


# Spectral Lines



[www.scvemc.org](http://www.scvemc.org) Santa Clara Valley Chapter of IEEE Electromagnetic Compatibility Society

March 2001 issue

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$$\nabla \times \vec{E} = - \frac{\partial \vec{B}}{\partial t}$$
$$\nabla \times \vec{H} = \frac{\partial \vec{D}}{\partial t} + \vec{J}$$
$$\nabla \cdot \vec{D} = \rho$$
$$\nabla \cdot \vec{B} = 0$$

## SCV EMC Society Meeting

### "OPTIMIZING GBIT ETHERNET IDLE PATTERN FOR BETTER EMC PERFORMANCE"

Tuesday, March 13, 2001

The March meeting of the Santa Clara Valley EMC Society will be held at SGI in Mountain View, 1600 Amphitheatre Pkwy., building 40, in the Presentation Center above the lobby. The social gathering will start at 5:30 PM, and food and drinks will be available. **The technical presentation will start at 7:00 PM.** A map with the location of the SGI campus is available in this newsletter.

Author - Todd Knibbe, Agilent SPG

BS+MS in Electrical Engineering from Massachusetts Institute of Technology 1993. Worked for MIT Lincoln Laboratory on satellite free-space laser communication links 1991-1994. Worked for Hughes Network Systems designing satellite radio transceivers (DirecTV) 1994-1999. Currently an Applications Engineer with Agilent Technologies.

#### ABSTRACT:

Of all the possible data patterns used in a Gigabit-Ethernet system, the Idle Pattern dominates the EMC emissions. It is typically used as a worst case scenario for EMC characterization and testing. This is because in many systems, the steady state Idle Pattern consists of a repeating 20-bit sequence, causing a very distinct emissions spectrum which can be radiated by high-speed serial components when no data is being sent. However, the Gigabit Ethernet standard allows for some flexibility in the implementation of Idle Pattern. Software/Firmware can be modified to lengthen/randomize the Idle Pattern, lowering peak emissions and improving EMC compliance dramatically. Reduced emissions in a multi-port Gigabit Ethernet system using these alternative Idle Patterns was demonstrated. The 10-Gigabit Ethernet Alliance is already applying these lessons to reduce Idle Pattern emissions in next generation 10-gigabit Ethernet systems.

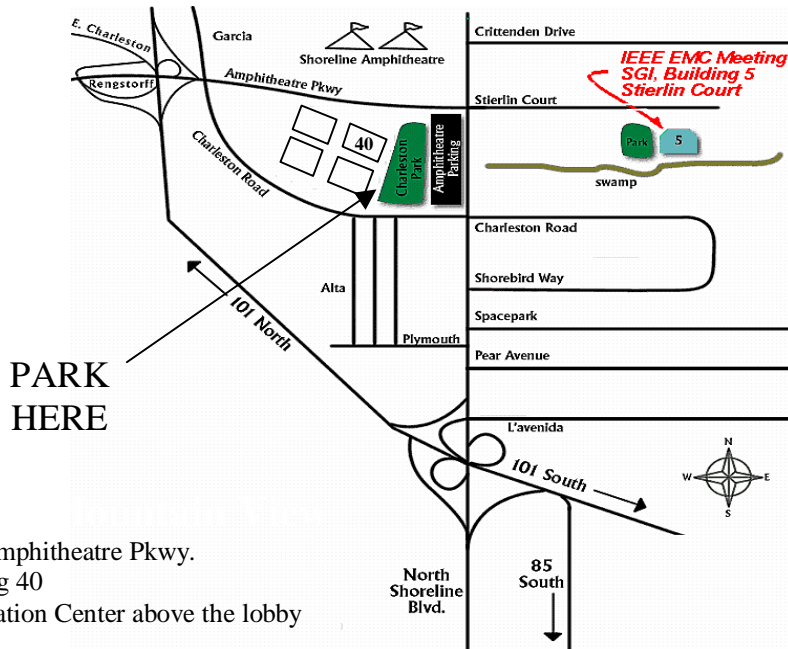
#### OUTLINE:

Introduction  
GbE Idle Pattern and EMC Performance in GbE systems  
8B/10B Encoding  
Basic discussion of 8B/10B encoding system used by GbE systems  
Idle Pattern  
Implementation of GbE Idle Pattern using 8B/10B encoding  
Initial Experiment  
Initial experiment with alternative GbE Idle Patterns to reduce EMI  
EMC Testing of Alternative GbE Idle Patterns  
EMC testing with commercial system and alternative GbE Idle Patterns  
10GbE Committee Recommendations  
Alternative (Randomized) Idle Pattern included in 10GbE standard

Anyone interested in presenting an outline of EMC-related topics should contact Tom Cokenias (trephonc@macconnect.com) at 650-726-1263.

For more information about the newsletter and its distribution, please contact the editor Neven Pischl (npischl@cisco.com) at 408-527-7874.

# SCV-CHAPTER OF THE IEEE EMC SOCIETY MEETING, 13 MARCH 2001



Dated Material - Meeting Notice  
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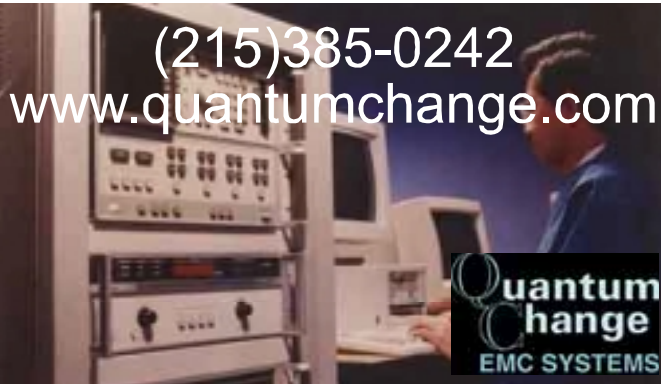
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