Technology Day Rochester
October 13, 2011

Time	Session	Power Supply Solutions	Analog Design Considerations	Wireless Connectivity	Precision Analog	Embedded Processing
8:30 to 9 a.m.	**Registration**					
9 to 10 a.m.	1	Battery Management Basics	Signal Integrity Modeling and Simulation Capabilities Available to TI Customers	RF Basics, Tools and Getting Started	Shorten Your Concept to Prototype Time with TI's MAVRK™ Modular System-Level Reference Kit	Under the Hood of FRAM and the New MSP430FR57xx MCU Family
10 to 10:15 a.m.	**Break**					
10:15 to 11:15 a.m.	2	DC/DC Converter 101	How to Get the Best Performance Out of Your High-Speed Data Converter	Designing RF Systems with Low Power Consumption Targets	Introduction to Motors and Motor Control	What's Next for TI's ARM Based Microcontrollers
11:15 a.m. to 12:30 p.m.	**Lunch**					
12:30 to 1:30 p.m.	3	Wireless Power: Total Solution for Charging Using the Wireless Power Consortium Standard	High-Performance Differential ADC Input Interface Design	*Bluetooth*® Low Energy and ANT: Very Low Power Wireless Connectivity Solutions	Tackling EMI and RFI at the Board and System Level	Designing Motor Controls *by D3*
1:30 to 1:45 p.m.	**Break**					
1:45 to 2:45 p.m.	4	SEPIC Design Made Easy Using the TPS61165 and TPS61175	TINA-TI™ Software v9: A New Simulation Solution for 2011	Basics of Range and Frequency Selection for Low-Power Wireless by Anaren, Inc.	An Update on TI Analog Trends AND Technology	Getting Started with C6-Integra™ Processors: Software Development on the OMAP-L138 Demonstrated with a Machine Vision Application
2:45 to 3 p.m.	**Break**					
3 to 4 p.m.	5	What's New in TI Power Devices for 2011	Understanding Clock Basics and Portfolio – the Capabilities and Limitations of Frequency Generation and Meeting Jitter/ Phase Noise Requirements	Digital Isolation Techniques and Implementations	Op-Amp Noise Calculation, Simulation, and Measurement	DMVA Processors: World's First IP Camera SoC with Built-In Video Analytics

Texas Instruments
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Session Titles and Abstracts

Track and Course	Abstracts
Track 1 – Power Supply Solutions	
Battery Management Basics	This technology overview will cover charging, protection, chemistries, gas gauging and TI's portfolio, discussing advantages and hot products (roadmap).
DC/DC Converters 101	This presentation is an introduction to power supplies for non-power supply engineers. If you are an engineer that works on systems that require power but you don't design the actual power supply, this presentation is for you. We will define and explain some of the terminology surrounding power supplies and explain why you might use one topology over another; for example, efficiency considerations and how they relate to the differences between synchronous and non-synchronous converters. We will also explain many terms you may have heard but not fully understood, such as split rail, PSRR, converter vs. controller, LDO vs. linear regulator, buck vs. boost, etc. This presentation will not show you how to design a power supply, but it will help you to understand what power supply designers are talking about.
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.
SEPIC Design Made Easy Using the TPS61165 and TPS61175	Designers often have problems generating a regulated output voltage when the input voltage goes above and below the required output voltage. A common example is generating a regulated 12-V rail from an 8-V to 16-V rail. The solution is easily accomplished by converting the TPS61165 or TPS61175 boost converters into SEPIC converters. This presentation shows the benefits and limitations of using these ICs as SEPIC converters, outlines the design procedure including component selection, covers the challenges of compensating the RHPZ, and addresses board space and layout concerns.
What's New in TI Power Devices for 2011	This session will provide on overview of TI's latest power management products. The focus of this presentation will be on new high-performance power devices including DC/DC converters with integrated FETs, DC/DC controllers, high-efficiency FETs and TI's new integrated power solutions (IPSs). We will also touch on the latest in offline switching controllers, battery chargers and integrated power manangement ICs.

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Track 2 – Analog Design Considerations	
Signal Integrity Modeling and Simulation Capabilities Available to TI Customers	There are many customers who would like to use high-speed TI devices in their designs but have little high-speed design experience and limited or no in-house modeling and simulation capabilities. TI's signal integrity modeling and simulation capabilities could be used by customers to validate the usefulness of TI devices in their systems, provide estimated performance parameters, provide system design rules and suggest possible changes to the system architecture, and provide simulation test benches so they can reuse them in future designs with TI devices. This paper provides an overview of the signal integrity modeling and simulation capabilities that TI provides to customers for high-speed devices.
How to Get the Best Performance Out of Your High-Speed Data Converter	This session deals with some of the common issues that haunt the proper application of high-speed ADCs. This session is meant for engineers that have a working understanding of data conversion fundamentals already. We will cover 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.
High-Performance Differential ADC Input Interface Design	High-performance ADCs used in high-speed data acquisition systems like test and measurement, wireless infrastructure, medical, and military applications require high-performance differential input drive circuits. Designing the drive circuit for optimum SFDR and SNR from the ADC is a challenge for design engineers. This presentation will provide an overview of how ADCs are characterized and show how SFDR and SNR can be combined with the amplifier drive circuit to estimate overall system performance. Different circuit architectures will be presented along with their strengths and weaknesses. To show achievable results, three example application circuits and performance will be shown: THS4521 interface to ADS1278 (24-bit, lower frequency, very high resolution, first Nyquist zone application), OPA695 interface to ADS5500 (14-bit, higher frequency, first Nyquist zone application), and THS4509 interface to ADS6148 (14-bit, narrowband IF second Nyquist zone undersampling).
TINA-TI™ Software v9: A New Simulation Solution for 2011	TINA-TI™ software has been TI's free circuit simulator for five years. During that time, TI has released hundreds of macromodels and reference designs that can be simulated. This capability allows you to quickly evaluate parts, validate designs to ensure first-pass success, and, if necessary, debug problems. This session will provide an introduction to TINA-TI software, with an emphasis on new features in version 9. We will cover topics such as modifying EVM schematics to meet your needs, importing third-party models, running simulations, visualization/analysis of simulation output, and using parametric sweeping to improve your design.

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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 customers. Clock drivers can be a phase-locked loop (PLL)
Track 3 – Wireless Connectivity	
RF Basics, Tools and Getting Started	Have you been told by your manager to go remove the wires from the design? Not sure where to start? This presentation serves as an overview of the parameters and considerations designers would use to select a low-power wireless (LPW) solution. It also highlights the devices and tools from TI and how they fit in a typical low-power RF design.
Designing RF Systems with Low Power Consumption Targets	This session will cover how to configure your RF system for low power consumption. We will tackle a low-power RF protocol design from scratch, including periodic transmission, polling receiver and TDMA, power optimization, protocol considerations, designing, debugging, and testing. Specific low-power features of LPRF chips will be explored: wake-on radio, fast startup from sleep and low-power modes.
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, which 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.
Basics of Range and Frequency Selection for Low-Power Wireless by Anaren, Inc.	Thinking about using a wireless link in your system for command, control or sensor monitoring? Want to go green and use low power? Wondering whether 915 MHz or 2.4 GHz is the right band for you? Want to know if the radio you have in mind can transmit and receive over the distances that you need? How about regulatory influences such as the FCC? Understanding wireless range and frequency band selection can help you understand how low-power RF can be used successfully in your system. Anaren's RF expert will discuss the science/practice of frequency selection and range determination in this session, touching on all of the above questions and issues along the way. Anaren is a 45 year-old publicly held company in the RF components and systems industry. In 2010, Anaren introduced its Anaren Integrated Radio (AIR) modules product line, based on Texas Instruments low-power RF radios. AIR modules are small, surface-mountable, FCC-certified RF modules complete with a TI radio transceiver and antenna, giving you a head start in adding RF capability to your product or system.

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Digital Isolation Techniques and Implementations	Multiple options are now available to electronics designers to implement galvanic isolation. Apart from isolation technologies like capacitive, optical and inductive/magnetic, they must also contend with various isolation standards regarding voltage ratings and creepage/clearance distances. This discussion intends to simplify the decision-making associated with choosing the right isolation solution.
Track 4 – Precision Analog	
Shorten Your Concept to Prototype Time with TI's MAVRK™ Modular System-Level Reference Kit	The MAVRK™ modular and versatile reference kit is designed to allow customers and developers to quickly evaluate multiple configurations of Texas Instruments silicon to show system-level performance. Each MAVRK module is a reference-level design that allows for full performance evaluations of the device in the system. The MAVRK system is motherboard-based, allowing multiple combinations of RF, ADC/DAC, transceivers, signal conditioning and driver circuits to be configured to a system-level design. This session will offer an overview of the MAVRK system and how its different software and hardware components fit together. Learn how you can save more than six weeks off your system development time.
Introduction to Motors and Motor Control	This session will talk about the different types of motors used in the industry: DC, brushless DC, steppers, permanent magnet synchronous and AC induction. To gather a better understanding of motors, we will show the differences between them and discuss the advantages and disadvantages of each. Basic motor drive circuits will be covered, from full H-bridge drive to half-bridge for three-phase motors, as well as other drive concepts such as six-step commutation and drive issues such as current recirculation. Field-oriented control will also be discussed and how it has progressed with improving technology. This session will end with how to implement a motor control application using TI analog products, digital controllers and software to precisely control the position, velocity and torque of mechanical drives.
Tackling EMI and RFI at the Board and System Level	Electromagnetic interference (EMI) and radio frequency interference (RFI) can affect any system in an undesirable manner as the proliferation of unintentional radiators and receptors continues to increase. EMI and RFI, an undesirable byproduct of electrical systems, produce a wide range of frequency spectra that can affect otherwise properly operating circuits. During this seminar hour, we will review the fundamental principles of radiated interference and coupled interference, along with the respective allowed limits for both of these interference sources. In this discussion, we will describe transmitters and receivers along with techniques to mitigate the effects of both culprits. The solutions we will cover will be effective power-line filtering, proper filtering for input signals of high-gain circuits and details on key components. Finally, we will discuss the common rules of thumb for wire and PCB routing to minimize EMI and RFI effects. With this seminar, you will see some basic methods that will help reduce sources and receptors of EMI and RFI events in and near your
An Update on TI Analog Trends and Technology	TBD
Op-Amp Noise Calculation, Simulation and Measurement	This presentation covers calculation, simulation and measurement of intrinsic noise. Intrinsic noise is noise generated by resistors, op amps and other active devices in a circuit. The presentation does not cover extrinsic noise (RFI, and EMI pick-up) but does cover specific real-world examples where the peak-to-peak output noise is predicted and measured.

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Track 5 – Embedded Processing	
Under the Hood of FRAM and the New MSP430FR57xx MCU Family	This session is intended to introduce MCU designers to the latest in nonvolatile memory technology: ferroelectric RAM (FRAM). You will gain experience with the MSP430™ MCU'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.
What's Next for TI's ARM-Based Microcontrollers	TI has introduced many processors based on various ARM architectures. This session compares the various ARM-based microcontroller (MCU) options and the technical components included as part of these cores. You'll learn about the different architectures that save customers time and money – architectures that can be leveraged for high- to low-end products and across different industries. Plus, we'll show you how to use the differentiation inherent in TI's MCU portfolio to get your customers to market and you to revenue more quickly.
Designing Motor Controls *by D3*	This session explores the process of designing a low-voltage motor and motion control system, including analog motor drivers, microcontrollers, hardware reference designs, modular software libraries, debugging tips, and creating GUIs for interface and instrumentation.
Getting Started with C6-Integra™ Processors: Software Development on the OMAP-L138 Demonstrated with a Machine Vision Application	Getting started with software development on a C6-Integra™ processor can seem daunting. This class will demonstrate a simple vision application that illustrates receiving video data into an OMAP-L138 VPIF interface. The DSP will be used for image processing using TI libraries, while the ARM will handle control and display functions using Linux and the Qt graphics framework. DSPLink will also be discussed, illustrating how the ARM and DSP work together to provide an integrated solution. A live development example will be demonstrated on the OMAP-L138-based MityDSP-L138F system on module from Critical Link. Software source code used in the demo will be available to attendees.
DMVA Processors: World's First IP Camera SoC with Built-In Video Analytics	Texas Instruments is proud to introduce the DMVAx processor line, which expands the broad feature set of the DM36x device family by including the first vision coprocessor to accelerate video analytics algorithms. The DMVAx provides a single low-cost platform for developing products with video analytics and high-definition image and video processing. These devices are packaged with smart analytics, a suite of five entry-level turnkey video analytics applications that include camera tamper detection, intelligent motion detection, trip zone, object counting and streaming metadata. In this seminar, we'll provide a technical overview of the DMVAx and smart analytics, as well as demonstrations using the DMVA2 IP camera reference design.