IEEE EMC Society Eastern North Carolina Chapter
8304 Druids Lane
Raleigh, NC 27613-4321

ADVANCE PROGRAM &
REGISTRATION FORM

The Eastern NC Chapter of the
IEEE Electromagnetic Compatibility
(EMC) Society

Proudly Presents

EMC Design Concepts and Applications for the Real World

A Tutorial and Exhibition

Honored Guest Speakers
Dr. Bruce Archambeault, IBM
Research Triangle Park, NC
and
Lee Hill, SILENT
Amherst, NH

Dr. Archambeault is the author of the renowned EMC book:
PCB Design for Real-World EMI Control

Wednesday, March 9, 2005

at the

Hilton RDU at RTP
4810 Page Road
RTP, NC 27709

Program Outline

otherwise known as
"The Bruce Lee Show"

Wednesday, March 9, 2005

8:30	**REGISTRATION & EXHIBITS** **CONTINENTAL BREAKFAST**
9:30	**Inductance in PC Boards, Connectors, and Cables (with demonstrations)** Lee Hill
11:00	**BREAK**
11:30	**The Ground Myth** Dr. Bruce Archambeault
1:00	**LUNCH**
2:00	**Illustrations and Demonstrations of Signal Returns, Grounds, and Ground Problems in Product Design** Lee Hill
3:30	**BREAK**
4:00	**Decoupling of PC Boards for EMC and Functionality in the Real World** Dr. Bruce Archambeault
5:30	**ARCHAMBEAULT BOOK SIGNING**
7:00	**EXHIBITS RECEPTION**

Speaker Biographies

Mr. Lee Hill and Dr. Bruce Archambeault are currently serving on the IEEE EMC Society Board of Directors. Mr. Hill is a former Distinguished Lecturer of the EMC Society and is the current chairman of the program. Dr. Archambeault is a current Distinguished Lecturer for the EMC Society. Detailed biographies are available at …
www.Compliance-Engineering.com/bio.pdf

The Program

Mr. Lee Hill will start the program by discussing inductance in PCBs, connectors, and cables. Many electrical engineers, PCB designers, and EMC engineers first learned about inductance in the context of energy storage and phase angle between current and voltage. Unfortunately, in practical PCB and system EMC design, these concepts are virtually useless. This presentation rigorously defines and provides demonstrations of inductance along low and high frequency signal paths. Mr. Hill will provide examples of "good" and "bad" designs where self and mutual inductance can be easily visualized without complex mathematics. In his afternoon presentation on illustrations and demonstrations of signal returns, grounds, and ground problems in product design, Mr. Hill asks: "What picture comes to your mind when someone says the word "ground" to you within the context of electrical design?" Most electronic and EMC design personnel describe surprisingly different electrical circuit concepts when asked to define exactly what "ground" means to them. This presentation discusses in detail the three different functions of signal ground. Ground loops within PCBs and systems are formally defined, with a detailed discussion of their characteristic magnetic and common impedance immunity problems.

Dr. Bruce Archambeault will first present "The "Ground" Myth." The term "ground" is probably the most misused and misunderstood term in EMC engineering, and in fact, in all of circuit design. Ground is considered to be a zero potential region with zero resistance and zero impedance at all frequencies. This is just not the case in practical high-speed designs. The term "ground" is a fine concept at DC voltages, but it does not exist at the frequencies running on today's typical boards. This presentation discusses the origin of the word "ground", what we really mean when we use the term "ground" and how to optimize our designs to achieve the over all goals for our reference strategy. In the afternoon, Dr. Archambeault will present decoupling of PCB's for EMC and functionality in the real world. Decoupling of power and ground-reference planes is an important issue for both EMI emissions control and for circuit functionality. This topic has generated a lot of technical papers, and controversy. This talk focuses on the sources of noise that the decoupling capacitors are intended to control, the physics involved in the noise propagation, and how to properly analyze the decoupling capacitor performance. The analysis must be performed in BOTH the time domain and the frequency domain. The frequency domain analysis is a steady state analysis, and will determine resonances, which are most useful for EMI emissions analysis. The time-domain analysis is a transient analysis and will help determine how well the current is delivered to the IC, and ultimately, how large (or small) the generated noise pulse will become. Real-world examples of measurements, as well as computer simulations, are used to demonstrate the optimal decoupling strategy.

FEE SCHEDULE

IEEE Members, Postmarked by Feb 15	**$125**
IEEE Members, Postmarked by March 1*	**$175**
IEEE Members, After March 1 or at Door	**$200**
Non IEEE Member Additional Charge:	**$25**
PCB Design for Real-World EMI Control by Archambeault, ordered by March 1.	**$125**
Full-time Students with copy of valid Student I.D., Postmarked by March 1:	**$99**
Unemployed or retired IEEE Members	**$99**
Tutorial Record, with advance registration:	**Free**

* Please do not mail after March 1.

The IEEE EMC Eastern NC Chapter

Chairman and REGISTRATION:
Glenn Robb, R T Compliance Engineering
919-673-5057, Robb@Compliance-Engineering.com

Tabletop Exhibits

Dave Guzman, EMC Technologists
919-832-6244, daveguzman@emctech.com

Hotel Information and Arrangements

Courtesy of Janet O'Neil, ETS-Lindgren
425-868-2558 , j.n.oneil@ieee.org

Hilton Raleigh-Durham Airport at RTP
4810 Page Road, Phone 919-941-6000
Formerly a Holiday Inn, this white mansion on a hilltop is visible from the Page road exit (#282) of I-40. East or Westbound I-40 may turn right on Page Road and right onto Creekstone Drive. "EMC Society" group rates of $129 are available if booked before February 18.

The Exhibition

There will be an exhibition by vendors of EMC products and services adjacent to the technical presentation, where a continental breakfast, morning and afternoon refreshments will be served during breaks. During the reception and book signing with Dr. Bruce Archambeault from 5:30 to 7:00 pm in the exhibit area, heavy appetizers will be served. Drink tickets will also be provided to attendees so they can enjoy the "Happy Hour" open bar. A raffle will be held during the reception for great prizes. You must be present to win! Eastern NC EMC Chapter IEEE members are welcome to attend the reception only at NO CHARGE provided a registration form is completed and sent in advance. A badge will be available for the reception only attendees upon arrival at 5:30 pm.

Registration Information

Name:_____
Title:_____
Company: _____
Street Address: _____
_____
_____
City:_____ **State:**_____ **Zip:**_____
Daytime Phone:_____
e-mail Address:_____
IEEE Member: Y___ N___ IEEE #:_____
Full-time Student: Y___ N___
(Please attach copy of Student ID to obtain Student rate)

Registration by Mail

Registration Total Per Fee Schedule

Check Enclosed in Amount of: _____
(Checks payable to: IEEE EMC Eastern NC Chapter)
-- OR --
Credit Card Payment – Please Provide:
Name on Card:_____
Credit Card No:_____
Expiration Date: _____
Amount Charged: $ _____

Signature: _____

Mail to: **IEEE EMC Eastern NC Chapter**
c/o Glenn Robb
8304 Druids Lane
Raleigh, NC 27613-4321

Registration by FAX

Fax To: **(772) 619-8262**
Credit Card Registration Only

The registration fee includes one copy of the tutorial record for pick up at "The Bruce Lee Show", continental breakfast, refreshments, lunch, and evening reception. The organizing committee reserves the right to substitute speakers, restrict size, or to cancel the tutorial. In the event the organizing committee cancels the tutorial, registration fees only will be fully refunded. Individuals canceling their registration prior to February 15 will receive a full refund. No refunds will be made to individuals who cancel their registration after February 15. Substitutions are allowed. Attendance is limited. Registration will be confirmed on a first come, first served basis.