



Sierra Foothills Amateur Radio Club

<http://www.sf-arc.org/>

SEPTEMBER 2010

PO BOX 1005. NEWCASTLE. CA



At the key of SFARC

OFFICERS

PRESIDENT

Al Martin, NI2U
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ae6lr@yahoo.com

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kd6wty@yahoo.com

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kq6rt@sbcglobal.net
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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 Riversix
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

S

F

A

R

C



Calendar of Events

September 10 "Breath California" Bike Trek
Operators needed (See page 5)

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

SFARC CLUB MEETING

September 10, 2010

Bring a friend See you there!

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

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From the Presidents Shack

Al Martin, NI2U

President's Thoughts

Club Picnic


All who attended had a great time. There was a lot of talking and plenty of food.

End of 2010 is getting close

The club needs to replace the Refreshment Committee for next year. Please think about helping with a job that brings a lot of camaraderie to the meetings.

The Board has been active all year and I want to thank them for all of their work. Chuck AE6LR has been providing great programs and a wonderful Field Day. Bob KD6WTY and Mary Anne KE6EST have done a load of work straightening out the Club Government Paper Work. Bill W6WEM is on top of all of the documentation. George KG6LSB and Gary KQ6RT have provided plenty of support for the Board and Membership. Then Richard WA6RWS is always there and also is the Chair of the Repeater Committee.

Thank you everyone for your help and Support



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[Local ARRL Exam Sessions](#)
Courtesy of the ARRL

SFARC TESTING

SFARC has testing sessions on the first Saturday of each month at Raley's on the corner of Auburn Folsom Road & Douglas Bl. in Granite Bay. Sessions are in the multi-purpose room in the back left hand corner of the store. The session starts at 8:00 AM

OTHER TESTING SITES

09/18/2010 | [Carmichael CA 95608-6613](#)

Sponsor: River City ARCS

Location: Carmichael Elks Lodge-Use
East Entrance

Time: 7:00 AM (Walk-ins allowed)

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Location: Carmichael Elks Lodge-Use
East Entrance

Time: 7:00 AM (Walk-ins allowed)

MISCELLANEOUS RADIO

Digital Signal Processing – The Fourier Transform (or “So That’s Where The Waterfall Comes From”)

We’ve figured out how to sample a complex signal at the second IF frequency of our receiver to produce the “number soup,” we built a digital FIR bandpass filter for the number soup, and we spent last month working on impulse response and what it all means. This month, we’re going to take a [hopefully] scenic side trip into another of the sexier things we can do with the number soup. Ultimately, it will lead to the familiar “waterfall display” that most digital radio software [like MixW or DigiPan] have.

It all starts with some mathematics [surely you’re not surprised by now] and specifically, one Jean Baptiste Joseph Fourier. Fourier was a French mathematician in the 18th and 19th centuries, and among many many other things [he’s one of history’s greatest mathematicians], he investigated a transformation that would take a function based on time into an equivalent function based on frequency. I got an A- in this part of math in college so you can just take my word for that. It involves integral calculus, so at this point we get into generalizations and assorted arm waving maneuvers.

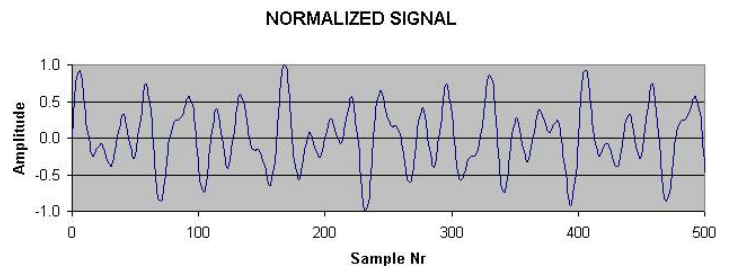
As is nearly always the case in mathematics however, whatever we can do with continuous functions, we can find an equivalent thing to do with a time-series of samples of that function – the number soup that’s becoming so familiar. And, wonder of wonders, all the mathematical arm waving collapses to simple arithmetic, something most of us learned to do in our heads prior to the advent of calculators on cell phones. In the digital world of the number soup, it is called the Discrete Fourier Transform, or DFT. And, again as is common in mathematics, it has an inverse process that will take the frequency spectrum and reproduce the original time-series.

But wait! There’s more! If we put a couple of constraints on our sampling process, we can get rid of a whole bunch of tedious arithmetic in the DFT, making it very fast on a computer. It is called the Fast Fourier Transform, and it is indeed very fast ... fast enough for a current generation microprocessor to compute it in microseconds,

and do it over and over. The largest constraint on the sampling and number soup is that each computation requires that the number of samples be a power of 2. Fortunately, this really isn’t much of a problem since for our radio, we’re going to just keep doing this over and over, and we don’t really care about exactly how many samples we take at any one time.

We’ll demonstrate this on – what else – an Excel spreadsheet and some plots. Excel can do an FFT, you just have to load the Data Analysis tools. For this, I decided to create a semi-complex signal consisting of the sum of three sine waves – 500 Hz, 750 Hz, and 1100 Hz. I picked these frequencies because they are not related harmonically, and in fact, are not related by very small integers. This leads to a sort-of-complex waveform. It is still periodic like a sine wave but it takes a large number of cycles before it begins to repeat.

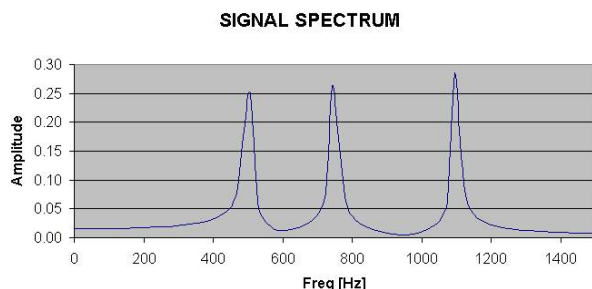
I sampled the three sine waves at a 20 kilo-



samples per second rate and added the samples together for 1,024 samples. 1,024 is two to the tenth power [2x2x2...ten times], the main criterion for the Excel FFT to work. Here’s what a small segment of the composite signal looks like, and as before, I normalized it so it ranges between +1 and -1.

Now, looking at this over time [sample nr is the same as time for us in the number soup], it sort of looks like noise, and it’s hard to distill much information from it. That’s the primary characteristic of the number soup ... it’s just a series of numbers representing the sampled amplitude of the input signal.

However, look what happens when I subject this input series of samples to the Excel FFT. It gives us frequency instead of time on the horizontal axis of the plot, and amplitude on the vertical axis. We all call this a spectrum plot, and just as we should, we can see that that sort of “noise waveform” I started with really consists of three major frequencies, 500, 750, and 1100 Hz.



“So,” I hear you say, “Those aren't exactly single frequency peaks in the plot,” and you're right. I used only 1024 samples out of the number soup coming into me. Had I used more [always a power of 2], those peaks would have narrowed. Had I used an infinite number of samples, the peaks would have narrowed to infinitesimal width and it would have taken forever. None of us want to wait around until forever is over to see what our QSO buddy is typing, so we accept the approximations.

This is what produces the “waterfall” and spectrum displays in our digital communications software. For the waterfall, the higher the peak, the brighter the display at that frequency. This transformation is computed over and over again as the waterfall moves down.

You may wonder why the three peaks are not all the same amplitude – after all, I created the complex waveform from three equal amplitude sine waves. The answer harks back to the business of sampling. The number soup is just a series of samples taken at equal times. At a 20Khz sample rate, I got 1024 samples in a little over 0.05 seconds. In that time, the 500Hz signal went through 25 full cycles and part of the 26th. The 750Hz signal went through 38 full cycles plus part of the 39th, and the 1100Hz signal went through 56 cycles and a bit of the 57th. So, in the

string of 1024 samples, there was more “information” about the higher frequency signals than the lower, which shows up in the FFT.

Computation of an FFT from the number soup involves a number of operations, such as bit-reversals, to be performed multiple times. As with the filter calculations, DSP processors often implement those operations as single instructions to increase speed. When you look at it, even from 30,000 feet as we are, it sort of boggles my mind what is happening inside the DSP processor in my K3. Next month, we'll try our hand at building an IIR filter just like our 20th order FIR filter. And, this will be the first time Excel fails us.

73, Fred K6DGW



Fifty Years Ago at SFARC Gary Cunningham, KQ6RT

September 14, 1960

The September meeting was held at Jim Carman's home on the 14th of the month. President Carman called the meeting to order at 2015,

The minutes of Augusts' meeting were read and approved; the treasurer reported a balance of \$84.91

There were nine members and one guest, Leland Tindall, present. Before the meeting was adjourned, he became a member of the club.

A code class was discussed which would also include theory study. Bob Davis moved that the club sponsor a Novice & General class in code and Theory. Bob Richier seconded the motion and it was carried unanimously. The classes will meet at the Davis home temporarily. The first meeting is slated for next Monday evening.

A meeting place was discussed. An ad in the Journal was suggested and was to be made up by the secretary. The place should be suitable for a work bench, lock-up etc. Jim and Dick's phone numbers to be used. Also, Craig Tindall, Bob Richier and Jim Carman were chosen as a committee to look for a room.

A radio display for next year's fair was suggested and will be followed through. A card of thanks was read from Mrs. Walter Randall. Walt Dowdy is to let the group know when he goes up to his friend's cabin so if anyone can go along the can see how it would develop into a site for a "Field Day type outing".

The next meeting will be at Lindell Hunter's. The group will meet at Jim Carman's at 7:30 and form a car pool to go to Lin's.

Bob Davis will give a talk on the recent ARRL convention in San Mateo.

Meeting adjourned at 2130.

Respectfully submitted, Richard H. Lund



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Auburn, CA 95603

(right next door to Midas)
530.888.8483

dave@radiosupplyco.com

**CLOSING AS OF
SEPTEMBER 30, 2010**



We have decided to throw in the towel at Radio Supply Company. I am shooting for the last day of business to be September 30th. From this point on, I will no longer be accepting repairs (unless it's simple & quick), and no new incoming consignments. All store owned gear, parts, accessories, antennas, etc is available at blowout pricing. Some of the estate gear that we have on consignment is negotiable.

I would like to thank my many customers who have supported the store, but with the economy the way it is, it is unsustainable. It's time for me to go back to work somewhere. I will be attending the Lincoln swap meet on the 11th, with as much as I can bring there, but encourage folks to come by the store and make a deal on anything I have left available.

Thank you & 73,

Dave

SFARC BOARD MEETING MINUTES

BOARD MEETING MINUTES FOR AUGUST 13, 2010

MEETING BEGAN AT 1800 HOURS AT THE ROUND TABLE PIZZA IN THE ELM CENTER, AUBURN.

PRESENT WERE- PRES. AL NI2U, V.P. CHUCK AE6LR, SECRETARY BILL W6WEM, DIRECTOR GARY KQ6RT AND FRANK W6DHN AND RICHARD WA6RWS.

OUR NON-PROFIT STATUS ARE STILL BEING WORKED ON BY AL NI2U, BOB KD6WTY AND MARY ANNEKE6EST.

THE UPCOMING PICNIC WAS DISCUSSED AND DUTIES ASSIGNED.

THE MEETING WAS ADJOURNED @1850 HOURS.

SFARC Club Meeting Minutes

AUGUST 13, 2010

MEETING BEGAN AT 1930 HOURS WITH THE PLEDGE OF ALLIGENCE AND INTRODUCTIONS.

SECRETARY BILL W6WEM REPORTED ON THE BOARD MEETING AND REPORTED \$1143.03 IN THE BANK FOR THE ABSENT TREASURER BOB KD6WTY.

VE REPORT - 8 TESTERS AND 2 TESTEES, 1 GENERAL AND 1 EXTRA, BOTH PASSED.

SATELITE REPORT - GREG KC6TH REPORTED THAT A PERQUIUS METEROR SHOWER WILL BE TONIGHT AT 1200 MIDNIGHT TO 0400 HOURS.

SUNSHINE REPORT- RICHARD WA6RWS REPORTED THAT BOB WA6ULL IS NOT DOING TO WELL. WE ALL GIVE OUR BLESSINGS AND GOOD THOUGHTS FOR BOB AND HIS FAMILY.

REPEATER REPORT - RICHARD WA6RWS REPORTED THAT EVERYTHING WAS WORKING FINE EXCEPT SOME PEOPLES AUDIO WAS LOW.

TECH TEN - AL NI2U TALKED ABOUT FOX HUNTING, THE BASIC EQUIPMENT NEEDED ETC.

OLD BUSINESS – THE PICNIC WAS DISCUSSED, TIME, PLACE AND DATE. THE BY-LAW REWORK IS STILL IN THE WORKS.

GUEST SPEAKER AND PRESENTATION WAS PAT BARTHELOW AA6EG. HE GAVE AN INTERESTING TALK AND SLIDE SHOW OF “ECHOES OF APOLLO” BIG DICH EME (EARTH MOON EARTH). SHOWED BIG DISHES FROM JAMESBURG TO ARECIBO. SAID THERE ARE 1500 BIG DISHES IN THE WORLD AND HAD THE OPPORTUNITY TO USE THREE OF THEM FOR A MOON BOUNCE. GREAT SLIDE SHOW.

MEETING ADJOURNED @ 2115 HOURS

RESPECTFULLY SUBMITTED BY,

SECRETARY BILL MAHL W6WEM



1. Kenwood TS430S with matching Kenwood AT250 Tuner.

2. ICOM IC735 with matching AT150 tuner.

Contact Dr. Whit Woodard, K3WB Rocklin, CA with a reasonable offer. 916-768-5022.

1. BIRD DA-140/AP looks to be in good condition except I just now found some tags that said the coil assembly was burned up. I do not know if it can be repaired. \$25

2. Coax adapters in good condition. \$25

E-mail John Perry
john@johndperry.com



Sierra Foothills Amateur Radio Club

HOME Meetings Breakfast Repeaters Nets Officers Newsletters Member Application

VISIT OUR WEB PAGE AT


<http://www.sf-arc.org/>



CLUB BREAKFAST

Last Saturday of the month
Susie's Café, Cirby at Riverside,
Roseville 8:00 AM

SATURDAY JULY 31

SATURDAY AUGUST 28



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2010 SFARC CLUB PICNIC



