

# The **B E E E T**

## *The Bulletin of Electrical & Electronics Engineers of Tucson*

### **IEEE TUCSON SECTION MEETING**

#### **A TRANSISTOR VOLTAGE REFERENCE AND WHAT THE BANDGAP HAS TO DO WITH IT**

Date: Tuesday, October 5, 2004

Time: 6:00 P.M.

Speaker: A. Paul Brokaw, IEEE Fellow, Analog Devices

Place: AME S202 at the U of A

In this presentation a core circuit consisting of two bipolar transistors and two resistors will be used to illustrate the principal of the "Bandgap Reference." The connection between the temperature stable output voltage and the Bandgap voltage of Silicon will become evident.

Born at Minneapolis in 1935, spent his early years investigating flashlight workings and disemboweling toasters. Following experience in radio-TV repair shops and military radar maintenance, he developed circuits for geophysical instrumentation at Well Surveys Inc. After obtaining the BS - Physics from Oklahoma State University, he developed electronics for scientific satellites with Labko Scientific Inc. In 1963 he joined Arthur D. Little Inc. as a circuit design consultant to industrial, scientific, and government clients. He next became a designer for Communication Technology Inc. doing contract product designs of telephone plant and subscriber equipment. In 1971 he moved to Nova Devices which became the Semiconductor Division of Analog Devices. He has held several positions at Analog, generally related to design, and is now an Analog Fellow. He has designed a variety of products and holds upward of 90 U.S. patents in areas including monolithic A/D and D/A converters, sensors, voltage references, amplifiers, power management circuits, and Asics. He was selected in 1993 as "Innovator of the Year" by the readers of EDN magazine and more recently elected to the Electronic Design Magazine "Hall of Fame." He has presented and published papers at technical conferences and in IEEE journals, has been active in IEEE including several years on the ISSCC program committee, served as guest editor of the JSSC, and is a fellow of the IEEE.

#### **Conferences Coming to Tucson**

The 42nd Annual Applied Reliability Engineering and Management Institute Conference will be held November 15-18, 2004 at the Doubletree Hotel at Reid Park. For information, email: [dimitri@u.arizona.edu](mailto:dimitri@u.arizona.edu) or check out the website at <http://www.u.arizona.edu/~dimitri/Seminar.htm>

Also, the IEEE Power Switchgear meeting is tentatively scheduled for September 19-24, 2004 at the Westin La Paloma

here in Tucson. Anyone interested should contact Ted Burse at [tburse@ieee.org](mailto:tburse@ieee.org) for more information. Check out the website at <http://www.ewh.ieee.org/soc/pes/switchgear/MEET.htm>

The 2005 IEEE International Conference on Networking, Sensing and Control will be held March 19-22, 2005 in here in Tucson. For more information, you can find the website at: <http://www.ieeeicnsc.org/>

#### **Feedback and Volunteering**

We need to hear from you! We want to know what we can provide to make IEEE a better organization. If you have any ideas for meetings, any activities that promote engineering and the IEEE, let us know! We'd like to hear from you. Also, remember that we run this as a set of volunteers. If you put something into this organization, you can get much more out of it! We need you to help out! Contact us! Help out! Contact us!

#### **Elections Coming for the Next Year**

Get involved with IEEE in Tucson! The Tucson Section will soon have elections for officers for the coming year and the best way to get involved is to become an officer! If want to see something more than just the mailers and magazines, help us help you get it.

The Tucson Section also has standing committees whose chairperson is not elected, but is appointed by the Section Chairman. If you are interested in any of these positions or are interested in having a say in what the Tucson Section does, please notify Joseph Wu at [joewu@ieee.org](mailto:joewu@ieee.org) or at 519-0904.

#### **Senior Membership**

Do you want to become a senior member of the IEEE? The IEEE wants to promote qualified candidates to senior membership! If you have 10 years of professional experience of which five years of *significant professional performance*, you are qualified for a senior member upgrade. Educational experience such as a bachelor's degree in an IEEE-designated field counts 4 years to that number, a master's degree counts 5 years and a doctorate counts 6 years. In order to find out more, point your web browser to [www.ieee.org](http://www.ieee.org) and search for senior membership!

#### **Email and Electronic Support for IEEE**

In case you didn't know, you can get email notices about meetings in the Tucson Section. Just check out the page in the Tucson Section Website: <http://www.ewh.ieee.org/r6/tucson/mail.htm>. Also, if you want change addresses, change a typographical error in your profile, or have problems with your subscriptions, you can do solve those problems yourself! Send an email to one of the addresses listed below:

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Tucson Section, Institute of  
Electrical and Electronics Engineers  
1029 N. Del Valle Pl.  
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Tucson Section Questions

joewu@ieee.org or 519-0904

Website:

<http://ewh.ieee.org/r6/tucson>

**Tucson Section Meeting  
Tuesday, October 5, 2004  
6:00 PM, at the U of A  
AME S202**

**(NE corner of Speedway and Mountain – Parking  
available east of the building after 5 P.M.)**

**Refreshments Provided**

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**Remember**

?? We're always looking for topics for general meetings, if  
you have an idea or a speaker in mind let us know!

?? Also, check out the website at:

<http://ewh.ieee.org/r6/tucson>

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**There is an email mailing list for the Tucson Section. If you  
want email notices, you can put yourself on the list. Just find  
the link through our website and follow the directions.**

