

TM S320 Digital Signal Processor Solutions

Solutions for today

Sockets to look for:

- 8-/16-bit Microcontrollers
- General-purpose Microprocessors
- Competitor DSPs

Advantages of designing with DSPs over other Microprocessors:

- High-speed number crunching
- Real-time performance, simulation and emulation
- Flexibility
- Reliability
- Increased system performance
- Reduced system cost

Advantages of TM S320 Family over the competition:

- Broad portfolio
- Market leaders in solutions
- Manufacturing strength and commitment
- Mixed Signal Support Devices
- Wide variety of packaging options
- Better support from concept to completion
- Low-cost starter kits and evaluation modules
- Cycle-accurate simulators
- Optimizing high-level language compilers
- Debuggers
- Real-time scan-based emulators
- Application software library
- Technical hotline, bulletin board service, and Internet presence (including On-Line Lab and Hotline)
- Third-party support

General DSP Literature

(800) 477-8924

TMS320 DSP Product Overview (Flipbook)	SPRZ094C
TMS320 DSP Brochure	SPRB113
TMS320 Revised Software Co-op Data Sheet Packet	SPRT111B
TMS320 Development Support Brochure	SPRT096B
TMS320 Development Support Reference Guide	SPRU011D
TMS320 Third Party Support Guide	SPRU052C

General Technical DSP Literature

(800) 477-8924

DSP Digital Control Applications	SPRA019
TMS320-SCSI Target Controller Application Report	SPRA025
Implementation of <i>fuzzyLogic</i> Applications	SPRA028
Minimize Quantization Effects Using 320 DSP	SPRA035
TI/Inform <i>fuzzyLogic</i> Specifications	SPRT110A
<i>fuzzytech</i> Product Bulletin	SPRT113
Setting up TMS320 DSP Interrupts in C Applications	SPRA036
Engine Knock Detection Using Special Analysis	SPRA039

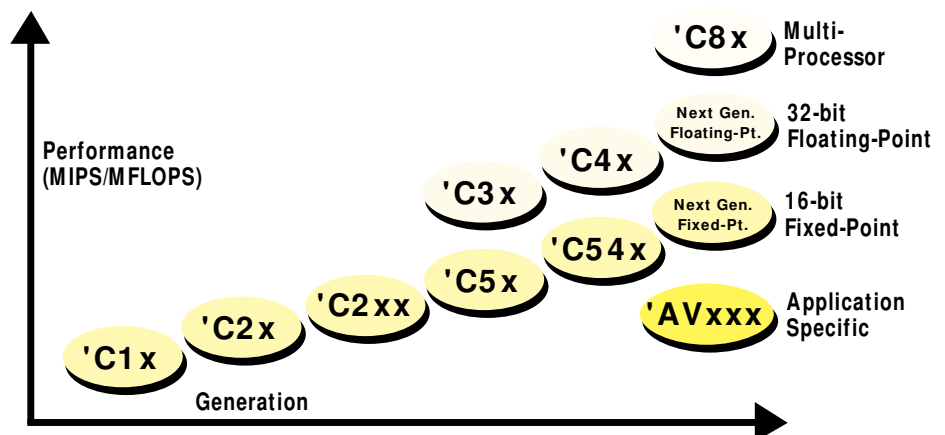
Designer Notebook Pages (DNP)

Notebook Pages	DNP #
• Designer Notebook Volume 1	(1-60) SPRT125
• Multipass Linking	61
• Linking C Data Objects Separate From Loss Section	62

Contacts

DSP Hotline	(713) 274-2320 or dsph@msg.ti.com
Product Information Center (PIC)	(214) 644-5580
Bulletin Board Service (BBS)	(713) 274-2323 (See page 22 for access information)
DSP Faxline	(713) 274-2324
TI DSP Web Page	http://www.ti.com/dsps
DSP On-line Lab	http://www.ti.com/sc/docs/dsps/dsplab.htm
320 Hotline On-line	http://www.ti.com/sc/docs/dsps/expsys.htm
'C8x E-Mail/Hotline	'C8x-hotline@ti.com
Literature Ordering Information	(800) 477-8924

Digital Signal Processors – Family Roadmap



TM S320 Digital Signal Processor Solutions

TM S320C1x (Fixed-Point)

Key specifications:

- On-chip RAM with ROM or OTP PROM for broad flexibility
- One of the lowest cost DSPs on the market
- Integration capability through cDSP
- Choice of five versions ('C10, 'C14, 'C15, 'C16, 'C17) for optimizing system costs

Key applications:

- Anti-lock braking
- Musical instruments
- Energy metering
- Servo and motor control
- Digital tapeless answering machines

Key features:

- 144-word programmable on-chip data RAM on the 'C10, 256 on other 'C1x devices
- 1.5K-word on-chip program ROM on the 'C10, 4K-word on the 'C14, 'C15 and 'C17, 8K-word on the 'C16
- Secure 4K-word on-chip program OTP
- 64K-word external data reach on the 'C16, 4K for the other 'C1x devices
- 32-bit ALU/accumulator
- 16x16-bit parallel multiplier with a 32-bit product
- Single-cycle multiply
- Up to four on-chip timers for control operations
- Up to eight-level hardware stack
- Two auxiliary registers
- Four-word input and output channels on the 'C14, 'C15 and 'C17
- 16-bit barrel shifter
- Wait states for communication with slower off-chip memories/peripherals

'C1x Product Specification Guide

Device	RAM	ROM	OTP	DAT/PRO	SER	PAR	DMA	COM	Timers	MHz	Cycle(ns)	MIPS	Packaging	\$/1ku
TM S320C10	144	1.5K	.	x/4K	.	8x16	.	.	.	20	200	5	40 PDIP, 44 PLCC	4.20 4.20
TM S320C10-25	144	1.5K	.	x/4K	.	8x16	.	.	.	25	160	6.25	40 PDIP, 44 PLCC	5.10 5.10
TM S320C14	256	4K	.	x/4K	1	7x16	.	.	4	25	160	6.25	68 PLCC	8.00
TM S320P14	256	.	4K	x/4K	1	7x16	.	.	4	25	160	6.25	68 PLCC	17.58
TM S320C15	256	4K	.	x/4K	.	8x16	.	.	.	20	200	5	40 PDIP, 44 PLCC	5.30 5.30
TM S320C15-25	256	4K	.	x/4K	.	8x16	.	.	.	25	160	6.25	40 PDIP, 44 PLCC	5.80 5.80
TM S320LC15	256	4K	.	x/4K	.	8x16	.	.	.	16	250	4	40 PDIP, 44 PLCC	5.30 5.30
TM S320P15	256	.	4K	x/4K	.	8x16	.	.	.	20	200	5	40 PDIP, 44 PLCC	13.20 13.20
TM S320P15-25	256	.	4K	x/4K	.	8x16	.	.	.	25	160	6.25	40 PDIP, 44 PLCC	16.40 16.40
TM S320C16	256	8K	.	x/64K	.	8x16	.	.	.	35	114	8.779	64 PQFP	6.32
TM S320C17	256	4K	.	.	2	6x16	.	.	1	20	200	5	40 PDIP,* 44 PLCC*	5.28 5.28
TM S320P17	256	.	4K	.	2	6x16	.	.	1	20	200	5	40 PDIP, 44 PLCC	14.52 14.52

* 10ku minimum

TM S320C1x Literature

(800) 477-8924

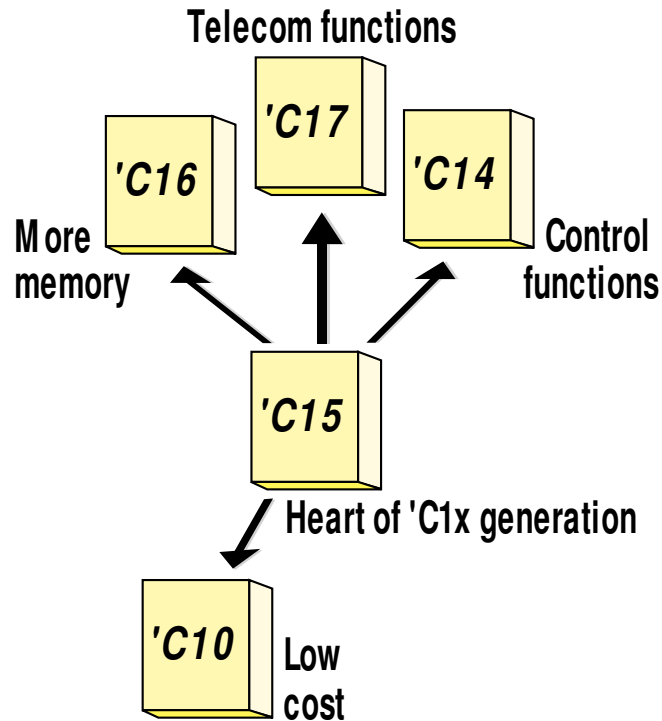
TM S320C1x User's Guide (C/E/P/LC 10/14/15/16/17)

SPRU013C

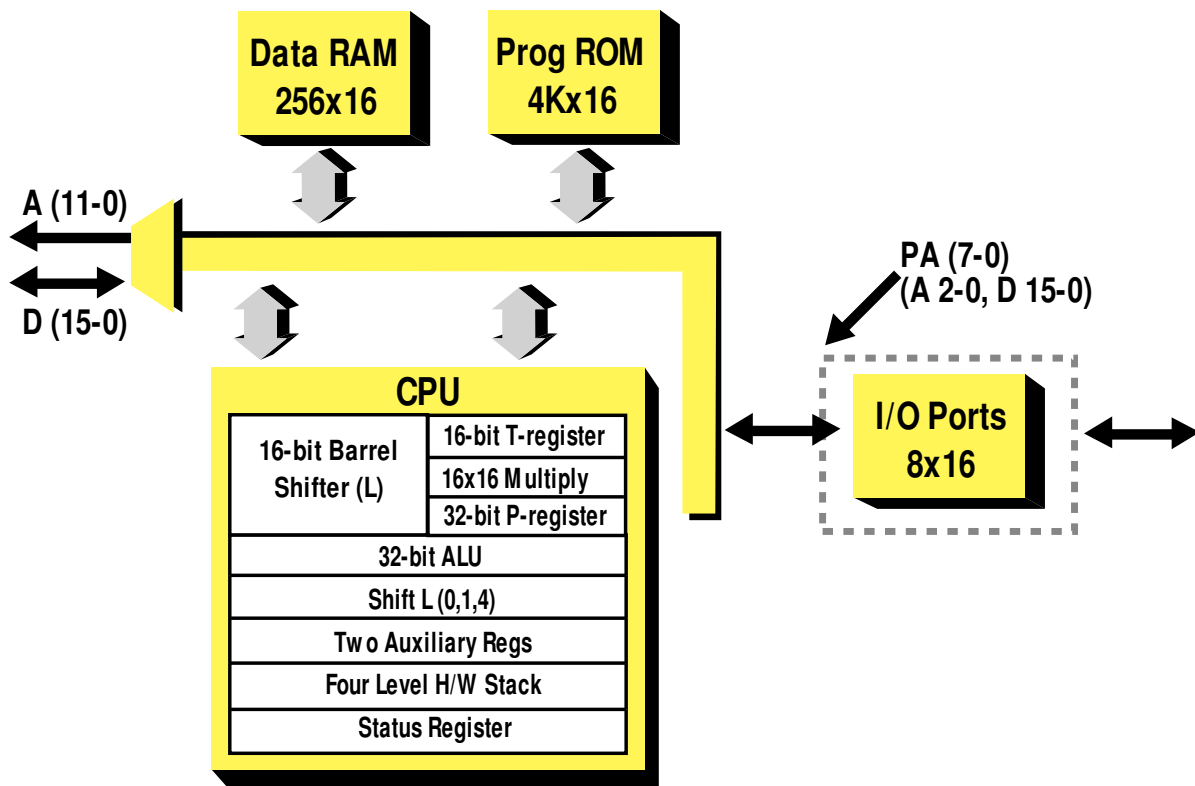
TM S320C1x Product Bulletin

SPRT115

TM S320C1x Family



TM S320C15 Block Diagram



The TM S320C15 is an upgraded version of the 'C10 and provides the core for subsequent 'C1x generation developments.

'C1x Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Evaluation Module (EVM)	TMDS3260016	'C16 EVM Card for IBM PC-DOS, Win	TM S320C1x EVM Analog Int. Appl. Report TM S320C16 Source Debugger User's Guide TM S320C16 Evaluation Module Tech. Ref.	SPRA029 SPRU077 SPRU080	795
Simulator Software	TMDS3240811-02	'C10/'C15/'C17 PC/DOS Simulator	TM S320C1x Simulator User's Guide	SPRU009B	500
Code Generation Software	TMD3242850-02	'C1x/'C2x/'C5x PC-DOS, OS/2, Asm/Lnk	Assembly Language Tools User's Guide	SPRU018D	500
Programming	TMDX3270110	P14/E14 EPROM Adaptor 68LCC->28DIP (STD & RBIT)			100
Programming	RTC/PGM320A-06	P15/E15/E17 EPROM Adaptor 40DIP->28DIP			106
Programming	RTC/PGM320C-06	P15/E15/P17/E17 EPROM Adaptor 44LCC->28DIP (STD & RBIT)			106
Programming	RTC/AIB320A-06	Analog I/F Board			1400
XDS/22 Systems Emulator	TMDX3262214	'C14 XDS/22 (+ 'C14PM)			8500
XDS/22 Systems Emulator	TMDS3262215	'C10/'C15 XDS/22 (+ 'C10/'C15 PM)			8500
Digital Filter Design	DFDP	ASPI Digital Filter Design Package PC/DOS			1195

TM S320 Digital Signal Processor Solutions

TM S320C2x (Fixed-Point)

Key specifications:

- On-chip RAM with ROM or OTP PROM for broad flexibility
- A wide range of development tools from \$99 U.S. DSP Starter Kit to real-time emulator
- Integration capability through cDSP
- Available in two versions to optimize system costs ('C25, 'C26)

Key applications:

- Anti-skid braking
- Servo and motor control
- Robotics/numeric control
- Telecommunications
- Sound systems, voice processing
- Digital filtering applications

Key features:

- 544-w word programmable on-chip data RAM (including 256-w word program/data RAM)
- 1568-w word configurable program/data RAM (TM S320C26 only)
- 4K-w ord on-chip program ROM (TM S320C25)
- Secure 4K-w ord on-chip program OTP ROM
- 128K-word total data/program memory space
- 32-bit ALU/accumulator
- 16x16-bit parallel multiplier with a 32-bit product
- Single-cycle multiply/accumulate instructions
- Repeat instructions for efficient use of program space and enhanced execution
- Block moves for data/program management
- On-chip timer for control operations
- Up to eight auxiliary registers with dedicated arithmetic unit

'C2x Product Specification Guide

Device	RAM	(Words) ROM	OTP	DAT/PRO	SER	PAR	DMA	COM	Timers	MHz	Cycle(ns)	MIPS	Packaging	\$/1ku
TM S320C25	544	4K	.	64K/64K	1	16x16	Ext	.	1	40	100	10	68 PLCC, 80 PQFP	11.20
TM S320C25-50	544	4K	.	64K/64K	1	16x16	Ext	.	1	50	80	12.5	68 PLCC	12.30
TM S320P25	544	.	4K	64K/64K	1	16x16	Ext	.	1	40	100	10	80 PQFP, 68 PLCC	29.50
TM S320C26	1.5K	256	.	64K/64K	1	16x16	Ext	.	1	40	100	10	68 PLCC	11.20

TM S320C2x Literature

(800) 477-8924

TM S320C2x User's Guide	SPRU014C
'C2x User's Guide Manual Update Sheet	SPRZ093
TM S320C2x DSP Fixed-Point Product Bulletin	SPRT116
DSP Applications Vol.2 ('C1x/'C2x)	SPRA016
TM S320P25 Data Sheet	SPRS028

Designer Notebook Pages (designed specific to the 'C2x)

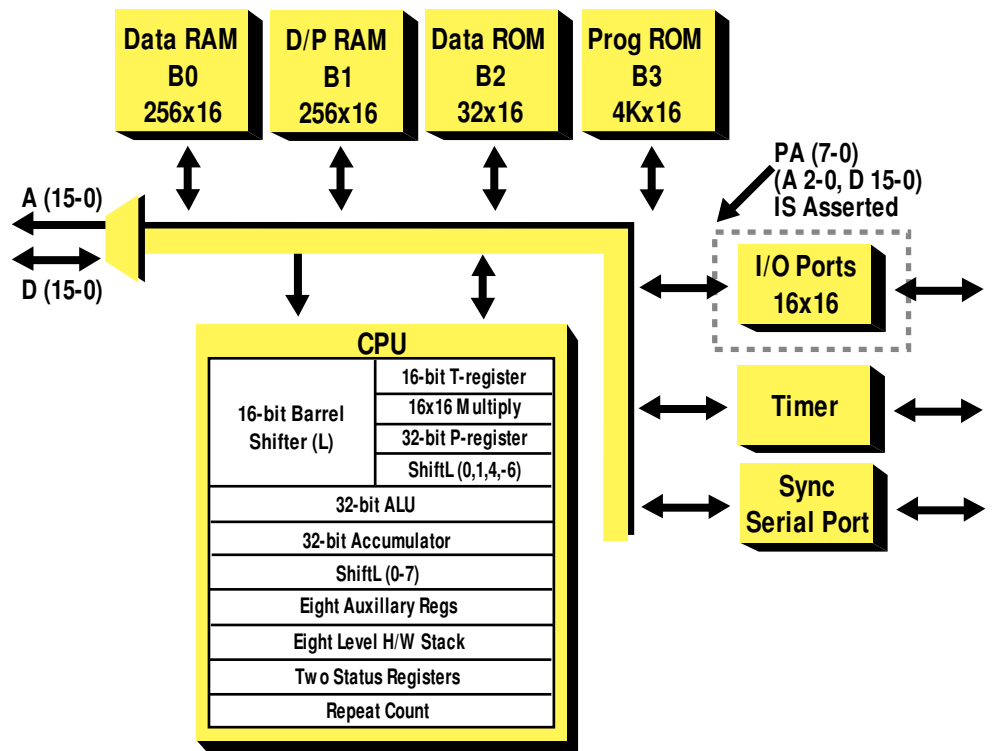
Notebook Pages	DNP #
• Circular Buffer in Second Generation DSPs	7
• TM S320C25 Logical Shifts in Parallel With ALU Operations	11
• Creating a Delay Buffer on a TM S320C2x EVM	18
• TM S320C2x/C5x EVM AIC Initialization and Configuration	25
• Using the RBIT on the TM S320P25	29

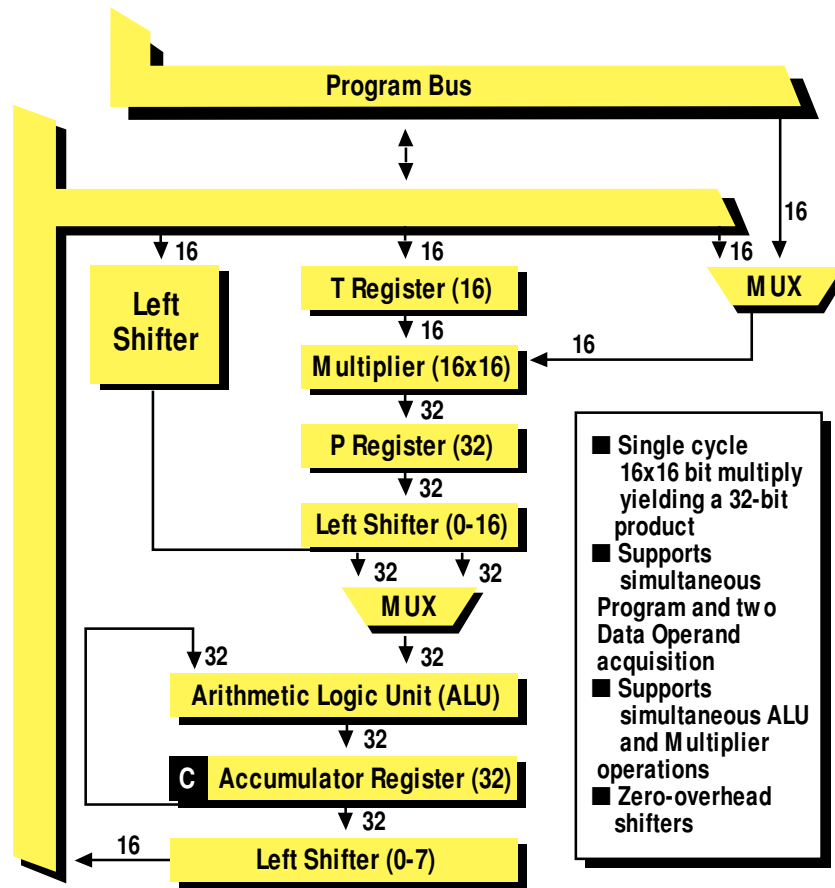
RTC 'C2x Training Class

Price \$1395

For Registration Call:

Northeast	(617) 895-9185
Western States / Canada	(408) 383-2363
Mid-America / Southeast	(214) 917-3894
Schedule Available via Hibbert - SSRB090F	(800) 477-8924





'C2x Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Evaluation Module (EVM)	TMDS3260026	'C26 EVM Card for IBM PC-DOS, Win	TM S320C2x Source Debugger User's Guide TM S320C2x Evaluation Module Tech. Ref.	SPRU070 SPRU088	995 .
Simulator Software	TMDS3242851-02 TMDS3242551-09	'C2x PC/DOS & WIN Simulator w/ Debug 'C2x SUN SPARC Simulator w/ Debug	'C2x S/W Dev. System Tech. Ref.	SPRU072	500 3000
Code Generation Software	TMDS3242850-02 TMDS3242855-02 TMDS3242555-08	'C1x/'C2x/'C5x PC-DOS, OS/2, Asm/Lnk 'C2x/'C5x PC-DOS, OS/2 C Cmp/Asm/Lnk 'C2x/'C5x SUN SPARC C Cmp/Asm/Lnk	Assembly Language Tools User's Guide	SPRU018D	500 1500 3500
Programming	TMDX3270120	E25 EPROM Adaptor 68 PLCC->28DIP (STD & RBIT)			100
Programming	RTC/AIB320A-06	Analog I/F Board			1400
XDS/22 Systems Emulator	TMDS3262221	'C25/ XDS/22 (33 & 40 MHz only)			8500
DSP Starter Kit (DSK)	TMDS3200026	'C26 DSP Starter Kit (DSK) 'C26, AIC, Basic Asm & Debug.	TM S320C2x DSP Starter Kit User's Guide Sample SW	SPRU093	99
Digital Filter Design	DFDP	ASPI Dig. Filter Design Package PC/DOS			1195
Fuzzy Logic Tutorial	MCU320-EXPLORE	fuzzyTECH MCU-320 fuzzy logic			199
Fuzzy Logic Code Generator	MCU320-EDITION	fuzzyTECH MCU-320 fuzzy logic code generation tool			1890

TM S320 Digital Signal Processor Solutions

TM S320C2xx (Fixed-Point)

Key specifications:

- 20 to 40 MIPS operation
- Prices start as low as \$0.12 U.S. per MIPS
- 3V and 5V versions
- Typical active power; 1.9 mA/MIPS at 5V and 1.1 mA/MIPS at 3V
- 100-pin TQFP, 80-pin TQFP
- Source code compatible with 'C1x and 'C2x generations
- Upwardly compatible with 'C5x generation
- Integration compatibility through cDSP
- JTAG scan-based emulation

Key applications:

- Set top boxes
- Feature phones
- Point-of-sale terminals
- Security systems
- Telecom
- Networking
- Servo and motor control
- Radar detectors
- Two-way pagers
- Digital cameras
- Modems
- CD Roms

Key features:

- Up to 4.5K Data/Program RAM on-chip
- 32K words of flash on-chip ('F206/'F207)
- 16 general purpose I/O pins ('F207)
- 32-bit ALU/accumulator
- 16x16-bit parallel multiplier with a 32-bit product
- Repeat instructions for efficient use of program space and enhanced execution
- 16-bit on-chip timer
- 16-bit barrel shifter
- Eight-level hardware stack
- Built-in power down mode
- Software wait-state generator

'C2xx Product Specification Guide

Device	RAM	(Words)		FLASH	DAT/PRO	SER	PAR	DMA	COM	Timers	MHz	Cycle(ns)	MIPS	Packaging	\$/1ku
		ROM	ROM												
TM S320C203	544	Boot	.	64K/64K	2	64Kx16	Ext	.	1	40	50	20	100 TQFP	6.50	
TM S320C203-57	544	Boot	.	64K/64K	2	64Kx16	Ext	.	1	57	35	28.5	100 TQFP	6.80	
TM S320C203-80	544	Boot	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	7.10	
TM S320C204	544	4K	.	64K/64K	2	64Kx16	Ext	.	1	40	50	20	100 TQFP	7.90	
TM S320C204-57	544	4K	.	64K/64K	2	64Kx16	Ext	.	1	57	35	28.5	100 TQFP	8.30	
TM S320C204-80	544	4K	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	8.70	
TM S320C205	4.5K	Boot	.	64K/64K	2	64Kx16	Ext	.	1	40	50	20	100 TQFP	9.40	
TM S320C205-57	4.5K	Boot	.	64K/64K	2	64Kx16	Ext	.	1	57	35	28.5	100 TQFP	9.90	
TM S320C205-80	4.5K	Boot	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	10.30	
TM S320C209	4.5K	4K	.	64K/64K	.	64Kx16	.	.	1	40	50	20	80 TQFP	11.90	
TM S320C209-57	4.5K	4K	.	64K/64K	.	64Kx16	.	.	1	57	35	28.5	80 TQFP	12.90	
TM S320F206	4.5K	.	32K	64K/64K	2	64Kx16	Ext	.	1	40	50	20	100 TQFP	15.20	
TM S320F206-57	4.5K	.	32K	64K/64K	2	64Kx16	Ext	.	1	57	35	28.5	100 TQFP	15.90	
TM S320F206-80	4.5K	.	32K	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	16.60	
TM S320F207	4.5K	.	32K	64K/64K	3	64Kx16^	Ext	.	1	40	50	20	144 TQFP	16.60	
TM S320F207-57	4.5K	.	32K	64K/64K	3	64Kx16^	Ext	.	1	57	35	28.5	144 TQFP	17.50	
TM S320F207-80	4.5K	.	32K	64K/64K	3	64Kx16^	Ext	.	1	80	25	40	144 TQFP	18.20	

^ = 'F207 also includes 16-bit addressable I/O Pins

TM S320C2xx Literature

(800) 477-8924

'C203/209 Data Sheet

SPRS025

'C2xx User's Guide

SPRU127A

'C2xx Product Bulletin

SPRT122A

RTC 'C2xx Training Class

Price \$1395

For Registration Call:

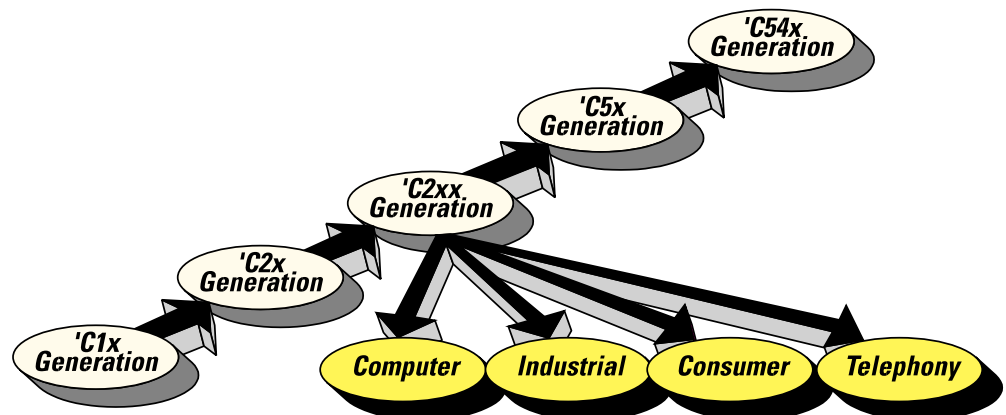
Northeast (617) 895-9185

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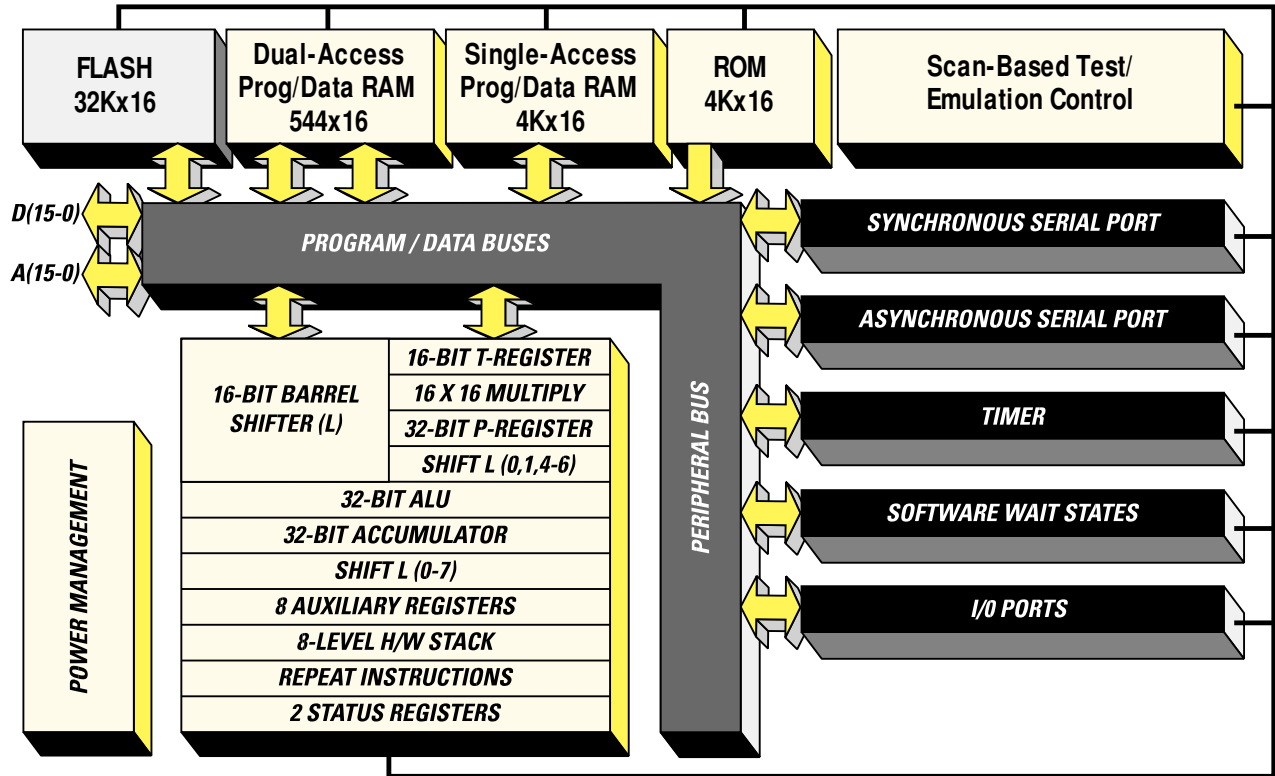
Schedule Available via Hibbert - SSRB090F (800) 477-8924

TM S320C2xx Migration Path to Other TM S320 Generations



TM S320C2xx DSPs provide a migration path to other TM S320 fixed-point generations. They enable DSP processing for new applications in the computer, industrial, consumer and telephony segments.

'C2xx Block Diagram



TMS320C2xx DSPs offer optimized memory and peripheral configurations for a range of emerging DSP applications.

'C2xx Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Simulator Software	TM DX324X851-02	'C2xx Simulator SW (PC)			500
	TM DX324X551-09	'C2xx Simulator SW (SPARC)			3000
Code Generation Software	TM DS3242850-02	'C1x/'C2x/'C2xx/'C5x PC-DOS, OS/2, Asm/Lnk	Assembly Language Tools User's Guide	SPRU018D	500
	TM DS3242855-02	C Comp/Asm/Lnk (Windows, O/S 2)	'C2x/'2xx/'5x Optimizing C Comp User's Guide	SPRU024D	1500
	TM DS3242555-08	'C2x/'C2xx/'C5x SUN SPARC C Cmp/Asm/Lnk			3500
XDS510/XDS510 WS HW	TM DS00510	XDS510 + JTAG cable (PC)			4000
	TM DS00510WS	XDS510 + SCSI cable + JTAG cable			6000
Debugger Software	TM DX324012XX	XDS510 C Source Debugger PC	C Source Debugger User's Guide	SPRU151	2000
	TM DX324062XX	XDS510 C Source Debugger SPARC			4000
EMU Porting Kit	TM DX324002XX	EMU Porting Kit PC/SPARC			6000

TM S320 Digital Signal Processor Solutions

TM S320C3x (32-bit Floating-Point)

Key specifications:

- Performance up to 60 M FLOPS
- Highly efficient C language engine
- Large address space: 16 M Words
- Fast memory management with on-chip DMA

Key applications:

- Digital audio
- 3-D Graphics
- Laser printers, copiers, scanners
- Bar-code scanners
- Video conferencing
- Industrial automation and Robotics
- Voice/facsimile mail
- Servo and motor control
- Networking

Key features:

High Performance:

- 33-ns instruction cycle
- 30 MIPS
- 60 M FLOPS
- 330 MOPS
- 120 M bytes/second I/O bandwidth

Register-based, pipelined CPU:

- Parallel multiply and arithmetic/logical operations on integer or floating-point numbers in a single chip
- Eight extended-precision registers

Powerful Instruction Set:

- Single-cycle instruction execution
- System control and numeric operation

Integrated Peripherals:

- DMA controller for concurrent I/O and CPU operation
- Timers
- Serial Port

Memory:

- Extensive internal busing and parallelism for rapid data-movement capability

'C3x Product Specification Guide

Device	RAM	(Words) ROM	OTP	DAT/PRO	SER	PAR	DMA	COM	Timers	MHz	Cycle(ns)	MIPS	Packaging	\$/1ku
TM S320C30	2K	4K	.	16M	2	16M x32	1	.	2	33	60	16.667	181 PGA	150.00
TM S320C30-40	2K	4K	.	16M	2	16M x32	1	.	2	40	50	20	181 PGA, 208 PQFP	173.00 72.60
TM X320C30-50*	2K	4K	.	16M	2	16M x32	1	.	2	50	60	25	181 PGA, 208 PQFP	199.00 83.20
TM S320C31-40	2K	#	.	16M	1	16M x32	1	.	2	40	50	20	132 PQFP	49.20
TM S320C31-50	2K	#	.	16M	1	16M x32	1	.	2	50	40	25	132 PQFP	54.10
TM S320C31-60	2K	#	.	16M	1	16M x32	1	.	2	60	33	30	132 PQFP	60.00
TM S320LC31	2K	#	.	16M	1	16M x32	1	.	2	33	60	16.667	132 PQFP	49.20
TM S320LC31-40	2K	#	.	16M	1	16M x32	1	.	2	40	50	20	132 PQFP	54.10
TM S320C32-40	5K	#	.	16M	1	16M x32*	2	.	2	40	50	20	144 PQFP	26.30
TM S320C32-50	5K	#	.	16M	1	16M x32*	2	.	2	50	40	25	144 PQFP	28.90
TM X320C32-60	5K	#	.	16M	1	16M x32*	2	.	2	60	33	30	144 PQFP	34.70
TM X320LC32-40*	5K	#	.	16M	1	16M x32*	2	.	2	40	50	20	144 PQFP	28.90

Notes from table: # = Boot Loader / * 16Mx8/16/32 configurable / * These devices will be available soon.

TM S320C3x Literature (Floating-Point)

(800) 477-8924

TMS320C3x User's Guide	SPRU031D
TMS320C31 Embedded Control Technical Brief	SPRU083
Peripheral Control Library User's Guide	SPRU086
DSP Applications Vol. 3 (Primarily 'C3x)	SPRA017
TMS320C3x DSP 3-D Graphics Application Report	SPRA024
TMS320C3x DSP Floating-Point Product Bulletin	SPRT117B
Choosing a High-Performance Floating-Point DSP	SPRN073
'C32 Data Sheet	SPRS027B
Interfacing Memory to the TMS320C32 DSP	SPRA040
'C32 Addendum to User's Guide	SPRU132B
'C3x User's Guide Addendum Update Sheet	SPRZ097
User's Guide Manual Update Sheet	SPRZ098
How TM S320 Tools Interact with 'C32 Enhanced Memory	SPRA048
TMS320C3x DSK User's Guide	SPRU163

Designer Notebook Pages (designed specific to the 'C3x)

Notebook Pages	DNP #
• 'C3x Block Repeat	1
• Avoiding False Interrupts on the 'C3x	2
• TM S320C30 Addressing Up to 68 Gigawords	5
• Bit-reversed Addressing in C on the 'C3x	8
• Interfacing the TM S320C31 to A/D and D/A Devices	14
• Fast Logarithms on a Floating-Point Device	22
• Switching From Bootloader to MP Mode With TM S320C31	23
• Hardware UART for TMS320C3x	27
• Interrupts in C on the TMS320C3x	31
• Floating-Point C Compiler: Tips and Tricks - Part 1	33
• Using a 'C30 Serial Port as an Asynchronous RS-232 Port	44
• Developing a Full-Duplex uART on 'C3x	58

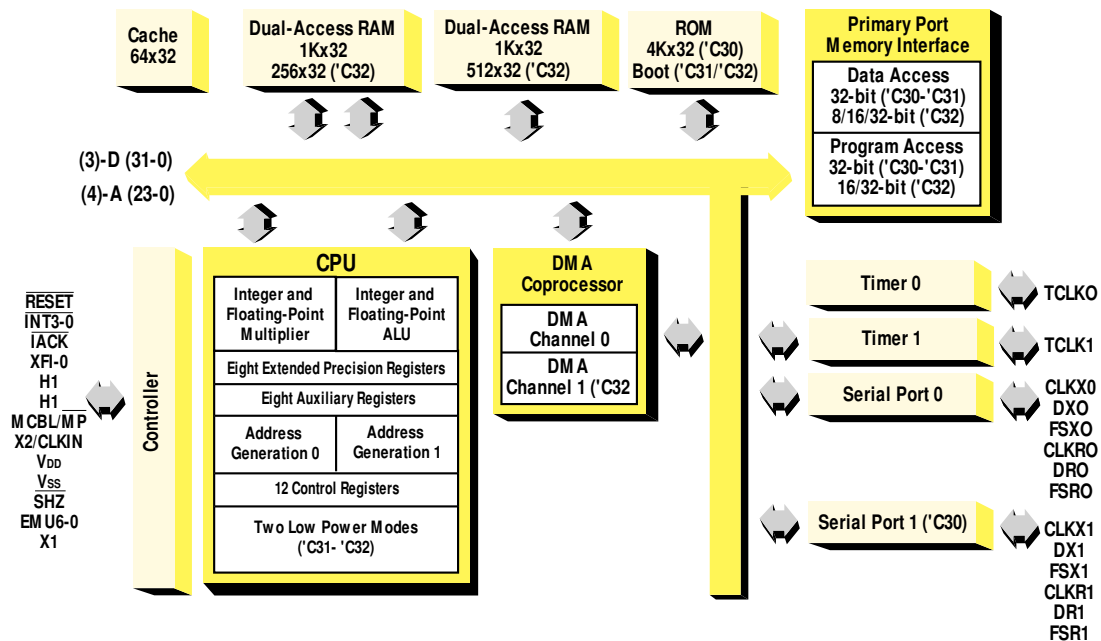
RTC 'C3x Training Class

Price \$1395

For Registration Call:

Northeast	(617) 895-9185
Western States / Canada	(408) 383-2363
Mid-America / Southeast	(214) 917-3894
Schedule Available via Hibbert - SSRB090F	(800) 477-8924

'C3x Block Diagram



TMS320C3x DSPs offer extensive internal busing, up to 60 M FLOPS performance and, in the case of the 'C32, a variable width external memory interface.

'C3x Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Evaluation Module (EVM)	TM DS3260030	'C30 EVM Card for IBM PC-DOS, Win Appl. Library Asm/Lnk & HLL Debug	TM S320C3x Source Debugger User's Guide TM S320C3x Evaluation Module Tech. Ref. TM S320C30 EVM Application Notes	SPRU053B SPRU069 SPRA021	995
Simulator Software	TM DS3243851-02 TM DS3243551-09	'C3x PC/DOS & WIN Simulator w/ Debug 'C3x SUN SPARC Simulator w/ Debug	'C3x C Source Debugger User's Guide	SPRU053B	500 3000
Code Generation Software	TM DS3243850-02 TM DS3242855-02 TM DS3243555-08	'C3x/'C4x PC-DOS, OS/2, Asm/Lnk 'C3x/'C4x PC-DOS, OS/2 C Cmp/Asm/Lnk 'C3x/'C4x SUN SPARC C Cmp/Asm/Lnk	TM S320C3x Peripheral Control Library UG TM DS324 F/P DSP: Optimizing C Comp UG Floating-Point Assy. Lang. Tools User's Guide	SPRU086 SPRU034F SPRU035B	500 1500 3500
XDS510/XDS510 WS HW	TM DS00510M TM DS00510WSM	XDS510 Board and MPSD cable XDS510WS Controller Box & MPSD cable			4000 6000
DSP Starter Kit (DSK)	TM DS3200031	'C31 DSP Starter Kit (DSK)	TM S320C3x DSK User's Guide	SPRU163	99
Debugger Software	TM DS3240130 TM DS3240630 CCM SP34XWIN	'C3x XDS510 C Source Debugger PC 'C3x XDS510 C Source Debugger SPARC 'C3x/'C4x Code Composer PC	'C3x C Source Debugger User's Guide Go-DSP Brochure	SPRU053B SPRT126	2000 4000 2000
Conversion Cable	TM DS3080004	'C3x 3V/5V PC/SPARC Emulation cable			1000
Porting Kit	TM DX3240030	EMU Porting Kit PC/SPARC			6000
Digital Filter Design	DFDP	ASPI Dig. Filter Design Package PC/DOS			1195
Fuzzy Logic Tutorial	MCU320-EXPLORE	fuzzyTECH MCU-320 fuzzy logic tutorial			199
Fuzzy Logic Code Generator	MCU320-EDITION	fuzzyTECH MCU-320 fuzzy logic code generation tool			1890
Tartan Library	320FLO-PC-C30 320FLO-SUN-C30 TAR-CCM-PC TAR-CMS-PC TAR-CCM-SP TAR-CMS-SP TAR-DBG-EVM-PC TAR-DBG-XDS-PC TAR-DBG-XDS-SP	Tartan Floating-Point Library for PC/DOS Tartan Floating-Point Library for SPARC 'C3x/'C4x Tartan C/C++ Comp for PC 'C3x/'C4x Tartan C/C++ Comp for PC w/sim 'C3x/'C4x Tartan C/C++ Comp for SPARC 'C3x/'C4x Tartan C/C++ Comp SPARC w/sim 'C3x Tartan Debug PC/DOS & MS Win 'C3x/'C4x Tartan Debug for PC/DOS, Win 'C3x/'C4x Tartan Debug for SPARC	FLO-TAR 64-bit Floating-Point Data Sheet Tartan C++ Compiler Data Sheet	SPRT108 SPRT109A	695 895 2995 3995 6495 8495 795 795 1795

TM S320 Digital Signal Processor Solutions

TM S320C4x (32-bit Floating-Point)

Key specifications:

- 80 MFLOPS performance
- Increased computational power
- Increased communications power
- Multi-processing capability
- Scalability
- Fault tolerance

Key applications:

- High-speed communications
- Virtual Reality, simulators
- Radar/sonar/image processing
- 3-D Graphics
- Robotics/numeric control
- Speech recognition
- Telecom infrastructure

Key features:

Six communication ports for high-speed interprocessor communication:

- 32 M bytes/s asynchronous transfer at each port for maximum data throughput
- Direct (glueless) processor-to-processor communication for ease of use

Six-channel DMA coprocessor for concurrent I/O and CPU operation:

- Concurrent data transfers and CPU operation for sustained CPU performance

High performance DSP CPU capable for 440 M OPS and 512 M bytes/s:

- 11 operations per cycle throughput
- 25-, 33-, 40- and 50-ns instruction cycle times

Two identical external data and address buses supporting shared memory systems and high data rate, single cycle transfers:

- High port data-transfer rate of 160 M bytes/s ('C40-80)

'C4x Product Specification Guide

Device	RAM	(Words)		DAT/PRO	SER	PAR	DMA	COM	Timers	MHz	Cycle(ns)	MIPS	Packaging	\$/1Ku
		ROM	OTP											
TM S320C40-50	2K	4K#	.	4G*	.	4Gx32	6(12)%	6	2	40	40	25	325 PGA	178.00
TM S320C40-60*	2K	4K#	.	4G*	.	4Gx32	6(12)%	6	2	60	33	30	325 PGA	196.00
TM S320C44-50	2K	#	.	32M*	.	32Mx32	6(12)%	4	2	50	40	25	304 PQFP	129.60
TM S320C44-60*	2K	#	.	32M*	.	32Mx32	6(12)%	4	2	60	33	30	304 PQFP	143.00

Notes from table: # = Boot Loader / *One logical memory space available soon for program, data, I/O minus on-chip RAM, peripherals and reserved / %12 DMA channels in split mode

TM S320C4x Literature (Floating-Point)

(800) 477-8924

TM S320C4x User's Guide	SPRU063A
'C4x Product Bulletin	SPRT118B
TM S320C44 Data Sheet ('C44-40, 50, 60)	SPRS037
TM S320C4x Parallel Processing Applications	SPRA031
TM S320C40 Power Dissipation Application Report	SPRA032
TM S320C40 60 and 80 MHz Product Bulletin	SPRN074
'C40PPDS Technical Reference	SPRU075A
TM S320C4x Parallel Runtime Support Library	SPRU084A
Choosing a High-Performance Floating-Point DSP	SPRN073
TM S320C4x Technical Brief	SPRU076

Designer Notebook Pages (designed specific to the 'C4x)

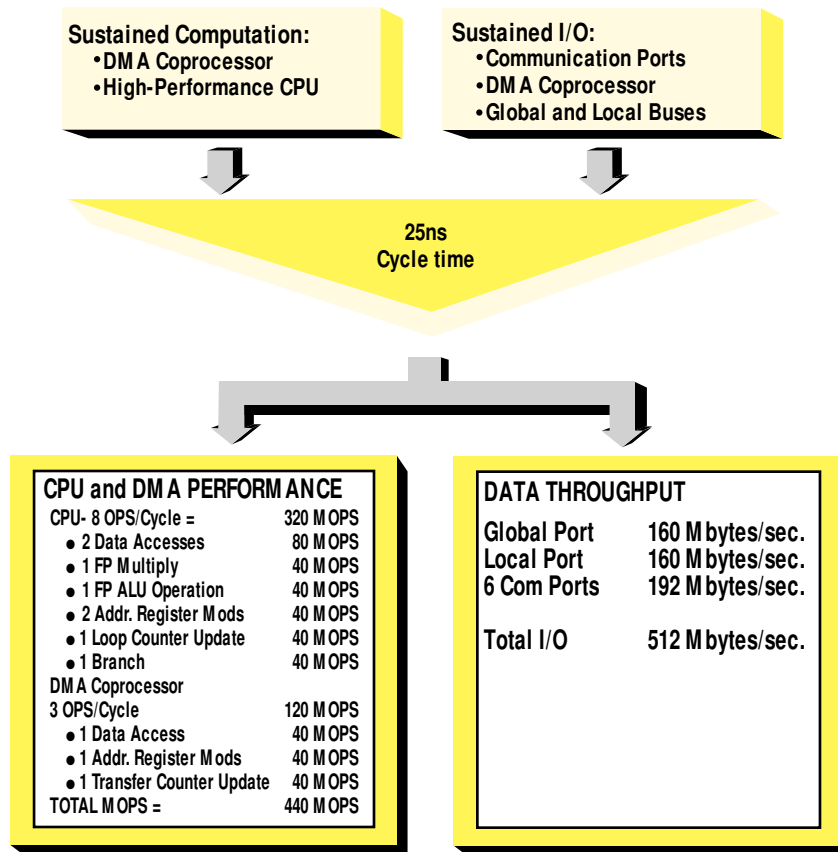
Notebook Pages	DNP #
• TM S320C40 Boot Loader Selection	12
• TM S320C40 DMA Memory Transfer Timing	16
• Designing With TM S320C40 Communication Ports: Part 1	17
• A Simple Way to Terminate Unused 'C40 Communication Ports	20
• Fast Logarithms on a Floating-Point Device	22
• A Novel Way of Using TM S320C40 Cache	26
• TM S320C40 Emulator Tips	32
• Floating-Point C Compiler: Tips and Tricks, Part 1	33
• Mastering the 'C4x DMA (Direct Memory Access)	38
• Bootloading a 'C4x Network - Part 1: Direct Connect	51

RTC 'C4x Training Class

Price \$1395

For Registration Call:

Northeast	(617) 895-9185
Western States / Canada	(408) 383-2363
Mid-America / Southeast	(214) 917-3894
Schedule Available via Hibbert - SSRB090F	(800) 477-8924



'C4x Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Simulator Software	TMDS3244851-02	'C4x PC/DOS & WIN Simulator w/ Debug	'C4x C Source Debugger User's Guide	SPRU054	500
	TMDS3244551-09	'C4x SUN SPARC Simulator w/ Debug			
Code Generation Software	TMDS3243850-02	'C3x/'C4x PC-DOS, OS/2, Asm/Lnk	Floating-Point Assy. Lang. Tool User's Guide	SPRU035B	500
	TMDS3243855-02	'C3x/'C4x PC-DOS, OS/2 C Cmp/Asm/Lnk	TMDS324 Floating-Point DSP: Optimizing C Comp User's Guide	SPRU034F	1500
	TMDS3243555-08	'C3x/'C4x SUN SPARC C Cmp/Asm/Lnk	TM S320C4x Parallel Routine Support	SPRU084A	3500
XDS510/XDS510 WS HW	TMDS00510	XDS510 Board and JTAG cable ('C4x/'C5x/'C8x)			4000
	TMDS00510WS	XDS510WS Controller Box & JTAG cable			6000
Debugger Software	TMDS3240140	'C4x XDS510 C Source Debugger PC	'C4x C Source Debugger User's Guide	SPRU054	2000
	TMDS3240640	'C4x XDS510 C Source Debugger SPARC	Parallel Debug MGR Addendum	SPRU094	4000
	CCMSP34XWIN	'C3x/'C4x Code Composer	Go-DSP Brochure	SPRT126	2000
Conversion Cable	TMDS3080002	'C5x/'C4x 3V/5V PC/SPARC EMU cable			1000
Porting Kit	TMDX3240030	EMU Porting Kit PC/SPARC			6000
Digital Filter Design	DFDP	ASPI Dig. Filter Design Package PC/DOS			1195
Tartan Library	320FLO-PC-C40	Tartan Floating-Point Library for PC/DOS	FLO-TAR 64-bit Floating-Point Data Sheet	SPRT108	695
	320FLO-SUN-C40	Tartan Floating-Point Library for SPARC	Tartan C++ Compiler Data Sheet	SPRT109A	895
	TAR-CCM-PC	'C3x/'C4x Tartan C/C++ Comp for PC			2995
	TAR-CMS-PC	'C3x/'C4x Tartan C/C++ Comp for PC w/sim			3995
	TAR-CCM-SP	'C3x/'C4x Tartan C/C++ Comp for SPARC			6495
	TAR-CMS-SP	'C3x/'C4x Tartan C/C++ Comp SPARC w/sim			8495
	TAR-DBG-XDS-PC	'C3x/'C4x Tartan Debug for PC/DOS, Win			795
	TAR-DBG-XDS-SP	'C3x/'C4x Tartan Debug for SPARC			1795
Parallel Development	TMDX3261040	Parallel Processing Development Board			10,000

TM S320 Digital Signal Processor Solutions

TM S320C5x (Fixed-Point)

Key specifications:

- 50 MIPS performance
- Prices start as low as \$0.30 U.S. per MIP
- 3V and 5V versions
- 100-pin TQFP/PQFP, 128-pin TQFP, 132-pin PQFP and 144-pin TQFP options
- Integrated RAM and ROM configurations
- JTAG scan-based emulation
- Fully compatible with TM S320C1x, 'C2x and 'C2xx

Key applications:

- Cellular/cordless telephone
- High-speed modems
- Personal communications
- Sound systems, voice processing
- Laser printers, copiers
- Other telecommunications applications
- Multimedia
- Hard disk drives

Key features:

- 'C5x DSPs can perform an instruction in as little as 20-ns
- 50 MIPS performance
- Active power consumption is as low as 1.15 mA/MIPS
- Choose from an array of integrated RAM and ROM configurations
- Performs on-chip emulation, eliminating the propagation delay associated with older emulation technology
- Source code compatibility with 'C1x, 'C2x and 'C2xx
- Provides a high-speed bit manipulation without modifying the ALU status bits or registers
- Provides a glueless, external interface allowing the use of slower off-chip memory and I/O devices reducing system costs
- The 12 most fundamental CPU registers are duplicated to provide zero-overhead context saves

'C5x Product Specification Guide

Device	RAM	(Words) ROM	OTP	DAT/PRO	SER	PAR	DMA	COM	Timers	MHz	Cycle(ns)	MIPS	Packaging	\$/1ku
TM S320C50-57&*	10K	Boot	.	64K/64K	2	64Kx16	Ext	.	1	57	35	28.57	132 PQFP	26.30
TM S320C50-80*	10K	Boot	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	132 PQFP	30.30
TM S320C51-57&*	2K	8K	.	64K/64K	2	64Kx16	Ext	.	1	57	35	28.57	132 PQFP, 100 TQFP	20.00
TM S320C51-80*	2K	8K	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	132 PQFP, 100 TQFP	23.20
TM S320C51-100*	2K	8K	.	64K/64K	2	64Kx16	Ext	.	1	100	20	50	132 PQFP, 100 TQFP	27.40
TM S320C52-57&*	1K	4K	.	64K/64K	1	64Kx16	Ext	.	1	57	35	28.57	100 PQFP, 100 TQFP	15.10
TM S320C52-80	1K	4K	.	64K/64K	1	64Kx16	Ext	.	1	80	25	40	100 PQFP, 100 TQFP	17.30
TM X320C52-100*	1K	4K	.	64K/64K	1	64Kx16	Ext	.	1	100	20	50	100 PQFP, 100TQFP	20.70
TM S320C53-57	4K	16K	.	64K/64K	2	64Kx16	Ext	.	1	57	35	28.57	100 PQFP	25.00
TM S320C53-80	4K	16K	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 PQFP	28.40
TM S320C53S57&*	4K	16K	.	64K/64K	2	64Kx16	Ext	.	1	57	35	28.57	100 TQFP	25.00
TM S320C53S80	4K	16K	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	28.40
TM S320LBC56-57	7K	32K	.	64K/64K	2!	64Kx16	Ext	.	1	57	35	28.57	100 TQFP	45.30
TM S320LBC56-80	7K	32K	.	64K/64K	2!	64Kx16	Ext	.	1	80	25	40	100 TQFP	54.70
TM S320LBC57-57	7K	32K	.	64K/64K	2!	64Kx16	Ext	HPI	1	57	35	28.57	128 TQFP,	49.80
TM S320LBC57-80	7K	32K	.	64K/64K	2!	64Kx16	Ext	HPI	1	80	25	40	128 TQFP,	59.80
TM S320BC57S-57	7K	Boot	.	64K/64K	2!	64Kx16	Ext	HPI	1	57	35	28	144 TQFP	26.30
TM S320BC57S-80	7K	Boot	.	64K/64K	2!	64Kx16	Ext	HPI	1	80	25	40	144 TQFP	30.30

Notes from table: & = Extended temperature version available / * 3.3V version available / ! Buffered Serial Port / Bootloader available on all devices

TM S320C5x Literature

(800) 477-8924

TM S320C5x User's Guide	SPRU056B
TM S320C5x Fixed-Point DSP Product Bulletin	SPRT119A
'C5x Power Dissipation Application Report	SPRA030
'C5x DSP Seminar Workbook	SPRW017
'C5x Data Sheet	SPRS030
Telecommunications Applications With 'C5x	SPRA033
TM S320WP010 Product Bulletin	SPRT124
TM S320WP010 Data Sheet	SPRS040
TC320IS54B Product Bulletin	SPRT114
TC320IS54B Chipset User's Guide (Preliminary)	SPRU128A
'C5x On-Chip Oscillator With External Resonator	SPRA054

Designer Notebook Pages (designed specific to the 'C5x)

Notebook Pages	DNP #
• Optimizing Control Algorithms on 'C5x	4
• 'C5x EVM Provides for Auto Processing	6
• Efficient Coding on the TM S320C5x	15
• Dual Access Into Single-Access RAM on a 'C5x Device	19
• TM S320C5x Interrupts	21
• TM S320C5x Interrupts Response Time	24
• TM S320C2x/C5x EVM AIC Initialization and Configuration	25
• TM S320C5x Interrupts and the Pipeline	35
• Bootload of C Code for the TM S320C5x	39
• Supporting External DMA Activity to Internal RAM for TM S320C5x Devices with the PZ Package	41
• Binary Search Algorithm on the TM S320C5x	42
• Random Number Generation on a TM S320C5x	43
• Fast 'C5x External Memory I/F	45
• 'C5x Memory Paging	46
• 'C5x Clock Modes	47
• 'C5x Wait States	48
• Clocking Options on the 'C5x	49
• 'C5x DSK Analog I/O	50
• Accessing 'C5x Memory Mapped Registers in CC5XREGS.H	54
• C Routines for Setting Up the AIC on the 'C5x EVM	55
• Initializing the 'C5x DSK Board	57
• Designing Macros for the 'C5x	59

'C5x Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Evaluation Module (EVM)	TMDS3260050	'C50 EVM Card for IBM PC-DOS, Win	TM S320C5x Source Debugger User's Guide TM S320C55x Evaluation Module Tech. Reference	SPRU055B SPRU087	995
Simulator Software	TMDS3245851-02 TMDS3245551-09	'C5x PC/DOS & WIN Simulator w/ Debug 'C5x SUN SPARC Simulator w/ Debug			500 3000
Code Generation Software	TMDS3242850-02 TMDS3242855-02 TMDS3242555-08	'C1x/'C2x/'C5x PC-DOS, OS/2, Asm/Lnk 'C2x/'C5x PC-DOS, OS/2 C Cmp/Asm/Lnk 'C2x/'C5x SUN SPARC C Cmp/Asm/Lnk	'C1x/'C2x/'C5x Assembly Lang. Tools User's Guide 'C2x/'C2xx/'C5x Optimizing C Comp User's Guide TM S320C4x Parallel Routine Support	SPRU018D SPRU024D SPRU084A	500 1500 3500
XDS510/XDS510 WS HW	TMDS00510 TMDS00510WS	XDS510 Board and JTAG cable (C4x/5x) XDS510WS Controller Box & JTAG cable			4000 6000
Debugger Software	TMDS3240150 TMDS3240650	'C4x XDS510 C Source Debugger PC 'C4x XDS510 C Source Debugger SPARC	'C5x C Source Debugger User's Guide Parallel Debug MGR Addendum	SPRU055B SPRU094	2000 4000
Conversion Cable	TMDS3080002	'C5x/'C4x 3V/5V PC/SPARC EMU cable			1000
DSP Starter Kit (DSK)	TMDS3200051	'C50 DSP Starter Kit (DSK) 'C50, AIC, Basic Asm & Debug. Sample SW	TM S320C5x DSP Starter Kit User's Guide TM S320C5x DSK Product Bulletin	SPRU101 SPRV032	99
Digital Filter Design	DFDP	ASPI Dig. Filter Design Package PC/DOS			1195
Fuzzy Logic Tutorial	MCU320-EXPLORE	fuzzyTECH MCU-320 fuzzy logic tutorial			199
Fuzzy Logic Code Generator	MCU320-EDITION	fuzzyTECH MCU-320 fuzzy logic code generation tool			1890

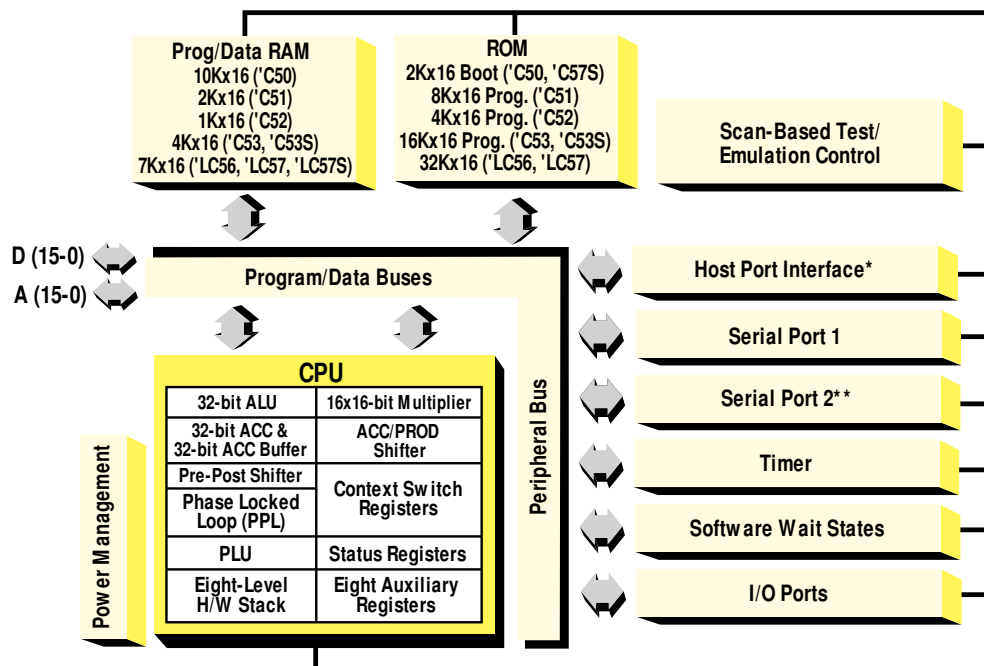
RTC 'C5x Training Class

Price \$1495

For Registration Call:

Northeast	(617) 895-9185
Western States / Canada	(408) 383-2363
Mid-America / Southeast	(214) 917-3894
Schedule Available via Hibbert – SSRB090F	(800) 477-8924

'C5x Block Diagram



* Available on the 'LC57 and 'C57S ** One serial port on 'C52; buffered serial port on 'LC56, 'LC57 and 'C57S

TM S320 Digital Signal Processor Solutions

TM S320C54x (Fixed-Point)

Key specifications:

- Performance up to 66 MIPS
- Integrated Viterbi operation
- Three power-down modes
- Integrated RAM and ROM configurations
- Auto-buffered serial port
- Host-port interface
- Ultra-thin packaging (100-, 128- and 144-pin TQFPs)

Key applications:

- Digital Cellular Communications
- Personal Communications Systems (PCS)
- Pagers
- Personal Digital Assistants
- Digital Cordless Communications
- Wireless Data

Key features:

- 50 MIPS performance
- Integrated Viterbi accelerator
- Operates at 2.7 and 5V
- 40-bit address and two 40-bit accumulators to support parallel operations
- 40-bit ALU with a dual 16-bit configuration capability for dual one-cycle operations
- 17x17 multiplier allowing 16-bit signed or unsigned multiplication
- Four internal buses and dual address generators enable multiple operand operations and reduce memory bottleneck
- Single-cycle normalization and single-cycle exponential encoding
- Eight auxiliary registers and a software stack enable the industry's most advanced fixed-point DSP C compiler
- Power-down modes for battery-powered applications

'C54x Product Specification Guide

Device*	(Words)						DMA	COM	Timers	MHz	Cycle(ns)	MIPS	Packaging	\$/1ku
	RAM	ROM	OTP	DAT/PRO	SER	PAR								
TM S320C541#-40	5K	28K	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	36.80
TM S320C542#-40	10K	2K	.	64K/64K	2!+	64Kx16	Ext	HPI	1	80	25	40	128, 144 TQFP	41.10
TM S320LC541#-40	5K	28K	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	36.80
TM S320LC541#-50	5K	28K	.	64K/64K	2	64Kx16	Ext	.	1	100	20	50	100 TQFP	41.10
TM S320LC542#-40	10K	2K	.	64K/64K	2!+	64Kx16	Ext	HPI	1	80	25	40	128, 144 TQFP	41.10
TM S320LC542#-50	10K	2K	.	64K/64K	2!+	64Kx16	Ext	HPI	1	100	20	50	128, 144 TQFP	45.30
TM S320LC543#-40	10K	2K	.	64K/64K	2!+	64Kx16	Ext	.	1	80	25	40	100 TQFP	38.90
TM S320LC543#-50	10K	2K	.	64K/64K	2!+	64Kx16	Ext	.	1	100	20	50	100 TQFP	43.20
TM S320LC545#-40	6K	48K	.	64K/64K	2!	64Kx16	Ext	HPI	1	80	25	40	128 TQFP	43.20
TM S320LC545#-50	6K	48K	.	64K/64K	2!	64Kx16	Ext	HPI	1	100	20	50	128 TQFP	47.40
TM S320LC546#-40	6K	48K	.	64K/64K	2!	64Kx16	Ext	.	1	80	25	40	100 TQFP	41.10
TM S320LC546#-50	6K	48K	.	64K/64K	2!	64Kx16	Ext	.	1	100	20	50	100 TQFP	45.30
TM S320LC548#-40	32K	2K	.	4M/64K	3!+	64Kx16	Ext	HPI	1	80	25	40	144 TQFP	51.40
TM S320LC548#-50	32K	2K	.	4M/64K	3!+	64Kx16	Ext	HPI	1	100	20	50	144 TQFP	56.60
TM S320VC541#-40	5K	28K	.	64K/64K	2	64Kx16	Ext	.	1	80	25	40	100 TQFP	36.80
TM S320VC541#-50	5K	28K	.	64K/64K	2	64Kx16	Ext	.	1	100	20	50	100 TQFP	41.10
TM S320VC542#-40	10K	2K	.	64K/64K	2!+	64Kx16	Ext	HPI	1	80	25	40	128, 144 TQFP	41.10
TM S320VC542#-50	10K	2K	.	64K/64K	2!+	64Kx16	Ext	HPI	1	100	20	50	128, 144 TQFP	45.30
TM S320VC543#-40	10K	2K	.	64K/64K	2!+	64Kx16	Ext	.	1	80	25	40	100 TQFP	38.90
TM S320VC543#-50	10K	2K	.	64K/64K	2!+	64Kx16	Ext	.	1	100	20	50	100 TQFP	43.20
TM S320VC545#-40	6K	48K	.	64K/64K	2!	64Kx16	Ext	HPI	1	80	25	40	128 TQFP	43.20
TM S320VC545#-50	6K	48K	.	64K/64K	2!	64Kx16	Ext	HPI	1	100	20	50	128 TQFP	47.40
TM S320VC546#-40	6K	48K	.	64K/64K	2!	64Kx16	Ext	.	1	80	25	40	100 TQFP	41.10
TM S320VC546#-50	6K	48K	.	64K/64K	2!	64Kx16	Ext	.	1	100	20	50	100 TQFP	45.30
TM S320VC548#-40	32K	2K	.	4M/64K	3!+	64Kx16	Ext	HPI	1	80	25	40	144 TQFP	51.40
TM S320VC548#-50	32K	2K	.	4M/64K	3!+	64Kx16	Ext	HPI	1	100	20	50	144 TQFP	56.60

Notes from table: * Devices available soon, check before ordering / Bootloader available on all devices / ! Buffered Serial Port ('C548 have 2), + 1TDM Serial Port / # = 1 for PLL option 1, = 2 PLL for option 2 (see User's Guide for details) LC = 3.3V, VC = 3.0V parts

TM S320C54x Literature

(800) 477-8924

TM S320C54x Product Bulletin	SPRT121A
TM S320C54x User's Guide	SPRU131
'C54x Serial Ports User's Guide Addendum	SPRU156
'C54x C Source Debugger User's Guide	SPRU099A
'C54x Assembly Language Tools User's Guide	SPRU102A
TM S320C54x Datasheet	SPRS039

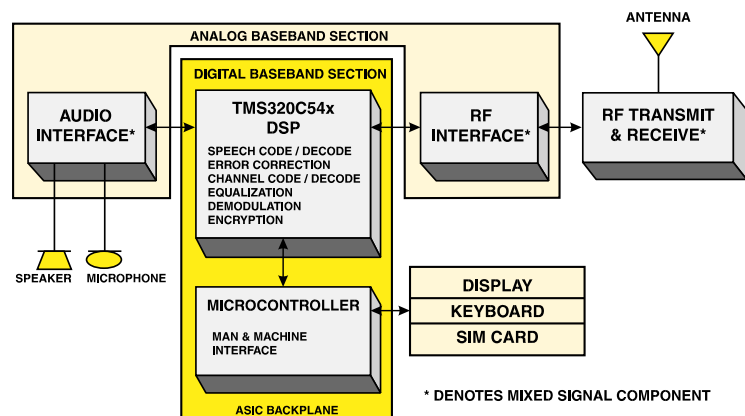
RTC 'C54x Training Class

Price \$1395

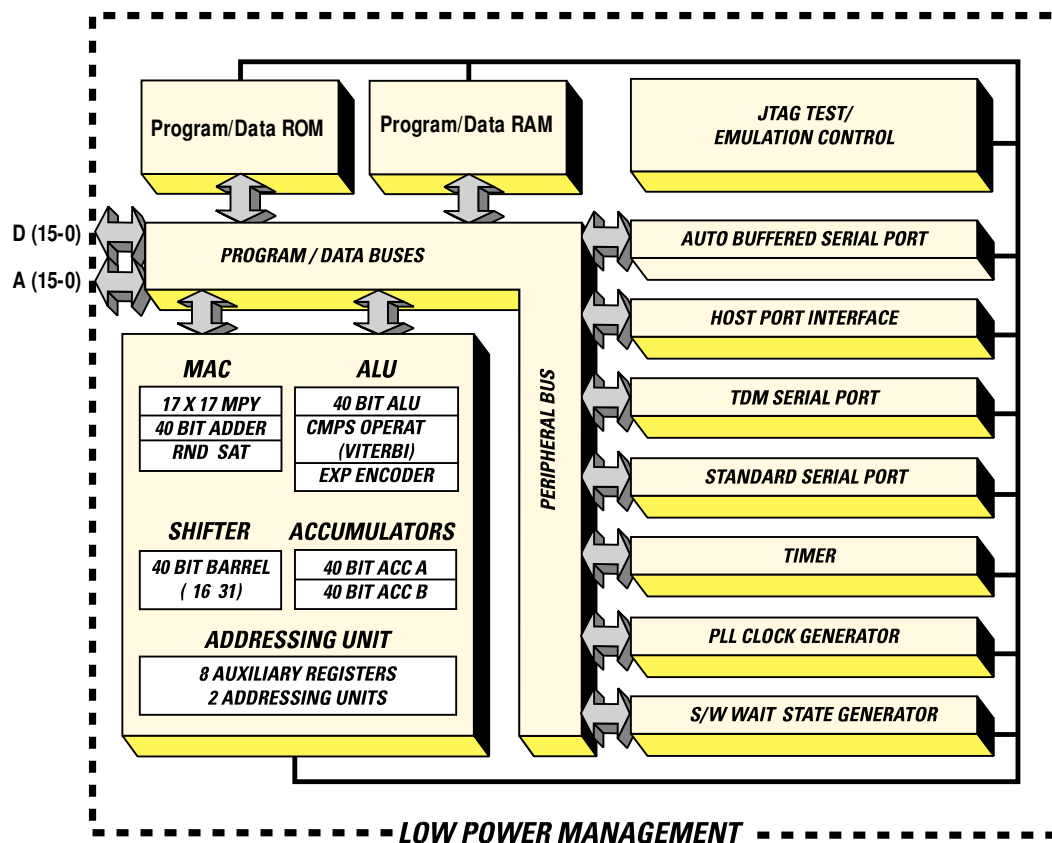
Class length is 3.5 days. For Registration Call:

Northeast	(617) 895-9185
Western States / Canada	(408) 383-2363
Mid-America / Southeast	(214) 917-3894
Schedule Available via Hibbert - SSRB090F	(800) 477-8924

Digital Cellular Phone Solution



'C54x Block Diagram



TM S320C54x DSPs are optimized to meet the performance, cost and low-power needs of wireless communications systems.

'C54x Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Evaluation Module (EVM)	TM DX3260051	'C54x EVM Card for IBM PC-DOS, Win	TM S320C54x EVM Tech. Reference	SPRU135	995
Simulator Software	TM DS324L851-02 TM DS324L551-09	'C54x PC/DOS & WIN Simulator 'C54x SUN SPARC Simulator			500 3000
C Compiler/Asm/Linker	TM DS324L850-02 TM DS324L855-02 TM DS324L555-09	'C54x Asm/Lnk for PC 'C54x C Cmp/Asm/Lnk for PC-DOS, OS/2 'C54x SUN SPARC C Cmp/Asm/Lnk	TM S320C54x Opt. C Compiler User's Guide TM S320C54x Assy. Lang. Tools User's Guide	SPRU103A SPRU102A	500 1500 3500
XDS510/XDS510 WS HW	TM DS00510 TM DS00510WS	XDS510 Board and JTAG cable (C54x) XDS510WS Controller Box & JTAG cable			4000 6000
Debugger Software	TM DS32401L0 TM DS32406L0	'C54x XDS510 C Source Debugger PC 'C54x XDS510 C Source Debugger SPARC	TM S320C54x C Source Debugger User's Guide	SPRU099A	2000 4000
Conversion Cable	TM DS3080002	3V/5V JTAG cable (510 and 510WS)			1000

TM S320 Digital Signal Processor Solutions

TM S320C8x

Key specifications:

'C8x Architecture

- Fully programmable MIMD Architecture
- 32-bit data/64-bit instruction advanced DSP
- 32-bit RISC Master Processor
- Transfer Controller
- 400-M byte/sec 4-Gbyte address space
- 20/25-ns cycle time

TM S320C80

- Video Controller
- Four parallel processing DSPs
- 50 Kbytes of on-chip RAM
- 2 BOPS performance
- 305-pin PGA, 352 BGA (planned)

TM S320C82

- Two parallel processing DSPs
- 44 Kbytes of on-chip RAM
- 1.5 BOPS performance
- 352 BGA (planned)

Key applications:

- Video Conferencing
- Video Phones
- High-Speed Telecommunications
- Image and Video Processing
- Multimedia Workstations
- 2-D and 3-D Graphics Accelerators
- Virtual Reality
- Security
- Radar and Sonar Systems

Key features:

- Intelligent On-chip Transfer Controller and On-board Memory (SRAM)
- Multiple 32-bit Parallel Processing, Advanced DSP
- 32-bit ALU, can be divided into two 16-bit ALUs or four 8-bit ALUs for parallel processing on lower precision data
- Direct interface to DRAM, SRAM and VRAM
- 8-, 16-, 32-, 64-bit dynamic external bus interface

'C8x Product Specification Guide

Device	Shared RAM	32-bit DSPs	32-bit RISC	Video Controller	Transfer Controller	Cycle (ns)	Address Space (Byte)	MHz	Packaging	\$/1ku
TM S320C80	50K	4	1	2	1	20, 25	4G	40, 50	305 PGA, 352 BGA	353.60 442.00
TM S320C82	44K	2	1	0	1	20	4G	50	352 BGA	180* (1pc.)

Notes from table: Boot Loader and Industrial Temperature versions are available / * 'C82 pricing for TMX, samples available 3Q96.

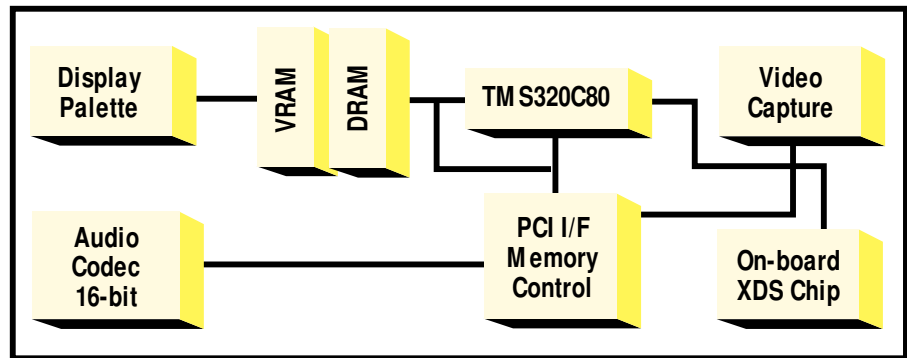
TM S320C8x Literature

(800) 477-8924

System Level Synopsis	SPRU113B
'C80 Product Bulletin/Brochure	SPRT112B
'C80 Data Sheet	SPRS023
TM S320C80 DSP PC Based Tools Product Bulletin	SPRT123
'C80 User's Guide (* CD ROM)	SPRC001B
Transfer Controller User's Guide	SPRU105A
C Source Debugger User's Guide	SPRU107A
Code Generation Tools	SPRU108A
Master Processor User's Guide	SPRU109A
Parallel Processor User's Guide	SPRU110A
Video Controller User's Guide	SPRU111A
Multitasking Executive User's Guide	SPRU112A
'C82 Compatibility User's Guide	SPRU154
TM S320C80 H.320 Software Library White Pages	SPRY002

* IMPORTANT: CD ROM more readily available than paper documentation.

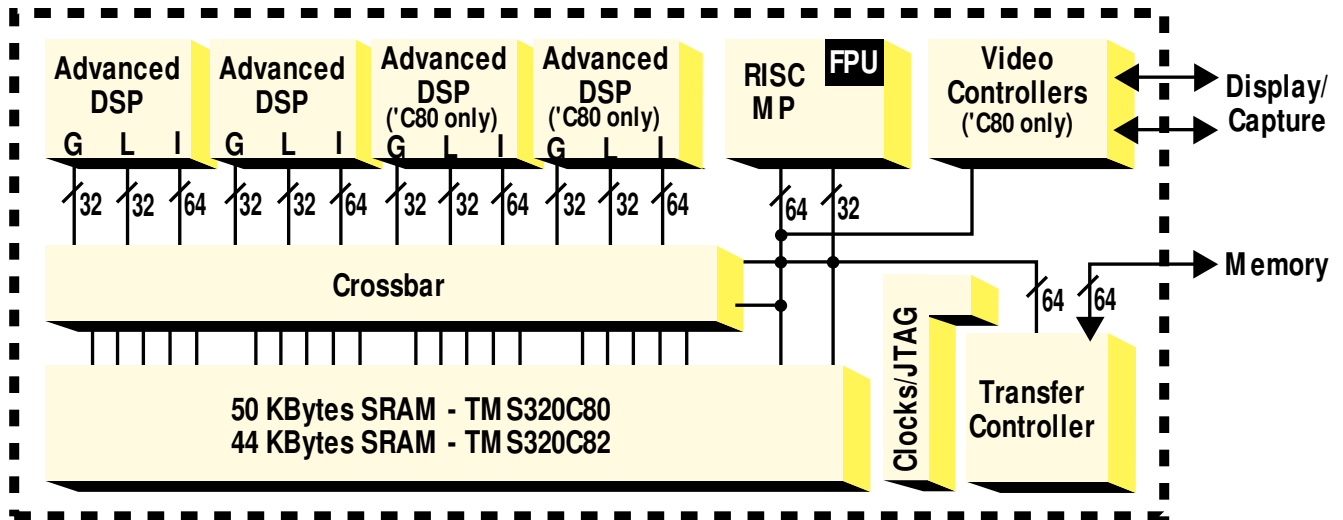
TM S320C8x Software Development Board



The SDB's bus master interface facilitates high-speed data transfer.

Simplify your design process with TI's TM S320C8x DSP development tools.

'C8x Architecture



RTC 'C8x Training Class

\$1595

A four day Regional Technology Center training course is now available. It is similar in style and format to the other TMS320 RTC. For more information call (800) 336-5236 ext. 3904 or call (214) 917-3894. Schedule Available via Hibbert – SSRB090F (800) 477-8924

'C8x Development Tools

Tool	Part #	Description	Literature for Tool	Literature #	\$/U
Debugger Software	TM DX3240680	'C8x XDS510WS C Source Debugger (SPARC)	C Source Debugger User's Guide	SPRU107A	2000
	TM DX3240810	'C8x XDS510 C Source Debugger (PC)			2000
Code Generation Software	TM DX3248555-67	'C8x Code Generation Tool (SPARC)	Code Generation Tools	SPRU108A	12500
	TM DX3248855-07	'C8x Code Generation Tool (PC)			3500
SW Development Board	TM DX3260080	'C8x Software Development Board	TMS320C8x DSP PC Tools Product Bulletin	SPRT123	6000
XDS510/XDS510 WS HW	TM DS00510	XDS Board and JTAG Cable (PC)			4000
	TM DS00510WS	XDS510WS Controller Box and JTAG Cable (SPARC)			

TM S320 Digital Signal Processor Solutions

TM S320AVxxx (DCP)

TM S320AV110 key features:

- Single-chip ISO-MPEG audio decoder
- Decodes mono, dual, stereo and joint stereo modes
- Supports all MPEG sampling and data rates, including free formal
- Accepts compressed and audio at up to 15-M bits/sec burst rate
- Small footprint 120-pin plastic quad flat package

TM S320AV120 key features:

- Does not require a host microprocessor for initialization or operation
- Accepts SCR and audio PTS and provides automatic synchronization
- Provides status information at beginning of every frame
- Low-cost 44-pin PLCC package

TM S320AV220 key features:

- Direct interface with 'AV110 MPEG audio decoder and 'AV120 NTSC encoder
- Integrated system decoder, micro-coded ROM and audio input buffer
- Automates audio and video synchronization – no external logic needed
- Supports NTSC and PAL video output timing formats
- Supports SIF and CCI R 601 resolution

TM S320AV420 key features:

- Single-chip digital NTSC encoder
- Vertical line interpolation for MPEG-1 video
- Input: RGB, YUV 4:4:4 or YUV 4:2:2
- Output s-video (Y and C)
- On-chip synchronization signal generator circuitry
- 80-pin quad flat package

Digital Compression Product Specification Guide

Device	Function	Input Format	Output Format	Controller Interface	Off-chip Memory	Packaging	\$/1ku
TMS320AV110	MPEG Audio Decoder	MPEG Audio Stream or MPEG System Stream	16- or 18-bit serial PCM	8-bit	Optional 1M DRAM	120-pin PQFP	13.75
TMS320AV120	MPEG Audio Decoder	MPEG Audio Stream	16- or 18-bit serial PCM	None	None	44-pin PLCC	10.00
TMS320AV220	Video CD MPEG Decoder	MPEG System Stream	704x240 @ 60Hz 704x288 @ 50 Hz	8-bit	4M DRAM	160-pin PQFP	29.00
TMS320AV420	Digital NTSC Encoder	RGB, YUV 4:4:4 or YUV 4:2:2	S-Video (Y and C)	None	None	80-pin PQFP	7.50

TM S320AVxxx Literature

(800) 477-8924

TMS320AV110 Application Notes	SCSA005
TMS320AV110 Product Bulletin	SCSB001
Large DCP Presentation Folder	SCSB004
TMS320AV110 Data Sheet	SCSS013C
TMS320AV120 Data Sheet	SCSS014
TMS320AV420 Data Sheet	SCSS015A
TMS320AV220 Data Sheet	SCSS016A
Video CD Chipset Product Bulletin	SCST002A
'AV120 Product Bulletin	SCST003

Video CD Chipset – Support to Simplify Your Designs

An Optimized Chipset that's also versatile



■ Provides a cost-effective, dedicated implementation of the MPEG Audio algorithm (Layers 1 and 2).

■ Architecture mathematically modeled to minimize silicon and maximize audio quality. CD quality is maintained with no additional quantization noise added.

■ Can also be used as a stand-alone MPEG Audio Decoder, eliminating the need for a host processor.

■ Derived from TI's highly successful TMS320AV110 MPEG Audio Decoder and optimized to reduce cost for Video CD applications.



■ Based on C-Cube's CL450 Video Decoder with integrated features specifically for Video CD.

■ Integrates MPEG-1 system decoder, audio buffer and on-chip microcode.

■ Synchronizes audio and video outputs without an external host.

■ Integrates Video CD control functions (fast forward, reverse and freeze frame).

■ Provides a seamless interface to Sony and Sanyo CD-ROM decoders.



■ Converts RGB (red-green-blue) or YUV (luminance chrominance) bit-streams output from the 'AV220 to an analog NTSC signal for TV.

■ Vertically interpolates scan lines to create a smooth picture by reducing the noise and flicker that is associated with line-doubled implementations of MPEG-1 Video.

■ Generates synchronization timing signals for the 'AV220 Video Decoder.

■ Supports overlays, providing the ability to superimpose both text and graphics on the video display.

Although the three devices in TI's Video CD chipset are optimized to operate together in Video CD systems, they can also function independently.

Complete listing of Notebook Pages

Notebook Pages	DNP #
• Designer Notebook Volume 1	1-60/SPRT125
• 'C3x Block Repeat	1
• Avoiding False Interrupts on the 'C3x	2
• Bit-reversed Addressing Without Data Alignment	3
• Optimizing Control Algorithms on 'C5x	4
• TMS320C30 Addressing up to 68 Gigawords	5
• 'C5x EVM Provides for Auto Processing	6
• Circular Buffer in Second Generation DSPs	7
• Bit-reversed Addressing in C on the 'C3x	8
• Sharing Header Files in C and Assembly	9
• Initializing the Fixed-Point EVM's AIC	10
• TMS320C25 Logical Shifts in Parallel With ALU Operations	11
• TMS320C40 Boot Loader Selection	12
• Reducing System Power Requirements	13
• Interfacing the TMS320C31 to A/D and D/A Devices	14
• Efficient Coding on the TMS320C5x	15
• TMS320C40 DMA Memory Transfer Timing	16
• Designing With TMS320C40 Communication Ports: Part 1	17
• Creating a Delay Buffer on a TMS320C2x EVM	18
• Dual Access Into Single-Access RAM on a 'C5x Device	19
• A Simple Way to Terminate Unused 'C40 Communication Ports	20
• TMS320C5x Interrupts	21
• Fast Logarithms on a Floating-Point Device	22
• Switching From Bootloader to MP Mode With TMS320C31	23
• TMS320C5x Interrupts Response Time	24
• TMS320C2x/C5x EVM AIC Initialization and Configuration	25
• A Novel Way of Using TMS320C40 Cache	26
• Hardware UART for TMS320C3x	27
• Using VRAMS and DSPs for System Performance	28
• Using the RBIT on the TMS320P25	29
• Addressing Peripherals as Data Structures in C	30
• Interrupts in C on the TMS320C3x	31
• TMS320C40 Emulator Tips	32
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• Improved Context Save/Restore Performance and Interrupt Latency for ISRs Written in C	36
• Serial ROM Boot	37
• Mastering the 'C4x DMA (Direct Memory Access)	38
• Bootload of C Code for the TMS320C5x	39
• How to Convert a HEX30 Output File Into a Linkable Assembly File	40
• Supporting External DMA Activity to Internal RAM for TMS320C5x Devices With the PZ Package	41
• Binary Search Algorithm on the TMS320C5x	42
• Random Number Generation on a TMS320C5x	43
• Using a 'C30 Serial Port as an Asynchronous RS-232 Port	44
• Fast 'C5x External Memory I/F	45
• 'C5x Memory Paging	46
• 'C5x Clock Modes	47
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• Clocking Options on the 'C5x	49
• 'C5x DSK Analog I/O	50
• Bootloading a 'C4x Network - Part 1: Direct Connect	51
• Emulator Processor Access Timeout	52
• Extending Fixed-Point Math Dynamic Range with Minimum Cycles	53
• Accessing 'C5x Memory Mapped Registers in CC5XREGS.H	54
• C Routines for Setting Up the AIC on the 'C5x EVM	55
• How Can Comb Filters Be Used to Synthesize Musical Instruments on a TMS320 DSP	56
• Initializing the 'C5x DSK Board	57
• Developing a Full-Duplex uART on 'C3x	58
• Designing Macros for the 'C5x	59
• Accessing Status and Control Fields and I/O Ports in the TMS320Cxx HLL Debugger	60
• Multipass Linking	61
• Linking C Data Objects Separate From Loss Section	62

Easy steps for accessing the DSP Bulletin Board Service (BBS)

The procedure for access to the DSP BBS via INTERNET follows:

- The BBS contents are mirrored onto INTERNET at 'ftp.ti.com' and 'evans.ee.adfa.oz.au'; the Evans Site has a bit more information than 'ftp.ti.com'.
- The BBS contents are under the directory /mirrors.
- At 'ftp.ti.com', the sub-directory is tms320bbs.
- At 'evans.ee.adfa.oz.au', the sub-directory is tibbs.
- There is a readme file in the sub-directory that gives a filelist and explains the format of the files, how to extract the files from their compressed format and where to get a decompressor.

- On a machine that has TCP/IP (full site, not the DIS lan., i.e. Sun, Appollo, IBM, etc ... RISC Machines or PC's with FTP S/W, or IBM TCP/IP or ...), type 'ftp.ti.com' (or FTP 192.94.94.5 if DNS not enabled) followed by <enter>.
- When prompted for Username, reply with 'anonymous', followed by <enter>.
- When prompted for Password, reply with your EMAIL ADDRESS, followed by <enter>.
- If you are connected to 'ftp.ti.com', type 'cd /mirrors/tms320bbs', followed by <enter>, and you are there.

- On 'evans.ee.adfa.oz.au', type 'cd /mirrors/tibbs', followed by <enter>.
- All files are image files (binary).
- A readme file is in this directory that explains again how the files are stored, how to extract them and contains a file list.