

PAARAgraphs



The Official Newsletter of the
Palo Alto Amateur Radio Association, Inc.

The Friendliest Club Around

Celebrating 87 years as an *active* amateur radio club—*Since 1937*

<http://www.paara.org/>



Introduction to the Adventure Radio Protocol George Zafiropoulos, KJ6VU

The Adventure Radio Protocol provides a common radio frequency and tone signaling standard to make it easier for radio operators in the field to find and communicate with each other. The protocol improves on the Wilderness Protocol by adding signaling methods that allow for unattended alerting for various types of on air activities from emergencies to POTA and SOTA spotting. More details can be found at adventureradio.info/

George Zafiropoulos, KJ6VU, is active in portable operating and building repeater control systems. George is also the host of the Ham Radio Workbench Podcast focusing on technical topics of interest to the radio amateur. George tells his story when he was interviewed by Eric Guth on the QSO Today podcast in episode 232 qsotoday.com/podcasts/kj6vu

**This meeting will be a
Hybrid Meeting
Zoom and In Person**

Time: Sept 6, 2024 07:00 PM Pacific Time
Please check <https://www.paara.org> for
Zoom Details

Upcoming Events

Sept 6	PAARA General Meeting, 7:00 PM Zoom and In Person Meeting
Oct 4	
Nov 1	
Sept 18	Board Meeting, 7:00 PM. Everyone welcome! Zoom Meeting, eMail President for details.
Oct 16	
Nov 20	



President's Corner

September 2024

By the time you read this letter, the PAARA field trip to the Computer History Museum in Mountain View will be over. I hope those who went had a wonderful time learning about the rich history of Silicon Valley as it relates to electronics, integrated circuits, and computers.



The next event I hope that is marked on your calendar is PAARA in the Park on Saturday, September 28th in Cupertino's Memorial Park. The event will be another gathering of hams and visitors wanting to learn about the hobby. Anyone interested in learning more about amateur radio, licensed or not, is encouraged to attend. There will be at least one if not more HF stations to get participants on the air. It's a

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Question of the Month

What is a common-mode choke, and what is it used for?

Ham Radio Elmers

Rich, W6APZ

A high school friend of mine built a 2-tube receiver kit and was very proud of himself. It tuned the normal broadcast band and when he plugged in a different coil, it received short wave. Inviting me to his house to see his project made me want one.

Living in Chicago at the time, the "go to" place for anything electronic was Allied Radio, near downtown. Looking at their catalog, I found many receiver kits. Not knowing anything about electronics at the time, I reasoned: "if a two-tube radio was good, a three-tube radio had to be better." The catalog had a 3-tube radio for \$25 dollars, which was a lot of money in the 1950s, especially for a high-schooler.

Saving up my pennies, I finally accumulated the \$25; then I had to convince my parents to let me buy the radio. My parents saw their child interested in something that grabbed his interests, so they supported my decision. I had to take the bus to the Chicago Transit Authority (CTA) elevated train to get to Allied Radio. It was a long trip as I lived on the North side of town and Allied was south of downtown. This was the first of many trips to Allied.

I taught myself to solder, and quickly assembled the kit. The radio had no speaker, so listening was done with headphones. Not finding much of interest on the broadcast band, I plugged in one of the coils that came with the kit and tuned around. I quickly found the 75 meter AM phone band. SSB was just getting started back then, so most ham conversations were either on CW or AM.

The 75 meter band covered about 1/2" on the dial, making tuning difficult. Having read various electronics magazines at the time, I got the idea of putting a small variable capacitor in series with the main tuning capacitor. Voila! The band now covered half the dial; about 90 degrees. This made tuning in station much easier.

I'd lie in bed at night with my headphones on listening to the hams talk. While some of them were local, others were far away from other parts of the US. Recognizing my interest in ham radio, my parents introduced me to a friend of theirs, a dentist; Dr. Weintraub. He invited me

to his house and in his basement were two 6 foot tall racks of equipment. He flipped a few switches and the next thing I knew, we were talking to a ham in Mexico City. Wow!! that was a fabulous experience for a 14 year-old!

During the contact, Dr. Weintraub mentioned that many boys had come to visit his station over the years, yet few followed through to get their ham license. After the contact, I asked what I needed to know to get a ham license. At the time, 13 words-per-minute (WPM) sending and receiving Morse Code was a requirement, so he told me where to rent an Instructograph machine which would help me learn CW and the ARRL books: "How to become a radio Amateur" plus the License Manual.

Back then, one had to be able to draw schematics of oscillators, amplifiers, power supplies, etc. as part of the license test. Not only that, but the test asked the student to explain what each part did in each circuit. Examples of all of these were in the license manual. I drew and redrew these schematics many times until I could reproduce them accurately and explain why each part was there. Did I understand what I was drawing and memorizing? No, but that did not matter; I had to learn to do all this to pass the test.

The Instructograph used punched paper tape and one could run it through the machine at adjustable speeds to get up to 13 WPM. After several months of studying, I thought I was ready to take the test.

I had to travel on the CTA to get to the Federal Building near downtown Chicago to take the test. I expected to ace the written test, but was given the code test first...which I failed! I was flabbergasted! With tears in my eyes, I explained to the examiner that I had no problem copying 13 WPM at home; why did I not pass now?

He asked how I had learned the code. I told him about the Instructograph. He guessed that I had subconsciously memorized the Instructograph tapes. He asked if I had a short wave radio, to which I said yes. He suggested that I listen to CW on the air for the next month and then come back to take the test. In those days after failing a test, one had to wait 30 days to retake another

(Project — Continued from page 2)

ham test.

Thirty days later, I retook the CW test and passed and was given the written exam, which I also passed. Remember, this was 1951, before the Novice license, before home computers, and before the Internet. So, even though I had passed everything, I had to wait months till the FCC finally sent me my license via the US mail!

I needed a transmitter. The ARRL book on How to Become a Ham had a picture of a single 6L6 crystal controlled vacuum tube transmitter, built on a wooden support and using lollipop sticks on which the final coil was wound. I built a duplicate, but needed a crystal. Fortunately, I had been a member of Junior Achievement (JA) and a ham-advisor gave the group of us in JA his excess parts. Among those parts was an 80 meter crystal, which I used.

I knew nothing about resonant antennas back then, and simply hooked up my transmitter to the long wire I had been using for receiving. Yes, I made a transfer switch from an old tin can and a few pieces of wood. I started calling CQ on CW. After many hours of calling, I finally got a response from Colorado. The ham there asked: "What are you using, a door bell buzzer?"

Time to call my Elmer, Dr. Weintraub. He came over and immediately spotted the fact that my filter capacitor in my power supply needed replacing. Remember: I was in high school and had built most of my projects from radios that I had taken apart. That bad capacitor was probably the reason someone gave me that old radio. After another trip to Allied, I was back on the air...but it turned out that the 80 meter crystal I had was very close to the frequency that W1AW used for its transmissions, so I had to check the W1AW schedule before transmitting. Having read about crystal grinding, I unscrewed the metal plate on the crystal, carefully removed the crystal blank, and proceeded to rub the crystal with carbon-tetra-chloride, the approved material for moving crystal frequencies. This worked, as I was able to move the crystal frequency up, away from W1AW.

After reading QST, Ham Radio, CQ and other magazines, I decided to copy parts of various schematics and build a VFO using a 6AG7 as

an oscillator, a purchased aluminum chassis for stability, and a second 6AG7 as a possible doubler, with my trusty 6L6 as the final. This would get me on 80, 40, 20, and 10 meters. I quickly found out that 12 Watts of DC input gave insufficient output on 20 to compete with the high powered stations with beams.

Deciding to accept the limitations of the equipment that I had, I put up a folded dipole for ten and had no problem talking all around Chicago on AM phone. I joined RACES and participated in many Civil Defense drills. I was feeling like a real ham!

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great place to make HF contacts, test out new equipment, ask questions, bring your own ham equipment to test, and have lunch. Kristen, K6WX the ARRL First VP, is taking an antenna out of her bag of tricks for the antenna build project. The project is a twin lead VHF antenna. More information regarding the build project can be found on www.PAARA.ORG. I look forward to seeing everyone there.

October 18~20 is Pacificon. For those new to amateur radio, it's the local national convention. If you haven't attended, you should consider attending as there are a large number of interesting seminars, vendor displays, other interesting activities, and a Flea Market on Sunday morning. Information and advanced tickets can be found at; <https://www.pacificon.org/>.

Of major interest at Pacificon is the Special Event station W1AW/6 sponsored by PAARA. The station is in operation from Friday, around noon, until Sunday morning. PAARA will be setting the station up, overseeing the operation, and taking down the station. Mikko, AB6RF, in conjunction with Christopher, AI6KG, are the captain and co-captains of the station. Please let them know if you can help in any way to make this station another smashing success. Setup starts on Thursday, October 17th.

If you haven't been following the board minutes you'll be interested to know that the board decided to switch from using Write Log to N1MM

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for logging calls. Darryl, KI6LDM, has loaded and configured N1MM in the club's computers. Pacificon will be the first use by PAARA of this logging program. If you are not familiar with this program, you can find information here: <https://n1mmwp.hamdocs.com/getting-started/learning-your-way-around/>.

September is the start of the election "season". All officers and directors, except Bob, KN6YGN, are up for re-election. I asked Clark, KK6ISP, if he would run the election again this year. He accepted the nomination. Clark needs two assistants to help in the nomination/election process as outlined in the Bylaws. Please let Clark know if you can help. For those not remembering the process, nominations will open at the start of the September 6th meeting and close at the end of the November 1st meeting. The candidates will be published in the December issue of PAARAgaphs. Elections will be held during the December 6th meeting. The results of the elections will be announced at the end of the December 6th meeting.

Of note, I mentioned to the board that I will not be seeking another term as President. I have spent 11 years as an officer of PAARA, 6 as secretary and 5 as president. It's time for me to move on and let someone else fill the role. I mentioned to the board that I'll be around next year to assist in whatever way is needed to make for a smooth transition. I'm open to having a conversation with anyone considering running for President so they can learn more about what's involved. It has been an honor to serve as long as I have. Over the years, I've enjoyed some very dedicated fellow officers and directors. I thank them all for their assistance in making the club what it is today and my job easier. Believe me when I say, we are the envy of many other clubs. I only wish for that to continue.

I look forward to seeing all the smiling faces at the September 6th meeting. The meeting will be both an IRL and Zoom meeting.

73, Jim K6SV

Get on the air to keep the airwaves alive!

DX-100 Transmitter & Blowing Fuses

Rich, W6APZ

By the time I got to college, I wanted to put a better signal on the air than was possible with a 6L6 final. I decided to buy the Heathkit DX-100 transmitter kit which had a good reputation, and the name "Heathkit" behind it. The DX-100 used a pair of 6146 tubes in the final.

Following Heathkit's detailed instructions, the transmitter went together precisely as Heathkit had intended. My parents had given me a Hallicrafter's S-76 receiver for a high school graduation present, so I thought I was all set for many enjoyable operating hours on the air. Their house had a lot of tall trees nearby, which made hanging up dipole antennas a snap. Yes, trees sway in the wind, so I used a pulley at one end over which the wire from the end of the dipole was routed to a weigh hanging below. Now the trees could sway, but my dipole would stay up!

I started by making short QSOs and having fun with my new transmitter. As I progressed to longer contacts, I suddenly noticed the plate grid current dropping and "pop" went the line fuses. What was causing the fuses to blow?

Since I was in college, I told my problem to a young professor, hoping that he would have a practical solution to my problem. He had me taking data, drawing graphs, and not getting me any closer to solving the problem of blowing fuses. This was NOT the response for which I had hoped.

I decided to take the old ham radio approach. I built up parts of the driver circuits to eliminate everything prior to that part of the transmitter, finally getting to the point of driving the 6146 tubes directly from a built-up external driver circuit. Still the fuses blew! The only thing that was left were a few by-pass capacitors and resistors, which seem to be OK. Taking a trip to Allied Radio in Chicago, I purchased a new pair of 6146 tubes and plugged them in. Voila! Everything worked! No blown fuses.

Writing my experience to Heathkit, brought a new pair of 6146 tubes and a note saying that apparently the tubes originally provided were gassy, and I should just throw them away. Problem solved!

October Board Meeting Minutes

Attending were President Jim Thielemann K6SV, Vice President Rob Fenn KC6TYD, Secretary Ric Hulett N6AJS, Treasurer Margaret Cooper K6WEK, Directors Doug Teter KG6LWE, Darryl Presley KI6LDM, Walt Gyger K6WGY, and Bob Ridenour KN6YGN. A quorum was present. The meeting was called to order at 7:05

- President's Report — Scammers seem to be more and more active. I received 9 calls today, of which 6 were one after the other, all from different phone numbers. Also, we are receiving multiple scam e-mails asking for gift cards for PAARA (not really). Be cautious of phone numbers you look up on Google. It seems the listed numbers can be altered by scammers. One man lost \$100,000 when he was duped into thinking he was calling a legitimate bitcoin company. Be extra cautious! Keep checking your credit cards information, too. Remain more vigilant than ever, and be careful with your personal information.
- Secretary's Report — We welcomed a new member, Tim KO6EMS this month. Ric will meet with Shri KA6Q to review badge PayPal ordering.
Reminder: Club memberships expire at the end of December: It's not too early to renew!
- Treasurer's Report — No activity this month.
- VP/Program Chair Report — Meeting presentation for September will be George Zafiropoulos KJ6VU. His topic is "Introduction to the Adventure Radio Protocol".

Old Business

- We are in need of articles for PAARAgaphs: This is your opportunity! If you have had an interesting ham radio experience, or have some historical knowledge to pass on, please type up a few paragraphs (or more) and send to our editor Jim, K6SV. Member content is the 'special sauce' that makes PAARAgaphs unique.
- Education Committee: Darryl
September's question of the month: What is a common-mode choke, and what is it used for?
PAARA new ham invitation postcards: New hams postcards have been printed, and will go in the mail next week.
- PAARA Field Trip: PAARA will visit the Computer History Museum on August 24. About 30 people have signed up for the visit.
- Rob KC6TYD raised the topic of PAARA partici-

pation as support for a public service event. In the past we have announced some events at the club meeting, but we have not formally participated as a club.

- Darryl KI6LDM has installed N1MM+ logging software on the club laptops. We will use this system for the first time as W1AW/6 at this year's Pacificon.
- We need a time source and small network switch for the club laptops so they all reflect the correct time for logging. The board voted to acquire an NTP250 NTP Server Appliance. It's about \$250.
- The next PAARA in the Park will be on September 28, at Memorial Park in Cupertino. Our educational activity will be construction of J-Pole antennas for 2 meters. Kristen K6WX will conduct this. We agreed on a charge of \$10 for each antenna. We will accept payment by cash, check, or PayPal.
- Pacificon, October 18 to 20: Again this year, we will operate as W1AW/6 for this event. Mikko AB6RF is coordinating the station arrangements.

New Business

- The board discussed the need for a policy on responsibility for Club-owned equipment that fails or is damaged. We did not get to a conclusion on this topic.
- Club callsigns: In the next year we will need to renew some of the club callsigns. Christopher AI6KG has agreed to take over trusteeship for one call. We will also confer with our ARRL contact on the topic of renewal of multiple vanity calls.
- September marks the start of the club elections. Clark, KK6ISP has agreed to be the coordinator for our election. Members who wish to be nominated for a board position should contact Clark.
- PAARA's K3 transceiver repair: Awaiting time for Christopher to evaluate.
- Electronics Flea Market: The next EFM is scheduled for September 8. FARS is the sponsor; they are requesting additional volunteer help. Contact Clark KK6ISP if you wish to volunteer.

The meeting was adjourned at 9:36 pm

Respectfully submitted,

Ric Hulett N6AJS
PAARA Secretary

PAARA-In-The-Park

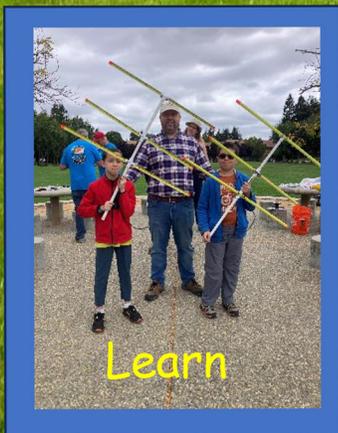
**September 28, 2024 Cupertino Memorial Park
10:00 A.M. to 5:00 P.M.**



\$10



Kristen McIntyre, K6WX, will teach you how to build your own VHF roll-up J-Pole antenna. A great item for your go-kit!
The class starts at 11:00 A.M. Don't be late.



Build a J-Pole Antenna!
Reserve yours now with one of these payment options by September 20 :

1. Email paarapay@gmail.com for a PayPal invoice.
2. Make check out to PAARA and mail to: PAARA J-Pole Project
PO Box 911
Menlo Park, CA 94022
3. Pay by cash at the September meetings, 9-6-24

Palo Alto Amateur Radio Association, Inc.

PO Box 911 Menlo Park, CA 94026

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 dteter@wcv.com
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 Technical Tips..... Ric Hulett, N6AJS
 Photographer *Position Vacant*

VE Exams

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>

Electronics Flea Market (EFM)

Sponsorship: Association of Silicon Valley Amateur Radio Organizations (ASVARO). The Electronics Flea Market is held at West Valley College, 14000 Fruitvale Ave, Saratoga.
 Website: <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 website at <http://www.paara.org>. For more information. contact: Joel Wilhite KD6W, kd6w@arrl.net, 650-325-8239

FARS — Foothills Amateur Radio Society

Meets 4th Friday each month at 7:00pm at Covington School, Los Altos.
 Website: <http://www.fars.k6va.org>

NCDXC — Northern California DX Club

Meets 3rd Thursday 7:00pm each month,
 Repeater for member info 147.360. Contact president@ncdxc.org. Website: <http://ncdxc.org>. YouTube content: "The Northern California DX Club Official Channel". Cohost of the International DX Convention.

The 50MHz & Up Group of Northern California

This organization specializes in vhf + wak signal and microwave activities. Meetings are held on the first Tuesday of each month. Time is usually 5pm for in person meetings, and 7pm for Zoom only meetings. In person meetings are held Sports Basement, 1177 Kern Ave, Sunnyvale. Always check the website, <http://50MhzandUp.org>, for correct information. Zoom information is also there.

San Mateo Radio Club W6UQ.ORG

Meets, 3rd Friday, January through November.
 Tuesdays & Thursdays, [Directed] Net, 7pm, N6ZX 145.370Hz, -600KHz, PL107.2Hz
 Contact: SanMateoRadioClub@gmail.com, Website: <http://W6UQ.org/calendar>

SPECS

Southern Peninsula Emergency Communication System users Group

Meets each Monday 7:30pm and 8:00pm.
 See: <https://specsnet.org/monday-night-net> for more info.
 Contact: <https://www.specsnet.org/contact> or board@specsnet.org

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

SCCARA

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+)
 Website: <http://www.svecs.net> or contact: Lou Stierer WA6QYS 408 241 7999

WVARA — West Valley Amateur Radio Association

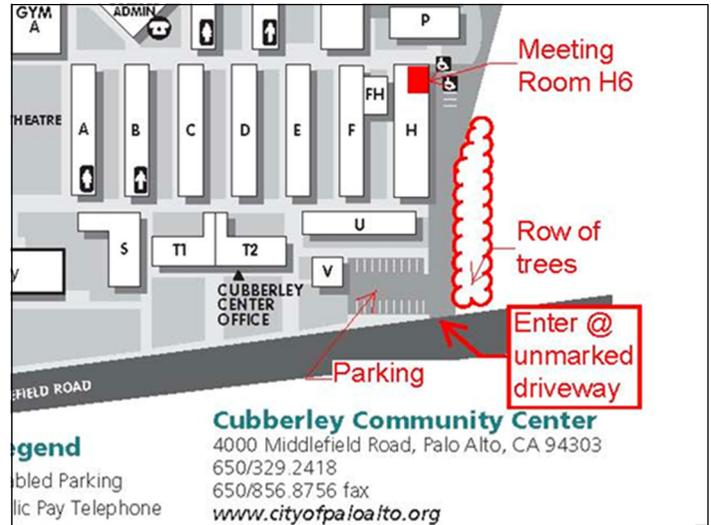
W6PIY six-meter repeater on 52.58MHz. Normally, six-meters is linked with 147 and 223, while 441 and 1286 repeaters are linked.

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

Meetings are 2nd Wednesday of every month except July, August and December.

Website: <http://wvara.org>. Contact: info@wvara.org

(Please send changes to PAARAgaphs editor)



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

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	Doug - KG6LWE
2 nd	Doug - KG6LWE
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.

Electronics Give Away

Over the many years I've been a ham, I've collected a lot of equipment. Most of it is still in good working order. A few items may need repair, such as a new filter capacitor... nothing serious.

Given my advancing age, I'd like to get this equipment into the hands of younger hams who can use it. The list of gear is too long to list here, but includes signal generators, power supplies, amplifiers, test equipment, etc.

Please pass this on especially to hams under 21 who might be interested.

They can reach me at: 650-494-0128. If I'm not available to take your call, after the 4th ring, the phone will go to my answering machine and you can leave a message with your name, phone number, and when is a good time to reach you.

Alternately, they can send me an email at: W6APZ@comcast.net with the Subject: "Electronics Give Away" and I'll respond.

Rich, W6APZ

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Email: KARLDRESDEN@juno.com

**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 PAARAGraphs \$6 for each additional family member (no newsletter).

Make payment to the Palo Alto Amateur Radio Association, P.O. Box 911, Menlo Park, CA 94026-0911

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ARV'S, WA6UUT (SK)
WEDNESDAY
HAM RADIO
LUNCHEON
 Our 18th year!
 - Since May 2, 2007 -
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PAARA W6OTX Repeaters Located near Alum Rock Park, San Jose		
VHF DMR	144.9625 MHz +2.5 MHz CC3	Slot 1: Dynamic Slot 2: NorCal BM (31068)
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 pages/members-current.html](https://www.paara.org/pages/members-current.html).

Scroll to the bottom of the page
 and fill out the info. All badges will
 be mailed.

The cost for a badge is \$30.00.

PAARAgaphs Ad Rates

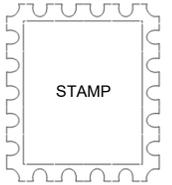
PAARAgaphs accepts paid advertisements from non-members. (short personal ads remain free for members in good standing). **All ad rates listed are per issue.**

- 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 — September 2024

Accept no substitutes. Produced and printed in California USA



Palo Alto Amateur Radio Association, Inc.
 PAARAgaphs Newsletter
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FDX101MP | 200W HF/50MHz Transceiver

- Hybrid SDR Configuration • Unparalleled 70 dB Max. Attenuation VC-Tune • New Generation Scope Display 30SS • ABL Active Band Indicator & MPD (Multi-Purpose VFO Outer Dial) • PC Remote Control Software to Expand the Operating Range • Includes External Power With Matching Front Speaker



FT-710 Aess | HF/50MHz 100W SDR Transceiver

- Unmatched SDR Receiving Performance • Band Pass Filters Dedicated for the Amateur Bands • High Res. 4.3-inch TFT Color Touch Display • AESS Acoustic Enhanced Speaker System with SP-40 For High-Fidelity Audio • Built-in High Speed Auto Antenna Tuner



FTM-500DR | C4FM/FTM 144/430MHz Dual Band Xcvr

- Front Firing Acoustically Enhanced Speaker System • True Dual Band Operation, C4FM/C4FM Digital D-D Dual Receive • 2.4" High-Resolution Full-Color Touch Panel Display • Built-in High Precision GPS Receiver • Wireless Operation Capability with Optional Bluetooth® Headset



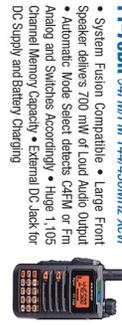
FDX101 | HF/50MHz 100 W SDR Transceiver

- Narrow Band and Direct Sampling SDR • Down Conversion, 9MHz IF Roofing Filters Produce Excellent Stage Factor • 5-Full-Color Touch Panel W/3D Spectrum Stream • High Speed Auto Antenna Tuner • Microphone Amplifier W/3-Stage Parametric Equalizer • Remote Operation w/optional LAN Unit (SD-LAN10)



FT-891 | HF-50 MHz All Mode Mobile Transceiver

- Stable 100 Watt Output • 32-Bit DSP • Large Dot Matrix LCD Display with Quick Spectrum Scope • USB Port Allows Connection to PC with a Single Cable • CAT Control, FT118TTY Control



FT-70DR C4FM/FTM 144/430MHz Xcvr

- System Fusion Compatible • Large Front Speaker delivers 700 mW of Loud Audio Output • Automatic Mode Select detects C4FM or Fm Analog and Switches Accordingly • Holds 1,105 Channel Memory Capacity • External DC Jack for DC Supply and Battery Charging



FT-991A | HF/VHF/UHF All Mode Transceiver

- Real-time Spectrum Scope with Automatic Scope Control • Multi-color waterfall display • State of the art 32-bit Digital Signal Processing System • 3kHz Roofing Filter for enhanced performance • 3.5 inch Full Color TFT USB Capable • Internal Automatic Antenna Tuner • High Accuracy TCXO



FTM-300DR | C4FM/FTM 144/430MHz Dual Band

- 50W Output Power • Real Dual Band Operation • Full Color TFT Display • Band Scope • Built-in Bluetooth • WIRESS X Portable Digital Mode/Fixed Mode with HR-200



FT-65R | 144/430 MHz Transceiver

- Compact Commercial Grade Rugged Design • Large Front Speaker Delivers 1W of Powerful Clear Audio • 5 Watts of Reliable RF Power With In a compact Body • 3.5-Hour Rapid Charger Included • Large White LED Flashlight, Alarm and Quick Home Channel Access



FDX101D | HF + GM Transceiver

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FT-2980R | Heavy-Duty 80W 2M FM Transceiver

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FTM-200DR | C4FM/FTM 144/430MHz Dual Band

- 1200/9600bps APRS® Data Communications • 2" High-Res Full-Color TFT Display • High-Speed Band Scope • Advanced C4FM Digital Mode • Voice Recording Function for TXRX

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- All New User Operating Interface-E20-III (Easy to Operate-III) • Robust Speaker Delivers 3W of Clear, Crisp Receive Audio • Detachable Front Panel Can be Mounted in Multiple Positions • Supports Optional Bluetooth® Wireless Operation Using the SSM-BT10 or a Commercially Available Bluetooth® Headset



- RETAIL LOCATIONS - Store hours 10:00AM - 5:30PM - Closed Sunday
- PHONE - Toll-free phone hours 9:30AM - 5:30PM
- ONLINE - WWW.HAMRADIO.COM
- FAX - All store locations
- MAIL - All store locations

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