RF

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. XLII NO. 12 P.O. BOX 3454, TUSTIN, CA 92861-3454 DECEMBER 2001

The Prez Sez:

Merry Christmas!

It's already time for our next Christmas Party. We will again meet at Mimi's restaurant, 18461 Brookhurst Ave., Fountain Valley at 6:30 PM on Sunday December 16th, 2001. Are reservations required? Why of course not, it would be fine to just show up at the door. But if you do get a chance to let Cory know how many will be in attendance on your behalf, it would make it simpler for her to coordinate. Catch her on the air or drop her an email. She is listed in ***RF***.

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What ever happened to the past year? Everything seems to have flashed by in one big blur. The year has had a lot of tragedy, but also there is a lot to be thankful for.

I'd like to thank all that have helped to make the Orange County Amateur Radio Club stay in it's excellent condition. Just a few short years ago the club had the weekly nets, monthly ***RF*** by US Mail, and our monthly meeting. Now we have established an excellent presence on the Internet in addition to all of the above. Are you missing a copy of a recent ***RF***? No problem, just go online and download another copy. People have found us on the web and taken the time to look us up. It just goes to show you how much we all work together to keep a good thing great.

So thank you Ken and Bob for the fine web site and the fine job of publishing ***RF***. Thanks to all of the officers that have pitched in this year to help maintain our good standing as a ham radio club.

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Members of the club have helped in a variety of ways in support of Public Service. For many of us it may mean a weekend at a time, and may be repeated several times a year. Other times it is only an early morning event. Then there are the dedicated who spend weeks at disaster sites. Cindy, are you back yet? Others are simply "on call" and ready at the drop of a hat to respond to local disasters. This could be through the Red Cross, Hospital Disaster Group, Ares, Races or ???

See: **The Prez Sez** on page 3

The Annual OCARC

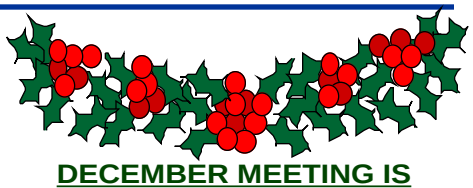
Christmas Dinner

Will be held on **SUNDAY December 16th, 2001**

6:30 PM at Mimi's Café

18461 Brookhurst St., Fountain Valley

See Page 6 for Details



DECEMBER MEETING IS THE CHRISTMAS DINNER

There will be no regular club meeting in December. Instead the Annual Christmas Dinner will be held on Sunday the 16th at 6:30 PM. at Mimi's Café, 18461 Brookhurst St. in Fountain Valley. (At Ellis Av.)

More information, including a map to the restaurant, may be found on page 6 in this issue of ***RF***.

The next regular meeting will be:

Friday, Jan 18th 2002 @ 7:30 PM

We will be meeting in **Room 208** in the **east Red Cross Bldg.**

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Reminder:
January 5th 2002
Next Club Breakfast

THE ORANGE COUNTY AMATEUR RADIO CLUB, INC.
P.O. Box 3454, Tustin, CA 92781

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OCCARO Delegate:
Bob Buss, KD6BWH
(714) 534-2995
kd6bwh@aol.com

Monthly Events:

General Meeting:
Third Friday of the month
at 7:30 PM
American Red Cross
(near Tustin Ave & 4th St)
Santa Ana, CA

Club Breakfast:
First Saturday of the
month at 8:00 AM
IHOP
1001 E. 17th Street
(west of Lincoln)
Santa Ana, CA

Club Nets (Listen for **W6ZE):**
Wednesday Evenings

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

146.55 MHz Simplex FM
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 December & 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.

The 100th Anniversary of Marconi's Historic Trans-Atlantic Radio Transmission

December 11 - 16, 2001

The Marconi Radio Club, W1AA and The Falmouth Amateur Radio Association Amateur Radio operators are making plans to celebrate a Marconi world historical event. December 12, 2001 will mark the 100th anniversary of the first Trans-Atlantic radio transmission by Guglielmo Marconi. That signal was a series of "S S S" transmitted on CW across the Atlantic from Poldhu, Cornwall England to St. John's, Newfoundland.

The Marconi Radio Club will be using the call sign W1AA/CC and will be operating from Cape Cod, Massachusetts, U.S.A. the location of Marconi's 1903 Trans-Atlantic radio station. Marconi's 1903 call sign was " C C "

W1AA/CC Suggested SSB Calling Frequencies:

Band	MHZ	Band	MHz
75 M.....	3.952	40 M....	7.252
20 M.....	14.282	17 M..	18.152
15 M.....	21.352	12 M..	24.952
10 M.....	28.352	6 M..	50.152

W1AA/CC Suggested CW Calling Frequencies:

Band	MHZ	Band	MHz
80 M.....	3.552	40 M....	7.052
30 M.....	10.112	20 M..	14.052
17 M.....	18.082	15 M..	21.052
12 M.....	24.892	10 M..	28.052
6 M.....	50.102		

Frequencies may vary ±10 KHz.

December 12, 1300Z to 2100Z -The 1901 Replica Kite Antenna will be used on 14052 khz on CW to contact St. Johns, Newfoundland and Poldhu, England. W1AA/CC will also answer calls from amateur stations worldwide.

QSL with an SASE via the W1AA Callbook address.

Bob Doherty K1VV
President: Marconi Radio Club W1AA
http://personal.tmlp.com/k1vv/w1aa/
-sk-

Local ARRL News

There is a new 6th District QSL Bureau Manager. Effective December 1st, Steve Frick, N6QEK, will turn the management over to Chuck and Arlette Marshall, KD6WP and KO6IS, in northern California. The new address is:

ARRL 6th District Incoming QSL Bureau
P.O. Box 530
Weed, California 96094-0530

Effective noon Jan 1st Tuck Miller - NZ6T is the new SWD Vice Director and Art Goddard - W6XD, is the new SWD Director. Please welcome them to their new challenging League positions.

Info from Fried - WA6WZO
Retiring ARRL SWD Director

The Prez Sez from Page 1

In order to be a good responder, you have to keep your gear at the ready and your batteries charged. It's always so rewarding when an event is completed & you realize how much ham radio took part in the event's success. Lots of fun for all, and all for a good cause.

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OCCARO Report:
One new item on the agenda is the possibility of having a convention in Orange County. Next year's convention will be hosted by San Diego; 2003 is up for grabs. The Orange County Council of Amateur Radio Organizations (OCCARO) is starting to pole the various clubs to see if we can muster the interest to put on a convention. Riverside Convention information could be passed on to us so that we would not be re-inventing the wheel. At the last OCARC Club meeting the idea of an Orange County convention was well received, so I will be reporting to OCCARO with a "thumb's up". Maybe 2004 will be a perfect year for us to sponsor a convention?

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See you at the Christmas dinner!

73,
Bob - KD6BWH

From the *RF* Editor:

The past year has been a lot of fun (and a lot of work) putting together the club newsletter ***RF***. I'd like to thank all those who contributed to the paper with articles and input, and curse those who ignored my deadlines!

I feel the club newsletter has been brought back to first-rate status after years of indifference by the club. The club can once again be proud of their publication.

Next year Ken - W6HHC will be taking over the editor duties; Ken will continue to produce a first-rate newsletter in 2002. Support him!

The Tech Talk series will continue next year if there is interest among the club members. I am disappointed that I've received so little feedback (positive or negative) on my articles. An email with suggestions, corrections, or comments (good or bad) would be appreciated.

For those interested, the 2001 ***RF*** newsletter issues were assembled on a Macintosh© 6320CD Power-PC© using *AppleWorks* v5.0.3 (Formerly known as *ClarisWorks*.)

73, de Bob AF6C
af6c@arrl.net

For Sale:

Kenwood TR-9000 Two-meter All-Mode Xcvr w/BO-9 System Box. $150.00

Yaesu FT-757GX HF Xcvr $250.00

Yaesu FC-757AT Auto Tuner for FT-757GX $200.00

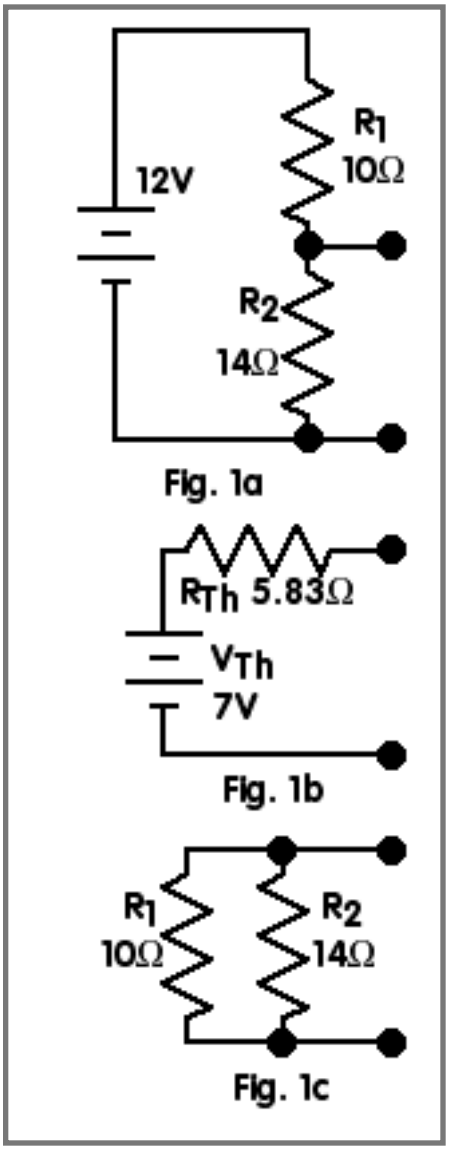
Astron RS-20A DC Power Supply 13.8 VDC @ 20A/16A Int/Cont. $50.00

Heath PS-1175 DC Power Supply 13.8 VDC @ 10A/5A Int/Cont. $35.00

Contact: Allan Avnet AB8AA
(714) 531-6707
ab8aa@arrl.net

Tech Talk
by Bob, AF6C
Ohm's Law (Part II):

Thévenin's Theorem:
Last month the three forms of Ohm's Law were introduced. For simple circuits the law is easy to apply, as we saw in the examples and problems. However, as the last problem emphasized, sometimes a circuit can present a problem that is less intuitive to solve. Two theorems may be used to simplify more complex circuits; this month we're going to look at Thévenin's Theorem. The theorem basically states that: *Any two terminal linear circuit composed of resistors and voltage sources may be replaced by one power source in series with a fixed resistor*. Whoa! What does that really mean?



Let's look at the voltage divider circuit from last month (see Figure 1a). Two output terminals have been added and the meters removed; otherwise it is the same circuit as figure 2 from last month. According the Thévenin's Theorem this circuit may be replaced with the circuit in figure 1b. The Thévenin's equivalent voltage source is the calculated open circuit voltage across the two terminals. The Thévenin's equivalent resistance may be calculated by assuming all the voltage sources are replaced by short circuits and then calculate the resistance between the two terminals.

First let's calculate the Thevenin's equivalent voltage source. Last month we used ohm's law to find the current flowing through the resistors and used it again to find the voltage across R_2 to solve the voltage divider. You can also use the Voltage Divider equation (6) to find the Thévenin's equivalent voltage:

$$V_{Th} = \left(\frac{R_2}{R_1 + R_2} \right) \times V \qquad (6)$$

The numerator in this equation is always the (series) value of the resistor(s) across the output terminals (in this case R_2) and the denominator is the total series resistance of the circuit (R_1 + R_2 in this case). Solving figure 1a we get:

$$V_{Th} = \left(\frac{14}{10 + 14} \right) \times 12 = 7 \text{ volts}$$

To calculate the Thévenin's equivalent resistance redraw the circuit with all voltage sources as shorts and calculate the resistance looking into the terminals. Figure 1c shows the circuit as it should be redrawn. The Thévenin's equivalent resistance is just R_1 and R_2 in parallel or 5.83 ohms. Using equation 5 from last month:

$$R_{Total} = \frac{R_1 \times R_2}{R_1 + R_2} \qquad (5)$$

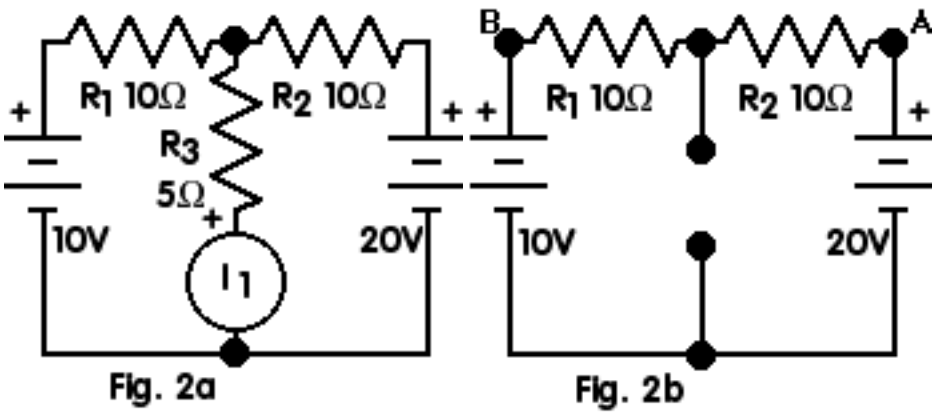
$$R_{Total} = \frac{10 \times 14}{10 + 14} = 5.83\Omega$$

Last Month's Problem Three:
Thévenin's Theorem is a very powerful tool for simplifying circuits. Let's look at problem 3 from last month. The circuit is redrawn as figure 2a. You probably had a lot of trouble solving it. Assuming you didn't get any help from Thévenin and you are a math wiz, you most likely solved it by using simultaneous equations (three equations and three unknowns); it was not an easy task! Since we want to find the current through R_3, let's replace it with two terminals as shown in figure 2b. This is just a series circuit with two batteries and two resistors. Since the voltage at point A is +20V and the voltage at point B is +10V there is 20V minus 10V across the two series resistors R_1 and R_2. The circuit current through these resistors is:

$$I = \frac{E}{R} = \frac{(E_2 - E_1)}{(R_1 + R_2)}$$

$$I = \frac{(20 - 10)}{(10 + 10)} = 0.5 \text{ amps}$$

And the voltage at the upper termi-



nal is the voltage at point A minus the voltage drop across R_2, which is 5 volts:

$$E_{R2} = I \times R = 0.5 \times 10 = 5 \text{ volts}$$

$$E_{Th} = 20 - 5 = 15 \text{ volts}$$

The Thévenin's equivalent resistance is easily determined by redrawing the circuit with the two batteries replaced with a short. It is just the two 10 ohm resistors in parallel or 5 ohms. Figure 3a is the Thévenin's equivalent circuit of figure 2b. Now, to solve problem 3, let's just add R_3, the resistor we removed earlier, across the terminals as shown in figure 3b and solve for the current:

$$I = \frac{E}{R} = \frac{E_{Th}}{(R_{Th} + R_3)}$$

$$I = \frac{15}{5+5} = 1.5 \text{ amps.}$$

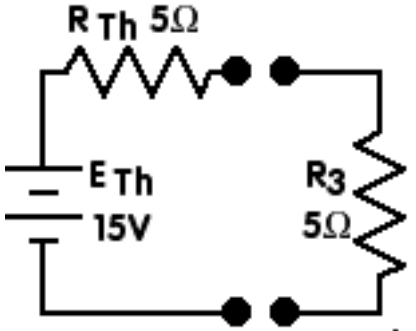


Fig. 3a Fig. 3b

Let's try another one! The Wheatstone bridge circuit, shown in figure 4, is used with strain gages, instrumentation transducers and measurement test equipment. Basically, when the ratio of R_1 to R_2 is equal to the ratio of R_3 to R_4 the bridge is balanced and no current flows through R_5, which is often a sensitive meter or other detector. The values given in figure 4 are for an unbalanced bridge so current is flowing through R_5. Our assignment is to find out what the value of that current is. Those resistors at 45 degree angles have always looked overwhelming, so our first task will be to redraw the circuit as shown in figure 5a. Note that I've broken the circuit into two voltage dividers with their Thévenin terminals, and separated out R_5. I've also shown the battery twice so it appears on both sides of the circuit, which changes nothing as shown by the dotted circuit lines. Looking at the left side voltage divider, the Thévenin's equivalent voltage and resistance are calculated using equation (6) and equation (5) respectively as:

$$E_{Th1} = \left(\frac{15}{10+15}\right) \times 20 = 12 \text{ volts}$$

$$R_{Th1} = \frac{(10 \times 15)}{(10+15)} = 6 \text{ ohms}$$

Looking at the right side voltage divider, the Thévenin's equivalent voltage and resistance are:

$$E_{Th2} = \left(\frac{5}{20+5}\right) \times 20 = 4 \text{ volts}$$

$$R_{Th2} = \frac{(20 \times 5)}{(20+5)} = 4 \text{ ohms}$$

The Wheatstone circuit of figure 4 can now be drawn as figure 5b, and the current through R_5 can be easily calculated:

$$I_{R5} = \frac{E}{R} = \frac{E_{Th1} - E_{Th2}}{R_{Th1} + R_{Th2} + R_5}$$

$$I_{R5} = \frac{12-4}{6+4+6} = 0.5 \text{ amps}$$

This is a good example of how Thévenin's Theorem can simplify an otherwise difficult circuit problem. While we haven't probed too deeply, you should now have a good understanding of Ohm's law and how to use it in basic and even somewhat complex circuits. There is another tool, Norton's Theorem that can also be used to simplify circuits. It is beyond the scope of this month's article but it may get

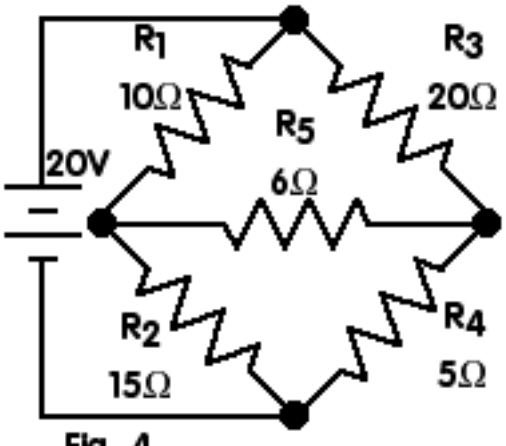


Fig. 4

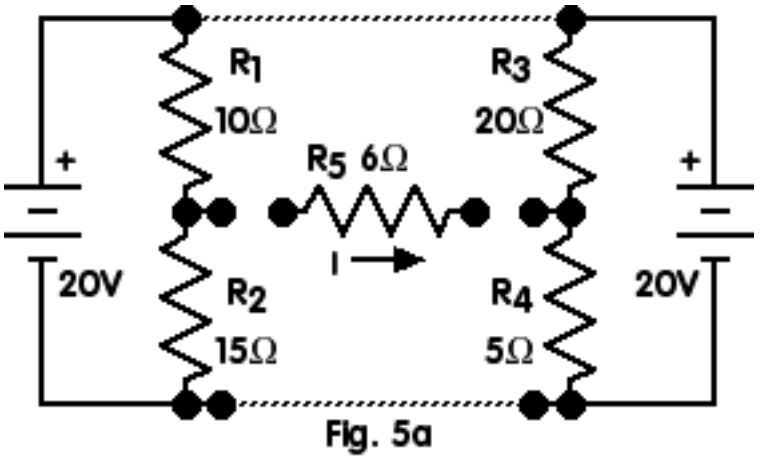


Fig. 5a

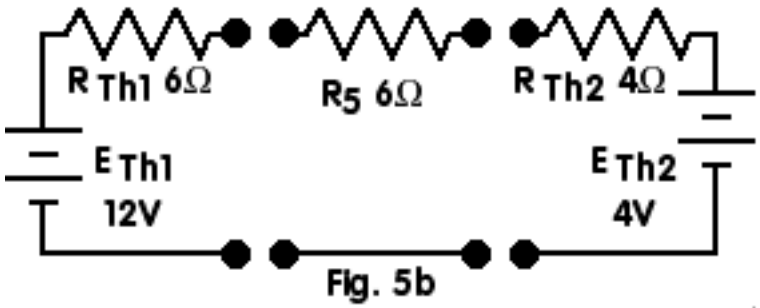


Fig. 5b

Solving the Wheatstone Bridge Circuit

Congratulations to the New 2002 Board Members

President:	**Cory Terando**	**KE6WIU**
Vice President:	**Lowell Burnett**	**KQ6JD**
Secretary:	**Matt McKenzie**	**K6LNX**
Treasurer:	**Al Toering**	**N6TEZ**
Activities:	**Phil Andersen**	**N7PA**
Membership:	**Chris Winter**	**W6KFW**
Publicity:	**Frank Smith**	**WA6VKZ**
Technical:	**Larry Beilin**	**K6VDP**
Member at Large:	**Bob Buss**	**KD6BWH**
Member at Large:	**Larry Hoffman**	**K6LDC**

discussed in a future issue if anyone shows interest (hint)!

Non-Ideal Meters:
Last month we talked about ideal voltmeters (infinite resistance) and ammeters (zero resistance). Unfortunately these are only available in the labs at *Hogwart's School of Witchcraft and Wizardry*. As a "muggle" you must use non-ideal meters. Let's look at ammeters first:

Analog ammeters have a low series resistance that varies with range. A standard 0-1mA meter typically has a series resistance of 50 to 100 ohms. By Ohm's law this amounts to a voltage drop of 50 to 100 mV across the meter. In certain applications this can have a noticeable influence on the circuit being measured. The series resistance does provide one benefit; by adding a resistor in parallel with the meter, the meter can be made to operate at a higher full-scale value. This resistor is called a meter shunt. If you want to have a 0-1 mA meter with a series resistance of 50 ohms read 0-5 mA full-scale, a shunt of 12.5 ohms can be placed across the meter. This is also a simple Ohm's law problem!

Ammeters are normally manufactured in the range of 20 uA full-scale to 5 amps full-scale; very low current ammeters used in labs are called galvanometers. The full-scale range of high current ammeters is often 5 amps and either an internal or external shunt is used. For very large currents the external shunt can be placed in a convenient place and the wires to the meter need only handle the lower current.

Non-Ideal Voltmeters:
If you place a resistor in series with a 0-1 mA ammeter and select the resistor so that the total resistance of the meter and resistor in series is 10,000 ohms you have a voltmeter that will read 10 volts full-scale. Other resistances may be calculated for other full-scale voltage ranges using Ohm's law. For

See: **Ohm's Law** on page 7

November Meeting Minutes:

President Bob Buss - KD6BWH called the meeting to order at 1944 hours with the Pledge to the Flag. The meeting started late because we were locked out of the meeting room until we could find a Custodian to let us in.

April Moell - WA6OPS presented an inspiring program on the "North Pole Network", a well thought out operation that allows hospitalized children (and some older folks too) to talk to Santa Claus via Amateur Radio. April related many examples of children's reactions, sometimes with results that can be classified as miracles! See:

http://member.aol.com/emcom4hosp/npn.html

After the presentation and a break the business portion of the meeting began. All board members were present except Treasurer Ken - W6HHC, and Member-at-Large Bob - KD6XO. A total of 26 members and visitors were present. Secretary Bob - AF6C filled in for the Treasurer.

Treasurer - W6HHC, who was attending a class, provided a current report:

Balance on 01/01/2001:	$1,595.44
Income thru 11/13:	2,919.11
Expenses thru 11/13:	(2,062.16)
Balance on 11/13:	$2,452.39

Dick - W6RNY provided a membership report. Current membership in the OCARC organization is 65[1].

Elections were held for the 2002 year Board of Directors. The membership accepted the slate recommended by the nominating committee with one exception - no recommendation for Activities Chairman was provided. Phil, - N7PA volunteered. The new Board consists of:

President:	Cory Terando	KE6WIU
Vice Pres:	Lowell Burnett	KQ6JD
Secretary:	Matt McKenzie	K6LNX
Treasurer:	Al Toering	N6TEZ
Activities:	Phil Andersen	N7PA
Membership:	Chris Winter	W6KFW
Publicity:	Frank Smith	WA6VKZ
Technical:	Larry Beilin	K6VDP
Members-at-Large:	Bob Buss	KD6BWH
	Larry Hoffman	K6LDC

OCARC is planning to again provide radio support to the Orange, Cypress and Garden Grove Police Departments in next year's Baker-to-Vegas relay race.

Activities Chairman Tom - WA6PFA reported on the special raffle for a $250 gift certificate; tickets are not selling well.

A discussion was held on the time for the 2002 monthly Board meetings. This is set by the new Board, and is tentatively slated to be held directly before each regular meeting in the Red Cross lounge. The breakfast will be held as usual, though we are looking for a new place to hold future breakfasts after December.

Frank Smith - WA6VKZ proposed a club camp-outing be held at the Anza RV Park. Cost is $16 per campsite, which can hold up to four tents. Tentative dates are March 9 and 10, or 22 and 23.

OCCARO (The Orange County Council of Amateur Radio Organizations) is considering holding the 2003 ARRL SWD Convention in Orange County, and Bob - KD6BWH asked for a show of hands to see if the club would be interested in participating. A poll showed that there was high interest. Though no commitment was made, Bob will take our show of interest back to the next OCCARO meeting.

Thanks was given to AF6C for acting as ***RF*** editor throughout the year.

The meeting was adjourned at 2155 hours, followed by the raffle.

[1] The number reported at the meeting was erroneously given as 56. Subsequently Dick corrected it to 65.

Submitted by Bob - AF6C

Wednesday Nets

November Check-ins (Both 10–meter and **2–meter** nets)**:**

AB8AA	**N6APG**	ZL2BLQ
KD6BWH	**AF6C**	K6CCD
NG7D	**W6HHC**	KB1GZ
KQ6JD	**W6KFW**	K3IMW
WB6IXN	**KF6LEX**	KD6NOT
N6TEZ	**KB6TWA**	KE6UCH
K6VDP	**KE6WOX**	

Check WB6IXN's Net News page on:
http://www.w6ze.com

Ohm's Law from page 6

large resistors the small meter resistance can be ignored. The example above has 0.5% error.

This voltmeter draws one milliamp from the circuit being measured. It can have a major influence on a high impedance circuit. Since the voltmeter described above has a 10 volt full-scale range and a 10,000 ohm impedance, it is said to be a 1000 "ohm-per-volt" meter. Common values of 1000, 20,000 and 30,000 "ohms per volt" corresponding to meter movements of 1mA, 50 uA and 33uA. The higher the value the less influence on the circuit. To find the resistance of a voltmeter multiply the "ohms per volt" by the full-scale value of the meter (If it's a multirange meter, use the full scale value of the range you're on.) For an old workhorse Simpson Model 260 Volt-Ohm Meter (20,000 ohms per volt) the meter resistance is 50,000 ohms on the 2.5 volt scale and 20 Meg-ohm on the 1000 volt scale. Vacuum tube and FET voltmeters were developed to allow a higher meter impedance at the lower voltage ranges and thus influence the circuit under test less. Most Heathkit VTVMs have an impedance of 11 Megs on all ranges!

Meters would make an interesting topic for a future Tech Talk; but for the next installment we will continue with Ohm's law and discuss Ohm's power law. Resistive devices dissipate power; this law calculates the power being dissipated in the resistance or load.

Best wishes for a great Holiday Season to your family from AF6C!

-sk-

Dec. Board Meeting Minutes

The December board meeting was held after the Breakfast on Saturday December 1st. Thirteen people, including 6 board members were present. Board members in attendance were: President Bob - KD6BWH, VP Cory - KE6WIU, Secretary Bob - AF6C, Treasurer Ken - W6HHC, Activities Tom - WA6PFA and MAL Larry - K6LDC. There was no correspondence from the Secretary, Bob - AF6C.

Treasurer's Report:
Ken - W6HHC reported the current balance as $2,525.39 with no major expenses outstanding. Ken also reported that the insurance for next year (normally paid in December) has been paid.

The President appointed an audit committee consisting of Bob - AF6C, Tom - WA5PFA and Bud WA6VPP to look over the books. The yearly audit will be held near year's end at the discretion of the audit committee and the Treasurer.

Old Business:
Phil announced that the Tustin Police Department will also be participating in the annual Baker-to-Vegas relay race and would like the club to include them in our communications support effort.

Jane - K8JAA is looking for a volunteer to take over her duties as a coordinator for radio operators to support races put on by Race Pace and Kinanne Race. Jane, who is moving back East with her family, has been coordinating communications for eight to ten races a year; she has a good list of operators to draw from.

The Orange County Amateur Radio Club's annual Christmas dinner will be held on December 16th. Details are in [this] *RF*. Cory will check to confirm our reservation at Mimi's Café F.V. Also, though no formal reservations are necessary, members should check with Cory so she has an approximate head count for the event. We'll order from the menu and separate checks will be issued. An email to Cory - KE6WIU is fine (see page 2).

Larry - L6LDC suggested that the club's web site have a "Hot Site" for late breaking information for club members. This would allow information to get out at the last minute independent of the nets or even after the nets were held. Ken suggested a mass emailing as an alternative.

Bud announced that Ford Electronics would like to advertise in our club paper and on our web site. Normally the club has not accepted advertising. Bud will talk to Ford about an ad in ***RF***. If Ford Electronics has a web site we will link it to our supplier page.

Respectfully submitted - Bob AF6C

Next RF Deadline: JAN 7th

ORANGE COUNTY AMATEUR RADIO CLUB, INC
P.O. BOX 3454
TUSTIN, CA 92781-3454

First Class Mail

Time Dated Material.
Please Expedite!!