

# HP RAID Software for OpenVMS

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## Installation Guide

This installation guide provides installation information for the HP RAID Software for OpenVMS layered software product.

**Software Version:**                      Version 3.0

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

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# Preface

## Purpose of This Guide

This installation guide contains the installation procedure for installing the HP RAID Software for OpenVMS.

## Intended Audience

The intended audience is the system administrator who installs the HP RAID software, and configures and manages the RAID arrays.

## Related Documentation

The following related documents contain information you might find helpful.

- HP RAID Software for OpenVMS Guide to Operations
- HP RAID Software for OpenVMS Installation Guide
- HP OpenVMS System Manager's Manual: Essentials
- HP OpenVMS System Management Utilities Reference Manual: A-L BACKUP
- HP OpenVMS System Management Utilities Reference Manual: M-Z MOUNT and SYSGEN
- HP OpenVMS DCL Dictionary: A-M
- HP OpenVMS DCL Dictionary: N-Z
- HP OpenVMS I/O User's Reference Manual
- OpenVMS System Messages: Companion Guide for Help Message Users
- OpenVMS Cluster Systems

## Reader's Comments

HP welcomes your comments on this manual. Please send comments to either of the following addresses:

Internet	<b>openvmsdoc@hp.com</b>
Postal Mail	Hewlett-Packard Company OSSG Documentation Group, ZKO3-4/U08 110 Spit Brook Rd. Nashua, NH 03062-2698

## Conventions Used in this Guide

The conventions shown in Table 1 are used in this guide.

**Table 1 Conventions Used in This Guide**

Convention	Meaning
[parameter]	In command formats, brackets indicate optional parameters. When you enter the optional parameter, do not enter the brackets.
\$ SHOW TIME 18-MAY-2004 12:42:16	Command examples show the OpenVMS prompt character (\$). The command (what you enter) is in uppercase type.
<i>italic text</i>	In examples and messages, italic text represents input that is unique for each system. In other areas, italic text is used to introduce a new term.
<b>boldface text</b>	Boldface text is used to introduce a new term that is also found in the glossary.
<span style="border: 1px solid black; padding: 2px;">XXXXX</span>	A key name enclosed in a box indicates that you should press that key on the keyboard (for example <span style="border: 1px solid black; padding: 2px;">Return</span> or <span style="border: 1px solid black; padding: 2px;">Help</span> ).
data 1 . . . data <i>n</i>	In examples, a vertical ellipsis represents the omission of data that the system displays in response to a command or data that a user enters.
filespec[. . . ]	In command formats, a horizontal ellipsis indicates that the preceding item can be repeated one or more times.
OpenVMS VAX	The OpenVMS operating system for VAX hardware.
OpenVMS Alpha	The OpenVMS operating system for Alpha hardware.
OpenVMS, VMS	The terms OpenVMS and VMS refer to the OpenVMS operating system.
<span style="border: 1px solid black; padding: 2px;">RAID0</span>	The <span style="border: 1px solid black; padding: 2px;">RAID0</span> icon indicates that the following information applies to only RAID0 arrays. If no icon is used, assume that the information applies to both RAID0 and RAID5 arrays.
<span style="border: 1px solid black; padding: 2px;">RAID5</span>	The <span style="border: 1px solid black; padding: 2px;">RAID5</span> icon indicates that the following information applies to only RAID5 arrays. If no icon is used, assume that the information applies to both RAID0 and RAID5 arrays.

This chapter describes how to install and register the Product Authorization Key (PAK) for the HP RAID Software for OpenVMS. Table 1–1 provides a list of topics in this chapter.

**Table 1–1 Topics in This Chapter**

<b>Subject</b>	<b>Section</b>
Installation Planning	1.1
Installing HP RAID Software for OpenVMS	1.2
Postinstallation	1.3

After you receive HP RAID Software for OpenVMS in the form of a standard OpenVMS software installation kit, do the following:

1. Perform the preinstallation procedures described in Section 1.1.
2. Install the HP RAID Software using the PRODUCT utility, as described in Section 1.2.
3. Perform the postinstallation procedures listed in Section 1.3.

## 1.1 Installation Planning

In this section, you will find the following information:

- Preinstallation requirements
- Time needed for installation
- PAK registration
- OpenVMS SYSGEN parameter settings for HP RAID Software

### 1.1.1 Preinstallation Requirements

Before installing the HP RAID Software for OpenVMS, you must:

- Be running one of the OpenVMS versions specified in the release notes.
- Have enough free blocks on the system disk during installation for temporary file storage. The number of blocks required is specified in the release notes.
- Allow enough blocks of storage for the HP RAID software after installation. The number of blocks required is specified in the release notes.
- Install any OpenVMS patches required for your version of OpenVMS software, as specified in the release notes.
- Install the PAK.

- Have the privilege SETPRV. HP recommends that the installation be performed from the SYSTEM account.

The number of free global sections and free global pages required are specified in the software release notes.

HP recommends that you back up the system disk prior to installation.

### 1.1.2 Time Needed for Installation

Approximately 10 minutes is required for the installation, including HP RAID startup and execution of the Installation Verification Procedure (IVP), depending on the system configuration and the load on the system at the time.

### 1.1.3 Registering the License Product Authorization Key

You must register your Product Authorization Key (PAK) before you install HP RAID Software for OpenVMS.

#### 1.1.3.1 What Is the PAK?

The PAK is the certificate included with your distribution kit that contains the data you need to run HP RAID Software for OpenVMS. HP RAID Software for OpenVMS is a layered product that is separate from the OpenVMS operating system. You must purchase and license the HP RAID product separately from the OpenVMS software.

You license HP RAID with a HP RAID PAK. The PAK describes the HP RAID contract you have with HP.

When you enter information from the PAK into the online license database, the OpenVMS License Management Facility (LMF) authorizes the use of HP RAID. You must register and activate a license for HP RAID on each node using the software, including satellites in a VMScluster system. If you do not register and activate all nodes that will use HP RAID, each node displays the following error message at system startup time and no further RAID operations will proceed:

```
%LICENSE-E-NOAUTH, SW_RAID5 use is not authorized on this node
-LICENSE-F-NOLICENSE, no license is active for this software product
-LICENSE-I-SYSMGR, please see your system manager
```

The HP RAID software does not need to run on every node on a VMScluster system, but those nodes on which it is not running will not be able to create or use the RAID arrays. Only nodes with a valid PAK installed will be able to use the RAID arrays.



### 1.1.3.2 How to Register the PAK

Use the OpenVMS License Management Facility (LMF) to register your PAK. Registration is done by entering the following at the DCL prompt:

```
$ @SYS$UPDATE:VMSLICENSE
```

Choose “1” on the menu of options and answer the questions using the data from the PAK. Be sure to enter each field exactly as it appears on the PAK. Do not enter any fields that are blank on the PAK.

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#### Note

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There are multiple valid licenses for this product. While it is necessary to have only one license active for this product, the LMF will check for the existence of any valid license.

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### 1.1.4 Setting the SYSGEN Parameters

SYSGEN parameter settings for this product may vary from release to release. See the release notes for information on setting SYSGEN parameters.

## 1.2 Installing HP RAID Software for OpenVMS

It is necessary to install HP RAID Software for OpenVMS on only one node of any set of nodes which are sharing a given system disk. However, it must be started up on every licensed node you intend to run it on in the cluster. The HP RAID Software for OpenVMS installation procedure automatically updates the DCL command table to include the HP RAID commands. See Example 1-1 for a sample listing from a kit installation.

To install HP RAID Software for OpenVMS, perform the following steps:

1. At the DCL prompt, enter the following:

```
$ PRODUCT INSTALL RAID
```

2. Enter the applicable information for your system at each PRODUCT prompt.

---

#### If You are Upgrading a Previous Version

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If you are upgrading a previous version of the HP RAID software, the installation procedure does not allow for automatic startup of the software. A system reboot is necessary following the installation.

The software will automatically be started during the reboot if invocation of the SYS\$STARTUP:RAID\$STARTUP.COM procedure has been added to the SYS\$MANAGER:SYSTARTUP\_VMS.COM procedure.

If the software does not start automatically, start it by manually executing the SYS\$STARTUP:RAID\$STARTUP.COM procedure following the reboot.

For more information on these .COM files, see Section 1.3.3.2.

---

### Example 1–1 Sample Installation

```
$ PRODUCT INSTALL RAID

The following product has been selected:
    HP OpenVMS RAID V3.0-133                Layered Product

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

You will be asked to choose options, if any, for each selected product and for
any products that may be installed to satisfy software dependency requirements.
HP OpenVMS RAID V3.0-133
    This product uses the PAKs: SW-RAID5 or SW-RAID-STG-USER
* This product does not have any configuration options.
Execution phase starting ...

The following product will be installed to destination:
    HP OpenVMS RAID V3.0-133                DISK$IA64V82:[VMS$COMMON.]

Portion done: 0%...10%...30%...50%...60%...80%...90%...100%

The following product has been installed:
    HP OpenVMS RAID V3.0-133                Layered Product

%PCSI-I-IVPEXECUTE, executing test procedure for HP OpenVMS RAID V3.0-133 ...
Copyright 2004 Hewlett-Packard Development Company, L.P. All rights reserved.

Beginning RAID Software for OpenVMS IVP
Checking for existence of product files...

All product files found
Checking RAID server...

RAID Software for OpenVMS V3.0-133    Display Time: 13-OCT-2004 17:20:44.54
Copyright 2004 Hewlett-Packard Development Company, L.P. All Rights Reserved.
Server is operational

IVP for RAID Software for OpenVMS completed successfully.

%PCSI-I-IVPSUCCESS, test procedure completed successfully

HP OpenVMS RAID V3.0-133
    Insert the following line in SYS$MANAGER:SYSTARTUP_VMS.COM:
        @SYS$STARTUP:RAID$STARTUP

    Insert the following line in SYS$MANAGER:SYSHUTDOWN.COM:
        RAID SHUTDOWN

    To enable the new RAID commands in the current process use:
        $ SET COMMAND/TABLES=SYS$SHARE:DCLTABLES
$
```

## 1.3 Postinstallation

After you install HP RAID Software for OpenVMS on your system, you may want to make some adjustments. The following sections provide information for verifying the installation of HP RAID and modifying your files to allow automatic startup of HP RAID on your system.

### 1.3.1 Enabling the DCL Commands on all Nodes

Before you start the HP RAID software on other licensed nodes in your cluster, you should do one of the following to ensure that the HP RAID commands are enabled on the other nodes.

- Reboot the other nodes.
- or
- Enter the following command:

```
$ INSTALL REPLACE SYS$SHARE:DCLTABLES.EXE
```

### 1.3.2 Files Added to Your System after Installation

A number of files are involved in the installation of the HP RAID software. Some of these files are used in the installation procedure and then deleted; others are stored permanently in various directories of the system.

The following permanent files are added to the specified directories following installation and startup of the HP RAID software:

- SYS\$HELP:RAID\*.RELEASE\_NOTES
- SYS\$SYSTEM:RAID\$ERF.EXE
- SYS\$LOADABLE\_IMAGES:RAID\$DPDRIVER.EXE
- SYS\$SYSTEM:RAID\$SERVER\_MAIN.EXE
- SYS\$SYSTEM:RAID\$CLI\_MAIN.EXE
- SYS\$STARTUP:RAID\$STARTUP.COM
- SYS\$STARTUP:RAID\$SERVER\_MAIN.COM
- SYS\$MANAGER:RAID\$SYSTARTUP.TEMPLATE
- SYS\$MANAGER:RAID\$SERVER\_MAIN.LOG
- SYS\$MANAGER:RAID\$DIAGNOSTICS\_*nodename*.LOG
- SYS\$MESSAGE:RAID\$MESSG.EXE
- SYS\$TEST:RAID\$IVP.COM
- SYS\$EXAMPLES:RAID\$CONFIG.COM
- SYS\$EXAMPLES:RAID\$DISPLAY.COM

### 1.3.3 System File Modifications after Installation

#### 1.3.3.1 Starting the Software

The HP RAID software may be started either manually or automatically.

To automatically start HP RAID software after a system startup, include the SYS\$STARTUP:RAID\$STARTUP.COM in your system startup command procedure:

- SYS\$MANAGER:SYSTARTUP\_VMS

To manually start HP RAID software, enter the following command line:

```
$ @SYS$STARTUP:RAID$STARTUP.COM
```

### 1.3.3.2 The RAID\$STARTUP.COM and RAID\$SYSTARTUP.COM Files

You must invoke the RAID\$STARTUP.COM file on all the other licensed nodes in the cluster on which you wish to use HP RAID Software for OpenVMS.

#### The RAID\$STARTUP.COM File

HP RAID Software for OpenVMS provides a RAID\$STARTUP.COM file for you when you install the product. This file performs the following:

1. Installs the HP RAID DCL command line interface and message images with the appropriate privileges.
2. Loads the driver.
3. Starts the server process (which causes RAID arrays in the cluster to become available to this node).
4. Invokes RAID\$SYSTARTUP.COM.

#### The RAID\$SYSTARTUP.COM File

The RAID\$SYSTARTUP.COM file is designed to help you manage your RAID arrays. A template file, SYS\$MANAGER:RAID\$SYSTARTUP.TEMPLATE, is provided by the HP RAID installation. Create a RAID\$SYSTARTUP.COM file based on the template provided.

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#### Note

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HP does not recommended that you modify the actual template file because you may need it again in the future.

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When entering BIND commands in the RAID\$SYSTARTUP.COM file, specify all the disk drives that will be members of the RAID array. You may also want to include the list of spares in any spareset associated with the RAID array so that when a spareset is associated with a RAID array, the array's membership can change automatically without action by the user. Including the names of all current and possible future members in the BIND command helps ensure successful binds in the future when the membership of the RAID array has changed due to members being removed.

A BIND command search algorithm allows binds with incomplete or inaccurate BIND commands. Only disks that are valid members of the RAID array will be bound, so there is no drawback to including potential future members in the list. The BIND command requires at least one valid member to succeed. Thus, HP recommends that you periodically update the RAID\$SYSTARTUP.COM file if you are keeping your BIND commands in this file.

Similarly, when entering spareset BIND commands, list all current and potential future spares.

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#### CAUTION

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Because the RAID INITIALIZE command deletes all data on a disk, do not put RAID INITIALIZE commands in the RAID\$SYSTARTUP.COM file.

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### 1.3.3.3 The RAID SY\$MANAGER:SYSHUTDOWN.COM File

The RAID SHUTDOWN command informs the HP RAID Software for OpenVMS that the system is about to shut down. This command operates only on the issuing node and will unbind all arrays on the issuing node provided the RAID virtual devices are dismounted.

HP recommends that the RAID SHUTDOWN command be inserted into the system shutdown file (SY\$MANAGER:SYSHUTDOWN.COM) to ensure that underlying RAID members are dismounted correctly. To ensure that the RAID SHUTDOWN command completes successfully on a node, all RAID virtual devices must be dismounted on this node.

The RAID SHUTDOWN command performs the equivalent actions of the RAID UNBIND command on all RAID arrays, except that the UNBIND operation only affects the node which issued the RAID SHUTDOWN command. RAID arrays as seen by other nodes in the cluster will not change. The RAID SHUTDOWN command will also stop the RAID\$SERVER process.

### 1.3.3.4 Restarting the RAID\$SERVER Process

The RAID\$SERVER process can be restarted by using the RAID\$STARTUP.COM file:

```
$ @SYS$STARTUP:RAID$STARTUP.COM
```

Entering this command from the SYSTEM account causes the RAID software to restart the RAID\$SERVER process. The server process polls other nodes in the VMScluster and binds all RAID arrays known cluster wide.

Restarting the RAID\$SERVER process is intended to assist operations staff restart local RAID operations when the local RAID\$SERVER process has been stopped manually by mistake or has crashed due to a software inconsistency. If there are VMScluster conditions that will prevent the restarted process from completing its recovery (e.g., RAID array disks are in mount verification), restarting the RAID\$SERVER process may not result in complete local recovery of RAID arrays known cluster-wide.

## 1.3.4 Verifying the Installation

The following table describes what occurs with the Installation Verification Process (IVP) when you choose to execute the IVP during installation:

If...	The IVP...
You choose to start the HP RAID software,	verifies that all HP RAID files are in the proper directories.  executes a RAID SHOW command to verify that the RAID driver, server, and CLI are executing properly.
You choose not to start the HP RAID software,	verifies only that the HP RAID files are in the proper directories.

### Upgrading a Previous Version of HP RAID

If you are upgrading a previous version of the HP RAID software, the IVP will not run during installation.

### IVP Manual Execution

You can run the IVP manually by performing the following steps:

1. Log into the SYSTEM account
2. Execute the following command procedure:

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

### 1.3.5 Process Level Images

There are two process level images that are run with HP RAID software. The privileges the images have are shown in Table 1–2.

**Table 1–2 Two Process Level Images**

Process Images	Privileges
CLI	VOLPRO, SYSPRV, PHY_IO, DIAGNOSE, PRMMBX, CMKRNL, SYSLCK, SYSNAM, SHARE, TMPMBX
SERVER	VOLPRO, SYSPRV, PHY_IO, DIAGNOSE, SYSNAM, SYSLCK, NETMBX, TMPMBX, PRMMBX, SHARE, CMKRNL, READALL

### 1.3.6 Reporting Product Problems

If an error occurs while HP RAID Software for OpenVMS is being used and you believe that a problem with this product is causing the error, do one of the following:

- If you have an HP service agreement, call HP Services.
- If the product is under warranty and you do not have a HP service agreement, submit a problem report.

## 1.4 Deinstalling HP RAID Software

Use the PRODUCT REMOVE command to remove the software from your system. Before executing the remove command, you must remove the invocation of RAID\$STARTUP.COM from your SYSTARTUP\_VMS.COM startup command procedure and then reboot the system so the RAID software is not running at the time the product files are removed.

### Example 1–2 Sample Deinstallation

```
$ PRODUCT REMOVE RAID
The following product has been selected:
  HP OpenVMS RAID V3.0-133                Layered Product
Do you want to continue? [YES]
The following product will be removed from destination:
  HP OpenVMS RAID V3.0-133                DISK$I64SYS82:[VMS$COMMON.]
Portion done: 0%...10%...20%...30%...40%...50%...60%...70%...80%...100%
The following product has been removed:
  HP OpenVMS RAID V3.0-133                Layered Product
$
```

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