

The PROPAGATOR

October, 2003

The Monthly Newsletter of South Orange Amateur Radio Association

N6NHP on Digital Radio

If you attended the April meeting, you will recall the entertaining and informative presentation on Radio Astronomy by John Hoot, N6NHP. This month John, who is a SOARA member, will be back with a program on "Digital Radio - From Morse to MPEG."

The program will start with a short video on Claude Shannon and his invention of information theory and then John explains in layman's terms how it has affected radio communications.

EchoLink Notes

When the 445.660 machine is being used solely as a local repeater, it will time out and cease operations after 3 minutes of continuous operation. The timer is reset after the repeater detects absence of carrier on its receiver. This is usually accompanied with a courtesy tone, but as you are probably aware, I have suppressed the courtesy tone as part of the EchoLink integration. If the timers are not cleared, one user's transmission time gets added to the next until the total equals 2 3/4 to 3 minutes and then the system shuts down.

During the past month we have noted several instances of the repeater and/or the link being timed out. To avoid this problem, allow our local repeater's carrier to fully drop and then wait an additional 1 1/2 seconds before keying up for a transmission. This should allow all of our local timers, and probably the remote timers, to clear between transmissions.

Howard G. Brown (KG6GI)
Repeater Director

New Members

A hearty welcome to SOARA's newest members:

Anne Frye-Fryman	KG6QWX
Everett Baggs	W6EQM
Larry Bass	WB6MEV
Robert Evans	KG6SPI

Membership Drive



Our club continues to grow despite the trends we have seen in other clubs who have experienced significant declining membership. What seems to make our club different is the involvement of our many members. As such, you play a vital role in keeping our club active and vibrant.

Recently the Board approved a unique idea for a membership drive contest to increase membership. This contest will give those of you who recruit one or more new members the potential to win a sizable cash prize that you can put toward your favorite hobby.

Here is how the SOARA Membership contest will work:

Contest Period - October, 2003-January, 2004 (Four Months)

Eligibility - Each member who recruits a new member to the club will be eligible for a drawing. You will receive one chance for each new member recruited. (Board and Membership Committee are not eligible.)

Prize Fund - For each new paid member recruited, \$25 will be put into a prize fund to be drawn at the February meeting.

Example - If 25 members are recruited during the four month period, the fund will be worth \$625 and one name will be drawn — a nice amount to go shopping at HRO. If we have more, the fund will be worth more and if less . . . less.

Go recruit a friend or acquaintance to join our club. Help us be the best club in South Orange County. Remember to have them put your name on the application so we know to whom to give credit.

Jim Riedel, K6EEE
Membership Committee

EchoLink Continued . . .

Worked any DX recently? How about Monaco, Serbia, Israel, Japan, China, Germany, Spain, England, Ireland, Italy, Switzerland, Greece, Hungary, Hawaii, New Zealand, Brazil, Poland, Iceland, Denmark, Belgium, Finland, Holland and India? No, that's not a list from some big gun's logbook. It's just a sample of locations that were heard on our Laguna Beach 445.660 repeater during its first six weeks of operation on EchoLink. During that time there were nearly 700 connects to the system from 339 different stations around the world.

Some of the connections have been from SOARA members traveling on business trips - e.g. Malcolm, KO6SY, connected in from his hotel room in Bombay India. Other connects are from folks who used to live in southern California and just want to talk with someone back home.

I've used it to connect to the repeater in Hastings, England so that I can keep in touch with friends back home. Some members have had fun using random connects - the feature that is like a 'box of chocolates' - you never know what you're going to get. ☺

The system has been working well with no major problems. There are, however, a few things that we need to remember when using it. You can find a list of these operating tips on the new EchoLink page at the SOARA web site, but here are a few of the more important ones.

- ☞ Don't forget to ID before using the system.
- ☞ Listen, before and after you connect, to check if there is a QSO in progress.
- ☞ When connected to a remote repeater that has a similar configuration to ours (link radio), the repeaters can get into a mode where the courtesy beeps of the two repeaters play ping-pong with each other. If this happens the system is still usable; just start transmitting as soon as our repeater drops and you should be heard both locally and at the other end.

Richard, K6RBS / GOERY



**The Way I See It:
Understanding Radio Theory Without Math.**

If you have been following the past columns on the Smith Chart, there are a couple of questions that may have occurred to you. (Perhaps several questions, but I want to address two in particular.) First, we treated the antenna transmission line in terms of the complex impedance at the station end. How does this treatment relate to the more common picture of power from the transmitter flowing to the antenna and the reflected power flowing back toward the transmitter? This is the more familiar view when we use our SWR meters as we adjust the antenna tuner.

The second question that may have bothered you has to do with the shape of the Smith Chart. Last month's column explained the distortion we imposed on the horizontal axis, but there was no justification given for making the chart circular. In other words, why was the vertical axis distorted (transformed is a more mathematical term) to make a circle? Why not an oval, or any other shape? What benefit arises from the chosen shape? (Maybe that didn't bother you — circles are nice!)

Let's explore our first question above. When we say a transmission line has a characteristic impedance of 50Ω what we mean is that any power flow along that line will have a voltage to current ratio of 50 [volts per ampere or the equivalent: ohms]. To say that power is flowing toward the antenna end indicates that the current (associated with that power) is moving toward the antenna when the voltage is positive. Power moving in the other direction has current moving toward the transmitter when the voltage is positive.

Put another way, if we call currents moving toward the antenna "positive", then power in the direction of the antenna has the current positive when the voltage is positive. We can say that the voltage and current are in phase. Power moving in the other direction has the voltage and current out of phase.

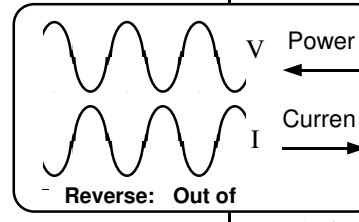
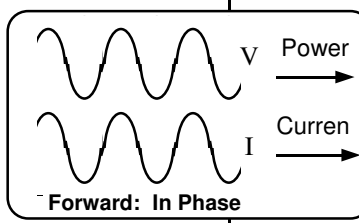
For the general case we will have voltage from both forward and reflected waves as well as current from both. Let us be very clear what this means. When we make a measurement at a particular time and place, we get only one voltage and one current. What we mean by talking about the two components is that if only one power source is active, then we would have the indicated voltage and current. If only the other power was active, then we would have its corresponding voltage and current.

The result of both power flows is the presence of the sum of the voltages and the sum of the currents. Now this is true only for linear circuits, and we want most of our circuits to be very linear. If our measurements are of only the sum of the voltage, how can our SWR meter determine the forward and the reverse powers? Remember that for the forward power the voltage and current are in phase and for the reverse power they are out of phase. To get an indication of the forward current we obtain a sample of the total voltage ($V_{\text{forward}} + V_{\text{reverse}}$) and a sample of the total current ($I_{\text{forward}} - I_{\text{reverse}}$).

Note that the reverse current is negative because it is out of phase with its corresponding voltage!

Convert the current to a voltage by passing it through a resistor. If the small samples were the same fraction, say 1%, of the voltage and current, then the resistor we choose is 50Ω. Thus, the voltage developed by the current sample is equal to the voltage sample. We need only add the voltage sample ($V_F + V_R$) to the voltage from the current sample ($V_F - V_R$) to obtain $2V_F + 0V_R$. Use a diode to detect this RF voltage and drive a meter (with properly marked scale), and we have a forward power meter.

To get a reading of power in the reverse direction we merely use a similar circuit arrangement to subtract the voltage derived from the current measurement. In this case we get a resulting voltage which is equal to

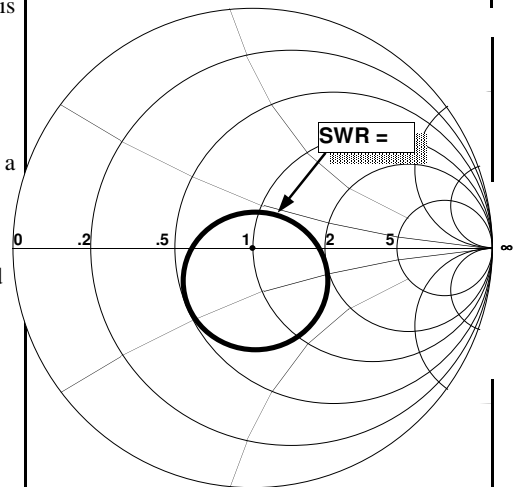
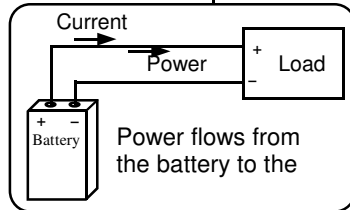
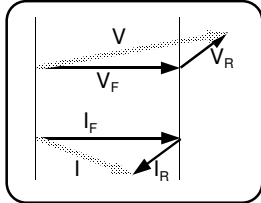


$2V_R$. If we want a linear meter reading, we have to correct for the nonlinearities of the rectifying diode used and to square the voltage so that our signal is proportional to the power.

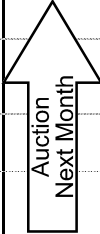

Note that nothing has been said about the relative phases between the voltages associated with the two power flows. Of course, it varies with the position along the feedline, but we could ignore it in the above development (because I knew that one signal would be canceled).

If we look at the impedance of the total voltage to the total current), then we will have to be aware of the phase differences. Because the current and voltage are out of phase for the return power, the total voltage and total current will show a phase difference. So the total voltage divided by the total current will be complex (i.e. will have a reactive component) and will not equal the characteristic impedance of the line.

We took a long trip to get that result, but I hope you got some insight into how that nifty SWR meter on your rig or antenna tuner performs its magic.



Now a quick answer to question 2: The vertical scale is chosen so that points of constant SWR are circles! The circle representing an SWR of 2:1 is indicated in the diagram above. There will be more. □

Year 2003	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
General Meeting 7:00 PM	27	24	17	21	19	16	21	18	15	20	17 Auction	No meeting
Program	W6XD	WD6DIH	W6PJ	N6NHP	Spring Auction	Field Day		Echo- Link	Echo- Link	Digital Radio	Fall Auction	
VEC Testing 5:30 PM	27	24	17	21	19	16	21	18	15	20	17	—
Propagator Deadline	21	17	10	14	12	9	14	11	8	13		
Board Meeting	2/3	3/3	24	28	26	23	28	25	22	27		
ARRL Field Day						28/29						
SOARA picnic								2				
Fall Auction											17	
SOARA Holiday Party												

Mark your calendar

ON THE AIR

Operating Tips by
John Walker, AC7GK

Let me take a break from voice production techniques to talk about one of the aesthetic aspects of our radio lives. I write this in my motorhome midway through the MS 150 bicycle tour from Huntington Beach to San Diego. We are providing health and welfare support over the radio for approximately 1400 cyclists, and since my role is small, I can talk freely about the joys of such service and the great value our hobby is to us and to others.

Every rider I have seen is cheerful, eager, dedicated and in good spirits. They are all riding to raise money to fight a serious disease and so have an aesthetic pleasure from doing that in addition to the joys of riding. I even hear them singing as they go along! They enjoy each other's company during and after the ride, their families are often there to cheer them on, and they themselves raise the spirits of onlookers with their bright colors and enthusiastic natures. They know that we radio people are here just to be of service to them, using our own equipment and training as they are using theirs. We are concerned about their health, safety and riding pleasure, and we have been busy already helping in equipment

malfunctions, physical problems and occasional accidents. We are the eyes and ears of the route and the rest stops, aiding in moving people and supplies to where they are needed. We are a solid resource on which many people depend. And we do this anonymously since few of the riders know who we are.

And yet, we know that we are just part of the bigger picture. The riders have already been active getting pledges and donations (and are raising well over a million dollars with just this one event!). Medical people, rest stop volunteers, sag wagon drivers, planners and facilitators, dedicated sponsors providing food and other necessities, and many other people have been giving unselfishly of their time and talents in the cause. Those who donate the actual moneys that are raised do it completely anonymously. All of these efforts create a little world in itself of service and caring that gives just a glimpse of what life would be like if everyone concentrated on such positive and humanistic endeavors all of the time. And radio people get to be in this world as often as we give of our service. Isn't radio grand? It has been a beautiful day. 73. □

Contest Fun

Seven fellow members of the South Orange Amateur Radio Association (SOARA) joined me at my desert QTH for the California QSO Party. It was a learning experience for most of the operators who have not done a large amount of contesting. We had a great time with everyone getting to operate under some excellent band conditions with good openings to Europe. My 765proII died when the AL-1200 arced, and we moved to a IC756 and my SB200 which I hadn't fired up in 2-3 years.

See pictures of the operation, QTH, and some cool time-lapse nighttime shots at <http://www.pncs.com/soara/CQP2003/> and the SOARA write-up at: <http://www.soara.org/newsroom.htm>

Dana, K6NR □

Upgrade Class



For anyone looking to upgrade, SOARA has a **General Class** license preparation course starting October 30th. The course meets on Thursdays from 7:00 to 9:00 PM and run through December 11th. The cost is \$35, which includes the ARRL study guide and testing fees. Please register with Chad Edwards at classes@soara.org □

The PROPAGATOR

South Orange Amateur Radio Association
P.O. Box 2545
Mission Viejo, CA 92690



Are your dues paid?

Meeting: October 20, 2003 at 7:00 PM
John Hoot, N6NHP "Digital Radio"

☛ **SOARA** meets at the Mission Viejo Community Center, 26932 Veterans Way, Mission Viejo, the third Monday of every month at 7:00 PM. Changes to the meeting time or place are announced in this newsletter and on the two-meter repeater.

☛ **License Exams:** Amateur License Exams are given prior to SOARA meetings. Exams are from 5:00 to 7:00 PM. Walk-in applicants are welcome. For information call Paul Levey, NZ1M, at 949-249-0121.

☛ **Contacting SOARA:** Questions about SOARA? Send e-mail to: info@soara.org, or leave a message at 949-249-1373.

☛ **Web Site:** SOARA maintains a web site with current club information. The URL is: <http://www.soara.org>.

☛ **Repeaters:** The SOARA 2-meter, 70 cm and 224.100 MHz repeaters are open to all licensed hams.

SOARA 2m — 147.645 – (110.9) Laguna Beach

SOARA 2m — 146.025 + (110.9) San Clemente

SOARA 2m — 145.240 – (110.9) Trabuco

SOARA 220 — 224.100 – (110.9) Laguna Beach

SOARA 440 — 445.660 – (110.9) Laguna Beach

The SOARA 220 and HROC 440 repeaters are shared by members of both clubs. Each machine is subject to the operating rules of its respective club. Call KG6GI for details.

SOARA 220 — 224.640 – (123.0) Santiago Pk. (C)

HROC 440 — 447.180 – (131.8) Santiago Pk. (C)

☛ **Nets:** SOARA 2 m repeater open net is held Tuesday 8:00 PM 40 meter HF net (7.268 MHz +/- for QRM), Sunday 7:30 AM.

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