

PAARAgraphs



The Official Newsletter of the

Palo Alto Amateur Radio Association, Inc.Celebrating 84 years as an *active* amateur radio club—*Since 1937*

Early Digital Communications: 176 Years of Telegraph Apparatus.

Rick Ferranti, W6NIR

Rick W6NIR grew up in Menlo Park and was PAARAgraphs editor from 1972 - 76, then moved to the Boston area to attend grad school (and regularly QSO with the original W6NIR from university club stations W1AF and W1MX.) He worked at MIT Lincoln Laboratory for nearly 20 years before returning to the SF Peninsula in 1999 to start his current position at the Stanford Research Institute. Rick is interested in the history of radio technology, in restoring communications equipment from the last century, and in capturing "natural radio" signals at wavelengths greater than 30 kilometers.

This meeting will be conducted with Zoom


Time: Mar 5, 2021 07:00 PM Pacific Time

<https://us02web.zoom.us/j/82158179215>

Login ID: First name and Call Sign

Meeting ID: 821 5817 9215

Upcoming Events

• Mar 5	PAARA General Meeting, 7:00 PM
• Apr 2	Zoom Meeting
• May 7	
• Mar 17	Board Meeting, 7:00 PM.
• Apr 21	Everyone welcome! Zoom Meeting,
• May 19	eMail President for details!
• Mar	Electronic Flea Market Cancelled

President's Corner

March 2021

Welcome to March! I was happy to see after last month's comments regarding no rain that we finally received some. My rain gauge indicated I received 2.78" over the 3 days of rain. Not a staggering amount but something nonetheless. Now we seem to be back in a dry spell. One can only hope that changes sooner than later.



Thanks to Walt, K6WGY, for showing us his shack at the last meeting. We were treated to a shack show as well as his current homebrew activities. Great job Walt and thanks for kicking us off with a new meeting segment! Who's next? I'll be asking for attendees at the next meeting who wish to show us their

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Debugging the Darth Vader Audio in My Mobile Unit

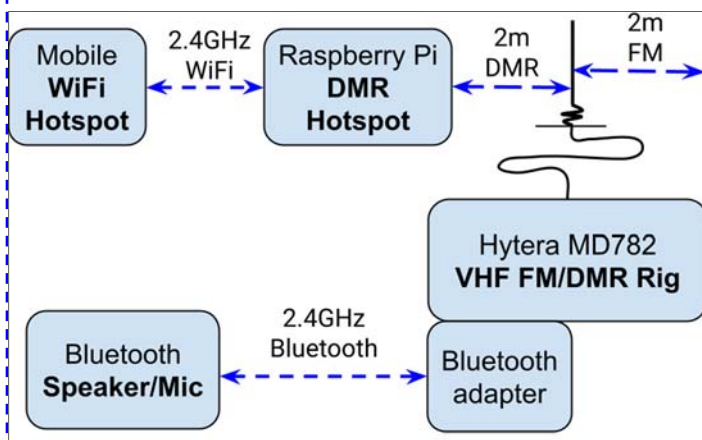
Mikko, AB6RF

Towards the end of last year, my 2 meter mobile radio started to occasionally misbehave in a way that for weeks baffled me, and annoyed many of the other users on our “home repeater”, the N6NFI.

I had been using the same, albeit little complicated, mobile setup already for a couple of years without any problems, but seemingly without any reason it developed this strange issue. The issue was that many times when I would transmit, the others on the repeater reported back that my transmit audio was extremely distorted, to the point that it was hard to copy what I was saying.

Later when I listened to my own signal on Broadcastify, I agreed that one of the reports that described my TX audio as “sounds like Darth Vader” was indeed spot on.

What made the issue more difficult to debug was the fact that as I already mentioned, my mobile setup is a bit more complex than your average 2 meter FM rig installation. Since one picture is worth a thousand words, here’s a simplified block diagram of what I have in my car.



All this gear is more or less hard-wired, permanently in place, and starts automatically when the ignition is turned on, and shuts

down again when the ignition is turned off.

In the trunk of the car, or more accurately, under the trunk floor in the space where the tools, the spare tire and the jack live, I have a Hytera VHF DMR/FM rig. The rig has a Bluetooth adapter that connects to a wireless speaker mic that’s there on the dash. The mic



Fig. 2 — Hytera Bluetooth Speaker/Mike

also has a small LCD display and few programmable buttons to control the rig remotely.

For DMR use, there is also a Raspberry Pi Hotspot there in the trunk, and it gets the internet connection to Brandmeister (DMR Network) via a mobile WiFi hotspot.

All the stuff is there under the trunk floor, and very much out of my reach when driving the car, so the only practical way to reboot the radio while I was doing the debugging, was to stop and restart the car.

The plus side of having the radio and all the other gear out of my reach is that it’s also out of sight and not attracting any would-be thieves.

Back to the issue I was having.

Sri, KI6Q, helped me to narrow things down, and we made few solid, but not very conclu-

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sive observations.

1. The audio distortion was only present during my first trip of any given day.
2. When the issue was there, it would not go away by just turning on and off the Bluetooth speaker-mic. And It didn't ever go away on its own just by driving and waiting for a longer time.
3. If the radio started in the bad state, it would stay like that until I restarted the car, effectively power cycling the rig.
4. The issue was never present during a trip that was not the first start of the day.

By now this started to sound like a bad episode of the “Car Talk” by Click and Clack the tappet brothers.

I got many helpful ideas on how to fix my radio setup, like “put it back the way it was”, “get rid of the Bluetooth thing”, “you should add ferrite chokes, there's RF feedback”, and then also some less helpful suggestions, like “stop asking how's my audio, it's bad every time and it's not getting any better.”

While all these would normally be very good suggestions, things didn't make sense to me because:

1. The setup had not been changed in any meaningful way, so there was no way for me to put it back to some old, better configuration.
2. The Bluetooth speaker-mic had been working fine for a long time, I wasn't ready to accept that it just somehow had stopped working properly (but didn't outright fail).
3. If RF feedback was the problem, how come the radio worked just fine every time after a second or a third start. Things just didn't add up.

Sri actually made a suggestion that was may-

be intended as a joke, but at the end it turned out to be poetically close to the final answer. He suggested,

“Don't ever make the first trip of the day, just skip the first trip and start with the second trip.”

After I posted a description of my TX audio issue on a Hytera users' group on Facebook, I finally got a key suggestion that led to resolving the problem. More than one person there suggested that these rigs are very sensitive to an under-voltage condition, and I should make sure that the input voltage into the rig doesn't drop too low, not even momentarily.

And that turned out to be exactly my issue!

Many factors were contributing to the problem to start happening when it did, and in hindsight it all made perfect sense.

Because of the Covid restrictions, I was now working from home almost every day, and my car was often sitting for days without being driven at all. So the battery was not getting “topped off” daily as it had been before.

The issue started late in the year when nights were getting colder, and it took just a bit more “cranking” to get the car started.

Also, my car is a diesel, so it puts a heavier load on the battery to get it started compared to a car with a similar size gasoline engine.

What was going on was that as I hit the Ignition/Start button on the car, all the radio stuff gets immediately powered on, and as the rig was booting up the engine was also being started at the same time. So while the rig was booting, it was running from a battery voltage that momentarily dropped too low, and the rig booted into bad state. And the only way to clear that bad state it was stuck in, was to reboot the rig.

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Now that I knew what was causing the TX audio distortion, I had to figure out how to change things so that the issue would be eliminated.

Of course, I could just wait for the warmer weather to return so that the engine starts quicker, or I could take the car for daily drive just to keep the battery at a full charge.

Neither sounded practical, so I started to look into solutions that would delay the turn-on of the rig until after the engine has started, and the battery voltage has reliably increased to above 13.8V.

I thought about home-brewing a simple delay circuit with a 555 driving a relay, or detecting the battery voltage and engaging a relay only when the voltage indicates that the alternator is running.

I much enjoy home-brewing, but I found a commercial product that does exactly what I needed, and then some. A product called "ChargeGuard" is widely used in police cars, ambulances and other commercial vehicles that have a lot of added 12V accessories. Without making this into too much of an "advertisement" for the ChargeGuard, I'll just mention a few of the interesting features it provides. First, it monitors the battery voltage and detects the voltage fluctuations from the alternator, and turns on the 12V accessories only after the engine is detected to be running. Second, it monitors the battery DC voltage for under- and over-voltage and disconnects the accessories if the battery voltage exceeds the predefined limits to keep both the battery and the accessories safe.

It also allows the accessories to remain On for a selectable time after the engine is turned off (as long as the battery doesn't drain too low).

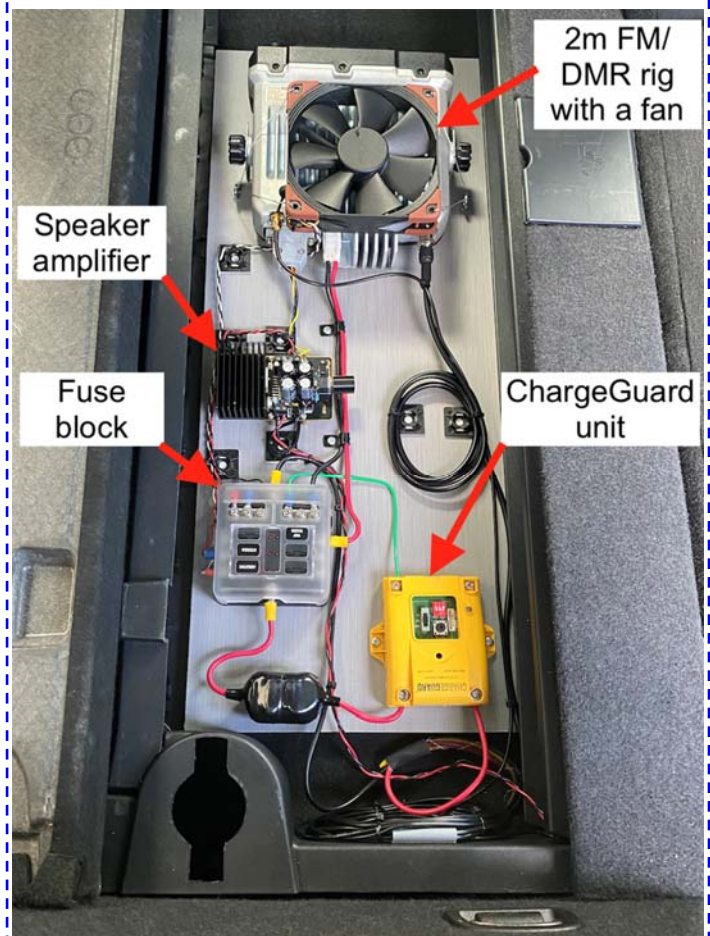
I decided the ChargeGuard is exactly what I wanted for my mobile rig installation.

The best part is that, as so many of these devices are being pulled from decommissioned police/agency/commercial vehicles, used units are available for a very low price on the popular on-line auction site.

One catch with the lowest cost used units is that they no longer include the rubber flap that would normally protect the DIP switches and a push button that are used to configure the unit. But since I was going to install my unit in a dry, weather protected location anyways, I was happy to save a few bucks by leaving out that protective flap. Other than being cosmetically bit "weathered" looking, both units that I received seem to work 100% a-OK.

Since I had to re-do some of the wiring for the mobile rig anyways, I decided to re-wire the whole setup so that I don't ever need to worry about it ever again.

I think the end result looks almost pretty :-)



Easy Field Day Points for PAARA

Rich, W6APZ

ARRL recently announced that some of the Field Day rules that were established last year due to Covid-19 would apply this year as well. In particular, I'm referring to the rule where each club member's score can be added to make up an aggregate PARRA club score. This is in lieu of being able to gather as a club in one location as had been traditional.

This means that it is important for each of us to get on the air on Field Day and operate for as long as we are comfortable "sitting in the chair." During that time we want to maximize our contacts. This calls for an efficient strategy. Last year a lot of us got on 2 meter and 440 simplex frequencies to make contacts. Sure, this is not DX, but each contact is another point for PAARA.

Mostly neglected were ten meters, 6 meters, and 1.2 GHz. I did call CQ FD on ten and got two contacts across the bay operating QRP, but mostly very few stations were working ten meter SSB. Listening here in South Palo Alto with a vertical antenna on ten, I can hear beacons in San Jose, Salinas, and even the W6WX beacon on Mt. Umunhum in San Jose when they transmit at 0.1 Watt. At this writing, the sun spots are not favorable, so things could only improve as Field Day approaches. Therefore to make the maximum number of points in the shortest time requires a strategy.

What if PAARA members who have equipment for ten were to decide to get on the National FM Simplex frequency of 29.6 MHz at a particular time? Or if we decided to get on some ten-meter CW frequency for those so equipped, or to activate 28.6 SSB at a particular time? If even half of the membership would do this, we'd rack up easy points with little interference compared to normal 20 meter Field Day pile-ups.

We could do something similar on 6 meters and 1.2 GHz FM at different preselected times.

The ARRL Repeater Directory lists 52.525 MHz as the Primary FM Simplex Frequency. On 1.2 GHz, the National FM calling frequency is 1294.5 MHz, which would be a good choice for that band.

The purpose of this writing is to get PAARA members thinking of the best times and frequencies on 10, 6, and 1.2 to make it easy for all of us to score points and help PAARA's Field Day score. Let's have some specific suggestions so we can choose the best ones to implement to enhance PAARA's score while helping our own Field Day scores in the process.

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shack. This is a perfect time to show others where you call home when operating. One board member plans to show their shack. Who will it be? Attend the meeting to find out.

I'm sure most everyone heard the latest NASA rover, Perseverance, landed on Mars on February 18th. Did you also know that Scott Tilley, VE7TIL, of British Columbia successfully heard the signals from the Tianwen-1 probe China sent to Mars? He found the signal in the X band, between 8 GHz and 12 GHz. He contributes his success to his 60 cm dish, an SDR radio, and some good old amateur rubbing salts. This isn't the 1st satellite he's heard with his setup. He planned on listening for the Perseverance but likely had a hard time hearing it as it has a small antenna owing to relaying its communications to earth through one of NASA's Mars orbiting satellites. Interestingly, the story was originally published on spaceweather.com.

You may have noticed that the ARRL announced the Field Day rule changes implemented last year are once again in effect for this year. The minor change is to limit the power of D & E stations to 150w PEP. As you'll see in the board minutes, we talked about this year's PAARA effort. Things are

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still very much up in the air regarding COVID and the ability to meet in person by June as well as what restrictions there may be. There is also the issue that the antennas, which are stored outside, all need servicing before the event on June 26-27th. Servicing the antennas may be hard to do owing to the current restrictions on gatherings.

As I see it, we have 3 options, hold a scaled-down (2A) event at Bidwell Bayfront Park (assuming we can get a permit from the City), hold a scaled-down (2A) event at Doug's, KG6LWE's, QTH in Morgan Hill, or participate from your QTH as last year. As there is a lot to consider especially concerning how many members would be interested in participating in a whichever club-sponsored event, we'll be sending out a quick poll to get a read on the memberships' desire to participate or not and what kind of an event we should look at providing. Look for the poll in your email at some point in the next couple of weeks. It's very important that everyone responds so we can best meet the desires of the membership as well as enough participants for either of the club sponsored event formats.

As I suspected, hams once again came to the aid of others during the arctic weather push into Texas. Once again assisting others and providing communications where needed. I suspect the average ham is more prepared than the average non-ham to overcome natural situations that arise. This event serves as a good reminder to make sure your supplies and preparations are complete. It's a good time to switch out any items that may be nearing their expiration date along with those bottles of drinking water you stashed. That stash of fuel for the generator shouldn't be forgotten either. Even with stabilizers in the mix, you should cycle through your fuel within a year. I put blue tape on mine with the date it was stored to make it easier as I don't want all the cans coming due at the same time.

Have you been to our website lately? If so, did you notice the new button on the left entitled "Blogs"? Ron Chester, W6AZ, has been posting a blog for many years. Most should remember Ron's dedication to PAARA's as treasurer for 20 years! Following the link takes you to a lengthy list of ham and non-ham-related topics. There are several on learning CW which are quite interesting. More than one ham has found the information contained in those posts helpful in learning CW. Thanks go to Ron for making the information accessible to PAARA members.

Make sure to join us for the March meeting where the topic will be "Early Digital Communications", i.e., CW. See everyone at the meeting.

73, Jim K6SV

Keep the airwaves alive by getting on the air!

Feb. Board Meeting Minutes

The February board meeting was held online, via Zoom. Meeting was called to order at 7:06 p.m. Attending were: Jim Thielemann K6SV, President; Rob Fenn KC6TYD, Vice President; Ric Hulett N6AJS, Secretary; Bob Korte KD6KYT, Treasurer; Doug Teter KG6LWE, Walt Gyger K6WGY, Darryl Presley KI6LDM, Joel KD6W, Directors. A quorum was present.

President's Report: One thing I can say, is I'm really glad I'm not in Texas.

No electricity, no water, no fun. Cell phone service is spotty.

Media outlets are not functioning all the time, internet service is often out. We probably will be seeing lots of stories of hams stepping in to provide the necessary communications.

Ham radio is still "There when all else fails".

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Secretary's Report: We have 192 club members. Seventy-seven of those have not yet renewed for 2021. Members who have not renewed will have a reminder sticker on the March newsletter.

We have gained some new members in the last few months: Please welcome Fred Elizondo KN6LMU, Richard Simpson W6JTH, Mark Howitson KN6MCW, David Rice KN6MXI, and Ken Kightly KJ6GVC to PAARA! We are also pleased to be rejoined by Herbert Vanderbeek WY6G and Charles Winegarden KK6IPR

Congratulations to new Amateur Extra license holders Alessio Sangali AJ6QR and Truman Lindsey N6TRU.

Treasurer's Report: Recent checks for membership renewals have been deposited, as well as payment for club radio equipment which was sold. Club expenses remain very low.

VP / Program Chair Report: 2021/2022 meeting dates have been renewed at Cubberley community center: 2021: Sept 10 (after Labor Day). October 8, November 5, December 3.

2022: January 7, February 4, March 4, April 1, May 6, June 3, and July 8 (after Independence Day), August 5

We will inquire of the custodian whether we can have more chairs available for large meeting nights.

Thanks to Jim Thielemann for getting the speaker information to the website promptly.

We have guest speakers lined up through August.

Old Business

The March PAARA meeting will be held

March 5th at 7:00 p.m. by videoconference online. Check the PAARA webpage for the Zoom link. Once again, we will have a virtual 'visit' to a member's ham shack.

PAARA members are encouraged to draft a PAARAgaphs article about any topic of interest to the club. PLEASE put pen to paper and get some to Jim W6SV. (We do have a few stories in the hopper now)

900 MHz repeater: Joel KD6W expects to finish the installation within a month or so.

New Business

PAARA-puzzle: Rob, KC6TYD has discovered a service that will generate a word-search puzzle for us, if we furnish them with a list of words: This will go into a future PAARAgaphs.

Field day: ARRL has announced that Field Day rules from 2020 will be used for 2021, except home stations (class D and E) are limited to 150 watts transmitter power.

The board discussed the options for 2021 FD: Bedwell park, Alternate site, individual entrants.

We still want to minimize exposure to the corona virus. Doug Teter's ranch would be good for this. Ric Hulett will compose a survey to gauge club interest in the various options, and will poll the board first.

The meeting was adjourned at 8:10 pm

Respectfully submitted,

Ric Hulett N6AJS
PAARA Secretary

Palo Alto Amateur Radio Association, Inc.

PO Box 911 Menlo Park, CA 94026

Officers

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	energyconserved@sbcglobal.net	
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	bob@rgktechsales.com	

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	dteter@wawi.com	
Director ('21)	Darryl Presley, K16LDM	650 255-2454
	ki6ldm@arrrl.net	

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	energyconserved@sbcglobal.net	
Chaplain	Rick Melrose K6RDM	408-341-9070
	K6RDM@yahoo.com	
Public Affairs	<i>Position Vacant</i>	
Station Trustee W6OTX, W6ARA....	Gerry Tucker, N6NV	
Station Trustee K6YQT...	Doug Teter, KG6LWE	650-367-6200
Station Trustee K6OTA...	Ron Chester, W6AZ	
Property Manager	Gerry Tucker, N6NV	
Badge Coordinator	Doug Teter, KG6LWE	650-367-6200
	dteter@wawi.com	
Historian Position	<i>Position Vacant</i>	
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	Shrikumar, KA6Q	
	shri.paara@enablery.org	
Field Day Coordinator ...	Doug Teter, KG6LWE	650-367-6200
ASVARO Rep	Clark Martin, KK6ISP	
	kk6isp@comcast.net	
Webmaster	John Miller K6MM	
	webaron@gmail.com	
Technical Coordinator ...	Joel Wilhite, KD6W	408-839-5948
	kd6w@arrrl.net	
QSL Manager	Marty Wayne, W6NEV	408-234-8023
Speaker Coordinator	Rob Fenn, kc6tyd	650-888-9060

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	ab6so@smrn.com	
Photographer	<i>Position Vacant</i>	

VE Exams

Redwood City Main Library, Community Conference Room, 4th Saturday 10:30 am each month and De Anza Park, Sunnyvale, 2nd Saturday 10:30 am each month except November and December. See website for details and exceptions: <http://amateur-radio.org> or Contact Al, WB6IMX@att.net

Electronics Flea Market

Sponsorship by A.S.V.A.R.O. — Association of Silicon Valley Amateur Radio Organizations

Second Saturday of month, March-September, 6am–12 noon
 Contact: <http://www.electronicfleamarket.com/>

PAARA — Palo Alto Amateur Radio Association

Meets 1st Friday 7:00pm each month at Room H-6, Cubberley Community Center; Net 145.230 - PL 100Hz Mondays at 8:30. See our website at <http://www.paara.org> for more information or contact: Joel Wilhite KD6W, KD6W@ARRL.NET, 650-325-8239

FARS — Foothills Amateur Radio Society

Meets 4th Friday each month at 7:30pm
 Contact: <http://www.fars.k6ya.org>

NCDXC — Northern California DX Club

Meets 3rd Thursday 7:30pm each month,
 Repeater for member info 147.360, Thursday 8:00PM
 Contact: <http://nodxc.org> or Mike Gavin W6WZ, (650) 851 8699

50 MHz & Up Group

Meets 1st Thursday each month at 7pm in the Summit Room at the Sunnyvale Sports Basement, 1177 Kern Ave, Sunnyvale
 Contact: <http://50MhzandUp.org>

SPECS

Southern Peninsula Emergency Communication System

Meets each Monday 8:00pm on Net 145.27, 440.80 MHz
 Contact: <http://specsnet.org> or Tom Cascone, KF6LWZ, 650-688-0441

SCARES

South County Amateur Radio Emergency Service

Meets 3rd Thursday 7:30pm each month, Belmont EOC, Belmont City Hall, One Twin Pines Lane, Belmont CA 94002. Net is on 146.445 [PL 114.8] & 444.50 (PL-100) 7:30 Monday evenings. Contact: President Gary D. Aden, K6GDA 650-743-1265 (D), 650- 595-5590 (N)
 Web: <http://k6mpn.org> E-mail: pres@k6mpn.org

SCCARRA

Santa Clara County Amateur Radio Association

Operates W6UU & W6UU/R, repeater 146.985-pl
 Nets: 2m, 7:30pm Mon; 70cm, 10M (28.385) 8PM Thur.
 Meets 2nd Mon each month @ 7:30 PM.
 ARRL/VEC license testing contact 408-507-4698

SVECS — Silicon Valley Emergency Communications

Operates AA6BT repeater (146.115 MHz+)
 contact: <http://www.svecs.net> or Lou Stierer WA6QYS 408 241 7999

TEARS — The Elmer Amateur Radio Society

Dedicated to operational training, knowledge building & FCC exam testing.
 KV6R repeater under construction.

Contact: AA6T@ARRL.NET

Most members are Extra Class or VE's. See QRZ dot com/kv6r for class info

WVARA — West Valley Amateur Radio Association

W6PIY six-meter repeater on 52.58MHz. Normally, six-meters is linked with 147 and 223, while 441 and 1286 repeaters are linked.

VHF: 52.58 (-500) 151.4 ctcss UHF: 441.35 (+5.0) 88.5 ctcss
 147.39 (+600) 151.4 ctcss 1286.20 (-12m) 100.0 ctcss
 223.96 (+1.6) 156.7 ctcss

Meetings are 2nd Wednesday of every month except July, August and December.
 Contact: <http://wvara.org>, Bill Ashby N6FFC, 408-267-3118, president@wvara.org

American Red Cross, Santa Clara Valley Chapter

Contact: <http://santaclaravalley.redcross.org> or Scott Hensley KB6UOO, (408) 967 7924 shensley@Novell.com

(Please send changes to PAARAgaphs editor)

WE ARE PLEASED TO ANNOUNCE
THE NEXT CHAPTER FOR US:

HSC HAS SOLD TO

EXCESS SOLUTIONS!



That's right!

- ✦ Halted Specialties Co., Inc. has sold HSC Electronic Supply to Excess Solutions of San Jose...making the biggest surplus electronics store in the Bay Area!
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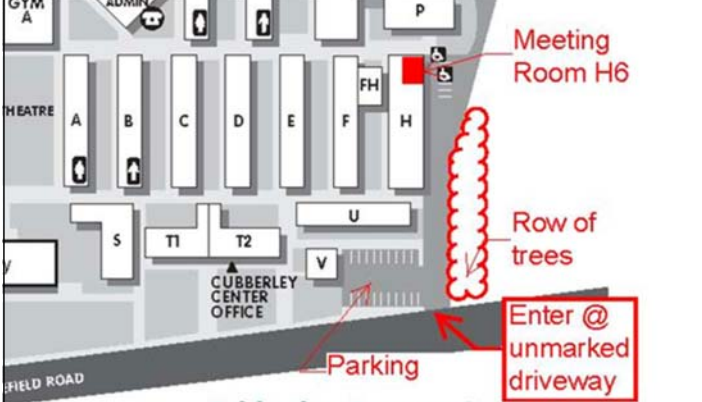
www.jameco.com

PAARA Weekly Radio Net

Info and Swap Session
 every Monday evening at 8:30pm
 on the N6NFI 145.230 MHz repeater

Week	Control Operator
1 st	Joel - KD6W
2 nd	John - W6JMK
3 rd	Ric - N6AJS
4 th	Rob - KC6TYD
5 th	Rob - KC6TYD

If you're interested in trying out at Net Control, Contact Doug, KG6LWE. It's good practice, and lots o' fun! Give it a try.



Cubberley Community Center
 4000 Middlefield Road, Palo Alto, CA 94303
 650/329.2418
 650/856.8756 fax
 www.cityofpaloalto.org

Meeting Location — Middlefield Road between San Antonio and Charleston in Palo Alto. 4000 Middlefield Road

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Palo Alto Amateur Radio Association

P.O. Box 911, Menlo Park
 California 94026-0911

Club meetings are on the first Friday of each month, 7:00pm at the Room H-6, Cubberley Community Center.

Radio NET & Swap Session every Monday evening, at 8:30pm, on the 145.230 –600 MHz repeater, PL 100Hz.

Membership in PAARA is \$25.00 per calendar year, which includes one subscription to PAARAgaphs \$6 for each additional family member (no newsletter).

Make payment to the
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Opening hours
 Monday-Friday: 8 AM – 7 PM; Saturday-Sunday: 8 AM – 6 PM



ARV'S, WA6UUT (SK)
**WEDNESDAY
 HAM RADIO
 LUNCHEON**
 Our 11th year!
 - Since May 2, 2007 -
BLACK BEAR DINER
Sunnyvale, California
 415 East El Camino Real
 (Just "North" of South Fair Oaks
 Avenue on El Camino Real)
11:30 AM ~ 3:00 PM
 Website: www.blackbeardiner.com

Many food choices available
 from the breakfast, lunch or
 dinner menus. Ample park-
 ing is available. Walk in &
 "bear" left for our location in
 the restaurant!

 NOT A CLUB, CLOSED
 GROUP OR CLIQUE; AMA-
 TEUR RADIO OPERATORS
 AND FRIENDLY PEOPLE ARE
 ENCOURAGED TO ATTEND!

Submit items to
PAARAgaphs
 by the 3rd Wed to:
 rrvt@swde.com
 Text: .doc, .rtf,
 or .txt
 Photos:
 jpg, png or tiff

Subscription
 Problems?
 Contact Database
 Manager:
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 408-332-4593
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 the membership page to order.
 Badges will be mailed to purchas-
 ers, at an additional cost of \$4.95
 until we can meet face to face
 again.

PAARAgaphs Ad Rates

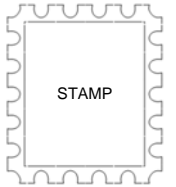
PAARAgaphs accepts paid advertisements from non-members. (short personal ads remain free for members in good standing). **All ad rates listed are per issue.**

- Not-for-profit ads by association members for ham-related items and wants. No cost for business card-size ads (additional space at \$2.50 per business card size per issue).
- For Profit organizations and/or individuals: \$5-business card size, \$14.00-quarter page, \$25-half page, \$50 full page or back cover per issue. These fees may be reduced or waived in exchange for a valuable consideration that is given to the Association or its general membership. Such consideration must be in addition to any existing arrangements with the association. The PAARAgaphs editors reserve the right to reject any ad deemed to be not in the best interest of the Association.

All fees payable in advance by the year with "scanner-ready" copy or text-only ads. **Give payment and copy to Walt Gyger, K6WGY.**

PAARAgaphs — March 2021

Accept no substitutes. Produced and printed in California USA



Palo Alto Amateur Radio Association, Inc.
 PAARAgaphs Newsletter
 P.O. Box 911
 Menlo Park, California 94026

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TM-V71A
2M/440 Dualband



TM-281A
2 Mtr Mobile



TH-D74A
2M/220/440 HT

YAESU
The radio



FT-991A
HF/VHF/UHF Transceiver



FT-891
HF-50 MHz All Mode Transceiver



FTM-300DR
CFM/FM 144/430 MHz Dual Band



FTM-400XD
2M/440 Mobile



FT-70DR
CFM/FM 144/430 Xcvr

5 Weeks to Ship!

- RETAIL LOCATIONS - Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE - Toll-free Phone hours 8:30AM - 5:30PM
- FAX - All store locations
- ONLINE - WWW.HAMRADIO.COM
- MAIL - All store locations

HQ is family owned and operated by active hams!

AMHERST, CA (800) 854-6046	OAKLAND, CA (877) 892-1745	PORTLAND, OR (800) 756-4287	PHOENIX, AZ (800) 559-7288	MILWAUKEE, WI (800) 558-0411	WOODBRIIDGE, VA (800) 444-4799
PLANO, TX (877) 455-9790	SAN DIEGO, CA (877) 500-9623	DENVER, CO (800) 444-9476	ATLANTA, GA (800) 444-7927	NEW CASTLE, DE (800) 644-4476	SALEM, NH (800) 444-0047

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