

TCARES - Tuolumne County Amateur Radio & Electronics Society Amateur Radio Club Fall 2026 Newsletter

September 22, 2026



Multi-County Picnic, September 19, 2026

Autumn has Officially Arrived!

Hello TCARES members - Autumn is here and things are starting to cool down! And as always, this quarter's newsletter is out and in it you will find articles that are meant to *teach*, *inform*, and *inspire*! The TCARES club newsletter helps to keep us informed of the news of interest from the last quarter, along with promoting connections between club members. Our article authors have put effort into their pieces and we hope you enjoy their contributions, keeping you aware and actively engaged in our club.

We continue to have breakfast meetings at [My Garden Cafe](#), in east Sonora at 9 am on the 3rd Saturday of the month - come join us and connect with other Hams! We hope to see you all at the next [TCARES Club Breakfast](#) meeting on [October 17th](#). Many other events are listed on the TCARES club [Events Calendar](#) (upcoming events are listed on the right side of the webpage). So, please, come join in on the fun!

Coming Up:

Inside This Issue

President's Message	3
Antenna of the Month	5
Meet Our Members	11
Volunteer Examiners	14
Repeater Coordinator Notebook	15
ARES/RACES Emergency Communications Report	18
Sparkie's Corner	20
Tech Talk: Beyond the Basics	21

Dates to Remember

September 22	September Equinox
September 27	Emergency Radio Class Training
October 15	The Great ShakeOut
October 17	TCARES Breakfast Mtng
November 7	Ham Radio FCC Test Session
November 21	TCARES Breakfast Meeting
November 21	TCARES Board Meeting
December 5	Christmas Party

President's Message

by Jeff Tolhurst

N6JWT/WRDP326



President's Message

For many of our club members, the Fall season is their favorite. The days are still warm, but not stultifyingly hot and evenings are pleasantly cooling off. We're entering the "shoulder season", with fewer tourists and smaller crowds, with usually mild weather, though things can become unpredictable at times.

In talking with Ned, K6NED, our ARES/RACES coordinator, he just notified me that the Governor just signed an executive order declaring a state of emergency for the super El Niño season approaching. It's amazing to me that our current technology can be used to predict El Niño events far enough in advance for us to prepare for the different consequences outlined by scientists. One of those consequences is the potential breakdown in communications, which is what our club plans, prepares, and practices for. With that in mind, I would urge all of us to take part in the exercises that the California Office of Emergency Services (Cal OES) and the Federal Emergency Management Administration (FEMA) support, such as The Great California ShakeOut, which is coming up soon, on October 15th, at 10:15 am. Other events may include ARRL's the Perfect Storm (likely to be held in March), the Tuolumne County OES Siren Test (held the past 3 years), and the BEACON (Building Emergency Area Communication Operations and Networks) exercise, which will take place on April 27, 2027 (beaconexercise.org). More info will be posted on the club's website, so keep track on tcares.net.

In the last newsletter I noted that there are changes that have taken place in the Tuolumne County OES. We have invited the new coordinator, Dave Salzer, who has agreed to talk with our club at either the October, or November, breakfast meeting. We're hoping to get clarification on the direction OES will be taking, as well as how TCARES will be able to continue supporting auxiliary communications during local and regional incidents. ARES & RACES are built into the Communications section of the Emergency Operations Plan for the State & County OES. More information on a meeting program will be announced ahead of time on our weekly nets, as well as being posted on tcares.net.

Finally, it was great to see so many folks at the recent Multi-County BBQ Picnic, at Utica Park in Angels Camp. At one point I observed 56 attendees enjoying conversations, purchasing used radio gear, and feasting on the delights. Thanks go out to all of those, who helped make this event a success (special thanks to Ginger, KM6RFT, for her extra efforts!). We're now looking forward to the Christmas Party, which will be held on December 5, 2026, at the Rambling Hills Estates, in Columbia, CA (same place as last year). As usual, check tcares.net for more info and put it on your calendars.

Enjoy the change in seasons and get on the air!

73, jeff

June 27, 2026



Antenna of the Month

By [Gary W. Johnson](#)
NA6O



Half-Sloper

Of all the oddball antennas I've worked with, the **half-sloper** is definitely one of them. It consists of a vertical element (typically a tower) and a single sloping quarter-wave counterpoise wire, fed at the junction at the top. It will provide primarily low-angle vertical radiation, a slightly directional pattern, and good SWR bandwidth. The trick is to get it adjusted for a decent match, something nearly every builder struggles with. One thing is for sure, every half-sloper installation is different and it's almost mandatory to do some simulation to get an idea of how it might work out.

These antennas are most commonly chosen for 80 and sometimes 160 m when no other geometry will work. That was the case at my remote station, W6SRR, where the tower is quite short and the property owner could barely be convinced to allow us to run even a single wire across the property let alone a nice stand-alone vertical or something more elaborate.

Operating Principles

In *Low-Band DXing*, ON4UN comes to the same conclusions that I have regarding how the half-sloper works: Both the vertical tower and the sloping element contribute to the basically omnidirectional pattern. Most of the low-angle vertical radiation comes from the tower, and a significant amount of horizontally-polarized radiation at high angles comes from the horizontal component of the sloping wire. Directionality will depend upon ground qualities, likely being more directional over poor ground. In effect, it's more like a top-loaded vertical with a single tuned counterpoise.

Antennas on top of the tower act as capacity hats, effectively lengthening the tower, which can be helpful. Having a tower that's near an electrical quarter-wavelength seems to make it easier to obtain a good match. Also, it's not unusual to see the SWR of the half-sloper vary a bit as a Yagi is rotated, especially if the sloping wire is very close. Keep in mind that *any wire antenna anywhere near a Yagi can easily alter its pattern* on frequencies where that wire is resonant!

Ground radials are required though the demands are typically not as great as for a regular ground-fed vertical because the current at the base of the tower is diminished. Having the high-current point well-elevated improves effectiveness of a half-sloper.

Because there is high RF current flowing on the surface of the tower, all cables leaving the tower near the base require robust common-mode chokes. Otherwise they will act as additional radials and will conduct significant amounts of RF current into the shack. Running all cables inside the tower is helpful.

Another problem can arise at the balun on any antennas atop the tower. High common-mode current may be present. If the choking impedance of the balun is insufficiently high, it may heat up, possibility to destruction. Simulation of my system showed very high dissipation (tens of Watts) in the balun. For that reason, a relay was added that shorts the driven element of the Yagi to ground. This same problem can happen anytime a tower is driven, for instance with a shunt-feed arrangement.

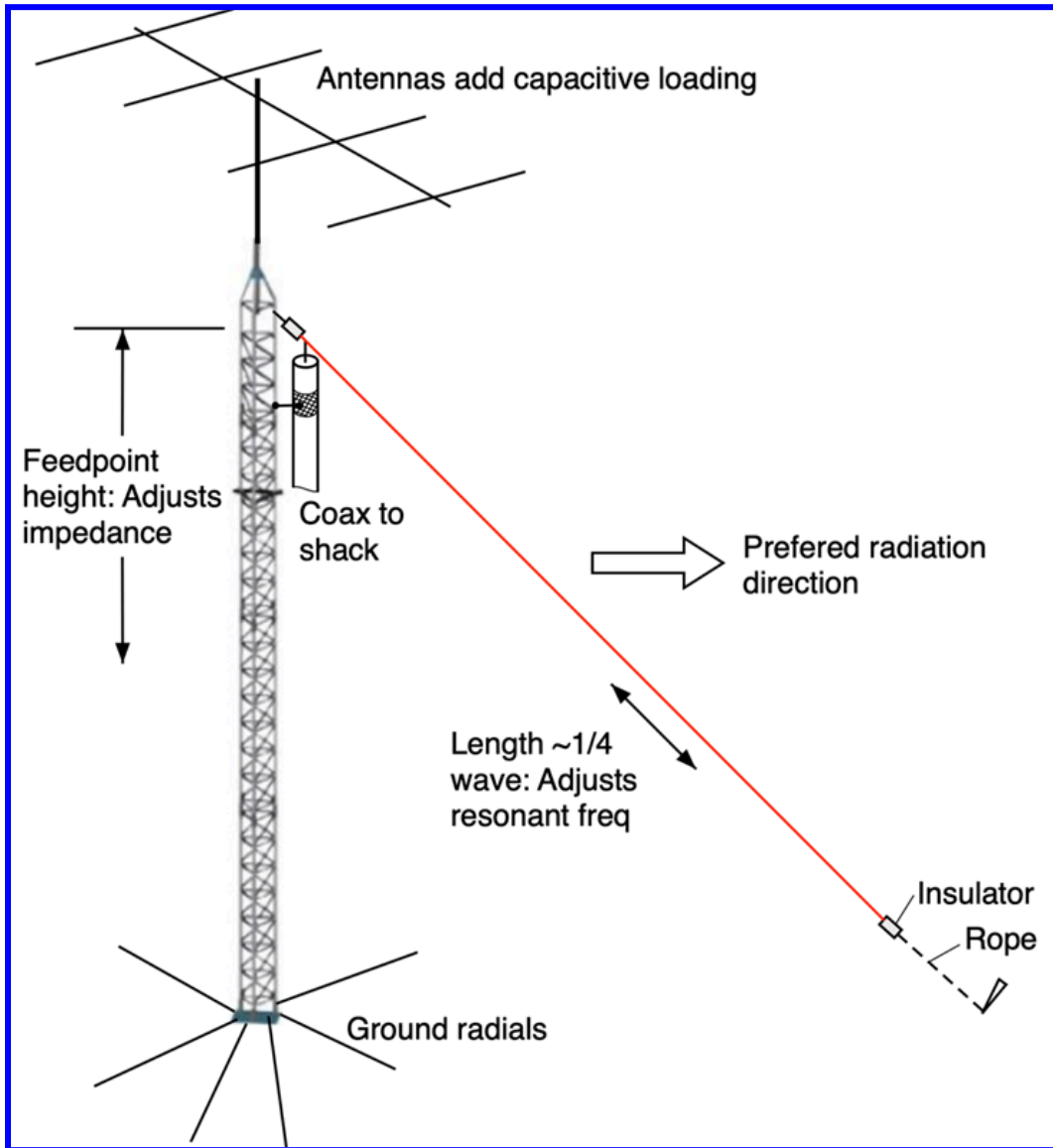


Figure 1: Overview of the half-sloper geometry.

Matching

Simulation and experiment have shown that a reasonable impedance match to 50 ohms can often be obtained by adjusting the feed point elevation. Then the counterpoise wire is trimmed for resonance. These adjustments interact and experimentation is required. This is like any off-center fed antenna, where the choice of feed point location will set the basic impedance. And as I said,

every installation is different so it's impossible to give you simple rules of thumb. Some stations seem never to obtain anything near 50 ohms and require a matching network.

For my 80 m half-sloper, simulation showed that moving the feedpoint upward increased impedance by 3.4 ohms per foot and increased resonant frequency about 30 kHz per foot. Your setup will no doubt be completely different. But having tuning estimates like these available makes it easier to adjust in the field and that's another good reason for simulation.

Performance of the W6SRR 80 m Half-sloper

I simulated my 80 m W6SRR setup in EZNEC with the NEC5 engine. We have a 30-ft tower with 14 ft of mast and multiple antennas on that. There are a 9 radials in the ground covering a half-circle. The sloping wire actually goes down a real slope since we are on a hilltop and it is oriented toward Europe. The effects of that physical slope can't be modelled with NEC but are usually beneficial in lowering the takeoff angle [Ref. 1 below].

Figure 2 shows the currents in each conductor. Note that the highest current is actually on the upper part of the tower rather than the lower part, which makes the radial field less critical. The match ended up nearly perfect and the 2:1 SWR bandwidth is about 200 kHz, typical for wire antennas. We then used the a quarter-wave coaxial matching section trick popularized by Dave Leeson, W6NL [Ref 2] to allow our antenna tuner to cover the entire 80 m band.

Patterns are shown in Figs. 3 and 4. Peak gain is fairly low, a bit below 0 dBi at a takeoff angle of 36 degrees. A low dipole would be even worse, so I consider this a win. Assuming my choice of ground constants was in the ballpark, we might have as much as 10 dB of rejection off the back which is toward Oceania. And yet we are able to work them just fine so it may not be that much. As expected, there is significant horizontally-polarized radiation off the side and straight up. This antenna works fine for short-haul contacts.

By the way, we also built a 160 m half-sloper with a similar arrangement as the only possible way of accessing that band. Gain is even lower, -6 dBi at best, and we have a difficult time getting out. We do hear very well with both of these antennas, which is the good news. This one is a case of. *"just because you can hear them does not mean you can work them."*

Conclusion

Half-slopers performance is a bit unpredictable but can fill a need in some situations. I would prefer an inverted-L or some other design but it's certainly better than no antenna. Before building one of these, you really need to simulate it to get an idea of how it might behave. At least it's not complicated or expensive to build.

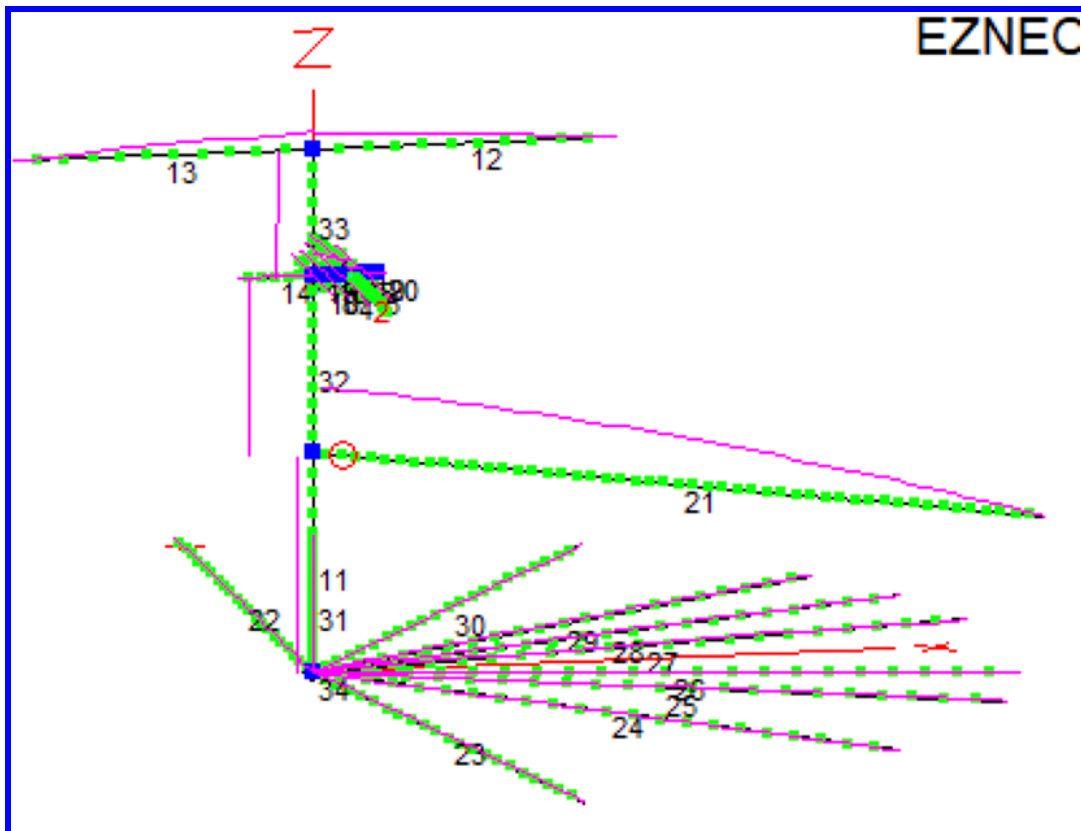


Figure 2. Current distribution in my 80 m half-sloper. Pink lines are current magnitudes.

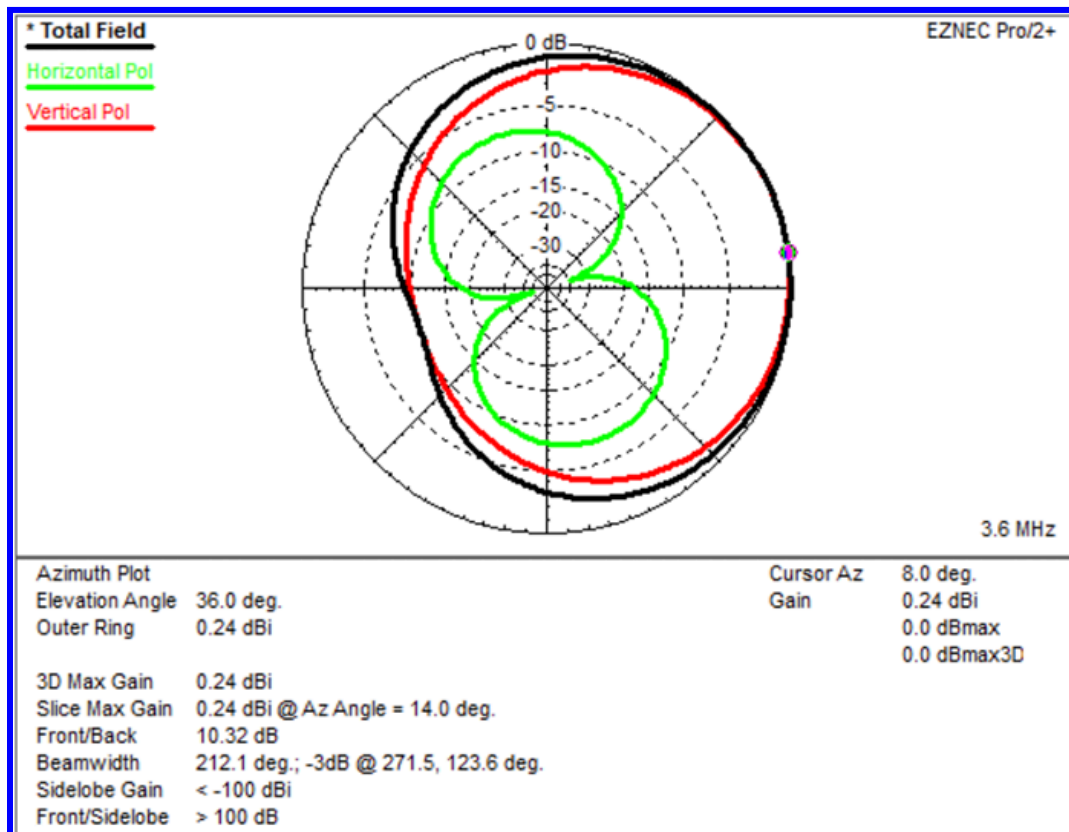


Figure 3. Azimuth pattern. Peak gain (0.24 dBi) is in the direction of the sloping wire.

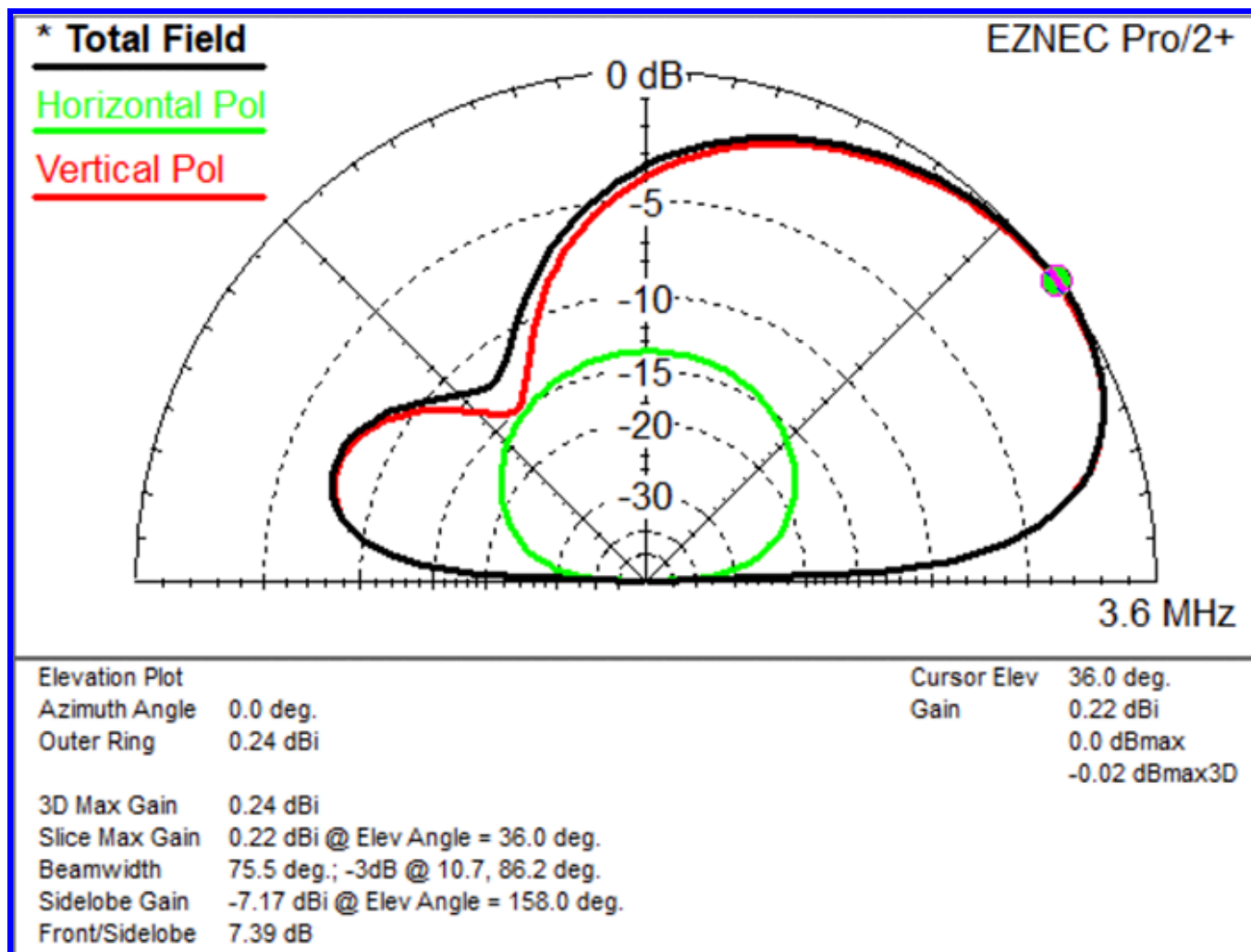


Figure 4. Elevation pattern in the direction of peak gain.

References

1. Tom Schiller, N6BT, A New Look at Verticals, <https://ncjweb.com/features/mayjun19feat.pdf>
2. Dave Leeson, W6NL, The Story of the Broadband Dipole.
<http://ncjweb.com/features/QEX-Leeson-Broadband-Dipole.pdf>

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/>.

**TCARES N1MM Training Session by George, N6GEO
Pinecrest Academy School, Pinecrest, CA, June 27, 2026**



Meet Our Members

By [Ginger Rohlen](#)
KM6RFT/WSAP468



Conal O'Neill, KGPWB, was born in the city of Liverpool in the United Kingdom (UK). In the 1970s, the UK suffered a major "brain drain". The country lost a net total of 500,000 people, including many of its brightest scientists, engineers, doctors, and business professionals, who packed up and moved abroad. Conal's father, an engineer, took his family and joined the thousands of skilled workers who left the UK. At the age of 14, Conal, the second of 6 children, settled with his family in California.

From a very early age, Conal was interested in electronics. At 9, he found a complicated radio set and took it completely apart with the intention to rebuild it. As he attempted to put it back together he learned what each component was and what it did. If he didn't recognize a part, he looked it up. At the age of 10 Conal "left behind the books about the Little Engine That Could, and Curious George", and began reading textbooks to teach himself about electronics. He was given an HF communication set from a Lancaster Bomber from World War II. Conal was fascinated listening to transmissions from all over the world with his receiver.



Conal attended high school in Alameda and Contra Costa Counties and his favorite subjects were science and mathematics. Conal graduated from U.C. Berkeley with a degree in Mechanical Engineering. He didn't receive any formal education about electricity as he found electronics interesting enough to learn on his own. After his graduation Conal became a combustion researcher first at Chrysler Corporation, in Detroit, MI, then at the De Laval Engine Company, in Oakland, CA, and finally at the Physics International Company, in San Leandro, CA. Several fuel injection projects at these companies required actuator technologies that did not currently exist. Conal was involved in developing piezoelectric actuators to fill the need and applied them particularly to high-speed automotive diesel engines.

As time went by, Conal's career focused more on piezoelectric technology, and he went to work for a spinoff from Physics International. There, he worked with his colleagues to support other applications to utilize the piezoelectric actuators they had created. These included: fuel injection, positioning mirrors, directing lasers, an artificial heart, flight control actuators for aircraft, hydraulic pumps without electric motors, and many other applications. Conal's knowledge of both electricity and mechanical engineering proved to be an invaluable skill in this environment.



Towards the end of his career, Conal was interested in pursuing new hobbies. A close friend was moving out of state and convinced Conal to try out Ham radio so they could keep in touch. Conal got his Ham Technician license, followed by his General, about 20 years ago. He enjoys the camaraderie and community of Ham radio and enjoys spending time helping others. In San Francisco, Conal became a member of the Mt. Diablo Amateur Radio Club (MDARC) which has repeaters up on Mt. Diablo. With MDARC, Conal volunteered to help

with radio support for the Escape from Alcatraz Triathlon. The first year, he was placed out on a boat to help the stragglers and protect against hypothermia. The next year, he was positioned on the shore to offer support to those that had completed the swim and were preparing for the 18-mile bike ride to follow.

Conal has owned a house up in the foothills, outside of Groveland, since 2003. In 2020, he moved up here full time. Currently he is using an inverted V antenna, on 80 meters, and a UHF/VHF base station. Conal can see the Duckwall repeater from his living room and says it's a great place for HF. He gets great reception! He first became aware of our Tuolumne County Amateur Radio and Emergency Services Club (TCARES), when he discovered the repeaters and looked them up. He learned of our linked repeater system and wanted to become a member to support his use of the repeaters and to find community. He has an Elmer who has helped him with his ventures into the digital modes, and who is able to answer his questions. Not one who is interested in the competition side of things, Conal enjoys instead the challenges of looking for ways to set up a radio in a very remote area and enjoys going out to look for peaks that haven't been logged yet. Conal has done Summits On The Air (SOTA) for the experience of it, while letting his friend get the points.

Something else Conal really enjoys doing is hiking. He is a member of three hiking clubs: one in Groveland and two on the Highway 108 corridor above Sonora. The Groveland hiking club spends a



significant amount of time taking hikes together in Yosemite. Two weeks prior to our interview, Conal and the group had hiked to Cloud's Rest, and more recently had just completed another hike from May Lake to Tenaya Lake. When hiking, Conal brings an HT, but occasionally he likes to bring his 100-watt HF radio along. To avoid spending money on a relatively heavy battery, Conal coupled a Ryobi portable drill motor battery with a DC/DC converter he bought off of eBay for \$4.00. This works well and weighs less than one pound. He carries this with him when he brings his 100-watt HF along. Conal says he doesn't get a lot of talk time at 100 watts, and he has ideas about how to improve it a little without adding more battery.

I first met Conal on the course of the Groveland Grind, a 50-mile bike race in the mountains behind Harden Flat, near Yosemite. It was at the end of a day where TCARES volunteers, who were stationed along the bicycle course, had spent the day offering radio support for the participants in the race. Conal was a fellow volunteer who had spent the day volunteering and offering support from an isolated station on the course. My partner Jeff and I had spent our day at a different isolated station, approximately 25 miles out from the starting point. In the late afternoon, as Jeff and I made our way down from Trumbull Peak in Jeff's 4WD Jeep, we came across Conal on the road, with a flat tire. It was hot, everyone was tired, and yet the tire needed to be changed. We



stopped and joined Conal to offer our help and support as he changed the tire. There's a wonderful sense of camaraderie and friendship that builds when we offer to support one another. It's also

very refreshing to meet another fellow Ham who chooses to volunteer his time to help others. It felt good to offer our assistance and to get to know one of our newer club members, who enjoys volunteering and helping others, too.

73, Ginger

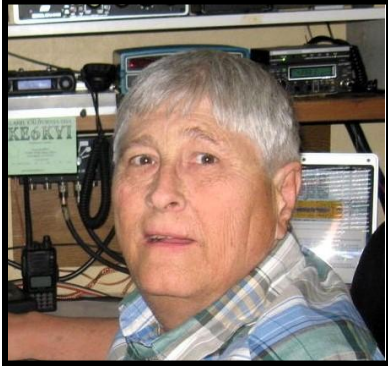
Ginger is a mom, a teacher, a student, a devoted partner, and a life-long learner. Her interests are many and center around service, communication, leadership, and integrity. She recently completed a Masters of Science in Counseling. She is open to challenging herself to learn and grow and in facilitating 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.

TCARES Winlink Class Presentation by Greg, KN6RUQ, and Rich, KK6RIC Pinecrest Academy School, Pinecrest, CA, June 27, 2026



Volunteer Examiners

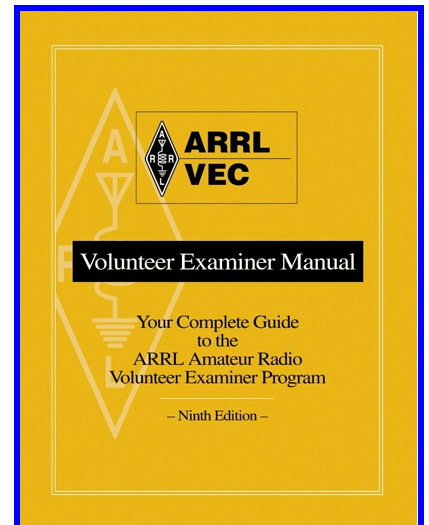
By Grayson Rehn
KE6KYI/WR1623



Most of you know me from being net control on a lot of the nets. But I am also the VE (Volunteer Examiner) coordinator and the go between for TCARES and the ARRL when it comes to holding VE, (ham test) sessions. I am responsible for seeing that sessions are held properly and all the paperwork is correct and submitted to the ARRL (American Radio Relay League). I became a VE about 20 years ago after I got my Extra license and was being hounded by the former VE coordinator, Carl, N16Z. I helped out at the VE sessions and became the club's VE coordinator after Carl became an SK (silent key) in 2018.

To be a volunteer examiner, you have to take another test. You can download the VE manual from the ARRL website (<http://www.arrl.org/ve-manual>); read it, and then take the test. This one is an open book test and it is taken on the computer. The computer will grade the test and let you know if you passed. You need a General license, or above, to become a VE. I would recommend anyone to try the VE test and become a VE, as we could always use a few more. We need a minimum of 3 VE's at each test session.

Well, now things have changed. The ARRL has decided to catch up with the times and has gone digital for the ham test. So now testing is done on computers. The ARRL no longer sends test booklets and all the necessary paperwork required for testing. We now have to download the test booklets and paperwork if we want to do paper testing. Then we have to put this all together into a computer file and forward the file to the ARRL. Now, we can do testing on computers, tablets, or cell phones. Then everything is on the computer and the tests are graded online and you get your results then. We have not gone full digital yet. I am still in the learning mode. Herb, AF6HL, has been helping with the testing and showing me the ropes. Thanks Herb, I could not do it without you.



I have been doing this for some time and I could use a backup for the VE coordinator position. If anyone is interested, please let me know. You can join me in learning the new digital system.

73, Grayson

Hi, I am Grayson, KE6KYI. I also have a GMRS license, WR1623. I had an interest in electronics back when I was a kid. My dad worked in electronics so I got the interest from him. He also was into ham radio, so I tried it also, but could never master CW. So I gave up until I moved here and met Bob Airhart, WA6RTS, in 1994. I got my Tech license that year, then got into ham radio when Bob invited me to a ham Tech class. I got licensed and have been hooked ever since. It took another 10 years to get my General. The thing that always was my stopping block was CW. So I took the General written first and passed knowing I had a year to pass the code, or I would have to start over. It took me almost the full year, and five tries, but I finally passed the CW test and got my General in 2004. Then I got my Extra in 2014. Been going ever since and I am still learning new things all the time.

Repeater Coordinator Notebook

By [Greg Triplett](#)
WA6HNA/WRZS966



TCARES Repeater System Status Q3 2026

[Editor's Note: No report this quarter. See last quarter's newsletter for a detailed list on the status of the system.]

Greg and Marc, N6NEZ, did a site visit to the Moccasin repeater this quarter. Upon inspection they observed that the antenna system had basically been wiped out by woodpeckers! They cleaned out all the accumulated acorns and woodpecker meal from the mast and feedline system. There's a 4-bay dipole + mast with coax running inside and woodpeckers had shoved acorns through the hole and jammed it up; they emptied out around 20 lbs of acorns and ran a new Helix cable with all new connectors. It is all inspected and wearing very well.

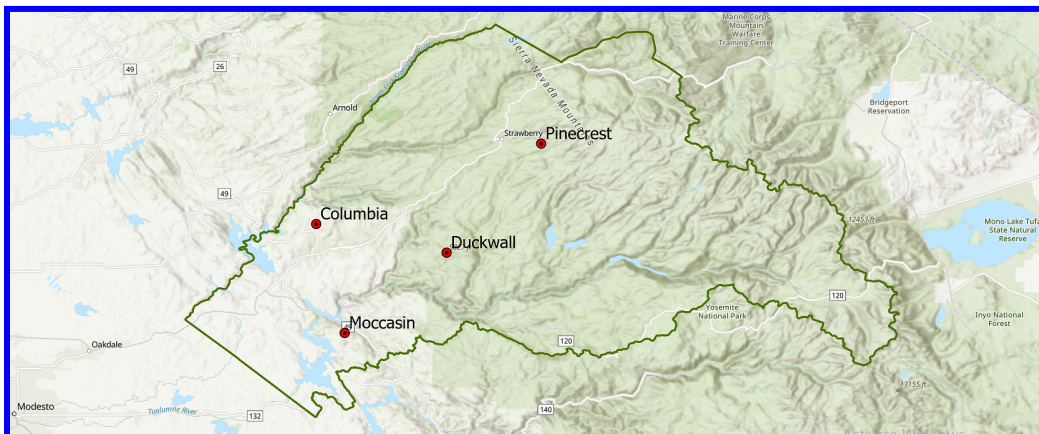
The Duckwall repeater system's internet link was down, for a couple of days, when a router failed. That has been replaced and is up and running again. Echolink and AllStarLink are fully functioning.

Greg is planning to visit the Pinecrest repeater, at the top of Dodge Ridge, before the snow falls. The battery charger up there is dead, so there is currently no backup. A new one will be installed before winter.

The Columbia AllStarLink node needs to be updated/rebuilt. Electrical storms have caused issues at that site in the past, and the flash drive might be corrupted, so he's planning on inspecting that. It can tend to go out intermittently, and can be repaired during the winter.

A huge THANK YOU goes out to Greg & Marc, for all they do to maintain the club's repeater system. It's one of the best and we don't take it for granted!

Greg is the TCARES Repeater Coordinator & K6TUO FCC Trustee. He is a senior hardware engineer at Google (now semi-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 Club Breakfast Meeting @ My Garden Cafe, Sonora, CA July 18, 2026



TCARES Club Breakfast Meeting August 15, 2026

(Note: This activity was used during the TCARES July 18, 2026 monthly club breakfast meeting)

GPS Coordinates Activity (*Where is your husband?!*)

On an Android Phone

1. Open Google Maps.
2. Tap the blue dot showing your current location. (If the blue dot isn't centered, tap the crosshair target icon in the bottom right corner).
3. Tap and hold your finger on or right next to the blue dot until a red pin drops on the screen.
4. Look at the Search Bar at the top or swipe up on the bottom card. Your coordinates will appear in Decimal Degrees (DD) format (e.g., 37.9783, -120.2236).
5. Tap the coordinates to copy them to your clipboard.

On an iPhone (iOS)

1. Open the Compass app (pre-installed on all iPhones).
2. Look at the bottom of the screen.
3. Your current latitude and longitude are displayed in Degrees, Minutes, Seconds (DMS) format (e.g., 37°58'42"N, 120°13'25"W), along with your elevation and general location.

Note: If you don't see the coordinates, open Settings > Privacy & Security > Location Services, tap Compass, and set it to While Using the App.

ARES/RACES Emergency Communications Report

By [Ned Sudduth](#)

K6NED/WRPM781



2026-27 Super El Niño Season Declared an Emergency

Ned, K6NED, sent the following report:

The Governor just signed this EO (Executive Order) to declare a state of emergency for the super El Niño season. Specifically, item 13 pertains to ARES/RACES generically under the 'volunteers' designation.

***Item 13.** California Volunteers, in coordination with the Governor's Office of Emergency Services and other appropriate agencies, shall prepare to mobilize volunteers and trained service members, consistent with their training, mission, safety requirements, and applicable law, to support state and local preparedness, response, and recovery activities in connection with the El Niño event.*

There has been no other ARES/RACES activity due to the absence of major threatening fires locally.

Planned meetings with the Tuolumne County Office of Emergency Services (TC OES) representatives will be coming soon. The TC OES coordinator has been invited to speak to the club and will be at either the October, or November, TCARES Breakfast club meeting. Check www.tcares.net for updates and details.

There is a new HF radio for EmCom Trailer. It has not been installed yet, but Ned is working on that. The trailer also now has a StarLink system, which will provide an internet connection from anywhere.

The club has participated in the Great ShakeOut emergency test during the 3rd week of October over the past several years. With changes at TC OES, we are waiting to hear if we will coordinate with them, as in the past, or if we will run our own exercise.

Other upcoming events include the BEACON Exercise and the Perfect Storm. The BEACON (Building Emergency Area Communications and Operations Networks) Exercise will be on April 29th. Clear communications bring order to chaos, which is where BEACON comes in to provide training on how to send & receive information via radio, when infrastructure fails. For more info see www.beaconexercise.org.

The ARRL San Joaquin Valley section's "Perfect Storm" emergency training session took place during March last year and we're waiting for the details for 2027. Those will be shared on tcares.net, when they become available. The TC OES Siren Test will also be announced, as information is available.

Thanks to all the TCARES volunteers, who keep ARES and RACES running!

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.

TCARES Club Breakfast Meeting August 15, 2026

(Note: This activity was used during the TCARES August monthly club breakfast meeting)

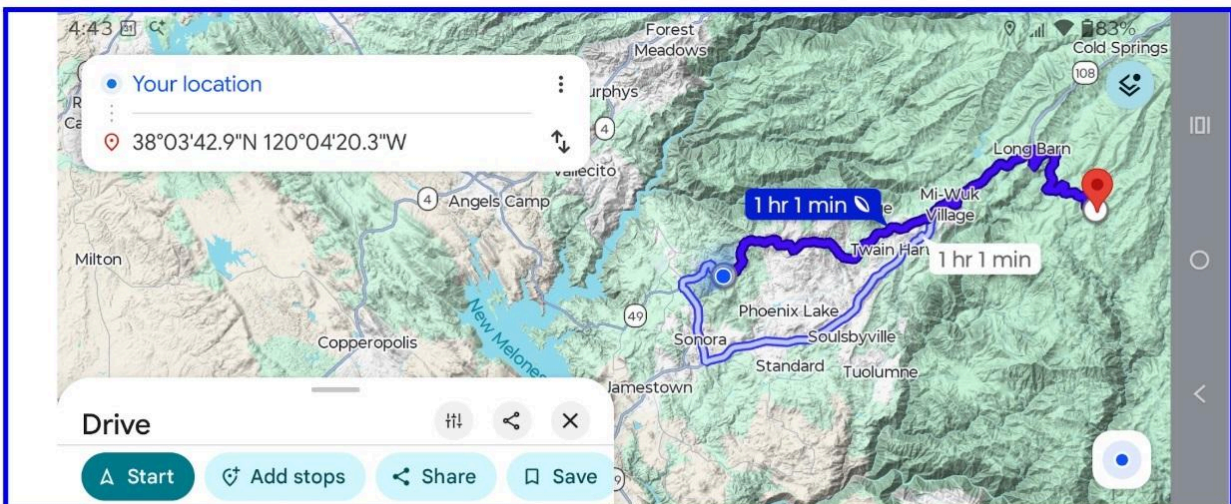
GPS Coordinates Activity (*Where is your husband?!*)

Question: If someone gives you GPS coordinates, can you input them into your smartphone mapping app to navigate to them?

Answer: YES - there's a way!

Step-by-Step Instructions:

1. **Open your mapping app:** Open **Google Maps**, **Apple Maps**, or **Waze**.
2. **Tap the Search Bar:** Tap the search bar at the top of the screen where you normally type an address.
3. **Type or Paste the Coordinates:** Enter the coordinates exactly as provided, then tap **Search** or press the **Search/Magnifying Glass** key on your keyboard.
4. **Start Navigation:** A pin will drop on the exact location. Tap **Directions** or **Start** to begin route navigation.



Sparkie's Corner

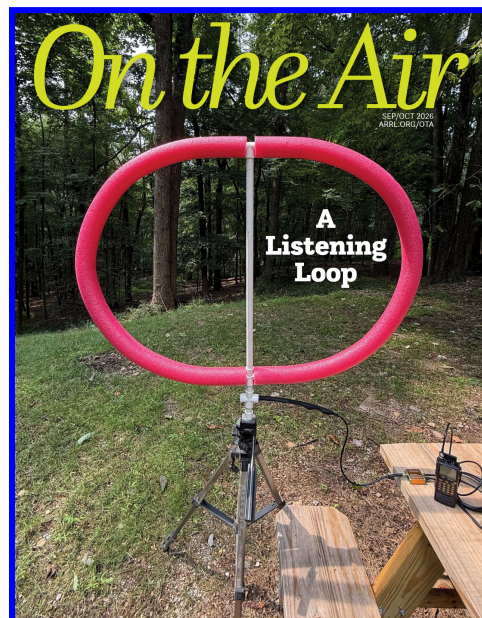
By Rich Combs

KK6RIC/WRMM317



Too Good to Miss!

Many TCARES members are also members of the ARRL ([American Radio Relay League](#)), and so we have the opportunity to read the main ARRL publications: On The Air, OST, QEX, and NCJ. Unfortunately we “just don’t have the time”! The one publication that I try to make time for is “[On The Air \(OTA\)](#)”. It is focused, in general, on the beginner Ham, but I’ve found its brief, clear, informative, articles just too tasty to pass up.



In this month’s OTA issue I found the best description of CTCSS (Continuous Tone-Coded Squelch System) and DCS (Digitally Coded Squelch), commonly called the PL (or Private Line) Tones. After dispensing with the misnomer that a PL Tone makes the conversation *private*, which it doesn’t, the article goes into how it works and how the CTCSS or DCS tone appears on an SDR (Software Defined Radio) trace. The most interesting part however was the description of TONE vs TONE SQUELCH and the confusion it can cause if used incorrectly. I leave it as an exercise for the student to read the article, and while you are there take a look at the Tips and Tricks that appear in every issue, especially the tip for Anderson Power Pole connectors. Be careful though, you just might get hooked into reading it every other month!

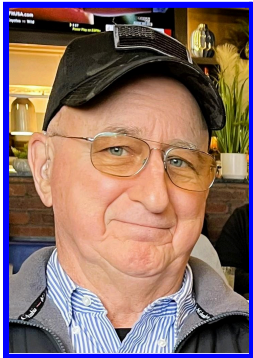
73, Sparkie (Rich)

I passed my Technician and General licenses in February, 2020 and Extra in September 2021. (I’m good at taking tests; I need to work on working a radio!) Main QTH = Livermore, CA, USA, (CM97). I’m relatively new to the radio world! Member of LARK (Livermore Amateur Radio Klub), and TCARES (Tuolumne County Amateur Radio Electronics Society). My alternate QTH = Strawberry, CA (CM98). As of 10/2021, I’m now working on CW via CW Academy. I passed the Beginner level in October, 2020, and I passed the Basic level in March 2022. I got interested in HAM radio to improve emergency communications for the Strawberry Volunteer Fire Department in 2019. I have gotten in way over my head since then! I have enjoyed building a few kits from QRPme and QRPguys. I have been developing a Neighborhood Radio Watch (NRW) program in Tuolumne County, modeled on one in El Dorado County, CA, USA.



Tech Talk: Beyond the Basics

By [Dave Arrich](#)
AD6AE



TinySA Basic Model – Introduction and First Use

WARNING: Be aware of bad quality copy products, see [where to buy](#) below.

The tinySA is already well documented.

This post will refer only to the TinySA 'Basic' model. There is a lot of documentation online. Any or all of it can be copied and pasted. Links for the Menu

Options are listed and will open sub-links that provide greater detail. They're not lab-grade but are quite accurate for the price. Validate all claims – reading a post in a user's group doesn't make it so.



Welcome to the tinySA® wiki! [tinySA | Main / HomePage](#); [hamcom.dk/TinySA/TinySA ULTRA_UK.mp4](#)

For a complete manual: [Description of TinySA a real Spectrum Analyzer for little money.pdf](#)

Note: The text refers to **Low** (lower port) and **High** (upper port) which double as **Inputs** or **Outputs**. This refers to physical connector positions as well as signal levels and frequency ranges. When selected, the low port produces a Sine Wave output; the high produces a Square Wave output. High In/Out is the Upper SMA Jack and Low In/Out is the Lower SMA Jack.

The tinySA Units are small spectrum analyzers and signal generators with some nice capabilities:

- **tinySA Basic**
 - Screen size 2.8 inches
 - Spectrum Analyzer with two inputs, high quality MF/HF/VHF (lower) input port for 0.1MHz-350MHz, lesser quality UHF (upper) input port for 240MHz-960MHz or
 - Signal Generator with two outputs, sine wave output for 0.1MHz - 350MHz and square wave output for 240MHz-960MHz when not used as Spectrum Analyzer.
 - Switchable resolution bandpass filters for both ranges between 2.6kHz and 640kHz
 - Color display showing max 290 scan points providing gapless covering up to the full low or high frequency range.

Introduction and other videos - Kurt Poulson

- A short 7 minute video introducing the main features of the tinySA can be found [here](#).
- A short introduction video to the tinySA Ultra can be found [here](#).
- Many more videos available in "my [YouTube channel](#)"

- Erik Kaashoek has created a very extensive introduction video for the tinySA Ultra. Watch it [here](#).

Manual: For those that prefer to read a document instead of browsing a wiki.

- The English version can be found [here](#).
([Description of TinySA a real Spectrum Analyzer for little money.pdf](#))
- A second option is a PDF version of the wiki, which allows for easier reading for some people, that can be found [here](#) (tinysa@groups.io | Home)

Main subjects covered in this wiki:

- [Spectrum Analyzer introduction](#)
- [Make sure you do not buy a bad performing illegal copy product](#)
- [First use](#)
 - Follow link and read left navigation bar for all menu options

Credits: The tinySA Firmware (FW) is based on the NanoVNA FW created by edy555

Be aware of bad performing illegal copies. Buying elsewhere is at your own risk.

Safe places to buy an original tinySA:

- **Aursinc on Amazon**
- **SeeSii store on Amazon**
- [Zeenko store on AliExpress](#). This is the factory store, guaranteed to deliver genuine tinySA. Other sellers on AliExpress may sell bad clones. To be sure, only buy from Zeenko store on AliExpress.
- [R&L Electronics](#) in the USA. When the tinySA is listed as "out of stock" R&L can still take you order and will only charge your credit card when the product is available again (which may take a few weeks).
- [Eleshop](#) in Europe
- [Switch Science](#) in Japan
- [Taobao](#) in China
- [1688](#) in China

The 'tinySA' Basic model - First Use

After completing the setup steps you can begin using the **tinySA**. Visit the [Videos](#) page for ideas how to use the tinySA and if you get stuck, the "[Getting support](#)" page may have the answer.

1. Unpack

2. Charge the Internal tinySA Battery

3. Check tinySA Authenticity

If you did not purchase from the '[Where to buy](#)' page you may be holding a fake.

4. Update Firmware – Not necessary; works well out of the box.

The tinySA arrives with the current firmware version of the manufacture date. But some owners want to [Update the firmware](#).

5. The included instructions outline how to:

- Run the Self-test – Required on First Use – Optional Anytime Thereafter
- Calibrate
- Warnings – Avoiding Input Overload

6. The tinySA is Now Ready to Use

Connect an input signal or antenna to the low input and go back to the [INPUT](#) menu, you can select which input to use from the [MODE](#) menu, select either [LOW INPUT](#) or [HIGH INPUT](#).

Use the [FREQ](#) menu to set the frequency range displayed and the [LEVEL](#) menu to set the displayed levels.

You can always go back to a defined state by clicking the [PRESET](#) button in the input menu and then [LOAD STARTUP](#).

Screen Info and Jog wheel.

The screen is divided in 5 areas.

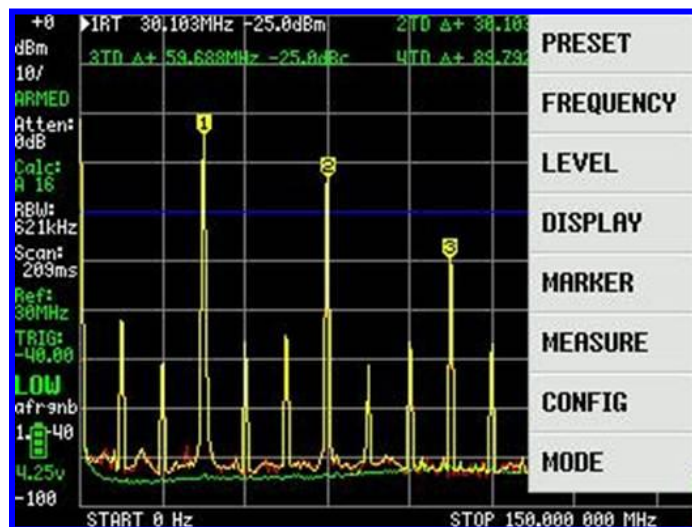
1. Info Panel – Left Side

From top to bottom the following info is shown (between brackets the actual info shown).

- Reference level (+0) turns green when manually set, white when automatic
- Unit (dBm)
- Scale (10dB/square) turns green when manually set, white when automatic.
- Scan status (ARMED) can be PAUSED either manually or when single sweep is done, auto rearms.
- Attenuation (0dB) turns green when **manually set**; white when automatic.
- Calculation (A 16 means a Running Average of 16 measurements), only shown when calculation is active.
- RBW (612kHz) turns green when manually set, white when automatic.
- Scan time as measured (209ms), turns red while the first scan is still in progress after changing settings.
- Cal output frequency (30MHz); is only shown when cal. output is active.
- Amplification of the external amplifier or attenuator; only shown when not zero.
- Trigger level set (-40dBm), turns red when waiting for trigger in NORMAL mode, turns green when SINGLE trigger is completed. Only shown when not in AUTO
- Input mode (LOW) LOW is low input mode/port. HIGH is high input mode/port.
- Compact setting status (afrnbg) all lower case letters mean everything is on automatic.
- FW version (1.0-40)
- Battery Charge Level and Voltage
- Measurement Baseline level (-100dBm)

2. Marker Panel – Across Top

- Shows info for a maximum of 4 active markers. Symbol Legend:
- An optional arrow indicates the currently selected marker



- The type of marker is denoted with some letters. R=Reference, D=Delta marker, N=Noise marker with level normalized per Hz RBW
- The frequency of the marker, a '+' or '-' indicates a delta frequency
- Level of the marker. If no unit is indicated the level is in dBmW or in dBc for a delta marker.

A marker can be selected by touching its marker info. A selected marker can be positioned using the jog switch unless it is a tracking marker. Only one marker can be a Reference marker.

3. Scan Info – Across Bottom

- Shows the Start/Stop, Center/Span or Zero span/Scan time info.
- Scan info can be selected by touching the info. Selected info is marked with a caret symbol and can be changed using the jog switch

4. Measurement Panel (Display) – On Screen

Shows maximum 3 traces.

- Yellow trace is the measurement trace, either as measured (when no calculation is active) or as calculated.
- If a calculation is active a red trace shows the info from the last scan.
- The stored info is shown in a green trace
- Shows a maximum of 4 markers. Tracking markers are automatically positioned. Non-tracking markers can be grabbed and shifted to any location, or the **MARKER SEARCH** can be used to position them.
- The active trigger level is indicated with a blue line

5. Menu – Right Side

The menu is shown after touching the screen or pushing the jog button. This menu activation aborts the current sweep. After the menu setting is finished the sweep (when not in paused mode) will restart with the possibly updated settings.

6. Jog wheel – Top Right of Case Edge (beside power switch)

(Touch Screen is the primary and the Jog wheel is an alternate means of user input.)

- Pressing in (no left or right movement) toggles and activates menus.
- Pushing left or right moves the cursor left or right when no menu is displayed.
- Pushing left or right while a menu is displayed highlights and steps through the displayed menu options.
- Pushing left or right during startup starts the tinySA without loading any user settings
- The jog wheel is the only source for user input when certain menus are activated, such as Brightness.

tinySA Menu Tree – Lists All of The Main Menu Sub-Functions in Detail

Everything the device can do is in the Home Screen Menu Tree links and are too detailed to show here.

Home Screen Main Menu

- **PAUSE** pauses the sweep (no link).
- **[PRESET](#)** loads or saves configurations.
- **[FREQ](#)** sets everything related to the frequency range to scan.
- **[LEVEL](#)** sets everything related to the level of the signals being measured.
- **[TRACE](#)** sets everything related to a trace including storage
- **[DISPLAY](#)** controls various aspects of how the signals are being displayed.
- **[MARKER](#)** controls the markers on the display.

- [MEASURE](#) helps to quickly set the tinySA for certain measurements.
- [STORAGE](#) opens the storage menu. In some models, may be listed in the **Trace Menu**.
- [CONFIG](#) opens the configuration menu.
- [MODE](#) opens the input/output mode switching menu.

73, Dave

"It isn't what you don't know that gets you in trouble, but what you know for sure that just ain't so." – Mark Twain

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.

Multi-County Ham Club Picnic @ Utica Park, Angels Camp, CA September 19, 2026



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