# RF

ORANGE COUNTY AMATEUR RADIO CLUB, INC.

VOL. XLII NO. 11 P.O. BOX 3454, TUSTIN, CA 92861-3454 NOVEMBER 2001


## The Prez Sez:

What have you discovered lately in the world of ham radio? Is there something that you would like to bring into the meeting and present to the rest of the club? Most likely there is something that you have taken for granted in your ham world, but lots of us have not yet found the inspiration to create or use this special item or theory. Please help liven up the club meetings by sharing your ideas.

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Another year has come & gone for the Orange County M.S. Bay to Bay bike marathon. It was a pretty mellow year for the communicators. Things went pretty much according to plan, and there were no serious accidents. My heart did skip a beat during one section of narrow roads and heavy traffic. As we approached, one of the riders and a new Mercedes jockeyed for the same turf. The Mercedes turned right to enter a parking spot at the same time that the bike rider was passing the parking spot. Bike rider was bounced off the front bumper but continued on the course.

The weather was beautiful for the riders and the volunteers. It would be nice to see more familiar faces on this event next year. It happens each October. If you are interested, please let me know and I will get you hooked up. 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. Year 2003 is up for grabs. OCCARO (Orange County Council of Amateur Radio Organizations) 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. What say you? Would our club like to say yes to this?

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See you all at the next meeting

73, Bob - KD6BWH

## The November Program:

April Moell - WA6OPS, founder and Emergency Coordinator of the Hospital Disaster Support Communications System (HDSCS), will speak on their yearly community service event:

**"The North Pole Network"**

Visitors and guests are welcome.

Elections for 2002 OCARC Officers will also be held.

Don't miss our next meeting on:

**Friday, Nov 16th @ 7:30 PM**

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

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**Reminder:**
**-December 1st 2001-**
**Next Club Breakfast and Board Meeting**

**The Annual OCARC**

# Christmas Dinner

Will be held on **SUNDAY December 16th, 2001**
**at Mimi's Restaurant**
**18461 Brookhurst Ave., Fountain Valley**
**at 6:30 PM**

Details at: http://www.w6ze.org or in next month's ***RF***

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

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## 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.


**Review:**
**2000 ARRL Periodicals CD**
**American Radio Relay League**
**$19.95 SRP**

Storage space is limited in most Southern California homes. Keeping a large collection of magazines is a luxury that often succumbs to the recycling bin – even the prized issues of ***QST***. A solution is the ***QST* CD-ROM**. All the year 2000's ***QST***, ***NCJ*** and ***QEX*** issues (and more) are on the single CD.

At the recent Riverside ARRL Convention I purchased the **2000 *QST* CD** from AA6EE:

http://www.radiodan.com/aa6ee

who has been distributing ARRL publications for fifteen years. Starting with the **1999 *QST* CD** the ARRL made the wise decision to change over to the *Adobe Acrobat* (.PDF) format instead of the less known *Windows* based program used on previous CDs. This change allows the CD to be used on many other platforms and, since so much has been published in PDF format, these CDs will be more likely to be readable on the machines of the future.

I viewed the CD on a *Power Macintosh*, and a *Windows* PC. Both machines already had *Adobe Acrobat Reader* installed, though copies are included on the CD. Reading text from the screen was good, though sometimes selecting a little magnification (125%) helped. Printing an article to a laser printer resulted in quality as good as the paper issue. The full contents of each issue is there, including ads and color. A fast computer helps speed scrolling of pages; but even an older 75 MHz *Pentium* performed adequately.

Besides the twelve issues of ***QST***, the six issues each of *National Contest Journal* (***NCJ***) and ***QEX*** are also included, as well as a PDF based index and search program. Supporting files, that you would normally have to obtain from the ARRL by mail or downloading off their web page, are also on the CD (including software listings, object code and printed circuit board layouts.) Extended equipment reviews are also included – information that was too long to be published in ***QST***.

Minimum computer requirements are reasonable; the ***QST*-CD** can be run on many older machines. CD Requirements are: *(Minimum RAM / Recommended RAM)

° A 486 or later PC with a CD-ROM or a *Power Mac.*

° *Windows* 95, 98, (8 MB/16 MB*) NT, 2000 or ME (16 MB/24 MB*), *MacOS* 7.1.2 or later (4.5 MB/6.5 MB*)

° *Adobe Acrobat Reader* 4 (included) and enough hard drive space to install it (around 8 MB). Many computers probably already have *Acrobat Reader* installed.

° An additional 1 MB of disk space for *Windows* machines.

I'm still exploring the **2000 *QST* CD**. The **1999 QST CD** wasn't available at the convention (that I could find) but I plan to add it to my collection soon. My hope is that the older QST CDs will become available in multiplatform PDF in the future.

de AF6C

**November Board Meeting Minutes**

Due to a conflict with the Not-So-DXpedition event on November 3rd and 4th, no breakfast board meeting was held this month.

de AF6C

## NotSoDXpediton Goes to El Mirage Dry Lake

by: Ken - W6HHC

Chief NotSoDX organizer, Larry K6LDC planned another great low-key outing for the OCARC. It was held on Nov 2-4 at El Mirage Dry Lake, near Adelante...12 miles West of highway 395. Here is a run down of the five operators who attended: Larry - K6LDC operated out of his new "battleship motorhome" using a vertical antenna and operated from 40M-thru-10M. Art - KE6WOX operated a small 15M MFJ QRP rig using a "wire-shortened" 15M 1/2 wave vertical and solar power panel from his "open air table top". Charmaine Smith - KF6YOL operated from her "cruiser motorhome" using a vertical antenna and got her first taste of DX with Italy, Bosnia, Polynesia, and more. Tom - WA6PFA operated his ICOM from the tailgate of his pickup truck and used a 10M rotatable dipole (it turns out that 10M was the hottest band on the weekend). Ken - W6HHC operated with a YAESU using a 15M dipole from his "open air table top". The club generator worked flawlessly!

The weather was very reasonable... a little breezy... some sprinkles on Sunday morning... but no scorching temperatures... the desert sunset was outstanding. The radio bands were in very active shape (winter conditions) and everyone got enough contacts to make the event worthwhile. As usual, Larry executed some terrific campfires in the evenings. If you have never attended one of these relaxing outings... plan to attend the next NotSoDX event (next spring?)

NSDXP Campfire-pix – more on website

## Tech Talk

by Bob, AF6C

**Ohm's Law(Part I):**

Ohm's law is a simple equation that solves the relationship between voltage, current and resistance in a simple electrical circuit. An understanding of the law is necessary to dabble in even the simplest aspects of design and troubleshooting of electrical and electronic circuits. Radio Amateurs should have a solid understanding of Ohm's law if they plan to do anything other than be a total appliance operator. In the 1950's and 1960's the amateur exams, including the Novice exam, had at least one question on Ohm's law, and you were expected to solve the problem(s) on a sheet of paper that was turned in with the exam. Today, all that's needed is to memorize the answers; the values in the problems never change from the question pool to the actual test! That's great to pass the test, but don't you really want to know more? Whether you're learning Ohm's law for the first time or are just a little rusty and want to review it, feel free to join us on this adventure.

Ohm's Law says: *The voltage across a resistance is equal to the current flowing through that resistance multiplied by the value of the resistance itself.* In equation form it is:

$$E = I \times R \qquad (1)$$

where E is the voltage in volts; I is the current in Amperes and R is the resistance in ohms. (See the sidebar "Why 'E', Why 'I'"?)

By rearranging the equation two other variations are possible. The first is:

$$I = \frac{E}{R} \qquad (2)$$

This variation allows solving for the current when the voltage and resistance are known. In words, equation (2) says: *The current flowing through a resistance is equal to the voltage across the resistance divided by the value of that resistance.* By dividing both sides of equation (1) by 'I', we get yet another variation of the equation:

$$R = \frac{E}{I} \qquad (3)$$

This variation allows solving for the resistance when the voltage and current are known. In words, equation (3) says: *The value of resistance that allows a given current to flow through it when a given voltage is applied across it is equal to the voltage across the resistance divided by the current flowing through it.*

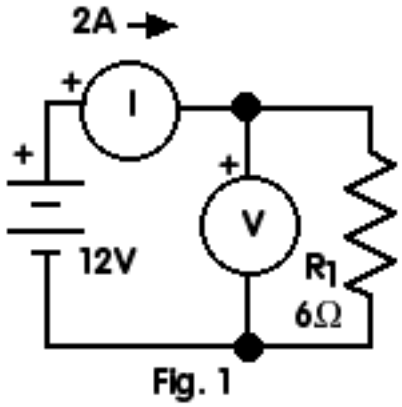
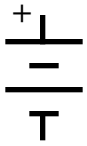


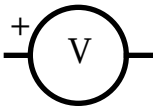
Fig. 1

Let's solve a few problems; but first maybe it would be wise to review a few schematic symbols and a simple circuit such as the circuit of figure 1. The schematic symbol:

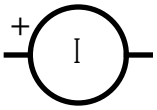



on the left is the symbol for a battery. The longer bar is always the positive terminal (we'll include the plus sign anyway.) The battery voltage is commonly printed next to the battery. It is an ideal battery, that has no internal resistance, will never go dead and can supply infinite current! (I'm told these ideal components are available only at the Radio Shack in ***Diagon Alley***). The voltage of the battery is the electromotive force that the battery exerts to push current through the circuit. Some people relate it to pressure from a water pump. When the battery is not connected to a circuit, the force is present but there is no flow of current. The symbol:

on the right is the symbol for resistance. The resistance could be a resistor, or something more useful, such as a lamp or DC motor. Resistance impedes the flow of electricity. It can be related to a narrow opening in a pipe that reduces the flow of water. The size of the opening is analogous to the resistance. The smaller the opening is, the higher the resistance. The symbol:




is a symbol for a voltmeter; it measures the voltage across the two points where it is connected. The plus sign signifies the meter polarity. It will read positive when this terminal is more positive than the other terminal. Consider our voltmeter ideal; that is, it has infinite resistance and no influence on the circuit to which it is connected. In real life this isn't the case.




is a symbol for an ammeter; it measures the current flowing through the circuit at the point where it is connected. The plus sign signifies the meter polarity (see sidebar on the direction of current flow). Consider our ammeter ideal; that is, it has zero resistance and no influence on the circuit to which it is connected. Again, in real life this isn't the case.

Let's look at figure 1. If the ammeter reads two amps and the resistor value is six ohms, what does the voltmeter read? We want to solve for 'E', the voltage across the resistor. Look at equations 1 through 3; equation (1) solves for voltage across a resistance. Since the voltage across the resistor equals the current through the resistor times the resistance, we get:

$$E = I \times R; \quad E = 2 \times 6; \quad E = 12V$$

This is what we'd expect since the battery is 12 volts and the meters are ideal and don't influence the circuit. (Remember: Voltmeters appear as open circuits and ammeters appear as short circuits!)

Looking at figure 1 again; let's pretend we don't know what the ammeter is reading and solve for I, the current. This time we'll use equation (2) that solves for the current flowing through a resistance when the resistance and voltage across the resistance are known. Since the current through the resistor equals to the voltage across the resistor divided by the resistance, we get:

$$I = \frac{E}{R}; \qquad I = \frac{12}{6}; \qquad I = 2\,\text{A}$$

Looking at figure 1 one more time, lets say we want to solve for the value of R, the resistance. We know the readings on the voltmeter and ammeter. Equation (3) solves for the resistance when we know the current flowing through the resistance and the voltage across the resistor. Since the resistance that allows a given current to flow through it equals the voltage across the resistor divided by the current flowing through the resistor, we get:

$$R = \frac{E}{I}; \quad R = \frac{12}{2}; \quad R = 6\Omega$$

Figure 2 is a little more difficult. We want to calculate what the voltmeter and ammeter read. To do this we need to know what happens when resistors are connected in series; you can review this in the ARRL Handbook. Simply, resistors that are in series may be replaced by one resistor whose resistance is the sum of the series resistors.

Thus, $R_1$ and $R_2$ may be replaced by a single resistor whose value is the sum of the two resistors. Since $R_1$ and $R_2$ may be replaced with one 24 ohm resistor, the circuit simplifies to that shown in figure one with R = 24 ohms. From equation (2) the current can be calculated:

$$I = \frac{E}{R}; \qquad I = \frac{12}{24}; \qquad I = 0.5A$$

Now that the current flowing through $R_1$ and $R_2$ is known, equation (1) can be used to find the voltage across $R_2$. Read the description of equation (1) carefully. The current flowing through $R_2$ is known, and the value of $R_2$ is known. Using equation (1):

$$E = I \times R; \quad E = 0.5 \times 14; \quad E = 7V$$

The circuit in figure 2 is often called a voltage divider circuit. It is very common and we'll be discussing it in more detail later in this series.

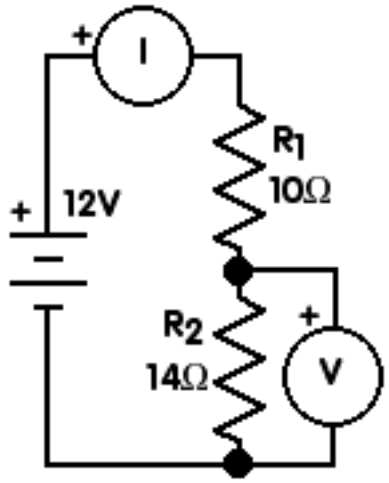


Fig. 2

Figure 3 is a bit more difficult than figure 2. The problem is to find the current flowing in the two ammeters. To solve this problem, knowledge of calculating resistors in parallel is required. This is more difficult than resistors is series. Review the section on resistors in parallel in the ARRL Handbook if you need a refresher. When only two resistors are in parallel equation (5) may be used. This is derived from the more general equation (4) that is good for any number of resistors.

$$R_{Total} = \frac{1}{\left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots + \frac{1}{R_n}\right)} \quad (4)$$

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

Where n is the number of resistors in parallel.

Equation (5) might need some clarification for those who are unfamiliar with this type of notation. First take the reciprocal of each resistor (Divide the resistance into one - The reciprocal of 4 is 1/4 or 0.25). Next add up the reciprocals of all the resistances and take the reciprocal of that sum to get the total resistance. For example, what is the total resistance of a 1-ohm, 2-ohm, 4-ohm, 8-ohm and 10-ohm resistor, all in parallel. The reciprocals of these resistors, in order, are: 1.0, 0.50, 0.25, 0.125 and 0.10. The sum of these reciprocals is 1.975. Taking the reciprocal or 1.975 yields 0.506 ohms. One simple check is that the resistance will always be smaller than the value of the smallest parallel resistor.

**Why 'E', Why 'I'?**

You may ask why these letters were chosen to symbolize the component they do in Ohm's Law. Using 'R' to represent resistance is straight forward, but why not 'V' for voltage and 'C' or 'A' (Amperes) for current? Actually 'V' is occasionally used instead of 'E', which represents Electromotive Force, a more descriptive term for voltage. The use of 'I' to represent current is less easy to explain; 'I' was chosen because other, more appropriate characters were already in use. 'I' (and 'i' in AC circuits) has since become the universal symbol for current.

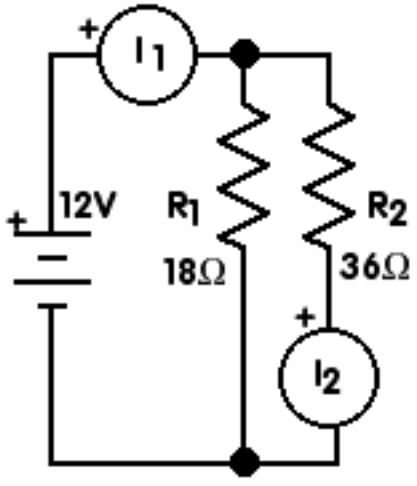


Fig. 3

Looking again at figure 3, the total resistance of $R_1$ and $R_2$ in parallel,

from (5), is:

$$R = \frac{18 \times 36}{18 + 36} = \frac{648}{54} = 12\Omega$$

Since the parallel resistors can be replaced with one 12-ohm resistor, $I_1$ can be solved using equation (2)

$$I_1 = \frac{E}{R} = \frac{12}{12} = 1.0 \text{ amps}$$

Solving for $I_2$ is even easier. $R_1$ is not involved in the solution. The voltage across the resistor and the resistance is already known. Again, using equation (2):

$$I_2 = \frac{E}{R} = \frac{12}{36} = 0.333 \text{ amps}$$

Following are some problems. They are a bit more complex, but should not be too difficult to solve using the processes and equations above. Some clues have been included to get you started. Have fun; the answers are given elsewhere in this issue of RF.

Next month, we will review these problems and then introduce you to Thévenin's Theorem. This theorem simplifies common linear circuits. You'll probably have some trouble solving the last problem. It will be a lot easier to solve after Thévenin's Theorem is introduced next month. For now, study problem #3 and see if you can find a solution.

**–SK–**

**The Direction of Current Flow**

Electrical current is the amount of electrons that flow past a given point in a circuit in one second. That number is large, 6,250 million - billion electrons! But electrons flow from the negative terminal of a battery to the positive terminal. They also flow from the cathode of a vacuum tube to the plate. Why is current flow commonly shown in the other direction?

The misconception of current flow from positive to negative came from the early days of electricity and has stuck with us to the present. Current flow has come to be defined as opposite to electron flow. This works, except when studying the physics of vacuum tubes and semiconductors where electron flow is used. We'll keep with convention and use positive-to-negative current flow.

**Here are three problems:**
Try them and see how you do:

**Problem #1:** Find $I_1$, $I_2$ and V.

**Problem #2:** Find $I_2$.

**Problem #3:** Find $I_2$.

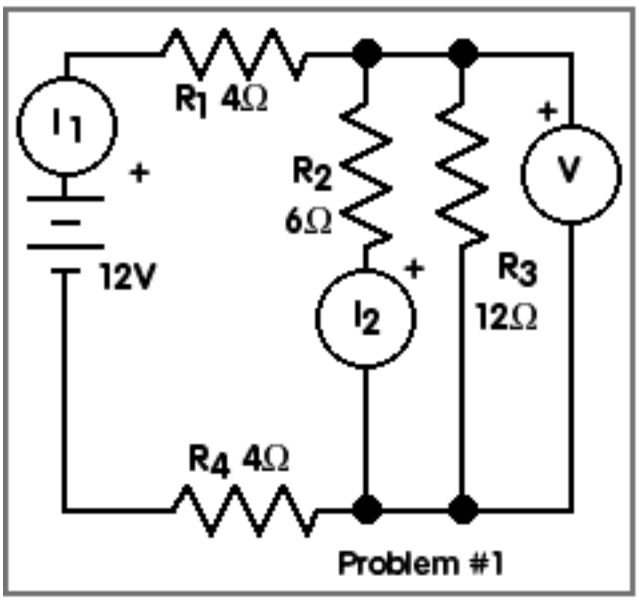
**Hints for Problem #1:**

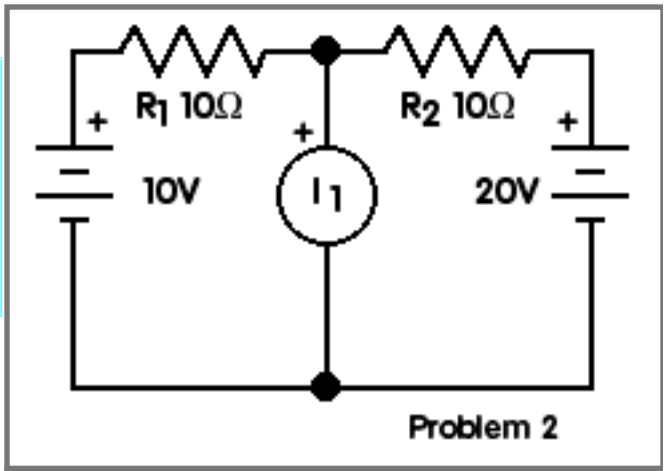
- First calculate resistance $R_2 \parallel R_3$ (That's $R_2$ in parallel with $R_3$ ).
- Then calculate the series resistance of $R_1$, $R_4$ and $R_2 \parallel R_3$.
- Now $I_1$ may be calculated.
- Now V, the voltage across $R_2 \parallel R_3$ may be calculated.
- Finally $I_2$ may be calculated because V and $R_2$ are known.

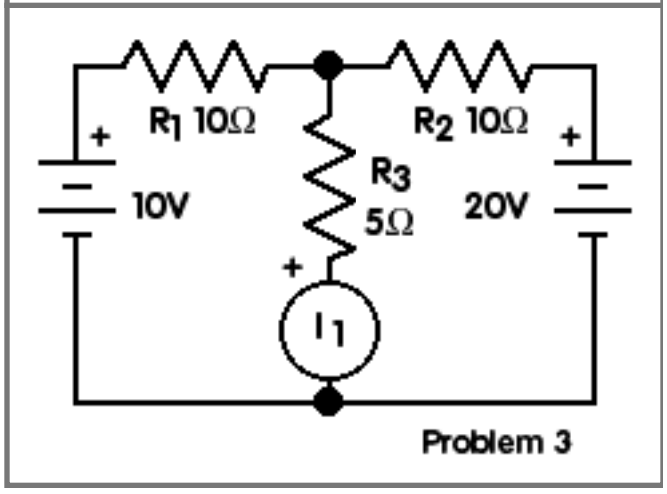
**Hints for Problem #2:**
Don't let the second battery scare you. Remember the definition of the perfect ammeter.

**Hints for Problem #3:**
Only one resistor has been added. Now the problem becomes more difficult. See if you can solve it. Next month Thévenin will help us find $I_1$!

**Answers:**
#1a) $I_1$ = 1 amp
#1b) $I_2$ = 0.667 amps
#1c) V = 4 volts
#2) $I_1$ = 3 amps
#3) $I_1$ = 1.5 amps



# ARRL News Page

### ARRL Members Needed to Help with CC&R Effort

September 17, 2001 -- Have you ever been denied the ability to put up an antenna, or to operate a radio transmitter, or had any other restriction on your Amateur Radio activities because you live in a housing development or condominium complex governed by private land use regulations? (These are often referred to by lawyers and real estate professionals as CC&Rs.) As a result of requests from members, the ARRL Board of Directors, at its July meeting, adopted a goal of trying for legislative action that helps overcome the unreasonable restrictions of CC&Rs that prohibit or restrict Amateur Radio antennas.

Like any other telecommunications issue, this one, upon closer inspection turns out to quite entangled with many issues affecting a wide range of commercial telecommunications services. These include wire-line telephone, cellular and PCS phones, and over-the-air-receiving-devices, all seasoned by the politically hot-pepper issue of private property rights, and, of course, a great deal of confusion on Capitol Hill over the whole thing.

In order to build awareness in Congress that CC&Rs really have become a problem for many in the Amateur Radio community, and to backstop our efforts to meet with elected representatives and their staff on Capitol Hill, letters from ARRL members to their representatives have become increasingly important. In the meantime, we continue to prowl the halls of Congress in search of supporters!

If you are affected by a CC&R, or know someone in your Congressional district who is, and you want to help out, please adapt our sample letter to your own situation and consider sending it to your member of Congress. By the time you read this, there will be a sample of the letter on ARRLWeb to save you some time. If you decide to write to your member of Congress, it would help ARRL's Office of Legislative Affairs to receive a copy of the letter you send. To find your Senator's mailing address check the following URL:

http://www.senate.gov/contacting/index.cfm

To find your Representative's, check this URL:

http://www.house.gov/writerep/

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### Amateur Radio Spectrum Protection Act of 2001 Introduced in Senate

NEWINGTON, CT, March 21, 2001--The Senate version of the Amateur Radio Spectrum Protection Act of 2001, introduced earlier this month in the House, now is officially S.549. Republican Sen Michael Crapo of Idaho introduced the bill in the upper chamber March 15.

Democratic Sen Daniel Akaka of Hawaii was a cosponsor. "I am pleased to be joined today in this bipartisan effort," Crapo said. The bill has been referred to the Senate Commerce, Science, and Transportation Committee.

S.549 is identical in its wording to H.R.817, which was introduced in the House of Representatives March 1 by Rep Michael Bilirakis of Florida. If approved by both chambers and signed by Pres George W. Bush, the Spectrum Protection Act would require the FCC to provide equivalent replacement spectrum should it ever reallocate primary Amateur Radio spectrum to another service. The same requirement would apply if the FCC acted to diminish any secondary amateur allocations or to make additional allocations in ham bands that diminish their utility.

Bilirakis and Crapo introduced the Spectrum Protection Act in a past session of Congress at the request of the ARRL. The League's Legislative and Public Affairs Manager Steve Mansfield, N1MZA, says he's encouraged by the fact that the Spectrum Protection bill is getting a head start with early introduction in both chambers this time around.

In introducing the Senate measure again this year, Crapo and Akaka referred to the importance of Amateur Radio in providing communication in times of disaster. In remarks published in the Congressional Record, Crapo noted that in his home state of Idaho, trained Amateur Radio volunteers have helped to rescue stranded hikers, organized a cleanup effort after the Payette River flood, and helped the Forest Service communicate during major forest fires.

In a similar statement in the Congressional Record, Akaka said Amateur Radio operators were the sole source of information in the immediate aftermath of Hurricane Iniki, which hit Kauai in 1992. Akaka also suggested that FCC spectrum auctions could negatively affect Amateur Radio allocations.

"Mr. President, Senator Crapo and I are here today because the Balanced Budget Act of 1997 requires the FCC to conduct spectrum auctions as a means to increase revenue," he said. "While these auctions may not immediately take away from the Amateur Radio Service, there is nothing to prevent the FCC from selling off portions of the spectrum currently utilized by Amateur Radio operators."

The prefatory "findings" section of the bill states that the FCC has taken actions that "have resulted in the loss of at least 107 MHz of spectrum to radio amateurs."

More information on the Spectrum Protection Act, including a copy of the House and Senate versions of the bill, is available on the ARRL Web site.

## Wednesday Nets

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

| | | |
|---|---|---|
| **ZL2BLQ** | **KD6BWH** | **AF6C** |
| **K6CCD** | **W1CY** | **NG7D** |
| **W6HHC** | **K3IMW** | **WB6IXN** |
| **KQ6JD** | **W6KFW** | **K6LDC** |
| **KF6LEX** | **WA6NOL** | **KD6NOT** |
| **WA6OGO** | **W6RWY** | **N6TEZ** |
| **KB6TWA** | **KE6UCH** | **KF6UEB** |
| **K6VDP** | **KE6WOX** | |

**Halloween Night** (Nov 1st UTC) check-ins are included.

Be sure to checkout the Net News page on our web site.


## 2001 Auction Report

The annual club auction was held in lieu of the October general meeting on October 19th. Veteran Auctioneers Chris - KJ6ZH and Bob - AF6C were unable to attend the auction, so volunteer Auctioneers, Larry - K6VDP and Larry - K6LDC filled in. Ken - W6HHC, the Treasurer, was unable to attend due to class, so our President, Bob Buss - KD6BWH filled in admirably at the record-keeping table.

Some general attendee comments:

• While attendance was good, (26 registered buyers) the quantity of items to bid on was more limited than in past years. {A total of 25 items sold.]

* Early-on, bids for items were closed too quickly; people weren't given enough time to think about increasing the bid.

* There was plenty of space and the facilities were very good.

After reviewing the records, Ken - W6HHC, the Treasurer, reports:

| | |
|---|---|
| Total sales: $ | 225.00 |
| Gross club profit: | $42.00 |
| Club expenses: | $32.00 |
| Net profit: | $10.00 |

Plans will soon be underway to improve next year's auction.

## October Meeting Minutes:

No regular October meeting was held so that the club could sponsor its annual Radio and Electronics Auction.

Submitted by Bob - AF6C

**Next RF Deadline: Dec 2nd**

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

***First Class Mail***

***Time Dated Material.***
***Please Expedite!!***

Happy Thanksgiving