



# The PROPAGATOR

March, 2001

The Monthly Newsletter of South Orange Amateur Radio Association

## Video Explained

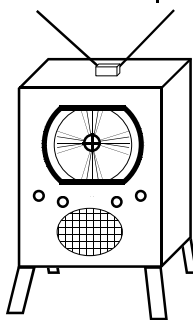
*Dreams of seeing beyond the horizon are as old as the human imagination.*

On Christmas Eve, 1883, a German engineer, Paul Nipkow, devised a method of breaking a picture into a single stream of information (scanning) so that it could be transmitted over wires. He obtained German patent number 30105 to cover his idea.

In 1925, John Logie Baird, using a Nipkow type system, obtained the first recognizable face carried by video. On March 8, 1941, the National Television Standards Committee (NTSC) recommended the standards for television (monochrome) to the FCC. The FCC accepted the color system proposed by (a second) NTSC on December 17, 1953. This is the system most U.S. TV receivers still use in 2001.

This month's speaker, Kevin Moon, KG6ABX, will discuss video. His presentation will include: video multiplexing, NTSC/PAL standards, video formats such as RGB, JPEG, MPEG, and digital video. This should be very interesting for those using video on their computers or those interested in the latest high definition TV (HDTV). A live demo will conclude the presentation.

Originally from South Africa, Kevin has lived in the US for 5 years. He is a qualified engineer specializing in video and image processing. Since moving to the USA in 1996, he has been involved in the design of video multiplexers.



## New Members

A hearty welcome to SOARA's newest member:

Dale Brown KC6WNX

## SOARA Announces Class Schedule for Spring

SOARA is excited to offer a **free** No-Code Technician Class for people interested in becoming radio amateurs. The classes will begin **April 19, 2001**, and conclude on **June 21, 2001**. Class times are from **7:00 p.m. to 9:00 p.m.** All classes will be held at the **Norman P. Murray Community Center in Mission Viejo**. Class structure will include two periods of lecture with questions and answers, a break, and also a period of general discussion that will allow deeper coverage of the topic presented. The FCC licensing examination will be offered shortly after the end of the final class.



SOARA's philosophy is to give more in-depth coverage of each topic than one would receive in a "weekend" licensing class. We believe that the most informed radio amateur is also the strongest and most enthusiastic amateur. They are also the ones who make the greatest contributions to the hobby. All SOARA's classes are taught by amateurs who have a good depth of knowledge on their topic and are enthusiastic about Amateur Radio.

The textbook for the class will be **Now You're Talking** by the American Radio Relay League. These books are available at all local Radio Shack stores as well as Ham Radio Outlet in Anaheim.

The topics covered will include: • FCC Rules, • Operating Procedures, • Radio Wave Propagation, • Amateur Radio Practices, • Electrical Principles, • Circuit Components, • Practical Circuits, • Amateur Radio Signals and Emissions, • Antennas, and • Radio Frequency Safety.

*Continued on page 3*

## Grand Re-opening of Anaheim HRO Store Set For March 17

Ham Radio Outlet will celebrate the opening of their Anaheim store at their old 933 N. Euclid address on Saturday March 17. After operating from a small store at 947 N. Euclid for the year since the fire, they are pleased to occupy the spacious and better than ever store location. Phone and FAX numbers have not changed.



Come visit with manufacturer's reps., partake of refreshments, enter the drawing for hourly prizes, and take advantage of special one-day-only pricing! This is an opportunity you don't want to miss.

It happens on St. Patrick's Day, and there will be some "savin' o' the green", Richard, WW7D (HRO salesman and SOARA member) invites all club members to stop by

See you at



## Interested in T-Hunting?

You won't want to miss this seminar for all ages which is put on by experienced T-Hunters and SOARA members, Howard Brown, KG6GI and Roger Kepner, W6SQQ. There will be approximately 2 hours of lecture covering most phases of this fascinating subset of the hobby, followed by one or more actual on-foot hunts, where your new found skills will be put to the test. Bring a 2 meter handheld with signal strength indicator and a willingness to have some fun.



**When & Where:** April 14th (Saturday) morning, at the Senior Center. Listen for details on the SOARA Tuesday night net.



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

In last month's column we looked at the topic of representing the relationship between two quantities (such as current and voltage) by means of a graph (plot). By this means we can describe the circuit behavior of a component in a very intuitive way. A plot allows us to convey relational information in a form other than using a formula.

In electronics there are many types of relationships of importance. We can describe the operation of a rectifying diode with the plot of figure 1 which shows the current flow versus the voltage drop across the diode.

A plot tells us a lot about the diode. In the forward direction a large current flow is accompanied by only a small voltage drop. The forward voltage drop is about 0.6 volts, even for a very small current. In the reverse direction there is an essentially zero current until we reach a fairly high voltage. In the plot there is a break to indicate that a section has been omitted. The reverse breakdown voltage of a diode can vary from about zero to hundreds of volts. An entire class of diodes is produced to take advantage of this reverse breakdown (the so-called Zener breakdown.)

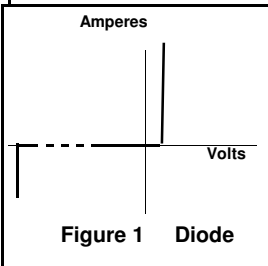


Figure 1 Diode

A relationship that often interests us is that of the *output* of a circuit versus the *input* which gave rise to that output. In figure 2 is plotted the "transfer function" of an amplifier. An input wave, shown below the horizontal

input axis is reproduced, at a greater amplitude to the right as the output wave

In order for the amplifier to faithfully reproduce the input, the transfer function must be a straight line. In other words, we want an amplifier to increase the amplitude of our signal, but we don't want it to distort the wave in any other way. We want our amplifier to be "linear."

"Linear Amplifier" is a familiar name. It is the type of amplifier we buy to increase the power of an HF rig. In fact, we want most of our amplifiers to be linear to a high degree of precision. Linearity is an important property of many other circuits and components as well. Most passive components are, in fact, quite linear.

Notice that for a transfer function which is linear, i.e., a straight line, we can completely represent it by a single number. That number (the gain or attenuation) is the fixed ratio of the output to the input.

The real reason for producing a plot such as as the one in figure 2 is to show the limits of the region of linearity. You may have noticed that near the upper end of the plot there is a bend in the transfer function. If the input signal were to have excursions into this region, then the output waveform would be distorted. For every amplifier, and for every passive circuit for that matter, there is some input signal level at which the circuit will no longer be linear.

Are frequency selective filters we discussed last month expected to be linear? Yes, the numerical value of the gain (attenuation) will differ for each frequency, but the output at a specific frequency will be exactly proportional to the input at that frequency.

In order to better understand the importance of linearity we will consider what happens when a signal passes through a circuit (an amplifier, a filter, etc.) which is non-linear.

input signal drive the amplifier into the nonlinear range indicated at the top of the plot. A distortion will be produced in which the "top" of the wave is flattened.

Any distortion of a sinusoidal wave (a single frequency wave) which is repetitive in each cycle can be shown to represent harmonics of the waves fundamental frequency. A proof of that statement would take us much farther into math than you would want to go. Still we can convince ourselves of its reasonableness.

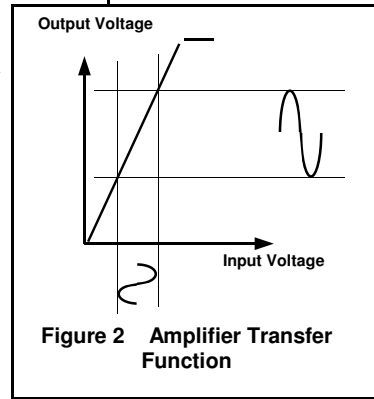


Figure 2 Amplifier Transfer Function

of that statement would take us much farther into math than you would want to go. Still we can convince ourselves of its reasonableness.

(1) Any distortion of a sinusoidal wave which is identical in every cycle must

be at the fundamental frequency or at a harmonic (multiple of the fundamental). Thus the distorted wave must be made up of a series of sinusoids at  $f, 2f, 3f, \dots$  (2) The sum of two sinusoids at the same frequency (shifted in phase) can only result in a pure sinusoidal. Therefore a nonlinear amplifier produces harmonics in the output. (A standard measure of the quality of an audio power amplifier is the percent THD (total harmonic distortion) — an indication of the non-linearity!)

If there are multiple frequencies present at the input of the amplifier, then the situation is more complex when it is driven into a non-linear region. Again, the analysis can be complex, but the results are familiar. We get Intermodulation (IM) in which the signals and their harmonics mix to produce sum and difference frequencies. The real problem is when one of these frequencies falls within our desired tuning range.

Clearly it is beneficial to filter out undesired signals before they are amplified to levels that drive the following amplifiers into a non-linear region. Filtering signals at low levels is done to avoid problems in the active devices, not the filters. The simple fact is that filters are equally effective for any level of signal as long as they are within their linear range. A filter can not remove a signal which has been shifted into its passband by a previous amplifier driven beyond its linear region.



First, we will consider an AC signal consisting of a single frequency wave. Go back to our amplifier whose transfer function is given in figure 2 and let the

Year 2001	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
<b>General Meeting</b> 7:00 PM	22	26	19	16	21 Auction	18	16	20	17	15	19 Auction	No meeting
<b>VEC Testing</b> 5:30 PM	22	—	19	—	21	23	16	—	10	—	19	—
<b>Propagator Deadline</b>	6	10	3	1	5	2	1	4	1	9/29	3	2
<b>Board Meeting</b>	29	3/5	26	23	TBA	25	23	27	24	22	26	
<b>Spring Auction</b>					21							
<b>ARRL Field Day</b>						23 - 24						
<b>SOARA picnic</b>								4				
<b>Fall Auction</b>											19	
<b>SOARA Holiday Party</b>												2

### Class *Continued from page 1*

To pre-register for the class, please send an e-mail to Mike Mullard, KF6HVO, at [kf6hvo@soara.org](mailto:kf6hvo@soara.org).

Mike will send you more information on the classes including directions to the site, via return e-mail.

Even if you are already licensed, but want to "brush up" on some of the theory, come down and sit in on the classes anyway. You will be glad you did. Please tell all of your friends about the classes, especially any kids you know who are junior high to high school age and have an interest in science.

If you have any questions, please feel free to catch me on the radio, or call me. We are looking forward to seeing you there!

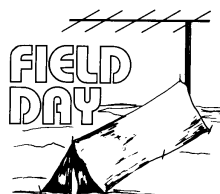
Mike Mullard, Education Director

### Activities Planning Starts

Steve Perluss, KR6CE, was recently appointed to the position of Activities Chairman. Steve helped his predecessor, Mike Mullard, KF6HVO, with preparations for the year-end party last December and took the job when Mike moved into the position of Education Director.

Steve has started the detailed planning for Field Day, June 23 - 24. Field Day is the highlight of SOARA's summer activities and requires the efforts of many volunteers. Everyone can get involved in some way — even if you just come and share the fun of watching the activities.

You will be hearing from Steve as he seeks people to take part in the planning and activities of the weekend. If you have attended Field Day in the past, you know what fun it can be. If you have never attended, then do mark your calendar and plan on being there.



### Directors up for Election



Every year about this time the S.O.A.R.A. Board nominates candidates for the annual election. Officers and directors are elected on alternate years and serve for two years. This year it is the directors who will stand for election. Most of the directors have agreed to run for another term. Nominees for the board are:

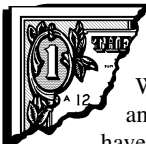
Repeater: Howard Brown, KG6GI  
 Publications: Dale Griffith, W8RRV  
 Membership: Chris Reed, KB6FYG  
 Education: Mike Mullard, KF6HVO  
 Communications: Ray Hutchinson, AE6H  
 Technical: Position open.

Please let your interest in any position be known. SOARA depends on volunteers.

The list of nominees will be presented at the March general meeting. Additional nominations may be made from the floor at the March meeting. The ballots are mailed to all SOARA members in good standing in April.

So please make your way to the next SOARA meeting and let your voice be heard.

For the Board of Directors;  
 Heiko Peschel, AD6OI, Treasurer



### Dues Reminder

We are well into the new year and not all of the dues renewals have been received. If you have not sent in your dues, please do so right away. SOARA has managed to keep the dues low because of member's cooperation in paying and in volunteering. The club does have expenses that must be covered, and we do want to keep up the level of benefits. So if you are behind, now is the time to act.

# The PROPAGATOR

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

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**Meeting: Monday, 3/19/01 at 7:00 PM.  
Program: Kevin Moon, KG6ABX, on Video**

☛ **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 most SOARA meetings. Exams are from 5:30 to 7:30 PM. You must make an appointment at least a week in advance. Call Lou Parker, KA6BJO, at 951-0336. (No calls after 9:00 PM please.)

☛ **Contacting SOARA:** Questions about SOARA? Send e-mail to: [info@soara.org](mailto: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 and 70 cm repeaters are open to all licensed hams.

SOARA 2m — 147.645 - (110.9)

SOARA 440 — 445.660 - (110.9)

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 — 224.100 - (110.9)

SOARA 220 — 224.640 - (123.0)

HROC 440 — 447.180 - (131.8)

☛ **Nets:** SOARA 2 m repeater open net is held on Tuesdays at 8:00 PM following the Laguna and M.V. emergency nets.

40 meter HF net (7.262 MHz +/- for QRM), Sunday 7:30 AM  
PSK-31 net: 28.120 USB 1 KHz meets Fridays at 6:00 PM.

## SOARA OFFICERS

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*Secretary:* Richard Coyne, WW7D . . . . . 949-855-4689  
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*Treasurer (appt.):* Heiko Peschel, AD6OI . . . . . 949-859-3868  
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*Website:* Chris Reed, KB6FYG . . . . . 949-361-1438  
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