

W6OTX**W6ARA**PAARA NEWSLETTER
VOLUME 62, NUMBER 2, FEB 2012**K6OTA****K6YQT**

PAARAgraphs



The Official Newsletter of the

Palo Alto Amateur Radio Association, Inc.Celebrating 75 years as an *active* amateur radio club—*Since 1937*

Fun On 160M!

Jim Peterson, K6EI

Jim will talk about some commonly held myths about 160 meters, our only MF (Medium Frequency) band. He will discuss how to get on the air and have fun on the Top Band. His talk includes one of the biggest challenges, putting up top band antennas as well as some of the things that make MF propagation quite different from HF propagation.

sation with your fellow hams, and a great talk by Richard Dillman, W6AWO, of the Maritime



President's Corner

February 2012

We've started 2012 with some interesting solar activity, particularly during the end of January. That has led to some nice auroral displays, but there have been solar radiation storms as well, making HF radio communications a dicey proposition.



As I write this we have just finished the PAARA / FARS Winter Banquet for 2012. I think it's safe to say that a good time was had by all. There was great food and drink provided again by Michael's at Shoreline, fun and interesting conver-

Historical Radio Society. I was very impressed by the passion with which he and others who work at KSM / KPH strive to preserve the heritage, not only of the site itself, but of the radio-men and women who valiantly served those ships at sea. It is a true labor of love for something greater than just moving traffic back and forth from ship to shore. If you missed the talk, you really missed something special. I also want to congratulate Mike Wimble, KM6WP, who was the grand prize winner at the raffle. He won the Yaesu FT-857D. He was convinced that he would win, and sure enough he did. Congratulations Mr. Mike! I'll look forward to seeing you all at the Winter Banquet next January.

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(Continued from page 1)

Solar conditions this past month have been variable. As is typical for winter, propagation has not been as good here in the northern hemisphere, since the part of the ionosphere that we launch our signals into does not see as much ultraviolet flux because of the shortened daylight hours. This decreases the ion density for that critical first hop, so we tend to see worse propagation. A large number of CMEs and flares near the end of the month have caused unstable geomagnetic conditions and auroral disturbances, which have increased the noise floor. Not all of these have been direct hits, but there has been enough noise to make a significant difference. If we get some quiet CONDX after this, there might be some nice propagation for a time, and some nice DX to go with that. At the moment, though, the X-ray flux is rather high (B5), and we are in the middle of an S2 storm. DXSummit doesn't show much going on from 6 land near sunset, but there is some activity on 15 meters, and a little on 10 meters. Hopefully things will improve as we approach the spring contest season.

The PAARA KPH trip is fast approaching, and there should be details elsewhere in PAARAgaphs describing how to sign up. We have a large, air conditioned motor coach, with a DVD player. We have the barbecue ready to go. We have everything you need to have a fun and informative trip back to the history of maritime radio. If you missed the talk at the banquet, or if you saw it I'm sure you're even more motivated, you are really going to want to visit one of the last remaining coast stations in the world. This is a once in a lifetime chance. Join PAARA and Richard Dillman at KSM / KPH and see, touch, and hear the station on the air in April. Details in PAARAgaphs, and at the PAARA meetings. See Marty, W6NEV, PAARA Vice President to sign up.

At a recent board meeting we have approved a move to allow our membership to renew via PayPal on the PAARA website! Now, don't get too excited yet. This is not yet implemented,

but we are working on it. It will still take some time to get our accounts set up and to finalize our website changes, but I wanted to let you know that this is in progress. I think this will be very convenient for those of you who do things on the web (like me). Hopefully it will save Rick from any extra repetitive stress injury from writing out all of those receipts :).

Lastly I wanted to start everybody thinking about the PAARA sponsored ASVARO Electronics Flea Market. It's coming up in April, on the second Saturday, right before the KPH trip. I'll be hitting up the usual 'volunteers' for help, so look for an e-mail pretty soon. Until then.

73 ES CU ON THE BAND DE K6WX

KSM/KPH Field Trip

PAARA is visiting the Marine Radio Historical Society station KPH/KSM. This coast station was one of several marine communication transmitting and receiving stations located around the globe. The field trip will include visits to both the transmitting and receiving sites. Transportation to and from the site will be by bus. As is part of the PAARA tradition, we will be well fed with hamburgers and accompaniments. Get your tickets while there are still seats available!

Date: Saturday, April 28

Leave: 700 Alma St, Menlo Park at 8:00 AM.

Return: KSM/KPH site approx 4:00 PM.

Cost: \$40 per person.

Please see or call me for tickets. If there are any questions, please contact me at w6nev@arrl.net or call 408-246-7531.

Marty, W6NEV

Palo Alto Amateur Radio Association, Inc.

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Future PARRA Meeting Dates

Feb 3rd, Mar 2nd, April 6th

VE Exams

3rd Saturday each month, 10:30AM, 145.23- PL=100Hz
 Redwood City Main Library, Community Conference Room
 1044 Middlefield Road, Redwood City, CA
 Contact: <http://amateur-radio.org> or 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-October, 6am-2pm
 Howard M. Krawetz, N6HM 650-856-9761
 Contact: <http://www.electronicfleamarket.com/>

PAARA — Palo Alto Amateur Radio Association

Meets 1st Friday 7:00pm each month at Menlo Park Rec. 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

NorCalQRP — Northern California QRP Club

Meets 1st Sunday each month
 Contact: <http://www.norcalqrp.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 City Hall, 2nd floor, 1 Twin Pines Lane,
 Belmont. 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

WVVARA — 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 3rd Wednesday of every month.
 Contact: <http://wvvara.org>, Bill Ashby N6FFC, 408-267-3118, N6FFC@Juno.com, or
N6FFC@ARRL.NET

**American Red Cross,
 Santa Clara Valley Chapter**

Contact: <http://santacalaravalleym.redcross.org> or Scott Hensley KB6UOC, (408) 967 7924
shensley@Novell.com

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

Cascata - an Arduino Waterfall by WA5ZNU

What is Cascata?

Cascata is an Arduino Waterfall display program built using the [Arduino](#) and the [Sparkfun Color LCD Shield](#).

It has a selectable 0-4 kHz or 0-2 kHz audio range, and can display a waterfall, a spectrum graph, or both. It features variable attenuation and automatic DC centering.

Background

Ham radio operators use a signal visualization display called a "Waterfall" to plot signal strength and frequency against time on a scrolling display. This type of display is common in both digital mode radio programs and in software-defined radio displays.

Cascata is a simple project using an Arduino and a Nokia LCD color display to provide a pocket-sized display for field operations, or for computer-free operations.

Cascata requires a small amount of soldering and can serve as an introduction to the Arduino for ham radio operators, or an introduction to ham radio for Arduino enthusiasts.

Video

A video of the waterfall display may be seen at:

http://www.youtube.com/watch?feature=player_embedded&v=o4oW2X8QVhk.

Source Code

Here is the Arduino Sketch, including the updated LCD and FFT code:

<http://wa5znu.org/2011/07/cascata/Cascata-20110707.zip>

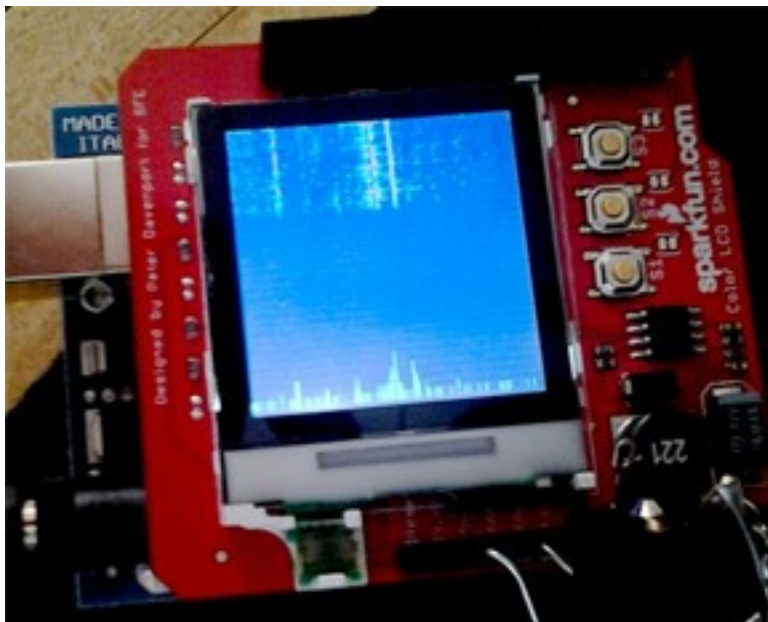
The software is built using enhanced versions of the Mark Sproul LCD library and the FFT Code is the Roberts/Slaney/Bourras/DEIF FFT library with bug fixes in 8-bit conversion. All is included in the zip file, which you can unzip into your Arduino Sketches directory. It will create a new project called *Cascata*.

Operation

- Top button switches modes: Display, Bandwidth, Attenuation Buttons 2 and 3 are up/down. (The [Sparkfun LCD Breakout Board](#) doesn't have button 3, but the Arduino Shield does. Both buttons cycle through all the choices, so you can use this firmware with the 2-button version.)
- Display: Waterfall+Spectrum, Waterfall, Spectrum
- Bandwidth: 0-4 kHz, 0-2 kHz
- Attenuation: -3, -2, -1, 0 1, 2, 3. Negative values are "gain".

The voltage reference is set to the internal 1.1v band-gap, and the bias network below sets the center point to about half of that value, when referenced to the 5v supply. The firmware automatically determines the DC reference point and the 0.1uF input capacitor AC couples the signal.

If your input signal voltage is too low, use the Attenuator adjustment to change to lower values.



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LCD Construction

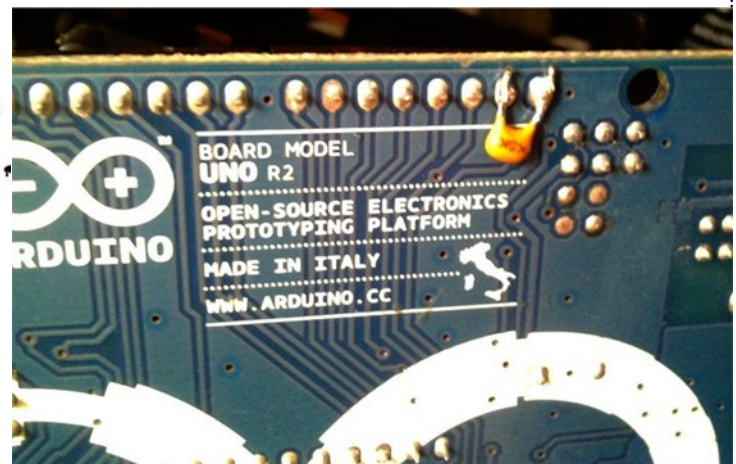
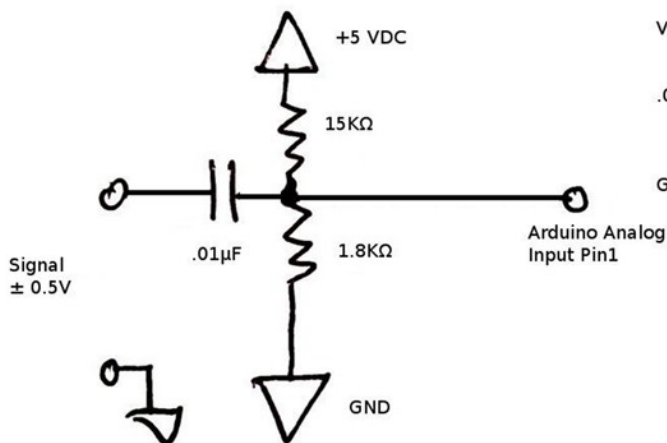
The SparkFun Color LCD Arduino Shield requires headers be soldered on.

A convenient option is the Sparkfun [stackable header set](#). These headers allow easy access to the Arduino pins, but they stick up a bit above the LCD board and may make it hard to put in a case. If you have plans for build this project in a case, you may want to use a non-standard Arduino (such as the Ardweeny) and in that case you may want the [SparkFun Color LCD Breakout Board](#), but you will sacrifice one button.

Interfacing

The Arduino 2009 and Uno have a choice among 5V ADC reference, internal 1.1V ADC reference, or external reference. 5V is too high for audio input, so we'll chose the simply 1.1V internal reference. A resistor divider produces approximately 0.55v using standard value resistors, and a 0.01uF capacitor tacked onto the bottom of the Arduino bypasses the VREF signal to ground to reduce noise.

I built my input network on a protoboard first, then "flying-lead" style, but you could put it on a small piece of perfboard and use header pins to attach to the LCD Shield. A 3.5mm audio jack completes the interface, which I plugged into the headphone jack of my radio.



Arduino Audio Coupling an Use with 1.1 V internal ref $5v * 1.8 / (1.8 + 15) = 0.54v$ or about half of the ADC r

WASZNU 2011-07-09

- Tack a 0.01uF capacitor on the bottom of the Arduino from VREF to ground.
- Install the Arduino LCD Shield with socketed headers.
- On the shield headers, put a 15 k Ohm resistor into the Arduino 5V pin to the ground pin below the LCD.
- Solder a 1.8 k Ohm resistor from the ground side of the above resistor. Put the other end into Analog input 1.
- Solder a 0.01 uF capacitor to the 1.8 k Ohm resistor at the Arduino analog input 1 pin.
- Input voltage should be +/- 0.5v max.

Drawbacks

Noise: The default value of the Attenuator is 1, which eliminates the LSB of ADC and cuts down on some of the noise. The 0.1uF capacitor added to the bottom of the Arduino board before VREF and ground helps with the noise some, but doing any better would require quiescing the CPU before the ADC measurement, further reducing the signal bandwidth and processing time available.

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Sample time: Sampling at 8kHz takes 125 μ s, and it takes 100 μ s for each ADC operation. That leaves only 25 μ per sample or 6.4ms for a 256 sample row. That's not enough time to do the FFT or Display, so we drop samples between lines.

Future Directions

Cascata is designed to be a project for you to undertake and extend. Here are some ideas for ways to move forward:

Put it in a box?

The SparkFun LCD board doesn't fit nicely in the SparkFun Arduino Shield Case, however with the [Sparkfun Color LCD Breakout Board](#) and the [SolarBotics Ardweeny](#) and a 5V regulator, you could make a much smaller device in a nice case.

Decode PSK31?

Add a mode to disable display and decode PSK31. Is there enough time in 6.4ms/row to do the decimation, filtering, phase detection, bit decoding, and Varicode conversion?

Make it faster?

At 16 MHz, the Arduino is a wonder at getting this DSP done. Switch to a 72 MHz [Maple Board](#) and you could have enough cycles left over to do something really interesting.

Expand the bandwidth?

Can you use aliasing to sample a much wider bandwidth? Since the output display size is limited to about 128 pixels, you would need to do decimation anyway.

Narrow the bandwidth?

David (WB4ONA) asks if you could narrow the bandwidth to 200 Hz, for use as a display with QRSS or other ultra-low bandwidth modes. I think you need to integrate over time; perhaps the Joe Taylor (K1JT) WSTJ source code would be a good start for techniques.

Oscilloscope Output?

Instead of an LCD display, display on an attached oscilloscope using a single DAC (either an [I²C DAC from SparkFun](#) or an [op-amp/integrator DAC](#)). Use one of the digital out pins for trigger. You could use a green-screen CRT scope, or a portable digital scope that you already have. You won't get a waterfall, but instead a spectrum display.

Similar Projects

[Arduino Realtime Audio Spectrum](#). This turned up in searches when I looked for Arduino FFT and I got a lot of ideas from here. It's good to be able to share ideas across ham and Arduino projects. I found a link to the FFT from reading this post, but had to fix a few bugs to make it work at 256 samples.

[Gobotronics XProtolab GT-0010](#) This is a great board and I recently bought one. The framework source is available, including an ASM version of FFT, but the DSO source isn't open.

Mentions

Thanks for [Hack-a-day](#) for publishing a complimentary writeup: [Waterfall signal visualizer from Arduino and cellphone LCD](#) under their neat-o [radio hacks](#) tag.

Leigh L. Klotz, Jr WA5ZNU



Michael KM6WP, winner of the first prize a Yaesu FT-857



Kristen K6WX, winner of the second prize a Powerwerx Wouxun KG-UV3D-2/UHF Dual Band HT

Banquet Raffle Winners

- #1 Yaesu FT-857 HF Transceiver w/ Separation Kit - Michael KM6WP
- #2 Powerwerx Wouxun KG-UV3D-2/UHF Dual-Band HT - Kristen K6WX
- #3 Diamond X-30A Dual-Band High Gain Base Antenna - Josh KJ6PVN
- #4 The ARRL Handbook 2011 Edition - Leigh WA5ZNU
- #5 WB6IQN DBJ-2 Dual-Band Roll-Up J-Pole Antenna - Joanna K6YL
- #6 Daiwa CS-201 Coax Switch - Karen KI6FGS
- #7 MFJ-260C Dummy Load - Davis AE6EO
- #8 27 LED Portable Work Light with Built-in Flashlight - Howard W6HOC
- #9 MFJ 24 Hour LCD Dual Clock - Ivan AE6XA
- #10 Kill-A-Watt - Bill K6VWO
- #11 ARRL Small Antennas for Small Spaces - Josh KJ6PVN
- #12 ARRL Remote Operating for Amateur Radio - Mark K6MDH
- #13 3 Feet RG-8X Cable - Ramsey KE6TFZ
- #14 MFJ 24 Hour LCD Clock - Michael KM6WP
- #15 PL-259 Connectors - Rob KI6GCL
- #16 Dogbone End Insulators - Michael KM6WP

PAARA thanks Howard W6HOC who donated over \$100 in raffle prizes.

Minutes of the 18 January 2012 PAARA Board

The Board Meeting was held at the Palo Alto Red Cross building, commencing at 7:30 PM on the 18th of January, 2012. Attending were Kristen McIntyre K6WX (Pres), Marty Wayne W6NEV (Vice Pres), Rick Melrose K6RDM (Sec, Database), Larry Rebarchik N6DB (Dir), Rob Riley KI6INR (Dir), Darryl Presley KI6LDM (Dir), Vic Black AB6SO (Membership) and Doug Teter KG6LWE (Field Day Coordinator). A quorum was present.

President's Report: Kristen K6WX reported that the projects presented at the January Home Brew Night meeting were of considerable interest and well received along with the delicious cookies provided by Marty's XYL. Jim Peterson K6EI will be giving the talk at the February 3rd meeting on the subject of "How to Get On the Air and Have Fun on 160m." For many of us, the factors involved in getting a station and an antenna up for 160m can be daunting. Jim will have some very welcome solutions.

Secretary's Report: Rick K6RDM reports that the minutes of the 21st of December Board meeting had been previously submitted and approved. There was one new member at the January 6th General Meeting, and 15 renewals with 2 rejoining. Members are reminded that it is time to renew for 2012. Your mailing label will show the year of current membership as recorded in our database. The last issue to be distributed to members who have not yet renewed will be the March issue.

Treasurer's Report: Ron W6AZ was unable to attend due to other commitments.

Vice President's Report: Marty W6NEV told the board that George Rubin KC6NYU expressed his appreciation to the members who had helped him install his antenna and thanked them with a donation to the club.

Plans for our PAARAtrip to KPH, the restored ex-RCA coast station at the Point Reyes National Seashore, are moving ahead. The presentation by Richard Dillman W6WAO, on Maritime Radio and KPH in particular, at the upcoming Winter Banquet, is likely to peak interest in the trip. For more information see the website of the Maritime Radio Historical Society (MRHS), <http://www.radiomarine.org/>. Members are reminded that club membership is not required for participation and that the date is set for April 28th, and the price will be \$40 per attendee, which will include transportation and lunch at the site. We'll be departing the Menlo Park Recreation Center at 8 AM and returning at about 6 PM. Any questions can be directed to Marty via email at <W6NEV@arrl.net>. Payments may be mailed to Marty at the address on our PAARA.org website, or handed to Marty at a club meeting.

Marty told the Board that a coordination meeting for this year's Field Day will be scheduled and that the antenna trailer needs sand blasting, painting and other upgrades. We are looking for volunteers, who may have resources or who would like to work on the project, to contact Marty via email or Doug Teter KG6LWE at <dteter@wawi.com>.

Larry N6DB told the board that a donation of antennas, towers and other equipment had been made to the club and that a trip to Lafayette to pick these up for relocation to our own facilities is scheduled for the 4th of February. Help from members is needed to make this transfer and any wishing to pitch in should email Larry at rebar@hamilton.com.

The meeting was adjourned at 9:05 PM.

New member to be welcomed from the January meeting:

Paul Zahn

KJ6PPM Newark

Badges Ready for Pickup

KI6DQF	Kevin	Redwood City
K6FTF	Mark	San Jose
KJ6GBE	Sreendish	Redwood City
K6GHD	Buzz	Mountain View
KJ6GUK	Karl	Redwood City
KG6GYG	Art	San Jose
N6JCY	Joani	San Jose
KG6QKN	Francis	Palo Alto
KG6QKO	Kali	Palo Alto
KF6SRD	Chuck	Palo Alto
K6TSR	George	Portola Valley
K6VVK	Vincent	Palo Alto

January Raffle Winners

- 1st Prize: Gary Barnes / KI6HIG/ Yaesu FT-60R / Dual Band / 2m-440 / HT
- 2nd Prize: Joanna Dilley / K6YL / Alpha Delta 4-position Coax Switcher
- 3rd Prize: Bud / N6SN / Two West Mountain COM Speakers
- 4th Prize: Bill Parsons / AF6AE / MFJ Dual Clock
- 5th Prize: Vicki / N7HBJ / NARCC Repeater Directory
- 6th Prize: Vic Black / AB6SO / Two PL-259 Connectors
- 7th Prize: Rick Melrose / K6RDM / ARRL Mini-Log



PAARA Feb 3rd Raffle Prizes

- 1st RIrunner 4008 40Amp Power Panel / 8 Fused Outlets / Volt Monitor / Audio Alert
- 2nd MFJ 25 Amp Switching Power Supply / 2.8 lbs. / 5-way Binding Posts
- 3rd Atomic Wall Clock Wireless Weather Station / Large Display / Indoor-Outdoor Temperature / Date
- 4th Battery Tender Junior Charger / 12V / 0.75A / Auto Float
- 5th Two Uniden FRS / GMRS / Radios
- 6th NARCC Repeater Directory
- 7th Coax Seal Black Weatherproof Tape

K6AK Jim Rice





James Farrey
Sales Manager

James Electronics Ltd
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HERE

*Badges are ready for
pickup.*

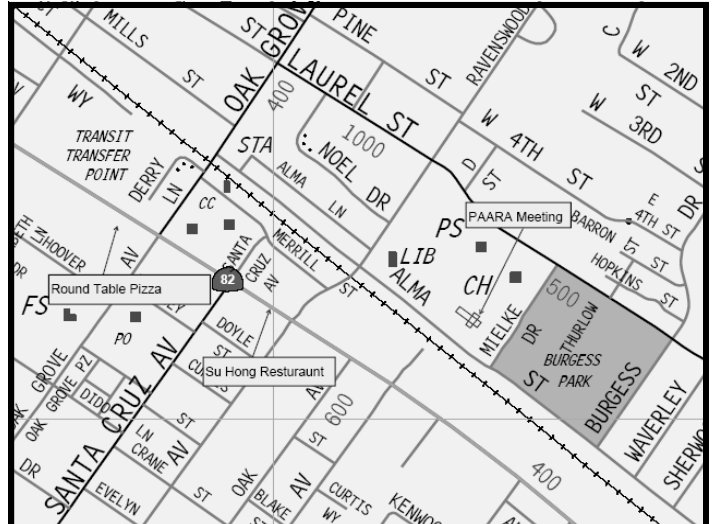
If you would like to
order a badge, see
Lynn Gentry, KG6JPV.

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	Michael - N6MEB
2 nd	Doug - KG6LWE
3 rd	Jack - N1VSL
4 th	Marty - W6NEV
5 th	Up for Grabs!

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.



Directions to PAARA meeting:
<http://paara.org/meetings/>

Join us for pre-meeting eyeball
**Eye Ball QSO
 gab & gobble**

*Food will be served at 6:00 sharp, so guests will be on time for the
 PAARA meeting. Those arriving late will be responsible for their own
 food order.*

5:30 pm—at Su Hong Restaurant
1039 El Camino Real
Menlo Park

*across from Kepler's Book Store
 on El Camino Real
 Walking distance from Caltrain!*

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 Menlo Park Rec Center, 700 Alma Street, Menlo Park, CA.

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

Membership in PAARA is \$20.00 per calendar year,
 which includes one subscription to PAARAgaphs
 \$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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 Day**

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 WHEN A NEW
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 DETERMINED.

8AM TO 6PM



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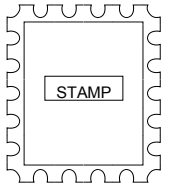
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