http://www.sf-arc.org/ DECEMBER 2009 PO BOX 1005. NEWCASTLE. CA

At the key of SFARC

S F A R C

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REPORTERS
Satellites: Greg, KO6TH
History: Gary, KQ6RT
Misc Radio: Fred, K6DGW

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 Riverside, 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

SPECIAL SERVICE CLUB ARRL

Calendar of Events

12/4-6/09 ARRL 160 Meter Contest
www.arrl.org/contests/calendar.html

12/16/09 **Holiday Dinner!**

The SFARC Annual Christmas Party will be held December 11th at the Newcastle United Methodist Church
410 Buena Vista Avenue.
(916) 663-2250
See Page 2 for Directions

12/25/2009 CHRISTMAS DAY!

In this issue

At the Key and Meeting Information	Page 1
Christmas Party Information	Page 2
Miscellaneous Radio, Fred K6DGW	Page 3
2010 SFARC Dues	Page 4
Meeting Minutes	Page 5
ARRL VE Exam Sessions and Locations	Page 6
SFARC Thirty Years Ago	Page 6
Crossword Puzzle	Page 7

President: Al Martin, NI2U
Vice President: Charles Baker, AE6LR
Secretary: Bill Mahl, W6WEM
Treasure: Bob Balthrope, KD6WTY
Directors: George Simmons, KG6LSB, Kurt Hess, N6RS and Frank Sharit, N6GP

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

Holiday Dinner: Friday December 11th, 6:30pm

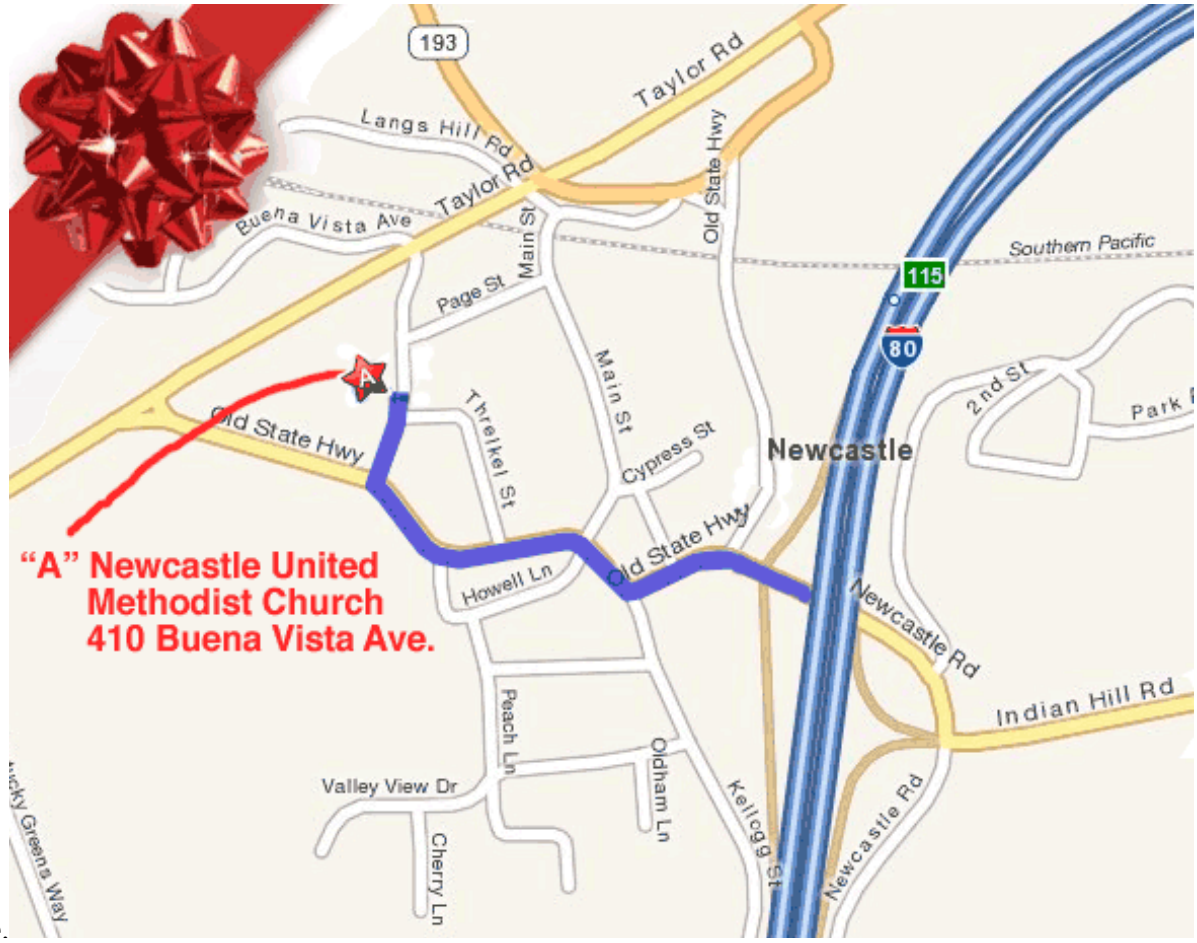
Note: Everyone should bring a side dish, salad or dessert. The club will provide the turkeys (2) and a large ham.

Directions to Christmas Party - Dinner starts at 6:30 pm

The SFARC Annual Christmas Party will be held on
December 11th at the Newcastle United Methodist
Church located at 410 Buena Vista Avenue. (916) 663-2250

From Sacramento - Take Highway 80 EAST toward Reno.
EXIT Newcastle Road/Indian Hill. Turn LEFT at the
light onto Newcastle Road. Go OVER the freeway, bear
to the LEFT (Old State Highway, the road takes a few curves)
continue past the Post Office, then
turn RIGHT onto Buena Vista Avenue.
The church will be on the LEFT side.

From Auburn - Take Highway 80 WEST toward Sacramento.
EXIT Newcastle Road. Turn right onto Newcastle Road, bear
to the left (Old State Highway, the road takes a few curves)
continue past the Post Office, then
turn RIGHT onto Buena Vista Avenue.
The church will be on the LEFT



Miscellaneous Radio

By Fred Jensen, K6DGW

Roofing Filters

The term "roofing filter" has crept into the ham vocabulary in the last decade or so. Prior to that, the term was hardly, if ever, heard. Nowadays, it is a major subject of conversation when comparing receiver performance, and not a small amount of time is spent deciding on just what filters you want when purchasing a new transceiver. For example, Elecraft offers a number of roofing filters for it's top-of-the line K3 transceiver with various bandwidths and shape factors. Just what are roofing filters anyway, where did they come from, and how come they're talked about now but not in the past? I think the best way to understand the answers to those questions is to go back and take a peek at the evolution of radio receivers [surely you're not surprised this would involve at least a little history ☺]

The first radio receivers were beyond crude by even WW2 standards. The signals they were receiving were generated by spark transmitter and were raucous and very broad in bandwidth, and so were the receivers. Initially, they were tuned by the antenna [so were the transmitters]. A bit later, some ability to select a band of frequencies and have reduced sensitivity elsewhere appeared, however, for all practical purposes, they listened to just about all the frequencies anyone could transmit on then. With the advent of the vacuum tube, transmitted signals became "CW" [continuous wave] occupying a single frequency, and receivers gained RF and AF amplifiers and the ability to select received frequencies. The invention of the superhetrodyne in 1919-1920 brought the "Three S's" … sensitivity, selectivity, and stability … for characterizing receivers.

The "superhet," for the first time, allowed receiver passbands to become similar to the spectrum of the signals being received. This came primarily from the fact that the superhet converts the RF signal down [eventually] to a fixed Intermediate Frequency for amplification before the detector. The fixed IF at a lower frequency allowed good filters to be implemented to reject all but the desired signal – well, on any day other than the ARRL Sweepstakes contest. The IF frequency of choice for AM broadcast receivers rapidly converged on 455 Khz for a number of reasons. When FM broadcast came along, the IF for its receivers was chosen at 10.7 MHz [because they were receiving in the range of 88-108 MHz, much higher than AM broadcasting]. TV manufacturers experimented with several IFs, including the monumentally stupid choice of 21 MHz.

If one IF is good, shouldn't 2 or more be better? Well, maybe – maybe not. Most of today's transceivers are at least double conversion. The old Drake 2B [an outstanding receiver for its day] had two: 455 KHz and 50 Khz. Good, tunable L-C filters using realizable-sized component values can be implemented at 50 KHz, and the 2B was one of the first with passband tuning. Some of the more exotic radios, mainly from Japan, are triple or quadruple conversion, and often the first conversion is to a relatively high first IF, well above the highest frequency to be received [~70 MHz]. The Elecraft K3 is a dual conversion radio with a first IF at 8.13 MHz, and the second at 15 KHz … that's not a typo, it is 15 KHz, just above audio.

Filters also evolved. The first were L-C filters, those little square "IF Cans" that dotted the chassis. They were certainly better than the no-filter receivers, however, it is hard to get a narrow passband from them. Quartz crystal filters were much better due primarily to the much higher Q of crystals, and are in major use today. Collins popularized the mechanical filter, where the 455 [or 50] KHz electrical signal was converted to mechanical motion in a rod with disks on it, and then reconverted to the electrical signal, the mechanical characteristics of the rod and disks providing very good filtering action – signals within the passband got though, nothing else did.

The current digital technologies, made possible by µprocessors, convert the last IF signal to a digital stream, process it using mathematical functions implemented in the computer code, and then detect it. One nice thing about mathematics is that it can describe and implement things that cannot be fabricated with real parts. The error correcting codes that make your CDMA cell phone work are formulated in multiple dimensions. For mathematics, 23-space isn't really any different than 3-space … unless you demand a picture. ☺ As a result, some really amazing things can be done with Digital Signal Processing at that last IF frequency. My K3 allows me to move the passband back and forth, make it wider or narrower, cut off high or low frequencies to get rid of a guy who has gotten too close to me, all with a couple of knobs. It can identify a signal out of noise and suppress the noise, it can automatically find and notch out one or more heterodynes from BC stations on 40 meter phone, and it can automatically zero beat my transmit signal to the received signal.

"OK, nice history lesson," I hear you say, "But the title of this little dissertation is 'Roofing Filters." Well, what happened is that the "Three S's" became moot. We could get as much sensitivity as we could use [once the external noise from the antenna is much larger than the internal receiver-generated noise, more sensitivity doesn't help], as much and as good selectivity as we needed – except during ARRL Sweepstakes – and oscillators became super stable

years ago. Consequently, new things evolved to characterize the quality of receivers, and one of them is IMD [Inter-Modulation Distortion], and suddenly, "roofing filters" became important.

IMD occurs anytime two different frequencies pass through a non-linear device. The two frequencies generate their sum and difference, and the sums and differences generate more sums and differences with themselves and the original two frequencies, and you can probably see where this is leading. It kind of resembles rabbits procreating. "Why not just make everything linear in the radio?" – well, designers do. In fact, they go to great lengths to keep all the amplifier stages squeaky linear – but perfection isn't possible. Worse, a strong signal adjacent to the weak YI9 you're trying to hear can drive your first amplifier stages into non-linear operation, and so we come to roofing filters.

Probably the best example was my Kenwood TS-850, a really nice, functional, good sounding radio … until Jack, KF6T [1.7 mi from me], or Jim, WX6V [2.1 mi from me] began transmitting with 1 KW. Their signals are so strong that they drove the first IF mixer and amplifier stages very non-linear, and I could hear their keying as a raucous power-line sound all over the band. What the 850 needed was a filter to keep them out of the mixer unless I was tuned to them, and that's what roofing filters do. I bought an Elecraft K2 in 2004 and found that with it, I could get within a few KHz of Jack or Jim before they started leaking through the front end filter enough to be heard, and even then, it was mainly key clicks, not so much IMD. I finally replaced the 850 with an Elecraft K3 which has probably the best IMD and dynamic blocking specifications on the market, and I can now cuddle up within 1 Khz to Jack and his 1,500 watt signal and still copy the S2 QRP guy. The K3 roofing filters operate at the 8 MHz first IF, and are quartz crystal filters. There are two, a 2.7 KHz for SSB, and a 500 Hz for CW. There's room for several more in the radio, but I'm pretty happy with what I have.

A second lesson comes out of this. It gets harder and harder to implement good roofing filters as their frequency goes up. This is tough on those manufacturers who choose the "Major Up-Convert to a 70 Mhz first IF" architecture which is often the triple or quadruple conversion architectures. Building 70 MHz filters equivalent to the 8 MHz filters in other rigs is next to impossible, and for them, the Jack's and Jim's of the world do get through and drive the front end non-linear, with the expected results.

73,

Fred K6DGW

SFARC Christmas Party and 2010 Dues

By Leslie Nye, K7NYE, SFARC Treasurer

Seasons Greetings!

As you know, our annual SFARC Christmas Party is on Friday, December 11th at the Newcastle United Methodist Church. Directions to the church are on the website at www.sf-arc.org. The Newcastle United Methodist Church located at 410 Buena Vista Avenue and their phone number is (916) 663-2250. Everyone attending is asked to bring a side dish, salad or dessert to share. The club will provide soft drinks, water, coffee/tea, turkeys (2) and a large ham. Doors will open around 6:00 and dinner starts at 6:30 PM.

It is also that time of year to renew your membership to SFARC. If you have not already paid your dues, you can mail them to SFARC, P.O. Box 1005, Newcastle, CA 95658 or pay them at the Christmas Dinner. First, please download the membership form from the website and print it out. (There is also a copy of the membership form on the back of the monthly newsletter.) Please fill out the form and include with your dues. The annual dues are $22.00 for the primary member and.$7.00 for associate members. A check made out to SFARC is preferred if you are mailing your dues (no cash in the mail). If you are renewing your membership at the party, both a check or cash are acceptable. Also, make sure that you have updated your email address and other contact information if they have changed. Rosters will be emailed out in January after the 2010 membership renewals have been completed. Print copies will also be made available at the meetings.

For those SFARC members that have already paid or will pay their dues by Dec 11th at the dinner, you will receive a free drawing ticket as a thank you. (You must be present to win.)

If you have any questions, please let me know. Thank you and see you on the 11th of December!

Sincerely,

Leslie Nye
K7NYE
Treasurer-SFARC

Meeting Minutes

November 13, 2009

The meeting was called to order by Vice President Al, NI2U, at 7:34 PM. The meeting was held at the Auburn Dive Shop courtesy of Dave, NO6NO, as someone had forgotten to get the key to the room at the Library.

Flag salute was followed by the introduction of officers and then the members.

Per Treasurer Leslie, K7NYE, we had $1738.08. A bill for the club insurance had also just arrived in the amount of $320.

A summary of last months meeting was given by Wayne, W6DT.

Richard, WA6RWS, advised the club that Joe Silva, KF6OQY, had just had a mild stroke and he would send a card on behalf of the club. Joe and Dottie, K6DMS, have just recently moved to Sparks, Nevada to be closer to family.

An update on the repeater was also provided by Richard. It is ready to go as soon as good weather and schedule permit. The subject of a board to allow the repeater to do phone patches came up. The cost of the board would be $150.00.

Three motions came before the members on the phone Patch Board for the repeater.

Motion 1. By Jim, KI6AZH, and seconded by Greg, KO6TH. **To have the club take up a collection to buy the auto patch board.**

Motion 2. By Jim, KI6AZH, and seconded by Casey, W7IB. **To authorize the club to spend the money to buy the board.**

Motion 3. By George, KG6LSB, and seconded by Casey, W7IB. **To have the auto patch for club members only, except for 911 calls.**

All motions passed by voice votes. Members who wish to donate may give their donations to Treasurer Leslie, K7NYE.
Leslie, K7NYE, also advised that the club had incurred a small expenditure in replacing a coffee urn that had come to an untimely demise.

The Tech Ten was presented by Al, NI2U. The subject was a continuation on RF exposure including accounting for losses in calculating RF power.

The Christmas Dinner was discussed. It will be held on the regular meeting day, December 11, 2009 at the United Methodist Church in Newcastle, the same location as has been used for the last several years. The time discussed at the meeting was 6 PM. A **Motion** was made by George, KG6LSB and seconded by Dave, NO6NO. **To authorize a drawing prize of $150 and to authorize a donation to the Church of $200.** The motion passed by voice vote.

Elections were held. Richard, WA6RWS, advised the club that there were no back room deals, arm twisting and nothing changed hands to nominate the following slate of candidates:

President.....	*Al Martin, NI2U*
Vice President..	*Charles Baker, AE6LR*
Secretary....	*Bill Mahl, W6WEM*
Treasure.....	*Bob Balthrope, KD6WTY*
Directors.....	*George Simmons, KG6LSB*
	Kurt Hess, N6RS
	Frank Sharit, N6GP

There being no opposition, all were elected by acclamation.

The main program was an overview of APRS by Greg, KO6TH. Greg brought in his APRS equipped handheld to show how small and simple the equipment can be. Attempts were also made to obtain Internet access, with varying degrees of success, to show real time tracking as well as history.

The drawing was held and the meeting then adjourned at 9:11 PM.

Respectfully submitted,
Wayne Stilwell, W6DT Secretary

Thirty Years Ago at SFARC

Dec. 13, 1979

Meeting for December was a dinner held at the home of WA6EMU, Ken and Nancy Weger. It was a pot luck affair with many good dishes and desert to choose from.

The raffle of the year, a 220 mhz transceiver, was won by the clubs secretary, Bob Rett, W6MEI.

We all had a tour of Ken and Nancy's home, while enjoying all the delicious food.

The dinner/meeting broke up at 10:00pm.

ARRL VEC
AMATEUR RADIO VOLUNTEER EXAMINER

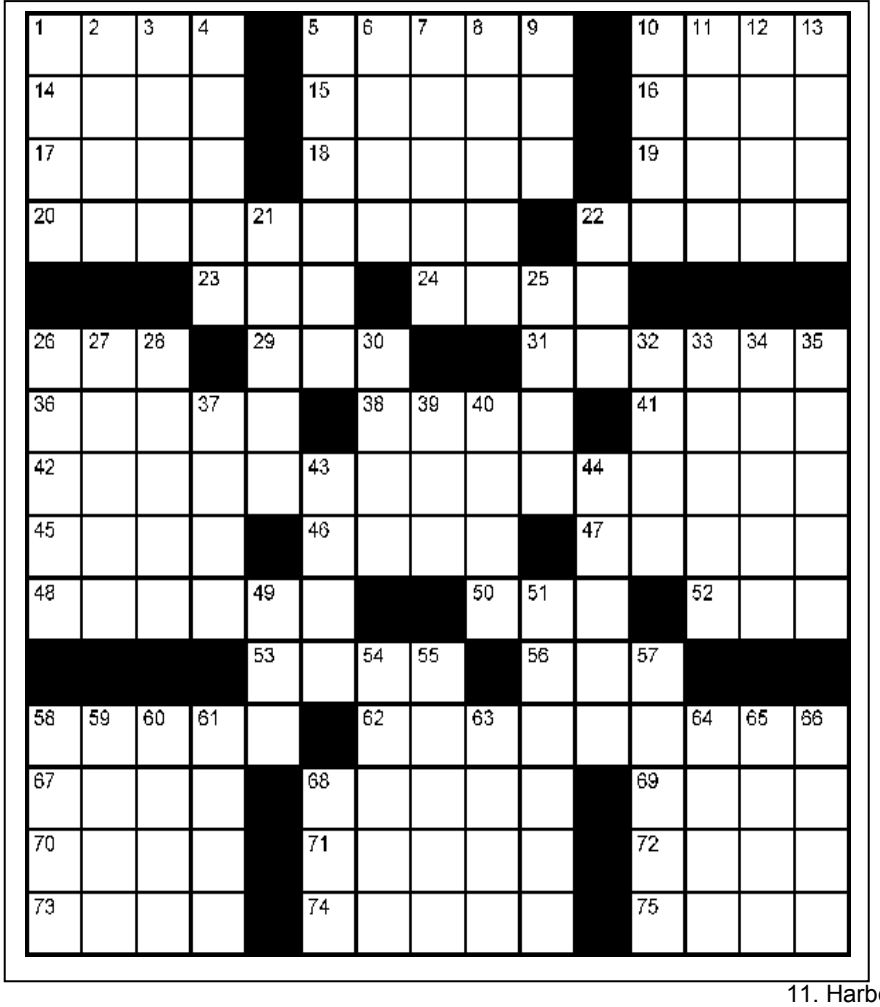
Local ARRL Exam Sessions
Courtesy of the ARRL

05-Dec-2009
Sponsor: UNSPONSORED
Time: 8:00AM (Walk-ins allowed)
Contact: LARRY R HODGE
(916)361-2476
Email: LARRYHODGE2000@COMCAST.NET
VEC: ARRL/VEC
Location: RALEY'S COMMUNITY EVENT CENTER
6845 DOUGLAS BLVD
GRANITE BAY, CA 95746

19-Dec-2009
Sponsor: RIVER CITY ARCS
Time: 7:30 AM (Walk-ins allowed)
Contact: KENNETH M HALL
(916)492-6115
Email: WO6J@ARRL.NET
VEC: ARRL/VEC
Location: CARMICHAEL ELKS LODGE-USE EAST ENTRANCE
5631 CYPRESS AVE
CARMICHAEL, CA 95608

02-Jan-2010
Sponsor: UNSPONSORED
Time: 8:00AM (Walk-ins allowed)
Contact: LARRY R HODGE
(916)361-2476
Email: LARRYHODGE2000@COMCAST.NET
VEC: ARRL/VEC
Location: RALEY'S COMMUNITY EVENT CENTER
6845 DOUGLAS BLVD
GRANITE BAY, CA 95746

06-Feb-2010
Sponsor: UNSPONSORED
Time: 8:00AM (Walk-ins allowed)
Contact: LARRY R HODGE
(916)361-2476
Email: LARRYHODGE2000@COMCAST.NET
VEC: ARRL/VEC
Location: RALEY'S COMMUNITY EVENT CENTER
6845 DOUGLAS BLVD
GRANITE BAY, CA 95746



The Amateur Radio Crossword Puzzler

By Chris Codella, W2PA

Lots of pieces play together to create a signal on the air.

Across

1. Ant. meas.
5. Cousin of 38-across
10. Caucasus region prefix
14. Part of DE, on phone
15. Lid like
16. PW1 maker
17. Part of 23 across
18. Eastern zone-36 prefix
19. NA or SA, e.g.
20. Encoder, in a way
22. Last stage, with 62 across
23. Measuring dev.
24. W5LFL's employer, once
26. SDR part
29. Band booking
31. RX starter
36. Prefix with -band
38. Parasitic array
41. Part of a score, maybe
42. Political pundit?
45. Apple spray
46. Theories
47. Lisbon prefix
48. Seminal radio textbook author
50. Equipment seller
52. Homer's neighbor
53. Eastern zone-28 prefix
56. Dir., for one
58. Dit dah doer
62. See 22 across
67. Tea type
68. Dig, so to speak
69. Eight in some circles
70. HS denizen
71. Part of some joints
72. Dayton digs
73. QSL bureau process
74. Put up, as a crank-up, say
75. Lodges

Down

1. DVM predecessor
2. "QSY!"
3. "___ Thing"
4. Q followers
5. JD1 name
6. "Get ___!"
7. It's a gas
8. Probably contains a 41 across
9. W5 sect.
10. KP4 name
11. Harbor vessel
12. Turin prefix
13. Apache or Cheyenne, e.g.
21. Gates' job
22. Hole goal
25. Span's partner
26. Amateur 24 across partner
27. Having two parts
28. RIT button
30. Swindles
32. 90 degrees
33. Illegal lighting?
34. Belfast prefix
35. Cut down
37. School session
39. Ready for firing
40. "Gee!"
43. Kink companion
44. Gut bug
49. MI, MO and MT QP mo.
51. Give in
54. Water walker
55. Bratislava prefix
57. CD followers
58. SB-401, 301, 201 and 101, once
59. EME artifact
60. Y2K part
61. Menu option
63. CPU part, abbr.
64. EP place
65. Take home
66. SM-land rugs
68. Took the cake, say

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

PLACE
STAMP
HERE

SIERRA FOOTHILLS AMATEUR RADIO CLUB **Please Print**

2010 Membership Application

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: _____