

# The READOUT

Year 13

Number 9

September 1991

## Jolly Green Naval Giant

The U.S. Navy has created a Jolly Green Giant which occupies 56 miles of real estate and requires 1492 fifty foot telephone poles and hundreds of miles of one inch thick wire in order to operate. No, Navy engineers have not been charmed by mischievous leprechauns. They have created a giant radio transmitting and receiving facility so the Navy could talk to submarines around the world. Why so big? The answer to this question lies in a common characteristic of radio waves. Have you ever traveled through a tunnel, listening to your car radio, and hear the station fade away? Radio signals really suffer when they are asked to pass through dense materials like stone, steel, and water. The extremely low frequencies (ELF) were designed to cure the problem.

Using the extremely low frequency of 76 Hertz, vital data and instructions can be transmitted to America's submarine fleet reliably to depths of 400 feet or more.

High-tech sophisticated radios, with computerized digital processing, receive the signals using antennas 1,200 to 2,000 feet in length trailing behind the submerged vessels. The ELF system sends three letter encoded messages to the ships, each character taking several minutes to transmit. ELF radio waves are 2,500 miles long.

Many obstacles had to be met to complete the ELF transmission system located near the town of Republic in Michigan's northern peninsula. Crow-sized pileated wood-

peckers found the supporting telephone poles delightful dining. Several poles had to be replaced because of the huge holes the birds created. Deterrent sprays could not be applied to the poles because of environmental consideration. Nearby telephones had to be filtered to prevent them from ringing randomly during ELF broadcasts.

The Upper Peninsula Power  
See 'Giant' page 7

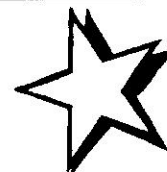
**'Jolly Green  
Giant occupies  
56 Miles of real  
estate.'**

## Neighbor Files Law Suit Tucson Amateur Operator

Joe Michaels, W4DDV of Tucson, Arizona, is being sued on four counts by his next door neighbor who is a self-employed consultant geologist. Arthur Still's initial complaint was that he objected to the ugliness of Michaels' tower...and the fact it obstructed his scenic view of the mountains.

Still now contends that Michaels Amateur operation interferes with his electronic devices; namely his telephone, computers, radio receivers, television and FAX machine...and his right to conduct a business from his residence. He maintains that Michaels' transmissions constitute a nuisance. Furthermore, the plaintiff believes that the valuation of his property has been reduced by 15% to 20% due the installation of W4DDV's radio tower and antenna and the electro-magnetic interference generated by his ham station. Still

See 'Tucson' page 4



**Next SARA  
Meeting  
Tuesday**

**Sept. 17, 1991**

**730 pm**

**Stanislaus Co.  
Administration Building**

**12th & H Streets**

**Downtown Modesto, CA.**

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#### 1991 SARA Officers

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Oliver Borns KJ6YZ 551-5855

##### Vice President

David Grout, N6YHZ 576-8730

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Ernie Rader, K6UVI 522-5303

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#### SARA VHF Net

Thursdays @ 8 p.m.

(Except Holidays)

2 meters 145.39 MHz WD6EJF

220 Band 224.14 MHz WD6EJF

10 Meter 28,440 kHz USB

Tuesdays at 730 pm.

Contributions to *The READOUT* are always welcome and may be submitted to the editor by mail or via packet at N6REB-BBS on 145.79 MHz. The deadline for articles is the 15th of the preceding month. Articles regarding religion or politics are not accepted.

#### Editor

Bob Pinheiro, WA6ZLO

1221 Mist Flower Ct.

Modesto, CA. 95355

209-523-5880

An ARRL affiliated club!

ARRL membership may be paid through SARA with the club retaining a \$2.00 commission. Please send your ARRL membership form along with your check made payable to "SARA". We will deduct the \$2.00 and send a check to the ARRL.

## Dreadful Dualband Intermod

By Linda Reeder, N7HVF

One of the latest fads in the world of ham radio is the dual-bander hand-held. There are some great features about them such as monitoring one band while talking on the other.

440 MHz works better than 2 meters getting out of buildings also. The small size of the unit makes it easy to carry around. Unfortunately, there is a big...big.. problem with them. Dreadful intermod!!

It seems the manufactures were so busy putting these neat little package together that they over looked this problem. The intermod apparently affects all the popular brands of talkies including Kenwood, Icom, Yaesu and Alinco. I have talked to individuals with each of these brands and they all report the same problem.

Imagine being able to hear the shrilling sound of a dentist drill without being in the dentist's chair. That's exactly how bad it sounds and I have it on tape to prove it.

One of my friends won a Yaesu dual-bander at a steak fry. Shortly after that he was trying to carry on a conversation but the intermod was so bad that he said forget it and sold it to some poor unfortunate soul.

Another friend decided he

wanted to join the ranks of the dual-bander hand-helds. He was told that if he bought the Icom he wouldn't have any intermod problems like the Kenwood, Yaesu and Alinco did.

It wasn't long before he discovered that he was lead down the wrong pad. The intermod was so bad that in disgust he bought a mobile dual-bander which seemed to elevate this problem. A couple of weeks ago a gentlemen from California was here in Salt

Lake City, Utah visiting.

He was having some problems with his car and needed help. The intermod on his radio was so bad that he had to ask several times for the Amateurs who were trying to help him to repeat their transmissions. He was very frustrated.

I joined the ranks of the dual-bander hand-held in February despite my friends warning not to get one. I wish I had listened to him, maybe then I could monitor in peace.

I love the idea of having so much available in one little rig. But, something needs to be done about this dreadful intermod.

73, Linda Reeder, N7HVF,  
Salt Lake City, Utah.

**SARA's Digi** will be off the air for at least two weeks due to construction work on the hill. The digi is located in a building owned by the U.S. Government which is in the process of installing a new tower at the site. All antennas, in-

cluding ours were taken off the old wooden tower which will be removed to make way for the new steel tower to be erected. The digi will return to service as soon as possible.

# Build A Better Bugger™

By , Tim Low, N6ZUC

One of the areas of ham radio that far too few amateurs enjoy today is in building some of their own equipment. You don't have to be a certified electronics technician to put together some simple ham black boxes either.

Sure, most of us have cut some wire and hung it up for an antenna, and that's a start, but why not try a 2 meter Yagi? How 'bout a trapped vertical? Simple projects like an amplifier for your mic, or, get carried away and try your hand at buildin' a speech processor for your HF rig. Not hard to do. ARRL books and ham magazines are chock full of good 'li'l' projects.

I recently put together an electronic keyer to team up with my Bencher™ paddles. The keyer is built around the Curtis 8044 integrated circuit. This has been featured in several publications including QST and the ARRL Handbook. The IC must be purchased direct from Curtis Electro Devices,™ and runs less than \$15.00. The circuit board can also be purchased. I bought mine from a vendor at a swap meet for \$2.00. Complete circuit board and parts kits are also available from several sources.

An experienced kit builder can easily put one of these together in an afternoon. However, I always recommend taking your time, there's no rush, do a nice job. Build something that looks good sitting on your radio table. A well constructed project that looks good too adds to the enjoyment.

Most of the parts, even the

enclosure, came out of my spare parts stash and junk boxes. Granted, my parts supply is a little bit bigger than most people's, but even if you buy everything, the cost is still within reason.

The project can be customized to suite your needs. Some of the options you can incorporate are, audio circuit for side tone, fixed or variable speed control, word per minute indicator (meter), dual inputs for simultaneous dual paddle or straight key operation and weight and pitch control for your side-tone. You can make it battery operated or build in a simple 6-9 volt power supply, or put in a 9 volt regulator and run it off 13.8 volt station supply.

Instead of a pot to vary the character speed, try a rotary switch with fixed resistors to set the speed. Maybe you would want a six position switch with settings from 5, 10, 15, 20, 25, & 30 words per minute. Use a switch with enough positions for the number of speeds you intend to operate. It will take some experimentation to come up with the correct value resistors. The way to determine the speed per minute is to hold the dash paddle and count the number of dah's generated in five seconds. Twenty dah's equal twenty words per minute.

Maybe your one of those guys or gals who only work high speed CW. Simplify the project by building it for just one speed and eliminate the speed control altogether. Mine is set up for variable operation from 13 WPM character speed on the bottom end, and 30 WPM at the top end of the control. 13 WPM is as slow as I ever go, and 30 WPM is just at the top of my ability to control the paddles. You can decide what your own needs are and build it accordingly.

The speed indicator is a neat little feature and is available with the

18 pin package. The IC can be purchased in either 16 or 18 pin versions. The indicator is nothing more than a 50-100 micro-amp meter movement. Take the meter apart and rub off the graduation marks on the face plate. Use transfers to mark the proper graduations for CW speed. Now you have a custom meter movement. Get creative!

I have my keyer setup so both my Bencher™ paddles, and my old Radio Shack straight key are always hot. No switching or changing plugs. On those occasions when I need to slow down below 13 WPM such as when working a new Novice, I just start tappin' away. I still like to use the old straight key and like to stay in practice for those times when the keyer might decide to quite before I do. It happens! Even in a superbly built piece of gear like my keyer, HI HI.

The cost of the project, depending on how carried away you get, can run nearly as much as some of the commercially available keyers. It will be cheaper, but not all that much, if you must buy all of the parts new. So, why build one? PRIDE! Also, so you can make it to fit your exact requirements with just the features you need and want. I put mine in real nice enclosure. I even went so far as to buy rub on lettering for the face and back plates so all controls and connections are neatly labeled. It looks like something you would buy from a ham radio store, and has my call sign prominently displayed on the front. Bottom line, it makes me feel good just looking at it. It's a feeling of accomplishment. Build something, you'll like it too! I'm already making plans to build a bigger and better keyer, but that will wait as my next construction project will be to build a 10 meter beacon

See 'Bugger' page 5



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## Ladies of The Night Radio

Villa Mimosa is part of Rio de Janeiro's Estacio district. It is a poor area, just two block long. Vendors sell food and drinks outside about 50 small stone houses of faded blue, pink or yellow.

But selling lemonade and hot dogs is not the main business of Villa Mimosa. For the past 100 years, it has been one of Rio's most notorious red-light districts and the blue, pink and yellow buildings house over 400 prostitutes.

Now a new business has come to Villa Mimosa: a prostitute radio station. Euridice Coelho Reis, 44, herself a one-time employee of the Villa, launched the station to provide both prostitutes and clients with information about AIDS

"We decided to build a radio station because most of our girls are illiterate. And our clients would probably be uncomfortable because they don't want their wives to know where they spend their free time."

Prostitutes Radio broadcasts news, music, interviews and advice about safe sex in Villa Mimosa.

-Monitoring Times

## Technical Report

By LeRoy, NV6S

The repeater system is nearing completion. The 220 link is now operational as is the autopatch. If your license doesn't allow you to operate on two meters, you must have a Technician class or higher bring the link up and act as control operator for you. Please remember to un-link the repeaters when your contact is complete.

The PL's haven't been wired to the remote control yet although they will be on line soon as an option when problems occur. The user access PL will be 136.5 Hz for all repeaters.

The 440 repeater still needs work and I will be improving that system as time and money permit. The sensitivity is less than I would like to see and I will need to install a preamp to improve that. An extra cavity has pretty well solved the interference problem although it may reappear when the sensitivity is improved. If that is the case we may have to add another cavity. Anyway bear with me as I have time to improve the system.

The ten meter digi and the six meter repeater are waiting for others to get them on the air. Jim, N6KMR has been very busy and hasn't had time to get the ten meter digi going. The six meter repeater is being worked on by N6YHY. He is attempting to isolate the transmitter from the receiver and having difficulty because the duplexers lack sufficient rejection. I'm sure he will work that problem out.

We have two new deep cycle marine batteries here in the shack to install on the hill to increase our backup power ability. My plans are to put both new batteries at the two meter site and use both old batteries at the digi site. I also want to build up a circuit that will let us know when we are on backup power so we can minimize long rag chews during those times. The current system switches instantly over to battery power in the event of a power failure. The system is solid state and there is no way to tell that we are on battery power at this time.

The sensitivity of the 440 repeater was down to about 10 millivolts quieting. After attempting to tune the transmitter I finally did get about 200 micro volts for 20 db of quieting out of it but the tuning caps are flaky and it just would not tune up properly. I think the club will have to spring for a new receiver. The transmitter is putting out its rated ten watts and I have 9 watts out of the cavities.

The digipeater was off the air and I went up to the Bureau of Reclamation building to check on it. Surprise!

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.....Tucson from from page ....

is asking for damages of not less than \$30,000 to be determined by trial.

The third count involves what Still says is the health-hazard caused by the on-going exposure to electromagnetic fields radiated by the ham station next door.

The fourth count is against the Federal Communications Commission who is "vested with regulation control of radio devices...." Still says the FCC has failed to take action within its administrative authority to regulate interference. Actually, the FCC has taken action. They made unannounced inspections of Michaels' station on two separate occasions and found there were no violations of FCC regulations and found no technical deficiencies of any kind.

Reportedly, Still has consistently refused to permit the FCC to enter his premises to determine the nature and extent of interference or other problems and FCC Engineer John Glenn of the Douglas, Arizona, field office has closed the case. Still responded by filing suit in U.S. Federal Court for the District of Arizona on August 9th. This case has serious ramifications for all of ham radio! Michaels' legal costs have already exceeded \$10,000 and he needs all the help he can get. (Joseph Michaels, W4DDV, 6830 Camino Fray Marcos, Tucson, Arizona 85718) -W5YI Report

# SARA Minutes

By Ernie Rader, K6UVI, Secretary

The regular SARA monthly meeting was called to order by President Oliver Bourns, KJ6YZ at 7:36 PM on August 20th, 1991. Introductions were made as the sign-in sheet and latest copy of the club roster were passed around for corrections. Thirty members attended.

Oliver reported that Steve, N6EKV had called him the night before and said the club's net profit from the fireworks stand fund raiser totaled \$624.84 including pre-sales of \$128.04. Treasurer's report followed. The General Account showed a beginning balance of \$413.88, six credits totaling \$680.98 and 10 debits of \$850.82 for an ending balance of \$244.04.

The Fund Raiser Account showed a beginning balance of \$1,144.82, no credits and two debits totaling \$494.73 for an ending balance of \$650.09. The Education and Training Account showed a beginning balance of \$722.67 with one debit of \$157.89 for an ending balance of \$564.78. Bob, WA6ZLO asked about the high amount in debits to the General Account and a discrepancy was found in double payments to Budget Copy Center. Al is to check with them for a refund. The treasurer's report was then accepted.

Secretary's report was accepted as printed in The *READOUT*, and

Dave, N6YHZ had photographs of field day displayed at the front table for all to see. LeRoy's technical report included the six meter repeater being inoperative and Frank, N6YHY was to be looking at it shortly. The 10 meter digipeater is presently inoperative, and Jim, N6KMR is scheduled to look at it also. The 440 machine audio is intermittent and LeRoy is to look at that on his next trip to the hill. The balance of the system is working normally. Several items in a WARC bulletin were read by Oliver, and T-shirts were passed out to all that participated in the communications for the 1st Graffiti USA bike-a-thon. A letter of appreciation for that participation was read. Also, an Outstanding Service Award and letter of appreciation for our help in the American Diabetes Association Spring Ride and Stride was presented to the club by Oliver. Their letter also requested that we provide communication for their upcoming annual Fall Cycle Tour to be held on October 5th at Linden. Bob, WA6ZLO suggested that we not take on this activity since it is too far away, and Ernie, K6UVI was commissioned to write suggesting another club handle their needs. The Cheese and Wine Festival is having a bike-a-thon on October 13th, and volunteers were asked for to provide communication for that event. Under old

business, Bob, WA6ZLO described a letter he had recently received from WB2LDL requesting a TVI/RFI brochure. It seems that 2 1/2 years ago WorldRadio had printed an ad saying SARA was able to supply these brochures from Palomar Engineering. Over 2000 letters and requests for this brochure have come in since then, and it was interesting to note that we are still getting those requests.

Break taken at 8:22 PM. At 8:39 the meeting resumed, and Neil, N6CWK, one of our newest members, won a battery operated clock.

Under new business, Ernie, K6UVI reminded the membership that several months ago it had been proposed to amend the bylaws to include another class of membership for those residing outside a 150 mile radius of Modesto. The required ten members had signed the petition to make that amendment, it had been published in The *READOUT*, and it was then voted that this amendment be made. The secretary was instructed to make that change.

There was a short discussion of repeater etiquette, and it was noted that there was a typo in The *READOUT* with respect to the date of the next meeting. It is to be on the 17th, not the 7th. The meeting was adjourned at 8:52 PM. Respectfully submitted, Ernie, K6UVI, Secretary.

## Bugger from page 3

station. I will construct a simple memory keyer, along with a QRP transmitter to run about 100 milli-watts. The whole thing, including the power supply, will be housed in a

small enclosure. It should be fun. Look for N6ZUC/B beacon coming soon to a 10 meter rig near you. Frequency yet to be determined. Solar-powered? Hmmm! Next month, I'll talk about propagation. hen, 73, Tim.

## Amateur Fees Lifted

On July 30, 1991, the House Energy and Commerce Committee passed HR 1674, the FCC Authorization Bill, and sent it to the full House.

The bill specifically exempts Amateur Radio licenses from user fees. The full

House is expected to consider the bill after the August recess. The Senate Commerce, Science and Transportation Committee is expected to take up its version of the bill sometime this month.

# Editor's Notes

By Bob Pinheiro, WA6ZLO

**C**ongratulations to Gayle Griswold, KC6YTI, who recently earned her Technician license. She was influenced by the OM, Tom, N6LSA. Congratulations to Ann Farr, KC6ZBQ, who passed her Novice exam and is working on her Technician license. She was encouraged by her husband Tommy, WJ6O.

- Best wishes to Jim Hanson, W6SQP, who has been under the weather lately. He's getting better and we wish him the best.

- Welcome new members: Neil Obus, N6CWK, of Stockton. Neil is a General and a retired police officer who lives on a yacht in the Delta. Dobby Dobbins, KC6TVG, of Riverbank. Dobby is an industrial computer programmer. Welcome back Lillie Dalton, KB6CCL, of Modesto. Lillie owns and operates her own used car business.



**Bob, N6OCS**

- Best wishes to Bob, N6OCS, who is moving to Auburn, Washington. He likes the country up there, but more importantly, he likes his bride-to-be who lives there. Approximately 30 SARA members and their wives got together August 30, 1991 to roast Bob at the Oasis Restaurant in Modesto. Good Luck Bob, and keep in touch.

- Help is needed to provide communications for the River-

bank Cheese and Wine festival bike-a-thon coming up on October 13, 1991. If you can help, please contact Oliver, KJ6YZ, at 551-5855. This is a premier event and lots of fun to work.

- Like any other government agency, the FCC is looking for ways to increase revenues. A time honored way is to make money with forfeitures (fines). Under the Communications Act, the FCC has the authority to impose "monetary forfeitures," in the form of fines for rules violations. The following is a partial list of the amount of the fine if you get caught violating one of these rules.

- \$8,000- Violations of distress/safety rules; False distress communications. -\$7,500- Failure to permit inspection or Malicious interference; Failure to respond to Commission communications. \$7,000 - Importation or marketing of unauthorized equipment. \$6,000 - Exceeding authorized antenna height. --\$5,000 - Exceeding power limits; Unauthorized emissions; Using un-

authorized frequencies; Transmission of indecent or obscene material. \$1,000 - Failure to give station ID. \$500.00- Miscellaneous violations.

- Ham Radio Outlet (HRO) has moved their Burlingame store to Sunnyvale. The new store is at 510 Lawrence Expressway # 102. It's across from Fry's Electronics in Sunnyvale.

- A new YL-Net for women Amateurs from Fresno to Sacramento will meet every Thursday evening starting September 5, 1991. Check-in-time is 730 pm on 147.945/440.975 repeaters in Sonora. The net is sponsored by the lady members of the Tuolumne CARES (Tuolumne County Amateur Radio and Electronics Society).

- The 9th annual indoor/outdoor Sonoma Co. Flea Market/Auction will be held in Sebastopol, CA. on Saturday September 28. Free Admission! Breakfast and lunch will be available. Seller's setup starts at 7 am with the doors open at 8 am. The auction starts around noon. The event is held at The Holy Ghost Society hall, 7960 Mill Station Road, just north of Sebastopol on Hwy 116. Plenty of free parking. Talk-in on 146.73. Mhz.

- We are sorry to report that SARA members Bob and Laura Kimbal, KC6TVE and KC6TVD were seriously injured in a traffic accident in August. The accident occurred in San Joaquin County. Bob was treated and released. Laura was in intensive care and is doing better now. They were broadsided at Hwy120 and Jack Tone Rd. near Stockton on August 25th. Best wishes to the Kimbals' for a speedy recovery.

- A reciprocal operating agreement with Mexico has been announced by the FCC as of July 9, 1991. The details are to be finalized by both countries and until they are, don't try to operate in Mexico without a Mexican license.

- ICOM America has moved their service center in Irvine, Texas to Irvine, CA. The new address is 18102 Sky Park South, Suite 52-B. Phone 714-852-8026. This should speed up repairs which formerly were being handled by the repair facility in Bellevue, Washington.

- ARRL Emergency Coordinator for Stanislaus County, Allen Woods, WA6OYF, has resigned after 10 years of service. If you are interested in the position contact SCM Byron Smith, WA6YLB, 504 S. Joyner, Exeter, CA. 93221.

*...That's it for this month. 73, Bob.*



...**'Giant'** from front page

Company had to redesign their utility lines to reduce attenuation of the ELF signals. Many other telephone, cable and power companies followed suit.

Environmentalists and residents have protested the ELF project throughout the 22 years since its original proposal, and have lengthened the project throughout the 22 years since its original proposal, and have lengthened the project's completion time. The extremely low frequency transmissions were feared as a cause of environmental and biological damage. Large expanses of countryside and woods had to be cleared to make a right-of-way for the construction of the system. Many expensive compromises were reached and the Navy has pledged to continue its "good-neighbor" status with Michigan's Department of Natural resources and the townspeople living close to the antenna farm.

The final result could be considered the eighth wonder of the world by any radio enthusiast, but it is much smaller than originally planned. An underground grid antenna, spanning 2,000 square miles, called Project Seafarer, was first proposed as the ultimate ELF system. Campaigns against ELF by the

people of Michigan, a dwindling federal budget, and the realization that even an underground ELF system could be destroyed by severe enemy bombings, forced the Navy to scale down the project to its current dimensions.

Although the ELF facility build in northern Michigan is the largest in the world, the Navy still maintains its original ELF transmission center at Clam Lake, Wisconsin. Clam Lake's antenna farm consists of a 267 mile long array that resembles a tilted cross, built in 1969. The ELF outside Republic, Michigan, the second transmitter sit to go on the air, began broadcasting in 1989. Instead of a tilted cross design, their antenna resembles a hugh letter F.

Three thick cables run parallel to each other creating the most efficient antenna possible. Fifty foot tall supports, constructed with two vertical telephone pole and a strengthening horizontal crossbar, are place several hundred feet apart keeping the antenna cables high and away from obstructions. The ELF antenna could easily be mistaken for a power company's high tension distribution system.

The ELF's location is more important than the hugh antenna built upon it. Underneath both sites lie enormous plates of Laurentian granite,

known for its unusually strong round conductivity. This allows an electrical loop to be created. The transmitted ELF signals run down the 56 mile antenna that is ground deep in the earth at each end. The bedrock returns the signal underground creating a complete circuit. The Navy's ELF transmitter effectively uses most of Michigan's northern peninsula as its radiating system.

The messages transmitted via ELF follow a path as complicated as an ELF antenna. From the offices of various commanders at the Pentagon, and naval bases worldwide, instructions to submarines are sent to the Navy Broadcast Control Authority offices in Norfolk, Virginia.

The appropriate three letter code is decided upon and relayed to the original ELF transmission site at Clam Lake, Wisconsin, still in active use today. Clam Lake then sends the date to the ELF site at Republic, Michigan, and a synchronous transmission of the pulses from both sites occurs shortly thereafter.

The ELF system cost 400 million dollars to construct and one million dollars to operate annually. It has become " a reliable, redundant, continuous and reconstitutable communication system for submarines.

-Thanks Monitoring Time Magazine

.....**Tech Report** from page 4

All the antennas on the pole, including ours, had been taken down and were neatly stacked beside the digipeater. I'm not sure what is happening, but it appears they are planning to put us back on the air on the new tower recently installed or perhaps they will leave that to us. We were not notified about this move and Bill, W6AFS, is checking to see what's going on.

Thanks to all those who have helped me over the past months. There have been countless trips and many hours involved in getting the system to this point. Again, thanks to all who have helped me with the equipment.



- (1) Hustler Mobile vertical antenna with ball mount, spring and quick disconnect mast. With resonators for 75-40-20-10. \$90.00
- (1) MFJ mobile antenna matcher \$15.00
- (1) Kenwood 140 Transceiver with the mobile mount and extra DC cord \$620.00.
- (1) 4-1 Balun (New) \$10.00
- (1) MFJ 949D Versa Tuner antenna transmatch. \$90.00. (1) 35M Astron 35 amp power supply. \$125.00

**Call Vorus Stillwell, WA6LJB (209) 527-3683**

For Sale: Star NX2400 24 pin Letter Quality Printer excellent condition. Including several extra ribbons, inking machine and ink. \$225.00.  
- Heathkit HD4040 Packet TNC with manual. \$100.00.

**Call Bob Pinheiro, WA6ZLO (209) 523-5880 Evenings**

# Calendar

- Sept. 14, 1991 ..... Final Flea Market .....All Day  
Foothill College Los Altos, CA.
- Sept. 17, 1991 ..... SARA Monthly Meeting ....730 pm
- Nov. 16, 1991 ..... VE Testing in Sonora .....900 am
- Nov. 19, 1991 ..... SARA Monthly Meeting ....730 pm
- Dec.7,1991 ..... VE Testing in Modesto .....900 am
- Dec. 17, 1991 ..... SARA Monthly Meeting ....730 pm

SARA meets the third Tuesday of each month (except holidays) at the Stanislaus County Administration Building at 12th and H Streets in downtown Modesto. The meetings are held in the lower-level conference room starting at 730 pm. Visitors and interested parties are most welcome.

SARA is an ARRL Affiliated Club and is affiliated with Stanislaus County and the City of Modesto RACES.

The club owns and operates three FM repeaters using the club station call of WD6EJF. Frequencies are 145.39 MHz, 224.14 MHz & 440.225 MHz. The club's digipeater, WD6EJF-1, operates on 145.79 MHz. All repeaters and the digipeater are located on Mt. Oso, 18 miles SW of Modesto at an elevation of 3400 feet in the Coast Range mountains. SARA conducts informational nets each Thursday evening at 8 pm on the 2M and 220 repeaters.

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**To:**

**The Next SARA Meeting is September 17, 1991  
at 730 pm & You're Invited!**