Sierra Foothills Amateur Radio Club

http://www.sf-arc.org/ MAY 2010 PO BOX 1005. NEWCASTLE. CA

At the key of SFARC

S F A R C

OFFICERS

PRESIDENT
Al Martin, NI2U
amartin4@wavecable.com
VICE PRESIDENT
Charles Baker, AE6LR
ae6lr@yahoo.com
SECRETARY
Bill Mahl, W6WEM
wemahl@wildblue.net
TREASURER
Bob Balthrope, KD6WTY
kd6wty@yahoo.com
DIRECTORS
George Simmons, KG6LSB
grsim@mindspring.com
Gary Cunningham, KQ6RT
kq6rt@sbcglobal.net
Frank Sharit, W6DHN
n6gp4900@sbcglobal.net

REPORTERS
Satellites: Greg, KO6TH
History: Gary, KQ6RT
Misc Radio: Fred, K6DGW
Sunshine: Richard WA6RWS
rkuepper@ymail.com
916-482-5027

RESOURCES

REPEATERS
145.430 (-0.6 MHz/PL 162.2)
440.575 (+5.0 MHz/PL 94.8)
223.860 (-1.6 MHz/PL 100.0)
CLUB NET
Thursdays, 7:30PM, W6EK/R 145.430
CLUB MEETINGS
Second Friday of the month, 7:30PM at the Library, 350 Nevada St, Auburn CA
CLUB BREAKFAST
Last Sat of the month at Susie's Café, Cirby at Riversic Roseville – 8:00 AM
NET CONTROL OPS
Dave Jenkins, WB6RBE
Gary Cunningham, KQ6RT
Norm Medland, W6AFR
Casey McPartland, W7IB
NEWSLETTER EDITOR
Matthew Diridoni, KC6RUO
916-749-3032
matteod@comcast.net

In this issue

Calendar of Events

May 23 — **Sacramento Hamfest NHRC**, **Natomas High School, off Truxel Rd.**
http://www.k6is.org/hamfest10.pdf

June 26 & 27 — **ARRL Field Days**

September 11 — **Third Annual Sacramento Valley Hamfest**
Lincoln High School
790 J St., Lincoln, CA
http://svhamfest.org/

For more information and rules on the ARRL activities listed above, go to:
http://www.arrl.org/contests/calendar.html?year=2010

SFARC CLUB MEETING

Presentation

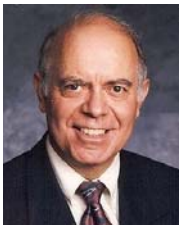
"Solar Storms"

"Tech Ten" Presentation

"ARRL Propagation Report" and
By Chuck Baker, AE6LR

Don't miss this interesting presentation!
Bring a friend See you there!

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



From the Presidents Shack

Al Martin, NI2U

President's Thoughts

Field Day

Field Day is just around the corner. Please make plans to come out and enjoy the fun. Contact Chuck AE6LR to provide support.

Let's encourage the new hams and hams who have not been involved with operating to come on out and join in the fun. We are planning to run a better GOTA Station than last year. Last year's GOTA provided us with a lot of free points and the participating Hams with a lot of good coaching.

There are a lot of support positions open. Please consider helping with set-up, cooking, GOTA Coaching, Natural Power, Beam Antennas and Rotators and anything you think will be helpful.

Last year was a lot of fun and we made a nice number of points. We also had a lot of fun camping, hanging out and operating.

Club Picnic

We are still working on a location. Any and All suggestions are welcome. The Club Board is on board the cooking, clean-up and other support functions.

ARES

There was a county wide Mass Casualty Exercise (MCI) held in Placer County on April 22nd. ARES received support from CERT and more than fifteen Placer County ARES Members. Roseville and Auburn hospitals and Emergency Operation Centers were actively supported by ARES.

Please consider contributing to ARES and also practicing with equipment at the various locations.

Miscellaneous Radio

By Fred Jensen, K6DGW

Radios and Software

The Smoothed Sunspot Number fell to zero, the bands are pretty quiet, about the only ham radio news of note is the new ARRL web site [which I'm still working to understand], all raising the question of what what to send Matt for the May Sierra Signals. With great timing, I got an E-mail that there was a new release of firmware for my Elecraft K3, and the question was answered – Radios and Software.

Computer programs [aka software] used to be confined to computers which used to be confined to big air conditioned rooms sometimes surrounded by windows so people could look in and and watch all the blinking lights, spinning reels of magnetic tape, and printers consuming boxes of fan-folded paper with green bars on it. That's all changed now, of course. My college roomie [another engineer] and wife were through several weeks ago, and at one point, Linda asked us what we thought was causing the problem with the Toyota Prius. Almost simultaneously, we both said "software." I don't actually know if that's true, but it would be my #1 guess.

Computers have become tiny and incorporated into just about anything electrical these days. Incorporated with them is the software that gives function to the device. There are several computers in my Chevy truck. One of them repositions the seat depending on which of the two keys you use and also switches the radio preset buttons between my and Andrea's radio stations. It has more memory than the primary guidance computer that landed on the moon, and is a little over 100 times as fast which is still slow compared to the processor on which I'm writing this column.

Computers have found their way into our radios too. Initially, they ran the display on the front panel, provided memory for frequencies and modes, and the like. They were sort of "controllers" but the "radio part" of the radio was pretty much the same as always … a superhetrodyne receiver, and a transmitter with a signal generator, modulator, and amplifier. Finally, as processing speeds continued to go up, a whole new architecture for the "radio part" of the radio evolved, and this time, the computer pretty much took over much of the job previously handled by a lot of tubes or transistors, resistors, capacitors, transformers, filters, and wire. It's called software defined radio [SDR]. There are a number now on the market, and the number is growing – Elecraft K3, Flex-Radio, and Soft-Rock modules are some examples.

Some of you will want to skip this column and the couple that will follow it because it will be old news. For the rest, we'll take a little trip through the basics.

I'm going to use the K3 as an example simply because I have one, but the principles apply to any of them. And, we'll concentrate on the receiver portion because that's where much of the software action is. And for the record, except for the several checks I've written to Elecraft, I have no financial interest in the company [but I wish I did].

The K3 receiver starts out with an RF amplifier followed by a standard mixer stage that converts the HF signal down to an 8 MHz 1st IF. This IF signal passes through a crystal filter, and is then converted down in frequency again in a mixer to the 2nd IF which is at 15 KHz. This seems remarkably low – some people can actually hear a 15 KHz audio signal – 2nd IF frequencies have typically been around 455 KHz [the Drake 2B had a 50 KHz 2nd IF], but 15 KHz works the same as 50 KHz. Everything up to this point in the receiver is done with more or less standard analog electronic components, but that ends here.

The 15 KHz signal feeds an analog-to-digital converter which repetitively samples the signal amplitude producing a stream of 24-bit binary number, one number per sample. That stream of numbers feeds the digital signal processing unit which does all the rest of the work – filtering, demodulation, noise blanking, equalization, AGC – everything that would have been done with electronic components. At the very end the processed 24-bit numbers are converted back to analog audio signals feeding the headphones and/or speaker.

The magic comes from the fact that, once you have the digital stream of numbers representing the amplitude of the 2nd IF signal, you can compute with them. For example, we could double each number corresponding to doubling the amplitude of the original signal. We can limit the amplitudes just like the limiter stage in your FM HT. We can create filters of any desired bandwidth. In fact, because the full range of mathematics is available for computation, we can "construct" filters that cannot be built with real components in the real world.

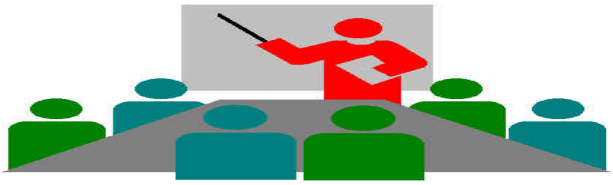
Demodulation is a mathematical process which we normally approximate with electronic components. Here, we demodulate the signal by just doing the math on it. We can identify noise pulses and just throw their numbers away making essentially a perfect noise blanker. We can tailor the audio spectrum mathematically making an audio equalizer, and the K3 does which is great for me on SSB because my hearing is really bad at frequencies over about 1 KHz. When we're finally done with all the computation, we feed our processed stream of numbers into a digital-to-analog converter, audio comes out, and we listen to it.

But wait!! There's more. Want to add a new way to blank noise pulses? Easy. Just change the computer program appropriately … OK, that's the hard part … and replace what's in the radio with the new one. Fortunately for me, the wizards at Elecraft do the hard part and all I have to do is download it from their site and load the file into the radio. They even give me a utility program that runs on my laptop and takes care of this for me. Thus, the result is a radio that can be upgraded essentially forever.

Next month, we'll dig into some of the basics of digital signal processing, and in then look at how we can build filters, noise blankers, equalizers, and the like. Meanwhile, despite low solar flux, 15, 12, and 10 meters <u>are</u> opening, there's just no one there.

73,

Fred K6DGW



BOARD MEETING MINUTES
FOR APRIL 9, 2010

Meeting started at 1730 hours at the Round Table Pizza on Elm Ave.

Present were - Vice president Chuck Baker AE6LR, Secretary Bill Mahl W6WEM, Treasurer Bob Balthrope KD6WTY, Director Frank Sharit W6DHN, Director George Simmons KG6LSB, Richard Kuepper WA6RWS and Mary Anne Balthrope KE6EST. Absent were President Al Martin NI6U, and Director Gary Cunningham KQ6RT.

Chuck AE6LR discussed this years planning for Field Day. What equipment will be needed, who will be going and any new ideas. A letter to the property owner with our insurance will need to be sent.

The picnic day still needs to be determined.
Richard WA6RWS and George KG6LSB stated that they would be bracing the equipment racks at the repeater site in the next couple of weeks.

SFARC CLUB MEETING MINUTES
APRIL 9, 2010

Meeting called to ordered at 1900 hours by Vice President Chuck Baker AE6LR followed by the Pledge of Allegiance, Officer, member and visitor introductions. Several members from the Lincoln Hills Amateur Radio club attended.

Secretary Report – Bill W6WEM reported on the Board meeting minutes

Treasurer Report – Bob KD6WTY reported $1869.00 in the bank

VE Report – 15 applicants attended, 14 passed

Sunshine Report - Happy Birthday to Jetty, also Bob Boeckman WA6ULL was hospitalized with fluid on his lungs on Monday April 9th at Roseville Kaiser. He is in the ICU unit being treated for Pneumonia. Get well soon Bob.

Ares Report - Chuck KG6FFK reported they are preparing for the Mass Casualty Incident on April 22.

New Business – Reminder that Field Day is the last weekend in June

Guest Speaker – Bob Hess W1RH the Director of Operations And Engineering for local television channels CBS 13 and CW31 and member and editor of the El Dorado County Amateur Radio Club newsletter gave a informative talk on the history, construction and maintenance of large radio and television transmission towers on the east coast and local towers in Walnut Grove.
Meeting adjourned @ 2120 hours

Respectfully Submitted,
Secretary,
Bill Mahl W6WEM

ARRL VEC
AMATEUR RADIO VOLUNTEER EXAMINER

Local ARRL Exam Sessions
Courtesy of the ARRL

05/08/2010 | Yuba City CA 95991-2810

Sponsor: Yuba Sutter ARC
Location: Cornerstone Evangelical Church
Time: 9:00 AM (Walk-ins allowed)
05/15/2010 | Carmichael CA 95608-6613

Sponsor: River City ARCS
Location: Carmichael Elks Lodge-Use East Entrance
Time: 7:00 AM (Walk-ins allowed)
05/21/2010 | Sacramento CA 95821-4853

Sponsor: SHARP
Location: Sherriff Marconi Station
Time: 7:00 PM (Walk-ins allowed)
06/03/2010 | Granite Bay CA 95746-6258

Sponsor: Unsponsored
Location: Raley's Community Event Center
Time: 8:00 AM (Walk-ins allowed)

NEED OPERATORS

The Club has been asked to support the Enduro once again. This is an annual motorcycle event that is scheduled for Sunday 16 May 2010.

We need at least 6 more operators with mobile 2 meter radios to fill the request.

This is a very simple yet important event that the Club has been doing for about 6 years and the California Endurance Riders usually give the club a donation for our assistance.

Any Questions? Richard, WA6RWS, 916-482-5027

Please come out and help the Club provide a valuable service.

George KG6LSB

SATTELITE REPORT
Greg Dolkas, KO6TH

HOW TO LIGHT UP THE MOON

The weekend of April 16-18 was the setting for a unique event. It's what you get when you put a few hundred watts of Ham Radio transmitter at the focal point of the planet's largest radio telescope. Moonbounce, like you've never seen it before.

In celebration of the 2010 World Moonbounce Day, the Echoes of Apollo team, led by Pat AA6EG, set up shop in Puerto Rico at the Arecibo radio telescope as KP4AO. The scale of this thing boggles the mind. Most "TV" dish antennas are about a foot or two in diameter. The really big ones - those C-band "Big Ugly Dishes" from days gone by were maybe 5 or 10 feet in diameter. The big radio dishes used for space missions are maybe 100 feet across. Arecibo's dish is ten times as large. 1,000 feet from edge to edge.
A fifth of a mile. One antenna.

What scientists and engineers did to create the Arecibo telescope was to basically fill in a valley in the mountains of Puerto Rico with a huge metal screen. They erected towers around the edge and strung wires across to hang the feed point over the middle. Other than a little fine tuning by moving the feed back and forth, the primary way they aim the dish is by waiting for the Earth to spin around in its orbit. It's that big.

Dominico, I8CVS, did some calculations for the event. The 1,000 foot dish has an effective gain of 60 dBi, giving a 400 watt 70cm transmitter, after feedline losses, an effective radiated power of 243 Megawatts. That's enough gain to illuminate an area 865km across on the Moon's surface. But the Moon is a long ways out in space, and is a very poor reflector (7%), so the result is that Earth-bound hams need to be able to pick up the equivalent of a 17 watt handi-talkie feeding a rubber duckie antenna a quarter of a million miles away. Yeah,right.

Ah, but it's line of sight! Even though Dominico's math is ugly, he predicted that a station with 15 dbi of gain and a good preamp could actually pick up a signal like that. Just barely. The station here at KO6TH has a 2x16 element (circularly polarized) 70cm beam and a preamp, both of unknown pedigree having been purchases at ham swaps. During the event, I was able to just barely hear KP4AO's signal, right at the noise floor. On SSB I could pick out a few call sign letters. CW came in better, of course, and the tones of MT65B (a really weak signal digital mode) were clearly heard. That would have been no problem to copy there, had I had the software configured right... Normally, operating EME is an exercise in copying signals well below the noise floor, so being able to hear anything is utterly amazing. Dominico also predicted that the return trip was also possible with as little as 100 watts, given the telescope's amazing ability to hear weak signals, though I did not have any luck getting through.

The whole event was also broadcast live on the Web, giving hams and non-hams alike a view of operations as they happened. If you do a Web search for KP4AO, you'll find a number of other ham stories posted, some along with audio or video clips of their adventures. Hopefully they'll be able to do this again in the future. When they do, I'll be ready.

Greg KO6TH

Fifty Years Ago at SFARC

May 4, 1960

The regular stated meeting of May 4, 1960 was called to order at 2015 by President Jim Carman. The minutes of the previous meeting were read and approved. There were 11 members and one guest, Dennis Powning, present.
Bob Davis, Activities Manager, gave a report on the forthcoming Pot Luck dinner. It will be held in the multi-purpose room of the Placer Hil1s School on Saturday May 21 at 1830. The rental for the room will be $5.00. The Club will furnish coffee, ice cream, soda pop and other incidentals. Cards will be sent out by the secretary to find out if those attending want to bring enough for 8 of one of the following: Salad, Casserole, Cake or Pie.
A proposed entertainment program was suggested. It will be to put some portable station in operation, Two 4-H boys will give demonstrations, Sage's daughter will play a couple piano selections, Walt Dowdy will give a magic act to take up about 10 minutes, a Hi Fi will play background dinner music. Bob Davis made a motion that a resume of this be approved and the committee to act accordingly. Bob Richier seconded the motion and it was approved the committee will meet next Tues. at 1930 at Frank Carman's.
Constitutions were passed out by the Secretary to those who did not have one.
A discussion of Field Day on June 25th followed. Lynn Hunter and Bob Davis are to serve as a committee to look into this with a further discussion to continue next meeting. Coffee and Do-Nuts are to be served after next month's meeting. Frank and Jim Carman will take care of this and a Kitty is to be present to pay these expenses.
The Treasurer reported a balance of $86.50. Dues collected were: Mike Bauman $1, Howard Davis $.50 Bob Davis $.50, Bob Richier $1, and Otto Draper $.50. This made a balance at the end of the meeting $90.10.
The meeting adjourned at 2140.

Respectfully submitted, Richard H Lund, Treasurer

SIERRA FOOTHILLS AMATEUR
RADIO CLUB
P.O. Box 1005
Newcastle, CA 95658

PLACE
STAMP
HERE

SIERRA FOOTHILLS AMATEUR RADIO CLUB
2010 Membership Application

Please Print

Name: _____ Call: _____ Class: _____ e-mail: _____

Address: _____ City: _____ State: _____ Zip: _____

Associate Name: _____ Call: _____ Class: _____

Phone Number: _____ Application: (Circle One) New Renewal

Member Dues: Circle Amounts That Apply.

Applications (for new members only) received in the middle of the year will be pro rated. Contact the President or Treasurer for exact rate.

Membership: (P)	$22.00	Name Badge: (R)	$7.00
Associate: (Q)	$ 7.00	Repeater Donation: (S)	$_____
Auto Patch Donation: (T)	$_____	Newsletter Booster: (V)	$_____
Misc. Donation: (X)	$_____	Christmas Donation: (W)	$_____
		TOTAL: (Y)	$_____

OFFICE USE ONLY: DO NOT WRITE BELOW THIS LINE

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

Payment: _____ Check Number: _____ Cash: _____