

VSI OpenVMS

VSI Fortran for OpenVMS Alpha Systems Installation Guide

Document Number: DO-DFRAIG-01A

Publication Date: May 2020

This guide describes how to install VSI Fortran for OpenVMS and the VSI Extended Math Library (VXML) on an Alpha processor running the OpenVMS operating system.

Revision Update Information: This is a new manual.

Operating System and Version: VSI OpenVMS Alpha Version 8.4-2L1

Software Version: VSI Fortran Version 8.3-3 for OpenVMS

VSI Fortran for OpenVMS Alpha Systems Installation Guide



Copyright © 2020 VMS Software, Inc. (VSI), Bolton, Massachusetts, USA

Legal Notice

Confidential computer software. Valid license from VSI required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

The information contained herein is subject to change without notice. The only warranties for VSI products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. VSI shall not be liable for technical or editorial errors or omissions contained herein.

HPE, HPE Integrity, HPE Alpha, and HPE Proliant are trademarks or registered trademarks of Hewlett Packard Enterprise.

The VSI OpenVMS documentation set is available on CD.

Preface	v
1. About VSI	v
2. Intended Audience	v
3. Structure of This Document	v
4. Related Documents	v
5. VSI Encourages Your Comments	vi
6. Conventions	vi
Chapter 1. Preparing for VSI Fortran Installation	1
1.1. What You Need to Know First	1
1.2. Reading the Release Notes	1
1.3. Required Operating System Components	2
1.4. License Registration	2
1.5. Installation Procedure Requirements	3
1.5.1. Installation Account Privileges and Disk Space	3
1.5.2. System Parameters	3
1.5.2.1. Calculating Values for GBLPAGES and GBLSECTIONS	4
1.5.2.2. Changing System Parameter Values with AUTOGEN	4
1.6. Backing Up Your System Disk	5
1.7. Recovering from Installation Errors	5
Chapter 2. Installing VSI Fortran for OpenVMS	7
2.1. How to Install VSI Fortran for OpenVMS	7
2.2. Installing VSI Extended Math Library	11
Chapter 3. After Installing VSI Fortran for OpenVMS	13
3.1. Running the Installation Verification Procedure Separately	13
3.2. Modifying the System-Wide Startup Command Procedure	13
3.3. Making the Product Usable on a VMScluster	14
3.4. Making the FORTRAN Command Available After Installation	15
3.5. Setting User Account Quotas	15
3.6. Enhancing VSI Fortran for OpenVMS Performance	16
3.7. Removing VSI Fortran	16
3.8. Performing VXML Postinstallation Startup Tasks	17
3.8.1. Setting VXML System-Wide Parameters	17
3.8.2. Select a User-Specific Default VXML Link Library	18
3.9. Troubleshooting the Installation	18
Appendix A. Files Added or Updated During Installation	19
Appendix B. Installation Messages	21

Preface



This guide explains how to install VSI Fortran on an Alpha processor system running the OpenVMS operating system. It also describes how to install the VSI Extended Math Library (VXML).

Keep this guide with your distribution kit. You will need it to install maintenance updates or to reinstall VSI Fortran for any other reason.

1. About VSI

VMS Software, Inc. (VSI) is an independent software company licensed by Hewlett Packard Enterprise to develop and support the OpenVMS operating system.

VSI seeks to continue the legendary development prowess and customer-first priorities that are so closely associated with the OpenVMS operating system and its original author, Digital Equipment Corporation.

2. Intended Audience

This guide is intended for system managers who install VSI Fortran for OpenVMS.

3. Structure of This Document

This guide contains the following chapters and appendixes:

- Chapter 1 describes procedures that you must complete before installing VSI Fortran.
- Chapter 2 describes how to install VSI Fortran.
- Chapter 3 describes post-installation considerations.
- Appendix A lists the files installed.
- Appendix B lists the installation messages.

4. Related Documents

In addition to this guide, the VSI Fortran documentation set includes the following:

- *The VSI Fortran for OpenVMS Language Reference Manual.*
- *The VSI Fortran for OpenVMS User Manual.*
- A cover letter titled *Read Before Installing or Using VSI Fortran for OpenVMS Alpha Systems*
- VSI Fortran online release notes.
- VXML online release notes and the *Compaq Extended Math Library Reference Guide.*

- VXML example programs in SYSS\$COMMON:[SYSHLP.EXAMPLES.VXML] (described in the file READ_ME.INDEX in that directory).

For the location of the cover letter and VSI Fortran release notes, see Section 1.2.

Once installed, you can use VSI Fortran online HELP, which describes the command qualifiers, explains run-time messages, and provides a quick-reference summary of language topics. To use online HELP, type HELP followed by the command name as in the following example:

```
$ HELP FORTRAN
```

5. VSI Encourages Your Comments

You may send comments or suggestions regarding this manual or any VSI document by sending electronic mail to the following Internet address: <docinfo@vmssoftware.com>. Users who have OpenVMS support contracts through VSI can contact <support@vmssoftware.com> for help with this product. Users who have OpenVMS support contracts through HPE should contact their HPE Support channel for assistance.

6. Conventions

The following typographic conventions might be used in this manual:

Ctrl/x	A sequence such as Ctrl/x indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
PF1 x	A sequence such as PF1 x indicates that you must first press and release the key labeled PF1 and then press and release another key or a pointing device button.
...	A horizontal ellipsis in examples indicates one of the following possibilities: <ul style="list-style-type: none"> • Additional optional arguments in a statement have been omitted. • The preceding item or items can be repeated one or more times. • Additional parameters, values, or other information can be entered.
. . .	A vertical ellipsis indicates the omission of items from a code example or command format; the items are omitted because they are not important to the topic being discussed.
()	In command format descriptions, parentheses indicate that you must enclose choices in parentheses if you specify more than one.
[]	In command format descriptions, brackets indicate optional choices. You can choose one or more items or no items. Do not type the brackets on the command line. However, you must include the brackets in the syntax for OpenVMS directory specifications and for a substring specification in an assignment statement.
	In command format descriptions, vertical bars separate choices within brackets or braces. Within brackets, the choices are optional; within braces, at least one choice is required. Do not type the vertical bars on the command line.

{ }	In command format descriptions, braces indicate required choices; you must choose at least one of the items listed. Do not type the braces on the command line.
bold type	Bold type represents the name of an argument, an attribute, or a reason.
<i>italic type</i>	Italic type indicates important information, complete titles of manuals, or variables. Variables include information that varies in system output (Internal error <i>number</i>), in command lines (/PRODUCER= <i>name</i>), and in command parameters in text (where <i>dd</i> represents the predefined code for the device type).
UPPERCASE TYPE	Uppercase type indicates a command, the name of a routine, the name of a file, or the abbreviation for a system privilege.
-	A hyphen at the end of a command format description, command line, or code line indicates that the command or statement continues on the following line.
numbers	All numbers in text are assumed to be decimal unless otherwise noted. Nondecimal radixes — binary, octal, or hexadecimal — are explicitly indicated.
real	This term refers to all floating-point intrinsic data types as a group.
complex	This term refers to all complex floating-point intrinsic data types as a group.
logical	This term refers to logical intrinsic data types as a group.
integer	This term refers to integer intrinsic data types as a group.
Fortran	This term refers to language information that is common to ANSI FORTRAN-77, ANSI/ISO Fortran 90, ANSI/ISO Fortran 95, and VSI Fortran for OpenVMS 90.
Fortran 90	This term refers to language information that is common to ANSI/ISO Fortran 90 and VSI Fortran for OpenVMS. For example, a new language feature introduced in the Fortran 90 standard.
Fortran 95	This term refers to language information that is common to ISO Fortran 95 and VSI Fortran for OpenVMS. For example, a new language feature introduced in the Fortran 95 standard.
VSI Fortran for OpenVMS	Unless otherwise specified, this term (formerly Compaq Fortran) refers to language information that is common to the Fortran 90 and 95 standards, and any VSI Fortran for OpenVMS extensions, running on the OpenVMS operating system. Since the Fortran 90 standard is a superset of the FORTRAN-77 standard, VSI Fortran for OpenVMS also supports the FORTRAN-77 standard. VSI Fortran for OpenVMS supports all of the deleted features of the Fortran 95 standard.

In this manual, some version numbers are given as *Vn.n*. When you install VSI Fortran, the actual version numbers appear on your screen.

Chapter 1. Preparing for VSI Fortran Installation

This chapter describes:

- Section 1.1: What You Need to Know First
- Section 1.2: Reading the Release Notes
- Section 1.3: Required Operating System Components
- Section 1.4: License Registration
- Section 1.5: Installation Procedure Requirements
- Section 1.6: Backing Up Your System Disk
- Section 1.7: Recovering from Installation Errors

1.1. What You Need to Know First

For this release of VSI Fortran, VSI provides two separate compilers (VSI Fortran and Fortran 77) under one license and one name (VSI Fortran). You can choose to install and/or use either compiler or both compilers.

By default, the `FORTTRAN` command invokes the VSI Fortran compiler, which supports the Fortran 90 and 95 standards as well as older versions of the Fortran language. If you choose to also install the older Fortran 77 compiler, programmers can request the Fortran 77 compiler by using the `/OLD_F77` qualifier on the `FORTTRAN` command line.

You can install the VSI Extended Math Library (VXML) separately from VSI Fortran, which allows you to call the VXML routines from either VSI Fortran or Fortran 77.

You can install VXML either before or after you install VSI Fortran. (See Chapter 2).

1.2. Reading the Release Notes

You can extract the VSI Fortran release notes to a file and type or print them before starting VSI Fortran installation. The VSI Fortran release notes are also installed on your system after installation.

For information about using the `CDMENU` utility and locating the appropriate media CD-ROM, see the first few steps in Section 2.1.

For information about reading the online release notes before installation, use the `PRODUCT EXTRACT RELEASE_NOTES` command described in Section 2.1 (step 6).

VSI strongly recommends that you read the release notes before installing VSI Fortran. They contain information about changes to the installation and use of VSI Fortran, such as the minimum version of the OpenVMS Alpha operating system required for this release of VSI Fortran.

After installation, the release notes are installed as text and PostScript form in:

```
SYSS$HELP:FORTRAN.RELEASE_NOTES  
SYSS$HELP:FORTRAN_RELEASE_NOTES.PS
```

Release notes for VXML are provided separately. After VXML installation, the VXML release notes are installed in:

```
SYSS$HELP:CXML_V5201_RELEASE_NOTES.TXT
```

The *VXML Reference Guide* is also provided in PostScript form in the SYSS\$HELP directory.

1.3. Required Operating System Components

VSI Fortran requires the OpenVMS Alpha operating system V8.4-2L1 or higher.

Future VSI Fortran releases may require higher versions of the operating system, as described in the release notes or the cover letter.

The OpenVMS operating system comes with a variety of support options (or components). To use VSI Fortran, your system should be running a version of the OpenVMS operating system that includes the base component and the following other components:

- Programming support
- Utilities

For a complete list of the required components, see the *VSI Fortran for OpenVMS Software Product Description* (SPD).

1.4. License Registration

Before you install and run VSI Fortran on a newly-licensed node (or cluster), you must first register a License Product Authorization Key (License PAK), using the License Management Facility (LMF). VXML does not require a License PAK.

This specific LMP product names used by VSI Fortran for OpenVMS are:

- FORTRAN or FORTRAN90: Unlimited or Personal-Use License
- FORTRAN-USER or FORTRAN90-USER: Concurrent-Use License

The VSI Fortran and Fortran 77 compilers will each accept either a FORTRAN(-USER) or FORTRAN90(-USER) PAK. It is not required that PAKs for both product names of a given license type be loaded.

The License PAK may be shipped along with the kit if you ordered the license and media together. Otherwise, it is shipped separately to a location based on your license order. If you are installing VSI Fortran as an update on a node or cluster already licensed for this software, you have already completed the License PAK registration requirements.

If you are installing prerequisite or optional software along with VSI Fortran, review the PAK status and install the PAKs for any prerequisite or optional software before you install VSI Fortran.

You must register and load your license for VSI Fortran before you start the installation in order to run the Installation Verification Procedure (IVP) and use the software.

Log in to a privileged account, such as the system manager's account, SYSTEM. You have a choice of two ways to register a license:

- Invoke the SYSSUPDATE:VMSLICENSE.COM procedure. When it prompts you for information, respond with data from your License PAK.
- At the DCL prompt, enter the LICENSE REGISTER command with the appropriate qualifiers that correspond to License PAK information.

If you plan to use VSI Fortran on more than one node in a cluster, you will need to perform a license load on the other nodes after you complete this installation. See Section 3.3.

For complete information on using LMF, see the *VSI OpenVMS License Management Utility Manual*.

1.5. Installation Procedure Requirements

After you have registered and loaded the license PAK and read the appropriate parts of this installation guide, the installation takes approximately 2 to 5 minutes, depending on your system configuration.

1.5.1. Installation Account Privileges and Disk Space

To install VSI Fortran or VXML, you must be logged in to an account that has at least the following privileges enabled:

- BYPASS
- CMKRNL
- SYSLCK
- SYSPRV

Table 1.1 lists VSI Fortran's requirements for free disk storage space.

Table 1.1. Disk Space Requirements

Kit Component	During Installation	After Installation
VSI Fortran compiler	28,000 blocks	28,000 blocks
Fortran 77 compiler	16,000 blocks	16,000 blocks
VSI Fortran compiler kit	44,000 blocks	44,000 blocks
VXML (optional)	150,000 blocks	150,000 blocks

To determine the number of free disk blocks on the current system disk, enter the following DCL command:

```
$ SHOW DEVICE SYS$SYSDEVICE
```

1.5.2. System Parameters

Installing VSI Fortran (both compilers) requires certain system parameter settings.

The minimum number of free global pagelets (512-byte subpage unit) and global sections needed is eleven (11) global sections and approximately 20,000 contiguous free global pagelets, plus a sufficient

number of contiguous free global pagelets to contain the file SYSS\$LIBRARY:DCLTABLES.EXE. (See Section 1.5.2.1).

If the optional VSI Extended Math Library is installed, an additional 18 global sections and 50,000 contiguous free global pagelets are required.

These values represent the number of free global pagelets and global sections required for the installation, not the total number you need to run your system and other software.

Note

If you do not ensure that your system has the necessary global pagelets and global section SYSGEN parameters for the installation, the DCL tables can become corrupted in some situations.

1.5.2.1. Calculating Values for GBLPAGES and GBLSECTIONS

To install and run VSI Fortran, you must have sufficient free global pagelets and global sections.

Enter the following DCL command to determine the number of global pagelets required by SYSS\$LIBRARY:DCLTABLES.EXE:

```
$ DIRECTORY/SIZE SYSS$LIBRARY:DCLTABLES.EXE
```

This command returns the size (in blocks) of SYSS\$LIBRARY:DCLTABLES.EXE. As an approximation, use this figure as the number of global pagelets for the file.

You can use the WRITE command with the F\$GETSYI lexical function to find the number of free contiguous global pagelets and free global sections. The following example shows how to get this information at your terminal (the default for SYSS\$OUTPUT):

```
$ WRITE SYSS$OUTPUT F$GETSYI ("CONTIG_GBLPAGES" )
15848
$ WRITE SYSS$OUTPUT F$GETSYI ("FREE_GBLSECTS" )
24
```

If the value of free global pagelets or global sections is less than the required value (see Section 1.5.2), you must increase the system parameter setting.

Section 1.5.2.2 describes the procedures for increasing these values using AUTOGEN.

1.5.2.2. Changing System Parameter Values with AUTOGEN

If you do not have enough free global pagelets or free global sections to install VSI Fortran, you can use the AUTOGEN command procedure to increase the GBLPAGES or GBLSECTIONS system parameters.

AUTOGEN automatically adjusts values for parameters that are associated with the values you reset manually. To change system parameters with AUTOGEN, edit the following file:

```
SYSS$SYSTEM:MODPARAMS.DAT
```

To change a parameter value listed in this file, delete the current value associated with that parameter and enter the new value.

To add a new parameter, add a line to the file that specifies the name of the parameter and its value. To modify incremental parameters such as GBLPAGES and GBLSECTIONS, use the ADD_ prefix.

After you make all your changes, exit from the editor.

When you execute the AUTOGEN procedure to recalculate your system parameters, AUTOGEN uses the information in your MODPARAMS.DAT file and also can automatically adjust some of the SYSGEN parameters based on the consumption of resources since the last reboot.

For information about using AUTOGEN and its command-line parameters, see the *VSI OpenVMS System Manager's Manual*.

1.6. Backing Up Your System Disk

VSI recommends that you do a system disk backup before installing any software. Use the backup procedures that are established at your site. For details on performing a system disk backup, see the *Using OpenVMS Backup Manual*.

1.7. Recovering from Installation Errors

Errors can occur during the installation if any of the following conditions exist:

- The operating system version is incorrect.
- The privileges or disk space for successful installation are insufficient.

For descriptions of error messages generated by these and related conditions, see the OpenVMS Alpha documentation on system messages and software installation or the online HELP/MESSAGE command. Take the appropriate action described in the message.

For information on system requirements for installing VSI Fortran, see Section 1.3.

For a list of problems that can cause an unsuccessful installation, see Section 3.9.

Chapter 2. Installing VSI Fortran for OpenVMS

This chapter describes:

- Section 2.1: How to Install VSI Fortran for OpenVMS
- Section 2.2: Installing VSI Extended Math Library

2.1. How to Install VSI Fortran for OpenVMS

The installation procedure loads VSI Fortran product distribution files on to the system disk on the system where you perform the installation.

Follow these steps to install VSI Fortran from the OpenVMS Alpha Software Products Library CD-ROM set:

1. Log in to a privileged account on the system (or cluster) where you will install VSI Fortran. This account must have the following privileges enabled:
 - `BYPASS`
 - `CMKRNL`
 - `SYSLCK`
 - `SYSPRV`

If your process has the `SETPRV` privilege, you can enable these privileges by entering the following command:

```
$ SET PROCESS/PRIVILEGE=(BYPASS,CMKRNL,SYSLCK,SYSPRV)
```

To check whether your process has these privileges enabled, enter the following command:

```
$ SHOW PROCESS/PRIVILEGES
```

2. To obtain the kit directory location of the VSI Fortran product distribution files on the appropriate OpenVMS Alpha Software Product Library CD-ROM (media CD-ROM), do one of the following:
 - Use the `CDMENU` utility provided on the media CD-ROM.
 - View the CD-ROM master index file on the media CD-ROM.
 - Contact the appropriate system manager.
3. To determine whether the appropriate media CD-ROM is already mounted on your system, enter the following command:

```
$ SHOW DEVICE DKA400
```

Note

DKA400 is the device name used in examples in this document to show where the appropriate media CD-ROM has been mounted.

4. If the media CD-ROM containing the VSI Fortran installation files is not mounted, either contact the appropriate system manager or insert the appropriate media CD-ROM (write down the volume label) into an available CD-ROM drive. Enter the appropriate MOUNT command to mount the media CD-ROM (omit the /FOREIGN qualifier), such as the following:

```
$ MOUNT DKA400 label
```

Where *label* is the volume label of that media CD-ROM.

5. To check that you have located the correct CD-ROM device and directory, use the following DIRECTORY command:

```
$ DIRECTORY *.PCSI$COMPRESSED*
Directory DKA400:[dir.subdir]
DEC-AXPVMS-FORTRAN-Vnnnn-x-1.PCSI$COMPRESSED
DEC-AXPVMS-FORTRAN-Vnnnn-x-1.PCSI$COMPRESSED_ESW
Total of 2 files.
```

6. Check that the VSI Fortran compiler product distribution files copied from the VSI Internet FTP area and decompressed are available on your local node or cluster. If it is not already mounted, mount the disk (MOUNT command) containing the VSI Fortran product distribution files. Refer to the field test cover letter for FTP copying and decompressing instructions.
7. To extract the VSI Fortran online release notes before you install VSI Fortran, enter the following command:

```
$ PRODUCT EXTRACT RELEASE_NOTES FORTRAN /SOURCE=disk:[dir] -
$_/FILE=FORTRAN.RELEASE_NOTES
```

In this command, *disk:[dir]* is the specification of the disk and directory containing the product installation files. If your process default directory is the directory on the CD-ROM that contains the VSI Fortran product distribution files, you can specify the /SOURCE directory as /SOURCE=[].

You can view or print the file FORTRAN.RELEASE_NOTES before you continue with the installation (next command). For example:

```
$ TYPE/PAGE FORTRAN.RELEASE_NOTES
```

8. If DEC Fortran 90 Version 2.0 was previously installed on this system, it must be removed before VSI Fortran is installed. To determine if DEC Fortran 90 is present, enter the following command:

```
$ PRODUCT SHOW PRODUCT FORTRAN90
```

If DEC Fortran 90 is present, something similar to the following text appears:

```
PRODUCT
-----
DEC AXPVMS FORTRAN90 Vn.n
1 item found
```

If DEC Fortran 90 is not present, the following text appears:

```
PRODUCT
-----
0 items found
```

If DEC Fortran 90 is present, remove it by entering the `PRODUCT REMOVE` command. Specify the product name `FORTRAN90`. For example:

```
$ PRODUCT REMOVE FORTRAN90
```

The following text appears:

```
The following product has been selected:
    DEC AXPVMS FORTRAN90 V2.0
```

```
%PCSI-E-CONREMUNR, optionally remove product DEC AXPVMS FORRTL V2.0
    that is no longer required by another product
```

```
Do you want to take this action? [NO]
```

```
Do you want to continue? [YES]
```

```
The following product will be removed:
    DEC AXPVMS FORTRAN90 V2.0
```

```
%PCSI-I-VOLINFO, estimated space information for volume DISK$vvvvvvvvv
-PCSI-I-VOLSPC, -nnnnn required> nnnnnnn available> nnnnnnn net
Portion done: 0%...50%...60%...70%...80%...100%
```

```
The following product has been removed:
    DEC AXPVMS FORTRAN90 V2.0
```

For more information on removing VSI Fortran, see Section 3.7.

9. To install the VSI Fortran compilers, enter the following `PRODUCT INSTALL` command:

```
$ PRODUCT INSTALL FORTRAN /SOURCE=disk:[dir]
```

Where `disk:[dir]` is the specification of the disk and directory containing the product installation files.

Note

Please do NOT choose to de-install `DEC$FORRTL` if you are asked. If you have a currently-installed Fortran and its `DEC$FORRTL`, then installing this release—which no longer has a dependency on `DEC$FORRTL`—will ask you if you would like to remove it.

The following text appears:

```
The following product has been selected:
    DEC AXPVMS FORTRAN Vn.n Layered Product
```

```
Do you want to continue? [YES]
```

```
Configuration phase starting ...
```

You will be asked to choose options, if any, for each selected product and for any products that may be installed to satisfy software dependency requirements.

DEC AXPVMS FORTRAN Vn.n: HP Fortran 77 for OpenVMS Alpha Systems
Copyright 2007 Hewlett-Packard Development Company, L.P.
This software product is sold by Hewlett-Packard Company
PAKs used: FORTRAN or FORTRAN-USER

Do you want the defaults for all options? [YES]

Copyright 2007 Hewlett-Packard Development Company, L.P.
HP, the HP logo, Alpha and Op0enVMS are trademarks of
Hewlett-Packard Development Company, L.P. in the U.S. and/or
other countries.

Confidential computer software. Valid License from HP
required for possession, use or copying. Consistent with
FAR 12.211 and 12.212, Commercial Computer Software, Computer
Software Documentation, and Technical Data for Commercial
Items are licensed to the U.S. Government under vendor's
standard commercial license.

Do you want to review the options? [NO]

Execution phase starting . . .

%PCSI-I-NOREF, product DEC AXPVMS FORRTL Vn.n-x is no longer referenced
-PCSI-I-NODEP, by another product as a software dependency requirement

-PCSI-I-REMLP, you can remove product DEC AXPVMS FORRTL Vn.n-x at this
time

Do you want to take this action? [NO]

Do you want to continue? [YES]

The following product will be installed to destination:

DEC AXPVMS FORTRAN Vn.n DISK\$DISKNAME:[VMS\$COMMON.]
Portion done: 0%...40%...70%...80%...90%...100%

The following product has been installed:

DEC AXPVMS FORTRAN Vn.n Layered Product

%PCSI-I-IVPEXECUTE, executing test procedure for DEC AXPVMS FORTRAN Vn.n

...

%PCSI-I-IVPSUCCESS, test procedure completed successfully

DEC AXPVMS FORTRAN Vn.n: HP Fortran 77 for OpenVMS Alpha Systems
Execute SYS\$STARTUP:FORT\$STARTUP.COM on all other VMScluster nodes
Type HELP FORTRAN Release_notes for release notes location
Install Extended Math Library (CXML) if desired
If you wish to install the Extended Math Library, which
contains advanced mathematics routines such as BLAS, FFT and
vector operations, install the CXML kit from the media CD-ROM.
See the HP Fortran 77 for OpenVMS Installation Guide for more
details.

Insert the following lines in SYS\$MANAGER:SYSTARTUP_VMS.COM:

```
@SYS$STARTUP: FORT$STARTUP
```

```
$
```

10. Installation takes about 2-5 minutes depending on your system. When installation has been completed, the DCL \$ prompt reappears.

11. To obtain a list of files installed, enter the following command:

```
$ PRODUCT SHOW OBJECT /PRODUCT=(FORTRAN, FORRTL)
```

To use other features of the PCSI utility, see the *POLYCENTER Software Installation Utility User's Guide*.

2.2. Installing VSI Extended Math Library

The VSI Extended Math Library (VXML), an optional component, is a set of scientific subroutines optimized for Alpha systems, organized into the following libraries:

- BLAS – Basic Linear Algebra Subprograms
- LAPACK – Extensive library of Linear System and Eigenproblem Solvers
- Sparse Linear System Solvers – Library of direct and iterative sparse solvers
- Signal Processing – FFTs, sine/cosine transforms, convolution, correlation and filters
- SCIPOINT – Library of routines compatible with Cray's SCILIB V7

Before you install VXML, be aware that the account and privileges requirements are the same as for VSI Fortran. Unless you are installing VXML from the same account immediately after installing VSI Fortran, review steps 1 through 6 in Section 2.1 to ensure you have the necessary privileges, can locate the VXML installation files (in the same directory as the Fortran files), and can print out the VXML release notes before installation.

To install the VSI Extended Math Library, enter the following PRODUCT INSTALL command:

```
$ PRODUCT INSTALL CXML /SOURCE=disk:[dir]
```

Where *disk:[dir]* is the specification of the disk and directory containing the product installation files.

The following text appears:

```
The following product has been selected:
  DEC AXPVMS CXML V5.2-1 Layered Product
```

```
Do you want to continue? [YES]
Configuration phase starting ...
```

Installation takes about 2 to 5 minutes (depending on your system). When installation has been completed, the DCL \$ prompt reappears.

To obtain a list of files installed, enter the following command:

```
$ PRODUCT SHOW OBJECT /PRODUCT=CXML
```


Chapter 3. After Installing VSI Fortran for OpenVMS

You can perform the following tasks after VSI Fortran is installed:

- Section 3.1: Running the Installation Verification Procedure Separately
- Section 3.2: Modifying the System-Wide Startup Command Procedure
- Section 3.3: Making the Product Usable on a VMScluster
- Section 3.4: Making the FORTRAN Command Available After Installation
- Section 3.5: Setting User Account Quotas
- Section 3.6: Enhancing VSI Fortran for OpenVMS Performance
- Section 3.7: Removing VSI Fortran
- Section 3.8: Performing VXML Postinstallation Startup Tasks
- Section 3.9: Troubleshooting the Installation

3.1. Running the Installation Verification Procedure Separately

The VSI Fortran Installation Verification Procedure (IVP) runs automatically during VSI Fortran installation. Similarly, the VSI Extended Math Library (VXML) IVP runs during VXML installation.

If system problems occur, you should run the VSI Fortran IVP separately to ensure the integrity of the installed files. To run the IVP, enter the following command:

```
$ @SYS$TEST:FORT$IVP.COM
```

If any problems are encountered, a message such as the following appears:

```
HP Fortran 77 Version n.n TEST FAILED
```

Similarly, you can run the VXML IVP after installation, or at other times, to ensure the integrity of installed files if system problems have occurred. You need system privileges to run the VXML IVP. To run the VXML IVP, execute the following command procedure:

```
$ @SYS$TEST:VXML_IVP.COM
```

If the IVP runs successfully, you will see the following display:

```
CXML-I-IVP> Completed CXML Vnnnn Installation Verification Procedure
```

3.2. Modifying the System-Wide Startup Command Procedure

Add the following lines to the system-wide startup file (if you have not done so previously), such as the file SYSS\$MANAGER:SYSTARTUP_VMS.COM or a command procedure that it invokes:

```
$ @SYS$STARTUP:FORT$STARTUP
$ @SYS$STARTUP:CXML,$STARTUP
```

These command procedures install VSI Fortran and VXML images in memory and perform related actions.

The Fortran startup procedure line does not take any parameters (arguments).

The VXML startup procedure line lets you specify certain parameters to:

- Control the default VXML link library
- Specify names of VXML shareable images to be installed as shared images
- Specify names of VXML shareable images to be installed as resident images

Among other things, inserting this line in the startup procedure makes the correct VXML library available automatically, eliminating the need for the user to explicitly specify the VXML link library on the LINK command line.

In addition, individual users can select a user-specific default VXML link library, by executing the SYSS\$LIBRARY:VXML\$SET_LIB command procedure.

For more information on the VXML startup procedure arguments and specifying a user-specific default VXML link library, see Section 3.8.

3.3. Making the Product Usable on a VMScLuster

If you want to run VSI Fortran on multiple nodes of a VMScLuster, first check to see that you have the appropriate software license (see Section 1.4). Then perform the following steps after you install VSI Fortran:

1. Issue the LICENSE LOAD command, as described in the *VSI OpenVMS License Management Utility Manual*, to activate the license on each node in the VMScLuster on which VSI Fortran is to be executed.
2. The commands in this step should be executed on all cluster nodes, whether or not they are licensed to use VSI Fortran; failure to do so may cause unexpected errors for users.

Note

If you are using a dual-architecture (VAX and Alpha systems) heterogeneous cluster, before executing these commands, make sure the appropriate logical names have been set to define the scope of the SYSMAN DO commands. For more information, see the *VSI OpenVMS System Manager's Manual*

3. While logged in as SYSTEM, or as another username that has the CMKRNL and SYSPRV privileges enabled, use the OpenVMS SYSMAN utility to make the new versions of shareable images available, as follows:

```
$ RUN SYS$SYSTEM:SYSMAN
SYSMAN> SET ENVIRONMENT/CLUSTER
```

```

%SYSMAN-I-ENV, current command environment:
  Clusterwide on local cluster
  Username SYSTEM      will be used on nonlocal nodes
SYSMAN> DO INSTALL REPLACE SYS$LIBRARY:DCLTABLES.EXE
%SYSMAN-I-OUTPUT, command execution on node NODE1
%SYSMAN-I-OUTPUT, command execution on node NODE2
SYSMAN> DO INSTALL REPLACE SYS$LIBRARY:DEC$FORRTL.EXE
%SYSMAN-I-OUTPUT, command execution on node NODE1
%SYSMAN-I-OUTPUT, command execution on node NODE2
SYSMAN> DO INSTALL REPLACE SYS$LIBRARY:DPML$SHR.EXE
%SYSMAN-I-OUTPUT, command execution on node NODE1
%SYSMAN-I-OUTPUT, command execution on node NODE2

```

If any of the INSTALL commands fail, reboot the affected node.

The SYSMAN utility will cause each DO command to be executed on all nodes of the local cluster.

4. The SYS\$STARTUP:FORT\$STARTUP.COM file installs the compilers as a known image. This command procedure file should be executed on all cluster nodes using the following DO command:

```

SYSMAN> DO @SYS$STARTUP:FORT$STARTUP
%SYSMAN-I-OUTPUT, command execution on node NODE1
%SYSMAN-I-OUTPUT, command execution on node NODE2

```

5. Finally, exit from SYSMAN.

```

SYSMAN> EXIT
$

```

3.4. Making the FORTRAN Command Available After Installation

VSI Fortran is now installed and can be invoked by all users with the FORTRAN command.

The installation procedure modifies the DCL command table so that the FORTRAN commands are recognized and processed. However, the previous command table is still in effect for those users who are currently logged in.

All logged-in users who want to use the FORTRAN command must log out and log in again, or use the following DCL command:

```
$ SET COMMAND /TABLES=SYS$LIBRARY:DCLTABLES
```

3.5. Setting User Account Quotas

No special privileges are needed to use VSI Fortran. There is no benefit from installing the compilers with privileges.

To use VSI Fortran, a user account does not need to meet any special quota requirements. However, for users who will be compiling very large programs (many program units compiled together) or running very large performance-critical programs, consider the adjusting working set (WSDEF, WSQUOTA, WSEXTENT) and page file (PGFLQUOTA) account quotas to improve performance.

Use the OpenVMS Authorize Utility from a suitably privileged account to change the process quotas in the user authorization file (UAF). Some sites may restrict the use of the Authorize Utility to certain accounts or people.

After the quotas for the account have been changed, the user should log out of the account and log in again for the new quotas to take effect.

For information on using the Authorize Utility, see the *VSI OpenVMS Manager's Manual*.

3.6. Enhancing VSI Fortran for OpenVMS Performance

This section includes information on system tuning and explains how to install VSI Fortran as a shared image.

After you install VSI Fortran, you might want to adjust your system to enhance performance or lower the use of some system resources.

If users will be compiling very large programs (many program units compiled together) or running very large performance-critical programs, consider the following:

- Check that adequate page file space exists. Large programs need more virtual memory during compilation and execution than small programs. Use the `INSTALL` command to extend an existing page file or create one or more new page files.
- The `SYSGEN` parameter virtual page count is related to the total amount of page file space. If you create more page file space, review the virtual page count parameter and increase it if necessary.
- The `SYSGEN` parameter maximum working set (`WSMAX`) might also be checked if a larger process working set is needed.

For more information on page file use and `SYSGEN` parameters, see the *VSI OpenVMS Manager's Manual*. For information about system tuning and performance investigation, see the *Guide to OpenVMS Performance Management*.

3.7. Removing VSI Fortran

To remove VSI Fortran from the system, use the following command:

```
$ PRODUCT REMOVE FORTRAN
```

You may be asked if you would like to also remove the `FORRTL` product. VSI recommends that you answer `NO` to this prompt.

After removing VSI Fortran from the system, remove the call to `SY$STARTUP:FORT$STARTUP.COM` from your system startup procedure.

To remove VSI Extended Math Library from the system, use the following command:

```
$ PRODUCT REMOVE CXML
```

After removing VSI Extended Math Library from the system, remove the call to `SY$STARTUP:VXML$STARTUP.COM` from your system startup procedure.

3.8. Performing VXML Postinstallation Startup Tasks

As part of the post-installation process described in Section 3.2, you need to add the following line to your system's startup procedure:

```
@SYS$STARTUP: CXML,$STARTUP
```

Among other things, inserting this line in the startup procedure will make the correct VXML library available automatically, eliminating the need for the user to explicitly specify the VXML link library on the LINK command line.

In addition, individual users can select a user-specific default VXML link library, by executing the `SYS$LIBRARY:VXML$SET_LIB` command procedure, as described in Section 3.8.2.

This command procedure has three system-wide default parameters, which you can optionally change (as described below). The default parameters control the following things:

- The first parameter sets the default VXML link library. Its default value is "IEEE".
- The second parameter is a list of the names of VXML shareable images to be installed as shared images. Its default value is " " (none).
- The third parameter is a list of the names of VXML shareable images to be installed as resident images. Its default value is " " (none).

If the default parameter values described above are acceptable, you can skip the rest of this step.

If you want to change any of these parameters, use the following instructions.

3.8.1. Setting VXML System-Wide Parameters

The first parameter controls the default VXML link library. If it has the value "IEEE", the library of routines using IEEE floating-point format will be designated as the default VXML link library. If its value is "VAX", the library of VAX floating-point format routines will be designated as the default VXML link library. The default value of this first parameter is "IEEE". If it does not have the value "VAX" or "IEEE", an error message will be given.

The second parameter is a list of the names of VXML shareable images to be installed as shared images. Its default value is " ".

The third parameter is a list of the names of VXML shareable images to be installed as resident images. Its default value is " ".

The list entries are not case-sensitive. If more than one name appears in a list, the names are separated by commas. The list may contain only the above names and comma(s). If a VXML shareable image name appears in both lists, it will be installed as a shared image.

For example, the following command will set the default VXML link library to be the one using IEEE floating-point format and will install the IEEE-format COMMON shareable image along with all the IEEE-format BLAS shareable images as resident images. No other VXML shareable images will be installed.

```
$ @SYS$STARTUP: CXML,$STARTUP IEEE " " -
```

```
$ _ IEEE_BLAS1 , IEEE_BLAS1E , IEEE_BLAS2 , IEEE_BLAS3 , IEEE_COMMON
```

To install VXML images, your system must have sufficient resources available. Refer to the following tables to obtain the total number of global resources required.

If you are installing images as a /SHARED resource, add all relevant entries under the columns GBLPAGES and GBLSECTIONS. Then check that your system is configured with a sufficient number of free global pages and free global sections to accommodate the images to be installed.

If you are installing images as /RESIDENT resources, add all relevant entries under the column GH_RSRVPGCNT. Check that your system has sufficient free pages in the resident image code area of the granularity hint region.

3.8.2. Select a User-Specific Default VXML Link Library

Individual users can change the VXML link library by changed by invoking SYSS\$LIBRARY:VXML\$SET_LIB from their process.

The system-wide default VXML link library is set using the system startup file SYSS\$STARTUP:VXML\$STARTUP, as described in Section 3.8.1. In addition, individual users may change their own specific default library by invoking SYSS\$LIBRARY:VXML\$SET_LIB themselves. For example, the following command alters the default VXML link library for the current user to the VAX format library:

```
$ @SYSS$LIBRARY:VXML$SET_LIB VAX
```

For information on using VXML, see the *Compaq Extended Math Library Reference Guide*.

3.9. Troubleshooting the Installation

If your installation is not successful, check for the following possible problems:

- The appropriate PAK must be available to the user performing the installation. The PAK must be registered and loaded before you can install VSI Fortran. For information about registering a PAK, see Section 1.4. Then reinstall VSI Fortran.
- The DCLTABLES.EXE file should be in the SYSS\$COMMON:[SYSLIB] directory. There should not be a copy of DCLTABLES.EXE in SYSS\$SPECIFIC:[SYSLIB].

If a copy of DCLTABLES.EXE is found in a SYSS\$SPECIFIC root, rename it to DCLTABLES.OLD, do an INSTALL REPLACE SYSS\$LIBRARY:DCLTABLES, then reinstall VSI Fortran.

- The system logical name SYSS\$SYSROOT should not be modified from the preset definition provided by the OpenVMS Alpha operating system.

Appendix A. Files Added or Updated During Installation

This appendix lists, for each of the installable kits, the files that are added to or updated on your OpenVMS system during installation. Note that some files may not be installed depending on selected options or your system's configuration or operating system version.

FORTRAN (Fortran Compiler)

```
[SYS$STARTUP]FORT$STARTUP.COM
[SYSEXEC]F90$MAIN.EXE
[SYSEXEC]FORT$FSPLIT.EXE
[SYSEXEC]FORT$MAIN.EXE
[SYSHLP]FORTRAN.RELEASE_NOTES
[SYSHLP]FORTRAN_RELEASE_NOTES.PS
[SYSLIB]FORSYSDEF.TLB
[SYSLIB]FORSYSDEF-V83R.TLB
[SYSLIB]FORT$FORTRAN-F77.CLD
[SYSLIB]FORT$FORTRAN-F95.CLD
[SYSMSG]F90$MSG.EXE
[SYSMSG]FORT$MSG.EXE
[SYSMSG]FORT$MSG2.EXE
[SYSTEST]FORT$IVP.COM
```

VXML (Extended Math Library)

```
[SYS$STARTUP]CXML_STARTUP.COM
[SYSHLP]CXML_LAPACK_C.TXT
[SYSHLP]CXML_LAPACK_D.TXT
[SYSHLP]CXML_LAPACK_S.TXT
[SYSHLP]CXML_LAPACK_Z.TXT
[SYSHLP]CXML_V5201_RELEASE_NOTES.PS
[SYSHLP]CXML_V5201_RELEASE_NOTES.TXT
[SYSHLP.EXAMPLES.CXML]CXML_ITSOL_PRINT.FOR
[SYSHLP.EXAMPLES.CXML]CXML_REBUILD_MOD_FILES.COM
[SYSHLP.EXAMPLES.CXML]EXAMPLE_DSS.C
[SYSHLP.EXAMPLES.CXML]EXAMPLE_DSS.F
[SYSHLP.EXAMPLES.CXML]EXAMPLE_DSS.F90
[SYSHLP.EXAMPLES.CXML]EXAMPLE_ITSOL_1.C
[SYSHLP.EXAMPLES.CXML]EXAMPLE_ITSOL_1.CXX
[SYSHLP.EXAMPLES.CXML]EXAMPLE_ITSOL_1.FOR
[SYSHLP.EXAMPLES.CXML]EXAMPLE_ITSOL_2.FOR
[SYSHLP.EXAMPLES.CXML]EXAMPLE_ITSOL_3.FOR
[SYSHLP.EXAMPLES.CXML]EXAMPLE_ITSOL_4.FOR
[SYSHLP.EXAMPLES.CXML]EXAMPLE_ITSOL_5.FOR
[SYSHLP.EXAMPLES.CXML]EXAMPLE_LAPACK_1.C
[SYSHLP.EXAMPLES.CXML]EXAMPLE_LAPACK_1.FOR
[SYSHLP.EXAMPLES.CXML]EXAMPLE_LAPACK_2.FOR
[SYSHLP.EXAMPLES.CXML]EXAMPLE_SFFT_1D.C
[SYSHLP.EXAMPLES.CXML]EXAMPLE_SFFT_2D.C
[SYSHLP.EXAMPLES.CXML]EXAMPLE_SIG_PROC.FOR
[SYSHLP.EXAMPLES.CXML]READ_ME.INDEX
[SYSHLP]CXML.HLP
[SYSLIB]CXML_EMACS.ML
[SYSLIB]CXML_EVE.TPU
```

```
[SYSLIB]CXXML_FGS.OLB
[SYSLIB]CXXML_SET_LIB.COM
[SYSLIB]CXXML_STS.OLB
[SYSLIB]CXXML_STS_SCIPORT.OLB
[SYSLIB]CXXMLDEF.FOR
[SYSLIB]CXXMLDEF.H
[SYSLIB]CXXML_DSS.F77
[SYSLIB]CXXML_DSS.F90
[SYSLIB]CXXML_DSS.F90$MOD
[SYSLIB]CXXML_DSS.H
[SYSLIB]CXXML_DSS.HXX
[SYSLIB]CXXML_DSS_PRIVATE.F90$MOD
[SYSLIB]CXXML_EQUIVALENCE_LAPACK.C
[SYSTEST.CXML]BLAS_BUILD_TEST.OBJ
[SYSTEST.CXML]DSS_BUILD_TEST.OBJ
[SYSTEST.CXML]IVP_LAPACK_IEEE.OBJ
[SYSTEST.CXML]IVP_LAPACK_VAX.OBJ
[SYSTEST.CXML]IVP_SIG_IEEE.OBJ
[SYSTEST.CXML]IVP_SIG_VAX.OBJ
[SYSTEST.CXML]IVP_SPARSE_B1_IEEE.OBJ
[SYSTEST.CXML]IVP_SPARSE_B1_VAX.OBJ
[SYSTEST.CXML]IVP_SPARSE_IS_IEEE.OBJ
[SYSTEST.CXML]IVP_SPARSE_IS_VAX.OBJ
[SYSTEST.CXML]IVP_VLIB_IEEE.OBJ
[SYSTEST.CXML]IVP_VLIB_VAX.OBJ
[SYSTEST.CXML]LAPACK_BUILD_TEST.OBJ
[SYSTEST.CXML]SIG_PROC_BUILD_TEST.OBJ
[SYSTEST.CXML]SORT_BUILD_TEST.OBJ
[SYSTEST.CXML]SPARSE_BUILD_TEST.OBJ
[SYSTEST.CXML]VLIB_BUILD_TEST.OBJ
[SYSTEST]CXXML_IVP.COM
[SYSUPD]CXXML_REMOVE_FILES.COM
```

Appendix B. Installation Messages

This appendix lists the more common diagnostic messages you might see during product installation. If you encounter a message not shown here, use the HELP/MESSAGE command to display information about it. If you add the /LOG qualifier to the PRODUCT INSTALL command, many additional informational messages will be displayed, which can be ignored.

FAILCONF, failed to resolve conflicting requirements for 'object-type'
'object-name'

Explanation: More than one product supplies a managed object of the same name, type, and scope. They cannot coexist because of a conflict in the objects' properties. Files, directories, and library modules are examples of managed objects.

User Action: If you are installing the FORRTL kit on OpenVMS 7.1, ignore this message and continue the installation. Otherwise, report the problem to VSI.

INSTALLERR, error executing DCL INSTALL command

Explanation: The POLYCENTER Software Installation utility installs a file as a known image by having the DCL command INSTALL execute in a subprocess. The INSTALL command failed.

User Action: Take action based on the accompanying messages. If you specify the /TRACE qualifier when you retry the operation, you can view the command sent to the subprocess.

IVPFAILURE, test procedure completed with an error status

Explanation: The installation verification test procedure for the product completed with an exit status that indicates a failure. If you were executing a PRODUCT INSTALL command, the product has been completely installed, but its test procedure failed.

User Action: Take action based on the accompanying messages. If you specify the /TRACE qualifier when you retry the operation, you can view the commands sent to the subprocess and the output generated when these commands are executed.

RETAIN, 'object' 'object-name' was not replaced because 'object'
from kit does not have higher generation number

Explanation: During installation of a software product (or a patch to a software product), the specified object (either a file or a library module) was not copied from the kit to the destination disk. The installation utility found an object with the same name already installed on the destination disk and that object's generation (sequencing) number was the same or greater than the generation number of the object from the kit. Therefore, the object with the latest generation number (the previously installed item) was left on your destination disk.

This condition typically occurs when you install multiple patches or updates to the same product. The installation utility performs conflict detection and resolution so that your system will always retain the most current files even if updates are not installed in chronological order.

User Action: None.