Track 1: Power

Session 1 — Lessons Learned from TI's Design Services Group

*Presented by Brian King, Texas Instruments*

This topic will cover some unique applications and circuits. Specific topics include paralleling POE PD power supplies, synchronous rectifier drive methods, green mode and the UCC28600, LED drivers and multiphase boosts with the TPS40090. In addition, design methods and lab hints will be provided for isolated power supplies, audio amplifier power supplies and single and multiple phase buck converters.

Session 2 — Component Selection, Layout and Thermal Design Consideration for DC/DC Converters

*Presented by Scot Lester, Texas Instruments*

DC/DC converters with internal transistors and compensation have become very popular due to their relative ease of use. This topic covers how to select the external components and properly layout the circuit to achieve the maximum performance of the converter. Several good and bad layout examples are provided to show how layout impacts sensitive circuits. Thermal layout for linear regulators is also explored.

Session 3 — DDR Memory Power

*Presented by Richard Garvey, Texas Instruments*

Powering Dual Data Rate (DDR) memory modules in end user equipment can be challenging for today’s system designs. Learn how to understand DDR Power requirements and how TI's portfolio addresses the power needs of modern memory modules.

Session 4 – Digital Power UCD9112 Digital Power — UCD Buck Controllers

*Presented by Adrian Harris, Texas Instruments*

Digital Power technology promises to revolutionize the way power architectures are designed. In this session, we will review TI’s latest product developments along with the theory of digital control. System level benefits and application examples will also be covered along with device configuration details using an intuitive graphical user interface (GUI). A product demonstration using the Fusion Digital Power Design Tool and the UCD9240 evaluation board will be given.

Session 5 – UCC28060/28070 Interleaved PFC Controllers

*Presented by Richard Garvey, Texas Instruments*

Introduction to transition mode and constant current mode interleaved PFC controllers. Pin by pin function description of each controller will be presented along with relevant design equations. EVM test data will also be presented along with issues and solutions.
Track 2: Wireless Infrastructure

Session 1 – High Speed Amplifier Design Considerations  
*Presented by Jim Karki, Texas Instruments*  
Voltage feedback (VFB) and Current feedback (CFB) amplifiers are the two most common high speed op amp architectures in use today. This presentation develops VFB and CFB models from simplified schematics, and shows the impact on amplifier circuit design, feedback and stability, and highlights the similarities and differences. Application comparisons are shown to point the designer to the right type of op amp given the application they are developing. The presentation then shows how these principles are applied to high speed op amp PCB layout giving practical dos and don'ts of high speed layout.

Session 2 – Clock Synchronization Solutions for Serial Link Communications  
*Presented by Roland Moubarak, Texas Instruments*  
The presentation focuses on VCXO and on Chip VCO based product to start, synchronize and synthesize any multiplier or divider of the recovered reference clock. This concept applies to Optical communications, Cable communication and SERDES backplanes communications. We will conclude with a Clocking Solution of Remote Radio Head over OBSI Serial Link example.

Session 3 – High-Speed Data Converters 102  
*Presented by Yiannis Papantonopoulos, Texas Instruments*  
This session deals with some of the common issues that haunt the proper application of ADCs. This is meant for the AFAs that have a working understanding of data conversion fundamentals already. We will treat subjects such as clocking and jitter, driving the analog input, driving/capturing digital data effectively and layout considerations. The session will focus more on real-world practical issues and their solutions, and less on theoretical or mathematical derivations.

Session 4 – High-Speed Data Converter Tools  
*Presented by Yiannis Papantonopoulos, Texas Instruments*  
With modern high performance DAC sample rates at 1GHz and similarly, ADC sample rates at 500MSPS; many customers may have challenges evaluating such high speed fast parts. The HS Data Converters team has developed a series of hardware tools and software tools to make it easier to demonstrate and evaluate our DAC and ADC portfolio. This seminar will provide relevant training on how to use the TSW3100 pattern generator and the TSW1100 logic analyzer, such that you can effectively demonstrate HS Data converter products to your customers and assist them with their evaluations.
Session 5 – Clocking Schemes for High Speed Data Converters

*Presented by Madhu Balasubramanian, Texas Instruments*

Are you aware of the clocking challenges that need to be overcome in order to achieve High-Speed Data Converters’ (ADCs and DACs) datasheet performance on SNR and SFDR? And are you interested in learning about the clocking techniques, using TI’s ultra-low jitter clock devices, to overcome these difficulties? This presentation focuses exactly on these topics for maximizing the data converter’s performance.
Track 3: Low-Power Design

Session 1 – Designing for Ultra-Low-Power with MSP430

*Presented by Mike Mitchell, Texas Instruments*

Realizing a low power system design when every micro amp counts is rarely an easy task to achieve. Such an effort requires detailed knowledge of everything your MCU offers in the way of enabling ultra-low power as well as the features of any external components. This course gives practical instructions of how to realize an ultra-low power application using the MSP430 family. Special focus is given to specific ultra-low power features, how to select components for ULP applications, and coding techniques that reduce the power consumption of your embedded application.

Session 2 – Complete SOCs MCU Solutions for Portable Medical

*Presented by Mike Mitchell, Texas Instruments*

Portable medical devices such as portable medical meters, digital pulse oximeters and wireless electrocardiograms are looking for highly integrated intelligent peripherals and larger memory options all on a single chip to reduce overall system cost. MSP430 MCUs can provide up to three precision operational amplifiers — to handle high precision instrumentation — coupled with the on-board 12-bit ADC, 12-bit DAC, and direct memory access controller (DMA) complete a signal chain on chip solution that reduces the need for external components. Come learn about the first MSP430X device, the FG461x MCU series includes up to 120 KB of flash and up to 8-KB RAM memory. Learn the workings of this complete solution and how it can be used to improve your application.

Session 3 – Design Considerations for a Low Power Wireless System

*Presented by Mike Claassen, Texas Instruments*

There are several key considerations that can significantly increase the battery life of a low power wireless system. This presentation not only covers the power features of the Texas Instruments (formerly Chipcon) radio ICs, but also the power features of the MCU and how the two devices can work together to retain a robust network that is also truly low power.

Session 4 – Battery Chemistry and Pack Electronics

*Presented by Jinrong Qian, Texas Instruments*

This training session will review the rechargeable battery characteristics including battery charging requirements, temperature qualification, charging termination, self-discharging, safety monitoring, discharging under different temperature and rates, degradation mechanism, cycle life, and battery impedance for Li-Ion batteries. It will also talk about new emerging battery chemistries such as high safety battery LiFePO4 from A123 systems. Finally, it provides an overview of three basic gauging methods which are voltage correlation, Coulomb counting and impedance track gas gauge.
Session 5 – Battery Charging System Design Considerations  
*Presented by Jinrong Qian, Texas Instruments*

Battery charging has become a more complex task as power converters have continued to become more integrated. Earlier designs were stand-alone chargers whose only task was to charge a battery. Today battery chargers are expected to charge the battery and power the system in a safe manner. This topic presents battery-charging-system interactions and possible solutions when the system load is directly connected to the charge output. It also discusses the charger front end (CFE), a new safety trend for redundant protection with a high input-voltage rating for improving the charging system’s safety. In addition, two power-path-management topologies are presented that can power the system from the input while independently charging a battery. The selection process for these topologies is also discussed.
Track 4: Precision Analog

Session 1 – Noise Calculator, How Do You Use it in Design?
*Presented by Bill Klein, Texas Instruments*
This presentation covers two Design tools from TI; a noise generator tool which is a Lab View 4-Run Time executable that generates Gaussian white noise, uniform white noise, 1/f noise, short noise, and 60Hz line noise. Temporal data, spectrum and amplitude histogram are given. Secondly, a noise calculator tool which is an Excel spreadsheet that calculates the spot noise and integrated noise over a user specified bandwidth for inverting, non-inverting and transimpedance topology op amp circuits. Performance parameters are installed for all signal op amps. The user specifies the op amp, temperature, spot noise frequency and resistor values.

Session 2 – Link A/D Converters and Microcontrollers using Long Transmission Lines
*Presented by Bonnie Baker, Texas Instruments*
Precision devices are available so that you can build high performance systems. As you know, system layout and design is important, but if a system has multiple boards a critical piece of the PCB design is board interconnection. A poor PCB interconnection design can easily ruin a great design using fabulous parts. This presentation will focus on the critical factors when achieving a high performance PCB interconnection system. The focus will be on long transmission line effects, such as reflection, termination and cross talk considerations in twisted pair cable and long PCB trace. You will leave this session armed with an interconnect strategy for your next design.

Session 3 – Comparing Digital Isolation Techniques
*Presented by Tim Lafferty, Texas Instruments*
Multiple options are now available to electronics designers to implement galvanic isolation. Apart from isolation technologies like Capacitive, Optical and Inductive/Magnetic to choose from, they must also contend with the various isolation standards regarding voltage ratings and creepage/clearance distances. This app report intends to simplify the decision making associated with choosing the right isolation solution.

Session 4 – An Introduction to the National Instruments LabVIEW™
*Presented by Joel Garner, National Instruments*
Some of TI's signal chain tools, the ADCPro™ and TSW1200 utilize National Instruments LabVIEW as the interactive demo environment. This course will highlight the basic features of LabVIEW and how to navigate standard widgets, such as graphing. The TSW1200 platform will be demonstrated.
Session 5 – The Whole Signal Chain for Your Single-Supply RTD Application

*Presented by Bonnie Baker, Texas Instruments*

The high-accuracy RTD, is a common low-cost sensing element used for wide temperature range measurements (-200°C to +850°C). Even though using a low-cost, wide temperature-range sensor is a great advantage you will find that the 3V single-supply, RTD current-source presents its own unique accuracy considerations. During this session we will successfully design a 3V current source and signal conditioning circuit that optimizes RTD temperature measurements. We will also show a complete error analysis from the RTD to ADC output. Add in battery portable equipment and this session gives you the reference design you are looking for.
Track 5: Audio/Video

Session 1 – CCD and CMOS Sensor and Imaging AFE Architecture/Technology
Presented by Werner Metz, Texas Instruments
This session will focus on the fundamentals of CCD and CMOS image sensors architectures and technology. It will discuss the advantages/disadvantages of each, basic operations, and fundamental aberrations of each device. It will also focus on how the imaging AFE operates to correct the aberrations induced by each type of sensor such as dark current, kTC noise and other effects. This session will focus on the existing and emerging markets for imaging AFEs. It will discuss the markets, the market requirements and the product features specific to each market. How to identify the correct AFE depending on the customers imaging system and requirements and how these features are used in real world applications.

Session 2 – High-Speed Amplifiers — Video Tips and Tricks
Presented by Randy Stephens, Texas Instruments
In this session, Randy Stephens our resident video guru will present tips and tricks for designing with our new integrated video line driver devices. Randy will focus on some common customer issues when using TI's new video amplifiers with built-in filters (THS73xx family). Known issues and solutions will be discussed like I2C bugs and work-around, frequency response issues, how to interface to DAC/Encoder, and issues to be aware of when replacing passive filters with our devices. The session will also provide an overview of key video tests using the industry standard VM700 and VM5000 test systems.

Session 3 – How Do I Make It Sound Louder?
Presented by Sachin Ranganathan, Texas Instruments
My customer has asked me if TI has any parts with AGC/compression/DRC/limiter function. This session will describe these functions, and our solutions.

Session 4 – Minimizing Pop and Click in Audio Designs
Presented by Steve Crump, Texas Instruments
Every customer complains about the pops and clicks in our devices. We have made great advances in minimizing the level of pop and click IN the device, but the customers’ external circuits can also cause pops and clicks. Steve will give you some tips on how to debug pop and click complaints from customers.

Session 5 – Schematic Design and PCB Layout Techniques for EMC
Presented by Steve Crump, Texas Instruments
This course will discuss design techniques used to improve analog circuit performance in applications with significant RF energy. He will demonstrate how to apply these techniques using TI’s Class-D audio amplifiers as examples.

ADCPro is a trademark of Texas Instruments.
All other trademarks are the property of their respective owners.
© 2008 Texas Instruments Incorporated