



YAVAPAI SIGNAL



The Yavapai Amateur Radio Club • Prescott, Arizona • DM-34 • Volume 26 - No. 4 • April 2011

From the President's Desk...



Hello again!

I wanted to remind our operators of a number of events on the YARC calendar that are coming up. The three-day Whiskey Off-Road Bicycle Event will run Friday, April 29th

through Sunday, May 1st. The most recent information I have on that indicates that the event is fully staffed but additional operators would be welcome to double up some positions and work in teams. Additionally, the 33rd running of the Whiskey Row Marathon is scheduled for Saturday, May 14. Again, the information I have indicates operators are still needed for that event. Operators interested in participating in Special Events Communications should contact Lloyd (WA6ZZJ). Thank you Lloyd for your wonderful power-point presentation of Special Events Communications last month!

At the meeting this month, those of you that signed up will have an opportunity to build a 2-meter J-pole antenna during the presentation time. Pete (K6VVR) and Jim (WB7UZV) have been pre-fabricating some of the parts to facilitate construction and getting that organized. Don't forget to bring your materials fees to the meeting if you're one of the folks who signed up.

Creighton, AD7YR

Upcoming Events

- **March 29, 2011** - Gunsite Special Event Station.
- **April 16, 2011** - Hamfest at DeVry University, Phx.
- **April 29, 30 & May 1, 2011** -Whiskey Off Road Mountain Bike event.
- **May 6, 2011** - VE Testing at Jeep Posse Bldg.
- **May 14, 2011** - Whiskey Row Marathon.

YARC Officers for 2011

President	Vice President
Creighton Grotbeck, AD7YR cgrotbeck@gmail.com	Jim Ball, WB7UZV wb7uzv@gmail.com
Secretary	Treasurer
George Imburgia, AD7RL ad7rl@netsecs.us	Tom Griswold, WN7E mrgriz@cableone.net
Board of Directors (includes Club Officers)	
Pete Morrison -- K6VVR	
Will Taylor -- AD7WW	
Ellis Rackoff -- KE7NAP	
Neil Vince -- K7SEN	
Newsletter Editor: Joe Oliver, AC6AA joliver@cableone.net	

Inside this issue:

Meeting Minutes.....	Page 2 & 3
April Program.....	Page 3
Treasurer's Report.....	Page 4
Hammarlund.....	Page 5
Special Event Communications.....	Page 6
VE Test Results.....	Page 7
A DXpedition to Kanton Island.....	Page 7
April Hamfest at DeVry.....	Page 8
International DX Convention - Visalia, Calif.....	Page 9
Essential ₂ clarity.....	Page 10 & 11

Membership Count:

1st Thurs. in February.....	180
Gain/Loss.....	+3
1st Thurs. in March.....	183



Welcome to the Yavapai Amateur Radio Club

The Yavapai Amateur Radio Club (YARC) is an ARRL affiliated Special Service Club. The club participates in many activities in the tri-city area by providing communications for local events, emergency communications, and promotion of the hobby throughout the community.

Membership in the YARC is open to any interested amateur or non-amateur alike. Dues are \$20.00/year (Full-time students \$15). The YARC meets at 7:00 p.m. local time on the first Thursday of every month in the Technology Room 404, at the Granite Mountain Middle School, 1800 Williamson Valley Road in Prescott. It is about ½ mile north of Iron Springs road, and all amateurs and non-amateurs as well are invited. Programs of interest are included as part of the meeting.

The weekly Net is held every Wednesday at 7:00 p.m. local time on 146.880- repeater. All amateurs are invited to participate, and visitors are always welcome.

The Yavapai County ARES/RACES Net is held on Monday nights approximately at 7:00 p.m. local time on the 145.290- repeater on Mingus Mountain. A PL of 127.3 is required.

Club Repeater

The YARC 146.880- repeater is located on the hill above Willow Creek road and requires a PL of 100.0 Hz. Our deepest gratitude to Bill Kafka, W2YAV for allowing us to acquire the original club repeater.

Minutes of March 3, 2011 Board Meeting



Meeting was called to order at 1810 hrs. by the President, AD7YR. Also in attendance:

K6VVR, AD7WW, AD7RL, WB7UZV, WN7E, and K7SEN.

Special Service Club certificate received from ARRL.

ARCA letter inviting participation in children's camps circulated.

Family membership fees where one family member is a life member clarified.

Swap column for Yavapai Signal discussed.

Dipole project progress reviewed.

IRLP options explored. Deferred to membership.

Bylaw clarification of Board review policy discussed. To be proposed at General Meeting this month, with a vote by membership next month.

Bio needed for W7YRC on QRZ.com.

Committee for Field Day needed.

Invitation for participation in Arizona's birthday activities discussed.

Procedure for getting new member packets to new members discussed.

Purchase of club hats to be discussed at General Meeting.

Need for Health and Welfare committee explored.

New website is up, with a Members Only section. Password to be distrib-

uted by email when site is ready.

General Meeting agenda discussed.

Meeting adjourned at 1853 hrs.

Minutes of March 3, 2011 General Meeting

Meeting was called to order at 1900 hrs. by the President, AD7YR. Following the Pledge of Allegiance, introductions were made.

Attendance: 64 of whom 52 signed in.

Visitors welcomed.

New members Gary, AL3L and Pete and Karen, KD5PIM were unanimously welcomed.

Minutes of the February meeting were approved as published with no dissenting.

Treasurer's report was approved as published with no dissenting.

Club stickers and patches are available from the Treasurer.

COMMITTEE REPORTS:

ARES/RACES: WA6ZZJ announced Friday, March 25th will be the date Interagency Fire and Emergency Management Group, Wildfire Exercise. Schedules for the events of April 29th through May 1st discussed. A few more operators are needed.

Classes: W7JLC has a Technician class to be held March 5th at ERAU. 9 people are signed up so far.

Shirts: K6VVR has XL club shirts on hand, please make needs known for other sizes.

Badges: WB6ODR reports a list of badges to be delivered; \$ 6.75 to order custom engraved club name badge.

Repeater: WB6ODR reports repeater working fine.

Refreshments: K6UWV has provided cookies and soft-drinks and lots of coffee. Please recycle.

Elmers: K7SEN is looking for net controls for the Wednesday night net. Feel free to check in to the net.

Nets: WB7UZV reports on 146.88 nets: Sunday slow code, 7:30 pm; club net every Wednesday 7:00 pm -- Net Control positions available for March, April and May. All please check in.

School Clubs: KB7TRE had 20 students at the last K7GMG club meeting/class. The GMMS club provided 9 students on February 14th, for Statehood Day at Sharlot Hall. 11 pizzas were consumed. "They didn't make a lot of contacts, but the kids had a ball. They were talking about it for a week afterwards." A request for an additional \$29.79 was made for the food budget, approved unanimously. A project to complete a vertical HF antenna for the club went well. Every member was on the mic at least once.

T-hunt: K6VVR reports the T-hunt will be held the Sunday following the meeting. W7JLC will be hiding the transmitter.

Food Bank: KB7TRE reminds us that any time is good to contribute to community food bank; please continue to bring non-perishable items to each meeting. Last month, the club contributed about 25lbs.

VE: AB7NK reports the next testing session will be on Saturday, March 19th at the Jeep Posse bldg. Another will be held on Friday, June 24th at 6PM (Field Day weekend).

AZWAC: AB7NK reports 15 people made the required contacts in all counties during the Arizona QSO party.

OLD BUSINESS:

A certificate of appreciation was presented to KE7DTR, for his service on the Board of Directors from 2005-2010.

A certificate from the ARRL designating YARC as a Special Service Club was displayed to the membership.

A letter of thanks from Nancy Page, for \$138 in donations to Honor Flight, which flies WWII survivors to see their monument in DC.

After being deferred for consideration by the Board of Directors at last month's meeting, the Board recommends that IRLP not be moved to the 146.88 MHz repeater. Discussion followed. W7JLC decided to surrender the equipment. A motion was made to continue discussion at next meeting. Motion denied by show of hands. A vote to host IRLP on the club's repeater was held. Motion denied by a show of hands.

NEW BUSINESS:

WB9VGJ reminds the club about the special event station will be operated on March 29th, to celebrate the 100th birthday of the M1911 .45 pistol at Gunsite.

KB7TRE requests \$50 for food at the Gunsite event. Approved unanimously.

Membership policies clarified. Membership fees more than 3 months past due will result in termination. Life Memberships are conferred to an individual. Memberships for family members of Life Members is \$10.

K6VVR reported on next month's project, building a portable dipole. Cost will be about \$10 each.

YARC hats were discussed.

A committee to send cards and greetings to ill members is needed. Interested parties should contact a Board member.

50/50: of \$54 was won by KE7DTR.

Adjourned at 1956 hrs.

Respectfully submitted,

George Imbrugia, AD7RL

YARC Secretary

APRIL PROGRAM

Pete, K6VVR
& Jim, WB7UZV,
will be hosting a
project to build a 2
meter J-pole antenna.



Those who signed up to participate are reminded to bring the project fee to the meeting.

Life's Unanswered Questions

- Why do Kamikaze pilots wear helmets?
- Why is it that no plastic bag will open from the end on your first try?
- How do those dead bugs get into those enclosed light fixtures?
- How come you never hear father-in-law jokes?
- Why do they use sterilized needles for death by lethal injection?
- The statistics on sanity is that one out of every four persons are suffering from some sort of mental illness. Think of your three best friends -- if they're okay, then it's you. ■

YAVAPAI AMATEUR RADIO CLUB

March Treasurers Report - Tom Griswold WN7E

Income

Date	Callsign	Name	Code	Check #	Paid	G. F. Amt.	Rep Fund	ARRL
03/01/11	KD7YEG	Morrow, David J.	R	1286	\$20.00	\$18.00	\$2.00	
03/01/11	KD5PIM	McGeoghegan, Peter	N F	3335	\$20.00	\$18.00	\$2.00	
03/01/11	KA5REN	McGeoghegan, Karen	N F					
03/01/11	AL3L	Taylor, Gary A.	N	10745	\$20.00	\$18.00	\$2.00	
03/01/11	KC5DKN	Marsh, John C.	R 2 yr	4245	\$40.00	\$36.00	\$4.00	
03/04/11	N5RO	Clark, Jim	R F	1158	\$20.00	\$18.00	\$2.00	
03/04/11	KE7DTY	Clark, Rose	R F					
03/04/11	K7POF	Sitterley, Robert	R F	582	\$20.00	\$18.00	\$2.00	
03/04/11	W7POF	Sitterley, Linda	R F					
03/04/11	KF6OLN	Murray, Steven	R F	3240	\$20.00	\$18.00	\$2.00	
03/04/11	KF6VUD	Murray, Lu	R F					
03/04/11	KF7MMO	Johnson, Brent	N A	cash	\$59.00	\$33.00	\$2.00	\$24.00
03/04/11	KB7HH	Garner, Jack W.	R	cash	\$20.00	\$18.00	\$2.00	
03/04/11	W6CCD	Hughes, Richard	R	cash	\$20.00	\$18.00	\$2.00	
03/04/11	WN7L	Drown, David	R	cash	\$20.00	\$18.00	\$2.00	
03/04/11	N6KZ	Zimmerman, Jim	R	cash	\$20.00	\$18.00	\$2.00	
03/04/11	K7CBK	Cunningham, Lee	R	cash	\$20.00	\$18.00	\$2.00	
03/04/11	KF7GGX	Hickman, Gary	R	cash	\$20.00	\$18.00	\$2.00	
03/04/11	AD7TG	Nelson, Eric	R F	cash	\$20.00	\$18.00	\$2.00	
03/04/11	KE7NAW	Nelson, Megan	R F					
03/04/11		fifty-fifty		cash	\$108.00	\$108.00		
03/05/11	WN7E	Griswold, Tom	R F 2 yr	3705	\$40.00	\$36.00	\$4.00	
03/05/11	K7YTI	Griswold, Gail	R F					

Income Totals

\$507.00 \$447.00 \$36.00 \$24.00

Expenses

03/02/11	(w7yrc.org)	Tiger Technologies	web hosting	1041		\$83.40		
03/03/11	K6UWV	Passell, David	refreshments	1042		\$35.01		
03/03/11	KB6TRE	Pemberton, T.	st. day refreshments	1043		\$29.52		
03/03/11	KE7DTR	Bozeat, Richard	50-50	cash		\$54.00		
03/04/11		Allegra	invoice #47333	newsletter	1044	\$28.22		
03/04/11	AC6AA	Oliver, Joe	stamps	1045		\$44.00		
03/04/11	W6CCD	Hughes, Richard	web softw	1046		\$60.00		

Total Expenses

\$334.15

Beginning Balance	\$4,523.47		
January Income	\$447.00	Dec. End Repeater Fund	\$1,238.92
		Jan. 2011 Repeater Fund	\$36.00
Sub Total	\$4,970.47	Jan. Repeater Fund Bal.	\$1,274.92
Expenses	\$334.15		
		ARRL Payments Ck # 1047	\$24.00

General Fund Balance \$4,636.32
 Net Loss/Gain \$112.85



Hammarlund

From "Boat Anchor Manufacturers", at <http://www.ominous-valve.com/ba-mfrs.html>

Hammarlund was a very old company, and something of a pioneer. It was founded in the 1920s, by Oscar Hammarlund in Manhattan. Its initial Comet Super Pro line led to the legendary SP- series of comm receivers, that was made, by the thousands, until the 1970s. Later on, Hammarlund introduced the HQ- line of receivers at a more affordable price for hobbyists. These, too, were made by the thousands, until the early 70s. Oscar Hammarlund died in 1945, and was succeeded by his son, Lloyd. In the 50s, Hammarlund began a move to North Carolina, which became complete in 1965. The company was sold to Telechrome in the late 50s, then to Giannini Scientific.

Hammarlund got into transmitters in the 50s and 60s, with its HX- series. The first ones were obviously intended as companions to the HQ- line of receivers, as the cases are quite similar. Just about all tube transmitters had turret dials for their VFOs, but Hammarlund's had a slide-rule dial more like what Hallicrafters put on its receivers. The later Hammarlund transmitters, plus the high-power, external linears, look quite a bit beefier, but they weren't big sellers and I don't know anything about them.



HAMMARLUND HQ-140X.
Less speaker. Net \$264.50.

The HQ- receivers were large, in the real boat anchor style. The HQ-140 had those ominous, gun-port-like, little holes through which you read the dials (the Super-Pro commercial/military series had these too). Later HQ- models were more generally streamlined, still large boxes, but hardly heavyweight ones, with bigger openings. The HQ-170 was ham bands only, the -180 was general coverage. These radios also had a large, strange, Telechron clock in one corner, matching the large S-meter in the center. The clock, which could turn on the radio, was optional at a cost so low that there was no excuse NOT to get it. However, you still see a lot of radios with just a dumb, empty hole plugged up with a cheesy logo. Yuk. Hams are such cheapies.



Hammarlund's top line, the Super Pro series, is the kind of thing that makes radio freaks drool. It never changed that much. It just got better. The best one is the last one, the redoubtable SP-600. Following the R-390, it's probably the receiver that defined the boat anchor scene.

Classic BA #2:
Hammarlund SP-600-JX



SP-600s were built to a spec, not a price. A standard version ran \$1000 in 50s money when \$1500 bought a car, and the -VLF model ran \$2000! Thousands of these were made, mostly for military and commercial use, sometimes with one of several different AN/FRR- or R- type designations.

Hammarlund continued selling the SP-600 until the very end. They did try to market solid state gear to hams, but it didn't sell. In the late 60s, Giannini sold the company to Electronic Assistance Corporation, which spun off assets, eventually selling all parts and stock (including the last few unsold SP-600-VLFs) to Cardwell Capacitor Corporation. The factory closed around 1972, and that was that. ■



By Lloyd, WA6ZZJ

SPECIAL EVENT COMMUNICATIONS.....

APRIL WHISKEY OFF ROAD MOUNTAIN BIKE EVENT SCHEDULE.....

Friday, April 29, 2011...

There will be a 15 Proof (miles) fun ride in the afternoon (starting time to be determined) on the same route as last year. **The 18 operator staffing has been reached, but more can still be used to double up position staffing more.**

Later in the afternoon will be a 'Fat Tire Criterium' race which is a race over a closed circuit (typically about a mile through city streets). This leads to tight groups with frequent turns, which makes the possibility for crashes more frequent than traditional road races. This event will be run on city streets near downtown Prescott. **At least 3 to 4 more operators are needed for this event due to a change in start time for the 15 proof race. These events will overlap so operators that signed on for both will only be available to participate in one of the events that day.**

Saturday, April 30, 2011...

Two races beginning in the morning. A 50 Proof starting first followed by the 25 Proof both on the same routes as last year. They are expecting 1400 +/- riders for these events. **The 24 operator staffing has been reached, but more can still be used to double up position staffing more.**

Sunday, May 1, 2011...

This is the day for the Professional Racers. There will be two groups (1 male and 1 female) and they are expecting 100 riders. This event will be run on the 50 Proof route. **At least 3 operators are still needed to staff this event.**

33rd ANNUAL WHISKEY ROW MARATHON.....

Saturday, May 14, 2011

The 33rd running of the Whiskey Row Marathon will take place. This is a long standing event for YARC to provide communications for and the YMCA looks forward to our

assistance each year. **18 to 20 operators will be needed and at least 7 to 8 operators are still needed to staff this event.**

Sign up sheets will be available at the April YARC meeting. Check your calendars and become involved in YARC Special Event Communications.

SOME RADIO NET PROTOCOL TIPS

Here is a list of tips for operating on a Radio Net.

- **Always call Net Control first** while a net is in operation. Ask permission before calling another station on the net frequency.
- **Always use ONLY your tactical call** when calling net control station (NCS), but remember to use your personal call sign when finished.
- **Don't use your personal call sign** when initiating or first responding to a call from Net Control, **but DO use it when finished.**
- **Listen to the instructions of Net Control.** They may want things done differently than what they put on this list.
- **Don't "quick-key".** Leave a pause in between when the other station un-keys and you key up.
- **Don't think out loud on the air.** Engage brain before engaging your microphone.
- **Be mindful that other radio operators are not the only ones listening** to you speak on the air. SAG Passengers and MS Staff can hear you too. Save the complaints and insults for one-on-one conversations in private.
- **Do give Rider #'s** when requesting or reporting action, to avoid duplication in reports. There may be times when multiple reports come over the radio for similar situations, but the location is slightly different. This item may vary by event, so ask Net Control for instructions first.
- **Don't give Rider Names** over the air. Respect their privacy. If names are needed, use a cell phone or other more secured method of communications other than over the ham radio.
- **Notify NCS when you are taking a break,** or will be away from the radio for a time. Be sure to let Net Control know when you return to the frequency.
- **Anticipate the needs of your Water Station, Way-point or assigned area** re: supplies or riders to be picked up. If you hear Net Control asking for specific information (like level of supplies or number of riders), start collecting that info ASAP instead of making Net Control repeat the question for you.

Active clubs are healthy clubs. In addition to building friendships and mentoring new hams, operating events are a good way to showcase Amateur Radio to the public and recruit new hams. ■

A DXpedition to Kanton Island

By Bud Semon, N7CW

I will be visiting Kanton Island in April and May, as part of a 13 member team, to activate the DX country of Central Kiribati (pronounced Kee-ree-buhss – yes, that is a weird way to say it). Kanton



Kanton Island, Central Kiribati

Island is located about 4100 miles southwest of Los Angeles or 2700 miles north of New Zealand and it is fairly close to Baker and Howland Islands, where Amelia Earhart is supposed to have disappeared (we will not be looking for her). The Republic of Kiribati is made up of 32 atolls and 1 island, spread out over 1.35 million square miles, with a population of about 98000. Kanton Island is one of those atolls.

For DX purposes, Kiribati is divided into 3 “countries” (we now call them DX entities, since many of the entities are not really countries) – Western, Central and Eastern Kiribati. Kanton Island is part of Central Kiribati and has the callsign prefix of T31. Our callsign is already issued and is T31A. There are no native hams in Central Kiribati, so the demand will be high, especially for stations very far from Kanton Island, which includes all of Europe. We expect, and are looking forward to, huge pileups of people calling us.

Our team has an international flavor – we have 9 Americans, 1 Ukrainian, 1 Spaniard, 1 Serbian and 1 Russian. We will be traveling by boat for 3 or 4 days from Samoa and will spend about 11 days operating. We will be operating all 3 major modes – CW, SSB and RTTY. We will also have a 6 Meter station set up, although there is almost no chance of working anyone at this time of year. You can read all about our plans at www.t31a.com.

I'll write more about the trip when I return. If you would like to schedule a QSO away from the pileups, check with me at the April club meeting or shoot me an email at n7cw@cableone.net. We expect to start operating on approximately April 17. I expect that Jim, N6KZ will be able to get a message to me (on the air, since we will not have Internet or phone service), so you might be able make a QSO schedule through him. ■

Need a Hand?

If you need assistance, we want to help you. If you are just starting out in ham radio, or simply have run across something that you could use a hand with... technical assistance or answers to questions about the Yavapai Amateur Radio Club, are available from knowledgeable club members.

Don't Hesitate to Ask for Help!!

CALL:

Neil Vince, K7SEN at: (928) 775-2158

Jim Ball, WB7UZV (928) 445-2997

Will Taylor, AD7WW (928) 445-1717

Need Cards Checked for ARRL Operating Awards?

Jim Zimmerman, N6KZ can check your QSL cards for DXCC, WAS, VUCC, WAC, etc.

For information contact Jim at: (928) 713-0542.

Jim's QTH is at: 778 Grapevine Lane,
Prescott, AZ 86305.

VE Test Results

By Mary Vince, AB7NK

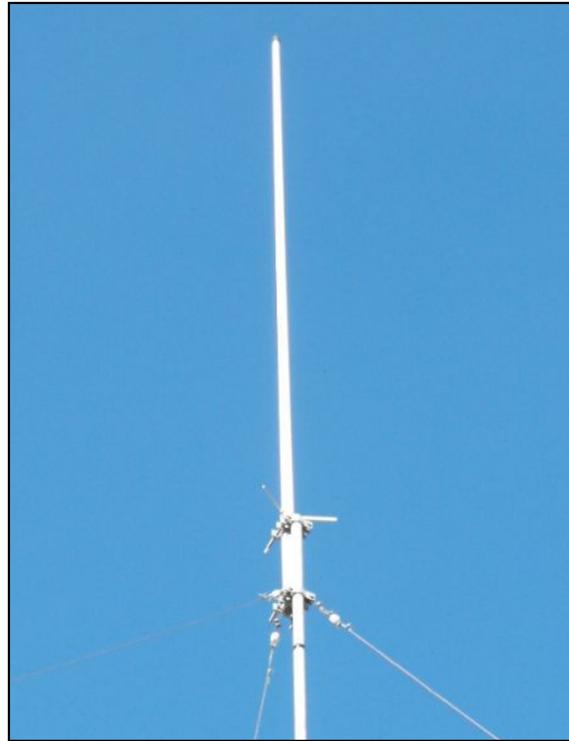
The first scheduled test session for 2011, held at the Jeep Posse Building in Prescott went extremely well. There were 10 applicants, some traveling from Flagstaff, Sedona, Camp Verde and Cottonwood. The remainder were from the tri-city area.

Results as follows: Six new Technicians, three from the March 5, 2011 Technician class, three upgraded to General and one will be returning to take the Extra. Congratulations to the new and upgraded amateurs. We were completely finished in just a little over an hour!

The next testing will be on Friday evening, May 6, 2011 at 6:00 P.M. at the Jeep Posse Building. If you would like to test or know of someone who does, please have them email ab7nk@arrl.net.

New 70 cm Repeater Listing

Bob Sitterley, K7POF's 449.250- MHz repeater has been added to the Area Repeaters listed on the back page of the Yavapai Signal. The repeater and antenna (shown in photos) are located at his QTH in Chino Valley.



April Hamfest at DeVry

April 16, 2011 a Hamfest hosted by the Amateur Radio Council of Arizona will be held at DeVry University, 2149 W Dunlap Ave, Phoenix. Admission donation is \$2.00, Tailgate spaces are \$10.00 each. Prizes, coffee, donuts and sodas will be available.

For reservation and information, contact ARCA at arca@arca-az.org.

Arizona Worked All Counties

Have you checked your logs lately?

If you've worked all fifteen Arizona counties, email az-wac@w7yrc.org for an application and rules.



Volunteers



Needed

Wednesday Evening Net

Join us on Wednesday evenings at 1900 MST on the 146.880 – pl 100Hz repeater for our weekly net.

Keep abreast of club activities and find out what other members are doing.

We need folks to volunteer to be Net control. New-comers especially are encouraged to try their hand at managing the Net. A Script is provided on the YARC website and a list of stations checking in the previous month also is available. You may provide a topic for discussion, or simply ask members to relate any of their interesting activities, if they wish to do so.

You can sign up for a week at a time or for an entire month.

Contact Neil, K7SEN at k7sen@arrl.net or call: (928) 775-2158 to volunteer.

ANNUAL INTERNATIONAL DX CONVENTION - VISALIA, CALIFORNIA



The 62nd Annual International DX Convention sponsored by the Northern California DX Club will be held at The Holiday Inn Hotel & Conference Center in Visalia, California from April 15 - 17, 2011.

If you're a DXer or interested in any aspect of Ham radio, then IDXC is the place to be. Top DX operators from around the world will be there. You'll match those familiar callsigns with new faces, and shake hands with the person you have had a schedule with for the past 10 years but never met.

Learn the secrets for big signals on top band. How to have fun adventures chasing IOTA, attend the contest forum, antenna forum, DX forum, or Contest Academy. There are seminars for everyone from the seasoned pro to the beginning DXer. Visit the Exhibit Hall, where you can talk to the people who design and use the best DX equipment. And don't forget the YL's — there is a Special Tour for them as well.

Over **\$45,000** In Major Prizes !!

Some great raffle Prizes will be given away, the likes of which top even the famed Dayton Hamvention -- transceivers from ICOM, Yaesu, Kenwood, and Flex Radio. Amplifiers from both ICOM and Alpha. Antenna-related products from SteppIR and US Towers and WaveNode. And of course the Elecraft K3 from the VP8ORK DXpedition.

Online Pre-Registration ends on Monday, April 4, 2011. After that date, you will still be able to register for the conference as a walk-in registration. However, a Late Registration fee will apply. ■



ARRL Renewals

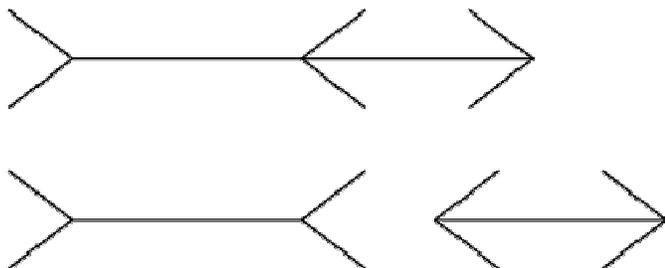
Because YARC is an ARRL Affiliated Club, we receive a commission for every new ARRL membership and renewal that is submitted to ARRL Headquarters.

- We retain a portion of the dues for each regular membership submitted to ARRL Headquarters:
- We retain \$15 for each new membership OR lapsed membership (of two years or more). A NEW MEMBER is defined as any individual who has never been a member of ARRL or any individual who has not retained a membership for two or more calendar years prior to the application submission.
- We retain \$2 for each renewal. A RENEWING MEMBER can renew at anytime, even before their current membership term expires.
- Family, Blind or 21-and-under discounted memberships are not applicable for any discount.
- May not be combined with any other promotion or special offer.

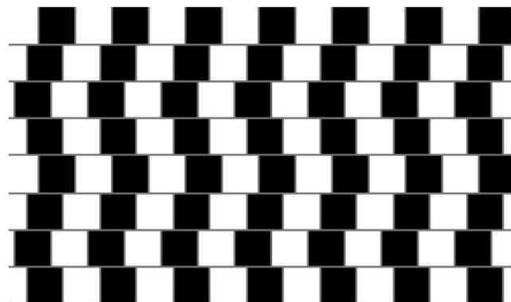
To obtain a new ARRL membership or to renew your ARRL membership, fill out the ARRL application form (available on the YARC website) and make a check out to the Yavapai Amateur Radio Club for the regular subscription amount. We will take that check; deposit it into the club's account, then issue a check to the ARRL for \$2.00 less than the regular subscription. Along with the applications and the checks, we fill out a form that explains that we are an ARRL affiliate club and are applying for this benefit.

Please take advantage of this when it is time for you to renew your ARRL membership. You will be making a \$2.00 contribution to the club at no charge to you! ■

Muller-Lyer Illusion



The line segments on the left and right are of equal length



Are the horizontal lines parallel or do they slope?

Essential₂ clarity

Reprinted from the "PCARA Update", September 2008 issue, courtesy of Malcolm Pritchard, NM9J

This is a further episode in the occasional series where we take a look at chemical products that are indispensable to the radio amateur. The American Chemistry Council's "Essential₂" campaign seeks to explain how the chemical industry is "essential₂" our lives.

One item that we frequently look straight through and forget about is the **glass** in our window frames, our picture tubes and even our watch glasses. Glass has several important uses in our radio shacks, and I hope to persuade you not to overlook it.

We covered one use of glass in the first *PCARA Update* "Essential₂" article that described liquid crystal displays (LCD). Back in July 2006, I explained how the liquid crystals, color filters and transistors are held between two sheets of glass substrate, with a transparent, conducting film of indium tin oxide deposited on the glass surface. The transistors that turn the pixels on and off are built up on these glass sheets using photoresist techniques similar to an integrated circuit. Next time you see someone poking at an LCD with his or her finger, bear in mind that the glass substrate is less than one millimeter thick and that it is quite vulnerable to cracking if impacted.

Long before the existence of liquid crystal displays, transistors or television, high performance glass was playing an important role in radio history. But we are running ahead of ourselves -- let's first take a look at how traditional glass is made.

Common soda-lime glass, as used in windows and bottles, is manufactured from sand (silica, SiO₂), sodium carbonate (Na₂CO₃) and lime (calcium oxide, CaO) plus other materials such as dolomite (CaMg(CO₃)₂). The ingredients, along with some recycled glass, are heated in an electric or gas-fired furnace to 1500 deg C to melt them all together. This forms a liquid mixture of sodium silicate, calcium silicate and excess silica that can be poured, drawn, blown or pressed into shape while still mobile. As the glass cools down, it maintains its amorphous structure, and this disordered atomic configuration is frozen into the solid state. The unusual solid structure with its freedom from crystallization gives glass its transparency.

Pyrex glass is made by replacing some of the sodium carbonate in soda glass with sodium borate, Na₂B₄O₇. The resulting "borosilicate" glass has a very low

coefficient of expansion and is extremely tough. First discovered in Germany in the 1880s, it was further developed in the early 1900s by Corning Glass Works to answer a request from the railroads. Their kerosene-burning signal lanterns with glass lenses ran very hot, so if rain or snow fell on the glass, it could shatter and the signal would fail. Corning developed globes made from low-expansion glass that could withstand weather and handling much better than regular glass. This super-tough "fire glass", as it was called, was resistant to temperature fluctuations, chemical corrosion and breakage.



Railroad signal lantern was an early application of borosilicate glass.

In 1915, Pyrex glass was also developed for ovenware, after the wife of one of Corning's scientists successfully baked a cake in a sawn-off glass battery jar. Pyrex was then put to good use as an excellent electrical insulator. In the early days of radio communication, insulators



Pyrex insulator, 1928

were needed to suspend the wire antennas and to carry the wire feeders into the

shack. One favored type of insulator was made of Pyrex glass by Corning Glass Works. According to Corning in 1928:

"Radio energy in all its original volume is delivered by antennae equipped with Pyrex Insulators. Signals from even the most distant stations reach the detector unweakened by leakage or eddy losses.

The special glass from which Pyrex Radio Insulators are made has the lowest power loss of any known substance suitable for antenna insulation, with the exception of fused quartz. The smooth hard surface prevents accumulation of dirt and soot.

Specified wherever perfect insulation is of vital importance -- in the U.S. Navy, Coast Guard, Light-house and Air Mail -- and in the country's largest broadcast stations."



Modern glass insulator



Porcelain is also used for large antenna insulators, but compared to glass, porcelain has the disadvantage that it is not transparent, so it is difficult to see internal voids -- voids that may very well lead to stress failure of the entire insulator when it is in service.

Corning went on to say that: *“Pyrex Radio Insulators are made from a special glass, developed by Corning Glass Works, which possesses an unusual combination of electrical, mechanical and chemical properties, making them an effective barrier against leakage and eddy losses.”*

In addition to antenna insulators, glass saw widespread use in the 20th century for the manufacture of vacuum tubes and cathode ray tubes. Metal connections could be sealed into the glass, providing a conducting path to the vacuum tube electrodes. With the correct choice of glass and lead-in material, the seals were leakproof and a good vacuum could be maintained inside the glass envelope for decades. In the early days, platinum was used as the lead-in-wire, but this expensive metal was soon replaced by cheaper alloys that expand at the same rate as the glass. Examples include

“Dumet” and “Kovar”. Dumet wire is a copper-clad wire with a core of nickel-iron alloy, having a low coefficient of thermal expansion to match that of soda lime glass. It is used in vacuum tubes, cathode ray tubes, fluorescent tubes and filament lamps. Dumet seals can be identified by their red appearance within the glass. Kovar is a nickel-cobalt-iron alloy designed to be compatible with the thermal expansion characteristics of borosilicate glass. Kovar is employed in power tubes, X-ray tubes and microwave tubes.



Borosilicate glass is used in power tubes like this European QQV06-40 (5894A) dual tetrode for VHF/UHF transmitters. The tube is neutralized and has the two separate anode connections brought through a tough, heat-resistant seal at the top of the glass envelope.

Modern plate glass for mirrors and windows is manufactured by the float glass process, invented by Pilkington Brothers during the 1950s in the UK. The molten glass is poured onto a flat surface of molten tin that allows the glass to be pulled down a line where it can cool while still being

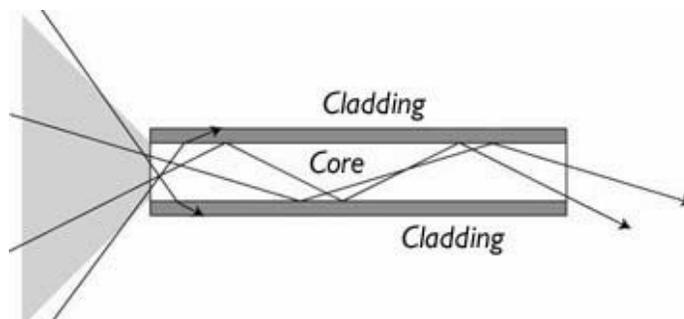
maintained perfectly flat, with an even thickness. (In the early 1980's I was able to see a float glass line in production, when my radio club joined a fascinating tour of Pilkington's glass factory in St Helens, led by Gerry, G3KTJ.)

Large glass panels for liquid crystal displays are formed in Corning's "Fusion Process" by feeding molten glass into a trough until it flows over both sides. The glass then rejoins beneath the trough, where it is drawn down to form a continuous sheet of flat glass.



Corning fusion process for making LCD flat panels

The latest application of glass in long-distance communications is the fiber optic cable. This operates on the principle of total internal reflection, where light moving through a dense medium is 100% reflected at the boundary with a less dense medium, provided the angle of approach is not too steep. In a fiber optic cable, light enters a core glass fiber and bounces around, reflected by the outer cladding of glass with a lower refractive index.



Light injected at a sufficiently low angle into the core of an optical fiber is continuously reflected at the junction with the cladding, which has a lower optical density than the core.

Manufacture of glass-based optical fibers was pioneered by Corning. The process starts with a large-diameter glass preform, having a controlled refractive index profile. The tip of the molten preform is then pulled down a drawing tower to form a long, thin optical fiber. The preform is made by chemical vapor deposition methods onto the inside of a glass tube or onto the outside of a glass rod.

From antenna lead-ins to fiber optic cables spanning the globe, glass has been part of world communications for over a hundred years. I suspect it will be with us for the next hundred.

- NM9J

Weekly Breakfasts



Wed. Morning Breakfasts:

7:00 a.m. at

Iron Horse Restaurant

(Hwy 89 in Chino Valley)

(N 34°43'56.5" W112°27'15.4")*

informal – all are invited

8:00 a.m.

Masonic Lodge

(1280 Willow Creek Road,

2nd Floor; above Bank of America)

informal – all are invited

* Location data (per WGS84) provided

by Fred Zimmermann, N7PJN

Area Repeaters

Fre- quency	PL	Location	Owner/Club	Auto- Patch	Rem. BaseOr Linked	Vo IP	Notes:
52.560-	100.0	Mt. Union	N7NGM			IRLP	Node 3301
145.290-	127.3	Mingus Mtn.	ARES/RACES				
146.780-	91.5	Williams Mtn.	BWARC			IRLP	
146.880-	100.0	Prescott	YARC				
146.980-	162.2	Flagstaff	CARC				
147.000+	162.2	Mingus Mtn	MMRG				
147.140+	162.2	Flagstaff/-Mt. Elden	ARA		Linked to Mt. Ord -		Mt. Ord=147.36
147.220+	162.2	Mingus Mtn	VVARA				
147.260+	103.5	Mt. Union	ARES/RACES				
224.080-	156.7	Mt. Union	WA7JC				
442.150+	100.0	Mingus Mtn	W1OQ/Northlink				
442.350+	100.0	Glassford Hill	N7KPU			IRLP	
448.475-	100.0	Flagstaff-Elden	ARA	Yes			
448.875-	100.0	Flagstaff-Elden	Northlink		Linked		
449.175-	100.0	Towers Mountain	Northlink		Linked		
449.250-	192.8	Chino Valley	K7POF				
449.675-	88.50	Prescott Airport	WB7BYV		Linked to P Mtn.		P mtn=927.3875
449.725	110.9	Mingus Mtn	WA7JC				
449.750	91.5	Williams	K7NAZ		Linked to Win-Sys		
927.0875-	151.4	Mingus Mtn	WB7BYV				
927.3875-	151.4	Prescott	WB7BYV	Yes	Yes	Echo	Be Nice

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For more Repeater Information & Listings refer to:

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Many thanks to Dick Hughes, W6CCD, our Webmaster

