W6OTX W6ARA PAARA NEWSLETTER K6OTA K6YQT
VOLUME 71, NUMBER 5, May 2020

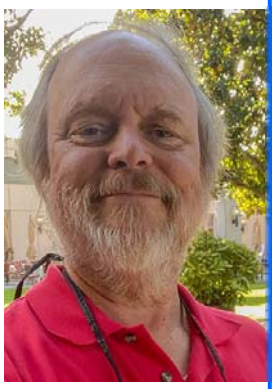
PAARAgraphs

The Official Newsletter of the
Palo Alto Amateur Radio Association, Inc.
Celebrating 83 years as an *active* amateur radio club—*Since 1937*

Meeting Note: Their will be no speaker for the foreseeable future. An announcement of any changes will be made here and on the website.

President's Corner

May 2020



About the time you read this, we'll have been sheltering in place for around 1 ½ months! One side of me says that's a long time, the other says where has the time gone? As I reflect on the time spent, I still am working though not as much as usual (though saving ~ 45 hours over this time not commuting is rather nice). I managed a few projects around the QTH, spent a little time in the shack both upgrading and working a bit of HF, conducted 1 club meeting and 2 board meetings using Zoom and drafted 2 president's letters. I guess the majority of time is accounted for after all.

The bands seem a bit more open than in the past and generally have lots of activity on them. Maybe that's due to so many people sheltering in place? Reports seem to indicate the possibility that the bottom of sunspot cycle 24 may have been reached in December. Two sunspots started the new year off seemingly to announce the start of cycle 25, but currently there are no sunspots. At the same time, the prediction is for the lowest sunspot activity this year in 200 years, not a good thing for us. The good news is there's been more activity on the WARC and 10 M bands than we've seen in many months. Hopefully, you had a chance to get on the air on World Amateur Radio Day, 4/18/20 and put these open bands to use.

As the shelter in place order will still be in place by the time of our May meeting, once again the meeting will be conducted using Zoom. Check the PAARA web site for the information needed to log into the May 1st meeting. As always, everyone is welcome, member or not, licensed or not. As everyone that I talked with found the previous Zoom meeting format interesting, we'll follow the same format again. However, should you have another idea or like to see something added, please send me an email.

I received an interesting COVID-19 email with information on how many museums are finding new ways to let patrons experience their facility even though closed. Of interest

(President — Continued on page 4)

Upcoming Events

May 1 June 5 July 3	PAARA General Meeting, 7:00 PM Zoom Meeting, see article for details
May 20 June 17 July 15	Board Meeting, 7:00 PM. Everyone welcome! Zoom Meeting, eMail President for details!
May	Electronic Flea Market Cancelled

What we Used to do Before Transistors
A Historical Perspective 021520

Rich Stiebel, W6APZ

Transistors have been around for so long that we tend to forget that once they were "the new kid on the block." The CK722 was the first low-cost junction transistor available to the general public. It was a small-signal unit produced by Raytheon in early 1953 and cost about $7. It was principally useful as an audio amplifier. I built several amplifiers, using the CK722 at the time. Power transistors, switching transistors, and HF and VHF transistors were still being developed.

Amateur radio equipment of that era used regular vacuum tubes, as did TV sets. These required high voltages on the tube's plates to attract the electron stream given off by the cathode. Many of the less expensive ham transmitters used the rugged TV-sweep tubes as final amplifiers.

Vibrators

Mobile equipment was more challenging. The creation of the 27 MHz Citizen's Band in 1958 created a need for home and mobile CB gear. Tubes of that era needed high voltage for their plates, but car batteries produced a nominal 12 Volts DC. For CB and low-power ham mobile rigs, a vibrator was used in the power supply. A vibrator is an electro-mechanical device for chopping up DC. The vibrator was essentially a single-pole double throw-switch that operated very rapidly to switch the battery voltage first across one half of the primary winding of a power transformer, and then across the other half of the winding, thus enabling the DC to be transformed into high-voltage AC, which could then be rectified to produce 250 – 350 Volts DC for the plate voltages of regular vacuum tubes.

Switching Transistors

When switching power transistors became available, they were used instead of vibrators to generate the high-voltage DC to power the vacuum tubes used in the public address systems of the day. Those of you who flew on commercial airlines at the time will remember hearing the high-pitched squeal of the switching frequency coming over the aircraft PA system the moment the stewardess keyed the microphone. As higher frequency power transistors were developed, the switching frequency was moved above the audio range, and the squeal disappeared.

Dynamotors

In the mid-1950s, 2 meters was just beginning to catch on in the Chicago area, where I was living. Surplus taxi radios became available on the ham market. I purchased a Motorola FMTRU80D, an 80-Watt-output taxi radio, and converted it to 2 meters. It used a dynamotor to produce the high voltage DC needed by the vacuum tubes. A dynamotor is an electro-mechanical motor–generator for converting electrical power from the car battery to high-voltage DC.

Car radios initially used regular vacuum tubes and vibrators to provide the plate voltages needed.

A Better Way

As with most technologies, many approaches to solving a problem coexist. Today we have the all electric Tesla and Leaf, along with hybrids such as Prius and Camry which are being sold along with more traditional gas-powered cars. So back in the 1950s, engineers were developing vacuum tubes that required only 12 Volts DC on their plates.

Recently I came across a Sylvania data sheet dated 1957 for a 12U7. Yes, 12U7, not 12AU7, with which many of us are familiar. This brought back memories. My first job out of college was for Stromberg-Carlson Company. We were building the car radio for the Ford Edsel. This was the era of audio transistors; nothing higher in frequency capability was commercially available then. This radio used 12-Volt vacuum tubes for all the electronics except the audio amplifier, which was

(Before Transistors — Continued on page 4)

SYLVANIA

engineering data service

SYLVANIA
12U7

MECHANICAL DATA

Bulb	T-6 ½
Base	E9-1, Miniature Button 9-Pin
Outline	6-2
Basing	9A
Cathode	Coated Unipotential
Mounting Position	Any

ELECTRICAL DATA

HEATER CHARACTERISTICS

Heater Voltage[1]	12.6 Volts	
Heater Current	150 Ma	
Heater-Cathode Voltage (Design Center Values)		
Heater Positive with Respect to Cathode	30 Volts	Max.
Heater Negative with Respect to Cathode	30 Volts	Max.

DIRECT INTERELECTRODE CAPACITANCES

	Section 1[2]		Section 2	
	Shielded[3]	Unshielded	Shielded	Unshielded
Grid to Plate	1.5	1.5	1.5	1.5 μμf
Input: g to (h+k)	1.8	1.6	1.8	1.6 μμf
Output: p to (h+k)	2.0	0.4	2.0	0.32 μμf

RATINGS (Design Center Values)

Plate Voltage	30 Volts	Max.
Cathode Current	15 Ma	Max.
Grid Circuit Resistance		
Fixed Bias	0.25 Megohm	Max.
Cathode Bias	1.0 Megohm	Max.

CHARACTERISTICS AND TYPICAL OPERATION

Class A_1 Amplifier—Each Section

Plate Voltage	12.6 Volts
Grid Voltage	0 Volts
Plate Current	1.0 Ma
Transconductance	1600 μmhos
Amplification Factor	20
Plate Resistance (Approx.)	12,500 Ohms
Grid Voltage for Ib = 10 μa (Approx.)	−1.5 Volts

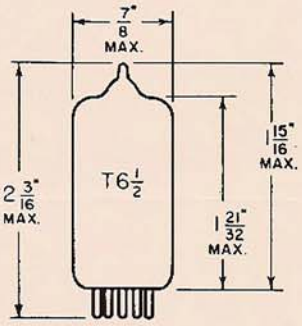
NOTES:

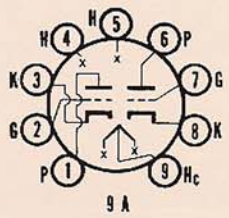
1. *This tube is intended for use in automobile radios operated from a nominal 12 volt battery. Design of the tube is such that the heater will operate satisfactorily over the range 10.0 volts to 15.9 volts, and that the maximum ratings provide a safety factor for the wide voltage variation encountered with this type of supply.*
2. *Section 1 connects to pins 6, 7 and 8. Section 2 connects to pins 1, 2 and 3.*
3. *External shield No. 315 connected to cathode of section under test.*

QUICK REFERENCE DATA

The Sylvania Type 12U7 is a general purpose, medium mu, dual triode, having separate cathodes for each section.

It is designed for operation where the heater and plate voltages are supplied directly from a 12 volt automotive storage battery.





SYLVANIA ELECTRIC PRODUCTS INC.
RADIO TUBE DIVISION
EMPORIUM, PA.

Prepared and Released By The TECHNICAL PUBLICATIONS SECTION EMPORIUM, PENNSYLVANIA
FEBRUARY, 1957

(Before Transistors — Continued from page 2)
implemented using a pair of audio-power-transistors.

By 12-Volt I'm referring to both the filaments AND the plate voltage! These 12-Volt-on-the-plate tubes eliminated the vibrator. Elimination of the vibrator and the associated high voltage circuitry required by regular tubes at the time was considered a great breakthrough in the industry and a substantial cost savings.

Since no one knew when/if RF transistors would be available, the tube industry developed a product line of tubes that required only 12 Volts on the plate. The 12U7 is a dual-triode vacuum tube that was used in that Edsel radio. A whole line of 12-Volt tubes was developed at the time. I've attached a scan of the first page of the 12U7 data sheet to give you an idea of the tube's parameters. Complete data sheets are available on the Internet.

This data sheet gives no information as to how high in frequency this tube can be operated.

Nuvistors

The nuvistor is a type of vacuum tube produced by RCA in 1959. Most nuvistors are smaller than a thimble and much smaller than conventional vacuum tubes of the day, almost approaching the compactness of early discrete transistor casings. Triodes and a few tetrodes were made.

The nuvistor worked well in TV tuners and other VHF, UHF equipment, but its advantages were soon overtaken by developments in the semiconductor industry.

Semiconductors

As we are all aware, today semiconductors have taken over all electronics into the microwave bands except for very high power applications.

Now you know some of the history of how our electronics progressed to where it is today.

W6APZ

(President — Continued from page 1)
to many may be the Bovington Tank Museum in the UK. Many will remember the field trip we took in March of 2014 to the Military Vehicle Technology Foundation in Los Altos just before it closed. The Bovington Tank Museum is along the same lines but a more formal presentation of various tanks. If you go to Google Maps or Google Earth and enter the "Bovington Tank Museum" in the search window, and go to street view, you can walk through the displays.

Along the same lines, you can tour the Vatican Museum's Sistine Chapel: http://www.museivaticani.va/content/museivaticani/en/collezioni/musei/cappella-sistina/tour-virtuale.html, or Raphael's rooms: http://www.museivaticani.va/content/museivaticani/en/collezioni/musei/stanze-di-raffaello/tour-virtuale.html, Tomb of Ramses VI in the valley of the kings: https://my.matterport.com/show/?m=NeiMEZa9d93&mls=1&fbclid=IwAR3HnGQckKDYf1kYa7A6iBCAJeq3jYE6K2XCrOb242evbadM-JsGJehB-F0 or the Louvre: https://petitegalerie.louvre.fr/visite-virtuelle/saison5/. I'm sure many other museums are doing the same thing which could be found if you do a bit of searching. It's not quite the same thing as seeing it in person but you don't have to get on a plane to visit.

On the amateur radio front, the ARRL posted a story on progress being made figuring out how to resume license testing during the shelter in place order. This is welcome news as there is an increasing number of hams that have used this shelter in place time to study and would like to get a license or upgrade an existing one. Darryl, K6LDM, spotted another story posted by Hamstudy. Links to both stories can be found on the home page of PAARA.org.

In closing, I, as does everyone, hope this situation passes quickly with a minimum of impact on everyone. Though I know the impact

(President — Continued on page 5)

(President — Continued from page 4)

on a large number of people has been substantial. I know as challenging it is for us, it's more challenging for the 1st responders and doctors, nurses, and medical staff that is doing all they can do to keep the recovery rate high and the mortality rate as low as possible. I also know the pharmaceuticals are working hard to find a cure and vaccine to combat this virus, but that's a way off. I also feel that we are all very fortunate to have such a large group of professionals to provide the countermeasures needed at a time of such great need. At the same time, we can easily make their situation harder by not abiding by the guidelines on protecting ourselves. There seems to be a sect of society that doesn't think it's real or are just rebellious and want things back to normal now and not some point in the future. We should all feel fortunate that we live in times where there are so many ways to pass the time which didn't exist in previous pandemics. Put them all, including amateur radio, to use and keep your spirits up. This situation will end only to reveal the next challenge we will all have to conquer.

73, Jim K6SV

Keep the airwaves alive by getting on the air!

Next Meeting

Friday, May 1, 2020

Zoom Meeting:

https://zoom.us/j/99689296388?pwd=QzlaRkZZZUJVYnlvNnZQaS9OODBaQT09

Download the PDF ZOOM Guide from:

https://www.paara.org/files/ZoomGuide.pdf

Login using: 1st name and call sign:

Meeting ID: 996 8929 6388
Password: 137560

One tap mobile

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+1 346 248 7799 US (Houston)
+1 253 215 8782 US
+1 301 715 8592 US
+1 312 626 6799 US (Chicago)
+1 929 205 6099 US (New York)

Meeting ID: 996 8929 6388
Password: 137560

Find your local number: https://zoom.us/u/abDr2KBZwa

I hope to see everyone there!
73, Jim K6SV

Palo Alto Amateur Radio Association, Inc.

PO Box 911 Menlo Park, CA 94026

Officers

President	Jim Thielemann, K6SV thielem@pacbell.net	408-839-6815
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Director ('20-'21)	Walt Gyger, K6WGY walt@tradewindsaviation.com	408-921-5901
Director ('21)	Doug Teter, KG6LWE dteter@wcwi.com	650-367-6200
Director ('21)	Darryl Presley, KI6LDM ki6ldm@arrl.net	650 255-2454

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Membership	Vic Black, AB6SO ab6so@smrn.com	650-366 0636
Database	Ric Hulett, N6AJS energyconserved@sbcglobal.net	408-332-4593
Chaplain	Rick Melrose k6rdm K6RDM@yahoo.com	408-341-9070
Public Affairs	*Position Vacant*	
Station Trustee	W6OTX, K6YQT, W6ARA….Gerry Tucker, N6NV	
Station Trustee K6OTA	Ron Chester, W6AZ	
Property Manager	Gerry Tucker, N6NV	
Asst. to the Treasurer	Ron Chester, W6AZ	
Badge Coordinator	Doug Teter, KG6LWE dteter@wcwi.com	650-367-6200
Historian Position	*Position Vacant*	
Raffle Coordinator	Marty Wayne, N6NV	408-234-8023
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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QSL Manager	Marty Wayne, W6NEV	408-234-8023
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Photographer	*Position Vacant*	

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. — A**ssociation of **S**ilicon **V**alley **A**mateur **R**adio **O**rganizations
Second Saturday of month, March-September, 6am–12 noon
Contact: http://www.electronicsfleamarket.com/

PAARA — Palo Alto Amateur Radio Association

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

FARS — Foothills Amateur Radio Society

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

NCDXC — Northern California DX Club

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

50 MHz & Up Group

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

SPECS

Southern Peninsula Emergency Communication System

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

SCARES

South County Amateur Radio Emergency Service

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

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+)
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:			UHF:		
52.58	(-500)	151.4 ctcss			
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 KB6UOO, (408) 967 7924 fshensley@Novell.com

(**Please** send changes to PAARA*graphs* editor)

WE ARE PLEASED TO ANNOUNCE
THE NEXT CHAPTER FOR US:

HSC HAS SOLD TO

EXCESS SOLUTIONS!




That's right!

- Halted Specialties Co., Inc. has sold HSC Electronic Supply to Excess Solutions of San Jose...making the biggest surplus electronics store in the Bay Area!
- Much of the millions of parts seen on HSC's shelves will be showing up soon on Excess Solutions' shelves...for your electronic needs.
- Techs, Developers, Experimenters, Hobbyists and Creators will once again have access to the basic parts that Silicon Valley was built upon!
- Support your local surplus store...there are few left, and you know how much this Silicon Valley resource is needed!

Excess Solutions
and HSC Electronic Supply
Now under one roof!
1555 S. Seventh St.
San Jose, CA 95112
(Diagonally across intersection from Spartan Stadium)
1-408-262-3900 **www.excesssolutions.com**

Excess Solutions

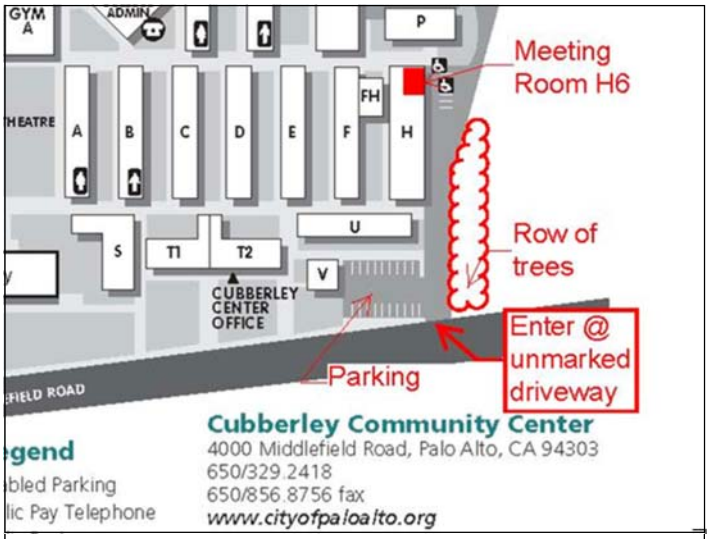
HSC Electronic Supply

PAARA Weekly Radio Net

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

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



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

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

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

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

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

PAARA Badges

You can order a $20 badge from the PAARA web site or at a meeting through Doug Teter, KG6LWE, and usually pick it up at the next meeting.

This space is available.

PAARA W6OTX DMR Repeater Frequencies

144 – 144.9625 up 2.5 MHz	DMR—NOR CAL Brandmeister Network
440 – 444.475 up 5 MHz	DMR
1.2G – 1284.15 down 12MHz	Off line
1.2G – 1249.15 half duplex	Off line

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

Subscription Problems? Contact Database Manager: Ric Hulett, N6AJS, 408-332-4593
energyconserved@sbcglobal.net

PAARA*graphs* Ad Rates

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

PAARA*graphs* — May 2020

Accept no substitutes. Produced and printed in California USA

STAMP

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

FIRST CLASS MAIL