

1 INTRODUCTION

Thank you for purchasing VisualDSP++™ Analog Devices development software for Analog Devices Digital Signal Processors (DSPs). This software provides you with the following:

- An assembler for processing source files in ASCII format, producing object files, machine-level versions of the source code
- Object files in ELF/DWARF-2 binary formats for providing relocatable code and debugging information
- Relocatable data memory and program memory sections for placing by a linker in a processor's memory
- A preprocessor for including header files, defining macros, and conditional assembly
- Online access to all manuals for this product via PDF files

This book contains information on the assembler program for the ADSP-219x DSPs, the new family of Analog Devices 16-bit, fixed-point digital signal processors for computing, communications, and consumer applications. The ADSP-219x family includes the ADSP-2191 and ADSP-2192-12 DSPs.

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 website 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 Digital Signal Processor Division File Transfer Protocol (FTP) site at [ftp 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 DSP Tools Customer Support in the following ways:

- E-mail questions to dsptools.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:

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One Technology Way
P.O. Box 9106
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USA

Purpose of this Manual

The *VisualDSP++ 2.0 Assembler and Preprocessor Manual for ADSP-219x DSPs* provides information on the assembler and preprocessor development software, including new and legacy syntax for command lines, switches, directives, and comments. This manual provides information to help you to write assembly programs for the ADSP-219x DSPs and provides reference information on related development software.

Intended Audience

Programmers who are familiar with Analog Devices DSPs are the primary audience for this manual. This manual assumes that the audience has a working knowledge of Analog Devices' DSP architecture and DSP instruction set.

DSP programmers who are unfamiliar with Analog Devices DSPs can use this manual, but should supplement this manual with other texts (such as a chip user's manual) describing the Analog Devices DSP architecture and DSP instruction set.

Manual Contents Description

This manual contains the following chapters. Chapter 2 and Chapter 4 contain guide and reference sections. Guide sections provide software overview and usage procedures. Reference sections provide comprehensive information on command syntax and typical usage examples. For information about the assembler and preprocessor software, see the following chapters:

Chapter 2 — “[Assembler](#)”

The guide section provides an overview of the process of writing and building your assembly programs. The reference section provides information on the assembler’s switches, expressions, keywords, and directives.

Chapter 3 — “[Assembler Enhancements and Legacy Support](#)”

The appendix describes differences between assembler development software Releases 6.n and 7.0, including information on command line options, directives, file formats, and conventions of syntax that have been introduced, modified, replaced, or removed.

Chapter 4 — “[Preprocessor](#)”

The guide section contains procedures for using preprocessor commands within your source files. The reference section contains information on the preprocessor’s command syntax and typical usage examples.

Appendix A — “[Utilities](#)”

The appendix contains information about the comment converter program.

What's New in this Manual

This edition of the *VisualDSP++ 2.0 Assembler and Preprocessor Manual for ADSP-219x DSPs* documents support for the new ADSP-219x family of processors.

In addition to documenting all existing assembler and preprocessor features, this manual highlights new directives, switches, and commands, including syntax and code examples. The manual also covers new binary object file formats and debugging capabilities of the assembler. In cases when new syntax has replaced the old one, this manual adds a note on the preferred usage and explains the change. For more information on the legacy support issues, see [“Assembler Enhancements and Legacy Support” on page 3-1](#).

Related Documents

For information about Analog Devices DSPs and development software, see the following publications:

- *ADSP-219x/2191 DSP Hardware Reference*
- *ADSP-219x/2192 DSP Hardware Reference*
- *ADSP-219x DSP Instruction Set Reference*
- *VisualDSP++ 2.0 Getting Started Guide for ADSP-21xx DSPs*
- *VisualDSP++ 2.0 User's Guide for ADSP-21xx DSPs*
- *VisualDSP++ 2.0 C/C++ Compiler and Library Manual for ADSP-219x DSPs*
- *VisualDSP++ 2.0 Assembler and Preprocessor Manual for ADSP-219x DSPs*
- *VisualDSP++ 2.0 Linker and Utilities Manual for ADSP-21xx DSPs*
- *VisualDSP++ Kernel (VDK) User's Guide*
- The *ADSP-2191* and *ADSP-2192* preliminary data sheet

All of the manuals are included on the software distribution CD-ROM. To access these documents within the VisualDSP++ environment, use the **Help Topics** command on the VisualDSP++'s **Help** menu and select the **Reference book** icon, the **Online Manuals** topic. From this **Help** topic, you can open any of the manuals, which are in Adobe Acrobat PDF format. If you are not using VisualDSP++, you can manually access these PDF files from the CD-ROM using Adobe Acrobat.

Conventions

The following are conventions that apply to all chapters. Note that additional conventions, which apply only to specific chapters, may 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 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 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 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 <code>letter gothic</code> font.
<i>filename</i>	Non-keyword placeholders appear in text with <i>italic</i> style format.
	A note, providing information of special interest or identifying a related DSP topic.

Table 1-1. Notation Conventions (Cont'd)

	A caution, providing information on critical design or programming issues that influence operation of the DSP.
Click Here	In the online version of this document, a cross reference acts as a hypertext link to the item being referenced. Click on blue references (Table, Figure, or section names) to jump to the location.