

1 INTRODUCTION

The C/C++ compiler is part of Analog Devices development software for TigerSHARC™ DSPs. The software aids your DSP project development efforts by:

- Processing C and C++ source files, producing machine level versions of the source code and object files
- Providing relocatable code and debugging information within the object files
- Providing relocatable data and program memory segments for placement by the linker in the processors memory

Using C/C++, you can significantly decrease time-to-market since it gives you the ability to efficiently work with complex signal processing data types. It also allows you to take advantage of specialized DSP operations without having to understand the underlying DSP architecture.

If you develop using the VisualDSP++ environment, you also get the following:

- An integrated development and debugging environment (IDDE) with support for editing programs, managing projects, and controlling build tools
- Context-sensitive help for the Windows-based development environment.
- Online access to all documentation for this product through PDF files.

Supported Processors

The name TigerSHARC™ refers to a family of Analog Devices processors that currently includes two DSPs: ADSP-TS001 and ADSP-TS101.

For Additional Information about Analog Products

Analog Devices is online on the internet at www.analog.com. Our Web pages provide information about our broad range of products: analog integrated circuits, amplifiers, converters, and digital signal processors. For information on our digital signal processors, visit our web site at www.analog.com/dsp. Our Web pages provide access to technical information and documentation, product overviews, and product announcements. You may also obtain additional information about Analog Devices and its products in any of the following ways:

- FAX questions or requests for information to 1(781) 461-3010 (North America) or 089/76 903-557 (Europe Headquarters).
- Access the DSP Division File Transfer Protocol (FTP) site at [ftp.analog.com](ftp://ftp.analog.com) or [ftp 137.71.23.21](ftp://137.71.23.21) or <ftp://ftp.analog.com>.

For Technical or Customer Support

You can reach our Customer Support group in the following ways:

- E-mail development tools questions to dsptools.support@analog.com
- E-mail processor questions to dsp.support@analog.com
- Phone questions to 1800-ANALOGD
- Visit our World Wide web site at www.analog.com/dsp
- Telex questions to 924491, TWX:710/394-6577
- Cable questions to ANALOG NORWOODMASS

- Contact your local ADI sales office or an authorized ADI distributor
- Send questions by mail to:

Analog Devices, Inc.
DSP Division
One Technology Way
P.O. Box 9106
Norwood, MA 02062-9106
USA

Purpose of This Manual

The *VisualDSP++ 2.0 C/C++ Compiler and Library Manual for TigerSHARC DSPs* provides information about the C/C++ compiler and run-time library software, including syntax for command lines, switches, and language extensions. This manual leads you through the process of using library routines and writing mixed C/C++/assembly code.

Intended Audience

The primary audience for this manual are DSP programmers who are familiar with Analog Devices DSPs. This manual assumes that the audience has a working knowledge of the TigerSHARC family DSP architecture and instruction set and the C/C++ programming languages.

DSP programmers who are unfamiliar with TigerSHARC family DSPs can use this manual, but should supplement this manual with other texts, such as the appropriate TigerSHARC DSP hardware specification and instruction set specification.

Manual Contents Description

In addition to this chapter, this manual contains two other chapters, described below. Chapters may contain a guide and reference sections. Guide sections provide software usage procedures, typical usage examples, and error message information. Reference sections provide comprehensive information on command syntax and typical usage examples. For information on compiler and runtime library software, see the following chapters:

- Chapter 2 — [“Compiler” on page 2-1](#)

Provides information on compiler options, language extensions and C/C++/assembly interfacing.

- Chapter 3 — [“Run-Time Library” on page 3-1](#)

Tells how to use library functions and provides a C library function reference.

What's New in This Manual

This edition of the *VisualDSP++ 2.0 C/C++ Compiler and Library Manual for TigerSHARC DSPs* documents C/C++ support for new processors and software development environments.

Related Documents

For additional information on development software and TigerSHARC DSPs, see the following documents:

- *VisualDSP++ 2.0 User's Guide for TigerSHARC DSPs*
- *VisualDSP++ 2.0 Assembler and Preprocessor Manual for TigerSHARC DSPs*

- *VisualDSP++ 2.0 Linker & Utilities Manual for TigerSHARC DSPs*
- *VisualDSP++ Kernel (VDK) User's Guide*

All the manuals are included on the software distribution CD-ROM. To access these documents within the VisualDSP++ environment:

1. Choose `Help Topics` from the `VisualDSP++ Help` menu.
2. Select the `Reference book` icon.
3. Select the `Online Manuals` topic.
4. Click the `Click here to view online manuals` button. A list of documents displays.
5. Select the document you want to view.

If you are not using VisualDSP++, you can manually access these PDF files from the CD-ROM using Adobe® Acrobat®.

Other related DSP publications, such as hardware and instruction set reference manuals, are available for download from
http://www.analog.com/industry/dsp/tech_doc/gen_purpose.html

Conventions

[Table 1-1](#) describes notation conventions that apply to all chapters. Additional conventions, which apply only to specific chapters, appear throughout this document.

Table 1-1. Notation Conventions

Example	Description
<code>Close Command</code> (<code>File Menu</code>)	Titles in reference sections indicate the location of an item within the VisualDSP++ environment's menu system (for example, the <code>Close</code> command appears on the <code>File</code> menu)
<code>{this that}</code>	Alternative items in syntax descriptions appear within curly brackets and are separated by vertical bars; read the example as <code>this</code> or <code>that</code> . One or the other is required.
<code>[this that]</code>	Optional items in syntax descriptions appear within brackets and are separated by vertical bars; read the example as an optional <code>this</code> or <code>that</code> .
<code>[this,...]</code>	Optional item lists in syntax descriptions appear within brackets and are delimited by commas and terminated with an ellipse; read the example as an optional comma-separated list of <code>this</code> .
<code>.SECTION</code>	Commands, directives, keywords, and feature names are in text with letter gothic font.
<i>filename</i>	Non-keyword placeholders appear in text with <i>italic</i> style format.



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General Purpose DSPs & Development Tools

Technical Documentation

Analog Devices offers several ways in which users can obtain the latest DSP and development tools technical documentation.

1) Download documentation from the ADI web site

Analog Devices offers a complete suite of documentation for its General Purpose DSPs and Development Tools. All of this documentation is available in Adobe Acrobat PDF format. To view Acrobat files you must install the [Adobe Acrobat Reader](#) and click on the name of the document you want to view or select the "Download Now" button.

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Some documentation may also be purchased with a credit card using [BuyOnline](#). If a publication is available to purchase online, a "Buy Online" button will appear next to its name. Choosing this button will place the desired item into a BuyOnline order and allow you to check pricing and availability. View [detailed information](#) on the ADI DSP documentation that is available for sale.

3) Request selected documentation

Limited quantities of selected publications are also available from our literature center. If a hard copy is available to request, the "Send Me" button will appear next to its name. Choosing this button will give you access to a form where you can select the desired publication and have it sent to you.

- [General DSP Publications](#)
- [Blackfin DSP Family & DSP Development Tools](#)
- [16-Bit ADSP-21xx DSPs & DSP Development Tools](#)
- [32-Bit SHARC DSPs & DSP Development Tools](#)
- [VisualDSP++ 2.0 Installation Guide](#) (pdf, 78,813 bytes; revision 3.1, July 2001)

General DSP Publications

Document Title	Order Number	Availability
Scientist and Engineers Guide to DSP	SE_Guide_To_DSP	Download Now!
DSP Selection Guide 2001 Edition	G02458-25-3/01 (G)	Download Now!
DSP Key Products: Recommended for New Designs		Download Now!
DSP Solutions-2001 CD-ROM	DSP-Solutions-2001	Send Me!

Blackfin DSP Family & DSP Development Tools

Analog Devices offers a complete suite of documentation for its 16-bit Blackfin DSP family of processors. This page provides access to the latest publications.

Document Title	Order Number	Availability
VisualDSP++ 2.0 for Blackfin DSPs (First Revision)	VDSP-BLKFN-MAN-FUL	
VisualDSP++ 2.0 Getting Started Guide for Blackfin DSPs		Download Now!
VisualDSP++ 2.0 User's Guide for Blackfin DSPs		Download Now!
VisualDSP++ 2.0 C/C++ Compiler and Library Manual for Blackfin DSPs		Download Now!
VisualDSP++ 2.0 Assembler and Preprocessor Manual for Blackfin DSPs		Download Now!
VisualDSP++ 2.0 Linker and Utilities Manual for Blackfin DSPs		Download Now!
VisualDSP++ Kernel (VDK) User's Guide (Second Revision)		Download Now!

Document Title	Order Number	Availability
Blackfin DSP Family Emulators		
Summit-ICE™ Emulator Hardware User's Guide		Download Now!
Apex-ICE™ USB Emulator Hardware Installation Guide		Download Now!
VisualDSP Emulation Tools Installation Guide for Windows 95/98/NT/2000		Download Now!

16-Bit ADSP-21xx DSPs & DSP Development Tools

Analog Devices offers a complete suite of documentation for its ADSP-21xx processors. This page

provides access to the latest 16-bit ADSP-21xx processors, VisualDSP and hardware development tools publications.

Document Title	Order Number	Availability
VisualDSP++ 2.0 for the ADSP-218x/219x DSP	VDSP-21XX-MAN-FULL	
VisualDSP++ 2.0 Getting Started Guide for ADSP-21xx DSPs		Download Now!
VisualDSP++ 2.0 User's Guide for ADSP-21xx DSPs		Download Now!
VisualDSP++ 2.0 C Compiler and Library Manual for ADSP-218x DSPs		Download Now!
VisualDSP++ 2.0 C/C++ Compiler and Library Manual for ADSP-219x DSPs		Download Now!
VisualDSP++ 2.0 Assembler and Preprocessor Manual for ADSP-218x DSPs		Download Now!
VisualDSP++ 2.0 Assembler and Preprocessor Manual for ADSP-219x DSPs		Download Now!
VisualDSP++ 2.0 Linker and Utilities Manual for ADSP-21xx DSPs		Download Now!
VisualDSP++ Kernel (VDK) User's Guide		Download Now!
ADSP-21xx DSP Family Publications		
ADSP-2100 Family User's Manual	82-000780-03	Send Me! Download Now!
ADSP-219x DSP Instruction Set Reference	82-000390-07	Send Me! Download Now!
ADSP-2191 DSP Hardware Reference		Download Now!
ADSP-219x/2192 DSP Hardware Reference		Download Now!
ADSP-218x DSP Instruction Set Reference		Download Now!
ADSP-218x DSP Hardware Reference		Download Now!
16-Bit DSP Development Boards & Emulators		
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ADSP-2181 EZ-KIT Lite Evaluation Manual		Download Now!

ADSP-2189M EZ-KIT Lite Evaluation System Manual		Download Now!
ADSP-218X Family EZ-ICE® Hardware Installation Guide		Download Now!
VisualDSP Emulation Tools Installation Guide for Windows 95/98/NT/2000		Download Now!
ADSP-219x DSP Family Emulators		
Mountain-ICE™ Emulator Hardware User's Guide		Download Now!
Summit-ICE™ Emulator Hardware User's Guide		Download Now!
Apex-ICE™ USB Emulator Hardware Installation Guide		Download Now!
VisualDSP Emulation Tools Installation Guide for Windows 95/98/NT/2000		Download Now!
ADSP-21xx Family DSP Product Information and Datasheets		
Note that datasheets can all be downloaded or viewed on-line.		
ADSP-2141L	ADSP-2186M	
ADSP-2181	ADSP-2187L	
ADSP-2183	ADSP-2188M	
ADSP-2184	ADSP-2188N	
ADSP-2184L	ADSP-2189M	
ADSP-2185	ADSP-2192	
ADSP-2185L	ADSP-21xx Family DSP	
ADSP-2185M	ADSP-2171/2172/2173	
ADSP-2186	ADSP-2104/2109	
ADSP-2186L	ADSP-21msp58/21msp59	

To download publications about previous versions of ADSP-21xx Family Development Tools and DSPs, please view the [legacy publications](#).

32-Bit SHARC DSPs and DSP Development Tools

Analog Devices offers a complete suite of documentation for its 32-bit SHARC processors. The table below provides access to the latest 32-bit SHARC processors and development tools publications. All publications can be downloaded or viewed directly online.

Document Title	Order Number	Availability

VisualDSP++ for the SHARC DSP Family Release 1.0 Manuals (This package contains the full set of VisualDSP++ manuals listed below)	VDSP-SHARC-MAN-FUL	Buy Online!
VisualDSP++ Getting Started Guide		Download Now!
VisualDSP++ User's Guide for the ADSP-21xxx Family DSPs		Download Now!
Assembler Manual for the ADSP-21xxx Family DSPs		Download Now!
C/C++ Compiler & Library Manual for the ADSP-21xxx Family DSPs		Download Now!
Linker & Utilities for the ADSP-21xxx Family DSPs		Download Now!
Product Bulletin for VisualDSP++ and the ADSP-21xxx Family DSPs		Download Now!
SHARC Family DSP Publications		
ADSP-2106x SHARC User's Manual	E2003a-16-5/97	Send Me! Download Now!
ADSP-21065L SHARC User's Manual & Technical Reference	82-001833-01	Send Me! Download Now!
ADSP-21160 SHARC DSP Hardware Reference	82-001966-01	Send Me! Download Now!
ADSP-21160 SHARC DSP Instruction Set Reference	82-001967-01	Send Me! Download Now!
SHARC DSP Development Boards & Emulators		
Apex-ICE™ USB Emulator Hardware Installation Guide		Download Now!
Trek-ICE™ Universal Emulator Hardware and Software Installation Guide		Download Now!
VisualDSP Emulation Tools Installation Guide for Windows 95/98/NT/2000		Download Now!
ADSP-21160M EZ-KIT Lite Users Guide		Download Now!
ADSP-21160 EZ-KIT Lite Errata		Download Now!

ADSP-21160 EZ-KIT Lite Errata 1.01		Download Now!
ADSP-21065L EZ-KIT Lite Manual		Download Now!
ADSP-21061 EZ-KIT Lite Manual		Download Now!
Mountain-ICE™ Emulator Hardware User's Guide		Download Now!
Summit-ICE™ Emulator Hardware User's Guide		Download Now!

ADSP-21xxx Family DSP Product Information and Datasheets

Note that datasheets can all be downloaded or viewed on-line.

[ADSP-21060/60L](#)

[ADSP-21060C/LC](#)

[ADSP-21061/61L](#)

[ADSP-21062/62L](#)

[ADSP-21065L](#)

[ADSP-21160](#)

[ADSP-21161N](#)

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