K6YQT

PAARA NEWSLETTER
VOLUME 51 NUMBER 1 January 2002

W6OTX

PAARAgraphs

Celebrating 64 years as an *active* ham radio club—*Since 1937*
Newsletter for the **Palo Alto Amateur Radio Association, Inc.**

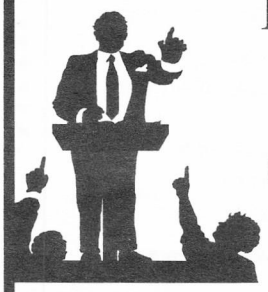
CALENDAR

January.....4, **PAARA Meeting**, 7:30
Menlo Park Recreation Center
700 Alma Street, Menlo Park
January.....9, **PAARA Board Meeting**, 7:30
Red Cross Bld., 400 Mitchell Ln., Palo Alto
January .....18, **PAARA/FARS Banquet**
Michael's at Shoreline
February.....1, **PAARA Meeting**, 7:30
February.....6, **PAARA Board Meeting**, 7:30
March.....1, **PAARA Meeting**, 7:30
March.....6, **PAARA Board Meeting**, 7:30

2 m **CODE PRACTICE**, 2000 to 2030 PST Tues
N6NFI 145.23 repeater
Also try 7.100 for 24 hr code practice

PROGRAM

January 4, **2002 7:30 P.M.**



Speaker:

Bill Rausch AA6AP

"Personal Satellites for the Amateur"

Join us for pre-meeting eyeball
at Su Hong Restaurant , 1039 El Camino Real, Menlo Park
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 order and bill.

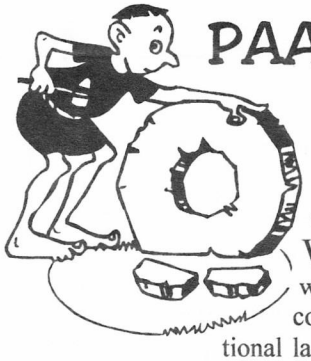
—PAARA Radio NET every Monday evening at 8:30 P.M.,local time— on the 145.230 -600 MHz repeater, PL tone off

New Member for 2002:

Pink Foster KG6ILA
1335 Montecito Ave Apt 7
Mountain View, CA 94043-4561
pinkfoster@yahoo.com kg6ila@arrl.net
650-428-1970 (home) 408-439-2005 (work)

New Call:

W6AZ Ron Chester (was KG6ELY)



PAARA PROJECT 2002

by **Joel Wilhite, KA7TXV**

With the change in the California weather comes the need for low cost entertainment and the traditional lack of cable TV service. A quick solution to this dreaded problem is to either bury oneself in a new technical manual or to start a project. A kit uniquely

(Continued on page 114) *PROJECT 2002*

Personal Satellites for the Amateur

CubeSats, 4 inch cubes packed with electronics and launched into earth orbit, are the subject of the guest speaker at the August meeting. Bill Rausch, AA6PA, a key member will discuss the process and demonstrate a working CubeSat model. For those of you who don't know Bill, he started his career in electronics by making a crystal set in 1945 at age13. He was licensed as W8GIF in Detroit when he was 18. While working in electronics at Lockheed and Ford Aerospace, ham radio wasn't a part of his life until 1988, when he passed the Technician exam and received N6SXQ as his call. He rapidly upgraded, and has been active on the VHF through microwave bands, terrestrially and through the ham satellites. He is a past PAARA president and an AMSAT Area Coordinator.

Celebrating 64 years as an *active* ham radio club—*Since 1937*

Miscellaneous Dates

Flea Market at Foothill (info:<*http://www.electronicsfleamarket.com*>)

PAARA Palo Alto Amateur Radio Association
meets 1st Friday 7:30 each month, Net 145.230 each Monday 8:30,
contact: Andreas Junge N6NU.....(650) 233 0843

FARS Foothills Amateur Radio Society
meets 4th Friday 7:30 each month,
contact: Sheldon Edelman N6RD, 650-858 2176, *n6rd@earthlink.net*

NCDXC Northern California DX Club
meets 2nd Friday 7:30 each month, repeater for member info 147.360, Thur 8:00PM,
contact: Bob Mammarella KB6FEC 408 729 1544.

NorCalQRP Northern California QRP Club
meets 1st Sunday each month,
contact: Jim Cates 3241 Eastwood Rd., Sacramento, CA 95821.

Perham Foundation,
contact: (408) 734 4453,

SPECS Southern Peninsula Emergency Communication System
meets each Monday 8:00PM on Net 145.27, 440.80 MHz, www.specsnet.org
contact: Tom Cascone, KF6LWZ, 650-688-0441 *.specs@svpal.org*

SCARES South County Amateur Radio Emergency Service
meets 3rd Thursday 7:30 each month, San Carlos City Hall.
Net is on 144.45 & 444.50 (PL-100) 7:30 Monday evenings.
contact:

SCCARA Santa ClaraCounty Amateur Radio Association
Operates W6UU repeater 146.385+ Nets: 2m, W6UU, 7:30 Mon; 10m, 28.385, 8:00 Thur. meets 2nd Mon each month.
contact: Jack Ruckman AC6FU

SVECS Silicon Valley Emergency Communications
Operates WB6ADZ repeater (146.115 MHz+)
contact: Lou Stierer WA6QYS 408 241 7999

WVARA West Valley Amateur Radio Association
operates W6PIY repeater 147.39+, 223.96, 441.875, 1286.2
meets 3rd Wed every month.
contact: Glen Lokke Jr. KE6NBO at 408 971 8626, or *glokke@pacbell.net*

Disaster Services,

PALO ALTO CHAPTER, American Red Cross, *www.paarc.org*
400 Mitchell Lane
Meets 3rd Wed. each month 7:30PM,
HF, packet, BBS, ATV, OSCAR Gateway, NASA satellite.
contact: Mac Millian 650-688-0423. *MACM@paarc.org*

SAN JOSE CHAPTER. American Red Cross
contact: Scott Hensley KB6UOO, (408) 967 7924, *FSHENSLEY@NOVELL.COM*

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: Al WB6IMX@att.net.

Swap meet, LosPositas College, Livermore, 1st Sunday each month.
Contact: Cliff Kibbe (209) 835 6715 or Eliot Ross (925) 606 7710

(please send changes to PAARAgraphs editor: k6uro@arrl.net)

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tucker.gerry@ssd.loral.com
Rolf Klibo, N6NFI '03
Jim Rice, K6AK '03

(see "Calendar" for Board meeting times, **visitors welcome**)

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PAARA Website http://www.qsl.net/paara/

Join us for pre-meeting eyeball

QSO January 4th 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 order and bill.*

6 pm— at Su Hong Restaurant
1039 El Camino Real
Menlo Park
—across from Kepler's Book Store—

THANKS TO 2001 OFFICERS

President Andreas Junge N6NU
Vice President Dick Kors, KM6EP
&
BOARD MEMBERS
Pat Gormley KB6HZM
Don Trask, KF6JMQ

PAARA 2002 DUES, $12 are DUE NOW

Technical Tip

Magic Antenna Lengths

by **Jerry W. Haigwood W5JH**

I have recently been considering the various lengths of dipole antennas for multi-band operation. L.B. Cebik W4RNL has written extensively on the 88-foot and 44-foot dipole antennas (see The "Ideal" Back-Up Antenna for 80-20 Meters <http://www.cebik.com/88.html>). These lengths lend themselves well to multiple band usage when used with a low loss (as in open ladder line) feeder. The 88-foot length is popular for 80-20 meter operation and the 44-foot length is popular for 40-10 meter operation. Here are some things I have figured out.

Let's consider the 88-foot length first. The reason for the "magic" 88-foot length is two fold. Firstly (as the English say), it produces a broadside pattern for the 80-20 meter range. Secondly, the SWR and efficiency on 80 meters is still a "reasonable" figure. So how do we arrive at this length? To answer that question, let's consider the highest frequency: in this case 20 meters. An 88-foot dipole on the 20-meter band is a Double Extended Zepp. That means the antenna is 5/8 wave long on either side of the center insulator. The Double Extended Zepp is the longest dipole that will still produce a broadside pattern in its main lobe. You can prove this to yourself by modeling the antenna with your favorite antenna modeling software. On 20 meters, the 88-foot length dipole produces about 3dB gain over a similar height half wave dipole. On the 80-meter band, the same antenna has just a small amount less gain than a full size half wavelength dipole at the same height. EZNEC reports the SWR on 80 meters at about 50:1 (using 450 ohm line). On 20 meters the SWR is considerably less, about 13:1. SWR is also somewhat dependent on the height above ground. These SWR values require a very low loss feedline. The recommended feedline is open ladder line used with your favorite parallel line tuner.

As mentioned, the 44-foot dipole operates well over the 40 to 10 meter bands. On 10 meters, the 44-foot length is a Double Extended Zepp with gain. On 40 meters, the length is shorter than a half wave dipole but still has good efficiency. The SWR values are similar to those stated for the 88-foot model.

Looking closely at the two antennas, a pattern emerges. To make a generic dipole with a broadside pattern for a large frequency range, we can pick the highest frequency to be used and calculate a Double Extended Zepp. The antenna is then usable down to a frequency of that highest frequency divided by 4. Here are a couple of formulas: Dipole length, L = 1232 / Fh(MHz). Lowest usable frequency in MHz., Fl(Mhz) = Fh(Mhz) / 4. Here is an example. Desired Fh = 21 Mhz. L = 1232 / 21 = 58.7 feet. Fl = 21 / 4 = 5.25 MHz. So, a 58.7-foot dipole would give a broadside pattern from 5.25 MHz to 21 MHz and at 21 MHz have approximately 3db gain over a half wave dipole. Why would we be interested in this antenna? Several reasons come to mind. If we ever get some band between 80 and 40 meters, this antenna might make sense! How about the case where the person doesn't have any interest in 10 meters and wants better performance or a lower SWR on 40 meters, then this length may work. Other band/frequency combinations also work out well. A 68-foot dipole (dang, that's close to a half wave dipole for 40) works well on 40-17 meters producing 3dBd gain on 17 meters. For Short Wave Listening (SWL), a 70-foot dipole would be a useful length.

Building the Dipole

The dipole and feed line are built from two pieces of wire. To calculate the lengths of the wire, divide the dipole in half and add the length of the feed line. Cut two wires the same length. For an 88-foot dipole with a 65-foot feedline, the two wire lengths would be: (88/2)+65 = 109 feet. Each wire becomes one half of the antenna and also one half of the feedline. Note: there are no breaks in the wire at any place. Therefore, there aren't any solder joints to go bad! Take a look at The FFD ANTENNA: A Field-Friendly Doublet, with Notes on Related Designs by **Charlie Lofgren, W6JJZ** <http://www.natworld.com/ars/pages/back_issues/1998_text/0698_text/ffd.html>.

Open Ladder Line and Tuners

Open ladder line is making a comeback as a great low loss feedline. Back many years ago, it was the ONLY type of feedline in use! When I say open ladder line I mean just that. I am not talking about the commercial 450 ohm "window line" being sold today as ladder line. Ladder line is usually homebrewed and will exhibit a much lower loss than the commercial window line, especially when wet. See Balanced Transmission Lines in Current Amateur Practice, by **Wes Stewart, N7WS** <http://www.vaxxine.com/phil/ladder_line.pdf>. When making open ladder line, chose a large conductor. #14 or larger wire works best. The 168-strand PVC covered "flexweave" wire is excellent for homebrewed ladder line. The impedance chosen is not very critical but keep it above say 350 ohms and perhaps below 600 ohms. The modeling for the antennas discussed here was done using a 450-ohm feedline.

Very few companies make parallel line tuners. The commercial companies (MFJ, etc.) produce single wire and coax fed line tuners that usually have 4:1 voltage baluns. Experience has shown that voltage baluns don't work well into complex impedances. If you plan to use a coax line type of tuner for parallel lines, make or buy a 1:1 or a 4:1 current balun. The 1:1 current balun is really just a high impedance choke and keeps the current constant on the parallel lines. Of course if you can find a good Johnson Matchbox at a reasonable price, go for it!

Performance

Without going into a great deal of detail about patterns, the Double Extended Zepp will produce approximately 3 dBd gain on the band it was designed for. On the other bands (the lower ones), it will produce less gain. At about

(Continued on page 117) Antenna

Technical Tip

Getting the Most from Your Hand-Held Transceiver

Ed Harris, KE4SKY,
Virginia State RACES Training Officer

If repeaters are unavailable after a disaster and you are limited to simplex operation, a portable transceiver with its original flexible antenna is inadequate for emergency communications.

I started with a "handy-talkie" or "HT" when I first got my ham license. Today, as Virginia ARES / RACES training officer I recommend that new operators buy 2-meter mobile transceivers. They cost no more than a portable. Today's equipment is very compact, rugged and reliable. For portable operation, carry the mobile transceiver in a briefcase with a 17ah-gel cell battery and telescoping 1/2 wave or magnetic-mount mobile antenna. Include 25 feet or more of coax to get the antenna up high, away from people. This arrangement may not work for everyone. Therefore, if all you have is a portable transceiver, the following will help you to make the most of it!

An "HT" makes perfectly good sense for:

- Anyone who doesn't drive;
- Commuters who use public transportation;
- Controlling a mobile radio as a cross-band repeater
- As a spare, a backup or loaner.

The National Institute of Science and Technology tested Public Safety "high-band" VHF and amateur 2-meter antennas. Flexible antennas commonly used on portable transceivers have negative gain compared to a quarter wave whip held at face level. This means that 5-watt portable VHF with stock antenna has an effective radiated power of only 1-watt. Placing the portable on your belt produces -20db of attenuation, reducing EIRP to 50 milliwatts! UHF results are no better...

"Rubber ducky" antennas are rubber covered helical springs, which are intended to withstand some rough handling, but they are not indestructible. Flexible antennas used on California fire lines for several weeks showed a 60% failure rate. Flexible antennas should be replaced annually or as soon as they show ANY apparent kinks, cracks, abrasion or other wear to visual inspection.

An effective expedient to improve a flexible antenna is to attach a counterpoise (19.5" long for the 2-meter band, or 6.5" for the 70 cm band) of stranded wire, crimped and soldered to a battery clip or ring terminal, which will fit over the antenna connector. Reinforce the soldered connection with heat shrink to resist flex. When attached to the outer collar of the BNC connector or the antenna shield, the counterpoise prevents transmitted RF from coupling with your body. This enables it to perform like a center-fed dipole, instead of an "end-fed dummy load!" The main lobe of the radiation pattern can be "aimed" by grasping and pointing the end of the counterpoise in the direction where you need a stronger signal.

Some after-market and home-made antennas perform much better than the standard helical "rubber duck." A J-pole antenna constructed of 300-ohm twin-lead rolls up and fits into your pocket. When thrown up in a tree, it increases both height and gain. Full-sized, flexible 1/4 wave and telescoping 2-wave antennas work very well.

A quarter wave provides unity gain when used with a counterpoise and held at face level. This represents a 5 dB improvement over a stock flexible antenna, because most of the effective signal is radiated. If operating from a vehicle, connect your portable to a magnetic mount mobile antenna to provide a clear RF path outside the vehicle. This overcomes the substantial attenuation, which results from operating a portable unit from inside a metal vehicle. Always carry suitable adapters so that you can connect your portable transceiver to an outside base or mobile antenna, when one is readily available.

In marginal operating locations a telescoping, half-wave is much better, because it provides the same unity gain without a ground plane that a 1/4 wave antenna does when used with a ground plane. A 2-wave antenna can be pulled up into a tree, dangled out a window, attached to a window pane with suction cups, or be used bicycle or motorcycle mobile, or in city driving on a window clip mount. A telescoping half-wave increases useable simplex range of a typical 5 watt, 2-meter portable from about a mile with the stock flexible antenna to 3 miles or more, depending upon terrain. Adding a counterpoise to an efficient antenna enables a portable unit to keep in reliable contact within 5 miles of an EOC or base station equipped with an efficient antenna elevated on a tower.

Telescoping antennas are more fragile and work best when stationary or in the open, avoiding side impacts or rough handling. Avoid prolonged mobile use of telescoping antennas on window clip mounts at highway speed, because excessive flexing loosens their internal electrical connections. Never collapse a telescoping antenna by whacking it down with the palm of your hand. Gently pull it down with your fingers. If you note any wobbling or looseness, replace the antenna.

Flexible antennas are safer when working in close quarters around people and are more durable when walking through dense vegetation for wildfire suppression or search and rescue operations. They better for dual-band transceivers because telescoping antennas are usually mono-band. Dual-band flexible antennas approximate a 1/4 wave on 2 meters and a 5/8 wave on 70 cm, are optimized for one band and may resonate poorly on the other. How efficient a particular antenna is can be determined only by testing. A telescoping half-wave, or half-wave, dual-band-mobile antenna with magnetic mount, will work well either with or without a ground plane, and offer the best bang for the buck.

Any emergency antenna for your portable transceiver is rated to safely handle up to 25 watts of RF output. This enables it to be used as an expedient antenna for a mobile radio in portable operation, or to permit use of an external "brick"

(Continued on page 115) Hand-Held Transceiver

PAARA / FARS Banquet Signup

(See program next page)

Date: Friday, January 18, 2002.

Place: Michael's at Shoreline, Mountain View.

Meal choices:

- Roast Prime Rib of Beef, au jus; or,
- Breast of Chicken, Picatta; or,
- Broiled Salmon Lemon Beurre Blanc.

Each entree includes an "intermezzo" pasta and is served with seasonal greens, fresh vegetables, potato du jour, and French rolls.

Coffee and cheesecake dessert are also included.

Prices:

- **Beef, $31.00**
- **Chicken, $25.00**
- **Salmon, $28.00**

Reservations and payments received or otherwise made after January 9, 2002 can not be accepted, and refunds can not be made after that date. This is a matter of restaurant policy, which states that we must give the restaurant the total count no later than a full week before the event, and that we are responsible for paying for all meals ordered at that time, whether or not the person shows up.

The restaurant can not readily handle more than about two meals for people who do not reserve ahead but show up at the banquet anyway; and if the restaurant is able to serve them, they may not be able to select the meal they want.

Reservations and payments must be mailed to: **Sheldon Edelman N6RD**
2195 Columbia St.
Palo Alto, CA 94306
(650) 493 7212

✂ ----------

Call: _____ Name: _____ Phone Number _____

Call: _____ Name: _____ Call: _____ Name: _____

__ Beef @ $31 $_____

__ Chicken @ $25 $_____

__ Chicken @ $25 $_____

Total: $_____

Banquet Program

Greetings.

I am **KN6FR, Rick Lagerstrom**. I am a retired Army officer and single parent of two teenage boys and a daughter at home and two daughters off on their own. I am very active in school, youth, and community activities and events. I have built and owned several diverse businesses and have significant professional experience in training and development, education, telecommunications, remote sensing, GPS and GIS systems, contracting and industrial management, business, leadership development, and communications.

I am an accomplished public speaker, award-winning instructor, and widely published author. Today, I am a full-time graduate student at Golden Gate University, am on staff with Helicair/Trimble as a GPS/GIS Systems Analyst, consult through WestLog, and teach in various venues. I am pursuing what I call a Masters in Ham Radio, actually a Masters and MBA in Telecommunications Management.

In ham radio, I am President of the Navy Postgraduate School Amateur Radio Club, Executive Director and President of the Coast Amateur Radio Training & Operations Group, an ARRL Instructor of the Year, Herb S. Brier Award winner, Command and Control Communications Director for both the Big Sur International Marathon and the PG Marching Band Festival, and Communications Director of several Monterey Bay area events.

My talk is: "Eventing: How to do Stuff."

Eventing is a method for doing things. This talk will show you how to do any task from a quick trip to the store to running the response to a national emergency. The four short parts of the talk are:

1. What is Eventing? A method for doing things.
2. ICS Short Course. A very brief look at the five basic functions.
3. Application. How do do things.
4. Idea Seeds. Dozens of ham-related ideas we do that you may enjoy.

Eventing energizes clubs, members, and others who see us having fun. Eventing is a great way to support our communities and organizations. Eventing helps you do anything, whether leisure, work, school, family, or ham radio related. Eventing is fun and the enthusiasm is infectious.

Practice Makes Perfect! Using eventing tools in our daily lives enables us to perform at our very best whenever called on. Try it. You'll like it. Most of all, have fun with "Eventing."

(Continued from page 109) **PROJECT 2002**

solves the boredom rut; it teaches and provides something fun to build and play with not to mention building ones self-esteem. The real trick is to select a design that is something new and reasonably inexpensive given the current economic climate. QRP kits are a natural fit since they are usually low cost and practical. With so many QRP kits to choose from, the question then becomes which one to build?

At a recent PAARA club board meeting, an initiative was started to look for ways to spur tinkering activity amongst the ranks. The thought was to choose a project (maybe one or two a year) that would get the membership to work together towards a common goal and be low in cost and easy for any member to build with moderate skills. Again, a QRP kit fits the bill. We recalled the kit that was a published in QST was a low cost QRP rig for 80 meters and promoted digital (keyboard) operations.

The PSK 80 Warbler Kit from NJQRP

When the kit arrived I immediately opened the package and started to read the 24-page book from cover to cover. The assembly directions plus the parts list was covered on four pages in 12 steps! I thought to myself this seems way too easy and do I have to admit I have a drinking problem? On closer inspection of the instructions, it read like an automotive repair manual; step one – remove the transmission. In the kit manual, the first step you perform is an accounting of all parts and to notify them if any are missing, mine was OK. I have learned time and again that this is laborious but a crucial step. Beyond the first step, I didn't agree with the order of the rest of the assembly instructions.

I like to prep everything before starting actual construction like winding coils and mating up any hardware components to check for fit. The Warbler has very little hardware to prep but does include 3 cores to wind that will take an average person a coffee cup of effort to complete. The kit also includes a pair of NPN transistors that need their heatsinks attached.

The Warbler includes two surface mount integrated circuits or SMICs. If you have never soldered such a fine pitch device, chances are you will be intimidated. But not to worry, I managed putting both devices down with a fine tip point on my Weller. The trick is to pre load one of the corner solder pads with a dab of solder. Then with the finesse of a surgeon, the next step is to hold the device pins over the approximate location of the pads and then heat the preloaded pad until the device sits down. With one corner down and the device aligned, it is a trivial matter of hitting the rest of the pins. As a final step I like to wick away extra solder. The only draw back to wicking off too much solder is when the board flexes. If you know the board will flex, the potential is that the connection on the pin can break. Use your own judgement. The board is fairly small and stiff so I don't expect it to flex very much if at all.

(Continued on page 116) **PROJECT 2002**

(Continued from page 112) Hand-Held Transceiver
amplifier with the portable transceiver.

A magnetic mount works best on a car, but an improvised ground plane can almost always be found around the home or office, such as a metal filing cabinet, metal trash can, cookie sheet, rain gutter, refrigerator, window air conditioning unit, balcony railing or any other large metal object. On boats, motorcycles, fiberglass truck caps or wooden balcony railings use a half-wave antenna, which does not require a ground plane.

Battery Power Basics

A common error of new ARES / RACES operators is failure to plan to carry enough battery power. Always carry at least one spare charged NiCd pack and AA battery case, which enables you to keep operating when the power goes off, if you can't recharge your NiCd pack.

Cycle and recharge dry NiCd packs monthly. Write the recharge date on a strip of tape on each pack. In cold weather keep NiCd packs warm by keeping them in an inside coat pocket and not exposed on your belt.

An adapter cord to power your transceiver from an auto cigarette lighter plug or a gel cell battery is needed for extended operation. Cigarette lighter cords are often unreliable because auto sockets aren't the best conductors, due to contamination and size variations, which cause the plug to vibrate loose. As an alternate power source, you should still have one, because they are ubiquitous and in a pinch, much better than nothing!

Portable power packs such as Quantum are excellent, but expensive. We encourage our operators to make their own using 12-volt gel cell batteries obtained from local hospitals. Sealed lead-acid (SLA) batteries are used to power emergency lighting, alarm systems, medical instruments and computer backup power supplies. They are replaced on a fixed schedule, usually before they are worn out. Because SLA batteries require disposal as hazardous waste unless recycled or reused, a hospital donation to your CERT or ARES / RACES group reduces their disposal cost. Contact your local hospital and explain how SLA batteries they discard can support auxiliary emergency communications.

Donated SLA batteries must be inspected, recharged and load-tested. Any 12V batteries with an open circuit voltage (Voc) of 12.8V or more are tested immediately and distributed for reissue, if OK. Batteries with Voc <12.8V are connected in parallel across a regulated 13.8V power supply. Those not accepting charge after 4 hours are discarded. Total charge time and current should not exceed 140% of battery capacity. Gel cells should never be recharged at over 14V due to gassing.

Reject batteries if their internal resistance exceeds an ohm, as determined by voltage drop divided by the current load in amps. Good batteries suitable for re-issue should not drop below 11.7V under a test load approximating AC,@ their amp-hour capacity, for 30 seconds or AC/5" for one minute.

A simple test load for small gel cells up to 20ah is a 50w, 12V-marine/RV bulb or automotive droplight. This equals about 3.8A, approximating a mobile radio on low power 5w transmit or a portable 2-meter hand held, plus a laptop PC and packet TNC. Using two bulbs and 'Y' adapter simulates mobile or brick amp at 25w RF output. This is a good test load for batteries to 30amp-hours. In a good battery, voltage drop stabilizes quickly, does not fall below 11.5V under load, and recovers quickly when the test load is removed.

Standard Power Cord Connectors

Auxiliary power cords should follow the configuration shown in the ARRL ARES Resource Manual. Use twin lead, red-black AWG14 or AWG16 zip cord with Molex Series 1545, 2-pin polarized connectors and .093 pins. The female pins are assembled into the male plug, which is attached to the power source, and the male pins into the female receptacle, which is attached to the rig.

The plug, receptacle and pin set is rated for 8A continuous duty and costs $0.99 from Radio Shack, Part No. 274-222. Wiring is simple. The end of the two-conductor Molex plug in cross section resembles a little 2-story house with peaked roof. Remember proper polarity by the word associations red roof and black basement, or pointy positive and flat black. Crimp wires before soldering to ensure a strong connection. After inserting the pins into the plug and receptacle, check fit of the assembled fitting. Reinforce the wires behind the plug and receptacle with heat shrink or tape. On the battery ends attach crimp type female tab terminals to fit the male tabs on the battery.

It is recommended that you rig two sets of cords directly to your car battery to power your portable or mobile radio, and laptop computer, if you will send data via packet radio to your EOC. Splice type fuse holders onto both leads, as close to the battery as possible.

If all you have is a portable transceiver, the above information will help to ensure that you can provide an adequate signal for reliable emergency communications. Doing so is vitally necessary to enable your volunteer disaster unit to complete its mission efficiently and safely. More training materials for amateur radio operators to learn essential core skills in emergency communications are featured on the Virginia ARES / RACES Training page located at: <http://va-ares.org/Training/training.html>

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(Continued from page 114) **PROJECT 2002**

The next step is to lay the parts down from the smallest to the largest. The manual in this case doesn't explicitly tell you to put each part down step-by-step either, a refreshing change from the Heathkit way. The builder is expected to look at the parts placement drawing for the correct location and placement of all the components. So it stands to reason that any confusion on the value or location of a part is easily resolved once all the resistors have been placed. The same is true for diodes, capacitors and transistors. It took me about 45 minutes to get all the resistors down and soldered. It then took me another 45 minutes for the capacitors. In practically no time at all I was finished.

We Have Waterfall!

Using a 12.5 volt 500mA wall wart, I fired the unit up and checked the voltages with the values labeled on the schematic, everything looked good. I then scrounged up the mini plug to mini plug cables for the audio connection with the lap-top and clipped on a piece of wire for the antenna. After I started DigiPan on the computer I immediately saw speckles in the waterfall. To say the least, I was impressed. I then toddled off to go look for a cable to connect the serial port so I could key up the transmitter. I found two such cables but both were null cables. The gender was right but the pin out was wrong.

With DigiPan you have a choice to use either DTR or RTS to toggle TX/RX mode. The Warbler schematic called for RTS on pin 7. The null-cable I had put the RTS on pin 6. After thinking about the problem for a moment I decided to introduce my first modification.

Modification Number One

The problem with jumping pin 6 to pin 7 on the PC board is the unknown affect of sending the voltage back up the cable on another pin and what it will do to the PC. I closely examined the traces on the PC board and determined the trace running out the back-side of the connector on the component side was the one to cut. After I cut the trace I doped the board cut to seal it. I then jumped the one side of C112 to pin 6 to complete the connection. If I ever get the correct cable (non-null) I then will need to move the jump from pin 6 to pin 7. The next step was to hook the cable up and check the voltages in transmit mode to make sure that section worked. For this step I loaded a string of "RYRYRY" into the transmit buffer with an occasional "de KA7TXV" for ID. The voltages seemed to be ok and after ball parking the local oscillator frequency I noticed that my waterfall was hot (the waterfall was awash with lots of yellow) as described by other builders. This was due to the connection on the PC being a microphone port and not a line level port. I went into the control port and turned it all the way down. This helped some, but it was still fairly hot.

In the manual Wayne, N6BM describes a component change to resolve the hot audio problem. R23 is a 2.2k ohm resistor that sets the output for a line level input. R24 matches the impedance to a line level input. But most older lap tops only support Microphone inputs, what do you do? He solved the issue by replacing R23 with a 56k ohm resistor. I didn't want to go to that extreme if I ever want to use the Warbler on a different computer, one with a line input. So I compromised and replaced R23 with 10k ohm resistor and have achieved a reasonable middle ground. When I connected it back up to the laptop I still see speckles in the pass band but more of a blue shade this time instead of yellow. When I connected it to my other computer with a line input, I turn the volume up a little past 3/4 and I can get the near same result.

The Antenna

Whether operating QRP or not, there is much to be said about having a good antenna system. Fortunately, I have a fair amount of real estate and trees dotting my property to hang long wires between. This last summer with the help from Andreas' sling-shot, I pulled up an 80 meter loop antenna approximately 252 feet long. The feed point was dangling right outside the window where I can set up the Warbler without to much effort. I connected a chunk of RG58 with soldered pig-tails at the feed end (center to one side, braid to the other) and terminated the other end with a BNC connector. I checked the SWR with my antenna analyzer and it indicated a sweet spot around 3.7MHz, well enough for a quick check. I can add more wire later and adjust the feed point to a location closer to where I want it later. I'm also going to add a loop of cable at the feed point as well.

First Contact

The moment of truth came on December 6th when I worked Fred, K0VK in Woody Creek, Colorado. I was so unaccustomed to using DigiPan I was fumbling over the keyboard like a Novice making a first CW contact. Four minutes later I worked Pat, N7UVH in Post Falls, Idaho. Not bad for a thrown together antenna? A couple nights later I was copying Larry, NF6S in Livermore full strength but he was having problems with my signal. After making some adjustments to the antenna I got the SWR sweet spot right about the dead center of 3.58 where the Warblers live.

I now make contacts all over the place but none very close to home, clearly my angle of radiation is going right over the heads of everybody in the Bay Area. To solve that problem will be the next experiment and the next article. Till then, see you on 3.581 PSK31.

-Joel Wilhite, KA7TXV

(Continued from page 111) Antenna

one third the design frequency, the antenna will have gain equal to a half wave dipole. This antenna is also useful for portable operation or as a low profile antenna for antenna unfriendly neighborhoods. As with any horizontally polarized antenna, this dipole needs to be put up as high as possible, preferably 1/2 wavelength or higher at the lowest intended frequency.

Jerry W. Haigwood W5JH, Peoria, AZ
Web page http://www.haigwood.org

(Editorial comment): **Doug Hendricks KI6DS** makes an extremely light weight QRP double extended zepp, the NorCal Doublet, from a piece of 4-conductor ribbon cable, like that used in computers. Using a piece 50 feet long, he measures back 22 feet, and strips out the center two conductors from that section. One 22 ft. length conductor makes up one side of the doublet, and the other conductor is the other 22 ft. length. Doug uses a cable tie to secure it to a #1 fishing brass snap swivel for use as a center support. The rest of the ribbon cable is the feedline. The two center conductors in the feedline are simply spacers to make the outer conductors match your 50-ohm transceiver output. The antenna can be mounted as either a dipole or an inverted VEE. The original article describing the NorCal Doublet was in the Hints and Kinks column of the Fall '99 QRPp, the official journal of the NorCal QRP Club.

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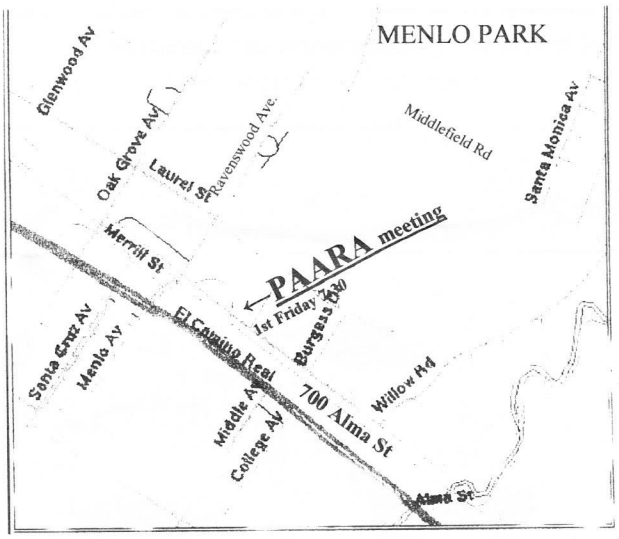

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