Sun Flash Accelerator F40 PCIe Card Product Notes

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Using This Documentation

- **Overview** – These product notes include information about supported software and firmware, and important operating guidelines for Sun Flash Accelerator F40 PCIe Cards.
- **Audience** – Technicians, system administrators, authorized service providers, and users.
- **Required knowledge** – Experience with servers and advanced understanding of server storage systems.

Product Documentation Library

Documentation and resources for this product and related products are available at http://www.oracle.com/pls/topic/lookup?ctx=sunflashf40.

Feedback

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

Sun Flash Accelerator F40 PCIe Card Product Notes

This document contains late-breaking information about the Sun Flash Accelerator F40 PCIe Card from Oracle. Read this document before reading other Sun Flash Accelerator F40 PCIe Card documentation.

For specific installation instructions, see your system installation guide. For late-breaking information about the installation and use of the Sun Flash Accelerator F40 PCIe Card on your server, see the most recent version of the server product notes.

The following sections are included in this document:

- Supported Hardware and Software
- Card Implementation Considerations
- Known Issues

Supported Hardware and Software

The following sections describe the servers, operating systems, software and firmware supported for the Sun Flash Accelerator F40 PCIe Card.

- Supported Servers and Operating Systems
- Minimum Supported Card Firmware Version
- Required Host Software
- Keeping Drivers and Firmware Up To Date

Supported Servers and Operating Systems

This section describes servers that support the Sun Flash Accelerator F40 PCIe Card. 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 the Sun Flash Accelerator F40 PCIe Card:

SPARC Servers	Number of Cards	Slots Supported and Preferred Order for Installing F40 Card	Supported Operating Systems
SPARC T4-1	1 to 2	5, 3	■ Oracle Solaris 11.1 ■ Oracle Solaris 10 8/11 OS with required patchsets ■ Oracle Solaris 10 9/10 OS with the Solaris 10 8/11 SPARC Bundle and required patchsets
SPARC T4-2	1 to 4	9, 8, 7, 0 (Slot 6 if Slot 0 is unavailable)	■ Oracle Solaris 11.1 ■ Oracle Solaris 10 8/11 OS with required patchsets ■ Oracle Solaris 10 9/10 OS with the Solaris 10 8/11 SPARC Bundle and required patchsets
SPARC T5-2	1 to 4	1, 8 ,2, 7, 3, 6, 4, 5	■ Oracle Solaris 11.1 SRU 4 ■ Oracle Solaris 10 1/13 OS with required patchsets
SPARC T5-4 See “SPARC Server T5-4 and T5-8 Configuration” on page 15	1 to 8	1, 3, 5, 7, 9, 11, 13, 15	■ Oracle Solaris 11.1 ■ Oracle Solaris 10 1/13 OS with required patchsets
SPARC T5-8 See “SPARC Server T5-4 and T5-8 Configuration” on page 15	1 to 8	1, 3, 5, 7, 9, 11, 13, 15	■ Oracle Solaris 11.1 ■ Oracle Solaris 10 1/13 OS with required patchsets
SPARC M5-32 See “SPARC M5-32 Server Configuration” on page 16	1 to 60	Slot 8 in each I/O unit (IOU) is not supported.	■ Oracle Solaris 11.1 SRU 4 ■ Oracle Solaris 10 1/13 OS with required patchsets
Fujitsu M10-1	1 to 3	2, 0, 1	■ Oracle Solaris 11.1 SRU 1.4 ■ Oracle Solaris 10 1/13 OS with required patchsets
Fujitsu M10-4	1 to 11	10, 6, 2, 8, 4, 9, 5, 1, 7, 3, 0	■ Oracle Solaris 11.1 SRU 1.4 ■ Oracle Solaris 10 1/13 OS with required patchsets
Fujitsu M10-4S	1 to 8	6, 2, 4, 5, 1, 7, 3, 0	■ Oracle Solaris 11.1 SRU 1.4 ■ Oracle Solaris 10 1/13 OS with required patchsets

Note - Direct I/O support (DIO) is available for SPARC T4-1 and T4-2 servers.

x86 Servers	Number of Cards	Slots Supported for Installing F40 Card	Supported Operating Systems
Sun Server X3-2L See "Sun Server X3-2L Configuration" on page 15.	1 to 4	1, 2, 4, 5	■ Oracle Solaris 11.1 ■ Oracle Solaris 10 8/11 ■ Oracle Linux 5.8, based on UEK2 (Unbreakable Linux Kernel Release 2) ■ Oracle Linux 6.2, 6.3, based on UEK2 (Unbreakable Linux Kernel Release 2)

Other servers and processors may 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.

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 - For up-to-date information on supported servers, operating systems and required patchsets, refer to the product notes for the servers.

Minimum Supported Card Firmware Version

Use the DDCLI utility to check and update firmware.

Firmware	Version	Patch
F40 Firmware Package (recommended)	13.05.10.01	SW2.0 25292105
F40 Firmware Package	09.05.40.00	SW1.2 19933424
F40 Firmware Package	08.05.01.01	SW1.1 16005846
F40 Firmware Package (minimum)	08.05.01.00	SW1.0 14383129

Summary of Changes in Firmware 13.05.10.01 Release

The following improvements and changes are included in SW2.0 Phase 13.05.10.01 release of the Sun Flash Accelerator F40 PCIe Card:

- Permanently disabled SMART caching, removed the checksum error reported by smartctl.

- DDCLI updated to 112.05.25.00 for F40 Management Command line utility (OS specific) for management and monitoring of the F40 PCIe card. Utility update for both Linux and Solaris (compatible with F80)
- Bug 22727539 - FATAL resetting due to F80 and F40 fault_state(0x0d04)
- Bugs 22843161 and 22848220 - Cards failed with "poor performance" at the same time, due to background recycler.

If you install the Sun Flash Accelerator F40 PCIe Card as an x-option on a server, you must update the firmware from 08.05.01.01 to 13.05.10.01, or a subsequent release if available.

Summary of Changes in Firmware 09.05.40.00 Release

The following improvements and changes are included in firmware Phase 09.05.40.00 release SW1.2 (Released November 2014) of the Sun Flash Accelerator F40 PCIe Card:

- Bug 19140306 – F40 card may fail at initial power on after no power on for long period.
- Bug 18160181 – F40 card may not show up on powercycle.
- Bug 17773639 - Sun Flash Accelerator F40 flash module may not initialize at powercycle.
- DDCLI updated to 11.00.12.00, Utility update for both Linux and Solaris (compatible with F80)

If you install the Sun Flash Accelerator F40 PCIe Card as an x-option on a server, you must update the firmware from 09.05.40.00 to 13.05.10.01, or a subsequent release if available.

Summary of Changes in Firmware 08.05.01.01 Release

The following improvements and changes are included in firmware Phase 08.05.01.01 release SW1.1 (Released December 2012) of the Sun Flash Accelerator F40 PCIe Card:

- Bug 15801572 - SUNBT7181173 variable (up to 25% IOPS) read throughput (11%) performance.
- Bug 15805379 - SUNBT7185967 DFF is reported missing during power cycle.
- Bug 15799303 - SUNBT7178453 Panic Logs found on Sun Flash Accelerator F40 PCIe Card.
- DDCLI updated to 107.00.00.05 Utility for both Linux and Solaris-SPARC provided.
- Bug 15780582 - DDCLI reports overall health as GOOD even if SSD temperature is over 74C.

If you install the Sun Flash Accelerator F40 PCIe Card as an x-option on a server, you must update the firmware from 08.05.01.00 to 13.05.10.01, or a subsequent release if available.

Required Host Software

The Sun Flash Accelerator F40 PCIe Card runs with the minimum required host software listed below:

SPARC Driver	Minimum Required Host Firmware Version With Patches	Recommended System Software Version (Patch No.)
SPARC T4-1	8.2.1.b	148822-03
SPARC T4-2	8.2.1.b	148823-03
SPARC T5-2	9.0.0.h	16588974
SPARC T5-4	9.0.2.g	17019069
SPARC T5-8	9.0.2.g	17019069
SPARC M5-32	9.0.1.b	1540816.1
Fujitsu M10-1	XCP version 2041	Patch 16687261: FUJITSU M10-1 XCP2041 FIRMWARE
Fujitsu M10-4	XCP version 2041	Patch 16687263: FUJITSU M10-4 XCP2041 FIRMWARE
Fujitsu M10-4S	XCP version 2041	Patch 16687267: FUJITSU M10-4S XCP2041 FIRMWARE

x86 Driver	Minimum Required Host Firmware Version With Patches	Recommended System Software Version (Patch No.)
Sun Server X3-2L	Software 1.2.0	■ X3-2L SW 1.2.0 Firmware Pack - Patch number 16039828 ■ X3-2L SW 1.2.0 OSA Updater - Patch number 16039823

Note - For up-to date information on supported servers, drivers, host software, firmware and required patchsets, refer to the product notes for the servers.

Keeping Drivers and Firmware Up To Date

Use the DDCLI utility to check and update card firmware. For information on updating drivers and firmware for Sun Flash Accelerator F40 PCIe Card, refer to the *Sun Flash Accelerator F40 PCIe Card User's Guide* and “Accessing DDCLI Software Updates and Firmware Downloads” on page 17.

Card Implementation Considerations

The following sections contain important information for configuring Sun Flash Accelerator F40 PCIe Card.

- "Configuring Sun Flash Accelerator F40 PCIe Card For Optimum Performance" on page 14
- "Sun Server X3-2L Configuration" on page 15
- "SPARC Server T5-4 and T5-8 Configuration" on page 15
- "SPARC M5-32 Server Configuration" on page 16
- "Card Volume Management" on page 16
- "Accessing DDCLI Software Updates and Firmware Downloads" on page 17

Configuring Sun Flash Accelerator F40 PCIe Card For Optimum Performance

Sun Flash Accelerator F40 PCIe Cards must be configured for optimum flash card performance. You should take the following into account when configuring your server system for installed Sun Flash Accelerator F40 PCIe Cards:

- Follow performance guidelines for implementiing Sun Flash Accelerator F40 PCIe Card 8k block tuning. The Sun Flash Accelerator F40 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. Refer to:

  - ZFS Tuning Guide: `http://docs.oracle.com/cd/E26502_01/html/E29022/chapterzfs-flash.html`
  - *Card Optimization Guidelines* in *Sun Flash Accelerator F40 PCIe Card Users Guide*
- Follow cache flush recommendations for servers with ZFS and installed Sun FlashAccelerator F40 PCIe Cards. Refer to the ZFS Tuning Guide for cache flush recommendations. See `http://docs.oracle.com/cd/E26502_01/html/E29022/chapterzfs-flash.html`.

- Do not disable power management in BIOS menus, to avoid a reduction in card performance if the server is reset.
- When configuring Power Safe mode, CPU deep cstates should be disabled in `/etc/system` files.
- Install the latest software and firmware for servers with installed Sun Flash Accelerator F40 PCIe Cards. See "Keeping Drivers and Firmware Up To Date" on page 13.

Sun Server X3-2L Configuration

Sun Flash Accelerator F40 PCIe Card support ing Sun Server X3-2L is restricted to the following Intel Xeon processors:

- 7100604 - Intel® Xeon® E5-2609 4-core 2.4 GHz processor (for factory installation)
- 7100602 - Intel® Xeon® E5-2640 6-core 2.5 GHz processor (for factory installation)
- 7100601 - Intel® Xeon® E5-2660 8-core 2.2 GHz processor (for factory installation)

Refer to the Sun Server X3-2L documentation for more information on card installation at: `http://www.oracle.com/pls/topic/lookup?ctx=SunServerX3-2L`.

SPARC Server T5-4 and T5-8 Configuration

SPARC Server T5-4 and SPARC Server T5-8 require a doublewide PCIe hot plug carrier extension for each installed Sun Flash Accelerator F40 PCIe Card to facilitate air flow. Doublewide carriers do not allow the use of one adjacent PCIe slot. PCIe hot plug carrier extensions (Mkt PN 710710) are installed in odd numbered PCIe slots. The Sun Flash Accelerator F40 PCIe Card cannot be installed in slot 16.

- Refer to the SPARC Server T5-4 documentation for more information on card installation at: `http://www.oracle.com/goto/T5-4/docs`.
- Refer to the SPARC Server T5-8 documentation for more information on card installation at: `http://www.oracle.com/goto/T5-8/docs`.

The following figure shows an example of doublewide PCIe hot plug carrier extensions that populate two PCIe slots for each Sun Flash Accelerator F40 PCIe Card.

SPARC M5-32 Server Configuration

Fifteen Sun Flash Accelerator F40 PCIe Cards are supported per SPARC M5-32 server physical domain. A SPARC M5-32 server can include one to four physical domains. For example, a server with two physical domains supports 30 Sun Flash Accelerator F40 PCIe cards, fifteen in each physical domain. A server with four physical domains supports 60 cards.

The Sun Flash Accelerator F40 PCIe card requires increased cooling to remove the heat generated by the card. By the internal design of the I/O Unit (IOU), PCIe slot 8 receives less airflow than the other slots. Do not install a Sun Flash Accelerator F40 PCIe card into PCIe slot 8. Hot-plug installation of the Sun Flash Accelerator F40 PCIe card is not supported. For IOU slot priority, additional configuration options, and PCIe card installation instructions, refer to the *SPARC M5-32 Server Service Manual* at `http://www.oracle.com/goto/M5-32/docs`.

Card Volume Management

Use the Automatic Storage Management (ASM) volume manager or other volume manager to concatenate multiple flash memory module domains. For example, a volume manager can be used to concatenate four 200 GB domains into a single 800 GB volume. A volume manager can also present multiple SSD cards as one larger volume.

Refer to the documentation for more information at: `http://docs.oracle.com/cd/B28359_01/server.111/b31107/asmcon.htm#OSTMG036`

Accessing DDCLI Software Updates and Firmware Downloads

Sun product patches, updates and firmware are available on My Oracle Support at https://support.oracle.com. from the Patches and Updates tab. Information on accessing and using My Oracle Support can be found at the *My Oracle Support Welcome Center for Oracle Sun Customers and Partners.*

▼ Downloading the Card Software Package

To find the card software package that includes the DDCLI utility, access My Oracle Support and download the latest software package for the Sun Flash Accelerator F40 PCIe Card.

1. **Sign in to MyOracle Support at https://support.oracle.com.**
2. **Click the "Patches & Updates" tab.**
3. **In the "Patch Search" box on the right side, select "Product or Family (Advanced Search)"**
4. **Enter a partial product name for "Product is".**

   A list of matches displays.
5. **Select the product of interest.**

   Select one or more "releases" in the "Release is" drop down list.

   Close the pop-up window.
6. **Click Search.**

   A list of product downloads (listed as patches) displays.
7. **Select the download of interest.**

   The Download Information Page displays.

   If, on the Download Information Page, you get the message "You do not have permissions to download this Patch...", see *How Patches and Updates Entitlement Works* at https://support.oracle.com to help you determine the reason.

Known Issues

The following sections describe known issues for the Sun Flash Accelerator F40 PCIe Card:

SW 2.0:

- Permanently disabled SMART caching, removed the checksum error reported by smartctl.
- Bug 22727539 - FATAL resetting due to F80 and F40 fault_state(0x0d04)
- Bugs 22843161 and 22848220 - Cards failed with "poor performance" at the same time, due to background recycler.

SW 1.2:

- Bug 19140306 – F40 card may fail at initial power on after no power on for long period.
- Bug 18160181 – F40 card may not show up on powercycle.
- Bug 17773639 - Sun Flash Accelerator F40 flash module may not initialize at powercycle.

SW 1.1:

- Bug 15801572 - SUNBT7181173 variable (up to 25% IOPS) read throughput (11%) performance.
- Bug 15805379 - SUNBT7185967 DFF is reported missing during power cycle.
- Bug 15799303 - SUNBT7178453 Panic Logs found on Sun Flash Accelerator F40 PCIe Card.
- Bug 15780582 - DDCLI reports overall health as GOOD even if SSD temperature is over 74C.

▼ `FATAL` resetting due to F80 and F40 `fault_state (0x0d04)` (22727539)

The Sun Flash Accelerator F40 PCIe Card may fail with `FATAL` resetting due to critical error `fault_state(0x0d04)`.

Workaround

- **Update the firmware to SW 2.0 or later.**

Cards failed with "poor performance" at the same time, due to background recycler (22843161 and 22848220)

Multiple Sun Flash Accelerator F40 PCIe Cards may fail with "poor performance" at the same time. Fix for reset due to `fault_state (0x0d04)`, and performance improvement due to background recycler.

Workaround

- **Update the firmware to SW 2.0 or later.**

Card may fail at initial power on after no power on for long period (19140306)

The Sun Flash Accelerator F40 PCIe Card may fail at initial power on after no power on for long period.

Workaround

- **Update the firmware to SW 2.0 or later.**

Card may not show up on power cycle (18160181)

The Sun Flash Accelerator F40 PCIe Card may not appear to be present after a power cycle.

Workaround

- **Update the firmware to SW 2.0 or later.**

Card may not initialize at power cycle (17773639)

The Sun Flash Accelerator F40 PCIe Card may not initialize at power cycle.

Workaround

- **Update the firmware to SW 2.0 or later.**

SUNBT7181173 variable (up to 25% IOPS) reads throughput (11%) performance (15801572)

The Sun Flash Accelerator F40 PCIe Card SUNBT7181173 variable (up to 25% IOPS) reads throughput (11%) performance.

Workaround

- **Update the firmware to SW 2.0 or later.**

SUNBT7185967 DFF is reported missing during power cycle (15805379)

The Sun Flash Accelerator F40 PCIe Card SUNBT7185967 DFF is reported missing during power cycle.

Workaround

- **Update the firmware to SW 2.0 or later.**

SUNBT7178453 Panic Logs found on Sun Flash Accelerator F40 PCIe Card (15799303)

Sun Flash Accelerator F40 PCIe Card Panic Logs are generated.

Workaround

- **Update the firmware to SW 2.0 or later.**

▼ Sun Flash Accelerator F40 PCIe Card DDCLI reports overall health as GOOD even if SSD temperature is over 74C (15780582)

The Sun Flash Accelerator F40 PCIe Card DDCLI utility reports overall health as GOOD even if the SSD temperature exceeds 74 degrees C.

Workaround

- **Update the firmware to SW 2.0 or later.**