TCARES - Tuolumne County Amateur Radio & Electronics Society

Amateur Radio Club Fall 2023 Newsletter



September 21, 2023



We've Recovered from Covid and We're Back!

Hi all! TCARES is **back**! We survived Covid-19 and we're now holding F2F (Face to Face) meetings, after adapting to the Zoom meeting format (that thankfully saved us during the pandemic!). We've had a few F2F breakfast meetings at My Garden Cafe, in east Sonora, and attendance has been steadily growing. We hope to see you all at the Multi-Club Annual Picnic on September 23rd @ 11:00 am – 4:00 pm PDT and/or at our next TCARES Club Breakfast, on October 21st. Additionally, The Great Shake Out Statewide Drill and the Pacificon 2023 Ham Radio Convention are also on the docket (see "Dates to Remember", for these events, and more, below). So, please, come join in on the fun and get reconnected with other hams!

Coming Up:

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Dates to Remember:

September 23	Multi-Club Annual Picnic	
October 19	The Great Shake Out Statewide Drill	
October 7-8	Calif. QSO Party	
October 20-22	Pacificon 2023 Ham Radio Convention	
November 18	TCARES Club Breakfast Meeting	
November 25	TCARES Club Board Meeting	
December	Christmas Party	
December 16	TCARES Club Breakfast Meeting	
December 23	TCARES Club Board Meeting	

Editor's Note By <u>Jeff Tolhurst</u> N6JWT/WRDP326



Greetings TCARES members. The newsletter has now been officially *REVIVED*! Many thanks go out to all of my colleagues, who have volunteered their time and efforts to help with this edition. The purpose of the newsletter is to keep TCARES members informed, engaged, and connected, while promoting our club's mission and fostering a strong sense of community and involvement, in all forms of radio (FRS, GMRS, and HAM/Amateur Radio).

During 2023, in Tuolumne County, we had a winter with crippling snowstorms, flooding, multiple thunderstorms with numerous damaging lightning strikes, a tornado, some wildfires, widespread power/cell phone/internet outages, and

more. During many, if not all, of these events, amateur radio has helped TCARES members to stay connected with one another for news reports, information, and helpful knowledge. Our robust repeater system has played a major role in supporting club members and the general public. We have a wonderful team, led by Greg Triplett, WA6HNA, who have all worked to keep the system up and running. Additionally, we continue to support our community with radio communications for multiple different events. For example, so far this year our club members have provided support for TCARES Winter Field Day, the Old Mill Run, the Orient Express Run, the Groveland Grind Mtn. Bike Race, Columbia Airport Day, OES EmComm Incident, GMRS Neighborhood Radio Watch, with more to come.

Our members are mostly from Tuolumne County, but we also have members from Calaveras County, the Central Valley, and the Bay Area. The map below shows TCARES members (*red antennas*) geocoded by address. There are: 71 members in Tuolumne County; 9 members in Calaveras County; 6 members in San Joaquin County, 4 members in Stanislaus County; 4 members Mariposa County; 4 in San Jose/Santa Clara area; with 2 others in Santa Rosa and Sacramento (100 members total).



TCARES is a wonderful group of like-minded people, sharing a common interest in ham radio. We also share interests in volunteering for the common good and we like to keep learning throughout our lives, improving and bettering ourselves through serving others, training, education, and social connection. Radio can be incredibly appealing for many reasons. Here's some food for thought on how radio can keep us in that psychological "flow", which is essential for maintaining a high quality of life: The Psychology of Optimal Experience. Enjoy this newsletter and "flow" with ham radio!

President's Message by <u>George Overturf</u> N6GEO



Dear TCARES Members! Welcome to the first issue of the TCARES newsletter! It joins the TCARES website, Facebook, and our weekly NETS as yet another way to connect you to the local HAM community. I also encourage you to contribute articles to keep the content fresh and alive. Use our "Letters to the Editor" section to help the board know what our club members are thinking. I look forward to hearing from you.

73, George, N6GEO n6geo@arrl.net

Winter Field Day was a Success!

George Overturf, N6GEO, shown above, made a successful contact via satellite, on Winter Field Day in Columbia State Park, which attracted significant attention (thanks George)! Planning for the upcoming Winter Field Day (January 2024) is currently in progress.

Watch our Field Day Video (2021)

Read More on our Website



This is a radio propagation map showing Duckwall repeater site (top center) and the Groveland Grind Mtn. Bike Race Area. Green = excellent coverage.

Letters to the Editor

Dear TCARES Board,

I would like to make a suggestion for the operation of the local repeater system. I feel it would be very beneficial to only use one PL tone and have the repeaters in link mode as it is during the NETs. There are many benefits that are accomplished by doing this. I believe this would make the system much more friendly especially for a new user during an emergency situation. At this point in time if someone needing assistance attempts to access the system and is not familiar with it could very easily set the local PL and not be linking up to the other repeaters. I realize we all understand how the system works and for a large system like CARLA, where the repeaters are 100s of miles away and there are many more repeaters being able to unlink can be useful, but for a small system, I feel it just makes it more complex and that has the possibility for discouraging new users. Personally I have had many occasions when I try to return a call just to find out I am on local and they did not hear me. I have also heard this occurring with other people on many, many occasions. This would also eliminate the need for having 8 channels taken up.

I talk mostly on the Salinas Valley Repeater System and this is how their system is set up and they have zero issues. Sure they do have options for other repeaters if the main system is in use, but we also have CARLA and simplex and I can talk on 5 or 10 other systems in different areas that are also never in use so I feel we also do have options.

Thanks for your Time.

Tim Kreger, KN6MKS

[Editor's Note: This letter to the TCARES Board was submitted in May, 2023, and the issue has been discussed by the TCARES Board. After discussion over several Board meetings, the Board's response was to link all of the repeaters together for a trial period of time. The repeaters will all be linked soon, and the experiment will be run through the end of this year (minimum), then the policy will be reevaluated and voted upon. The Board has contacted Greg, WA6HNA, who has put this on his task list to complete.]

Letters to the Editor can be emailed to Jeff Tolhurst at *jewato@gmail.com*. Jeff is reviving the TCARES newsletter, which will be published quarterly. Jeff taught geoscience and geospatial technology at Columbia College for 26 years and has had a ham license since 1990 (N6JWT). He has been a member of TCARES since ~2004 and is interested in VHF, APRS, GMRS, NRW, and is slowly moving toward HF and CW. He was recently elected to the TCARES Board as a Director and has been recently "voluntold" to head up the club's new Education Committee. *TCARES* is a non-profit volunteer service organization of amateur radio enthusiasts, interested in promoting our club's mission and fostering a strong sense of community and involvement.





CYCLE 25 IS HERE. WHAT'S THAT MEAN ?!

We are now entering the "Solar Maximum" part of Solar Cycle 25, which could mean four years of excellent conditions for DXing. Maximum solar activity increases ionization in the "F" region of the ionosphere (150-250 miles up) which facilitates daytime 20 to10-meter propagation and nighttime 40 through 10-meter propagation.

If you're wondering <u>when</u> to look for DX, the SN (Sunspot Number) may help. While the SN is the result of observation and calculation with some tricky statistics thrown in (for a "smoothed" number), it is often a good indicator of conditions for DXing. The highest SN count in 20 years was this past June, at

a level of 163.4, but higher values are predicted for late 2023 and early 2024.

Another indicator is the SFI or Solar Flux Index. This is strongly correlated to the degree of ionization of the F2 region.

Finally, the K-index quantifies disturbances in the earth's magnetic field that cause, for us, background radio noise. When this index is 2 or less — and the SFI has been at 150 or more for a few days (to "charge" the F2, DX should be great!

A K-index over 3 can mean high absorption, i.e. poor reflection of radio waves, and a K of 5 to 9 means a geomagnetic storm is probably going to cause interference. The A-index, a summary of world K-index readings, also relates to geomagnetic stability, and low (1-6) numbers are best, 11 up worst). The Boulder K index, updated every three hours on WWV, is probably the most accurate one to use at our latitude.

Current solar data (SN, SFI, K, A, etc.) are readily found at *QRZ.com*, and a full page of current information is at the K7RA solar update. The *ncdxc.org/propagation/* page also has alert messages about strong space weather (solar storms) that may lead to radio blackouts. Finally, *spaceweather.com* is an interesting resource. For activity on the sun and what it means for us, check out Dr. Tamitha Skov's podcast (*spaceweatherwoman.com*).

Space weather charts will indicate which bands are good, poor, or closed for DX contacts. You can also figure this out by listening for beacons, digital signals, and WWV stations. You can generally tell from others' spots (see below) if the band is open for us. You can also learn, e.g. from *spaceweather.com*, about CMEs and flares that can shut down the bands. For more information and links go to *arrl.org/propagation-of-rf-signals*.

How about where to look?

If you want help finding DX, try a spotting service. I like to use **DXSummit.fi**, which will give you VOACAP propagation predictions when you put in your location (e.g. CM98tb for Columbia). It will also show where you and the desired station are on the map *AND* in relation to that magic "gray line"

when there may be an especially strong connection with that DX station. Note that this will apply to any station in the same geographic area.

So how do I find DX?

Be sure to look for DXpeditions, especially in the Pacific region that's relatively easy for Californians to reach, especially in the late afternoon or evening. Here's a partial list of some we might hear and work in October:

Oct. 1-14	5W0ML	Samoa
Oct. 1-31	YJOTT	Vanuatu
Oct. 2-15	TX6D	French Polynesia
Oct. 3-15	V73AH	Marshall Island
Oct. 10-23	E6AM	Niue
Oct. 10-30	T2C	Tuvalu
Oct. 18-30	V63AH	Micronesia
Oct. 26-Nov9	H40WA	Temotu
Oct. 27-31	V63CB	Micronesia

A fuller list – going into 2024 – can be found at **ng3k.com**; thanks to Pat, WA6SCW, for this. The ARRL puts out a weekly DX bulletin. Information on propagation was inspired by George, N6GEO's, recent "3rd Tuesday TCARES Tech Net" (@ 7:30 pm). Errors and confusions are of course my own!

How do I work DX?

DX-pedition stations are much sought after, and there will be pileups of US stations calling them. Finding the pileups can be a shortcut to finding DX, but be sure not to tune up on a calling frequency or, worse, on top of the DX station! DXing often requires operating "split," with you calling up a kHz or more. The DX station will specify "up."

Use your operating skills to figure out what frequency the DX is listening on! Another place to find DX (and pileups) is in contests. A couple of these that are useful for grabbing DX and coming up in the next few months are the CQ Worldwide DX Contest (SSB Oct. 28-29 and CW Nov. 25-26). A full contest list is found at WA7BNM's page (times/dates in UTC).

You can also find DX from a spotting site, by hearing a CQ, or calling CQDX yourself. These are the most satisfying contacts and may involve more conversation than the minimum signal report required for a confirmed contact!

There are 340 DX entities currently on the official list, and 64 that have been withdrawn, mainly for political reasons. Most are familiar countries (e.g. UN member states), some are remote territories, or some uninhabited reefs or islands. You learn a lot of geography while DXing!

By the time of the next Newsletter the solar maximum should be close to its peak. Please send reports of your ATNOs (all time new ones) and what you've observed of the bands and times that are especially good for DX, so I can share them with the club in the next Newsletter.

Get out those world maps and start marking places you've contacted! Please write to *dmcneil36@gmail.com* with your comments, questions, and reports of your DX successes for inclusion in a future column.

David began his love affair with ham radio at age 13, keeping out of trouble by hanging around a University radio club station. He built and operated Heathkits, making his first DX contacts in mid-1957, shortly after upgrading to General from Novice. This was (during the "19th Solar Cycle," which peaked in1958). He renewed his K5GRT General class license but after moving to California got his present W6PHO call. After 45 years of studying European history, he has returned to the radio hobby he fell in love with as a teenager. He upgraded to Extra in 2015 and got his DXCC certificate in 2017.



Meet Our Members

By <u>Ginger Rohlen</u> KM6RFT/WRDP326



It's 10:19 AM on July 19th, 2023, in Sonora, and I'm meeting with Carol Brown. Carol is one of the founding members of TCARES and she has graciously agreed to meet with me and share her experiences as a club member and a Ham radio enthusiast. To begin with, I've asked Carol to tell me a little bit about herself.

Carol was born in Southern California and lived there for eleven years. When her parents divorced, she moved North to the Bay Area to get a fresh start. She graduated from Fremont High in 1967 and became a Christian. Carol met her husband, Sterling in church. "One day he walked in and dropped his books and his Bible in the seat next to me and we started talking. The rest is history." Carol and Sterling were married in 1971 and

they have three children, one of whom has special needs. They will celebrate 52 years of marriage this December. "We are more in love now than ever. We have a great relationship. We love a lot of the same things, we work well together and we love to travel."

When asked what brought her to Ham Radio, Carol spoke about going with her grandparents as a young girl to visit her father's cousin, who was a Ham Radio operator. She remembered his Ham Shack out in the carport, and her shock one day when she heard him talking on the radio.

"What are you doing?" she asked, "Talking to someone from *outer space*?!"

Carol also talks about her discovery, as a young girl, of the Morse Code when reading through the encyclopedias in her home. It was the combination of these two early discoveries that eventually led Carol to become a Ham Radio operator. When she married Sterling and discovered that he, too, shared an interest in the code, she signed him up for Ham Radio classes. When Sterling returned from his first Ham class, Carol asked him how it went and then asked, "Is it something I could do?" Carol joined



Sterling to attend the next class and thought, "This is a kick! I want to do this!"

In the beginning, Carol struggled with learning the code because she couldn't differentiate between a dot and a dash. One day though, she finally heard the difference, and through the years, was eventually able to get up to 20 words a minute. A compliment that has been shared with Carol many

times, is that, as a keyer, she has a "good fist". Carol has many stories to share about learning and working with the code and I would invite you to ask her to share them with you, if you get a chance.



Carol has devoted many years of service to our club. When Carol got her Extra class license, she served as a secretary in SPARKS, the Sonora Pass Amateur Radio Club. When TCARES was formed, Carol served a year as Vice President and then a year as President of the Club. Carol is a VE (Volunteer Examiner) and as a team, she and Sterling have taught classes to those wanting to get their Ham Radio licenses. At one time, Carol and other women members ran a YL ("Young Lady") net once a week. They did it on Thursday nights and would rotate as net control operators each week. Looking forward, Carol would like to get more active in

the club again and do more with CW. She would like to get to a place where she can copy in her head rather than writing down the symbols as she hears them.

It was such a pleasure talking with Carol and getting to know her better. Her generous spirit, her willingness and her fearless attitude were evident throughout her stories. I admire her ability to continue to challenge herself and her desire to learn even more. Thank you Carol for meeting with me. I look forward to seeing you at our next Ham Breakfast.

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. Currently she is pursuing 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, and enjoys hiking, biking, 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



National Night Out is an annual community-building campaign that promotes police-community partnerships and neighborhood camaraderie to make our neighborhoods safer, more caring places to live. Neighborhoods host block parties, festivals, parades, cookouts and various other community events with safety demonstrations, seminars, youth events, visits from emergency personnel, exhibits, and more.

TCARES was fortunate enough to be invited to Tuolumne County's National Night Out. I want to say thank you to



Tuolumne County and those who volunteered at the TCARES booth. The booth was located right behind the Sheriff's Swat Vehicle and that was fantastic. The kids loved the tactical vehicle! We were there to ask the children and adults to practice and play on the radios we had. It was fun showing everyone how to operate on FRS, GMRS, 2m/70cm, and HF.



My Daughter, Annemarie (age 9), was able to bring in kids to play radio on a set of FRS radios that were available. She would show the kids which buttons to press and then would "make a contact".

I was able to talk with the public on what TCARES is and how we help the community from emergency communications during a disaster

(ARES and RACES), education in amateur radio (i.e. getting a license), programming radios, and making and strengthening social connections.

It was an amazing experience, meeting and growing relationships for both TCARES and myself.

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.



Mike's CW Column By Michael McGinty W6MVM



Hi, the first question is "*Is CW dead?*??". Code is no longer required to get a license. Does anybody still use it? It was dropped from the requirements because the military no longer needs trained operators. For many years it was thought essential for national defense to have trained Morse Code operators, but not in the age of digital communications. But is it dead? Not hardly.

As I'm writing this column, I'm tuned to the 20 meter band. Looking at the lower CW portion with my Flex 6300. The spectrum is set to cover the whole CW area from 14000 kc to 14085 kc. There are more than 20 CW QSOs going on. This is about 5:30 on a Tuesday afternoon. Not a hot operating time. Moving up to the SSB portion of the band, 14150 kc

to 14350 kc, there are about the same amount, 20 QSOs going on. CW seems to be about as popular as SSB.



[Note: This is me operating as KH6DOX in Honolulu in about 1961. The rig is a Hellicrafters SX-101 and a Heathkit DX-35. I still have, and use, the keys.]

The digital area, 14070 kc to 14085 kc, is packed. No idea how many contacts are being made. Notice I didn't call them QSOs, just contacts. Digital is great for contacts, especially DX, but so is CW. Many of our club members have been very successful with digital, especially FT8 at making a lot of DX and other contacts that count for 'DXCC', 'Worked All States', 'Worked All Continents' and other operating goals. I encourage everyone to explore these modes. They're great for that, but communication is

limited to a fixed exchange. You can't really have a conversation on FT8.

This brings us to what I like about CW. I like to rag-chew. I like to talk to other hams in conversational CW. The quality of the conversations is usually very good. The operators are generally helpful and friendly. I've never had anything but a polite QSO on CW. CW conversations are a big contrast to the conversations I've had on 80 meter SSB. 80 meter SSB can be a rough place.

Conversational CW is about sending words, not a stream of characters. Being able to hear the words clearly really helps to make the QSOs pleasant. This can take some practice. Search for 'bens best bent wire' on Google. You will find many reference sites, YouTube videos, and discussions on sending good CW. More on this topic in later columns.

Besides conversational CW (rag-chewing), there are two other popular CW activities, chasing DX and contesting.



[Note: This is Dave, W6PHO, and I, W6MVM, operating the CW station at this year's Field Day.]

Chasing DX is just that. Sometimes just finding the DX station in the cluster of stations trying to make a contact is difficult, but it can be very satisfying if you are one of the operators that makes a contact. CW is one of the best ways to chase DX. The site dxheat.com has a DX Cluster chart that shows most of the current DX activity. Looking at it now, most of the activity is on FT8. This morning it was mostly CW on 15 and 20 meters with some on 10 and 12 meters. DX contacts are usually short exchanges of name, RST, and sometimes QTH. Then the DX station goes off to the next contact. I have had a few conversations with DX stations, usually late at night when there wasn't a cluster of callers. Dave, W6PHO, will cover DXing with CW in his DX column in this newsletter.

Contesting can be great fun on CW, especially Field Day, QSO Parties, and SKCC sprints. Last Field Day, Dave and I made about 200 CW contacts on 20 meters alone.

CWops Tests (cwt) are one-hour contests held every Wednesday and Thursday. They are mostly a bit fast for me. I'll keep trying, but they are great ways to develop contesting skills. Check their web site cwops.org. It's a great reference on everything CW. Check the 40 meter CW band at 8PM on Wednesday night. There will be over 100 contestants in the cwt. The CW band just lights up on my spectrum display.



[Note: 20 Meter CW Sunday afternoon. Plenty of activity and a DX cluster right middle of the picture. From my Flex 6300.]

Contest CW is skill all its own. It's short, fast, bursts of fixed format information called an exchange. Each contest has its own exchange, but once you pick up the pattern it becomes easy, even at speed. It

really helps you learn numbers in CW.

In summary, the best reason to operate CW is because it's fun. It becomes like another language. The QSOs are polite, and often informative. CW operators usually have good operating skills and are helpful to beginners. It's still a very popular mode of operation.

CW operating is very inclusive, all classes of operators, including Novice/Technicians, can operate HF CW on 80, 40, 15, and 10 meters on certain frequencies. The allowed frequencies for Technicians are usually the best CW frequencies on the bands. In my youth, I hurried to upgrade to General so I could use a VFO and operate on 20 meters.



[Note: Mike, W6MVM, at his home CW station.]

In future columns, I plan to cover other aspects of CW operating like: 1) How to learn the code (many good ways); 2) What is the best (in MHO) station equipment and how much power do you really need? 3) Antennas; 4) Keys; 5) CW resources; and 6) Fun CW events.

In the meantime, check these websites for further information: 1) CWops.com – Great site, great courses in the CW academy; 2)

Fistsna.org – FISTS The International Morse Preservation Society; great site, many resources, free lifetime membership; and 3) Skccgroup.co – The Straight Key Century Club; free lifetime membership, great resources, fun contests and monthly straight key nights on the first of every month.

The CW book to read is "The CW Way of Life: Learning, Living and Loving Morse Code (in a Digital World)" by Chris Rutkowski. Available on Amazon. I'll review it in another column.

Dave, W6PHO, reminded me of another very good book on CW, 'Zen and the Art OF Radiotelegraphy' by Carlo Consoli. I purchased and read half of this book in 2015. It's very good and like 'The CW Way of Life' is very philosophical. It shows how to avoid the mental roadblocks to learning, using and enjoying CW. The book is available from Amazon and is legal to download from several ham radio sites. Just search for it.

Thanks for reading this column. Let me know what you would like to discuss in future columns (submit thoughts to "Letters to the Editor" and have fun on CW.

73, Mike

w6mvm@arrl.net

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.



Repeater Coordinator Notebook By Greg Triplett WA6HNA

TCARES Repeater Courtesy Tones



Repeater Courtesy Tones. What are they, what do they mean, why do some sound different, and why do we have them? The answers to these questions are fairly simple, but in our TCARES Repeater System, the courtesy tones actually convey a lot of information.

Courtesy Tone Purpose

The primary purpose for any of the repeater courtesy tone is to let the radio operator know: 1) when a transmission is complete; 2) if the repeater system has had enough time to reset; 3) provide time for a breaking station to jump in; and 4) to let the next-in-line operator know when the system is ready to accept a new transmission. In a

multi-linked-repeater system, like TCARES', it takes time for all the links to drop and prepare for the next transmission. As such, it's important to **wait for the courtesy tone** before starting a new transmission, otherwise some parts of the linked system may not be ready for your transmission!

Courtesy Tone Overview

The TCARES Repeaters use 3 distinct tones, and either one, two, or three, tones stringed together to form the Courtesy Tone. With this combination of tones, we are able to determine the following: 1) which repeater we are listening to; 2) if the repeater is in *Linked* or *Local* operating mode; 3) if the station we are hearing on the repeater is also on that same repeater; or 4) if they are being linked into that repeater from another TCARES repeater, an AllStar Link port, or an EchoLink port.

The Three Individual Tones

Two of the three individual tones are exactly the same tones that TCARES has been using for decades on the W6FEJ repeater when it was on Telegraph Peak. Now, W6FEJ, on Duckwall, continues to use those tones to this day. The 3 tones are:

A low pitch tone with a long duration. This tone is called the Boop.
A medium pitch tone with a medium duration. This tone is called the Beep.

3) A **high** pitch tone with a short duration. This tone is called the **Peep**. Yes, it sounds like a *baby chick*!



	A	В	С	D 👻	
1		TCARES REPEATER COURTESY TONES			
2		LOCAL STATION UNLINKED	LOCAL STATION LINKED	REMOTE STATION LINKED	
3	COLUMBIA	BOOP - BOOP (Low - Low)	BOOP - BOOP - PEEP	PEEP (High)	
4	MOCCASIN	BOOP - BEEP (Low - Med)	BOOP - BEEP - PEEP	PEEP	
5	DUCKWALL	BEEP - BOOP (Med - Low)	BEEP - BOOP - PEEP	PEEP	
6	PINECREST	BEEP - BEEP (Med - Med)	BEEP - BEEP - PEEP	PEEP	

TCARES Repeater Courtesy Tones Chart

Putting the Tones Together to make a Courtesy Tone

The low and medium pitch tones (Boop and Beep) always refer to the TCARES repeater you are currently listening to, and are always transmitted as a pair of tones. The high pitch tone (Peep) always indicates the repeater is either in Local mode (no Peep), or in Linking mode (Peep).

The Boop and Beep tones uniquely identify the repeater you are listening to. If you think of Boop (low pitch) as a Digital Logic "0", and the Beep (medium pitch) as a Digital Logic "1", then with a sequence of two tones you are able to identify up to 4 repeaters, which just happens to be the number we have! The two-tone sets are the equivalent of counting from binary 0 to binary 3. We then number our repeaters from 0 to 3 based upon their elevation up the mountain. Columbia is at ~2,000', so it's number 0; Moccasin is at ~3,000', number 1; Duckwall is at ~6,000', number 2; and finally Pinecrest is at ~8,000', so we wrap up with number 3. With this system you have the following 2-tone-sequence courtesy tones:

- 0) Boop, Boop == Low Pitch then Low Pitch == Binary 00 == Columbia
- 1) Boop, Beep == Low Pitch then Med Pitch == Binary 01 == Moccasin
- 2) Beep, Boop == Med Pitch then Low Pitch == Binary 10 == Duckwall
- 3) Beep, Beep == Med Pitch then Med Pitch == Binary 11 == Pinecrest

When we add a third tone, the hi-pitched, short Peep tone to the end of the 2-tone-sequence repeater identifier courtesy tone, you now have a "Linked" mode tone added to that repeater's sequence. This is the 3-tone sequence that applies to all our repeaters. For example, if you are listening on Pinecrest, and you, or another Pinecrest user, is using Linked mode, you would hear Beep, Beep, Peep. Also, if you don't hear the Peep at the end, you know the user is using Local mode, and is not Linked.

Finally, if you are listening to a repeater and only hear a single "Peep" tone, but do not hear the two-tone ID sequence for the repeater you are on, then that transmission came into your local repeater from a linked station that is not on your local repeater. For example, if you are listening on Moccasin and hear just a "Peep" at the end of a transmission, there are currently 5 possibilities of where that transmission originated from: 1) Duckwall; 2) Pinecrest; 3) Columbia; 4) AllStar Link; or 5) EchoLink; but **NOT** from Moccasin! And in the future there may be other additional linked locations added. If you want to talk to the person you just heard linking in from somewhere else, you need to

make sure that you are using Linked mode, so your transmission will go out to all other repeaters and Linking systems, and you will be heard.

Now you know everything there is to know about TCARES Courtesy Tones, so grab your radio and see if you can tell which repeater and mode you are listening to, just by hearing the Courtesy Tone!

73, Greg

Former senior hardware engineer at Google (now retired) specializing 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 in test & measurement, telecommunications, satellite TV, security, military, and aviation.

ARES/RACES Emergency Communications Report

By Ned Sudduth

K6NED/WRPM781

[Note: This report was submitted on behalf of K6NED, updating TCARES on upcoming EmComm events.]



"Dear Neighboring Ham Leadership....

Tuolumne County OES wants TCARES to participate in the earthquake drill in October.

Last year, we winged it and learned some lessons. [Note: TCARES is viewed in a positive light after our tornado event (Click here for Youtube Video Link).]

This year, I want to have a better plan and gather ideas on how to conduct an earthquake Net for the Motherlode.

My initial plan is to have home stations and designated rovers, and use as much APRS as possible. Since we only have about 3 people in the county ready to use Winlink, we will rely on voice FM, repeaters, simplex, maybe some HF as well. Plus some GMRS relaying, etc.

Plans are being birthed.... Any input from you is welcome. Or send your plans for this year or last year so we can copy ideas.

Please email or give me a call with ideas or reference material.

Thanks.

73, Ned

Sparky's Corner

By <u>Rich Combs</u> KN6HSR/WRMM317



Back on 9/9/99 I was struck by lightning, knocked out, ruptured eardrums, etc. When I returned to work my "friends" had taped strips of foil to the air vent in my office so that when the air came on I heard crackle, crackle, snap! And since then I've picked up the nickname "**Sparky**". So I've decided to name this column "**Sparky's Corner**".

Initially I'll be covering FRS and GMRS radios and communication.

FRS. Family Radio Service, was initially proposed for family use by Radio Shack in 1994, with a limit of **less than or equal to 500 mW transmit power***. At this level it was considered by many to be just a child's toy. In 2017 the FCC significantly modified the FRS rules. It

allowed transmitted power at up to 2W on Channels 1-7, and 15-22. Power is still limited to 0.5 W on channels 8-14. These are the only allowed FRS channels.

Speaking of channels, this is similar to the HF 60 meter (5.3 MHz) band. Each channel corresponds to a fixed frequency. Channels 1-7 range from 462.5625 to 462.7125 MHz in 0.025 MHz steps. Channels 15-22 range from 462.550 to 462.7250 also in 0.025 MHz steps. This is slightly, but significantly above, the amateur radio 440 MHz band. The bandwidth of all FRS channels is 12.5 kHz which is considered NFM (narrow FM). As a result, the audio is theoretically poorer quality than normal FM, at 25 kHz bandwidth. I can't say I hear much of a difference.

Early FRS radios were sometimes sold with just 16 channels. Buyer beware, the channel-to-frequency mapping does not necessarily follow the same mapping in different radios. Recent radios will have all 22 channels and should have a consistent mapping of channel to frequency. A true FRS radio will not have the ability to transmit on any frequency other than the 22 channels.

FRS radios are also required to have a fixed antenna. And it makes sense. It is for local communication and the fixed antenna and limited power are meant to minimize on-air interference. It really is family and local community oriented.

The biggest plus is that there is *no test or license required* to operate a FRS radio. We do like to think, though, that it is a "gateway drug" to GMRS or even HAM radio!

* A word about the phrase "less than or equal to 500 mW". Usually located Inside the battery compartment of any transmitting radio you will find the FCC ID. Search on the ID, and you should find the documents submitted to the FCC for certification of the radio. These documents will show the actual transmitted power of the radio as tested. The radio does not need to transmit at, say 500 mW. It needs to be **LESS THAN** or equal to 500 mW. Or whatever the spec is. Radios are never right at the upper limit, since due to manufacturing tolerances, it will need to be lower than the upper limit. I found one "High/Low power unit, 2 W and 0.5 W that was certified at 400 mW low power, and 300 mW high

power. Not a typo! It meets spec, less than 2 W. You can usually find the FCC ID before you buy by searching for "FCC ID" and the model name or number. This note applies to all radios, not just FRS.

FRS radio quality is much improved. Most receive NWS (National Weather Service) broadcasts, have lights, scanning, and a few other options such as PL, or CTCSS, tones. The one I like, RETEVIS RT49P, is even fully waterproof, and designed for water sports.

That's it for this column, next time I'll look at Tones, GMRS radios, and then talk about some of the local applications of FRS and GMRS. 73 Sparky

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79.7
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<mark>192.8</mark>
<mark>196.6</mark>
<mark>199.5</mark>
203.5
206.5
210.7
218.1
225.7
229.1
233.6
241.8
250.3
254.1

Chart showing how the Tone Name vs. Frequency can be different for the RETEVIS FRS & GMRS radios compared with a Radioddity GMRS radio.

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 QQRPguys. I have been developing a Neighborhood Radio Watch (NRW) program in Tuolumne County, modeled on one in El Dorado County, CA, USA.

From Hobby Hill: GMRS MATTERS

By <u>John Buster</u> KN6RLM/WROX508



General Mobile Radio Service (GMRS) is gaining traction in the Mother Lode. A useful tool to help keep family members and friends connected, it has also proved to be a valuable tool in emergency situations. *Neighborhood Radio Watch* (NRW) groups have been formed in several towns here in Tuolumne County. Pinecrest, Twain Harte, Groveland, and Columbia have NRW nets. Some are simplex nets, like in Pinecrest and Twain Harte, and some use a local repeater, like Groveland and Columbia.

The Columbia College Hobby Hill repeater is a GMRS '700' repeater. The Hobby Hill GMRS repeater uses CH21

(RX=462.700MHz) with a +5MHz offset (TX=467.700MHz) and a CTCSS tone of (RX77.0/TX77.0) TSQL. GMRS users should know how to program their radios to work on this repeater.

The Hobby Hill GMRS repeater has a Zello linking system. Using the Zello (free) app for PC, Android, or iPhone, add the "*Hobbyhillgmrsrepeater*" channel to connect to the Hobby Hill repeater, and one of the moderators can make you a trusted user. When you connect just give us a shout! A valid GMRS license is required. All GMRS users are invited to the Tuesday night net (7:30 pm PST time)!

Our Hobby Hill Repeater Zello link has been a work in progress, and I believe Jeff Tolhurst, N6JWT/WRDP326, is working on acquiring a more robust Zello gateway, as our current setup has a bit of lag. Even with the lag, we have had good communications with folks near and far, and we get compliments on our net every week. Thanks guys!

Our Tuesday night net (@ 7:30 pm local (PST) time) has been a general user net, accepting check-ins from all stations; all users are welcome. Our net has also been running up to an hour or more, so the need to create a separate net to run the NRW for the local folks here in Columbia has been noticed. Our Zello link has allowed our net to grow and we have found friends nationwide, but as the net grows, the run-time also has exceeded an hour. So, we are considering a separate NRW simplex net to reduce traffic, and to also let local FRS (*Family Radio Service*) stations participate. FRS stations cannot use the Hobby Hill repeater without a valid GMRS license.

A simplex net may begin on Fridays (from 6-9 pm PST), for the Columbia NRW. GMRS shares the same simplex channels with FRS radios, and non-licensed users can participate with those radios during the proposed Friday Night NRW simplex net. This net will use CH15, with a CTCSS tone of 151.3. Sorry folks, but there will not be a Zello link for this net. It's for the locals only. The focus being emergency communications and neighborhood communications

in an emergency is the sole purpose of this NRW net.

Thanks to Tuolumne County Amateur Radio Emergency Services (TCARES) for helping to build our infrastructure and for being supportive as we grow our user base! A special thanks to Greg, WA6HNA, our local repeater guru! And Jeff, N6JWT/WRDP326, thanks for putting up with all my questions and for running our Tuesday night nets. You guys are my heroes, thanks for your support. This is WROX508 and I'll be clear.

Links:

- 1. How to program your GMRS handheld
- 2. Tuolumne County Amature Radio Emergency Services
- 3. Get a Radio
- 4. GMRS License (not as easy as it should be)

My name is John Buster, and I've been a member of TCARES for a couple years. My dad was a contractor and used HAM radio to communicate with repeaters and auto patch from all kinds of remote places when I was a kid. I always thought it was magical, and I can remember times that his Motorola trunked repeater system got us out of a few binds! Fast forward to me getting on the air, I was a CDL interstate truck driver, and used CB radio to communicate with other drivers and companies I worked with. I listened to a lot of garbage on the CB and after I left the trucking industry I realized there was a much better way to communicate with people. I got my technician license and made some good friends, and after that got my GMRS license to get my whole family on the radio. I live in a fire-prone area, and communications are vital during emergencies. I belong to the Hobby Hill Repeater Group and we have an established Neighborhood Radio Watch Net. I hope to help strengthen our emergency preparedness and look forward to helping improve TCARES relationship with the OES. 73's! KN6RLM



Groveland GMRS By Chris Passeau K6CDP/WRPX768



Hello to everyone.

This is an update on what the Groveland GMRS group is doing.

Richard Combs, KN6HSR/WRMM317, brought the neighborhood radio watch idea to Tuolumne County. The idea was to provide a radio service that the non-ham radio community would be able to use during emergencies. Thanks to Richard, the idea has taken off for the non-ham radio community, who do not want to obtain an Amateur Radio License. We now have **four** areas in the County that are using GMRS radios: 1) Strawberry, ; 2) Twain Harte; 3) Columbia; and 4) the Groveland neighborhoods. Columbia and Groveland are lucky enough to each have repeaters which provides greater coverage for their areas. Each

neighborhood is conducting a weekly NET.

The Groveland NET is on Saturday nights at 7 pm, PST. We welcome any GMRS licensed user to check into the NET. The Groveland NET channel (GMRS identifies it as channels not frequencies) is on repeater channel one. The repeater channel frequencies are: 1) Receive (Rx) = 462.550 MHz; and 2) Transmit (Tx) = 467.550 MHz with a CTCSS of 162.2 Hz. The repeater is located on Vernal Ridge Drive [above Groveland, just south of Pine Mtn. Lake (PML)] and provides great coverage. I have been able to hit the repeater from Tuolumne City, Twain Harte, and Sonora. We now have approximately 60 users on the Groveland repeater. On August 31st there was a cell and telephone outage in many parts of the county, including Groveland. The Groveland repeater was utilized throughout the outage by many people to keep in touch with each other. With the frequent PG&E power outages, and cell phone outages, GMRS has proven to be a great resource for Groveland.

I would like to thank Richard Combs, Jeff Tolhurst, and Marc Colton, for helping to keep their neighborhoods safe by bringing GMRS to the non-ham radio communities in Tuolumne County.

73, Chris



Groveland G.M.R.S. Facebook Page Link