



Texas Instruments

Tech Day Long Island 2009

Session Titles and Abstracts

Track & Course

Abstracts

Track 1 – Power

Reducing EMI Noise from Switch-Mode Power Supplies

Some designers experience high-frequency noise problems due to the introduction of switching power supplies in their systems. This presentation will explain how and where high-frequency noise is generated in switch-mode power supplies. The presentation will explain and show design methods to reduce or eliminate noise during the design and layout phases of the project. Topics such as part selection, board layout, clock synchronization, power-supply ripple rejection and post filtering will be covered.

NexFET™ – How To Design with Highly Efficient MOSFETs

TI's NexFET power MOSFETs are the next macro generation of low-voltage power MOSFETs with incredibly low gate charge and resistance. These devices enable high-efficiency and high-frequency DC/DC converter designs. The presentation will cover device structure, characteristics, layout and gate-drive recommendations and results.

Power Concerns for LEDs Used for Display Lighting

Driver concerns for LEDs used in general-display lighting continue to change rapidly. Because of increased of efficacy (Lumens/Watt), LED use for lighting continues to move forward. LED lighting has its own vocabulary and set of issues that need to be understood by the design engineer. Starting with the important features of general display lighting, the current methods and practices employed to provide power are examined. LED manufacturers also assist with suggestions for improved light quality. A full study can be made of control techniques for various types and topologies of lighting systems with the advantages and disadvantages of various solutions highlighted.

High-Frequency Modeling: Feedback in the Fast Lane – Modeling Current-Mode Control in High-Frequency Converters

Small-signal analysis of current-mode control has guided power-supply designers for nearly thirty years. As switching frequencies increase to the megahertz range, circuit component characteristics begin to affect feedback loop response creating discrepancies between measured and predicted results. This session re-examines a small-signal control model, and discusses circuit parameter effects on feedback loop performance.

Digital Control of Power Supplies Made Easy

Would you like to take advantage of what digital control has to offer, but are concerned about having to write software? Does the mention of the z-transform give you nightmares? Look no further than the Fusion Digital Power™ Designer Tool from TI. No programming required! The Fusion Digital Power Designer offers a complete and easy-to-use graphical design tool for the UCD91xx and UCD92xx digital power supply controller families. Basic design features include controller pole-zero placement and frequency response analysis, while also fully handling higher-level configuration such as soft start/stop, input and output warning and fault thresholds, and even the specification of calibration constants. This session will provide an overview of the Fusion Digital Power Design Tool, a review of the digital control law design techniques used, and the relationship of the tool to the PMBus communication standard. A demonstration of the tool will be provided.



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Track 2 – Signal Chain

Features and Benefits of Various Industrial Networks

An important trend in factory automation is the continual increase in networked interconnection between sensors, controls, actuators and other system components. Automation designers face many challenges and tradeoffs in the development of a successful network solution. This session discusses the necessary choices in selecting a network technology appropriate for various specific applications. Technical constraints of several common field buses will be compared, and guidelines for selecting media and protocol will be discussed.

An Overview of TI's Next-Generation Clock Synthesizers, Jitter Cleaners and Synchronizers

TI's focus on high-performance clock products has generated a pair of innovative clocking solutions with a nice roadmap for the future. This presentation will highlight the features and functions of four of these devices. VCO clock generation, jitter cleaning, clock distribution, buffering and synchronization will be discussed as well as the requirements of the industry and how TI is addressing them.

High-Speed Data Converters – *Advanced*

This session deals with some of the common issues that haunt the proper application of ADCs. This is meant for those that have a working understanding of data-conversion fundamentals. We will be discussing 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.

Avoid Electrical Overstress on Your Op Amps

A very common question for op-amp applications is can the inputs of an amplifier go above the power supply rail? This could be a problem if there are multiple power supplies in a system. Another overstress scenario is if a signal from the "real world" or from a separate part of a system, under different power, appears on the input or output of an op amp. If you want to design systems that are reliable and easy to manufacture, and have low-latent field failures, this presentation is a must attend. During this hour we will describe common ESD cells and the input, output, and power-supply pin circuitry that are candidates for Electrical Overstresses (EOS) events. We will also discuss the ESD stress models for human body model, machine model, and charged device model. By the end of this session, you will understand the op-amp input/output circuit structure so you can design a robust system outside the integrated circuit that prevents EOS errors.

Designing Mixed-Signal Systems with Noise Reduction Techniques in Mind

Sensor applications often have low-level signals. A peaceful co-existence of the sensor signal, analog circuitry, and processor requires careful attention to layout and noise reduction techniques. In this session we will discuss three sources of noise, the paths noise travels and how to reduce noise to tolerable levels. We will discuss the proper selection and placement of noise isolating and limiting components to keep analog and digital noise out of sensitive input circuits.



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Track 3 – Signal Chain 2

Exploit the ADC to Your Advantage

Sensors that measure real-world variables seldom have output signals that can be directly connected to a data converter in a system. Typically, there are requirements to amplify, filter, shift offset and perform other conditioning functions. These analog signal processing functions are performed by various device families, each having unique strengths and application requirements. Join our experts in an informative exchange designed to help you better understand the basic characteristics of various data converter architectures, the special considerations that must be made when considering input signal conditioning and how to best optimize the design of your signal chain.

Designing the Appropriate System Around High-Speed Data Converters

Most high-speed analog circuit designers and applications engineers know that to truly get the advertised performance from a high speed data converter the system is as important as the converter itself. Without the appropriate clocking, power, and analog front-end even the most advanced device will fall short of expectations. In this session we will highlight 3 of our leadership data converters, the ADS5463, ADS6425, and the DAC568, and discuss what parameters need to be considered in designing a system around them.

Sensors and the Analog Interface

In this presentation we will discuss the way to monitor many different physical phenomena, such as temperature, air flow, humidity, and power. We will discuss numerous sensor characteristics and the various styles of sensor signal conditioning that you can implement in your systems. Throughout this presentation, the output of every sensor circuit will be suitable for a conversion to a digital signal. You will leave this session fully armed to tackle your on-board or remote-sensor challenges.

Compliance by Design *by LS Research*

This session will outline the importance of RF component selection and PCB layout techniques and how they can be instrumental in achieving regulatory approval and optimal design performance. This will include a brief discussion on the pros and cons of using RF modules, reducing risk with compliance prescans and the insight provided through measurement of antenna radiation patterns.

Approaches to Multichannel, High-Resolution Data Acquisition

Data acquisition systems that require high resolution typically employ delta-sigma analog-to-digital converters. This architecture of converter has traditionally presented some challenges when used in multichannel systems; for example, multiplexer timing must be carefully considered to comprehend latency through the converter digital filter. In some cases, this led designers to using a converter-per-channel approach, which brings with it challenges in synchronization, especially if simultaneous sampling is required. Recent developments in integrated solutions make tradeoffs such as these easier. This presentation will examine these issues and tradeoffs in light of these new solutions, and suggest applications where different approaches may optimize the overall system performance.



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Track 4 – Embedded Processing

OMAP™ and DaVinci™ Overview

TI has several embedded processing solutions that are tailored for digital video applications. They consist of integrated processors, software, tools and support to aid in simplifying the design process and accelerate innovation. In this session, we will review TI's portfolio including the new OMAP35x application processors and the DaVinci processors including TMS320DM644x, TMS320DM643x, TMS320DM64x, TMS320DM355 and the recently announced TMS320DM6467 HD transcode engine. Among the many application spaces for this technology, we can outline machine vision, video security, video telephony, digital media streaming and IP set-to-boxes (STB).

Introduction to Code Composer Studio™ (CCS) v4.0

CCS v4.0 is a major new release of Code Composer Studio that is based on the Eclipse open-source software framework. Eclipse is becoming very popular in the embedded development community and is now becoming a standard in development environments. This session will provide an overview and explain advantages to using CCS v4.0 for your development.

Evaluation and Development Using C2000™ MCU Low-Cost Tools

Selecting the right processor for your design is a crucial step in a new project. In some cases, a test run of the device beforehand can provide that extra bit of confidence that you're making the best decision. Once your design is underway, a robust development system of hardware, software and function or application libraries coupled with a world-class support network can mean the difference between fast time to market and too late to market. TI understands this and has taken great strides to enhance its portfolio of C2000 low-cost evaluation and development tools. Attend and learn details on the tools and software portfolio along with a demonstration of how to get up and running quickly with your C2000 design.

MSP4305xx: Bigger, Faster, Lower Power – The Next Generation MSP430

The next generation in MSP430 technology is here, delivering enhanced performance and deeper integration. This session provides an overview of the feature set and modules of the new MSP430F5xx device family. These devices feature a clocking system with new clock sources and fail-safe features, deliver increased 16-bit performance, enable new on-chip power supervision, and provide enhanced features for simpler code and lower power. The 5xx family will also enable integration of powerful new peripheral modules.

C2000™ MCU Digital Power Solutions: AC/DC and DC/DC

Digitally controlled power conversion is the enabling force of efficiency and performance improvement in today's power-supply and power-conversion designs. This presentation will focus on introducing TI's latest development solutions for both AC/DC rectifier power supply and DC/DC converters including Power Factor Correction (PFC), phase-shifted DC/DC, and highly efficient resonant DC/DC, etc. An introduction of basic power-conversion concepts and topologies such as PFC, DC/DC, interleaved PFC and DC/DC, and resonant DC/DC, will also be presented. Attendees will learn basic and advanced digital power-conversion concepts and gain an understanding of TI's digital power solutions.

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