

Release Notice
CONVEX VECLIB V8.0
Document No. 710-010730-002

February 1993

CONVEX Computer Corporation
Richardson, Texas

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Printed in the United States of America

Release Notice

CONVEX VECLIB V8.0

1 Introduction

CONVEX VECLIB V8.0 is a collection of five libraries of highly optimized FORTRAN-callable subprograms that provides basic mathematical software and computational kernels for applications involving arrays on CONVEX C-Series supercomputers.

This document describes the V8.0 release of CONVEX VECLIB. Always refer to this release notice before reporting questions or problems with VECLIB; your questions may be answered here.

The remaining sections of this chapter describe the contents of this release:

- Section 2 describes the contents of this distribution.
- Section 3 contains information about installing CONVEX VECLIB V8.0.
- Section 4 contains notes and warnings about the use of the software.
- Section 5 describes new functionality.
- Section 6 lists enhancements to previous functionality.
- Section 7 describes bug fixes or changes in software specifications.
- Section 8 contains a list of subprograms that were obsoleted in this release.
- Section 9 notes changes in the documentation.
- Section 10 describes known software problems.
- Section 11 lists known documentation errors.

2 Distribution Package

The distribution package for this update of CONVEX VECLIB consists of this document, distribution media for the software, installation instructions, and documentation. The specific contents of the software and documentation distribution are described in Tables 1, 2, and 3.

Table 1: Software

Part Number	Description	Format
710-006615-002	CONVEX VECLIB V8.0 Installation Tape	GIP

Table 2: Documentation: Release Package

Order Number	Part Number	Description
—	710-010830-002	<i>CONVEX VECLIB V8.0 Installation Procedure</i>
DSW-132	710-011030-002	<i>CONVEX VECLIB User's Guide, Seventh Ed.</i>
DSW-360	710-013630-002	<i>CONVEX SCILIB User's Guide, Second Ed.</i>
DSW-036	720-005630-000	<i>CONVEX LAPACK User's Guide, First Ed.</i>
DSW-134	710-010930-002	<i>CONVEX VECLIB Quick Reference, Fourth Ed.</i>
DSW-361	710-014330-003	<i>CONVEX SCILIB Quick Reference, Second Ed.</i>
DSW-026	740-001121-200	<i>LINPACK Users' Guide</i>
DSW-027	710-018630-000	<i>EISPACK Guide Extension</i>
DSW-028	710-018730-000	<i>EISPACK Guide</i>
—	710-018830-000	<i>EISPACK Guide Extension Errata</i>
—	710-018930-000	<i>EISPACK Guide Errata</i>

Table 3: Documentation: Update Package

Order Number	Part Number	Description
—	710-010830-002	<i>CONVEX VECLIB V8.0 Installation Procedure</i>
DSW-132	710-011030-002	<i>CONVEX VECLIB User's Guide, Seventh Ed.</i>
DSW-360	710-013630-002	<i>CONVEX SCILIB User's Guide, Second Ed.</i>
DSW-036	720-005630-000	<i>CONVEX LAPACK User's Guide, First Ed.</i>
DSW-134	710-010930-002	<i>CONVEX VECLIB Quick Reference, Fourth Ed.</i>
DSW-361	710-014330-003	<i>CONVEX SCILIB Quick Reference, Second Ed.</i>

3 Software Installation

VECLIB software usually is installed by a system administrator or a CONVEX System Engineer, following the instructions in the *CONVEX VECLIB V8.0 Installation Procedure*, Document No. 710-010830-002.

The VECLIB V8.0 release includes five library files, *libveclib.a*, *libveclib8.a*, *libscilib.a*, *liblapack.a*, and *liblapack8.a*. The automatic installation procedure on the distribution tape installs these in */usr/lib*. You may access subprograms in these libraries using one of the FORTRAN compiler command line switches *-lveclib*, *-lveclib8*, *-lscilib*, *-llapack*, or *-llapack8*.

A machine-readable copy of this release notice is installed in */usr/doc/v8.0veclib.relnotes*.

The *CONVEX VECLIB Programmer's Reference*, the *CONVEX SCILIB Programmer's Reference*, and the *CONVEX LAPACK Programmer's Reference*, which are online documentation in the form of *man(1)* pages, are installed in the directory */usr/man/man3*. Man pages are available for each chapter introduction and every subprogram that is documented in the *CONVEX VECLIB User's Guide*, the *CONVEX SCILIB User's Guide*, and the *CONVEX LAPACK User's Guide*.

4 Notes and Warnings

The following restrictions apply to the use of VECLIB V8.0:

- You must be using ConvexOS V10.0 or higher.
- CONVEX ALL (Assembler, Loader, and Libraries) V2.0 or higher must be installed.
- Programs that use VECLIB V8.0 must be linked with CONVEX FORTRAN V7.0 or higher.
- If you use the CONVEX Performance Analyzer (CXpa) to profile programs that call VECLIB V8.0 subprograms, you should use CXpa V1.3 or higher.

5 Added Functionality

CONVEX VECLIB V8.0 includes functionality that was not in VECLIB V7.0. The major new functionality is the CONVEX implementation of LAPACK, a collection of FORTRAN-callable subprograms that provides mathematical software for application programs involving linear algebra, including linear equations, least squares, eigenvalue problems, and the singular value decomposition. The name "LAPACK" is an acronym for "Linear Algebra PACKAGE." The package is designed to supercede LINPACK and EISPACK. The National Science Foundation, the Defense Advanced Research Projects Agency, and the Department of Energy supported the development of the public-domain version of LAPACK, from which CONVEX LAPACK was derived. Refer to the *CONVEX LAPACK User's Guide* for more information.

New subprograms also were added to the *libveclib.a* and *libveclib8.a* library files. Table 4 lists the names and chapter numbers in the *CONVEX VECLIB User's Guide*, and purposes of the new subprograms. Refer to the *CONVEX VECLIB User's Guide* for more information about these features.

Table 4: Additional Functionality

Name	Chapter	Purpose
SGEMMS	3	Strassen General Matrix-Matrix Multiply
DGEMMS	3	Strassen General Matrix-Matrix Multiply
CGEMMS	3	Strassen General Matrix-Matrix Multiply
ZGEMMS	3	Strassen General Matrix-Matrix Multiply
DSEVPS	7	Print Sparse Eigensolver Statistics
DSKYDA	8	Deallocate Skyline Matrix Solver Working Storage
DSKYDF	8	Direct Input Skyline Matrix Solver Numeric Factorization
DSKYDS	8	Solve a Direct Input Skyline Matrix System
DSKYFA	8	Skyline Matrix Solver Numeric Factorization
DSKYFS	8	One-Call Usage Skyline Matrix Solver
DSKYFX	8	One-Call Usage Skyline Matrix Solver
DSKYII	8	Skyline Matrix Structure Input by Single Entry
DSKYIC	8	Skyline Matrix Structure Input by Column
DSKYIE	8	Skyline Matrix Structure Input by Finite Element or Clique
DSKYIF	8	End of Skyline Matrix Structure Input
DSKYIM	8	Skyline Matrix Structure Input by Matrix
DSKYIN	8	Skyline Matrix Solver Initialization
DSKYIS	8	Skyline Matrix Structure Input by Skyline Matrix
DSKYOC	8	Skyline Matrix Solver Output Control
DSKYOR	8	Skyline Matrix Solver Reordering
DSKYOU	8	Accept User-Provided Skyline Matrix Solver Reordering
DSKYPS	8	Print Skyline Matrix Solver Statistics
DSKYRS	8	Restore Skyline Matrix Solver Problem State from Savefile
DSKYSL	8	Solve Skyline Matrix System Using Factored Skyline Matrix
DSKYSR	8	Retrieve Skyline Matrix Solver Runtime Statistics
DSKYSV	8	Save Skyline Matrix Solver Problem State to a Savefile
DSKYV1	8	Skyline Matrix Value Input by Single Entry
DSKYVC	8	Skyline Matrix Value Input by Column
DSKYVE	8	Skyline Matrix Value Input by Finite Element or Clique
DSKYVM	8	Skyline Matrix Value Input by Matrix
DSKYVS	8	Skyline Matrix Value Input by Skyline Matrix
SRAN	12	Long Period Scalar Random Number Generator
DRAN	12	Long Period Scalar Random Number Generator
SRANV	12	Long Period Vector Random Number Generator
DRANV	12	Long Period Vector Random Number Generator

6 Enhanced Functionality

6.1 Optimized Subprograms

Table 5 lists the name, chapter in the *CONVEX VECLIB User's Guide*, and purpose of each subprogram in *libveclib.a* that was optimized to improve performance on C3400 and C3800 Series systems.

Table 5: Optimized Subprograms in *libveclib.a*

Name	Chapter	Purpose
ISAMAX	2	Index of the Vector Element of Maximum Magnitude
IIAMAX	2	Index of the Vector Element of Maximum Magnitude
ICAMAX	2	Index of the Vector Element of Maximum Magnitude
ISAMIN	2	Index of the Vector Element of Minimum Magnitude
IIAMIN	2	Index of the Vector Element of Minimum Magnitude
ICAMIN	2	Index of the Vector Element of Minimum Magnitude
SAMAX	2	Maximum of Magnitudes of the Elements of a Vector
IAMAX	2	Maximum of Magnitudes of the Elements of a Vector
SCAMAX	2	Maximum of Magnitudes of the Elements of a Vector
SAMIN	2	Minimum of Magnitudes of the Elements of a Vector
IAMIN	2	Minimum of Magnitudes of the Elements of a Vector
SCAMIN	2	Minimum of Magnitudes of the Elements of a Vector
SASUM	2	Sum of the Absolute Values of the Elements of a Vector
IASUM	2	Sum of the Absolute Values of the Elements of a Vector
SCASUM	2	Sum of the Absolute Values of the Elements of a Vector
SAXPYI	2	Sparse Elementary Vector Operation
SCLIP	2	Two-Sided Vector Clip
ICLIP	2	Two-Sided Vector Clip
SCLIPL	2	Left-Sided Vector Clip
ICLIPL	2	Left-Sided Vector Clip
SCLIPR	2	Right-Sided Vector Clip
ICLIPR	2	Right-Sided Vector Clip
SCOPY	2	Copy Vector
ICOPY	2	Copy Vector
SDOT	2	Dot Product of Two Vectors
SDOTI	2	Sparse Dot Product of Two Vectors
SGTHR	2	Gather a Sparse Vector
SGTHRZ	2	Gather and Zero a Sparse Vector
SROTI	2	Apply a Sparse Givens Rotation to Two Vectors
SSCAL	2	Scale a Vector
SSCTR	2	Scatter a Sparse Vector
SZERO	2	Zero a Vector
IZERO	2	Zero a Vector
SGEMM	3	General Matrix-Matrix Multiply
DGEMM	3	General Matrix-Matrix Multiply
CGEMM	3	General Matrix-Matrix Multiply
ZGEMM	3	General Matrix-Matrix Multiply
SGEMV	3	General Matrix-Vector Multiply
DGEMV	3	General Matrix-Vector Multiply
CGEMV	3	General Matrix-Vector Multiply
ZGEMV	3	General Matrix-Vector Multiply
SGER	3	General Rank-1 Update

Table 5: Optimized Subprograms in *libveclib.a* (cont.)

Name	Chapter	Purpose
DGER	3	General Rank-1 Update
CGERC	3	General Rank-1 Update
CGERU	3	General Rank-1 Update
ZGERC	3	General Rank-1 Update
ZGERU	3	General Rank-1 Update
SSPR	3	Symmetric Rank-1 Update
DSPR	3	Symmetric Rank-1 Update
CHPR	3	Hermitian Rank-1 Update
ZHPR	3	Hermitian Rank-1 Update
SSPR2	3	Symmetric Rank-2 Update
DSPR2	3	Symmetric Rank-2 Update
CHPR2	3	Hermitian Rank-2 Update
ZHPR2	3	Hermitian Rank-2 Update
SSYMM	3	Symmetric Matrix-Matrix Multiply
DSYMM	3	Symmetric Matrix-Matrix Multiply
CHEMM	3	Hermitian Matrix-Matrix Multiply
CSYMM	3	Symmetric Matrix-Matrix Multiply
ZHEMM	3	Hermitian Matrix-Matrix Multiply
ZSYMM	3	Symmetric Matrix-Matrix Multiply
SSYMV	3	Symmetric Matrix-Vector Multiply
DSYMV	3	Symmetric Matrix-Vector Multiply
CHEMV	3	Hermitian Matrix-Vector Multiply
ZHEMV	3	Hermitian Matrix-Vector Multiply
SSYR	3	Symmetric Rank-1 Update
DSYR	3	Symmetric Rank-1 Update
CHER	3	Hermitian Rank-1 Update
ZHER	3	Hermitian Rank-1 Update
SSYR2	3	Symmetric Rank-2 Update
DSYR2	3	Symmetric Rank-2 Update
CHER2	3	Hermitian Rank-2 Update
ZHER2	3	Hermitian Rank-2 Update
SSYR2K	3	Symmetric Rank-2k Update
DSYR2K	3	Symmetric Rank-2k Update
CHER2K	3	Hermitian Rank-2k Update
CSYR2K	3	Symmetric Rank-2k Update
ZHER2K	3	Hermitian Rank-2k Update
ZSYR2K	3	Symmetric Rank-2k Update
SSYRK	3	Symmetric Rank-2 Update
DSYRK	3	Symmetric Rank-2 Update
CHERK	3	Hermitian Rank-2 Update
CSYRK	3	Symmetric Rank-2 Update
ZHERK	3	Hermitian Rank-2 Update
ZSYRK	3	Symmetric Rank-2 Update
STRMM	3	Triangular Matrix-Matrix Multiply
DTRMM	3	Triangular Matrix-Matrix Multiply
CTRMM	3	Triangular Matrix-Matrix Multiply
ZTRMM	3	Triangular Matrix-Matrix Multiply
STRMV	3	Triangular Matrix-Vector Multiply
DTRMV	3	Triangular Matrix-Vector Multiply
CTRMV	3	Triangular Matrix-Vector Multiply
ZTRMV	3	Triangular Matrix-Vector Multiply
STRSM	3	Triangular Solve with Multiple Right-Hand Sides
DTRSM	3	Triangular Solve with Multiple Right-Hand Sides

Table 5: Optimized Subprograms in *libveclib.a* (cont.)

Name	Chapter	Purpose
CTRSM	3	Triangular Solve with Multiple Right-Hand Sides
ZTRSM	3	Triangular Solve with Multiple Right-Hand Sides
STRSV	3	Triangular Solve
DTRSV	3	Triangular Solve
CTRSV	3	Triangular Solve
ZTRSV	3	Triangular Solve
SGEFA	4	LU Factorization of a General Matrix
DGEFA	4	LU Factorization of a General Matrix
CGEFA	4	LU Factorization of a General Matrix
ZGEFA	4	LU Factorization of a General Matrix
C1DFFT	9	One-Dimensional Fast Fourier Transform
Z1DFFT	9	One-Dimensional Fast Fourier Transform
S1DFFT	9	One-Dimensional Fast Fourier Transform
D1DFFT	9	One-Dimensional Fast Fourier Transform
C3DFFT	9	Three-Dimensional Fast Fourier Transform
Z3DFFT	9	Three-Dimensional Fast Fourier Transform
S3DFFT	9	Three-Dimensional Fast Fourier Transform
D3DFFT	9	Three-Dimensional Fast Fourier Transform
CRCFTS	9	Simultaneous One-Dimensional Fast Fourier Transform
ZRCFTS	9	Simultaneous One-Dimensional Fast Fourier Transform
SRCFTS	9	Simultaneous One-Dimensional Fast Fourier Transform
DRCFTS	9	Simultaneous One-Dimensional Fast Fourier Transform
CFTTS	9	Simultaneous One-Dimensional Fast Fourier Transform
ZFFT	9	Simultaneous One-Dimensional Fast Fourier Transform
SFFT	9	Simultaneous One-Dimensional Fast Fourier Transform
DFFT	9	Simultaneous One-Dimensional Fast Fourier Transform
SCONV	10	Discrete Correlation and Convolution
DCONV	10	Discrete Correlation and Convolution
SFLR1C	11	First Order Linear Recurrence with Constant Coefficient
DFLR1C	11	First Order Linear Recurrence with Constant Coefficient
SFLR1M	11	First Order Linear Recurrence
DFLR1M	11	First Order Linear Recurrence
SFLR1P	11	First Order Linear Recurrence
DFLR1P	11	First Order Linear Recurrence
SFLR2C	11	First Order Linear Recurrence
DFLR2C	11	First Order Linear Recurrence
SFLR2M	11	First Order Linear Recurrence
DFLR2M	11	First Order Linear Recurrence
SFLR2P	11	First Order Linear Recurrence
DFLR2P	11	First Order Linear Recurrence
SFLRLM	11	Last Term of a First Order Linear Recurrence
DFLRLM	11	Last Term of a First Order Linear Recurrence
SFLRLP	11	Last Term of a First Order Linear Recurrence
DFLRLP	11	Last Term of a First Order Linear Recurrence
SPPROD	11	Partial Products of a Vector
DPPROD	11	Partial Products of a Vector
IPPROD	11	Partial Products of a Vector
SPSUM	11	Partial Sums of a Vector
DPSUM	11	Partial Sums of a Vector
SSLR2	11	Second Order Linear Recurrence
DSL2R	11	Second Order Linear Recurrence
SSLR3	11	Second Order Linear Recurrence

Table 5: Optimized Subprograms in *libveclib.a* (cont.)

Name	Chapter	Purpose
DSLRL3	11	Second Order Linear Recurrence
SSLRL	11	Last Term of a Second Order Linear Recurrence
DSLRL	11	Last Term of a Second Order Linear Recurrence
SSORT	12	Sort the Elements of a Vector
DSORT	12	Sort the Elements of a Vector
ISORT	12	Sort the Elements of a Vector

Table 6 lists the name, chapter in the *CONVEX VECLIB User's Guide*, and purpose of each subprogram in *libveclib8.a* that was optimized to improve performance on C3400 and C3800 Series systems.

Table 6: Optimized Subprograms in *libveclib8.a*

Name	Chapter	Purpose
SAXPYI	2	Sparse Elementary Vector Operation
SDOTI	2	Sparse Dot Product of Two Vectors
SGTHR	2	Gather a Sparse Vector
SGTHRZ	2	Gather and Zero a Sparse Vector
SROTI	2	Apply a Sparse Givens Rotation to Two Vectors
SSCTR	2	Scatter a Sparse Vector
SGEMM	3	General Matrix-Matrix Multiply
CGEMM	3	General Matrix-Matrix Multiply
SGEMV	3	General Matrix-Vector Multiply
CGEMV	3	General Matrix-Vector Multiply
SGER	3	General Rank-1 Update
CGERC	3	General Rank-1 Update
CGERU	3	General Rank-1 Update
SSPR	3	Symmetric Rank-1 Update
CHPR	3	Hermitian Rank-1 Update
SSPR2	3	Symmetric Rank-2 Update
CHPR2	3	Hermitian Rank-2 Update
SSYMM	3	Symmetric Matrix-Matrix Multiply
CHEMM	3	Hermitian Matrix-Matrix Multiply
CSYMM	3	Symmetric Matrix-Matrix Multiply
SSYMV	3	Symmetric Matrix-Vector Multiply
CHEMV	3	Hermitian Matrix-Vector Multiply
SSYR	3	Symmetric Rank-1 Update
CHER	3	Hermitian Rank-1 Update
SSYR2	3	Symmetric Rank-2 Update
CHER2	3	Hermitian Rank-2 Update
SSYR2K	3	Symmetric Rank-2k Update
CHER2K	3	Hermitian Rank-2k Update
CSYR2K	3	Symmetric Rank-2k Update
SSYRK	3	Symmetric Rank-2 Update
CHERK	3	Hermitian Rank-2 Update
CSYRK	3	Symmetric Rank-2 Update
STRMM	3	Triangular Matrix-Matrix Multiply
CTRMM	3	Triangular Matrix-Matrix Multiply
STRMV	3	Triangular Matrix-Vector Multiply
CTRMV	3	Triangular Matrix-Vector Multiply

Table 6: Optimized Subprograms in *libveclib8.a* (cont.)

Name	Chapter	Purpose
STRSM	3	Triangular Solve with Multiple Right-Hand Sides
CTRSM	3	Triangular Solve with Multiple Right-Hand Sides
STRSV	3	Triangular Solve
CTRSV	3	Triangular Solve
SGEFA	4	LU Factorization of a General Matrix
CGEFA	4	LU Factorization of a General Matrix
C1DFFT	9	One-Dimensional Fast Fourier Transform
S1DFFT	9	One-Dimensional Fast Fourier Transform
C3DFFT	9	Three-Dimensional Fast Fourier Transform
S3DFFT	9	Three-Dimensional Fast Fourier Transform
CRCFTS	9	Simultaneous One-Dimensional Fast Fourier Transform
SRCFTS	9	Simultaneous One-Dimensional Fast Fourier Transform
CFTTS	9	Simultaneous One-Dimensional Fast Fourier Transform
SFTTS	9	Simultaneous One-Dimensional Fast Fourier Transform
SCONV	10	Discrete Correlation and Convolution
SFLR1C	11	First Order Linear Recurrence with Constant Coefficient
SFLR1M	11	First Order Linear Recurrence
SFLR1P	11	First Order Linear Recurrence
SFLR2C	11	First Order Linear Recurrence
SFLR2M	11	First Order Linear Recurrence
SFLR2P	11	First Order Linear Recurrence
SFLRLM	11	Last Term of a First Order Linear Recurrence
SFLRLP	11	Last Term of a First Order Linear Recurrence
SPPROD	11	Partial Products of a Vector
SPSUM	11	Partial Sums of a Vector
SSLR2	11	Second Order Linear Recurrence
SSLR3	11	Second Order Linear Recurrence
SSLRL	11	Last Term of a Second Order Linear Recurrence

Table 7 lists the name, chapter in the *CONVEX SCILIB User's Guide*, and purpose of each subprogram in *libscilib.a* that was optimized to improve performance on C3400 and C3800 Series systems.

Table 7: Optimized Subprograms in *libscilib.a*

Name	Chapter	Purpose
SGEMM	3	General Matrix-Matrix Multiply
CGEMM	3	General Matrix-Matrix Multiply
SGEMMS	3	Strassen General Matrix-Matrix Multiply
CGEMMS	3	Strassen General Matrix-Matrix Multiply
SGEMV	3	General Matrix-Vector Multiply
CGEMV	3	General Matrix-Vector Multiply
SGER	3	General Rank-1 Update
CGERC	3	General Rank-1 Update
CGERU	3	General Rank-1 Update
SSPR	3	Symmetric Rank-1 Update
CHPR	3	Hermitian Rank-1 Update
SSPR2	3	Symmetric Rank-2 Update
CHPR2	3	Hermitian Rank-2 Update
SSYMM	3	Symmetric Matrix-Matrix Multiply

Table 7: Optimized Subprograms in *libscilib.a* (cont.)

Name	Chapter	Purpose
CHEMM	3	Hermitian Matrix-Matrix Multiply
CSYMM	3	Symmetric Matrix-Matrix Multiply
SSYMV	3	Symmetric Matrix-Vector Multiply
CHEMV	3	Hermitian Matrix-Vector Multiply
SSYR	3	Symmetric Rank-1 Update
CHER	3	Hermitian Rank-1 Update
SSYR2	3	Symmetric Rank-2 Update
CHER2	3	Hermitian Rank-2 Update
SSYR2K	3	Symmetric Rank-2k Update
CHER2K	3	Hermitian Rank-2k Update
CSYR2K	3	Symmetric Rank-2k Update
SSYRK	3	Symmetric Rank-2 Update
CHERK	3	Hermitian Rank-2 Update
CSYRK	3	Symmetric Rank-2 Update
STRMM	3	Triangular Matrix-Matrix Multiply
CTRMM	3	Triangular Matrix-Matrix Multiply
STRMV	3	Triangular Matrix-Vector Multiply
CTRMV	3	Triangular Matrix-Vector Multiply
STRSM	3	Triangular Solve with Multiple Right-Hand Sides
CTRSM	3	Triangular Solve with Multiple Right-Hand Sides
STRSV	3	Triangular Solve
CTRSV	3	Triangular Solve
SGEFA	4	LU Factorization of a General Matrix
CGEFA	4	LU Factorization of a General Matrix
CFFT2	6	One-Dimensional Fast Fourier Transform
CRFFT2	6	One-Dimensional Fast Fourier Transform
CFFTMLT	6	Simultaneous One-Dimensional Fast Fourier Transform
RFFTMLT	6	Simultaneous One-Dimensional Fast Fourier Transform
RCFFT2	6	One-Dimensional Fast Fourier Transform
FILTERG	7	Discrete Correlation and Convolution
FILTERS	7	Discrete Correlation and Convolution

6.2 C Interface

Although the CONVEX VECLIB, CONVEX SCILIB, and CONVEX LAPACK libraries were designed for use with FORTRAN programs, C programs can also use them. The V8.0 release of VECLIB includes an improved interface between the libraries and C. Two aspects of the interface were modified:

- C header files were included for almost all subprograms documented in the *CONVEX VECLIB User's Guide*, the *CONVEX SCILIB User's Guide*, and the *CONVEX LAPACK User's Guide*.
- The dependence on the FORTRAN I/O library was reduced by recoding the error handlers, XERBLA, XERVEC, and XERSCI, in C. C programmers can also now adapt the error handlers to their programs.

Refer to Appendix A in the *CONVEX VECLIB User's Guide* for more information about these new features.

7 Bug Fixes

Table 8 lists minor corrections and bug fixes that were made since the last release of CONVEX VECLIB.

Table 8: Bug Fixes

Name	Chapter	Purpose
DGEMM	3	General Matrix-Matrix Multiply
DSYMV	3	Symmetric Matrix-Vector Multiply
CSYR2K	3	Symmetric Rank-2k Update
ZSYR2K	3	Symmetric Rank-2k Update
CGEFA	4	LU Factorization of a General Matrix
ZGEFA	4	LU Factorization of a General Matrix
C1DFFT	9	One-Dimensional Fast Fourier Transform
Z1DFFT	9	One-Dimensional Fast Fourier Transform
S1DFFT	9	One-Dimensional Fast Fourier Transform
D1DFFT	9	One-Dimensional Fast Fourier Transform
SC2IBM	12	Convert CONVEX Floating-Point Numbers to IBM Format

The following errors were corrected in VECLIB V8.0:

- DGEMM gave incorrect results on a particular test case that had $k = 0$, $\alpha = 0.0$, and $\beta \neq 0.0$.
- When $\alpha = 0.0$, DSYMV used an uninitialized register in a test for $\beta = 0.0$.
- CSYR2K and ZSYR2K failed on a particular test case that had $n = 1$, $k = 0$, $\alpha = (0.0, 0.0)$, and $\beta = (0.0, 1.0)$. The error was that the subroutines were supposed to multiply the C matrix by β , but didn't.
- CGEFA and ZGEFA attempted to access data outside the declared bounds of the a array.
- Erroneous profiling instrumentation in C1DFFT, Z1DFFT, S1DFFT, and D1DFFT resulted in the Convex Performance Analyzer (CXpa) reporting erroneous execution times for other VECLIB subroutines that call them.
- SC2IBM did not return sensible values when CONVEX native mode reserved operands and IEEE mode infinity and not-a-number (NaN) operands were converted.

8 Obsoleted Software

Table 9 lists a subprogram that was removed from CONVEX VECLIB V8.0 because it was added to the standard CONVEX FORTRAN utility library, *libU77.a*.

Table 9: Obsoleted Software

Name	Chapter	Purpose
CPUTIME	12	High Resolution CPU Timer

9 Documentation Revisions

9.1 *CONVEX VECLIB User's Guide*

The following changes were made to the *CONVEX VECLIB User's Guide*:

- The "Associated Documents" section in the preface was updated.
- Chapter 1 was reorganized.
- Descriptions of the Strassen's method matrix multiply subprograms were added to Chapter 3.
- Matrix Storage sections were added to the subprogram descriptions for the Level 2 and Level 3 BLAS in Chapter 3, the LINPACK subprograms in Chapter 4, and the EISPACK subprograms in Chapter 5.
- In Chapter 6, the data type of argument `opcnts` was corrected from `INTEGER*4` to `REAL*8`.
- Chapters 8 to 11 were renumbered 9 to 12. A new Chapter 8 was inserted to describe Skyline Linear Equation subprograms.
- In Chapter 11, the argument `incx` was added to the `INTEGER*4` and `INTEGER*8` declarations for subprograms `SFLR2M`, `SFLR2P`, `DFLR2M`, and `DFLR2P`.
- Documentation for function subprogram `CPUTIME` was removed from Chapter 12 because this routine has been moved to the standard FORTRAN utility library, `libU77.a`.
- Scalar and vector long period random number generator subprogram descriptions were added to Chapter 12.
- The combined documentation for subprograms `RAN` and `RANV` in Chapter 12 were split into two subprogram descriptions to conform to the documentation for the new long period random number generators.
- Information about C header files for `VECLIB`, `VECLIB` error handling capabilities available in C programs, and more examples were added to Appendix A.
- Appendix C, "Reporting Problems," and the Reply Form were removed from the back of the manual.
- Miscellaneous small errors were corrected.

The corrections and additions to the *CONVEX VECLIB User's Guide* were also incorporated into the *CONVEX VECLIB Programmer's Reference* (online man pages).

9.2 *CONVEX SCILIB User's Guide*

The following changes were made to the *CONVEX SCILIB User's Guide*:

- The "Associated Documents" section in the preface was updated.
- Chapter 1 was reorganized.

- Matrix Storage sections were added to the subprogram descriptions for the Level 2 and Level 3 BLAS in Chapter 3, the LINPACK subprograms in Chapter 4, and the EISPACK subprograms in Chapter 5.
- Appendix A, "Reporting Problems," and the Reply Form were removed from the back of the manual.
- Miscellaneous small errors were corrected.

The corrections and additions to the *CONVEX SCILIB User's Guide* were propagated into the *CONVEX SCILIB Programmer's Reference* (online *man* pages).

9.3 CONVEX LAPACK User's Guide

The *CONVEX LAPACK User's Guide* was added to the VECLIB documentation kit, and the *CONVEX LAPACK Programmer's Reference* (online *man*(1) pages) was added to the product.

10 Known Software Problems

None.

11 Known Documentation Problems

Several errors were found in the *CONVEX SCILIB User's Guide* after it was sent to the printer. Please make the following corrections:

- In the description of the *tol* argument on page 4-6, replace "*tol* > 0" with "*tol* ≥ 0."
- In the middle of page 4-7, replace the last error condition, "*tol* ≤ 0" with "*tol* < 0."
- In the first line of the third and fourth paragraphs on page 6-5, replace "scaled" with "unscaled."
- In the second displayed equation on page 6-5, remove the factor 1/*l* so that the equation reads

$$z(n) = \sum_{m=1}^l Z(m) e^{+2\pi i(m-1)(n-1)/l}.$$