with his skills and his time, as a member of our club.

Marc has generously devoted so much of his effort, time, and resources to helping to make our community a safer place and in addition, he continues to support and help others to become empowered and to learn more about radio. His enthusiasm and willingness to work so closely with our Repeater Coordinator and our Education Committee and to work so selflessly to create a robust GMRS repeater system in our county for all of us to use is a true testament to his character. Thank you Marc, for being a highly valued member of TCARES and our county.

73, Ginger

Ginger is a mom, a teacher, a student, a devoted partner, and a life-long learner. Her interests are many and center around service, communication, leadership, and integrity. She recently completed a Masters of Science in Counseling. She is open to challenging herself to learn and grow and in facilitating that in others. Ginger shares a love of Geology and the natural world around her with her partner, Jeff, N6JWT, and enjoys hiking and exploring the outdoors. Her interest in Ham radio stems from a desire to join others in learning, to be of service, and to continue to improve her communication skills on the air.



Community Corner

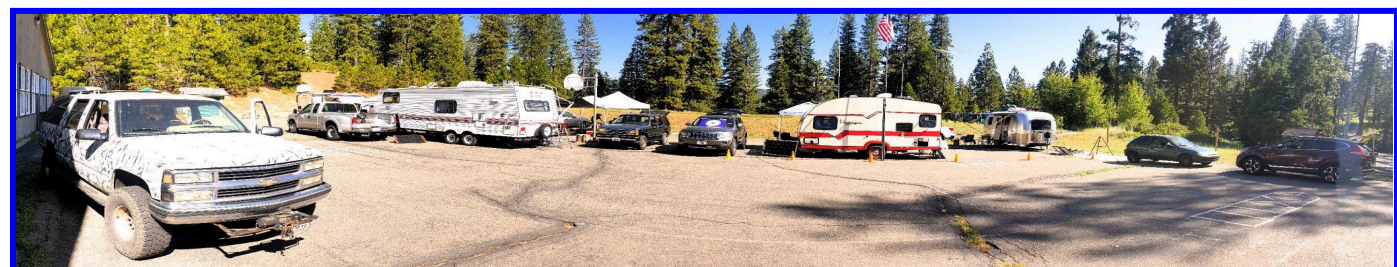
By [Paul Bailey](#)
KN6CWT/WRWS835



[Editor's Note: Paul injured his arm and wasn't able to submit an article for this issue. If you hear him on the air, wish him a speedy recovery!]

73, Paul

Hello, my name is Paul Bailey and I have been in love with radios for as long as I can remember. I have been a Ham since 2019. My callsign is KN6CWT. During that time I have gotten involved with TCARES quite a bit. I have been lucky to have been elected to the board of the club as a director and now the Treasurer. I have helped with programing and operating radios for both fun and in emergencies, I've also been fortunate enough to help put in a new repeater. I have also learned so much from APRS to WIN System. I have had the opportunity to participate in club events like field day, races, National Night Out and Fly-in's.





TCARES ARRL Summer Field Day, June 28-29, 2025

Mike's CW Column

By [Michael McGinty](#)
W6MVM



CW News

Hi all. I did not get the logging column ready for this article. Just too much going on with my cabin at Pinecrest and other family obligations.

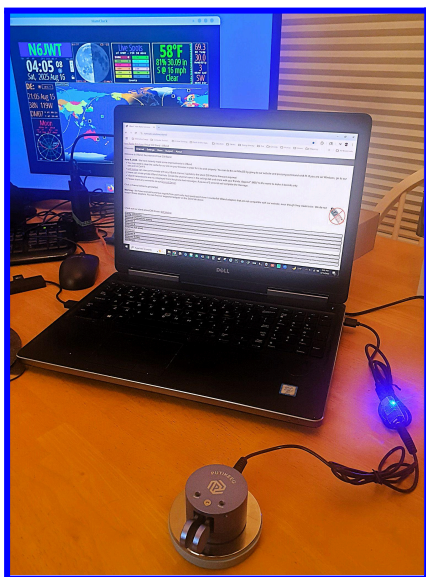
Our CW net has had some interesting check-ins: David, W6PHO, in San Francisco, Connie, W6EFI, in Palo Alto, and our regulars Mike, KI6WJT, and Paul, KN6CWT. And there have been some others from around the western states. This net is getting more popular.

Not much more. Please join us on 7.053 MHz, at 8:30 pm Thursdays, after Grayson's simplex net.

Just send your call sign, and 73, for an in-and-out.

73, Mike

I started in Ham Radio in 1957 as KN5UHU and K5UHU in Kingsville, TX. I was very active in the early 60's as KH6DOX in Honolulu. Then I received my EE degree from San Jose State in 1969 and focused on working as a consulting engineer. Ham radio took a back seat to what were very exciting times in electronics and software. After retirement in about 2010, I went back to enjoying ham radio and have been active with TCARES in Sonora. I've collected a lot (too much) of Collins equipment and used them on the air exclusively until recently. I purchased several modern rigs including my favorite Flex 6300. I use the Flex in two locations, at home in Soulsbyville, and on my sailing yacht, Integrity. My main station is in Soulsbyville, CA.



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Thank You!

Activate Windows
Go to Settings to activate Windows.

Repeater Coordinator Notebook

By [Greg Triplett](#)
WA6HNA/WRZS966



TCARES Repeater System Status Q3 2025

[Editor's Note: Greg is on vacation and the TCARES VHF 2 meter repeater system is currently functioning well! Both he and Marc are continuing to work on the "succession plan" mentioned in the last newsletter (June 2025), formalizing TCARES' relationships with owners on the Moccasin Peak and Duckwall Mountain repeater sites.]

Greg is the TCARES Repeater Coordinator & K6TUO FCC Trustee. He was a senior hardware engineer at Google (now retired), who specialized in FPGA (Field Programmable Gate Array) design for high-speed digital circuits and systems in the networking, data communications, storage area networking, wireless, and RF industries. Additional industry experience was in test & measurement, telecommunications, satellite TV, security, military, and aviation.



TCARES Breakfast Meeting July 19, 2025

ARES/RACES Emergency Communications Report

By [Ned Sudduth](#)

K6NED/WRPM781



Changes at the OES EOC & the New Comms Trailer

Mike, W6MVM, Dave, K6DCL, Ginger, KM6RFT, Craig, KN6DCU, Grayson, KE6KYI, Paul, KN6CWT, Jeff, N6JWT, and I, K6NED, all met for a TCARES Board meeting to discuss the Communications (Comms) Trailer project. I asked for some direction from the board on how to proceed.

After discussion, we decided I would work on the interior and roof (insulation, etc.), and also on a design for the graphics on the exterior - the driver side + the passenger side, with a budget of ~\$500-600. I have emailed the Board of my progress, so far, and the Board will help with further guidance and decision-making.

The board also directed me to install two HF radios - a Yaesu FT-857D, and a Yaesu FTDX-1200. The board also approved two antenna kits for the HF radios that Mike and George, N6GEO, will help research, then work with me on. I would like to have our Comms Trailer project presentable at the Pacificon conference in October, in Pleasanton - that would be a worthy goal, imho.

Additionally, the TCU September Lightning Complex Fire that started on September 2nd, at multiple locations across Calaveras, Tuolumne, San Joaquin, and Stanislaus Counties is now 100% Contained. The complex burned ~13,869 acres, according to the CalFIRE incident report. TCARES did not get called out for the incident, but our 2 meter VHF repeater system was fully functioning during the incident, and it was used to keep club members, their families, and community members informed with the latest information. Tuolumne County GMRS UHF repeaters were also an essential part of radio communications for the incident.

73, Ned

Ned is the TCARES Webmaster (<http://www.tcares.net>), as well as the club's ARES/RACES Coordinator. He was previously KM6EAC, then N4NED, and is now K6NED. He has achieved the following awards: Grid Squared; United States Counties; World Counties; and World Radio Friendship. He served in the U.S. Navy (PlankOwner USS Essex LHD 2) and he and his wife, Toni, K6TNI, live in Sonora.

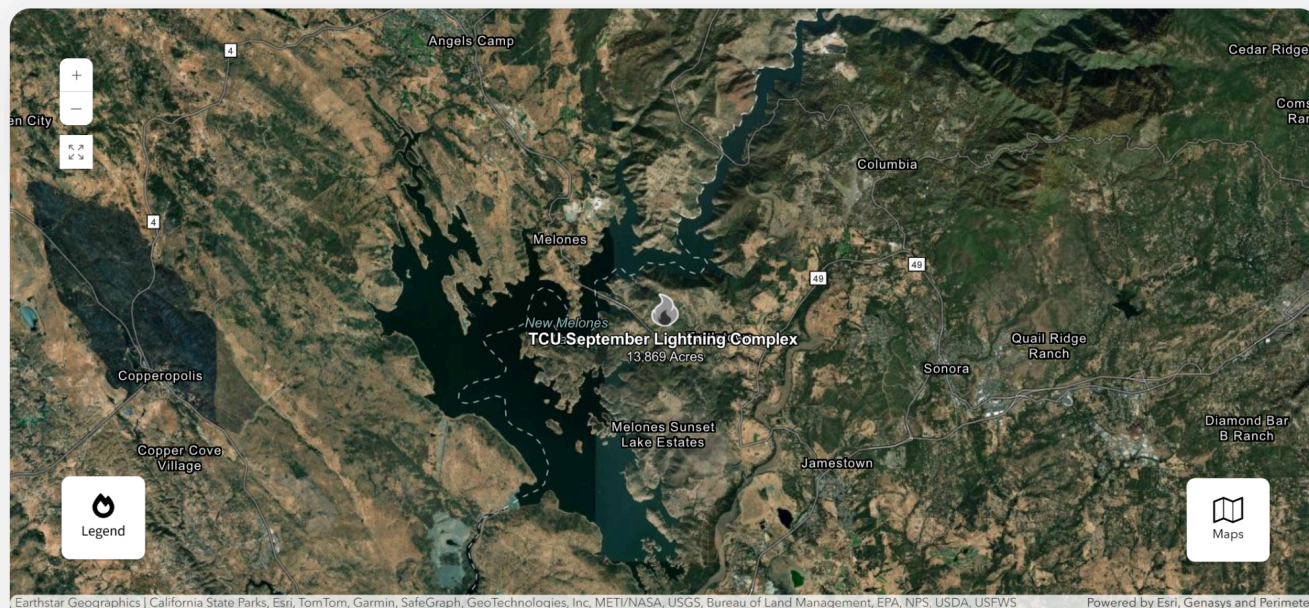


Home > Incidents > TCU September Lightning Complex

TCU September Lightning Complex



100% Contained 13,869 Acres 4 Counties: Calaveras, San Joaquin, Stanislaus, Tuolumne



Beginner Radio Class

September 27 @ 8:30 am – 10:30 am PDT

Go To www.tcares.net for more info.

THIS IS A FREE CLASS, Limited to the first 25 people. REGISTER BELOW.

Learn basic radio communications skills with a focus on the General Mobile Radio Service (GMRS), Family Radio Service and Ham Radio (GMRS/FRS/HAM). A NO TEST LICENSE is required to transmit on the GMRS frequencies. However, you can transmit **without a license** on the FRS frequencies that are used by some of our GMRS groups within Tuolumne County. Explore and learn all the details at this class.

Hands on skills training will get you up and transmitting right away, with instructions on emergency communication.

STAY INFORMED when cellphones are down and power outages occur.

How to Use Your Handheld Radio During an Emergency

October 4 @ 8:30 am – 10:30 am PDT

***Go To www.tcares.net
for more info.***

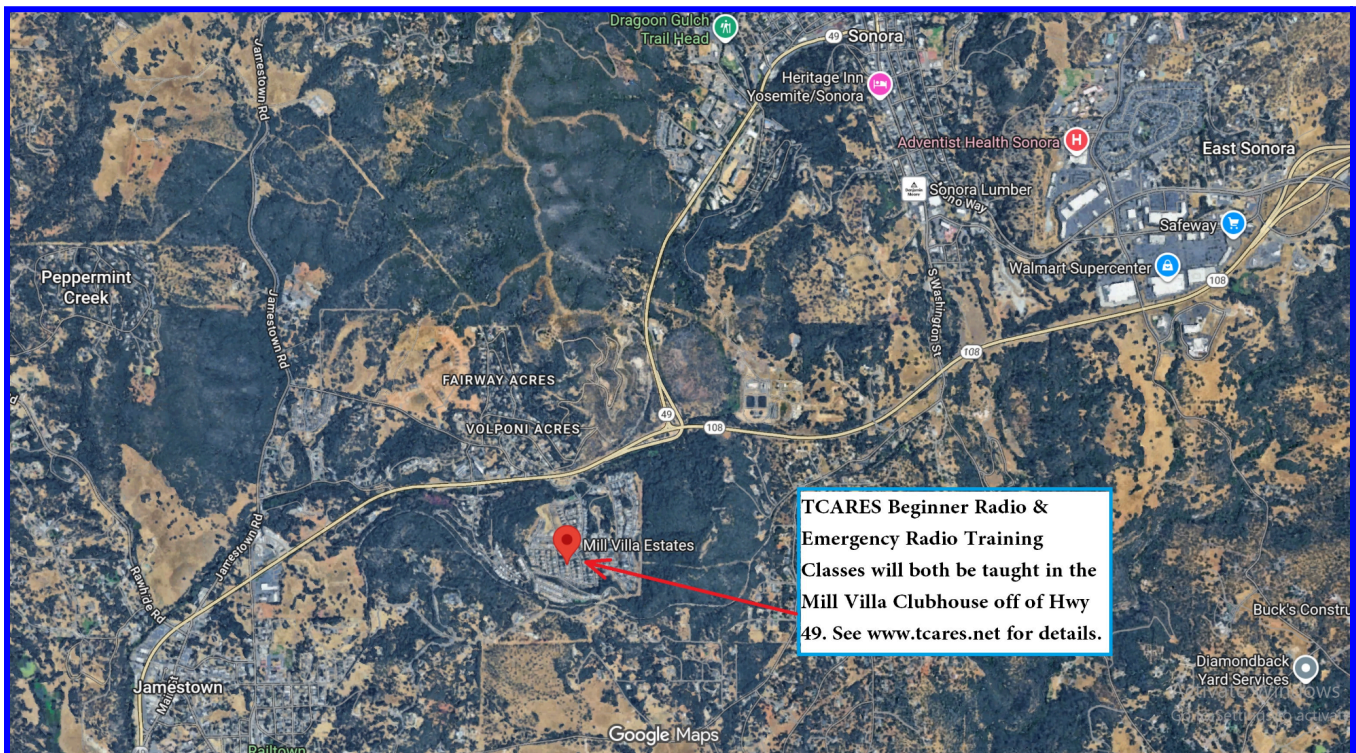
THIS IS A FREE CLASS, limited to the first 25 people. REGISTER BELOW.

Learn how to use your handheld radio during a simulated emergency. This class will give you radio experience by simulating two different emergency situations: **1) your own family, and 2) your neighborhood/community.** By the end of the class you will learn more about emergency handheld radio communications and discuss with others, best radio practices, so that you will be better prepared when the next incident occurs.

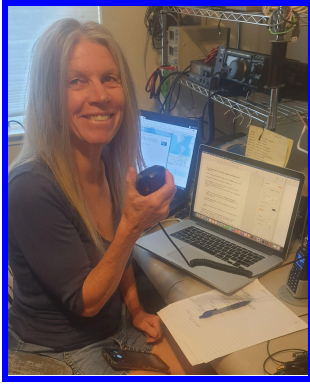
If you have a handheld radio (FRS/GMRS/Amateur), bring it to the class. If not, we will have extra radios for use.

Hands-on skills training will get you up and transmitting right away, with instructions on emergency communication.

STAY INFORMED when cell phones are down and power outages occur.







GMRS Women's Net!

Who: Any females with an FCC GMRS license

What: Weekly GMRS net

When: Thursday evenings @ 7 pm

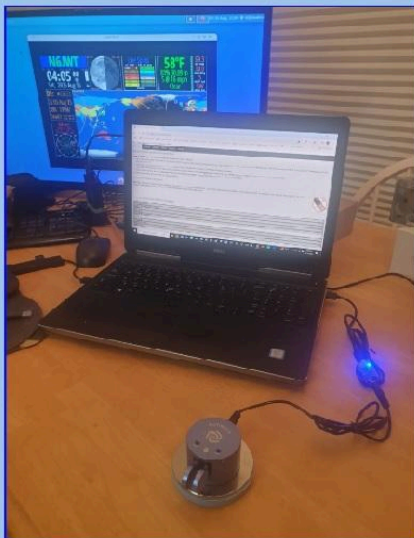
Why: To practice radio skills, increase knowledge, make connections, and more

How: Tune in to the Duckwall GMRS repeater (Channel 22R; RX: 462.725 MHz; TX: 467.725 MHz; PL: 192.8 Hz)

Where: Anyone within line-of-sight, who can hit the Duckwall GMRS repeater

*"The **purpose** of this net is to create a supportive community of women to practice skills in handling radio traffic and to share GMRS radio news, information, current status, and activities."*

VBand CW Web App Learning Tool



VBand can be connected to the web via computer, smartphone, tablet, or via CW Hotline, a wifi-connected device.



Tuolumne County GMRS

By [Marc Colton](#)
N6NEZ/WRME405



New GMRS Radio Repeater Installed on Strawberry Peak

On **August 20th**, the Tuolumne County GMRS Repeater Team successfully installed a **new GMRS repeater on Strawberry Peak**. This addition represents a major step forward in expanding reliable radio coverage for our community.

The new repeater is strategically located at an elevation of approximately **~6,067 feet**, giving it an excellent vantage point over the region. From this site, the repeater is expected to serve the communities of **Pinecrest, Strawberry, Cold Springs, and much of the Highway 108 corridor**. Early

testing also shows promising coverage extending into portions of the Tuolumne County backcountry.

Strawberry Peak is a **major communications site**, already hosting a variety of users including cellular carriers, government agencies, and private companies. The facilities are professionally maintained, making it an ideal location for this new addition to our GMRS system.



Coverage testing is still ongoing, and we'll be sharing updates as results come in. For now, we encourage members and radio users in the area to try out the new repeater and share their experience with the team. The frequency is 462.625 MHz. Contact [Richard Combs](#), KN6HSR/WRMM317, who will be managing the access to the Strawberry Peak Repeater.

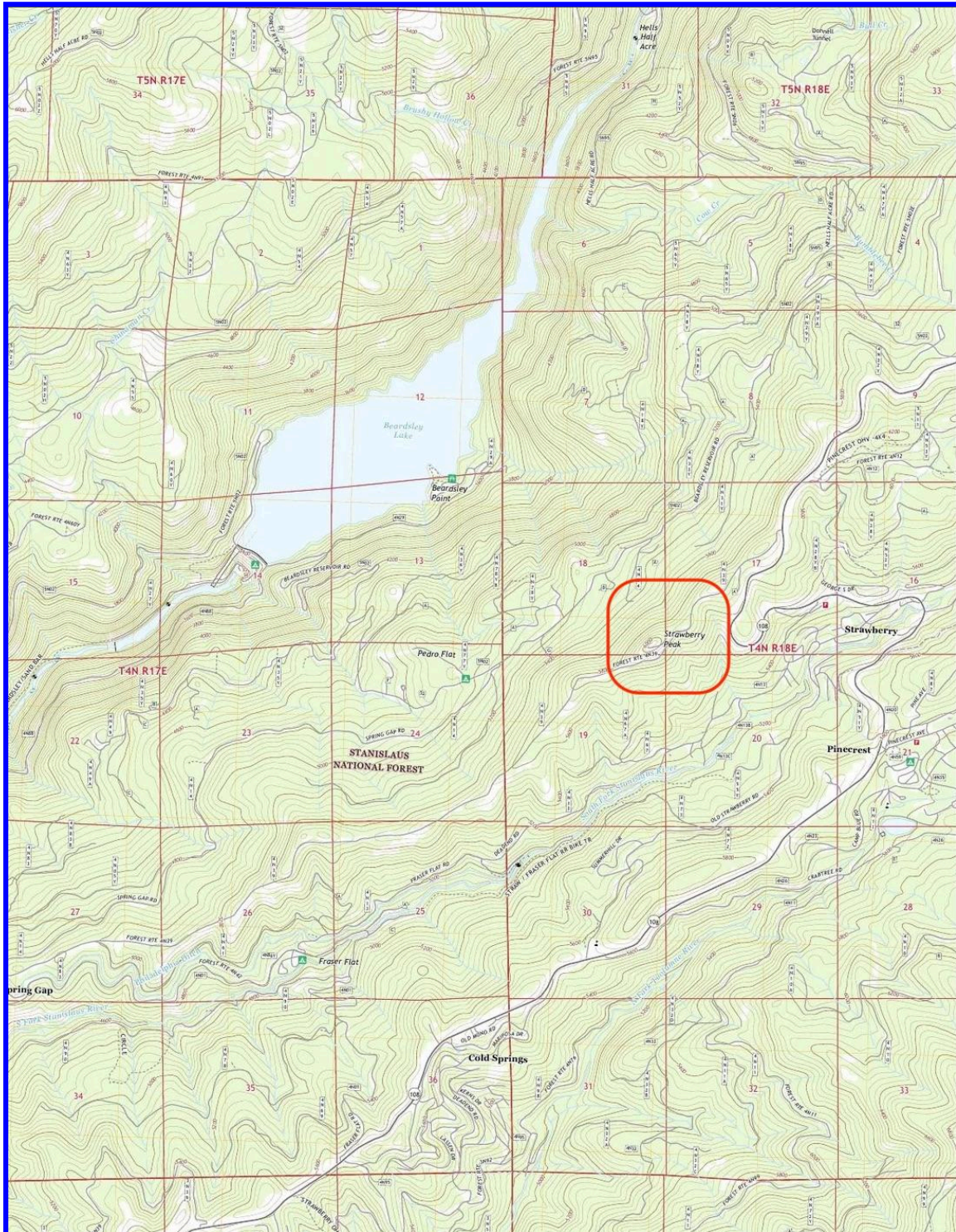
With this installation, there are now **six (6) GMRS repeaters serving Tuolumne County**, providing broad, and reliable, coverage across our communities.

The GMRS Team would also like to extend a special **thank you to the TRI-DAM Project** for providing space in their facility and supporting the **GMRS Neighborhood Radio Watch Program**. Their partnership makes a tremendous difference in keeping our county connected.

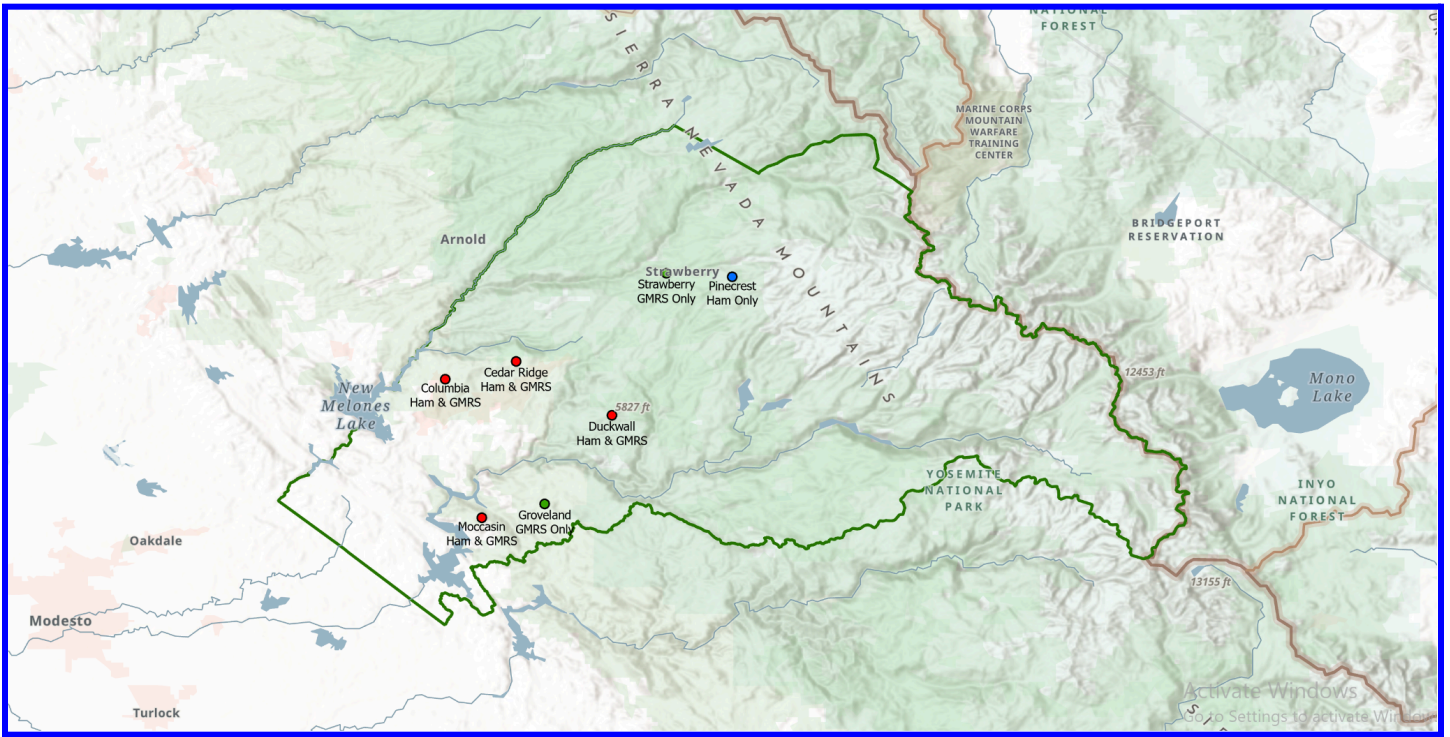
This is another great milestone in our efforts to **strengthen local communication, support emergency readiness, and connect our communities** through radio.



Marc has been interested in two-way radio since college when he earned his Amateur Radio License. He worked in the two-way radio field for most of his career and has seen many advancements in radio technology. He's currently enjoying helping Tuolumne County volunteers put together a robust GMRS radio system. Through the informal Neighborhood Radio Watch (NRW) program, citizens should be better prepared to help each other in the event of a natural disaster, loss of power, or loss of cell phone service, which can happen to residents in our County.



Map Showing the Location of the Strawberry Peak GMRS Repeater Site



Map Showing the Location of the Tuolumne County Ham & GMRS Repeater Sites



2025 Tri-County Ham Picnic @ Utica Park in Angels Camp

Tech Talk: Beyond the Basics

By [Dave Arrich](#)
AD6AE



NanoVNA H4 Vector Network Analyzer

This article covers setting up, and saving, four test configurations for the **NanoVNA** network analyzer: **1)** Default 'Antenna Analyzer' on power-up; **2)** Single band antenna measurement setup; **3)** Measuring coax or insertion loss; and **4)** Measuring coax length, or distance to a fault.

Also included are 'extra' VNA tips and notes that are good to know.

This article is focused on the new user and applies specifically to NanoVNA Model H4; Menu Maps may differ between makers and, if like mine, won't even be the correct one; so, I've included one in Figure 1b. that may apply; if not, it will be close. Copy and Paste it. It will expand to a full page guide. Initially, the **Menu Map** is intimidating; after using it a few times, it won't be.

*Video links in the examples, give a better, more detailed explanation. Most videos are for older models and may differ slightly. First, watch the video, become familiar with it; then perform setup steps that have been taken from that video; **However**, there is one Exception: Example 1 does not fully reconcile with the video by W2AEW; rather it configures a default, full-featured, antenna analyzer, on power-up that is versatile and user friendly.*



Fig 1: NanoVNA H4 Showing 'Port Savers'

What is a VNA? A **Vector Network Analyzer** (VNA) is a specialized instrument used to measure the electrical properties of radio frequency devices; components, cables, and antennas. A NanoVNA is a smaller, hobby-level device with many of the same features as the professional units; it is portable, easy to use, and has reasonable accuracy for a much, much lower cost.

Home Menu Definitions

- **DISPLAY:** Assigns measurements to different traces and charts; moveable markers and scale per division values.
- **MARKER:** Assigns up to 8 markers that indicate readings at selectable frequencies for analysis and comparison.
- **STIMULUS:** Sets frequency at fixed, sweep or span ranges. The maximum sweep range is currently 10KHz to 1.5GHz.
- **CALIBRATE:** Establishes a 'Reference Plane' which is the boundary between the VNA port and the outside world. Calibrating compensates for the effects of the internal measuring

circuitry that affects accuracy. To ensure accuracy, calibration must be done when any changing frequency, cables or external hardware setups for the DUT on either ports 1 or 2. **Calibrations are done in a specific order: Open, Short, Load, Isolation and Thru. O.S.L.I.T.** Isolation and Thru - are for calibrating the RX port, Port2 (S21) when measuring devices with both an input and an output; like a coax cable, filter or amplifier.

If temporary recalibration is required, just recalibrate and continue testing. If you want to make it permanent; be sure and tap 'Reset' to clear the old calibration data. Resetting will only affect old calibration data – NOT the setup configuration. If you don't reset the device, you may get errors.

- **RECALL:** Up to seven test setups (0-6) may be saved, then recalled without having to repeat the setup process.
- **MEASURE:** The VNA can function as a Resonance, Inductance or Capacitance meter; Cable or Crystal tester.
- **MicroSD CARD:** If one is installed, S1P and S2P (measurement) files and screenshots can be saved to it for sharing or archiving. Info is iffy on larger cards but it definitely handles a 32 GB SD card.
- **CONFIG:** User interface: Screen Touch Control/Test, Firmware Version, Brightness, Date/Time, Comm Ports, etc.

Sub-menu Definitions Used in this Article

- **Trace:** 4-colors available; each one can be assigned to display any of 20 parameters (SWR, SMITH, R, Z, X, Phase, etc.). To turn a trace off; **Tap:** display, Trace, (tap twice to turn off, once to turn on), Back, Back, Home Menu, screen.
- **Start/Stop:** Sets stimulus (frequency ranges or sweep spans) to measure responses of a Device Under Test (DUT).
- **Sweep Points:** An adjustable number of samples that can be taken within a stimulus range (usually set to 401).
- **Search (Maximum/Minimum):** A marker assigned to a trace that will lock onto and follow the max or min value.
- **Scale:** Assign values to horizontal grid lines for each trace. Must be reenabled each time upon power-up.

Experiment: Set up the NanoVNA; connect it to a DUT, length of coax or antenna; go thru the menu settings, make changes and see what happens and get familiar with it. It can't be 'bricked.' If you don't save changes, they will be gone when powering off. Currently, memory locations can be overwritten and updated but not erased without resetting all seven memory locations; hence, a stimulus range will always be displayed in the box and indicating that it's calibrated.

Figure 2a shows a typical NanoVNA kit. **Figure 2b** shows the included Menu Map that may or may not apply to your model – mine didn't. So, one has been included that may match. Copy & Paste it; when expanded, it will fill a regular page.



Figure 2a

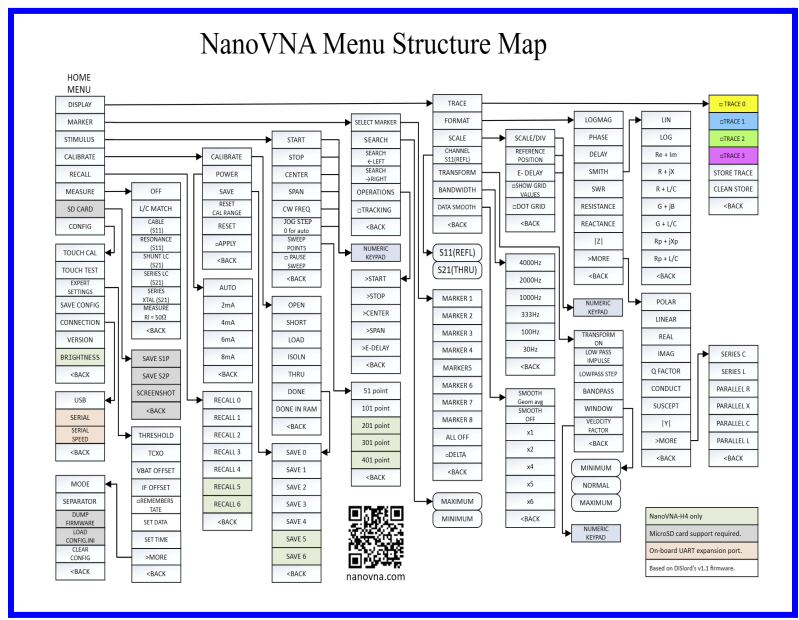


Figure 2b

EXAMPLE 1. Power-On Default Configuration as an Antenna Analyzer

SWR-Yellow Resistance-Blue Smith-Green Impedance |Z|-Magenta

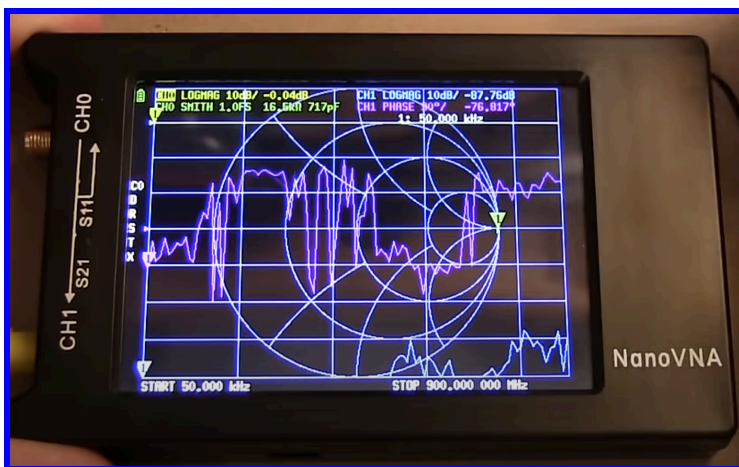


Figure 3a: Factory



Figure 3b: Custom (Scale shown is SWR)

Why a VNA needs to be calibrated & how to calibrate a NanoVNA by W2AEW

<https://www.youtube.com/>

The following written setup follows the video thru Step 10. From Step 11 onward, it's configured as an antenna analyzer and will be saved in location 'Save0'. All traces may be assigned to display different parameters and scales. However, only one scale can be displayed at a time; others will have to be selected one by one. Notice the white lettering beside the parameters at the top of the display show the value per division in the same color as that trace. When selecting a trace as shown in Figure 3b, an arrow of the same color will also appear to the left of the trace

that's selected (Figure 3b). **NOTE:** Tapping anywhere on the screen toggles menus on and off. Sometimes tapping on a menu selection automatically turns the menu off. Just tap on the 'screen' to continue if needed. To make permanent, 'Save' changes when finished.

Stimulus, Channel, Sweep Points

1. Tap: screen, (opens Home Menu).
2. Tap: Display, verify Channel is S11 (REFL), Back.
3. Tap: Stimulus, Start, (opens keypad), 1.8 M.
4. Tap: screen, Stop, (opens keypad), 30 M.
5. Tap: screen, Sweep Points, 401
6. Back, Back, Home Menu.

Calibrate, Assign Traces, Save to Location 0

7. Tap: Calibrate, Calibrate, **Reset**, Calibrate.
8. Attach **Open**, Tap: Open.
9. Attach **Short**, Tap: Short.
10. Attach **Load**, Tap: Load, Back, Apply, remove load. Tap: Back, Back.
11. Tap: Display, Trace, **Trace0**, Back.
12. Tap: Format, SWR, Back

13. Tap Trace, **Trace1**, Back, Format, Resistance, Back.
14. Tap: Trace, **Trace2**, Back, Format, Smith, Back.
15. Tap: Trace, **Trace3**, Back, Format, More, |Z|.
16. Tap: Back, Back, Back, Home Menu.
17. Tap: Calibrate, Save, **Save0**, Back, Back.
18. Home Menu, screen
19. Connect DUT.

Assigning Scale Values to Grid for any Trace

1. Tap: Display, Trace, (Trace#), (note arrow by color on screen) Back, Scale, Scale/Div, (opens Keypad), .25, Ent←, Screen, Show Grid Values, Back, Back.
2. Calibrate, Calibrate, Done, **Save0**, Back, Back.
3. Repeat steps 1-3 if scaling other traces

NOTE 1: On each power-up, to display scale values previously assigned to a trace: **Tap:** screen, Display, Trace, (verify that it's the correct one or select another). **Tap:** Back, Scale, Show Grid Values, Back, Back, **Tap:** screen.

NOTE 2: Stimulus - Steps 3 & 4: if temporarily changing stimulus or test setup; just change it **without** saving. Readings in the low bands will be close but not accurate; on higher bands, the error will be greater and may require recalibrating. If temporarily recalibrating, but not saving, **do not** tap reset. Just return to measuring. If saving, upon 'Resetting', you must repeat the calibration process then save.

EXAMPLE 2. Configuring A Single-Band Test Setup Which also Demonstrates the Effects of a Tuner.

W2AEW Antenna SWR and Effects of Tuning: [#314: How to use the NanoVNA to sweep / measure an antenna system](#)

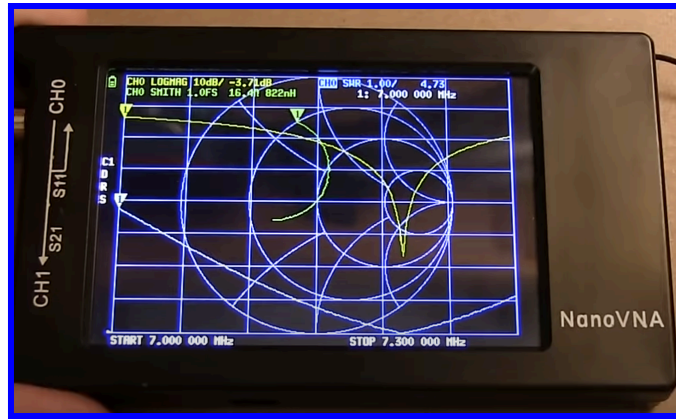


Figure 4

Set Stimulus, Channel, Sweep Points

1. Tap: screen, (opens Home Menu).
2. Tap: Display, Channel S11 (REFL), Back.
3. Tap: Stimulus, Start, (opens Keypad), 7 M.
4. Tap: screen, Stop, (opens Keypad), 7.3 M.
5. Tap: screen, Sweep Points, 401 (or choose)
6. Tap: Back, Back, Home Menu.

Calibrate, Assign Traces, Save to Location of Choice

1. Tap: Calibrate, Calibrate, Reset, Calibrate.
2. Attach **Open**, Tap: Open.
3. Attach **Short**, Tap: Short.
4. Attach **Load**, Tap: Load, remove.

5. Tap: Back, Back.
6. Tap: Display, Trace, Trace0, Back.
7. Tap: Format, Logmag, Back.
8. Tap: Trace, Trace1, Back, Format, Smith, Back.
9. Tap: Trace, Trace2, Back, Format, SWR.
10. Tap: Back, Back.
11. Tap: Trace, Trace3, Back, Format, |Z|.
12. Tap: Back, Back, Back, Home Menu, screen.
13. Tap: Calibrate, Save, **Save(#)**, Back, Back.
14. Home Menu, Tap: screen.

Settings are saved for 40 meter band tests

EXAMPLE 3. W2AEW Measuring Coax Or Insertion Loss using a NanoVNA

<https://www.youtube.com/>

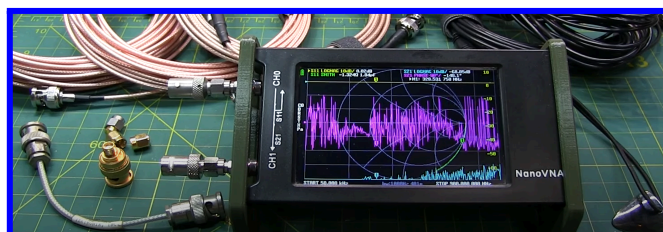


Figure 4. Showing, Cables, Adapters, OSL Standards and a short 'Thru' Coax Jumper

NOTE: The vertical white letters shown on the left side of the screen above indicate the test is **Calibrated** and memory location where settings are saved (0-6). If the unit is temporarily recalibrated for tests and NOT saved, letters will be red. If changes are made but not saved, they will not affect the current settings and will be lost when powering off.

The Jogging (rocker/pushbutton) switch is located on the top right of the VNA; it's also a push button when in 'Configure' Mode

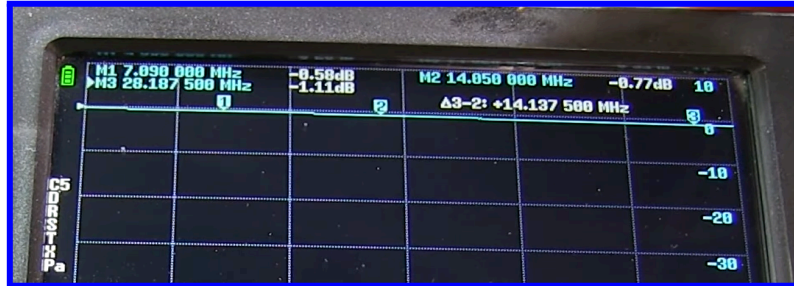


Figure 5: Showing losses (dB) in a 25-foot length of RG-174 cable for 7 (M1), 14 (M2), and 28 (M3) MHz

1. Tap: screen, (opens Home Menu)
2. Tap: Stimulus, Start (opens keypad), 1 M;
3. Tap: screen, Stop, (opens keypad), 30 M.
4. Tap: screen, Home Menu, Tap: Back
5. Tap: Calibrate, Reset, Calibrate, then **O.S.L.**

With Menu still displayed, set Up Port2 (S21) for 'Isolation' and 'Through'

1. Move Load from Port1 (S11) to Port2 (S21)
2. Tap: ISOLN, remove Load
3. Attach a short coax between Port1 and Port2
4. Tap: THRU, Done, **Save(#)**

Set Up The Display

1. Tap: screen, (opens Home Menu)
2. Tap: Back, Display, Trace.
3. Tap traces 0, 2, & 3 twice to turn, leaving only Trace1

Set markers for 7, 14, & 28.5 MHz

4. Tap: Back, Back, Select Marker, Marker1, Tap: screen

Jog Marker1 to desired frequency in 7 MHz band

5. Tap: screen, (opens Marker Menu)

6. Tap: 'Marker2', Tap: screen

Jog Marker2 to desired frequency in 14 MHz band

7. Tap: screen, (opens Marker Menu)

8. Tap: Marker3, Tap: screen

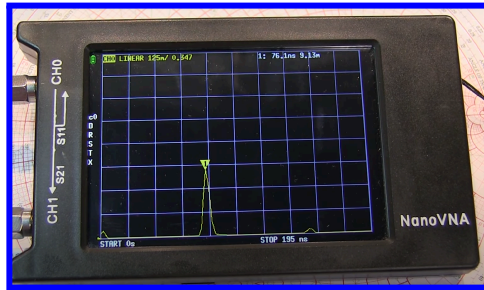
Jog Marker3 to desired frequency in 30 MHz band

9. Tap: screen, verify near 0-dB numbers beside markers at top of screen, remove short coax

10. Connect cable(s) to be tested between Ports 1 & 2.

EXAMPLE 4. W2AEW Measuring Coax Length or Distance to a Fault (TDR)

<https://www.youtube.com/>



(TDR: Time Domain Reflectometer or Reflectometry)

$$\text{STOP FREQ (MHz)} = \frac{5850}{\text{MAX DIST (m)}} \cdot \text{VF}$$

(START WITH LOWER FREQ, THEN INCREASE)

Figure 1. Coax Length In Meters (Shown on Top Right of Screen)

Measuring Coax Length or Distance to Fault:

1. Tap: screen, (opens Home Menu)
2. Tap: Display, Trace, turn off all except Trace0,
3. Tap: Back, Transform, Transform On, Low Pass Impulse.
4. Tap: Velocity Factor, opens keypad, 80, x1, Format, More, Linear. (VF of RG-8x is ≈ 80)
5. Tap: Back 3 times, Home Menu
6. Tap: Stimulus, Start, keypad, 50 K.*
7. Tap: Stop, keypad, 200 M. (see below**)
8. Jog marker to far right of screen; shows max. length or distance to fault in meters that can be measured.
9. Tap: Back, Marker, Search, Maximum.
10. Tap: screen, attach open ended cable; read length to end of cable or distance to fault (1m=3.28F).

*Set Stimulus Start frequency as low as possible for testing short cables or detecting short distances to a fault. **Stimulus Stop frequency determines the maximum length of coax or distance-to-fault that can be tested. Higher=shorter distance; Lower=longer distance. His VNA shows only 101 points; to set points higher: **Tap:** Stimulus, Sweep Points, (select), Back, Back, Home Menu, screen. Save changes.

EXTRA 1. To clear an old calibration and update it for an existing memory location:

Tap: Screen, Calibrate, Calibrate, Reset, Calibrate, (Attach 'Open') Open, (Attach 'Short') Short, (Attach 'Load') Load, Done, Save (back to the same memory location), screen.

Screen should show a white capital 'C' (and memory slot #) on the left side.

EXTRA 2. Turning Off an Unwanted Trace:

Tap: screen, Display, Trace (tap twice to turn off any not needed), Back, screen.

EXTRA 3. Recall of a Previously Saved Setup:

Tap: screen, (Opens Home Menu) Display, Recall, (tap location) Back, screen. **Note:** For my NanoVNA H4 version, memory locations cannot be renamed but will display the latest stimulus range.

RESOURCES

Updates and tips will appear in forthcoming newsletters. Videos are presented by two well-qualified, Electrical Engineers in 1-3 below.

Detailed Overall Instruction

1. **Ralph Gable nanoVNA: A Practical Menu Walk Through:**
https://www.youtube.com/watch?v=_96N3oGFatE
2. **Ralph Gable VNA Playlist: Begin with; "VNA What Is It?":** [\(1\) VNA - YouTube](#)
3. **W2AEW NanoVNA Playlist:** [NanoVNA - YouTube](#)

General Stuff

- **NanoVNA.com:** [About NanoVNA | NanoVNA](#)
- **NanoVNA Users Guide (translated):** [NanoVNA User Guide-English-reformat-Oct-2-19.pdf](#)
- **NanoVNA Menu Structure Map:** [NanoVNA Menu Structure Map | NanoVNA](#)
- **Understanding S-Parameters:** [Understanding S-Parameters: S11, S22, S12, and S21 | Test & Measurement World](#). [Understanding S-parameters | Rohde & Schwarz](#)
- **Kindle:**
<https://www.amazon.com/guide-NanoVNA-Christoph-Schw%C3%A4rzler-ebook/>
- **E-book:**
<https://www.amazon.com/NanoVNAs-Explained-practical-Network-Analysers-ebook/>
- **Users Group (Create an Account) – Lots of info in there:**
nanovna-users@groups.io | [Topics](#)
- **NanoVNA Saver:** [NanoVNASaver | NanoVNA](#) (Writeup forthcoming)
- **NanoVNA's & Books:** **R&L Electronics.** [Search Results -> nanoVNA : R&L Electronics, Amateur radio store](#)
- **Reputable Sellers List:** [tinySA | Main / Buying the tinySA](#), Aursinc on Amazon, SeeSii store on Amazon
- **SMA Adapters, M-F used as Port Savers, Adapters and Adapter Kits; RG-316 cables, pre-made:** Amazon
- **NanoVNA H4:** [Amazon.com: AURSINC Upgraded NanoVNA-H4 Vector Network Analyzer, Latest V4.3 10KHz-1.5GHz](#)

- **NanoVNA; Hard Case:** [Amazon.com: Honlyn Headphones](https://www.amazon.com/Honlyn-Headphones)
- **FYI: Google** any parameter listed in the Menu Map for an expanded description of what it is and how it's used. Start the search with: NanoVNA, what is or define (menu name in question).

Learn It – Apply It - Have Fun With It.



NanoVNA H4 Kit & Accessories in a Headphone Hard-case
Add a drawstring bag or pouch to better protect the VNA

73, Dave

"Everything should be made as simple as possible, but not simpler." -Albert Einstein

Dave's lifelong electronics journey began dramatically at age 4, causing a farmhouse blackout, and then a "shocking encounter" at age 8, sparked more intense curiosity. Self-taught through correspondence and mentoring, he was running a radio/TV repair service by age 14. In 1965, he earned an FCC First-Class Ticket with Radar Endorsement, leading to a role at GE (General Electric), testing Apollo program components. In 1967, Dave joined the Navy, serving 23 years as a Communications Technician, maintaining complex HF systems within a Wullenweber Antenna array. During a 1974 NSA (National Security Agency) assignment, he obtained his ham radio Extra Class license, actively engaging in DXing, contesting, and getting his code speed up to 20 wpm, before a 42-year hiatus. Post-Navy, he spent two decades with the NCPA (Northern California Power Agency), first as a geothermal electrician based out of Middletown, and Roseville, then as a SCADA (Supervisory Control and Data Acquisition) technician for a hydroelectric plant in Murphys. Three years ago, he reignited his passion for ham radio, delving back into antenna and transmission line theory.



2025 Tri-County Ham Picnic @ Utica Park in Angels Camp

BEGINNER RADIO CLASS

SEPTEMBER 27 8:30

THIS IS A FREE CLASS. Limited to the first 25 people.

Learn basic radio communications skills with a focus on the General Mobile Radio Service, Family Radio Service and Ham Radio (GMRS/FRS/HAM). Hands on skills training will get you up and transmitting right away, with instructions on emergency communication when **cellphones are down and power outages.**



RADIO CLASS AGENDA

- Types of Radio Services
- Pro and Cons of FRS/GMRS/HAM
- Radio Etiquette
- What is a Repeater?
- How to join a Network
- Common Radio Features
- Use Radio as a Scanner



SCAN



SIGN UP HERE

Mill Villa Club House
18717 Mill Villa Rd
Jamestown CA

<https://tcares.net/event/beginner-radio-class>