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THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

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Southcon 2005

Developing New Coding and Modulation Methods to Exploit Space, Time, and Frequency Diversities

Date & Time: 6PM, Thursday, 11 November 2004

Location: Raytheon Company, 1501 72nd
Street North, St. Petersburg, FL

Speaker: **Dr. K. J. Ray Liu**, Dept. of ECE/ISR
Univ. of Maryland, College Park

Reservations: www.ewh.ieee.org/r3/floridawc/ or
notify Dr. Mohamed Nezami at
(727) 302-3412.



Raytheon



Abstract: First, we will briefly review some of existing space-time block codes (STBCs) that can guarantee full diversity in space and time domains. Then, we will focus on the STBCs from orthogonal or block-orthogonal designs. These codes not only achieve full diversity, but also have a very simple maximum-likelihood (ML) decoding algorithm. Finally, we will talk how to combine orthogonal or block-orthogonal designs with sphere packing to further increase the coding advantage. We will briefly review previous works on Space Frequency (SF) coding. Then, we will introduce a systematic design method to construct full-diversity SF codes by taking advantage of the existing Space-Time (ST) codes and discuss an approach to design SF block codes that can guarantee full-rate full-diversity transmission in MIMO-OFDM systems. Finally, if coding delay is allowed, we will discuss how to obtain a Space-Time-Frequency (STF) code that reaches the maximum achievable diversity in space, time, and frequency.

Brief Biography: Prof. K. J. Ray Liu received the B.S. degree from the National Taiwan University in 1983, and the Ph.D. degree from UCLA in 1990, both in EE. He is a Professor and Director of Comm. and Signal Processing Laboratories of ECE Department and Institute for Systems Research of University of Maryland, College Park. His research contributions encompass broad aspects of wireless communications and networking in which he has published over 300 refereed papers. Dr. Liu is the recipient of numerous honors and awards including IEEE Signal Processing Society 2004 Distinguished Lecturer, the 1994 NSF Young Investigator Award, the IEEE Signal Processing Society's 1993 Senior Award (Best Paper Award), George Corcoran Award in 1994 and Engineering Faculty Award in 1996 (both from the University of Maryland). Dr. Liu is a Fellow of IEEE. Dr. Liu is the Editor-in-Chief of IEEE Signal Processing Magazine and was the founding Editor-in-Chief of EURASIP Journal on Applied Signal Processing.

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All material for THE SUNCOAST SIGNAL is due by 7th day of the month preceding the issue month. Address all correspondence to:

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Chair's Comments

By Art Nordlinger



Most of you are now aware that John Conrad has left the building...and the State. After a number of years of working independently, John is returning to the company that last employed him. This change required him to move to the Boston area immediately, and me, as vice chair, to assume the role of Section Chair for the remainder of the year.

Both at work and in organizations like IEEE, a notable measure of the amount that someone contributes is the number of people necessary to fill those shoes once that person moves on. In the case of John's leaving, it will take many. John personified the purpose of the Section; that is, bringing together the various society chapters and interest groups for the common good, as well as representing IEEE to the Tampa Bay area and beyond. He served as chair of the Engineer's Week Banquet, which brings together the various engineering societies annually. John's leadership, his extensive computer skills, and experience were instrumental in the continued success of the banquet. John's vision of including all of the area's engineering societies is indicative of his commitment to the profession. I'll pause here to note that this group is badly in need of assistance to put on the next affair in February 2005. Please contact me if you can help. John contributed to the continued success and expansion of the WAMI (Wireless And Microwave Instruction) Conference held annually at USF. He was also involved in putting on this year's Industrial Applications Society (IAS) Annual Meeting (<http://ewh.ieee.org/soc/ias/ias2006>) held in Clearwater, Sections Congress scheduled for Fall 2006, and more. John's wide-ranging interests even found him organizing a meeting recently to showcase hybrid vehicles.

John's involvement in the activities of all of the chapters is an example that we should all heed. He attended most of the meetings, talks, and tours put on by our society chapters. I believe that this was not only to show his support as Section Chair, but to expand his personal horizons and knowledge as well. Many of us, as we peruse the rest of this newsletter, skim (or skip) over chapter meeting announcements other than those in our primary area of interest. Allow me to suggest that this time you take a few extra minutes to look over some of the meeting announcements that you would have traditionally skipped. You may not be aware that every IEEE member is welcome at any IEEE meeting, regardless of society affiliation. Let's all take John's great example and attend a chapter meeting that will expand our horizons in the coming months.

I look forward to filling John's shoes, to the extent that I can with help from others over next few months. Please feel free to contact me at a.nordlinger@ieee.org or 813-630-6203 if I may be of assistance or if you have suggestions that will help our Section to succeed.

Recent Advances in High Performance Communication Modules and Circuits

WHEN: Thursday, November 11, 2004 6:00 pm
SPEAKER: Dr. Joy Laskar, School of Electrical and Computer Engineering
Georgia Electronic Design Center, Georgia Institute of Technology
LOCATION: To Be Announced
PLEASE RSVP: Leave name & country of citizenship with Ken O'Connor at (727) 302 2357.
Email: kenoconnor@ieee.org

Bring a guest; non-members welcome!

ABSTRACT: There is no question that the networks of the future require functional improvement along each of the important transmission media: wireless and wired (optical and copper). However, an even more daunting challenge is the integration and coexistence of these technologies in both function and form. We present several important enabling technologies for future integrated multifunctional systems. The System-on-Package (SOP) paradigm provides a highly integrated, microminiaturized, multifunctional systems technology that optimizes the IC and the package implementation. In this presentation, we will review the evolutionary trends in IC and module integration and how these trends are bounded by advanced communication applications. We consider the development of new module technologies for applications to mmW Gb wireless nodes and for active isolation in wireless systems.

BIOGRAPHY: Dr. Joy Laskar received the Ph.D. degree in Electrical Engineering from the University of Illinois at Urbana-Champaign in 1991. Prior to joining Georgia Tech in 1995, Dr. Laskar held faculty positions at the University of Illinois and the University of Hawaii. At Georgia Tech, he holds the Joseph M. Pettit Professorship of Electronics and is the Director of Georgia's Electronic Design Center. He has authored or co-authored more than 200 papers, several book chapters (including three textbooks in development), numerous invited talks and has filed 25 patents. Most recently his work has resulted in the formation of two companies: an advanced WLAN IC Company: RF Solutions, now part of Anadigics (Nasdaq: Anad) and a next generation interconnect company: Quellan which is developing collaborative signal processing solutions for enterprise applications.

He is a 1995 recipient of ARO's Young Investigator Award, a 1996 recipient of the NSF's CAREER Award, the 1999 co-recipient of the IEEE Rappaport Award, the faculty advisor for the 2000 IEEE MTT IMS Best Student Paper award, 2001 Georgia Tech Faculty Graduate Student Mentor of the year, the 2003 Clemson University COE Outstanding Young Alumni Award and the 2003 recipient of the Outstanding Young Engineer of the IEEE MTT Society. For the 2004-2006 term, Professor Laskar has been appointed an IEEE Distinguished Microwave Lecturer for his seminar entitled "Recent Advances in High Performance Communication Modules and Circuits."

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Industrial Power Systems: A Facilities Engineering Perspective

Date: Monday, November 15, 2004

Time: Registration and Lunch 11:00 AM - 12:00 noon
Lecture - 12:00 NOON - 1:00 PM

Speaker: BARRY C. BRUSSO, Principal Facilities Engineer and Manager Electronic Systems Support, S & C Electric Company

Location: TECO Hall, Tampa Electric Company, 702 N. Franklin Street, Tampa

Cost: Members \$10, non-members \$15, student members \$5 Please make checks payable to: IEEE – FWCS

Parking: Metered street parking is available. Reasonably priced parking is also available at the Ashley Street Garage next to the Public Library, approximately two blocks from TECO Plaza.

RSVP: <http://www.ewh.ieee.org/r3/floridawc/>

Questions: Tom Blair at 813-228-1111, ext 34407 or tblair@tecoenergy.com

Space is limited to 35 attendees.

Abstract: Typically the resident plant facilities engineering staff for an industrial facility are ultimately involved in the day to day on site performance, application, operation and maintenance of the plant power systems. It is critical to have this staff take the lead in planning, design, preparation of specifications, installation oversight and commissioning of new power systems. We will focus on the facilities engineers' role as the owner's representatives and the engineering steps they must follow to reach the project objectives associated with new and retrofitted industrial power systems.

Brief Biography: Barry C. Brusso received the B.S.E.E. degree from the University of Illinois (Champaign-Urbana) in 1967 and joined the Westinghouse Electric Corp. the same year. He joined Fidelity Electronics Ltd., in 1975 as Senior Engineer in the Biomedical Engineering Division, with overall responsibility for development and production. In 1978, he joined the S&C Electric Company as Facilities Engineer in the Plant Engineering Division and presently holds the dual positions of Principal Facilities Engineer and Manager – Electronic Systems Support with overall responsibility for electrical engineering of the manufacturing facilities and design and fabrication of the product's quality inspection testing equipment. For over 21 years, he managed the Metrology and Communication Systems Department maintains corporate standards and performs calibrations of the measuring and test equipment for the entire company. Barry has served as a member-delegate to the National Conference of Standards Laboratories for over 10 years. He is an IEEE Fellow, recipient of the IEEE Third Millennium Medal and a member of the following IEEE Societies: Industry Applications, Dielectrics and Electrical Insulation, Instrumentation and Measurement, and Power Electronics.

Officer Nominees for FWCS and PE/IA Chapter for 2005

The following individuals are being brought forward as the Officer Nominees for 2005. The Nominating Committees have contacted all nominees and confirmed their willingness to serve if elected. The election of these individuals will occur at the Section meeting and next PE/IA Meeting respectively.

FWCS Officers: Chair: Angela Alexander; Vice-Chair: Jim Anderson; Secretary: Jules Joslow; and Treasurer: Ralph Painter

PE/IA Officers: Chair: Ghaff Khazami, Vice-Chair: Tom Blair, and Secretary/Treasurer: John Stankowich. Additionally, the Consultants, who continue to support and guide the PE/IA Chapter include: Art Nordlinger, Jim Howard, Jim Beall, Ralph Painter, and Quang Tang.

Students' Corner

Thanks to the hard work of our SPAC Chair, Carlo Dionson and officers Jeremy Huffman and Joshua Schumacher, SPAC 2004 was a tremendous success! The Student Branch would also like to thank our speakers, Ms. Erna Grasz and Mr. Art Nordlinger, Mr. Jon Kile of Engineering Development at USF, IEEE-USA and all the students who attended.

October was the busiest month of the semester for the student branch with SPAC, the picnic and student branch meetings. November, although, less busy promises to be just as interesting. Interested in being an officer of the Student Branch? With the end of the semester approaching and officers graduating, we are actively searching for new officers. Stop by the meetings or the Student office for more information. Have you renewed your student branch membership? Renew by November 15th and get entered to win a Dell Inspiron Laptop.

November 11 th , 2004	Student Mentor Day, IEEE Office, ENB 380-C, 10:30am – 3:30pm
November 15 th , 2004	Paul Evers from Underwriters Laboratories, ENC 1002, 1:00 pm – 2:00pm
December 3 rd , 2004	Senior Banquet, Marshall Center 7pm-11pm
TBD	Fall Bash with the Society of Women Engineers



Re-thinking Your Applications with AC drives



Date: December 2, 2004

Time: Registration and Coffee – 8AM - 8:30 AM
Morning Session - 8:30 AM – NOON
Lunch Provided– NOON – 12:30 PM
Afternoon Session 12:30PM – 3:00 PM

Speakers:

- Norm Lindner, Drive Applications Engineer, Eurotherm Drives
- Stacy Matin, National Sales Manager – HVAC Industry, Eurotherm Drives,
- Brad Hagar, President, Motion-Controls Inc.

Location: TECO Hall, 702 N. Franklin Street, Tampa. Space is limited to 35 attendees.

Cost: \$20 Members, \$30 Non-Members, \$5 Student Members

PDH Credits: 4 PDH credits will be offered for completion of the morning session. Be sure to enter you name and PE number as it appears on your license. Florida exempt provider #00015.

RSVP: Online at: www.ewh.ieee.org/r3/floridawc/
Questions: Tom Blair at 813-228-1111, ext 34407 or thblair@tecoenergy.com

If you've ever been confused about how to justify using drives on your application, this seminar is for you. *Learn to avoid the pitfalls and gotchas when using AC drives! If you want practical real-world payback examples in action, this is the place to be!* In one short day, you will walk away with a thorough, practical understanding of drives as they relate to your industry. *The morning session will cover the technical aspects of drive applications and must be attended for PDH credits to be awarded.* You'll discover:

- ✓ AC drives regeneration and common bussing – what's it all about?
- ✓ Hidden installation costs when applying drives
- ✓ Which drive type to select for your application and why.
- ✓ Why AC vs. DC isn't always a straightforward decision.
- ✓ Why holding off on using drives can cost you now.
- ✓ How to easily calculate drive payback **and save many times your original investment.**

Brain Teaser Challenge Column

By Butch Shadwell

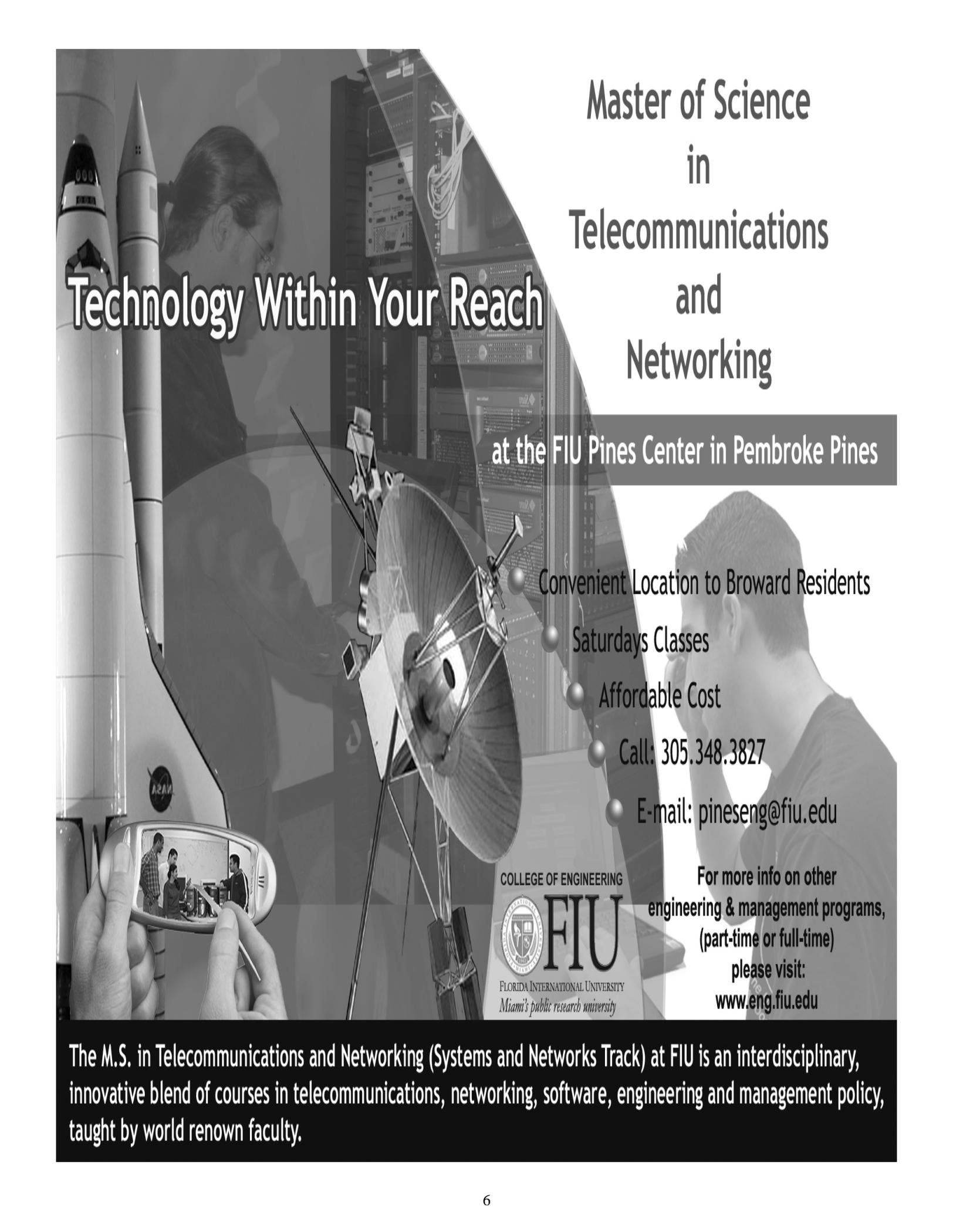
October BTC If you recall my discussion of toes, an xray machine came up. "In an xray tube the xrays are produced by bombarding a metal plate with an electron beam. If the assistant controls the xray flux density by setting the current of the beam, who can tell me what happens when she adjusts the voltage?"

At the time I am writing this, I have only received only one response to this BTC. He got it right. The current through the xray tube sets the flux density. By adjusting the voltage on the tube, you are altering the acceleration potential applied to the electron beam. This means that the electrons reach a higher velocity on their way to the target plate. In the inelastic collision that follows, they have more momentum to give up which results in higher energy xrays. One might want higher energy xrays for penetrating denser tissue for a better exposure. But I bet you already knew that.

November BTC If you've been reading this space regularly, I want to let you know that the orthotics really helped. Go figure? This month the topic is hurricane preparedness. Here in Jacksonville, we have been hit pretty well. From Frances we lost power for a week and then lost water after the power came back. My phone lines are still messed up. Lots of lost shingles and tree limbs but no terrible damage. The storm was bad enough to get me and my wife to take steps to weather the storm a little better the next time.

The subject today is window shutters. I have come up with a great design for window shutters that go up and come down very quickly and easily using barrel bolts into my brick wall. To test the strength I designed a strain gauge system that needs a 3 volt reference to work properly. I have a 5 volt regulated supply and two resistors with which to make a voltage divider. The Vref load is very high impedance, so the output impedance of the reference supply is not critical. On these resistors there are two brown bands, one red band, one orange band, one yellow band, and one blue band. Your challenge, should you choose to accept it, is to assign these color bands in the right sequence to each of the resistors, so that we get two standard 5% resistors that create the correct voltage divider nominally. Even though these are standard 5% values the resistors are actually 1% tolerance, and the values calculate to the exact voltage. Have fun.

Reply to Butch Shadwell at b.shadwell@ieee.org (email), 904-223-4510 (fax), 904-223-4465 (v), 3308 Queen Palm Dr., Jacksonville, FL 32250-2328. (<http://www.shadtechserv.com>) The names of correct respondents may be mentioned in the solution.



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On-Site

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1.

First Name		Last Name	
Job Title		E-mail	
Company			
Mailing Address		Mail Stop	
City	State	Zip	Country
() Telephone	() Fax		

2. Principal Job Function
(check only one)

- AA Engineer - Design
- AB Engineer - Manufacturing
- AC Engineer - Quality/Test
- AD Engineering Services
- AE Engineering Management
- AF Corporate/General Management
- AG Press
- AH Purchasing/Procurement
- AJ Marketing/Sales
- AK Student/Educator
- AL Other

3. What is the Primary End Product at this Location
(check only one)

- CA Communication Systems
- CB Components/Materials/Hardware Supplies
- CC Computers/Systems and Sub-systems
- CD Consumer Products, Automotive & Appliances

- CE Contract Services-Design/Manufacturing/Test/IC Foundry etc.
- CF Controls
- CG Military/Government/Avionics
- CH Medical Electronics
- CJ Semiconductors/ICs
- CK Test/Masurement/Inspection
- CL Distributors
- CM Other
- BF Contract Services - Design/Manufacturing/Test
- BG EDA Tools & Engineering Software
- BH Interconnection Devices
- BJ Laser & Electro-Optical Devices
- BK Microwave Components
- BL Packaging Hardware/Enclosures
- BM Power Sources
- BN Production Equipment
- BP Production Tools & Supplies
- BQ Sensors & Transducers
- BR System Boards
- BS Test & Measurement Equipment
- BT Other

4. Product Interest - Which of the following do you specify, recommend, approve, purchase or influence the purchase of?
(check all that apply)

- BA ASICs, PLDs, FPGAs
- BB Board Level Products
- BC Semiconductors/ICs
- BD Components other than IC's
- BE Computers/Peripherals/Software

6. Size of your organization

	At Your Location	In Entire Company
1 - 49	<input type="checkbox"/> EA	<input type="checkbox"/> EB
50 - 99	<input type="checkbox"/> EC	<input type="checkbox"/> ED
100 - 499	<input type="checkbox"/> EE	<input type="checkbox"/> EF
500 - 999	<input type="checkbox"/> EG	<input type="checkbox"/> EH
1,000 or more	<input type="checkbox"/> EI	<input type="checkbox"/> EJ

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5. Years Involved in Industry

- DA 1 - 2
- DB 3 - 5
- DC 6 - 9
- DD 10 or more



Persons under 18 years of age not admitted. Students 18 or older admitted on Thursday, February 17, only.

Also, please register my colleagues: Express Registration Free Admission-Exhibits Only.

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November 2004 Calendar of Events

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2 <u>5:30PM</u> <i>IEEE FWCS Excom Mtg., TECO Hall, Tampa</i>	3	4	5	6
7	8	9	10	11 <u>6PM</u> <i>SPCOMM Seminar on Coding & Modulation, Raytheon</i> <u>6PM:</u> <i>MTT/AP/ ED Seminar High Perf Comm Ckts</i>	12	13
14	15 <u>11AM-1PM:</u> <i>IAS Dist. Lecture on Industrial Power Systems, TECO Hall</i>	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

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