RF

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. XLIV NO. 8 P.O. BOX 3454, TUSTIN, CA 92861-3454 August 2003

The Prez Sez:

I would like to introduce our new treasure, Stephen KG6QVY. Stephen lives in Orange with his wife and they are expecting their first child, in September. Stephen holds a BS in Business Finance and a MBA. He brings with him the back ground and the youthful exuberance as he demonstrated at Field Day.

Cindy KC6OPI has been elected to fill the Member at Large spot, vacated by Frank WA6VKZ who resigned. Frank has moved to Portland Oregon, to be near his daughter and recuperate. As soon as his health permits, Frank plans to return, to Orange County.

The HAM Booth, at the OC Fair, was a success. The booth won the Blue Ribbon again and as usual the Morse Code Keys attracted the children. Thanks to the members who manned the booth.

The Board of Directors meeting and breakfast has been canceled in September. The Board meeting would have fallen on the same day as the ARRL Southwestern Convention, at the Long Beach Hilton.

The next General Meeting is August 15 at 1900.

See you at the meeting,
73's----Lowell-KQ6JD

WRC-2003 Provides Good News for 40M HAMs!!!

As just reported in the recent ARRL board minutes, the World Radio Conference 2003 (held in Geneva) has just ended in July. Many issues were discussed, but of interest to HAMs is the news that the ARRL was successful in realigning the 7 MHz band closer to the pre-WW2 configuration. It was agreed at WRC-03 that commercial broadcast stations would vacate the 7.1-to-7.2 MHz segment by the year 2009.

Early Warning!!!

September meeting will be held at Orange PD.

Our program chairman, Steve KB1GZ has announced that the OCARC September meeting will be held at the Orange PD Headquarters on Batavia in the City of Orange. We will visit the EOC. A talk will include a new program called CERT, the Community Emergency Response Team. If available we will tour the new $500,000 Emergency Comm Vehicle (else…video tape on the new unit). We will NOT meet at the normal Red Cross building.

August Meeting

Don't forget that the meeting will start one-half hour early at 7:00 PM, due to Red Cross new security rules.

The presentation at this meeting will be given by Bill Scholz W1HIJ (one of the local HRO team members) on:

"COØUS…….Field Day in Cuba"

A total of 10 hams, five from Cuba & five from U.S. operated COØUS during the FD 2003.

Don't miss it. All members and visitors are welcome.

The next general meeting will be:

Friday, August 15th
@ 7:00 PM

We will be meeting in Anaheim Room in the east **Red Cross** Bldg.

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THE ORANGE COUNTY AMATEUR RADIO CLUB, INC.
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Monthly Events:

General Meeting:
Third Friday of the month
at 7:00 PM
American Red Cross
(near Tustin Ave & 4th St)
Santa Ana, CA

Club Breakfast:
First Saturday of the month
at 8:00 AM
CowGirl's Cafe, Too
2610 S. Harbor Blvd
(just south of Warner)
Santa Ana, CA

Club Nets (Listen for W6ZE):

7.115 ± MHz CW **OCWN**
Sun- 9:00 AM – 10 AM
Rick KF6UEB, Net Control

28.375 ± MHz SSB
Wed- 7:30 PM - 8:30 PM
Bob AF6C, Net Control

146.55 MHz Simplex FM
Wed- 8:30 PM - 9:30 PM
Bob, WB6IXN, Net Control

VISIT OUR WEB SITE

http://www.w6ze.org

for up-to-the-minute club information, the latest membership rosters, special activities, back issues of RF, links to ham-related sites, vendors and manufacturers, pictures of club events and much much more.

Club Dues:

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

Dues run from January thru Dec and are prorated for new members.
*Additional members in the family of a regular member pay the family rate up to $30 per family.
**There is a $1 charge if you'd like to have your badge mailed to you.

Tech Talk #32

Standing Wave Ratio (SWR)

By Bob Eckweiler – AF6C

(This is part five in a series to explore RF impedance, from the antenna…down the feed line…and eventually reach the antenna tuner and transmitter.)

Review:

Before we begin discussing SWR, let's review what was discussed in the past several articles: When the impedance of an antenna matches the nominal impedance of the feedline, the impedance is constant along the feedline and has no reactive component. This "ideal" condition is difficult to achieve and really means very little to the efficiency of the antenna/feedline system. What is usually the case, though, is that the antenna presents a mismatched impedance to the feedline that consists of a resistive component between half and twice the nominal feedline impedance and a reactive component that is either inductive or capacitive, depending on whether you're operating frequency is above or below the antenna's resonant point. The impedance presented by the antenna is transformed along the feedline in a cyclic manner that repeats every half-wavelength. If the reactive component is inductive at a given point, it will be capacitive a quarter-wavelength away; and if the resistive component is above the nominal feedline impedance at a given point, it will be below it a quarter-wavelength away. If your coax was lossless, the impedance at any given point would repeat every half-wavelength. Loss in the feedline causes the reactive component to slowly approach zero, and the resistive component to slowly approach the nominal feedline impedance with each half-wavelength cycle away from the antenna. The higher the loss of the feedline, the faster the approach.

Last month we saw that the job of the antenna tuner is to transform the resistive component of the impedance present at that end of the feedline to the nominal output impedance that the transmitter is designed for (usually 50 ohms). The tuner also provides a reactive component that is opposite in reactance to the value present at that end of the feedline. This reactance is transformed up the feedline and cancels the reactive component of the antenna.

Last Month's Quiz:

No one emailed me by the meeting with the answers to the question I asked in last month's article. However, Bob, WB6IXN did email his answer after the meeting. The correct answers are: For 37.6ohm: 1.14 A and 49 W, and for 66.5ohm: 0.86 A and also 49 W.

SWR:

When energy flows along a lossless feedline that is terminated at the nominal impedance of the feedline, all the energy is absorbed by the terminating load. If you measure the RF voltage at any point along the feedline it will be identical with every other point. The maximum, average and minimum RF voltages are identical. The same is true of the RF current; see Figure 1.

-- See **TechTalk** cont'd on page 4 –

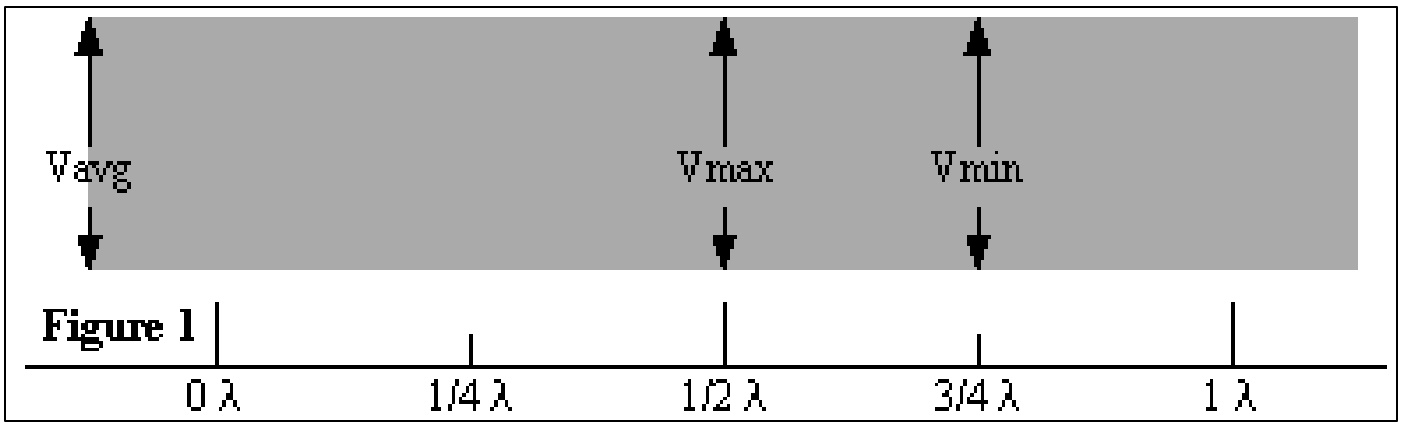

Figure 1 – Voltage levels along a transmission line with SWR = 1:1

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However, if there is a mismatch of impedances at the terminating load, some of the energy is reflected back along the feedline to the transmitter. As the reflected energy travels back along the feedline, its energy adds algebraically with the energy moving forward. At points where the two RF voltages are in phase, their voltages add, and at points where they are out of phase, their RF voltages subtract. The amount depends upon the phase angle between the two RF voltages at the point of measurement; they are maximum when the phase difference is 0° and minimum when it is 180°; see Figure 2. Remember that since energy is traveling in both directions, their relative speeds are twice as fast and thus these peaks and voltages repeat every half-wavelength.

This last point is important! We've learned that the impedance cycles every half-wavelength, but why this is so has never been discussed. Remember that impedance is made up of two components, resistance and reactance; and that reactance relates to the phase shift between the current and voltage. Since the energy traveling along the feedline is constant, high voltage points must mean higher impedance with lower current and low voltage points must mean lower impedance and higher current. Remember Ohm's law! This is what causes the impedance to change along a mismatched feedline.

As long as the frequency is constant, these voltage (and current) peaks remain physically at the same places along the feedline; that is, the wave doesn't move but *stands* still. Thus they are called *standing waves*! The ratio of the maximum voltage to the minimum voltage is referred to as the *Voltage Standing Wave Ratio* or VSWR. If the current ratios were used the result would be the same; often the 'V' is dropped and just SWR is used.

Since the maximum and minimum RF voltages of Figure 1 are identical, the VSWR represented is one to one (or 1.0 : 1). Figure 3 represents the voltages of Figure 2. Here the VSWR is 30 to 10 or 3 to 1 (or 3.0 : 1). Note that since the minimum voltage can never exceed the maximum voltage, SWR can never be less than 1.0 : 1. If the guy you're talking to is claiming an SWR of zero (I've heard it!) consider zero as his "credibility factor".

Last month it was mentioned that loss in your feedline will result in you seeing a lower SWR in the shack than at the antenna. From what we've learned today the reason is obvious. The forward RF voltage is higher at the transmitter end than at the antenna end after it's traveled along the feedline with its loss.

-- See **TechTalk** cont'd on page 6 –

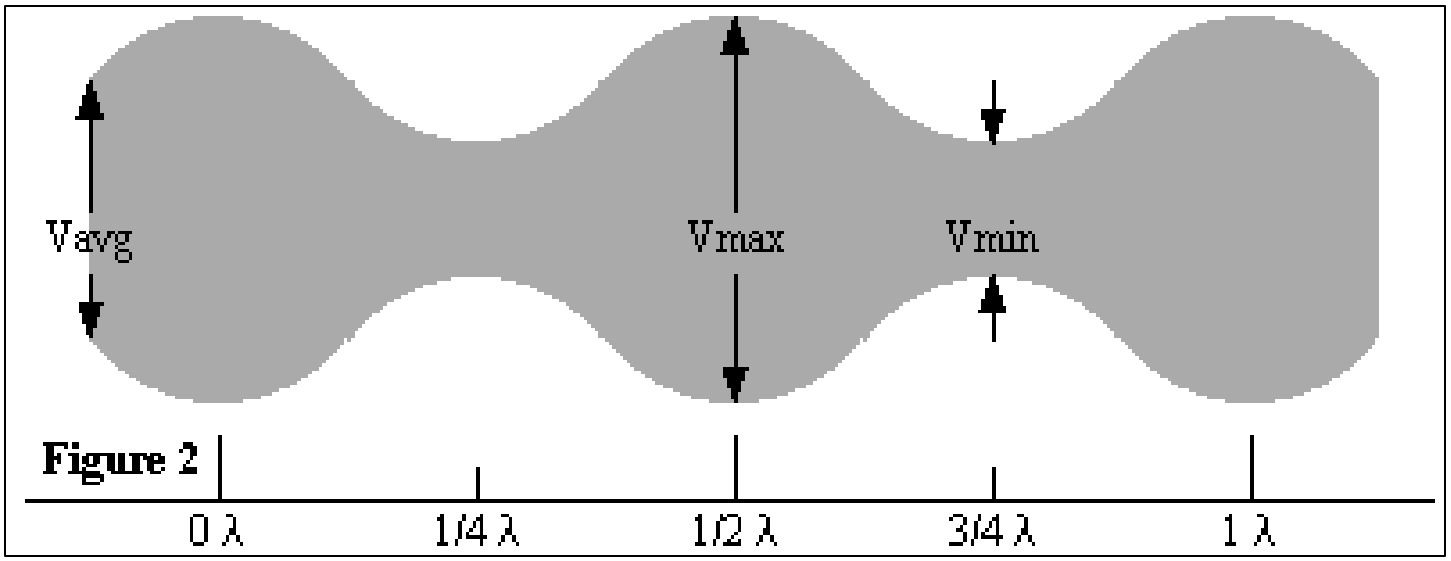

Figure 2 – Voltage levels along a transmission line with SWR = 3:1

OCARC General Meeting Minutes

July 18, 2003

The July 18, 2003 General Meeting of the Orange County Amateur Radio Club was called to order at 7pm by Pres. Lowell KQ6JD. The following guests were introduced: Vince WA6VJG; Richard Thompson WA6NOL; Jay Thompson W6JAY 2003 Young Ham of the Year; Mark K6YSC and visitors Cliff KG6MIG, Kevin KG6MIH & Brian KG6MIV. Welcome to you all.

Pres. Lowell introduced our speaker, Joe Moell KØOV, who gave a very interesting and informative talk on ARDF/Amateur Radio Direction Finding.

The Business Meeting was brought to order with roll call revealing that VP Steve KB1GZ; Cory AE6GW and Larry K6LDC were absent. There was a quorum

Old Business:
Wouff Hong: It was decided that not enough interest was exhibited in the club to conduct Wouff Hong. Pres. Lowell asked Bob KD6BWH to relay that fact to the Hamcon Organizing Committee.

New Business:
Two board members need to be replaced.
Treasurer: Stephen Sam KG6QVY was put forth as candidate for the post. His election was approved by a unanimous vote.

Member at Large: Cindy Hughes KC6OPI was nominated by Lowell KQ6JD and seconded by Rich KE6WWK. Her election was approved by a unanimous vote.

Congratulations to our two newest board members.

Christmas Dinner: Pres. Lowell will contact Mimi's-Tustin concerning setting a date for the clubs Christmas Party.

Morse Code: The international requirement for Morse code to obtain a license has been dropped. It has been left to each member IARU country to determine the need for code in its own licensing program. After a discussion within the group a vote was taken as to whether we wanted to leave a 5 wpm code requirement in the United States license program:

In Favor: 13
Opposed: 2
Don't Care: 3

There being no further business the meeting adjourned at 9:20PM.

Respectfully Submitted,
David Mofford W7KTS - Secretary

OCARC BOARD MINUTES

August 02, 2003

The Board Meeting of the OCARC was held at Cowgirls Cafe Too. There were a total of 12 members and visitors present. The meeting was called to called to order at 8:45am by Pres. Lowell KQ6JD. Roll call showed the following absent: Larry K6LDC, Cindy KC6OPI & Matt K6LNX. There was a quorum present.

Old Business:
Powerpole order: Bob AF6C said the total order amounted to $ 230.29 including shipping. Approx. $50.00 in product remains in inventory. A bill was given to the club for the balance remaining owed of $74.00.

Corporation: Ken W6HHC confirmed that the California issue concerning the standing of the OCARC corporation was removed on July 15. (Editor's note: Phil N7PA is designated as the "Agent for Service of Process" using the club P.O. BOX.)

New Business:
Badges: Bob AF6C handed out a sheet of the costs of making club badges with proposed prices. Motion was made that the club adopt the pricing of the badges as presented. Motion made by Cory AE6GW and seconded by Steve KB1GZ. Motion passed unanimously. (Copy of pricing sheet is attached to official minutes.)

Bylaw Amendments: Ken W6HHC handed out proposed changes to the OCARC bylaws. Discussion followed. The board was polled concerning changes in the policy of dual signatures on checks. Ken W6HHC will propose these changes at the next general meeting.

Web site hosting: Ken W6HHC mentioned that our current web hosting company is XO Communications. It was discussed that there are cheaper firms but that the quality of low-cost hosting capabilities many times left a lot to be desired. The board recently approved the 1 Year renewal of our agreement with XO. This was done by e-mail.

Treasurers Report: Stephen Sam KG6QVY, the new Club Treasurer, reports that the club has $829.56 in checking and $1510.50 in savings for a total of $2340.06.

Meeting adjourned at 9:35am.

Respectfully Submitted,
David Mofford W7KTS - Secretary

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Also, the reflected voltage is higher at the antenna where it has just been reflected than it is when it travels to the transmitter end along the feedline with its loss. At the transmitter end you have higher forward voltage and lower reflected voltage than at the antenna, and thus the VSWR is lower at the transmitter end.

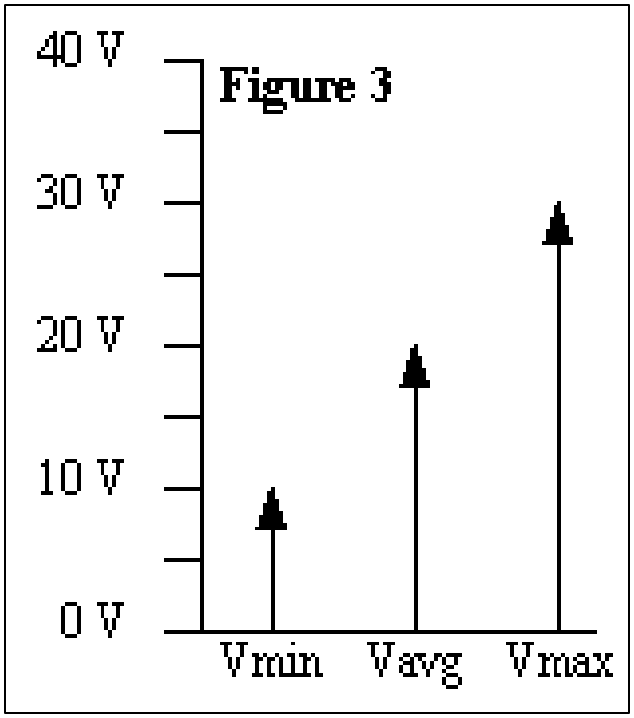

Figure 3 – The same voltage levels seen in Fig 2

Where Do You Measure SWR?

I've heard hams say that the best place to measure SWR is right at the antenna. My response is; "What do you really want to measure?" If you place the SWR sensor right at the antenna you measure the SWR of the antenna at the frequency you are currently using. Unless you like running outside and possibly climbing towers, or poles or onto your roof, you need a remote indicating SWR meter (hence the word sensor - the indicator would still be in the shack). You can also notice feedline and transmitter/tuner problems, but only if the meter can measure forward power. When the SWR meter is in the shack at the output of the radio (or antenna tuner) you get a composite picture of the feedline and the antenna. If you make careful measurements when you first install your antenna and feedline, you can get a good idea of any changes that are occurring as your antenna system ages. Your SWR meter is now reading the VSWR that your radio or antenna tuner is actually seeing. If problems do arise, then perhaps a measurement at the antenna would be an appropriate way to troubleshoot the root cause.

VSWR Meters:

There are numerous SWR/Wattmeters meters available. QST does a good job of reviewing them if you're in the market. Probably the most widely used meter for commercial and top-end amateur use is the Bird Model 43 Wattmeter. While it has become expensive in recent years, it can still be found on the used market at reasonable prices. This meter uses plug-in elements for different power levels and frequency bands. A modification kit is available to convert the Bird 43 to a peak reading wattmeter. The Bird 43 doesn't read VSWR directly. Instead it reads forward and reflected power. A nomogram is included to convert the two wattages into SWR.

Reflection Coefficient and Return Loss:

If you get involved in RF design, you will probably come across the sister terms of SWR: *reflection coefficient* and *return loss*. The reflection coefficient is the reflected voltage divided by the forward voltage and is often symbolized by **P** (rho). Since the voltages are complex and have phase as well as magnitude, **P** is a complex value. However, when you assume the nominal impedance of the feedline is purely resistive (which is a valid assumption at HF frequencies), the magnitude of **P** expressed as |**P**|) is easily calculated. The reflection coefficient ranges between zero and one; zero being no reflection (1.0 : 1 VSWR), and one being total reflection (infinite VSWR).

-- See **TechTalk** cont'd on page 8 –

2003 ARRL Southwestern Division
Amateur Radio Convention, Long Beach, CA.

www.hamcon.org

Save these dates: September 5, 6 & 7, 2003

"Focus Back on the Volunteer"

VE Testing	**Technical Forums**	**Many PRIZE Drawings**
Vendor Exhibits	**Wouff Hong**	**Demonstrations**
Saturday Luncheon	**Sunday Breakfast**	**Grand Banquet**

This year we will be in beautiful downtown Long Beach. This year's Convention Headquarters is the: Hilton Long Beach, 701 West Ocean Blvd., Long Beach, Ca. 90831-3102.

Early Bird Registration
Registrations post marked by April 30, 2003
$10.00 Per Registrant
Which INCLUDES One Logo Pin
Send registrations to Hamcon address below.

Pre-Registrations
Registration Post Marked from May 1 to August 1, 2003
$12.00 Per Registrant
Which INCLUDES One Logo Pin
While quantities last

Last Minute and Walk-In Registrations
Registrations received after August 1, 2003, and Fri., Sat. & Sun. Sept. 5, 6 & 7, 2003
$15.00 Per Registrant
INCLUDES One Logo Pin
While quantities last

Hilton Long Beach

Location: **701 West Ocean Blvd., Long Beach, CA. 90831-3102. For Reservations call 800-445-8667**
Mention "HAMCON" for a fantastic rate of $89 per night double occupancy.
Note: The last day to register and get this rate is August 15, 2003.

----------Mail-In Convention Registration Form----------

Call Sign: _____ Name: _____

Address: _____

City: _____ State/Prov: _____ ZIP /Postcode _____

Your E-Mail Address: _____ Club Affiliation: _____

Please List additional Attendees

No Charge for Children 16 years old or younger. They Must be accompanied by a registered adult.

KIDS	ADULT	Call Sign	Name *(Please Print Clearly)*
____	____	_____	_____
____	____	_____	_____
____	____	_____	_____

Note: Every attendee must be registered, including the kids

_____	Registrations	at $_____	ea.	= $_____
_____	Extra Pins	at $ 3.00	ea.	= $_____
_____	Kids under 16			= Free
_____	Banquet Tickets*	at $ 35.00	ea.	= $_____

**Please indicate preference: ( )Beef ( )Chicken ( )Vegetarian*

_____	Saturday Luncheon	at $ 20.00	ea.	= $_____
_____	Sunday Breakfast	at $ 17.00	ea.	= $_____
			Total Due	= $_____

Staff Use Only
Registration_____
Date_____
Finan._____
Date_____
Number Pins Given: _____
R-4

Make convention registration checks payable to**: HAMCON Inc.**
Mail this form to: **HAMCON Registration, P. O. Box 333, Pomona, CA. 91769-0333**

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Here are a couple of simple equations to allow you to convert between VSWR and reflection coefficient:

$$|r| = \frac{SWR - 1}{SWR + 1} \qquad SWR = \frac{1 + |r|}{1 - |r|}$$

The *return loss* is just the reciprocal of the reflection coefficient expressed in dB. It is often found in filter measurements. We won't go into detail on these other forms of VSWR. The handbook covers them well; but you should be familiar with their existence.

Next month we'll finish our journey along the feedline taking a look at where all that reflected energy goes as well as a look at baluns. In future columns we'll discuss the noise bridge and ways to make measurements on your feedline.

de AF6C

Party for Frank Smith WA6VKZ

On Monday, July 14th a group of Orange County Amateur Radio Club members met at Mimi's Restaurant in Santa Ana to wish Frank Smith, WA6VKZ a Bon Voyage before he left for Oregon to be with relatives while he vacations and recuperates from recent health problems.

The dinner, organized by Phil N7PA and Phyl K7PMA, was a surprise to Frank when suddenly thirteen other club members joined in the festivities. Besides Phil and Phyl; John, N6RUI; President Lowell, KQ6JD; Bob, AF6C; Ken, W6HHC; Tom, WA6PFA; Jim, AE6UC; Paul, WD6FMX and his wife Shirley; Roy, W5RT; David, W7KTS; Bob KM6TL and his friend Letty, and Bob, KD6BWH all showed up to wish Frank good health and a speedy return.

Frank has been a long time member of the club, past president (5 times), and an avid Field Day participant and chef. The "hardware trailer" that Frank brings to Field Day would put even the biggest hardware stores to shame. Ask Frank if he has a left hand, metric widget and his typical reply would be: "Any preference as to color?"!! Then he'd produce one!

We are all wishing Frank a quick recuperation, and are looking forward to seeing him at the club meetings again soon.

ORANGE COUNTY AMATEUR RADIO CLUB, INC
P.O. BOX 3454
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First Class Mail

Time Dated Material.
Please Expedite!!