Oracle Flash Accelerator F640 PCIe Card v3 User Guide

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Oracle Flash Accelerator F640 PCIe Card v3 User Guide,

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Using This Documentation

- **Overview** – Provides late-breaking information and specifications about Oracle Flash Accelerator F640 PCIe Card v3
- **Audience** – System administrators, network administrators, and service technicians
- **Required knowledge** – Advanced understanding of server systems

Product Documentation Library

Documentation and resources for this product and related products are available at: https://www.oracle.com/goto/oracleflashf640/docs

Feedback

Provide feedback about this documentation at: https://www.oracle.com/goto/docfeedback

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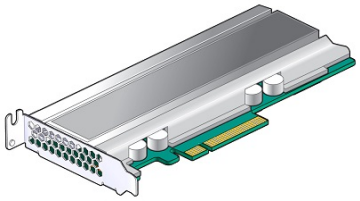
Oracle Flash Accelerator F640 PCIe Card v3 Product Information

This section contains late-breaking information about Oracle Flash Accelerator F640 PCIe Card v3s. Read this section before reading other Oracle Flash Accelerator F640 PCIe Card v3 documentation. Always refer to the latest version of the product information. Review the software and firmware supported for Oracle Flash Accelerator F640 PCIe Card v3s. Review important information for configuring Oracle Flash Accelerator F640 PCIe Card v3s. Check known issues.

For specific installation instructions, late-breaking information about the installation and use of Oracle Flash Accelerator F640 PCIe Card v3s with your server, supported firmware and operating systems, important operating notes, and known issues, refer to the latest platform product notes document.



These topics are included in this section.

- Supported Hardware and Software
- Implementation Considerations
- Updating Oracle Flash Accelerator F640 PCIe Card Software and Firmware
- Issues Fixed in This Firmware Release
- Known Issues
- Oracle Flash Accelerator F640 PCIe Card v3 Product Specifications
- Oracle Flash Accelerator F640 PCIe Card v3 Product Accessibility

Supported Hardware and Software

These sections describe the software and firmware supported for Oracle Flash Accelerator F640 PCIe Card v3s.

- Supported Servers and Locations
- Minimum Supported Card Firmware Version
- Required Host Firmware
- Keep Drivers and Firmware Up to Date
- Server Management Tools

Supported Servers and Locations

This section lists the servers that support Oracle Flash Accelerator F640 PCIe Card v3s. For detailed information about using this card with your server, see the product notes for your server, available at https://docs.oracle.com .

The following servers are supported for Oracle Flash Accelerator F640 PCIe Card v3.

x86 Servers	Number of Cards	Slots Supported for Installing Cards
Oracle Server X9-2L	1 to 4	Slots 4,5,6,10
	1 to 8	Slots 2,3,4,5,6,8,9,10

Other servers and processors might be added to this list in the future, if they qualify. Check your server product notes for confirmation that your server has subsequently been qualified for device support.

> **Caution:**
>
> Any unsupported configuration causes the host to power off as soon as it is powered on. A fault is generated on the service processor when an unsupported configuration is detected. The fault clears after the unsupported configuration is fixed and the host is powered on.

> **Note:**
>
> Refer to your server product notes for up-to date information on supported servers, operating systems, and required patchsets.

Minimum Supported Card Firmware Version

Oracle Flash Accelerator F640 PCIe Card v3s run with the minimum required firmware package listed in the following table.

Firmware	Minimum Required Card Firmware Version	Recommended Card Firmware Version
Oracle 6.4 TB NVMe SSD v3 Package	2CV1R105 F640 1.0.0 - FIRMWARE	2CV1RC50 F640 1.0.8 - FIRMWARE Patch 35155817: Oracle Flash Accelerator F640 v3 PCIe Card SW 1.0.8 - FIRMWARE PACK

> **Note:**
>
> **Important**
> You cannot downgrade from Firmware Version 2CV1RC50.

> **Note:**
>
> For best practice, install the latest device firmware versions.

- Summary of Changes in Firmware 2CV1R105 Release

Summary of Changes in Firmware 2CV1R105 Release

The following improvements or changes were included in firmware 2CV1R105 release of Oracle F640 Flash Card:

- If you install Oracle Flash Accelerator F640 PCIe Card v3s as an option, you must update firmware to 2CV1RC50, or a subsequent firmware release if available.

Required Host Firmware

Oracle Flash Accelerator F640 PCIe Card v3s run with the minimum required host firmware listed in the following table.

> **Note:**
>
> Refer to Firmware Downloads and Release History for Oracle Systems (https://www.oracle.com/servers/technologies/firmware/release-history-jsp.html)

x86 Driver	Minimum Required Host Firmware Version (Patch No.)	Recommended System Firmware Version (Patch No.)
Oracle Server X9-2L	Patch 29811557: Oracle Server X9-2L SW 1.2.2 - FIRMWARE PACK	Patch 34614448: Oracle Server X9-2L SW 3.4.0 - FIRMWARE PACK or later

Keep Drivers and Firmware Up to Date

Refer to the server documentation to check for updates to the device firmware. For information on updating drivers and firmware for Oracle Flash Accelerator F640 PCIe Card v3s, see Accessing Software Updates and Firmware Downloads.

> **Note:**
>
> Refer to Firmware Downloads and Release History for Oracle Systems (https://www.oracle.com/servers/technologies/firmware/release-history-jsp.html)

Server Management Tools

The following management tools are available for the server:

- Oracle Integrated Lights Out Management (ILOM). Preinstalled service processor (SP) with integrated firmware. No installation required. Some initial configuration is required.

For information, refer to the product information page at: Oracle Integrated Lights Out Manager. For documentation, refer to Oracle ILOM Documentation.

- Oracle Hardware Management Pack, available with the Oracle Solaris OS or as a standalone product with other OS. Monitor hardware through the host operating system, either remotely using SNMP or locally using command-line interface tools.

  For information, refer to the product information page at: Oracle Hardware Management Pack. For documentation and OS support matrix, refer to Oracle Hardware Management Pack Documentation at: Servers Documentation Systems Management

- Oracle Enterprise Manager Ops Center, available software to manage multiple systems in a data center. For information, refer to the product information page at: Oracle Enterprise Manager. For documentation, refer to Oracle Enterprise Manager Cloud Control Documentation at: Oracle Enterprise Manager Cloud Control.

Implementation Considerations

These topics provide important information for configuring Oracle Flash Accelerator F640 PCIe Card v3s in supported servers.

- Oracle Server X9-2L Configuration
- Configure Slot PCIe Connector
- SSD Volume Management

Oracle Server X9-2L Configuration

Minimum required software for Oracle Server X9-2L is SW1.2.2.

Oracle Server X9-2L supports Oracle Flash Accelerator F640 PCIe Card v3 as a boot device.

Oracle Flash Accelerator F640 PCIe Card v3 population rules for Oracle Server X9-2L:

- If Oracle F640 Flash Card v3 quantity is less than three, then Oracle F640 Flash Card v3 installation order is: NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11
- If Oracle F640 Flash Card v3 quantity is four, then Oracle F640 Flash Card v3 installation order is: NVMe4, NVMe5, NVMe6, NVMe10
- If Oracle F640 Flash Card v3 quantity is more than four, then Oracle F640 Flash Card installation v3 order is: NVMe0, NVMe1, NVMe2, NVMe3 NVMe4, NVMe5, NVMe6, NVMe7, NVMe8, NVMe9, NVMe10, NVMe11.

  Note the following restrictions for installing more than four Oracle F640 Flash Card v3s:

  – Do not install Oracle Storage 12 Gb SAS PCIe RAID HBA, Internal: 16 port card.
  – Do not install HBA-connected storage drives in the server front bays.

See Configure Slot PCIe Connector to configure UEFI BIOS for 2x4 bifurcation on Oracle F640 Flash Card v3. Select `x4x4 HP ENABLED Aura-9` to enable x4x4x4 HP ENABLED Oracle Flash Accelerator F640 PCIe Card v3 special configure this slot's PCIe connector.

Refer to the server documentation for more information at https://www.oracle.com/goto/x9-2l/docs .

Configure Slot PCIe Connector

Configure the UEFI BIOS for 2x4 bifurcation on Oracle F640 Flash Card v3.

1. Access the BIOS Setup Utility menus.
2. In the BIOS Setup Utility menus, navigate to the **IO** menu.
3. On the **IO** screen, select **PCIe Connector Special Configuration**, and press **Enter** to display the **PCIe Connector Configuration Settings** slots.
4. Specify the connector to control PCIe bifurcation and hotplug. On the **PCIe Connector Special Configuration** screen, select the Slot 1-9 PCIe Connector Configuration you want to configure and press **Enter**. **Special configure this slot's connector PCIe SLOT Connector Configuration**
5. On the `Menu to Control PCIE connector Bifurcation and Hotplug` pop-up screen for that slot, select one of the following and press Enter.
   - Select `No Special connector configuration` for this slot's PCIe connector.
   - Select `x16 Bifurcation` to enable x16 bifurcation special configuration in this slot's PCIe connector.
   - Select `x8x8 Bifurcation` to enable x8x8 bifurcation special configuration in this slot's PCIe connector.
   - Select `x4x4x4 Bifurcation` to enable x4x4x4 bifurcation special configuration in this slot's PCIe connector.
   - Select `Hotplug_Enabled` to enable PCIe card hotplug in this slot's PCIe connector.
   - Select `Hotplug_Disabled` to disable PCIe card hotplug in this slot's PCIe connector.
   - Select `x4x4 HP ENABLED Aura-9` to enable **x4x4** HP ENABLED Oracle Flash Accelerator F640 PCIe Card v3 special configure this slot's PCIe connector.
   - Select `x4x4x4x4 HP ENABLED Aura-9` to enable x4x4x4x4 HP ENABLED Oracle Flash Accelerator F640 PCIe Card v3 special configure this slot's connector.
6. Press the **F10** key to save the changes and exit the BIOS Setup Utility.

SSD Volume Management

A volume manager can present multiple SSD devices as one larger volume. Use the Automatic Storage Management (ASM) volume manager or other volume manager to concatenate multiple flash memory domains. For example, a volume manager can be used to concatenate four 6.4 TB domains into a single 25.6 TB volume.

Refer to the Automatic Storage Management documentation at https://docs.oracle.com/en/database/oracle/oracle-database/19/ostmg/index.html .

Updating Oracle Flash Accelerator F640 PCIe Card Software and Firmware

This section provides information on updating Oracle Flash Accelerator F640 PCIe Card firmware and software.

- Accessing Software Updates and Firmware Downloads

Accessing Software Updates and Firmware Downloads

Product patches, updates and firmware are available on My Oracle Support at https://support.oracle.com . from the Patches and Updates tab.

This section provides information on updating Oracle Flash Accelerator F640 PCIe Card v3 firmware and software.

- Download the Device Software Package
- Update the NVMe Storage Drive Firmware
- Verify Oracle Flash Accelerator F640 PCIe Card v3 Operation

Download the Device Software Package

To find the device software package, access My Oracle Support and download the latest software package for Oracle Flash Accelerator F640 PCIe Card v3s.

1. Go to the My Oracle Support web site: https://support.oracle.com.
2. Sign in to My Oracle Support.
3. At the top of the page, click the Patches & Updates tab.

   The Patch Search pane appears at the right of the screen.
4. Within the Search tab area, click Number/Name or Bug Number (Simple).

   The Search tab area appears with search fields.
5. In the Product field, enter the patch number for Oracle Flash Accelerator F640 PCIe Card v3s.

   See Minimum Supported Card Firmware Version.
6. In the Release field, select a software release from the drop-down list.

   Expand the list to see all available software releases.
7. Click Search.

   The Patch Advanced Search Results screen appears, listing the patches for the software release.
8. To select a patch for a software release, click the patch number next to the software release version.

   You can use the Shift key to select more than one patch.

   A pop-up action panel appears. The panel contains several action options, including the ReadMe, Download, and Add to Plan options. For information about the Add to Plan option, click the associated button and select “Why use a plan?”.

9. To review the ReadMe file for this patch, click ReadMe.
10. To download the patch for the software release, click Download.
11. In the File Download dialog box, click the patch zip file name.

    The patch for the software release downloads. The download is an archive zip file, which you must extract to find the directory containing the image.pkg file.

Update the NVMe Storage Drive Firmware

- Update your system to the latest software release.
- Verify that the latest supported software release of Oracle Hardware Management Pack is installed on the host.

  For CLI command instructions, refer to Oracle Hardware Management Pack documentation at https://www.oracle.com/goto/ohmp/docs .

This procedure provides instructions to update Oracle F640 Flash Card NAND flash controller firmware on the host for supported Oracle Solaris and Linux operating systems. Oracle F640 Flash Card firmware is updated as a single package using Oracle Hardware Management Pack utility command-line interface (CLI) tools.

> **Note:**
>
> For detailed instructions on system software updates, refer to the server documentation.

1. Check Oracle Flash Accelerator F640 PCIe Card v3 Product Information for the latest firmware requirements.

   See Minimum Supported Card Firmware Version.
2. Log in to the target system.

   For detailed instructions, refer to the server installation guide. For example, to log in to the target system through SSH or through Oracle ILOM Remote System Console Plus, do one of the following:

   - If you are using an SSH client connection.
     a. From a shell command line in a terminal window, establish an SSH connection to the server host.

        Type: `ssh root@hostname` , where *hostname* can be the DNS name or the IP address for the server host.

     b. Log in to the system using an account with root access.
     c. Proceed to Step 3.
   - If you are using a remote system console, first refer to the server Administration Guide and then perform these steps.

     To launch an Oracle ILOM Remote System Console Plus session, refer to Launching Remote KVMS Redirection Sessions in the server Administration Guide.

     a. Establish a remote connection to the host console.

        Start an Oracle ILOM serial console session, type:

```
-> start /HOST/console

Are you sure you want to start /HOST/console (y/n)? y
```

b. Ensure that the server is powered on and booted.

c. Access the operating system command-line interface.

You issue Oracle Hardware Management Pack commands from the operating system command-line interface.

3. Download and store any firmware image file updates on the server that are required to support Oracle Flash Accelerator F640 PCIe Card v3s.

a. Download firmware image files from this location:

https://support.oracle.com

See Download the Device Software Package.

b. Copy the downloaded firmware image files obtained to the target system root directory.

4. Identify all Oracle Flash Accelerator F640 PCIe Card v3 controller firmware versions in the server.

a. Type `# fwupdate list controller`.

In the following examples, Oracle Flash Accelerator F640 PCIe Card v3 controllers `c1` to `c11` are enumerated in the output returned by the above command.

```
# fwupdate list controller
================================================
CONTROLLER
================================================
ID    Type   Manufacturer   Model     Product Name              FW
Version
---------------------------------------------------------------------------
----
c0    NVMe   Samsung        0xa824    SAMSUNG
MZWLR7T6HALA-00AU3MPK94R5Q
c1    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC50
c2    HDC    Intel          0xa182    0x4873
-
c3    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC50
c4    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC50
c5    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1RC30
c6    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1RC30
c7    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1RC50
c8    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1RC50
c9    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC50
c10   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC50
c11   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC50
```

b. Verify that the firmware package files that are installed in Oracle Flash Accelerator F640 PCIe Card v3s require updating.

To identify NVMe controllers that need updated firmware image files, view the `FW Version` column in the output from the `fwdupdate list controller` command.

In the following example, Oracle Flash Accelerator F640 PCIe Card v3 controllers `c5, c6` show firmware version `2CV1RC30`, while the other NVMe controllers show firmware version `2CV1RC50`.

```
# fwupdate list controller
==================================================
CONTROLLER
==================================================
ID    Type   Manufacturer   Model     Product Name              FW Version
-------------------------------------------------------------------------------
c0    NVMe   Samsung        0xa824    SAMSUNG MZWLR7T6HALA-00AU3MPK94R5Q
c1    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S      2CV1RC50
c2    HDC    Intel          0xa182    0x4873                    -
c3    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S      2CV1RC50
c4    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S      2CV1RC50
c5    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S      2CV1RC30
c6    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S      2CV1RC30
c7    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S      2CV1RC50
c8    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S      2CV1RC50
c9    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S      2CV1RC50
c10   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S      2CV1RC50
c11   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S      2CV1RC50
```

c. View the Firmware Revision in the output from the nvmeadm list -v command.

To identify NVMe controllers and current firmware versions type `# nvmeadm list -v`.

In the following example, controllers `SUNW-NVME-1` and `SUNW-NVME-2` show firmware version `2CV1RC50` in the output returned by the above command.

```
# nvmeadm list -v
SUNW-NVME-1
SMART/Health Information:
        Critical Warning: 0
        Temperature: 315 Kelvin
        Available Spare: 100 percent
        Available Spare Threshold: 10 percent
        Percentage Used: 0 percent
        Data Unit Read: 0x2fa1c314 of 512k bytes.
        Data Unit Written: 0x23bd12c7 of 512k bytes.
        Number of Host Read Commands: 0x3f0bb9308
        Number of Host Write Commands: 0x1c2433434
        Controller Busy Time in Minutes: 0x525
        Number of Power Cycle: 0x56e
        Number of Power On Hours: 0x55f
        Number of Unsafe Shutdown: 0x307
        Number of Media Errors: 0x0
        Number of Error Info Log Entries: 0x0

SUNW-NVME-2
SMART/Health Information:
        Critical Warning: 0
        Temperature: 310 Kelvin
        Available Spare: 99 percent
        Available Spare Threshold: 10 percent
```

```
        Percentage Used: 1 percent
        Data Unit Read: 0x138a818a of 512k bytes.
        Data Unit Written: 0x2d71a25d of 512k bytes.
        Number of Host Read Commands: 0xe75e59ca
        Number of Host Write Commands: 0x7a604b45c
        Controller Busy Time in Minutes: 0xe0
        Number of Power Cycle: 0x89
        Number of Power On Hours: 0x1443
        Number of Unsafe Shutdown: 0x78
        Number of Media Errors: 0x0
        Number of Error Info Log Entries: 0x0

SUNW-NVME-3
SMART/Health Information:
        Critical Warning: 0
        Temperature: 310 Kelvin
        Available Spare: 99 percent
        Available Spare Threshold: 10 percent
        Percentage Used: 6 percent
        Data Unit Read: 0xe41b09fd of 512k bytes.
        Data Unit Written: 0xa86d0cea of 512k bytes.
        Number of Host Read Commands: 0x1b278da767
        Number of Host Write Commands: 0x1695d69510
        Controller Busy Time in Minutes: 0xc0b
        Number of Power Cycle: 0x1eb
        Number of Power On Hours: 0x19f1
        Number of Unsafe Shutdown: 0xb1
        Number of Media Errors: 0x0
        Number of Error Info Log Entries: 0x0
```

5. Quiesce Oracle Flash Accelerator F640 PCIe Card v3 devices.

   Before removing the card, manually quiesce I/O and device usage.

> **Caution:**
>
> **System hang or data loss.** Before updating device firmware, ensure that the device is quiesced and the following events are not occurring:
>
> - The operating system is not accessing the disk (for example, the system boot disk).
> - An application is not accessing the disk (for example, a database application).

6. Update the selected Oracle Flash Accelerator F640 PCIe Card v3s with the specified firmware package.

   The `fwupdate` command can update firmware for all similar devices in the system utilizing an XML metadata file. This method is called Automatic Mode and is the recommended method for upgrades.

> **Note:**
>
> Alternately, if you determine that each device must be updated with a separate `fwupdate` command, perform the `fwupdate` Automatic Single Drive method, or the `fwupdate` Manual method (if an XML metadata file is not available). For CLI command instructions, refer to Oracle Hardware Management Pack documentation at: https://www.oracle.com/goto/ohmp/docs .

a. Verify that an XML metadata file is available for the server.

   An XML metadata file must be included with the firmware update package to use Automatic Mode. Refer to the update package release notes for more information.

b. To update device firmware on Oracle Flash Accelerator F640 PCIe Card v3s, type `# fwupdate update controller -x metadata.xml`.

   In the following example, controllers `c5` and `c6` will be upgraded to firmware version `2CV1RC50`.

```
# fwupdate update controller -x metadata.xml
 The following components will be upgraded as shown:
============================================================
ID        Priority Action      Status      Old Firmware Ver.   Proposed
Ver.       New Firmware Ver.   System Reboot
-------------------------------------------------------------------------------
-----------------------------------
c5        1        Check FW    Success     2CV1RC30
2CV1RC50            N/A                 None
c6        1        Check FW    Success     2CV1RC30
2CV1RC50            N/A                 None
Do you wish to process all of the above component upgrades? [y/n]?
```

   If the current firmware package version on the selected controller is higher than the specified firmware package version, the command returns an error. For error codes, refer to Oracle Hardware Management Pack documentation at https://www.oracle.com/goto/ohmp/docs .

c. To upgrade the firmware packages and process all of the above component upgrades, type `y`.

```
Updating c5:  Success
Updating c6:  Success

Verifying all priority 1 updates

Execution Summary
============================================================
ID        Priority Action      Status      Old Firmware Ver.   Proposed
Ver.       New Firmware Ver.   System Reboot
-------------------------------------------------------------------------------
-----------------------------------
c5        1        Check FW    Success     2CV1RC30
2CV1RC50            N/A                 None
c6        1        Check FW    Success     2CV1RC30
2CV1RC50            N/A                 None
System Reboot required for some applied firmware
Do you wish to automatically reboot now? [y/n]?
```

d. Type `y` to reboot the host server to initialize the firmware update.

7. Re-access the console. See step 2.

   For more instructions, refer to the server Installation Guide.

8. Verify that updated firmware packages are installed in Oracle Flash Accelerator F640 PCIe Card v3s.

   a. Type the following from a terminal:

      ```
      # fwupdate list controller
      ```

      In the following example, Oracle Flash Accelerator F640 PCIe Card v3s are displayed.

      ```
      # fwupdate list controller
      ==================================================
      CONTROLLER
      ==================================================
      ID    Type   Manufacturer   Model     Product Name              FW
      Version
      ---------------------------------------------------------------------------
      ----
      c0    NVMe   Samsung        0xa824    SAMSUNG
      MZWLR7T6HALA-00AU3MPK94R5Q
      c1    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
      2CV1RC50
      c2    HDC    Intel          0xa182    0x4873
      -
      c3    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
      2CV1RC50
      c4    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
      2CV1RC50
      c5    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
      2CV1RC50
      c6    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
      2CV1RC50
      c7    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
      2CV1RC50
      c8    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
      2CV1RC50
      c9    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
      2CV1RC50
      c10   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
      2CV1RC50
      c11   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
      2CV1RC50
      ```

   b. Verify host recognition of all Oracle Flash Accelerator F640 PCIe Card v3s by checking PCIe ID enumeration.

      In the above example, Oracle Flash Accelerator F640 PCIe Card v3 controllers `c0` and `c11` are enumerated in the output returned by the above command.

   c. Ensure that Oracle Flash Accelerator F640 PCIe Card v3 firmware was updated in the output returned by the above command.

      In the above example, Oracle Flash Accelerator F640 PCIe Card v3 controllers `c0` to `c11` show firmware version `2CV1RC50`.

9. Verify Oracle Flash Accelerator F640 PCIe Card v3 operation.

   See Verify Oracle Flash Accelerator F640 PCIe Card v3 Operation.

10. Repeat the firmware upgrade process until Oracle Flash Accelerator F640 PCIe Card v3s have the most up to date firmware release.

    See Minimum Supported Card Firmware Version.

    For example, upgrade firmware revision to 2CV1RC50.

    Related Information

    - Minimum Supported Card Firmware Version
    - For CLI command instructions, refer to Oracle Hardware Management Pack documentation at https://www.oracle.com/goto/ohmp/docs .

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Verify Oracle Flash Accelerator F640 PCIe Card v3 Operation

- Verify that Oracle Hardware Management Pack is installed on the host.

  For CLI command instructions, refer to Oracle Hardware Management Pack documentation at https://www.oracle.com/goto/ohmp/docs .
- Ensure that you have access to the server (either directly or over the network).

This procedure provides instructions to verify Oracle Flash Accelerator F640 PCIe Card v3 operation on the host for supported Oracle Solaris and Oracle Linux operating systems. Verify Oracle Flash Accelerator F640 PCIe Card v3 and 6.4 TB NVMe SSD operation using Oracle Hardware Management Pack utility CLI tools.

1. Observe Oracle Flash Accelerator F640 PCIe Card v3 status indicator LEDs.

   Verify that the Fault-Service Action Required Oracle Flash Accelerator F640 PCIe Card v3 status indicator is not lit and that the green Power status indicator is lit on Oracle Flash Accelerator F640 PCIe Card v3s and 6.4 TB NVMe SSDs that you updated.

   Refer to *LED Status Indicator Characteristics* in *Oracle Flash Accelerator F640 PCIe Card v3 NVMe Solid State Drive Specification*.
2. Log in to the target system.

   For detailed instructions, refer to the server installation guide. For example, to log in to the target system through SSH or through Oracle ILOM Remote System Console Plus, do one of the following:

   - If you are using an SSH client connection.

     a. From a shell command line in a terminal window, establish an SSH connection to the server host.

        Type: `ssh root@hostname` , where *hostname* can be the DNS name or the IP address for the server host.

     b. Log in to the system using an account with root access.

     c. Proceed to Step 3.
   - If you are using a remote system console, refer to the server administration guide and perform these steps.

     a. Establish a remote connection to the host console.

        Start an Oracle ILOM serial console session, type:

        ```
        -> start /HOST/console
        ```

```
Are you sure you want to start /HOST/console (y/n)? y
```

To launch an Oracle ILOM Remote System Console Plus session, refer to Launching Remote KVMS Redirection Sessions in the server administration guide.

b. Ensure that the server is powered on and booted.

c. Access the operating system command-line interface.

You issue Oracle Hardware Management Pack commands from the operating system command-line interface.

3. Identify all Oracle F640 Flash Cards and verify that the latest firmware packages are installed.

a. Type the following command: # fwupdate list controller.

```
                        #
                        fwupdate list controller
================================================
CONTROLLER
================================================
ID    Type   Manufacturer   Model     Product Name              FW
Version
---------------------------------------------------------------------------
----
c0    NVMe   Samsung        0xa824    SAMSUNG
MZWLR7T6HALA-00AU3MPK94R5Q
c1    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC30
c2    HDC    Intel          0xa182    0x4873
-
c3    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC30
c4    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC30
c5    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1R105
c6    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1R105
c7    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1R103
c8    NVMe   Intel          0x0b60    INTEL SSDPFCKE064T9S
2CV1R103
c9    NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC30
c10   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC30
c11   NVMe   Intel          0x0b60    INTEL SSDPF2KX076T9S
2CV1RC30
```

b. Verify host recognition of all Oracle F640 Flash Cards by checking controller ID enumeration.

In the above example, Oracle F640 Flash Card controllers `c0` and `c1` are enumerated in the output returned by the above command.

c. Ensure that all Oracle F640 Flash Card firmware revisions are current in the FW Version output returned by the above command.

See Minimum Supported Card Firmware Version.

4. Check NVMe device status.

   To identify NVMe controllers and current firmware versions, type `# nvmeadm list -v`.

   To identify NVMe controllers that have updated firmware, view the `Firmware Revision` row in the output from the `nvmeadm list -v` command.

   In the following example, controllers `SUNW-NVME-1` and `SUNW-NVME-1` show firmware version `2CV1R104` in the output returned by the above command.

```
                #
                nvmeadm list -v
SUNW-NVME-1
        PCI Vendor ID:                  0x144d
        Serial Number:                  S64TNE0N800033
        Model Number:                   SAMSUNG MZWLR7T6HALA-00AU3
        Firmware Revision:              MPK94R5Q
        Number of Namespaces:           32
SUNW-NVME-2
        PCI Vendor ID:                  0x8086
        Serial Number:                  PHAB011200LV7P6GGN
        Model Number:                   INTEL SSDPF2KX076T9S
        Firmware Revision:              2CV1RC30
        Number of Namespaces:           128
```

5. Check Oracle Flash Accelerator F640 PCIe Card v3 health and SMART information.

   To check the selected 6.4 TB NVMe SSD health and SMART (Self-Monitoring, Analysis, and Reporting Technology) information, type:

   `# nvmeadm getlog -h`

   Ensure that Oracle F640 Flash Cards have remaining drive life (`Percentage Used`) in the output returned by the above command.

```
                #
                nvmeadm getlog -h
SUNW-NVME-1
SMART/Health Information:
        Critical Warning: 0
        Temperature: 315 Kelvin
        Available Spare: 100 percent
        Available Spare Threshold: 10 percent
        Percentage Used: 0 percent
        Data Unit Read: 0x2fa1c314 of 512k bytes.
        Data Unit Written: 0x23bd12c7 of 512k bytes.
        Number of Host Read Commands: 0x3f0bb9308
        Number of Host Write Commands: 0x1c2433434
        Controller Busy Time in Minutes: 0x525
        Number of Power Cycle: 0x56e
        Number of Power On Hours: 0x55f
        Number of Unsafe Shutdown: 0x307
        Number of Media Errors: 0x0
        Number of Error Info Log Entries: 0x0

SUNW-NVME-2
SMART/Health Information:
        Critical Warning: 0
        Temperature: 310 Kelvin
        Available Spare: 99 percent
        Available Spare Threshold: 10 percent
```

```
Percentage Used: 1 percent
Data Unit Read: 0x138a818a of 512k bytes.
Data Unit Written: 0x2d71a25d of 512k bytes.
Number of Host Read Commands: 0xe75e59ca
Number of Host Write Commands: 0x7a604b45c
Controller Busy Time in Minutes: 0xe0
Number of Power Cycle: 0x89
Number of Power On Hours: 0x1443
Number of Unsafe Shutdown: 0x78
Number of Media Errors: 0x0
Number of Error Info Log Entries: 0x0
```

Related Information

- Minimum Supported Card Firmware Version
- Oracle Hardware Management Pack documentation at: https://www.oracle.com/goto/ohmp/docs

Issues Fixed in This Firmware Release

This section lists Oracle Flash Accelerator F640 PCIe Card v3 cumulative issues fixed in Firmware Release 2CV1R105 or previously.

- Fixed Issues

Fixed Issues

The following issues are fixed in Firmware Release 2CV1R105.

Bug ID	Issue
Bug 26566040	Determine the correct NVMe Shutdown timeout period for RTD3 (RunTime D3) power state Oracle Flash Accelerator F640 PCIe Card v3s support NVMe specifications for RTD3 Resume Latency and RTD3 Entry Latency. RTD3R Resume latency allows 7.5 seconds of margin for devices to safely start before main power is applied to the device controller. RTD3E Entry latency allows 6 seconds of margin for active devices to safely shutdown before main power is removed from the device controller. **Note:** Shutdown not complete messages may appear for OSes that do not support RTD3 Resume Latency and RTD3 Entry Latency.

Known Issues

This section describes important operating issues and known hardware and software issues for Oracle Flash Accelerator F640 PCIe Card v3.

Supplementary and workaround information for Oracle Flash Accelerator F640 PCIe Card v3. Specific Bug ID identification numbers are provided for service personnel.

Oracle ILOM Incorrectly Faults the Device with Message

`fault.io.scsi.cmd.disk.dev.rqs.baddrv`

Bug ID: 28244670

Issue: Oracle ILOM might report a `fault.io.scsi.cmd.disk.dev.rqs.baddrv` error for NVMe devices. Oracle ILOM incorrectly faults the device with message Fault `fault.io.scsi.cmd.disk.dev.rqs.baddrv on` *`FRU /SYS`* .

Affected Hardware and Software: NVMe storage devices on all supported operating systems

Workaround: None

Recovery:

If a system encounters this issue, do the following steps.

1. Look for the NVMe ILOM fault code: `fault.io.scsi.cmd.disk.dev.rqs.baddrv`

   The following screen shows a fault.io.scsi.cmd.disk.dev.rqs.baddrv error for Oracle Flash Accelerator F640 PCIe Card v3.

   ```
   ereport.io.scsi.cmd.disk.dev.rqs.baddrv@/SYS/MB/PCIE5
                           status_flags  = 0xc3
                           smart_warning = 0xff
                           reason        = Drive is not functional
   ```

   You can also use the Oracle ILOM `show faulty` command at the Oracle ILOM command-line prompt (->) to identify a drive failure.

   To list all known faults in the server, log in to the Oracle ILOM service processor from the Oracle ILOM Fault Management Shell and issue the `fmadm faulty` command. For more information about how to use the Oracle ILOM Fault Management Shell and supported commands, refer to the *Oracle ILOM User's Guide for System Monitoring and Diagnostics* in the Oracle Integrated Lights Out Manager (ILOM) 5.0 Documentation Library at https://www.oracle.com/goto/ilom/docs .

2. Upgrade drive firmware if not current.

   See Oracle Flash Accelerator F640 PCIe Card v3 Supported Hardware and Software.

3. Do one of the following:

   If SMbus `status_flags = 0xbb` displays, then clear the fault. No power cycling is required. To clear the fault code in Oracle ILOM, go to step 4.

   If SMbus `status_flags = 0xc3` displays, complete a server power cycle, then clear the fault. Do the following to recover, then go to step 4.

   a. To identify the drive slot, type:

```
                    #
                    lspci -vv -s 1b:00.0
1b:00.0 Non-Volatile memory controller: [NVM Express])
    Subsystem: Oracle/SUN Device
    Physical Slot: 900
    Control: I/O- The PCIe address of /dev/nvme10n1 is 0000:e7:00.0
```

b. Take the affected drive off-line.

   Disconnect all users of the NVMe drive and back up the NVMe drive data as needed. Use the `umount` command to unmount any file systems that are mounted on the device. Remove the device from any multiple device (md) and Logical Volume Manager (LVM) volume using it.

   If the device is a member of an LVM Volume group, then it might be necessary to move data off the device using the pvmove command, then use the `vgreduce` command to remove the physical volume, and (optionally) `pvremove` to remove the LVM metadata from the disk. If the device uses multipathing, run `multipath -l` and note all the paths to the device. Then, remove the multipathed device using the `multipath -f device` command. Run the `blockdev --flushbufs device` command to flush any outstanding I/O to all paths to the device.

c. To prepare the NVMe drive for removal, that is, to detach the NVMe device driver and power off the NVMe drive slot, type: `# echo 0 >/sys/bus/pci/slots/900/power`

d. To power on the drive, type: `# echo 1 >/sys/bus/pci/slots/900/power`

4. To clear the fault code in Oracle ILOM, type:

```
            ->
            set /SYS/DBP/HDD0 clear_fault_action=true
  Are you sure you want to clear /SYS/MB/PCIE5 (y/n)? y
  Set 'clear_fault_action' to 'true'
->
```

5. Enable the drive.

   Rescan the PCI bus to rediscover the NVMe drive.

   `# echo 1 > /sys/bus/pci/rescan.`

If the same failure occurs again, use the same recovery process noted above. The drive has failed if the failure occurs again within minutes. If problem persists, then replace the faulty card identified in the `fmadm faulty` output.

Refer to the following document for the latest procedures for displaying event content in preparation for submitting a service request and applying any post-repair actions that may be required. *PSH Procedural Article for ILOM-Based Diagnosis* (Doc ID 1155200.1)

Oracle ILOM Reports a Fault for NVMe Devices When Performing a Reboot, Firmware Update, or Hot-Plug Operation

Bug ID: 28654297

Issue: Oracle ILOM might report a fault.chassis.device.fail error for NVMe devices when performing a reboot, a firmware update, or hot-plug operation.

Affected Hardware and Software: NVMe storage devices on all supported operating systems

Workaround : Disable the device_monitor feature in Oracle ILOM using the following command:

```
set /SP/services/device_monitor servicestate=disabled
```

Oracle ILOM Reports Faults for Correctable Errors

Bug ID: 28601316

Issue: The PCIe link retrains, a PCIe PHY reset event occurs on PCIe channels, and Oracle ILOM reports three different types of correctable errors. OS logs contain errors.

- Bad DLLP
- Bad TLP
- RTTO

Workaround: None

The TCRH (Train Cold – Run Hot) Compensation Feature is an expected behavior on Oracle Server X9 series servers.

Secure Erase Drives Before Use

Oracle Flash Accelerator F640 PCIe Card v3 may report uncorrectable errors or assert after not being powered for three or more months. For best practice, secure erase Oracle Flash Accelerator F640 PCIe Card v3s before use (especially if use is reading from the card as a test) and especially if the Oracle Flash Accelerator F640 PCIe Card v3 has been unpowered for more than three months. If the NAND media is not refreshed for approximately three months, the drive may experience media errors.

Over time, the drive firmware policy refreshes the media in the background while it remains powered-on. If the drive has been powered on long enough for the background refresh policy to be applied to all bits, the drive is not at risk for this issue. The time required to refresh all the bits is approximately 14 days and varies by product.

If the number of bits experiencing this issue exceeds the error-correction code (ECC) capability, it may result in an uncorrectable read error. If the uncorrectable read errors occur during normal drive operation, the drive will report an increased number of SMART media errors to the host.

Workaround:

Secure erase the drive to return the drive to service. Secure erase frees and reuses all blocks starting with an empty Flash Translation Layer table (FTL). Any LBAs that may have held data that may have degraded are now released as free blocks to be reused.

Select one of the following methods before use of the drive for operation or test. An off-line server can be used.

Choose one of the erase options:

- Secure erase the drive, using the `nvmeadmin` utility.

- Download and use third party utilities to secure erase the drive.
- Wait two weeks for a media refresh while the drive is powered-on before using the drive.

> **Caution:**
>
> All data will be destroyed after an erase.

Secure Erase Drive Using `nvmeadmin` Utility

To secure erase the drive, using the Oracle Hardware Management Pack NVMe admin utility:

1. Stop all IO to the NVMe device before attempting this action.
2. To securely erase all namespaces, type: `# nvmeadm erase -s -a` *controller_name*. For example: `# nvmeadm erase -s -a SUNW-NVME-1`
3. List all server devices.
4. Verify drive health.

Refer to *Oracle Hardware Management Pack 2.4 Server CLI Tools User's Guide*: https://www.oracle.com/goto/ohmp/docs . See Server Management Tools.

Secure Erase Drive Using Third-party Utilities

To secure erase the drive before use, using the Intel Solid-State Drive Configuration Manager utility, if available:

1. Install the Intel Solid-State Drive Configuration Manager.
2. Stop all IO to the NVMe device before attempting this action.
3. Use the `-secure_erase` option to erase all the data on the drive.

   ```
   issdcm -drive_index 1 -secure_erase
   ```

4. The user is prompted unless the `-force` option is used:

   ```
   WARNING: You have selected to secure erase the drive!
   Proceed with the secure erase? (Y/N)
   ```

5. If the drive contains a partition, the prompt contains a second warning message:

   ```
   WARNING: You have selected to secure erase the drive!
   WARNING: Tool has detected as partition on the drive!
   Proceed with the secure erase? (Y/N)
   ```

6. To bypass the warning prompts, use the `-force` option:

   ```
   issdcm -drive_index 1 -secure_erase -force
   ```

7. List all server devices.
8. Verify drive health.

Oracle Flash Accelerator F640 PCIe Card v3 Product Specifications

This section provides the specification for Oracle Flash Accelerator F640 PCIe Card v3.

- NVMe Storage Drive Product Specification

NVMe Storage Drive Product Specification

Oracle Flash Accelerator F640 PCIe Card v3 product specifications are listed in the following table.

Specification	Value
Device name	• Product Identifier: SSDPFCKE064T9S • Oracle Part Number: 8204597 • Device Identification: – Designation: SE=Standard Endurance – PCIe Device ID: 0x0B60 – Subsystem PCIe Vendor ID: 0x8086 – Subsystem ID: 0x108E
Manufacturing name	6.4TB Intel ArbordalePlus D7-P5608, 3D NAND TLC AIC HHHL Solid State Drive
Form factors	• AIC (Add-In-Card form factor): HHHL (Half Height, Half Length) • PCIe card form factor
PCIe interface	PCIe Gen 4 Interface, x8 lanes 4 lanes, each going directly to a controller (no PCIe bus switch). Requires 2 x 4 lanes bifurcation.
Features	• NVMe PCIe Gen4 Interface • Basic Management commands, No MCTP support. • VPD per NVMe-MI Ver 1.0a specification
Product Compliance	• NVM Express Specification Rev. 1.3c • PCI Express Base Specification Rev. 4.0 • Enterprise SSD Form Factor Version 1.0a • NVMe-MI Rev 1.0a
Product ecological compliance	RoHS
Certifications and declarations	cUL-us, CE, TUV-GS, CB, CE, BSMI, KCC, Morocco, VCCI, RCM, FCC, IC

Table 2-1 Drive Usage Information

Usage	Description
Operating temperature (Case)	0 to 70 degrees Celsius
Non-Operating temperature	-40 to 95 degrees Celsius

Table 2-1 (Cont.) Drive Usage Information

Usage	Description
Maximum temperature (SMART trip)	Thermal Throttling at 70 degrees Celsius (SMART) when approaching maximum temperature. Thermal Shutdown at 80 degrees Celsius (SMART)
Error rates	Uncorrectable Bit Error Rate (UBER): 1 sector per 10^17 bits read
Data retention	3 months powered off at 40 degrees Celsius at end of rated endurance
Endurance	• Drive Writes Per Day (DWPD) for 5 years: 3 • PBW (at 4KB Random Write) 30 PB Refer to the JEDEC JESD218A standard for SSD device life and endurance measurement techniques.
Other environmental factors	Conforms to IEC standards

Table 2-2 Drive Reliability

Attribute	Value
Component Design Life (Useful life)	5 years
MTBF	2,000,000 hours
Expected AFR (Annualized Failure Rate)	0.44% for normal 24x7 operating conditions

Table 2-3 Drive Capacity and Performance

Attribute	Value
Capacity, formatted	Default Formatted Capacity: 3,200,631,791,616 bytes (x2) Sector Size (LBA size): 512 bytes per sector per controller
Capacity, unformatted	Unformatted Capacity (Total User Addressable LBA): 6251233968 per controller
Capacity, raw NAND	4096 GiB per controller
Random 4 KB Read	1.56M IOPS Typical 4KB Random Read QD=256, Worker=8
Random 4 KB Write	460K IOPS Typical 4KB Random Write QD=256, Worker=8
Sequential Read	128 KB, QD 128, Worker=1: 13,400 MB/s **Note**: Sequential accesses on both controllers for aggregate performance.
Sequential Write	128 KB, QD 128, Worker=1: 6,800 MB/s **Note**: Sequential accesses on both controllers for aggregate performance.

Table 2-3 (Cont.) Drive Capacity and Performance

Attribute	Value
Interface data transfer rate	• Interface Data Rate: PCIe Gen 4 • Data Transfer Rate 16 GT/sec • Interface drivers/receivers AIC: 2x4 lanes • 2 Controllers, 4 lanes per controller. 8 lane card bifurcated to two 4 lanes.

Table 2-4 Drive Electrical Specifications

Attribute	Value
Power On to Ready (no rebuild)	RTD3R: 10 seconds (TTR Time to Ready)
Power On to Ready (full rebuild)	20 seconds (TTR Time to Ready)
Supply Voltage / Tolerance	12 V +10%/-20% 3.3 Vaux +/-9%
Supply Average Current	12 V: 2.1 A @ 25W 3.3 Vaux: 20 mA (non-wakeup enabled)
Inrush Current	12 V, 1.5 A
Power Consumption	• Max Avg Active Read: < 25 W • Max Avg Active Write: < 36 W • Idle < 10 W • Max Burst: 2 < 45 W **Note:** Maximum power is measured as the average power in a 1 ms interval.
Power Requirements	Refer to vendor product specification.

Table 2-5 Drive Physical Characteristics

Height	Width	Depth	Weight
68.8 mm +/-0.34	167.55 mm +/-0.1	14.47 mm Max Component side. 2.67 mm Max bottom side.	205g +/- 5g

Table 2-6 NVMe Solid State Drive Characteristics

Attribute	Value
Minimum operating system versions	Refer to the server product notes for minimum operating system versions, hardware, firmware, and software compatibility.

Table 2-6 (Cont.) NVMe Solid State Drive Characteristics

Attribute	Value
Life monitoring capability	Provides alerts for proactive replacement of the drive before the endurance is depleted. Provides endurance remaining in NVMe SMART logs. SSD supports the standard method defined by NVMe for Solid State Drive to report NAND wear through the “Get Log” command SMART/Health Information Percentage Used field. The units are whole percentage of wear. Percentage Used: Contains a vendor specific estimate of the percentage of NVM subsystem life used based on the actual usage and the manufacturer’s prediction of NVM life. A value of 100 indicates that the estimated endurance of the NVM in the NVM subsystem has been consumed, but may not indicate an NVM subsystem failure. The value is allowed to exceed 100. Percentages greater than 254 are represented as 255. This value is updated once per power-on hour (when the controller is not in a sleep state). Refer to the JEDEC JESD218A standard for SSD device life and endurance measurement techniques.
End-to-End data-path protection	T10 DIF Type 0, Type 1, Type 2, Type 3, no performance impact. T10 DIF (data integrity field) end-to-end data protection includes multiple levels of data-path protection.
Enhanced power-loss data protection	Energy storage components complete buffered writes to the persistent flash storage in case of a sudden power loss.
Power loss protection capacitor self-test	Supports testing of the power loss capacitor. Power is monitored using SMART (Self-Monitoring, Analysis, and Reporting Technology) attribute critical warning.
Out-of-Band Management (SMBUS)	Managed through the SMBUS. Provides out-of-band management by means of SMBUS interface. This requires 3.3V auxiliary voltage. SMBUS access includes NVMe-MI, the VPD page and temperature sensor.
Hot-Plug Support	Supports PCIe presence detect and link-up detect. Device advanced power loss protection provides robust data integrity. During IOs, the storage drive integrated monitoring enables the integrity of already committed data on the media and commits acknowledged writes to the media.
Management utilities	For more information about management utilities, refer to the server documentation.

Table 2-7 LED Status Indicator Characteristics

LED	Color	Normal operation	Status
(1) Controller 1 Activity	Green	N/A	Green Drive Activity indicator for controller ASIC 1: OFF – Power is off, or normal operation. STEADY ON (does not blink) – Oracle Flash Accelerator F640 PCIe Card v3 Activity LED status indicator LED 1 should be ON during idle. Driver is Idle. Driver is disabled. Power off until Host system shuts down. Controller function level reset. BLINK with varying duty cycle - Power On. BLINK at 375 msec on, 125 msec off – IO activity, Format NVM. **Note**: Both flash memory controllers enumerate.

Table 2-7 (Cont.) LED Status Indicator Characteristics

LED	Color	Normal operation	Status
(2) Controller 2 Activity	Green	N/A	Green Drive Activity indicator for controller ASIC 2: OFF – Power is off, or normal operation. STEADY ON (does not blink) – Oracle Flash Accelerator F640 PCIe Card v3 Activity LED status indicator LED 2 should be ON during idle. Driver is Idle. Driver is disabled. Power off until Host system shuts down. Controller function level reset. BLINK with varying duty cycle - Power On. BLINK at 375 msec on, 125 msec off – IO activity, Format NVM. **Note**: Both flash memory controllers enumerate.
(3) Link Status	Green Yellow	ON – Normal operation.	Green STEADY ON (does not blink) – Link at highest speed and lane width. Drive PCIe link is healthy. Normal operation. Yellow STEADY ON (does not blink) – Drive link sub-optimal The LED reports only secondary bus link status (behind internal switch) and does not report the status between the switch and host. OFF – No link
(4) Health	Yellow Red	OFF – Normal operation.	Yellow – Fault, Drive Critical Warning: OFF – Drive is idle. Power is off, or normal operation. STEADY ON (does not blink) – Drive critical warning. Red – Drive fail: OFF – Drive is idle. Power is off, or normal operation. STEADY ON (does not blink) – Service Action Required. Drive is in disabled logical mode.

Oracle Flash Accelerator F640 PCIe Card v3 Product Accessibility

Oracle strives to make its products, services, and supporting documentation usable and accessible to the disabled community. To that end, products, services, and documentation include features that make the product accessible to users of assistive technology.

For more information about Oracle's commitment to accessibility, go to https://www.oracle.com/corporate/accessibility/.

- Documentation Accessibility
- Diversity and Inclusion

Documentation Accessibility

Documentation for Oracle hardware is provided in HTML and PDF formats. The HTML documents are accessible using standard operating system controls and assistive technology. PDF documents are also provided, but are not an accessible format. PDF documents are considered support documents because the PDF content is available in accessible HTML format.

Product documentation provides figures, other types of images, and screenshots that do not rely on color for interpretation. Within the figures, callouts indicate the referenced component information. The callouts are mapped within a table to provide text descriptions of the referenced parts of the figures. In addition, alternative text is provided for all tables and images that provides the context of the information and images.

Note that screen readers might not always correctly read the code examples in the documentation. The conventions for writing code require that closing braces should appear on an otherwise empty line. However, some screen readers might not always read a line of text that consists solely of a bracket or brace.

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You can access the accessible HTML documentation for Oracle Flash Accelerator F640 PCIe Card v3 products at https://www.oracle.com/goto/oracleflashf640/docs .

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers and partners we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.