Technology Day Austin
August 18, 2011

Time	Session	Track 1 Signal Chain	Track 2 Wireless Connectivity	Track 3 Embedded Processing	Power
8:30 to 9 a.m.	**Registration & Continental Breakfast**				
9 to 10 a.m.	1	SuperSpeed USB & Thunderbolt: Overview & Comparison	Texas Instruments Wireless Products and What Works Best for Your Design	Under the Hood of FRAM and the New MSP430FR57xx MCU Family	How TI PowerBlock, Power Stage and NexFET™ Technology Enable the Highest Efficiency and Power Density in Low- to Medium-Input Voltage Power Systems
10 to 10:15 a.m.	**Break**				
10:15 to 11:15 a.m.	2	ESD Protection: Protecting the Complete System	*Bluetooth*® Low Energy and ANT: Very Low Power Wireless Connectivity Solutions	Tablet Design: Using TI's Products to Develop your Solution	Switching Power Supplies Made Easy with SwitcherPro™ Software and the New, Powerful TINA-TI™ Software v9
11:15 a.m. to 12:30 p.m.	**Lunch**				
12:30 to 1:30 p.m.	3	Low-Power, High-Resolution Data Converter Techniques for Industrial, Sensing and Metering	Adding Wi-Fi and *Bluetooth*® to TI Embedded Processors (MCUs and MPUs)	Video Solutions Demystified	Achieving Better Transient Response with Less Output Capacitance from Your DC/DC Power Designs
1:30 to 1:45	**Break**				
1:45 to 2:45 p.m.	4	Understanding Clock Basics and Portfolio – the Capabilities and Limitations of Frequency Generation and Meeting Jitter/ Phase Noise Requirements	Lower Power RF Design Tools to Help During Characterization and Testing of Your RF Products	Concerto™ MCUs – Eliminate Compromises by Combining the ARM Cortex-M3 with C28x™ DSPs in a Single-Chip Solution	Wireless Power: Total Solution for Charging Using the Wireless Power Consortium Standard
2:45 to 3 p.m.	**Break**				
3 to 4 p.m.	5	New, Differentiated Audio-Enabled Products from TI for 2011 that Solve New Market Trends	Energy Harvesting, Wireless Charging and Zero Power Devices *by Cymbet*	Getting the Most Out of Your Ultra-Low-Power MSP430™ MCU Design	Digital PWM Controllers for the Analog Point-of-Load Designer

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Session Titles and Abstracts

Track and Course	Abstracts
Track 1 – Signal Chain	
SuperSpeed USB & Thunderbolt: Overview & Comparison	SuperSpeed USB has shown significant growth since the first certified products became available in early 2010. Many customers are still asking: What is this? & What can I do with it? In addition with the Intel/Apple announcement of Thunderbolt, many in the market have become even more confused on what each technology is intended for and when they should be used. The first part of this session will present a brief overview of SuperSpeed USB. This will be followed by a brief overview and Thunderbolt followed by a discussion of whether Thunderbolt and USB are competing or complimentary. Finally the presentation will review TI's SuperSpeed USB products and plans.
ESD Protection: Protecting the Complete System	System-level ESD protection at the interface connector is particularly challenging. Semiconductor chips based off advanced low voltage, small geometry process nodes enable miniaturization, more power savings and better economy of scale. But this poses an even bigger challenge to provide ESD immunity, since it becomes more difficult to design robust ESD solutions as process geometry gets smaller. External ESD clamp circuits or integrated protection devices are popular choices to enhance system-level ESD protection. This presentation will cover key system-level ESD challenges, common techniques to improve overall system-level ESD performances, TI's IPD solutions, and selecting the right ESD clamps for a given application.
Low-Power, High-Resolution Data Converter Techniques for Industrial, Sensing and Metering	Industrial sensor signal conditioning can be driven by numerous design requirements including integration, power consumption and/or precision measurement. Temperature sensing using RTDs and thermocouples (as well as various bridge and pressure sensing) are common to industrial process and control. But what are the trade-offs that one must consider when optimizing a design? This topic will focus on the design considerations and trade-offs in ADC-based techniques for optimizing low-power, precision signal-acquisition systems in a modern industrial design.
Understanding Clock Basics and Portfolio – the Capabilities and Limitations of Frequency Generation and Meeting Jitter/Phase Noise Requirements	Selecting a clock driver for a system consisting of single or multiple ICs should be a simple task. If only a single frequency from an oscillator or a crystal is needed, then it really is a simple matter: just select the frequency, tolerance and signaling level. When a system becomes more sophisticated, it may require a clock driver to support various digital and analog ICs; then things can get a little complicated. As additional requirements come into play, it can become frustrating when the specifications of the receivers don't match explicitly with those of the clock driver. Some requirements are very obvious, such as supply voltage, propagation delay, temperature range, etc.; others, such as jitter, pulse skew, duty cycle, rise/fall time and power dissipation, can be application- and configuration-dependent. Even for programmable clock drivers, frequency generation and/or jitter number can be a little perplexing. With a basic knowledge of clock drivers and the typical parameters associated with clock drivers and system requirements, it's easier to find the right clocking solution from our portfolio for cus (PLL)-based buffer, a simple (non-PLL) clock distribution circuit, clock generator, jitter cleaner or synthesizer. A clock driver can perform signal processing such as frequency multiplication (integer or fractional) and division, distribution, level translation, skew control, and noise cleaning. This presentation will address the basics of clock classification, common definitions of clock parameters, various signaling levels involved in clock distribution, common clock termination, and how a PLL contributes in terms of jitter addition or cleaning. It also will describe the capabilities and limitations of clock drive in terms of frequency generation, configuration-dependent noise/jitter variation, and how devices can produce the right clock frequencies and low jitter to meet system requiremen with examples.

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New, Differentiated Audio-Enabled Products from TI for 2011 that Solve New Market Trends	Trends in markets using audio change overnight. This presentation highlights recent audio products that have been released by TI to address these new market challenges, how (specifically) TI solved the challenges, and how we are making it easy for customers to speed their time to advantage with these new products/features and resulting user-perceivable benefits.
Track 2 – Wireless Connectivity	
Texas Instruments Wireless Products and What Works Best for Your Design	Ever wonder what wireless standard best fits into your embedded system? Texas Instruments supports a variety of wireless products from standards such as *Bluetooth*® and ZigBee to proprietary radio hardware. How all of the standards fit in a typical design can be confusing. This session covers the TI wireless portfolio and compares the operation of these radios and standards with the trade-offs of each. The discussion will touch on 6LoWPan, *Bluetooth*®, *Bluetooth*® low energy, ZigBee, ANT, Wi-Fi, RF4CE, the SimpliciTI™ Internet protocol, RFID and proprietary solutions. We will also talk about what modules are available for evaluation and design support.
Bluetooth® Low Energy and ANT: Very Low Power Wireless Connectivity Solutions	*Bluetooth*® low energy (BLE) and ANT represent wireless standards operating in the 2.4-GHz arena that are gaining lots of momentum due to their small size, reasonable cost and very low power requirements. They enable communication between self-powered devices in an extensible network environment. This session will present an overview of the BLE and ANT standards before diving into the key priorities and challenges when designing with these two protocols. The session will then cover how to set up a quick BLE and ANT link.
Adding Wi-Fi and *Bluetooth*® to TI Embedded Processors (MCUs and MPUs)	Quickly and easily add Wi-Fi and/or *Bluetooth*® technology to systems using TI MPUs (AM/DM37x, AM18x) and MSP430™ MCUs. In this session, we will start with an overview of the WL1271-TiWi 802.11b/g/n + *Bluetooth*® transceiver and CC2560-PAN1325 *Bluetooth*® transceiver, and then go into the details of the platform. The platform provides complete system integration of all components including WLAN and *Bluetooth*® hardware, host hardware, Linux WLAN drivers, supplicant, TCP/IP integration, *Bluetooth*® stack, profiles, example code for configuration, and sample source applications. We will walk through the sample applications and explain how you can get started developing Wi-Fi and *Bluetooth*® applications.
Lower Power RF Design Tools to Help During Characterization and Testing of Your RF Products	SmartRF™ Studio is a development tool designed to help you understand the operation and analyzing of Texas Instruments Low Power RF products. The tool provides an easy-to-use graphical user interface to control all of the chip's main RF parameters. It can also be used for performance testing and for finding the appropriate RF configuration settings for your system. The goal for this session is to familiarize you with SmartRF™ Studio and learn how it works and what it can do. You will learn how to use the tool to measure the output power from an RF transmitter, how to check the link quality and measure the packet error rate, how to export settings from SmartRF Studio for direct integration in your software, and how to customize the tool for your own needs.
Energy Harvesting, Wireless Charging and Zero Power Devices *by Cymbet*	New techniques and technologies are now available to create self-powered devices by harvesting ambient energy. Actual energy harvesting (EH)-based designs will be reviewed that use photovoltaic, piezoelectric, thermoelectric and electromagnetic EH transducers. New technologies in the areas of ultra-low-power MSP430™ MCUs; the CC430 combination MCU/integrated radio; wireless charging and communications using the TI passive low-frequency interface device (PaLFI); energy processors; solid-state batteries; and solar energy harvesting for the TI MSP430 LaunchPad kit will be detailed. The last portion of the session will include hands-on lab demos of various EH implementations.
Track 3 – Embedded Processing	

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Under the Hood of FRAM and the new MSP430FR57xx MCU Family	This session is intended to introduce MCU designers to the latest in non-volatile memory technology – Ferroelectric RAM (FRAM). You will gain experience with MSP430's first FRAM offering – the MSP430FR57xx family and become familiar with key architecture blocks such as the new power management module, clock system and FRAM controller. Advantages unique to FRAM such as ultra low active power, fast writes and unified code memory will be covered and attendees will learn about tools available to aid in starting development with this new addition to the MSP430 portfolio.
Tablet Design: Using TI's Products to Develop your Solution	The tablet form factor has become increasingly ubiquitous in both industrial and consumer applications and end users are increasingly expecting more connectivity in a battery powered, handheld package. TI has hardware solutions spanning the entire system, the software solutions from low level drivers and board support packages to multiple operating system options, and design partners to get your idea to market. Accelerating time to market and reducing complexity becomes easier by being able to tie TI to TI across the entire system. Join this session to learn more about TI's tablet strategy, products, and solutions available for your design.
Video Solutions Demystified	TI provides application-specific solutions to accommodate video needs and trends regardless of what imaging/video end equipment is in development. Attend this session to learn more about customized solutions for various market segments that simplify development by providing access to software, tools, third parties and local support.
Concerto™ MCUs – Eliminate Compromises by Combining the ARM Cortex-M3 with C28x™ DSPs in a Single-Chip Solution	Real-time control, connectivity and software simplicity come together in TI's Concerto™ MCU series. Building on the C2000™ DSP family's industry-leading C28x™ DSP core and control peripherals, Concerto MCUs add a host subsystem consisting of the ARM Cortex-M3 core and new communication peripherals such as USB OTG and Ethernet. Combined, the Concerto MCU's host and control subsystems make a cleanly partitioned, single-chip solution to eliminate compromises. Learn more about Concerto MCUs and how you can simplify hardware **and** software development in application areas including industrial control, renewable energy, digital power, electric vehicles and more.
Getting the Most Out of Your Ultra-Low-Power MSP430™ MCU Design	Realizing a low-power system design when every microampere counts is rarely an easy task. Such an effort requires detailed knowledge of everything your MCU offers in the way of enabling ULP 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™ MCU family. Special focus is given to specific ULP features, how to select components for ULP applications, and coding techniques that reduce the power consumption of your embedded application.
Track 4 – Power	
How TI PowerBlock, Power Stage and NexFET™ Technology Enable the Highest Efficiency and Power Density in Low- to Medium-Input Voltage Power Systems	Switching-power-supply FET technology is ever-advancing. TI's PowerBlock, Power Stage and NexFET™ technology enable ~92 percent efficiency at output currents of >100 A, and meet the ever-increasing power density and efficiency demands of inline and portable power systems. You will come away with a complete understanding of the system approach that NexFET technology facilitates in TI power management solutions and will understand TI's NexFET Power MOSFET technology's competitive advantages in the marketplace.
Switching Power Supplies Made Easy with SwitcherPro™ Software and the New, Powerful TINA-TI™ Software v9	In this hands-on training session, you will learn to generate custom power solutions in minutes with SwitcherPro™ software from Texas Instruments. SwitcherPro software allows you to select TI parts and real-world components, analyze designs for efficiency, stability, size and other design factors; and modify designs to meet your needs with Design Options, What If Analysis and User Defined Parts. Review your designs in the design report, complete with a full bill of materials and notes for layout. Please bring a laptop if you wish to follow along.

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Achieving Better Transient Response with Less Output Capacitance from Your DC/DC Power Designs	The TPS54225, TPS54226, TPS54235 and TPS54326 are new product offerings in the switchers with integrated FETs (SWIFT™) power product line. They represent a significant addition to the product line with a totally different control mode from other SWIFT devices. They are very low cost and require a minimum number of external components to target cost-sensitive consumer or other applications. These devices use a proprietary DCAP2™ Mode control scheme that exhibits some very high performance characteristics not normally found in low-cost devices, while also eliminating bothersome external compensation. Transient response is extremely fast and the TPS54226 and TPS54326 feature a power saving auto-skip mode. This presentation fully explains the DCAP2 Mode control scheme, shows its advantages and high-performance features, and provides competitive analysis with both TI and competitor products.
Wireless Power: Total Solution for Charging Using the Wireless Power Consortium Standard	TI's first wireless power solution for the mass market is called the bqTESLA100LP solution. This Qi-compatible kit includes both the transmit and receive ICs plus design to take a Wireless Power Consortium-based solution to market today. In this session, we will discuss the basics of wireless power, the Wireless Power Consortium and the TI devices that make up our first-generation solution.
Digital PWM Controllers for the Analog Point-of-Load Designer	This is an introductory session covering the UCD92xx digital power controller product line and Fusion Digital Power™ designer software (Fusion GUI), including the features and benefits of digital controllers and related UCD72/74xx drivers, as well as PowerTrain™ modules for nonisolated multirail power systems. Sequencing, voltage tracking, fault limits/response, communication and other topics will be covered. This will be followed by a configuration/monitoring/control example demonstrating the Fusion Digital Power designer's functionality and flexibility using UCD9224EVM-464 hardware.