PAARA*graphs*

The Official Newsletter of the
Palo Alto Amateur Radio Association, Inc.
Celebrating 77 years as an *active* amateur radio club—*Since 1937*

Upcoming Events

Sep 5   PAARA General Meeting, 7:00 PM
Cubberly Community Center,
Room H-6   400 Middlefield Rd,
Palo Alto

Sep 17   Board Meeting, 7:00 PM
Everyone welcome!
Round Table Pizza Parlor in Menlo Park

Oct 10-12   Pacificon 2014 — W100AW/6 Host

The Life of a Broadcast Engineer What a Long, Strange Trip It's Been

Art Lebermann, W6REQ

Art is a transmitter engineer for Cumulus Media in San Francisco. The SF Cumulus group includes KGO, KSFO, KNBR, KTCT, KFOG, KSAN and KSJO. Art began his career as a broadcast engineer in Detroit, and arrived in the Bay Area in the early 70's. He has worked as a Chief Engineer, transmitter engineer, and studio maintenance engineer for AM and FM stations - from 10 watts to 50,000 watts. If you wonder what it's like to actually be paid to play with transmitters, you'll learn the truth - the good, the bad, and the ugly!

President's Corner

September 2014

It's nearly September already, and that means the fall contest season is ready to unfold. We should also see a shift in propagation as the days and nights equalize, and that is why the season happens now. We also have CQP coming up very soon. On the PAARA front, it's time to begin thinking about leadership elections as well.

As we begin to enter September, some of the big contests begin. By 'big', I mean those sponsored by the ARRL and CQ Magazine. This is not to say that they are the only contests on the air, but they are the most well attended contests, with the most entrants. If you want a chance to just work some interesting DX stations on HF, and you have a smaller station, these contests often provide a great opportunity. The big contest in September is the CQ Worldwide DX Contest, RTTY, on Sept 27 and 28. That can be a great contest for DX. There are also some smaller contests this month that are fun to operate, like the All Asian DX Contest, Phone, on Sept 6 and 7.

If you'd like to practice your contesting skills, there are other great opportunities now that we're past the summer lull. The state QSO parties are starting up again, and September has a few. You can operate these on phone or CW typically, and some are very serious contests. Coming up there is the Tennessee QSO Party, Sept 7 and 8, the Arkansas

Minima Digi Board Programming
Bob Van Tuyl, K6RWY

Ashhar Farhan, VU2ESE, designed a QRP transceiver called the BITX some time ago. In 2013 Ashhar placed another QRP design on the internet (http://www.phonestack.com/farhan/minima.html) called the Minima. The Minima is a superhet design with IF at 20 MHz, 1 watt of RF output and is controlled by an Arduino chip, the Atmel Atmega328P-PU. Ashhar provided a schematic, some detail descriptions of the circuit and some pictures of a prototype.

Adrian Preda, YO4HHP, has designed two printed circuit boards that implement the Minima. The Arduino chip is placed on the smaller PCB, which is called the Digi Board. The board is designed so that a LCD display may be plugged into a socket and Atmega328P may be programmed from a PC using the Arduino IDE. The Digi Board, when completed, will perform as a local oscillator using a Silicon Labs Si570 IC. It is a programmable oscillator with a frequency range from 10 to 945 MHz. The Atmega328P controls the frequency generated and displays the appropriate RF frequency on the LCD display.

It is useful to upload various programs into the Atmega328P during the construction process so that the circuits can be tested at various stages of construction. Unfortunately, this design is fairly new and certain critical details are not specified except in a general way. The purpose of this paper is to describe one method of programming the Atmega328P on the Digi Board.

Arduino USB Serial Light Adapter

The Arduino USB to Serial Light Adapter (see http://arduino.cc/en/Main/USBSerial) is a tiny board that has enough logic to interface a PC USB to a serial receive/transmit line on the Digi Board. In the picture, the connector on the right of the board is a USB connector. On the left is a socket containing five labeled signals. They are from top to bottom in the picture:

- Ground
- Unknown
- +5 volts
- Transmit (TX)
- Receive (RX)
- External Reset
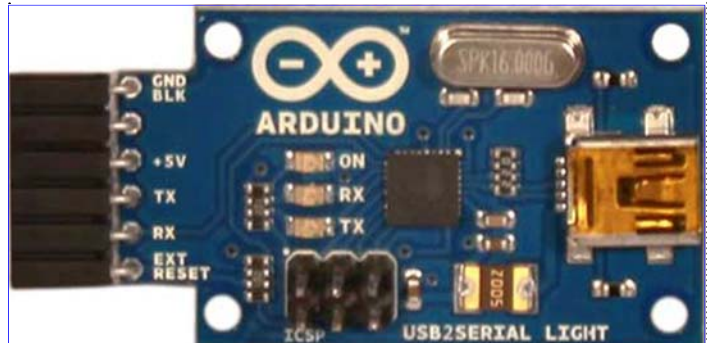
Arduino USB Serial Light Adapter

Note that the USB to Serial Adapter delivers 5 volts to the target. This allows us to ignore the power supply circuits on the Digi Board and program the Atmega328P using only the Adapter. Another feature of the Adapter board that will be useful downstream is the bi-directional nature of the USB to Serial Adapter. The Arduino IDE is used to upload programs to the target Atmega328P, but once the upload is finished the program begins to run. The IDE provides a Serial Monitor that catches and displays any characters sent from the Atmega328P to the PC. The Arduino programming language provides several functions for sending text (single characters, strings of characters and values converted to text in various bases).

Programming Interface to the Digi Board

Unfortunately for us there are several USB to Serial Adapter boards available to the Arduino community. Thus Adrian, YO4HHP, could not provide a single header on the Digi Board into which the
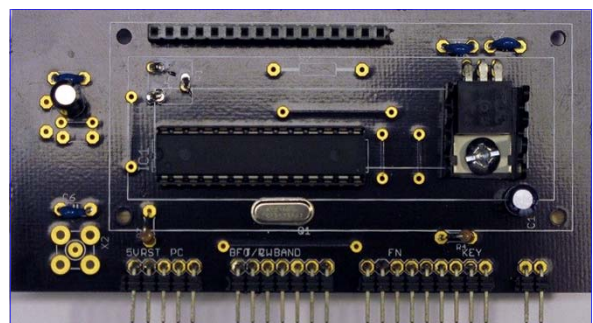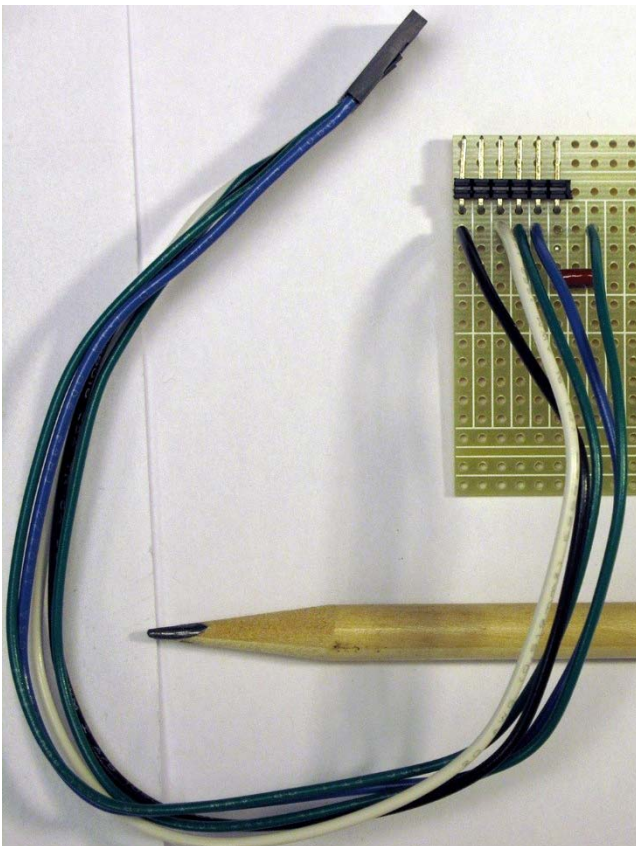

Digi Board

(Continued from page 2)

Adapter board could be plugged. In the picture of a partially completed Digi Board ready to be loaded with the first test program, note the five pins on the bottom left side of the board. The pins are from left to right:

- +5v
- Reset
- Ground
- Receive (RX)
- Transmit (TX)

Besides the six/five pins issue and a different order of pins there is one more complication to consider. The external reset line on the Arduino Adapter board puts out the wrong signal to the target. This is fixed by placing a 0.1uf capacitor between the Reset output of the Adapter board and the reset input of the Digi Board. These differences require an interface between the USB to Serial Adapter board and the Digi Board.

The interface can be implemented in many ways. I have chosen to put a right angle six pin header on a mini prototype board (0.1 inch spacing is

Interface between Serial Adapter and Digi Board

perfect for the header). The USB to Serial Adapter plugs nicely into the six pins. I then wired a five socket connector (0.1 in spacing, square sockets) to the correct pins on the prototype board adding a 0.1uf capacitor in the Reset line. Here are the connections:

- Ground to Ground
- +5 v to +5v
- TX to RX
- Rx to TX
- Reset to 0.1uf to Reset

Arduino IDE

There are many Arduino chips and boards. The Arduino UNO board supports the Atmega328P and that is the chip that is needed on the Digi Board. The Arduino USB Serial Light Adapter provides all the circuitry needed to interface the Digi Boards Atmega328P to the PC. That being said, it is imperative that the IDE be configured correctly to upload programs to the Digi Board. This requires only few steps:

- Connect the three boards together as shown below
- Connect the USB cable to the PC and the USB Serial Light Adapter
- Open a file or sketch (a sketch is usually two or more files while simple programs are contained in one file)
- Using the Tools/Board menu item set the Board to "Arduino Uno"
- Using the Tools/Serial Port menu item set the port to ComX, where X is the port to the Adapter (usually not Com1)
- Compile the program using the check mark on the tool bar (just compiles and shows errors at bottom of window)
- Compile the program/sketch and Upload into the Atmega328P using the right arrow on the tool bar.

The IDE will indicate errors and completion of the upload near the bottom of the IDE window. If there are no errors the program should begin running as soon as the upload completes.

(Continued from page 3)
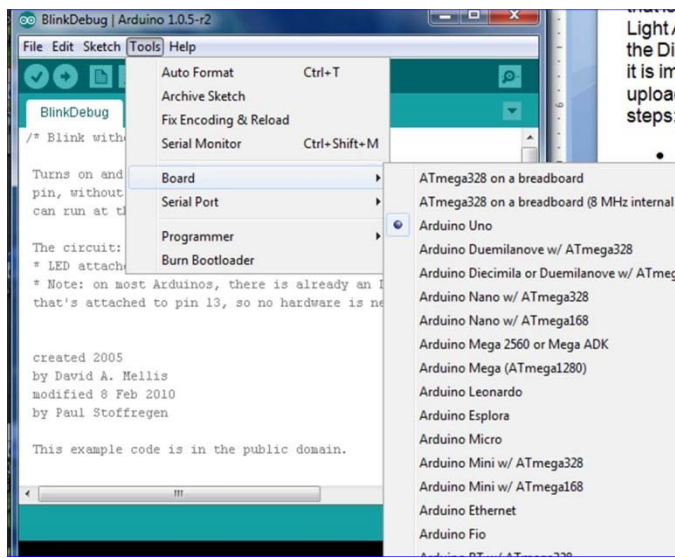
Choose the Arduino Uno Board

One popular test is a blink program. The Digi Board sixteen pin socket on the upper edge of the board appears to be consistent with the sixteen pins on the Arduino Uno board. The blink program outputs one second of 5 volts on pin 13 and pin 16 is ground (Pin 1 on the socket is on the right end of the socket when the socket is farthest away from you).

Debugging or Communication from the Atmega328P to the PC

An Arduino program has two main parts:

- A setup function
- A loop function

The setup is executed once and is used to setup the Atmega 328P for the remainder of the program. The loop function is executed repeatedly as fast as possible.

To communicate with the PC there are two parts:

- A program on the PC to send data to or receive data from the Atmega328P
- A function on the Atmega328P to send data to the PC
- A function on the Atmega328P to receive data from the PC

In the IDE, after the program completes downloading a "Serial Monitor" window may be started by selecting the menu item "Tools/Serial Monitor". The Monitor has an edit box at the top of the window with a send button. Placing characters in the edit box and clicking send will dispatch the characters to the Atmega328P. If the Atmega328P is listening for data on the serial interface it will read them, otherwise they will be lost.

Below the edit window is an output window. Characters sent from the Atmega328P via the serial interface will be displayed in the window. If the window has not been started, the characters will be lost. The program will continue to run even though the characters are lost.

To add serial input/output to an Atmega3328P program add "Serial.begin(9600); Serial.setTimeout(10);" to the setup function. Look the functions up in the IDE's Help/Reference menu item.

To write a string to the PC, use the function "Serial.write("xxx");". To read a character from the PC us the function "Serial.readBytes(buf, 1);". The number of bytes read is returned as the return value of the function. There are several functions that are useful for reading and writing characters, strings and integers. Study the Reference Manual (i.e. "Help/Reference") to understand the details.

The Final Picture

Here is the complete picture of the programming of the Digi Board using the Adapter and Interface board. Now that I can send test programs to the Digi Board lets test it and add more parts!
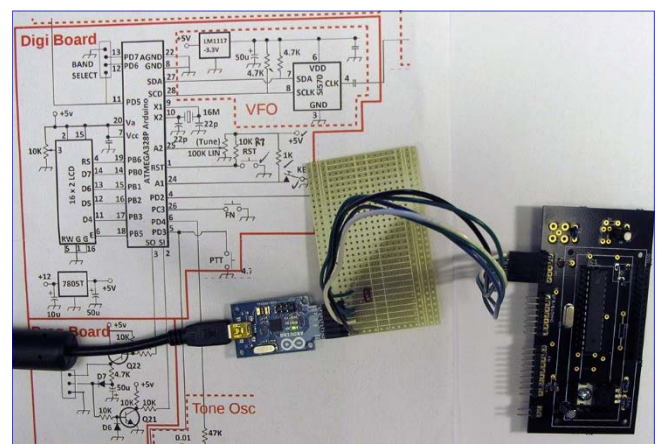
Computer connected to Digi Board

(President — Continued from page 1)

QSO Party, Sept 13 and 14, and one of the biggest, the Texas QSO Party, Sept 27 and 28. These are all great practice, and all can be operated for awards as well.

These contests also offer great opportunities to improve operating skills on a mode you are not used to working with. Our speaker from last month, Rick N6RNO, talked about operating CW for the phone OP, so maybe this is a good chance to get on the air and make some CW QSOs without the pressure of having to score some points for Field Day. You can learn to hear your callsign, and program your rig with the exchange for the contest, and just try to make some Qs. I think you'd be amazed at how successful you might be. Or, how about RTTY? Get set up for the digital modes, and get used to tuning those signals in, the rhythm of making those Qs, and the exchanges that are appropriate during a contest.

You may have noticed that the days are getting shorter already. I certainly have. The shorter daylight hours in the northern hemisphere change the ionization profile in the ionosphere here in our area. While the ultimate amount of F-layer charging (responsible for multi-hop propagation) is less, the time spent in D-layer charging is also less, and this makes for less attenuation at HF frequencies. Remember also that the D-layer recombines faster because of the higher ion density. With less attenuation, there is more signal to be refracted by the upper layers, and more signal also makes it back down to the earth's surface after the refraction, so we get more efficient propagation through each hop. This happens while still having enough F-layer charging to get good refraction at frequencies where we want to operate.

Don't forget that one of my favorite contests of the year is coming up very soon - the California QSO Party. It's a fun contest that often involves traveling to a remote part of California to operate from a rare county, so that we have them all activated. This year it's on October 4 and 5. Be there or be square! More info at www.cqp.org.

PAARA leadership elections are at the end of the year. I will be selecting the election committee very soon, so if you're interested in running for a leadership position, let us know! Until then … CU AT PAARA DE K6WX

August 20 2014 Board Meeting Minutes

The August Board Meeting was held at the Menlo Park 'Round Table Pizza Parlor', commencing at 7:45 on August 20th, 2014. In attendance were Kristen McIntyre, K6WX (President), Marty Wayne, W6NEV (V.P.), Jim Thielemann KI6KVW (Sec, Membership), Ron Chester W6AZ (Treasurer), Larry Rebarchik N6DB (Dir), Darryl Presley KI6LDM (Dir), Rob Riley KI6INR (Dir), and non-Board Members, Rick Melrose (Chaplain), and Doug Teter, KG6LWE (Field Day Coordinator) and one visitor. Everyone was happy to see that Rebar could attend his 1st meeting in some time.

President's Report: Kristen, K6WX, commented on how wonderful Rick Eversole, N6RNO, talk was on "CW for the SSB operator". She complimented Marty, as did the rest of the board, on his excellent speaker lineup this year and what a big difference it makes. A lineup of great interesting speakers helps make PAARA a "different" club and brings new people to experience what PAARA has to offer.

She also mentioned that September is the start of elections for the officers and 2 of the directors. She will be contacting a few members to find one who will "run" the election process. She hopes to announce the member who will run the process at the next meeting.

Kristen indicated her reserve of stories is better than in the past but new stories are always needed. The board wishes to encourage the general membership to submit articles to be published in upcoming issues of PAARAgraphs. Do you have any projects, technical articles, hints n kinks, DX, on the air experiences that might be of interest? We can even help you write them up, "even if it's only 4 sentences", says Kristen.

Vice President's Report: Marty, W6NEV, reported that the next speaker is Art Lieberman whose talk is entitled "The Life of a Broadcast

(Minutes — Continued from page 5)

Engineer". Marty also reported that he has a full roster of interesting speakers lined for the rest of the year and 2 months into next year. Marty is still working on the next field trip. His idea from last month isn't going to pan out but he has come up with another one. Stay tuned…..

Marty also reported that there are still plenty of club T-shirts and hats along with Field Day shirts from 2012, our club record setting year. Make sure to pick one up at the next meeting.

Secretary's report: Jim, KI6KVW, reported that the membership stands at 156 for 2014, with two members paid through 2015, for a total of 158 members. So far there have been 43 renewals via PayPal through the Club website. He also reported there was one person rejoining in July.

Treasurer's Report: Ron, W6AZ, has recovered from working feverishly on the PAARA Field Day submission. Ron is to be commended for once again compiling an exhaustive document on PAARA's efforts and for his extensive report at the last meeting. He reported that the club finances are in fine order. Gerry has managed a good month or two of flea market sales.

Under Old Business, the Board once again discussed hosting the Electronics Flea Market in October. Kristen advised ASVARO that PAARA would host the event in October. There seems to be a bit of push back that the board discussed. This is still an open item though if not resolved before the next flea market on September 13th, we will not have enough time to notify the venders that there will be an October event.

Jim, KI6KVW, reported that he's not had time to update the web site roster and email members. Rebar utilized the "member update" form to update his record. This verified the form works. At this point, no other members have requested any of their information to be withheld from the roster. He hopes to have this accomplished shortly.

A quick discussion regarding the PAARAplink (previously named PAARAshoot) resulted in agreement to wait until early next year to hold the event. There are just too many activities this year and as the range is indoors, outside of the outdoor lunch BBQ, it really doesn't matter what the weather is like.

Under New Business, Doug, KG6LWE reported that he received notice to be out of his office building by the end of September. The issue for PAARA is all the antennas and support "stuff" that PAARA has had the luxury of storing there between Field Days. After considerable discussion, the board agreed that the PAARA "stuff" will be relocated to Doug's San Martin residence. Some form of temporary cover will be created to protect the PAARA property. The board voted to have the brakes fixed on the tower trailer so it could be safely towed to his residence. Once his house is complete the board will re-evaluate the situation. The likely weekend for the move to take place is September 6th or 7th. Watch your inbox for his email.

There was discussion regarding the several people waiting for PAARA's "antenna group" to assist in some form of antenna work. "Uncle Bill" was visited by Doug and a couple others before the last meeting, as he lived directly behind Cubberly School. The current plan is for a small group to get a new dipole up before attending the October meeting. Marty reported having an antenna for Pink, K7ILA. The board voted to cover the cost of shipping. Marty also reported that Don (KE6CFX), Gary (KI6HIG), and Rich (Gerry's brother) assisted him and the wife of an SK in removing antennas and "stuff" from his shack. She was VERY appreciative of their efforts. Gerry has a "new" collection of equipment for the next Flea Market.

The meeting was adjourned at 9:00.

Jim Thielemann, KI6KVW

Re-join Member:

Frank Weiss K6FCW

PAARA "The Friendliest Club Around"

Palo Alto Amateur Radio Association, Inc. www.paara.org

Date and Time: Friday, September 5th at 7 p.m.
Cubberley Community Center
4000 Middlefield Road, Palo Alto, CA

1st   Wouxon KGUV3D-2-UHF HT Transceiver
2M/440 DUAL BAND HT
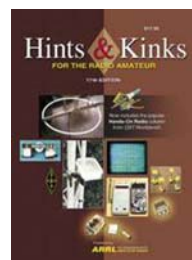128 Memories
1700mAh LI-ON BATTERY

2nd   Two West Mountain COMspkr

3rd   LM 801 EXP HT "Cup Holder HT Mount"

4th   ARRL Hints & Kinks book

5th   ARRL Repeater Directory

6th   Two Rolls of Rescue Tape

7th   Bongo Ties

PAARA 8/1/14 Raffle Prize Winners

In Left to Right Order

1st   **Prize / Norma Chamberlain / KK6HAF / Wouxon Dual Band HT**

5th   **Prize / Amanda Wigylus / KK6CWV / ARRL Repeater Directory**

2nd   **Prize / Amanda Wigylus / KK6CWV / HT Antenna**

6th   **Prize / Karen Misenhimer / KK6NGA / Two Rolls of Rescue Tape**

7th   **Prize / Peter Chow / W0NG / Bongo Ties**

3rd   **Prize / Vic Black / AB6SO / Battery Tender Junior**

4th   **Prize / Joel Wilhite / KD6W / Cup Holder HT Mount (not shown)**

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. — A**ssociation of **S**ilicon **V**alley **A**mateur **R**adio **O**rganizations
Second Saturday of month, March-October, 6am–2pm
Howard M. Krawetz, N6HM 650-856-9761
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

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

American Red Cross,
Santa Clara Valley Chapter

Contact: http://santaclaravalley.redcross.org or Scott Hensley KB6UOO, (408) 967 7924
fshensley@Novell.com

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

Week	Control Operator
1st	Joel KD6W
2nd	Doug - KG6LWE
3rd	Jack - N1VSL
4th	Marty - W6NEV
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.
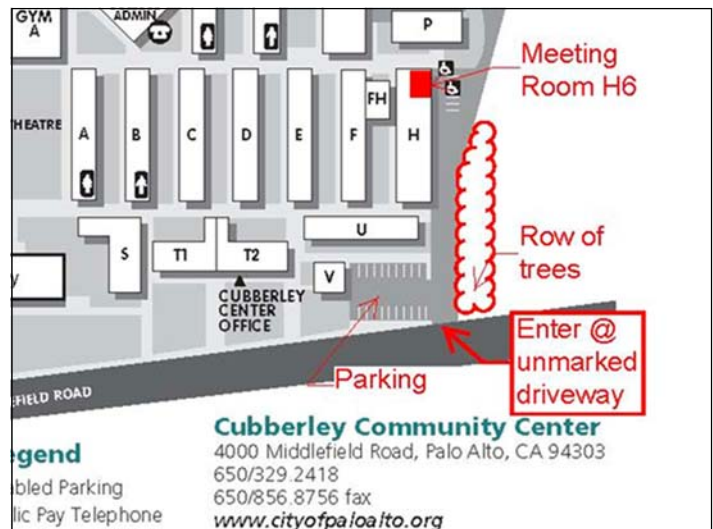
Meeting Location — Middlefield Road between San Antonio and Charleston in Palo Alto. 4000 Middlefield Road

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

Subscription Problems? Contact Database
Manager: Jim Thielemann, ᴋɪ6ᴋᴠᴡ,
408-839-6815,   thielem@pacbell.net

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STAMP