

# PAARAgraphs

Since 1937

Monthly Newsletter for the Palo Alto Amateur Radio Association



## Calendar

April 7, 1995 **PAARA Meeting**

Menlo Park Recreation Center  
700 Alma Street  
Menlo Park 7:30-9:30 PM

April 19 **PAARA Board Meeting**

Red Cross Bld. 400 Mitchell Ln., Palo Alto

April 21, 22, & 23 weekend

**International DX Convention**

Visalia, CA contact- George Allan (408)225-1819

June 3, 1995 **PAARA Picnic** (see Picnic page 4)

June 24-25, 1995 **Field Day**

October 20, 21, & 23 weekend **Pacificon '95**

Concord, CA contact-Richard Schulze, AA6DL  
(510) 932-6125 (hotline)



## Program

April 7, 1995 **Speaker:**

**Wes Irish, WA2CRQ** will present a talk on the American Red Cross Emergency Communications Van from Xerox Corp. The van is completely self sufficient with antennas, power supplies, extra batteries and chargers. There several operating positions for HF, VHF, and UHF as well as Red Cross frequencies, cellular telephones and facsimile.

## PAARA MEMBERS NEEDED TO HELP WITH PUBLIC SERVICE EVENTS:

We are looking for Amateur operators to help with two upcoming public service events.

On Sunday, **April 2nd** there will be a 5 and 15 k walk-a-thon to benefit the MS Society. The time commitment will be from 8:00 am till 2:00 PM. This will be held in the Baylands Nature Preserve in Palo Alto. We are looking for Hams and first aid people (or folks who can do both) for this event. For the **MS Walk-a-thon**, there is a pre-event meeting, which we encourage everyone to attend.

The meeting will be on Sunday March 26 at 12:30 PM at the MS Office, 2589 Scott Blvd. in Santa Clara. If you can operate bicycle - mobile, we are also interested in knowing that.

The second event is **Palo Alto's Black & White Ball** occurring on Saturday, **May 6th**. The time commitment will be from 7:00 PM through 2:00 am on Sunday morning. This year, the event has moved to Palo Alto airport.

If you are interested in working on either of these events, please call me or respond via packet.

Thanks, **Gordon Baillie, KD6LHO, 961-6906**

## Radio Class

EMARC (Electronics Museum Amateur Radio Club) is sponsoring amateur radio classes for Novice and Technician Licenses:

Cost: FREE! (only \$15 for Now You're Talking textbook-reg. \$19)

Date: Starts Tuesday, March 14th, Tu. & Th. for Six Weeks

Time: 7:00 PM to 9:30 PM

Where: "Boardroom," Covington School,  
201 Covington Road, Los Altos

Students need not attend every session. Class will include videotape(s), multiple instructors, equipment demos, etc. Class appropriate for those without technical backgrounds, too. Emphasis on fun, including the various activities of amateur radio, equipment, etc., in addition to learning what it takes to pass the tests.

Contact: Peter **408-747-1222** days/leave message evenings.

⇒ **Membership fees are due each January. Pay before April 15 to avoid being dropped from the Roster and PAARAgraphs mailing list**

⇒ This months mailing label should read '95 or later. Call: Dave Bailey WS6W, 408-730-5215 for membership info.

## PAARA Members' News

Technician Class **Ron Carmichael, KD6RFI**, studied hard and long for his 5 WPM Novice code test. The examiner was set up for 20 WPM test so Ron took that as a "warm up" then moved down to the General Class 13 WPM as a final prep for his Novice exam. To his great surprise, Ron easily passed the 13 WPM test. He's now a Technician plus with a year to study for the General Class theory test.

Maybe Ron should team up with **Jeff Furman, KD6MNP**. After son **Mike, KD6OCS**, recently passed his General Class test, Jeff passed the written exams for General, Advanced and Amateur Extra Class in one sitting. He then passed the 5 WPM test and has a little under a year to really master Morse code.

**Les Dyer** did it his own way. He always wanted to be a ham, but didn't want to get stuck in the Novice or Technician ranks. For over **50 years** it was his dream to become a General Class ham. After passing his Novice, Technician and General Class tests in one test session he's now a very proud **KE6LWX**, General Class, and ready to make up for lost time. Congratulations, Les!

A warm welcome back to the airwaves to all of our ailing members. **Sy Stein, WA6ROM**, is well on his way to normal after a recent heart attack at the end of '94. Sy is doing a fine job as raffle chairman for club meetings. **Steve Stuntz, K6FS**, is recovering from a massive heart attack and is sporting a new pacemaker. **Bill Rausch, AA6PA**, just returned from his Australian DXpedition where he was known as **VK2ICH**. Upon his return home he was welcomed back by two muggers and suffered several broken bones.

**Gerry Tucker, WA6LNV**, recently fractured his pelvis and is on the mend. **Andy Korsack, VE3FZK**, is recovering from a painful bout with pleurisy. Get well soon, gentlemen.

**Vic Black, AB6SO**, was the January guest speaker at So. Bay Amateur Radio Association and March speaker at SPARC where he spoke about QRP communications. At SBARA he also gave a presentation on learning Morse code using phonetic mnemonics. When he used the word fed-e-AR-ion for the letter F (di-di-DAH-dit), a YL corrected him. "No", she said. "It's for-ty-NINE-ers"! There's a fast learner. If you get a chance, check out Vic's latest article and

photos which made the front cover of **WORLD RADIO** for March, 1995.

**Bill Fies, K6TYO**, outfoxed all but one ham at the Feb. 25 San Mateo County hidden transmitter hunt. Hunters showed up with portable computers, digital magnetometers, multi-element yagis and cubical quads, TDOA rigs, GPS receivers, Doppler phase shift units and interferometers. The one ham who found Bill stumbled across him by accident. Good hiding, Bill.

**Andy Korsak, VE3FZK**, was surprised when **Phil Maka, VE3FZL**, called him on a local repeater. At first each thought the other was pirating his call sign. Phil, from Mississauga, Ontario near Toronto was in San Francisco on business and took the train to Menlo Park to attend the Feb. PAARA speaker's dinner, club meeting and after meeting pizza gathering.

A big PAARA thanks to **Paul Thekan, N6FEG**, for the great job he's doing as net control for the PAARA Net which meets every Monday night at 2030 local time. The switch from simplex to the 145.23 repeater has allowed everyone to hear each other without relays. The repeater P/L tone is turned off during the net to allow operators without P/L to access the repeater. The wide area coverage spreads the PAARA message to new hams who wouldn't otherwise know about our activities.

If the storm in January was the "storm of the decade", then the March storms must have been the "storms of the century". PAARA's Foothill flea market saw much reduced participation because of the worst weather in years. Just to prove that everything is relative, though, one ham said he actually enjoyed the fine, warm California weather. Who would say that? Why is was **Vasili Maslyukov, UA0SN**, who was visiting from Irkutsk, Siberia just North of Mongolia. This was Vasili's first flea market, American style.

de **Vic Black, AB6SO**

**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 only.

1. 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).
2. For Profit organizations and/or individuals: \$5 for business card size, \$25 for half page, \$50 for full page or back cover

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 are for "scanner-ready" copy or text-only ads.



# Picnic

The PAARA annual spring picnic will be held, Saturday, June 3, at Ron & Helga Pantan's house from 11 AM to 3 PM. The club will supply beer, cold drinks, charcoal, and a cold cut plate. Bring your own bar-b-que goods and something to share. We will have door prizes extraordinaire. Friends and guests are welcome. Look for *more information and a map in next month's PAARAgaphs.*

-Lilly Anne, K6PGM

## Miscellaneous Dates

### Flea Market at Foothill (6AM - 2PM)

March 11..... PAARA  
 April 13..... The Perham Foundation  
 May 13..... SCCARA  
 June 10..... SPECS  
 July 8..... EMARC  
 August 12..... SVECS  
 September 9..... American Red Cross (PA Chapter)

### PAARA Palo Alto Amateur Radio Association

meets 1st Friday 7:30 each month, Net 145.230 each Monday 8:30, contact Jerry Tucker WA6LNV 415-326-4908.

### EMARC Electronics Museum Amateur Radio Club

Meets last Friday 7:30 each month, contact Sheldon Edelman 415-858-2176.

### NCDXC Northern California DX Club

Meets 2nd Friday each month, repeater for member info 147.360 each Thursday 8:00PM, contact John Troster W6ISQ 415-854-3939.

### NorCalQRP Northern California QRP Club

Meets 1st Sunday each month, contact Jim Cates 3241 Eastwood Rd., Sacramento, CA 95821.

### Perham Foundation, contact Sy Stein WA6ROM 408-734-4453

### SPECS Southern Peninsula Emergency Communication System

Meets each Monday 8:00PM on Net 145.27, 224.36, 440.80 Mhz+ contact Mike Hastings KB6LCJ, 408-243-6745 or 408-249-6909.

### Disaster Services, Palo Alto Chapter, American Red Cross

Meets 3rd Wednesday each month 7:30PM, HF, packet, BBS, ATV, OSCAR Gateway, NASA satellite, contact Ruth Claypool 415-688-0423.

## From the Director's Corner

This year's Foothill flea market was an event to remember. No mega bucks for the club but mega rain. Actually it was fun to watch all these hams in their rain suits and poncho's rummage around in the rain, with their flash lights looking under tarps covering the precious merchandise. Hams are a special breed!

However, even with this rain, the number of volunteers from PAARA was overwhelming and they made the best out of it. We had early crew roping the pace off, collecting the vendor fees and enforcing order. The food crew came later, well prepared with gallons of coffee, the best hot dogs money can buy, donuts galore and a ton of soft drinks. They practiced their culinary skills under some improvised tarps. But heck, it was fun.

Most hams are of sound mind and that's why attendance was not that great this year with our Spring rain. Therefore, St. Anthony's in Redwood City was the beneficiary of the surplus hot dogs and buns and the homeless had a better time because of it. Another ham club will buy the surplus soft drinks from us. All in all, we want to really thank all PAARA volunteers !

By the way, a few things are already almost around the corner. On June 3 we will have that Summer extravaganza, the picnic at the home of Helga and Ron in Menlo Park. If you have not been there before, make sure you come this time. It is a really fun affair, a chance to bring the spouses or assorted girl friends, lots of food, door prizes and a mini fox hunt organized by VE3FZK. More to come on this subject.

And then on June 24 and 25, the time to demonstrate your radio skills: Field Day. Mark these dates already on your calendar. PAARA was always the big winner on Field Day, that's is until last year. We need more operators for all types of stations ... we will again operate on HF, VHF/UHF, Lars will set up his satellite station, Chris will organize a novice station and we need CW operators (by the way WB6IYS, I hear you are a pretty hot CW operator ... how about it?). Do not be intimidated by at all. You can always help erect the antennas, check for dupes, provide manual power for a radio station (extra points for that). We will also try to get the press out there to get some extra publicity for ham radio and the club.

Finally, we made some 'important' decisions at the last Board meeting. We will purchase a new slide and maybe even an overhead projector!!! We will even throw in a new screen and some extra bulbs. And Sy will tell you at the next meeting how you can win radio magazine subscriptions in our monthly raffle. Do not forget to return the survey Vic put together on what activities you want our club to provide. And now, I'll shut up. See you at the April 7 meeting and don't forget to bring your 1995 membership dues if you have not already done so.

Koert , KC6WCI

## HF Propagation Forecasting

If you ask a gold prospector where the gold is located, he'll tell you it's wherever you find it. Of course, experienced prospectors find gold more often than untrained beginners do. Predicting HF propagation often seems like gold prospecting and, like mining, you'll improve your chances of success with experience and the use of some of the available "tools of the trade". Some of those tools are provided by the US. government and are available to anyone with a general coverage AM receiver.

Station WWV began broadcasting frequency tones and time signals in 1923. Over the years more information was added along with sister stations WWVH and the low frequency stations WWVB and defunct WWVL. The National Institute of Standards and Technology operates the stations (I liked their former name, Bureau of Standards, better). They transmit frequency and time standards as well as storm alerts, global positioning system (GPS) and Omega navigation system bulletins and propagation forecasts. Both stations transmit simultaneously on 2.5, 5, 10 and 15 MHz. In addition, WWV transmits on 20 MHz. Simple dipole antennas are used at both stations on all frequencies. Station WWVH is located in Hawaii and WWV is located in Fort Collins, near Boulder, Colorado.

Propagation forecasts are announced at 18 minutes after the hour by WWV and 15 minutes before the hour by WWVH. Information is always presented in the same order as follows: 1) solar flux, 2) Boulder A index, 3) Boulder K index, 4) solar terrestrial activity, 5) geomagnetic field activity and 6) forecasts for the next 24 hours for solar terrestrial activity and geomagnetic activity.

The information comes quickly so it's easy to miss some of the details. Since it is always presented in the same order, I like to write down the categories ahead of time and fill in the blank spaces as I hear the report.

Solar flux is measured at 2000 UTC daily by Canada's Dominion Radio Astrophysical Observatory and is reported by WWV and WWVH. Solar flux is a measure of background radio noise emitted by the sun and is measured at microwave frequencies. It is indicative of ionizing radiation from the sun. Values range from about 65 during the sun spot low to as high as 250. Recently the solar flux has been around 100 and dropping. The higher the number, the better for HF propagation. This is the radiation which ionizes the refractive F layer of the ionosphere. Radio signals sent

at a low angle into the F layer will be refracted, or bent, back to earth.

The Boulder A index is an indication of activity for the past 24 hours in the earth's geomagnetic field. The higher the A index, the higher absorption of radio waves will be in the ionosphere's D layer, especially in the higher latitudes. Consequently, a low number is desirable. A value under 10 is excellent, but can go from 100 to 400 on very rare occasions. Transequatorial paths are not affected as much by high values of A index.

The Boulder K index is similar to the A index, but is a logarithmic number and is almost always lower than the A index. It is not measured but is calculated from the A index. The Boulder K index is updated every three hours and reflects more current conditions than the A index. It's useful to think of the A index as analogous to a main tuning dial while the K index is analogous to a fine tuning control.

Solar terrestrial activity is a sort of wide angle snapshot of solar flux. It is reported as very high down through moderate to very low. High solar terrestrial activity corresponds with high solar flux and is desirable for good DX conditions, especially in high latitudes.

Geomagnetic field conditions should be quiet for best communications. Unsettled conditions will cause absorption of HF signals by the ionosphere's D layer. Active conditions and geomagnetic storms can disrupt all HF communications. Geomagnetic storms are reported as minor or major.

Solar flux, Boulder A index, Boulder K index and solar terrestrial activity all are indications of electromagnetic wave-type radiation coming from the sun. This radiation travels at the speed of light and requires about 8 minutes to arrive on the earth. Geomagnetic field activity is an indication of incoming heavier particles from the sun, especially after a solar flare. These particles, mostly protons, require from 20 to 40 hours to reach the earth. They are attracted to the earth's magnetic north and south polar regions where they disrupt communications by colliding with free electrons and absorbing their RF energy. Because of the long travel time of the particles, a solar observatory can predict changes in radio conditions up to a day or two in advance. Since the particles exhibit mass, it's possible that gravity plays some part in radio propagation as well.

(continue to HF Prop. page 5)

Occasionally you'll hear the term stratwarm. This occurs as summer approaches in either the northern or southern hemisphere. It indicates that the gases that make up the stratosphere are beginning to warm up. Because of this there is a vertical mixing of the gases along with a stirring of the normal layers in the ionosphere. This causes a less dense F layer. Conditions for DX will worsen and the maximum usable frequency will generally be lower in summer as compared to winter.

The sun requires approximately 27 days to completely rotate on its axis. Therefore, the Boulder A and K indexes will tend to repeat over that time frame. Because of this periodicity, it's worthwhile to make a daily log with dates down the left side and index values across the top. Fill in the daily values while listening to the propagation reports. Over time you can spot trends in the indexes.

WWV and WWVH can be used directly as DX beacons. Here's how. Listen for a couple of minutes to WWV and WWVH. Try each of the frequencies and note the signal strength. This will help you establish the lowest usable frequency (LUF) and the maximum usable frequency (MUF). DX conditions will be best on frequencies just under the MUF. Just before each minute the time is given by a female voice from WWVH followed by a male voice from WWV. From California if you can hear the female voice only, conditions are better toward Hawaii. If only the male voice is audible, then conditions are better toward Colorado.

This varies from frequency to frequency. For instance, the Hawaiian signal may be strongest on 15 MHz indicating that 20 meters may be a good bet to the Pacific. On 10 MHz both stations may be equally strong indicating good conditions on 30 meters. Only Colorado may be audible on 5 MHz so 40 meters might be a good bet across the US mainland. Expect lower signal strength on 2.5 MHz as the transmitter power level is 2.5 KW as compared to 10 KW on 5, 10, 15 and 20 MHz. Note that a band may appear "dead" because of lack of activity, but the beacon is strong. This often happens at the end of a contest weekend when most operators close down and get some rest. Once, after sunset with a "dead" band, I worked a ZL on 15 meters. I couldn't hear anyone else on the band. After a half hour chat, a JA tail ended and worked the ZL for another half hour. A similar thing often happens on 10 meters. I tune down into the citizen's band. CBer's don't seem to know the band is supposed to be

"dead". If there's a lot of activity on the citizen's band, a CQ on 10 at that time can sometimes be productive.

Sensitive and inquiring minds stay awake at night pondering the mysteries of the universe. Some important questions to QRP types include "What are sunspots, anyway?", "What causes layering in the ionosphere?", and "Why does the D layer absorb radio waves while the F layer refracts them?"

The sun has an atmosphere somewhat analogous to the earth's atmosphere. Radiation that causes ionization in the earth's atmosphere originates in the sun's upper atmosphere. This radiation increases with increasing numbers of sunspots which are areas of concentrated magnetic fields on the sun. Since the sunspot regions are cooler than the surrounding areas on the sun they can be seen as dark spots on the sun's bright disk when viewed with a solar telescope.

The composition of the earth's atmosphere changes with altitude with heavier gases near the earth's surface and lighter gases farther away. Various wavelengths of solar-produced microwave, ultraviolet and x-radiation interact with the gases. Some radiation reacts with particular gases and other radiation types react with other gases. This creates belts of ionization. Ionization means that one or more electrons have been knocked off the gas atoms so that the atoms carry an electrical charge. These belts of ionization are much like electrically conductive clouds which can bend radio waves. Free electrons recombine with their parent atoms when the ionizing radiation is absent, such as during the winter or at night.

Solar flares occur occasionally. At these times enormous energy is released in a very short time. When this happens lots of high energy x-rays are released. They are energetic enough to penetrate the earth's upper atmosphere and charge the D layer.

Normally, RF signals set free electrons into oscillation when the RF encounters them. The electrons take up some of the RF energy and then re-radiate the signals much like miniature QRP rigs. Signals which are in phase with the original RF signal will add to it. In the high reaches of the ionosphere (F region) this process is fairly efficient. Closer to the earth's surface, in the D layer, the atmosphere is denser. The oscillating electrons are much more likely to collide with other molecules shortly after becoming excited by the RF signal. They give up their RF energy as heat before re-radiating. The bottom line is that most of the signal is absorbed in the D layer. ....(continued to HF Prop. page 6)

(HF Prop. continued from page 5)

The "sporadic E" layer is between the D and F layers and becomes charged only occasionally (sporadically). Its effects are similar to those of the F layer but are more prominent on VHF bands. There is some speculation that the E layer is charged by lightning since it is most active during the summer lightning storm season.

What happened to the A, B, and C layers? Early investigators left room for them in case they were discovered. They never existed. No problem. Just like a dog named Spot, the D, E and F layers come when you call them so it doesn't matter what their names are!

de Vic Black, AB6SO

**DX**

I feel like a novice-writing my thoughts about DX. After enjoying ham radio and DX for 64 years, I decided to become a volunteer ham radio license examiner. Now I find myself writing about DX. My interested in DX started in 1930 when I found my call listed in Qst "Calls Heard". I was heard in New Zealand! But instead of 10 watts and a piece of wire, I now have a beam and 800 watts. DX can still be worked with low power and a simple dipole, and it is difficult to realize that all over the world there are people just like me with a hobby just like mine, most of whom have low power and a wire antenna.

On 17 meters I use a home made dipole, no balun, fed with RG58/U and 8 to 80 watts. Country score so far is 10. Fun! I always get a thrill at hearing a foreign accent talking with me, and last week-end I contacted over 120 different countries, but I was using 800 watts, the beam, and 15 & 20 meters. You will find it a wonderful experience to contact foreign hams, and I see listed on packet; Syria, Indonesia, Albania, Hungary, Scotland, Australia, Madagascar, and the Cayman Islands, to name a few countries on the air today. Most of them are on 15 meters. This looks pretty good to me, considering that we are at the bottom of the present sun spot cycle. My 2 meter radio is set on one of the local DX Spotting Networks. Anyone can tune in with a two meter receiver, a computer and a TNC. (A black box connected between the radio and the computer.)

The DX Spotting Network stations are: W6OAT on 145.77, K6LLK on 144.95 and N6ST on 146.595. The ARRL publishes many books on packet information and I am sure that HRO has them in stock. There are many other packet stations on the air in this area, but the ones listed above are DX oriented.

W6VG

**Palo Alto Amateur Radio Association, Inc.**  
**PO Box 911**  
**Menlo Park, CA 94026**

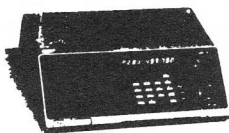
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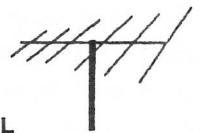
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**Good Ole' Mode One**



from the October '94 West Allis ARC "Hamtrix"—Lester Peterson, W9YCV, Editor

**THE FCC WANTS YOU!**

YES, the FCC wants you to upgrade! do you know of the exams given by the friendly volunteer examiners every month? The PAARA VE's are looking for you each 3rd Saturday at the Ampex cafeteria, 11 A.M. Upgrade, and enjoy the additional frequencies, get away from the QRM of the lower classes. More DX is on the clearer frequencies. CU April 15th, no joke!



**1994 California QSO Party (CQP) Results**

**TROPHIES**

SECTION	CALL	OPERATOR	CLASS	SCORE	POWER	SECTIONS	QSOs	CW QSOs
<b>TOP 3 CAL</b>								
LAX	AB6FO		S	239,714	H	58	1654	825
SCLA	AE6Y		S	228,752	H	58	1687	570
PLA	WA6AUE		S	206,074	H	58	1505	543
<b>TOP 3 NON-CAL</b>								
BC	VE7SZ	VE7NTT	S	145,008	H	57	1143	258
WA	K7QQ		S	107,464	H	56	846	227
MI	AA8AV		S	106,314	L	58	753	327
<b>TOP CAL MULTI SINGLE</b>								
RIV	W6EEN	W6EEN,K6XC,KA6SAR		287,970	H	58	2100	765
<b>TOP CAL MULTI MULTI</b>								
CCOS	N6RO	N6RO,K3EST	MM	389,644	H	58	2926	866
<b>TOP SINGLE OP EXPEDITION</b>								
ALP/MONO	AA6KX		S	199,557	H	57	1421	659
<b>TOP MULTI OP EXPEDITION</b>								
MER	KS6H	KS6H,N6ZB	MM	191,007	H	57	1392	567
<b>SPECIAL AWARDS</b>								
<b>TOP SINGLE OP CAL WITH MOST QSOs</b>								
SCLA	AE6Y		S	228,752	H	58	1687	570
<b>TOP SINGLE OP NON-CAL WITH MOST QSOs</b>								
BC	VE7SZ	VE7NTT	S	145,008	H	57	1143	258
<b>TOP SINGLE OP CAL WITH MOST CW QSOs</b>								
LAX	AB6FO		S	239,714	H	58	1654	825
<b>TOP SINGLE OP NON-CAL WITH MOST CW QSOs</b>								
IL	K9BG		S	53,091	H	51	347	347
<b>TOP CAL MOBILE WITH MOST QSOs</b>								
GLEN	WJ6QM		SM	46,872	H	56	331	175
<b>TOP CAL SINGLE OP LOW POWER</b>								
SDGO	W6UQF		S	175,218	L	58	1204	613
<b>TOP NON-CAL SINGLE OP LOW POWER</b>								
MI	AA8AV		S	106,314	L	58	753	327
<b>TOP CAL NOVICE/TECHNICIAN</b>								
STAN	KD6KKP		N/T	10,791	L	33	114	99
<b>TOP NON-CAL NOVICE/TECHNICIAN</b>								
PA	WB0IWG		N/T	30	L	3	5	0
<b>TOP NON USA/CANADA ENTRY</b>								
N AMERICA	XE1/AA6RX		S	19,400	L	50	150	88

**QRP Frequencies (Mhz)**

CW	SSB	Novice
1.810		
7.040	7.285	7.110
10.106		
14.060	14.285	
21.060	21.385	21.110
24.900	24.950	
28.060	28.885	28.110
50.060	50.885	

**Paul Thekan, N6FEG, has ask to be relieved as Net controller. If you would like to help or have thoughts contact: Vic Black, AB6SO now!!!**

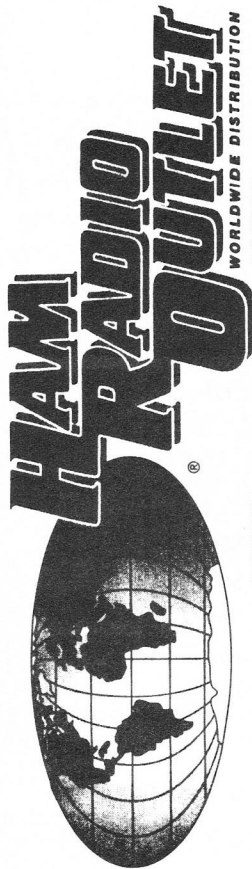


**PAARA, Palo Alto Amateur Radio Association, P.O. Box 911, Menlo Park, California 94026-0911**

Club meetings are on the first Friday of each month, 7:30 pm at the Menlo Park Recreation Center, 700 Alma Street, Menlo Park, CA. Radio NET every Monday evening, at 8:30 pm, on the 145.230-600 repeater Mhz, PL tone off. Membership in PAARA is \$6.00 per calendar year which includes a subscription to PAARAgaphs. Make payment to the Palo Alto Amateur Radio Association.

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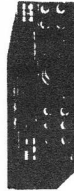


45W/35W • Airband RX  
Detachable/Removable Head  
Keyboard freq. entry from microphone!

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FT - 990



100W HF Gen. Conv. Transceiver  
DSS JSK - 500Hz CW Filter Included

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2M/440HT

5W Optional

SS Built-in

RTTY

DTMF Memories

Built-in CTCSS Enc. Dec.

User-Friendly Menu Sys.

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Ultra Compact

2M HT 5W opt.

40 Memories

Encode Built-in

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IC - 737A

HF Transceiver

12V 100W w/out Ant. Tuner

Built-in Gen. Conv. RX 101 Memos VOX

DSS OSK Passband Tuning

ALINCO

DJ - 580T

2M/440 Dual Band

40 Mem Channels

DSX Dual Display

CTCSS Enc./Dec. Built-in

Cross Band Full Duplex

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FT-530

2M/440MHz

2W Standard 5W opt.

82 Mem. Dial in-band RX

DTMF paging • coded S.O. sid

Built-in VOX & CTCSS

Auto tone search

Built-in lock • Bakelite Keyboard!

SPECIAL PRICING!

KENWOOD

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HF Transceiver

TS-60S, 100W, 50MHz opt.

558 CW AM FM

100W out (100W TS-60S 50MHz opt.)

12V Gen. Conv. RX 6.4 lbs. 7.16 x 2.4 x 3.32"

100dB dynamic range, 100 Memos

Dpt. ext. ant. tuners available (TS-50S only)

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ICOM

IC-D1A

2M/440/1.2 Tri-Band

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2M/440 2M/220

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