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# THE SUNCOAST SIGNAL

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

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## Re-thinking Your Applications with AC drives

**Date & Time:** 2<sup>nd</sup> December 2004

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

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

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

### Speakers:

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

**RSVP:** Online at: [www.ewh.ieee.org/r3/floridawc/](http://www.ewh.ieee.org/r3/floridawc/)

**Questions:** Tom Blair, 813-228-1111 (34407), [thblair@tecoenergy.com](mailto:thblair@tecoenergy.com)

**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.



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.**

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## Chair's Comments

By Art Nordlinger

If you are both a senior member and a licensed Professional Engineer (PE) you have my permission to skip this column, but only this once. For the rest I'd like to tell you about an opportunity I had to speak at a Student Professional Awareness

Conference (SPAC) at USF. This seminar, which was sponsored by IEEE USA, the PES/IAS Chapter, WilsonMiller, Inc, and the College of Engineering, is structured to provide students with job search information to help them through the research, application and interview process. I decided to take on the daunting task of convincing this group of college students that they should take an optional, all-day test, and pay to do so. The test to which I am referring is the Fundamentals of Engineering (FE) Examination; the first step to becoming a licensed Professional Engineer. This comprehensive test covers most of the math, science, and general and basic engineering courses taken by undergraduate engineering students. Since for most of us, in-depth knowledge follows the "use it or lose it" rule, this test is most easily passed by recent graduates. I went with a two-part pitch. First, since you can't see into the future, you don't really know where your career will lead. So even though right now you think you'll never need a PE license, you really can't be sure. And if you do find you need one, passing the FE exam is going to be that much harder the longer you are out of school. Second, when applying for a job with a new company or for a promotion where you work, you need to set yourself apart from the pack. All other things being equal (experience, qualifications, etc.), having a PE license, or even just having taken the FE exam, can only help to move you ahead of other candidates. Was I successful? I can only hope; but I know I got through to at least one student. When asked by the next speaker what his accomplishments would be in the next five years (this was in the context of a hypothetical interview question), he mentioned that he will have gotten his PE license. YES!!! For those of you who have not taken the FE exam, and especially those of you who graduated in the last five years, let me appeal to you to consider doing so. It's never too late and review classes are available. Feel free to contact me if you have questions.

Another thing that you can do to distinguish yourself is to become a senior member of IEEE. Did you know that senior members pay the same dues as regular members? Yes, it's true. Do you need references for your senior member application or have questions? We can help. Contact Tom Blair, our Membership Chair. And the best news is that, unlike getting your PE license, no tests are involved. The requirements and application materials for senior membership may be found at: [www.ieee.org/organizations/rab/md/membershipforms.html](http://www.ieee.org/organizations/rab/md/membershipforms.html).

## ***USF's EE Students Present Their Senior Projects***

*By Dr. Rudy Henning*

On Friday Dec. 3<sup>rd</sup> at 1:00 pm, the E.E. Department holds its 11<sup>th</sup> MiniCircuits Senior Design Projects Poster Presentations in Building ENB's Hall of Flags. It is a tradition of this event that the oral presentations of all students are judged, with outstanding presenters receiving special recognition at that evening's Senior Banquet. About 35 students will make brief oral presentations with the aid of a single Poster depicting the highlights of their work.

There are two ways in which IEEE members and their guests can become part of this event:

1. Notify Dr. Rudolf Henning (E-Mail: [henning@eng.usf.edu](mailto:henning@eng.usf.edu), and/or Tel. 813-974-4782) by Tuesday, November 30th at 5 pm that, as an experienced engineer, you would like to be one of the judges. Include your contact information (return address, E-Mail or telephone contact number) and, if available, a very brief resume identifying your engineering experience. Be prepared to arrive ½ hour earlier for a brief orientation meeting for judges. (Dr Henning will notify you of exact time and location for this meeting).

2. Join students, faculty and professionals who make up the poster presentation audience.

Questions should be addressed to Dr. Rudolf Henning at the address listed above.

## ***Help Our Community and Profession: Is This An Unusual Opportunity For You?***

*By Dr. Rudy Henning*

Dr. Rudy Henning issued a call for engineer volunteers who will work with him to start an "Engineering Club" in Pinellas County for K-5 students. Initial plans call for the club to be formed for students of Pinellas County's new Douglas L Jamerson Jr. Elementary Magnet School which focuses on mathematics, science, and engineering technology. The *Club* would meet one day a week immediately after school ends.

Individual Club meetings are visualized as including "Hands-on", student teams and competitive activities. During the school year, "projects" involving various engineering disciplines will be covered. Details would be handled by engineer volunteers from their specific professional societies.. The first meeting of the K-5 students Engineering Club is targeted to be scheduled on or near USF's EXPO (Feb. 18 and 19).

A first Orientation meeting for engineer volunteers is being planned for mid-December. Exact date and location will depend on who is interested in affiliating with this project. The date of the first meeting of the K-5 students Engineering Club is targeted to take place at or near USF's EXPO's date (Feb. 18 & 19).

Please contact Dr. Henning if you plan to consider becoming part of this important effort. Use E-, fax or regular Mail. Besides your name and how you can be contacted, provide him with minimal information on your engineering discipline and experience. Contact Dr. Rudolf E. Henning, Distinguished Professor Emeritus, Electrical Engineering Department, ENB 118, USF, Tampa FL 33620 E-Mail: [henning@eng.usf.edu](mailto:henning@eng.usf.edu); Fax: 813-974-5250.

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## ***IEEE Region 3 Meeting, Atlanta, GA - October 15, 16, & 17***

*By Jim Howard*

Region 3 of the IEEE, which covers all of the Southeast US plus Jamaica, held its second meeting of the year on October 15, 16, & 17th in Atlanta, Georgia. Over 60 volunteers from around the Region attended the meeting. Of the 41 Sections in the Region, approximately 30 had representatives at the meeting. These volunteers, along with the Region 3 Executive Committee met for three days to discuss the needs of our members, how to accommodate these needs, as well as what the Sections need in order to provide meetings, newsletters, etc., for our members.

Our Section, the Florida West Coast (FWCS), was represented by Angela Alexander who provided the report of our Section activities and shared what our Section provides to and for our members. In addition to the Region meeting, the IEEE Florida Council also held a meeting on Friday evening. The 12 Sections that make up the Florida Council hold several meetings a year to exchange ideas on meeting topics, discuss and vote on award nominations, and in general discuss ways to provide more information and services to the members.

The next face-to-face meeting of the Florida Council will be in January of 2005, and the next Region meeting will be held during SoutheastCon, April 8-10, 2005 in Ft. Lauderdale, FL.



*Angela Alexander presents the FWC  
Section Report to the  
Attendees*



*Quang Tang at Region 3 meeting.  
Quang is Region 3  
Newsletter Editor and Florida Council  
Treasurer and a past Chair of the  
FWCS.*



*Bill Harrison, the Region 3 Director,  
leads the meeting  
in Atlanta.*

## ***USF to Offer a Course in Power Quality Beginning January 2005!***

The course will be offered for either undergraduate or graduate credit, and will be available both on the Tampa campus and through FEEDS, an Internet-based delivery system.

Practicing engineers can register and take the course as "special students" without having to apply and be accepted into a degree program. There are some restrictions like available room in the class, but degreed engineers are almost always approved as special students. If you decide to pursue a degree program later, up to 40 hours earned as a special student can be applied to your degree program. Florida PE's can claim 15 PDH's continuing education for every semester-hour of classes offered by institutions that, like USF, are accredited by ABET.

The course will be taught by Prof. Joe Skala, a professional engineer with over 30 years in the electric power industry.

If you have any questions about this course, please contact Ralph Fehr (Email: [r.fehr@ieee.org](mailto:r.fehr@ieee.org)). If you have never taken a course at USF, DON'T PANIC!! The FEEDS department will make the registration process simple and painless. They (Jim Manning) can be contacted by email: [jpmannin@eng.usf.edu](mailto:jpmannin@eng.usf.edu). Please pass word of this new course offering to your colleagues. We hope to see you at USF in 2005!

Course outline: (1) Introduction (2) Terms and definitions (3) Voltage sags and interruptions (4) Transient over-voltages (5) Fundamentals of harmonics (6) Applied harmonics (7) Long-duration voltage variations (8) Power quality benchmarks (9) Distributed generation and power quality (10) Wiring and grounding (11) Power quality monitoring .

## ***Calling All IEEE Science Fair Volunteers!!***

*By Carlo Dionson*

Science fairs will once again start next year. So far, the only definite date is for Hillsborough County's fair which is on Feb. 23 at the USF Sun Dome. The dates for the other counties will be posted as soon as they come in. For anyone interested in volunteering, please contact Carlo Dionson [carlomagno@ieee.org](mailto:carlomagno@ieee.org) or 813-974-4776.

***REZlink Needs  
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## ***IEEE SPAC 2004***

*by Jeremy Huffman*

The Student Professional Awareness Conference (SPAC) at USF for 2004 proved to be one of the most valuable and well attended professional events at USF this semester. The conference began with a special noon luncheon catered by Trang Viet Cuisine, also featuring an intuitive and informative discussion entitled "Corporate Kung-Fu: All It Takes Is One Good Question" by Erna Grasz, Vice President of Nellcor Products R&D. Erna discussed specific verbal techniques that provide a more creative means of conducting interviews for industry positions. Erna made the talk interactive, giving the approximately 30 student attendees the chance to share thoughtful insights with one another. The general conference commenced later in that afternoon around 4pm at the Gibbons Alumni Center. There were approximately one hundred students that came to enrich their minds with information related to interview skills and the Fundamentals of Engineering (FE) exam. Steve Csotty discussed the importance of conveying interest and enthusiasm during interviews with his talk, "How to Stand Out: What Corporate Recruiters Look for at Career Fair." Art Nordlinger, Tampa Electric Grid Planning Manager, gave an informational session on the characteristics of the FE exam. Finally, it was Erna Grasz who gave the attendees a powerful talk on the specifics of what interviewers are expecting from top quality candidates via her talk entitled "Opening the Door and Closing the Deal: Successful Interviewing and Offer Negotiations." All in all, the 2004 IEEE SPAC provided students with an array of useful information from which to gain prosperity upon entering the business world.



## *It's Time for Renewal of Your IEEE Membership!!*

It is that time of year to renew your IEEE membership. This is also a great time to introduce the benefits of IEEE membership to other fellow engineers. There are many benefits to IEEE membership. IEEE is a community of nearly 360,000 innovators and students in 150 countries around the world! IEEE is the world's largest technical society, bringing members access to the industry's most essential technical information, networking opportunities, career development tools, and many other exclusive benefits. Members of the IEEE lead the world to new technical developments, formulate internationally recognized standards, and shape the global community.

IEEE is a great way to enhance your career. Get the latest in your chosen technology, meet peers in your field, and focus your career when you join an IEEE Society. IEEE Societies enhance the benefits you already receive as an IEEE member. Most Society memberships include a personal subscription to the Society's core magazine or newsletter. Many also offer online access to their technical content, providing you with the top information in your field. The 39 IEEE Societies are also the best place to meet the peers in your field and develop the support structure you need to succeed in your career. The top minds in technology belong to IEEE Societies, and membership connects you with innovators and practitioners around the world – people you may not otherwise meet in the course of your daily job. Local Society chapters provide further opportunities to share knowledge and exchange expertise.

IEEE is a great place to network with other professionals in the industry. When you join IEEE, you also become part of a local community. There are more than [300 IEEE Sections](#) around the world, connecting you with IEEE members in your neighborhood. Local meetings are a great opportunity to meet other members and exchange ideas and information.

IEEE is also the place to be for the professional connections you need. IEEE organizes more than 300 conferences around the world every year! Join the IEEE Standards Association to help shape the next wave of global technology standards and make your mark on society in the process. And there's so much more: IEEE virtual communities... young professional activities and student branches... IEEE Women in Engineering.

There are host of other exclusive benefits to IEEE membership. IEEE membership comes with a host of services and discounts – benefits no other organization can match. Stay connected with the IEEE Personal Email Alias. You get an @ieee.org email address while we scan your incoming mail for viruses and unsolicited commercial email (spam). Your messages are then forwarded your mail to your real address. It shows you're part of a community of innovators while keeping your PC safe and clean. Insurance and financial resources are available to you through the IEEE Financial Advantage Program®. There are dozens of programs available at members-only rates, plus travel protection and discounts, the IEEE credit card, and more. Every product listed in the online *ShopIEEE* catalog is discounted for members – some as much as 50%. Save on standards, conference proceedings, books from IEEE Press, and more. And there's so much more... discounts on conference registration fees... great mortgage rates... travel discounts and services.

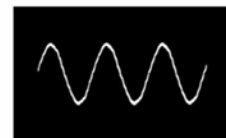
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### ***Clean Power Electronic Converters***

In this 200-page book, ISBN: 0-9759274-0-X, IEEE life member, Derek A. Paice, describes features affecting the design and application of Clean Power Electronic Converters. These converters facilitate compliance with IEEE 519 guidelines.

#### **Sample Titles From The Ten Chapters**

Characteristics of 12-pulse converters.  
Design features of 18-pulse converters.  
Multipulse concepts for single-phase loads.  
Iron-core, air-gapped inductors.  
Background distortion and harmonic measurements.



AC Line current of  
150-HP CleanPower Converter

#### **Sample Titles From The Eleven Appendixes**

Short circuits in multipulse autotransformers.  
Phase-shifting transformers.  
Modeling transformers with coupled coils.  
Third harmonics in three-phase systems.  
Voltage unbalance and sequence calculations.



400-HP Clean Power  
Transformer

The book revises and expands *Power Electronic Converter Design and Application*, (2001), now out of print. It is a companion volume to *Power Electronic Converter Harmonics*, (1995) published by J. Wiley. The author finds this sturdy, lay-flat, coil-bound, 6.5" x 9" book, invaluable in his engineering work. He hopes that others will find it an equally useful resource.

***Clean Power Electronic Converters* can be obtained from Amazon.com or by sending \$89 and your mailing address to:**

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# Brain Teaser Challenge Column

By Butch Shadwell

**November BTC** The Florida hurricane activity provoked the problem last month. "... a strain gauge system that needs a 3 volt reference .... I have a 5 volt regulated supply and two resistors with which to make a voltage divider. The  $V_{ref}$  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."

This is a real brain teaser, considering one of these color bands is a x10 multiplier. The colors stand for one, two, three, four, and six respectively. We need a 2 to 3 resistor value ratio to get the requisite voltage. So after some trial and error, I hope you ended up with a 240 ohm (red yellow brown) and a 360 ohm (orange blue brown) resistor. As required these are standard 5% resistor values. But I bet you already knew that.

**December BTC** By the time you read this, we will have elected a new President of the United States. All over the country, states have been spending lots of money trying to come up with the perfect voting technology. Being a consultant in new technology development, this field of endeavor is too good to pass up. So, I have just begun my own R&D project to come with the perfect voting technology.

I suspect that one way of thwarting potential cheaters is to make the device such a complicated Rube Goldberg device that they would have no hope of figuring out how the votes are tallied.

Anyway, I had the idea that I might make a vote to frequency conversion system, with separate oscillators for each candidate. Then with a frequency to voltage converter I could look at each candidate's performance on a simple d'Arsonval meter movement. The frequency to voltage converter circuit involves a one-shot with a very short, but constant pulse duration. I want a pulse on the rising edge of each cycle of the candidate's frequency generator. I have some passive parts, caps and resistors, and an assortment of quad gates, and, or, nand, xor, etc.

Your task, should you choose to accept it, is to design the simplest one-shot you can with these parts. We're looking for the fewest parts in this design. Also, since we will need a separate one-shot for each candidate's signal, it would be good to get as many circuits as possible from each quad chip.

*Reply to Butch Shadwell at [b.shadwell@ieee.org](mailto: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.*

## ***Ten FWCS Members are Elevated to IEEE Senior Member Status***

*By Tom Blair*

The following is a list of FWCS members that were elevated to senior member level during the September 2004 meeting:

- |                       |                       |
|-----------------------|-----------------------|
| • Robert F. Austin    | • Harry F. Hill       |
| • James W. Culver     | • Larry L. Hunter     |
| • Ronald B. Greenwald | • Douglas K. Linkhart |
| • Basit Hussain       | • David C. Miller     |
| • Alan R. Hevner      | • Truman W. Prevatt   |

The Section congratulates each of these members for this recognition. Many thanks to all the volunteers who have provided references for these applications. There is one more meeting this year on 20<sup>th</sup> November and we are getting some last minute applications in. We would greatly appreciate any new reference volunteers that would be willing to review some applications and provide a referral. If you are a Senior Member and would like serve as a reference, please contact Tom Blair ([thblair@tecoenergy.com](mailto:thblair@tecoenergy.com)). Thanks again for the help. This has been a great TEAM effort!!!

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#### FAX Deadline - February 11, 2005

813-996-4460  
Please do not both fax and mail

#### Electronically [www.southcon.org](http://www.southcon.org)

After January 21, 2005 badges will be held for pick-up at the Orange County Convention Center.

#### On-Site

Bring this form with you to Southcon/2005 for FREE admittance.

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

☐ GA I would like to receive show and conference updates via e-mail

☐ GB Send me complete Technical Program Information

I am a member of  
(or referred by)

- ☐ IEEE
- ☐ ERA

#### 5. Years Involved in Industry

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



Southcon®/2005

February 16-17, 2005  
Orange County Convention Center  
Orlando, Florida

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.

First Name	5-90101
Last Name	
Job Title	
Mail Stop	

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Last Name	
Job Title	
Mail Stop	

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310-937-1006

## December 2004 Calendar of Events

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2 8-3PM: <i>IEEE IAS/Eurotherm Seminar on AC Drives, TECO Hall, Tampa.</i>	3 1PM: <i>USF EE 11<sup>th</sup> Mini-Circuits Posters, USF.</i>	4
5	6	7 5:30PM: <i>IEEE FWCS Executive Committee Mtg., TECO Hall, Tampa</i>	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

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