

# HP Fortran for OpenVMS Alpha Systems

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## Installation Guide

**October 2007**

This guide describes how to install HP Fortran and the Compaq Extended Math Library (CXML) on an Alpha processor running the OpenVMS operating system.

<b>Revision/Update Information:</b>	This manual supersedes the Version 7.6 <i>HP Fortran Installation Guide for OpenVMS Alpha Systems</i> , AA-PU3AH-TE.
<b>Operating System:</b>	OpenVMS Alpha Version 7.3-2 or higher
<b>Software Version:</b>	HP Fortran Version 8.2

**Hewlett-Packard Company**  
Palo Alto, California

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# Preface

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

Keep this guide with your distribution kit. You will need it to install maintenance updates or to reinstall HP Fortran for any other reason. This manual applies to Version 8.2 of HP Fortran and all subsequent releases until a revised installation guide is issued.

## Intended Audience

This guide is intended for system managers who install HP Fortran.

## Structure of This Document

This guide contains the following chapters and appendixes:

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

## Related Documents

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

- *The HP Fortran for OpenVMS Language Reference Manual*
- *The HP Fortran for OpenVMS User Manual*
- A cover letter titled *Read Before Installing or Using HP Fortran Version 8.2 for OpenVMS Alpha Systems*
- HP Fortran online release notes
- CXML online release notes and the *Compaq Extended Math Library Reference Guide*.
- CXML example programs in SYS\$COMMON:[SYSHLP.EXAMPLES.CXML] (described in the file READ\_ME.INDEX in that directory)

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

Once installed, you can use HP 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
```

## Reader's Comments

You can send email to:

```
fortran@hp.com
```

Be sure to tell us the name of the manual and the operating system that you are using (that is, OpenVMS on Alpha servers) in the subject line or content of your email.

## HP Fortran Web Page

The HP Fortran web page is located at:

```
http://www.hp.com/go/fortran
```

This Web site contains information about software patch kits, example programs, and additional product information.

## Conventions

The following typographic conventions might be used in this manual:

Ctrl/ <i>x</i>	A sequence such as Ctrl/ <i>x</i> indicates that you must hold down the key labeled Ctrl while you press another key or a pointing device button.
PF1 <i>x</i>	A sequence such as PF1 <i>x</i> indicates that you must first press and release the key labeled PF1 and then press and release another key or a pointing device button.
<span style="border: 1px solid black; padding: 2px;">Return</span>	In examples, a key name enclosed in a box indicates that you press a key on the keyboard. (In text, a key name is not enclosed in a box.)  In the HTML version of this document, this convention appears as brackets, rather than a box.
...	A horizontal ellipsis in examples indicates one of the following possibilities: <ul style="list-style-type: none"><li>• Additional optional arguments in a statement have been omitted.</li><li>• The preceding item or items can be repeated one or more times.</li><li>• Additional parameters, values, or other information can be entered.</li></ul>
.	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.
<b>bold type</b>	Bold type represents the introduction of a new term. It also 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 ( <i>/PRODUCER=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 radices—binary, octal, or hexadecimal—are explicitly indicated.

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





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# Preparing for HP 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 HP Fortran, HP provides two separate compilers (HP Fortran and HP Fortran 77) under one license and one name (HP Fortran). You can choose to install and/or use either compiler or both compilers.

By default, the FORTRAN command invokes the HP 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 HP Fortran 77 compiler, programmers can request the HP Fortran 77 compiler by using the /OLD\_F77 qualifier on the FORTRAN command line.

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

You can install CXML either before or after you install HP Fortran. (See Chapter 2.)

## 1.2 Reading the Release Notes

You can extract the HP Fortran release notes to a file and type or print them before starting HP Fortran installation. The HP 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).

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

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

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

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

```
SYS$HELP:CXML_V5201_RELEASE_NOTES.TXT
```

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

### 1.3 Required Operating System Components

HP Fortran Version 8.2 requires the OpenVMS Alpha operating system Version 7.3-2 or higher.

Future HP 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 HP 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 HP Fortran Software Product Description (SPD) on the media CD-ROM.

### 1.4 License Registration

Before you install and run HP Fortran Version 8.2 on a newly-licensed node (or cluster), you must first register a License Product Authorization Key (License PAK), using the License Management Facility (LMF). CXML does not require a License PAK.

The specific LMP product names used by HP Fortran are:

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

The HP Fortran and HP 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 HP 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 HP Fortran, review the PAK status and install the PAKs for any prerequisite or optional software before you install HP Fortran.

You must register and load your license for HP 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 SYS\$UPDATE: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 HP 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 *HP 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 HP Fortran or CXML, you must be logged in to an account that has at least the following privileges enabled:

- BYPASS
- CMKRNL
- SYSLCK
- SYSPRV

Table 1–1 lists HP Fortran's requirements for free disk storage space.

**Table 1–1 Disk Space Requirements**

Kit Component	During Installation	After Installation
HP Fortran compiler	28,000 blocks	28,000 blocks
HP Fortran 77 compiler	16,000 blocks	16,000 blocks
HP Fortran complete kit	44,000 blocks	44,000 blocks
CXML (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 HP 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 SYS\$LIBRARY:DCLTABLES.EXE. (See Section 1.5.2.1.)

If the optional Compaq 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.

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### Note

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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.

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### 1.5.2.1 Calculating Values for GBLPAGES and GBLSECTIONS

To install and run HP 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 SYS\$LIBRARY:DCLTABLES.EXE:

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

This command returns the size (in blocks) of SYS\$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 SYS\$OUTPUT):

```
$ WRITE SYS$OUTPUT F$GETSYI("CONTIG_GBLPAGES")
15848
$ WRITE SYS$OUTPUT F$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 HP 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:

SYS\$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 *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

## 1.6 Backing Up Your System Disk

HP 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 VMS 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 HP Fortran, see Section 1.3.

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

To report a problem to HP, see Section 3.10.



---

## Installing HP Fortran

This chapter describes:

- Section 2.1, How to Install HP Fortran
- Section 2.2, Installing Compaq Extended Math Library

### 2.1 How to Install HP Fortran

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

Follow these steps to install HP 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 HP 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 HP 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**

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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 HP 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 HP Fortran compiler product distribution files copied from the HP 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 HP Fortran product distribution files. Refer to the field test cover letter for FTP copying and decompressing instructions.
7. To extract the HP Fortran online release notes before you install HP 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 HP 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 HP 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$vvvvvvvv
-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 HP Fortran, see Section 3.7.

9. To install the HP 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**

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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 V8.2          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 V8.2: HP Fortran 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]
```

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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 V8.2                   DISK\$DISKNAME:[VMS\$COMMON.]

Portion done: 0%...40%...70%...80%...90%...100%

The following product has been installed:  
DEC AXPVMS FORTRAN V8.2                   Layered Product

%PCSI-I-IVPEXECUTE, executing test procedure for DEC AXPVMS FORTRAN V8.2 ...  
%PCSI-I-IVPSUCCESS, test procedure completed successfully

DEC AXPVMS FORTRAN V8.2: HP Fortran 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 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 Compaq Extended Math Library

The Compaq Extended Math Library (CXML), 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

You can find information about CXML in the CXML online documentation or at the CXML Web site at:

<http://www.hp.com/techservers/software/cxml.html>

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

To install the Compaq 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]
Return

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 CXML V5.2-1: Compaq Extended Math Library for OpenVMS Alpha Systems
  Copyright 2002 Compaq Information Technologies Group, L.P.
  The CXML requires no license PAKs
* This product does not have any configuration options.

Execution phase starting ...

The following product will be installed to destination:
  DEC AXPVMS CXML V5.2-1      DISK$DISKNAME:[VMS$COMMON.]

Portion done: 0%...40%...90%...100%

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

%PCSI-I-IVPEXECUTE, executing test procedure for DEC AXPVMS CXML V5.2-1 ...
%PCSI-I-IVPSUCCESS, test procedure completed successfully

DEC AXPVMS CXML V5.2-1: Compaq Extended Math Library for OpenVMS Alpha Systems
  Release notes at SYS$HELP:CXML_V5201_RELEASE_NOTES.TXT.
  Insert the following lines in SYS$MANAGER:SYSTARTUP_VMS.COM:
  @SYS$STARTUP:cxml$startup
$
```

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
```

---

## After Installing HP Fortran

You can perform the following tasks after HP 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 HP Fortran Performance
- Section 3.7, Removing HP Fortran
- Section 3.8, Performing CXML Postinstallation Startup Tasks
- Section 3.9, Troubleshooting the Installation
- Section 3.10, Getting Help and Reporting Problems

### 3.1 Running the Installation Verification Procedure Separately

The HP Fortran Installation Verification Procedure (IVP) runs automatically during HP Fortran installation. Similarly, the Compaq Extended Math Library (CXML) IVP runs during CXML installation.

If system problems occur, you should run the HP 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 Version 8.2 TEST FAILED
```

Similarly, you can run the CXML 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 CXML IVP. To run the CXML IVP, execute the following command procedure:

```
$ @SYS$TEST:CXML_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 `SYS$MANAGER:SYSTARTUP_VMS.COM` or a command procedure that it invokes:

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

These command procedures install HP Fortran and CXML images in memory and perform related actions.

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

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

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

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

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

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

## 3.3 Making the Product Usable on a VMScluster

If you want to run HP 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 HP Fortran:

1. Issue the LICENSE LOAD command, as described in the *HP OpenVMS License Management Utility Manual*, to activate the license on each node in the VMScluster on which HP 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 HP Fortran; failure to do so may cause unexpected errors for users.

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### Note

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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 *HP 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

HP 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 HP Fortran. There is no benefit from installing the compilers with privileges.

To use HP 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 *HP OpenVMS System Manager's Manual, Volume 1: Essentials*.

### 3.6 Enhancing HP Fortran Performance

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

After you install HP 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 *HP OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*. For information about system tuning and performance investigation, see the *Guide to OpenVMS Performance Management*.

### 3.7 Removing HP Fortran

To remove HP 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. HP recommends that you answer NO to this prompt.

After removing HP Fortran from the system, remove the call to SYS\$STARTUP:FORT\$STARTUP.COM from your system startup procedure.

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

```
$ PRODUCT REMOVE CXML
```

After removing Compaq Extended Math Library from the system, remove the call to SYS\$STARTUP:CXML\$STARTUP.COM from your system startup procedure.



## 3.8 Performing CXML 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 CXML library available automatically, eliminating the need for the user to explicitly specify the CXML link library on the LINK command line.

In addition, individual users can select a user-specific default CXML link library, by executing the `SYS$LIBRARY: CXML$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 CXML link library. Its default value is "IEEE".
- The second parameter is a list of the names of CXML shareable images to be installed as shared images. Its default value is " " (none).
- The third parameter is a list of the names of CXML 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 CXML System-Wide Parameters

The first parameter controls the default CXML link library. If it has the value "IEEE", the library of routines using IEEE floating-point format will be designated as the default CXML link library. If its value is "VAX", the library of VAX floating-point format routines will be designated as the default CXML 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 CXML shareable images to be installed as shared images. Its default value is "".

The third parameter is a list of the names of CXML 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 CXML shareable image name appears in both lists, it will be installed as a shared image.

For example, the following command will set the default CXML 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 CXML shareable images will be installed.

```
$ @SYS$STARTUP: CXML$STARTUP IEEE " " -  
$_ IEEE_BLAS1, IEEE_BLAS1E, IEEE_BLAS2, IEEE_BLAS3, IEEE_COMMON
```

To install CXML 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 CXML Link Library

Individual users can change the CXML link library by changed by invoking SYS\$LIBRARY:CXML\$SET\_LIB from their process.

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

```
$ @SYS$LIBRARY:CXML$SET_LIB VAX
```

For information on using CXML, see the *Compaq Extended Math Library Reference Guide* or the Web site at:

<http://www.hp.com/techservers/software/cxml>

## 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 HP Fortran. For information about registering a PAK, see Section 1.4. Then reinstall HP Fortran.
- The DCLTABLES.EXE file should be in the SYS\$COMMON:[SYSLIB] directory. There should not be a copy of DCLTABLES.EXE in SYS\$SPECIFIC:[SYSLIB].

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

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

## 3.10 Getting Help and Reporting Problems

If an error occurs while HP Fortran is in use and you believe the error is caused by a problem with HP Fortran, do one of the following:

- If you have a Software Product Services Support Agreement, contact your Customer Support Center (CSC) by telephone (in the United States, 1-800-354-9000) or by using the electronic means provided with your support

agreement. You can use DSNlink or other electronic means to report the problem to the CSC.

- If you do not have a service contract, you can arrange for per-call CSC support.

When you initially contact the CSC, indicate the following:

- The name and version number of the operating system (OpenVMS Alpha) you are using
- The name (HP Fortran) and version number of HP Fortran you are using
- The hardware system you are using (such as a model number)
- How critical the problem is
- A very brief description of the problem (one sentence if possible)

When you submit information electronically or are speaking on the phone to the appropriate support specialist, you can provide more detailed information. This includes the specific commands used to compile and link the program, the error messages displayed, and relevant detailed information (possibly including source program listings). Try to narrow the cause of the problem to a specific source module or lines of code.

CSC personnel may ask for additional information, such as listings of any command files, INCLUDE files, relevant data files, and so forth. If the program is longer than 50 lines, submit a copy of it electronically or provide machine-readable media (floppy diskette or magnetic tape).

Experience shows that problem reports sometimes do not contain enough information to duplicate or identify the problem. Concise, complete information helps HP give accurate and timely service to software problems.

To obtain information about purchasing HP support services, contact your local sales representative.

You can also send comments and questions about the HP Fortran product to the following email address: [fortran@hp.com](mailto:fortran@hp.com)



# A

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## 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
```

### CXML (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]CXML_FGS.OLB
[SYSLIB]CXML_SET_LIB.COM
[SYSLIB]CXML_STS.OLB
[SYSLIB]CXML_STS_SCIPORT.OLB
[SYSLIB]CXMLDEF.FOR
[SYSLIB]CXMLDEF.H
[SYSLIB]CXML_DSS.F77
[SYSLIB]CXML_DSS.F90
[SYSLIB]CXML_DSS.F90$MOD
[SYSLIB]CXML_DSS.H
[SYSLIB]CXML_DSS.HXX
[SYSLIB]CXML_DSS_PRIVATE.F90$MOD
[SYSLIB]CXML_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]CXML_IVP.COM
[SYSUPD]CXML_REMOVE_FILES.COM

```

---

## 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 HP.

**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.