



# RF



## ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. XLIV NO. 6

P.O. BOX 3454, TUSTIN, CA 92861-3454

June 2003

### The Prez Sez:

The Red Cross has changed their security procedures. All external doors are now locked by computer control at 19:15. This caused some confusion and when members arrived late, they were not able to enter the building. To that I must say, that I am sorry. The membership passed a motion, to change the starting time to 19:00, this should ease the problem.

April Moell WA6OPS was our guest speaker, who gave an outstanding talk in May on the Hospital Disaster Support Communications System. Many thanks to April, for responding to be our speaker, with very short notice.

June and July will be busy months, we have Field Day June 28, 29 and our date, to man the HAM booth, at the Orange County Fair is July 16.

**The next meeting is June 20 at 19:00 (7:00 PM).**

I hope all of you can come and help plan, for Field Day

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

### **STARTING TIME FOR OCARC MEETINGS CHANGES TO 7:00 PM**

The doors at the Red Cross building will be locked by computer at 17:15. We can not leave the door ajar for late arrivals. Come early. We will monitor 146.550 for late arrivals.

### **Field Day is Coming!!!**

#### **Mark your Calendar to Come to FD – June 28 & 29**

Field Day is a practice of an emergency communications event that lasts for 24 hours. The FD contacts start at 11AM on Saturday, June 28, and continue until 11AM on Sunday, June 29. Setup of equipment will begin at 7AM in Portola Park in Santa Ana (on Santa Clara Ave, west of Tustin Ave.)

The club will provide food for dinner and breakfast.

Plan to come even if you can only stay for 1 or 2 hours.

### **June 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:

### **"Field Day...**

**- short FD slide show**

**- Operation plans"**

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

The next general meeting will be:

**Friday, June 20th  
@ 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.**

P.O. Box 3454, Tustin, CA 92781



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**2003 Club Appointments:**

**W6ZE Club License Trustee:**

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**ARRL Awards Appointee:**

Larry Beilin, K6VDP  
(714) 557-7217  
[k6vdp@aol.com](mailto:k6vdp@aol.com)

**OCCARO Delegate:**

Bob Buss, KD6BWH  
(714) 534-2995  
[kd6bwh@aol.com](mailto:kd6bwh@aol.com)

**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.

## Feedline Impedance

By Bob Eckweiler – AF6C

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

Last month we took a break to discuss Anderson Powerpole® connectors, how they are used and why they have become the standard for 12V radio equipment. This month we're back on our trip down the coax from the antenna to the transmitter! We left off after discussing the impedance of the dipole antenna and how it varied as the length (or frequency) changed from resonance. This month we'll begin discussing the feedline and how impedance varies along a feedline down to the transmitter.

### Coaxial Cable:

Let's talk a little about coaxial cable (coax) before we start. Coaxial cable became popular during the second world war. Prior to that, open feedline was commonly used. The advantages of coaxial cable are good shielding (unaffected by near by objects), low impedance and easy routing (through holes, around sharp bends, beside a metal structures [fuselage], next to other feedlines, etc). These make up for the disadvantages which are higher cost, higher losses and lower SWR handling capability. The additional loss in coax is due mostly to the dielectric material. The dielectric material has another effect; radio waves travel slower in coaxial cable than in free space; the ratio between these speeds is the velocity factor of the cable. Velocity factor (Vf) is determined principally by the dielectric used in the cable and values between 0.82 and 0.66 are common. When we talk of cable length in wavelengths the velocity factor must taken into consideration. A one-quarter wavelength at 10 MHz in free space is 7.5 meters (24.6 feet) while a quarter-wavelength in

standard RG-8 with a polyethylene dielectric (Vf = 0.66) is 5 meters (16.2 feet).

### Lossless Feedline:

Let's start with an ideal resonant dipole with an impedance of  $72 + j0$  ohm at your frequency of choice; this is measured right at the antenna terminals. If we feed this antenna with **lossless** 72 ohm coaxial cable, then the impedance at the far end of the cable will also be  $72 + j0$  ohm independent of the length of the cable. This is the ideal case, but not one usually found in the real world, especially if you like moving away from your frequency of choice.

Instead, take a more practical dipole that is somewhat off resonance with a terminal resistance that measures  $57.6 - j43.2$  ohm, at your frequency of choice, and feed it with 72 ohm lossless coaxial cable. We haven't talked much about SWR so trust me when I tell you that this represents an SWR of 2.0:1. If we move down the feedline one-eighth wavelength and measure the antenna impedance from this point it will measure  $36 + j0$  ohm. Moving another one-eighth wavelength, one quarter wavelength total, the antenna measures  $57.6 + j43.2$  ohm. If we continue moving from the antenna in one-eighth wavelength intervals taking measurements we get the values shown below in Table 1.

Distance in wavelengths from antenna	Impedance at this point using <b>lossless</b> 72 ohm coaxial cable
0	$57.6 - j43.2$ ohm
1/8	$36 + j0$ ohm
1/4	$57.6 + j43.2$ ohm
3/8	$144 + j0$ ohm
1/2	$57.6 - j43.2$ ohm
5/8	$36 + j0$ ohm
3/4	$57.6 + j43.2$ ohm
7/8	$144 + j0$ ohm
1.0	$57.6 - j43.2$ ohm
1-1/8	$36 + j0$ ohm
1-1/4	$57.6 + j43.2$ ohm

**Table 1 – Impedances at Distances along Lossless Coax**

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

While the values in Table 1 are only for the specific antenna above, a lot of information can be obtained from the data. Notice that at every half-wavelength from the antenna the impedance is the same as at the antenna. Not only that, but the impedance at any point along the coax is the same as it is one-half wavelength away from that point! Also, notice that every quarter-wavelength the reactance changes between capacitive (-j) and inductive (+j). In order for this change to occur, the reactance must go through zero, and we know that where that occurs is a point of resonance. What exactly is resonant? Not the antenna, but the antenna and the given length of coax in combination. In the table above, the first two of these resonant points occur at 3/8 and 5/8 wavelength. Notice that at one the resistive component is low (36 ohms) and at the other it is high (144 ohms). Since the nominal impedance of the coaxial cable is 72 ohms both of these resonant points can easily be shown to have an SWR of 2.0:1 ( $144/72 = 2.0$  and  $72/36 = 2.0$ ); so do all the other points in the table. The change in impedance that occurs along a section of mismatched coaxial cable is sometimes used to help match an antenna to a transmitter. This is often why instructions for an antenna sometimes give specific lengths of coax to use for the feedline. For instance, it might be easier for a transmitter designed to match  $50+j0$  ohms to match this antenna if it sees an impedance of  $36+j0$  ohms rather than an impedance of  $144+j0$  ohms or even an impedance of  $57.6 \pm j43.2$  ohms.

**The Smith Chart:**

The impedance at all points along a coaxial cable can be easily determined, if you know the frequency and the impedance at any one point, by using a Smith Chart. The Smith Chart is an ingenious tool, easy to use, and it can help solve many types of impedance and matching problems. It is beyond the scope of this series, but was well presented in some older ARRL Antenna Handbooks and again in recent volumes. I suggest you look there for more information.

**Lossy Coax Feedline:**

Unless you shop in Diagon Alley, lossless coax doesn't exist. How does lossy coax affect the values in Table 1? If the coaxial cable is old and has lots of loss, say a bit over 2 dB over its one-and-a half wavelength (extremely bad coax!), Table 2, below, shows the impedance you would measure at different distances from the antenna.

Distance in wavelengths from antenna	Impedance at this point using <b>lossy</b> 72 ohm coaxial cable
0	57.6 - j43.2 ohm
1/8	38.2 + j0 ohm
1/4	59.8 + j40.3 ohm
3/8	132 + j0 ohm
1/2	61.9 - j36.8 ohm
5/8	41.8 + j0 ohm
3/4	63.4 + j33.8 ohm
7/8	117 + j0 ohm
1.0	65.5 - j30.2 ohm
1-1/8	46.8 + j0 ohm
1-1/4	67.0 + j27.4 ohm

**Table 2 – Impedances at Distances along Lossy Coax**

Notice the differences between table one and table two. The resonance points occur at the same position along the cable and the resistive component still alternates between a high and low impedance; but, in table 2, as you move farther from the antenna, the low and the high resistance component values get closer together. They are actually converging on 72 ohms, the nominal impedance of the coaxial cable. The points that are not resonant are also converging towards  $72 + j0$  ohms. In our example above, if you calculate the SWR (that is 2.0:1 at the antenna) you will only measure about 1.5:1 at the other 1-1/4 wavelength end.

Lossy long coaxial cable will result in an almost perfect SWR in your shack no matter how badly the mismatch is between the coax and the antenna.

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

## OCARC General Meeting Minutes

May 16, 2003

The May club meeting of the Orange County Amateur Radio Club was called to order at 7:30PM in room 232 in the East Building of the OC Red Cross by Pres. Lowell KQ6JD. There were 19 members and visitors present.

Vice Pres. Steve KB1GZ introduced our guest speaker: April Moell WA6OPS, the Emergency Coordinator for Hospital Disaster Support Communications System, who gave a very informative presentation on the lessons learned by HDSCS in its service to OC Hospitals. Thank you April.

No Business Meeting was held as there was not a quorum of the board present. The following officers were absent: Phil N7PA; Bob KD6BWH; Matt K6LNZ; Larry K6LDC; Cory AE6GW and Frank WA6VKZ.

The following items were informational and discussed;

- 1) Starting with the June 2003 meeting OCARC meetings will start at 7PM due to time change by Red Cross locking the exterior door. We will keep a handheld tuned to 146.550 MHz turned-on in the meeting looking for latecomers.
- 2) Bob AF6C said that OCARC is doing a group purchase of Powerpole connectors and to e-mail him at AF6C@arrl.com to order.
- 3) Ken, W6HHC explained that Larry K6VDP will move from 75/80m and take over as 40m team captain. 75/80m will be abandoned. Ken made a motion to the membership to allocate \$250.00 of club funds for field Day. Seconded by; Steve KB6GZ.

Discussion followed. Motion Passed.

- 4) Pres. Lowell KQ6JD said that Frank WA6VKZ is at LaVeta Health Care Center and encouraged us all to call and see him.

Meeting adjourned at 9:45PM.

Respectfully Submitted,  
David Mofford W7KTS - Secretary

## OCARC BOARD MINUTES

June 07, 2003

The board of Directors meeting was called to order at 08:25, June 7, 2003. All directors were present except Steve KB1GZ and Dave W7KTS.

### Old Business

The subject concerning who will pay, for the sales tax and shipping, of the recent order, of Anderson connectors, was discussed. Motion was made by Lowell KQ6JD, for the club, to pay the tax and shipping. Cory AE6GW then second the motion and it passed on voice vote.

The State notified Phil N7PA that the club needed to file a tax return, for 1983. Phil said he would make diligent effort to obtain the 1983 statement and file the return. This is needed to get the club active as a non profit corporation.

Phil gave a report, from himself and Frank WA6VKZ, concerning the restructure of the Board of Directors and the Club Bylaws. Copies of Phil and Frank's proposal were given to Board members for review.

Ken W6HHC provided a different viewpoint on the bylaws progress as a member of the bylaws committee. He stated that there was still work for the bylaws committee to do before their recommendations should be reviewed by the board.

Larry K6LDC made a motion to table the bylaws discussion to a later date. It was second by Bob Buss.

Larry K6VDP outlined his plans, to publicize the club auction.

-- See **Board Minutes** cont'd page 8 --

## TechTalk -- cont'd from page 4

The bandwidth of the antenna will also appear very broad; changing frequency won't require much retuning. You will also find yourself not making a lot of contacts. The ideal broadband antenna is called a dummy load. Be happy if you have a full sized antenna and have to retune when you change frequencies. Yours is probably working well!

More than one ham has complained after installing new, lower-loss, coaxial cable that his SWR had increased noticeably. No, the SWR didn't change; it's still the same at the antenna; it's just that your SWR bridge down in the shack is now measuring the SWR more accurately. You're also getting more power to the antenna. Rejoice, don't complain!

### Conclusion:

What have we learned? Since lossless coax is unobtainable for mere muggles, the discussion involving Table 1 may seem useless. On the contrary, at HF frequencies, on good coax the losses are small enough that you can assume lossless coax and still be reasonably accurate at calculating the impedance at any point on the feedline if you know the value at just one point. Here's a tip next time you install a new antenna or feedline. Before you install the coax, measure its length as accurately as you can. Record this as well as the published specifications for the cable (velocity factor and loss). Antenna analyzers are becoming more accurate and less expensive so if you buy or borrow one in the future you can find the impedance right at the antenna from the far end of the coax with the data you acquired when you installed the feedline!

### Next Month:

In TechTalk next month, we'll finally reach the antenna tuner and transmitter on our journey down the coax. We'll discuss such questions as "What does the antenna tuner really do?" and other controversial stuff that are usually only found in the most adult of ham magazines behind the "Sterba Kurt'N."

## Power Pole Order a Success

In the recent group buy, the Club purchased over 250 sets of Anderson Powerpole(R) connectors. If you placed an order and haven't received it yet, they will be available at the meeting.

If you missed out, and want some connectors, there is still a limited quantity of 30 AMP and 45 AMP connectors available, as well as some spare contacts and roll pins.

Contact Bob, AF6C, (af6c@arrl.net) for availability and pricing. For more information on Anderson Powerpole(R) connectors see last months Club's newsletter "RF".

## Cell Phones could Interfere with Heart Pacemakers

Signals from GSM cellular phones could interfere with heart pacemakers, according to a study published in the Institute of Physics journal, Physics in Medicine and Biology. This study found that some pacemakers confuse the signals from cell phones for the heart's own electrical signals, causing the pacemaker to go on the blink.

For each pacemaker in the study, the output of the sensing amplifier was monitored under exposure to modulated and non-modulated RF signals, and to GSM signals (900 and 1800 MHz). Non-modulated RF signals did not alter the response of the pacemaker sensing amplifier. The block capacitor did not succeed in short circuiting the modulated RF signal, which is somehow demodulated by the pacemaker internal non-linear circuit elements. Such a demodulation phenomenon poses a critical problem because digital cellular phones use extremely low-frequency modulation (as low as 2 Hz), which can be mistaken for normal heartbeat.

The report's authors, based in the US and Italy, say that newer pacemakers fitted with a ceramic filter are immune from the problem. They're now calling on all pacemaker manufacturers to use these filters. "Most manufacturers have started to equip their new models with ceramic filters," said Giovanni Calcagnini, biomedical engineer at the Italian Institute of Health in Rome. Another recommendation was to keep the cell phone more than 15 CM away from an unmodified pacemaker.

-excerpted from articles published on  
<http://www.theregister.co.uk>



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

[www.hamcon.org](http://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.

<p><b><u>Early Bird Registration</u></b>          Registrations post marked by          April 30, 2003  <b>\$10.00 Per Registrant</b>          Which INCLUDES          One Logo Pin          Send registrations to Hamcon          address below.</p>	<p><b><u>Pre-Registrations</u></b>          Registration Post Marked from          May 1 to August 1, 2003  <b>\$12.00 Per Registrant</b>          Which INCLUDES          One Logo Pin          While quantities last</p>	<p><b><u>Last Minute and Walk-In Registrations</u></b>          Registrations received after          August 1, 2003, and Fri., Sat. &amp;          Sun. Sept. 5, 6 &amp; 7, 2003  <b>\$15.00 Per Registrant</b>          INCLUDES One Logo Pin          While quantities last</p>
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## 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.	= \$ _____
_____	Saturday Luncheon	at \$ 20.00	ea.	= \$ _____
_____	Sunday Breakfast	at \$ 17.00	ea.	= \$ _____
	<b>Total Due</b>			<b>= \$ _____</b>

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

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**

**BOARD MINUTES** - cont'd from page 5

Ken, said that a letter to the Portola Park neighborhood about the Field Day was needed, both for the City of Santa Ana and the People who live around the Portola Park. Ken said he would Email the city a copy and Matt K6LNx is going to do the mailing to the local residents.

Ken also, discussed that a check for \$250.00 was needed, to cover food and other Field Day expenses. Motion was made by Bob AF6C and second by Cory and the motion was passed.

A work-party to move the club's FD generator was organized for Saturday, June 14.

Bob KD6BWH announced that he will need volunteers, for the HAM RADIO booth, at the Orange Count Fair. The OCARC will be manning the booth at the OC Fair on July 16. As always the people who volunteer will receive FREE ADMISSION AND PARKING.

The meeting was adjourned at 0945.

Submitted,  
Lowell KQ6JD – (acting Secretary)

**Club Nets**

May check-ins for Wednesday evening 10M and 2M phone nets and the Sunday morning 40M OCWN CW net:

<b>KD6BWH</b>	<b>K6LDC</b>
<b>AF6C</b>	<b>KE6LEX</b>
<b>K6CCD</b>	<b>KG6MIF</b>
<b>KS6CW</b>	<b>KG6MIG</b>
<b>KB1GZ</b>	<b>KG6MIH</b>
<b>W6HHC</b>	<b>KG6MPW</b>
<b>W7IB</b>	<b>W6NT</b>
<b>KØIOA</b>	<b>KE6OIO</b>
<b>K3IMW</b>	<b>WA6PFA</b>
<b>WB6IXN</b>	<b>K6RMR</b>
<b>KQ6JD</b>	<b>WA6RND</b>
<b>K3JIL</b>	<b>KB6TWA</b>
<b>WA6JQC</b>	<b>KF6UEB</b>
<b>W6KFW</b>	<b>K6VDP</b>
<b>W7KTS</b>	<b>WA6VKZ</b>
<b>KG6KYJ</b>	

Check WB6IXN's NetNews  
monthly reports on  
[WWW.W6ZE.ORG](http://WWW.W6ZE.ORG)

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**ORANGE COUNTY AMATEUR RADIO CLUB, INC**  
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**TUSTIN, CA 92781-3454**

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