



January 2016

QUA CVARC

A Newsletter for the Conejo Valley Amateur Radio Club

President's Message

Andy Ludlum-KI6NON

Contents

<u>SUBJECT</u>	<u>PAGE</u>
President's Message	1- 2
Club Meeting	1
Members Have Done	3
Members Are Doing	3
Members Are Planning (Calendar)	4
Newbie Net, How Did it Start?	4
Winter Mini Field Day	4
Other Announcements	5
Sale or Want	6
Editor's Reminder	6
Icom IC-745 Restored	7-10
Receivers: IF and Conversion	11
General CVARC Information	12

It's 2016! Happy New Year to all CVARC members and friends. Thank you for electing me and I look forward to serving you as club President this year.

I especially want to welcome new club members and encourage you to get involved in some of the many CVARC activities. We have opportunities to build your operating skills and confidence, educational programs, public service projects and just plain fun with the hobby.

I want to thank Tim Wheeler, K6POI for his hard work as President in 2015. Tim is staying on the board as Vice President and already has some interesting ideas for speakers and programs this year.

We have several members joining (or rejoining) the board in 2016. Norm Campbell, AB6ET is the Editor of the newsletter. Norm actually took over the newsletter last November. Ben Herrera, W6JWZ, will be the Operations chair this year and has already been busy redesigning our website, <http://www.CVARC.org>. Eric Peterson, WB6PYK returns to the board this year as Secretary.

Staying on the board, some in new roles are Avi Carmi, K6AVI; Mark Horner, KK6IKX; Adrian Jarrett, K6KY; Charley Pember, KG6CLT; Joe Sprissler, AI6MW and Chris Ylagan, K6CAY.

Continued on Page 2

QUA CVARC Newsletter Editor

Norm Campbell-AB6ET
radioab6et@verizon.net

Club Meeting and Pre-Meeting Dinner, Thursday January 21

The regular club meeting is Thursday, January 21 (always the third Thursday) at the East County Sheriff's Station Community Room at 7:30 p.m. If the parking is full in front, it's OK to park in the area marked Employee Parking on the right as you turn in from the street. Talk-in coordination on Bozo repeater, 147.885 (- 127.3).

Join fellow club members and the guest speaker at the pre-meeting dinner at Toppers T.O. at Janss Rd. and Moorpark Ave. at 5 p.m. First to arrive should try to get the tables in the back room.

The guest speaker will be Ben Herrera-W6JWZ who will present an overview of the new club website and discuss other social media the club has started such as Facebook and Twitter. Ben will also talk about the Winter Field Day event.

President's Message, continued from Page 1

A special thanks for the service of the outgoing board members, Jaap de Goede, KK6LMJ; Michelle Horner, KK6RBW, Todd Kleopfer, KD6RCM and Mike Slate, N6TEA.

Every year, usually around board election time, there are pleas for you to become more involved with CVARC. I've heard several of you say you might be willing to be more involved if you had a better idea of exactly what the board is doing. I promise to spend a few minutes at every meeting updating you on the issues and programs being discussed by the board. In addition, I will publish the board meeting agendas as well as the minutes on CVARC.org. Any member is welcome to attend the board meetings and I encourage you to comment on the issues you care about. For instance, we should take a look at the club's dues structure. After eliminating the major expense of mailing out the newsletter it may be time to consider reducing the dues. Or we can keep them unchanged and apply some of the funds towards programs of interest to the members.

The CVARC Holiday party returned after a year off last December with a new look and a new location. I think the party was enjoyed by all who attended, though I'd love to hear your feedback as it is never too early to start planning the 2016 party! Please join me in thanking Michelle and Mark Horner, KK6RBW/KK6IKX for their hard in work in putting on a great event.

The club's education program is already underway. Zak Cohen, N6PK and Tim Wheeler, K6POI, have started a five week course for Technicians looking to upgrade to a General Class license. They are also offering three, one-day clinics for anyone wanting to learn more about using Packet and FLDigi. By the time you read this, there will be one more clinic session available on Saturday, January 23rd. Email Zak at n6pk@arrl.net if you are interested.

You'll hear more about this at the January 21st meeting, but planning is already underway for a Winter Field Day on Saturday, January 30th at Thousand Oaks Community Park.

Whatever your interests, I encourage you to share your thoughts with me or any member of the board. The biggest benefit of CVARC is having an opportunity to share knowledge and experiences with people like you who enjoy amateur radio.

73,

Andy
KI6NON
ki6non@arrl.net

Do you know the...

- >Band limits for your class license?***
- >Band plan for certain bands?***
- >Power limits for certain bands?***
- >Mode restrictions or accepted practices for certain bands?***

Members Have Done

There was no regular club meeting in December. Instead, the club held its annual Holiday Party, this time at the Best Western Posada Royale Hotel in Simi Valley, as arranged by Michelle-KK6RBW and Mark-KK6IKX, the club social directors. The accommodations were excellent, the food selection was superb, and the 30-40 attendees were well served.

There was a brief threat of rain, but that did not materialize. The ladies gowns and hairdos remained in good form and the gentlemen's tuxedos were unwrinkled. A number of those in attendance that night were guests of club members and the buzz around the room from them was that the evening was quite nice and, "Those hams are friendly."

Thank you Mark and Michelle for another fabulous job well done!



Holiday Party, 2015

Members Are Doing

Sunday nights, Newbie Net, 7 p.m., Bozo repeater 147.885 (-127.3), all are welcome especially newer hams. Want to be net control? The procedure will be provided. Contact Todd-KD6RCM, kd6rcm@arrl.net.

Tuesday nights, ARES/RACES net, 7 p.m., Bozo repeater.

Wednesday nights, HF Roundtable, 7 p.m., 21.333 ±, USB, all are welcome.

Second Thursday, Board meeting, 7:30 p.m., Westlake Village City Hall.

Third Thursday, regular club meeting, 7:30 p.m., East County Sheriff's Station.

Send me a note if you know a recurring activity that should be listed here. -Ed.

Members Are Planning (Calendar)

Jan 09 +	General Class Training starts	Multiple Saturdays. See announcement. Zak-N6PK, n6pk@arrl.net
Jan 17-23	Quartzfest, Quartzsite, AZ	Annual ham radio RV campout. http://quartzfest.org/
Jan 21	CVARC Club Meeting	East County Sheriff's Station, 7:30 p.m. Dinner first at Toppers, 5 p.m.
Jan 21-24	Linux Expo	Pasadena, see announcement.
Jan 30	Winter Mini Field Day	Park north of T.O. High School. Ben-W6JWZ, see announcement.
Jan 30	Bandit Run	Corriganville, Simi Valley. Contact Steve King at ke6wez@arrl.net
Jan 30	VHF Contest	Details at http://www.arrl.org/january-vhf
Feb 11	CVARC Board Meeting	Westlake Village City Hall, 7:30 p.m.
Feb 14	Radio License VE Testing	E. Co. Sheriff's Station, 8:30 a.m. Jeff, AA6JR@sbcglobal.net
Feb 18	CVARC Club Meeting	East County Sheriff's Station, 7:30 p.m.

Go to the <http://www.cvarc.org> calendar tab for additional events, links, contact persons, locations and times.

Newbie Net, How Did it Start?

If you want to know about the Newbie Net and how it started you have to ask Diane-KJ6JEJ.

When Diane became a ham a few years ago she thought there must be a way to meet new hams and to encourage them to get on the air and use their radios. She was involved with the club as Social Director and decided to make something happen.

She coordinated a time slot on the 2 meter Bozo repeater, enlisted the help of a few advisors, and got on the air. We now know that Sunday nights at 7 p.m. is Newbie Net time.

Diane ran the net as Net Control until it was well established. Now there is a rotating group of new and experienced hams filling in as Net Control.

Listen in, participate, try Net Control. You will find a friendly and helpful group of regulars and new hams checking in, sharing information, and using their radios. And it all started with Diane. Look for a smiling face at a club meeting, it's probably her.

Winter Mini Field Day, Saturday, January 30

Operations Coordinator, Ben-W6JWZ, is organizing Winter Mini Field Day on Saturday January 30, 9 am. to 4 p.m. The location is the same as previous mini events at the park north of Thousand Oaks High School under the covered picnic area. Electric power should be available.

This is a low key activity designed to get out, test the radios, antennas, and related equipment while making contacts and presenting a positive image of ham radio to the community.

The club will provide coffee and bagels in the morning and order out for pizza later.

See Ben or email him to discuss your ideas and participation in this event, w6jwz@outlook.com

CVARC Website — Up and Operational

Ben-W6JWZ and Stu-AG6AG announce the new club website at www.CVARC.org.

Most of the information previously available has been brought forward. It's still a work in progress with a brand new look, so check it out and tell them what you think. Clear your internet browser, cache, and cookies and only use the link above to avoid being directed to the old website.

All the previous newsletters are there as well as a new section for the Board of Directors agenda and minutes.

Ben-W6JWZ will be the guest speaker at the January 21st meeting and will discuss the new website and other social media services where members can stay current with each other and the club.

General Class License Training Underway

ZaK-N6PK and Tim-K6POI are continuing to present the General Class license training in preparation for the next VE testing session.

The class is held in the Community Room of the East County Sheriff's Station. Training began January 09 and continues on subsequent Saturdays: January 16, 23, 30, and February 6, from 9 a.m. to 1 p.m. Training ends the weekend before the VE testing session on February 14.

Zak reports that the classes have produced a 100% pass rate by those who have taken the FCC test soon after training.

In addition, Zak and Tim will present digital training for NBEMS (Narrow Band Emergency Messaging System) and FLDigi (computer software for digital) following the General Class training on January 16 and 23 from 1 p.m. to 3 p.m.

Follow up with ZaK-N6PK, n6pk@arrl.net for more information.

Guest Speakers for 2016

Tim-K6POI has moved from club President to Vice President and is working on presenting interesting and informative guest speakers at the monthly meetings.

Tell him your ideas about what you want, who you want, or if you want to be a guest speaker. The club has many talented members who have years of experience to share, or know of persons with information to share.

See Tim or email him with your thoughts, k6poi@yahoo.com.

Acronyms and Abbreviations

The next time you hear someone on the air say, "I need an 807 to get away from that lid who causes more QRM than a DX pileup," you may want to familiarize yourself with the website listed below to understand what he is saying.

Ham radio has developed its own shortcut language that dates back from the earliest telegraph and radio days. Some abbreviations are easy enough to understand, others require a bit of familiarization with the acronyms. Follow the link to common acronyms and abbreviations used in general communications and some more specialized used in CW.

<http://www.ac6v.com/jargon.htm>

For a complete reference to a world of resources, check the index page of the AC6V website at www.ac6v.com.

Change Your Call Sign

It's easier than ever to change your call sign within the guidelines of the FCC rules for your class of license. The fee structure has been eliminated and it only takes following the modification procedure to request a new call sign.

The link listed below to the Ham Radio School (<http://www.hamradioschool.com/>) explains what to do. In addition, you will find many other interesting things on their website.

<http://www.hamradioschool.com/vanity-call-sign/>

Linux Expo, Pasadena, January 21-24

Stu-AG6AG announces the 14th annual Linux Expo in Pasadena. He has arranged a 50% discount for those wishing to attend. Use the five letter promo code "CVARC" when registering.

The talk-in frequency is 146.550 simplex and the special event call sign is N6S.

Go to www.socallinuxexpo.org for more information.

Wanted:

Looking for a clean, working, complete, Collins general coverage HF receiver, model 51J-4. (Locally preferred.)

Cancel the want from last month looking for a Navy Flameproof key. One has been located.

Norm-AB6ET
radioab6et@verizon.net



Newsletter Editor's Reminder

In order to save costs and confusion, and to provide a wider distribution, the CVARC QUA newsletter will only be available on the club website. A reminder link will be sent to the CVARC Yahoo discussion group when the newsletter is published, usually the weekend after the Board of Directors meeting and before the regular club meeting.

Direct access to newsletters is available on the website under the Resources tab which will take you to all the newsletters that are current and archived.

Information, stories, projects, and club member news or events is welcomed. Send me what you have and I'll print it. If you need help with a story I'll work on it with you.

Norm-AB6ET, radioab6et@verizon.net

The November 2015 CVARC QUA listed a number of radios and other equipment for sale by Adrian-K6KY. Here is the story about one of them. -Ed.

Radio Resurrection: Reviving A Rusty Icom IC-745

Ben Kuo, KK6FUT

In a world of disposable electronics (ever tried to change an iPad battery?), one of amateur radio's greatest pleasures is the ability to use equipment which was designed and built 10-, 20-, 30-, or even 50 years ago– and put it on the air-waves, and still have it communicate with the latest and greatest equipment built this year.

To that end, I was fortunate to see a rusty, corroded HF rig being sold recently by fellow club member Adrian (K6KY), an old Icom IC-745. The Icom IC-745 is a 1980's era, all band HF radio, which supports 160m to 10m, including WARC bands. This particular Icom appeared to have been covered with fertilizer, wrapped in plastic, and stored in a garage for many years – resulting in severe rusting and corrosion both inside and outside the case. The radio – which fortunately, still powered on –

failed to receive or transmit, in addition to having serious cosmetic issues. Plus, the corrosion on the outside of the radio included the screws which fastened the case to the chassis, so we were unable to open the box and take a look at the innards. It's unclear how long the radio had been in this sorry state, but I was happy to take the radio off the hands of K6KY, and see what I could do about restoring it .



Before: Icom IC-745 with major corrosion

The Restoration Process

The first step in getting the Icom IC-745 back up and running was figuring out what was going on inside. Which was a lot harder than you might imagine. After some soaking with WD-40 on the rusted screws, I was able to remove a few, but not all, of the screws. There were at least 6 screws which were completely, totally corroded, and in desperation, I drilled out those screws with a drill and appropriate bit. The result was not pretty: the next picture shows the major, major corrosion on the internal chassis.

Things were not looking so good. Given the extreme amount of corrosion, it was clear that cleaning up the corrosion – and any boards – was a high priority. In this process, I powered up the radio, and discovered one loose connection, and found that only 20 meters SSB was working – and only intermittently.

IC-745 showing internal corrosion.



What Do YOU Mean, RAM?

The first priority, though, turned out to be the internal memory of the Icom IC-745. The IC-745 – like many, 1980's Icom radios – was designed with on-board RAM (Random Access Memory), which, like all RAM, is volatile. That means – if power is removed, the RAM is wiped out. (Yes, I repeat, the radio's RAM is wiped out.) On these Icoms, there is a Lithium battery installed on the motherboard, which lasts from 5 to 10 years – maybe more. If that Lithium battery loses its charge, the entire radio becomes useless—essentially, it turns into a brick (it loses its brains!)! The traditional fix has been to send the radio (or the memory board) back to Icom – something which Icom no longer supports and has not for years! Fortunately, there are two options if your memory has not been wiped – you can replace or supplement that Lithium battery, and you can buy one of several, third party ROM boards (read only memory) which replace Icom's terrible 1980's RAM design with something which will never run out of Lithium battery! My first order of business was soldering another Lithium battery in place, to ensure that the memory here would not run down. Many, many, HF Icom radios from the 1980's – which you might think are “broken” – just need to have this RAM fixed.

Sandpaper, Windex, and Vinegar

The next step was to tackle the corrosion. The first order of business was completely (!!!) disassembling the Icom, to clean off any fertilizer or corrosive agents on the boards. Fortunately, the corrosion appeared to have bypassed the circuit boards, but I still took a picture of all the connectors and boards, and removed all the boards. For all the boards – except the one with the Lithium battery (!), I then thoroughly scrubbed them with Windex – which is a well known, safe way to clean circuit boards. I then blew dry all the boards and let them sit for a day.

In the meantime, the chassis was disassembled, and all the rusty metal parts (many!) sanded and brushed with a metal brush, and soaked in vinegar (repeated multiple times) to remove all the rust. This took forever, and was messy – and the case and the chassis both had major, major pitting. After the rust removal (which took several days), I then attempted to re-paint the chassis cover using what looked to be a matching green paint color.

Big mistake. It turned out, that pitting showed up on the top cover in a severe way after the painting (and to boot, the paint did not match) – back to the sandpaper. I ended up doing a lot more sanding, and more sanding, and more sanding, until the pitting was removed.

Trying the painting again – no more pitting! I ended up using two kinds of paint (a base coat of dark green and a mist of a metallic “sage” color) to more or less match the original Icom paint tone. In addition, using masking tape, I masked off all of the intact screen printing on the front, and painted the remainder of the front case metallic black, which covered up most of the corrosion damage on the front cover. Cleaning off the corrosion did result in the loss of some of those letters, however.

Putting It All Back Together

Next, it was reassembling the chassis, putting all the boards back into the chassis, and getting it up and working. This was a major puzzle, with the pieces being all of the boards (now disconnected), having to put them all back in the right place. After a few false moves (and references to those photos I took, plus the service manual) – it was finally all back together and working – but not without a lot of grief due to crossed wires. Advice: take more pictures if you intend to do this!

Does It Work?

After all that, and working out some crossed connections – the radio sort of came back to life. Sort of, in that random bands would receive, but then stop receiving at random. Hmm. A thorough cleaning of the band pass filter board resulted in slightly better band reception – but again, intermittent. A lot of research and investigation, and it turns out this IC-745 uses phased lock loop (PLL) technology to synthesize the frequency—and if several tuning capacitors are not within spec, you will randomly lose bands. Adjusting these capacitors resulted in all of the bands coming to life!

Not Quite There

However, on the air testing (with Norm, AB6ET) – found that, despite all the work, the radio was not behaving properly on transmit. There were several issues on phone and CW. On phone, there was a lot of distortion (RF) in the signal, and the frequency appeared to move. In CW, it was worse—the transmitted signal appeared to have RF in the signal. Finally, we figured out that physical movement (from a speaker, or even just tapping on the case) – was causing the PLL to unlock and drift, due to a known problem with the Icom IC-745's cheap, plastic variable capacitors – instead of better, ceramics. Fast forward several weeks (and searching for suitable replacement ceramic capacitors), a blow torch (to remove the soldered covers to the PLL!), and those capacitors were replaced—which fixed most of the issues. Additional RF distortion was traced to too high of gain on the mic, which was also adjusted.

Finally, On The Air (and in the field)!

After all of that work, the reward was taking the Icom IC-745 and putting it to work! Here are a couple of in-the-field deployments (running solar powered battery).



Off Mulholland Highway in the Santa Monica Mountains:
(contact with Rarotonga, E5OJ on 20 watts, Hawaii NH6I
on 5 watts, and Chile CE1OEB on 80 watts).

Mulholland Highway

Deployed at the beach, at Sycamore Cove (contacts to Van-
couver, Canada VE7MTW on 5 watts, and Yorba Linda on 5
watts CW).



Sycamore Cove



Before: The Project



After: The (Almost Fully) Restored IC-745

Most mornings on 40 meters around 7155 an interesting and eclectic group of hams meet and chat. I heard some talk one morning that sent me to their website where I discovered among other things, this explanation about receivers. Ken O'Neill-W6BQZ has given permission to re-print it here. Visit the 7155 Group website at: <http://group7155.com/>. Thank you, Ken. -Ed.

Receivers: Intermediate Frequency (IF), Conversion, and Band Scope

The IF and the Band Scope

Courtesy from Dave's Junk Shop, KB7JS

IF: The IF is simply the conversion frequency. The input signal is mixed with another signal. Mixing is simply a process where two different frequencies are passed through the same amplifier stage. In most receivers, this actually happens two, three, even four time (double, triple, quad conversion). The output of each IF amplifier is a broadband signal that contains both input signals, as well as the sum and product of their frequencies. It's like making soup, mix two things together, and get four separate flavors.

After the amplifier, a filter selects the desired mix result, usually the product. The idea is to obtain an output that always results in the same frequency to facilitate further filtering and processing of the input RF noise.

This is where it gets a little confusing, but the reason for converting all frequencies into a single frequency is to simplify the remaining receiver circuits so they only have to be designed to interpret one frequency band out of the billions of possibilities. Keep in mind that the VFO on your radio only spans a certain segment of a band, typically 500 kHz, so the output of the IF amp is usually passed through a 500 kHz filter, so that the output then contains all of the signals within +/- 250 kHz of the IF frequency. That is why your band scope driven from the IF signal can display all the signals within a certain range. The HSDR software needs to know what frequency band you are listening to, and then simply does the math to convert the display image of the IF frequency back to the actual signal frequency. This is computer software massaging the data to make it human readable by interpreting the IF content.

CONVERSION: There are a number of reasons for the different stages of conversion, but the driving force is selectivity and noise rejection. Converting the original signal to a different frequency also allows it to be cleansed of unwanted noise and heterodyne byproducts, some of which occur within the mixing process itself. This was much less of a problem in the vacuum tube days since the inherent high impedance of tubes (all that open space in a vacuum between elements) meant that there was very little noise generation. That is why older tube radios used only single or double conversion designs. Modern solid state radios with all their digital components self-generate an enormous amount of noise, so the receiver design has to separate all of that from the fundamental HF signal that you want to hear. Most solid state receivers today will first convert the input signal to a much higher frequency out of the bandwidth of the ham bands, aka "Up Conversion", typically somewhere in the area of 45-75 MHz. Then, the signal is converted back down to a more reasonable value for filtering, typically 10 MHz, where it is mixed with the output of the VFO to provide selectivity of the desired center frequency. Finally, the last stage of conversion will take the input down to a frequency that is easily converted to audio, and the most common frequency for this is 455 kHz.

The FT-1200 and FT-1000 are classic examples of multi-conversion of an input signal. The FT-1000 is a Quad conversion receiver, where the signal is converted to 73.62 MHz, 8.215 MHz, 455 KHz, and 100 KHz. The FT-1200 is a triple conversion design, with the first IF at 40.455 MHz. The 1st IF frequency is typically chosen to attack the self-generated noise problem. In the case of the 1200, they were focused on using DSP to filter noise at a later stage, and selected the 40 MHz range specifically because it was out of the bandwidth of the DSP and would not interfere.

General Information about the Conejo Valley Amateur Radio Club, CVARC

CVARC is a Special Service Club (SSC)

The Conejo Valley Amateur Radio Club is an ARRL affiliated Special Service Club. To be recognized by the ARRL as a Special Service Club, the club must regularly show that it is actively involved in certain areas, including: New Ham Development and Training, Public Relations, Emergency Communications, Technical Advancement, and Operating Activities.

Meetings and Location

Meetings are held on the third Thursday of every month, except December. The meeting location is the Community Room at the East County Sheriff Station, 2101 E. Olsen Road, Thousand Oaks. Meetings start at 7:30 p.m. with a pre-meeting social and technical assistance session beforehand or as announced. Meetings are open to the public, and members are encouraged to bring friends.

Visitors are always welcome at our monthly meetings, and we do not pressure newcomers to join. If, however, you would like to support the club and its activities by becoming a member then we will be pleased to have you join.

CVARC Membership Rates

The simplest way to join (or to renew) is to give a check bearing your name and address to the Treasurer in person or by mail. Make the check payable to "CVARC" and please put your call sign and email address on the memo line.

Current annual rates are: Regular Membership \$25. Family Membership \$30. Special discounts are available for new members (licensed in the last 12 months) \$10. Full-time Students \$10. Regular members renewing for multiple years \$20/year. Family members renewing for multiple years \$25/year. An application to join is found on the club website.

Name, call sign, or address changes may be e-mailed to the Treasurer.

QUA CVARC

"QUA CVARC" is the club newsletter published monthly, not later than the Monday preceding the CVARC club meeting, by the Conejo Valley Amateur Radio Club, AA6CV, PO Box 2093, Thousand Oaks, CA 91358-2093.

Opinions expressed in articles in this newsletter are those of the authors and do not necessarily represent the views of the club, its board, or its members.

Tax Deductible Donations to CVARC

CVARC is an IRS-certified 501(c)3 charitable organization and donations are deductible pursuant to IRS rules. If you have working radio equipment or ancillary equipment that you can and wish to donate to the club, please contact one of the board members and we will be happy to talk to you about the process to help fund and grow CVARC.

We cannot accept certain donations, and have to place some restrictions on them such as, no hazardous materials, nothing we could not sell, etc. If you are interested in donating, contact any board member at a meeting or via email.

Many companies will either grant or match employee's gifts to non-profit organizations like CVARC. Please determine if your company is among these and contact a board member for more details.

For the current list of CVARC officers together with their contact information, please visit the club's web-site at <http://www.cvarc.org>. You may view past newsletters on the website.