



YAVAPAI SIGNAL



The Yavapai Amateur Radio Club • Prescott, Arizona • DM-34 • Volume 26 - No. 6 • June 2011

From the President's Desk...



Hello again!

Summer seems to have finally arrived for us. HF operators can look forward to (hopefully) some improvements in propagation as we slide into the warmer weather.

There are many, many operators and organizers to thank for helping out with our most recent Special Events. YARC had a very busy month in May with the running of the Whiskey Off-Road and Whisky Row Marathon. Participation reached an all-time high and Lloyd, WA6ZZJ had to close the sign-up for the event for the first time to avoid over-staffing. All the operators who participated deserve a pat on the back for supporting their community and furthering the cause of Amateur radio in Yavapai Country.

This month's presentation at the meeting is scheduled to be a continuation of the DXpedition series with a showing of a short video detailing the 2009 DXpedition to Midway Island (K4M).

Creighton
AD7YR



Photo by Patti, KD7VDG

Whiskey Off Road Fun Riders Going West on Goodwin Street. See Page 5 for article.

Upcoming Events

- June 24, 2011 - VE Testing at Jeep Posse Bldg.
- June 25-26 - ARRL Field Day
- July 15 - 17, 2011 - ARCA/Williams Hamfest.

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 mrgris@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
Membership Count.....	Page 3
VE Testing.....	Page 3
June Program.....	Page 3
Treasurer's Report.....	Page 4
YARC and the Whiskey Off Road Bike Event.....	Page 5
The Whiskey Row Marathon.....	Page 6 & 7
Quiet as a Mouse.....	Page 8, 9, & 10
The Vacuum Tube.....	Page 11

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.

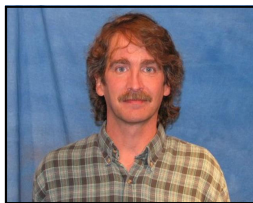
The weekly Net is held every Wednesday at 7:00 p.m. local time on 146.880- repeater. All amateurs are invited to participate, and visitors are always welcome.

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 May 5, 2011 Board Meeting



Meeting was called to order at 1815 hrs. by the President, AD7YR. Also in attendance:

K6VVR, AD7WW, AD7RL, WB7UZV, WN7E, and KE7NAP.

Discussed need to get volunteers for Field Day Committee.

Dues reminder notifications to resume.

YARC Party committee report by KE7NAP: YARC Party to be held on January 14th, 2012, at the Hotel St. Michael. New menu options, cost to be \$26-27 per plate. Committee request for \$400 approved unanimously.

General Meeting agenda discussed.

Meeting adjourned at 1857 hrs.

Minutes of May 5, 2011 General Meeting

Meeting was called to order at 1909 hrs. by the President, AD7YR. Following the Pledge of Allegiance, introductions were made.

Attendance: 67 of whom 52 signed in.

Visitors welcomed.

New members W7JGJ, KF7OTR and Patricia Perkins unanimously welcomed.

Minutes of the April 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:

VE: AD7YR reports the next testing session will be on Friday, May 6th at the Jeep Posse bldg.. Another will be held on Friday, June 24th at 6PM (Field Day weekend).

ARES/RACES: WA6ZZJ reports a large scale mass casualty exercise will be held on Aug. 16th at PRC. 48 operators worked the Prescott Off-road over 3 days, with some working all 3 days. The ARES/RACES repeater went up on Mt. Francis the Monday before the event and performed flawlessly. The Whiskey Row Marathon, Saturday May 14th, is fully staffed.

Newsletter: AC6AA reports the Yavapai Signal is doing fine, with good input from members.

Shirts: K6VVR is taking orders for club shirts.

Badges: Custom engraved club name badges available for \$6.75.

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

Elmers: AD7WW reports elmers available.

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

AD7YR will make available a configurable Morse Code generating program by request.

KI6AHH announced the Young and New Hams Net is now known as the Sunday Evening Net.

School Clubs: KB7TRE reported on a presentation by WB7UZV and K6VVR introducing fox hunting. A fox hunt was held the following week. The club is getting on the air twice a week, 2:40 – 3:05 PM, Tuesday and Friday.

T-hunt: K6VVR reports the T-hunt will be held the Sunday following Mother’s Day. WB7RFY and K6VVR hid two transmitters in April. Event held at 1 PM, starting at the Arizona Credit Union on Gail Gardner Way, off Willow Creek Road.

OLD BUSINESS:

Volunteers for Field Day Committee needed. Time is short.

YARC Party to be held on January 14th, 2012, at the Hotel St. Michael. New menu options, cost to be \$26-27 per plate.

NEW BUSINESS:

Sign-up sheets for Field Day Committee and Field Day operators being circulated.

50/50: of \$42 was won by KF7OTL.

Adjourned at 1939 hrs.

Respectfully submitted,
George Imbrugia, AD7RL
YARC Secretary

VE TESTING

By Mary , AB7NK



Testing Results

Congratulations to all who participated in the Friday, May 6, 2011 test session. There were seven applicants from various parts of Yavapai County who left with smiles on their faces. We have five new Technicians and two upgrades to General.

Thank you to the VE’s who participated as well.

The next test session will be held Friday evening, June 24, 2011 at the Jeep Posse Bldg. This is the LAST opportunity to take the general exam studying from the current test material.

All license classes will be tested and walk-ins are welcome. If you plan on testing on this date an email would be appreciated.

Please make note of the new email address for pre-registration, questions, etc. testing@w7yrc.org

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.

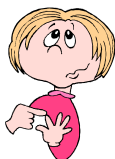
Don't Hesitate to Ask for Help!!

CALL:

- Neil Vince**, K7SEN at: (928) 775-2158
- Jim Ball** , WB7UZV (928) 445-2997
- Will Taylor**, AD7WW (928) 445-1717

Membership Count:

1st Thurs. in April.....173
Gain/Loss.....+4
1st Thurs. in May.....177



JUNE PROGRAM

A short video of the K4M DXpedition to Midway Island will be shown. The video shows K4M operating during the DXpedition, but the video also provides interesting details on the



Midway Gooney Birds

history of Midway Atoll and how the U.S. Forest and Wildlife Service was able to take control and make it into a reserve in 1988 to protect the wildlife on the island. ■

YAVAPAI AMATEUR RADIO CLUB

May 2011 Treasurer's Summary - Tom Griswold WN7E

Income

Date	Callsign	Name	Code	Check #	Amt. Paid	G. F. Amt.	Rep.Fund	ARRL
05/05/11	W7JGJ	Philip A. Seese	N	cash	\$20.00	\$18.00	\$2.00	
05/05/11	WB7UZV	Jim Ball	R	cash	\$20.00	\$18.00	\$2.00	
05/05/11	W4ZBP	Hank Riviere	R	cash	\$20.00	\$18.00	\$2.00	
05/05/11	KF7OTL	Robert F. Jones	N	1896	\$20.00	\$18.00	\$2.00	
05/05/11	KD7MTJ	Al Crook	R	10254	\$20.00	\$18.00	\$2.00	
05/05/11	KD7VBG	Patty Halgunseth-Small patch		cash	\$3.00	\$3.00		
05/05/11		Patch & 2 decals		cash	\$5.00	\$5.00		
05/05/11	KF7OTB	Vincent N. Carr	N	1255	\$20.00	\$18.00	\$2.00	
05/05/11	KF7PQY	Patricia A. Perkins	N	cash	\$20.00	\$18.00	\$2.00	
05/05/11		fifty-fifty		cash	\$98.00	\$98.00		
05/16/11	AD7TF	Dick Courtney	R	8531	\$20.00	\$18.00	\$2.00	
Income Totals					\$266.00	\$250.00	\$16.00	\$0.00

Expenses

05/05/11	AB7NK	Mary Vince	1911 day event cert.	1056		\$53.58		
05/05/11	K6VVR	Pete Morrison	5 handicap cones	1057		\$54.46		
05/05/11	KF7OTL	Robert Jones	50/50	cash		\$49.00		
05/12/11		Allegra	newsletter	1058		\$28.22		
05/12/11		Hays Companies	Liab. ins.	1059		\$200.00		
Total Expenses						\$385.26		

Beginning Balance	\$4,523.66					\$1,287.0	
January Income	\$250.00	Apr. End Repeater Fund				1	
		May 2011 Repeater Fund				\$16.00	
Sub Total	\$4,773.66	Interest				\$0.07	
Expenses	\$385.26	May Repeater Fund Bal.				8	\$1,303.0
		ARRL Payments				\$0.00	
General Fund Balance	\$4,388.40						
Net Loss/Gain	(\$135.26)						

YARC AND THE WHISKEY OFF ROAD MOUNTAIN BIKE EVENT.....

By Lloyd Halgunseth, WA6ZZJ

This was the first year for the 'Whiskey' to be a three day event. The YARC special event communications started on Friday, April 29th with what was billed as a 15 Mile Fun Ride beginning at 3:15 in the afternoon with about 100+ riders. Before the Fun Ride event ended, the 'Pro Fat Tire Critorium' event was run on an approximate one mile course on Prescott city streets near the Courthouse Square. This featured some close in racing and tight cornering.

Saturday's 50 Proof (miles) and 25 Proof rides had the most riders with 1000+ on the trails. The 50 Proof started at 7:30 in the morning with the 25 Proof following at 9:30. While watching the start of the races it seemed like the line of bicycles was almost endless. The races all began on Whiskey Row and then maneuvered west on Goodwin Street and then through city streets to Copper Basin Road. From there through Camp Perlstein where they picked up the 'single track' trail taking them south. The route then followed single track trails and Forest Service roads. The 50 Proof route included a trip on Copper Basin Road to Skull Valley and back. Included in the races were riders from 24 different States and 3 Canadian Provinces along with the countries of Mexico, Australia and New Zealand.

There were forty eight amateur operators involved in this event. Some worked all three days, some two days and some one day. Also, for the first time this year we had assistance from the Yavapai County Sheriff's Office Search and Rescue Quad Unit along with the amateur radio operators we had on Quads. Once again, as in past years, we worked closely with the Southern Arizona Rescue Association (SARA) who were the medical personnel located along the route and at the finish line. Net Control was operated from the ARES/RACES MARC which was located on Goodwin Street near the start/finish line. A member of the YCSO quad unit was also based in the MARC, to maintain communications with their units and liaison with us. SARA personnel were located right next to it for easy contact with their units. The SARA units were also capable of amateur radio communications. This year the race communications was operated on the ARES/RACES Mt. Francis repeater which went on the air just the Monday before the race weekend and covered the race route very well.



Photo by Patti, WD7VDG

Future Whiskey Off Roaders



Photo by Ken, WA6AQK

Tom, WN7E at Whiskey -7 Location

Fortunately, considering the number of riders involved, there were mostly only minor injuries like scrapes and bruises that occurred. One rider did have to be transported by Prescott Fire to the hospital with a broken color bone. A few broken bicycles also became victims of the race.

There are not enough words to express all of the needed Thank You's to the amateurs who participated. It was rewarding, to me, to see this response and to see the number of new amateurs and new YARC members that took part. This was a large communications task and you all stepped up to provide assistance when needed. THANK YOU... ■

For additional pictures, see John Broughton's Webshots at <http://tinyurl.com/6x9pu3h>

THE WHISKEY ROW MARATHON...

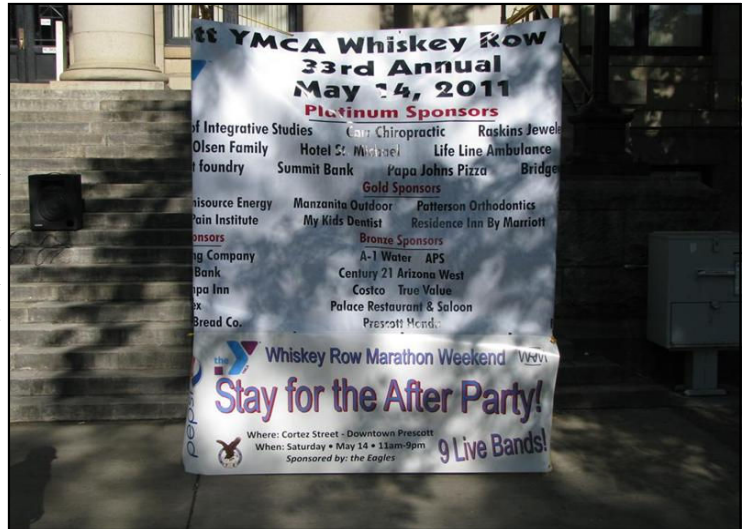
By Lloyd Halgunseth, WA6ZZJ

What is the Whiskey Row Marathon besides being a 26.2 mile run? It is a very early morning communications exercise for YARC members and amateur radio operators that rise to the occasion. This year there were 23 amateur operators participating in providing communications around the race course from nine different 'Water Stations', two Quad units, one "shadow" position for the race director, one mobile unit in the YMCA van and Net Control at the finish line. With the Full Marathon beginning at 6:00 in the morning there are several positions that need to be in place starting at 5:00 a.m. (there were several early runners that started at 5:00 a.m.).

Just what do the operators do at their respective locations? They are there to make sure the YMCA volunteers are on location in time for runners going past and that these volunteers have the necessary supplies for their locations. There are times when supplies need to be juggled between locations to meet the demands. This is all accomplished with our radio communications and greatly aids the operation of the race.

The Whiskey Row Marathon is one of the toughest runs in the United States due to the elevation and the elevation gain during the race. It starts at 5280 feet altitude and climbs to over 7,000 feet in the first seven miles where they drop down to just over 6,000 feet at the 13.1 mile turnaround and then go back over the same route. This year there were runners from seventeen different states, with one from Hawaii, along with one Canadian Province. The Full Marathon had 131 runners finishing; the ½ Marathon 479 runners and the 10K Race had 713 participants finish. There was also the 2 Mile Fun Run/Walk with over 325 taking part. The number of participants has been increasing each year. This year's winner in the men's division was from Flagstaff. He had just decided the day before to run this marathon for the first time. He drove down from Flagstaff in the early morning, ran the marathon in record time, got back in his car and drove right back to Flagstaff to go to work.

As with all of our event communications, the organizations we provide the communications for tell us that it couldn't be done without our help.



Walter, KF6SPS, Bob, KC7CJW, and Ken,



Marathon runners starting



Half Marathon runners starting



10K Race starting



2 Mile Fun Race runners getting ready



One of the cutest spectators



Again, a BIG THANK YOU to all who participated. Providing communications for events such as this cannot be done without your help.

The next scheduled public service communications event at this time is the March of Dimes March for Babies on Saturday, September 10, 2001.

For additional pictures, see John Broughton's Webshots at <http://tinyurl.com/3kgpr83>. ■

← **Left: Water Station 2**

Note Whiskey Row co-founder Tony Ebarb (No. 1095 -pink shirt), 71, celebrated his birthday by running in the race. Tony founded the Whiskey Row Marathon with Gerald Brownlow in 1979.

Quiet as a mouse

Reprinted from the "PCARA Update", April 2005 issue, courtesy of Malcolm Pritchard, NM9J



Electronic developments have brought many advances to amateur radio - but those same developments have been raising the RF interference level around the typical amateur shack. Here are some hints for keeping that RFI noise level down.

The first thing to remember is that electrical sparks are likely to be an intense source of noise. Remember how Marconi crossed the Atlantic with a giant spark transmitter in Cornwall? Well the same could be true — on a smaller scale — if you have anything in the house continuously generating sparks. Worn switches, worn electrical outlets and loose wiring are possible causes, especially when connected to a long length of house wire acting as the antenna.

Motoring on: Some items generate sparks as part of their design — for example, DC or universal motors with a **commutator** generate tiny sparks as the commutator's metal segments pass under the carbon brushes. If the brushes are worn, the sparks can be a lot larger. This type of motor is likely to be found in power tools, hair-dryers and food mixers. Fortunately, their use is normally limited to short periods of time... so the quickest solution is "turn it off!" Otherwise you may have to replace the carbon brushes or fit a filter.

Dim bulb: One of the worst inventions for generating lots of noise is the **thyristor**, or silicon controlled rectifier (SCR). Try to keep thyristor controls out of the house if you can. Most light dimmers employ a thyristor or triac circuit that generates large amounts of noise. There is some variation in the amount of noise developed by different dimmer designs, but the best solution in my view is to replace any dimmer with a simple on/off switch.



Thruster-based light dimmers can generate lots of noise at MF and HF. They are best avoided.

Not a fan: Electric fans are not usually a problem — induction motors are electrically quiet, and designs

with a *switched* speed control are usually problem-free. But beware of fans with a continuous speed control - the circuitry will use a thyristor or triac to generate copious amounts of noise at anything less than full speed.

Let there be light: Not long ago, there was little need to worry about light fittings as a source of electrical noise. Thomas Edison's glowing filaments have been electrically quiet for more than a century...but today they have been joined by a variety of other light sources.



Fluorescent lamps with an iron-core choke ballast produce little noise once they have started. This example is a Philips Ciclite.

Traditional fluorescent fittings are not normally a problem...shop lights in a grounded metal enclosure and slimline fluorescents where the

ballast choke is housed in a metal case produce little or no noise once they have started. In fact, when you are choosing a fluorescent lamp, the weight of a choke ballast can be a helpful clue as to the type.

Compact fluorescent lamps *without* an iron-core ballast are another matter. These small, lightweight designs might be excellent in terms of energy efficiency, but they can be a terrible source of noise. The electronic ballast usually includes an inverter running in the 20kHz - 60kHz range. The inverter's harmonics, plus wideband hash can spread far and wide.

The FCC sets limits for lighting applications in Title 47 CFR, Part 18 (Industrial, Scientific and Medical Equipment), subpart C for conducted frequencies



An electric fan with continuously variable speed control can be a terrible source of noise.

from 450 kHz to 30 MHz and for radiated frequencies from 30 MHz to 1 GHz. The limits for consumer equipment are lower than for non-consumer equipment. Despite these rules, lamps on sale today can cause plenty of interference to AM radio, to reception of WWVB atomic clock signals on 60



Compact fluorescent lamps can be a source of interference thanks to the electronic ballast.

kHz and to infrared controls as well as to amateur radio. If you must buy this type of lamp, my advice is to pick a well-known manufacturer, check the package for FCC compliance then watch for any warnings to keep the lamp away from marine or other radio equipment. Buy one lamp first then see if you can live with its level of RFI.

The good news is that evermore efficient 120V light bulbs are becoming available, including models based on white-light LEDs. At present the prices are astronomical, but I'm sure they will come down. See for example: <http://www.theledlight.com> or <http://www.lumileds.com>.

And next time you are

stopped at a traffic signal, check whether it contains red, yellow and green LED lamps. If the green light comes on suddenly, without any warm-up time, then it's LED-based.

Power source: Another device that is best avoided in the interests of a quiet life is the switched mode power supply. Sometimes these items are inevitable — there is a switched mode PSU in just about every PC, and most notebook computers come with a switched-mode AC adapter. Any time you have a choice of a traditional linear power supply over a switched mode unit, I would pick the traditional design, especially when there are antennas located nearby. Just try running an AM radio off a switched mode power supply — definitely not recommended. And some of those 120V LED lamps mentioned in the previous paragraph contain a multi-voltage switched mode power supply - ugh!



Switched mode power supplies can be a source of interference, especially when antennas are nearby

Computer QRM: If you experience a lot of noise on the HF bands while your PC is switched

on, bear in mind that the **monitor** attached to the computer can be a worse offender than the PC itself. The timebase harmonics plus the high frequency video signals applied to the CRT produce plenty of RF on unwanted frequencies. If you have a choice, pick an LCD display rather than a monitor based on a cathode ray tube. A notebook PC with the LCD display built-in can be the best combination for minimizing noise in the radio room.

Find your foe: Despite taking all the obvious precautions, you may still come across noise that affects reception on the MF, HF and VHF bands. Here are some suggestions for tracking down the source.

First of all, ask yourself is the noise related to operation of other devices around the house? Is it only present when the boiler or furnace is running? Does it go away if you switch off a power strip, lamp or timer?

Many electronic devices in the modern home are left plugged in and receiving power continuously. Think of the VCR, satellite/cable TV receiver, cable modem, microwave oven or answering machine. Any one of these could be a source of continuous interference. You may be able to pinpoint the source simply by turning off electrical circuits in the house one at a time.

If you are still having difficulty locating a noise source, try using tools you probably have on hand. A portable AM radio can be remarkably helpful in tracking down noise. The ferrite bar/rod antenna, usually mounted across a horizontal dimension of the radio, can be effective as a direction finding aid. Just tune the set to a clear frequency then rotate the radio to minimize the buzz. The source is then off the end of the ferrite rod antenna.



The ferrite bar antenna in a portable AM radio can be helpful in locating sources of interference.

Interference on VHF can be tracked down with the help of a handi-talkie. You can use a similar technique to the methods on our Fox Hunts. Remember that a leaky cable-TV installation can emit RF carriers on specific channels, with video buzz in between. Cable channel 18 has a carrier frequency of 145.000 or

145.250 MHz depending on the local channel scheme. Tightening up of the cable-TV F-connectors may be all that's needed to fix a leak.

At the end of the day, you should be able to identify all noise sources in the house, then suppress the ones that cause real problems in the radio room. For more information, check *The ARRL RFI Book*.

NM9J

Remember to check into the Wed. Night Net at 1900 MST on the 146.880 -pl 100 Hz Repeater.



Net Controls are still needed -- contact k7sen@arrl.net or call 775-2158.

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.

Reprinted with permission from Bob Beasley, K6BJH



Isn't that your call in there? That looks like the same radio you sold for \$25 about fifteen years ago.

Newspaper Headlines

Man Kills Self Before Shooting Wife and Daughter

Something Went Wrong in Jet Crash, Expert Says

Police Begin Campaign to Run Down Jaywalkers

Panda Mating Fails; Veterinarian Takes Over

Miners Refuse to Work after Death

Red Tape Holds Up New Bridges

Man Struck By Lightning: Faces Battery Charge

New Study of Obesity Looks for Larger Test Group

Astronaut Takes Blame for Gas in Spacecraft

Kids Make Nutritious Snacks

Local High School Dropouts Cut in Half

Juvenile Court to Try Shooting Defendant

War Dims Hope for Peace

If Strike Isn't Settled Quickly, It May Last Awhile

Cold Wave Linked to Temperatures

Enfield (London) Couple Slain; Police Suspect Homicide

Hospitals are Sued by 7 Foot Doctors

And the winner is....

Typhoon Rips Through Cemetery; Hundreds Dead

The Vacuum Tube

By Roy Freeman, KE4TG



About 100 years ago an American named Lee de Forest added a control grid to an already invented diode tube and came up with the triode tube. When the bulb's filament is heated, electrons are boiled off its surface and into the vacuum inside the Tube. If an electrode (also called the plate) is made more positive than the hot filament, a direct current flows through the vacuum.

Lee's "grid" used a bent wire between the plate and filament. The grid could change the current flowing from the filament to the plate. This device became known as a triode, the first successful electronic amplifier.

Countries other than the USA still make glass tubes. Currently the world's most popular vacuum tube is the 12AX7, with estimated annual worldwide sales of greater than 2 million units. The 12AX7 is a dual high-gain triode widely used in many electronic applications, not to mention the dozen new ones in my spare parts box. My Drake T4XB and R4B use the 12AX7's.

By adding another grid to a triode between the control grid and the plate, we make it into a TETRODE. This "screen" grid helps screen, or isolate, the control grid from the plate. The first popular beam tetrode was the RCA 6L6, introduced in 1936 and is still made today. The most powerful glass tubes have graphite plates. Because graphite is heat-resistant, it can operate with a dull red glow for a long time without failing. Graphite is not prone to secondary emission. The hot graphite plate will tend to react with, and absorb any free oxygen in the tube. The very popular 572 and 572B (used in ham radio) use graphite plates coated with purified titanium. A graphite plate is much more expensive to make than a metal plate of the same size, so it is only used when maximum power capability is needed.

By adding a third grid to the tetrode, we get a PENTODE. The third grid is called a suppressor grid and is inserted between the plate and the screen grid. It has very few wire turns, since its only job is to collect the stray secondary-emission electrons that bounce off the plate.

There were tubes with more than three grids. The pentagrid converter tube, which had five grids, was widely used as the front-end frequency converter in radio receivers.

Such tubes are no longer in production, having been fully replaced by semiconductors.

If you want to control a LOT of power, a fragile glass tube is more difficult to use. So, really big tubes today are made entirely of ceramic insulators and metal electrodes. Otherwise, they are much the same inside as small glass tubes--a hot cathode, a grid or grids, and a plate with a vacuum in-between.

In these big tubes, the plate is also part of the tube's outer envelope. Since the plate carries the full tube current and has to dissipate a lot of heat, it is made with either a heat radiator through which lots of cooling air is blown, or it has a jacket through which distilled water or some other liquid is pumped to cool it. 3-500Z air-cooled tubes are often used in radio transmitters and amplifiers such as the Ten-Tec

Centurion Amplifier. Some of us with homebrewed 4-1000A linear amplifiers require the use of forced air-cooling.

Magnetrons, klystrons, traveling wave tubes and other velocity modulated tubes are vacuum tubes that use magnets, buncher grids, repellers and other cool methods very different from our HF rigs. These tubes, usually liquid-cooled tubes are used to make high radio energy for radar, tropospheric scatter communications as well as experimental applications. ORNL's Spallation Neutron Source's (SNS) accelerator systems is designed to deliver a 695 ns proton-pulse onto a mercury target at a 60-Hz repetition rate and an average power of 2-MW. The linac consists of a drift tube linac up to 86.8 MeV, a coupled-cell linac to 185 MeV, and a superconducting RF linac to the nominal energy of 1 GeV (a GeV is a billion (in US counting) electron volts). Klystron tubes, not transistors are used at these high voltages, currents and frequencies. So don't say tubes were before my time as ya still may have a Cathode Ray Tube TV or computer monitor.

You cannot look at an undamaged tube and determine its operating condition. **THE ONLY RELIABLE WAY TO DETERMINE THE HEALTH OF A TUBE IS TO TEST IT ELECTRICALLY.**

Basking in the warm glow of a 4-1000A.

Roy, KE4TG

Reprinted from the East Tennessee DX Association Newsletter

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

For more Repeater Information & Listings refer to:

- www.w7ara.org/Web/
- www.azrepeaters.net
- www.azfreqcoord.org/listings.htm

YAVAPAI AMATEUR RADIO CLUB

P.O. BOX 11994

PRESCOTT, AZ 86304

Visit us on the web at <http://www.w7yrc.org>

Many thanks to Dick Hughes, W6CCD, our Webmaster

