



Texas Instruments

Tech Day Atlanta 2010

Session Titles and Abstracts

Track and Course	Abstracts
Track 1: Analog Workshops	
TLV320AIC3254 Audio Codec with miniDSP Hands-On Demo	The TLV320AIC3254 is a very low-power stereo audio codec with miniDSP and Power Tune™ integrated circuit technology. The 3254 is well adapted for many applications, including cell phones, portable navigation devices, MP3 players, headsets and many others. This session will walk you through the out-of-the-box experience of getting the TLV320AIC3254EVM-U configured and running. The EVM-U is a small USB stick form-factor EVM. The USB connection to the PC provides power, control and streaming audio for easy evaluation. Preprogrammed EEPROM boots the TLV320AIC3254 as a fully functional USB audio device when connected to a PC.
CC8520 Wireless Audio System-on-Chip Hands-On Demo	The CC8520 is a 2.4-GHz PurePath™ technology-based wireless audio system on chip designed for wireless digital audio streaming. The CC8520 is well suited for wireless HiFi equipment, or where wireless audio is being designed. This session will demonstrate the CC8520 designer's tool and how to get started using the tool.
TAS5630 Audio Power Stage Hands-On Demo	The TAS5630 is a high-performance, integrated stereo feedback analog-input digital amplifier power stage designed to drive 4-Ω speakers at up to 300 W per channel. This amplifier requires only a simple passive demodulation filter to deliver high-quality, high-efficiency audio amplification for driving speakers in applications such as DVD receivers, active subwoofers, microcomponent systems and more. This session will demonstrate the TAS5630DKD2EVM PurePath™ technology-based HD customer evaluation module. This EVM is configured with two BTL channels and the possibility to apply either a single-ended or differential analog input signal.
Open session	
C2000™ DSP Digital Lighting Control Demo	The C2000™ real-time 32-bit MCU has an integrated 12-bit ADC and high-resolution PWM outputs. It is used in many control applications including lighting control, power-line communications, motor control and digital power. This demo will show the C2000 MCU in a lighting control application, where it is used to implement a sepic DC/DC and eight-string LED current control. Using an MCU for these functions gives several advantages, such as a >20,000:1 dimming ratio for precise color mixing; flexibility in the number of strings, number of LEDs and the type of LEDs used; on-the-fly adjustability to the DC/DC or other operating parameters; housekeeping functions; and communications/control such as power-line communications.
Track 2: Low-Power Embedded Processing	
Understanding 32-Bit MCU Peripherals' Advanced Capability in Embedded Systems Using the Piccolo™ MCU ControlSTICK (Hands-On Lab Part 1)	This hands-on workshop will provide an overview of the Piccolo™ integrated circuit C28x™ DSP core and 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 on-board ADC, ePWM, high-res PWM, analog comparator and more. Sample projects include generation of an asymmetric PWM output with period and duty variation, triggered ADC conversion using an on-board filtered PWM output, and use of comparators to generate a CPU interrupt on a cycle-by-cycle basis. Attendees will leave with a comprehensive understanding of the performance and capability offered in the Piccolo integrated circuit series of devices.
Understanding 32-Bit MCU Peripherals' Advanced Capability in Embedded Systems Using the Piccolo™ MCU ControlSTICK (Hands-On Lab Part 2)	This hands-on workshop will provide an overview of the Piccolo™ integrated circuit C28x™ DSP core and 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 on-board ADC, ePWM, high-res PWM, analog comparator and more. Sample projects include generation of an asymmetric PWM output with period and duty variation, triggered ADC conversion using an on-board filtered PWM output, and use of comparators to generate a CPU interrupt on a cycle-by-cycle basis. Attendees will leave with a comprehensive understanding of the performance and capability offered in the Piccolo integrated circuit series of devices.
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 with permanent thin-film battery technology; sensors; and TI's MSP430™ MCU, CC2500 and CC430. 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 and the new DigiKey self-powered CC430 weather station reference design.
Hands-On Training with the C5505 eZdsp USB Stick Development Tool (Part 1)	Experience the easy-to-use eZdsp development tool based on the VC5505 DSP and learn how to quickly start developing your applications. The VC5505 DSP is ideally suited for low power applications including voice, audio, biometrics, medical, and a variety of portable devices. This session will cover an overview of the VC5505 DSP, the eZdsp development tool, TI DSP software development tools, and example applications on the eZdsp tool.
Hands-on Training with the C5505 eZdsp USB Stick Development Tool (Part 2)	Experience the easy-to-use eZdsp development tool based on the VC5505 DSP and learn how to quickly start developing your applications. The VC5505 DSP is ideally suited for low-power applications including voice, audio, biometrics, medical and a variety of portable devices. This session will cover an overview of the VC5505 DSP, the eZdsp development tool, TI DSP software development tools and example applications on the eZdsp tool.



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Track 3: Video	
Implementing Skype Video Conferencing on the DM36x	Skype has changed the video phone industry. OEMs and manufacturers are now able to directly connect to the consumer without interoperability and operator concerns. To meet this challenge, TI offers a DM365-based D1 video phone that runs Skype software stacks for encryption and streaming. This session will address some of the unique challenges facing hardware and software designs, such as how to share the hardware design with the DM365-based USB camera to maximize hardware reuse, challenges when running Skype software on the DM365, how to solve acoustic echo-cancellation issues, and audio and video synchronization.
How to Interface with Video Displays	Interfacing embedded processors to video displays can be complicated and challenging. Understanding whether or not a particular display is even compatible is usually the first hurdle, not to mention understanding topics such as interfacing to two displays showing different content, interfacing to VGA LCD, and interfacing to large displays. Join this how-to session to understand the fundamentals of connecting TI's processors to video displays.
Introducing the Graphics Capabilities of TI SoCs	This session will take a look at the graphics hardware capabilities across the AM, DM and OMAP™ family of TI devices and will explain what software is provided to enable developers to easily write applications that can leverage these hardware features. This session will then demonstrate how the various hardware capabilities can be utilized within a higher level graphics framework such as Qt/embedded from Nokia. Such a framework can drastically reduce the time taken and learning curve required for the creation of complex mixed 2-D/3-D user interfaces on TI SoCs.
TI's Community Linux Strategy and Partners for DaVinci™, OMAP™ and Sitara™ Devices	Initially, TI offered only a single commercial Linux offering – MontaVista Linux – to customers requiring Linux on TI devices. Beginning with the OMAP3530, TI is now releasing community Linux kernels for its devices, along with the associated SDKs and DVSDKs. These community Linux kernels give customers full access to "free Linux" and have enabled multiple commercial Linux companies to support TI devices. This presentation will begin by describing the community Linux distributions TI is releasing, when they will be available, how to obtain them and their support model. It will conclude by overviewing TI's commercial Linux product and consulting partners and the additional value they offer beyond pure community Linux.
Achieving 720p Encode/Decode Performance on OMAP 3 by Leveraging the Cortex Processor and the IVA2.2	TI's OMAP3xxx class of devices were originally designed with D1 video codecs as the target that would run on the IVA2.2. However, the device has a very powerful ARM Cortex-A8 with NEON coprocessor in addition to the IVA2.2. To extend the capability of the device, Ittiam has come up with a heterogeneous multicore implementation of multiple video encoders and decoders that utilize both the Cortex and the IVA2.2 to achieve 720p resolution performance. This presentation will cover an overview of the high-level software architecture for a video decoder and video encoder. It will also highlight the ability of this design to transfer as much of the processing to the IVA2.2 as the device clocking gets higher, so that a single design applies from low-end OMAP3530 devices to high-end OMAP37xx devices. The challenges of such a design and the advantages and side effects will be presented.
Track 4: Wireless	
Range Considerations for RF Networks	This course will cover the theories behind antennas and RF range and discuss what occurs when line of sight is not an option. Antenna types and sizes will be compared, as well as when elements in near field (plastic enclosures) and far field (a wall) are introduced into a system. Finally, these considerations will be applied to a link budget example.
So You Want Wi-Fi? <i>by LSR</i>	This session discusses Wi-Fi from a developer's point of view. Topics covered include a WLAN standards overview, hardware design considerations (including antenna design and EMC testing), and TI's WiLink™ 6.0 software. We will also explore the module that LSR has developed for TiWi solutions to help your design get to production faster.
Bringing TI's Bluetooth Technology to Embedded MCU Platforms	As TI expands the reach of our connectivity platforms, we are putting new tools in the hands of customers to quickly and easily add connectivity to products based on TI embedded processors such as the MSP430™ MCU. In this session, we will introduce the newest platform offering that integrates TI's BlueLink™ product family with the MSP430 solution. You will learn about the platform's features, capabilities, differentiators and how to position this offering with your customers. You will also get to see the platform in action as we demonstrate a gaming and a health care sample application running on an MSP430F5438 experimenter board.
Connecting Low-Power Sensor Nodes to the Internet by Synapse	Synapse's SNAP network operating system is an Internet-enabled, instant-on, multihop, mesh network software solution designed to cost-effectively run efficiently on TI's microcontrollers. Low-power SNAP nodes can effectively read sensors and report the data back through the Internet. We will demonstrate the key features of the tools and power of monitoring and controlling anything from anywhere.
Plug Into the Smart Grid	This conference provides a complete description of TI solutions for the smart grid. This includes a detailed presentation of the metrology piece, including the new Stellaris® devices that address host-processor applications such as encryption and communication channels management through FreeRTOS. From the communication side, RF is discussed in depth with sub-1 GHz as well as the 802.15.4 roadmaps, including the latest evolutions of the ZigBee stack and Smart Energy profile. Power-line communication is also a key focus of the speech, given the opportunities that are emerging in the U.S. and South America. Specific guidelines are provided to appropriately position the TI offer vs. other market solutions such as HomePlug and G.hn. The TI smart meter board will be demonstrated at the end of the Q&A session and illustrates TI knowhow in smart metering.



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Track 5: Power Supply Design	
Switching Power Supplies Made Easier with TI's DCAP™ Control Topology	The TPS54225, TPS54226, TPS54235 and TPS54326 are new product offerings in the SWIFT™ power products 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 applications. These devices use a proprietary D-CAP2™ Mode control topology, which exhibits some very high-performance characteristics not normally found in low-cost devices. Transient response is extremely fast and the TPS54226 and TPS54326 feature a power-saving auto-skip mode. This presentation fully explains the D-CAP2 Mode control scheme, shows its advantages and high-performance features, and provides analysis with both TI and competing products.
Simplifying Battery Charging for Lithium Cells Using PowerPath Management	The selection of a battery charger is complicated due to the large number of battery chemistries, battery-pack configurations, charging methods and safety concerns. However, new battery-charging ICs are meant to simplify the design of a battery charger by integrating power path management functions and by providing dynamic power management to efficiently charge the battery while powering the system. This presentation covers the challenges of charging one- to six-cell Li-ion and one- to seven-cell LiFePO4 batteries for industrial and medical applications. It explains the LiFePO4 charging profile and the benefits of power path management and dynamic power path management charging techniques. Design examples using the bq24610 (five-cell Li-ion) and bq24630 (six-cell LiFePO4), along with test results, will be presented.
Years of Power Supply Tips and Tricks and Lessons Learned	Robert Kollman will take you through years of knowledge of tips and tricks the power supply design team have come up with after designing power supplies for several years. You will come out of this session amazed.
TI Lighting Power Solutions Overview	This training will present an overview of general LED lighting solutions available from Texas Instruments for residential, commercial, outdoor and infrastructure lighting. Both AC/DC and DC/DC solutions in the forms of reference designs, EVMs and products will be discussed. Solutions from both analog and embedded processing will be presented.
NexFET™ Power MOSFET Applications and Selection	This presentation will provide a detailed review and inspection of MOSFET parameters, how they effect circuit performance, and how to choose the right MOSFET, with a review of MOSFET configurations and applications highlighting key operating considerations in the buck and boost topologies.
Track 6: Signal Chain Solutions	
Op Amp Stone Soup: A "Cookbook" Collection of Single-Supply Op-Amp Circuits	This presentation offers a "stone soup" collection of useful op-amp circuits to solve linear application problems on a daily basis. Each op-amp circuit (prebuilt in the included TINA-TI™ software SPICE schematic) is presented as a definition-by-example, with a brief overview of its functionality, applicable transfer function and/or waveforms, and key equations for rescaling the function to your exact application. A sampling of the ingredients includes the following circuits: voltage-to-current conversion, drive circuits (bridge-tied load, parallel op amps, high-current cascade reference buffer), translation circuits (single-ended to differential, differential to single-ended, differential in to differential out), conditioning circuits (full-wave rectifier, supply splitter, integrator amp in feedback, isolation amplifier, $G = 1/G = -1$ amp) and comparator circuits (AC coupled, comparator with hysteresis).
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, TINA-TI™ software simulation and bench tests, a stable system can be realized.
Evaluating Analog-to-Digital Converters with ADCPro	When you consider an analog-to-digital converter (ADC) for a new design, you can get a rapid assessment of the device with an evaluation board (EVM). If you intend to view collected time-domain, histogram or FFT data, ADCPro software from Texas Instruments will ease your evaluation. During this session, we will identify the appropriate test equipment for your EVM and introduce basic ADC evaluation test methods. We will show how ADCPro simplifies the tasks of collecting and analyzing ADC data.
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 and 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... 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 and the typical parameters associated with the clocks drivers, and the system requirements then it would be easier to find a right clocking solution from our portfolio.
Interfacing Data Converters with FPGAs	This presentation will address common issues of interfacing data converters with FPGAs. Information on device selection, interface support and communication will be covered.

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