Compaq Pascal

Installation Guide for OpenVMS

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This guide explains how to install the *Compaq Pascal* compiler and related software components on an *OpenVMS Alpha* or *OpenVMS VAX* system.

Revision/Update Information:	This is a updated guide.
Operating System:	*OpenVMS Alpha* Version 6.1 or higher. *OpenVMS VAX* Version 5.5 or higher. Future maintenance releases may require higher versions.
Software Version:	*Compaq Pascal Version 5.7*

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Preface

This guide explains how to:

- Install *Compaq Pascal* on *OpenVMS Alpha* or *OpenVMS VAX*
- Read the online release notes

This guide applies to *Compaq Pascal* Version 5.7 and all subsequent maintenance releases up to the next major product release.

Intended Audience

This guide is intended for the system manager who installs *Compaq Pascal*. Keep this guide with your distribution kit. You will need it to install maintenance updates or to reinstall *Compaq Pascal* for any other reason.

Document Structure

This guide contains the following chapters:

- Chapter 1 describes the hardware and software requirements for *Compaq Pascal* installation and related procedures that you complete before installation.
- Chapter 2 describes the *Compaq Pascal* installation procedure.
- Chapter 3 describes the *Compaq Pascal* Installation Verification Procedure (IVP) and any postinstallation procedures you must complete to use *Compaq Pascal*. (
- Appendix A contains a sample *Compaq Pascal* installation and the IVP.)

Associated Documents

In addition to this guide, the *Compaq Pascal* documentation set includes the following books:

- *Compaq Pascal User Manual for OpenVMS*
- *Compaq Pascal Language Reference Manual*

For general information on *OpenVMS* system management, see the *OpenVMS* operating system documentation set.

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

Conventions

This guide uses the following documentation conventions:

Convention	Meaning
$	The dollar sign ($) is the default DCL prompt.
Return	In code examples, an enclosed symbol indicates that you must press the named key on the keyboard.
Ctrl/Y	In interactive examples, this symbol indicates that you must press the Ctrl key while you simultaneously press another key (in this case, Y).
Username: **@SYS$UPDATE:VMSINSTAL**	In interactive examples, prompts or displayed text appears in a monospace font. User input appears in **bold monospace** font.
UPPERCASE	In syntax descriptions and interactive examples, uppercase letters indicate the name of a command, a file, a parameter, a procedure, or a utility.
lowercase	Lowercase letters indicate variable information such as a file name or a device name.
file-spec,...	Horizontal ellipses indicate that you can enter additional parameters, values, or information.
[YES]	Square brackets indicate that the enclosed item is a default value in a VMSINSTAL prompt. Also, square brackets serve as delimiters for a directory name in a file specification.
VMS system	All references to VMS system refer to the *OpenVMS Alpha* or the *OpenVMS VAX* operating system.
On OpenVMS Alpha systems only *On OpenVMS VAX systems only*	This guide uses labels to indicate information that applies to one or more platforms.
n	In some code examples, version numbers are given as n. When you install *Compaq Pascal*, the actual version numbers appear on your screen.

Unless otherwise noted, press the Return key after entering commands and responses to command prompts.

1
Preparing to Install Compaq Pascal

This chapter discusses the preparations and requirements necessary for installing *Compaq Pascal Version 5.7*.

Your bill of materials (BOM) and indented bills report (BIL) specify the number and contents of your media. Be sure to verify the contents of your kit with this information. If your kit is damaged or if you find that parts of it are missing, contact your Compaq representative.

Compaq Pascal provides online release notes, which are copied to the following file during installation:

```
SYS$HELP:PASCAL05n.RELEASE_NOTES
```

Compaq strongly recommends that you read the release notes before proceeding with the installation. For information on accessing the online release notes, see Section 2.1.

Your distribution kit includes a ‘‘Read First’’ cover letter. Please read this cover letter for information that is important for you to know before installing *Compaq Pascal*. This information may not be included in this installation guide or in the release notes.

1.1 Required Operating System Components

Compaq Pascal Version 5.7 requires *OpenVMS Alpha* Version 6.1 or higher, or *OpenVMS VAX* Version 5.5 or higher. Future *Compaq Pascal* releases may require higher versions of the *OpenVMS* operating system, as described in the online release notes or the Read First cover letter for your operating system.

The *OpenVMS* operating system comes with a variety of support options or components.

1.2 Optional Software

The following is a list of optional software that you can use with *Compaq Pascal*:

- Oracle CDD/Repository
- DECset

1.3 License Registration

You must register the *Compaq Pascal* license through the *OpenVMS* License Management Facility (LMF) in accordance with the license agreement signed by your site. The license registration information you need is contained in the Product Authorization Key (PAK) that is shipped with *Compaq Pascal* if you ordered the license and media together; otherwise, the PAK is shipped separately to a location based on your license order. The PAK is a paper certificate that contains information about the license to run a particular piece of software.

If you are installing *Compaq Pascal* as an update on a node or cluster that is licensed for this software, you have already completed the License PAK registration requirements.

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

To register a license, first log in to the system manager's account (username: SYSTEM). You then have a choice of two ways to perform the registration:

- 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.

For complete information on using LMF, see the manual on the License Management Utility in the *OpenVMS* documentation set.

1.4 Multiple Version Support

Compaq Pascal provides support for using multiple versions of the compliler on the same OpenVMS system.

During installation, you have the opportunity to save the current version of the compiler for later use. If chosen, the installation copies the current compiler before installing the new compiler.

The kit provides 3 command files to display and control which *Compaq Pascal* compiler is used.

- SYS$SYSTEM:PASCAL$SHOW_VERSIONS.COM is used to display all *Compaq Pascal* compilers saved on the system and their version numbers. It also shows the current settings for process, job, group, and system-wide compiler settings. This command file has no parameters.
- SYS$SYSTEM:PASCAL$SET_VERSION.COM is used to select a *Compaq Pascal* compiler other than SYS$SYSTEM:PASCAL.EXE. If invoked without parameters, it will display the currently available compilers and ask for a filename to use for the process-wide compiler setting. It has 2 optional parameters. The first parameter can be PROCESS, JOB, GROUP, or SYSTEM. This selects the level of visibility for the selected compiler. The second parameter can be a filename to use instead of being prompted for a file. This allows you to place a compiler selection in a LOGIN.COM or some other command file. All saved compilers are located in SYS$SYSTEM:.
- SYS$SYSTEM:PASCAL$DEFAULT_VERSION.COM is used to select the default *Compaq Pascal* compiler when SYS$SYSTEM:PASCAL$SET_ VERSION.COM has not be used. The installation always provides a new SYS$SYSTEM:PASCAL.EXE and copies existing compilers. You can use this command file to select one of the saved compilers to be SYS$SYSTEM:PASCAL.EXE and rename the existing SYS$SYSTEM:PASCAL.EXE for later use via SYS$SYSTEM:PASCAL$SET_ VERSION.COM.

1.5 Installation Procedure Requirements

The installation of *Compaq Pascal* takes approximately 5 to 45 minutes, depending on your system configuration.

1.5.1 Installation Account Privileges and Disk Space

To install *Compaq Pascal*, you must be logged in to an account that has SETPRV or at least the following privileges:

- CMKRNL
- WORLD
- SYSPRV

Note

VMSINSTAL turns off the BYPASS privilege at the start of the installation.

Compaq Pascal's requirements for free disk storage space are different during installation and after installation. Table 1–1 summarizes the storage requirements.

Table 1–1 Disk Space Requirements

	Number of Blocks Required	
Kit	**During Installation**	**After Installation**
Compaq Pascal Version 5.7 *On OpenVMS Alpha systems only*	17,000	16,500
Compaq Pascal Run-Time Library on *OpenVMS Alpha* systems only *and only when that kit is newer than the installed version*	500	500
Compaq Pascal Version 5.7 *On OpenVMS VAX systems only*	3,500	3,000
Compaq Pascal STARLET files	11,500	10,000
Compaq Pascal examples	150	150

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

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

Note

The *Compaq Pascal* STARLET files (STARLET.PAS, PASCAL$*xxx*ROUTINES.PAS, and so on) are built during the *Compaq Pascal* installation from a file shipped with the *OpenVMS* operating system kit. This allows the same *Compaq Pascal* kit to produce STARLET files that reflect the version of *OpenVMS* being used on the system.

Since updating the version of *OpenVMS* may add new definitions, the peak and net block count requirements for installing *Compaq Pascal* (see Table 1–1) may not always be accurate.

The values in Table 1–1 are meant to accommodate the larger definition files.

1.5.2 System Parameters

Installing *Compaq Pascal* 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:PASCAL.EXE was previously installed as a shared image, as follows:

- If not previously installed as a shared image:
  - One global section and a sufficient number of contiguous free global pagelets to contain the file SYS$LIBRARY:DCLTABLES.EXE.
- If previously installed as a shared image or will be subsequently installed with the PASCAL$STARTUP command file (Section 3.4.2)
  - Two global sections and a sufficient number of contiguous free global pagelets to contain the file SYS$LIBRARY:DCLTABLES.EXE.
  - 8,500 additional global pagelets on *OpenVMS Alpha* systems.
  - 1,500 additional global pagelets on *OpenVMS VAX* systems.

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

Note

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

1.5.2.1 Calculating the Values for GBLPAGES and GBLSECTIONS

To install and run *Compaq Pascal*, you must have sufficient free contiguous global pagelets and global sections. 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.

To find the number of free contiguous global pagelets and free global sections, use the WRITE command with the F$GETSYI lexical function. The following example shows how to get this information at your terminal (the default for SYS$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 *Compaq Pascal*, you can do either of the following:

- Delete an existing known image using the *OpenVMS* Install Utility.
- 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, insert a line in the file that includes both the name of the parameter and its value. For example:

```
WSMAX = 1024
```

To modify incremental parameters such as GBLPAGES and GBLSECTIONS, use ADD_. The following example increases the global pagelet 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 and then execute the AUTOGEN procedure to recalculate your system parameters. Enter the following command at the DCL prompt to recalculate your system parameters and to 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.

AUTOGEN 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 more information about using AUTOGEN, see the *OpenVMS* System Management Subkit.

1.5.3 Backing Up Your System Disk

At the beginning of the installation, VMSINSTAL asks if you have backed up your system disk. Compaq recommends that you do a system disk backup before installing *Compaq Pascal* or any other software.

Use the backup procedures that are established at your site. For details on performing a system disk backup, see the section on the Backup Utility in the *OpenVMS* system management documentation.

1.6 Stopping the Installation

To stop the installation procedure at any time, use Ctrl/C. However, files created up to that point are not deleted. You must then delete these files interactively. Chapter 2 lists the directories and files created during the *Compaq Pascal* installation.

1.6.1 Reader's Comments

Compaq appreciates your comments. If you find errors or want to comment about this manual, please send the manual title, order number, and your comments by one of the following methods:

- Electronic Internet mail:

  pascal_docs@bookie.enet.dec.com

- Fax:

  603–884–0120
  Attn: Languages Documentation, ZKO2–3/K35

- A letter sent to the following address:

  Compaq Computer Corporation
  Languages Documentation, ZKO2–3/K35
  110 Spit Brook Road
  Nashua, NH 03062–2698
  USA

2
Installing Compaq Pascal

This chapter explains how to install *Compaq Pascal*:

- Section 2.1 contains a step-by-step description of the installation procedure.
- Section 2.2 describes error recovery considerations.

For a sample *Compaq Pascal* installation, see Appendix A.

2.1 Installation Procedure

The *Compaq Pascal* installation procedure consists of a series of questions and informational messages. See Appendix A for a sample *Compaq Pascal* installation.

If you have not already done so, insert the Compact Disc (CD) or tape media into the CD drive or tape drive.

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 ([ ]).

To start the installation:

1. **Invoke the VMSINSTAL command procedure**.

   You should invoke the VMSINSTAL command procedure from privileged account, such as the SYSTEM account. The VMSINSTAL procedure is in the SYS$UPDATE directory. For example:

```
Username: SYSTEM
Password:

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

The following list defines the elements of the VMSINSTAL procedure:

saveset-name

The installation name for the component. For *Compaq Pascal*, use the following installation name:

```
PASCAL05n
```

To obtain the directory location of the *Compaq Pascal* saveset on the CD, refer to the *OpenVMS Alpha Layered Products Disc User's Guide* that accompanies the CD distribution kit. Or, you can do the following before starting the installation:

- To determine whether the CD drive is already mounted, enter the following command:

  ```
  $ SHOW DEVICE DKA400:
  ```

  If it is not mounted, enter the appropriate MOUNT command to mount the CD (omit the /FOREIGN qualifier).

- To obtain the directory name, enter the following command:

  ```
  $ DIRECTORY DKA400:[000000]*pascal*.dir
  Directory DKA400:[000000]
  PASCAL05n.DIR;1
  ```

- To obtain the saveset name, use the DIRECTORY command specifying the directory file from the previous command:

  ```
  $ DIRECTORY DKA400:[PASCAL05n.KIT]*.A
  ```

device-name

The name of the device on which you plan to mount the media and the directory containing the *Compaq Pascal* save set. In the following example, the device name is DKA400: and the directory is [PASCAL05n.KIT]. For tape installations, just enter the name of the tape device.

To specify the device name on the @VMSINSTAL command line, enter:

```
DKA400:[PASCAL05n.KIT]
```

DKA400: is the name of the CD drive used in the rest of the examples in this guide.

option-list

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

- Auto_answer option (A)

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).

- File log option (L)

  Logs all activity to the terminal during installation.

- Display or print the release notes (N)

  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.

Note

Even if you omit the N option when you invoke VMSINSTAL, the *Compaq Pascal* release notes are copied automatically to the SYS$HELP directory.

- Alternate root option (R)

  Allows you to install the product to a system root other than that of the running system.

For detailed information on these VMSINSTAL options, see the *OpenVMS* documentation on software installation in the *OpenVMS* System Management Subkit.

If you specify multiple options, use commas to separate the options, for example:

```
OPTIONS A,N
```

When you invoke VMSINSTAL, it checks the following:

- Whether you are logged in to a privileged account

  Compaq recommends that you install software from the system manager's account with your default device and directory set to SYS$UPDATE.

- Whether you have sufficient quotas for installation

This following example invokes VMSINSTAL to install *Compaq Pascal* and shows the system response. This example uses the OPTIONS N release note option.

```
$ @SYS$UPDATE:VMSINSTAL PASCAL05n DKA400:[PASCAL05n.kit] OPTIONS N

    OpenVMS Software Product Installation Procedure Vn.n

It is dd-mmm-yyyy at hh:mm.
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.

2. **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.

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 distribution (media) device and directory that contains the *Compaq Pascal* kit (save set). For example, if the media is contained on a CD located on unit DKA400:, type DKA400:[PASCAL05n.KIT] in reply to this question, as shown in the following example:

```
* Where will the distribution volumes be mounted:DKA400:[PASCAL05n.KIT]
```

3. **Verify the product being installed.**

   The following products will be processed:

```
PASCAL V5.n

Beginning installation of PASCAL V5.n at hh:mm

%VMSINSTAL-I-RESTORE, Restoring product saveset A...
```

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

4. **Select a release notes option.**

```
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]:
```

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

   - If you select option 1, VMSINSTAL displays the release notes immediately on the console terminal. You can terminate the display at any time by pressing Ctrl/C.
   - If you select option 2, VMSINSTAL prompts you for the name of the print queue that you want to use:

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

     You can then enter a queue name or press Return to send the file to the default output print device.
   - If you select option 3, VMSINSTAL displays the release notes immediately on the console terminal and then prompts you for a queue name for the printed version of the release notes.
   - If you choose option 4, the release notes are not displayed or printed but are still copied to the following file in the SYS$HELP directory:

     ```
     SYS$HELP:PASCAL05n.RELEASE_NOTES
     ```

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

```
$ HELP PASCAL RELEASE_NOTES
```

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

```
* Do you want to continue the installation [NO]?: YES
%VMSINSTAL-I-RELMOVED, 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:PASCAL057.RELEASE_NOTES
```

Note

The name of the release notes file installed by VMSINSTAL consists of the current product name (in this case, PASCAL) and version number (in this case, 057 for Version 5.7). Do not delete release notes for previous versions of *Compaq Pascal*.

5. **Install the compiler.**

   ```
   * Do you want to install the Compaq Pascal compiler [YES]?
   ```

   The *Compaq Pascal* kit contains the compiler, message files, command line definition, and help files.

6. **Install STARLET.**

   ```
   * Do you want to install the Compaq Pascal definition files [YES]?
   ```

   The *Compaq Pascal* kit contains definition files for *OpenVMS* System Services and several run-time library facility codes. These system definition files are built using information shipped with the *OpenVMS* operating system.

   The installation procedure determines whether *Compaq Pascal* definition files already exist. If the files do not exist, the installation procedure notifies you of this and advises you to create the definition files.

   If the *Compaq Pascal* definition files exist, but the *OpenVMS*-supplied system definitions, which are the basis for the *Compaq Pascal* definition files, have been modified since the last time the *Compaq Pascal* definition files were created, the installation procedure advises you to recreate the files.

If the *Compaq Pascal* definition files exist and if the *OpenVMS*-supplied system definitions have not been modified since the last time the *Compaq Pascal* definition files were created, the procedure tells you that it is not necessary to recreate the definition files.

7. **Install the examples.**

```
* Do you want to install the Compaq Pascal example programs [YES]?
```

The *Compaq Pascal* kit contains a set of example programs using many features of *Compaq Pascal* and *OpenVMS*. The examples are installed in the directory SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]. You can access them using the logical PASCAL$EXAMPLES, if you run the optional startup file SYS$STARTUP:PASCAL$STARTUP.COM (see Section 3.3).

8. **Save previous compiler.**

```
* Do you want to save your existing Compaq Pascal compiler [NO]?
```

The *Compaq Pascal* kit contains support to save your existing *Compaq Pascal* compiler for access later. The installation provides various command files to display and select the saved *Compaq Pascal* compilers. See Section 1.4 for more information.

9. **Purge files.**

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

You have the option to purge files from previous versions of *Compaq Pascal* that are superseded by this installation. Purging is recommended. If you answered YES to question 8, you can answer YES to this question with no danger of deleting any saved compilers.

10. **Choose the Installation Verification Procedure (IVP) option.**

The installation procedure now asks if you want to run the IVP. The IVP for *Compaq Pascal* checks that the installation is successful. Compaq recommends that you run the IVP.

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

This kit contains an IVP that is used to verify the correct installation of the *Compaq Pascal* compiler. The IVP is located in:

```
SYS$TEST:PASCAL$IVP.COM
```

After *Compaq Pascal* 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 *Compaq Pascal*.

11. **Respond to license registration queries.**

```
Product:      PASCAL
Producer:     Compaq
Version:      5.7
Release Date: dd-mmm-yyyy

* Does this product have an authorization key registered and loaded?
```

The installation procedure displays license information about your product and then asks if you have registered and loaded your Product Authorization Key (PAK).

If you have not registered and loaded your PAK, you must answer NO to this question. You must register and load your PAK to successfully complete the installation. If you have not done so, you should stop the installation, register and load your PAK, and then start the installation procedure again.

12. **Read informational messages.**

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 message is displayed:

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

13. **Observe the Installation Verification Procedure (IVP).**

If you chose to run the IVP, VMSINSTAL runs it now. When the IVP runs successfully, you see the following messages displayed:

```
** Successful Installation of Compaq Pascal V5.7 on 14-APR-1999 at 13:35 **
          Compiler Version = Compaq Pascal V5.7-80

 *-----------------------------------------------*
 *    Installation Verification Procedure for    *
 *       Compaq Pascal STARLET libraries         *
 *-----------------------------------------------*
```

14. **End the installation procedure.**

```
Installation of Compaq Pascal V(n.n) completed at hh:mm

VMSINSTAL procedure done at hh:mm
```

These messages indicate that the entire installation procedure is complete.

You can now log out of the privileged account:

```
$ LOGOUT
SYSTEM     logged out at dd-mmm-yyyy 20:20:02
```

Note

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.

2.2 Error Recovery

If errors occur during the installation itself or when the Installation Verification Procedure (IVP) is running, VMSINSTAL displays failure messages. If the installation fails, you see the following message:

```
%VMSINSTAL-E-INSFAIL, The installation of Compaq Pascal V(n.n) has failed.
```

If the IVP fails, you see these messages:

```
The Compaq Pascal V(n.n) Installation Verification Procedure failed.
%VMSINSTAL-E-IVPFAIL, The IVP for Compaq Pascal V(n.n) has failed.
```

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

- The operating system 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 1.5.

3
After Installing Compaq Pascal

Compaq Pascal is now installed and can be invoked by all users with the PASCAL command. The following tasks can be performed after installing *Compaq Pascal*:

- Running the Installation Verification Procedure (IVP) separately
- Editing the system startup and shutdown files
- Making the product usable on a VMScluster
- Enhancing performance
- Reporting problems

The following sections describe these tasks in detail.

3.1 Running the Installation Verification Procedure (IVP) Separately

You usually run the Installation Verification Procedure (IVP) during installation. If you want to run the IVP separately to ensure the integrity of installed files should system problems occur, execute the following command procedure:

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

If the IVP fails for any reason, the following message is displayed:

```
Compaq Pascal VERSION V5.n TEST FAILED
```

3.2 User Account Requirements

Several 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 *Compaq Pascal*.

3.2.1 Privileges

Compaq Pascal does not require any special privileges. There is no benefit from installing the *Compaq Pascal* compiler with privileges.

3.2.2 Quotas

See Section 3.4 for information.

3.3 Editing System Files

You can edit the system startup file to provide for automatic startup of *Compaq Pascal* when your system is rebooted. Use the optional startup file to define the PASCAL$EXAMPLES logical name and to install *Compaq Pascal* as a shared image (see Section 3.4.2).

Edit the system startup file SYS$STARTUP:SYSTARTUP_VMS.COM (or SYS$STARTUP:SYSTARTUP_V5.COM on OpenVMS VAX V5.n systems) to include the following line:

```
$ @sys$startup:pascal$startup.com
```

3.4 Enhancing Compaq Pascal Performance

This section includes information on system tuning and explains how to install *Compaq Pascal* as a shared image.

3.4.1 Using Multiple Environment Files *On OpenVMS VAX systems only*

If you intend to use multiple *Compaq Pascal* environment files, you can increase the compilation speed by modifying the FILLM quota of those processes that run the compiler. The *Compaq Pascal* compiler will keep more than one environment file open during the compilation (with a maximum of 50 environment files). If you inherit more than 50 environment files, the compiler will close some of them in order to open other files.

3.4.2 Installing Compaq Pascal as a Shared Image

If you expect *Compaq Pascal* 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 *Compaq Pascal* as a shared image on a system that is currently running, use the optional *Compaq Pascal* startup file:

```
SYS$STARTUP:PASCAL$STARTUP.COM
```

Compaq recommends that you install *Compaq Pascal* 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.

The requirements for additional global pages and global sections are listed in section Section 1.5.2.

3.4.3 Improving Compaq Pascal Compilation Performance on OpenVMS Alpha Systems

For many user applications, the *Compaq Pascal* for OpenVMS Alpha compiler requires significantly more system resources than *Compaq Pascal* for OpenVMS VAX. The compiler will sometimes fail with a "%LIB-E-INSVIRMEM, insufficient virtual memory" error. Also, for very large programs (greater than 10,000 lines) there could be a report of an extremely long compile time.

The following sections explain why *Compaq Pascal* for OpenVMS Alpha requires more memory, and suggests actions to be taken to avoid resource problems.

The Alpha architecture is a RISC (Reduced Instruction Set Computer) architecture. The VAX architecture is a CISC (Complex Instruction Set Computer) architecture. The main distinguishing characteristic of a RISC machine is that it has few instructions, and each instruction does a small amount of work. A CISC machine generally has many instructions, most of which perform many complicated operations in one step.

By reducing the amount of work that is done in each instruction (and by reducing the number of instructions), the complexity of the hardware is reduced. This reduction in complexity allows the hardware designers to raise the clock speed (and thus the number of instructions per second that can be completed). This results in better overall system performance.

Another characteristic of RISC systems is that compilers for these architectures generally must do a great deal more work than a corresponding compiler for a CISC architecture.

For example, the compiler must compute the best way to use all of the functional units of the processor, and it must determine how to make the best use of registers and on-chip data cache because reads and writes to main memory are generally slow compared to the speed of the processor.

The *Compaq Pascal* for OpenVMS Alpha compiler is a globally optimizing compiler. The compiler constructs an internal representation of the entire Pascal program, and repeatedly traverses this structure at compile time, so that it can produce the most efficient machine code for the program. This

results in high performance code, but the drawback is that the compiler requires more resources than the *Compaq Pascal* for OpenVMS VAX compiler.

The *Compaq Pascal* for *OpenVMS Alpha* compiler will require more resources than the *Compaq Pascal* for *OpenVMS VAX* compiler because it must do more work. However, there are some things that can be done to reduce system resource usage:

- Use the /NOOPTIMIZE qualifier when "checking" programs.

  The optimizer is one of the biggest users of system resources in the Pascal compiler and is turned on by default. Also, the higher the optimization level, the more memory required by the compiler.

- Check system tuning.

  Since the Pascal compiler often needs a great deal of virtual memory, increase working-set limits for developers that use the compiler. This results in decreased paging and improvements in compile time.

- Check program sizes.

  The bigger the program is, the more resources it requires.

Section 3.4.3.1 and Section 3.4.3.2 provide basic guidance about memory requirements for *Compaq Pascal* programs on *OpenVMS Alpha*.

In many tuning exercises, it is instructive to work with a relatively quiet system, submit batch jobs, and retain the log files for later analysis.

Note

The guidance in the following section is based on a study of a set of large modules. Please note that your results may differ.

For detailed information on *OpenVMS* tuning, see the *OpenVMS System Manager's Manual*, sections "Managing System Parameters" and "Managing System Page, Swap, and Dump Files".

3.4.3.1 Required Virtual Memory

If there is not enough virtual memory, the compile command may fail with the message "insufficient virtual memory".

OpenVMS has two parameters that control the amount of virtual memory available to a process:

- The system generation parameter VIRTUALPAGECNT, which sets an upper bound on the number of pagelets of virtual memory for any process in the system.
- The AUTHORIZE parameter PGFLQUOTA, which determines the number of pagelets a process can reserve in the system's page file(s).

After an "insufficient virtual memory" error, issue the following DCL command to see the Peak virtual size used by the process, or look at the Peak page file size at the end of a batch job's log:

```
SHOW PROCESS/ACCOUNTING
```

If the peak size is *at* the system generation parameter VIRTU you will need to raise this value. If the peak size is *below* VIRTUALPAGECNT, and *at or above* PGFLQUOTA, run AUTHORIZE to increase PGFLQUOTA for the Pascal users. Peak size can exceed PGFLQUOTA because some virtual memory, such as read-only image code, is not allocated page file space.

It is difficult to predict precisely how much virtual memory will be required for a compilation, but a starting point for system tuning can be computed by either of the following:

- Multiply 250 times the size of the largest program in disk blocks (including all INCLUDE files referenced).
- Multiply 25 times the number of lines in the program (including all INCLUDE files.

The resulting figure can then be used as a starting point for the system generation parameter VIRTUALPAGECNT. Place a line in the parameter file SYS$SYSTEM:MODPARAMS.DAT. For example, if you estimate 370,000 pages, add the following line in MODPARAMS, run AUTOGEN and reboot.

```
MIN_VIRTUALPAGECNT = 400000
```

If the compilation now completes successfully, use the command SHOW PROCESS/ACCOUNTING to determine the Peak Virtual Size; if the actual peak is significantly less than the value computed above, you can reduce VIRTUALPAGECNT.

When modifying VIRTUALPAGECNT and PGFLQUOTA, you may also need to increase the size of the page file.

3.4.3.2 Required Physical Memory

When dealing with physical memory you must know:

- If there enough memory on the system
- If enough available to the process running the compilation

If the physical memory on the system is too small, the command LOGOUT /FULL (which is automatically issued at the end of a batch job) will show a high number of faults, for example, > 100,000 for a single compilation, and an "Elapsed time" that greatly exceeds the "Charged CPU time", as the system waits for disk I/Os to resolve page faults. In this situation, tuning attempts may be of limited benefit.

If the physical memory on the system is adequate, but the physical memory allotted to the process running the compilation is too small, you may still observe a large number of faults, but elapsed time may remain closer to CPU time. This is because OpenVMS resolves page faults from the page caches (free list, modified list) whenever possible, avoiding the relatively slow disk I/Os. In this situation, basic tuning may also be beneficial.

The amount of physical memory required will vary, but it should be a large fraction of the process peak virtual size-as close to 1.0 as practical. The reason for this is that the compiler makes multiple passes over the internal representation of the program; therefore a page which falls out of the working set in one pass is probably going to be needed again on the very next pass.

The physical memory present on the system can be determined by the command SHOW MEMORY/PHYSICAL. The physical memory used by the compilation is reported as "Peak working set size" by the command SHOW PROCESS/ACCOUNTING or at the end of a batch log file.

More physical memory can be made available to a process by minimizing the number of competing processes on the system (for example, by compiling one module at a time, or scheduling large compiles for off hours.)

It can also be made available to a process (if it is present on the machine) by adjusting the system generation parameter WSMAX and the corresponding WSEXTENT (in AUTHORIZE). Such adjustments must be attempted with great caution, as the system may hang if memory is oversubscribed and you create a situation where OpenVMS effectively has no options to reclaim memory.

The following guidelines have been found useful:

- Set the Pascal users' WSEXTENT (in AUTHORIZE or INITIALIZE /QUEUE) to match WSMAX.
- Keep WSQUOTA (in AUTHORIZE or INITIALIZE/QUEUE) low. Make sure that no process or batch queue has a WSQUOTA of more than about 20% of physical memory. The difference between WSEXTENT and WSQUOTA allows OpenVMS to manage memory to meet varying demands.
- Use AUTOGEN. AUTOGEN will attempt to make a consistent set of changes that do not interfere with each other.

  By default, AUTOGEN will set the maximum working set (system generation parameter WSMAX) to 25% of physical memory. This value is reasonable for a workstation or multi-user system with many active processes.
- WSMAX can be increased to a somewhat larger value by editting MODPARAMS.DAT. For a system with 64 MByte of physical memory, try setting WSMAX to no more than about 40% of physical memory, or 52000 pagelets. With 128 MByte or more of physical memory, a setting of 50% of physical memory can be attempted.

3.4.3.3 Effects of Physical Memory

The effects of physical memory on compilation time were studied for a set of seven large modules. The modules ranged in size from about 1600 to 3300 disk blocks. Your results may differ; but to help to give a rough appreciation for the effect of physical memory on compilation time, the following can be noted:

- When the amount of physical memory available to the processes matched the amount of virtual memory, the elapsed times were close to the CPU times.
- As the physical memory was reduced, CPU times rose only slightly, about ten percent.
- As the physical memory was reduced, elapsed times were elongated, at the rate of about one hour for each 100MB of difference between Peak Virtual Size and the actual memory available. For example, when compiling a program that used a Peak Virtual Size of 947760 pagelets, or 463MB (1MB = 2048 pagelets), on a system where about 180MB of physical memory was available to user processes, the compile required about three hours longer than on a 512MB system.

Your results will be strongly affected by the speed of the devices that are used for paging. Both virtual memory and physical memory requirements can be reduced by breaking large modules up into smaller modules.

3.5 Determining and Reporting Problems

If an error occurs while using *Compaq Pascal* and you believe the error is caused by a problem with *Compaq Pascal*, take one of the following actions:

- If you have a basic or DECsupport Software Agreement, call your Customer Support Center (CSC). The CSC provides telephone support for high-level advisory and remedial assistance.
- If you have a Self-Maintenance Software Agreement, you can submit a Software Performance Report (SPR).
- If you purchased *Compaq Pascal* within the last 90 days and you think the problem is caused by a software error, you can submit an SPR.

If you find an error in the *Compaq Pascal* documentation, please fill out one of the Reader's Comments forms at the back of the document containing the error and send the form to Compaq. Please include the section and page number where the error occurred.

When you submit an SPR, please take the following steps:

1. Describe as accurately as possible the state of the system and the circumstances when the problem occurred. Include in the description the version number of *Compaq Pascal* being used. Demonstrate the problem with specific examples.
2. Reduce the problem to as small a size as possible.
3. Provide a listing of the program. Remember to include listings of any command files, relevant data files, and so forth.
4. If the program is longer than 50 lines, submit a copy of the program on machine-readable media (floppy diskette or magnetic tape). If necessary, also submit a copy of the program library used to build the application.
5. Report only one problem per SPR. This will facilitate a faster response.
6. Mail the SPR package to Compaq.

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

A
Sample Installation

This appendix contains a sample installation of *Compaq Pascal*. This sample was run on a system that had no previous version of *Compaq Pascal* installed. Depending on which version of layered products or which version of *OpenVMS* you have on your system, you might see additional messages and questions when you perform your installation.

The *Compaq Pascal* installation procedure installs several files on your system and defines some logical names. The file names are listed at the end of the installation procedure (see Appendix A).

The PASCAL$EXAMPLES logical name is entered into the system logical name table when the PASCAL$STARTUP.COM command file is invoked. This name points to the location of the optional *Compaq Pascal* examples.

The sample installation assumes that DECnet has been shut down, that no users are logged on to your system, and that OPTIONS N is specified to print the release notes. The Installation Verification Procedure (IVP) runs at the end of the installation.

```
$ @vmsinstal

 OpenVMS AXP Software Product Installation Procedure V6.2-1H3

It is 14-APR-1999 at 13:32.

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

* Are you satisfied with the backup of your system disk [YES]?
* Where will the distribution volumes be mounted: dka300:[pascal057.kit]

Enter the products to be processed from the first distribution volume set.
* Products: pascal057
* Enter installation options you wish to use (none):
The following products will be processed:

  PASCAL V5.7

 Beginning installation of PASCAL V5.7 at 13:32
```

```
%VMSINSTAL-I-RESTORE, Restoring product save set A ...
%VMSINSTAL-I-RELMOVED, Product's release notes have been moved to SYS$HELP.

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 *-------------------------------------------------------------*
 *              Installation Command Procedure for             *
 * Compaq Pascal V5.7 compiler, definition files, and examples *
 *-------------------------------------------------------------*

  The Compaq Pascal V5.7 kit contains the compiler, message files, command
  line definition and help files.  These files require 17000 blocks during
  installation and will occupy 16500 blocks after installation.

* Do you want to install the Compaq Pascal compiler [YES]?

  The Compaq Pascal V5.7 kit contains definition files for OpenVMS System
  Services and several Run-Time Library Facility codes.  The definition
  files require 11500 blocks during installation and will occupy 10000
  blocks after installation.

  In addition, if you have Compaq Pascal compilers that were saved from prior
  upgrades, the definition files will be built with the oldest possible
  compiler to allow for the older compilers to inherit the newly constructed
  definition files.

  The OpenVMS-supplied system symbol definitions, which are the basis for
  Compaq Pascal definition files (STARLET.PAS and others), have not been
  modified since the last time the Compaq Pascal definition files were
  created.  It is not necessary to recreate the Compaq Pascal definition
  files at this time.

* Do you want to install the Compaq Pascal definition files [YES]?

  The Compaq Pascal V5.7 kit contains a set of example programs using
  many features of Compaq Pascal and OpenVMS.  The example files require
  150 blocks during installation and will occupy 150 blocks
  after installation.

* Do you want to install the Compaq Pascal example programs [YES]?

  The Compaq Pascal kit is capable of copying your existing Pascal compiler
  for later use.  The kit will provide command files to show which versions
  of Compaq Pascal are on the system, to select a non-default compiler version,
  and to select which compiler is the default compiler.  See the installation
  guide for more information on these command files.
```

```
* Do you wish to save your existing Compaq Pascal compiler [NO]?

* Do you want to purge files replaced by this installation [YES]?
* Do you want to run the IVP after the installation [YES]?

       Product:      PASCAL
       Producer:     DEC
       Version:      5.7
       Release Date: 20-JAN-1999

* Does this product have an authorization key registered and loaded? yes

  This kit contains a file summarizing the new features, changes,
  restrictions, and compatibility issues in this release of Compaq
  Pascal.  This file is named PASCAL057.RELEASE_NOTES and has been
  placed in SYS$HELP:.  This file contains information valuable to
  Compaq Pascal programmers.  Please inform your user community of this
  file's existence.

  In addition, a file describing record layout considerations to
  improve performance and/or coexistance between VAX and AXP systems
  has been provided in SYS$HELP:PASCAL_RECORD_LAYOUT_GUIDE.MEM

  This kit will construct the following definition files in SYS$LIBRARY:

   STARLET.PAS/PEN
   PASCAL$ACLEDIT_ROUTINES.PAS/PEN      PASCAL$CLI_ROUTINES.PAS/PEN
   PASCAL$CONV_ROUTINES.PAS/PEN         PASCAL$DCX_ROUTINES.PAS/PEN
   PASCAL$DTK_ROUTINES.PAS/PEN          PASCAL$EDT_ROUTINES.PAS/PEN
   PASCAL$FDL_ROUTINES.PAS/PEN          PASCAL$LIB_ROUTINES.PAS/PEN
   PASCAL$LBR_ROUTINES.PAS/PEN          PASCAL$MAIL_ROUTINES.PAS/PEN
   PASCAL$MTH_ROUTINES.PAS/PEN          PASCAL$NCS_ROUTINES.PAS/PEN
   PASCAL$OTS_ROUTINES.PAS/PEN          PASCAL$PPL_ROUTINES.PAS/PEN
   PASCAL$PSM_ROUTINES.PAS/PEN          PASCAL$SMB_ROUTINES.PAS/PEN
   PASCAL$SMG_ROUTINES.PAS/PEN          PASCAL$SOR_ROUTINES.PAS/PEN
   PASCAL$STR_ROUTINES.PAS/PEN          PASCAL$TPU_ROUTINES.PAS/PEN
   PASCAL$C_ROUTINES.PAS/PEN            PASCAL$CMA_ROUTINES.PAS/PEN
   PASCAL$CVT_ROUTINES.PAS/PEN

  For compatibility with existing programs, symbols in previous
  versions of STARLET.PAS will remain in STARLET.PAS even though the
  symbols might be associated with a run-time library.  For example,
  the SMG$K_* symbols are still in STARLET.PAS instead of
  PASCAL$SMG_ROUTINES.PAS, while the SMG$ entry points and the SMG message
  numbers are in PASCAL$SMG_ROUTINES.PAS.

  This kit provides several examples in SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL].
  The names of the files reflect the topic being demonstrated by the programs.

  The IVP (Installation Verification Procedure) will be left in
  SYS$TEST:PASCAL$IVP.COM.  After the installation is complete, you
  can invoke the command file at any time to reverify that Compaq Pascal
  is installed and working correctly.
```

```
  An optional startup file has been placed in SYS$STARTUP:PASCAL$STARTUP.COM.
  The file installs the Compaq Pascal compiler, Run-Time Library, and
  message files as shared images to improve the performance of using
  the Compaq Pascal compiler or applications written in Compaq Pascal.
  If you wish to use this file, add the following DCL command to
  SYS$MANAGER:SYSTARTUP_VMS.COM

    $ @SYS$STARTUP:PASCAL$STARTUP.COM

  All questions regarding the installation have now been asked.
  The installation of Compaq Pascal V5.7 will now continue for 5
  to 45 minutes depending on your configuration and the options
  requested.

  Installing Compaq Pascal compiler...
%VMSINSTAL-I-RESTORE, Restoring product save set B ...

  Installing Compaq Pascal definition files...
%VMSINSTAL-I-RESTORE, Restoring product save set C ...

  Generating STARLET.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$ACLEDIT_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$CLI_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$CONV_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$DCX_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$DTK_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$EDT_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$FDL_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$LIB_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V54-041.EXE...
  Generating PASCAL$LBR_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$MAIL_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$MTH_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V54-041.EXE...
  Generating PASCAL$NCS_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$OTS_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V54-041.EXE...
  Generating PASCAL$PPL_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$PSM_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$SMB_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$SMG_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$SOR_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$STR_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$TPU_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$CVT_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$CMA_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V50-009.EXE...
  Generating PASCAL$C_ROUTINES.PAS/PEN using SYS$SYSTEM:PASCAL-V52-026.EXE...

  Installing Compaq Pascal example programs...
%VMSINSTAL-I-RESTORE, Restoring product save set D ...

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

```
SYS$SYSTEM:PASCAL.EXE                              [new]
SYS$HELP:PASCAL057.RELEASE_NOTES                   [new]
SYS$COMMON:[SYSTEST.PASCAL]PASCAL$IVP.PAS          [new]
SYS$HELP:HELPLIB.HLB                               [modified]
SYS$HELP:PASCAL_RECORD_LAYOUT_GUIDE.MEM            [new]
SYS$LIBRARY:DCLTABLES.EXE                          [modified]
SYS$LIBRARY:LIBDEF.PAS                             [new]
SYS$LIBRARY:MTHDEF.PAS                             [new]
SYS$LIBRARY:PASDEF.PAS                             [new]
SYS$LIBRARY:PASSTATUS.PAS                          [new]
SYS$LIBRARY:SIGDEF.PAS                             [new]
SYS$MESSAGE:PASCALER1.EXE                          [new]
SYS$MESSAGE:PASCALER2.EXE                          [new]
SYS$STARTUP:PASCAL$STARTUP.COM                     [new]
SYS$SYSTEM:PASCAL$SHOW_VERSIONS.COM                [new]
SYS$SYSTEM:PASCAL$SET_VERSION.COM                  [new]
SYS$SYSTEM:PASCAL$DEFAULT_VERSION.COM              [new]
SYS$TEST:PASCAL$IVP.COM                            [new]
SYS$COMMON:[SYSTEST.PASCAL]PASSTR$IVP.PAS          [new]
SYS$LIBRARY:STARLET.PAS                            [new]
SYS$LIBRARY:STARLET.PEN                            [new]
SYS$LIBRARY:PASCAL$ACLEDIT_ROUTINES.PAS            [new]
SYS$LIBRARY:PASCAL$ACLEDIT_ROUTINES.PEN            [new]
SYS$LIBRARY:PASCAL$CLI_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$CLI_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$CONV_ROUTINES.PAS               [new]
SYS$LIBRARY:PASCAL$CONV_ROUTINES.PEN               [new]
SYS$LIBRARY:PASCAL$DCX_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$DCX_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$DTK_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$DTK_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$EDT_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$EDT_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$FDL_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$FDL_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$LIB_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$LIB_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$LBR_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$LBR_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$MAIL_ROUTINES.PAS               [new]
SYS$LIBRARY:PASCAL$MAIL_ROUTINES.PEN               [new]
SYS$LIBRARY:PASCAL$MTH_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$MTH_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$NCS_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$NCS_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$OTS_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$OTS_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$PPL_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$PPL_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$PSM_ROUTINES.PAS                [new]
SYS$LIBRARY:PASCAL$PSM_ROUTINES.PEN                [new]
SYS$LIBRARY:PASCAL$SMB_ROUTINES.PAS                [new]
```

```
     SYS$LIBRARY:PASCAL$SMB_ROUTINES.PEN              [new]
     SYS$LIBRARY:PASCAL$SMG_ROUTINES.PAS              [new]
     SYS$LIBRARY:PASCAL$SMG_ROUTINES.PEN              [new]
     SYS$LIBRARY:PASCAL$SOR_ROUTINES.PAS              [new]
     SYS$LIBRARY:PASCAL$SOR_ROUTINES.PEN              [new]
     SYS$LIBRARY:PASCAL$STR_ROUTINES.PAS              [new]
     SYS$LIBRARY:PASCAL$STR_ROUTINES.PEN              [new]
     SYS$LIBRARY:PASCAL$TPU_ROUTINES.PAS              [new]
     SYS$LIBRARY:PASCAL$TPU_ROUTINES.PEN              [new]
     SYS$LIBRARY:PASCAL$D_FLOAT.PAS                   [new]
     SYS$LIBRARY:PASCAL$D_FLOAT.PEN                   [new]
     SYS$LIBRARY:PASCAL$G_FLOAT.PAS                   [new]
     SYS$LIBRARY:PASCAL$G_FLOAT.PEN                   [new]
     SYS$LIBRARY:PASCAL$CVT_ROUTINES.PAS              [new]
     SYS$LIBRARY:PASCAL$CVT_ROUTINES.PEN              [new]
     SYS$LIBRARY:PASCAL$C_ROUTINES.PAS                [new]
     SYS$LIBRARY:PASCAL$C_ROUTINES.PEN                [new]
     SYS$LIBRARY:PASCAL$CMA_ROUTINES.PAS              [new]
     SYS$LIBRARY:PASCAL$CMA_ROUTINES.PEN              [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]CONSTRUCTOR_1.PAS         [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]FUNCTION_CALLS.PAS        [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]HANDLER.PAS               [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]HELLOMOTIF.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]HELLOMOTIF.UIL            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]IMPLEMENTATION_MODULE.PAS [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]INITIAL_STATE_1.PAS       [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]INITIAL_STATE_2.PAS       [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]INTERFACE_MODULE.PAS      [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]LIB$FIND_FILE.PAS         [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]MAIN_PROGRAM.PAS          [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]RFA_READ.PAS              [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SCHEMA_PARAMETERS.PAS     [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SCHEMA_PARAMETERS.DAT     [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SMG_EXAMPLE.PAS           [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$ASCTIM_AND_GETTIM.PAS [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$CHECK_ACCESS.PAS      [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$DCLEXH.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$DEVICE_SCAN.PAS       [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$FAO.PAS               [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$GETDVI.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$GETJPI.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$GETQUI.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$GETSYI.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$GETUAI.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$PROCESS_SCAN.PAS      [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$PUTMSG.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$SNDJBC.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]SYS$TRNLNM.PAS            [new]
     SYS$COMMON:[SYSHLP.EXAMPLES.PASCAL]USE_XABDAT.PAS            [new]
%VMSINSTAL-I-MOVEFILES, Files will now be moved to their target directories...
```

```
 *------------------------------------------------*
 *      Installation Verification Procedure       *
 *          for Compaq Pascal V5.7                *
 *------------------------------------------------*

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** Successful Installation of Compaq Pascal V5.7 on 14-APR-1999 at 13:35 **
          Compiler Version = Compaq Pascal V5.7-80

 *------------------------------------------------*
 *    Installation Verification Procedure for     *
 *       Compaq Pascal STARLET libraries          *
 *------------------------------------------------*

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** Compaq Pascal STARLET libraries are installed and functioning normally **
 Installation of PASCAL V5.7 completed at 13:35
```