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

## At the key of SFARC

S F A R C

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History: Gary, KQ6RT
Misc Radio: Fred, K6DGW
Sunshine: Richard WA6RWS
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### 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**
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## In this issue



## Calendar of Events

**November 6** ARRL Sweepstakes (CW)

**November 11** Veteran's Day

**November 12** Club Meeting

**November 25** Thanksgiving

**November 20** ARRL Sweepstakes (Phone)

**November 27** Club Breakfast

**December 10** SFARC Christmas Party

## SFARC CLUB MEETING PRESENTATION

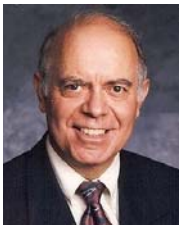
"12VDC in the Shack"

Presented by Lonnie Moore, Vice President of the Yuba Sutter Amateur Radio Club. He will also bring a two meter quad antenna

The October "Tech Ten" will be presented by Gregg Dolkas - KO6TH - regarding "Satellites".

**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

The White Elephant Sale was a terrific success. Around $350 was made for the Christmas Party.

The club needs the support of its members to function. It is always easier to let someone else do the work but help makes the jobs easier.

We support a Thursday Night Net and have weekly columns. There is the ARRL Report, the Satellite Report, the Volunteer Examiner Report, the ARES Report and the Mystery Question. It would be much appreciated if someone would pick up the Mystery Question and a second person would pick up the ARRL Report. The Mystery Question is easy to do. The ARRL Report does need access to the internet.

The Mystery Question is courtesy of the Website QRZ and many paper copies of some of the questions are available.

The ARRL Report is based on the weekly ARRL Letter and requires email access and being signed up on the ARRL Website.

We all enjoy the Net and more hands make for lighter work.

Al Martin






### 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

## Amateur Radio Station Recognizes NRA's 139th Birthday

Courtesy of American Rifleman Magazine
November 2010 – Submitted by James Lee, KA6DFP

The Yavapai Amateur Radio Club (YARC) of Prescott, Ariz., will operate a special event station November 17, 2010, in celebration of NRA's 139th birthday. The amateur radio station will operate from the Gunsite Academy's 2000-acre campus north of Prescott, Ariz. The special event call sign will be K7NRA, an FCC-licensed amateur radio station. The operation will take place from 1500 to 2300 UTC (0800 to 1600 MST) on the following frequencies: 7.250, 14.250 and 21.335.

A unique NRI/Gunsite QSL Card (acknowledgement of communications) will be forwarded to those stations contacted during the event. All amateur stations, especially those operated by NRA members and Gunsite alumni, are urged to participate. More information can be found at YARC's website: www.w7yrc.org

# MISCELLANEOUS RADIO

## Fred Jensen, K6DGW

### Infinite Impulse Response [IIR] Filters

*I apologize for missing last month's Sierra Signals, the Alpine County expedition for the Cal QSO Party intruded and I just didn't make it to Miscellaneous Radio. We abandoned our summit camp this year [got really tired of getting the crap beat out of us by the weather] and were in a cabin at 7,400 ft at Lake Alpine Resort. Much much more enjoyable. 1,670 QSO's, all 58 multipliers, 240,000+ points.*

We're closing in on this series of Misc. Radio, but there really is another sort of filter that I've at least alluded to and which actually represents all of the filters we can build with real electronic components like capacitors, inductors, crystals, and anything that mimics them in the real universe [the famous Collins mechanical filter would be one of those]. The mathematics when dealing with real components can be daunting … just ask any undergraduate EE struggling through Laplace transforms. Ahh, but as before, when we enter the digital world of signal processing, it all turns out to be simple arithmetic and none of the mathematics are needed, unless you want to know "why" this works. We won't ask that question, it does and that will work for us.

Recall that the impulse response of a network [a filter is an electronic network] is the output when you bang it once. In the DSP world, that means the first sample in the number soup is 1.0 and all succeeding samples are zero. In the case of the Finite Impulse Response network, which we can only implement in a DSP environment, once the zero samples fill the input register, everything goes to zero in the output and it stays there [i.e. it quits "ringing"].

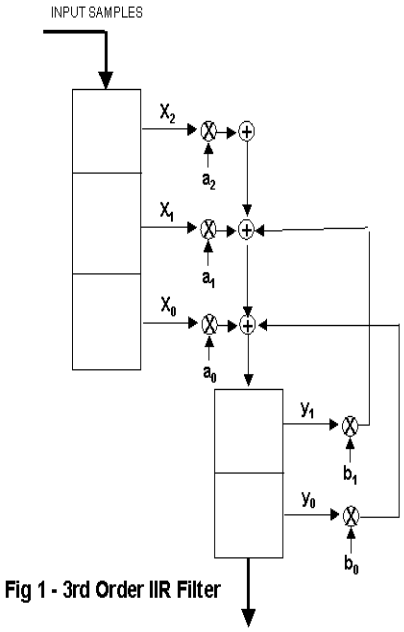


Fig 1 - 3rd Order IIR Filter

"Real filters" [i.e. those we can build with real components] will ring forever. The amplitude gets unmeasureably small, but it never really reaches zero. The DSP equivalent of such filters is the IIR digital filter. Figure 1 is a crude pictorial approximation of a 3rd order IIR filter … it's a lot easier to describe this using mathematical notation, but this will work for us.

The singular difference between the DSP FIR and IIR filters is that the IIR filters incorporate feedback. Parts of the output stream from what would have come from the FIR filter are fed back and modify the new samples coming in. The result appears more complex in Figure 1, however it will turn out that it actually simplifies the computations. Because of the feedback, you cannot guarantee that the output buffer [the second rectangle in Fig 1] will ever contain all zeroes, even if the input sample stream is all zeroes. Hence, the filter may "ring" forever once it has experienced the impulse. The only reason there are only two feedback paths and not three is because my diagram got too big. Pretty much all the time, if there are three "a" taps, there are three "b" taps as well.

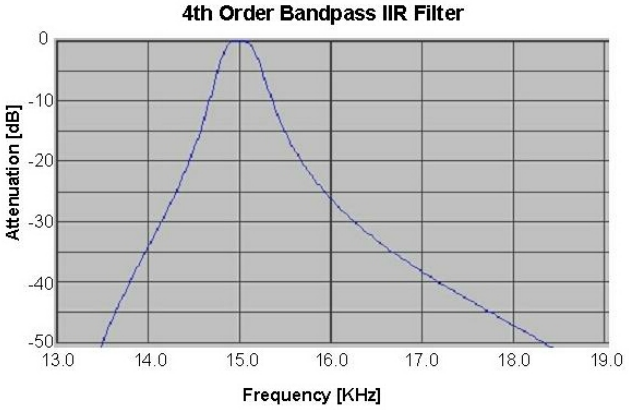
Now, in filters with real components, there are losses, which eventually drive the ringing amplitude to as close to zero as you want. In the digital world, there are no losses, and it is possible to build digital filters that are truly unstable and not only will ring forever but will do so loudly. We try to avoid those designs. ☺

Last issue, I mentioned that with an IIR filter, Excel fails us. The reason is the feedback. Excel will not allow the results of a computation to be used in that computation, it calls it a "circular reference," and that's exactly what happens in an IIR filter. Parts of the output stream of what would have been an FIR filter feed back and modify the following samples coming through the filter. Consequently, we have to resort to another means to design and characterize our filter, and fortunately, we now have the Internet and such capabilities exist there for free.

One such tool can be found at www.dsptutor.freeuk.com/IIRFilterDesign/IIRFilterDesign.html as a Java applet and that's what I used. For our example, I decided to continue the FIR examples and design a 4th order bandpass filter with a 200 Hz passband centered on the K3 IF frequency of 15 KHz … again, our prototypical

CW filter. And, there's one other choice to be made.

Recall that any filter we build with real electronic components will be an IIR filter, and there are any number of configurations of the inductors and capacitors that we could choose. In the EE-world, these configurations are often called "prototypes," and there are probably more than a dozen in common use. Two the most common are the Butterworth and Chebyshev, both named after their inventors. For our example, I chose a Butterworth prototype for no good reason, the Chebyshev prototype yields approximately the same frequency response with a little more ripple




at the very top.

And this is the resulting frequency response. Note, it looks a little different than the charts I made from Excel because this one didn't come from Excel, it came from the little Java application on the Internet.

It is centered on 15 KHz, and at the -6 dB points, it is almost exactly 200 Hz wide. Note that it isn't totally symmetrical. This is again an artifact of the sampling process similar to the FFT example where the higher frequencies by their nature end up with more information.

Another feature, possibly not quite as obvious, is that a 4th order IIR filter gives a frequency response that is comparable to the earlier 20th order FIR filter example. This is an inherent characteristic of IIR filters. Part of the reason stems simply from the definition of the term "order" for IIR filters, which is the larger of the number of "a" and "b" tap coefficients. In our case, there are four "a's" and four "b's" so it is a 4th order filter. Note however, it really has eight active taps, four forward and four feedback.

The impulse response does not ring forever, but that is simply the result of the DSP processor's word-length. The "ringing" decays as we would expect, meaning the output sample numbers get smaller and smaller. Eventually, they get so small they can no longer be represented in the processor's computer words and everything goes to zero. We could increase the number of bits in a computer word and it would ring longer, but eventually, even the longer words will all be zero.

We've only scratched the surface of what one can do with the number soup entering our DSP processor. DSP noise reduction is quite amazing. The K3 [and a number of other modern transceivers] have several noise reduction processes which can result in some amazing effects. One of the K3 processes actually builds IIR filters on the fly, one after another which find the signal in the psuedo random noise and enhance it, thereby reducing the noise you hear. DSP noise blankers simply punch holes in the signal to get rid of periodic noise, product and other detectors can be all digital, and equalizers that allow you to tailor your receive and transmit audio are all just arithmetic on the number soup. The K3 has an "AFX" mode which capitalizes on an effect in human hearing. It delays and conditions the received audio and then combines it back with the unprocessed audio. The effect in your headphones is that noise and other trash recedes into the background and the desired signal stands out right between your ears.

Today's radios are a far cry from our fathers' radios, but then, electronics has changed a lot. I left most of my hearing on a mountain top in Laos many years ago. I've had several hearing aids, all of which made sounds louder but no more intelligible. A half dozen or so years ago, the VA gave me a pair that immediately digitize the sounds into number soup and then process it, and suddenly, I can understand people in meetings, the TV, and in the theater. They are quite small, and run on 1.4 volts which astounds me.

I'm not sure where Miscellaneous Radio will go next, but something usually shows up. The solar flux is up to 91, smoothed sunspot number is 61 this morning, and 10 meters has been really alive. It looks like we'll get to have a Cycle 24 after all. Keep in mind that Technicians have a sideband allocation on 10 meters [28.300 – 28.500].

**73, Fred, K6DGW**

## LOCAL PUBLIC SUPPORT EVENTS UPDATE

Submitted by George Simmons, KG6LSB

As a club we support some local events. One of the regular events was the MS walk in Rocklin. I've been informed that last year's walk took in almost $25,000. At the same time I was told that there will be no more walks in Rocklin and the nearest event will be in Folsom some time in the April/May 2011 time frame. Any takers for support? Let me know at kg6lsb@arrl.net

Another event was the Enduro that was run in Georgetown. That event has been canceled indefinitely due to Forest Service clamp downs on trail running. The Club usually got a generous donation for our support.

George KG6LSB


**Fifty Years Ago at SFARC**
**Gary Cunningham, KQ6RT**
Nov. 9, I960

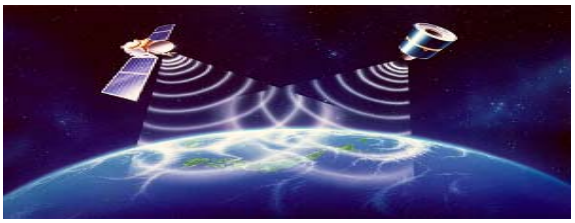
President Carman called the meeting to order at 2025 after giving the Treasurer time to take in any dues that might be forthcoming. The meeting was held in the home of Mike Bauman on Memorial Lane with 9 members present. The Secretary's minutes for the October meeting were read and approved, as was the Treasurer's report. The Secretary read a letter from the FCC on setting up a club station and the largest obstacle at the present time, outside of needed gear, is a meeting place so we can have an address. The next letter read was one from President Carman to the Stockton Box Company regarding the possibility of using their building by the fairgrounds as a meeting place. To this date, no answer has been forthcoming. Leland Tindall reported for his father, who was ill, that if the group wanted to meet to take a look at his father's property that they could do so on either Fri., Nov.11 between 8:30 to 9 A.M. or Sat. Nov. 19th at the same time. The group decided to take the Saturday date. They are to meet at Craig's and then proceed from there.

It was decided to make a few nominations for next year's officers. Those nominated were:
President: Sage Otow and Lindell Hunter V. Pres.: Jim Carman. Further nominations were left till next month's meeting.

Among other topics discussed were:
1-Fund raising projects which might be carried out.
2-Possibilities of a Christmas Party or perhaps a few being invited to the MARS party.

The meeting adjourned at 21:55 after which the group enjoyed the hospitality of Mike and his XYL for coffee or tea and doughnuts.

Respectfully submitted,
Richard H. Lund - Sec.



SFARC Satellite Report Greg Dolkas, KO6TH

## Satellites come full circle….Almost.

There's a new satellite that's being proposed, intended to be a calibration target for military "over the horizon" radar systems. RADAR, of course, works by bouncing radio signals off targets, listening for and timing the returning echo. To be an effective target, the new satellite needs to be a sphere. A big one. Like, 30 feet in diameter. With an estimated lifetime of 30 years, and being totally passive, the reliability of it as a space resource has not gone unnoticed. Bob Bruninga WB4APR, ever the inventive one, asks the Amateur Satellite community: Hey, can we bounce a signal off this thing too? You know, like they did 50 years ago?.Launched 50 years ago last August (August 12, 1960), Echo-1 was a 100 foot diameter metalized balloon. When inflated in orbit, it was effectively a small mirror in space. Radio signals beamed at it would be reflected back down to Earth, providing the first transcontinental radio, telephone, and television links. The success of this "satelloon", as the development team called it, led to the

development of active reflectors (we call them Transponders), and the first commercial satellite communication system, Telstar, launched in 1962.

Unfortunately for Bob, the laws of physics don't quite work for his idea. This satellite, while spherical, turns out to not be solid. It's actually planned to be a geodesic grid, more like a jungle-jim in space. Presumably this is done to reduce the weight of the satellite, and also to extend its orbital life. Even in orbit, something that big gets dragged down by the faintest bit of the planet's atmosphere, and the particles of Solar Wind being tossed out by the Sun. The International Space Station is periodically given a reboost by one of the visiting Space Shuttles or Russian supply craft for this reason.

But a satellite that's mostly not there makes for a more difficult target. The large openings force the use of longer wavelengths than the 900 MHz and 2.3 GHz links used 50 years ago on the larger Echo-1; these shorter wavelength signals would pass right through the grid. But longer wavelengths and a smaller target means that the returning signals would be too weak for an amateur-class station. Scribbling on the back of the proverbial envelope, Bob calculates that a 1,000 watt 10 meter signal, beamed through a 10db gain antenna would have a return echo at -170dBm, which is some 48db below the noise floor of most HF receivers. Narrowing the signal bandwidth would help, but probably not enough. It would also increase the challenge of following the Doppler shift. Bummer. (Bob also reports that the military have LOTS more power and LOTS bigger antennas than we do, so this is not a problem for them. No surprise there.)

So, after 50 years of progress, we nearly return to our roots. While the link budget analysis doesn't appear to work in our favor, something tells me that we'll come up with another way to use it. After all, we've become pretty adept at bouncing signals off the Moon.

That's what Amateur Radio is all about. Any bets?

Greg KO6TH

# Robert B. Boeckman, Sr. WA6ULL/SK

**By Dean W Handy, KG6YVQ**

Bob was born in Vinncense, Indiana on October 30, 1935. He was born at home which made his birth certificate a bit harder to get when he and Linda needed it to obtain a passport some years ago.

He was married to Linda in a ceremony that few who attended will ever forget. It took place in the Folsom Firemen's Association Clubhouse on October 30, 1968.

Bob wandered down the aisle much ahead of his lovely bride wearing a bowling ball on a chain attached to his ankle. Just before Linda appeared one of his fellow firefighters, Frank Davidson, dressed in the garb of an old Farmer and carrying a shotgun, came to the front of the aisle and asked "Just who is the 'City Slicker' who says he wants to marry my daughter?"

Linda was such a good sport to put up with all the shenanigans that Bob and his friends pulled over the years.

He had a great love for his one major hobby, Ham Radio, and spent a great deal of his spare time in his 'radio room' trying to coheres me to get my license by letting me chat with contacts he made on his Hallicrafter Radio. (I should remember better which model he had, but I do remember that the first radio he let me chat on was one that he had made from a kit.)

Although Bob was fairly much an introvert few could really tell this because of his 'stage persona' which often showed up even before you got to know who he was. He liked to play the organ and he loved to tell a couple of jokes every now and then. Sometimes he would even combine these two activities such as when he did his little show at the old Sam's Hof Brau in Cameron Park.

Few among his Ham buddies in either of the two local radio clubs he held membership in would ever believe the first sentence of the previous paragraph. He was likely to find something to say at most every club meeting. And, likely as not, it was meant to be humorous … even if sometimes it was not understood to be as funny as he might have meant it to be.

Bob was a Catholic and in his youth he was an alter boy at his local parish in Vincennes. His religious activities allowed him to join the Knights of Columbus and he worked with that organization at their fairs and other activities.

Bob was also a member of the Folsom Lion's Club. He and Linda helped that club with their activities at the Folsom Rodeo and whenever they called upon him to do so.

Among Bob's other great loves was the fire service. He joined the North Highlands Volunteer Fire Department when he first moved to California. And when he moved from North Highlands to Folsom his friend (and boss) Jack Kipp made sure that Bob found a place in the Folsom Fire Department (which at that time was also a volunteer organization). Bob was initially brought on the department as an Engineer and later promoted, first to Captain and then to Assistant Fire Chief. Bob and I, along with our wives and family, attended many activities with the Folsom Fire Department during the time he was on the department. He also helped me acquire a VHF radio which we put on the fire frequency and installed in my little red pinto.

Under Bob's insistence I did finally get my Amateur Radio License after taking a course which was offered by Rob Carpenter and Casey McPartland. Bob attended almost every class they taught – first to be there for me … second to be there for his other buddy Rob … and third just to kibitz whenever he could.

Joining the SFARC was also something Bob 'made me do' … But because I could be with him and Rob and Carl and John – it really seemed like the right thing to do … and still does.

We will surely miss Bob … and I know that he and Rob will be DXing to us – if we just listen for their call!

## SFARC BOARD MEETING MINUTES

**October 8, 2010**

Meeting started at 1800 hours at the Round Table Pizza in the Auburn Town Center on Elm Ave., Auburn.

Present were President Al AI2U, Secretary Bill W6WEM, Treasurer Bob KD6WTY, Directors Mary Anne KE6EST, George KG6LSB, and Gary KQ6RT. Also present was Richard WA6RWS. Absent was Vice President Chuck AE6LR.

Al NI2U stated there was no update on By-Law revisions.

The White Elephant Sale, Officer elections, Repeater funding and the club budget was discussed.

## SFARC Club Meeting Minutes

**October 8, 2010**

Meeting was called to order by President Al AI2U at 1930 hours in the Placer County Library in Auburn followed by the Pledge of Allegiance and introductions.

Secretary - Bill W6WEM reported on the Board meeting.

Treasurer - Bob KD6WTY reported $826.02 in the checking account.

Satellite - Greg KO6TH reported that Oscar 51 was reloaded again.

Repeater - Richard WA6RWS reported everything is working fine and the 220 repeater is up and running.

Old Business - An award was presented to Matt KC6RUO for the great work he does every month on the Club's newsletter.

New Business - It was agreed to round up bids for the White Elephant sale. The budget was discussed and also passing the hat for repeater funding was suggested.

The White Elephant sale went off with no problems and was a great success.

Meeting was adjourned @ 2120 hours.


**VISIT OUR WEB PAGE AT**

**http://www.sf-arc.org/**

## SFARC SUNSHINE REPORT

Richard Kuepper, WA6RWS

Joe, KF6OQY has his antenna back up and we have a schedule at 10am weekdays on 7245khz. Allan, KI6WDV has joined us and anyone else who would like to speak to Joe, please join in. If frequency changes will announce on repeater. Joe is doing better.

I received a letter from one of our past presidents (1979), Col. Craig Bledsoe, KL4E, ex K6CBP, who now lives in Alaska. We had a nice chat on the telephone. He asked me to say hello to Jim Carmen and Len Taylor. He is also a pilot with FedEX and involved with two radio clubs around Anchorage. I am adding him to our newsletter list so he can keep up with our club down here too.

Richard, Your official greeter.

## CLUB BREAKFAST

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