TI Education Events

Connecting Real People with Real Solutions

TI Worldwide Technical Support

Internet

TI Semiconductor Product Information Center Home Page
support.ti.com

TI Semiconductor KnowledgeBase Home Page
support.ti.com/sc/knowledgebase

TI DSP Home Page   **TI Analog Home Page**
www.dspvillage.ti.com   analog.ti.com

TI DSP FTP Site
ftp.ti.com/pub/tms320bbs

Product Information Centers

Americas
Phone	+1(972) 644-5580
Toll Free	(800) 477-8924
Fax	+1(972) 927-6377
Software Registration/Upgrades	(972) 293-5050
Fax	(866) 855-8428
Hardware Repairs/Upgrades	(512) 615-4633
Internet/E-mail	support.ti.com/sc/pic/americas.htm

Europe, Middle East, and Africa
Phone	
Belgium (English)	+32 (0) 27 45 54 32
Finland (English)	+358 (0) 9 25173948
France	+33 (0) 1 30 70 11 64
Germany	+49 (0) 8161 80 33 11
Israel (English)	1800 949 0107
Italy	800 79 11 37
Netherlands (English)	+31 (0) 546 87 95 45
Russia	+7 (0) 95 7850415
Spain	+34 902 35 40 28
Sweden (English)	+46 (0) 8587 555 22
United Kingdom	+44 (0) 1604 66 33 99
Fax	+(49) (0) 8161 80 2045
E-mail	epic@ti.com
Internet	support.ti.com/sc/pic/euro.htm

Japan
Fax	International	+81-3-3344-5317
	Domestic	0120-81-0036
Internet/E-mail	International	support.ti.com/sc/pic/japan.htm
	Domestic	www.tij.co.jp/pic

Asia
Phone	
International	+886-2-23786800
Domestic	Toll-Free Number
Australia	1-800-999-084
China	800-820-8682
Hong Kong	800-96-5941
Indonesia	001-803-8861-1006
Korea	080-551-2804
Malaysia	1-800-80-3973
New Zealand	0800-446-934
Philippines	1-800-765-7404
Singapore	800-886-1028
Taiwan	0800-006800
Thailand	001-800-886-0010
Fax	886-2-2378-6808	E-mail	tiasia@ti.com
Internet	support.ti.com/sc/pic/asia.htm		ti-china@ti.com

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TI Training Resources

TI offers multiple training opportunities to aid in the development of your signal processing application:

WORKSHOPS – TI workshops are a fast and efficient way to learn how to use and implement designs on TI DSPs. The workshops are designed to develop a strong working knowledge of TI DSPs through lectures and practical hands-on exercises. All workshops are facilitated by qualified TI representatives and are based on DSP Starter Kits (DSKs), Evaluation Modules (EVMs) or simulators. We have a range of One-day, Application, and Multi-day Workshops.

> **ONE-DAY WORKSHOPS** – One-day workshops are introductory courses designed to offer product or technology knowledge. These workshops include a significant hands-on section and are ideal introductions to get started with TI DSPs.

> **APPLICATION WORKSHOPS** – Application workshops are introductory courses that teach integration of a DSP into an application. Additionally, these workshops focus on the application functionality.

> **MULTI-DAY WORKSHOPS** – Three- or four-day, hands-on, advanced, educational courses are highly technical and designed for engineers who want to sharpen their design and development skills. Managed by TI's Technical Training Staff, these workshops include extensive hands-on labs emphasizing the demonstration and application of techniques and skills.

TI DEVELOPER CONFERENCE – Whether you are a novice or experienced user, learn about the latest in signal processing design from industry experts through demonstrations, presentations, hands-on training, networking activities and more.

ONLINE TRAINING – A variety of free online training courses are available to you at your fingertips 24/7. Learn more about how to design your signal processing application with self-paced online training courses covering DSP and Analog applications, easy-to-use software development tools and more.

WEBCASTS – TI webcasts cover topics ranging from technical "How-tos" to systems solution presentations and product overviews. Attend live webcasts or view the library of archived webcasts.

TI TECHNICAL SEMINARS – TI Technical Seminars provide hardware, software and system designers, and engineering managers a technical review of real-time design advantages. Technical experts from Texas Instruments and third parties offer instruction, live demonstrations, and Q&A sessions to address your signal-processing needs.

TMS320™ DSP Workshop

Common Applications of TMS320 DSPs
- Audio
- Communications
- Control
- Security
- Systems
- Video and Imaging

Evaluating DSP for Embedded Applications Workshop

This workshop is tailored for engineers who are familiar with MCU, FPGA/ASIC, or GPP design techniques, and may be considering the use of DSPs in future systems. *No prior DSP experience is required.*

Workshop Overview
- Compare different system solutions, design trade-offs and an intro to Code Composer Studio™ IDE (CCStudio)
- Lab 1: Use CCStudio to build/debug a simple DSP/BIOS™ application and view results using real-time analysis tools
- Analyze DSP architecture, performance and how to achieve high performance using various tools/methods
- Lab 2: Use C compiler/optimizer to generate efficient code and benchmark results vs. hand-coded assembly
- Introduction to TI's DSP platforms, applications and starterware
- Demo: Reference Frameworks (RF3) + instructor-selected demo
- Summary/Conclusion: What is the next step?

What You Will Learn
- Evaluation of TMS320 digital signal processors (TMS320C2000™/C5000™/C6000™ DSPs) alongside other solutions
- Introduction to Code Composer Studio™ IDE, DSP/BIOS™ Kernel and RTA (real-time analysis) tools
- Overview of DSP architecture, performance and code generation tools
- How to achieve high performance via the use of DSPLIB, C compiler/optimizer, third-party software
- Introduction to TI's DSP platforms and which applications they support best
- Overview of DSP starterware and Reference Frameworks (including a demo of RF3)
- Run hands-on labs of simple applications to demonstrate tools features and signal-processing concepts

Workshop Fee

The workshop fee is $195 USD or €195 euro and includes all training and materials. Lunch is provided. The workshop runs from 8:30 a.m. to 5:00 p.m.

C2000™ Digital Signal Controller Workshops

Common Applications of TMS320C28x™ Generation of Controllers
- Industrial drives
- Appliances
- Optical networking
- Cooling systems
- Power management
- Automotive
- Consumer goods
- Fuel pumps
- Tunable lasers
- UPS
- Intelligent sensors

Digital Motor Control One-Day Workshop

This is a one day hands-on technical workshop to discover how to implement Field Oriented Control (also called FOC or vector control) on a TMS320C2000™ DSP driving a 3-phase AC motor (synchronous and asynchronous).

It is designed to offer an overview of the theoretical background in field oriented control as well as an in-depth explanation of the use of the TI DMC-Lib application software using existing tools.

Workshop Overview
- Description of scalar motor control techniques, advantages and inherent limitations
- Overview of the synchronous and asynchronous machines
- Theory of the Field Oriented Control (FOC)
- Comparison between FOC and scalar techniques
- System control strategies (sensored vs. sensor less, one vs. two or three shunts, field weakening)
- Implementation on the C2000 platform from the hardware and software perspective

What You Will Learn
- Overview of the synchronous and asynchronous machines
- A review of scalar and vector control techniques, and the advantages and disadvantages of each
- Receive the latest technology and product updates to support your future design
- Learn how the use of DSP processors can lead to the most effective control of your motor control system

Workshop Fee

The fee is $195 USD or €195 euro without a take-home DSK. Or in Europe, the price is €495 euro which includes a take-home F2812 eZdsp DSK. Lunch is provided. The workshop runs from 8:30 a.m. to 5:30 p.m.

Common Applications of TMS320C28x™ Generation of Controllers
- Industrial drives
- Appliances
- Optical networking
- Cooling systems
- Power management
- Automotive
- Consumer goods
- Fuel pumps
- Tunable lasers
- UPS
- Intelligent sensors

Common Applications of TMS320C28x™ Generation of Controllers
- Industrial drives
- Appliances
- Optical networking
- Cooling systems
- Power management
- Automotive
- Consumer goods
- Fuel pumps
- Tunable lasers
- UPS
- Intelligent sensors

TMS320F2812 eZdsp™ One-Day Workshop

This workshop is tailored for hardware or software design engineers who are currently designing or plan to design on the TMS320F2812 DSP controller. This training provides an overview of the functionality and capabilities of the F2812 controller. *Experience with digital systems and basic knowledge of programming is helpful.*

Workshop Overview
- TMS320C28x controller overview
- TMS320F281x introduction
- Control peripherals
- DSP/BIOS™ real-time OS
- Flash programming

What You Will Learn
- Basic controller implementation
- F2812 architecture
- How to use PC-based development tools
- F2812 eZdsp and Code Composer Studio™ IDE
- System design

Workshop Fee

The fee is $495 USD or €495 euro and includes all training, materials and an F2812 take-home eZdsp. The fee without the F2812 eZdsp board is $195 USD or €195 euro. Lunch is also provided. The workshop runs from 8:30 a.m. to 5:00 p.m.

TMS320C28x Controller Multi-Day Workshop

This is an intensive workshop tailored for software design or system engineers to prepare them to implement designs quickly and efficiently on a C28x™ controller. The C28x controller workshop steps the user through system initialization, peripheral setup and programming an application into Flash memory. The workshop incorporates DSP/BIOS™ real-time kernel, IQMath, and the Flash plug-in utility. A working knowledge of C programming language is assumed. *Familiarity with embedded processors, DSPs, C and Assembly languages, and Code Composer Studio™ IDE is helpful, although not required.*

Workshop Overview
- Architectural overview
- Programming development environment
- Peripheral register header files
- Reset and interrupts
- System initialization
- Analog-to-digital converter
- Event manager
- Numerical concepts and IQMath
- Using DSP/BIOS™ Kernel
- System design
- Communications
- Support resources

What You Will Learn
- C28x™ controller architecture and instruction set
- Use of PC-based development tools
- Optimization of C programming environment
- Interrupts and traps
- Peripheral and input/output techniques
- System designs issues
- Hardware interface issues

Workshop Fee

The fee is $1995 USD or €2250 euro and includes all training, materials and a take-home F2812 eZdsp™. The fee without the F2812 eZdsp board is $1595 USD or €1800 euro. Lunch is also provided. This three-day workshop runs from 8:30 a.m. to 5:30 p.m.

MSP430 Workshops

Power-Efficient C5000™ DSP Workshops

Common Applications of the MSP430 Microcontroller
- Gas Meters
- Handheld Meters
- Industrial systems
- Portable medical devices
- Security systems
- Utility metering

Common Applications of TMS320C54x™ DSPs
- Bar code readers
- Cellular phone attachments
- Hands-free kits
- Headsets
- Hearing aids
- Scanners
- Thermal printers

MSP430 One-Day Workshop

This hands-on workshop is intended to educate the experienced MCU designer on the capabilities of the MSP430 and how to use them. The material is intended for the design engineer using the MSP430 in a new project. Basic experience with general MCUs and knowledge of assembler and C language programming is assumed. This workshop runs approximately six hours and consists of presentations, demonstrations, and hands-on labs.

TMS320C54x™ DSP Integration Multi-Day Workshop

This is the best course for an engineer/programmer who is new to the TMS320C54x DSP and needs to get a whole system running. This workshop takes you through all phases of designing a C54x™ DSP-based system using eXpressDSP™ tools. Using the TMS320C5416 DSK platform you will gain hands-on experience using Code Composer Studio™ IDE to build and debug projects. *The course has no specific prerequisites.*

Workshop Overview
- Architectural overview
  - MSP430 overview
  - MSP430 roadmap
  - MSP430 architecture
  - Embedded emulation
- Ultra-low power concept
  - Principles for ultra-low power applications
  - Usage of low-power modes
  - Oscillators
  - Battery selection
- Project
- Getting to production
  - Basics about source code
  - Brownout
  - PCB fundamentals
  - Crystal selection
  - Oscillator fault feature
  - In-system production programming

What You Will Learn
- Embedded design with the MSP430
- Getting familiar with an MSP430 development environment
- Where to find and how to use resources
- Understand the MSP430 low-power concept
- How to avoid common production traps

Workshop Overview
- Introduction to C54x DSP generation
- Code Composer Studio IDE
- Using DMA and HWI
- Configure and use McBSP
- Double-buffered systems
- Multi-threaded systems
- Channel sorting
- Integrate eXpressDSP-compliant algorithms
- Memory management
- Code optimizations
- System design considerations
- Creating a bootable, standalone design
- Future technologies and summary

What You Will Learn
- Use Code Composer Studio™ IDE
- Design a real-time double-buffered, channel sorted system
- TMS320C5416 DSP Starter Kit (DSK)
- DSP/BIOS real-time operating system
- Debugging with real-time analysis
- Setup peripherals using the Chip Support Library (CSL)
- Use some of the McBSP serial ports multi-channel features
- Use the DMA's auto-initialization feature
- Use eXpressDSP-compliant algorithms in an application
- Optimize code and memory for the C54x DSP generation
- C54x DSP system memory management
- HEX500 system memory management
- Use C5416 boot loader
- Program the DSK's on-board Flash memory

Workshop Fee

The fee is $195 USD or €195 euro and includes all training, materials and a take-home development kit. Lunch is also provided. This one-day workshop runs from 9:00 a.m. to 4:00 p.m.

Workshop Fee

The fee is $1995 USD or €2250 euro and includes all training, materials and a TMS320C5416 DSK. The fee without the C5416 DSK is $1595 USD or €1800 euro. Lunch is also provided. This four-day workshop begins at 8:30 a.m. each day. You can expect to finish class by 2:00 p.m. on the final day.

Common Applications of TMS320C55x™ DSPs

- Portable imaging
- Personal medical devices
- Wireless modems
- Biometrics
- Digital audio players
- Digital still cameras
- Electronic books
- Headsets
- Voice recognition
- GPS receivers
- Mobile radio
- Access gateway

TMS320C5510 DSP One-Day Workshop

This workshop is tailored for hardware or software engineers who are evaluating and wish to design on the TMS320C55x DSP. This training provides an overview of the functionality and capabilities of the C55x™ DSP. *No prior DSP experience is required.*

Workshop Overview
- Intro to C55x DSP, Code Composer Studio™ (CCStudio) IDE, C5510 DSK
- Use CCStudio to build and debug code
- C55x DSP efficiency – achieving high performance and low power
- Implement and measure power-reduction techniques
- Programming with ease (C, CSL, DSP/BIOS™ Kernel)
- Using C Compiler/Optimizer, CSL, DSP/BIOS Kernel
- Development tools from TI

What You Will Learn
- TMS320C5000 DSP overview
- C55x DSP architecture and peripherals
- Introduction to CCStudio
- Using the C5510 DSP Starter Kit (DSK)
- Use the Chip Support Library (CSL) to setup and program peripherals
- Analyze and use power-reduction techniques
- Evaluate methods to maximize performance
- Use DSP/BIOS Kernel and RTA (real-time analysis tools) to build, analyze and debug a system
- Run labs/demos using common real-time applications on hardware (C5510 DSK)

Workshop Fee

The fee is $495 USD or €495 euro and includes all training, materials and a take-home C5510 DSK. The fee without the C5510 DSK is $195 USD or €195 euro. Lunch is also provided. The workshop runs from 8:30 a.m. to 5:00 p.m.

TMS320C55x DSP Integration Four-Day Workshop

This new workshop takes you through all phases of designing a C55x™ DSP-based system using eXpressDSP™ tools. With the C5510 DSK platform, you will gain hands-on experience using Code Composer Studio™ IDE to build and debug projects. This workshop is especially useful for designers doing system integration and planning to use TI's advanced software technologies. It will give you a complete view of the DSP system integration process. *This course has no specific prerequisites.*

Workshop Overview
- Introduction to C55x DSPs
- Code Composer Studio™ IDE
- Using DMA and HWI
- Configure and use McBSP
- Double-buffered systems
- Multi-threaded systems
- Channel sorting
- Integrate eXpressDSP™-compliant algorithms
- Memory management
- Code optimizations
- System design considerations (including power-down modes)
- Creating a bootable, standalone design
- Future technologies and summary

What You Will Learn
- Use Code Composer Studio IDE
- Design a real-time double-buffered, channel sorted system
- C5510 DSP Starter Kit (DSK)
- DSP/BIOS real-time operating system
- Debugging with real-time analysis
- Setup peripherals using the Chip Support Library (CSL)
- Use some of the McBSP serial ports multi-channel features
- Use the DMA's auto-initialization feature
- Optimize code and memory for the C55x DSP
- C55x DSP system memory management
- HEX500 system memory management
- Use C5510 DSP boot loader
- Program the DSK's on-board Flash

Workshop Fee

The fee for this 3.5 day workshop is $1995 USD or €2250 euro and includes all training, materials and a C5510 DSK. Without the DSK the fee is $1595 USD or €1800 euro. Lunch is provided. Classes begin at 8:30 a.m. each day.

High-Performance C6000™ DSP Workshops

Common Applications of TMS320C6000™ DSPs
- Pooled modems
- Digital subscriber line
- Wireless basestations
- Central office switches
- Digital imaging
- Call processing
- 3D graphics
- Speech recognition
- Voice over packet
- Streaming video servers and clients
- Multimedia gateway

TMS320C6416/C6713 DSK One-Day Workshop

This workshop is tailored for hardware or software design engineers who plan to design on TMS320C6000™ DSPs. This training provides an overview of the functionality and capabilities of the TMS320C6000 DSPs. *No prior DSP experience is required.*

Workshop Overview
- Programming peripherals on C6000™ DSPs with Chip Support Library (CSL)
- Overview of C6000 DSP system tools and software
- Optimizing code using C Compiler
- Correction of real-time problems created by integrating the new algorithm
- Using the DSP/BIOS™ real-time analysis

What You Will Learn
- TMS320C6000 DSP and Code Composer Studio™ IDE overview
- Using TI's Chip Support Library (CSL)
- C6000 DSP system tools and software
- Using the C6416/C6713 DSP Starter Kit
- Utilizing the architecture to achieve advanced features

Workshop Fee

The fee is $495 USD or €495 euro and includes all training, materials and a C6416 or C6713 DSK, or $195 USD or €195 euro without a take-home DSK. Lunch is also provided. The workshop runs from 8:30 a.m. to 5:00 p.m.

TMS320C6000 DSP Integration Four-Day Workshop

The C6000™ DSP Integration Workshop will step you through all phases of designing a C6000 DSP-based system using eXpressDSP™ tools. Using the TMS320C6713 or TMS320C6416 DSK platform, you will gain hands-on experience using Code Composer Studio™ to build and debug projects. It is especially useful for designers doing system integration and planning to use TI's advanced software technologies. This workshop is for anyone looking for a complete view of the DSP system integration process. *Knowledge of C-programming and DSP is not a prerequisite, but would be helpful for this workshop.*

Workshop Overview
- Design a real-time double-buffered system
- Debugging with real-time analysis
- Set up peripherals using the Chip Support Library
- Discuss the McBSP serial ports multi-channel features
- Use the EDMA's advanced features
- Use eXpressDSP-compliant algorithms in an application
- Examine a sample application template – reference framework
- C6000 DSP system memory management
- Use C6000 DSP self-check software
- Evaluate and use C6000 DSP boot loader
- Setting up a bootable image in Flash ROM
- Program the DSK's on-board Flash memory

What You Will Learn
- Use Code Composer Studio™ IDE
- Design a real-time double-buffered system
- DSP/BIOS™ real-time operating system
- Debugging with real-time analysis
- Discuss the McBSP serial ports multi-channel features
- Use the EDMA's advanced features (auto-initialization, interrupt synchronization)
- C6000 DSP system memory management
- C6000 DSP cache operation
- Design your DSP system to allow code/data overlays in memory
- Evaluate and use C6000 DSP boot loader
- Setting up a bootable image in Flash ROM

Workshop Fee

The fee is $1995 USD or €2250 euro and this includes all training, materials and a take-home C6416 or C6713 DSK. The fee without the DSK is $1595 USD or €1800 euro. Lunch is also provided. Classes begin at 8:30 a.m. You can expect to finish class by 4:00 p.m. on the final day.

High-Performance C6000™ DSP Workshops

Common Applications of TMS320C6000™ DSPs
- Pooled modems
- Digital subscriber line
- Wireless basestations
- Central office switches
- Digital imaging
- Call processing
- 3D graphics
- Speech recognition
- Voice over packet
- Streaming video servers and clients
- Multimedia gateway

TMS320C6000 DSP Optimization Four-Day Workshop

This workshop is primarily intended for software engineers writing code and algo-rithms for the C6000™ DSP platform. It will also be useful for system designers evalu-ating the C6000 DSP's CPU architecture. *Knowledge of C-programming and digital sig-nal processing would be helpful for this workshop.*

Workshop Overview
- Architectural overview
- Introduction to pipeline
- Using C programs
- Calling assembly from C
- Using the assembly optimizer
- Architectural details
- Optimization methods
- Software pipelining
- Software pipelining multi-cycle loops
- Advanced C topics
- Numerical issues
- Basic memory management (linking)
- Internal memory and cache
- Writing high-speed interruptible code
- Overview of C6000 DSP peripherals

What You Will Learn
- C6000 DSP platform CPU architecture and pipeline
- Building Code Composer Studio™ IDE projects
- Exploring C6000 DSP compiler build-options
- Writing efficient C Code
- Writing optimized standard and linear assembly code
- Mixing C and assembly language
- Software pipelining techniques
- Numerical issues with fixed-point processors
- Basic C6000 DSP system memory management
- How caches work and optimizing their usage

Workshop Fee

The fee is $1995 USD or €2250 euro and this includes all training, materials and a take-home DSK The fee without the take-home DSK is $1595 USD or €1800 euro. Lunch is also provided. Classes begin at 8:30 a.m. each day and run through 5:30 p.m. You can expect to finish class by 3:00 p.m. on the final day.

DSP/BIOS™ Kernel Workshop

DSP/BIOS OS Four-Day Workshop

This is an intensive workshop designed for engineers who need to develop or sharpen their design and development skills in real-time software design using Code Composer Studio™ IDE. *Attendees should have a background in software program-ming methodologies, either C or assembly language.*

Workshop Overview
- Common needs of real-time systems
- Foreground vs. background scheduling (HWI, IDL)
- Prioritization in a multi-threaded sys-tem (SWI, TSK)
- Data flow in real-time systems (SIO, IOM)
- Processing by sample, buffer and multi-buffer
- Real-time analysis graphing and API (STS, LOG, SYS)
- DSP software coding standards (XDAIS, IOM, CSL)
- Static and dynamic system design (MEM, BUF)
- Inter-thread communication (SEM, MBX, QUE, MSGQ)
- Examples using all the above: Reference Frameworks (RFx)

What You Will Learn
- Skills in the use of the Code Composer Studio (CCStudio) development environment
- How to develop real-time systems from modular and reusable components
- How to apply a wide range of available DSP/BIOS™ API to meet your system needs
- How to debug real-time systems logi-cally and temporally
- How to select the best options in development of your system

Workshop Fee

The fee is $1595 USD or €1800 euro and this includes all training and materials. Lunch is also provided. Classes begin at 8:30 a.m. each day. You can expect to finish class by 12:00 p.m. on the final day.

TI Developer Conference

TI|Developer Conference

The TI Developer Conference provides networking opportunities with experts, must-have technical learning, and peer-to-peer interaction for embedded developers. Both novice and expert-level designers can improve design efficiency by attending this conference.

The TI Developer Conference brings together top worldwide companies and leading-edge products and provides the following:

- Hands-on workshops
- Demonstrations of emerging technologies
- Presentations on the latest developments in signal processing
- Networking opportunities
- Expert panels and more

The conference keeps designers, engineers, developers, project managers and educators up-to-date on recent advances and future demands of the signal processing industry.

Topics include:
- Audio
- Communications
- Control
- Security
- Video/Imaging

- Hardware
- Software
- Tools information for both new and experienced users of signal processing applications
- Partner-specific sessions for university and third-party delegates

Locations and Dates:

Check the website for information in your area: **www.ti.com/tidc**

North America	Early 2006
Asia	Beijing – April 18–19, 2005 Shanghai – April 20, 2005 Shenzhen – April 22, 2005 Taipei – April 26, 2005 Seoul – April 28, 2005
Israel	Tel-Aviv – May 30, 2005
Europe	Milan, Italy – May 25, 2005

Online Training

ONLINE TRAINING – A variety of free online courses are available at your fingertips. Learn more about how to design your signal processing application with over 100 self-paced online training courses covering:

- Applications
- DSP basics
- Easy-to-use software development tools
- DSP programming tips and tricks
- TMS320C6000™, TMS320C5000™ and TMS320C2000™ DSP platforms
- Analog
- Power supplies

For a complete list of available courses, visit **www.ti.com/onlinetraining**

Signal-Processing Applications

Audio
Digital Audio Systems
Psychoacoustic Audio Solutions for Digital Audio Enhancement of Mobile Devices
Multichannel Surround Recording Encoding Techniques for Audio Video Recording
Delay-Based Audio Effects Using the TI TMS320C6713 DSP

Biometrics
Fingerprint Authentication Development Tool

Digital Control
Digital Control Systems
Gain Flexible, Innovative Embedded Control Development with Visual Tools

Streaming Media / IP Video Phone / Surveillance IP Camera / Media Encoder/ Decoder / Video-on-Demand Set-Top Box
Real-Time Implementation of Video Compression on TI TMS320DM642 Digital Media Processor
Design of Multi-Microphone Full-Duplex Systems

Telephony
Making Telephony Simple
Hands-Free Kit – A DSP Solution from Concept to Reality
Modem Design, Implementation and Testing Using NI's LabVIEW

Video and Imaging
TMS320C6000™ DSP Imaging Developer's Kit (IDK)

TMS320C6000 DSP Network Video Developer's Kit (NVDK)
Introduction to Digital Video Systems
Porting and Optimization for C++ Image Processing on TMS320C62x
Multichannel Surround Recording Encoding Techniques for Audio Video Recording
Introduction to TI's Digital Media Processor Suite
Low-Cost Media Gateways Using TI DSPs
Real-Time Implementation of Video Compression on TI TMS320DM642 Digital Media Processor

DSP Silicon

General
An Intuitive Approach to DSP
Using DMA Engines & Designing Device Drivers in High-Performance DSP Systems
Using FPGAs and DSPs to Reduce Time-to-Market
Using Signal & Imaging Processing Libraries to Jump-Start Your Real-Time DSP Apps
Embedded Debugging Solution Advantages Using Serial HPI
Expert Techniques for Efficient Real-Time Implementations Using Compiler-Directed Feedback

TMS320C2000™ DSP
TMS320F2401A DSP Overview
TMS320F2810/F2812 DSP Overview
TMS320F2810/F2812 DSP Technical Details
Flash Programming for Your TMS320LF24x DSP System

Online Training (Continued)

Debugging Your TMS320C24x™ DSP Using Code Composer Studio™ IDE Real-Time Monitor
IQMath on the Texas Instruments TMS320C28x™ DSP

TMS320C6000 DSP

90-nm Process Technology Drives Increased Performance and Price Reduction
How TI Achieved 1 GHz with C64x™ DSPs
720-MHz DSP Overview
C6000™ DSP One-Day Workshop
C6000 DSP Compile Tools Overview
C6000 DSP Compile Tools Technical Details
TMS320C6000 DSP Imaging Developer's Kit
TMS320C6000 DSP Network Video Developer's Kit (NVDK)
TMS320C64x DSP Technical Details
TMS320C64x/TMS320C55x™ DSP Overview
TMS320C6411 DSP Overview
TMS320C6414, TMS320C6415 and TMS320C6416 DSPs Overview
TMS320C6712 DSP Overview
Delay-Based Audio Effects Using the TI TMS320C6713 DSP
Optimize C Code on C6000 DSPs
Introduction to TI's Digital Media Processor Suite
Low-Cost, High-Performance TMS320C6410/C6413 DSP Overview
The MathWorks Developer Kit for TI DSPs

TMS320C5000™ DSP

C5000™ DSP One-Day Workshop
TMS320C55x DSP Technical Details
TMS320C5510 DSP Technical Details
TMS320C5509 and TMS320C5502 DSP Overview
TMS320C5509 and TMS320C5502 DSP Technical Details
TMS320C5501/C5502 $5 Dual-MAC DSPs
TMS320C55x/TMS320C64x DSP Overview
TMS320C5470 and TMS320C5471 DSP Overview
TMS320C54x™ and TMS320C55x DSP Migration Tutorial
A Straightforward Approach to Communicating Over the C5000 DSP Host Port Interface
New Power-Efficient DSPs and Tools Redefine Low-Power Signal Processing Designs

OMAP™ Processors and Software Development

OMAP5910 Processor Product Overview
Software Development for OMAP Processors: High-Level OS and Integrating DSP
Fast and Flexible OMAP Development Using the Innovator™ Development Kit
An Efficient Hardware and Software Architecture for Dual-Core OMAP Processor
OMAP Application Development Using DSP/BIOS™ Bridge for Symbian™ OS

DSP Tools and Software

Code Composer Studio IDE

NEW! Code Composer Studio Tuning Edition (V 3.0)
Code Composer Studio (CCStudio) v2.2 Overview
What's New in CCStudio v2.1
What's New in CCStudio v2.0
Profiling Your Code with CCStudio v2.0
CCStudio Simulators for Software Development – I
CCStudio Simulators for Software Development – II
CCStudio 2.0 Debug Facilities
CCStudio 2.0 Tutorials
Using Fast Simulators for DSP Application Debug, Analysis
MATLAB® Link for Code Composer Studio Development Tools
System-Level DSP Design using Matlab and Simulink®
Top 10 Code Generation Tools Mistakes and How to Avoid Them
Automate Embedded Systems Testing
Advanced Project Mgmt./Developing on UNIX
Migrating Existing CCStudio IDE v1.x Projects to v2.0

DSP/BIOS™ Kernel

DSP/BIOS Kernel Overview
DSP/BIOS One-Day Workshop
DSP/BIOS Audio Demo
Developing a DSP/BIOS Application for ROM on the TMS320C5402 DSK

Emulation

XDS560™ Emulator: Advanced Event Triggering
XDS560 Emulator: Product Overview
High-Speed RTDX™ Data Link

DSP Tools and Software (Continued)

eXpressDSP™/Reference Frameworks

eXpressDSP Real-Time Software Technology Overview
A Technical Review of eXpressDSP Reference Frameworks
Reference Frameworks for eXpressDSP Software
Developer Workshop Analyzing Dynamic Real-Time Systems with RTDX™
Introduction to Software Reference Frameworks

TMS320™ DSP Algorithm Standard

TMS320 DSP Algorithm Standard
TMS320 Algorithm Standard – Make vs. Buy

Analog

Analog and Mixed Signal

Meet the MSP430: An Introduction to MSP430 Ultra-Low-Power MCU
Analog Electronic Design in a Day!

Amplifiers and Comparators

2002 Signal Acquisition & Conditioning for Industrial Applications
2001 Signal Conditioning – Building the Analog Tool Kit

Analog to Digital Converters

2002 Signal Acquisition & Conditioning for Industrial Applications

Interface

Interface: Signaling Rate vs. Transfer Rate

Power Management

Understand – Optimize Electromagnetic Compatibility in Switchmode Power Supplies
Designing High-Power-Factor Off-Line Power Supplies
Achieving High-Efficiency with a Multi-Output CCM Flyback Supply
Transformer and Inductor Design for Optimum Circuit Performance
Under the Hood of Low-Voltage DC/DC Converters
Paralleling Power – Choosing and Applying the Best Technique for Load Sharing
Magnetics Design for Switching Power Supplies
100-Watt, 400-kHz, High-Efficiency DC/DC Converter Design Review
Practical Considerations in Troubleshooting and Optimizing Power Supply Control
2003 Unitrode Design Seminar – SEM1500
2001 Magnetics Design Handbook – MAG100A
2001 Unitrode Design Seminars – SEM1400
2000 Unitrode Design Seminars – SEM1300
1997 Unitrode Design Seminars – SEM1200
1996 Unitrode Design Seminars – SEM1100
1994 Unitrode Design Seminars – SEM1000
1993 Unitrode Design Seminars – SEM900
1991 Unitrode Design Seminars – SEM800
1990 Unitrode Design Seminars – SEM700
1988 Unitrode Design Seminars – SEM600
1986 Unitrode Design Seminars – SEM500
1985 Unitrode Design Seminars – SEM400
1984 Unitrode Design Seminars – SEM300
1983 Unitrode Design Seminars – SEM100
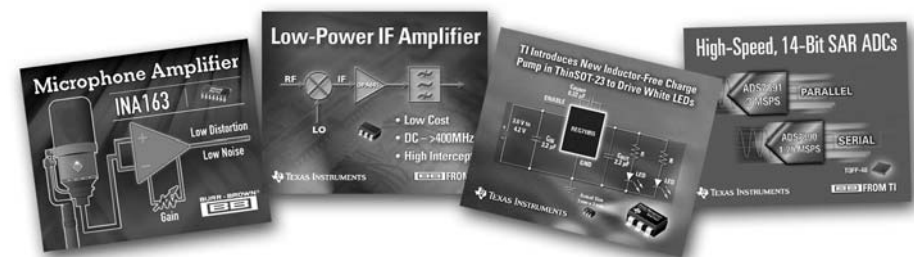
TI Webcasts

TI webcasts range from technical "How-Tos" and systems solutions to product overviews, which address current topics critical to designers. Webcasts typically last one hour that include a presentation followed by a Question & Answer session with a technical engineering presenter specializing in the topic.

Analog eLab Webcasts

TI has developed a series of free technical webcasts (Analog eLabs) that provide designers with an online lab/learning environment. Webcasts are hosted by analog experts from TI and authorized TI distributors. Nine eLabs webcast are planned for 2005. Visit **www.ti.com/analogelab** to learn about upcoming webcasts and to view previous programs:

• Amplifier Noise: types, Origins, Magnitude Predictions and Reduction Techniques
• Quantifying Amp to ADC – Distortion Considerations
• Quantifying Amp to ADC Interface Performance
• A Designer's Guide to Portable System Power Implementation
• Avoiding the Pitfalls with Single-Supply Op Amps

DSP Archived Webcasts

The DSP Webcast Library is designed for 24/7 access worldwide via the web. Visit **www.ti.com/webcasts** to view the wide array of DSP webcasts to help answer your technical questions.

Power Webcasts

A free series of webcasts hosted by Tech Online providing technical topics are related to Texas Instruments Power Supply Products. Please visit Tech Online at **www.techonline.com/community/ed_resource/webcast** to view the schedule of planned webcasts and to view archived topics.

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Hosted in numerous cities across Europe by TI's distributors, these one-day training sessions provide system designers and engineering managers with an applications-focused, technical review of easy-to-use, real-time design advantages. Technical experts from Texas Instruments will offer instruction, live demonstrations and Q&A to address your signal processing needs. For details, please see: **www.ti.com/europe/techtraining**

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Analog Seminars

Analog & Mixed-Signal

High-Speed Analog Design & Solution
Precision Data Acquisition Application

Power Management

2004–2005 Power Supply Design

Development Tools

	Analog	DSP	Logic	Microcontrollers	Networking
Software					
Application Software	✔	✔			
Real-Time OS – DSP/BIOS™		✔			
Peripheral Drivers		✔			
Signal Processing Libraries		✔			
TMS320™ DSP Algorithm Std.		✔			
Software Tools					
Code Composer Studio™ IDE		✔			
Developer Kits		✔		✔	
Compilers/Assemblers/Linkers	✔			✔	
Utilities/Plug-Ins	✔	✔			
Flash Tools		✔		✔	
Simulators		✔	✔		
Third-Party Development Environments	✔	✔			
Hardware Tools					
Development Boards/EVMs	✔	✔	✔	✔	✔
Daughter Cards	✔	✔			
Emulators/Analyzers		✔		✔	
Application-Specific Solutions					
Baseline	✔	✔			
Development Platform	✔	✔			
Reference Design	✔	✔			

Available Development Tools

Part Number	Name	Suggested Retail Price
TMDSDSK5416	TMS320C54x™ DSP Starter Kit (DSK)	$395
TMDSDSK5510	TMS320C55x™ DSP Starter Kit (DSK)	$395
TMDXDSK6416-T	TMS320C64x™ DSP Starter Kit (DSK)	$495
TMDSDSK6713	TMS320C67x™ DSP Starter Kit (DSK)	$395
TMDSeZD2407	TMS320LF2407 eZdsp™ DSK	$295
TMDSEZD2812	F2812 eZdsp Starter Kit (DSK)	$295
TMDSEZS2812	F2812 eZdsp Starter Kit (DSK) (DSP in socket)	$449
TMDXEZR2812	R2812 eZdsp Starter Kit (DSK)	$495
TMDXEZD2808	F2808 eZdsp Starter Kit (DSK) (DSP in socket)	$495

Notes

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Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
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Mailing Address: Texas Instruments
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