digital™

Installing Software Patches on Your StorageWorks Array Controller

Part Number: EK-PATCH-GD. A02

May 1998

Digital Equipment Corporation
Maynard, Massachusetts

April 1998

Printed in U.S.A.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Restrictions apply to the use of the local-connection port on this series of controllers; failure to observe these restrictions may result in harmful interference. Always disconnect this port as soon as possible after completing the setup operation. Any changes or modifications made to this equipment may void the user's authority to operate the equipment.

Warning!
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung!
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Avertissement!
Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l' utilisateur de prendre les mesures appropriées.

Contents

PREFACE

This document provides information about software patches that is not covered elsewhere in the documentation provided with your StorageWorks Array Controller. Individuals who configure, install, and use the controller should use this document.

Read this entire document before installing HSOF software patches.

Topics Covered

The following topics are included in this document:

- How to determine which patches are currently loaded on your array controller or PCMCIA card
- How to determine how much storage space is available on the PCMCIA card for new patches
- How to identify and delete patches that are no longer needed
- How to load new patches onto the PCMCIA card and controller
- Download location of available patches on the world wide web

Intended Audience

This document is intended for DIGITAL customers who currently operate an HSZ40, HSJ30, HSJ40, or HSD30 array controller and for DIGITAL Multivendor Customer Services personnel responsible for installing and maintaining systems that include these array controllers.

Typographical Conventions

Convention	Meaning
ALLCAPS BOLD	CLI command that you must enter to accomplish a particular task, for example: SET THIS_CONTROLLER PREFERRED_ID= (N,N,N)
ALLCAPS	CLI command discussed within a sentence or paragraph, for example: "Use the SHOW SPARESET command to show the contents of the spareset."
n	Numeric CLI command parameter or variable, for example: SET THIS_CONTROLLER PREFERRED_ID= (n,n,n) could be entered as: SET THIS_CONTROLLER PREFERRED_ID=(0,1,2)
[parameter]	Optional CLI command parameter or variable, for example: ADD RAIDSET disk-name1 disk-name2 disk-name3 [disk-nameN] Where [disk-nameN] indicates that you may enter more than three disk drive names.
lowercase italic	CLI command parameter or variable that you supply, for example: SHOW RAIDset-name could be entered as SHOW R1
-	One CLI command that wraps to two or more lines because of this manual's paper size. The hyphen is not part of the command; it merely connects two lines of a CLI command that you must enter on a single command line, for example: CLEAR_ERRORS THIS_CONTROLLER INVALID_CACHE – NODESTROY_UNFLUSHED_DATA should be entered all on one line as: CLEAR_ERRORS THIS_CONTROLLER INVALID_CACHE NODESTROY_UNFLUSHED_DATA
Monospaced	Screen display text.
italic	Cross-references to other manuals, for example: "See HSZ70 Array Controller HSOF Version 7.0 Service Manual for details."
⋮	Portion of an example or figure that has been omitted.
"this controller"	The controller that's serving your current CLI session.
"other controller"	The controller that's connected to "this controller" in a dual-redundant configuration.

Related Publications

The following table lists some of the documents related to the use of this product.

Document Title	Part Number
DIGITAL StorageWorks Ultra SCSI RAID Enclosure (BA370-Series) User's Guide	EK–BA370-UG
DIGITAL StorageWorks Ultra SCSI RAID Cabinet Subsystem Installation and User's Guide	EK-SW600-UG
HSZ40 Array Controller HSOF Version 3.1 Service Manual	EK-HSZ40-SV. 01
HSZ40 Array Controller HSOF Version 3.1 CLI Reference Manual	EK-CLI40-RM. 01
StorageWorks Array Controller HSZ40 Array Controller Operating Software HSOF Version 3.1 Release Notes	EK-HSZ40-RN. L01
StorageWorks Configuration Manager for DEC OSF/1 Installation Guide	AA–QC38A–TE
StorageWorks Configuration Manager for DEC OSF/1 System Manager's Guide for HSZterm	AA–QC39A–TE
StorageWorks Solutions Configuration Guide	EK–BA350–CG
StorageWorks Solutions Shelf and SBB User's Guide	EK–BA350–UG
StorageWorks Solutions SW300-Series RAID Enclosure Installation and User's Guide	EK–SW300–UG
The RAIDBOOK—A Source for RAID Technology	RAID Advisory Board
VAXcluster Console System User's Guide	AA–GV45D–TE
VAXcluster Systems Guidelines for VAXcluster System Configurations	EK–VAXCS–CG

Introduction

A code patch is a change to existing HSOF software that DIGITAL creates and distributes to its customers, usually in response to a code problem. To identify the patches that have been released for your controller, refer to the list of patches at http://www.storage.digital.com/menusupport.htm and select “Array Controllers”.

Follow the instructions included in this document to determine:

- Which patches are installed (*Listing Installed Patches*)
- How to delete patches that are no longer needed (*Deleting Obsolete Patches*)
- How to install patches that might be required but are missing from your controller (*Installing a Patch*).

Patching Controller Software

The Code Patch option of the Code Load/Code Patch (CLCP) utility allows you to enter small code changes to the controller’s software. The patches that you enter are placed directly into the controller's nonvolatile memory (NVMEM), and become active after the next controller initialization. If any storage devices have been initialized with the SAVE_CONFIGURATION switch of the INITIALIZE command, the patches that you enter are stored on those disks.

The CLCP utility allows multiple patches to be entered for a given software version. Each patch is associated with only one software version, and the CLCP utility verifies the patch against the currently installed software version. Each patch has a unique patch number to identify it. All patches require the installation of previous patches within that software version, before they can be installed.

The CLCP utility also allows you to list patches already installed. You may want to list patches before you install a patch to see what has previously been loaded and to see how much free space is available.

Run the CLCP utility from either a maintenance terminal or a virtual host terminal.

Code Patch Considerations

Be aware of the following when using the Code Patch function of the CLCP utility:

- The controller reserves approximately 1,000 bytes of NVMEM for patches.
- Each patch is associated with only one software version, and the CLCP utility verifies the patch against the currently installed software version.
- Patches are sequential; patch number one must be entered before patch number two, and so on. Patches are always numbered sequentially beginning with the number one.

- Because of the sequential patch structure, removing any patch also removes all higher numbered patches. For example, deleting patch number two also removes patches three, four, and so on.
- DIGITAL recommends that controllers in dual-redundant configurations have the same patches applied. Enter patches into each controller separately.

Listing Installed Patches

To find out which software patches are installed, use the List Patches option in the CLCP utility. The List Patches option allows you to display a listing of controller software versions and the currently installed patches that apply to them.

Following is an example of the List Patches option:

1. Connect a maintenance terminal to the controller.
2. Invoke the CLCP utility:

   RUN CLCP

   The CLCP main menu is displayed:

   ```
   Select an option from the following list:

   Code Load & Code Patch local program Main Menu

   0: Exit
   1: Enter Code LOAD local program
   2: Enter Code PATCH local program
   Enter option number  (0…2) [0]?
   ```

3. Enter option “**2**” to enter the patch program:

   ```
   You have selected the Code Patch local program. This
   program is used to manage firmware code patches. Select
   an option from the following list:

   Type ^Y or ^C (then press RETURN) at any time to abort
   Code Patch.

   Code Patch Main Menu

   0: Exit
   1: Enter a Patch
   2: Delete Patches
   3: List Patches

   Enter option number (0..3) [0]? 3
   ```

4. Enter option “**3**” to list patches.

   ```
   The following patches are currently stored in the
   patch area:

   Firmware Version  -  Patch number(s)
        ______          _________

         V27Z  -            2, 1
         V30Z  -          3, 2, 1
   ```

```
Currently, 91% of the patch area is free.
```

5. Note the amount of free patch area. You need to know how much space is available if you load a patch.
6. The SHOW THIS_CONTROLLER command also provides patch information in the form of a “dash number” following the software version.

In the following example, software Version 3.0 has had three patches applied to the current software.

At the CLI prompt, enter:

```
SHOW THIS_CONTROLLER

Controller:
HSXX0 ZG33400026 ➊Firmware V30Z-3, Hardware 0000
.
.
.
```

Note at ➊, the bold number 3 shows that three patches have been installed for software version 3.0

Installing a Patch

This option allows you to enter a patch directly into the controller's NVMEM. Enter the software version number to which the patch applies the patch length, the patch type, the patch number, the count, the RAM address, the new contents of that address, and a patch verification number.

Note: The patch data in these examples is provided only for the purpose of illustrating the code patch operation. Obtain actual code patch data for your controller’s software version from your DIGITAL representative or refer to the website at http://www.storage.digital.com/menusupport.htm and select “Array Controllers”.

The CLCP utility verifies that the patch you are entering is appropriate for the software version in the controller, and that there are no required previous patches. Enter only one patch at a time.

Error messages are displayed if you attempt to perform an illegal patch entry. Following is an example of the use of the patch entry option:

1. Obtain the appropriate patch data for your controller's software version from your Digital Equipment Corporation representative or the website previously provided.
2. Connect a maintenance terminal to the controller.

3. At the CLI prompt, enter:

   ```
   HSZ40> RUN CLCP
   ```

   The CLCP main menu is displayed:

   ```
   Select an option from the following list:

   Code Load & Code Patch local program Main Menu

   0: Exit
   1: Enter Code LOAD local program
   2: Enter Code PATCH local program

   Enter option number  (0…2)?
   ```

4. Enter option "**2**" for the code patch menu:

   ```
   You have selected the Code Patch program. This program is
   used to manage firmware code patches. Select an option
   from the following list:

   Type ^Y or ^C (then press RETURN) at any time to abort
   Code Patch.

   Code Patch Main Menu

   0: Exit
   1: Enter a Patch
   2: Delete Patches
   3: List Patches

   Enter option number (0…3)?
   ```

5. Select option "**1**" to enter a patch and press RETURN.

   ```
   This is the Enter a Patch option. The program prompts
   you for the patch information, one line at time. Be
   careful to enter the information exactly as it appears
   on the patch release.


   Patches may be installed for any version of firmware;
   however, patches entered for firmware versions other
   than V30Z are not applied until the matching version of
   firmware is installed.

   To enter any patch, you must first install all patches
   with lower patch numbers, beginning with patch number 1,
   for the specific firmware version.


   If you incorrectly enter the patch information, you are
   given the option to review the patch one line at a time.

   Type ^Y or ^C (then RETURN) at any time to abort Code
   Patch.

   Do you wish to continue (y/n) [y]?
   ```

6. Enter "**Y**" to continue.

7. Enter the required information as shown:

```
Version? V30Z
Length? 10
Patch Type? 0
Patch Number:? 1

Count:         ? 1
Address:       ? 10
Value[  0]     ? 0
Count:         ? 0

Verification: ? 18FG2118
The patch you just entered is not applied until
the controller is restarted.

Code Patch Main Menu

       0: Exit
       1: Enter a Patch
       2: Delete Patches
       3: List Patches

Enter option number (0…3) [0]?

CLCP - Normal Termination
Restart of the controller required to apply new patch

HSZ40>
```

8. If you are using a dual-redundant controller configuration, repeat the Installing a Patch procedure for the second controller.

Code Patch Messages

The CLCP utility does not allow you to incorrectly enter or delete patch information. The program provides messages to assist you with understanding any problems that you may encounter and suggests corrective actions.

Message:

`Firmware Version x does not have any patches to delete.`

Explanation:

You cannot delete a patch because the software (firmware) version entered does not have any patches entered.

Message:

`Firmware Version x does not have patch number x to delete.`

Explanation:

You cannot delete this patch because the software (firmware) version entered does not have the specified patch entered.

Message:

`The patch you entered is already installed on this controller.`

Explanation:

The specified patch is already present in the patch area of controller memory. If you wish to reenter this patch, first use the Delete Patch option.

Message:

`The patch you are entering requires other patches to be entered.`

Explanation:

You have attempted to enter a patch without first entering the lower numbered patches in the hierarchy. Enter all patches for this software (firmware) version that have lower numbers than the current patch. Then enter the current patch.

Message:

`WARNING The patch you are entering is not for the current firmware version x.`

Explanation:

The patch you are entering applies to a software version other than the one currently installed in the controller. Code Patch will allow you to enter the patch; however, the patch will not be applied until its correct software version is installed.

Message:

`You incorrectly entered the patch information.`

Explanation:

The patch information was not entered exactly. The program prompts you for each line of the patch entry, with the default from your previous response. Verify that each entry is exactly the same as the patch release. If you choose not to continue, or if you abort during this review procedure, the patch information you entered is lost and you must enter the entire patch again. Enter Ctrl/Z followed by Return at any prompt to choose the default for the remaining entries.

Message:

```
The patch you have just entered is not applied until the
controller firmware is changed to Version x.
```

Explanation:

The patch entered applies to a software version (firmware) other than the one currently installed in the controller. The CLCP utility will not apply the patch until its correct software version is installed.

Message:

```
You have requested deletion of a patch number that another
patch requires.
```

Explanation:

You are attempting to delete a patch in the hierarchy that has higher numbered patches entered. The CLCP utility allows you to proceed; however, the program deletes all the higher numbered patches in the hierarchy (for this software version) along with the specified patch.

Deleting Obsolete Patches

Use the Delete Patch option to free memory space for patches that need to be added to the current software version. When patches are removed from controller memory, they are also removed from storagesets that have been initialized with the INITIALIZE *container-name* SAVE_CONFIGURATION command.

Note: The version and patch numbers in this procedure are only examples. The CLCP utility does not allow any of the numbers used in these examples.

To remove a patch:

1. Connect a maintenance terminal to one of the controllers.
2. Start the CLCP utility:

   RUN CLCP

   The CLCP main menu is displayed.

   ```
   Select an option from the following list:

   Code Load & Code Patch Utility Main Menu

   0: Exit
   1: Enter Code LOAD utility
   2: Enter Code PATCH utility
   Enter option number  (0…2) [0]?
   ```
3. Press **2** to select the code patch program:

   The code patch menu is displayed:

   ```
   You have selected the Code Patch local program. This
   program is used to manage firmware code patches.
   ```



```
Select an option from the following list:

Type ^Y or ^C (then press RETURN) at any time to
abort Code Patch.
Code Patch Main Menu

0: Exit
1: Enter a Patch
2: Delete Patches
3: List Patches

Enter option number (0…3) [0]?
```

4. Select option **2** to delete a patch:

```
This is the Delete Patches option. The program
prompts you for the firmware version and patch number
you wish to delete. If you select a patch for
deletion that is required for an other patch, all
dependent patches are also selected for deletion. The
program lists your deletion selections and asks if
you wish to continue.

Type ^Y or ^C (then press RETURN) at any time to
abort Code Patch.

The following patches are currently stored in the
patch area:
```

Firmware Version	-	Patch Number(s)
V123		1,2
V456		1

```
Currently 90% of the patch area is free.

Firmware Version of patch to delete?
```

5. Enter the firmware version V456.

```
Patch Number to delete?
```

6. Press **1** to select patch 1:

```
The following patches have been selected for deletion:

Firmware Version - Patch number(s)

    V456 1

Do you wish to continue (y/n) [y]?
```

7. Press **Y** to continue.

```
The patch you have just deleted is currently applied,
but will not be applied when the controller is
restarted.

Code Patch Main Men

0: Exit
1: Enter a Patch
2: Delete Patches
3: List Patches

Enter option number (0…3) [0]?

The following patches are currently stored in the
patch area:
```

Firmware Version	-	Patch Number(s)
V123		1,2

```
Currently, 95% of the patch area is free.
```


Patch Repository

Patches for all releases of HSOF software are available from either your DIGITAL representative or the following website:
http://www.storage.digital.com/menusupport.htm
and select "Array Controllers".