

VSI C

Installation Guide

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Operating System and Version: VSI OpenVMS Alpha Version 8.4-2L1 or higher
VSI OpenVMS IA-64 Version 8.4-1H1 or higher
VSI OpenVMS x86-64 Version 9.2-1 or higher

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VSI C Version 7.4 for OpenVMS I64
VSI C Version 7.5 for OpenVMS x86-64

VSI C Installation Guide



VMS Software

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Preface

This guide explains how to install VSI C on an OpenVMS system.

Keep this guide with your distribution kit. You will need it to install maintenance updates or to reinstall VSI C 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.

2. Intended Audience

This guide is intended for system managers who install VSI C.

3. Document Structure

This guide contains the following chapters:

- Chapter 1 describes procedures that you must complete before installing VSI C.
- Chapter 2 describes how to install VSI C.
- Chapter 3 describes post-installation considerations.

4. Related Documentation

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

- The *VSI C Reference Manual* [<https://docs.vmssoftware.com/vsi-c-language-reference-manual/>]
- The *VSI C User Manual* [<https://docs.vmssoftware.com/vsi-c-user-s-guide-for-openvms-systems/>]
- The VSI C online release notes

For the location of the VSI C release notes, see Section 1.1.

The following manuals in the OpenVMS documentation set contain information relevant to installing software:

- *POLYCENTER Software Installation Utility User's Guide*
- *VSI OpenVMS License Management Utility Guide*
- *VSI OpenVMS System Manager's Manual, Volume 1: Essentials*
- *VSI OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*
- *OpenVMS Performance Management Manual*

Once installed, you can use VSI C online HELP, which describes the command qualifiers, explains compiler messages, and provides a quick-reference summary of language topics. To use online HELP for VSI C, enter the following:

\$ HELP CC

For help understanding OpenVMS error messages, see the *OpenVMS System Messages and Recovery Procedures Reference Manual* or the online HELP/MESSAGE facility.

5. OpenVMS Documentation

The full VSI OpenVMS documentation set can be found on the VMS Software Documentation webpage at <https://docs.vmssoftware.com>.

6. 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 VSI OpenVMS support contracts through VSI can contact <support@vmssoftware.com> for help with this product.

7. Conventions

The following product names may appear in this manual:

- HP OpenVMS Industry Standard 64 for Integrity Servers
- OpenVMS I64
- I64

All three names (the longer form and the two abbreviated forms) refer to the version of the OpenVMS operating system that runs on the Intel® Itanium® architecture.

Convention	Meaning
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.
. . .	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.

Convention	Meaning
	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.
\$ PRODUCT INSTALL	In interactive examples, prompts and displayed text appear in a monospace font. User input appears in bold monospace font.
Vn.n	In this guide, some version numbers are given as Vn.n. When you install VSI C, the actual version number appears on your screen.

Chapter 1. Preparing for VSI C Installation

This chapter contains important information about the VSI C installation requirements, license registration options, optional software that can be used with VSI C, and recommendations on what should be done before installing VSI C.

The VSI C Compiler kit provides the following files:

- VSI C installation kit files
- VSI C documentation set

Reading the release notes before proceeding with the installation is strongly recommended. VSI C provides online release notes. For information on accessing the online release notes, see Section 1.1.

1.1. Reading the Release Notes

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

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

To read the online release notes before installation, use the appropriate instructions depending on the architecture.

- For I64 and x86-64, use `$ PRODUCT EXTRACT RELEASE_NOTES`.

Refer to Section 2.4 ([Step 4](#)) for more detailed information on the command.

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

```
SYS$HELP:CC.RELEASE_NOTES  
SYS$HELP:CC_RELEASE_NOTES.PS
```

- If you are running OpenVMS on an Alpha system, refer to Section 2.2 and follow [Step 1](#) through [Step 8](#).

1.2. Optional Software

You can use the following optional OpenVMS software with VSI C:

- VSI Language-Sensitive Editor/Source Code Analyzer (LSE/SCA). Support for C requires that LSE be installed before the compiler is installed.
- VSI Test Manager (DTM)
- VSI Performance and Coverage Analyzer (PCA)
- VSI Code Management System (CMS)

- VSI Module Management System (MMS)

1.3. License Registration

During the installation, the system asks whether you have registered the VSI C license and loaded the appropriate PAK. Before you start the installation, you must register and load your license for VSI C to be able to run the Installation Verification Procedure (IVP), and for users to be able to run VSI C.

The license registration information you need is contained in the Product Authorization Key (PAK) file. If you are installing VSI C as an update on a node or cluster that is licensed for this software, you have already completed the License PAK registration requirements.

Note

On Alpha systems, the VSI C compiler license is covered by the ALPHA-LP license PAK.

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

To determine whether the VSI C license is registered on the current system, enter the `LICENSE LIST` command. If the license is not on the list, you must register it.

To register the PAK on your system, you have the following options:

- Copy the zipped license script (provided as part of the license distribution sent to you by a VMS Software manager) to your target system, unzip it there, rename its extension from `.TXT` to `.COM`, and execute it as a simple command procedure.
- Copy the script from the appropriate PDF file (provided as part of the license distribution sent to you by a VMS Software manager) directly into a `.COM` file on your target system. Execute the created command procedure.
- Run the `SY$UPDATE:VMSLICENSE.COM` command procedure and manually enter the PAK data¹ or load the PAK through the `LICENSE REGISTER` command. Refer to the *VSI OpenVMS License Management Utility Guide* for more information on how to do so.

Next, make sure the license is loaded into the license database using the `SHOW LICENSE` command.

```
$ SHOW LICENSE C
```

```
Active licenses on node NODE1:
```

Product	Product ID	Producer	Units	Rating	Activ	Version	Release	Termination
C		VSI	0 0	1	0.0	(none)	10-MAY-2024	

If the license is not found, you will need to load it using the `LICENSE LOAD` command.

```
$ LICENSE LOAD C
```

```
%LICENSE-I-LOADED, VSI C was successfully loaded with 0 units
$
```

If you plan to use VSI C 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 3.4.

¹When you register a license with `VMSLICENSE.COM`, you can choose an option to load the license automatically to avoid loading the license manually.

For complete information on using LMF, see the *VSI OpenVMS License Management Utility Guide* or the online HELP LICENSE utility.

1.4. 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 5 minutes, depending on your system configuration and the kit components chosen.

1.4.1. Installation Account Privileges and Disk Space Requirements

To install VSI C on Alpha, you must be logged in to an account that has the SETPRV privilege.

To install VSI C on I64 or x86-64, your account must have the SETPRV privilege or at least the following privileges enabled:

- BYPASS
- CMKRNL
- SYSLCK
- SYSPRV

Table 1.1 lists the VSI C requirements for free disk storage space to install the compiler and the documentation.

Note

By default, the documentation set is not installed on Alpha processor systems. If you do choose to install it, note the additional disk space required.

Table 1.1. Disk Space Requirements

Architecture	Kit	Blocks Required
Alpha	Compiler only	150,000
	Compiler and documentation	250,000
I64	Compiler and documentation	150,000
x86-64	Compiler only	175,000

These counts refer to the disk space required on the system disk. The sizes are approximate; actual sizes may vary depending on the user's system environment, configuration, and software options.

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

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

1.4.2. System Parameters

Installing VSI C requires certain system parameter settings.

The minimum number of free global pagelets (512-byte subpage unit) and global sections needed for the installation depends on whether SYS\$SYSTEM:DECC\$COMPILER.EXE was previously installed as a shared known image:

- If *not* previously installed as a shared image, 1 global section, and a sufficient number of contiguous free global pagelets to contain the file SYS\$LIBRARY:DCLTABLES.EXE.
- If previously installed as a shared image:
 - For x86-64, 5 global sections, approximately 85,500 contiguous free global pagelets, and a sufficient number of contiguous free global pagelets to contain the file SYS\$LIBRARY:DCLTABLES.EXE.
 - For I64, 11 global sections, approximately 25000 contiguous free pagelets, and a sufficient number of contiguous free global pagelets to contain the file SYS\$LIBRARY:DCLTABLES.EXE.
 - For Alpha, 5 sections, 11000 contiguous free pagelets, and a sufficient number of contiguous free global pagelets to contain the file SYS\$LIBRARY:DCLTABLES.EXE.

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.

1.4.2.1. Calculating Values for GBLPAGES and GBLSECTIONS

To determine the number of global pagelets required by SYS\$LIBRARY:DCLTABLES.EXE, enter the following DCL command:

```
$ DIR/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 1.4.2), you must increase the system parameter settings. The following section describes the procedures for increasing these values using AUTOGEN.

1.4.2.2. Changing System Parameter Values with AUTOGEN

If you do not have enough free global pages or free global sections to install VSI BASIC, 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. For example:

```
WSMAX = 8096
```

To modify incremental parameters such as GBLPAGES and GBLSECTIONS, use the ADD_ prefix. The following example increases the global page setting by 2000:

```
ADD_GBLPAGES = 2000
```

Note

When you set the page file quota, do *not* use a value that exceeds the amount of page file space available on the system.

After you make all your changes, exit from the editor, then execute the AUTOGEN procedure to recalculate your system parameters and reboot the system:

```
$ @SYS$UPDATE:AUTOGEN GETDATA REBOOT
```

When you specify REBOOT, AUTOGEN does an automatic system shutdown and then reboots the system. Any users logged on to the system are immediately disconnected during the shutdown. The automatic reboot puts the new parameter values into effect.

The AUTOGEN Utility automatically adjusts some of the SYSGEN parameters based on the consumption of resources since the last reboot. If you do not want to take advantage of this automatic adjustment, include the /NOFEEDBACK qualifier on the AUTOGEN command line.

For information about using AUTOGEN and its command-line parameters, see the *VSI OpenVMS System Manager's Manual, Volume 1: Essentials* and *VSI OpenVMS System Manager's Manual, Volume 2: Tuning, Monitoring, and Complex Systems*.

1.4.3. VMSINSTAL Installation Requirements (Alpha Only)

When you invoke VMSINSTAL, it checks the following:

- Whether you have set your default device and directory to SYS\$UPDATE
- Whether you are logged in to a privileged account
- Whether you have adequate quotas for installation (see Section 1.4.3.1)
- Whether DECnet is running
- Whether any users are logged in to the system

If VMSINSTAL detects any problems during the installation, it notifies you and asks if you want to continue the installation. In some instances, you can enter YES to continue. To stop the installation process and correct the situation, type NO or press Enter. Then, correct the problem and restart the installation.

1.4.3.1. Installation Account Quotas Requirements (Alpha only)

VMSINSTAL requires that the installation account have the following minimum quotas:

```
ASTLM = 100
BIOLM = 100
DIOLM = 100
ENQLM = 300
FILLM = 300
```

1.4.3.1.1. Modifying Process Quotas

Use the OpenVMS Authorize Utility to change the process quotas for the installation account in the user authorization file (UAF). (Some sites may restrict the use of the OpenVMS Authorize Utility to certain accounts or people.) For example, to change the BIOLM quota for the installation account, you might enter the following command sequence:

```
$ RUN SYS$SYSTEM:AUTHORIZE
UAF> MODIFY account-name /BIOLM = 100
UAF> SHOW account-name
.
.
.
UAF> EXIT
$ LOGOUT
```

After the quotas for the installation account have been changed, log out of the installation account and log in again for the new quotas to take effect. You can then proceed with the installation.

For more information on modifying account quotas, see the description of the AUTHORIZE utility in the *VSI OpenVMS System Manager's Manual, Volume 1: Essentials*.

1.5. 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.

At the beginning of the installation, VMSINSTAL asks if you have backed up your system disk. (*Alpha only*)

For details on performing a system disk backup, see the *VSI OpenVMS System Manager's Manual, Volume 1: Essentials*

Chapter 2. Installing VSI C

This chapter explains how to install VSI C on Alpha, I64, and x86-64 processor systems. It also contains the description of common errors and possible solutions.

2.1. Installing and Using Multiple Compiler Versions

VSI C provides support for installing and using multiple versions of the compiler on the same node.

2.1.1. Installing Multiple Compiler Versions

During installation of a newer version, if a previous version of the compiler is already installed, you have the opportunity to preserve that compiler rather than overwrite it. If you do choose to preserve the currently installed compiler, by default, it will be preserved as an alternate compiler and the new compiler will be installed as the system default.

The questions in the installation procedure differ slightly depending on the architecture.

For Alpha

To preserve the earlier installed compiler, answer YES to the following question :

Should the existing Vn system compiler be preserved [NO]: **YES**

- If you answer NO, the installation proceeds in the traditional manner, overwriting the currently installed system compiler.
- If you answer YES, you are then asked an additional question:

Should this Vn system compiler remain the default when cc is typed [NO]:

To get the traditional behavior of installing the kit compiler as the system default, answer NO.

Since you have chosen to preserve the existing system compiler, that compiler is made an alternate compiler before the new system compiler is installed from the kit. If you answer YES to the question above, the kit compiler is installed as an alternate compiler with a name that is based on its ident, and the existing system default compiler remains the default.

For I64 and x86-64

To preserve the earlier installed compiler, answer NO to the following question :

Do you want the defaults for all options? [YES] **NO**

Note

If you answer YES to the question above, you will not receive the second prompt (to set up your system for running alternate versions of C), and the installation proceeds in the traditional manner, overwriting the currently installed system compiler.

Answer YES to the question about making alternate compilers available:

Would you like to set up your system for running alternate versions of C?
[NO] **YES**

If you answer YES to the second prompt, the new compiler is installed as the system default compiler, and the previously installed compiler is set up as an alternate compiler with a name based on its ident.

2.1.2. Displaying and Selecting the Compiler Version

Users can choose to use an alternate compiler instead of the installed default system compiler by running a command procedure that changes the behavior of the CC command for the process that invokes it.

This kit provides two command procedures to display and control which VSI C compiler is used by a process:

- `SYS$SYSTEM:DECC$SHOW_VERSIONS.COM`

This procedure displays the VSI C compilers available on the system, along with their version numbers. It also displays which compiler is the default for the current process. The procedure takes an optional version-number argument.

To view the available compilers on your system, execute the following command:

```
$ @SYS$SYSTEM:DECC$SHOW_VERSIONS.COM [version-number]
```

- `SYS$SYSTEM:DECC$SET_VERSION.COM`

This procedure sets up process logicals that point to an alternate VSI C compiler in `SYS$SYSTEM`. The same procedure is used to remove the process logicals to revert to using the default system compiler.

The procedure takes one optional argument: a version number or the keyword `SYSTEM`. If no argument is specified, all compiler versions are displayed, as with `@SYS$SYSTEM:DECC$SHOW_VERSIONS.COM`, and you are then prompted to enter a version number or the keyword `SYSTEM`.

The `SYSTEM` argument selects the installed system compiler, which is the one displayed with the filename `DECC$COMPILER.EXE` in the output of `DECC$SHOW_VERSIONS.COM`. Alternate compilers are shown in that output with their version number appended to the simple filename. For example, the version 7.4-001 compiler is shown as `DECC$COMPILER_V07_04-001.EXE`.

To select a compiler, pass a full ident string or enough of the ident string to be unique as an argument. For example:

```
$ @sys$system:decc$set_version.com V7.4-001

$ show logical DECC$* /process

(LNM$PROCESS_TABLE)

"DECC$COMPILER" = "SYS$SYSTEM:DECC$COMPILER_V07_04-001.EXE"
"DECC$COMPILER_MSG" = "SYS$MESSAGE:DECC$COMPILER_MSG_V07_04-001.EXE"
```

When this procedure is run in a process, subsequent `CC` commands invoke the selected compiler version (until the procedure is run again).

Note

The process logicals used do not affect other processes or users on the system.

The `DECC$SET_VERSION.COM` sets up logicals `DECC$COMPILER` and `DECC$COMPILER_MSG` to point to the location of the target compiler and its message file. In addition, it issues a `SET COMMAND` to select the appropriate CDL file to select the correct set of qualifiers for the given compiler version.

Note

The `SET COMMAND` commands are not inherited by subprocesses. Make sure that all subprocesses run the necessary `DECC$SET_VERSION.COM` command procedure.

2.2. How to Install VSI C on Alpha

The VSI C installation procedure consists of a series of questions and informational messages.

To abort the installation procedure at any time, press `Ctrl/Y`. When you press `Ctrl/Y`, the installation procedure deletes all files it has created up to that point and exits. You can then start the installation again.

When the system prompts you with a question during the installation procedure, the default answer, if any, is enclosed in brackets `[]`.

The installation steps are as follows:

1. Make sure you have downloaded the latest kit file. For example, `AXPVMS-C-Xnnnn-nnn.ZIP`.¹
2. Use the UNZIP utility to extract the installation files.

The ZIP/UNZIP utility can be found on your system in the following directories:²

```
SYSS$COMMON: [SYSHLP.UNSUPPORTED.ZIP]
SYSS$COMMON: [SYSHLP.UNSUPPORTED.UNZIP]
```

To be able to use the UNZIP command, create a foreign command that will run the UNZIP utility, for example:

```
$ UNZIP == "$SYSS$COMMON:[SYSHLP.UNSUPPORTED.UNZIP]UNZIP.EXE"
```

For information on how to use this utility, execute UNZIP.

3. Log in to a privileged account on the system (or cluster) where you will install VSI C. This account must have the SETPRV privilege enabled.

You can check what privileges are enabled for your process by entering the following command:

```
$ SHOW PROCESS/PRIVILEGES
```

4. Invoke the VMSINSTAL command procedure.

You should invoke the VMSINSTAL command procedure from a privileged account, such as the SYSTEM account. The VMSINSTAL procedure resides in the SYSS\$UPDATE directory. Set your default directory to SYSS\$UPDATE. For example:

```
Username: SYSTEM
Password:
```

¹If your kit file has an extension different from `.ZIP`, proceed from [Step 3](#).

²If you cannot find the ZIP/UNZIP utility on your system, you can download it from the following webpage: <https://vmssoftware.com/products/zip-tools/>.

```
$ SET DEFAULT SYS$UPDATE
$ @SYS$UPDATE:VMSINSTAL saveset-name device-name [OPTIONS option-list]
```

saveset-name

The installation name for the component. For VSI C, use the following installation name:

```
CC07n
```

device-name

The name of the device and the directory containing the VSI C kit. For example:

```
$1$DGA700:[KITS]
```

OPTIONS option-list

The word OPTIONS followed by one or more of the following option designators: A, L, N, R.

If you specify multiple options, use commas to separate the options, for example: OPTIONS A, N.

The table below describes the meaning of the option designators.

Table 2.1. Options for the VMSINSTAL Procedure

Option	Meaning
A	Auto_answer option. Initially creates a file that contains your answers to VMSINSTAL questions and prompts. You can then use the option (and the answer file) to save time during a reinstallation (typically after upgrading your system).
L	File log option. Logs all activity to the terminal during installation.
N ¹	Display or print the release notes. Indicates that you want to see the installation question on release notes. If you do not include the OPTIONS N parameter, VMSINSTAL does not ask you about the release notes. You should review the release notes before proceeding with the installation in case they contain additional information about the installation. If you are restarting the installation and have already reviewed the release notes, you do not need to specify OPTIONS N.
R	Alternate root option. Allows you to install the product to a system root other than that of the running system.

¹Even if you omit the N option when you invoke VMSINSTAL, the VSI C release notes are copied automatically to the SYS\$HELP directory.

For detailed information on these VMSINSTAL options, refer to the *VSI OpenVMS System Manager's Manual, Volume 1: Essentials*.

The following example invokes VMSINSTAL to install VSI C and shows the system response. This example uses the OPTIONS N release note option.

```
$ @SYS$UPDATE:VMSINSTAL CC07n $1$DGA700:[KITS] OPTIONS N
```

```
OpenVMS Software Product Installation Procedure V8.4-2L1
```

Enter a question mark (?) at any time for help.

If you do not supply the product name or the device name, VMSINSTAL prompts you for this information later in the installation procedure. VMSINSTAL does not prompt you for any options, so be sure to include whatever option you want on the VMSINSTAL command line.

5. Confirm system backup.

```
* Are you satisfied with the backup of your system disk [YES]?
```

VMSINSTAL asks if you are satisfied with your system backup. You should always back up your system disk before performing an installation. If you are satisfied with the backup of your system disk, press the Return key. Otherwise, enter NO to discontinue the installation. After you back up your system disk, you can restart the installation.

6. If you fail to include the device name of the VMSINSTAL command line, the following prompt is displayed:

```
* Where will the distribution volumes be mounted:
```

If this prompt is displayed, type the name of the device and directory that contain the VSI C installation files.

7. Verify the product being installed.

The following products will be processed:

```
CC V7.n
```

```
Beginning installation of CC V7.n at 12:26
```

```
*****
%VMSINSTAL-I-VALSIGN, Performing product kit validation of signed kits ...
Success
```

```
%VMSINSTAL-I-VALPASSED, validation of $1$DGA700:[KITS]CC07n.A_VNC succeeded
Success
```

```
%VMSINSTAL-I-VALPASSED, validation of $1$DGA700:[KITS]CC07n.B_VNC succeeded
%VMSINSTAL-I-RESTORE, Restoring product save set A ...
```

The product name and version are displayed. The save set (A) is restored to a subdirectory of SYS\$UPDATE.

8. Select a release notes option.

If you specified OPTIONS N when you invoked VMSINSTAL, you are asked to choose one of the four options for reviewing the release notes:

Release notes included with this kit are always copied to SYS\$HELP.

Additional Release Notes Options:

1. Display release notes
2. Print release notes
3. Both 1 and 2
4. None of the above

```
* Select option [2]:
```

- Select option 1 to immediately display the release notes online. You can terminate the display at any time by pressing Ctrl/C.

- Select option 2 to print the release notes. You are prompted for the name of the print queue that you want to use:

```
* Queue name [SYS$PRINT]:
```

Either press Enter to send the file to the default output print device (SYS\$PRINT) or enter another queue name.

- Select option 3 to immediately display the release notes online and then be prompted for a queue name for the printed version.
- Select option 4 if you have already reviewed the release notes and are restarting the installation.

You can later use the HELP command to find the location of the release notes in the HELP facility:

```
$ HELP C RELEASE_NOTES
```

Whichever option you choose, VMSINSTAL asks the following question next:

```
* Do you want to continue the installation [NO]?: YES
%VMSINSTAL-I-REMOVED, The product's release notes have been
successfully moved to SYS$HELP.
```

To continue the installation, enter YES. Otherwise, press Return. In either case, the release notes are copied to a file in the SYS\$HELP directory:

```
SYS$HELP:CC07n.RELEASE_NOTES
```

Note

The name of the release notes file installed by VMSINSTAL consists of the current product name and version number. Do not delete release notes for previous versions of VSI C.

9. Respond to VSI C multiple-version queries.

The installation procedure detects any previous version of the VSI C compiler installed on your system, and asks if you want to keep it or supersede it with the new version you are installing. Enter YES to keep the previous version, or enter NO to supersede it with the new version:

```
A C V7.n-nnn compiler was found on your system.
Type YES to keep this compiler on your system either as
the default system compiler or as an alternate compiler.
Type NO to supersede C V7.n-nnn.
```

```
* Should the existing V7.n-nnn system compiler be preserved [NO]: YES
```

If you answer YES to the previous question, the installation procedure then asks if you want the currently installed ("old") compiler to remain the default compiler on your system:

```
Type NO to have the compiler on this kit become the default
system compiler and to have the currently installed compiler
saved as an alternate compiler.
Type YES to keep the current system compiler as the default
compiler and to have the compiler on this kit available as
an alternate compiler.
Alternate compilers can be invoked with the cc command after
```

```
invoking sys$system:decc$set_version.com passing a
version_number.
```

Should this V7.*n*-*nnn* system compiler remain the default when cc is typed
[NO]:

10. Respond to license registration query for the new compiler.

If you have not registered and loaded your PAK, you must answer NO to the following question:

```
Product:      C
Producer:     VSI
Version:      7.n
Release Date: dd-mm-yyyy
```

```
* Does this product have an authorization key registered and loaded? NO
%CC-I-NOLICENSE, DEC C V7.n Product Authorization Key (PAK) is not registered and
loaded.
%CC-I-NOLICENSE2, The IVP cannot be run without the PAK.
```

You have to register and load your PAK to run the Installation Verification Procedure (IVP). If you have not done so, you should stop the installation, register and load your PAK, and then restart the installation.

11. Choose the IVP option.

The installation procedure asks if you want to run the IVP. The IVP for VSI C checks to be sure that the installation is successful. It is recommended that you run the IVP; answer YES to the following prompt:

```
* Do you want to run the IVP after the installation [YES]?
```

After VSI C is installed, you can run the IVP independently to verify that the software is available on your system. You might need to run the IVP after a system failure to make sure that users can access VSI C.

12. Decide whether to install the documentation.

```
HTML, postscript and text versions of the VSI C Users Guide,
Language Reference Manual and RTL Reference Manual may be optionally
installed into SYS$COMMON:[SYSHLP.CC$ALPHA_HELP_07n].
These documents consume approximately 60000 blocks.
```

```
* Should these manuals be provided [NO]: YES
```

If you have adequate disk space and wish to install the C documentation, enter YES. Once the documentation is installed, you can browse the HTML version by opening the following file from your browser:

```
SYS$COMMON:[SYSHLP.CC$ALPHA_HELP_07n] INDEX.HTM
```

13. Read release-notes informational message.

```
This kit contains a file summarizing the new features, changes,
restrictions, and compatibility issues in this release of VSI C.
This file is named CC07n.RELEASE_NOTES and has been placed in
SYS$HELP:.
```

```
This file contains information valuable to VSI C programmers.
Please inform your user community of this file's existence.
```

14. Purge files.

* Do you want to purge files replaced by this installation [YES]?

The directories SYSS\$HELP, SYSS\$MESSAGE, SYSS\$SYSTEM, DECC\$LIBRARY, and SYSS\$TEST may contain previous versions of VSI C files. These files are replaced during the installation with new files, but the old files are not automatically purged. Purging is recommended.

In response to the purging prompt, press Enter to purge the files or enter NO to keep them.

15. At this point, the installation procedure displays a number of informational messages that report on the progress of the installation. There are no further questions. If the installation procedure has been successful up to this point, VMSINSTAL moves the new or modified files to their target directories, updates help files, and updates DCL tables, if necessary. If you chose to have files purged, that work is done now. The following messages are displayed:

You have answered all of the questions for this installation. The installation will now execute in 5 minutes without further intervention, depending on your configuration, and so forth.

The C Runtime Library headers and Starlet headers are installed as a Text Library (.TLB). The traditional text form of the headers (.H files) are also provided for reference purposes only) in the directories: SYSS\$COMMON:[DECC\$LIB.REFERENCE.DECC\$RTLDEF] and SYSS\$COMMON:[DECC\$LIB.REFERENCE.SYSS\$STARLET_C].

Please note that the compiler does not search the reference areas SYSS\$COMMON:[DECC\$LIB.REFERENCE.DECC\$RTLDEF] and SYSS\$COMMON:[DECC\$LIB.REFERENCE.SYSS\$STARLET_C] during compilation.

Instead headers are taken from the text library.

%VMSINSTAL-I-SYSDIR, This product creates system disk directory VMI\$ROOT:[SYSTEST.DECC].

Your OpenVMS system will now be modified to include the following new and modified files:

```
[SYSEXEC]DECC$COMPILER_V07_04-001.EXE [renamed]
[SYMSMSG]DECC$COMPILER_MSG_V07_04-001.EXE [renamed]
[SYSEXEC]DECC$COMPILER.EXE [new]
[SYMSMSG]DECC$COMPILER_MSG.EXE [new]
[SYSHLP]HELPLIB.HLB [modified]
[SYSHLP]CC$HELP*.HTML [new]
[SYSHLP]CC$ALPHA_HELP_07n [new]
[SYSHLP]CC.RELEASE_NOTES [new]
[SYSHLP]CC_RELEASE_NOTES.PS [new]
[SYSLIB]DCLTABLES.EXE [modified]
[SYSLIB]DECC$COMPILED_PRINTF.OLB [new]
[SYSLIB]DECC$RTLDEF.TLB [new]
[DECC$LIB.REFERENCE.SYSS$STARLET_C]*.H [new]
[DECC$LIB.REFERENCE.DECC$RTLDEF]*.H [new]
[SYSS$STARTUP]DECC$STARTUP.COM [modified]
[SYSTEST]DECC$IVP.COM [new]
[SYSEXEC]DECC$SET_VERSIONS.COM [new]
[SYSEXEC]DECC$SHOW_VERSIONS.COM [new]
[SYSTEST.DECC]DECC$IVP*.* [new]
```

The file SYSS\$STARTUP:DECC\$STARTUP.COM contains commands to be executed at system startup to allow for the best compilation performance. You may want to invoke this command file from your system's site-specific startup file. This command file does not have to be invoked for correct operation of VSI C.

The end of the installation is indicated by the following message:

```
%VMSINSTAL-I-MOVEFILES, files will now be moved to their target
directories...
```

16. Observe the IVP.

If you chose to run the IVP, VMSINSTAL now invokes the IVP to verify that VSI C was installed successfully.

```
Copyright 2005 Hewlett-Packard Development Company, L.P.
```

```
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.
```

```
Beginning VSI C V7.n Installation Verification Procedure
```

```
Image Check Complete
License Check Complete
Version Check Complete
Help Check Complete
Message Check Complete
Header Check Complete
Run Time Library Check Complete
```

```
VSI C V7.n Installation Verification Procedure Successful
```

17. The installation procedure ends.

```
Installation of CC V7.n completed at 12:28
```

```
Adding history entry in VMI$ROOT:[SYSUPD]VMSINSTAL.HISTORY
```

```
Creating installation data file: VMI$ROOT:[SYSUPD]CC07n.VMI_DATA
```

```
VMSINSTAL procedure done at 12:28
```

When the installation is complete, you can choose to install more products or to log out (as shown here). If you removed any media from the console drive before beginning the installation, you should replace it now.

Be aware that VMSINSTAL deletes or changes entries in the process symbol tables during the installation. Therefore, if you are going to continue using the system manager's account and you want to restore these symbols, you should log out and log in again.

2.3. Recovering from Installation Errors on Alpha

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

- The operating system version is incorrect.
- A prerequisite software version is incorrect.
- Quotas necessary for successful installation are insufficient.
- System parameter values for successful installation are insufficient.

- The OpenVMS help library is currently in use.
- The product license has not been registered and loaded.

For descriptions of the error messages generated by these conditions, see the OpenVMS documentation on system messages, recovery procedures, and OpenVMS software installation. If you are notified that any of these conditions exist, you should take the appropriate action as described in the message. For information on installation requirements, see Section 1.4.

If the installation fails, you must restart the installation procedure from 3 in Section 2.2. For an explanation of any system messages, see the *OpenVMS System Messages and Recovery Procedures Reference Manual* or the online HELP/MESSAGE facility. If the installation fails due to an IVP failure, contact VSI.

2.4. How to Install VSI C on IA64 and x86-64

The VSI C installation procedure consists of a series of questions and informational messages.

To abort the installation procedure at any time, press Ctrl/Y.

When the system prompts you with a question during the installation procedure, the default answer, if any, is enclosed in brackets "[]".

The installation steps are as follows:

1. Make sure you have downloaded the latest kit file. For example, `X86VMS-C-Xnnnnn-nnn.ZIP`
2. Use the UNZIP utility to extract the installation files.

The ZIP/UNZIP utility can be found on your system in the following directories:³

```
SYS$COMMON: [SYSHLP.UNSUPPORTED.ZIP]
SYS$COMMON: [SYSHLP.UNSUPPORTED.UNZIP]
```

To be able to use the UNZIP command, create a foreign command that will run the UNZIP utility, for example:

```
$ UNZIP == "$SYS$COMMON:[SYSHLP.UNSUPPORTED.UNZIP]UNZIP.EXE"
```

For information on how to use this utility, execute UNZIP.

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

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

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

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

```
$ SHOW PROCESS/PRIVILEGES
```

4. To extract the VSI C online release notes before you install VSI C, enter the following command:

```
$ PRODUCT EXTRACT RELEASE_NOTES C /SOURCE=disk:[directory]
```

In this command, *disk:[directory]* is the specification of the disk and directory containing the product installation files. If your process default directory is the same directory that contains the VSI C product distribution files, you can specify the source directory as `/SOURCE=[]`.

³If you cannot find the ZIP/UNZIP utility on your system, you can download it from the following webpage: <https://vmssoftware.com/products/zip-tools/>.

You can view or print the file `CC.RELEASE_NOTES` before you continue with the installation. For example:

```
$ TYPE/PAGE CC.RELEASE_NOTES
```

5. Set the default directory to a writeable directory to allow the IVP to succeed. Then run the `PRODUCT INSTALL` command, pointing to the kit location. For example:

```
$ SET DEFAULT SYS$MANAGER
$ PRODUCT INSTALL C /SOURCE=kit-device:[kit-location]
```

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

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

```
$ PRODUCT SHOW OBJECT /PRODUCT=C
```

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

2.5. Recovering from Installation Errors on I64 and x86-64

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 System Messages and Recovery Procedures Reference Manual* or the online `HELP/MESSAGE` command. Take the appropriate action described in the message.

Chapter 3. After Installing VSI C

This chapter describes the user account requirements needed to work with VSI C and the tasks that can be performed after VSI C is installed. It also contains guidelines on how to remove VSI C.

3.1. User Account Requirements

Some products cannot be used unless certain privilege and quota requirements are met by user accounts. The following sections describe the privilege and quota requirements needed to work with VSI C.

3.1.1. User Privileges

To use VSI C, each account must have TMPMBX and NETMBX privileges. Use the OpenVMS AUTHORIZE utility to determine whether users have the privileges they require.

3.1.2. User Account Quotas

To use VSI C, 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), consider adjusting working set (WSDEF, WSQUOTA, WSEXTENT) and pagefile (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 System Manager's Manual, Volume 1: Essentials*.

3.2. Running the Installation Verification Procedure Separately

The VSI C Installation Verification Procedure (IVP) is usually run during VSI C installation.

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

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

If any problems are encountered, a message like one of the following appears:

```
VSI C VERSION 7.n Installation Verification FAILED
VSI C VERSION 7.n Installation Verification did not run
VSI C VERSION 7.n Installation Verification ABORTED
VSI C VERSION 7.n TEST FAILED
```

3.3. Modifying the System-Wide Startup Command Procedure

You must edit the system-wide startup file to provide for automatic startup of VSI C when your system is rebooted.

Add the command line that starts VSI C to the system startup file, `SYSS$MANAGER:SYSTARTUP_VMS.COM`. VSI C cannot start until after the network has started, so you must position this new command line after the line that invokes the network startup command procedure. The following example shows the network startup command lines:

```
$ @SYSS$MANAGER:STARTNET.COM
.
.
.
$ @SYSS$STARTUP:DECC$STARTUP.COM
```

3.4. Making the Product Usable on a VMSccluster

If you want to run VSI C on multiple nodes of an OpenVMS cluster, first check to see that you have the appropriate software license (see Section 1.3). Then perform the following steps after you install VSI C:

1. Enter the `LICENSE LOAD` command, as described in the *VSI OpenVMS License Management Utility Guide*, to activate the license on each node in the cluster on which VSI C is to be executed.
2. Log in to the installation node and use the OpenVMS `INSTALL` Utility to determine whether `DECC$COMPILER.EXE` is a known image:

```
$ INSTALL
INSTALL> LIST SYSS$SYSTEM:DECC$COMPILER.EXE
```

If the output of the preceding `LIST` command shows `DECC$COMPILER.EXE` to be a known image, perform all of the following steps. Otherwise, perform all of the following steps except [Step 4b](#).

3. Log in to a node on the cluster.
4. Run the OpenVMS `INSTALL` utility as described in Section 3.6.2, with the following exceptions:
 - a. After invoking the OpenVMS `INSTALL` utility, enter the following command:

```
INSTALL> REPLACE SYSS$LIBRARY:DCLTABLES.EXE
```

This command updates the DCL tables. It should be entered on each node in the cluster, regardless of whether you activated the VSI C license (1) on all of the nodes.

- b. If DECC\$COMPILER.EXE was established as a known image using the INSTALL utility, enter the following command:

```
INSTALL> REPLACE SYS$SYSTEM:DECC$COMPILER.EXE
```

This command replaces the INSTALL entry for DECC\$COMPILER.EXE. It should be entered only on those nodes on which you activated the VSI C license in 1. (In most cases, all of the nodes will be licensed.)

5. Repeat [Step 3](#) and [Step 4](#) for each node of the cluster.

3.5. Making the CC Command Available After Installation

VSI C is now installed and can be invoked by all users with the CC command.

The installation procedure modifies the DCL command table so that the CC command is 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 CC command must log out and log in again, or use the following DCL command:

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

3.6. Enhancing VSI C Performance

The following sections include information on system tuning and explain how to install VSI C as a shared image.

3.6.1. Tuning Your System

After you install VSI C, you might want to adjust your system to enhance performance or lower the use of some system resources. General information about tuning an OpenVMS system is included in the *OpenVMS Performance Management Manual*.

3.6.2. Installing VSI C as a Shared Image

If you expect VSI C to be used extensively on your system, you can reduce the system overhead and memory requirements by installing it as a shared image. To install VSI C as a shared image on a system that is currently running, use the OpenVMS INSTALL utility. It is recommended that you install VSI C as shared on a system that has been rebooted recently, because the available space in the global page table is less likely to be fragmented.

To install VSI C as a shared image, determine the number of available global pagelets and global sections on your system. You may need to increase them. Section 1.4.2 contains guidelines for showing and setting these parameters.

After you have reset the system parameter values, run the following .COM file:

```
$ @SYS$STARTUP:DECC$STARTUP
```

3.7. Removing VSI C

On I64 and x86-64 systems, you can remove VSI C using the `PRODUCT REMOVE C` command.

This command will uninstall VSI C from your system and update the product database. This command operates on complete products. Any patches or mandatory updates that might have been applied to complete products are also removed.

On Alpha systems, a command procedure `CC$PRODUCT_REMOVE` is available should you wish to remove the VSI C compiler product from your system for any reason. The procedure performs the equivalent of a `PCSI PRODUCT REMOVE` command.

Before issuing the command procedure, you are required to disable the product license to prevent a compilation from interfering with the delete process. If the compiler has been installed as a shared image, the command procedure will uninstall the image. The command procedure takes no parameters and can be run as follows:

```
$ @SYS$SYSTEM:CC$PRODUCT_REMOVE
Do you wish to proceed with removing VSI C ? YES
```

Enter "Yes" to remove the compiler from your system.