

January 2004

See us on the WEB at: www.ewh.ieee.org/r2/susquehanna

January 2004 Section Meeting

Signal Conditioning

Date: Tuesday, January 20, 2004
Time: Dinner 6:30 PM
Presentation 7:30 PM
Dinner: Morrison Gallery
Penn State Harrisburg Library
Dinner Cost: Regular Members: \$15
Students: FREE
Guests: Jim Nadolny
FCI
Location: Morrison Gallery
Penn State Harrisburg Library
Contact: (by email if possible)
Stan Telson
717-569-6579
E-mail: st@qspp.com

RSVP to Stan Telson, st@qspp.com, by 1/12/04 so we can get the catering count right.

Note: Dinner no-shows will be charged if not canceled by Monday, January 12. There is no charge for attending just the talk. Students please RSVP and ensure you attend so we don't waste the food we order for you.

January's Program

The Susquehanna Section's program in January will be a week later than usual on 1/20/04 at the Penn State Harrisburg Library's Morrison Gallery. The talk that night will be by Jim Nadolny from FCI (see bio following) on the topic of Signal Conditioning. This presentation was also made at DesignCon East and to a very intelligent major silicon manufacturer; it will be interesting to all as both new material and as theory. We look forward to seeing you there as we kick off our 2004 activities. (Note - although we will hope for reasonable weather, if Penn State Harrisburg closes due to weather, we will not hold this event - if needed, check the local media for a PSU announcement).

December Section Meeting

The Section Dinner and Meeting originally scheduled for December 2 was cancelled because the pre-registration was too low to justify the event. We look forward to hearing from more of you in January.

The Year That Was, 2003

The last year saw the successful completion of many events by the IEEE Susquehanna Section. The year started off with the first meeting on Jan 14th with a presentation on the Open Sky Network by Patrick Noll and Brad Perkins of M/A-Com, Inc. (Tyco Electronics).

The Joint February Meeting with Central PA Engineering Week Council on "Turning Ideas into Reality" (Rescue of trapped coal miners) was presented by Mr. Joseph A. Scaffoni, Chief of Bituminous Mine Safety Division, PA DEP. It was a huge success with an attendance of about 250.

In March, we had a presentation by Don Appleby, Radio Project Engineer from the PA Governor's Office. The presentation was on the PA Microwave and 800 MHz Radio System.

The April meeting revolved around a presentation by Dr. Wood of NASA, Optics Lead Engineer for Hubble Space Telescope Project. The talk was entitled "The Accelerating Universe".

In May 2003, we had our first tour of the year at WITF Transmitting Site. There was no meeting in September.

The 50th anniversary meeting in October included a talk on the history of Bioelectricity and Electrocardiography by a distinguished speaker, David G. Geselowitz of Penn State University. Region 2 Director Moshe Kam attended the meeting and presented an anniversary banner to the section.

The year ended as it started, with a tour of M-A/COM, Division of Tyco. The plant assembles equipment for the Open Sky Network. The tour guides were Patrick Noll and Bradley Perkins.

Upcoming Events

- February 19: Joint Meeting with Central PA Engineering Week Council
- March 9: Special Agent Jack O'Brian from Office of Attorney General, on "Computer Forensics"
- April 13
- May 11
- September 14
- October 12
- November 9
- December 14

Our Honorable Speaker

Jim Nadolny has 10 years experience in the connector industry and works for FCI in the Harrisburg, PA area. Jim has an MSEE from University of New Mexico and a BSEE from University of Connecticut. For the past few years Jim has been involved with multi-gigabit data transmission of imperfect channels and frequently presents at IEEE and IEC venues including DesignCon. He has over 20 publications in technical journals and trade magazines.

Signal Conditioning Talk Abstract

The emergence of chips with active signal conditioning has pushed the limits for copper interconnects to higher data rates and higher interconnection lengths. By making use of such devices, transmitting 40 Gb/s (using 4 x 10 Gb/s/channel or 8 x 5 Gb/s/channel serial links in parallel) over cable and backplane links becomes feasible, not only over short distances but also over longer lengths. Furthermore, adaptive chipsets have made it possible that the signal conditioning have become nearly channel independent.

Signal conditioning techniques typically compensate for skin and/or dielectric losses in the interconnection link and as such they relax the system budget requirements. However, signal conditioning techniques do not solve all interconnection problems. They do not always compensate for resonances caused by hole stubs or multiple reflections caused by impedance mismatches. Also crosstalk, in particular near end crosstalk, can be an issue when applying signal-conditioning techniques.

This paper focuses on the link design requirements that are necessary to make optimum use of available signal conditioning techniques. Different types of signal conditioning such as pre- and de-emphasis at transmitter side and active equalization at receiver side are investigated. The difference between a cable and a backplane equalizer are explained and discussed. Budget improvements that can be realized through the use of these devices are calculated. The system requirements with respect to insertion loss, return loss, crosstalk, skew, group delay, jitter and other relevant link parameters for each of these techniques are studied. As a result of the study the interconnection link specifications that need to be met to take full benefit of signal conditioning are defined. Simulation and measurement results illustrate the conclusions of the paper.

Directions to Morrison Gallery

The entrance to Penn State Harrisburg is located on PA 230, West of Middletown.

From PA Turnpike (I-76): Get off at exit 19. Follow PA 283 East toward the Harrisburg International Airport. Follow signs for the airport and the college. Before entering the airport complex, take the exit for PA 230. Turn left at the junction of 230. Proceed on 230 East approximately 1 mile. The college entrance is on the left. As you travel inside the campus, take the first right that comes by. The library parking lot is on the left after you travel about 500 feet. The library is to your front and left. As you enter the library building, Morrison Gallery is to your right.

From Lancaster and points East: Take Route 283 West toward Harrisburg. Follow signs for the airport and the college. Before entering the airport complex, take the exit for PA 230. Turn left at the junction of 230. Proceed on 230 East approximately 1 mile. The college entrance is on the left. As you travel inside the campus, take the first right that comes by. The library parking lot is on the left after you travel about 500 feet. The library is to your front and left. As you enter the library building, Morrison Gallery is to your right.

From Harrisburg and points North: Follow signs for Harrisburg International Airport/283 East. Take 283 East to the Harrisburg International Airport exit. Follow signs for the airport and the college. Before entering the airport complex, take the exit for PA 230. Turn left at the junction of 230. Proceed on 230 East approximately 1 mile. The college entrance is on the left. As you travel inside the campus, take the first right that comes by. The library parking lot is on the left after you travel about 500 feet. The library is to your front and left. As you enter the library building, Morrison Gallery is to your right.

Engineer's week

The IEEE did not receive any awards this year for the Engineer's week. This year's award winners are:

Engineer of the Year: Steve Talian -- ASCE

Young Engineer of the Year: Matt Natale --PSPE

Tech. Achievement: Dr. Darlyn Shuster -- AICHE

These winners will receive their award at the Engineers Week Dinner at the Camp Hill Country Club. Their picture and bio will be published in the special Engineer's supplement to the Patriot News. Their picture will also be displayed at the CPEWC display at the Colonial Park Mall for National Engineers Week.

2004 Section Officers

The following are the volunteer officers for calendar year 2004, and will be elected by acclamation at an Executive Committee meeting in January.

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Vice Chair (Programs)	Stan Telson
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Open Positions:

Educational Activities
GOLD (Graduates of Last Decade)
Membership
Student Activities

Penn State Harrisburg Part-Time Faculty

Penn State Harrisburg's Electrical Programs have an opening for a part-time instructor (minimum of a masters degree) to teach courses (Linear Systems, Robotics & Automation, Sr. Project) in the spring 2004 semester. For details please contact Dr. J. F. Shoup (717) 948-6114 or jfs1@psu.edu.

Useful Information Column

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Webmaster

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Q/A-C Column

Do you have any questions or comments? Call, email or FAX it to our Co-Chairs at the above addresses.

Newsletter Mailing or WEB Page Notification

If you do not receive your Newsletter, please notify AB Shafaye mes121@psu.edu or Vittal Balasubramanian b.vittal@ieee.org. If you would like to convert from paper copy mailing of the Newsletter to WEB page delivery, please notify AB Shafaye, who serves as our Publisher.

Address Changes and Updates

There are several ways to correct member information with IEEE. They update their directory from the information you provide, and pass the changes to us monthly. Keeping your address information up to date will ensure accurate mailings.

- There is a WEB based interactive "change of address" form at: <http://services1.ieee.org/membersvc/coa/intro.htm>
- You can send an email to: address-changes@ieee.org
- Call IEEE Member Services at 1-800-678-IEEE
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