



Technology Day Minnesota May 26, 2011

Time	Session	Medical	Wireless & Connectivity Solutions	Power	Signal Chain	Embedded Processors	Embedded Processing Software	Applications
8 to 9 a.m.	Registration & Booths / Continental Breakfast							
9 to 10 a.m.	1	DLP® Technology: Real World Medical Applications and Beyond	RF Basics, Tools and Getting Started	Wireless Power: Total Solution for Charging Using the Wireless Power Consortium Standard	Digital Isolation Techniques and Implementations	ARM® Cortex-A, R, M Overview	StellarisWare™ Software Advanced – Taking Your Knowledge to the Next Level	Overview of TI Microcontrollers
10 to 10:30 a.m.	Break / Booths							
10:30 to 11:30 a.m.	2	Portable Medical: Smaller and Smarter with MSP430™ Microcontrollers	Lower Power RF Design Tools to Help You Characterize Your Radio Products	Designing Wide-Input-Voltage (Up to 60 V), High-Current, Non-Isolated DC/DC Converters	Op-Amp Stability Analysis	USB: From Introduction to Rapid Development	Enabling and Accelerating Android on Sitara™, Integra™ and DaVinci™ Devices	MCU Rapid Application Development with Model-Based Programming by VisSim
11:30 a.m. to 1	Lunch / Booths							
1 to 2 p.m.	3	Telehealth: Trends, Challenges and Solutions	Fundamentals of Antennae Design by LSR	High-Switching Frequency Barriers to Wide-Input-Voltage (Up to 60 V) DC/DC Converters	FilterPro™ Software 3: Designing Active Filters	Introduction to Ethernet for the Embedded Systems Designer	Go Green – Utilize New Linux Power Management APIs to Lower System Cost via Reduced Power Requirements	Analog Motor Drivers: Steppers, Microsteppers and DC Motors
2 to 2:15 p.m.	Break / Booths							
2:15 to 3:15 p.m.	4	Personal Health Device Sensors and Solutions	Wirelessly Connecting to the Internet with 6LoWPAN and Wi-Fi	ABCs of Isolated Power	Data Converter Stone Soup: A Collection of Data Converter Design Tips and Tricks	Adding Wi-Fi and Bluetooth® to TI Embedded Processors (MCUs and MPUs)	Code Composer Studio™ Software v4.0	Stellaris® Human Machine Interface (HMI) Hands-On Workshop (Part 1)
3:15 to 3:30 p.m.	Break / Booths							
3:30 to 4:30 p.m.	5	Leveraging Wireless Connectivity to Improve PANs and WANs in Telehealth Systems	Energy Harvesting, Wireless Charging and Zero Power Devices by Cymbet	Power Supply Layout Considerations	Interface Standards Comparison for Industrial Networks	Industrial Communications on Sitara™ MPUs	Linux Application Debugging with Code Composer Studio™ Software	Stellaris® Human Machine Interface (HMI) Hands-On Workshop (Part 2)

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Track and Course	Abstracts
Track 1 – Medical	
DLP® Technology: Real-World Medical Applications and Beyond	Vascular imaging, phototherapy, hyperspectral imaging, confocal microscopy and multispectral stereoscopic vision are a few of a growing array of applications using DLP® technology. Participants will learn the basics of DLP technology, how it enables a range of medical applications such as medical imaging and instrumentation, and the DLP development tools available today to start creating digital light processing solutions.
Portable Medical: Smaller and Smarter with MSP430™ Microcontrollers	Portability – meaning small, easy to use and with a long battery life – continues to be a strong desired trend in medical products. MSP430™ microcontrollers implement the latest in package technology to support small medical equipment with space restrictions. MSP430 MCUs also help reduce design complexity and time to market. In most portable medical equipment, the actual physiological signals are analog and require signal conditioning techniques, such as amplification and filtering, before they can be measured, monitored or displayed. The MSP430 microcontroller offers integration of the complete signal chain required for these applications, such as personal blood pressure monitors, pulse oximeters and heart-rate monitors.
Telehealth: Trends, Challenges and Solutions	Telehealth through portable patient monitoring enables independent elderly living, reduces health care costs, and improves access to health care services. It has been gaining tremendous momentum in recent years due to ongoing policy and infrastructure changes. This session will present an overview of telehealth systems and relevant technologies, including new TI solutions for portable thermometer, blood pressure monitors, pedometers and pulse oximetry. Specifically, we will look into the different components of a telehealth system design: processor, connectivity, power management and user interface. Solutions to enhance performance, improve connectivity, extend battery runtimes, and enable a rich user experience will be proposed.
Personal Health Device Sensors and Solutions	Personal fitness and home health care are driving the need for lower power analog front ends and processors. These sensor interfaces must be capable of running off batteries and have wireless interfaces. We will talk through several solutions that connect to various sensors that enable thermometers, blood pressure monitors, weight scales, glucose monitors and more.
Leveraging Wireless Connectivity to Improve PANs and WANs in Telehealth Systems	Telehealth is a medical applications that's gaining tremendous momentum. This session will provide a quick overview of telehealth, as well as its key blocks (personal health devices, aggregation manager, health record center). We will then focus on the choice of wireless standard when setting up the personal area network (PAN) and wide area network (WAN). We'll explain in detail the most used wireless connectivity standards in Telehealth, what makes these standards applicable for telehealth, and what are the key metrics to look for when choosing a particular wireless connectivity standard for telehealth.
Track 2 – Wireless and 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 (LPW) solution. It also highlights the devices and tools from TI and how they fit in a typical low-power RF design.



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Lower Power RF Design Tools to Help You Characterize Your Radio Products	SmartRF™ Studio is a low-power RF design tool designed to help you understand the operation, programming and analyzing of Texas Instruments low-power RF radio products. This session will discuss all the new changes that have been brought to the SmartRF tool, aimed at making more information available and presenting it in an very intuitive and understandable way. After this session, you will understand how to install the tool and then perform these analyzing tasks: measuring signal strength and packet error rates, code/register export functions, XML configuration, and strobe panel commands.
Fundamentals of Antennae Design <i>by LSR</i>	Antenna design is one of the most intimidating and important parts of any RF design. It is critical to understand the key factors involved when choosing an antenna topology, as well as what tools are needed for design, simulation and characterization. Designs must account for the effects of the enclosure material, the available space, the required radiation patterns, EMC compliance rules and regulations. This presentation discusses the fundamentals of antenna design for short-range devices, as well as the trade-offs between size, cost and performance. An antenna that is properly designed and optimized will enhance the overall performance of any radio.
Wirelessly Connecting to the Internet with 6LoWPAN and Wi-Fi	As “the Internet of things” is becoming a prominent reality, designers are looking for ways to add IP connectivity to traditionally wired devices. TI’s wireless portfolio offers two different wireless technologies heavily geared toward internet connectivity: 6LoWPAN and Wi-Fi. In this presentation, we will explore the fundamentals and technical considerations for each technology, their differences and application in IP systems.
Energy Harvesting, Wireless Charging and Zero Power Devices <i>by Cymbet</i>	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, CC430 combined MCU/integrated radios, wireless charging and communications using the TI passive low-frequency interface (PaLFI) device, energy processors, solid-state batteries, and solar energy harvesting for the TI MSP430 LaunchPad kit will be detailed. The last portion of this session will include hands-on lab demos of various EH implementations.
Track 3 – Power	
Wireless Power: Total Solution for Charging Using the Wireless Power Consortium Standard	TI has launched its first wireless power solution for the mass market, 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. We will discuss the basics of wireless power, the Wireless Power Consortium and the TI devices that make up our first-generation solution in this session.
Designing Wide-Input-Voltage (Up to 60 V), High-Current, Non-Isolated DC/DC Converters	Designing wide-input (up to 60 V) non-isolated DC/DC converters for high amperage applications (up to 20 A) creates some unique design challenges. This session will present these challenges and circuit solutions to overcome them. This application has been traditionally solved using expensive isolated bricks. Examples of circuit layout considerations and component selection will be provided. The solution for this discussion will be based around the TPS40170, a 4.5-V- to 60-V-input synchronous PWM buck controller.
High-Switching Frequency Barriers to Wide-Input-Voltage (Up to 60 V) DC/DC Converters	A DC/DC converter switching at 1 or 2 MHz sounds like a great idea, but there is more to understand about the impact to the power supply system than size and efficiency. Several design examples will be shown revealing benefits and obstacles when switching at faster frequencies.



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ABCs of Isolated Power	TBD
Power Supply Layout Considerations	<p>This topic will address methods for keeping circuit parasitic components from degrading the operation of your designs. Techniques to minimize the impact of parasitic inductance and capacitance of filter components and PWB traces will be discussed, together with a description of the impact that PWB trace resistance can have on power supply regulation and current capacity. A general overview of thermal design is also included, as well as sample temperature rise calculations in natural and forced-air environments. Finally, some practical examples of power stage and control IC layouts will be reviewed.</p>
Track 4 – Signal Chain	
Digital Isolation Techniques and Implementations	<p>Multiple options are now available to electronics designers to implement galvanic isolation. Apart from choosing between capacitive, optical and inductive/magnetic isolation technologies, they must also contend with the 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.</p>
Op-Amp Stability Analysis	<p>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-TI™ software simulation and bench tests, a stable system can be realized.</p>
FilterPro™ Software 3: Designing Active Filters	<p>Active filters are commonly applied in ADC anti-aliasing and DAC anti-imaging applications and directly in the analog signal path to condition signals. FilterPro™ software has been in use for two decades and is a favorite, easy-to-use tool for synthesizing these filters. As time has passed, FilterPro software has been updated to include additional responses; however, these changes were add-ons to the original program that limited their usefulness. Now, FilterPro software has been completely rebuilt from the ground up, featuring a new math engine and software that provides for additional filter features/responses and a modern GUI look. This session will look at FilterPro software 3's new features and capabilities using practical filter examples. Some filter basics will be included for those who are less familiar with filter characteristics.</p>
Data Converter Stone Soup: A Collection of Data Converter Design Tips and Tricks	Gina Hann is working on abstract
Interface Standards Comparison for Industrial Networks	<p>A wide variety of solutions exist for communicating between equipment in industrial applications. This session discusses the various standards and compares the trade-offs between their different protocols and physical/electrical interfaces. The standards will include PROFITBUS, CAN, DeviceNet, ControlNet, ModBus, IO-Link, and several flavors of industrial Ethernet.</p>
Track 5 – Embedded Processing Hardware	
ARM® Cortex-A, R, M Overview	<p>This session will detail the differences between Cortex-A, R and M. An explanation of target applications, architecture differences (including floating versus non-floating and how they communicate) will be covered. Join this overview presentation to better understand the differences between different ARM Cortex devices.</p>
USB: From Introduction to Rapid Development	<p>USB has become very popular in embedded systems, not only as a replacement solution for computer serial ports (i.e., RS232), but to integrate in various embedded applications. Join this session to learn more about the USB architecture, data flow models, host hardware and software topics, and device framework. Finally, a review of TI devices featuring this peripheral will be covered along with tips on how to quickly get your USB design started.</p>



Track and Course	Abstracts
Introduction to Ethernet for the Embedded Systems Designer	Embedded internet connectivity has become a must-have for many of today's applications. This session gives an introduction to Ethernet, explaining how to generate an IP address and connect to the network. A summary of devices featuring an Ethernet peripheral will be covered, along with details on how to quickly get your Ethernet-based design started.
Adding Wi-Fi and <i>Bluetooth</i> ® to TI Embedded Processors (MCUs and MPUs)	Quickly and easily add Wi-Fi and/or <i>Bluetooth</i> ® technology to systems using TI MPUs (AM/DM37x, AM18x) and MCUs (MSP430™, Stellaris®). In this session, we will start with an overview of the WL1271-TiWi 802.11b/g/n + <i>Bluetooth</i> ® transceiver and CC2560-PAN1325 <i>Bluetooth</i> ® transceiver, and then go into the details of the platform. The platform provides complete system integration of all components including WLAN and <i>Bluetooth</i> ® hardware, host hardware, Linux WLAN drivers, supplicant, TCP/IP integration, <i>Bluetooth</i> ® stack, profiles, example code for configuration, and sample source applications. We will demonstrate how to establish a Wi-Fi and <i>Bluetooth</i> ® connection by showing a sample application running on an AM/DM37x EVM.
Industrial Communications on Sitara™ MPUs	PROFIBUS is a leading industrial communication protocol. TI has integrated PROFIBUS into the newly announced AM1810 part. We will present the technical details of the AM1810, system block diagram, PROFIBUS overview and how customers can develop PROFIBUS-based systems.
Track 6 – Embedded Processing Software	
StellarisWare™ Software Advanced – Taking Your Knowledge to the Next Level	In this advanced session, we will cover the specific components that make up StellarisWare™ software. StellarisWare software components that will be covered include the Stellaris® peripheral driver library, USB library, graphics library, serial flash loader and boot loader. In addition, we will review the rich set of code examples provided in the Stellaris family and the in-system programming support.
Enabling and Accelerating Android on Sitara™, Integra™ and DaVinci™ Devices	With the availability of Android for TI's Cortex-A8-based devices, developers are now able to use the unique power of the Android application framework to create new, compelling designs. Attend this session to learn about Android fundamentals, including key benefits, architecture review, how Android can benefit different end-equipment and applications (including voice/video applications), and the TI/Android roadmap.
Go Green – Utilize New Linux Power Management APIs to Lower System Cost via Reduced Power Requirements	Customers are always interested in lowering their system cost. So it is important to point out hardware and software features that have recently become available, such as runtime power management in Linux. It was incorporated in kernel 2.6.32, which only became available in 2010. Embedded systems designers who liked the wide selection of I/O peripherals from the AM1808/OMAPL138 processor, as well as its low overall power consumption, can now harness these features via embedded Linux. This presentation will provide an overview of AM1808/OMAPL138 power control features and details of how embedded applications can take advantage of the Linux and DSP/BIOS™ power management APIs (OMAPL138 only) to save average power during runtime.
Code Composer Studio™ Software v4.0	Code Composer Studio™ IDE v4.0 is a major new release of Code Composer Studio software 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. Join this session to help you get started today



Track and Course	Abstracts
Linux Application Debugging with Code Composer Studio™ Software	Linux is a popular choice for designers using Sitara™, Integra™ and DaVinci™ devices. Code Composer Studio™ software v5 can be used for both kernel-level debugging as well as application debugging to reduce development time. Join this session to learn how to develop and debug Linux applications using Code Composer Studio IDE v5.
Track 7 – Applications	
Overview of TI 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 how these devices can fit in your next design.
MCU Rapid Application Development with Model-Based Programming <i>by VisSim</i>	Attendees will learn how to develop efficient digital control applications using the VisSim/Embedded Controls Developer trial, now included with the new \$39 Piccolo™ controlSTICK (TMDX28069USB). Topics covered include an introduction to VisSim programming, clock and timer configurations, peripherals access, interrupt handling, and thread priority and timing. A system based on a TI MCU and integrated motor drive evaluation kit will be explored.
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.
Stellaris® Human Machine Interface (HMI) Hands-On Workshop (Part 1)	During this interactive, hands-on session, we will take a close look at the Stellaris® RDK IDM and the RDK-IDM-L35. Both of these reference design kit includes serial connectivity options for easy implementation as a human machine interface (HMI) touch display panel in an embedded control device. This session will include an in-depth look at the Stellaris graphics library and utilizing the LM3S811 evaluation kit as a debugging interface.
Stellaris® Human Machine Interface (HMI) Hands-On Workshop (Part 2)	During this interactive, hands-on session, we will take a close look at the Stellaris® RDK IDM and the RDK-IDM-L35. Both of these reference design kit includes serial connectivity options for easy implementation as a human machine interface (HMI) touch display panel in an embedded control device. This session will include an in-depth look at the Stellaris graphics library and utilizing the LM3S811 evaluation kit as a debugging interface.

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