Sierra Signals

P.O. Box 6421 Auburn, CA 95604 **May 2013** http://w6ek.org info@w6ek.org

At The Key of SFARC:

PRESIDENT
Bob Brodovsky, K6UDA
bob@whpmotorsports.com

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
Mark Graybill, W8BIT
Donna Naylor, W6CQX

FIELD DAY CHAIRMAN
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:
Carl A Schultz, WF6J

Inside this issue:

Calendar:

Sat 4 May: Tour de Cure (Diabetes) in Roseville

Fri 10 May: Club Meeting

Sat 25 May: Club Breakfast

Sat/Sun 22 & 23 June: ARRL Field Day

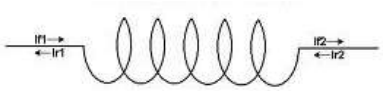
Sat 19 October: Cystic Fibrosis bike ride in the Newcastle area

Kick off summer with a barbecue!

We encourage members to receive Sierra Signals via email to save the Club the cost of reproduction and mailing

The Loading Coil

By Bob -K6UDA, President



It's springtime in ham radio land. The sun is out, it's warming up, and the days are getting longer. I hear hams all over talking about new radios, tower repairs, and a whole host of radio related projects as we come out of winter hibernation. A couple of my recent projects include hanging an 80-6 meter windom antenna, and routing my runs of LMR-400 through a new 2 1/2 inch pipe set in the wall of my shack. When I was studying for the extra exam, I used the Gordon West study guide. Throughout his course, Gordo stresses the importance of rewarding yourself with a new high dollar HF rig. I dutifully followed Gordo's instructions and I'm hunting for my dream rig. So far, it's looking like the Icom IC 9100. Maybe I'll have it all when Carl visits me for "Visit the Shack".

So what else is happening locally in ham radio? Our club is knee deep in events. On April 27, about a dozen of us worked the MS walk in Folsom. The entire event was done on simplex and even though I brought my trusty IC-92AD handheld, my $50.00 Baofeng worked great. We even had a bicycle SAG unit thanks to **Robert W6RBL**. In the next two weekends we'll have two large scale events: a large bike ride, Tour D' Cure, on Saturday May 4th and an upcoming motorcycle enduro. This is a great time to break out your little portable and play directed net radio. As with most bike/motorcycle events, there's a good likelihood our services will be needed for some sort of emergency. If you can spare a few hours next weekend, we sure could use your help.

Last weekend, **Dennis WU6X** made the trek down to Visalia CA for the DX Convention. He had a really good time and met several of the voices he's talked to over the years. Hamvention is coming up in Dayton OH. I've never been but hope to go next year. If you've never heard of the Dayton show, this is the mother of all hamventions. Almost every ham radio manufacturer and accessory company, large and small, pull out all the stops for Dayton and introduce the newest products out there. In addition to the trade show, there is quality training in a variety of subjects ranging from a one-day Tech license course & VE session, D-star operations, APRS, Techniques of the best operators, and even a live taping of Ham Nation. I'm told the swap meet here is mammoth. If anyone from the club is going, please take pictures and maybe give a little tech ten about it.

Lastly, we're always looking for things for show & tell. Bring your projects and treasures to the general meeting on Friday May 10th. That's all I've got.

Sunshine Report

I am sorry to report that Birton Gilbert N6UG's mother recently passed away. Please keep Birton and his family in your prayers.

Richard WA6RWS

MS Walk 2013

Folsom, CA

This year's charity 1-mile and 3k walk to support muscular dystrophy went without a hitch. This was the type of event everyone hopes for - no incidents of any consequence. **Chuck KG6FFK** did report handing out 3 bandaids to needy participants, however. ☺ Our hosts were super to us again this year, providing a pop-up tent over Net Control, t-shirts, food and drinks, and plenty of "thank yous" for our support. The Park Ranger service also participated and was thrilled to have one of our members aboard the Gator ATV as he circled the course. Thanks again to ALL who helped make this another successful SFARC supported event.

A group of volunteers from SFARC supported the event with communications links from a net control base station, SAG vehicles, and rest stops, in addition to a "bicycle SAG" and Park Ranger vehicle. Volunteers included:

- Net Control: **Dennis-WU6X** and **Justin-N6FWD**
- SAG1: **Richard-WA6RWS** and **Scott-KK6CGQ**
- SAG2: **Larry-KJ6WOL** riding with Ranger Jason on the Gator ATV
- Bicycle SAG: **Rober-W6RBL**
- Rest Stop1: **Chuck-AE6LR** & **Steve-KF6OCE**
- Rest Stop2: **Chuck-KG6FFK** & XYL Belynda
- Rest Stop3: **Bob-K6UDA** & **Jeremiah-W6DLO**

After 40 years of ham radio I finally decided to attend a convention … not sure why I waited this long, as it was a blast! The 64th annual International DX Convention was held April19-21 in Visalia at a new venue this year: the Visalia Convention Center downtown. This venue turned out to be a great choice as noted by feedback from the more than 800 attendees.

Activities included vendor exhibits, 1-hour technical sessions, reports by DXpeditions, a trailer with 60-foot tower and StepIR 3-element yagi in the parking lot connected to a new (not yet in production) FlexRadio Systems 6750 with Alpha auto-tune amp (special event call **N6V**) … Anyone wishing to, could operate CW or SSB. I particularly enjoyed the DXpedition presentations and learned that DX activities to remote places are typically done by very dedicated and serious radio operators, supported by many different sources, and can also be VERY expensive. For example, an upcoming DXpedition planned for Amsterdam Island (FT5ZM) in January 2014 is predicted to cost $400k. Wow! The bug bites, spider bites, miserable weather, and rugged terrain are typically free!

Prizes were incredible and totaled $50k for the event. Included in the drawings held every hour during Saturday were many nice transceivers by Yaesu, Icom, and Kenwood, many handhelds, gift certificates and a complete Elecraft K3 station (won by a YL – fantastic!). Saturday was busy with vendor shows, meetings and the banquet on Saturday night. Guest speaker was Nobel Laureate Dr. Joseph Taylor (K1JT) who gave a behind-the-scenes tour of the gigantic radio telescope *Arecibo* in Puerto Rico (seen in the James Bond movie Golden Eye), and rigged temporarily for the ham bands to make a few contacts bouncing off the moon. Awesome!

I ran into both **Jettie-W6RFF** and **Manfred-WB6MTA** and his wife at the convention … amazing considering all the attendees. I also spent some time with long-time friend **Bob-W6RGG** and saw Ron Murdock both of ARRL. It was especially fun to connect with many people I've known for years, only by radio, finally to shake a hand and trade some stories. Most of the time I hung out with **Gil-N2GG** and **Gary-K9WZB**, two guys I talk with regularly on 40m in the morning on the way to work. Gil and I were one space apart in a mobile home park we rented space in just a mile and a half from the convention. Needless to say, our receiver AGC's had to work very hard when either of us transmitted during a couple QSO's with friends who didn't make it.

Bottom line, if you've never been… plan to go! I'm already planning a trek to Dayton next year… or maybe the DX Convention again. It will be hard to choose… maybe both? I hope to see you at one of them. 73, Dennis

MISCELLANEOUS RADIO

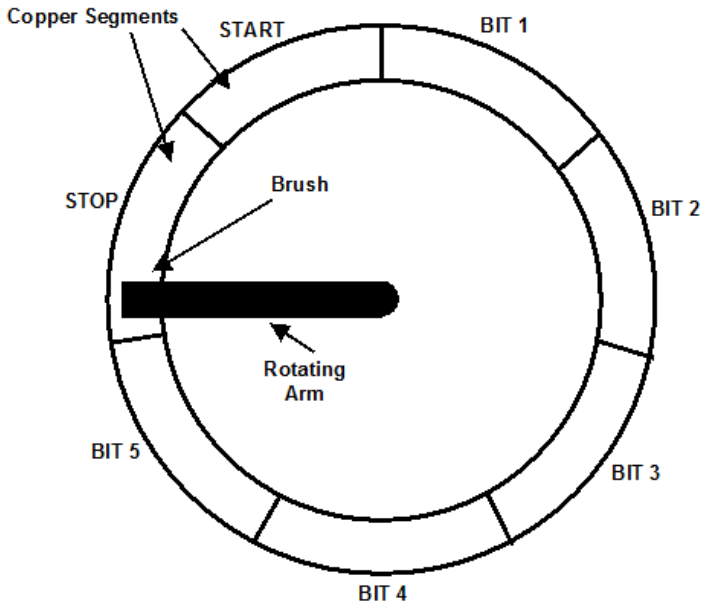
Radioteletype

Some have termed Morse code the "first digital mode" and it does possess most of the characteristics of what we typically call "digital modes." Combinations of on or off signals in groups, with each group denoting a character. In fact, it really only lacks the steady "clock" all other digital modes. You can send CW at widely varying speeds and humans can still decipher it. Conversely, machine decipherment of Morse code has presented a real challenge, even today in the age of lightning fast computers, many of which you can hold in your hands.

The first foray into the digital world beyond Morse code occurred the same year that the telegraph line between Washington DC and New York became operational. It employed 28 piano-like keys, one for each letter. The remaining two shifted between the letters, and an alternative character set including numerals and punctuation. While it worked, it never achieved practicality.

The first practical "printing telegraph" came along in about 1874 when Emile Baudot developed a 5-unit code which allowed for 32 possible combinations … not enough for the 26 letters, 10 digits, and miscellaneous punctuation. He solved this in much the same manner as the one in the paragraph above by reserving two of the combinations to shift between two different character sets. Today, we call them FIGS and LTRS. Once put into the FIGS case, the receiving machine stays there until it receives a LTRS combination.

Telephone and telegraph circuits required two wires [sometimes one wire and ground], and any electromechanical system needed to work on such a circuit. The ultimate scheme that evolved called for translation of the "bits" in each character into either current or no current in the circuit, in sequence. The electromechanical mechanism worked as follows:



The teletype machine contained a motor, either governed or sometimes synchronous if run on AC. The motor turned a shaft which actuated all the printing arms and turned a rotating arm on the "distributor" on the end through an electrically-operated clutch. The diagram at the left depicts the distributor [crudely] looking at the end of the shaft. It comprised seven copper segments on which a brush at the end of the arm rested like the brushes on the commutator on a DC motor.

When not sending or receiving, the clutch disengaged the arm and it rested on the STOP segment. The START segment connected to nothing. When the operator pressed a key, a system of levers placed either voltage or no voltage on each of the bit corresponding to the Baudot code for the character, and engaged the clutch.

The arm made one revolution, and when it got to the STOP segment, it disengaged the clutch. As the arm rotated, it first contacted the START segment which always sent no current down the line. It then contacted each of the BIT segments, either sending or not sending current in sequence until it got to the STOP segment which always sent current.

The receiver kept its clutch disengaged so long as current came on the line. Interrupting the current [START segment at the transmitter] engaged the clutch and its arm rotated one revolution just like the transmit distributor. The segments had insulating spaces between them not shown in my diagram, so the motors needed to stay close to each other for only one revolution, and the received current/no current for each BIT either energized or de-energized electromagnets, moving 5 levers with slots in them and bars on top. At the STOP segment, the slots lined up for only one bar and it fell into them. The receiving motor made one more revolution which mechanically actuated the type bar, again stopping on the STOP segment.

This scheme eliminated the need to have the two motors exactly in sync all the time and became known as "asynchronous" transmission. For quite a long time, the voltage on the line caused 60 mA to flow in the "loop" to the other end and back. In mid-20th century, a reduction to 20 mA evolved, and also a move to bi-polar signalling, wherein instead of zero current, the current shifted between plus and minus. In fact, today, the ITA2 5-unit code has replaced what we loosely call "Baudot." And I

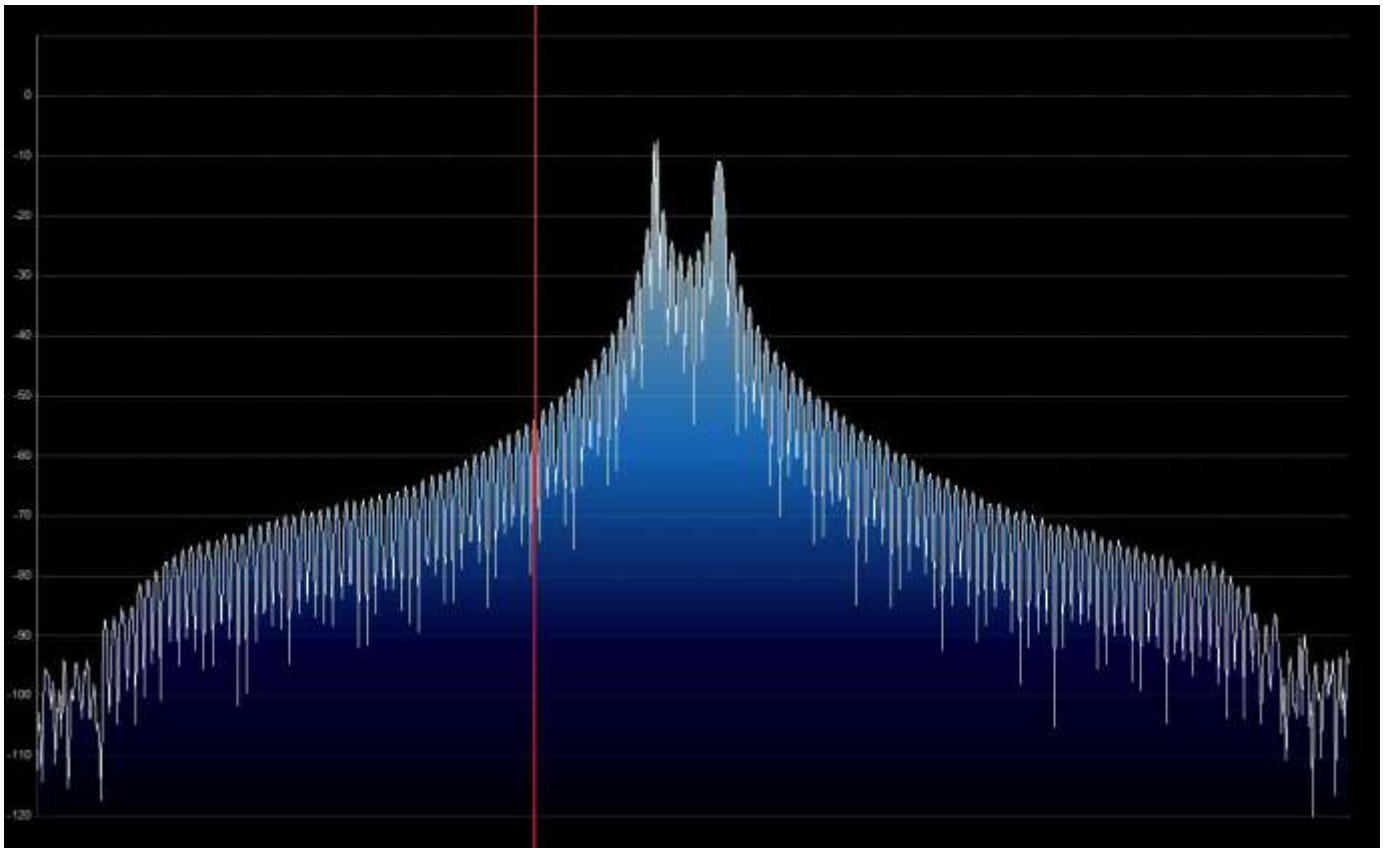
write this all in the past tense because very few mechanical teletype machines remain in existence in the ham world. We all use computers now.

So, what about RADIO-teletype? Well, the most obvious method would simply turn the transmitter on and off for each code bit. The receiver detects the presence or non-presence of the signal and just recreates the current/no current for the machine … amplitude modulation with only two amplitudes, on and off … not exactly unlike CW. Alas, nearly all radio noise falls into the category of amplitude modulation, and the AM scheme works very poorly, if at all when a machine is detecting it. Humans, very much better ... machines, not so much

Edwin Armstrong invented frequency modulation to solve that problem for broadcasting [and ultimately for hams and their mountain top repeaters ☺]. Why not employ FM for radioteletype? A radio broadcast audio signal has a continuously changing amplitude at a wide range of audio frequencies. A teletype signal has exactly two amplitudes at a fixed bit rate. So, you key your CW transmitter and with a relay controlled by the teletype signal, you have it switch a little capacitance into the oscillator circuit, shifting your CW frequency a little, and voila! … digital FM. Initially, that frequency shift standardized on 850 Hz, and it became Frequency Shift Keying.

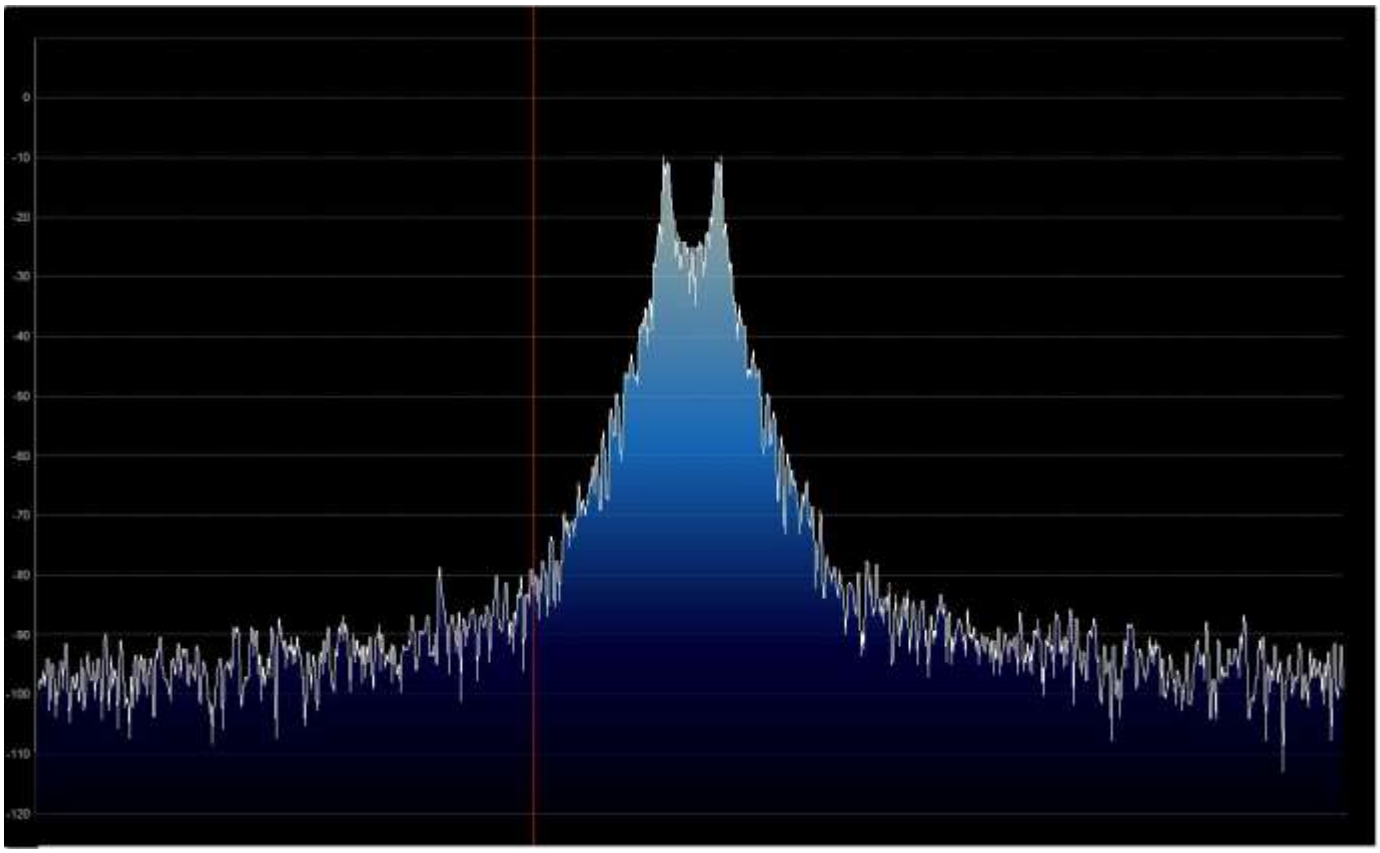
At the receiver, you added a discriminator stage which produced a positive voltage for one frequency and a negative voltage for the other. Simple, no? In actuality, instead of adding a separate detector [i.e. discriminator] to every receiver, we all just turned on the BFO and got two different audio signals out, separated by 850 Hz. This allowed the "FSK decoding business" to move to a separate device … the Terminal Unit or TU ... which you didn't have to buy if you didn't want to receive FSK.

It might seem that FSK generates just two discrete frequencies, but FSK = FM, and it generates sidebands just like FM does. Remember the Misc Radio from back in 2009 where I finally learned about FM and Bessel functions? Well, they apply here too. The spacing between the two frequencies becomes the deviation, and the modulating frequency becomes the rate between transitions in the input signal, something we call baud rate [a redundancy, "baud" implies rate]. And, worse yet, while we might think that our signal occupies exactly 850 Hz, that would ignore the very rich harmonics that it takes to make the square wave pulses that shift the transmitter between the two frequencies.



The real spectrum looks similar to the above using really square keying pulses. You can see the two FSK frequencies, and at 2 x the shift [1,700 Hz], they measure about 30 dB below the two tones. If you're running 1 KW, you're transmitting 1 watt there. Not a lot for the DX, but a lot for your friend a couple of miles away. Shaping the keying pulses will remove many of the

harmonics and significantly narrow the occupied bandwidth. The Elecraft K3, using the latest DSP firmware which "rounds off the corners" of the square keying pulses and results in:



Someone realized that you could cram more than one teletype channel into a single telephone channel using different audio frequencies for the MARK and SPACE, but 850 Hz spacing didn't leave much room, and 170 Hz shift came on the scene. It turns out, you can cram 16 independent teletype channels into one 3 KHz voice channel with 170 Hz shift, and we use it almost universally today. You can still find a few 850 Hz shift RTTY stations, all non-ham as far as I know. One hangs out near the top of 30m, usually on in the afternoon and evening, and encrypted, I've copied it. But, amateur standard now=170 Hz.

With the advent of SSB, a new way to generate FSK arose. The SSB transmitter suppresses the carrier and the redundant sideband. Thus, feeding a single audio tone to it results in a single RF frequency. It follows that feeding two audio tones sort of alternatively will result in a very good imitation of FSK. Only clean sine-wave tones will work, harmonics will also modulate the transmitter. But, today we have sound cards with incredibly pure sine waves, and we have DSP transmitters which don't have to suppress the carrier and sideband, they never generate it in the first place. We call this AFSK … audio frequency shift keying [from our computer/sound card]. You cannot detect the difference between AFSK and FSK unless the transmitting station has a problem. They both generate identical sidebands.[1]

I got into RTTY for contesting, I like it better than phone which I really can't hear well. I haven't yet done much in the realm of casual RTTY QSO's and DXing. Try MMTTY as a start, easy to install and actually integrates with a number of contest loggers. And, a great number of others await you in the digital world. We may come back to this, we have so very many digital modes now.

73, Fred K6DGW

PS: This issue of Misc Radio has a unique characteristic which has nothing to do with radio, RTTY, AM, FM, FSK, contesting, sidebands, or MMTTY. See if you can figure it out, maybe next month's subject.

1 If using AFSK, turn off Windows/Mac "sounds" … those annoying little noises your computer makes when you do something, usually wrong. They'll modulate your radio as much as your RTTY, with signals generally in a non-permitted sub-band.

BOARD OF DIRECTORS MEETING MINUTES
April 12, 2013

The SFARC Board meeting for April commenced at 1800 hours at Round Table Pizza in Auburn.

Roll Call: President Bob Brodovsky-K6UDA and all officers and Directors were present except for Donna-W6CQX. Also present were PIO Carl-WF6J, and guests N6EMS, NI2U, KK6CGQ and Mark's XYL Toni.

REPORTS and DISCUSSIONS

President's Report: Bob-K6UDA started a discussion on a "Prepper Net get-together" at Field Day. Demonstrations and discussions were suggested; the Board agreed to bring the idea to the membership at the General for a consensus.

VP's Report: Dave-NO6NO reported on a "wiki website" for Officers and Board discussions, being worked on; Dave confirmed that anyone is authorized to pick up a key for the new meeting room at City Hall, to open the room early for setup; he reported that parking lot lights at City Hall were being "worked on", and reported on parking alternatives. Richard will be asking for technical volunteers to join a repeater committee to assist with maintenance and control activities.

Secretary's Report: no report

Treasurer's Report: Richard-WA6RWS gave the Treasurer's report with net cash on hand at end of March as $5311.83; he reported 92 paid: 78 full/10 associates and 4 life members; a refund was received from the Auburn Library for cancelled reservation fees.

Repeater Report: Richard reported requests to both link and un-link the 220 box from the 2m box during events or during daily operations. The Board agreed to ask for a strawman vote at the General meeting.

VE Report: Dave-NO6NO reported 6 candidates took 8 test elements. 3-Techs, 1-General and 1-Extra passed.

Web/PIO Report: Carl-WF6J updated the Board on Field Day publicity and Prepper Gathering promotion suggestions. The next visit to "The Shack" schedule to be Bob-K6UDA.

Field Day: Dave-NO6NO will ask for volunteers to take Chuck-AE6LR's sub-committee chair for Field Day logistics. Also, T-shirt orders cut-off date to be announced, as the Club Breakfast on the last Saturday of the month.

Meeting adjourned at 1830 hours. Submitted by *Dennis Gregory-WU6X, SFARC Club Secretary*

GENERAL MEETING MINUTES
April 12, 2013

The SFARC General meeting for April commenced at 1930 hours at the Auburn City Hall Rose Room, President Bob Brodovsky-K6UDA presiding. All Officers and Directors were present except for Donna-W6CQX; also present was PIO Carl-WF6J and Field Day Committee members. Bob led approximately 50 members and guests in a Pledge of Allegiance to the flag, followed by an introduction of Officers, members and guests.

REPORTS:

Past minutes: The minutes of the past meeting as posted in the Newsletter were approved as submitted on motion by Chuck-AE6LR and 2nd by Jim-KI6AZH.

President's Report: Bob-K6UDA gave a brief summary of a few items discussed at the Board meeting to be reported on in more detail at this evening's meeting.

(Continued on page 9)

General Minutes *(Continued from page 8)*

VP's Report: Dave-NO6NO announced the programs for the evening will be the K6ARR blind auction in place of the Tech-Ten, and a presentation by Jeff-AK6OK.

Treasurer's Report: Richard-WA6RWS reported a beginning balance as of March 1st of $4,890.34; income of $964.90; and expenses of $543.41. Net cash on hand at end of March is $5311.83; as of the Board meeting, Richard reported 92 paid: 78 full/10 associates and 4 life members; a refund from the Auburn Library was received for cancelled reservation fees.

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 6 candidates took 8 test elements. 3-Techs, 1-General and 1-Extra passed.

Repeater Report: Richard-WA6RWS reminded members that wallet cards available to members, with auto-patch codes and "audio and tone" test functions available through the new repeater. He is looking to start a "repeater committee" to assist with maintenance and also control functions. Anyone technically-oriented and interested please contact Richard via email or W6EK. Richard wants members who will commit to "active" participation on the committee.

Satellite Report: Greg-KO6TH reported on various satellite activities including ISS passes in the near future, and another scheduled CubeSat launch. More information can be found at http://www.heavens-above.com/.

Sunshine Report: Richard-WA6RWS reported that Joe Sylvia-KF6OQY past last month and he is collecting email condolences to be sent to Dottie. Also, AE6LR's XYL is not doing well and the Membership is asked for their prayers.

Refreshments and Drawing: Refreshments Chair, Jim-WA8NPA (absent) was supported by Bob-N6EMS who reviewed the "eats and drinks" for the break, and Drawing Chair, George-KG6LSB reported on prizes available for tonight's drawing.

Other Information: Richard updated members on the availability of the Newsletter. As always, Barbara, our Newsletter Editor is looking for input, which should be sent to her (see W6EK for email address). Richard reported on the MFJ antenna analyzer and dual-trace scope available to Members for short-term use. Pat-AA6EG reported on using Google-Plus for dissemination of documents, videos and other information, and suggested the Club might consider using it for member communications.

OLD BUSINESS:

Field Day Update: Dave-NO6NO asked for volunteers to take Chuck-AE6LR's sub-committee chair for Field Day logistics as Chuck's XYL is ill and he needs to be attentive to her. Also, T-shirts are still available for order … the final cut-off date to place an order will be the Club Breakfast on the last Saturday of the month.

Upcoming Support Opportunities: George-KG6LSB reported on the upcoming MS Walk in Folsom (April 27th) and Tour de Cure for Diabetes the first weekend in May. Volunteer slots for the Tour de Cure are available; contact George for more information or to volunteer.

(Continued on page 10)

General Minutes *(Continued from page 9)*

Shack Tours: Carl-WF6J reported on videos being made of member's stations to be posted on W6EK. NO6NO was just completed with K6UDA next scheduled. If interested in having your shack profiled, contact WF6J.

NEW BUSINESS:

Show-n-Tell: Bob-K6UDA showed his newly acquired field antenna wire launcher. This appears to be serious hardware that will launch a tennis ball 300 feet!

Field Day Pins: Dick-WB6EDR reported on Field Day pins planned, and is collecting names/calls for an order to be placed for Field Day-2013 pins. Cost/pin is $5. Please email Dick at wb6edr@juno.com.

Member Bios: Richard-WA6RWS is looking for someone with investigative reporting or writing experience who can interview other Club members for a new column for the newsletter. The plan is to have a list of members with pictures that will link to their bios, pictures of their shack, etc. Perfect English and spelling are NOT required as content will be edited by the Newsletter Editor.

Repeater Linking: Richard reported on board discussions and recent requests to both link and un-link the 220 box from the 2m box during events or during daily operations. A discussion was held and a strawman vote taken. The consensus was to "**unlink**" the boxes during general daily operations and link the boxes during events (14 to 13 hand-count).

Wiki Planning: Dave-NO6NO reported on a new Internet "wiki" planned where Officers and Board can communicate and review/comment on topics before Board and General Meetings.

Field Day Prepper Gathering: Bob-K6UDA reported on the Board suggested Prepper Net "gathering" at Field Day. A show of hands was asked for to determine interest … response was in-conclusive.

General Announcements: The Club Net meets every Thursday's at 7:30; Board and General meetings occur on the 2nd Friday; Board is held at Round Table Pizza at 6pm, and General meetings at 7:30. Club breakfast (last Saturday), the "Prepper Net" and the Elmer Net are held on opposite Wednesday nights at 7:30pm. See W6EK.org for more information or date changes.

Tech-Ten: Dave-NO6NO hosted a blind auction of K6ARR's estate items. Many very nice items were presented and labeled with description and a suggested starting bid. Several items were acquired after the meeting.

Presentation: Jeff-AK6OK gave a very interesting and informative presentation on new radiation technology to combat tumor cancer and his own experience with battling the disease.

The meeting adjourned at 2120 – Submitted by, Dennis – WU6X, Club Secretary

SIERRA FOOTHILLS AMATEUR RADIO CLUB
P.O. Box 6421, Auburn, CA 95604

SIERRA FOOTHILLS AMATEUR RADIO CLUB
P.O. Box 6421, Auburn, CA 95604

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

OFFICE USE ONLY: DO NOT WRITE BELOW THIS LINE

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

Payment: _____ Check Number: _____ Cash: _____ PayPal:_____

Rev. Nov 2012