

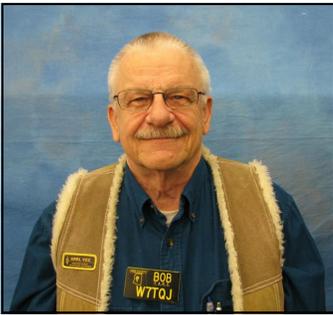


# YAVAPAI SIGNAL



The Yavapai Amateur Radio Club • Prescott, Arizona • DM-34 • Volume 24 – No. 6 • June 2009

## From The President's Desk ...



I'm happy to report that word of the Prescott Hamfest has really gotten around this year. A number of folks I chat with on 160-Meter AM, and 80-Meter AM/SSB/CW, who have not yet attended any of the previous Prescott Hamfests, are all planning on driving up to Prescott the

week-end of the 30<sup>th</sup> of May. Even a couple of hams from Southern California are planning on driving over for the week-end and taking in some of the other sights in the area as well. And these are just the ones I know about.

I'm not sure why all of the interest this year, but it could be due to a number of factors, such as the economy, word of mouth advertising, the cooler weather here in Prescott compared to Phoenix/Tucson, or all of the many new hams that just got their license this past year, or maybe even just some general curiosity about the event, now in its third incarnation.

Word of mouth advertising could be a big factor. The Prescott Hamfest has indeed grown over the last two years, and those that attended those events have obviously told

their friends and acquaintances, especially if they had a good time, and the overall experience was enjoyable.

The economy could be a big factor. After all, it's not an expensive proposition to drive to Prescott from Phoenix to spend the day (or Tucson for that matter), and with everyone watching their pennies and nickels this year, the Hamfest may be a desirable alternative to a much more expensive Saturday or whole week-end outing.

The weather could be a major factor. Temperatures in Phoenix average 20 degrees warmer than in Prescott, with those in Tucson at about 15 to 18 degrees warmer. Getting out of the heat has always been a good reason to head for the high country during the summer months in Southern Arizona, and the draw of the Prescott Hamfest may just be the deciding factor on a triple digit day down in the Valley. (They're already starting to approach 110° F. daytime temperatures).

The newly minted hams could be a factor. A number of new hams are trying to experience all that ham radio has to offer, and hamfests are just one of the many facets of the hobby.

Whatever the reasons, I am hearing rumblings of a record turnout this year. Lots of interest in what's going to be for sale on the tables, lots of interest in renewing old acquaintances in the form of eyeball QSO's, and lots of interest in attending an event without experiencing the sweltering heat of the desert floor. Whatever those reasons are, I think we're in for a real treat this year. See you all there!

/Bob Erdmann – W7TQJ

President, Yavapai Amateur Radio Club

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## Upcoming Events

- **May 30, 2009** - Annual Prescott Hamfest & VE Testing
- **June 27- 28, 2009** - Field Day at Willow Lake Park
- **July 17-19, 2009** - ARCA/Williams Hamfest in Williams, Arizona

## 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 7, 2009 Board Meeting

Meeting was called to order at 1830 hrs. by the President, W7TQJ. Also in attendance: KB7TRE, KF6SPS, KE7DTR, K6VVR, AB7NK, & WB7RFY.

Programs were reviewed; schedule through August confirmed.

Website update in progress. WB6ODR has addressed all navigation issues; a huge amount of work; now the appealing part can be handled page by page. W7TQJ assisting.

Hamfest has had considerable interest; KB7TRE has been queried by multiple vendors. Many volunteers have already agreed, but more are needed. Will solicit at meeting and from VVARA through WN7L.

Voting into Membership: Board was asked to discuss why this occurs. Record shows that By-law change 5 years ago was specifically proposed in part to add this requirement, reasons were reviewed. Consensus is that beyond legal concerns, it is welcoming to new members, being accepted, and is seen as a positive. No application has ever been denied, and no member has ever been removed, but the option is allowed as currently written. On motion of KE7DTR, second of KF6SPS and no dissenting votes, Board affirmed as written and as policy.

Field Day, all covered. KD7VBG has sign up sheet for operators.

Meeting was adjourned by W7TQJ at 1858 hrs.

Respectfully submitted,  
Jeff Hanna, WB7RFY  
Secretary

## Minutes of May 7, 2009 General Meeting



Meeting was called to order at 1901 hrs. by the President, W7TQJ. Following the Pledge of

Allegiance, introductions were made.

**Attendance:** 65 of whom 57 signed in. Visitors included W7JU, Ralph Adair; W4WDC, Wayne Curtis, & Bob Kane, K7KOL.

**Minutes:** of April 02, 2009 meeting, on motion of KB7TRE, second of WB6ODR, were accepted as published.

**New Members:** On motion of K6VVR, second of WB7UZV, and no dissenting votes heard, KB7HH, John Garner was voted into the membership.

**Treasurer:** AB7NK reports beginning balance of \$2391.78, ending balance of \$2235.22, and repeater fund balance of \$565.92. Report accepted as read.

### COMMITTEE REPORTS:

**Ares/Races:** No report.

**VE:** AB7NK thanks all VE's for their participation & Embry-Riddle for use of facilities for recent testing. Next session will be in conjunction with our Hamfest, May 30, 2009, starting @ 9:00 am sharp in the GMMS room 404 for all license levels. Pre-notification appreciated at [AB7NK@ARRL.net](mailto:AB7NK@ARRL.net).

**Newsletter:** Editor AC6AA has no report.

**Patches:** Treasurer displayed both sizes available for \$3.00 each. Club 'stickers' also available for \$1.00 each at club meetings or contact [AB7NK@arri.net](mailto:AB7NK@arri.net).

**Shirts:** W6CCD has a few on hand in M, L, & XL; \$19.00 each. Contact [W6CCD@arrl.net](mailto:W6CCD@arrl.net).

**Badges:** Orders for custom club badges are being accepted by WB6ODR, \$6.75 each. Contact [lsmith@cableone.net](mailto:lsmith@cableone.net).

**Repeater:** WB6ODR reports all is well.

**IRLP:** No report.

**PIO:** submit items to WB7RRQ.

**School Clubs:** For W7GMG, KE7TWR reports average meeting has 4 attendees, but those differ week to week; 2 probable testing at next session. KB7TRE noted that group meeting is planned for May 19<sup>th</sup> with W7BMB and Camp Verde to plan an operable station and display for county-wide school fair in September.

**Elmer:** KA7JAS reported on several postings of used equipment and treasures available for free or donation. Busy times ahead with hamfest and Field Day.

**Refreshments:** K6UWV suggests enjoy, then recycle. Often have excess coffee following meeting; bring a thermos if you like.

**Young Hams Net:** Sundays, 7:00 pm, 147.22+ 162.2pl. Growing activity. KI6AHH encourages all to check-in.

**Slow Code Net:** Sundays, about 7:30pm, 146.88- 100hz pl. WB7UZV suggests listen in, check-in, and have fun. Additional options discussed for those interested in increasing skills.

**Foxhunt:** K6VVR has equipment ready to test; for August program you can build a sniffer beam antenna for materials cost of \$10.00. Contact K6VVR.

**Programs:** KE7DTR outlined summer programs, rest of year is open!!! Please contact [richbozeat@cableone.net](mailto:richbozeat@cableone.net) with ideas of what you would like to have or do. June will be KD7VBG on logging software.

**Hamfest:** KB7TRE leads with WN7L as co-chair. Plans in works; work left to do. Is a big effort that needs many volunteers to be successful. Spaces will be larger at 15' x 15'; a few tailgate spaces will be available this year; also wheelchair accessible spaces. No vehicle movements inside the area between 8 & 1. Much interest from vendors and hams around the state and beyond; it's the place to be Saturday May 30, 8:00 am until 1:00 pm. Set-up starts at 6:00 am; no selling before 8:00 am; main drawing at 12:45 pm; hamfest ends at 1:00 pm.

**Field Day:** Final plans at next meeting. Sign-up sheet available to request specific radio hours if needed, or just sign-up to say you will be operating. Station layout depends on these results. Contact [wa6zzj@cableone.net](mailto:wa6zzj@cableone.net) to get your slot or say you wish to operate.

**Auction:** Silent auction of Club 60' tower ending May 21<sup>st</sup> was reviewed, [AB7NK@arrl.net](mailto:AB7NK@arrl.net).

**NEW BUSINESS:**

WB7UZV announced with K7IOG, that Amateur Radio Newslines is now available locally via Mingus Mountain Repeater Group on Tuesdays at 7:00 pm on 147.00+ 162.2pl repeater. Several spoke of great information available.

N0DAJ announced that the Has-sayampa Amateur Radio Klub (HARK) is now an ARRL affiliated club in Congress area.

N7RIS reports Batteries Plus on

Highway 69 in Prescott Valley can rebuild most any battery pack, and is a reliable local firm.

**anchors:** Repeating from Elmer, much available tonight; free and for sale including full Yaesu HF station.

**Tonight's Program:** K7KOL on continuing education opportunities and Ham Radio. [www.yc.edu/olli](http://www.yc.edu/olli).

**50/50 Drawing:** \$74.50 was won by WB6ODR.

**Adjournment:** at 1945 hrs., on motion of KE7DTR, second of KE7TWR.

Respectfully submitted:

Jeff Hanna, WB7RFY

YARC Secretary

**June Program**



June's Program will be about  
**"Logging Software"**  
and the speaker will be  
Patti Halgunseth, KD7VBG

**Membership Count:**

1st Thurs. in April.....	177
Gain/Loss.....	-13
1st Thurs. in May.....	164

\* Includes 7 3-Month Memberships



# Yavapai Amateur Radio Club

## Treasurer's Summary

### May 2009

By Mary Vince, AB7NK

Treasurer

#### Income

* Membership New/Renewals/Students (1new & 11renewals)	\$ 216.00
Repeater Fund (Renewals)	24.00
Patches/stickers/shirts	22.00
Proceeds from sale of donated equipment – KF7ANQ	38.00
Fifty-fifty	<u>149.00</u>
Total Income	\$ 449.00

#### Expenses

Ck # 1079	W6CCD	Richard Hughes	Shirts	\$ 111.17
Ck # 1080	K6UWV	David Passell	Refreshments	25.44
Ck # 1081		Allegra – Newsletter	Inv # 42306	32.87
Cash	WB6ODR	Bob Smith	50/50	<u>74.50</u>
Total Expenses				\$ 243.98

**Beginning Balance 5/13/09	\$2,235.22
Income	449.00
Expenses	<u>&lt; 243.98&gt;</u>
General Fund Balance 5/13/09	\$2,440.24
Repeater Fund Balance 5/13/09	( 589.92 )
Net Income	\$ 205.02

\*Itemized copy on file & available

AB7NK - Treasurer  
5/13/09

# EMP, our worst nightmare?

By Paul Honore' W6IAM

While manning the Emergency Management booth at the County Fair in August, I was discussing disaster scenarios with a gentleman and he asked what preparations we had made to protect against an EMP (*Electromagnetic Pulse*) attack. I had no answer for him. Fact is, I hadn't given it much thought since the '60s when I was involved in a classified project to harden military equipment against the effects of a nuclear blast. At the time, we were primarily interested in keeping vacuum tubes and transistors from going bonkers when exposed to intense radiation of various sorts. So far, no one had seriously considered the possibility of an electromagnetic "spike" being the real culprit in a nuclear event. The rude awakening came when a high altitude test over a Pacific Island upset radio communications a thousand miles away in Hawaii! Underground tests in Nevada followed and we began to learn how to apply filters and Faraday shields to protect sensitive equipment from EMP.

The good news was that with great expense of time and money, critical military equipment could be somewhat hardened against an EMP. The bad news was little could be done to prevent even a low-yield nuclear blast from disrupting the civilian infrastructure over a large part of the continental United States. For obvious reasons not much was said publicly at the time. Most of our defensive strategy lay in building a deterrent capability to prevent a preemptive attack by the only superpower capable of launching one against us.

Our thinking was focused on destruction of people and property and how we might intercept incoming missiles. EMP was put pretty much on the back burner.

Since the end of the cold war a couple of things have radically altered the picture. 1) Nuclear devices capable of creating an EMP are no longer the purview of superpowers, but can be built and delivered by almost anyone with a desire to create mass mayhem. 2) Our lives have become more and more dependent on computers and other electronic gadgetry to control and manage our infrastructure.

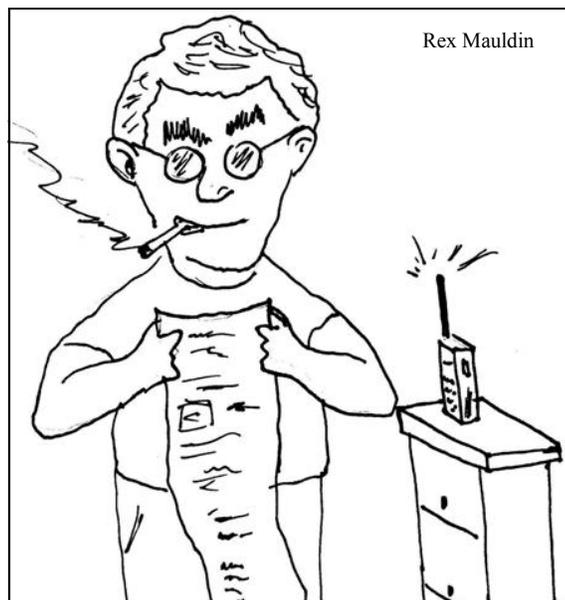
Here's how it works: A small atomic device detonated high over the earth won't do much harm to living organisms, but through a complicated interaction with the rarified atmosphere it will generate an Electromagnetic Pulse that can do great damage to electrical and electronic devices. The physics of this is hard to explain without a lot of esoteric mathematics, but trust me, it works. Three things occur in rapid sequence. First, an energy "shockwave", similar to static electricity and lasting about a microsecond, will burn out sensitive circuitry such as receiver front-ends. This is followed by an energy spike of much shorter duration, but of extremely high intensity. This energy spike will melt-down most commercially available lightning protectors and further degrade or destroy electronic equipment. Finally, a magnetic component lasting up to a full second arrives, causing a current surge that can damage anything connected to a power or phone line. It's a highly effective and relatively inexpensive way for a low-tech society to cripple a high-tech society.

See EMP, Page 11

**For Sale**

These items are from the estate of Bruce Thornburg [SK] (W7YDV). Please contact Nancy, at (928) 273-2466 if any interest. Items not sold through this Ad will be available for viewing and sale at the Prescott Hamfest.

- |  |       |
|--|-------|
| 1. Heathkit Model IP-18, 1 to 15 VDC, regulated power supply | \$10  |
| 2. Simpson Model 260 VOM (Great Condition)                   | \$40  |
| 3. Radio Shack Digital Tuning, Model DX-399 Receiver         | \$75  |
| 4. Electro-Tek Multi-meter                                   | \$8   |
| 5. Micronta LCD Digital Multi-meter                          | \$12  |
| 6. Drake R8B Receiver (Mint Condition)                       | \$899 |
| 7. Digital Multi-meter, Model DT-5806                        | \$25  |
| 8. PC Mother Board (Vintage Unknown, but lots of memory)     | \$25  |
| 9. Realistic SA-10 Stereo Amplifier                          | \$20  |



OOPS! Forgot the Wednesday Night Net again.



By Lloyd, WA6ZZJ

## ARES/RACES.....

### TRAINING MEETING.....

The next quarterly ARES/RACES training meeting is scheduled for Saturday, June 6, 2009. The format and location are yet to be determined, but pending an actual emergency activation the meeting will go on...

### SPECIAL EVENT COMMUNICATIONS.....

#### The Whiskey Off Road Bicycle Event...

Saturday, April 25<sup>th</sup> was a nice cool morning for a bicycle ride through the Prescott National Forest on forest roads and 'single track' trails and there were 722 riders that took advantage of it in the Whiskey Off Road. Some of them rode the 15 mile ride while some did the 25 mile ride and yet there were others that did the full 50 mile ride.



This year there were a few incidents where medical attention and possibly transportation was needed. There was a broken arm into Waypoint-1and, a knee injury on the Skull Valley out-and-back between Waypoints-3 and 5, along with an injury incident on Gurley Street near Gail Gardner that required medical transportation and the bike to be retrieved by a SAG vehicle.

Again this year, we worked closely with the Southern Arizona Rescue Association (SARA) whose members came up from the Tucson area.

Thanks to all of the YARC members who contributed to making the YARC Special Event Communications for this event a success. We fought some windy and cool weather, but stayed the course and completed our mission.



#### Mobile Amateur Radio Communications (MARC) Control Center

The following is just one of the many thank you emails received by Epic Rides:

*A big compliment and a round of thanks to the volunteers and crew you had out at the Whiskey. My husband broke his arm (as he admits because of some bad riding skills), fortunately we were close to the 15; 25 50 turn off and the volunteers there were a great help and super friendly! They called in the SARA crew who took good care of him and gave us a gentle lift back to our truck. Ranger Ron from the forest service kindly took our bikes and when he was finished with his duty personally brought them by the hospital. Sadly we had to leave (I spent many hours training for the water-hole challenge!!), but we will look forward to your next event.*

*Thanks again for ensuring you have awesome people out there looking out for us.*

The organizers, Epic Rides look forward to our assistance on this event again next year....

## The Whiskey Row Marathon...

Saturday, May 2<sup>nd</sup> was the 31<sup>st</sup> running of the Whiskey Row Marathon and the 11<sup>th</sup> consecutive year of our providing communications for this event.

ARES did the event in the late "90's", but it has been done in the Yavapai Amateur Radio Club's name since the early "2000's". Some of the members who have been doing it for years have their spots 'staked out' from year to year.

This year's event went smoothly after all of the Water Stations get their supplies squared away. There was one request for medical assistance on Copper Basin Road and Lifeline Ambulance responded to it.

As always, the YMCA greatly appreciates our help on this event and YARC is considered a major sponsor because of it. Be sure to mark Saturday, May 1, 2010 on your calendar for the 32<sup>nd</sup> running of the marathon.

## Why do we do it??

I am sure that many of you, like me, have had your none ham friends ask "why you get up at ridiculous hours of the morning and go out and provide communications for these events".

I usually reply that one of the main reasons we are able to get our Amateur Radio license is to provide service to the public and besides that its fun....

## Field Day...

The sign up sheet for Field Day operations at the May YARC meeting yielded nine (9) signups to operate. Let's see... The last roster I have shows over 170 members. That equates to about a 5% sign up. Even if we take 50 members (the possible average number at a meeting) it comes out to about 15%. The sign up sheet will be passed around at the June meeting and I hope we can come up with many more people signing on to operate. This is your club folks, and it's up to you to get actively involved in it. ■

# ANNUAL



## PRESCOTT HAMFEST HOSTED BY YARC / VVARA

### HURRY! HURRY! HURRY!



DONUTS, COFFEE,  
HOTDOGS & SODA  
FOR A NOMINAL FEE!



**TALK IN FREQUENCY**  
**146.880- PL-100 HZ**

### WHERE:

Granite Mountain Middle School  
1800 Williamson Valley Rd.  
Prescott, AZ 86305

Set up on the basketball court.  
Bring your own tables.

Sellers Fee: \$10.00 per Space.

### WHEN:

Saturday, May 30th, 2009

Gates open at 6:00 am.

Swap meet starts at 8:00 am  
and ends at 1:00 pm.

VE Testing Promptly at 9:00am

### HOW:

Check our website for directions.

W7YRC.org

### WHY:

Meet friends, make friends, swap stories and gear.

### YARC Officers for 2009

#### President

Bob Erdmann, W7TQJ  
W7TQJ@cableone.net

#### Vice President

Pete Morrison, K6VVR  
pm\_service@earthlink.net

#### Secretary

Jeff Hanna, WB7RFY  
jeff668@commspeed.net

#### Treasurer

Mary Vince, AB7NK  
ab7nk@ARRL.net

#### Board of Directors (includes Club Officers)

Terry Pemberton -- KB7TRE

Tom Griswold -- N6LSA

Richard Bozeat -- KE7DTR

Walter Schumann -- KF6SPS

Newsletter Editor: Joe Oliver, AC6AA  
joliver@cableone.net

# Frequency Standard for the Radio Amateur

(Revised 5/11/2009)

By Dick Hughes, W6CCD

I have been interested in frequency measurement and standards for as long as I have been a ham. Precision measurement and the instruments for doing that have always been one of the most interesting aspects of amateur radio for me.

My first serious frequency standard was one I built out of the November 1968 QST. It was called, "The Mainline FS-1 Secondary Frequency Standard. It used a 4 KHz low-drift crystal from International Crystal, and used 7490 IC's for frequency dividers. It had outputs down to 1 KHz. The 7490 IC's were \$10 each then, and all the parts were nearly \$100, which was a lot of money in 1968. I still have that FS-1 frequency standard.

Using the FS-1 standard, I bravely entered the ARRL frequency measurement test in February 1969. Using nothing but the FS-1 and my SB-101 Heathkit transceiver, I zero-beat the FS-1 at the nearest 10 KHz dial mark on the SB-101, then read the frequency as close as I could on that old analog dial. My closest reading was within 24 Hz on 40-meters, and my overall readings had an error of 10.9 parts per million. To qualify for a Class I Official Observer (OO) back then (the top rating) you had to be within 71.4 ppm. I never applied to be an OO, but I was very happy with my test score that was well within the requirements. The very best operators then could measure within about 0.1 parts per million.

As time went on, and transceivers acquired digital dials and temperature compensated crystal oscillators, the need for frequency measurement tests was eventually dropped by the ARRL in 1981. Any modern transceiver within calibration was orders of magnitude better than our old methods of frequency measurement. However, my interest in frequency measurement and standards never diminished.

Starting in the 1960's, several companies began pro-

ducing frequency measurement equipment that was very precise. Hewlett-Packard in particular made some very nice equipment, including a Cesium standard. Unfortunately, it was also very expensive, and out of reach of the average ham. The Cesium standard alone was \$40,000 in 1960's dollars. Inexpensive frequency counters came on the market, but these weren't much better than our modern transceivers. Then two things happened. First, the U.S. Government, bless their hearts, put 24 GPS satellites up in the sky for the military, which also allowed the average citizen to locate his position with amazing precision.

**"Why do we need such precise measurement of frequency?"**

The source of all this precision is atomic clocks in each satellite. The clocks produce a very precise timing pulse once each second, and with the proper equipment, these pulses can be averaged and translated into a very precise standard frequency. Each Block II/IIA satellite contains two cesium (Cs) and two rubidium (Rb) atomic clocks. Each Block IIR satellite contains three Rb atomic clocks.

One kind of organization that needs very precise timing is the telephone companies. For example, those with CDMA cellular networks have to synchronize signals between base stations. Toward this end, custom, GPS disciplined clocks were developed by Hewlett-Packard and Trimble. These clocks contain a GPS receiver that can lock on six or eight satellites at the same time, and other circuitry, including a double-oven, voltage controlled crystal oscillator (VCXO), that could yield the precise 1 pps signal that they needed, as well as standard frequencies. The most useful being 10 MHz. The VCXO is "disciplined" by averaging the timing pulses from the satellites currently locked, then changing the oscillator frequency to synchronize it with the atomic clocks. This is all done very slowly, and the oscillator becomes more precise over time as the crystal ages.

Then the second event came along to benefit amateur operators desiring precise frequency measurement. The Telco's decided to upgrade their CDMA networks from the IS95 standard to the newer 1XRTT standard. What these are is not important to us. What is important is that the original GPS disciplined clocks could not be up

See **Frequency Standard, Page 9**

## ● Frequency Standard (Continued from Page 8)

graded! And guess what? Suddenly, all these expensive GPS clocks became surplus and available for a reasonable amount. In the range of \$250 to \$300. A large supply of the HP receivers has become available from China on eBay.

The two most common receivers available today are the Hewlett-Packard Z3801A and the Trimble GPS Disciplined Clock. The Trimble does not carry a model number. These units require only a power supply, GPS antenna and an RS-422 to RS-232 converter if you want to control the receiver with your computer, and see what is going on. In most cases, you can even get by without the converter. The software is available free, but there is more sophisticated software available for the HP for around \$20. I use the free kind with my Trimble.

Those of you who like to roll your own should read the article, "A GPS-Based Frequency Standard" in the July 1998 QST. An excellent site on use of the commercial receivers is

[http://www.realhamradio.com/GPS\\_Frequency\\_Standard.htm](http://www.realhamradio.com/GPS_Frequency_Standard.htm)

I would also recommend reading the U.S. Navy Navstar site at <http://tycho.usno.navy.mil/gps.html>.

You might ask, "Why do we need such precise measurement of frequency?" For me it is simply an interest in the art of frequency measurement. I do, however, use my GPS receiver to increase the accuracy of a 30-year-old HP 5328A frequency counter. From a more practical standpoint, amateurs who participate in EME (moon-bounce) and weak signal VHF communications have to know their precise frequency, and GPS standard receivers are popular with them. Some modern transceivers, like the Kenwood TS-950SDX, make a provision on the back for using an external time base.

What kind of frequency accuracy are we talking about? The Trimble is conservatively rated at 2 parts in 10 to the 12<sup>th</sup> over a one-day average and 2 parts in 10 to the 10<sup>th</sup> at any single point in time. When I watch the monitor program for my Trimble, I typically see a measured variation of .05 parts per billion! That's 5 parts in 100 billion! About the same as a Rubidium standard. Should be good enough to pass the old OO tests don't you think? ■

## ARIZONA QSO PARTY

Announcing the 2009 Arizona QSO Party, sponsored by the ARRL Arizona Section and Catalina Radio Club, from Oct 10 1600Z to Oct 11 0400Z and Oct 11 1400Z to Oct 11, 2359Z. Phone, CW and Digital modes on 80/40/20/15/10/6/2 meters. Single-Op, Multi-Op, and Mobile categories.

Work stations once per band and mode. Mobiles may be worked once per band and mode in each county. County Line operations count as 2 QSOs. Exchange RST and location (AZ County, State, Province, or DXCC Prefix).

Suggested Frequencies (kHz): CW: 3548, 7048, 14048, 21048, 28048. SSB: 3848, 7248, 14248, 21048, 28448. FM Simplex: 146.48MHz. One point per Phone QSO, two points for CW and Digital QSOs. Multipliers for non-AZ entries are the 15 AZ counties. Multipliers for AZ entries are States, Provinces, and DXCC Countries. Final score is total QSO points times total multipliers. Mail logs no later than Oct 31 to Catalina Radio Club, C/O Gary Keck, PO Box 18135, Tucson, AZ 85731 or via email [tologs@azqsoparty.org](mailto:tologs@azqsoparty.org).

For full rules, along with log and summary sheets, Cabrillo electronic file format, and Award information, see <http://www.azqsoparty.org>.

Please pass on the information to your organizations, clubs, mail lists, etc. Thank you for your support!

+Gary Keck, KE7DX  
Catalina Radio Club

From the American Museum of Radio and Electricity

**Which Founder of the United States helped to save at least 700 lives during the *Titanic* disaster, more than a century after his death?**



*Benjamin Franklin and the Titanic*

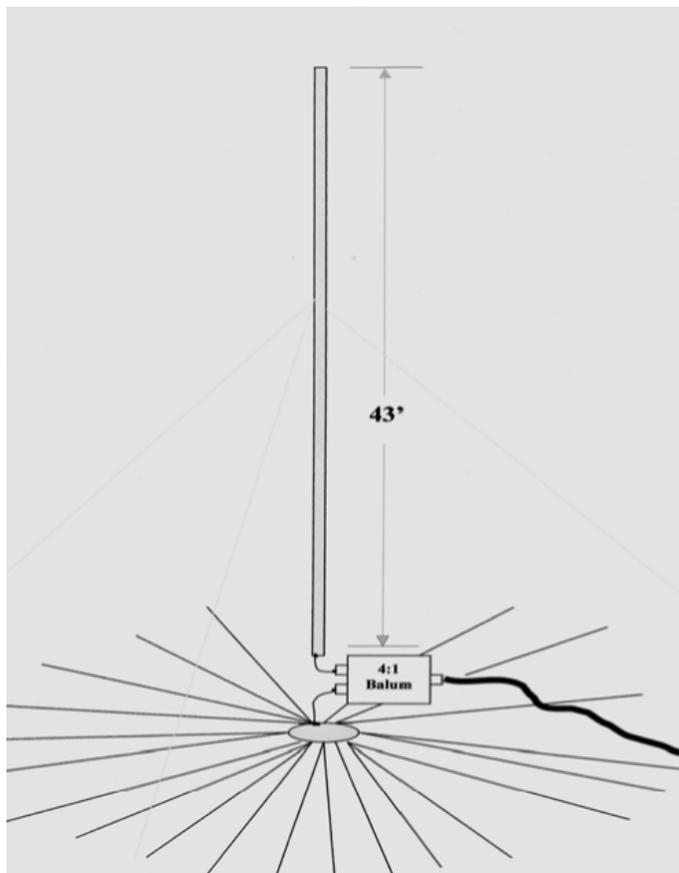
Benjamin Franklin carried out the first serious studies of atmospheric electricity and widely distributed his theories and findings. In 1749 he conducted his famous kite experiment. His work contributed mightily to the process of scientific investigation that would result in the establishment of wireless communications. Had it not been for radio transmissions of calls for assistance by the *Titanic*, many more lives would have been lost in the early hours of April 15, 1912.

# All-Band Vertical Monopole on a budget

By Bruce Randall, W1ZE

If you have been reading your ham magazines or surfing the ham web sites you may have seen ads from DX Engineering and MFJ about a 42-foot all-band Monopole vertical antenna. The monopole is not a new antenna. It has been around since the early days of radio. In fact the US Navy uses them on their ships for HF communications since before WWII. As the name implies, it is a single vertical element working against a ground.

Both the DXE-MBVA-1 and the MFJ-2990 monopoles claim that they are all-band (160 through 10 meter) antennas and will handle 1.5 kW. You may be asking, how do they do that with without coils or traps, because 43-feet is far too short for 80 and 160 meters. Well they make it radiate a signal with the aid of a 4:1 balun and a good broad range antenna tuner (transmatch). With most ground-mounted verticals, the key to their success and performance is a good ground system. The more radial wires on (or in) the ground the better.

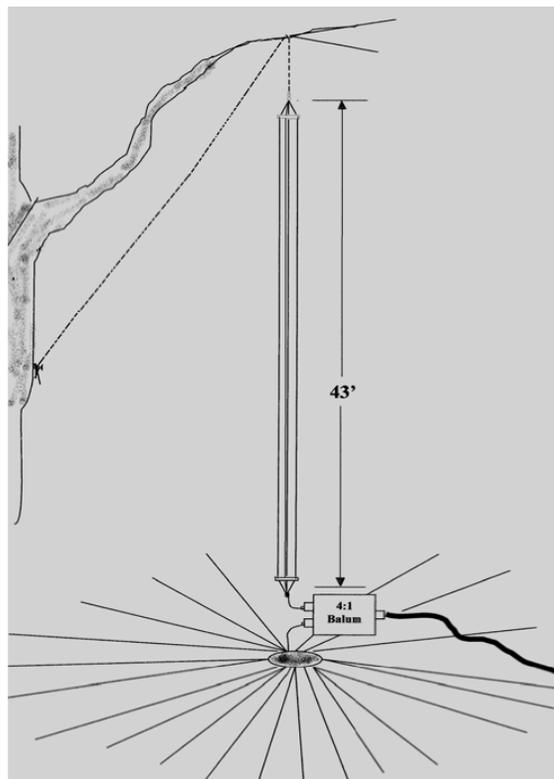


Both antennas are fabricated from aluminum tubing. The DXE uses tapered sections and both claim to be self-supporting. But if it were me, I would still guy it use some nylon line to steady it up a bit. Both models appear to be well made with an edge going to the DX-Engineering MBVA-1, which uses their popular radial termination plate and mount.

They may work well enough, but neither DXE nor MFJ are giving them away. The basic models are in the \$300+ range. Old tightwad Bruce has built monopoles in the past with a few used at Field Day sites in W6-land with some success. I don't think that the monopole will be as effective as a full quarter-wave vertical or inverted "L" on 160 meters because those antennas need to be high and very long (+/- 130-feet).

You could build your own 43-foot monopole using two or three inch aluminum tubing but that stuff is not inexpensive either.

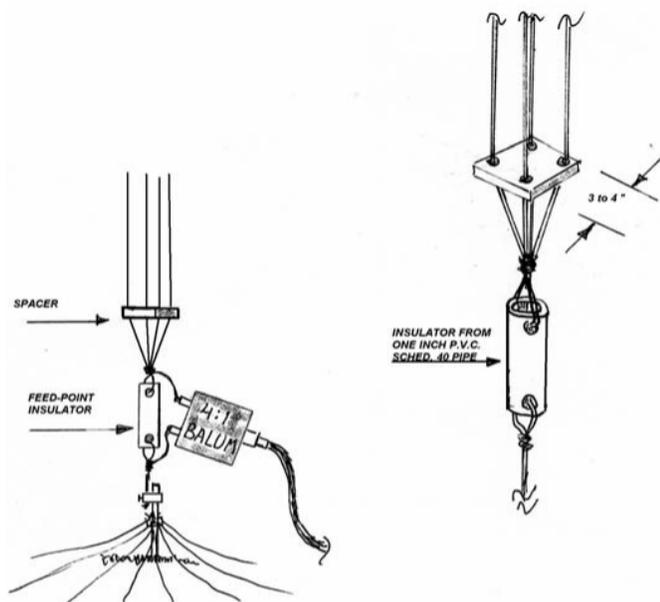
One of the reasons that help the antenna perform at such a short length is the fact the aluminum tubing has a large diameter than #14 wire. The larger the surface area of a radiating element the shorter the length required for a given frequency. It is common knowledge that making a large diameter radiating element can be done by running several common wires in parallel, which acts the same as a solid element of the same diameter or width.



The vertical element can be made with four each 43-foot long No. 14 or 12 stranded copper.

OK, so how do you make it vertical? Thank goodness for tall trees with limbs sticking out about 45 to 50 feet above ground. A halyard line slung over a tree limb can support the top end of the wire monopole. The bottom end of the vertical element can be supported by a ground rod and attached to the element via an insulator. The balanced output of a 4:1 balun can be connected to the ground stake and the monopole element at the feed-point insulator.

Solder the wire elements together at both ends. Before you solder the ends, make about six 4"x 4" squares of 1/4-inch thick plywood. These will be used as separators. In each corner of the plywood spacer drill a 1/4-inch hole. Two of them will be used as end spacers and the remaining four will be spaced out along the element and secured by tie-wraps. This should help keep each wire about three inches apart.



The 4:1 Balun can be purchased commercially but as described in the February 09 issue of Squelch Tales, you could build a 4:1 kW balun from a kit, saving more money. 50-ohm coax connects the balun to your antenna tuner.

Radial ground: As indicated earlier, to make the monopole or any other ground mounted HF vertical operate efficiently one needs to have at least a minimum of eight but better yet 16 + radial wires. Don't worry about making them a 1/4-wave at some frequency because the ground de-tunes them. Just lay down as many as you can and as long as you can. It is better to have 32 twenty-foot long radials than four 100-foot radial counterpoise wires.

On 160-meters the antenna tuning will be very sharp without much bandwidth. You will need to retune if you move +/- 15 kHz. The other bands will show broader tuning. Have Fun this summer. Build something! ■

## ● EMP (Continued from Page 5)

Imagine an EMP attack during rush-hour in Seattle. All vehicles but older diesel powered cars and trucks would be stopped dead in their tracks. Anything with an ignition system, from a lawnmower to a gasoline powered generator would quit working. The electrical power grid would overload and fail, certainly over several states; possibly the whole country. The internet, credit card systems and radio communications would be disabled and so would land line and cell phones. The result would be chaos and it could take months; even years to straighten out the mess. I don't want to sound like an alarmist but as Ham operators we are expected to step in and communicate when everything else is crashing about our heads. Shouldn't we try to learn everything we can about EMP and work to harden our own equipment against such a possibility?

■

## Technology Laws...According to Murphy

- Logic is a systematic method of coming to the wrong conclusion with confidence.
- Technology is dominated by those who manage what they do not understand.
- An expert is one who knows more and more about less and less until he/she knows absolutely everything about nothing.
- Nothing ever gets built on schedule or within budget.
- The first myth of management is that it exists.
- A meeting is an event at which minutes are kept and hours are lost.

## Echolink Node in Chino Valley

**Rex, N7NGM has an Echolink node in operation on 146.48 simplex from central Chino Valley. It is open for use and intended for people to learn what Echolink is like. To connect to him, use node number 266053.**

## Weekly Breakfasts



### Tues. Morning Breakfast:

**7:00 a.m. at**  
**Back Burner Cafe**  
 8400 E. Long Mesa Drive  
 & N. Robert Road  
 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,  
 2<sup>nd</sup> 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			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	YARC				
146.980-	162.2	Flagstaff	CARC				
147.000+	162.2	Mingus Mtn	MMRG				
147.040+	107.2	Prescott Heights	W2YAV				
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	
445.300-	100.0	Prescott	WINSYSTEM		Node 3727	IRLP	
448.475-	100.0	Flagstaff-Elden	ARA	Yes			
448.500-	100.0	Prescott	K6JSI				
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.		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 Tone of 100.0 Hz**

For more Repeater Information & Listings refer to:

- [www.w7ara.org/Web/](http://www.w7ara.org/Web/)
- [www.azrepeaters.net](http://www.azrepeaters.net)
- [www.azfreqcoord.org/listings.htm](http://www.azfreqcoord.org/listings.htm)

## YAVAPAI AMATEUR RADIO CLUB

P.O. BOX 11994

PRESCOTT, AZ 86304

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Many thanks to Bob Smith, WB6ODR, our Webmaster

