



The PROPAGATOR

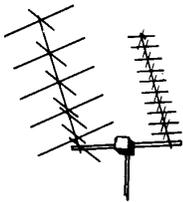
October, 2001

The Monthly Newsletter of South Orange Amateur Radio Association

October Meeting Topic is Antennas

Will Anderson, AA6DD, will present a talk on the topic of antennas at SOARA's general meeting on October 15. Will's talks are always well received, and have generated a high level of interest when he has visited SOARA in the past.

Will is an instructor in electronics and his considerable experience shows in his clear and informative style of presentation. He was an early enthusiast in ATV (standard TV scan rate). His present interests include 6 m operation, and he runs a six meter net on Sunday mornings. The net meets at 10:30 AM on 50.40 MHz.



On Monday, Oct. 15 he will discuss antennas: Beams, Linear, and Quads. Of all the areas of amateur radio antennas present one of the best opportunities for experimentation and home brewing. Even the technical analysis of antennas is within the reach of most hams as there is some excellent analysis software available at little or no cost.



ARRL President Praises Amateur Radio Emergency Effort

ARRL President Jim Haynie, W5JBP, took advantage of a visit to New York City hams to express his gratitude for the overall Amateur Radio volunteer effort in the wake of the terrorist attacks September 11.

"On behalf of the 680,000 ham operators in the US, thank you for doing such a fine job," he said during a September 21 visit with Amateur Radio Emergency Service volunteers at the heart of the communication effort.

ARRL Hudson Division Director Frank Fallon, N2FF, accompanied Haynie on his visit. "From the very first day I have been proud of the way ARRL members in the Hudson Division responded in overwhelming numbers," Fallon said. "So many responded that many, unfortunately, were turned away." Some 500 Amateur Radio volunteers helped out with communications support for the disaster

"It really has been our finest hour!" Fallon continued. "It has made us all very proud to be Amateur Radio operators."

John MacInnes, a Red Cross communications officer based in Tucson, Arizona, expressed high praise for the Amateur Radio community and for ARRL.

"We wouldn't be where we are today without the ham radio operators," he told Haynie. He said Haynie should be very proud of ARRL and asked him to relay his message of thanks throughout the amateur community.

More detailed and updated information on Amateur Radio's involvement in the disaster relief and recovery efforts is available on the ARRL Web site <<http://www.arrl.org>>.



Orange County RACES

Ralph Sbragila, KD6FYT, visited SOARA with a presentation on the county RACES (Radio Amateur Civil Emergency Service) operation. Although the program had been planned some time ago, emergency and disaster operations were on everyone's minds. The terrorist attack of September 11 made it clear that we never know when some disaster, natural or man made would strike.



Orange County RACES supports and works with the local city emergency groups. While there was some discussion of the interaction of the groups much interest was focused on the use of advanced modes of communications.

AC RACES has invested considerable effort into developing techniques for making amateur radio a more valuable service in emergencies. Techniques and equipment for using both slow scan (SSTV) and ATV to relay actual views of disaster sites back to the Emergency Operations Center were presented.



Some of the advantages of new digital modes are the capability of transmitting accurate typed lists and the

relative privacy. Privacy issues limit the transmissions of names or addresses over amateur bands.

On Saturday, October 13, OC RACES will conduct a countywide voice communications drill of local groups to test the mutual aid and activation procedures.





The Way I See It: Understanding Radio Theory Without

Diodes have an amazing variety of uses in electronic circuits. Last month's column certainly didn't cover all of them. The real work-horses, however, are transistors. Figure 1 is the circuit symbol for an NPN transistor. Bipolar transistors come in two complementary types: NPN and PNP. We will discuss the NPN, but the behavior of the PNP is equivalent if you reverse all of the voltages involved and interchange "holes" and "electrons".

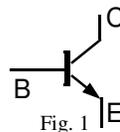


Fig. 1

The transistor symbol doesn't give us much guidance into the operation of the device. Figure 2 gives a schematic indication of the structure of the NPN transistor. Remember from the previous columns that the "N" type material is doped with impurities which donate an extra electron which is free to carry electrical current. (They are called "donor" impurities.) "P" type material has been doped with "acceptor" impurities which trap a lattice electron leaving a "hole", or empty electron site which can move (in the sense that an empty desk in a classroom can move as a student slips into the empty desk leaving their previous desk empty. The effect is that of a carrier of positive charge, although what always moves are the negatively charged electrons.

The bipolar (as opposed to the FET, field effect transistor, which has a different structure, and which we won't discuss here) looks very much like two diodes back to back. A quick and easy technique for testing a transistor with a common multimeter is to measure the conductivity between the elements. Most modern multimeters have a diode range (usually indicated by the diode symbol) which gives a direct reading of the voltage drop in the forward direction. A silicon diode will have a forward voltage drop of about 0.6 volts.

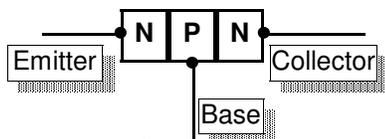


Fig. 2

Measuring between the base and the emitter we will find, for a good transistor, conduction (~ 0.6 V) in one direction and no conduction in the other. The same will be true for a connection between the base and the collector. A connection between the emitter and the collector will show no conduction in either direction (back to back diodes blocking in both directions).

I didn't tell you in which direction the conduction will be found for the base to emitter (for example). We can figure that out from what we know.

The red probe on the multimeter will be the positive one, and for a resistance (or diode) measurement will assert a positive voltage (on the order of one volt).

If we apply a positive voltage to the "P" region (positive carriers) and, of course, the negative to the "N" region, we will force the carriers away from our connections and toward the junction. Current can flow. For the reverse voltage connections we will attract the carriers away from the junction and since there is no source for new carriers at the junction there is no current flow. You will recall from your earliest introduction to electricity: "likes repel and opposites attract".

Most failures of a transistor will result in one or both of these diodes being destroyed. This could show up as either an open circuit or a short. The multimeter test gives you a good indication of the health of the transistor. As you can see from the proceeding, given an unknown transistor you can tell if it is an NPN or a PNP type, and which lead is the base lead.

Now, it may occur to you that there is something strange here. The structure diagram (fig. 2) is quite symmetrical (no difference between the emitter and the collector) although the

terminology and the symbol (fig. 1) would indicate that there is a difference. Let's look at how a transistor manages to provide amplification and that will lead us to the solution to this mystery.

Consider the circuit shown in figure 3. A

positive voltage is applied, through resistors, to both the collector and to the base. As we know applying a positive voltage to the collector of our NPN transistor tends to reverse bias the base - collector junction. A positive voltage of greater than 0.6 volts applied between the emitter and the base will forward bias that junction and current will flow.

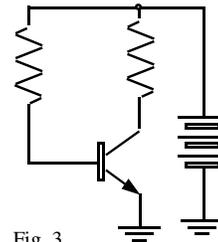


Fig. 3

A current of many times the base current will flow in the collector circuit. We call that factor the current gain of the transistor, a value of 100 would not be unusual. OK, I haven't told you everything

about the transistor. The base region is very thin. Figure 4 is a more accurate depiction of the structure. Electrons which cross the emitter - base junction have a great probability of making it all the way to the collector junction where they get swept across and constitute the collector current. The base region is that thin.

Only electrons from the emitter contribute to the collector current. Why doesn't the current across the emitter - base junction consist of about 50% holes from the base and 50% electrons from the emitter?

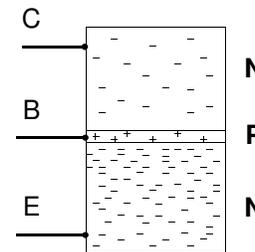


Fig. 4

Because the emitter is doped very heavily compared to the base, so there are many times the number of carriers

available from the emitter. In addition to ensuring that the emitter - base junction current is predominantly electrons this means that the reverse breakdown voltage is fairly low.

The collector must have a fairly high breakdown voltage so the collector doping level must be much lighter. A bipolar transistor could be operated with the emitter and collector interchanged, but it would have a very low current gain and a very low output breakdown voltage,

Most of the individual transistors you encounter will be bipolar transistors. I hope this review of their structure and operation will bring a greater appreciation of these wonderful devices and their circuits.



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

Emergency Groups

When an emergency strikes and communications is needed will you be prepared? There is a local city emergency group that would welcome your participation.

Laguna Beach: LBACT - RACES
John Kountz, KE6GFF, (949) 494-8783

Laguna Niguel: LNACS - RACES
Al Way, KC6LNP, (949) 461-0684

Mission Viejo: MVEARC - RACES
Charley Speelman, WA6RUZ, 770-2658

Rancho Santa Margarita: SMART- ARES
Bill Westfall, KD6NJP, (949) 858-4542

All other :contact Ray Hutchinson, AE6H,
(949) 496-8020 or e-mail at
ae6h@soara.org



Thought for the month

NOTE: Failure is not an option!

It comes bundled with the software...

It is October again and time for the annual dues renewal notices to arrive in the mail. Everyone gets their dues notification at the same time. Those who joined SOARA within the past year, although they paid for a full year, get a notice in October. Their dues will be for only that portion of the year necessary to bring them into synchronization with the rest of the club.

As you know from previous reports, the structure is being changed with this years dues. Starting in January of 2002 there will be no separate Advanced Access — all paid up members will have full privileges to all of the features of the repeaters.

At the first of the year you will receive a membership manual which will include all of the details on operating the repeaters. This booklet will include the roster of members and lots of handy information.

If you have suggestions on what you would like to see included in the booklet please send them to: w8rrv@soara.org. We will do our best to see that they are included.

SOARA operates five repeaters with good coverage of the local area and considerable coverage over a larger area. All seem to agree that the wide spread availability of cell phones has

reduced the interest in and use of the repeaters. If you have the chance to monitor one or more of the machines you are aware that the activity is down.

Do we only get on and chat when we hear a good friend that we want to talk to — do we ignore strangers and newcomers? Lets not become so elite that we refuse to talk to strangers. You will hear emergency nets (as well as the open club net on Tuesdays at 8:00PM), special events coordination (bicycle races, etc.) on the repeaters. Lets practice that amateur friendliness on our local air waves as well. If you hear a new call sign, give that ham a call and make a new friend. Who knows, you may win a new member for the club.

73. See you on the repeater!



The PROPAGATOR

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**Meeting: Monday, 10/15/01 at 7:00 PM.
Program: Will Anderson, AA6DD**

☛ **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, 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 2m — 145.240 - (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 Tuesday 8:00 PM
40 meter HF net (7.263 MHz +/- for QRM), Sunday 7:30 AM
PSK-31 net: 28.120 USB 1 KHz meets Fridays at 6:00 PM.

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