



P.O. Box 6421 Auburn, CA 95604

September 2013

<http://w6ek.org> info@w6ek.org

At The Key of SFARC:

PRESIDENT

Bob Brodovsky, K6UDA
K6UDA@att.net

VICE PRESIDENT

Dave Albright, NO6NO
no6no@pacbell.net

SECRETARY

Dennis Gregory, WU6X
wu6x@hotmail.com

TREASURER

Richard Kuepper, WA6RWS
rkuepper@surewest.net

DIRECTORS

Chuck Baker, AE6LR
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Donna Naylor, W6CQX

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Dave Albright, NO6NO

REPORTERS

Satellites: Greg, KO6TH
History: Gary, KQ6RT
Misc Radio: Fred, K6DGW
Sunshine: Richard, WA6RWS
rkuepper@surewest.net

REPEATERS

145.430 (-0.6 MHz/PL 162.2)
440.575 (+5.0 MHz/PL 162.2)
223.860 (-1.6 MHz/PL 162.2)

CLUB NET

Thursdays, 7:30PM, W6EK/R
145.430

CLUB MEETINGS

Second Friday of the month,
7:30PM at the Auburn City Hall,
1215 Lincoln Way, Auburn CA

CLUB BREAKFAST

Last Sat of the month at Mel's Diner
1730 Grass Valley Hwy, Auburn CA - 8AM

NET CONTROL OPS

Dave Jenkins, WB6RBE
Gary Cunningham, KQ6RT
Norm Medland, W6AFR
Casey McPartland, W7IB

NEWSLETTER EDITOR

Barbara Anderson, W6EVA
916.624.1343
anderson51@starstream.net

WEBMASTER & ARRL PIO:

Carl A Schultz, WF6J

Calendar:

Sat 7 September: Sacramento Valley Hamfest – McBean Park in Lincoln. 7am - noon

Fri 13 September: Club Meeting

Sat 28 September: Club Breakfast

Sat 19 October: Cystic Fibrosis Bike ride in the Newcastle area



Inside this issue:

- *The Loading Coil*
- *Patriot's Day Photo*
- *Volunteers Needed*
- *Miscellaneous Radio – Coding & Ham Radio*
- *Board & General Minutes*



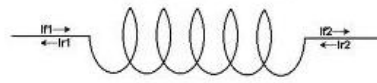
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The Loading Coil

By Bob -K6UDA, President



The Power of Wire

As I type this, I'm languishing in my motor home by the shore of *Eagle Lake* near *Susanville CA* (grid *CN00N22*). I've been playing around on my Elecraft KX3 hooked up to a 63 ft. (estimated) piece of 18 gauge automotive wire. I forgot to pack my antenna cannon, so I tied the end to a hunk of lava rock and threw it up in a tree. To re-orient, I simply pulled it down and tossed it up in another tree. So far I've had QSOs with guys in Washington, Oregon, Northern CA and Hawaii. It's been challenging and frustrating at times, but fun. For portable logging, I use both Hamlog on the iPhone & Maclogger DX on the iPad. Hamlog is cheap and works great in the field where there is no Wi-Fi connection.



K6UDA /Portable Station, Elecraft KX3, External Motorcycle Battery, iPad running Maclogger DX, LDG 4:1 Balun and 63 ft of wire out the window of the motor home.

(Continued on page 3)

On my home antenna front, I'm slowly tuning my 80 meter dipole. About 2 weeks ago, **Dennis WU6X** and I took the antenna down from its slightly east / west orientation and strung it up in a North / South position. This particular dipole is a home built model fed with 450 ohm ladder line. Based on advice from **Bob WE6C**, I knew that twin lead would provide me the lowest loss for the 125 foot run I previously needed. With the new orientation, the feed point is a mere 20 foot walk from my shack.

Being the Newbie that I am, I estimated the amount of twin lead it would take to make it from the feed point to the tuner in my shack and got out my trusty side cutters. Boy was I wrong. My wiz bang MFJ Intellituner didn't seem so intelligent anymore. I had no idea that the feed line needed to be a quarter wave or multiples of.. I measured the feed line in place and its 60 ft give or take a foot or two. So, I started hacking off a foot here, two feet there and ended up with very little improvement. I added 20 ft and hooked up the MFJ. Finally, its resonate at the very tip top of the 80 meter band. I'll keep playing for the rest of my life.



My 80 Meter Dipole with the feedline near the shack, near the Cushcraft R7

Without trying to re-invent the wheel, I've been taking principles of antenna building and trying my own unscientific experiments. Some are a bit frustrating like my 80 meter dipole and some others like 63 feet of wire from the local auto parts store are so simple and so effective for the cost and the effort you want to try it just to see if you can make it work. For those of us who are pretty new at this, what I'm trying to get across is to get out there and get on the air. Try something new. You don't need a 4 element yagi or a huge quad on a big stick to talk to people around the world.

There are plenty of experienced elmer types in our club to get advice and help from. Most if not all of them would be happy to help you with your next project. Come to a meeting and meet these guys. Ask them questions. See what they are doing.

A few weeks back at Patriots Day, **AI N1ZU** amazed me by hooking up a 25 ft piece of wire to his Elecraft K2 and floating the other end on some "borrowed" helium balloons. It really struck a chord with me. Three days ago, out in the middle of nowhere I just proved to myself that I could get out to the South Pacific on 8 AA batteries and a hunk of automotive wire tied to a rock.

This hobby is amazing! What's your story? Write about it and send it in for inclusion in the newsletter.

Better yet... get on the air!!!

**PATRIOT'S DAY – SATURDAY AUGUST 3
WILLIAM JESSUP UNIVERSITY
ROCKLIN, CA**



Dick Wilkins WB6EDR operated the booth for SFARC

Volunteers needed to support a Charity event and an Enduro in October

1. Once again the Club has been asked to provide radio support for the Cystic Fibrosis Charity Bike ride on Saturday 19 October in Newcastle.

The ride starts about 0700 for us and ends about 1300. A very nice catered meal is provided as well as a bright yellow T shirt. We provide operators for NCS, usually 4 rest stops, and 2 or 3 SAG vehicles. It's all done on 2 Meters using the W6EK repeater so HT's will work for most stations.

2. We have also been asked to support the California Endurance Riders Association (CERA) Enduro ride in the Eldorado National Forest on Saturday 26 October.

This event starts at 0800 and we are usually done by 1400. We will be needing operators for 3 stations using 2 Meters on simplex and mostly mobile radios because we will drive to the 3 stations requested. This is a fun event and we have been a great help in the past with our support and we are greatly appreciated.

New Hams who are interested in community work should volunteer to do at least one event. You will be assigned to accompany a trained operator who will introduce you to doing this kind of support. It will give you a great opportunity to see how the Club does an event and a chance for you to try out your radio on something other than the Thursday night net.

Contact George Simmons, KG6LSB, to volunteer for either or both events.

KG6LSB@ arrl.net or 530.888.0860

We can never have too many people volunteer!!!

MISCELLANEOUS RADIO

Coding and Ham Radio

Measuring Coding Efficiency

We've gone about as far as we can without getting a little quantitative. Specifically, we need some means to compare various coding schemes for a given communications requirement to decide which codes are better and which are worse.

Recall from the second part of this story the table on the right which was used to illustrate the Boolean-add operation [Exclusive OR]. That line of 1's and 0's labeled "ERRV" represents a way of quantifying and modeling a communications channel. We call it the "error vector," and every 1-bit in it represents a bit position in the received data that will actually be in error. And, in general, the worse the channel [noise, distortion, restricted bandwidth, etc], the more 1-bits that will appear in ERRV.

Exclusive-OR

0 xor 0 = 0
 1 xor 0 = 1
 0 xor 1 = 1
 1 xor 1 = 0

DATA: 0100111001001110101
 ERRV: 0100000000000100000

0000111001001000000

We quantify the prevalence of 1-bits in ERRV with the term Bit Error Rate or BER. BER is the probability that any given bit in ERRV will be a 1-bit. In my example, there are 19 bit positions and ERRV contains two 1-bits, so an estimation of the BER would be $2/19 = 0.1053$.

BER	#
0.5	49
0.4	35
0.3	31
0.2	30
0.1	6
0.09	9
0.08	6
0.07	7
0.06	3
0.05	3
0.04	7
0.03	4
0.02	1
0.01	2
0.009	0
0.008	1
0.007	1
0.006	1
0.005	0

There's a trap here however. BER is a probability ... part of statistics ... and when we're dealing with statistics we're dealing with random quantities¹ which makes sense, noise in a channel tends to often be random. Consider the table at the left. I created it using Excel by defining a row of 100 cells to represent 100 bit positions in an ERRV. I filled each bit cell with a random number between 0 and 1² Then, for each BER, I marked a 1 if the random number was less than or equal to the BER, and a zero if it was greater, and then for each BER, I counted the 1-bits which is the number on the right.

Thinking non-statistically, a BER of 0.5 should have filled the 100 bit positions with 50 1-bits, scattered around. Well, we got 49 1-bits for that BER ... close enough. For a BER of 0.2, I would expect 20% of the 100 bit positions to be 1-bits. In fact, 30% of them were. Not so good. And as you look down you can see that, while the number of 1-bits in the ERRV does decline as expected as the BER gets smaller, it's not exactly a steady change. BER=0.05 yielded 3 1-bits while BER=0.04, which we would expect to be smaller, yielded 7 1-bits.

If instead of 100 bit positions in the ERRV, I had used 1000, things would have looked much more like we would expect, but there would still be variations ... statistical "noise" ... in the numbers. Keep this in mind when reading polls around the next election. ☺

Now, this little experiment simulated what is known as "white noise". A Math Dude will tell you that the power spectrum of white noise is constant as a function of frequency. That means two things to us in our romp here:

- Every bit position in ERRV has an equal probability of being a 1-bit as any other bit position, and*
- The contents of one bit position does not depend on the contents of any previous position.*

Our Math Dude will tell us that the bit-positions are identically distributed and statistically independent, or uncorrelated ... the equivalent of flipping a coin. Every flip is independent of all other flips.³

¹ Noise in a channel is a random process after all, so this makes sense.

² The Excel RAND() worksheet function does that.

³ This noise is often called Additive White Gaussian Noise [AWGN], the name taken from Carl Friedrich Gauss, an 18th century mathematician

AWGN is produced in a great number of channels where atmospheric and galactic noise are essentially absent. It normally arises from the internal noise of the receiver [mainly the first RF amplifier stage], and is what you hear when you turn the squelch off on your VHF or UHF HT with no signal present. Microwave channels are another example as are telephone circuits. On radio circuits, the noise is proportional in some way to the RF signal strength, and since all signals exhibit some degree of fading, BER is really an instantaneous quantity that can and does change.

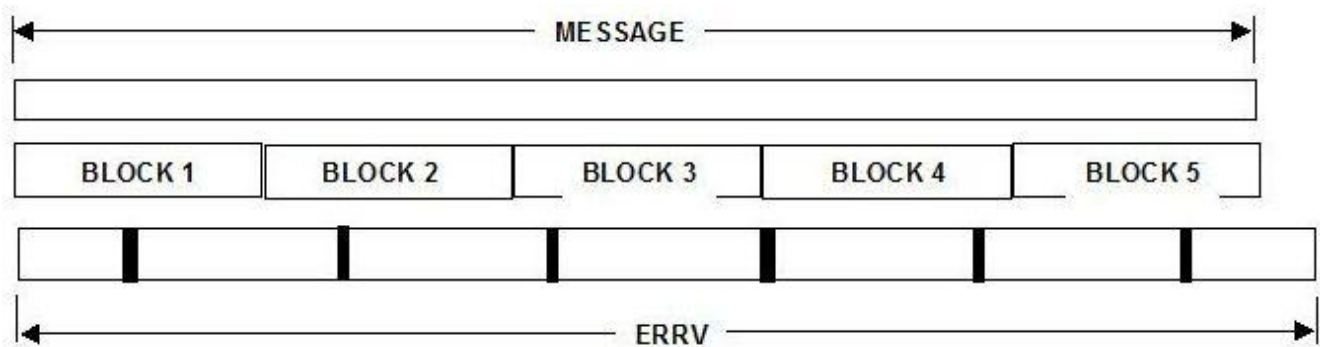
<Small Digression> White Noise has a constant power spectrum over its frequency range. There are other "colors" of noise. Pink Noise has a power spectrum that falls off at $1/f$. Thus, there are more low frequencies than higher frequencies. Red or Brownian Noise is similar to Pink except the power spectrum falls off at $1/f^2$ and Gray Noise is Pink Noise compensated for human hearing characteristics. Look up Pink Noise on Wikipedia, they have some short audio clips of the various colors of noise. </Small Digression>

Unfortunately, BER isn't the only parameter we need to characterize our communications channels. In many, and particularly amateur radio HF channels and VHF/UHF channels when in motion, the 1-bits in the ERRV are not independent ... that is they're correlated with previous bits. This means that, if the probability of getting a 1-bit is 0.5, and you do get the first 1-bit, the probability that the next bit will be a 1 goes up. The probability for the next bit may be higher too. The effect is that errors occur in bursts ... sequences of 1 bits. Multipath on VHF/UHF channels causes this. As you move, you're moving through the interference pattern generated by the signal taking more than one path to you, each path arriving at a different phase. At some points, the paths reinforce each other. At other points, they cancel each other out and the signal drops, and in FM systems, when the signal drops, the receiver noise rises. We often call it the "Picket Fence effect."

The general term for this form of noise [and thus appearance of the ERRV's] is "bursty noise." Atmospheric noise at HF, primarily from thunderstorms and lightning, is an extreme example. Auto ignition noise [not common these days but a real problem for mobile HF 30 years ago] is another, as is my neighbor's electric fence. Bursty noise can be difficult to characterize like AWGN with one parameter [BER].

Some [T-Storms] is purely random both in period between bursts and length of bursts. We all know what static crashes sound like on a fall evening on 40 or 80. Multipath, ignition noise, and my neighbor's fence all exhibit a characteristic repetition rate and burst length however, and those two parameters are often used to describe bursty noise at least semi-quantitatively.

There are also interactions between the characteristics of the data stream and burst noise that can make it very difficult to defend against it with coding. Consider the following transmission:



The message in the channel is some number of bits long. It has been divided into blocks by the FEC block code and each block contains the data bits for that block and the redundant FEC bits. In the channel we have burst noise, represented by the heavy dark bars in the ERRV box.

Note what happens. The repetition rate of the noise bursts in this example is a little faster than the blocks going by, so Blocks 1, 2, and 3 appear to get one burst each and we will assume that it is correctable. Block 4 gets two bursts which is too many bits for successful correction. Block 5 is home free with one burst. This becomes more complex when the 5 blocks are arbitrarily broken into packets for transmission.

The problem with burst noise, the most common for HF hams, is there's more than one parameter: BER, Burst Duration, and Burst Repetition Rate. Makes designing forward error correcting codes hard and evaluation of them even harder.

73,

Fred K6DGW



BOARD OF DIRECTORS MEETING MINUTES

August 9, 2013

The SFARC Board meeting for August commenced at 1800 hours at Mel's Diner in Auburn.

Roll Call: President Bob Brodovsky-K6UDA and all officers and Directors were present with exception of Carl-WF6J Club PIO who was absent. Also present were Refreshments Chair Jim-WA8NPA, and guests Bob-WE6C, AI-NI2U, Amaryllis -KG6TVT, Fred-KF7QVB, Jim-KI6AZH, Robert-W6RBL and Toni Graybill.

REPORTS and DISCUSSIONS

President's Report: Bob-K6UDA led a discussion of purchasing diplexer filters for Field Day to allow two stations on the same band. Motion by Dave-NO6NO, 2nd by Mark-W8BIT to ask Carl to investigate availability/pricing; passed unanimously. Bob also brought up going to Black Bear Diner next month's Board meeting; Dennis agreed to investigate the possibility.

VP/VE Report: No VP report from Dave-NO6NO; VE exams reported as 9 elements given, 7 candidates with (4) new Techs, (2) General and (1) Extra Class passing.

Secretary's Report: Dennis-WU6X reported on the suggested "standing" committees. A discussion was held.

Treasurer's Report: Richard-WA6RWS reported net cash on hand at beginning of July as \$7,170.81; expenses of \$1,164.70; income of \$100.00 and balance of \$6,106.11.

Repeater Report: Richard-WA6RWS received a request for autopatch on the 220 machine. Richard says that is available using the same codes as on the 2m side. He is also chasing down interference that has been noticed coming into the receiver on 2m. Richard reported on a NARC meeting scheduled for the 24th in Los Altos and invited any Officers or Board to attend. He cautioned that he had heard our 440 repeater frequency is being challenged, so it is important that an Officer attend to thwart any attempt to grab it for other use.

Web/PIO Report: Carl-WF6J (via email) suggested Auburn Rec Park for the Picnic and creating a certificate of appreciation to Dick-WB6EDR for organizing our participation in the Patriot's Day event.

Other Discussions:

Standing Committees: the Board agreed that "standing" committees were a good idea, and will be presented to the Membership at the Club General meeting. An immediate need for a Nominating Committee was discussed.

Club Picnic: the Club picnic was discussed further, and the possibility of adding "radios" as part of the event. AI-NI2U suggested a fox hunt; a tentative date of October 19th, Saturday was set.

Christmas Party: Donna-W6CQX suggested honoring the "quilt maker" who provides a beautiful homemade quilt as a drawing prize at the Christmas Party each year.

Meeting adjourned at 1835 hours. Submitted by *Dennis Gregory-WU6X, SFARC Club Secretary*

GENERAL MEETING MINUTES

July 12, 2013



The SFARC General meeting for August commenced at 1930 hours at the Auburn City Hall Rose Room, President Bob Brodovsky-K6UDA presiding. All Officers and Directors were present except for PIO Carl-WF6J. Bob led approximately 50 attendees in a Pledge of Allegiance to the flag followed by an introduction of Officers, members and guests.

REPORTS and OLD BUSINESS:

Past minutes: The minutes of the past General Meeting as posted in the Newsletter were approved as submitted on motion by Donna-W6CQX, 2nd by Dick-WB6EDR.

President's Report: Bob-K6UDA discussed standing committees. Dennis-WU6X presented a list of suggested committees (see New Business).

VP's Report: Dave-NO6NO reported on Tech-10 and main presentations planned for the evening.

Treasurer's Report: Richard-WA6RWS reported cash on hand at beginning of July as \$7,170.81; expenses of \$1,164.70; income of \$100.00 and a balance of \$6,106.11.

Secretary's Report: Dennis-WU6X reminded guests and new members to pick up a "Welcome Letter" during the break.

VE's Report: Dave-NO6NO reported 9 elements given, 7 candidates with (4) new Techs, (2) General and (1) Extra Class passing.

Repeater Report: Richard-WA6RWS reported on a 2m interference problem he was chasing down. Also, on a request from a member he reaffirmed the existence of a phone patch on the 220 box using the same codes as 2m. Richard also suggested contacting him if you did not receive the last Newsletter. Richard suggests we use the 220 machine as much as possible, as a lack of use can lead to "loss of use" of the spectrum.

Satellite Report: Greg-KO6TH reported on a fast-scan amateur TV project planned from the International space station (ISS). The mission of HamTV is to perform contacts between the astronauts and school students via voice and unidirectional video within the ARISS program. The IARU Amateur Satellite Frequency Coordination Panel have announced frequencies of 2422.0 MHz and 2437.0 MHz. More information can be found at: <http://www.kayser.it/index.php/exploration-2/ham-tv>.

Sunshine Report: Nothing to report.

Patriot's Day: Dick-WB6EDR gave a report on the success of our Patriot's Day involvement and thanked all members who participated.

Refreshments and Drawing: Refreshments Chair, Jim-WA8NPA reviewed the "eats and drinks", and while George-KG6LSB reported items available for the drawing.

NEW BUSINESS:

Standing Committees: Standing committees for certain activities were discussed and a report of Board recommendations given by Dennis-WU6X. Committees for Special Events (Christmas Party, white elephant sale, swap meets, picnic, etc.), Field Day, Education and Outreach, Membership and a Nominating committee were discussed. A Nominating Committee chaired by Al-NI2U with Donna-W6CQX, Chuck-KG6FFK and Dick-WB6EDR serving, was created.

Club Picnic: Al-NI2U announced a tentative date of October 19th, Saturday for this year's event, to be held at Auburn Rec Park. Al will Chair the committee with Robert-W6RBL, Richard-WA6RWS and Bob-K6UDA serving.

General Announcements: The Club Net meets every Thursday's at 7:30 on W6EK repeater; Board and General meetings occur on the 2nd Friday; Board is typically held at Round Table Pizza at 6pm (subject to change at the discretion of the Board), and General meetings at 7:30pm at Auburn City Hall. Club breakfasts are held (last Saturday of every month) at Mel's Diner in Auburn, the "Prepper Net" and the Elmer Net are held on opposite Wednesday nights at 7:30pm on W6EK repeater. See website (www.W6EK.org) for more information date or venue changes.

Serval Net: Pat-AA6EG gave a brief report on "mesh net" experiments; a new method of communications via local area networks, and specially modified wireless routers. More information can be found at: <http://www.meshnetworks.com/> and other websites.

Tech-Ten: none

Presentation: A very interesting presentation on Software Defined Radio (SDR) was given by Carol-KP4MD. Two examples were setup for show and tell thanks to NO6NO and WU6X. More information can be found as follows:

- SDR Sharp – <http://sdrsharp.com>
- HDSDR – <http://www.hdsdr.de/>
- SDR Radio – <http://v2.sdr-radio.com>
- Mac OSX – Gqrx, CuteSDR, SdrDx
- Android – SDR Touch

The meeting adjourned at 2130 – Submitted by, Dennis – WU6X, Club Secretary





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2013 MEMBERSHIP APPLICATION

Name: _____ Call: _____ Class: _____ e-mail: _____
Address: _____ City: _____ State: _____ Zip: _____
Associate Name: _____ Call: _____ Class: _____ email: _____
Phone: _____ Cellphone: _____ Application is: (Circle) New Renewal

Dues / Donations:

Membership: yearly*	\$ 22.00	Name Badge:	\$ 7.00	Yes (special name)_____
Associate: yearly*	\$ 7.00	Repeater Donation:	\$ _____	
Auto Patch Donation:	\$ _____	Newsletter Booster:	\$ _____	
Misc. Donation:	\$ _____	Christmas Donation:	\$ _____	ARRL member? (circle) Yes No
TOTAL:		\$ _____	Please add \$1 if paying via PayPal	

*Prorated dues for NEW Members/Associates Only

July	\$ 20 /6	October	\$ 14/3 + following year
August	\$ 18/5	November	\$ 12/2+ following year
September	\$ 16/4	December	\$ 10/1 + following year

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Date: _____	Treasurer: _____	Secretary: _____	Roster: _____
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