



YAVAPAI SIGNAL



The Yavapai Amateur Radio Club • Prescott, Arizona • DM-34 • Volume 21 – No. 6 • June 2006

From the President's Desk



We had a nice trip back to IL. However, I'm very glad to be back in AZ. The May meeting was another well-attended, lively one with a very interesting program. I was happy to see that the chances of sharing a booth at the Yavapai County Fair with the Verde Valley Amateur Radio Association look very promising. I think this will be a big plus for the clubs and the hobby in general. Thanks to Bob, WB6ODR, for conducting the amateur radio license class and to Mary, AB7NK, for heading the volunteer examination session for the students. This was another successful venture for the club.

It was fun, as usual, to participate in the communications for the Whiskey Row Marathon. The weather was beautiful and the event went very smoothly. I'd like to echo Lloyd's thanks to all the operators who participated and helped make the event a success. There were a record number of entrants for all the races this year. According to the race

results on the Prescott YMCA's Web site, the number of finishers were: Marathon, 123; 1/2 Marathon, 402; 10K Race, 598; 10K Racewalk, 27.

There is a nice gallery of photos of the marathon on the Web site:

<http://www.prescottymca.org/whiskeyrowmarathon.htm>

The pre-Field Day event Rex, N7NGM, hoped to have doesn't appear to be happening due to difficulties in getting necessary information from the Gateway Mall personnel. However, it looks like the club will have an opportunity to have some public exposure with a table at the mall from 5:00 p.m. to 8:30 p.m., Thursday, June 22nd as part of the weekly Street Faire the mall is having. Rex will have more information at the June meeting and will be looking for some volunteers to man the table. We keep getting more opportunities to participate in events and to have a presence before the public. This is very positive. I'm hopeful we keep getting club members willing to participate in these events as this is, I believe, one of the ways to keep the club active, growing and desirable to join.

73, John, WB9VGJ

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. 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 1/2 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 local 146.880- repeater is the official adopted repeater for the YARC. It is located on the hill above Willow Creek road and requires a PL of 100.0 Hz. If you hear a 1400 Hz pulsing tone, the repeater is on backup battery power and usage should be limited to necessary communications. Many thanks to Bill Kafka, W2YAV ■

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YARC Officers for 2006

President

John Broughton, WB9VGJ
wb9vgj@arrl.org

Vice President

Dick Hughes, W6CCD
w6ccd@arrl.net

Secretary

Pat Oliver, K7DUC
joliver@commspeed.net

Treasurer

David Passell, K6UWV
davidrex@northlink.com

YARC Board of Directors (includes Club Officers)

Rex Mauldin – N7NGM

Ken Severance – WA6AQK

Richard Bozeat – KE7DTR

Walter Schumann – KF6SPS

Newsletter Editor: Joe Oliver, AC6AA

Membership Count:



1st Thurs. in April...95*

Gain/Loss.....+3

1st Thurs. in May.... 98

* April count corrected.

Minutes of May 4, 2006 Board Meeting



A Board meeting was held at 1835 on May 4, 2006. Present were John, WB9VGJ; Pat, K7DUC; Dave, K6UWV; Dick, W6CCD; Richard, KE7DTR; , Ken,

WA6AQK, and Walter, KF6SPS.

It was decided to further discuss the sale of equipment owned by Oscar Green. The cost of buying the equipment outright is over half of our present treasury, and the immediate sale could not be certain. It was decided to bring it to the membership under "Anchors", see what the response is, and further check with Oscar.

Although VVARA members are in

agreement that a booth at the County Fair is a good idea, no member has yet signed up. YARC may have to carry it alone. We have had a good response in signups from our club.

The meeting was adjourned at 1845.

Respectfully submitted,

Pat, K7DUC, Secretary

Minutes of May 4, 2006 General Meeting

John, WB9VGJ called the meeting to order at 1900. The Pledge of Allegiance was recited and members introduced themselves.

Visitors: Vi Hughes; Gene Bockman, AB7XW, and Michael Damiani, KD7VLK.

New Members: Frank Maruna, W6RDY; Marty Goyette, KF6BTU; Tony Jackson, KI6AHH, and Edward Goodyear, KF6RUI, were voted in by the membership.

Meeting Minutes: A motion to approve the Board minutes of April 6, 2006 was made by Ken, WA6AQK and seconded by Terry, KB7TRE. A motion to approve the General Meeting Minutes was made by Terry, KB7TRE and seconded by Bob, WB6ODR. Both were unanimously approved by the membership.

Treasurer's Report: David, K6UWV reported a balance of \$3145.01. The report was approved after a motion by Jack, KE7FMD and a second by Terry, KB7TRE.

Committee Reports:

- **ARES/RACES:** Lloyd, WA6ZZJ reported that Saturday, May 20th will be a training meeting in Cottonwood, in the VV Fire Station.
- **Whiskey Row Marathon:** The Marathon will be held on Saturday, May 6, 2006, and our main job will be communications. There should be 1000 racers entered in the various events.

- **Public Information:** Jim, N5RO said that an interview will be held with Lloyd, WA6ZZJ on ARES/RACES on Sandy Moss's one on one program. Recordings have been sent out to various stations. We have had press releases printed in the Courier. About five Boy Scouts will be up at Field Day. An HF radio is needed for Field Day, for Scouts' use on Saturday.

- **Patches/Shirts/Badges:** David, K6UWV has club patches for \$3.00; Dick, W6CCD has club shirts for \$19, without a name, and Bob, WB6ODR has badges for \$5.75.

- **License Class:** Bob, WB6ODR reported that he had received a certificate from the section manager of ARRL in recognition of our club as a Special Service Club.

The class that just concluded was very successful. It was suggested that a General license class be held beginning August 7th.

- **VE Testing:** Mary, AB7NK reported 16 technicians and 1 written General passed, and 1 was grandfathered in on April 15th. One General written passed on April 29th. VE testing sessions will now be held at the Masonic Lodge. No testing is planned for December.

- **Booth at County Fair:** We have had 66 hour signups from YARC and need some more signups. We need some small details worked out. Bob, KC8BOB stated that he will get 40 hours of signups from members of the VVARA. Doug, KV8TD also stated a need for an HF radio for the club for 3 events so far.

- **Pre-Field Day at the Mall:** It appears that it will not be held this year.

- **Adopt a School:** Terry, KB7TRE does not have information about a need as yet.

Old Business:

- *Net control for 2006:* We still need a net control for May and July. A sheet was circulated for signups.
- *Elmer Signup Sheet:* Joe, AC6AA has referred the signup sheet to Neil, KA7JAS, who has a nice group of elmers to help out people needing assistance with ham radio.
- *“When All Else Fails” Banners:* Lloyd, WA6ZZJ and Terry, KB7TRE were given banners for use with the ARES/RACES van and classroom.

New Business:

- *Oscar Green, AB7YR Equipment:* Oscar has many items of interest to be sold. The club cannot afford the \$2000 required to buy it outright, but something will be worked out with all parties.

Announcements:

- Doug, KB6TWC encouraged members to join the YavapaiARC online user group through Yahoo. This is for YARC members only.
- We are invited to participate in Field Day, June 23-25 on Mingus Mountain. John encouraged members to help set up and to operate.
- VVARA will be having a meeting on Wed., May 17th at the Lake Valley Elementary school in Prescott Valley at 7:00 p.m. Speaker will be Richard Aldom, W7STS who will do a program on ARES/RACES.
- Anchor items were announced.

A motion to adjourn the business portion of the meeting at 2008, was made by Terry, KB7TRE and seconded by Lloyd, WA6ZZJ. The motion carried.

The 5050 drawing was held, and Terry, KB7TRE won \$22.

Tonight’s Program will be given by Ray Tyrell, N6MY, on “My Stealth Antenna and some transmission line considerations”.

Respectfully submitted,

Pat, K7DUC

Secretary



YARC Treasurer’s Report for May 2006

By David Passell, K6UWV Treasurer

INCOME

New Members (see applications for additional information)

Edward Goodyear	KF6RUI	05//07	05/04/06	cash	20.00
Marty Goyette	KF6BTV	05//07	05/04/06	cash	20.00
Tony Jackson	KI6AHH	05//07	KF6BTV	family	nc
F.A. Maruna	W6RDY	05//07	05/04/06	344	20.00

Renewals (Update Roster)

Albert J. Crook	KD7MTJ	05//07	05/04/06	7146	20.00
Roy L Jackson	AD7FW	02//07	05/04/06	1092	20.00
Carl Lubisich	KE6NOP	03//07	04/15/06	238	20.00
Fred Zimmermann	N7PJN	05//07	05/04/06	cash	20.00

ARRL Renewals

Jack McAllister	KE7FMD		05/04/06		36.00
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Other

50/50 drawing	44 tickets		05/04/06	cash	44.00
T-shirt, logo	Gail, K7YTI		05/04/06	cash	19.00

Total Income.....\$239.00

EXPENSES

50/50 winner	Terry, KB7TRE	05/04/06	cash	22.00
David Passell	Sweetener	04/28/06	867	7.34
David Passell	Refreshments/supplies	05/04/06	868	30.51
Pat Oliver	Staples	05/04/06	869	16.23
ARRL	Jack McAllister (new)	05/04/06	871*	21.00
				* 870 voided

Total Expenses\$97.08

Cash Flow (Income - Expenses)..... \$141.92

Deposits 05/08/06 \$217.00

Total Deposits.....\$217.00

PREVIOUS REPORTED CHECKBOOK BALANCE\$3145.01

CURRENT CHECKBOOK BALANCE.....\$3286.93

Plan to Join the ARRL or Renew Your Membership ?

Ask our Treasurer for a special ARRL Club Membership Application or download the appropriate application from the YARC Website. Complete the Application and return it to the Treasurer with the application fee.

There is no extra cost to you, and our club gets to retain a portion of the dues.

YARC and the Whiskey Row Marathon

By Lloyd Halgunseth WA6ZZJ
ARES DEC Yavapai County Arizona

The temperatures ranged in the low to mid 30's and the sun was almost shining. I say almost because it hadn't peeked above the horizon yet. It was 5:00 a.m. and members of the Yavapai Amateur Radio Club in conjunction with Yavapai County ARES/RACES were preparing to provide public service communications for the running of the 28th Annual Whiskey Row Marathon taking place in Prescott, Arizona. On this Saturday, May 6, 2006, they were doing as they had done many years in the past. The ARES/RACES CommVan was being set up as the net control position located at the finish line on Cortez Street. Other operators were reporting to their assignments at one



The Whiskey Row Marathon, sponsored by the Prescott YMCA, is by no means the largest in number of runners, but it is ranked among the five toughest in the United States due to its elevation gain. The route begins at an elevation of 5280 ft, on Prescott's Historic Whiskey Row, increasing to 7000 ft in the first seven miles where it then drops down to 6100 ft at the 13.1 mile turn around point where the runners make the turn to



of the eight water stops located approximately every two miles along the 26.2 mile Marathon route. A shadow operator for the race director and a portable radio in the YMCA van were also in position as was the 'quad' mobile operator that travels the course ready to respond where needed.



go back over the same route. The course is on paved roads for the first and last five miles, while the remaining 16.2 miles is on Prescott National Forest dirt road in the cool pines. Along with the full Marathon there is also a 1/2 Marathon, 10K run, 10K Judged Race Walk and a 2 Mile Fun Run / Walk. This year there was a total of 1599 participants in all races.

The Full Marathon begins at 6:00 a.m. so all Amateur Radio operators begin reporting to their respective positions between 5:00 a.m. and 6:00 a.m. depending on their location on the route. Communications are provided for the volunteer groups that man the water stop locations handing out water, Gatorade



and fruit to the runners as they pass. Once the lead runners are established, their position is reported as they pass the manned locations. Ambulances stationed on course, one at the finish line and one along the route in the back country, are also tracked by our operators as well. The 'quad' mobile patrols the route in the back country to report any problems that may arise and need attention. The YMCA van is used to transport supplies as well as be available to pick up any participants that may be unable to finish.



The 21 amateurs involved in this years operation included: AB7NK, KA7JAS, WB9VGJ, KD7VBG, KC6ZHG, KC5DKN, KI7JZ, KF6SPS, WA6AQK, N6LSA, KV8TD, K7DRV, W6CCD, KC7CBK, WB7RRQ, KD7RMV, KD7DGT, K7CJW, N7PJN, WA6JBV and WA6ZZJ.

More photos can be viewed at <http://www.k7yca.org/> ■

General License Class Scheduled

The YARC will host a General License class on Monday nights, 1800 hours beginning August 7, 2006 through September 25, 2006.

We expect to have the first hour or hour and one half as review in theory and the last half hour of so as CW practice. Anyone needing to brush up on their CW or wanting to upgrade to General or Extra class license is welcome.

This class will be held at the Yavapai County Jeep Posse Search & Rescue training building on Commerce Drive. Across the street from the MVD and DPS buildings.

For more information contact Bob Smith, WB6ODR (928) 443-9321 or Lrsmith@cableone.net

Program Speakers



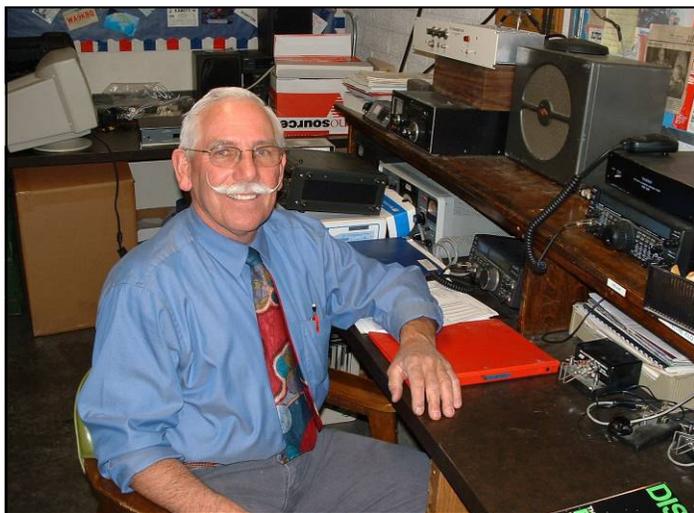
June: "FISTS CW Club",
By Bob, WA7YUL

July: "Miniature Horses",
By Bob, WB6ODR

August: "Grounding",
By Lee, KC7CBK

This Month's Featured Ham

By Pat, K7DUC



Terry Pemberton, KB7TRE

June's featured ham is Terry Pemberton, KB7TRE. Terry first got his license at the beginning of 1993, having taken the technician exam in the last part of 1992. Within a year, Terry became a General Class operator.

Terry didn't know any hams at first, but wanted to do a project with the space shuttle. He needed to have a license to participate. At that time, Terry found a 12 year old student at Granite Mountain Middle School, where he teaches, who elmered him.

Terry operates mostly on 2 meters, 70 cm for the IRLP, and both 20 and 40 meters. He loves 10 meters when it is possible to operate. He uses IRLP for the students, since it is easy for them and they enjoy it immensely.

His most memorable contacts were: (1) With the Space Shuttle in 1994. This took place in the school cafeteria at 5:53 a.m., with 300 students, parents, and community members present. Thirteen kids made a contact. This took 2 months to set up with many helpers and many facets to the presentation. Will, KI7SA who was Terry's elmer, was net control. The QSO was about 8 minutes long. There were only 13 schools worldwide that were selected to communicate with the Space Shuttle. (2) Terry worked packet with many stations and remembers one in France, who later hand delivered his QSL card. (3) Terry has worked mobile stations in airplanes, helicopters, sailplanes, and a commercial jet on its way to San Francisco.

Terry operates CW very little, but when we still had the Novice license, he and Pen Brown, KJ7KL, his sidekick for years, taught the kids CW. When the kids got their ticket, they would give them a QRP rig. They would operate from

their homes and have round robin CW transmissions.

Other memorable radio related mail Terry has received, was from a couple of contacts in Germany.

Terry and his students hooked up with a school in New York and talked with Joe, WB2JKJ and his students on 15 meters. Understanding the culture differences between New York's inner city and Prescott's rural environment was challenging for the students, and quite interesting.

Ham related activities Terry participates in are numerous. He teaches the kids at school, is involved in ARES/RACES, and tries to work as many of the special events as possible. He operates a special event station each year for Arizona's birthday on February 14th.

Terry prefers phone and IRLP. He also is a regular on the Knobby Knee Net. In his spare time, he does photography.

The equipment he works with is a Yaesu 840 and 847 with tuners. He has Yaesu and Icom gear in his vehicles.

Terry would like a larger, active participation in the club. He likes the community service activities that the club is involved in.

Lest we forget, Terry is responsible for providing YARC with a meeting place.

Terry is very active, both in his teaching profession and in the club. We are fortunate to have him in both roles. ■

For Sale

Icom IC-746 HF/2m xcvr w/2 filters \$600

Yaesu Ft-1000D xcvr w/SP-5 Speaker/patch, MD-1 Desk Mike, MH-1 Hand Mike, Filters \$1500

Kenwood TS - 430S \$300

Kenwood TM-G707A 2M xcvr \$200

Kenwood TR-7730 2m w/o PL \$50

PK 232 TNC w/latest upgrades \$200

Alinco DR-1200 2m works with TNC \$100

AEA MBA Code/RTTY Reader - No Work FREE

Yaesu 2m/70cm HT with docking station/amp 30W out, not working, make offer

XYL says I need to get rid of some stuff...

Bob Smith WB6ODR

Prescott, AZ

(928) 443-9321 or Lrsmith@cableone.net



Tech Notes

By Ray Tyrell, N6MY

This will be a series of short technical articles. This month's topic is:

"Standing Wave Ratio (SWR): What it is and what it isn't"

What it is:

- An indicator of the quality of match between transmitter and transmission line, antenna tuner and transmission line, or transmission line and antenna.
- Ratio of maximum to minimum voltage or current along a transmission line.

What it isn't:

- Indication of antenna radiation efficiency. Consider a 50 Ohm dummy load with low SWR, but zero (ideally) radiation efficiency.
- Cause of RF radiation from a transmission line
- Cause of TVI or other interference

Discussion

SWR can be expressed in terms of forward and reflected power as:

$$SWR = \frac{1 + \rho}{1 - \rho} ; \text{ where } \rho = \sqrt{\frac{\text{reflected power}}{\text{forward power}}}$$

Using the above expressions, you can calculate SWR from wattmeter readings.

In terms of impedance, SWR can be shown as:

$$SWR = \frac{Z_0}{R} \text{ (use the reciprocal form if R is greater than } Z_0 \text{)}$$

Impedance (Z) is comprised of two components which represent the characteristics of a system. These are R, the pure resistive component, and X, the reactive component. The X component represents the effects of capacitance and/or inductance.

A special case of the above equation exists when there is no reactive component (inductance or capacitance). In this case, SWR is just the ratio of source resistance to load resistance. For example, if a transceiver (source) has an output impedance of

50 Ohms resistive and a coax transmission line (load) has a characteristic impedance of 75 Ohms resistive, then SWR would be simply:

$$SWR = \frac{75 \text{ Ohms}}{50 \text{ Ohms}} = 1.5:1$$

In a real system, this is seldom the case, but is sometimes close enough to use this form as an approximation.

In practice, the design challenges are to reduce the effects of the X component and to transform the R component to the proper value, for example X = 0 and R = 50 Ohms. This job can be performed by an antenna tuner or matching network, usually placed between a transmitter and transmission line leading to an antenna. The ideal condition for maximum power transfer is when the source and load impedances are conjugate¹ matched.

It should be noted that in a system where high SWR exists, the antenna tuner's inductive and capacitive elements (X) perform a valuable function of storing reflected energy. This allows power that is reflected back from the antenna to the transmitter (due to high SWR) to be stored in the antenna tuner and re-reflected back to the antenna and then radiated. Thus, the only loss of energy is in the transmission line and the tuner itself.

Measuring and adjusting SWR is necessary to assure a good match between any two elements of a system. This is necessary in order to transfer maximum power from the source (transmitter) to the load (antenna). However, that's about as far as it goes. Yet, there is a tendency to give more meaning to SWR than is supported by facts, which leads us to the conclusions:

- Just because SWR is low, doesn't necessarily mean the system is *efficient*.
- A high SWR doesn't necessarily mean the system is *inefficient*

In a future article, the manner in which an antenna tuner provides a good match will be discussed. Next month's article will cover some of the causes and effects of RF currents on the outer shields of coaxial transmission lines and how to reduce them. One such effect is to get erroneous or inconsistent readings from SWR meters.

Further reading: ARRL Antenna Book, any addition. ■

¹ *Conjugate matching will be discussed in a future article*



By Lloyd, WA6ZZJ

Public Service

I want to thank all of the operators that got out of bed in the wee morning hours of Saturday, May 6th to provide communications for the Whiskey Row Marathon. It is members with dedication such as this that makes our public service communications possible. There were 21 amateurs that responded to this years call for assistance. The Prescott YMCA greatly appreciates the communications we provide for this event and because of that the Yavapai Amateur Radio Club is listed as a major sponsor of the race.

The amateurs involved in this years operation included AB7NK, KA7JAS, WB9VGJ, KD7VBG, KC6ZHG, KC5DKN, KI7JZ, KF6SPS, WA6AQK, N6LSA, KV8TD, K7DRV, W6CCD, KC7CBK, WB7RRQ, KD7RMV, KD7DGT, K7CJW, N7PJN, WA6JBV and WA6ZZJ.

Once again a big THANK YOU to all.....

ARES/RACES

As I write this, Yavapai County ARES/RACES is preparing for it's second quarterly training meeting of the year that will take place in Cottonwood.

The topic for the meeting is 'Message Handling', and at the last minute we are scrambling to prepare training for a new message form. Yavapai County Emergency Management is initiating use of the standard Incident Command System message form (ICS-213) so all areas will be on 'the same page' when it comes to forms. This is the form that is also used by the Arizona Department of Emergency Management.

A question that arises is "Why not use the NTS Radiogram Message Form"? The ARRL Radiogram is NOT compatible with the current Incident Command System message format.

- All Emergency Agencies are transitioning to ICS procedures and formats.
- Reformatting between the ARRL form and ICS forms unnecessarily increases the workload.
- Reformatting increases the probability of error.

The form itself is straight forward and easy to fill out and use. With training we should be able to adapt to its use fairly readily. I like to think that our ARES/RACES Amateur Radio operators are like they say in the Marine Corps able to 'adapt and overcome'...

It is when changes such as this come about that attending training meetings is of the utmost importance. At this time a Weapons of Mass Destruction (WMD) exercise is planned for later in the year so we will be preparing for it.

The image shows a yellow form titled "GENERAL MESSAGE" with fields for TO, FROM, SUBJECT, MESSAGE, SIGNATURE POSITION, REPLY, DATE, TIME, and SIGNATURE POSITION. It includes a red warning: "PERSON RECEIVING GENERAL MESSAGE KEEPS THIS COPY" and "(SENDER:) REMOVE THIS COPY FOR YOUR FILES".

Form ICS-213

Lee Cunningham, KC7CBK, has accepted appointment as West Yavapai County Emergency Coordinator/Asst. Radio Officer and Al Barber, AA7OV, has accepted appointment as Northeast Yavapai County Emergency Coordinator/Asst. Radio Officer. Both have extensive experience in emergency communications and ARES/RACES. ■

During the May Meeting, several mentions were made concerning the club's need for our own rig to be used for special events. In response to our need, Neil Vince, KA7JAS has graciously donated several items, including a:

- Kenwood TS-120S Transceiver
- Kenwood PS-30 Power Supply
- MFJ 945E Antenna Tuner

Thank you so very much Neil and Mary Vince for your donation. You, again, have helped us out in a wonderful way.

How a Repeater Works

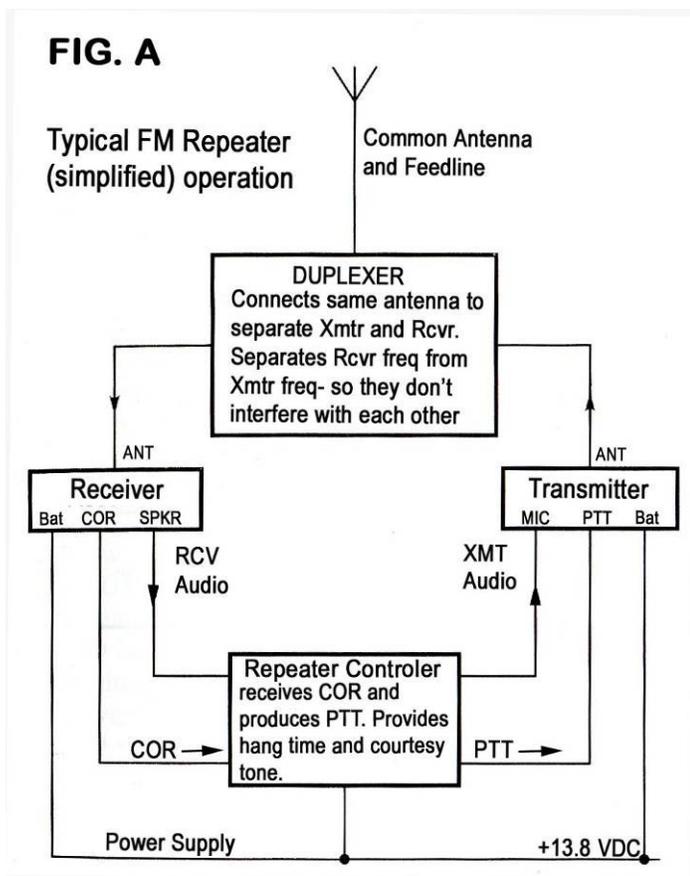
Reprinted with Permission From
Rich, KR7W

Editor's Note:

The following is an excerpt from Rich's "Build Your Own Repeater" article that appeared in the Radio Club of Tacoma's April issue of the "Logger's Bark" newsletter. Rich provides a basic explanation of a repeater's operation.

"...I think it is important for uninitiated readers to know how a repeater works.

The following explanation will use the W7DK repeater as the example of "how the repeater works". Figure A shows the basics.



Remember in "New Technician" class most of us learned that the receiver operates on a different frequency than the transmitter. On two meter FM the difference in frequencies is .600 MHz, also stated as 600 KHz. This is called the "split" or "offset".

Let's start at the top of the **Figure A** diagram and work down. W7DK repeater uses a single antenna and feed line. Some folks might be wondering how the receive signal and transmit signal co-exist in the same antenna system at the

same time. The secret of this operation is the DUPLEXER. The duplexer is basically a set of two narrow band filters with a common output (the antenna) and two separate inputs. The filters in the duplexer are very narrow in bandwidth. For instance, the transmitter outputs a frequency of 147.280 MHz into the duplexer. The transmit filter will allow this precise frequency to pass through (with very little loss), but will suppress all other frequencies on either side of the actual transmit frequency. This is done to prevent any spurious frequencies from being transmitted into the ether and into the receiver path of the duplexer.

On the receive side of the duplexer, the signal from the antenna system passes into the common input port and through the receive filters of the duplexer. This filter is precisely tuned to 147.880 MHz. Say I was transmitting 147.500 with my HT near the repeater. The band pass filter of the duplexer is tuned so sharp that very little of my HT's signal would pass through to the receiver. A well tuned duplexer will have a separation between transmit and receive frequencies of 50 to 60 dB and a pass through loss of about 3 dB. (as I like to say)... Let's do the math. 60 dB loss would equate to 1 millionth of the power, 50 dB would be 1/100000 of the power, and 3 dB is half of the power. It is important to keep any strong signal (even if not on the same frequency) out of the receiver to reduce the chance of overloading or blanking the receiver. If the adjacent strong signal blanks out the receiver... then it is not capable of receiving any lesser strength signals. The duplexer keeps the repeater's transmit signal out of the receiver to prevent blanking or overloading of the receiver.

Hopefully now... it is easier to see that very little of the transmitter's signal that goes into the antenna system will get into the receiver's input.

It is interesting to note that some repeaters (not very many) use two separate antennas instead of a duplexer. There are two ways to do this: (1) The transmitter and receiver are located miles apart and connected together via a **link** (phone line or a separate radio transmitter/receiver link). (2) The receive antenna is vertically separated from the transmit antenna. With this method... the antennas must be vertically orientated and be at least one wavelength apart and directly on top/underneath of each other. Vertical separation will produce a 30 to 60 dB separation of signals.

In the repeater, the Receiver, Controller, and Transmitter work together as a unit. When the **receiver** receives a signal,

See **Repeater**, Page 10

CQ DX de YARC – JUNE 2006

By Dick Diddams, W7QHE

DATE		DXCC ENTITY	CALL	QSL VIA	REPORTED BY	INFORMATION	<p style="text-align: center;">- - - MONTHLY HIGHLIGHTS - - -</p> <p style="text-align: center; color: blue;">GUINEA BISSAU</p> <p>Last reported there were 5-licensed amateur radio operators in Guinea-Bissau. However, due to the number of DXpeditions to Guinea-Bissau, this country is not on the 100 Most Wanted Country List.</p> <p>Guinea-Bissau is located in Western Africa, bordering the North Atlantic Ocean, between Guinea and Senegal and is slightly less than three times the size of Connecticut with a population of approximately 1.5-million. It is hot, dry, and a dusty harmattan haze may reduce visibility during the dry season -- brush fires country. Its natural resources are fish, timber, phosphates, bauxite, clay, granite, limestone, and unexploited deposits of petroleum. Only 8.31% of the land is arable.</p> <p>Since independence from Portugal in 1974, Guinea-Bissau has experienced considerable political and military upheaval. In 1980, a military coup established authoritarian dictator Joao Bernardo 'Nino' VIEIRA as president. Several coup attempts through the 1980s and early 1990s failed to unseat him. In 1994, VIEIRA was elected president in the country's first free elections. A military mutiny and resulting civil war in 1998 eventually led to VIEIRA's ouster in May 1999. In February 2000, a transitional government turned over power to opposition leader Kumba YALA, after he was elected president in transparent polling. In September 2003, after only three years in office, YALA was ousted by the military in a bloodless coup, and businessman Henrique ROSA was sworn in as interim president. In August 2005, former President VIEIRA was re-elected president in the second round of presidential polling.</p>
START	END						
Now	10 Jun	Senegal	6W	HA Buro	HA3AUI 20060213	Focus on 20 & 17m, SSB; some PSK RTTY; direct QSL also OK	
Now	10 Jun	Guinea Bissau	J5UAP	HA3AUI Direct	HA3AUI 20060306	By HA3AUI; 20-10m; SSB	
Now	31 Jul	Congo	9Q	ON7KEC	425DXN 20060311	Spare time operation; begin and end dates are estimates	
Now	25 Nov	Haiti	HH	PS7EB	PY2HS 20060405	All HF bands; CW SSB + digital; multiband vertical	
Now	20 Jun	Norfolk Island	V19NI	ODXG	OPDX 20060227	160-6m; CW SSB RTTY; QSL OK via Buro or direct: ODXG	
Now	09 Jun	Corsica	TK	DL4FF	425DXN 20060506	By DL4FF as TK/DL4FF fm EU-014; 160-10m; CW SSB	
Now	02 Jun	Crete	SV9	G3VMK	425DXN 20060513	As SV9/G3VMK fm EU-015; focus on 30 20 17m; CW only	
Now	08 Jun	Faroe Islands	OY	PA0VH A	425DXN 20060422	OY/homecall fm Eysturoy (EU-018); CW SSB RTTY PSK31	
03 Jun	21 Jun	Sardinia	IS0	IZ8GCB	IZ8GCB 20060512	As IS0/IZ8GCB fm EU-024; 80-10m; CW SSB	
06 Jun	24 Jun	Martinique	TO00	KC0W Direct	KC0W 20060505	By KC0W; all HF bands; CW SSB	
09 Jun	18 Jun	Senegal	6W2	F6ELE	425DXN 20060325	As 6W2/F6ELE fm Carabane Is (AF-078)	
16 Jun	19 Jun	Papua New Guinea	P29VV	F5NQL	F5NQL 20060307	By PA3EXX fm Witu (OC-181); 40 30 20 15 10m; SSB CW	
29 Jun	13 Jul	Mozambique	C9	K5LBU	K5LBU 20060326	By K5LBU/C91CF W5KDJ WW5L; QRV for IARU Contest	

• Repeater (continued from Page 9)

the controller tells the transmitter to “key up” and transmit the information the receiver is picking up. The FM receiver must initiate this flow of events. The receiver produces two outputs to the controller: 1) The **audio signal** and 2) The **COR**. The audio is pretty simple... it is basically the audio signal that would come out of the speaker in any FM transceiver. The **COR** (carrier operated relay) signal is usually a GND on the lead when the receiver’s squelch circuit opens up. At the W7DK repeater... two things must happen before COR operates: A) The receiver receives a good level RF signal... and B) The signal must contain the correct Tone, CTCSS Tone, or PL Tone. (remember setting the tone in your HT or Mobile rig to 103.5 Hz ?).

The controller does many things in the repeater. **Figure A** diagram only shows the basic operations. When the controller receives COR operation from the receiver...it passes the audio through to the transmitter’s MIC input. It also initiates PTT (**Push To Talk**) to turn on the transmitter as well as providing the courtesy tone (beep-beep-beep) The controller also contains some features not shown on the diagram... such as: Starts a couple of timers for ID-ing and to limit PTT length. It sends out the W7DK/R in Morse code to legally ID itself. It is also listening for Touch Tones (commands) within the receiver audio for remote control-

ling, such as: IRLP access for general users, Disable receiver’s need for PL tone for net controllers, shut down transmitter for the repeater control operator (repeater cops), and more. The controller is also connected to a phone line for further remote control capabilities if the repeater receiver fails.

It is easy to see that the controller could be eliminated in a “bare bones basic” repeater. The controller could be replaced with a PTT relay that was operated by the COR lead. Of course, this method would not provide any IDer or remote control capabilities that are required by the FCC.

The transmitter is very basic... it pretty much operates like your mobile radio or HT. Operating PTT turns the RF carrier on and audio goes into the MIC input circuitry.

The W7DK repeater uses an old General Electric commercial mobile (from a police or fire vehicle) radio for the receiver and transmitter. The transmitter in the mobile unit is the exciter (low power output)... that feeds a GE base station power amplifier (like a linear amp... but not the same). The W7DK repeater transmits (encodes) a PL TONE of 103.5 Hz. You can set up your HT or mobile radio to the Tone SQ mode to keep unwanted transmissions from opening up your radio’s squelch.”

The rest of Rich’s article documents how he built his repeater. ■

Lightning Safety Awareness Week June 18-24, 2006

By Joe, AC6AA



Follow the 30-30 Rule

If you see lightning, count for 30 seconds. If you hear thunder before you reach 30, get indoors. Wait 30 minutes after the last sighting of lightning or sound of thunder before returning outdoors. (To estimate the distance in miles between you and lightning flash, count the seconds between the lightning and the thunder and divide by five).

If lightning is occurring and a sturdy shelter is not available, get inside a hard top automobile, keep windows up and don't touch metal parts.

Telephone lines and metal pipes can conduct electricity. Unplug appliances not necessary for obtaining weather information. Avoid using corded telephones or any electrical appliances or equipment.

Don't watch lightning from open windows or doorways. Inner rooms are safer.

Do not take a bath or shower.

Turn off air conditioners. Power surges from lightning can overload the compressors.

Get to higher ground if flash flooding or flooding is possible. Once flooding begins, abandon cars and climb to higher ground. Do not attempt to drive to safety. Note: Most flash flood deaths occur in automobiles.

If Caught Outdoors and No Shelter Is Nearby...

Avoid the high ground. Find a low spot away from trees, fences, and poles. Make sure the place you pick is not subject to flooding. Avoid wide open areas.

If you are in a group - spread out.

If you are in the woods, take shelter under the shorter trees.

If you feel your skin tingle or your hair stand on end, squat low to the ground on the balls of your feet. Tuck your head between your knees and cover your ears. Make yourself the smallest target possible, and minimize your contact with the ground.

Avoid water. If you are boating or swimming, get to land and find some safe shelter immediately! ■

Lightning Myths and Facts

MYTH: If it is not raining, then there is no danger from lightning.

FACT: Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.

MYTH: The rubber soles of shoes or rubber tires on a car will protect you from being struck by lightning.

FACT: Rubber-soled shoes and rubber tires provide NO protection from lightning. However, the steel frame of a hard-topped vehicle acts as a Faraday cage and provides increased protection if you are not touching metal. Although you may be injured if lightning strikes your car, you are much safer inside a vehicle than outside.

MYTH: People struck by lightning carry an electrical charge and should not be touched.

FACT: Lightning-strike victims carry no electrical charge and should be attended to immediately. Apply first aid if you are qualified to do so. Call 911 or send for help immediately.

MYTH: "Heat lightning" occurs after very hot summer days and poses no threat.

FACT: What is referred to as "heat lightning" is actually lightning from a thunderstorm too far away for thunder to be heard. However, the storm may be moving in your direction!

Thunderstorms & Lightning Safety What YOU Can Do!

Before the Storm...

Know the county in which you live and the names of nearby major cities. Severe weather warnings are issued on a county basis.

Check the weather forecast before leaving for extended periods outdoors.

Watch for signs of approaching storms.

If a storm is approaching, keep a NOAA Weather Radio or AM/FM radio with you.

Postpone outdoor activities if thunderstorms are imminent. This is your best way to avoid being caught in a dangerous situation.

Check on those who have trouble taking shelter if severe weather threatens.

When Thunderstorms Approach...

Remember: if you can hear thunder, you are close enough to the storm to be struck by lightning. Go to safe shelter immediately!

Move to a sturdy building or car. Do not take shelter in small sheds, under isolated trees, or in convertible automobiles.

Weekly Breakfasts



Tues. & Thurs. Morning Breakfast – 7:00 a.m. at Michael's Restaurant

*(In the Safeway Shopping Ctr.,
Hwy 69 Prescott Valley)
(N 34°35'13.33" W112°19'44.6")**
Informal – all are invited.

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, N7PJJN

Area Repeaters

Frequency	PL	Location	Owner/Club	Auto-Patch	Rem. BaseOr Linked	Vo IP	Notes:
52.560-	100.0	Mt. Union	N7NGM			Echo	-500KHz Offset
53.040-	None	Prescott Airport	WB7BYV				-1MHz Offset
145.290-	127.3	Mingus Mtn.	ARES/RACES				
146.780-	91.5	Williams Mtn.	BWARC			IRLP	
146.880-	100.0	Prescott	W2YAV/YARC				
146.980-	162.2	Flagstaff	CARC				
147.000+	162.2	Mingus Mtn	MMRG				
147.040+	100.0	Prescott Heights	W2YAV				
147.140+	162.2	Flagstaff/-Mt. Elden	ARA		Linked to Mt. Ord 147.360-		
147.220+	162.2	Mingus Mtn	VVARA				
147.260+	103.5	Mt. Union	ARES/RACES				
442.150+	100.0	Mingus Mtn	W1OQ/Northlink				
442.350+	100.0	Glassford Hill	N7KPU			IRLP	
448.475-	100.0	Flagstaff-Elden	ARA	Yes			
448.500-	100.0	Prescott	KB6TWC	Yes	RB to White Tank 146.940		E-mail owner for instructions
448.875-	100.0	Flagstaff-Elden	Northlink		Linked		
449.175-	100.0	Towers Mountain	Northlink		Linked		
449.675-	88.50	Prescott Airport	WB7BYV		Linked to P Mtn. 927.3875		
927.3875-	151.4	Prescott	WB7BYV	Yes	Yes	Echo	Be Nice

Y.A.R.C. IRLP NODE
Node Number 3182
442.350+ MHz with a
PL of 100.0 Hz

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 Bob Smith, WB6ODR, our Webmaster

