Texas Instruments
Tech Day Portland 2009
Session Titles and Abstracts

Track & Course	Abstracts
Embedded Processing	
Essential Concepts in SoC System Design with OMAP™ and DaVinci™	Learn how to successfully develop with TI's OMAP and DaVinci devices. This session will provide a hardware overview as well as provide a dissection of software architecture. Attendees will gain an understanding of TI delivered software components (OSs, LSP, codecs), use cases, collateral and support paths, and system integration. Program management best practices will also be covered.
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.
DaVinci Hardware and Software Architecture Overview	DaVinci digital media processors are based on the TMS320C64x+™ DSP and ARM926 architecture and offer versions that can deliver real-time, multi-format, HD video transcoding. In this session, attendees will learn more about the features and capabilities of these devices and take a deep-dive tour into hardware and software architecture topics.
Exploring Windows Embedded CE 6.0 *by BSQUARE*	In this session, attendees will learn how to build an OS image using Platform Builder and Visual Studio 2005. The presentation will also cover some of the unique attributes of the OMAP 3 platform as it relates to the DSP and graphics accelerator, all running under Windows CE. Each attendee will receive an evaluation copy of Platform Builder with Visual Studio 2005.
Understanding 32-Bit MCU Peripherals Advanced Capability in Embedded Systems using the Piccolo™ MCU ControlSTICK	This hands-on workshop will provide an overview of the Piccolo MCU C28x™ core and a deep dive into the functionality and benefits offered in its feature-rich peripheral set optimized for real-time control applications. With the use of labs, attendees will gain insight into the onboard ADC, ePWM, HiResPWM, analog comparator and more. Sample projects include generation of an asymmetric PWM output with period and duty variation, triggered ADC conversion using an onboard filtered PWM output, use of comparators to generate a CPU interrupt on a cycle-by-cycle basis and more. Attendees will leave with a comprehensive understanding of the performance and capability offered in the Piccolo MCU series of devices.

Texas Instruments
Tech Day Portland 2009
Session Titles and Abstracts

Track & Course	Abstracts
Wireless	
RFID Overview: Technology, TI Solutions and Applications	A high level but comprehensive overview of the three globally accepted passive RFID technologies (LF, HF and UHF) and TI's RFID products, solutions and application/usage examples will be covered.
ZigBee® Smart Energy Solutions	A discussion of TI solutions for the ZigBee Smart Energy market will be provided, as well as a technical overview of the ZigBee Alliance Smart Energy Profile. Learn how you can use TI solutions to get to market fast.
Getting Started with SimpliciTI™ and the eZ430-RF2500	The first half of this module gives an overview of the components of the SimpliciTI network stack and their interaction in a SimpliciTI network. The second half of this module is hands on and covers setting up a SimpliciTI network and the utilization of the Smart RF Studio Tool to set up the radio component of the stack.
MSP430 in Low-Power Wireless Solutions	With a flexible peripheral mix and ultra-low-power architecture, the MSP430 is an ideal fit for mobile RF applications such as those supported by TI's low-power RF devices. The MSP430 and CCxxxx hardware pairing, software protocols, example applications, and the complete tool chain will be discussed for various markets including the industrial (sub-1 GHz), consumer (2.4 GHz) and IEEE 802.15.4/ZigBee®.
An Overview of Lower Power Cellular and GPS Platforms, Devices and Related IT Services Gateways for Creating End-to-End Asset Tracking Solutions *by Enfora*	This session provides a technical overview of an integrated wireless device platform developed by Enfora that combines global wide-area GSM/GPRS wireless connectivity and GPS location capability using TI silicon, allowing the user to retrieve critical information, such as asset movement, based on user-defined alerts, specific events or geofences, while at the same time optimizing power management and minimizing maintenance. This platform is configured to work seamlessly with Enfora's Services IT Gateway 2.0, which provides a user-friendly environment to directly connect, manage and provision wireless devices from existing enterprise applications. Users are provided with a detailed view of their mobile assets, enabling proactive management and systematic upgrades when needed. The latest release of the Services Gateway supports browser-based administration, command pooling and firmware-over-the-air (FOTA) support. The low platform and Service Gateway 2.0 middleware bring together the key hardware and software elements required to enhance the rapid deployment of business applications while providing the tie-in to existing IT infrastructure.

Texas Instruments
Tech Day Portland 2009
Session Titles and Abstracts

Track & Course	Abstracts
Data Conversion and Signal Chain	
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.
High-Speed Layout Considerations	This presentation will consider proper layout of high-speed systems utilizing op amps, data converters and clock chips. The key points discussed are high-speed models of common passive and PCB components, managing ground planes, when to use and when to clear them, optimum circuit routing, controlling parasitic capacitance, using bypass capacitors, avoiding ground loops, vias, and controlling impedance with transmission line techniques. Many high-speed signal chains will involve a mixed-signal boundary where the analog domain will cross into the digital domain. This presentation will provide guidance on factors you need to consider when crossing domains and techniques to ensure proper clocking of data converters with the goal of giving guidance on creating a successful high-speed signal-chain design.
Solving the Analog Front End Dilemma for High-Speed ADCs	In designing a signal chain, system engineers are required to meet performance and price requirements that largely become defined by the selection of the analog to digital converter (ADC). After selecting an ADC based off of system requirements, the signal chain must then be design to be transparent to the ADC specifications. Many times system goals also dictate that the signal chain must also be responsible for practical features such as gain, filtering, level shifting and single-ended to differential conversion. Relating concepts of dynamic range and SNR dictated by an ADC selection to a transparent, yet practical signal chain will be covered in this seminar. In particular, this seminar will cover: • How the ADC selection impacts signal chain architecture and component selection. • Relating system design goals to individual signal chain requirements. • Practical signal-chain design examples using the new High-Speed Rx Prototyping EVM. This EVM contains three distinct active drivers, each based on a different high-speed op amp, and each driving its own channel in a quad, 14-bit, 125-MHz ADC. The review will include lab measurements, a performance summary, suggested end applications as well as tips and tricks.
Clocking to Maximize High-Speed Signal-Chain Performance	Selecting a clock driver for a high-performance sampling system involving high-speed data converters is a hard task and often underestimated. It is especially harder for an analog-to-digital converter (ADC). If the ADC fundamentals are well understood, it makes the job of identifying required clock driver performance easier. Such a clock driver can be a simple (non-PLL) clock-distribution circuit, clock generator/synthesizer or jitter cleaner. A clock driver can do the signal processing such as frequency integer or fractional multiplication and division, level translation, skew control, etc. The higher the input frequency of an ADC, the more important the sampling clock jitter becomes and need to be kept at levels of the ADC's internal aperture jitter to achieve best possible SNR (and SFDR). This presentation will address sampling clock dependencies on the ADC performance metrics (namely SNR and SFDR), explain methods to calculate required sampling clock jitter, introduce TI high-performance synthesizers/jitter cleaners and show demonstrations of achieving best possible SNR (and SFDR) with such cost effective yet high-performance clocking devices.
Op-Amp Stability Analysis and Fixes	Any system that has gain is subject to stability issues. The basic conditions necessary for extended ringing and even sustained oscillation are connected with phase shift and gain. With information from the product data sheet with TINA simulation and bench tests a stable system can be realized.

Texas Instruments
Tech Day Portland 2009
Session Titles and Abstracts

Track & Course	Abstracts
Portable Power	
Buck-Boost Converters for Portable Systems	This topic presents several solutions to a typical problem encountered by many designers of portable power—how to produce 3.3 V from a single-cell TI's fully integrated TPS63000 buck + boost converter and other buck-boost solutions. The efficiency, overall ease of use, and operation in “transition mode”—when the converter switches from buck to boost mode—are discussed.
Li-Ion Technology and Battery Management	Li-Ion, Li-Ion Polymer technology and future development trends; theory/concepts of battery gas-gauge systems, introduction to ImpedanceTrack™ technology are discussed.
Preventing Battery System Failures in Portable Devices *by MicroPower*	Sony has implemented the largest battery pack recalls in the history of portable computing. Catastrophic safety issues – ranging from under-performance to explosions – with portable battery systems has heightened concern over battery system safety. We'll examine the most common causes for dangerous failures in battery systems, and provide design guidelines and techniques for power system designers to eliminate these failures in their own portable products. These design guidelines include cell selection and qualification, protection circuit design and placement, battery authentication, charging regimens, mechanical considerations, and battery integration with portable devices. This presentation will provide insight into developing portable power systems that are extremely safe and preclude dangerous failures.
Energy Harvesting *by Cymbet*	This session provides an overview of how to design autonomous wireless sensors using various energy harvesting transducers, energy conversion circuits, energy storage, sensors and the TI MSP430 and CC2500. Various configurations of autonomous self-power sensors based on energy harvesting will be detailed. Low-power EH RF system architectures will be discussed and design examples will be shown. An example of a Zero Power Wireless Sensor will be demonstrated using the eZ430-RF2500-SEH Demo Kit.
Illuminating Facts on LEDs and the Drivers that Love Them	The use of LEDs explodes in areas such as automotive, torch lights, video walls, LCD backlight and general lighting. This session will cover thermal, optical, chromatic and performance concerns for your system. Will also cover the component of the LED system that is getting less attention – the LED driver. LED driver circuitry is different from typical power supply. Will explain solutions for and typical devices used to get the most out of the LEDs.

Texas Instruments