Sun Flash Accelerator F80 PCIe Card User's Guide

Part No: E41251-02
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Contents

Using This Documentation

This user's guide provides detailed procedures that describe installing, configuring, and servicing Oracle's Sun Flash Accelerator F80 PCIe Card.

This document is written for technicians, system administrators, authorized service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

Note - For specific installation instructions, see your server installation guide. For information about restrictions and use of the Sun Flash Accelerator F80 PCIe Card on your server, see the most recent version of the server product notes.

This preface contains the following sections:

Product Notes

For late-breaking information and known issues about this product, refer to the product notes at the Sun Flash Accelerator F80 PCIe Card Documentation Library:

`http://www.oracle.com/goto/SunFlashF80/docs`

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Provide feedback about this documentation at:

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Change History

The following lists the release history of this documentation set:

- October 2013. Initial publication.
- December 2013. Updated Preface.

Sun Flash Accelerator F80 PCIe Card Overview

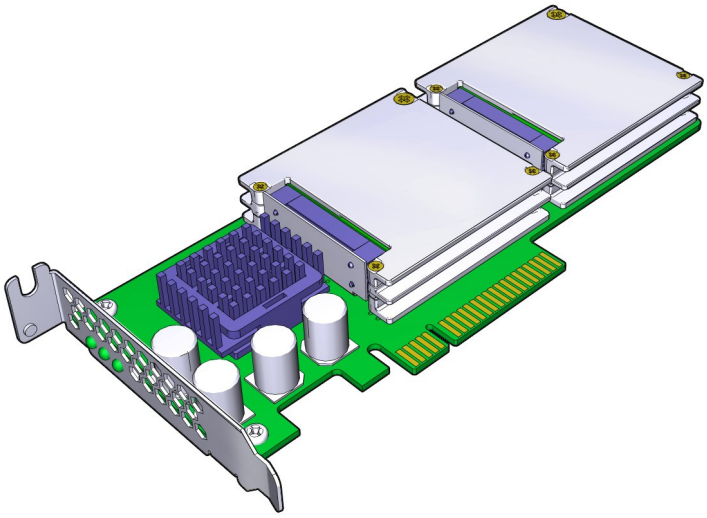
Review the following product information sections before you install or service the Sun Flash Accelerator F80 PCIe Card:

Card Overview

The following sections provide an overview of Sun Flash Accelerator F80 PCIe Card features:

About the Sun Flash Accelerator F80 PCIe Card

The Sun Flash Accelerator F80 PCIe Card is a turnkey PCI-E 2.0, host bus adapter (HBA), low-profile, half-height, and half-length PCIe board form factor flash memory storage card. The following image shows a Sun Flash Accelerator F80 PCIe Card.



Related Information

- “Card Specifications” on page 15

Key Features

Sun Flash Accelerator F80 PCIe Card key features include:

Feature	Description
Proven enterprise reliability	Block-level and page-level failure protection.
Best-in-class read and write performance	0.085 msec write latency (8k transfer size).
Capacity	800 GB, usable.
Life monitoring capability	Functional life expectancy based on read/writes such as write workloads, duty cycle writes, and retired blocks.
Low host burden	No static CPU and memory overhead.
Operating systems	Oracle Solaris supported OSes.
PCIe standard	PCI Express– 2.0, x8, PCIe low-profile bracket.
LED status indicators	Three board-mounted, right-angle LEDs shine through the PCI bracket to indicate activity, drive life, and status.

Characteristics

The Sun Flash Accelerator F80 PCIe Card has the following general characteristics:

Characteristic	Value
Device name	Sun Flash Accelerator F80 PCIe Card
Manufacturing name	Sun Flash Accelerator F80 PCIe Card
Capacity	800 GB, usable, 200 GB per flash memory module
Firmware	IT
NAND	eMLC (enterprise multilevel cell)
Card style	Low-profile, half-height, and half-length PCIe board

Related Information

- “Card Specifications” on page 15

Card Hardware Components

The Sun Flash Accelerator F80 PCIe Card contains these hardware components:

Component	Description
Four SSD flash memory modules	Total of 800 GB 24nm eMLC NAND flash is directly mounted on the card in two stacks. Each flash memory module hosts an integrated multi-channel NAND flash controller.
PCI-E to SAS protocol controller	The card host controller has a PCI-E 2.0 x8 host interface connecting to a SAS/SATA x4 6 Gbit/sec protocol controller.
Energy storage components	Energy storage component capacitance allows time to shut down tasks cleanly, assuring full data retention during loss of power.

The Sun Flash Accelerator F80 PCIe Card is a block storage device, with block sizing optimization capabilities. You can use the card for either nonpersistent or persistent data. The card offers high-performance with low latency and a low CPU burden. The Sun Flash Accelerator F80 PCIe Card is designed with advanced enterprise multi-level cell NAND (eMLC) technology for high-level performance and write durability, while providing higher capacity than SLC NAND cards.

The Sun Flash Accelerator F80 PCIe Card presents itself to the operating system through a Fusion-MPT™ interface as a flash card with four drives, that requires minimal user configuration. The card functions using a SAS controller with drive firmware running on its internal processor. The controller connects to up to four embedded flash memory modules.

For example, two Sun Flash Accelerator F80 PCIe Card available drives display as follows in an Oracle Solaris operating system:

```
      2. c0t5002361000096074d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000096074
      3. c0t5002361000096412d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000096412
      4. c0t5002361000098849d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000098849
      5. c0t5002361000096282d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000096282
      6. c0t5002361000099524d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000099524
      7. c0t5002361000087004d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000087004
      8. c0t5002361000087090d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000087090
      9. c0t5002361000098913d0 <ATA-2E256-TU2-510B00-UI5F cyl 65533 alt 2 hd 32 sec
186>
         /scsi_vhci/disk@g5002361000098913
```

The Sun Flash Accelerator F80 PCIe Card uses a low-profile, half-height, and half-length PCIe board, as shown in the following illustration.

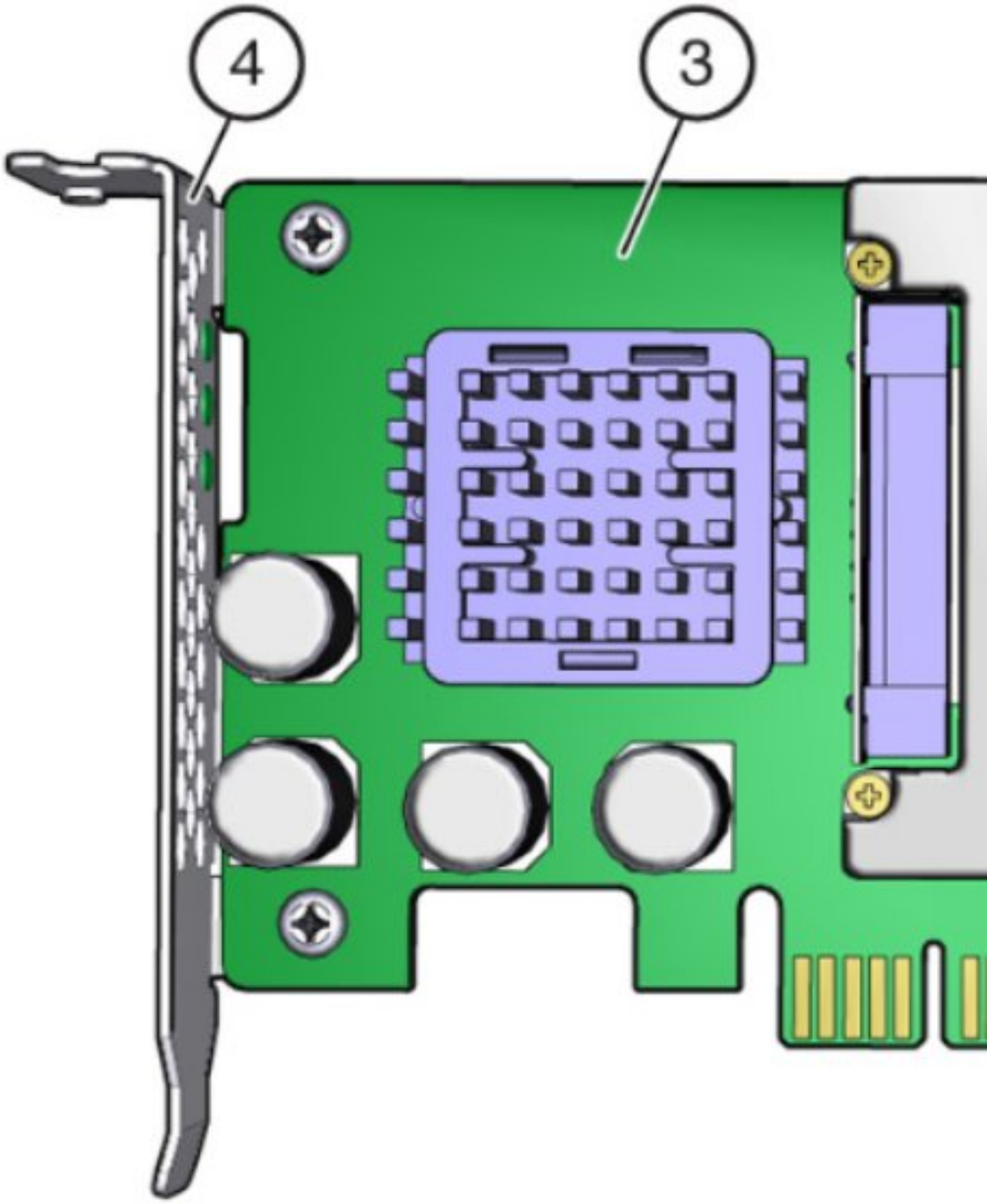

4
3

Figure Legend

1	Flash stack 1 (Cage 1)
2	Flash stack 2 (Cage 2)
3	Board
4	Bracket

The card meets the PCI low-profile MD2 specification. The card has a PCIe interface that complies with the PCI Express Specification 2.0.

Related Information

- “Card Software and Firmware Components” on page 14

Card Software and Firmware Components

The following firmware and software modules are included with the Sun Flash Accelerator F80 PCIe Card:

Component	Description
SAS controller firmware	The SAS firmware controller runs on the PCIe host controller board of the Sun Flash Accelerator F80 PCIe Card.
Flash controller firmware	The NAND flash controller firmware provides firmware for the four SSD flash memory modules.
DDCLI	The DDCLI software is a user application. The `ddcli` utility is a standalone CLI that allows you to service and monitor any Sun Flash Accelerator F80 PCIe Card connected to the server.

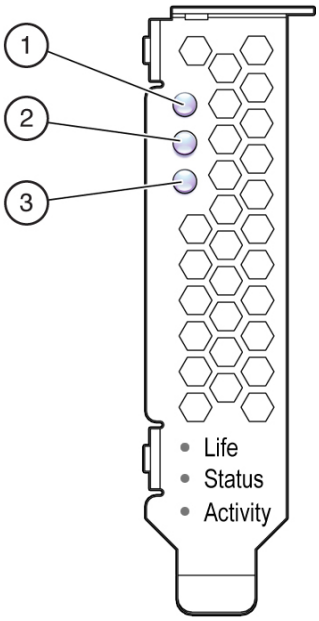
Refer to the *Sun Flash Accelerator F80 PCIe Card Product Notes* for compatibility with hardware, firmware, and software.

Related Information

- “Card Hardware Components” on page 11

Card LEDs

Use the Sun Flash Accelerator F80 PCIe Card LEDs to determine the status of the card. Three LEDs that are located on the PCI bracket indicate drive life, card status, and card activity.

Image	Normal LED state	Service required
	(1) Life LED - Green steady (2) Status LED - Green steady (Blinking Green - Locate indicator) (3) Activity LED - Green blinks when flash memory module access, dark when idle	Yellow, Red Yellow, Red

Related Information

- “Troubleshooting Using Card LEDs” on page 54

Card Specifications

The following sections provide information you need before installing or servicing the Sun Flash Accelerator F80 PCIe Card:

- “Physical Dimensions” on page 16
- “Environmental Specifications” on page 16

- “Electrical Specifications” on page 17

Note - For server specifications, see the most recent version of the server product notes. For compliance specifications, refer to the *Sun Flash Accelerator F80 PCIe Card Safety and Compliance Guide*, go to `http://www.oracle.com/goto/SunFlashF80/docs`.

Physical Dimensions

The Sun Flash Accelerator F80 PCIe Card has the following physical dimensions:

Specification	Dimension
Height	2.7 in. (70 mm)
Length	6.6 in. (167 mm)
Weight	0.5 lb / 10 oz maximum (283.5 g)

Related Information

- “About the Sun Flash Accelerator F80 PCIe Card” on page 9

Environmental Specifications

The Sun Flash Accelerator F80 PCIe Card operates and is stored in an environment defined by the following parameters:

Specification	Measurement
Temperature range	■ Operatiing temperature: 0 ˚C to 74˚C (measured at card temperature sensor) ■ Operational environment: 5 ˚C to 55˚C (dry bulb) ■ Storage and transit environment: –20 ˚C to 75 ˚C (dry bulb) ■ Thermal sensor temperature cannot exceed 75 ˚C ■ Maximum dry bulb temperature shall be derated by 3.3 ˚C per 1000 m above 500 m ■ Four thermal sensors on the cards monitor each flash memory module
Relative humidity range	■ Operational environment: 8% to 80% noncondensing ■ Storage and transit environment: 5% to 95% noncondensing ■ Non-operating: -20˚C to 75˚C noncondensing
Altitude	■ Operational environment: Up to 9840 ft (3,000 m)

Specification	Measurement
	■ Storage and transit environment: Up to 39,370 ft (12,000 m)
Airflow requirement	More than 200 LFPM (linear feet/minute)

The Sun Flash Accelerator F80 PCIe Card is designed to provide continuous full bandwidth performance with flash memory module temperatures up to 73 ˚C. Qualified host platforms with required software updates operate with sufficient margin to the maximum temperature under worst case environments.

Should the system maximum operating temperature be exceeded, or a system fault occur which causes internal temperatures of the flash memory modules to rise above this limit, the card responds as follows:

- 74 ˚C - Drive write throttling is engaged to reduce card power.
  - Card status LED yellow.
  - Temperature warning displays in `ddcli -health` output.
- 76 ˚C - Additional drive write throttling is engaged.
  - Card status LED red.
  - Critical temperature status displays in `ddcli -health` output.

Caution - Sustained critical temperatures may cause data loss.

Note - For specific site planning guidelines and best practices, refer to the server site planning guide and product notes for your server.

Related Information

- “About the Sun Flash Accelerator F80 PCIe Card” on page 9

Electrical Specifications

The Sun Flash Accelerator F80 PCIe Card receives power from the PCI Express +12 VDC and +3.3 VDC power rails as shown in the following table:

Specification	Value	3.3 Vdc	12.0 Vdc
DC power requirements	PCI Express	DC voltage 3.3 V +/-5%	12 V +/- 8%

Specification	Value	3.3 Vdc	12.0 Vdc
Power dissipation	Not to exceed 23.5 W		
DC voltage tolerance	3.3 V +/-5%	3.3 V aux +/-5%	12 V +/-8%
DC current		**Idle**:	**Max (100% write)**:
	+12 V:	510 mA rms	1.62 A rms
	+3.3 V:	1.6 A rms	1.65 A rms
	+3.3 V aux:	30 mA rms	30 mA rms
	Total power:	11.5 W	25 W max

Related Information

- “About the Sun Flash Accelerator F80 PCIe Card” on page 9

Preparing the Card for Installation

The following sections contain information about preparing a Sun Flash Accelerator F80 PCIe Card for installation:

Note - For specific installation instructions, see your system installation guide. For information about installation and use of the card on your server, see the most recent version of the server product notes.

Required Tools

You need the following tools to install or service the Sun Flash Accelerator F80 PCIe Card:

- Antistatic wrist strap
- Antistatic mat
- No. 1 Phillips screwdriver

Related Information

- “Installing the Card Into a Server” on page 26

Ship Kit Contents

The ship kit contains the components shown in the following diagram:

FIGURE 2 Sun Flash Accelerator F80 PCIe Card Ship Kit Contents

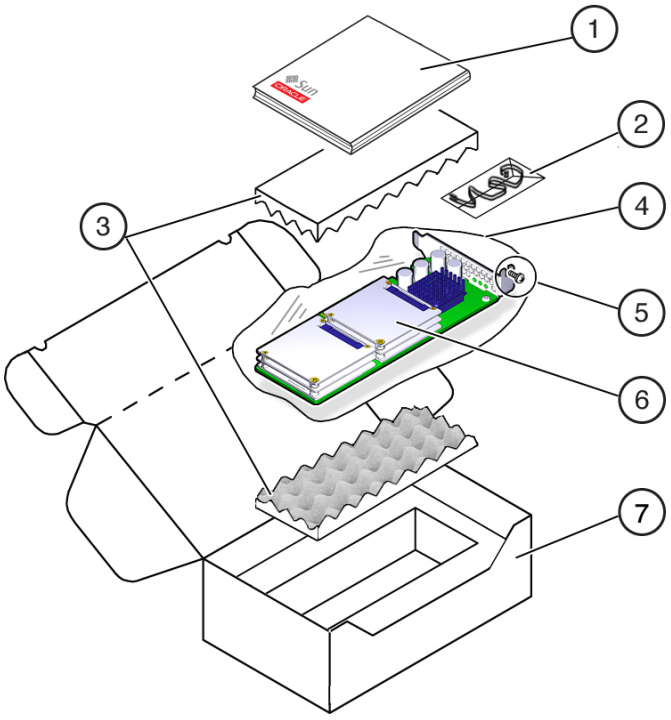


Figure Legend

1. Documentation
2. ESD wrist strap (Note: Not included in some ship kits)
3. Foam
4. Antistatic bag
5. Bracket screw
6. Sun Flash Accelerator F80 PCIe Card with low profile PCIe mounting bracket
7. Packaging

Related Information

- “Installing the Card Into a Server” on page 26

Observing Safety Precautions

This section contains information about safeguarding the equipment and personnel from damage:

General Safety Information

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all cautions and instructions marked on the equipment.
- Follow all cautions and instructions described in the documentation shipped with your system, and described in the server's safety information.
- Follow the electrostatic discharge safety practices as described in this section.
- Handle the card by the edges.

Safety Symbols

Note the meanings of the following symbols that might appear in this document:

Caution - There is a risk of personal injury or equipment damage. To avoid personal injury and equipment damage, follow the instructions.

Caution - Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.

Caution - Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

ESD Safety Measures

Electrostatic discharge (ESD) sensitive devices, such as the motherboard, PCI cards, hard drives, and memory modules, require special handling.

Caution - Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components along their connector edges.

Caution - You must disconnect all server power supplies before servicing any of the components documented in this guide.

Antistatic Wrist Strap

Wear an antistatic wrist strap when handling ESD-sensitive components.

Antistatic Mat

Place ESD-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat (not provided).

Related Information

- “Perform ESD Prevention Measures” on page 22

▼ Perform ESD Prevention Measures

1. **Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.**

   Place ESD-sensitive components such as the printed circuit boards on an antistatic mat. The following items can be used as an antistatic mat:

   - **Antistatic bag used to wrap a replacement part**

- **ESD mat**
- **A disposable ESD mat (shipped with some replacement parts or optional system components)**

2. **Attach an antistatic wrist strap.**

   When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

Related Information

- "ESD Safety Measures" on page 22

▼ Update the Host Operating System

Check the Sun Flash Accelerator F80 PCIe Card Product Notes for the latest firmware requirements, available at the *Sun Flash Accelerator F80 PCIe Card Documentation Library*:

`http://www.oracle.com/goto/SunFlashF80/docs`.

- **Download and install any firmware updates required to support the card, host bus adapter (HBA), drive backplane, system BIOS, or OBP/system (Oracle Solaris) firmware for your system from this location:**

  `https://support.oracle.com`

Note - The Sun Flash Accelerator F80 PCIe Card firmware update procedure is described in "Update the Card Firmware" on page 34.

Installing the Card

This section contains information about installing the Sun Flash Accelerator F80 PCIe Card into a server.

Related Information

- "Preparing the Card for Installation" on page 19
- "Sun Flash Accelerator F80 PCIe Card Overview " on page 9

Installation Overview

To quickly install your Sun Flash Accelerator F80 PCIe Card into a system, refer to the following table:

Steps	Description	See
1.	Prepare the card for installation. Carefully unpack the card and inspect it for damage. Follow ESD precautions.	"Preparing the Card for Installation" on page 19
2.	Prepare the system for service. Turn off the system. Remove all server power cords. Remove the server cover.	Refer to the server service manual.
3.	Insert the card in an available PCIe slot.	"Installing the Card Into a Server" on page 26
4.	Secure the bracket to the system's chassis.	"Install a New Card" on page 27, and refer to the server service manual.
5.	Return the server to service. Replace the cover and the power cord, and then power up the system.	Refer to the server service manual.

Related Information

- “Remove an Existing Card From a Server” on page 31

Installing the Card Into a Server

Follow the instructions in the following sections to install or replace the Sun Flash Accelerator F80 PCIe Card.

Note - For specific PCIe card installation instructions, see your server service manual and product notes.

- “Card Optimization Guidelines” on page 26
- “Install a New Card” on page 27
- “Remove an Existing Card From a Server” on page 31

Card Optimization Guidelines

Block size can be configured through a server OS or file system, and is set to a default size with Oracle databases.

The Sun Flash Accelerator F80 PCIe Card is designed to provide best performance for data transfers that are multiples of 8k size, and using addresses that are 8k aligned. Partitions should be aligned to start on 8k boundaries.

Oracle Solaris OS automatically ensures 8k alignment when the default `SMI` label type is selected. If a label of type `EFI` is desired, care must be taken to specify and ensure 8k alignment: the default start sector of 34 for `EFI` labels is not an 8k aligned value. Use the `partition` subcommand of the Solaris `format` command to change the start sector to 48, or any other 8k aligned value. Note that there are 512B per sector.

The ZFS file system automatically aligns partitions to start on 8k boundaries when a full disk is allocated to ZFS (recommended). If you allocate individual `EFI` partitions to a ZFS pool, ensure the partition is 8k-aligned as discussed above. For optimal performance of ZFS with the Sun Flash Accelerator F80 PCIe Card, refer to the *ZFS Best Practices Guide* and the *ZFS Evil Tuning Guide*.

For highest performance, verify that the following hardware criteria are met:

- The PCI Express slot is PCIe 2.0.
- The PCI Express slot has an active width of 8 or 16 (x8 or x16).
- The system meets the physical, environmental, and electrical specifications listed in "Card Specifications" on page 15.

The Sun Flash Accelerator F80 PCIe Card functions in x4 and x2 slots, with an active width of 4 or 2, but with reduced performance.

Related Information

- "Card Hardware Components" on page 11
- https://wikis.oracle.com/display/systemsperformance/Flash+and+SSD+Performance
- Tuning ZFS When Using Flash Storage http://docs.oracle.com/cd/E26502_01/html/E29022/chapterzfs-flash.html

▼ Install a New Card

Before You Begin To install a new Sun Flash Accelerator F80 PCIe Card:

1. **Back up your data, as required, before changing your server configuration.**
2. **Prepare the card for installation.**

   See "Preparing the Card for Installation" on page 19.

   a. **Gather the required tools.**

      See "Required Tools " on page 19.

   b. **Unpack the shipping kit that includes the card.**

      See "Ship Kit Contents" on page 20.

   c. **Remove the card from the antistatic bag using good good antistatic grounding procedures.**

      See "ESD Safety Measures" on page 22.

   d. **Carefully inspect the card for damage.**

If you notice any damage, contact Oracle support , or your reseller support representative. Go to: https://support.oracle.com.

3. **Prepare the server for service.**

   Refer to the servers service manual.

   a. **Remove the server from active operation.**

   b. **Turn off the server.**

      Power down the system.

   c. **Disconnect all power cords from the server power supplies.**

      Refer to the servers service manual.

   d. **Remove the cover from the chassis.**

Caution - Electric shock hazard. Disconnect the server from the main power and from any networks before installing the card to avoid electrical shock.

4. **Identify a supported and available PCI Express slot in the server.**

   Refer to the *Sun Flash Accelerator F80 PCIe Card Product Notes* at http://www.oracle.com/goto/SunFlashF80/docs.

Note - Exceeding the maximum number of Sun Flash Accelerator F80 PCIe Cards or placing cards in unsupported slots results in host platform error report and shutdown.

5. **Insert the card in the supported PCI Express slot.**

   a. **Remove the blank bracket panel on the server chassis that aligns with the empty PCI Express slot.**

      Save the bracket screw, if applicable.

   b. **Align the card to the PCI Express slot.**

   c. **Press down gently, but firmly, to properly seat the card in the slot.**

      The following figure shows how to insert the card in a PCI Express slot:

FIGURE 3 Sun Flash Accelerator F80 PCIe Card Installation

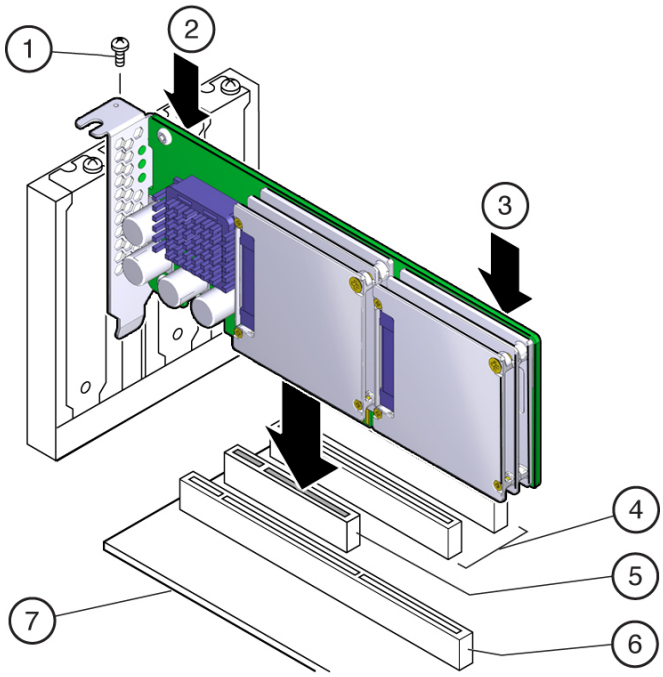


Figure Legend

1	Bracket screw
2	Press here
3	Press here
4	32-bit slot (3.3 V only)
5	PCI express x8 slot
6	64-bit slot (3.3 V only)
7	Motherboard

Note - Your server chassis may contain a card riser or other configuration. Refer to the servers service manual for card installation instructions.

6. Secure the card bracket to the server chassis.

- **Install the bracket screw, as required, to secure the card to the server chassis. or**
- **Engage the server retention mechanism to secure the card to the server chassis.**

7. **Return the server to service.**

   Refer to the servers service manual.

   a. **Replace the cover.**

   b. **Reconnect the power cord and any network cables.**

   c. **Power on the system.**

   The card hardware installation is complete.

8. **If applicable, perform any required commands for your system to recognize the new card.**

   For the Oracle Solaris OS, enter the `reboot` command with the reconfiguration option. Refer to the servers administration guide.

9. **Verify successful installation of the card through your systems OS.**

   Upon completed installation, the Sun Flash Accelerator F80 PCIe Card appears on your server. Refer to the servers administration guide.

10. **Configure the system to maximize flash technology.**

    Refer to the *Sun Flash Accelerator F80 PCIe Card Product Notes* at `http://www.oracle.com/goto/SunFlashF80/docs`.

    Refer to the servers administration guide.

Related Information

- "Installation Overview" on page 25

▼ Remove an Existing Card From a Server

For specific PCIe card removal instructions, refer to the system service manual and product notes.

1. **Prepare the server for service.**

   Refer to the servers service manual.

   a. **Remove the server from active operation.**

   b. **Turn off the server.**

      Power down the system.

   c. **Disconnect all power cords from the server power supplies.**

      Refer to the servers service manual.

   d. **Remove the cover from the chassis.**

Caution - Electric shock hazard. Disconnect the server from the main power and from any networks before installing the card to avoid electrical shock.

2. **Remove the bracket from the server chassis [1].**

   Remove the bracket screw.

3. **Remove the card from the server chassis [2].**

   Carefully lift the card out of the PCIe slot to remove the card.

Caution - Hot surface. Avoid contact. Equipment surfaces are hot and might cause personal injury if touched.

FIGURE 4 Sun Flash Accelerator F80 PCIe Card Removal

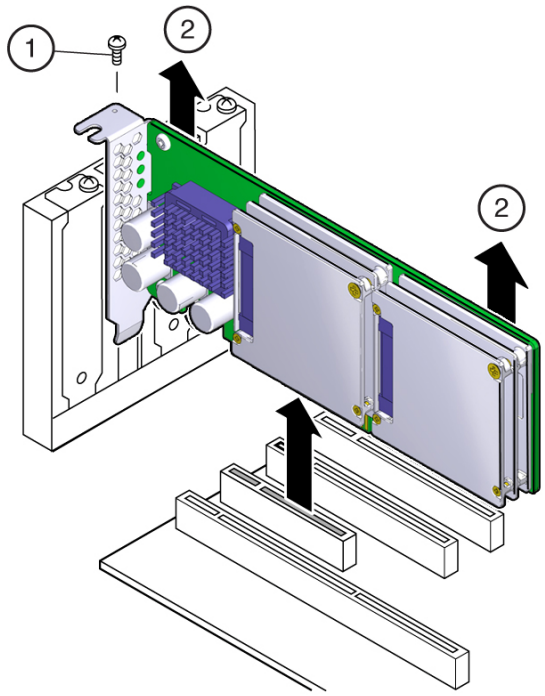


Figure Legend

1	Bracket screw
2	Lift here

4. **Install the new card, as required.**

   Refer to "Install a New Card" on page 27.

Related Information

- "Installation Overview" on page 25

Servicing the Card

The following sections contain service information for the Sun Flash Accelerator F80 PCIe Card.

This section includes the following sections:

Service Overview

For service, the Sun Flash Accelerator F80 PCIe Card contains updatable flash ROM for storing the BIOS and firmware, and also NVRAM for storing nonvolatile configuration data. Use DDCLI to monitor and service the card. You can also use the MegaRAID Storage Manager (MSM) software utility for troubleshooting.

In addition, you can monitor Sun Flash Accelerator F80 PCIe Card health and flash media life through card bracket LED status indicators. The card has three LEDs on the PCI bracket to indicate activity, drive life, and status. See "Troubleshooting Using Card LEDs" on page 54.

The Sun Flash Accelerator F80 PCIe Card requires no periodic maintenance. For data protection, the Sun Flash Accelerator F80 PCIe Card is designed with energy storage components, such as on-board capacitors, to complete buffered writes to the persistent flash storage in case of a sudden power loss. These energy storage components are designed for the life of the Sun Flash Accelerator F80 PCIe Card and do not require periodic maintenance.

The Sun Flash Accelerator F80 PCIe Card is a complete field-replaceable unit (FRU), with no removeable components. Individual flash disks are not field serviceable, and should never be

removed, even though the `ddcli` utility identifies each SSD flash module DFF using unique descriptors.

Related Information

- “Servicing the Card Using the `ddcli` Utility” on page 36
- “Troubleshooting Using Card LEDs” on page 54
- “Sun Flash Accelerator F80 PCIe Card Overview ” on page 9

Update the Card Software

Check the Sun Flash Accelerator F80 PCIe Card Product Notes for the latest software requirements, available at:

`http://www.oracle.com/goto/SunFlashF80/docs`

- **Refer to the SPARC server documents.**

Related Information

- “Servicing the Card Using the `ddcli` Utility” on page 36

Update the Card Firmware

Check the Sun Flash Accelerator F80 PCIe Card Product Notes for the latest firmware requirements, available at:

`http://www.oracle.com/goto/SunFlashF80/docs`

The Sun Flash Accelerator F80 PCIe Card has two sets of firmware. Both firmware sets are updated as a single F80 firmware package using the `ddcli` utility, or MSM:

- NAND flash controller firmware
- SAS controller firmware (host PCIe to SAS controller)

1. **Download and store any firmware updates required to support the Sun Flash Accelerator F80 PCIe Card from this location:**

   `https://support.oracle.com`

2. **Use the `-listall` command to identify the selected Sun Flash Accelerator F80 PCIe Card.**

   See "List All Command" on page 39.

3. **Verify that the firmware package file that is installed in the Sun Flash Accelerator F80 PCIe Card requires updating.**

   See "Health Reporting Command" on page 44.

4. **(Optional) If you are updating only specific cards in the server, use the `-locate` command to identify the logical mapping of the Sun Flash Accelerator F80 PCIe Card.**

   Skip this step if you are updating all cards in the server with the specified firmware package.

   See "Locate Card Command" on page 47.

5. **Use the `-updatepkg` command to update the selected Sun Flash Accelerator F80 PCIe Card with the specified firmware package.**

   See "Update Flash Package Command" on page 43.

6. **Verify that the updated firmware package is installed in the Sun Flash Accelerator F80 PCIe Card.**

   See "Health Reporting Command" on page 44.

Related Information

- "Servicing the Card Using the `ddcli` Utility" on page 36
- "Update the Card Software" on page 34

Technical Support

For assistance installing, configuring, or running the Sun Flash Accelerator F80 PCIe Card, contact My Oracle Support (MOS). Please have your CSI Customer Support ID ready. Go to My Oracle Support:

`https://support.oracle.com`

Sign in to My Oracle Support to open a service request. Call Oracle support, using the appropriate number from the Oracle Global Customer Support Contacts Directory:

`http://www.oracle.com/us/support/contact-068555.html`

Servicing the Card Using the ddcli Utility

This section includes the following sections:

Accessing the ddcli Utility

The ddcli utility supports both a text menu and a command line interface (CLI) interface to service the Sun Flash Accelerator F80 PCIe Card.

Before you begin, download the ddcli utility at http://support.oracle.com. Search under product F80. Refer to the Sun Flash Accelerator F80 PCIe Card product notes for additional download information at http://www.oracle.com/goto/SunFlashF80/docs.

Note - The term WarpDrive refers to the Sun Flash Accelerator F80 PCIe Card in the menu and CLI text.

▼ Access Text Menu Interface in ddcli Utility

To access the ddcli utility in text menu mode:

1. **Start the ddcli utility in text menu mode by typing the ddcli command command without any options:** `ddcli`

The ddcli utility displays the following top-level menu, showing a list of cards in the system. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00

Select the WarpDrive [1-4 or 0:Quit]
```

2. **Select a Sun Flash Accelerator F80 PCIe Card ID 1 to 4 (ELP).**

3. **After you select one of the cards in the top-level menu, the ddcli utility displays the following menu:**

```
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]:
```

4. **Select the operation [1-7 or 0:Quit]:**

Related Information

- “Access Command Line Interface (CLI) in ddcli Utility” on page 37

▼ Access Command Line Interface (CLI) in ddcli Utility

To access the ddcli utility in CLI mode, type one of the following commands:

- **ddcli -< -c DDiD > -< -option arg >**

  - **or ddcli**

Related Information

- “Access Text Menu Interface in ddcli Utility” on page 36

Verify Card Status

To assess if the Sun Flash Accelerator F80 PCIe Card is ready to be used:

1. **Run the `ddcli` utility.**
   See "Access Text Menu Interface in `ddcli` Utility" on page 36.
2. **List card information.**
   - **Select 1 in text interface. or:**
   - **Type `ddcli -listall`**

   See "List All Command" on page 39
3. **Display card health.**
   - **Select 3 in text interface. or:**
   - **Type ddcli `-health`**

   See "Health Reporting Command" on page 44

Related Information

- "`ddcli` Utility Command Summary" on page 38

`ddcli` Utility Command Summary

The following table lists all of the user commands supported by the `ddcli` utility. The sections following the table provide detailed descriptions of each command in the `ddcli` utility.

Command	Action
`-listall`	Display information about the cards in the system. You do not need to select card number (-c).
`-list`	List all information about the selected cards.
`-updatepkg`	Update card firmware with the flash package.
`-health`	Display the health of the selected card.
`-locate`	Locate the selected card in the system.

Command	Action
`-format`	Format the selected cards.
`-showvpd`	Show the Vital Product Data.
`-getsmartlog`	Extract the SMART Logs.
`-help`	Display help for command line usage. You do not need to select card number (-c).
`-c`	Card Number. Type the card ID option after the `ddcli` command to specify a card with an ID number range from 1 to 256.

Related Information

- "Servicing the Card Using the `ddcli` Utility" on page 36

List All Command

The `-listall` command identifies all Sun Flash Accelerator F80 PCIe Cards installed in a server.

The following information is displayed with the `-listall` command:

- Card ID number
- Card name
- Card flash package version
- PCI address

Text Menu Interface Usage: The `ddcli` utility lists seven commands. Type `1` to list all installed Sun Flash Accelerator F80 PCIe Cards installed in a server, as shown in the following example:

```
# ddcli

1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 1
```

Command Line Interface Usage: Enter the following line of text in the CLI to run the `-listall` command: `ddcli -listall`

The `-listall` command runs without any command line parameter. You need not specify the `-c` option on the command line.

Sample Output: When the `-listall` command runs, the `ddcli` utility outputs the following text. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00
```

Related Information

- "Verify Card Status" on page 38
- "`ddcli` Utility Command Summary" on page 38

List Command

The `-list` command lists the physical device information of a selected Sun Flash Accelerator F80 PCIe Card.

The following Sun Flash Accelerator F80 PCIe Card information is displayed with the `-list` command.

- Sun Flash Accelerator F80 PCIe Card ID
- PCI address
- SAS address
- Card flash package version
- RAID support

Text Menu Interface Usage: The following top-level menu lists the cards in the system and prompts you to select a card on which to perform an operation. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
# ddcli

ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
```

```
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00
Select the WarpDrive [1-4 or 0:Quit]: 1
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 1
```

Command Line Interface Usage: In CLI mode, select a Sun Flash Accelerator F80 PCIe Card by including its card number (adapter index). Enter the following line of text in the CLI to run the -list command: `ddcli -c 1 -list`

Sample Output: When the `-list` command runs, the `ddcli` utility outputs the following text:

```
# ddcli -c 1 -list

********************************************************************************
   LSI Corporation WarpDrive Management Utility
   Version 110.110.03.00 (2013.07.12)
   Copyright (c) 2013 LSI Corporation. All Rights Reserved.
********************************************************************************

WarpDrive Selected is ELP-4x200-4d-n
--------------------------------------------------------------------------------
WarpDrive Information
--------------------------------------------------------------------------------
  WarpDrive ID                          : 1
  PCI Address                           : 00:03:00:00
  PCI Slot Number                       : 0x05
  PCI SubSystem DeviceId                : 0x50A
  PCI SubSystem VendorId                : 0x108E
  SAS Address                           : 500605B 00639C760
  Package Version                       : 09.05.24.00
  Firmware Version                      : 109.05.22.00
  Legacy BIOS Version                   : 106.00.00.00
  UEFI BSD Version                      : N/A
  Chip Name                             : WarpDrive
  Board Name                            : ELP-4x200-4d-n
  Board Assembly Number                 : 03-25598-00B
  Board Tracer Number                   : SP32232377
  NUMA                                  : Enabled
  RAID Support                          : NO

--------------------------------------------------------------------------------
```

```
Physical Device Information
----------------------------------------------------------------------

Device is a Solid State Drive
  SSD Slot #                          : 4
  Cage                                : 1
  Location                            : Upper
  Capacity (in bytes)                 : 400000000000
  Manufacturer ID                     : 2361
  Model Number                        : 2E256-TU2-510B00
  Serial Number                       : 11000082150
  Firmware Revision                   : PROLUI5D
  Link Rate                           : 6.0
  Unique Identifier                   : 0x3232333532
                                      : 2E256 - 8K Optimized
  DLC                                 : Enabled

Device is a Solid State Drive
  SSD Slot #                          : 5
  Cage                                : 1
  Location                            : Lower
  Capacity (in bytes)                 : 400000000000
  Manufacturer ID                     : 2361
  Model Number                        : 2E256-TU2-510B00
  Serial Number                       : 11000082614
  Firmware Revision                   : PROLUI5D
  Link Rate                           : 6.0
  Unique Identifier                   : 0x3232333532
                                      : 2E256 - 8K Optimized
  DLC                                 : Enabled

Device is a Solid State Drive
  SSD Slot #                          : 6
  Cage                                : 2
  Location                            : Upper
  Capacity (in bytes)                 : 400000000000
  Manufacturer ID                     : 2361
  Model Number                        : 2E256-TU2-510B00
  Serial Number                       : 11000081523
  Firmware Revision                   : PROLUI5D
  Link Rate                           : 6.0
  Unique Identifier                   : 0x3232333532
                                      : 2E256 - 8K Optimized
  DLC                                 : Enabled

Device is a Solid State Drive
  SSD Slot #                          : 7
  Cage                                : 2
```

```
  Location                                : Lower
  Capacity (in bytes)                     : 400000000000
  Manufacturer ID                         : 2361
  Model Number                            : 2E256-TU2-510B00
  Serial Number                           : 11000082494
  Firmware Revision                       : PROLUI5D
  Link Rate                               : 6.0
  Unique Identifier                       : 0x3232333532
                                          : 2E256 - 8K Optimized
  DLC                                     : Enabled
```

Related Information

- “`ddcli` Utility Command Summary” on page 38

Update Flash Package Command

The `-updatepkg` command updates Sun Flash Accelerator F80 PCIe Cards with the specified firmware package file. You select a card by typing the card ID, or all cards in the server are updated if you do not select any card ID using the command line interface or text interface.

This command supports the upgrade of only the firmware package. If the current firmware package version on the selected card is higher than the specified firmware package version, the command returns an error.

Text Menu Interface Usage: The following top-level menu lists the cards in the system and prompts you to select a card on which to perform an operation. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
# ddcli

ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00
Select the WarpDrive [1-2 or 0:Quit]: 1
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
```

```
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 2
Enter Flash Package File: /home/user/ELP-4x200-3d-n_09.05.24.00.bin
```

Command Line Interface Usage: Enter the following line of text in the CLI to run the `-updatepkg` command: `ddcli -c 1 -updatepkg SLP-300_01.02.00.00.bin`

`ddcli -c` <*card number*> -updatepkg <*flash package file*>

Error Handling: The following statements are true with regard to error handling:

- If a controller firmware update fails, the `-updatepkg` command terminates.
- If a firmware download fails on any of the card components, the process terminates.

Related Information

- “Update the Card Firmware” on page 34
- “Exception Handling” on page 56
- “`ddcli` Utility Command Summary” on page 38

Health Reporting Command

The `-health` command shows the overall health status of a selected card and its components. If any alert exists, this command shows the component that is causing the alert, along with further information. Use the `-health` command to verify firmware versions before and after firmware updates.

Text Menu Interface Usage: The following top-level menu lists the cards in the system and prompts you to select a card on which to perform an operation. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
# ddcli

ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00
Select the WarpDrive [1-4 or 0:Quit]: 1
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
```

```
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 3
```

Command Line Interface Usage: Enter the following line of text in the CLI to run the -health command: `ddcli -c1 -health`

Sample Output: When the `-health` command runs, the `ddcli` utility outputs the following text.

```
# ddcli -health
********************************************************************************
   LSI Corporation WarpDrive Management Utility
   Version 110.110.03.00 (2013.07.12)
   Copyright (c) 2013 LSI Corporation. All Rights Reserved.
********************************************************************************

Raid Volume status = unconfigured.
--------------------------------
WarpDrive ELP-4x200-4d-n Health
--------------------------------

Backup Rail Monitor          : GOOD




SSD Drive SMART Data Slot #: 4: Drive Serial Number 11000082150

-------------- Current (since last Power Cycle)  ----------------------
Current Temperature                  36         (degree C)

-------------- Cumulative  --------------------------------------------
Retired Block Count                  0
Power-On Hours                       184.2
Uncorrectable RAISE Errors           0
Maximum Lifetime Temperature         55         (degree C)
SSD Life Left (PE Cycles)            100        (%)
Total Writes From Host               10954
Total Reads To Host                  8996
Warranty Remaining                   100        (%)

Life left                         : 100.000
```

```
SSD Drive SMART Data Slot #: 5: Drive Serial Number 11000082614

-------------- Current (since last Power Cycle)  ----------------------
Current Temperature                   37         (degree C)

-------------- Cumulative  --------------------------------------------
Retired Block Count                   0
Power-On Hours                        184.3
Uncorrectable RAISE Errors            0
Maximum Lifetime Temperature          55         (degree C)
SSD Life Left (PE Cycles)             100        (%)
Total Writes From Host                11045
Total Reads To Host                   9016
Warranty Remaining                    100        (%)

Life left                          : 100.000


SSD Drive SMART Data Slot #: 6: Drive Serial Number 11000081523

-------------- Current (since last Power Cycle)  ----------------------
Current Temperature                   36         (degree C)

-------------- Cumulative  --------------------------------------------
Retired Block Count                   0
Power-On Hours                        184.3
Uncorrectable RAISE Errors            0
Maximum Lifetime Temperature          61         (degree C)
SSD Life Left (PE Cycles)             100        (%)
Total Writes From Host                11053
Total Reads To Host                   8997
Warranty Remaining                    100        (%)

Life left                          : 100.000


SSD Drive SMART Data Slot #: 7: Drive Serial Number 11000082494

-------------- Current (since last Power Cycle)  ----------------------
Current Temperature                   37         (degree C)

-------------- Cumulative  --------------------------------------------
Retired Block Count                   0
Power-On Hours                        184.4
Uncorrectable RAISE Errors            0
Maximum Lifetime Temperature          61         (degree C)
SSD Life Left (PE Cycles)             100        (%)
Total Writes From Host                10960
```

```
Total Reads To Host                  8968
Warranty Remaining                   100        (%)

Life left                          : 100.000

Overall Health           : GOOD
```

The definitions are:

Item	Definition
SSD .... Slot #	PCIe slot number in server. Logical disk number assigned as cards are discovered. For example: 0-3 for card ID 1, 4-7 for card ID 2. Refer to the *Sun Flash Accelerator F80 PCIe Card Product Notes* for supported slots.

Related Information

- "Verify Card Status" on page 38
- "`ddcli` Utility Command Summary" on page 38

Locate Card Command

The `-locate` command initates green blinking of the Status LED on the selected Sun Flash Accelerator F80 PCIe Card. Use this command to locate a selected card in a rack of servers. The Status LED returns to an operating status indicator after 60 seconds.

Text Menu Interface Usage: The following top-level menu lists the cards in the system and prompts you to select a card on which to perform an operation. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
# ddcli

ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00
Select the WarpDrive [1-4 or 0:Quit]: 1
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
```

```
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 4
Enter Operation [1:on]:
```

Command Line Interface Usage: Enter the following line of text in the CLI to run the `-locate` command: `ddcli -c 1 -locate on`

Related Information

- "`ddcli` Utility Command Summary" on page 38
- "Troubleshooting Using Card LEDs" on page 54

Format Card Command

The `-format` command erases all of the data on the selected Sun Flash Accelerator F80 PCIe Card.

Caution - Data Loss. Use the -format command with caution, because it erases all of the data on the card. Create a backup of all data before running this command.

Note - Do not use this command unless directed by service personnel.

Text Menu Interface Usage: The following top-level menu lists the cards in the system and prompts you to select a card on which to perform an operation. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
# ddcli
****************************************************************
LSI Corporation WarpDrive Management Utility
Version  107.00.00.04 (2012.06.05)
Copyright (c) 2011 LSI Corporation. All Rights Reserved.
****************************************************************

ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
```

```
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00

Select the WarpDrive [1-4 or 0:Quit]: 1
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 5

Enter whether to format single or all SSDs[1:Single 2:All or 0:Quit] 2

Perform Over-provisioning? (Yes/No): No


WARNING: Formatting will result in loss of all data on the selected WarpDrive device.
Type YES if you would like to continue, or any other key to abort the request: yes
LSI WarpDrive Management Utility: Please wait. Format of WarpDrive is in progress.....
LSI WarpDrive Management Utility: WarpDrive format successfully completed.

Select the WarpDrive [1-2 or 0:Quit]: 1
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 1
```

Command Line Interface Usage: Enter either of the following lines of text in the CLI to run the `-format` command: `ddcli -c 1 -format` or `dccli -c 1 -format -s`

The `-s` option for the `-format` command activates silent mode. In silent mode, the `ddcli` utility does not require confirmation before running the -format command.

If the `-s` option is not specified, the `ddcli` utility prompts you for confirmation before running the command.

Related Information

- “`ddcli` Utility Command Summary” on page 38

Show the Vital Product Data Command

The `-showvpd` command is used to display the VPD information on the selected Sun Flash Accelerator F80 PCIe Card.

The VPD (Vital Product Data) definitions are:

VPD Item	Definition
Product Name	Full description of the card
PN	Part Number
EC	ECO or Revision level
SN	Serial Number
VA	FRU shortname

Text Menu Interface Usage: The following top-level menu lists the cards in the system and prompts you to select a card on which to perform an operation. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
# ddcli
ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00
Select the WarpDrive [1-4 or 0:Quit]: 1
1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 6
```

Command Line Interface Usage: Enter the following line of text in the CLI to run the `-showvpd` command: `ddcli -c 1 -showvpd`.

Sample Output: When the `-showvpd` command runs, the `ddcli` utility outputs the following text.

```
# ddcli -showvpd
```

```
------------------------------------------------------------
                      VPD Information
------------------------------------------------------------
 Product Name   : Sun Flash Accelerator F80 PCIe 2.0 Low Profile Adapter
 PN             : 7069200
 EC             : 03-25598-00D
 SN             : 000000P+9999999999
 VA             : Flash HBA
 VB             : 0000
 V1             : LSI Corporation
 V2             : 1000
 V3             : 007E
 V4             : 108E
 V5             : 050A
 V6             : 17.6W
 V7             : 5.8W
 V8             : 0.1W
 MN             : 10080
 RV             : 0x6a
 V1             : SP33333333
 V3             : 04
 V4             : 91
 V6             : V6
 V7             : P
------------------------------------------------------------
```

Related Information

- “`ddcli` Utility Command Summary” on page 38

Extract SMART Logs Command

Note - Do not use this command unless directed by service personnel.

The `-getsmartlog` command extracts SMART logs for the selected Sun Flash Accelerator F80 PCIe Card. Use the `-getsmartlog` command when requested to assist Oracle support in debugging and resolution. This command extracts two specific files for each single card or all cards in the server if the -slot option is not used. The following files are extracted:

- `SSDEventLog<`*_slot_cage_location_configid_serialnumber_timestamp*`>.bin`
- `SystemEventLog<`*_slot_cage_location_configid_serialnumber_timestamp*`>.bin`

Text Menu Interface Usage: The following top-level menu lists the cards in the system and prompts you to select a card on which to perform an operation. Four Sun Flash Accelerator F80 PCIe Cards are shown in the following example:

```
# ddcli
********************************************************************************
   LSI Corporation WarpDrive Management Utility
   Version 110.110.03.00 (2013.07.12)
   Copyright (c) 2013 LSI Corporation. All Rights Reserved.
********************************************************************************

ID    WarpDrive     Package Version    PCI Address
--    ---------     ---------------    -----------
1     ELP-4x200-4d-n    09.05.24.00        00:02:00:00
2     ELP-4x200-4d-n    09.05.24.00        00:03:00:00
3     ELP-4x200-4d-n    09.05.24.00        00:04:00:00
4     ELP-4x200-4d-n    09.05.24.00        00:05:00:00

Select the WarpDrive [1-4 or 0:Quit]: 1

1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs

Select Operation [1-7 or 0:Quit]: 7

Get Log for single or all SSDs[ Enter 1:All or 0:Single]: 1
Enter Log File Path: /root
Successfully collected SSD Event Logs for Cage = 01 Location = Upper
Successfully collected System Event Logs for Cage = 01 Location = Upper
Successfully collected SSD Event Logs for Cage = 01 Location = Lower
Successfully collected System Event Logs for Cage = 01 Location = Lower
Successfully collected SSD Event Logs for Cage = 02 Location = Upper
Successfully collected System Event Logs for Cage = 02 Location = Upper
Successfully collected SSD Event Logs for Cage = 02 Location = Lower
Successfully collected System Event Logs for Cage = 02 Location = Lower

1.    List WarpDrive Information
2.    Update Flash Package
3.    Display WarpDrive Health
4.    Locate WarpDrive
5.    Format WarpDrive
6.    Show Vital Product Data
7.    Extract SMART Logs
```

```
Select Operation [1-7 or 0:Quit]: 7
```

Command Line Interface Usage: Enter the following line of text in the CLI to run the `-getsmartlog` command: `ddcli -c 1 -getsmartlog -slot 2 -path /root`.

Related Information

- "`ddcli` Utility Command Summary" on page 38

Help Command

The `-help` command displays help for command line usage.

Sample Output: When the `-help` command runs, the `ddcli` utility outputs the following text.

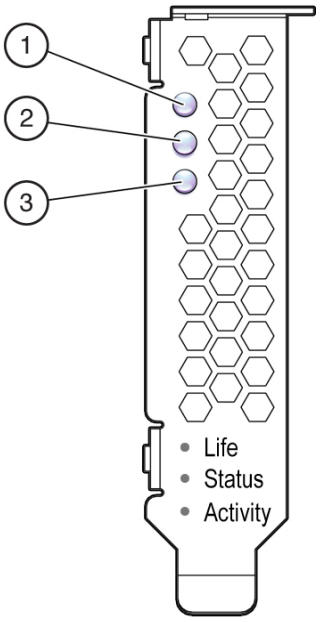
```
# ddcli -help
********************************************************************************
   LSI Corporation WarpDrive Management Utility
   Version 110.110.03.00 (2013.07.12)
   Copyright (c) 2013 LSI Corporation. All Rights Reserved.
********************************************************************************

ddcli <-c controller#> [command] [parameters]

<controller #> :  Number between 1 and 256

<command> is:
-listall        - Display information about WarpDrive(s) in the system (does not need
 controller number)
-list           - Lists information about the selected WarpDrive
-updatepkg      - Updates WarpDrive flash package
-health         - Display the health of selected WarpDrive
-locate         - Locate selected WarpDrive in the system
-format         - Format selected WarpDrive
-showvpd        - Show Vital Product Data
-getsmartlog    - Extract SMART Logs
-help           - Display help(does not need controller number)

<parameters> are:
Command specific values
```

Related Information

- “ddcli Utility Command Summary” on page 38

Troubleshooting Using Card LEDs

Use the Sun Flash Accelerator F80 PCIe Card LED indicators to determine the status of the card. The Life, Status, and Activity LEDs, shown in the following image, provide key status indicators to diagnose card issues.



The following table describes troubleshooting using the LED status indicators:

LED	Color	Description
Life (1)	Green	**On, steady**: Card has sufficient life remaining for programming and erasing the flash memory. No action required.
	Yellow	**On, steady**: Card has approximately 10%, or less, of life remaining for programming and erasing the flash memory. Plan for replacements.

LED	Color	Description
	Red	**On, steady**: Card has 0% programming and erasing cycles remaining. Backup data and copy data to a new card immediately.
Status (2)	Green	**On, steady**: Normal.
		On, blinking: Locate. A user can locate a specific card in a rack of servers.
	Yellow	**On, steady**: Warning. A warning is caused by the following: ■ At least one flash drive reporting a high temperature warning. ■ Other component issues: Run the list and health commands in the `ddcli` utility to determine which component has an issue.
	Red	**On, blinking**: Firmware fault code: ■ Run the `ddcli` utility to determine which component has an issue. ■ If no information appears, reboot the system and retry. ■ If no information appears, contact your Oracle support engineer. **On, steady**: One of the following conditions applies: ■ One or more of the SSDs has failed. ■ At least one of the SSDs has reported critical temperature. ■ Backup power rail monitor failure detected. ■ Other component issues: Run the `-list` and `-health` commands in the `ddcli` utility to determine which component has an issue. **Caution -** System Damage. If the critical temperature warning persists, you can damage your card. Increase cooling or shut down your system to prevent damage.
Activity (3)	Green	**On, blinking**: Indicates data activity on the card. No action required.

Related Information

- “Verify Card Status” on page 38
- “Card LEDs” on page 15

Error Messages

The following sections contain service information for the Sun Flash Accelerator F80 PCIe Card.

Exception Handling

The following table lists all of the input validation errors for the Sun Flash Accelerator F80 PCIe Card `ddcli` utility.

Message
LSI WarpDrive Management Utility: Invalid command format specified on the command line.
LSI WarpDrive Management Utility: Invalid argument: %s.
LSI WarpDrive Management Utility: Incorrect number of command line parameters.
LSI WarpDrive Management Utility: File doesn't exists or not a regular file. Name
LSI WarpDrive Management Utility: No controllers found.
LSI WarpDrive Management Utility: Failed getting controller information.
LSI WarpDrive Management Utility: Insufficient memory.
LSI WarpDrive Management Utility: Feature not supported in this release.
LSI WarpDrive Management Utility: Execution completed successfully.
LSI WarpDrive Management Utility: Error executing command %s.
LSI WarpDrive Management Utility: Command terminated %s.
LSI WarpDrive Management Utility: Format failed for Cage=%d Location=%s component.
LSI WarpDrive Management Utility: Only %d out of %d components found.
LSI WarpDrive Management Utility: WarpDrive is not in a proper state.
LSI WarpDrive Management Utility: Preparing WarpDrive for format.
LSI WarpDrive Management Utility: Couldn't prepare WarpDrive for format.
LSI WarpDrive Management Utility: Please wait. Format of WarpDrive is in progress.
LSI WarpDrive Management Utility: Format failed for component at "Cage=%d Location=%s".
LSI WarpDrive Management Utility: WarpDrive could not be brought in usable state.
LSI WarpDrive Management Utility: WarpDrive format successfully completed.
LSI WarpDrive Management Utility: Invalid package signature.
LSI WarpDrive Management Utility: Checksum error.
LSI WarpDrive Management Utility: Package type not supported. Type: 0x%x
LSI WarpDrive Management Utility: Invalid file size.
LSI WarpDrive Management Utility: Package does not contain required image.
LSI WarpDrive Management Utility: Package type does not match controller.
LSI WarpDrive Management Utility: Failed to get current package version from Aura2.
LSI WarpDrive Management Utility: Cannot downgrade package version xx.xx.xx.xx to xx.xx.xx.xx.
LSI WarpDrive Management Utility: Failed to Flash image. Type: 0x%x

Message
LSI WarpDrive Management Utility: Flash upgrade not allowed for component at "Cage: %d, Location: %s".
LSI WarpDrive Management Utility: Failed to update component at "Cage: %d, Location: %s".

Related Information

- “ddcli Utility Command Summary” on page 38

Firmware Exception Error Messages

The following table lists the firmware error messages for the Sun Flash Accelerator F80 PCIe Card ddcli utility.

Message
SSD is being throttled Slot Number <slot#> (Cage <cage#> Location <upper or lower>) Throttle <level>
SSD throttling is now removed Slot Number <slot#> (Cage <cage#> Location <upper or lower>) Throttle <level>"
SSD Life is at warning level Slot Number <slot#> (Cage <cage#> Location <upper or lower>) Drive Life <current life> Warning Level <warning threshold> Error Level <critical threshold>
SSD Life is exhausted Slot Number <slot#> (Cage <cage#> Location <upper or lower>) Drive Life <current life> Warning Level <warning threshold> Error Level <critical threshold>
Critical Error: Backup Rail Monitor has failed on warpdrive. Check warpdrive documentation for additional details (Note: Contact Oracle Support.)
Temperature <current temp> on sensor <sensor#> has exceeded warning temperature threshold <warning threshold>
Temperature <current temp> on sensor <sensor#> has exceeded critical temperature threshold <critical threshold>
Percent Power Throttled <throttle%> PCI Slot Available Power <max slot power>
Power throttling is now removed Percent Power Throttled 100% PCI Slot Available Power <max slot power>
Temperature <current temp> on slot <slot#> has exceeded warning temperature threshold <warning threshold>

```
Temperature <current temp> on slot <slot#> has exceeded critical temperature
threshold <critical threshold>
Temperature <current temp> on slot <slot#> has exceeded critical temperature
threshold <critical threshold>
LSI WarpDrive Management Utility: Format failed for Cage=%d Location=%s
component.
Diagnostic trigger fired
```

Related Information

- “ddcli Utility Command Summary” on page 38

Reason Codes

The following table lists the Reason Codes for the Sun Flash Accelerator F80 PCIe Card `ddcli` utility.

Health Reason Code	Description
0	Backup rail monitor failure
1	Could not determine backup rail monitor status
2	Reserved for RAID solutions
3	Reserved for RAID solutions
4	Reserved for RAID solutions
5	Volume missing
6	Volume status not available
7	Device(s) missing
8	Too many devices present
9	Device locked
10	LifeLeft critical threshold exceeded
11	Critical temperature threshold exceeded

Related Information

- “ddcli Utility Command Summary” on page 38

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