

Product Bulletin

TMS320™ Floating-Point Digital Signal Processors

Application designers now have the greatest range of price and performance options with floating-point digital signal processors (DSPs) from Texas Instruments. TMS320C67x™ DSPs are the industry's most powerful floating-point processors, and TMS320C3x™ DSPs provide incredible performance, precision and dynamic range. These processors are available at a number of price points so developers can select the device that best meets the needs of target applications.

The TI Floating-Point DSP Advantage

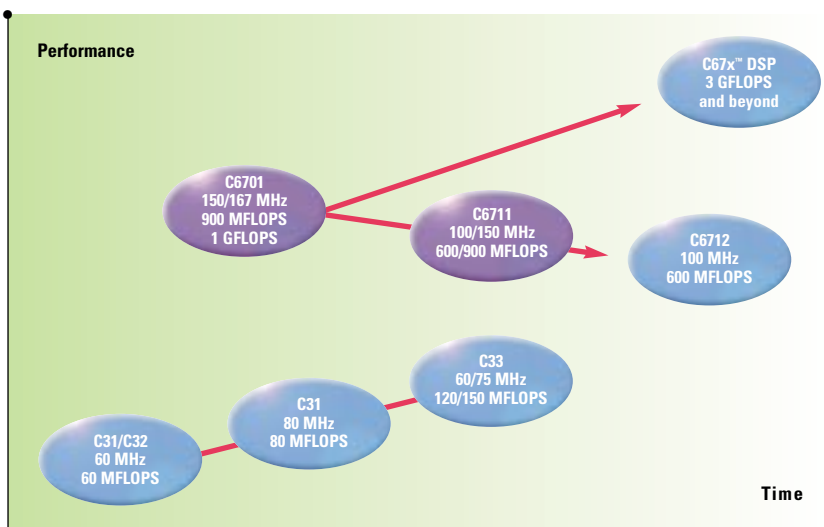
TI floating-point DSPs raise the bar in performance, set new levels in cost efficiency, and offer low power dissipation—energizing existing products and supporting the development of next-generation applications. Several features of TI's floating-point DSPs make them attractive for applications that require a larger dynamic range and a higher level of precision than offered by typical 16-bit fixed-point devices. For example, a 32-bit

NEW!
C6712 DSP
Samples Available

Key Features:

- New TMS320C6712 DSP: 100MHz, 600 MFLOPS, U.S. \$9.95 (100Ku)
- TMS320VC33 DSP: 60 MHz, 120 MFLOPS, U.S. \$5.00 (100Ku)
- TMS320C6711 DSP: 900 MFLOPS with dual-level cache architecture
- TMS320C6701 DSP: the highest performance floating-point DSP in production today delivers up to 1 GFLOPS
- TMS320C67x™ DSPs are code compatible with TMS320C62x™ fixed-point DSPs
- Industry's most advanced C compiler achieves greater than 80 percent of the performance of hand-coded assembly
- New TMS320C6711 DSP Starter Kit (DSK) for only U.S. \$295.00 enables easy prototyping of TMS320C6000™ DSP-based designs (Available 4Q00)

TMS320™ Floating-Point DSP Roadmap



TI provides application designers the largest assortment of DSP floating-point price and performance options. TI leads the way in floating-point DSP technology and continues to build on its leadership position—as it has for more than 12 years.

word-width enables high fidelity audio systems to produce more life-like sound. Graphics and imaging systems need the full 32-bits to achieve greater resolution and more realistic visuals. In addition, the DSPs' substantial processing power provides higher frame rates and additional polygon manipulations that further enhance image sharpness and quality. Motion control, automotive, robotics, instrumentation, military and voice/speech applications similarly benefit from the extra precision and high performance of TI floating-point DSPs.

Unparalleled Performance with VelociTI™ Architecture

All TMS320C6000™ DSPs are based on the same CPU core, featuring VelociTI™, an advanced very long instruction word (VLIW) architecture designed to achieve high performance through increased instruction-level parallelism. TI achieves breakthrough performance by adding floating-point instructions to six of the C6000 DSP architecture's eight functional units. The eight functional units, including two multipliers and six arithmetic units, are highly orthogonal, providing the

compiler and Assembly Optimizer with many execution resources. Eight 32-bit RISC-like instructions are fetched by the CPU each cycle. The VelociTI instruction packing features allow these eight instructions to be executed in parallel, in serial, or in parallel/serial combinations. This optimized scheme enables significant reductions in code size, program fetches and power consumption.

Unified Architecture Provides Code Compatibility

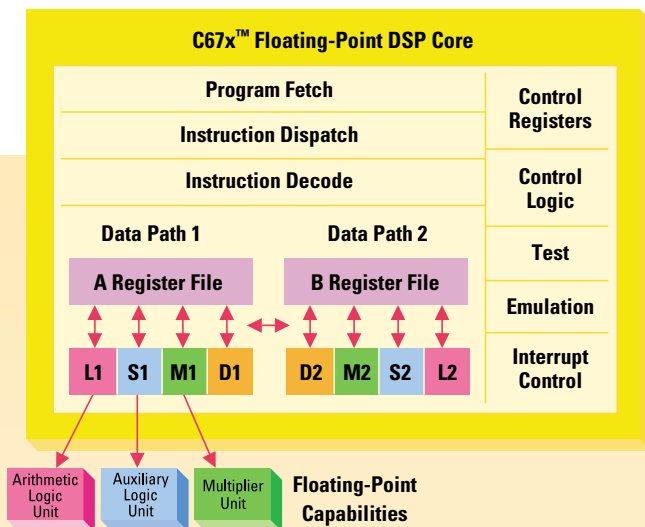
With the same VelociTI™ core, TI's C67x™ DSPs are code and

pin-for-pin compatible with C62x™ fixed-point DSPs. The C67x DSP instruction set is a superset of that for the C62x devices. This allows developers to take advantage of the ease-of-use of floating-point by prototyping on the C6711 DSP, and then porting their code to the fixed-point C6211 DSP for reduced production costs. Together with the ease of a single development platform, this code-transfer capability between fixed- and floating-point DSPs results in significant savings in development, resource and manufacturing costs.

TMS320™ Floating-Point DSP Specifications Chart

Device	RAM	ROM	DAT/PRO (address reach)	SER	Ext Memory Interface	DMA	Timers	MHz	Cycle (ns)	MFLOPS	Host Port	Voltage	Packaging Interface	Availability
TMS320C6701-167	1 Mbit	—	52 Mbytes	2	1 – 32-bit	4	2	167	6	1000	16-bit	3.3V I/O; 1.9V Core	352 pin BGA (35mm)	In Production
TMS320C6701-150	1 Mbit	—	52 Mbytes	2	1 – 32-bit	4	2	150	7	900	16-bit	3.3V I/O; 1.8V Core	352 pin BGA (35mm)	In Production
TMS320C6711-150	0.5 Mbit	—	512 Mbytes	2	1 – 32-bit	16 (enhanced)	2	150	7	900	16-bit	3.3V I/O; 1.8V Core	256 pin BGA (27mm)	In Production
TMS320C6711-100	0.5 Mbit	—	512 Mbytes	2	1 – 32-bit	16 (enhanced)	2	100	10	600	16-bit	3.3V I/O; 1.8V Core	256 pin BGA (27mm)	In Production
NEW! TMS320C6712-100	0.5 Mbit	—	512 Mbytes	2	1 – 16-bit	16 (enhanced)	2	100	10	600	—	3.3V I/O; 1.8V Core	256 pin BGA (27mm)	Samples Now Production 1Q01
TMS320VC33-150	1 Mbit	#	16M	1	1 – 32-bit	1	2	75	13	150	—	3.3V I/O; 1.8V Core	144 TQFP	In Production
TMS320V33-120	1 Mbit	#	16M	1	1 – 32-bit	1	2	60	17	120	—	3.3V I/O; 1.8V Core	144 TQFP	In Production
TMS320C32-60	512 x 32	#	16M	1	1 – 32-bit	2	2	60	33	60	—	5V	144 PQFP	In Production
TMS320C31-80	2K x 32	#	16M	1	1 – 32-bit	1	2	80	25	80	—	5V	132 PQFP	In Production
TMS320C31-60	2K x 32	#	16M	1	1 – 32-bit	1	2	60	33	60	—	5V	132 PQFP	In Production
TMS320LC31-40	2K x 32	#	16M	1	1 – 32-bit	1	2	40	50	40	—	3V	132 PQFP	In Production
TMS320C30-50	2K x 32	4K x 32	16M	2	2 – 32-bit	1	2	50	40	50	—	5V	181 PGA	In Production

denotes bootloader
 - the TMS320C30 is available in three speed grades: 30 MHz, 40 MHz, and 50 MHz (shown).
 - the TMS320C31 is available in four speed grades: 40 MHz, 50 MHz, 60 MHz (shown) and the new 80 MHz (shown).
 - the TMS320C32 is available in three speed grades: 40 MHz, 50 MHz, and 60 MHz (shown).



TMS320C67x™ FUNCTIONAL UNITS

L Unit:

- 32/40-bit fixed-point arithmetic and compare operations
- 32/64-bit floating-point arithmetic and compare operations
- (IEEE single and double precision)
- 32-bit fixed-point logical operations
- Fixed/floating-point conversions
- 64- to 32-bit floating-point conversions

S Unit:

- 32-bit fixed-point arithmetic operations
- 32/40-bit shifts and 32-bit bit-field operations
- Branching and constant generation
- 32/64-bit floating-point reciprocal, absolute value, compares and 1/sqrt operations
- 32- to 64-bit floating-point conversions

M Unit:

- 16 x 16-bit fixed-point multiplies
- 32 x 32-bit fixed-point multiplies
- 32 x 32-bit single-precision floating-point multiplies
- 64 x 64-bit double-precision floating-point multiplies

D Unit:

- 32-bit add, subtract, linear and circular address calculation
- 8/16/32/64-bit loads
- 8/16/32-bit stores

Key Features of the C67x™ DSP Core

- Load store architecture with 32 general-purpose registers, each 32-bit
- IEEE floating-point format
 - 1 GFLOPS single precision
 - 420 MFLOPS double precision—hardware supported
- CPU
 - Dual data path
 - 8 functional units (4 Floating & Fixed-Point ALUs, 2 Fixed-Point ALUs, and 2 Multipliers)
 - 8, 32-bit instructions per cycle
- 32-bit address range
- Additional integer multiply instructions not available on the C62x™ core
 - 32-bit multiply
- Integer instruction features
 - Data byte addressable (8-, 16-, 32-bit data)
 - 8 bits overflow protection
 - Saturation
 - Bit field extract, set, clear
 - Bit counting
 - Instruction packing reduces code size
 - All instructions conditional

Instruction Set Features

- Hardware support for IEEE single-precision instructions
- Hardware support for IEEE double-precision instructions
- Byte-addressable (8-, 16-, 32-bit Data)
- 8-bit overflow protection
- Saturation
- Bit-field extract, set, clear
- Bit-counting
- Normalization
- 100% Conditional instructions through five registers (A0, A1, B0, B1 and B2)
- Low power modes

Comprehensive Development Support

- Ultra-efficient C compiler, ANSI C, and C++
- Industry's first assembly optimizer
- Code Composer debugger
- Code Composer simulator
- Code Composer Studio™ IDE integrated DSP development environment:
 - Real-time analysis and debug capabilities using RTDX™ technology and DSP/BIOS
 - Standard application program interfaces (APIs)

Development Support Tools

- C67x™ evaluation module (EVM) is available to assist in development
- For only \$295, developers can start today to develop on the TMS320C6711 DSP Development Kit (DSK) enabling easy and inexpensive benchmarking and prototyping of C6000 DSP-based designs.

TMS320C6701 DSP

C6701

MHz 167, 150

MFLOPS 1000, 900

Price \$110.50 (100Ku @ 167 MHz)
\$78.75 (100Ku @ 150 MHz)

The C6701: The Highest Performance Floating-Point DSP

With performance of up to 1 Giga Floating-Point Operations per Second (GFLOPS) at a clock rate of 167 MHz, the C6701 DSP offers effective solutions to high-performance DSP programming challenges. Extended temperature offerings are available.

Key Features

- 150-, 167-MHz Clock rate
- 6.7-, 6-ns Instruction cycle time
 - Eight 32-bit Instructions/cycle
 - 900 MFLOPS, 1 GFLOPS
- TMS320C6201 Fixed-point DSP pin-compatible
- Flexible phase-locked-loop (PLL) clock generator
- 352-pin ball grid array (BGA) package (GJC Suffix)
- 0.18-um/5-level metal process
- CMOS technology
- 3.3-V I/Os, 1.8-V internal (150-MHz)

- 3.3-V I/Os, 1.9-V internal (167-MHz only)
- IEEE-1149.1 (JTAG) boundary-scan-compatible

Integrated Peripherals

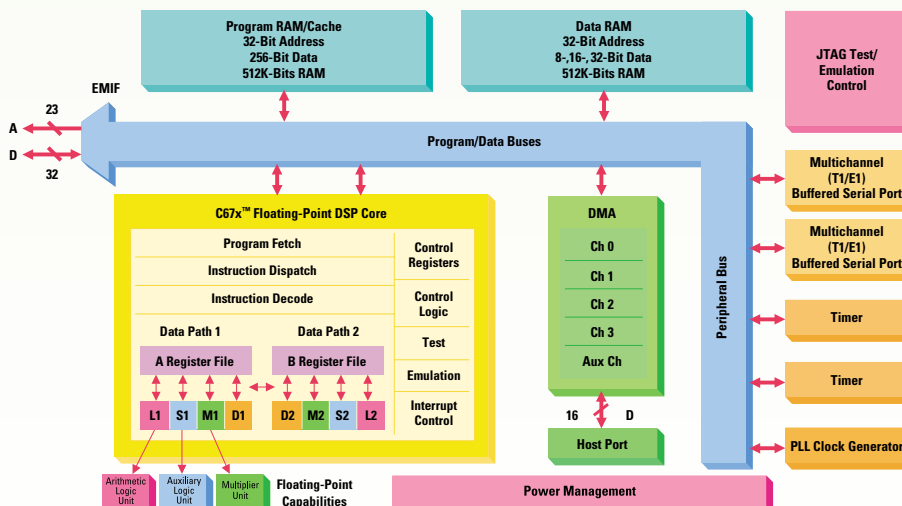
- 32-bit external memory interface (EMIF)
 - Glueless interface to synchronous memories: SDRAM and SBSRAM
 - Glueless interface to asynchronous memories: SRAM and EPROM
 - 52MB addressable external memory space
- Four-channel bootloading direct-memory-access (DMA) controller with an auxiliary channel
- 16-bit host-port interface (HPI)
 - Access to entire memory map

- Two multichannel buffered serial ports (McBSPs)
 - Direct interface to T1/E1, MVIP, SCSSA framers
 - ST-Bus-switching compatible
 - Up to 256 channels each
 - AC97-compatible
 - Serial-peripheral-interface (SPI) compatible (Motorola™)
- Two 32-bit general purpose timers

Memory

- 1M-bit on-chip SRAM
 - 512K-bit Internal program/cache (16K 32-bit Instructions)
 - 512K-bit dual-access internal data (64K Bytes)

TMS320C6701 Block Diagram



TMS320C6711 & TMS320C6712 DSPs

C6711

MHz 150, 100

MFLOPS 900, 600

Price \$28.50 (100Ku @ 150 MHz)
\$20.00 (100Ku @ 100 MHz)

C6712

100

600

\$9.95 (100Ku)

The New C6712 Floating-Point DSP

The C6712 DSP is the newest solution in a family of floating-point DSPs that offers developers a range of choices in high-performance and cost-efficiency. Like TI's popular C6711 DSP, the code compatible C6712 DSP features a versatile internal memory architecture that can be used as a two-level cache, one-level cache with direct-mapped memory, or a combination of two-level cache and direct-mapped memory, depending on the needs of the designer.

C6711 Floating-Point DSP

For sophisticated applications, the C6711 DSP provides a level of affordability and performance that enables design engineers to replace multiple devices with a single DSP, greatly reducing total system and development costs.

Key Features

- 150-, 100 MHz (C6711 only) clock rate
- 6.7-, 10-ns instruction cycle time
 - Eight 32-bit instructions/cycle
- 600, 900 MFLOPS
- C6712 and C6711 are pin and code compatible
- C6712 and C6711 are pin and code compatible with the TMS320C6211 DSP
- Flexible phase-locked-loop (PLL) clock generator
- 256-pin ball grid array (BGA) Package (GFN Suffix)
- 0.18-um/5-level metal process
- CMOS technology
- 3.3-V I/Os, 1.8-V internal
- IEEE-1149.1 (JTAG) boundary-scan compatible

Integrated Peripherals

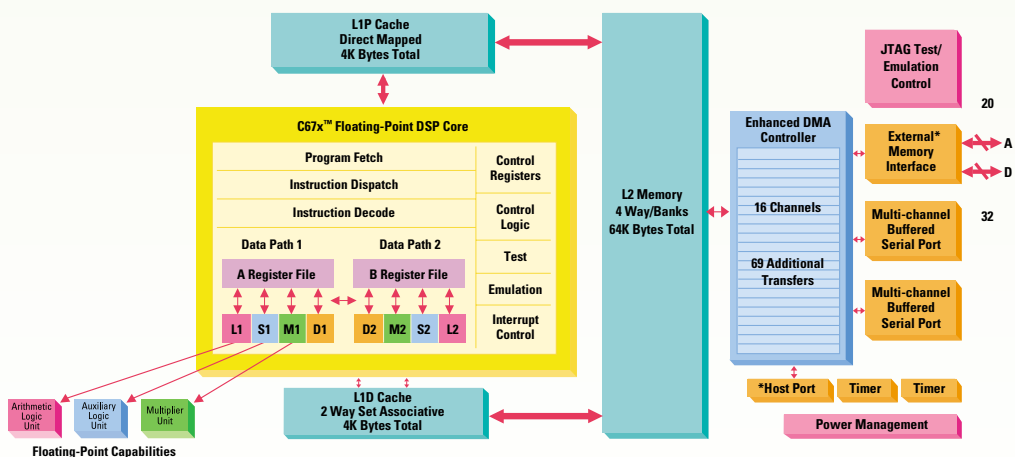
- External memory interface (EMIF)
 - Glueless interface to synchronous memories: SDRAM and SBSRAM

- Glueless interface to asynchronous memories: SRAM and EPROM
- 32-bit width (C6711)
- 16-bit width (C6712)
- 16-channel enhanced DMA with 2 Kbytes parameter RAM and bootloading capability timers
- 16-bit host port interface (HPI) (C6711 only)
- Two multichannel buffered serial ports (McBSPs)
 - Direct interface to T1/E1, MVIP, SCSA framers
 - ST-bus-switching compatible
 - Up to 256 channels each
 - AC97-compatible
 - Serial-peripheral-interface (SPI) compatible
- Two 32-bit general-purpose timers

Memory

- 72 Kbytes on-chip, two-level cache
 - 4 Kbytes of L1P (program cache) and 4 Kbytes of L1D (data cache)
 - 64 Kbytes of L2 (program and data cache)

TMS320C6711/C6712 DSP Block Diagram



*The C6711 expands the C6712 peripheral set by upgrading the 16-bit external memory interface (EMIF) to a 32-bit EMIF and adding a host port interface (HPI).

TMS320VC33 DSP

C33

MHz 75, 60

MFLOPS 150, 120

Price \$7.95 (100Ku @ 75 MHz)
\$5.00 (100Ku @ 60 MHz)

The TMS320VC33 Floating-Point DSP: The Latest Member of the C3x™ DSP Generation

For TI customers with cost-sensitive and low power applications, the C33 floating-point DSP extends TI's TMS320C3x™ DSP generation, the most widely used floating-point DSPs in the industry. The C33 DSP integrates an additional 1 Mbit of RAM for increased performance and lower total system cost, and includes a peripheral superset of TI's highly successful TMS320C31 DSP, making design migration straightforward.

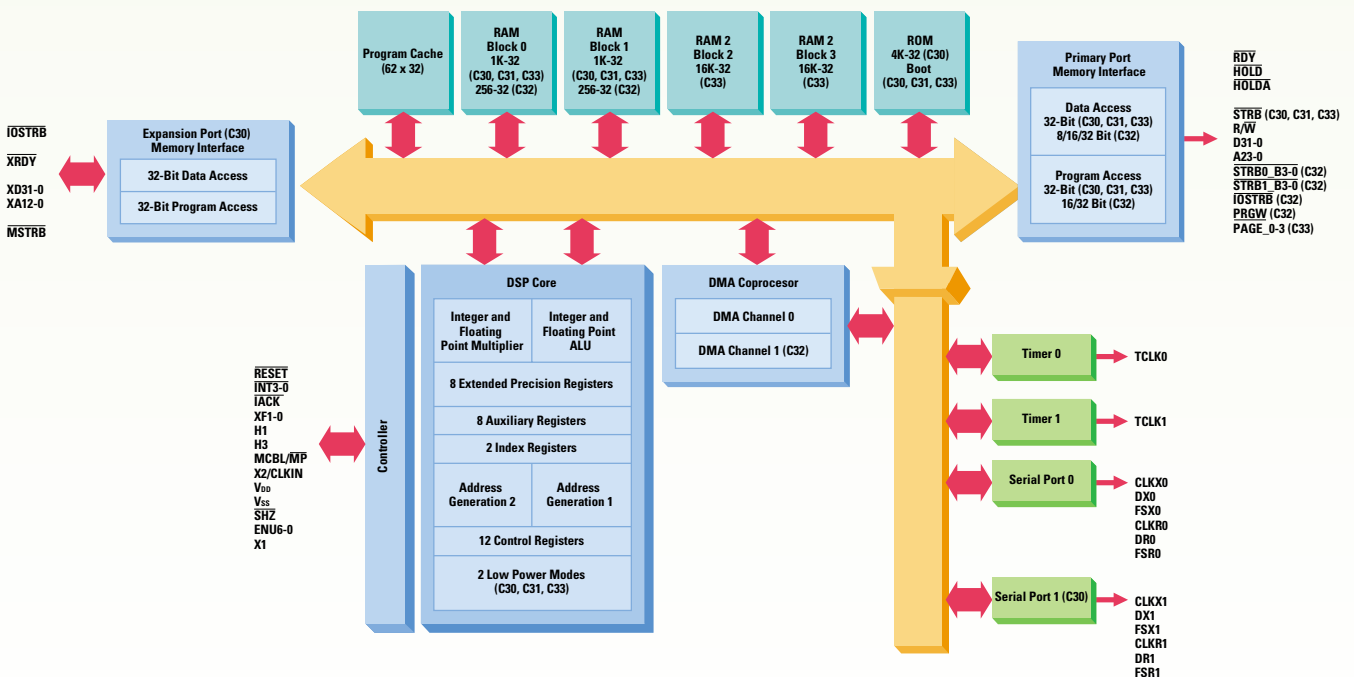
Key Features

- Register-based, pipelined DSP core
- Parallel multiply and arithmetic/logical operations on integer or floating-point numbers in a single cycle
- Very low (60mA typical) core current (C33)
- 3.3-V I/Os, 1.8-V Internal
- Eight extended-precision registers
- 24-bit address space
- Two address generators with eight auxiliary registers, two index registers and two auxiliary register arithmetic units
- 32-bit barrel shifter
- 144-pin thin plastic quad flat (PGE suffix) package

Powerful Instruction Set

- Single-cycle parallel and non-parallel math and memory operations supporting up to six operands
- Flexible addressing modes including circular addressing and auto increment/decrement modes allow high-speed data access
- Zero-overhead looping
- Single-cycle branching
- Conditional calls and returns
- Interlocked instructions for multiprocessing support
- Low power modes

TMS320C3x™ DSPs



Integrated Peripherals

- On-chip PLL allows use of lower frequency clock references (C33)
- Internally decoded peripheral select pins simplify or eliminate high-speed external decoders (C33)
- Edge and level sensitive interrupts (C32, C33)
- DMA controller for concurrent I/O and CPU operation
- Two-way, set-associative instruction cache maximizes performance while minimizing system cost
- Flexible serial port for 8-, 16-, 24- or 32-bit transfers, which can also be configured for general-purpose bit I/O plus two 16-bit timers
- Two 32-bit timers, which can also be configured for bit I/O
- Two additional dedicated bit I/O pins, increasing bit I/O up to 10 for C31, C32 and C33 and up to 16 for C30

Memory

- Extensive internal busing and parallelism for rapid data-movement capability
- 34 K x 32-bit words (C33), 2 K x 32-bit words Kbytes (C30 and C31), or 512 x 32-bit words (C32) of single-cycle dual access internal RAM support two accesses per machine cycle

Comprehensive Development Support

- ANSI-C optimizing compiler
- real-time operating system support
- Windows®-based C-source/assembly debugger (programmer's interface)
- Code profiler
- Software simulator
- C3x™ XDS scan-based emulator for non-intrusive system integration, emulation and debug
- TMS320C31 DSP starter kit (DSK)
- TMS320VC33 eZdsp starter kit from Spectrum Digital (<http://www.spectrumdigital.com/products/>)

TMS320™ Floating-Point DSP Tools

TMS320C3x™ DSP Platform Hardware Development Tools

Description	Part #	S.U.S. ⁺
DSP STARTER KIT (DSK)*		
C31 DSP Starter Kit	TMDS3200031	99
EVALUATION MODULE (EVM)**		
C30 EVM Card for IBM PC-DOS, Win	TMDS3260030	995
Application Library Asm/Lnk & HLL Debug	—	
JTAG EMULATOR		
XDS510 Board and MPSD cable	TMDS00510M	4,000
XDS510WS Controller Box and MPSD cable	TMDS00510WSM	6,000
CONVERSION CABLE		
C3x™ 3V/5V PC/SPARC Emulation cable (MPSD)	TMDS3080004	1,000
JTAG cable (for C33 customers)	TMDS3080002	495

+ Prices are quoted in U.S. dollars and represent year 2000 suggested resale pricing.

* Includes Code Explorer Debug GUI, code generation tools (Assembly language), target board and target-specific device drivers.

** Includes TI HLL Debug GUI, code generation tools (Assembly language), target board and target-specific device drivers.

TMS320C3x™ DSP Platform Software Development Tools

Description	Part #	S.U.S. ⁺
INTEGRATED DEVELOPMENT ENVIRONMENT		
C3x™/C4x™ Code Composer IDE, code generation tools, XDS510 drivers and simulator†	TMDS3240130	1,495
C3x Code Composer IDE Free Evaluation Tools	C3XFREETOOL	Free
CODE GENERATION TOOLS		
C3x/C4x PC-DOS, OS/2, Asm/Lnk*	TMDS3243850-02	250
C3x/C4x PC-DOS, OS/2 C Cmp/Asm/Lnk§	TMDS3243855-02	750
C3x/C4x SUN SPARC C Cmp/Asm/Lnk	TMDS3243555-08	1,125
SIMULATOR SOFTWARE		
C31, C32, C33 Code Composer Simulator	TMDS3243851-02	250
C3x SUN SPARC Simulator with Debug	TMDS3243551-09	495
DEBUGGER SOFTWARE		
C3x XDS510 C Source Debugger - SPARC	TMDS3240630	1,495

+ Prices are quoted in U.S. dollars and represent year 2000 suggested resale pricing.

* Includes code generation tools (Assembly language).

§ Includes code generation tools C Compiler/Assembler/Linker and code generation tools (Assembly language).

† Includes Code Composer integrated development environment (IDE), code generation tools C Compiler/Assembler/Linker XDS510 device drivers (emulation software) and simulator.

TMS320VC33 Development Board

The C33 eZdsp kit from Spectrum Digital is a low-cost, easy-to-use, high performance, and expandable platform for developing real-time signal processing applications with TMS320C3x™ DSPs. The included C33 device allows

full-speed verification of TMS320C3x™ code. For more information please visit www.ti.com/sc/docs/products/dsp/tms320vc33.html

Key Features

- 60-MHz, 120 MFLOPS TMS320VC33 DSP
- Communications to host PC via parallel port for debug

- Embedded IEEE 1149.1 JTAG scan controller
- Two expansion connectors for custom user logic (data, address, I/O)
- C3x™ DSP Code Composer™ debug tools
- C3x C Compiler/assembler/linker compatible
- Available now

TMS320C6000™ DSP Platform Hardware Development Tools

Description	Part #	U.S.*
TMS320C6211 DSP Starter Kit (DSK)†	TMDX320006211	295
TMS320C6711 DSP Starter Kit (DSK)†	TMDX320006711	295‡
EVALUATION MODULES (EVMs)		
C62x™ EVM Bundle*	TMDS326006201	1,995
C67x™ EVM Bundle*	TMDS326006701	2,495
XDS510 Emulator (ISA) & JTAG Cable	TMDS00510	4,000
XDS510 Emulator (SCSI) & JTAG Cable	TMDS00510WS	6,000

* Prices are quoted in U.S. dollars and represent year 2000 suggested resale pricing.

* Includes Code Composer Studio™ integrated development environment (IDE), DSP/BIOS™, code generation tools (C compiler/assembler/linker), RTDX™, EVM board with device drivers and profile-based compiler.

† Includes Code Composer Studio IDE, DSP/BIOS, code generation tools (C compiler/assembler/linker) with limited application size, RTDX, EVM board with device drivers and profile-based compiler.

Available 4000.

TMS320C6000™ DSP Platform Software Development Tools[§]

Description	Part #	U.S.*
TMS320 DSP Algorithm Standard Developer's Kit*	TMDX320DAIS-07 (included with CCS or from web only)	149
C6000™ Code Composer Studio™ Integrated Development Environment (IDE)†	TMDS324685C-07	2,995
C6000 Code Composer Studio IDE – Compile Tools**	TMDS3246855-07	1,495
C6000 Code Composer Studio IDE – Debug Tools#	TMDS3240160-07	1,995
C6000 Code Composer Studio IDE 30-Day Free Evaluation Tools‡	SPRC020	Free

§ All C6000™ tools support C62x™, C67x™, and C64x™ products.

+ Prices are quoted in U.S. dollars and represent year 2000 suggested resale pricing

* Non-Code Composer Studio licensees pay U.S. \$149, otherwise the kit is free. The web address to access the Kit is dspvillage.ti.com/docs/general/dsp/expressdsp/readfrst.htm

† Includes Code Composer Studio IDE, DSP/BIOS, code generation tools (C compiler/assembler/linker), XDS510 device drivers (emulation software), RTDX, simulator, target-specific device drivers and profile-based compiler.

** Includes Code Composer Studio IDE, DSP/BIOS, code generation tools (C compiler/assembler/linker), simulator and profile-based compiler.

Includes Code Composer Studio IDE, DSP/BIOS, XDS510 device drivers (emulation software), RTDX, and target-specific device drivers.

‡ Includes full-featured Code Composer Studio IDE, code generation tools (C compiler/assembler/linker) and simulator all limited to 30 days.

TI's Industry-leading Development Environment

To support its high-performance floating-point DSPs, TI provides an advanced development environment that features an ultra-efficient C compiler, the industry's first Assembly Optimizer and Code Composer Studio™ IDE, a fully integrated suite of DSP software development tools. Along with these

tools, designers have access to over 250 third-party products that further simplify the design and development of C67x™ DSP-based end equipment. TI also makes it easy to complete DSP designs with numerous C6x™ compatible data converter and power supply products.

TMS320C6711 DSP Starter Kit (DSK)

The C6711 floating-point DSP makes the TMS320C6711 DSK the most powerful development board in the market. The C6711 DSK's parallel-port-interfaced platform enables TI—and its customers and third-parties—to efficiently develop and test applications for the TMS320C6211 and TMS320C6711 DSPs. And since

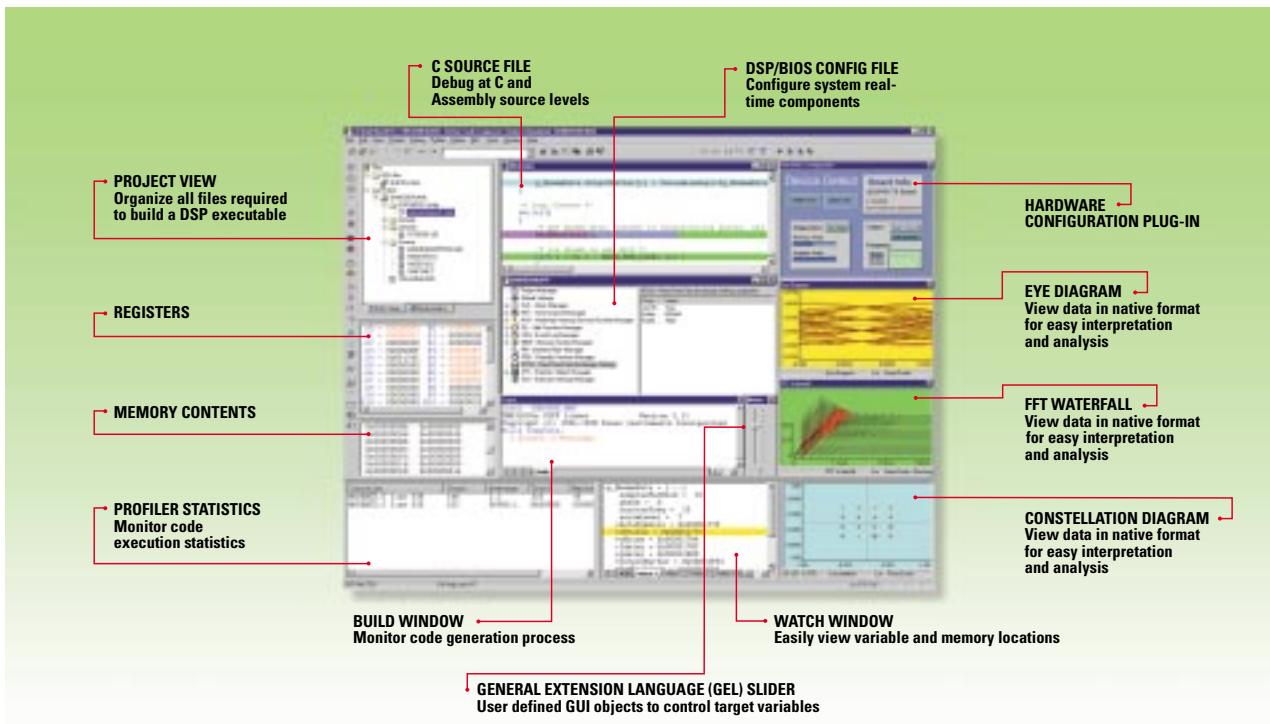
TMS320™ Floating-Point DSP Tools

Key Features of Code Composer Studio™ IDE

Features	Description	Benefit
Open Plug-in Architecture	For the first time, developers can mix-and-match tools from the largest DSP third-party network and seamlessly plug them into the Code Composer Studio™ IDE.	Users can spend less time developing their own utilities and focus their energies on product innovation and differentiation.
Integrated Host and DSP Target Communication	Another first, the combination of DSP/BIOS and RTDX technologies enables the host development environment to be fully aware of and integrated with the DSP target and its resources.	This underlying foundation allows for advanced real-time functionality and facilitates all phases of the DSP code development cycle.
Real-Time Analysis	Real-time analysis is accomplished by a tight set of DSP/BIOS and RTDX functions that allow system developers to make function calls during code development and to collect information during application execution.	These functions enable developers to see the time-related interactions between code sections, taking debugging functionality to a new level.
Advanced Data Visualization	Using Probe Points™ and file I/O, a developer can view data and signals at any point in the algorithm in native format or in processed form.	This oscilloscope-like functionality provides a window into the algorithm, enabling faster analysis, easier data interpretation and increased productivity.

The Code Composer Studio™ Integrated Development Environment (IDE) is an advanced, open DSP development environment for the C6000™ DSP Platform.

Code Composer Studio™ IDE



The Code Composer Studio™ Integrated Development Environment (IDE) provides designers with a real-time window into their target system and data. This capability is enabled by seamless host-target communication and real-time debug and analysis capabilities.

TI C6000 Compiler Performance on Floating Point Algorithms

TI C67x™ DSP Compiler Performance: Kernels Execution time @ 167 mHz						
Algorithm	Used In	Assembly Cycles	Assembly Time (µs)	C Cycles	C Time (µs)	% Efficiency vs. Hand Coded
Biased cross-correlation <i>8 element vector with 26 element vector</i>	Signal Processing	113	0.68	118	0.71	95.8%
Gain Computation <i>22 element vector</i>	VSELP based voice coders	59	0.35	60	0.36	98.3%
Vector Max <i>100 element input vector</i>	Search Algorithms	80	0.48	82	0.49	97.6%
Block FIR Filter <i>24 complex samples, 12 complex coefficients</i>	VSELP based voice coders	710	4.25	804	4.82	88.3%
Weighted Vector Sum <i>80 element input vector</i>	Vector Math	104	0.62	104	0.62	100%
Forward Synthesis <i>Lattice Filter N=20</i>	Filter	110	0.66	110	0.66	100%
Inverse Analysis <i>Lattice Filter N=20</i>	Filter	108	0.65	108	0.65	100%
MAC (Multiply Accumulate) <i>Two 42 samples vectors</i>	VSELP based voice coders	69	0.41	73	0.44	94.5%
Vector Sum <i>Two 80 sample vectors element vectors</i>	Vector Math	100	0.60	100	0.60	100%
Vector Sum of Squares <i>80 sample input vector</i>	Vector Math	71	0.43	77	0.46	92.2%

The highly efficient, optimizing C6000™ compiler offers up to five times the cycle count efficiency of other DSP compilers. Programmers can tune the compiler performance level based on application requirements.

the TMS320C6712 is code and pin compatible with the C6711, developers can start now on next-generation designs.

Key Features

- 150-MHz, 900 MFLOPS C6711 DSP
- 16 Mbytes of 100-MHz synchronous dynamic random access memory (SDRAM)

- Embedded JTAG emulation via the parallel port and external XDS-510 support
- Expansion memory and peripheral connectors for daughter-board support
- Ships with Code Composer Studio™ DSK tools
- Available now (TI part # TMDX320006711) C67x™

C67x™ DSP Evaluation Module

The C67x™ DSP evaluation module (EVM) from TI provides a comprehensive platform that allows developers to benchmark their systems by running application software on target C6701 DSP hardware. The EVM saves designers the time expense of building their own application development boards—simplifying the rapid development of powerful next-generation DSP products.

TMS320™ Floating-Point DSP Tools & Data Converters

Get To Market Faster with TI's Industry Leading Development Environment

eXpressDSP™ Real-Time Software Technology

For rapid product development, TI's floating-point DSPs are supported by eXpressDSP Real-Time Software Technology that slashes development time by over 50 percent while improving product robustness.

Made up of four key components, eXpressDSP™ Real-Time Software Technology enables developers to tap into the full power of TI DSPs:

Code Composer Studio™ Integrated Development Environment

– Integrated and powerful code development tools for performing visualization and real-time analysis of

data reduces development time from weeks to minutes. The C compiler, assembly optimizer, simulator and linker deliver optimum DSP efficiency and performance. An open, plug-in architecture for third-party tools makes Code Composer Studio™ easily adaptable to different development needs.

Data Converters for Floating-Point DSPs

Device	Resolution	Conversion Rate	Power (mW)	Parallel or Serial	# of Inputs	Supply Voltage	FIFO
Analog-to-Digital							
TLV571	8	1.25 MSPS	12 mW	P	1	2.7-5.5	—
TLV1504/8	10	200 kSPS	2.7 mW	S	4/8	2.7-5.5	—
TLC1514/8	10	400 kSPS	22 mW	S	4/8	5	—
TLV1543/2543	10/12	66 kSPS	5 mW	S	11	5	—
TLV1544/8	10	85 kSPS	1.05 mW	S	4/8	2.7-5.5	—
TLV1562	10	2 MSPS	15 mW	P	4	2.7-5.5	—
TLV1571/8	10	1.25 MSPS	30 mW	P	1/8	2.7-5.5	—
TLV2544/8	12	200 kSPS	4.5 mW	S	4/8	2.7-5.5	—
TLC2554/8	12	500 kSPS	4.5 mW	S	4/8	5	—
THS1401/3/8	14	1/3/8 MSPS	270 mW	P	1	3.3	—
THS14F01/3	14	1/3 MSPS	270 mW	P	1	3.3	32x
THS1206	12	6 MSPS	216 mW	P	4	3 to 5	16x
THS12082	12	8 MSPS	186 mW	P	2	5	16x
THS1207/9	12	6/8 MSPS	186 mW	P	4/2	5	—
THS10064/82	10	6 MSPS	186 mW	P	4	3 to 5	16x
THS1007/9	10	6/8 MSPS	186 mW	P	4/2	5	—

For a complete list of TI's data converters, please visit www.dataconverter.com

Device	Resolution	Conversion	Power (mW)	Parallel or Serial	# of Inputs	Supply Voltage
Codec						
TLV320AIC10/11	16	22.05 kHz	39 mW	S	1	3.3/5
TLV320AIC27	18	48 kHz	139 mW	S	2	3.3/5
TLC320AD52	16	22.05 kHz	120 mW	S	1	3.3/5
TLC320AD56	16	22.05 kHz	100 mW	S	1	5
TLC320AC01/02	14	25 kHz	100 mW	S	1	5

For a complete list of TI's data converters, please visit www.dataconverter.com

Device	Resolution	Settling time (us)	Power (mW)	Parallel or Serial	Supply Voltage	Output (V or I out)	# of DACs
Digital-to-Analog							
TLV5606	10	3 or 9	0.9	S	2.7 - 5.5	V	1
TLV5613	12	1	1.2	P8	2.7 - 5.5	V	1
TLV5620/1	8	10	6/3.6	S	2.7 - 5.5	V	4
TLV5623	8	3	0.9	S	2.7 - 5.5	V	1
TLV5624	8	1.0 to 3.5	4.5	S	2.7 - 5.5	V	1
TLV5625	8	2.5 or 12	2.1	S	2.7 - 5.5	V	2
TLV5626/7	8	1/3	5.1/3	S	2.7 - 5.5	V	2/4
TLV5633/9	12	1	2.7	P8/P12	2.7 - 5.5	V	1
TLV5636	12	1	4.5	S	2.7 - 5.5	V	1
TLV5637/8	10/12	1	4.2/4.5	S	2.7 - 5.5	V	2

For a complete list of TI's data converters, please visit www.dataconverter.com

DSP/BIOS™ – A real-time software kernel provides the run time target software necessary to support any DSP application. It reduces programming effort by providing device drivers, I/O, task and buffer routines.

TMS320™ DSP Algorithm

Standard – Another TI industry first, these standards for DSP application interoperability include not only general programming but also DSP-specific

guidelines to ensure hardware and software compatibility, allowing maximum software reuse.

Complete DSP Solutions with Complementary Mixed-signal and Analog Products

The analog market is both broad and fragmented. Almost every component of electronic equipment uses analog ICs—however each device must be carefully selected to best fulfill its

intended purpose. To address this unique market, TI continues to develop an ever-expanding portfolio of catalog products.

Data Converters Optimized for C67x™ DSPs

TI offers several analog-to-digital converters (ADCs), digital-to-analog converters (DACs) and DSP codecs optimized for C67x™ floating-point DSPs. In fact, TI's analog product portfolio

TMS320™ Floating-Point DSP Power Management Products

Power Management Products for Floating-Point DSPs

DSP Family	DSP Supply Voltage	Dual SVS	Recommend Power Management Devices to Meet Maximum DSP Core and I/O Currents							
			Single Switcher (up to 20A+)	Switcher w/LDO (up to 15A+)	Plug In Module (up to 8A)	Dual Plug In Module (up to 8A)	Low Dropout Regulator ¹			Dual LDO
C67x Platform			One or More DSPs				1 DSP	2 DSPs	4 DSPs	1 DSP
TMS320C6701 (167 MHz)	1.9V Core 3.3V I/O	TPS3707-33	TPS56100 TPS56100	TPS56300	PT6526 PT6521	PT6937	TPS75101 TPS77633	UCC383-ADJ TPS77833	— TPS75133	—
TMS320C6701 (150 MHz)	1.8V core 3.3V I/O	TPS3306-18	TPS56100 TPS56100	TPS56300	PT6526 PT6521	PT6937	TPS76818 TPS76633	TPS75418 TPS77633	UC385-ADJ TPS77833	TPS767D318
TMS320C6711 (150 MHz)	1.8V core 3.3V I/O	TPS3306-18	TPS56100 TPS56100	TPS56300	PT6526 PT6521	PT6937	TPS76818 TPS76633	TPS75418 TPS77633	UC385-ADJ TPS77833	TPS767D318
TMS320C6711 (100 MHz)	1.8V core 3.3V I/O	TPS3306-18	TPS56100 TPS56100	TPS56300	PT6526 PT6521	PT6937	TPS76818 TPS76633	TPS75418 TPS77633	UC385-ADJ TPS77833	TPS767D318
TMS320C6712 (100 MHz)	1.8V core 3.3V I/O	TPS3306-18	TPS56100 TPS56100	TPS56300	PT6526 PT6521	PT6937	TPS76818 TPS76633	TPS75418 TPS77633	UC385-ADJ TPS77833	TPS767D318

¹Does not include other system current requirements in the application.
See www.ti.com/sc/docs/products/msp/pwrmgmt/index.htm for a complete device offering.

continues to develop around the TMS320™ DSP family.

The THS14(F)0x family of 14-bit ADCs offers data, address and control lines that directly connect to TMS320C6000™ DSPs. Several DACs ranging from 8-12 bit resolution at 2.7 to 5.5-V supply voltage are also among the data converters optimized for TI DSPs. And DSP codecs, such as

TLV320AICxx, directly connect and support DSP audio and voice applications.

Evaluation boards, which interface easily to TI DSPs, together with free Code Composer Studio™ device drivers available on the worldwide Web, make selecting TI analog the easy choice for new applications.

FIFOs in DSP Applications

TI's high-performance FIFOs provide the data rate buffering necessary to allow DSPs, microprocessors and Analog Front Ends (AFE) to operate at peak efficiency. The following table shows the TI FIFO devices best suited for use with TI's

C67x™ DSPs

DSP Port Size: 32-bits System Supply Voltage: 3.3 V	
Asynchronous FIFO	Synchronous FIFO
ALVC7804	ALVC3631
ALVC7806	ALVC3641
ALVC7814	ALVC3651
	ALVC7803
	ALVC7805
	ALVC7813
	SN74V215
	SN74V225
	SN74V235
	SN74V245

C3x™ DSPs

DSP Port Size: 32-bits System Supply Voltage: 3.3 V	
Asynchronous FIFO	Synchronous FIFO
ALVC7804	ALVC3631
ALVC7806	ALVC3641
ALVC7814	ALVC3651
	ALVC7803
	ALVC7805
	ALVC7813
	SN74V215
	SN74V225
	SN74V235
	SN74V245

Floating-Point DSPs. For a comprehensive overview of TI's FIFO product line visit www.ti.com/sc/fifo

TI DSP Third-Party Network – eXpressDSP™ Real-Time Software Technology is used throughout TI's DSP third-party network—the world's largest. This network offers hundreds of reusable and modular software algorithms, plug-ins, and products that can accelerate your design cycle and get you to market faster.

For More Information

For more information on how to harness the power of TI's floating-point DSPs, their wide variety of compatible tools, and the eXpressDSP™ Real-Time Software Environment, please contact the local TI sales office or visit the TI Web site at www.ti.com/sc/c6000

Third-Party Support

TI has a strong network of third-party companies, offering expertise in a variety of applications. These third parties support the TI floating-point DSPs with a wide range of tools that increase design productivity and speed, including emulators, development boards, software libraries, block-level code generators, Ada compilers, and C++ compilers. For more information please visit our Web site: www.ti.com/sc/3p

● S/W ● H/W ● Consulting

● 3L Ltd.	●● GAO Research and Consulting Ltd.	● Real Time Products Ltd.
● Adaptive Digital Technologies, Inc.	● GBM mbH	●● S & K Electronics
● AG Electronics	● Gordian	● Signalogic, Inc.
● Alliance Technology Group (ATG)	● Hema Elektronik GmbH	● Signals and Software Limited
● Allant Software Corporation	● High-Tech Services Partners	● Signalware
● Blue Wave Systems	● Howe Digital Telephony	● Signatec, Inc.
● CMX Company	● Hunt Engineering	● Signix Corporation
● CodeSourcery, LLC	● Hyperception	● Signum Systems Corp.
● Colorado Electronic Product Design, Inc.	● Innovative Integration, Inc.	● Softronics
● Commetrex	● Instrumental Systems Corporation	● Spectral Design
● Comuniq ASA	● Ixthos, Inc.	●● Spectrum Digital, Inc.
● Consulting Engineer Alexander Kuhn	● Jovian Systems, Inc.	● Spin Logic, Inc.
● Coreco, Inc.	● Kane Computing	● Strampe Systemelektronik GmbH & Co.
● DSP Research, Inc.	●● M.B. International	● Systems Technology Associates
● D.SignT	● MVP Development Group, Inc.	● Traquair Data Systems, Inc.
● Delphi Communication Systems	● Mango Computers, Inc.	● Treck, Inc.
●● DiCon Lab, Inc.	● Mentor Graphics Corporation	● Visual Solutions Incorporated
● Digital Voice Systems, Inc.	● MicroLAB Systems Ltd.	● Vital, Inc.
● DNA Enterprises	● Ncore Technology	● Voyager Co. (Real Time Graphics)
● DSPecialists	● novaCAM Technologies, Inc.	● White Electronic Designs Corporation
●● Durand Intersellar, Inc.	● Numerix Ltd.	● Wireless Systems International Ltd.
● Easytools S.L.	● OBJECTIF S.A.	● Zeidman Consulting
● Elanix	●● Orsys GmbH	
● Embedded Systems Design, Inc.	● Paragon Innovations, Inc.	
● Eonic Systems, Inc.	● Pentek	
● Express Logic, Inc.	● Precise Software Technologies, Inc.	
● Fraunhofer	● Premia Corporation	



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