RF

VOL. LI NO. 2 P.O. Box 3454, Tustin, CA 92781-3454 February 2010

The PREZ Says:

"The prez" and her special Valentine, Dan!

Hello OCARC! I cannot believe we are already in February. Where does the time go!?!? We have some great speakers and activities planned this year. I would love to hear more ideas from the members on what you would like to see. This is an amazing club that is full of knowledge and love for the hobby. So if you are looking for help in a certain area of the hobby or want to learn about something new, ask and I am sure there is someone in this club that can help! I am challenging the club members to get more involved this year in being elmers, learning new things that amateur radio has to offer and bringing new people into our great hobby! Don't forget to bring a show and tell item for the February meeting. Looking forward to seeing you there!

Kristin – K6PEQ

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THE ORANGE COUNTY AMATEUR RADIO

SPECIAL SERVICE CLUB

Club Dues:

Regular Members…$20
Family Members*…$10
Teenage Members…$10
Club Badge**…$3

Dues run from Jan. through Dec. & are prorated for new members.
* Additional members in a family of a regular member pay family rate up to $30 per family
** There is a $1 charge for the badge being mailed to you.

ORANGE COUNTY AMATEUR RADIO CLUB – W6ZE

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General Meeting:

Third Friday of the month
at 7:00 P.M.
AMERICAN RED CROSS
600 Parkcenter Drive
(Near Tustin Ave. & 4th St.)
Santa Ana, CA

Club Breakfast:

2nd Saturday of the month
at 8:00 am
Jaugerhaus
2525 E. Ball Road
(Ball exit off 57 freeway)
Anaheim, CA

Club Nets (W6ZE):

28.375 ± MHz USB
Wednesday 7:30-8:30 p.m.
Bob AF6C, Net Control

146.55 MHz Simplex FM
Wednesday 8:30-9:30 p.m.
Bob, WB6IXN, Net Control

145.400 MHz, (-) 103.5 Hz PL
N6ME Repeater – 2 Meters FM
Thursday, 8:00-9:00 p.m.
Nicholas AF6CF, Net Control

Tilt-N-Raise Antenna Mount

by

OCRACES Capt. Ken Bourne, W6HK, Chief Radio Officer

The **http://www.tiltnraise.com** Web site describes The Tilt-N-Raise antenna mount, which is a no-tools-required method of securing an antenna mast to a vehicle. The device was designed with portable communications, emergency communications, and amateur radio lighthouse activators in mind. Instead of arriving at an operating site and searching for somewhere to hang an antenna, simply insert the Tilt-N-Raise into a receiver hitch and proceed with the antenna installation. With the Tilt-N-Raise, the user simply drives to the site, tilts the mount over, inserts the antenna base or antenna mast, and raises the antenna up in place.

Applications include VHF/UHF contesting, HF or VHF mountaintop operations, rover in state QSO parties and national contests, EmComm operations, etc. The Tilt-N-Raise will accept mast diameters up to 1.25 inches or 2 inches, depending on the model. The 2-inch model will accommodate the Rohn H40 mast, the MFJ Model 1908 43- foot mast, and the HyGain ATN-65 65-foot mast. The device is not designed for mobile operation while the vehicle is moving.

Construction of the Tilt-N-Raise is made with 6061 or 6063 aluminum, stainless steel, and PVC. The aluminum parts are made from 0.5-inch thick 6061 aluminum plate, 1.25-inch by 1.25-inch 6061 aluminum solid bar or 2.00- inch by 2.00-inch aluminum square tubing, and 6061 Schedule 40 aluminum pipe. For the clamping mechanism, ground lug, and radial bolts, stainless-steel hardware is used for the bolts, washers, and nuts. The insulator portion is made from Schedule 40 PVC pipe, considering that the aluminum used has electrical conductivity that is 40 percent of copper. The finish on each Tilt-N-Raise is achieved by sand blasting the bare aluminum and then powdercoating to help prevent damage from UV rays. Powder coating was chosen for durability. It is available in Sky White or Gloss Black. Other colors are available at additional cost.

The vehicle will not serve as a ground for the Tilt-N-Raise mount, considering the powder-coating on the aluminum and the additional insulation provided by the PVC piping inside the vertical support. Likewise, the vehicle might not serve as an effective ground plane for the antenna. Accordingly, four holes are provided at the bottom of the vertical tube to allow for the use of temporary radials. The grounding at the lower gusset support of the mount may be used to connect a ground wire to a ground rod used operating portable. Setting up an antenna for field operations with only one or two operators is now quick and easy with the Tilt-N-Raise. The antenna or antenna support can be up in 5 minutes or less.

Attention Members!!!

Do you know a fellow ham that would be interested in joining OCARC? Do you have a friend that is curious about ham radio and wants to learn more about our hobby? Why not invite him or her to one of our exciting monthly meetings?!?! The meetings are fun, informative and entertaining. And don't forget about the raffle prizes too. So bring a visitor to one of our meetings, and help **your** club expand!

Make sure to inform your friends of our club's website, which is always kept up to date. Information on club meetings, activities and our newsletter archive make it a worthwhile site to surf! http://www.w6ze.org

2010 ARRL CONTEST SCHEDULE

February	20 - 22	ARRL International DX Contest (CW)
March	6 - 8	ARRL International DX Contest (Phone)
June	12 - 15	ARRL June VHF QSO Party
	19 – 20	ARRL Kids Day
	26 – 27	ARRL Field Day
July	10- 12	IARU HF World Championships
August	7 - 9	ARRL UHF Contest
	21 - 23	ARRL 10 GHz and Up Contest
September	11 - 14	ARRL September VHF QSO Party
	18 - 20	ARRL 10 GHz and Up Contest
November	6 - 9	ARRL November Sweepstakes (CW)
	20 - 23	ARRL November Sweepstakes (Phone)
December	3 - 6	ARRL 160 Meter Contest
	11 - 13	ARRL 10 Meter Contest

Renew Your OCARC Membership

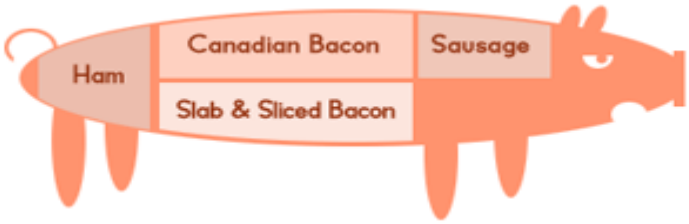
It's that time of the year again. Time to renew your OCARC membership for 2010, if you have not already done so.

Help continue to support your growing club. There are many entertaining monthly meetings, speakers and events planned for this year. But it can't happen without your support for OCARC.

♡

Dues can be paid at the monthly club meetings, club breakfasts or via snail mail. Regular dues are only $20. Additional family members are $10 (Total). Membership for teenagers is only $10 as well. What a deal!

OCARC
P.O. Box 3454
Tustin, CA 92781



Ham Cuisine

by Kristin Dankert K6PEQ

The following recipe was found on food.sulekha.com. It's a great recipe for Valentines Day!

Parma Ham Valentine's Tart

Ingredients:

2 slices Parma ham, 75 gm Prepared rolled puff pastry, 25 gm Feta Cheese-cut into chunks
1 Red onion-finely slice, 1 Egg, 1 1/2 tbsp Balsamic Vinegar, 1/4 tbsp extra virgin Olive oil
3/4 tbsp Brown Sugar, 1 Fig and 1 tbsp Rosemary-finely chopped

Cooking Directions:

1. Preheat the oven to 200 degree C.
2. Unroll the puff pastry and cut out two squares. Using a sharp knife, cut heart shapes from the two pastry squares then score 3 mm from the edge of the hearts around their perimeter.
3. Place the pastry hearts on a baking sheet and prick the inner hearts with a fork.
4. Brush the pastry with beaten egg, season with cracked black pepper and bake for 10-12 minutes until turns to brown.
5. Take the pastries from the oven and use the knife to trace the line that was scored before cooking.
6. Peel off the top of the inner heart to leave a heart-shaped pastry case.
7. In a pan heat oil and fry the onions until turns to golden.
8. Add 3/4 tbsp of balsamic vinegar and half of brown sugar, stirring until the onions have caramelized.
9. Season to taste with salt and cracked black pepper.
10. Tear up a slice of parma ham and put it into the base of one tart.
11. Share the caramelized onions between the tart cases.
12. Sprinkle with the rosemary and chunks of feta and return to the oven to cook for another 10 minutes until the cheese begins to brown.
13. Meanwhile, quarter the fig and place on a baking tray.
14. Drizzle with the remaining balsamic vinegar and brown sugar and season with cracked black pepper.
15. Place in the oven for 5-6 minutes until soft and caramelized.
16. Remove the tarts from the oven and top with the remaining slices of parma ham.
17. Serve with the roasted balsamic figs and sprigs of fresh rosemary.

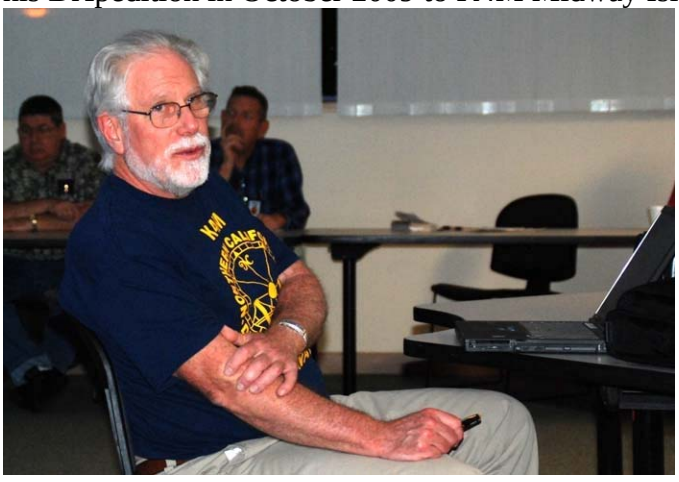
OCARC General Meeting Minutes
January 15, 2010

The OCARC January General Meeting was held at the Red Cross complex in Santa Ana at 7:00 pm on Friday evening, January 15, 2010. There were a total of 49 members and visitors present. All of the club officers were present for a quorum.

Our meeting was started by Tom Woodard, KI6GOA, from the Red Cross with an update on the tragic earthquake in Haiti. Tom gave a brief overview of the situation in Haiti from a humanitarian standpoint. He also explained about the different agencies of the Red Cross working together under the International Federation of the Red Cross. The people of Haiti are in dire need of help. Communication was difficult. Ham radio was basically unavailable with the exception of a few stations in the US. For those who wished to donate, Tom gave all the information on how to donate go online to www.redcross.org or simply done is by texting 90999 on your cell phone automatically donates $10.00.

Tom Woodard KI6GOA of Santa Ana Red Cross provides a status on Haitian earthquake victims and relief preparations being made by Red Cross

Our guest speaker Arnie N6HC is well known to the club as a member and avid DXer, his presentation was on his DXpedition in October 2009 to K4M Midway Island.



Arnie N6HC presented an excellent slide show of the K4M Midway Island DXpedition that was held Oct 2009.

As always, Arnie's presentation was terrific. He shared the challenges that the team experienced when their transportation was delayed due to technical difficulties. Arnie, having lived in Hawaii, was able to be their team's tour guide for some fantastic sites. The group enjoyed a guided tour of many interesting sites, which included the Arizona and Missouri Memorial.

A beautiful lagoon on tropical Midway

As you can see Midway is a beautiful and serene area controlled strictly by Fish & Wildlife. Permits and Permission to come onto the Midway Atoll was applied for by the K4M DXpedition far in advance.

Phone operators in action during DXpedition.

The team that worked 61,077 QSOs during K4M DXpedition

We would like to thank Arnie for sharing his DXpedition with the group. Very well done!

Just a reminder that the ORARC Board Meetings will now be held on the second Saturday of each month at 8:15 AM at the Jagerhaus Restaurant, 2525 East Ball Road Anaheim. Visitors are welcome. The W6ZE will have an additional net on Thursday evenings on the WARA 2 meter repeater 145.400 at 8:00 PM, Nicolas AF6CF will be the net coordinator. Please check in and say hello. For our Show and Tell Nicholas AF6CF shared the emergency battery pack that he created. Very good Nicholas! If you have a Show and Tell, please bring it to the next General Meeting and share with the group.

Motion to adjourn at 8:40 pm by Paul W6GMU, seconded by Sharon K6IRD. Followed by the raffle.

Submitted by: Kristine Jacob KC6TOD, OCARC Secretary

Bob's TechTalk #39 (TechTalk #82)
by Bob Eckweiler - AF6C

The "L" Matching Network - Pt I

Introduction:
Often when working with high frequencies you need to match two impedances. For example, you have just built a 10.1 MHz vertical with lots of quarter-wave ground radials and you want to feed it with 50 ohm coax. The antenna, at resonance, measures 36 ohms with no reactive component, as it should. If you connect the coax directly to the vertical you get an SWR of about 1.4 to 1. Not too bad, but you are a perfectionist and would like to see the SWR lower. The solution is to build an "L" Matching Network. Figure 1 shows a completed matching network that will produce a 1:1 SWR match at 10.1 MHz. Ideally this circuit is lossless and even in real world terms the losses are tiny, mostly from the DC resistance of the coil.

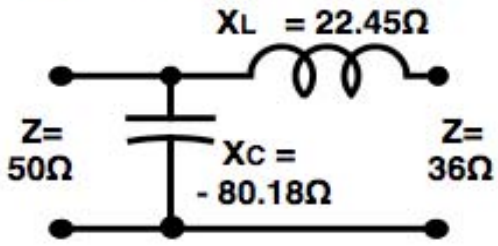


Fig. 1 "L-Network" to Match 50Ω and 36Ω. At 10.1 MHz: C = 196 pF & L = 0.354 μH

Here are some questions we'll answer in this and a future column:

- ★ Why is it called an "L-Network"?
- ★ What are some of the uses of the "L-Network"?
- ★ How does an "L-Network" match?
- ★ How do I choose the component values?
- ★ What are the pros and cons of the "L-Network"?

Today we are going to answer the first three questions. The concept of the "L-Network" is easy to understand if you have a basic understanding of AC impedance. You might want to reread Bob's TechTalk # 27 Impedance Part I (See the March 2003 ***RF*** newsletter - available at http://www.w6ze.org).

Why the "L"?:
Why is it called an "L-Network"? Looking at Figure 1, the coil and capacitor are in an "L" configuration with one reactive component in parallel and the other in series with the inputs/outputs.

What the "L"?:
The "L-Network" is low loss at HF frequencies making it very efficient and handles high power well. It is bi-directional and can be used to match an impedance to a higher or lower impedance just by swapping the input and output. Design calculations are simple and component values reasonable for low to moderate matching ranges. It can also act as either a high-pass or low-pass filter for attenuating unwanted signals. The "L-Network" is the building block for the more complex "PI Network" and "T-Network" often used in tube RF-amplifiers and antenna tuners respectively. It is also a feature of some antenna matching schemes, especially the beta match.

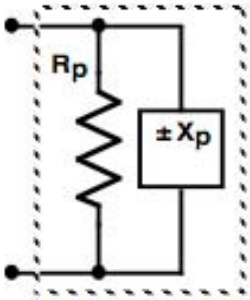


Fig. 2a - Resistance (Rp) in parallel with reactance (Xp)

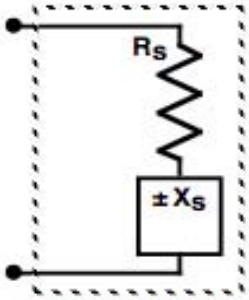


Fig. 2b - Resistance (Rs) in series with reactance (Xs)

How the "L"?:

The "L–Network" is based on a simple phenomena of impedance; *At a given frequency an impedance composed of a resistance and reactance in parallel may be replaced by an equivalent resistance and reactance in series (and vice versa) without any change in the operation of the circuit.* Figure 2a and 2b appear the same to an attached circuit. For any values of Rp and Xp, values can be calculated for Rs and Xs that make the circuits appear the same. Xp and Xs can be either an inductance (positive) or a capacitance (negative), but they must be the same. Rp must always be larger than Rs. This ability to be able to switch between series and parallel impedances forms the basis for the "L–Network". The astute will notice that since reactive components change value with frequency, this equality is frequency dependent!

Let's go back to our vertical antenna matching problem. What we need is a magic box has two sets of terminals. When 50 ohms is connected across terminals a-b, terminals c-d looks like 36 ohms; and conversely when 36 ohms is connected across terminals c-d, terminals a-b looks like 50 ohms. Figure 3a and 3b show this magic box.

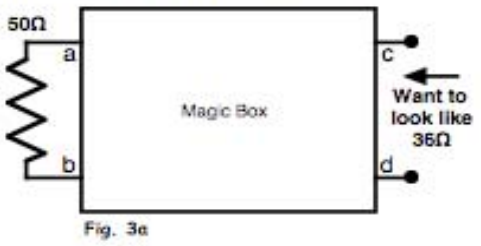


Fig. 3a

Fig. 3b

Inside the magic box add a reactance across the the higher of the two resistance values; in this case across the 50Ω a-b terminals. Call the resistance

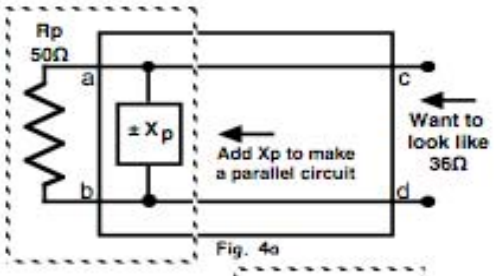


Fig. 4a

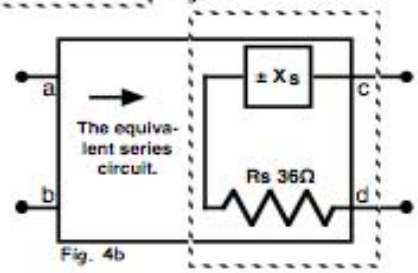


Fig. 4b

Rp and the added reactance Xp since they make up a parallel circuit (Figure 4a). This parallel circuit has an equiva-

lent series circuit. What is wanted is an equivalent series circuit that has an Rs value of 36 ohms (Figure 4b). Since Rp and Rs are known, it is a simple matter to calculate the value of the Xp as well as the value of Xs that shows up in series with Rs. Calculating Xp and Xs results in two sets of answers, positive or negative. Thus Xp and Xs may be chosen to either both be inductors (positive) or both be capacitors (negative). If inductors are chosen the "L-Network" acts as a high-pass filter; if capacitors are chosen is acts as a low-pass filter.

Looking into terminals c-d in Figure 4b we see the wanted 36 ohms, but there is also a reactance ±Xs in series with the resistance. You cancel this reactance by adding an opposite reactance – (±Xs) in series with ±Xs (Figure 5).

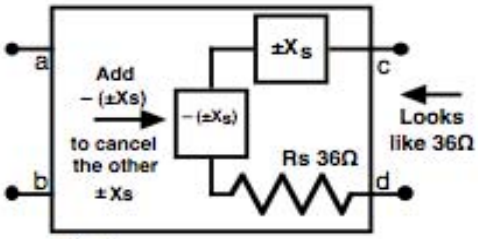


Fig. 5

Physically, just two components have been added inside the magic box, Xp and –Xs (Figure 6), one an inductor and one a capacitor. The component values can be calculated for whatever frequency you want the match to occur at using the reactance formulas you learned getting your ham license. Looking back at figure 1 the component values were calculated for 10.1 MHz. The reactance values Xp and Xs are independent of frequency, but the chosen capacitance and inductance must be calculated for whatever frequency the match is desired to be at.

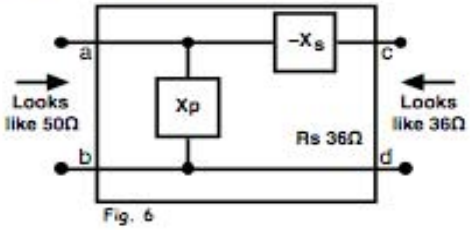


Fig. 6

As hinted in the article, the components can either be inductive or capacitive; the choice is yours. Figure 7 performs the identical match as figure 1. However, for most radio work figure 1 is preferred since it acts as a low-pass filter reducing harmonics of the fundamental frequency. However if you want high-pass action, then figure 7 is a better choice.

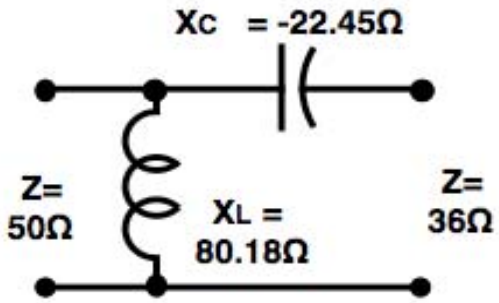


Fig. 7 High-pass "L-Network" version of Fig. 1. At 10.1 MHz: C = 702 pF & L = 1.26 μH

Next month we'll look at the equations used to calculate the needed reactance values; we'll also discuss some of the pros and cons of the L-Network and some caveats when using them.

de Bob – AF6C

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OCARC
Member Spotlight

In this month's Member Spotlight, we are featuring a short Q&A session with a newer member of OCARC. Although he is new to the club, many of you already know him. In the spotlight is Bill Kendrick, N6RV.

RF: What year were you first licensed as a ham, and how old were you at the time?
N6RV: I was first licensed in 1967.

RF: What were your previous call signs (if any), and in what years did you hold these previous call signs?
N6RV: My former call signs are WN6ZHT, WB6ZHT, and WK6V. I had a two-year novice and I used every minute of it before I tested for my general.

RF: How did you originally get interested in amateur radio?
N6RV: I was a freshman in high school. Three years prior my brother received an electronics project set for Christmas. I took it over and built all the projects. The last was a simple general coverage receiver that really worked. The next spring dad brought home a Hallicrafters SX-99 receiver very similar to the radio in your front room. My dad was a department manager in engineering at Long Beach Naval Shipyard. He was a mechanical engineer who loved thermodynamics. He served in the Navy in WWII on the black gang in the boiler room. I found out later his first assignment was the radio room but he changed because with the boiler room schedule he could play basketball in the inter ship league. I was glued to that radio from the moment I got it.

RF: Did you have any Elmers? If so, who were they?
N6RV: My best friends grandfather was Tom Casey, K7HUJ. I spent a few weeks in the summer of 1965 at his home in Scottsdale Arizona where I was introduced to a real DX super station. He had two towers with monobanders and a complete Collins S-Line. I remember one morning he was talking to a ham in Singapore. He handed the mike to my friend and then to me. It was out of this world. Every day he tutored us on the code and theory.

My neighbor was the GM for Pace Communication Corporation, a CB radio manufacturer in Harbor City. He picked up to my interest in radio and began bringing home surplus parts for me to experiment with. When I was 16 he hired me for the summer checking out radios as they were coming off the line.

Thinking about it I learned what the electronics industry was all about that summer. It steered me to that career.

My other neighbor was a ham, Paul Ford, W6HFV. He administered my novice license. I recall he was not versed in the morse code and I passed a questionable code test. Paul had one of the first 89-foot crank up towers. We lived in the upper South Shores tract of San Pedro. My back yard rose about 60 feet to the backyard of the houses on the next street. From East to West through North I looked into this hill. Directly above me was Paul with his huge tower and Swan TH-4 tribander. He looked over the top of the rest of the hill behind him. His antenna was visible from most every part of town. It was funny to hear him work stations I could not hear. Prior to his large tower he had a roof mounted tower consisting of two sections of TRI-EX T-10, a mast, a rotator, and a TA-33. He sold it to me for $100 and my dad and I put up the antenna above my room. For Christmas I received half of a Heathkit DX-60B. I paid for the other half. I recall building it with no supervision. I could barely solder and after it was done a friend went through it and got it to play. His name was Danny Harrison, WB6WOG. His dad owned Neptune Electronics in San Pedro.

Danny introduced me to the United Amateur Radio Club (URAC). They met in a bank lunch room in San Pedro at the time. There were about 20 high schoolers in the club. We were into all kinds of mischief, a topic for another story sometime. I still am in contact with many of them and they are still involved in amateur radio. In fact for the past four year four of them, Bob, N6BK, Alan, W6AWG, Roy, N6VW, and Dave, WX7G have met in Long Beach and sailed to Catalina to operate Field Day from Alan's (W6AWG) sailboat. This is a pretty cool deal. Alan lives in La Mirada. Bob lives in Thailand. Roy lives in New Hampshire, and Dave lives in Utah. It is good to see friends stick together over such a long span of time and distance. That group and a few others were very competitive. We chased DX and contested all the time. Roy actually went to live in Germany the last year of high school. His dad worked for the US Government. We would talk to him when the bands were open.

RF: Do you prefer CW, SSB or Digital?
N6RV: DX and DX contesting was in our blood from day one. I recall Alan recording a JA pile up and a European pile up. It was a frenzy back then. It was just a roar and occasionally a station would walk in and be heads and shoulders above the rest, full quieting! It was a different time. No internet, no cable TV only the local channels and radio. HF was loaded with activity. The LA basin was filled with big guns. W6AM, K6SVL, and W6AOA were always loud. In the beginning I operated CW out of necessity. My station was AM capable also. When I passed my General Class license I went to 10 meters and worked hundreds of DX stations who only had AM. It was fun to talk to people living on Wake Island, Okinawa, Japan, Uruguay, Brazil, and Argentina on a regular basis. Eventually I upgraded to a Hallicrafters HT-32B transmitter and Drake 2B receiver. Both were great radios.

I became very interested in SSB and operated it solely except for the CW contests. Eventually I migrated back to CW. It now is my mode of choice though I have been operating RTTY and PSK31 lately also. Currently I have 337 countries confirmed. I actually kicked in money for the Hex Beam that the Georgian ham was using in North Korea. Before I had a chance to work him he was booted out with all the United Nations Food Bank personnel. Hopefully North Korea will undergo some political change that will enable me to get that last country. Then maybe the political change will lower the current total country count :-)!

RF: What aspects of amateur radio are you enjoying most right now, and why?
N6RV: Right now I operate in the major DX contests. I can be found on 6 during sporadic E season with Chip, K7JA and 160 in the winter. I do spend a lot of time just listening and snagging the occasional new band / country. I am looking forward to a good solar cycle and great DX openings on 6 and 10 meters. I have 70 countries on 6 meters and the thrill of working a new one is still there! My main focus these days has been on club activities. I was Vice President of URAC until an untimely exit. I am the editor for Southern California DX Club. I am the Secretary for Chapter 7 of the QCWA. I am on the 2010 Visalia International DX Convention Committee and I am the Technical Coordinator for the ARRL Los Angeles Section. It is a lot of fun and I have met and reacquainted myself with a lot of ham friends. It seems like retirement is a lot busier than work!

RF: What do you do for a living?
N6RV: After high school I went to CSULB and studied electrical engineering. My focus was and still is radio electronics and communication systems. I spent 30 years at Hughes Space and Communications which morphed into GM Hughes Electronics and now is part of Boeing. I started out designing receivers for space application. Then I moved up to payload subsystem integration and test. My last years were spent in system engineering overseeing the technical aspects of satellite design, integration, teat, and deployment and it all started when my dad brought that receiver home.

After college I married my wife Beckie. We are celebrating our 33rd anniversary next month. It has gone by so fast. We raised our two children, Kelly and Tim in the house we have owned for 32 years. You know... None of them became hams. Both are married and live in the area. We became grandparents last year and that has put our plans on hold. I retired two years ago with the intention of moving to Idaho. It is tough to move away from your family. It is tougher when you have grandchildren. Your priorities go out the window and for good cause. That said I have kept a fairly significant station here in Harbor City.

RF: Now for the timeless question that keeps being debated! Assuming that money and the support structure is a non-issue, would you choose a full size yagi or a full size quad?
N6RV: You asked if had the structure to support either would I have a full size quad or yagi. I have had both. I have had a full sized 4-element triband quad with a 2-element 40-meter quad in a delta loop configuration strung perpendicular to it. It was all mounted on a Tristao 65 foot mast that rotated from the bottom. It worked great. I currently have a 70-foot tower with a 20-foot mast out the top. I have two tribanders, an M2 KT36XA at the top with a KLM KT34XA on a rotating ring at 50 foot. Above the KT36XA I have an M2 6M5X 5-element six-meter beam. I would say from that both yagis and quads perform well. The quad is a mechanical beast and takes a lot more maintenance. The quad is still in rafters in the garage along with a 4-element SteppIR. I believe the SteppIR is the way to go. It may have some maintenance issues but with one antenna you get as many as 9 bands. My plans are to put up a new SteppIR DB-18E replacing the top tribander and the 4-element SteppIR at the top of the tower on a second rotating ring. Hopefully I will have moved to a ranch where I can put up several towers before this insanity comes to fruition!

RF: What radio equipment and antennas do you currently use?
N6RV: I am still upgrading my station. I had the intention of hosting low power multi multi contests here for local hams who do not have the resources for a competitive station. I have done this in the past. In the shack I have a three position wrap around desk with an Icom 756PROII, 756PROIII, Flex 5000A, Yaesu

FT1000MP MKV, Yaesu FTV 1000, Yaesu FT847, a Kenwood TS950SAT, TS850SAT, two full Collins S Lines and a KWM 2A as well as a Swan 350 and a Viking Valiant. I also have two Alpha 87A amplifiers, two Kenwood TL 922A amplifiers, an Icom PW-1 amplifier and a Heathkit SB 220 modified for 6 meters. In the garage are two homebrew 4-1000A amps, which I intend to bring back up to snuff and shoe horn into the room. You could say I am radio poor. My plans were to move out to a hilltop and set up a multi-multi station. I acquired the radios in advance! I enjoy antenna design and simulation as well as anything technical.

Thanks Bill for the interview! We sure do appreciate the time and we are very glad that you and Beckie have not moved to Idaho!

12/31/2009

OCARC Financial Report for 2009

Revision 3

Cash Flow - 2009
1/1/2009 through 12/31/2009

INFLOWS

Auction In	$719.25
Badge Income	$45.00
Christmas Dinner Ticket Sales	$1,176.00
Donations - FD	$380.00
Donations - WØMEC RADIO EQPT SALES	$733.00
Dues, Family	$360.00
Dues, Membership	$1,163.00
Interest	$1.92
Raffle - Christmas	$1,150.00
Raffle-Monthly	$1,607.00
Accounting Adjustment	$140.23
TOTAL INFLOWS	**$7,475.40**

OUTFLOWS

Auction Payout	$246.15
Christmas Dinner 2009	$1,000.00
Donations - OC FAIR	$100.00
Field Day Food	$1,025.14
Field Day Other	$428.47
Gen Mtg Food	$31.65
OCCARO Membership	$20.00
PO Box Rental	$56.00
QSL Card Printing	$76.00
QSL Postage	$5.00
Raffle - Christmas Radios	$467.73
Raffle - Christmas Womens	$100.00
Raffle - Monthly	$1,961.01
TREASURER CHECK STAMP	$30.89
Web Site Hosting	$155.85
TOTAL OUTFLOWS	**$5,703.89**

NET CHANGE	**$1,771.51**

Cash - Beginning Balance: 2009-01-01

Checking Account	$3,097.73
Savings Account	$792.94
Outstanding checks	-$112.60
Total Beginning Balance:	**$3,778.07**

Cash - Ending Balance: 2009-12-31

Checking Account	$5,031.72
Savings Account	$792.94
Outstanding checks	-$275.08
Total Ending Net Balance:	**$5,549.58**

Total Beginning Balance:	**$3,778.07**
Total Ending Net Balance:	**$5,549.58**
Net Change for the Year	**$1,771.51**

Audit Acceptance:

Kristin Dankert K6PEQ
Kristin Dankert, President

Ken Konechy W6HHC
Ken Konechy, Incoming Treasurer

Kristine Jacob KC6TOD
Kristine Jacob, Secretary

George Jacob N6VNI
George Jacob, Member

Paul Gussow W6GMU
Paul Gussow, Outgoing Treasurer

Date signed: **2010-Feb-09 (by e-mail)**

TechTalk #81

Understanding DATV RF Bandwidth for DVB-S

by Ken Konechy W6HHC
&
Hans Hass DC8UE

In TechTalk76, Ken W6HHC explained how FEC and Symbol-rate affected the RF Bandwidth for the Digital Video Broadcasting (DVB) standard for satellite communications, called DVB-S. It turns out that defining RF Bandwidth for QPSK deserves some additional explanations in order provide a full understanding. Ken is pleased to be joined by Hans DC8UE for the creation of this month's TechTalk article. Hans had earlier helped Ken to understand the design of the popular DBØDHL DATV Multimedia repeater in Hamburg Germany...and has technical experience as a satellite-communications-engineer in a commercial TV-uplink-station.

Confusion about the word "Bandwidth"

When Ken-W6HHC and Robbie-KB6CJZ were talking to hams in Europe about DATV repeater designs, they noticed that sometimes they were given unexpected bandwidths being used by the European repeaters. The Symbol-rates (S/R) being reported by the repeaters were always accurate (symbol-rate is always a setting in the transmitter, so it is well known), but the RF bandwidth reported sometimes had an unexpected relationship to Symbol-rate. A little searching on the internet (love Google and Bing search engines) showed that there are at least three popular ways methods of defining RF Bandwidth for DVB-S.

- **"minus 3 dB" bandwidth method**
- **"occupied" bandwidth method**
- **"allocation" bandwidth method**

So if you were to ask three different hams "what DATV bandwidth are you using?"...you may get three different answers when talking about the same DATV repeater!!

Ken and Hans agree that the most important purpose of describing bandwidth for DATV hams...is to provide a value that can be used for band-plan spacing and frequency coordination to avoid adjacent interference. Now we will look at these three methods of describing RF Bandwidth for DVB-S (QPSK modulation).

"minus 3 dB" bandwidth method

With this method, the bandwidth is measured at the points that are down 3 dB. This is a typical method for measuring an analog filter bandwidth and represents the "half-power point" if you are looking at voltage on a spectrum-analyzer.

Mathematically, $\mathbf{BW_{-3dB} \approx S/R}$ for this definition.

While the $\mathbf{BW_{-3dB}}$ method is very familiar to analog engineers and analog ATVers, it is not very useful for DATV to define the bandwidth of a digital signal transmission link for two reasons.

First, a modulation with a digital-(pulse-)modulation-signal produces a non-Gaussian signal-flank.

Second, you would not want to space several DATV stations "shoulder-to-shoulder" on their 1/2–power-points, since significant power would overlap neighboring frequencies. This approach to spacing of stations would create potential receiving interference. Especially, if several DATV repeaters are located together on the same hill-top or tower so that receiving antennas are pointing in the same direction toward adjacent DATV repeaters.

As a note: The bandwidth of the DVB-S carrier at the minus 3.8 dB points is approximately the same as the symbol rate (S/R).

"occupied" bandwidth method

As defined by the commercial satellite standard, 3GPP TS 34.121 section 5.8, the Occupied Band-Width (OBW) is the bandwidth containing 99% of the total integrated power of the transmitted spectrum, centered on the assigned channel frequency.

Mathematically for hams: $\mathbf{BW_{occupied} = 1.19 \times S/R}$

How is the occupied bandwidth measurement determined? During this measurement, a Gaussian filter with a bandwidth greater than 10MHz and a resolution bandwidth (RBW) of 30 kHz or less is used to measure the distribution of the power spectrum.

First, the total power found in the measured frequency range is calculated.

Then, starting at the lowest frequency in the range and moving upward, the power distributed in each frequency is summed until this sum is 0.5% of the total power. This gives the lower frequency value for measuring the bandwidth.

Next, starting at the highest frequency in the range and moving downward, the power distributed in each frequency is summed until 0.5% of the total power is reached. This gives the upper frequency value. The bandwidth between the 0.5% power frequency points is called the "occupied bandwidth".

While the **"occupied" bandwidth** spacing of repeater frequencies is better at preventing adjacent interference than **"minus 3 dB" bandwidth** spacing, it still lacks one feature. The spacing should have a little guard-band to allow for unplanned obstacles ...like signal-path non-linearity, etc.

"allocation" bandwidth method

This method for describing bandwidth provides a little guard-band between adjacent DATV signals.

The allocation bandwidth for DVB-S is calculated as

(1 + Roll-off-Factor) x Symbol-rate

$BW_{allocation}$ = 1.35 x S/R

when using a 0.35 Roll-off-factor. The Roll-off-factor (shown in **Fig 1**) controls the grade of the slope of a DVB-S signal-edge.

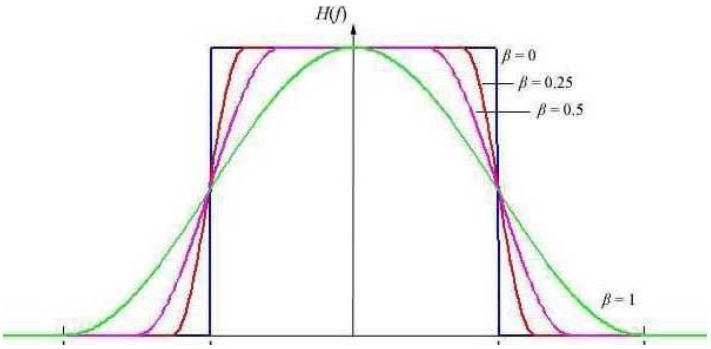

Figure 1 – Different roll-off slopes for different Roll-off-factors

The "allocation bandwidth" is determined by the big satellite-providers (like inside the Intelsat Earth Station Standard 420: (IESS420e.pdf) as an area, inside that the power-level will be not be lower than –26dB. There will be a filtering necessary on the signal borders (mostly performed by software), which takes care, that the borders rolls out weakly. The grade (slope) of this roll off will be described by the Rolloff-factor. It shows the relationship between half of the roll off area to half of the wanted channel-bandwidth.

DVB-S specifies the Roll-off-factor at 0.35. A raised cosine filtering at the edge region for the transmission path is required. The used filter generates in a first step only a root raised cosine shape. Only in combination with the same filtering inside the receiver you will get the wanted raised cosine form of the filter shape. After the transmitter, inside the "on the air" signal, you will find the larger signal shape (shown as the dotted line) in **Figure 2.**

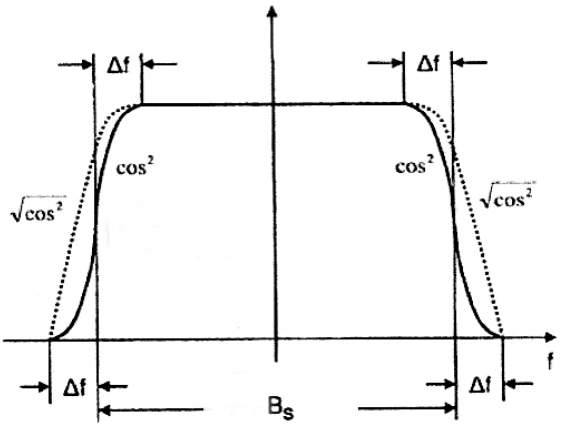

Figure 2 – "On the Air" DVB-S signal has the shape shown as dotted lines

The DVB-S Standard uses a Roll-off-factor of 0.35 for video-transmissions and a Roll-off of 0.4 for data-transmission equipment. You may find on newer professional hardware utilize a Roll-off-factor of 0.25.

The new DVB-S2-standard (for high definition TV - HDTV) also utilizes a Roll-off-factor of 0.2. This means, the DVB-S2 used bandwidth is only 20% bigger than the symbol-rate. Hans DC8UE further explained that the DVB-S2 standard is now being used in Europe for transmissions from commercial broadcast-studios and also from an OB-van (outside broadcasting) to the up-link transmission-center.

Figure 3, on the next page, shows a D-ATV DVB-S QPSK signal using a 1.5 MSymbols/sec symbol-rate of (generated by a MiniMod). It shows clearly 2.025 MHz of used bandwidth. Below 35dB you can see the additional shoulders, generated by intermodulation on the non-linear characteristic curves of the equipment being used. A value of 42 dB for the shoulder seems to be normal for the single MiniMod exciter. But, if a power amplifier is driven too hard, then the following PA can increase the power levels of the shoulders to extremely poor values.

The "allocation bandwidth" is in practice really very useful to describe the real used bandwidth for spacing DATV repeater frequencies. For ham radio, Ken W6HHC prefers to "adjust" the allocation formula to

$BW_{allocation}$ ~ = 1.33 x S/R

Ken explains that this "adjusted value" is less than a 2% error and is much easier to calculate in his head. Both Hans DC8UE and Ken W6HHC agree that hams should only use the term **$BW_{allocation}$** when they talk about DVB-S.

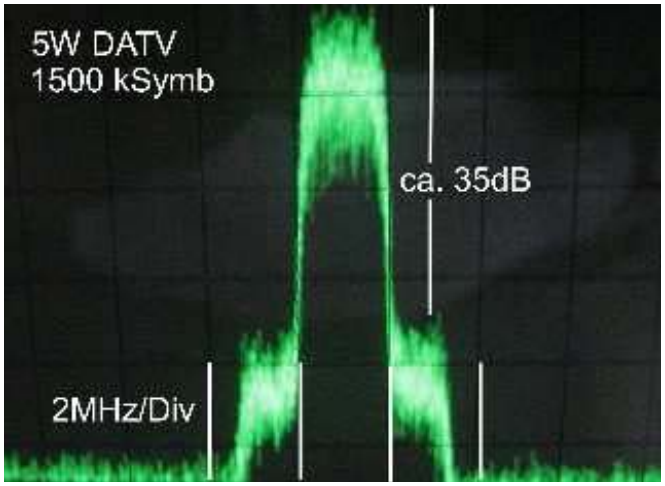

Fig 3 – DATV QPSK signal at 1.5 M Symbol/sec produces 2.025 MHz of bandwidth

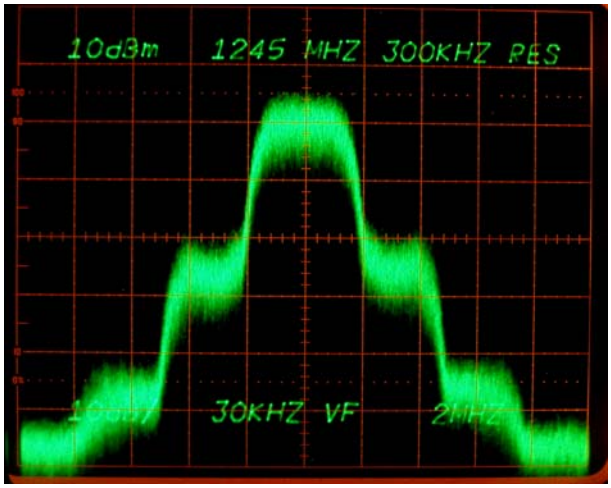

Fig 4 - Spectral regrowth amplified by different a PA with shoulders now only 20 dB below carrier
(Photo courtesy of Art-WA8RMC)

Non-Linearity effects on bandwidth

It is extremely important, to avoid compression in the power amplifier and to operate the signal path and PA in a linear mode. As mentioned earlier, the shoulders in **Fig 3** (don't you think they look like "shoulders on a human"...on each side of the head??) can continue to grow in strength through non-linearity, including compression. While **Fig 3** shows the shoulders down about 35 dB below the carrier, **Fig 4** shows that the shoulders on this PA output are only 20 dB below carrier.

Hans DC8UE explains that when he made a transmission via a commercial satellite in the old (no longer used) analog FM-mode, they used the HPA (high power amplifier) in saturation (class-C). In the digital world with QPSK-modulation, they have to lower the power for class-A linear mode. That reduces the possible output power down to a level 4 to 5 dB below saturation. This reduction is called output backoff (OBO). During a terrestrial transmission (DVB-T RF-link), we have to reduce the OBO to a level 6dB below saturation, in order to hold the shoulders down.

One concept that DATV hams need to understand with DATV amplification....is that the DATV signal has a very high Peak-to-Average-Ratio, as shown as PAR in **Fig 5**. So while the average power level may seem low, the peaks can be going into compression (or even flat topping in saturation), hence nonlinearity and hence stronger shoulder power levels.

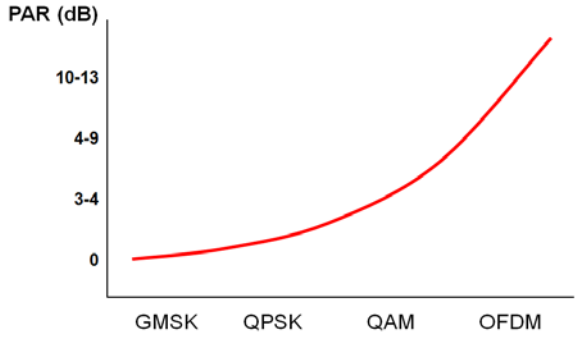

Fig 5 - PAR for amplifier output power when processing signals with various digital modulation technologies
(Graph courtesy of Robert Green - Keithley Instruments, Inc.)

Commercial satellite-uplink operators adjust their shoulders to be more than 26 dB below the main carrier. Likewise it should be the duty of hams who operate DVB-S repeaters and transmitters to not allow shoulders to get within 26 dB of their main carrier.

Interesting DATV Links

- AGAF D-ATV components (Boards) – see **www.datv-agaf.de** and **www.AGAF.de**
- SR-Systems D-ATV components (Boards) – see **www.SR-systems.de** and **www.D-ATV.org**
- British ATV Club - Digital Forum – see **www.BATC.org.UK/forum/**
- British ATV Club – select from about 25 streaming repeaters – see **www.BATC.TV/**
- German ATV portal for streaming repeaters and forum – see **www.D-ATV.net/**
- Amateur Television of Central Ohio – see **www.ATCO.TV**
- Orange County ARC newsletter entire series of DATV articles – see **www.W6ZE.org/DATV/**
- TAPR Digital Communications Conference free proceedings papers – see **www.TAPR.org/pub_dcc.html**
- Darren-G7LWT site for "DATV Primer" – see **www.G7LWT.com/datv.html**
- Nick Sayer N6QQQ site for his future DATV repeater – see **www.N6QQQ.org**
- Rob-MØDTS D-ATV site including details of F4DAY-design – see **www.M0DTS.co.uk/datv.htm**
- Ultimate Resource for Digital Amateur Television – see **www.D-ATV.com**
- RF Bandwidth online calculator for DVB-S/DVB-S2 – see **www.satellite-calculations.com/Satellite/bitrates.htm**

Shoreline Yacht Club
386 Shoreline Drive South,
Long Beach CA 90802
(562) 435-4093

2010 Tom Herren Memorial

HAM Radio Classes

Technician License Course
March 6th and 7th, 2010
Saturday & Sunday, 8am to 5pm

General License Course
April 10th and 11th
Saturday & Sunday, 8am to 5pm

Each course fee is $75 per person which includes text book.
Sign up for both classes for $130! Save $20!
Continental breakfast and lunch on both days.

FCC license fee $14.00 (cash only) payable upon taking the exam on Sunday
Class size is limited, reserve early: call (562) 435-4093 or Email: KG6OTV@aol.com

Morse code is no longer required for HAM licenses. HAM radio is commonly used by boaters who are cruising or crossing oceans and is an excellent back up to other forms of communication at sea, even when coastal cruising or day sailing. Ham Radio also provides critical emergency communications in disaster situations when all other means of communications are disabled or overloaded. CERT and other disaster management organizations recommend HAM Radio Licenses for their volunteers.

The license courses must be taken in order. The Technician license is the entry level and must be achieved first. The General license allows access to all frequency bands and is the most useful for offshore and long term cruising. The classes are taught by Rod Goodman. Please contact Bill Miller at 562-818-1413 or e-mail KG6OTV@aol.com if you have any questions or for more information .

International DX Convention April 16, 17 & 18

The 61st Annual International DX Convention sponsored by the Southern California DX Club will be held at The Holiday Inn Hotel & Conference Center Visalia. The International DX Convention is the world's premier DX convention, if you're a DXer or interested in any aspect of Ham radio you need to be at Visalia. Top DX operators from around the world will be there. Meet the big guns from the US, Asia, Europe, Africa and Oceania. Meet the people on the other side of the mic or key, shake hands with the person you have had a sched with for the past 10 years but never met. Don't forget the YL's we will have something special for them as well.

The top DXpeditioners from every continent tell you how they did it. Learn the secrets for big signals on top band. How to have fun and adventures chasing IOTA, contest forum, antenna forum, DX forum, seminars for everyone from the seasoned pro to the beginning DXer. Saturday night banquet, Sunday breakfast, manufactures midway where you can talk to the people who design and use the best of DX equipment, and raffle prizes the likes of which top even the famed Dayton Hamvention.

The Holiday Inn is taking reservations for the 2010 convention, they are also be taking reservations for RV parking. Room reservations can be made by calling 559-651-5000, RV reservations can be made by contacting Brian Lancaster at extension 2608. You need to contact the hotel directly and not via the Holiday Inn main number or web site. This is a special event and reservations are handled directly buy the hotel at 559-651-5000.

Hotel Cancellation Policy: Reservations must be canceled seven (7) days prior to arrival date or a cancellation penalty of 1 nights room and tax will be charged to the credit card on file.

61ST Annual

INTERNATIONAL DX CONVENTION 2010 REGISTRATION FORM

Sponsored by the SCDXC

Are You A Newcomer: Yes No Golf Tournament: Yes No +Shirts NOT part of Pre-reg. Package

Name_____Call_____+Convention Polo Shirt S M LG XL 2XL 3XL 4XL

Name_____Call_____+Convention Polo Shirt S M LG XL 2XL 3XL 4XL

Ham Guest _____Call_____+Convention Polo Shirt S M LG XL 2XL 3XL 4XL

Address_____City_____State_____

Zip (Mail) Code_____Country_____E-Mail_____

All Pre-Registrations Must Be Postmarked On, Or Before, March 20, 2010

Late Registration after March 20, $95.00

Individual Pre-Registration (* with meals)	$90.00	per _____	Person(s)	Total $_____
Pre-Registration for Young Ham <21 (* with meals)	$65.00	per _____	Person(s)	Total $_____
Individual Pre-Registration (without meals)	$25.00	per _____	Person(s)	Total $_____
Saturday BBQ Lunch (* Included with Pre-reg w/meals)	$15.00	per _____	Person(s)	Total $_____
Saturday Banquet (* Included with Pre-reg w/meals)	$34.00	per _____	Person(s)	Total $_____
Sunday Breakfast (* Included with pre-reg w/meals)	$16.00	per _____	Person(s)	Total $_____
Drink sponsorship at the Parties	$ 5.00	per _____	Drink(s)	Total $_____
Raffle Tickets - 12 for $10.00	$10.00	per _____	Booklet(s)	Total $_____
Late Registration (Postmarked After 03/20/'10)	$95.00	per _____	Person(s)	Total $_____
Saturday Tour (Saturday, April 17, 2010)	$35.00	per _____	Person(s)	Total $_____
+Convention Polo Shirts with Call/Name Embroidered	$35.00	per _____	Shirt(s)	Total $_____

+Circle Shirt Size after Call. Shirts NOT included as Part of Pre-registration

Banquet Meal choices: Chicken____Ranch Steak____ Salmon____Veggie____ GRAND TOTAL $_____

Notes: *Do you need wheelchair access for banquet seating? Yes_____No_____

*Golf Tournament on Friday - Contact Skip Bolnick: kj6y@dxconvention.org

*If you don't wish to wait in line Friday or Saturday for Banquet Seating, E-Mail seating assignments will be accepted beginning Monday February 22, 2010. All seating is on a first come, first serve basis. No requests for a specific table or table location will be honored. Individual and Group seating will be available, but all parties must be registered for the convention and banquet before assignments can be made. One person must be responsible for the group request. 10 is the maximum per group. **See web site (www.dxconvention.org) for complete details.**

Make Checks Payable to:

Southern California DX Club (No Cash PLEASE)

Send Form & Check to: Cathy Gardenias - K6VC,

20902 Gardenias Street - Perris, CA 92570

MAIL EARLY

Valentine Word Search

D	X	I	G	N	E	L	M	E	S	R	M	E	E	T	I	N	G	S	F
X	E	M	M	A	H	E	V	M	B	T	C	A	D	G	H	E	A	U	N
I	A	C	F	Z	M	H	L	E	U	C	L	O	V	R	O	T	O	P	E
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Love
Dxing
County
Amateur
Heart
Club
Member

Valentine
Friends
Activities
Thanks
Hams
Raffle
Support

Help
Elmer
Meetings
Fun
Orange
Radio
Event