

3-Day Practical High Speed PCB Design

Signal Integrity and EMC

With the advancement of today's technology, high-speed devices have rise/fall times as low as 1 ns. Signal traces in the printed circuit board (PCB) can no longer be treated as simple short-circuit interconnects; instead they behave as transmission lines. The fast slew rate can contribute to signal integrity (SI) and electromagnetic interference (EMI) problems, such as impedance mismatch, signal reflection, crosstalk, ground bounce and radiation. Thus, it is highly possible that a high-speed PCB fails to work due to SI & EMI issues. Proper PCB design techniques and good understanding of high-speed concepts are required to ensure the smooth transition from circuit design to first prototype and final product.

Course Outline

Day 1

Introduction to Signal Integrity (SI)

- What is SI/EMI, definition of "High-Speed" PCB
- What are the common SI problems in High-Speed PCB

Transmission Lines and Signal Propagation

- What is transmission line
- Causes of delay, attenuation, reflection, and dispersion
- How to properly terminate transmission lines to diminish signal reflection

PCB Stack-up

- What are the factors in selecting PCB stack-up
- What is the relationship among trace width, dielectric thickness, dielectric constant, etc to trace impedance
- How will PCB stack-up configuration affect signal quality
- Steps to make a good PCB stack-up

Hands-on Session: Demonstrating SI/EMI issues via simulations

Day 2

Crosstalk

- What is Crosstalk
- How to minimize crosstalk between adjacent traces

Differential Signaling

- Why use differential signaling
- How to design a differential pair on PCB

Good Layout Techniques for High-Speed PCB Design

- Component placement planning and routing topology
- Minimize discontinuities, radiation, ground bounce, power sag, etc

Hands-on Session: Demonstrating SI/EMI issues via measurements

Day 3

EMC Regulation

- Overview of EMC Regulations
- Towards CE Certification

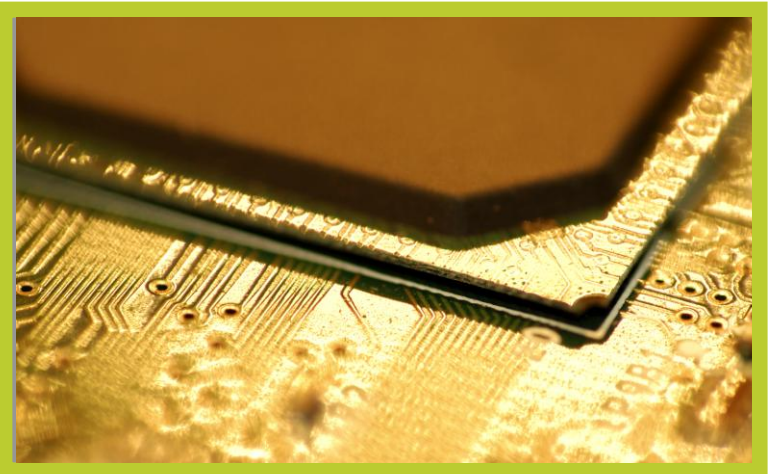
Emissions and Susceptibility Tests

- Radiated emissions
- Conducted emissions
- Radiated susceptibility
- Conducted susceptibility

Transient Immunity Tests

- Burst/electrical fast transient, Surge, Electrostatic discharge
- Power quality

Hands-on Session: EMC Measurements at Anechoic Chamber



Public Training Session



"Useful PCB design tips"

"No complicated formula"

"Explained with simple analogy"

"Witness EMC measurements at Anechoic Chamber"

Date: 31 Oct – 2 Nov 2012 (Wednesday - Friday)

Time: 0900 - 1700

Venue: Details as follows

Day 1-2

Bunga Dahlia Function Room
Renaissance Melaka Hotel
Jalan Bendahara
75100 Melaka, Malaysia

Day 3

Multipurpose Anechoic Chamber, A0004
Faculty of Engineering
Multimedia University (MMU)
Persiaran Multimedia
63100 Cyberjaya, Selangor, Malaysia

Register by 28 September 2012 to enjoy early bird discount.

Certificate will be awarded to participants who complete the training.

Lunch, refreshments and training handout provided and included.

Transportation and accommodation not included.

3-Day Practical High Speed PCB Design

About Go Training

Go Training applies effective pedagogical methodologies that demonstrate case studies and hands-on practical skills, in addition to explaining clearly how things work in principle. Every course that we conduct is delivered by a subject matter expert who holds the academic qualification and working experience in that specialization. On the days when they are not teaching, our trainers work on consultancy projects and technical deliveries. Their work has received numerous recognition and awards in the industry. Our team of trainers has collectively published more than 100 international journal and conference papers, and 2 technical text books. Some have also been invited as keynote speakers at numerous international conferences, and as principal consultants for various industries.

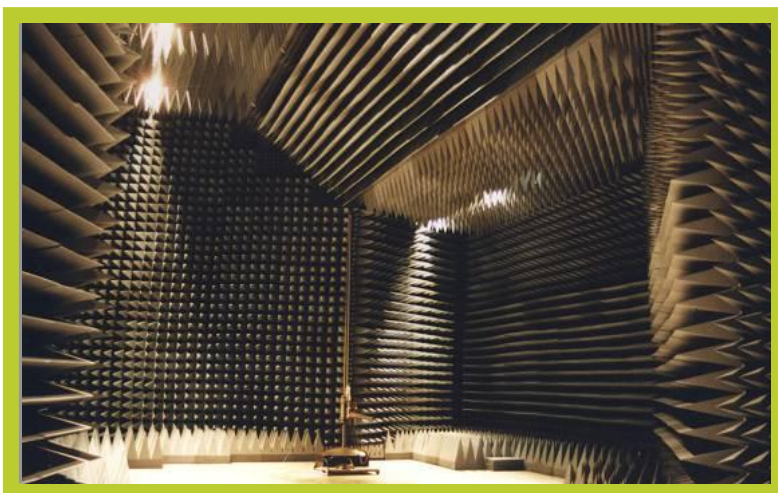
About the Instructor

Mr Chai Ched Chang received his B.Eng (Hons) from University of Malaya, Malaysia, and M.EngSc from Multimedia University, Malaysia. He was one of the pioneer researchers on Signal Integrity (SI) in Multimedia University. From 1998 to 2001, he had accomplished research projects in crosstalk, PCB modelling using 3-D full-wave Finite-Difference Time-Domain (FDTD) method, and lab measurement. His research outcome was published in reputable international conference and journal through Multimedia University.



Mr Chai then began his career as a Signal Integrity engineer in 2001 at Ultimate Technologies Asia Sdn Bhd, and specialized in designing High-Speed Printed Circuit Board. He had delivered many consumer electronics printed circuit board designs, where he is specifically experienced in resolving SI issues associated with high-speed memory (SDRAM, DDR, DDR2, DDR3), differential signaling (LVDS, HDMI, USB, PCI Express, Ethernet), and other digital interfaces (FPGA interface, FLASH memory, Video bus, ADC & DAC). He also has vast experience in making PCB stack-up, high-speed signal simulation and analysis.

In 2012, Mr Chai left Ultimate Technologies Asia as Chief Operating Officer and Chief Technical Officer, and started his company, iRtec Consulting Sdn Bhd. With 14 years of combined experience in both research and industry, he continues to strive to provide the best Signal Integrity consultation service with the vision to help his clients design products that meet their stringent quality requirements and shorten their product development cycle.



Hands-on session: EMC Measurement in Anechoic Chamber

**HANDS ON LEARNING
WITH LATEST TECHNOLOGY**



Go Training

Technical Training by Expert in the Field

Suite 1.5, Inkubator K-Ekonomi,
Jalan Business City, Melaka International Trade Centre,
75450 Ayer Keroh, Melaka, Malaysia.

t +606 252 3059

f +606 252 3059

m +6013 630 3125 / +6012 607 5537

e enquiry@gotraining.com.my

w www.gotraining.com.my