Technology Day Atlanta
June 9, 2011

Time	Session	Video	Lighting & Motor Solutions	Wireless Connectivity Solutions	What's New at TI
8:30 to 9 a.m.	**Registration**				
9 to 10 a.m.	1	Broadcast and Transcode Systems *by Ittiam*	Designing Motor Controls *by D3*	RF Basics, Tools and Getting Started	ESD Protection: Protecting the Complete System
10 to 10:15 a.m.	**Break**				
10:15 to 11:15 a.m.	2	Optimized Video Signal Chain for Surveillance DVRs	Analog Motor Drivers: Steppers, Micro-steppers, and DC Motors	How to Add Bluetooth® to MSP430™ and Stellaris™-Based Systems	Understanding Clock Basics and Portfolio – the Capabilities and Limitations of Frequency Generation and Meeting Jitter/ Phase Noise Requirements
11:15 a.m. to 12:30	**Lunch**				
12:30 to 1:30 p.m.	3	Analog Interfacing to Video Processors	LED Lighting: Solutions that are Ready by Using TI Lighting Reference Designs	How to add Wi-Fi and Bluetooth® to OMAP™ and Sitara™-Based Systems	Integration and Innovation - Data Converters from TI
1:30 to 1:45 p.m.	**Break**				
1:45 to 2:45 p.m.	4	Video Capture and Processing with the TMS320DM8127	Solid State Lighting Science, LED Theory of Operation, and the New LEDs from Cree	Bluetooth® Low Energy and ANT™: Very Low Power Wireless Connectivity Solutions	Introducing DSPs to Your Application
2:45 to 3 p.m.	**Break**				
3 to 4 p.m.	5	Video Communications – Consumer and Enterprise *by Ittiam*	Save Energy with LED Lighting and Intelligent Sensing	Lower Power RF Design Tools to Help During Characterization and Testing of Your RF Products	What's Next for TI Embedded Processing Microcontrollers

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Session Titles and Abstracts

Track and Course	Abstracts
Track 1 – Video	
Broadcast and Transcode Systems by Ittiam	Multimedia usage scenarios are increasing exponentially, which has increased the demand to deliver content generation and distribution in different ways. Broadcast systems are no longer restricted to high-end studio markets but are being deployed at a rapid pace in audio/video contribution, IPTV and other similar domains. Because they provide better quality multimedia content, digital audio/video broadcast and streaming systems have gained significant popularity and are replacing analog counterparts. The overall content delivery and revenue opportunities in the form of video on demand, advertisement and other interactive services are much more flexible and efficient in these systems. Powerful integrated platforms such as the Texas Instruments DM6467, DM8168, C647x and others have made it possible to build efficient broadcast-quality encoding and transcoding systems, providing high channel density without compromising quality at lower/affordable cost per channel to service providers/end users. IPTV systems, video on demand, audio/video contribution over IP, and multiscreen encoding/transcoding are some of the application use cases that are fast catching up in broadcast and transcode space. In this presentation, we will present the following topics: overview of digital broadcast/transcode systems; range of broadcast/transcode systems; relevant broadcast/transmission standards; software challenges in system design; hardware and BSP challenges in system design; Ittiam's broadcast/transcode systems (implementations on TI platforms); and a real-time demonstration of a broadcast system built on a TI DM6467 platform.
Optimized Video Signal Chain for Surveillance DVRs Using Netra	TI's new DM87xx SoC offers the industry's highest channel density for multistream, multichannel hybrid DVR applications. A single DM87xx device achieves 16 channels at full frame rates and full resolution, with triple streaming replacing competitor BOM >$150. The superior channel density relies extensively on an HD video processing subsystem (HD-VPSS), a highly optimized video signal chain consisting of efficient multiplexed video capture ports, noise filters, scalers, deinterlacers and multi-TV display ports. In this session, we will focus on DVR optimization tricks that must be used to achieve the highest possible channel densities. Specifically, we will look at the configurations of HD-VPSS software and hardware, which allow efficient deinterlacing of 16 channels of D1 video. We will also review the scaler and display options that allow the support of multichannel mosaic display on multiple monitors.
Analog Interfacing to Video Processors	In many video systems today, there is a heavy emphasis placed on the video processor, as this is the heart of the system. In most systems, however, an analog video interface is necessary for inputs and/or outputs to the outside world. Choosing the right video amplifier and filter can be critical to overall system performance. This session will focus on the process of selecting the right video amplifier and filter necessary to meet the overall system goals. This includes such elements as performance, filtering, bandwidth, size, power consumption and cost.
Video Capture and Processing with the TMS320DM8127	TI provides a range of video encoding and processing solutions. The DM8127 is TI's latest DaVinci™ media processor. We will describe the advanced video capabilities of the DM8127 processor and present a camera reference platform for the DM8127 that enables video capture, encoding, display and streaming. An in-depth discussion of the features of the camera reference will present TI's complementary products that enable a complete camera solution.

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Video Communications – Consumer and Enterprise By Ittiam	Communication has always been a quintessential part of human interaction and hence at the pinnacle of invention. We have come far from the days of pigeon carriers to modern-day cell phone communications. However, this has always been either text-only or voice-only communication and often non-real-time. Today, with improvements in infrastructure, video communications promise to bring people closer than ever before through videophones or other video communications-enabled devices. Video conferencing, or video communication, is a real-time interactive event where the user feels truly and closely connected. The video in the video communication may range from pictures of the participants, video clips and documentations (such as photos, diagrams, charts, graphics, etc.) to live video; the audio may include real-time audio signals from participants, as well as other audio and sound signals. With rapid development of communication infrastructures, broadband, 3G/4G wireless technologies, and the availability of fast video processors, a simple peer-to-peer video telephony is no longer a big deal. The challenge needs to be taken to the next level of being able to connect multiple people at the same time via multiparty/bridging scenarios. In this presentation, we intend to present how video communication systems work, with a brief history and applications; audio and video compression for video communication (audio/speech and video codecs and their customization); quality of service (QoS) for video communication; protocols and standards (ITU H.3xx and SIP); design considerations and implementation on TI platforms; and what's next for the technology. We will also run a real-time demo of a videophone with a built-in HD A/V bridge on a TI platform.
Track 2 – Lighting and Motor Solutions	
Designing Motor Controls by D3	Explorers 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.
Analog Motor Drivers: Steppers, Microsteppers and DC Motors	This session will walk through TI solutions for motor drivers, which are all-inclusive to the DRV8x product family. Solutions will be provided for several stepper motor examples such as microstepping, driving two stepper motors from a single driver, a dual H-bridge driver with microstepping indexer, and motor driver control through a serial interface. Many other features will be discussed such as PWM current control, programmable decay modes, and all the protection features that a motor driver should have. Coming out of this session, you will fully understand what TI products fit your application best.
Save Energy with LED Lighting and Intelligent Sensing	Main benefit of LEDs is that you can save energy by dimming the light. So what about an intelligent light that is aware of its environment and communicates to other lights on the need for illumination? From simple temperature measurement, ambient light and occupancy sensing using TI MCUs and DSPs to wired and wireless communication protocols, TI's software and hardware solutions help to design intelligent lighting.
Solid-State Lighting Science, LED Theory of Operation, and the New LEDs from Cree	This session will discuss LED technology – specifically, white lighting-class LEDs – and the critical engineering disciplines required to design LED luminaries. During this session, attendees will develop a broad understanding of the interdisciplinary trade-offs needed when designing with LED light sources. Other considerations are understanding how LED brightness and color binning work, their strengths and limitations, developing the ability to read between the lines of LED data sheet specifications, and learning the role that proper thermal management, driver design and optical design play in determining key operating parameters and lumen maintenance. At the end, a case study will be discussed to put it all together.

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LED Lighting: Solutions That are Ready by Using TI Lighting Reference Designs	As LED lighting is becoming more prominent, Texas Instruments continues to develop solutions for different LED lighting situations and applications. This session will walk through several solutions available from TI in a reference design and discuss the technical details behind each, such as operating voltage range, power factor correction (PFC), efficiency, dimming and isolation methods. We will also explain what we mean by an evaluation module versus a reference design. Examples of some of the reference designs discussed will be a 20-W T8 light bulb replacement that uses a single-stage PFC flyback topology; a 9-W PAR30/38 light bulb replacement that uses a buck topology and is TRIAC dimmable; a 13-W light bulb replacement using an isolated PFC flyback topology that would take in a universal AC input; and an MR16 light bulb replacement using new LEDs from Cree.
Track 3 – Wireless Connectivity Solutions	
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 solution. It also highlights devices and tools from TI and how they fit in a typical low-power RF design.
How to Add *Bluetooth*® to MSP430™ and Stellaris® Processor-Based Systems	Quickly and easily add *Bluetooth*® technology to systems using Stellaris® or MSP430™ MCUs. In this session, we will start with a detailed overview of the CC2560-PAN1325 *Bluetooth*® v2.1+EDR transceiver, and then go into the details of the platform. The platform provides complete system integration of all components including *Bluetooth*® hardware (CC2560-PAN1325), host hardware (Stellaris or MSP430 processors), firmware, low-level drivers, *Bluetooth*® stack, profiles, RTOS, and sample source applications using APIs. We will demonstrate how to establish a *Bluetooth*® connection by showing a sample application running on a Stellaris LM3S9B96 kit. We will also cover the MSP430 MCU-based *Bluetooth*® platform.
How to Add Wi-Fi and *Bluetooth*® to OMAP™ and Sitara™ Processor-Based Systems	Quickly and easily add Wi-Fi and *Bluetooth*® technology to systems using MPUs like the AM/DM37x and AM18x. In this session, we will start with a detailed overview of the WL1271-TiWi 802.11b/g/n + *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 (WL1271-TiWi), host hardware (AM/DM37x, AM18x), Linux WLAN drivers, supplicant, TCP/IP integration, *Bluetooth*® stack, profiles, example code for configuration, and sample source applications. We will demonstrate how to establish a Wi-Fi and *Bluetooth*® connection by showing a sample application running on an AM/DM37x EVM.
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 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.
Lower Power RF Design Tools to Help During Characterization and Testing of Your RF Products	SmartRF™ Studio software 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 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 software and to learn how it works and what it can do. You will learn how to use the tool to measure output power from an RF transmitter, how to check the link quality and measure the packet error rate, how to export settings for direct integration in your software, and how to customize the tool for your own needs.

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Track 4 – What's New at TI	
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 it 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.
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 and temperature range, while others such as jitter, pulse skew or 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 little perplexing. If we have a basic knowledge of clock drivers, the typical parameters associated with them and the system requirements, then it would be easier to find the right clocking solution from our portfolio for customers. Clock drivers can be a phase-locked loop (PLL)-based buffer, a simple (non-PLL) clock distribution circuit, clock generator, jitter cleaner or a synthesizer. A clock driver can do the signal processing such as frequency multiplication (integer or fractional) and division, distribution, level translation, skew control, noise cleaning, etc. This presentation will address the basic explanation 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 drivers in terms of frequency generation, configuration-dependent noise/jitter variation, and how the devices can produce the right clock frequencies and low jitter to meet system requirements – with examples.
Integration and Innovation – Data Converters from TI	TI's high-speed and precision data converter portfolio features market leadership converters for industrial, medical and communications applications (among many others) where the role of increased performance and functional integration continues to simplify and drive next-generation designs. This session will highlight the latest in TI's innovative high-speed and precision converter product lines, focusing on leadership converters for communications, integration and precision measurement for industrial sensor signal conditioning, portable medical, and monitoring and control designs.
Introducing DSPs to Your Application	DSPs are perfect for applications where users will not tolerate any delays. Special microprocessors – digital signal processors (DSPs) – can perform mathematical computations instantaneously, with a high level of precision that makes them very well suited for real-time processing. TI's DSPs can be used to process a vast assortment of information, including sound, images and video. Join this session to learn more about TI's DSP devices and which ones would work for your application.
What's Next for TI Embedded Processing Microcontrollers	From ultra-low power MSP430™ MCUs and high-performance TMS320C2000™ real-time controllers, to 32-bit general-purpose ARM-based MCUs and Stellaris® ARM Cortex-M3 MCUs, TI offers the broadest range of embedded control products. Join this session to learn more about TI's MCU portfolio.