

PAARAgraphs



The Official Newsletter of the

Palo Alto Amateur Radio Association, Inc.

Celebrating 80 years as an *active* amateur radio club—Since 1937

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



Emergency Power with Batteries

Rachel Kinoshita, KK6DAC

As part of becoming proficient in emergency communications, Rachel began researching alternative emergency power methods, including solar, generators, different types of batteries and what works best for a particular application. In this presentation, Rachel will be talking about batteries, the real world testing she has performed with them and how it applies to ham radio.

BIO

Rachel Kinoshita moved from Oregon to the San Francisco Bay Area in 1989 to work for a start-up email software company and has spent most of her career working in the messaging industry. She now spends her time fighting spam, malware and phishing attacks.

Rachel (KK6DAC) is still a newbie to ham radio, having only gotten her license in early 2013. Although like many things, Rachel jumped in with both feet and soon got her general license, an HF rig and starting exploring the world in the low bands.

At the same time, she found herself working with her local Community Emergency Response Team (CERT) to help develop and shape their communications plans and policies. She also found her way to the South County ARES (SCARES) organization where she developed an interest in emergency communications.

Upcoming Events

Sept 1	PAARA General Meeting, 7:00 PM
Oct 6	Cubberly Community Center, Room
Nov 3	H-6, 400 Middlefield Rd, Palo Alto
Sept 20	Board Meeting, 7:00 PM
Oct 18	Everyone welcome!
Nov 15	Location: Marty, W6NEV, QTH



President's Corner

September 2017

What an amazing month it's been for me. PAARA had it's Flea Market, I went to Albuquerque, and there was a total eclipse of the sun. And in a few days from this writing, I'm headed to JA again. Oh, and it's almost the fall contest season too.



There's Pacificon on the horizon and the NCDXC Elmering Project is getting ready to launch.

The early part of the month my son Christopher, KG6SVI, and I went for our now annual trip to the Duke City Hamfest in Albuquerque, NM. I was fortunate enough to be invited back for my 3rd year. The venue was different than it has been in the past - now at the Sid Cutter Pilot's Pavilion, at Balloon Fiesta Park. This is the spot where all of the hot air balloons launch each fall, so it's an enormous flat area in otherwise hilly country. It rained like crazy

(President — Continued on page 4)

The Club Projector

Joel Wilhite, KD6W

I had wondered where Jim K6SV was and why he came running in late to the meeting with another projector. So I asked Doug what happened to the club projector and he said “I plugged it in and nothing happened, it is absolutely dead.”

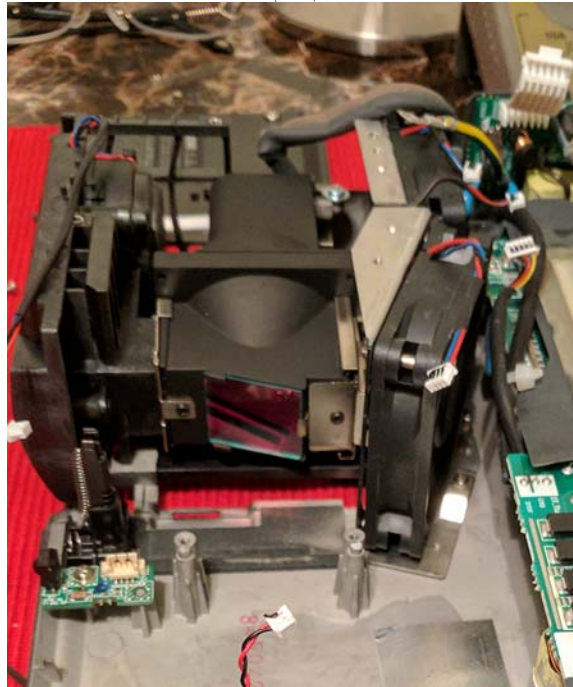
We all said the same thing, must be the power supply. Our projector like many other consumer devices doesn't offer a user replaceable fuse but in this instance it sure looks and acts like one is blown. So maybe there is an internally mounted fuse?

I took the projector home and started doing some online research. I found the repair manual online which included the disassembly instructions. Since I needed to get at the power supply to look for a fuse, I looked through the process to find out how far to go through the procedure to get to the board which was mostly covered up by the video processing card. The video processing card is tied in with everything else inside the projector which meant I had to nearly completely disassemble the whole projector just to get to the power supply board. I started to take the projector apart, piece by piece.

This projector, like many consumer projectors uses a “DMD” chip and a color wheel to make the image in a process called DLP, a trade mark by Texas Instruments who invented the chip. The DMD chip, light wheel and lens are contained in a module called the image engine which is controlled by a processor. All projectors have the same basic modules and processors to provide all the necessary functions though may offer additional or different interfaces and can be different sizes and shapes but in general include...

- | | |
|---|---|
| <ul style="list-style-type: none"> • power supply • processor board • image engine • lens assembly • lamp assembly • fan assemblies • user controls • remote control • audio amp and speaker | <p>provides the necessary voltages and protection circuits</p> <p>provides the video/audio input interface/control processor</p> <p>provides the picture output from the light input</p> <p>provides the optical lens's needed to zoom and focus</p> <p>provides the the necessary light source and bulb protection</p> <p>provides cool air flow at low audible level</p> <p>provides the push buttons to access the features in s/w</p> <p>provides the IR or USB link interface to the basic controls</p> <p>provides the audio output</p> |
|---|---|

Most of the modules are self explanatory. But the image engine has all the cool physics and the optics to focus the output all in one assembly. The color wheel is spun with a PLL motor control at precisely the video frame rate to make one frame per rotation. The translucent color wheel has 3 color primary (negative – cyan, magenta, yellow) and one polarized section each printed around the radius of the glass wheel. As it spins, each color window on the wheel exposes the DMD chip to a different color range from the white light created by the xenon bulb. These 4 windows track with the DMD chip refresh rate for every video frame. You can see the effect of the color



Light Source

(Projector — Continued from page 2)

wheel if while looking at the screen, you quickly move your head laterally (like shaking your head “no” while looking forward) and the leading edges of the object on the screen, according to your perception, your eyes will see the 3 colors separated in the blur of the edges of objects in the picture. The next cool part is how they make shades of Grey.

The output of the filter wheel is directed at the DMD chip which in turn reflects off the mirrors in the chip. One mirror represents the pixel and the color wheel chops the light into each color so each pixel can have levels or shades for each color. The mirrors of the DMD chip tilt between 0 and 12 degrees. When the light source is mounted at 24 degrees to the face of the chip, the reflected light will either be in or out of the projector lens. A shift between 0 and 12 degrees is black and white so to make shades of grey, the mirrors are pulse width modulated. Some chips can produce 1024 or more shades of Grey. Our little projector can manage 255 shades but enough to modulate each mirror at a frequency higher than our UHF band allocation (500 MHz). Our projector has a 720p resolution so the 1280 pixels per line and 720 lines equals 921,600 mirrors (actually has over a million) each mirror capable of moving at 500 MHz all at the same time to trick your eye into seeing moving pictures in color. Obviously, when we are watching still slides, we are not truly seeing the full potential of the light engines capability. But this is only possible when all the rest of the modules are working.

Since the projector is designed around modules, their removal was fairly easy and not secured with heavy Locktite or with security screws with odd ball drive heads. After removing all the main modules I was finally able to remove the power supply board and noticed something rather odd in my first visual inspection. I could see the fuse covered in a clear plastic tube which appeared to be OK and indeed buzzed out OK so this isn't good. But what caught my eye was a loose choke coil that seemed to dangle loosely which when holding the board in the orientation when installed in the projector is upside down, didn't seem right.

On closer inspection, one lead was completely broken and the part was dangling by two remaining leads. But choke coils have two leads and this has three. Is this a mini transformer? The projector power supply uses a custom switched mode power supply design. Was this a center tap coil?

But every SMPS design works the same. It takes the raw AC current from the wall, rectifies it into DC, then switches the DC into another transformer at a high frequency and the secondary outputs are wound to produce the necessary voltages. This coil was right up near the input next to the fuse. The coil suppresses the switching noise so the hash produced by the MOSFETs is attenuated into the household AC. But why would a choke have 3 wires? On closer inspection, 2 wires are for the coil and the extra wire is used to ground a copper strip wrapped around the coil to suppress the field created by the coil. The broken wire was one side of the choke breaking the path of the AC, just like a fuse. But in this case it failed because of mechanical stress as the coil weighs several grams and was not bonded physically to anything else mechanically.

To fix the coil, I backed out the outer winding enough to expose the broken wire end and removed the varnish insulation. I twisted and soldered on a short length of copper wire and then put the coil back together. I then used some low VOC potting compound on the bottom of the part to have the part sit on a blob of adhesive and then soldered the leads back onto the PCB. Then I put another blob of material on one side near some other components to add more rigidity. I didn't use silicon glue as



Coil next to power supply board before repair

(Projector — Continued on page 4)

(Projector — Continued from page 3)

the heat in the projector would have made a terrible smell when up to temperature. Once the compound dried, I put the projector back together to test it and it



Potted Coil

worked. This was easy fix as it could have been much worse had the internal fuse had blown. The next question would have been why did the fuse blow but in this case it was a mechanical failure and not a semiconductor breakdown.

(President — Continued from page 1)

the day we arrived, but cleared up for the rest of the trip. I had fun chatting with my new-found friends at the hamfest and made some new ones too. I met some very enthusiastic young hams as well. Each year there is a mystery author there named Patricia Smith Wood, KE5FVS. I haven't sampled her books before, but now she's written a ham radio related mystery called, Murder On Frequency. I couldn't resist. I'm still in the middle of it, so I don't know how it will end, but I'm really enjoying it. They had 2 IC-7300s and a KX2 in their raffle. I won some of the smaller prizes, but sadly none of the radios :). Maybe next time. Christopher and I headed to Santa Fe after that to indulge in some stacked enchiladas with red chile. If you like New Mexican Cuisine, then you know what I'm talking about. Very yummy! We also visited the Very Large Array in the Planes of St. Augustine, near Socorro. It was very fun and interesting to see all of the upgraded dishes. We ended up talking to a man named Gene Cole who works on the dishes, while we were on our walking tour. It turned out that he was in the informational video we had watched just before, and he also appeared in the movie Con-

tact. If you want to check out the video, look here: <https://public.nrao.edu/gallery/beyond-the-visible-vla/>.

I wanted to take a moment to acknowledge all of the hard work that went into making the PAARA sponsored ASVARO Electronics Flea Market a success once again. There were a lot of people involved in making it a success, but this year I wasn't included, given my trip to NM. There are many people to thank. If I miss one of you, let me know and I'll mention you next month. Thank you to Doug KG6LWE, Gerry N6NV, Harry K4YR, Clark KK6ISP, Walt K6WGY, Darryl KI6LDM, Rolf N6NFI, Jim K6SV, Doña KI6DAR, Rich W6APZ, Bob KD6KYT, Ron W6AZ, Joel KD6W, Marty W6NEV, Rob KC6TYD, and Svend KF6EMB. I haven't seen the numbers yet, but I hope we did well financially. I know we did well by doing our part for the amateur community.

The highlight of this month for me was going to Madras, OR to experience the total eclipse of the sun on August 21st. It was an incredible experience. Christopher and I met Jim, K6SV, and his wife Bobbi there. They had a nice RV to sleep in, but we were in a tent. They graciously invited us to dinner the night before the eclipse with Jim's cousin, and even lent me an air mattress after mine was found to have a hole! Boy did that make a difference. We also all took a ride in a tethered hot air balloon. What an experience! As for the eclipse itself, the world was transformed momentarily into a surreal twilight landscape ringed with ochre, with a giant plasma-ringed hole in the sky. There is no comparison between any part of the eclipse and totality. I took pictures and video, but it doesn't do it justice. You just have to see it for yourself in 2024. I'll be there.

It's going to be a busy September with me going to JA and preparing for Pacificon. Sadly I'll miss the next PAARA meeting, but I'll leave you in capable hands. Start thinking about the PAARA Leadership Elections, which are coming up fast, and give us a hand running your club. CU AFTER JA DE K6WX

Why I am a Ham
Alexia Snethen, KM6LGG,
A 10 year old ham.

There are many reasons why I got my license. I have always loved geography. With ham radio and the right equipment I could talk to people all over the world. I also love to learn things. Whether it's about countries or someone's name, I love it all.

I also got my license because of a deal. My mom said she would get her license if both my brother and I got our licenses.

My license will give me more independence. As long as someone from my family and I have our radios on, I can separate from the group.

Another reason is I always want to be prepared for emergencies.

Studying for my license was tough and tedious, but think of the goal ahead. If you are a kid wanting to get your license, don't get discouraged if you don't pass the first time. Try again. If you are having trouble studying there are websites to help teach you. You could also read books to help you too.

One of my dreams in ham radio is to talk to the ISS. I also hope to become an Extra class, along with some other things, like talking to people in all seven continents and building a Yagi antenna.

My brother (KM6DZY) found out about amateur radio in the Tri-City Voice newspaper. It was the SBARA event "Radio in the Park". We went. It inspired him and my dad to get licenses (W6ARY and KM6DZY). Just recently me (KM6LGG) and my mom (KM6LRD) got our licenses. So it's the whole Ham Family™ (Not actually!!)

It is really fun and I hope non-hams reading this are inspired to get their license.

August 16, 17 Board Meeting Minutes

Through an email exchange, the board agreed to not hold a board meeting due many of the board members being out of town or otherwise tied up.

Jim Thielemann
Secretary/membership
K6SV

PAARA 80th ANNIVERSARY BANQUET
CANCELED

I am sad to report that the PAARA 80th Anniversary Banquet has been cancelled due to insufficient reservations. Although the last day to reserve a spot at the banquet is still a week away, there wasn't enough early support to continue forward.

For those who have already paid for the banquet, refunds will be issued in the form payment was made. Those who sent in checks, the checks will be returned by mail. If you have any questions, please contact Marty, W6NEV.

Thank you,

Marty Wayne
PAARA VP
mcwayne2@comcast.net
408-234-8023

September Raffle Prizes

1st Yaesu FT25R/E — VHF 2 Meter Mono Band FM Handheld Transceiver



2nd Arrow 2m Yagi

3rd CS-201A Daiwa Coax Switch



(4th thru 8th prizes will be a surprise).



August Raffle Winners

Left to Right

1st Prize	Walt K6WGY	Yaesu FT25R/E VHF 2M HT
5th Prize	Walt K6WGY	50 piece Driver Set
2nd Prize	Jacob KK6RKA	Arrow 2m Yagi
8th Prize	Jacob KK6RKA	Flush Cut Dikes
6th Prize	Darryl KI6LDM	Escape Bluetooth Stereo Headset
4th Prize	Rachael KK6DAC	FSR Radios
7th Prize	Steve KO6L	Allen Wrench Set
3rd Prize	Fred W6BSD	Daiwa Coax Switch — Not Shown

Palo Alto Amateur Radio Association, Inc.

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	n6db@arrl.net	
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	ki6ldm@arrl.net	

Appointed Positions

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	thielem@pacbell.net	
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	K6RDM@yahoo.com	
Public Affairs	<i>Position Vacant</i>	
Station Trustee W6OTX, K6YQT, W6ARA....	Gerry Tucker, N6NV	
Station Trustee K6OTA...	Ron Chester, W6AZ	
Property Manager	Gerry Tucker, N6NV	
Fund Raising Coordinator.	Bob Korte, KD6KYT	408 396 4745
	bob@rgktechsales.com	
Badge Coordinator	Doug Teter, KG6LWE	650-367-6200
	dteter@wci.com	
Historian Position	<i>Position Vacant</i>	
Raffle Coordinator	Jim Rice, K6AK	650-851-2274
Field Day Coordinator ...	Doug Teter, KG6LWE	650-367-6200
ASVARO Rep.....	Clark Martin, KK6ISP	
	kk6isp@comcast.net	
Webmaster	John Miller K6MM	
	webaron@gmail.com	
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Speaker Coordinator	Marty Wayne, W6NEV	408-246-7531

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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.k6va.org>

NCDXC — Northern California DX Club

Meets 3rd Thursday 7:30pm each month,

Repeater for member info 147.360, Thursday 8:00PM

Contact: <http://ncdxc.org> or Mike Gavin W6WZ, (650) 851 8699

QCWA Chapter 11

Northern California Quarter Century Wireless Association

Meets third Wednesday monthly at Harry's Hofbrau in Redwood City @ 11:30 AM.

Guests are welcome. Saturday morning net on 146.850 MHz, PL 114.8

50 MHz & Up Group

Meets 1st Thursday each month at 7pm in the Texas Instruments Building E conference room in Santa Clara.

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

SCCARA

Santa Clara County Amateur Radio Association

Operates W6UU & W6UU/R, repeater 146.985-pl

Nets: 2m, 7:30pm Mon; 70cm, 442.425+ (pl 107.2) Thur.

Meets 2nd Mon each month @ 7:30 PM.

Contact: <http://www.qsl.net/sccara> or Clark Murphy KE6KXO 408-262-9334

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:

147.39 (+600) 151.4 ctcss 441.35 (+5.0) 88.5 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.

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 KB6UOJ, (408) 967 7924

shensley@Novell.com

(Please send changes to [PAARAgaphs editor](#))



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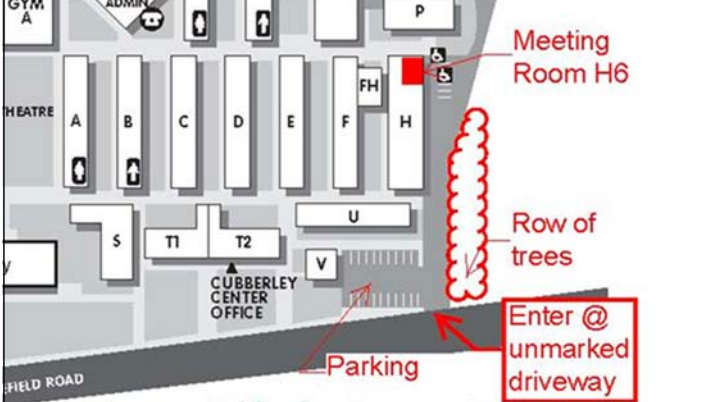
Badges are ready for pickup.

If you would like to order a badge, see **Doug Teter, KG6LWE.**

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

<u>Week</u>	<u>Control Operator</u>
1 st	Joel KD6W
2 nd	Doug - KG6LWE
3 rd	Jack - W1VSL
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.



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 650/856.8756 fax
 www.cityofpaloalto.org

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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).
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Subscription Problems? Contact Database
 Manager: Jim Thielemann, K6SV,
 408-839-6815, thielem@pacbell.net

PAARAgaphs Ad Rates

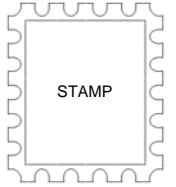
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- For Profit organizations and/or individuals: \$5-business card size, \$25-half page, \$50 full page or back cover per issue.

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 All fees payable in advance by the year with "scanner-ready" copy or text-only ads. **Give payment and copy to Ron Chester, W6AZ**

PAARAgaphs — September 2017

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 PAARAgaphs Newsletter
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TS-590SG
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TM-D710G
2M/440 Dualband



TM-V71A
2M/440 Dualband



TM-281A
2 Mtr Mobile



TH-D74A
2M/20/440 HT

YAESU
The Radio



FT-991A
HF/VHF/UHF Transceiver



FDX1200
100W HF + 6M Transceiver



FT-450D
100W HF + 6M Transceiver



FTM-400XD
2M/440 Mobile



FT-60R
2M/440 5W HT



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

HRO is family owned and operated by active Ham's!

AMHERST, CA (800) 834-8046	OKLAHOMA, CA (877) 882-1145	PORTLAND, OR (800) 785-4287	PHOENIX, AZ (800) 595-1588	MILWAUKEE, WI (800) 558-4411	WOODBRIDGE, VA (800) 444-4799	PLANO, TX (877) 458-9130
BURBANK, CA (877) 892-1748	SAN DIEGO, CA (877) 520-9823	DENVER, CO (800) 444-9476	ATLANTA, GA (800) 444-1927	NEW CASTLE, DE (800) 644-4478	SALEM, NH (800) 444-0047	ONLINE STORE WWW.HAMRADIO.COM

Contact HRO for promotional details. Shipping including Hawaii, Alaska and Canada. Call will be routed to the nearest store. All HRO 800-numbers can assist you. If the first time you call is busy, you may call another AZ, CA, CO, GA, TX. VA residents add sales tax. Prices, specifications and descriptions subject to change without notice.