April 10 CVARC Meeting Location

The April CVARC general meeting will be held on Thursday April 10 at the Elks Club at the regular time (7:30 to 9:30 PM). We had received word from the Elks Club that they would be closed that night for repair work. However, the date for the repair work was changed and thus will not affect our regularly scheduled April meet. The April meeting will be at the same time and place as usual.

April CVARC Program - Homebrewing

By Hugh Bosma KF6HHS

Put away your hydrometers, barley, yeast, and hops, we are talking about homebrew amateur radio style. There was a time when amateurs built their own equipment. We built Heathkits, modified surplus military gear, and some designed and built from scratch. Why, because in many cases it was better than what was commercially available, or cheaper, or just for the satisfaction of "I did it myself." Sure, now you can buy an all-band, all-mode radio that weights less than ten pounds, probably in a few years they might even fit in your shirt pocket. Is homebrew dead, hardly, there are several areas in the shack, and mobile that are ideal for the homebrewer. Miss that sweet aroma of Kester '44' resin emanating from the tip of your soldering iron. How about an audio control panel that can eliminate four of the five microphones and speakers in the shack, or two or three in the mobile. Not to mention a packet station, or an APRS tracker. How about a digital voice recorder you can plug into any rig for field day?

Last year I decided to participate in Field Day. Fortunately over the years I visited various club sites and witnessed how resourceful and ingenious amateurs were. I had never thought of using a garden hose to guy an antenna. I also noted by Sunday morning the phone operators were slurring their words and difficult to understand. Being fairly new to Amateur radio I could see participating in field day required a lot of planning and analysis. With pencil and paper in hand, I sketched an organizer for my radios, antenna switches, and preamplifier; plus a platform on the bed of my pickup truck that provided some protection from the weather and a place to mount my antenna tripod and solar panels. Being field day is just a few weeks after the Dayton Hamvention, you have to bring along your latest toys to show off - in my case it was going to be my secret homebrew project. With that said, it was off to Home Depot for wood and hardware for the organizer and platform, and Radio Shack for my secret homebrew project.

Being the world's greatest procrastinator, I waited until the Monday before field day to get in gear. However, by Thursday evening everything was finished and loaded in my truck. That other type of homebrew you all thought of when you read the title, you bet late Thursday evening was Miller Time. Friday morning it was off to the field site and station setup. Setup went well and was complete by late afternoon. With the station secured and my secret homebrew well hidden I returned home.

With great anticipation I set out Saturday morning for the site, of course the YL pack enough snacks to feed a platoon. How do you operate phone, enjoy the catered tri-tip and chicken, and nibble on the snacks without missing a beat? Well, you push a little button on that homebrew DVR you just built and hear - "this is alpha alpha six charlie victor - eleven alpha Santa Barbara calling"! Please join us this month and see a digital voice recorder you can build. The 'how-to' homebrew presentation will include schematics, layout, parts, and over the air demo using 900 Mhz - KF6HHS.

FCC License Examinations

By Jeff Reinhardt AA6JR

Next Exam on Sunday April 13

CVARC hosts FCC License Examinations at 8:30 AM on the second Sunday of even numbered months at the Ventura East County Sheriff Station on Olsen Rd. (near the Reagan Library). CVARC conducts exams for all license classes . Exam candidates must bring a form of government issued photo I.D., the original AND a photocopy of any existing license or Certificate of Exam Element Completion, a Social Security (or government issued Taxpayer I.D.) number, and $12 ARRL VE Exam fee (cash is preferred). No advance reservation is necessary, walk-ins are welcome. Advance notice is needed for special circumstances, such as reading the exam to sight-impaired candidates. If you have any questions, contact CVARC VE Coordinator Jeff Reinhardt at 818-706-3853.

CQ Field Day, CQ Field Day from Alpha Alpha Six Charlie Victor...

By Tom Stough, W0UFC

Yes, fellow radio ops--it's time again to get organized for Field Day, June 28-29. I need "band captains" for 80, 40, 20, 15 and 10 meters using phone, CW and data modes. I also need captains for VHF and UHF stations. This year, ARRL has added an additional category, a station operating from an Emergency Operations Center ("F" class). If we decide to do this, we'll need additional operators for that (separate) station as well.

If you're a follower rather than a leader, fear not--we'll need plenty of operators for each station, as well as antenna "setter-uppers" and "taker-downers". If you like to meet and greet non-ham visitors, we'll put you to work publicizing our club and our hobby. With the recent emphasis on homeland security, interest in emergency communications is at an all-time high.

So...call me or email me and sign up! You can also sign up in person at the April meeting.

73, Tom Stough, W0UFC

Operations Chair

Packet Training Course

Presented By Greg Lane K7SDW

A packet training course is being taught by Greg Lane, K7SDW, in the Community Room at the East County Sheriff's Station on Saturday May 3. The class will be from 8AM to approximately 4PM. A number of packet radio stations will be set up in the Community Room to provide hands on training. This

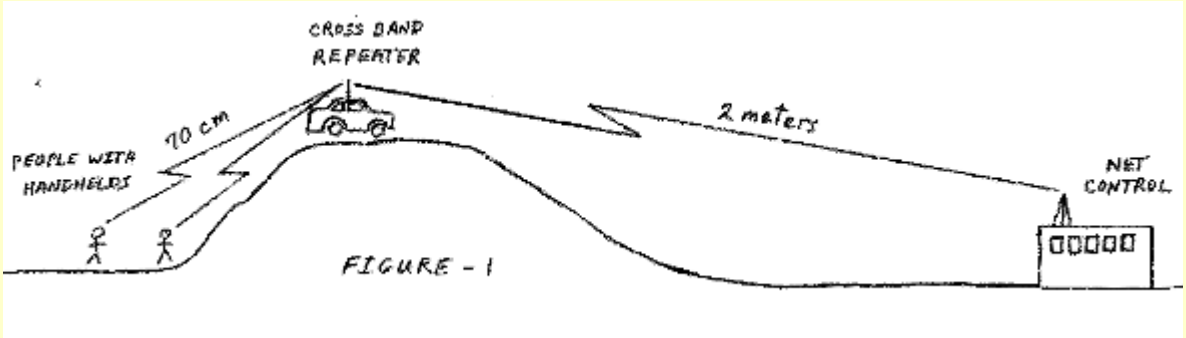
should be a fun day and an excellent opportunity to learn how to operate on packet radio. Those involved in ARES/RACES are encouraged to attend as we have a critical need in ARES/RACES for operators trained in packet communications. Those interested in attending should contact Greg at 805-498-0454 so that Greg will have an idea of how many will be attending. Also, anyone with packet experience that would like to help in the training is encouraged to contact Greg.

Cross Band Repeating

By Ken Larson KJ6RZ

Cross band repeating is a relatively inexpensive means for extending the range of handheld radios.

The purpose of a cross band repeater is the same as any radio repeater. It allows stations to communicate that ordinarily would not be able to do so because of the distance or terrain between them. In Figure 1, for example, the people with handheld radios on the left side of the hill are able to talk to net control by communicating through the cross band repeater located in the vehicle parked on top of the hill. If the cross band repeater were not present, the folks with the handhelds could not talk to net control because the hill would block their signals.



A cross band repeater is similar in function to a standard repeater in that it contains a receiver and a transmitter that are linked together, but which operate on different frequencies. Voice signals that the repeater receives on its input frequency are automatically retransmitted on its output frequency. A repeater is a relay station.

A cross band repeater is implemented using a dual band 2 meter - 70 cm radio. The repeater receives signals on one amateur radio band (for example 70 cm) and retransmits those signals on a second amateur band (2 meters). Thus the name cross band repeater.

A cross band repeater is far less expensive than a conventional repeater. A conventional repeater can cost several thousand dollars. It is expensive because it operates on a single frequency band, 2 meters for example. As a result, its transmit and receive frequencies are only separated by a few hundred KHz. (600 KHz. on 2 meters). This close frequency spacing requires the receive section of the repeater to have extremely narrow filters that are quite expensive. The narrow filters are needed so that the repeater can continue to receive on its input frequency (for example 147.285 MHz) while transmitting on its output frequency (147.885 MHz). If it were not for these expensive filters, the repeater's receive section would be immediately overloaded by its own transmitter, as soon as it began to transmit. Once overloading

occurs, the repeater can no longer receive input signals and thus ceases to operate as a relay station.

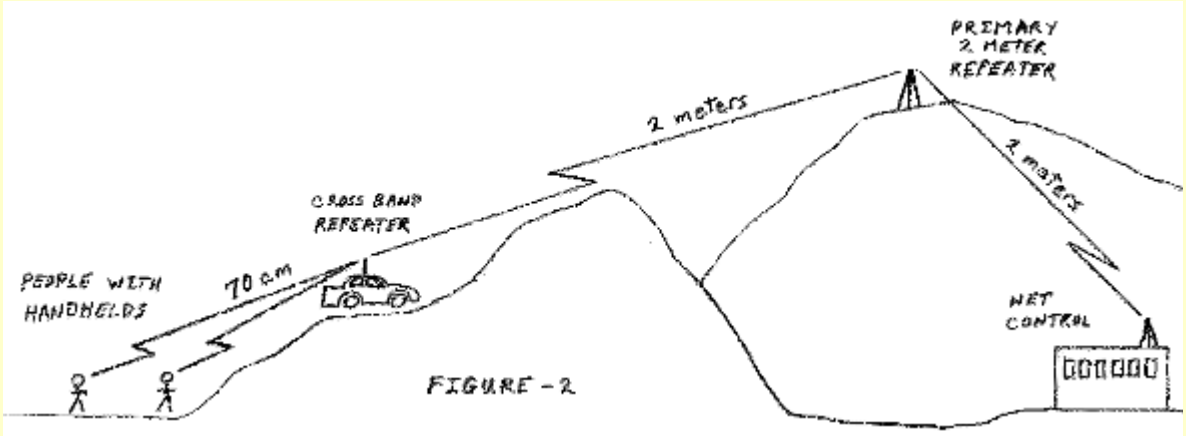
The cost of a repeater drops significantly if its input and output frequencies are separated by several hundred MHz instead of a few hundred KHz.. With a wide spacing between the input and output frequencies, expensive input filters are no longer required. The frequency spacing between the 2 meter (147 MHz) amateur radio band and the 70 cm (447 MHz) band is 300 MHz. With this wide spacing, the standard low cost input filters on a 70 cm radio will prevent the receive section of the radio from being overloaded by a close 2 meter transmitter and visa versa. Manufacturers of dual band 2 meter - 70 cm mobile transceivers quickly picked up on this fact and added cross band repeating functions to their radios. When in the cross band repeating mode, a signal received on 70 cm is retransmitted on 2 meters. Likewise, a signal received on 2 meters is retransmitted on 70 cm. Generally, however, a transceiver can only transmit on one frequency at a time. Thus if signals are received on both 2 meters and 70 cm, the signal heard first is the only one retransmitted.

As mentioned above, a cross band repeater is an effective way to expand the range of a handheld radio. The following example illustrates this point. CVARC provided radio communications support during a recent CROP Walk sponsored by Thousand Oaks area churches. The base station for the radio net was located at Nygreen Hall on the California Lutheran University (CLU) campus, the start and finish point for the walk. Two rest stops with water for the walkers were set up along the course. A CVARC radio operator was placed at each rest stop to provide communications from the rest stop back to Nygreen Hall. In addition, two mobile radio units drove along the course looking for people who needed help and also providing the rest stops with additional supplies (water and cups) as needed. Two meter simplex radio communications was used to avoid tying up the local Thousand Oaks repeaters. A handheld radio was used at Rest Stop 1 on the corner of Moorpark and Janss roads since there was not room on this street corner to set up a portable radio station and antenna. The hills between Rest Stop 1 and Nygreen Hall, combined with the handheld's low power and inefficient antenna, made radio communications between the two locations impossible. To over come this problem, a car with a dual band radio configured for cross band repeating was parked across the street from Rest Stop 1 in the McDonnalds parking lot. By using the cross band repeater, Rest Stop 1 could easily communicate with Nygreen Hall, Rest Stop 2, and the two radio equipped mobile units. The handheld at Rest Stop 1 communicated with the car on 70 cm and from the car to the 2 meter simplex net via cross band repeating.

In the more general case, shown in Figure 1, the vehicle containing the cross band repeater is parked on a hill to provide communications between net control and handheld units that can not reach net control because of distance, terrain, or both. One important observation is that people with handhelds can not only talk with net control via the cross band repeater, they can also communicate with each other. This capability is particularly usefully for Boy Scout troops, hikers, and search and rescue missions. People with dual band 2 meter - 70 cm handheld radios, capable of receiving on both bands simultaneously, can hear everyone on the net. Anyone anywhere on the net transmitting on 2 meters will be picked up by the cross band repeater and retransmitted on 70 cm. A person with a dual band handheld will receive the transmission on either 2 meters, or 70 cm, or both. Likewise, someone anywhere on the net transmitting on 70 cm will be picked up by the cross band repeater and retransmitted on 2 meters. A person with a dual band handheld will receive the transmission on ether 70 cm, or 2 meters, or both. People with single band 2 meter or 70 cm radios will not have quite as good coverage. Those with single band 70 cm radios can hear everyone who is transmitting on 2 meters since everything that the cross band repeater hears on 2 meters will be retransmitted on 70 cm. However, if a handheld person transmits on 70 cm, the cross band repeater will retransmit on 2 meters. Others with only 70 cm capability of course can not hear the 2 meter transmission. They will hear the 70 cm transmission only if they are in line of site with the person transmitting on 70 cm. A similar situation occurs if single band 2 meter handheld radios are used. In this case, the 2 meter handheld people can hear, via the cross band repeater, everything that is transmitted on 70 cm and those 2 meter transmissions which are in their line of sight. Obviously, the best situation is to use dual band handheld radios since people with th ese radios can hear everything that is transmitted on

the net.

Cross band repeating works best in simplex networks. Cross band repeating can be using on a standard repeater network, as shown in Figure 2, however, if this is done, more discipline is required by those operating on the net. The problem is that the cross band repeater will not switch into the 70 cm receive mode until after the carrier of the main 2 meter repeater has dropped. This makes the turn around times on the net (the time between the last person speaking and the next person beginning) abnormally long. If people on the main 2 meter net begin talking before the repeater carrier has dropped, the people with 70 cm handheld radios will rarely get a chance to speak. To provide for fairness on the net, anyone wishing to speak must wait until the repeater carrier has dropped before beginning to talk.



There is a mode of cross band repeating that can allow people with dual band handhelds to avoid the long turn around delay. This mode is called (by Kenwood) locked-band repeating. This mode can be used when those with handhelds can hear the primary repeater (on 2 meters for example), but the low power and inefficient antennas of their handhelds prevent them from reaching the primary repeater directly. I experienced this situation at the Moorpark rest stop during last year's Cruisin Conejo Bike ride. The Bozo 2 meter repeater was used for communications supporting the bike ride. I could hear the Bozo repeater on my handheld, but the transmit power of my handheld was not adequate to reach Bozo. In the locked-band mode, the cross band repeater receives only on 70 cm and transmits only on 2 meters (or visa versa). Thus anything that a handheld transmits on 70 cm is immediately retransmitted by the locked-band repeater on 2 meters. The result is that the handheld sounds to everyone as if it were actually operating on 2 meters. There is no unusual turn around delay with locked-band repeating. However, nothing is free. The problem with this mode occurs at the handheld. As the person with the handheld speaks, he hears his voice, slightly delayed, being transmitted by the 2 meter repeater. This is very annoying. I solved this problem by using a hand mic/speaker unit plugged into my handheld. Whenever I push the mic push to talk key, the speaker is cut off so that I do not hear my voice repeated by the 2 meter repeater. This arrangement works very well.

One final note. As with standard repeaters, cross band repeaters should be set up with a receive CTCSS tone on the frequency used by the handhelds. This should be done so that other stations on nearby frequencies do not inadvertently trigger the cross band repeater. This is important when the cross band repeater is working into a larger standard repeater net, particularly if it is a controlled net. Most dual band radios with cross band repeater capability support the standard CTCSS tones on the receive side of the radio as well as on transmit.

Event Calendar

Date	Event	Comments
Jan. 9	CVARC Meeting	Care and feeding of batteries
Feb. 4	CVARC Radio Class	CVARC amatuer radio class begins
Feb. 8	On foot fox hunt	On foot transmitter hunt in Santa Barbara
Feb. 9	CVARC VE Session	License exams given at sheriff station
Feb. 13	Student Radio Class	Technician class for students
Feb. 13	CVARC Meeting	Old Time Ham Radio
Feb. 20-23	Coyote 4 Play	Communications Support
Feb. 24	ARES/RACES Training	ARES/RACES Training class at sherrif's station
March 9	CLU MS Walk	CROP Walk
March 12-14	IWCE	North America's largest wireless technology show
March 13	CVARC Meeting	Radio Direction Finding
March 22	Arbor Earth Day	Civic Arts Plaza from 11 AM to 4 PM
April 6	Westlake Street Fair	Fair is open from 10 AM to 5 PM
April 6	Simi Valley MS Walk	Volunteers Welcome
April 10	CVARC Meeting	General Meeting
April 12-13	Baker to Vegas Run	Supporting Ventura County Sheriff Dept.
April 13	CVARC VE Session	License exams given at sheriff station
May 3	ARES/RACES Packet	Packet workshop at East County Sheriff Station
May 10	Cruisin Conejo Bike Ride	A major CVARC event supporting Conejo Valley Cyclist

May 17	Sea To Summit Bike Ride	Major Ventura County ARES/RACES event
June 8	CVARC VE Session	License exams given at sheriff station
June 28-29	Field Day	CVARC annual field day event, you don't want to miss it!
July 3	Moorpark Fireworks	Comm. support for Moorpark's 4th of July Fireworks
Aug 10	CVARC VE Session	License exams given at sheriff station
Sept	Country Days	Fun event supporting Moorpark Country Days Parade
Oct	SET	Simulated Emergency Test
Oct 12	CVARC VE Session	License exams given at sheriff station
Nov	State Hospital Drill	A very important annual emergency communications drill
Dec 13	Camarillo Parade	Big annual event for Ventura County ARES
Dec 14	CVARC VE Session	License exams given at sheriff station

Radio Amateur Civil Emergency Service

Ventura County Area 2 R.A.C.E.S. members are encouraged to check in every Tuesday night at 7:00 pm on the Area 2 Check-in Net. Specific ARES/RACES times and frequencies are as follows:

ARES/RACES Times And Frequencies

Area	**Time**	**Mode**	**Frequency**	**Pl**	**Repeater**
County	7:30-8 pm	Voice	146.880 -	127.3	WA6ZTT
County	7:30-8 pm	Voice	224.020 -	127.3	WB6ZTR
County	Before 6:30 pm	Packet	145.710	No pl	Hospital Net
County	RACES Simplex	Voice	147.570	No pl	____
Area 1	7:00-7:30 pm	Voice	147.930 -	127.3	WB6WEY

Area 2	**7:00-7:30 pm**	**Voice**	**147.885 -**	**127.3**	**N6JMI**
Area 2	**Simplex**	**Voice**	**147.555**	**No pl**	**___**
Area 2	**Backup Repeater**	**Voice**	**146.850 -**	**94.8**	**K6AER**
Area 2	**Amgen Repeater**	**Voice**	**449.440 -**	**131.8**	**KE6SWS**
Area 3	7:15-7:30 pm	Voice	147.150 +	127.3	WB6ZTQ
Area 4	7:15-7:30 pm	Voice	146.970 -	127.3	WB6YQN
Area 5	7:00-7:30 pm	Voice	145.400 -	No pl	N6FL
Area 6	7:00-7:30 pm	Voice	147.975 -	127.3	N6AHI
Area 7	7:00-7:30 pm	Voice	146.985 -	127.3	WB6ZTX
Area 8	7:00-7:30 pm	Voice	145.280 -	100	WB2WIK
6 Meter	6:45-7:00 pm	Voice	052.980 -	082.5	K6SMR

The Net Controller ✗s script for the Area 2 weekly RACES check-in net is on the CVARC website, in printable form. Every member is encouraged to periodically serve as net controller. RACES members should remember that their RACES card is issued for only two years. When your card is due to expire call Jackie at the Office of Emergency Services in Ventura for an appointment to renew your card. Call (805) 654-2551 or toll free from the east half of the county at (800) 660-5474. For packet, call coordinator Dan Dicke KE6NYT (805) 983-1401. To register for Red Cross Disaster Services Classes, call (805) 339-2234 ext 0 Ventura County ARES/RACES web site: http://home1.gte.net/res19999/

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ARRL VUCC (VHF/UHF Century Club) Certification:	Peter Heins, N6ZE	(805)496-1315 n6ze@aol.com

The Conejo Valley Amateur Radio Club is an ARRL affiliated Special Service Club. Meetings are held on the second Thursday of each month, unless otherwise noted. Meeting location is at the Elks Lodge, 158 Conejo School Rd., Thousand Oaks, CA. Meetings start at 7:30 pm. with a pre-meeting social and technical assistance session, for those who are interested at 7:15 pm. Meetings are open to the public, and members are encouraged to bring their friends.

Return to CVARC

Editors: Ken and Paula Larson