Sun Flash Accelerator F20 PCIe Card

Product Notes

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Preface

This document contains late-breaking information about the Sun Flash Accelerator F20 PCIe card from Oracle. Read this document first. 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 system installation guide. For late-breaking information about installation and use of the Sun Flash Accelerator F20 PCIe card on your server, see the most recent version of the server product notes.

This preface contains the following topics:

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- "UNIX Commands" on page v
- "Shell Prompts" on page vi
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- "Documentation Feedback" on page vii

UNIX Commands

This document might not contain information on basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system

- Oracle Solaris Operating System documentation, which is at (http://docs.sun.com)

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

The documents listed as online are available at:

(http://docs.sun.com/app/docs/prod/)

Application	Title	Part Number	Format	Location
Installation, service, and configuration	*Sun Flash Accelerator F20 PCIe Card User's Guide*	820-7265	PDF, HTML	Online
Late-breaking information	*Sun Flash Accelerator F20 PCIe Card Product Notes*	820-7267	PDF	Online

Documentation, Support, and Training

These sites provide information about the following additional resources:

- Documentation (http://docs.sun.com)

- Support (http://www.sun.com/support)
- Training (http://www.sun.com/training)

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Sun Flash Accelerator F20 PCIe Card Product Notes, part number 820-7267-14.

Sun Flash Accelerator F20 PCIe Card Product Notes

This document contains late-breaking information and known issues in the Sun Flash Accelerator F20 PCIe card.

- "System Requirements" on page 1
- "FMod Alignment" on page 4
- "Required ESM Replacement" on page 4
- "Monitoring ESM Lifespan" on page 5
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System Requirements

- "Supported Servers" on page 1
- "Supported Operating Systems" on page 2
- "Minimum Supported Firmware Versions" on page 3
- "Minimum Required System Firmware Patches" on page 3
- "Solaris Performance Patch" on page 3

Supported Servers

This section describes servers that support the Sun Flash Accelerator F20 PCIe card. For detailed information about using this card with your server, see the product notes for your server, available at:

`http://docs.sun.com/app/docs/prod/servers#hic`

Note – The following servers are qualified to work with the Sun Flash Accelerator F20 PCIe card at the *initial release of the card*. Check your server product notes for confirmation that your server has subsequently been qualified.

SPARC Servers	x86 Servers
Sun SPARC Enterprise® T5120	Sun Fire™ X4540
Sun SPARC Enterprise T5220	
Sun SPARC Enterprise T5140	
Sun SPARC Enterprise T5240	
Sun SPARC Enterprise T5440	
Sun SPARC Enterprise M4000	
Sun SPARC Enterprise M5000	
Sun SPARC Enterprise M8000	
Sun SPARC Enterprise M9000	

Supported Operating Systems

The following table describes which combinations of operating systems and servers are supported for use with the Sun Flash Accelerator F20 PCIe card.

Platform	Oracle Solaris 10 05/09 (S10U7)	Oracle Solaris 10 05/08 Update 5 (U5) for x64	Red Hat Enterprise Linux 4.6, 5.1	SUSE SLES Linux 10 SP1	Windows 2003 Server R2 SP2	Windows 2008 Server
Sun SPARC Enterprise® T5120	✓					
Sun SPARC Enterprise T5220	✓					
Sun SPARC Enterprise T5140	✓					
Sun SPARC Enterprise T5240	✓					
Sun SPARC Enterprise T5440	✓					
Sun SPARC Enterprise M4000	✓					

Platform	Oracle Solaris 10 05/09 (S10U7)	Oracle Solaris 10 05/08 Update 5 (U5) for x64	Red Hat Enterprise Linux 4.6, 5.1	SUSE SLES Linux 10 SP1	Windows 2003 Server R2 SP2	Windows 2008 Server
Sun SPARC Enterprise M5000	✓					
Sun SPARC Enterprise M8000	✓					
Sun SPARC Enterprise M9000	✓					
Sun Fire™ X4540		✓				

Minimum Supported Firmware Versions

Firmware	Version
FMod firmware	D20R
SAS/SATA controller firmware	1.27.03
System firmware version for the Sun SPARC Enterprise T5120, T5220, T5240, T5240, and T5440 Servers.	7.2.7.d
System firmware version for the Sun SPARC Enterprise M4000, M5000, M8000, and M9000 Servers.	1093

Minimum Required System Firmware Patches

System	Patch
Sun SPARC Enterprise T5120 and T5220	139439-09
Sun SPARC Enterprise T5140 and T5240	139444-08
Sun SPARC Enterprise T5440	139446-08

Solaris Performance Patch

Download and install the following performance patch on your Solaris host:

- For Solaris 10 SPARC U4-U7, 138880-01 or later with MPT patch 141736-05

- For Solaris 10 x86 U4-U7, 138881-01 or later with MPT patch 141737-05

Available for download from the following web site:

`http://sunsolve.sun.com/show.do?target=patchpage`

Note – To enable maximum throughput from the MPT driver, add `mpt_doneq_thread_n_prop=8;` to `/kernel/drv/mpt.conf` and reboot the system.

FMod Alignment

You must properly align the FMods before using the card.

Solid state flash devices have block alignments typically aligned on 4-Kbyte boundaries, not the 512-byte boundaries of conventional disks. To maximize performance, partitions need to be aligned on 4-Kbyte boundaries. For directions on aligning the FMods, see the *Sun Flash Accelerator F20 PCIe User's Guide*. For more information on performance tuning, see

`http://wikis.sun.com/display/Performance/Home#Home-Flash`

Required ESM Replacement

The Sun Flash Accelerator F20 PCIe card contains a component called the Energy Storage Module (ESM) that functions similar to a battery backup. The ESM plays a critical role protecting data during power outages and enabling optimal card performance. When the ESM is online and functioning properly, the card operates in write-back mode (providing optimal performance). When the ESM is not functioning properly, the card functions in write-through mode. While data is secure in write-through mode, performance is dramatically decreased.

Based on the expected life of the ESM, and to maintain optimal card performance, plan to replace the ESM every two years. To help you monitor the age of the ESM, Sun provides two options for monitoring the ESM, see "Monitoring ESM Lifespan" on page 5. Service the ESM (F371-4650) as described in the *Sun Flash Accelerator F20 PCIe User's Guide*.

Caution – If the ESM is not replaced at the recommended service interval, the level of stored energy will continue to degrade over time. Any data stored on the card is at risk of being lost if there is not enough stored energy to complete a write operation during a power failure. To avoid this risk, replace the ESM at the recommended service interval.

Note – The long-term durability of the ESM is affected by excessive heat. Refer to your server product notes to understand any slot or thermal restrictions that apply to your server.

Product documentation is available at:

http://docs.sun.com/app/docs/prod/servers#hic

Monitoring ESM Lifespan

Because the onboard ESM has a two-year lifespan, Sun provides two different methods that monitor how long an ESM has been installed, and notifies you when to replace the ESM.

One option is the Sun Flash Accelerator F20 ESM Monitoring Utility, a simple script that you install on your host server to track the life of the ESM. You must use this monitoring option for F20 cards with part number 511-1500-01.

The second option uses ILOM (or XSCF for M-series servers) to monitor the F20 card. ILOM will track the ESM lifespan and notify you when to replace the ESM. You must use this monitoring option for F20 cards with part numbers 511-1500-05 or greater, and with ILOM system firmware version 7.2.7.d or greater.

Sun Flash Accelerator F20 ESM Monitoring Utility

The Sun Flash Accelerator F20 ESM Monitoring Utility is a simple tool that you install on your host server to track the life of the ESM. Once installed, the ESM Monitoring Utility runs weekly to track the age of your ESM. The utility sends messages to the console and the `/var/adm/messages` file as the ESM approaches or exceeds the two-year replacement interval. Optionally, you can use an external monitoring tool to configure an SNMP trap that sends an email alert when these messages appear.

The utility can be run manually anytime to display the current ESM replacement data on all installed cards.

Note – Installation of this utility is required on cards with part number 511-1500-01 and 511-1275-03 or less to maintain optimal performance for the life of the card. This option will not work on cards with part numbers 511-1500-02 and 511-1275-04 or higher.

Download the ESM Monitoring Utility.

1. Go to
   http://www.oracle.com/technology/software/sun_az_index.html
2. Locate the “Sun Flash Accelerator F20 ESM Monitoring Utility for Solaris 1.0”.
3. Log in (if required) to download the file.

To install the utility, follow the directions in the README file.

If you have multiple Sun Flash Accelerator F20 PCIe cards of the same age installed, consider replacing the ESMs at the same time to minimize system downtime. Service the ESM (F371-4650) as described in the *Sun Flash Accelerator F20 PCIe User's Guide* (820-7265).

ILOM ESM Monitoring Option

For later-generation F20 cards (part number 511-1500-02 and 511-1275-04 or greater), ESM lifespan is automatically monitored by the ILOM system management firmware (system firmware version 7.2.7.d or greater) installed on your host.

Note – The Sun Fire X4540 requires ILOM version SW2.2 for ESM monitoring.

ILOM monitors ESMs by recording the Total_Time_On for each installed F20 card, and then issues warning messages (to the event log and to the host Solaris `syslog`) as an ESM approaches the end of its two year lifespan.

For example, one week before an ESM reaches its two-year threshold, ILOM issues this warning message:

```
"/SYS/MB/RISER1/PCI4/F20CARD ESM is approaching its lifespan.  Please
schedule a replacement as soon as possible."
```

When an ESM reaches its two-year threshold, ILOM issues this critical event message:

```
"/SYS/MB/RISER1/PCI4/F20CARD ESM has exceeded its lifespan. Please
schedule a replacement as soon as possible."
```

Note – You can configure ILOM to send these alerts by email or SNMP trap. See your ILOM documentation for more information.

Service the ESM (F371-4650) as described in the *Sun Flash Accelerator F20 PCIe User's Guide* (820-7265).

Once you have replaced your ESM, use ILOM's standard fault clearing methods to remove the fault warnings; this also resets the F20 card Total_Time_On counter to 0. For more information about using ILOM, see:

http://docs.sun.com/app/docs/coll/ilom3.0?l=en

XSCF ESM Monitoring Option

For later-generation F20 cards (part number 511-1500-02 and 511-1275-04 or greater), ESM lifespan is automatically monitored by the XSCF system management firmware installed on your host.

XSCF monitors ESMs by recording the Total_Time_On for each installed F20 card, and then issues fault reports when an ESM appoaches the end of its two year lifespan.

To view the ESM lifespan at any time, type:

```
XSCF> ioxadm lifetime
NAC                 Total Time On  (% of life)
IOU#0-PCI#1         1685           0
IOU#0-PCI#3         1685           0
XSCF> ioxadm -v lifetime
NAC            Total Time On  (% of life)  Warning Time   Fault Time
IOU#0-PCI#1        1685          0             1008000       1051200
IOU#0-PCI#3        1685           0             1008000       1051200
```

30-days before an ESM reaches its two-year threshold, XSCF posts a message, similar to the following message, to the console log:

```
Mar 25 15:35:10 burl-m4000-0 fmd: SOURCE: sde, REV: 1.16, CSN:
0000000000  EVENT-ID:
144796b5-a7e2-4285-a3f1-30ce047767f3 Refer to
http://www.sun.com/msg/SCF-8000-9X for detailed information.
```

Once you receive this message, type the following command for more detail:

```
XSCF> fmdump -m
MSG-ID: SCF-8000-9X, TYPE: Fault, VER: 1, SEVERITY: Minor
EVENT-TIME: Thu Mar 25 15:35:10 EDT 2010
PLATFORM: SPARC Enterprise M4000 , CSN: 0000000000, HOSTNAME:
burl-m4000-0
SOURCE: sde, REV: 1.16
EVENT-ID: 144796b5-a7e2-4285-a3f1-30ce047767f3
DESC: An energy storage module is approaching its lifespan.
Refer to http://www.sun.com/msg/SCF-8000-9X for more information.
AUTO-RESPONSE: No immediate action is taken
IMPACT: Backup power may not be available in event of power loss.
REC-ACTION: Schedule a repair procedure as soon as possible to
replace the ESM.
```

When an ESM reaches its two-year threshold, XSCF posts this message to the console log:

```
Feb 17 12:49:24 burl-m4000-0 fmd: SOURCE: sde, REV: 1.16, CSN:
0000000000  EVENT-ID:
98198f1d-2e66-4635-90dd-5381b2bf2f1f Refer to
http://www.sun.com/msg/SCF-8000-AE for detailed information.
```

Once you receive this message, type the following command for more detail:

```
XSCF> fmdump -m
MSG-ID: SCF-8000-AE, TYPE: Fault, VER: 1, SEVERITY: Major
EVENT-TIME: Wed Feb 17 12:49:24 EST 2010
PLATFORM: SPARC Enterprise M4000 , CSN: 0000000000, HOSTNAME:
burl-m4000-0
SOURCE: sde, REV: 1.16
EVENT-ID: 98198f1d-2e66-4635-90dd-5381b2bf2f1f
DESC: An energy storage module has exceeded its lifespan.
Refer to http://www.sun.com/msg/SCF-8000-AE for more information.
```

```
AUTO-RESPONSE: No immediate action is taken
IMPACT: Backup power may not be available in event of power loss.
REC-ACTION: Schedule a repair procedure as soon as possible to
replace the ESM.
```

Note – You can configure XSCF to send these alerts by email or SNMP trap. See your XSCF documentation for more information.

Service the ESM (F371-4650) as described in the *Sun Flash Accelerator F20 PCIe User's Guide* (820-7265).

Once you replace your ESM, use the following command to clear the fault warnings and reset the F20 card Total_Time_On counter to 0:

```
XSCF> ioxadm lifetime -z IOU#x-PCI#y
```

Use of `ioxadm lifetime -z` requires fieldeng privileges.

For more information,, see the XSCF product documentation:
http://docs.sun.com/app/docs/doc/819-6202-16

Known Issues

This section describes hardware, firmware, and software issues known to exist at this release of Oracle's Sun Flash Accelerator F20 PCIe card.

CR ID	Description	Workaround
6868341	In some cases, the server fails to recognize the card after a SATA controller firmware upgrade. The upgrade fails with an error message similar to the following: `MPT BIOS Fault 0Dh encountered at adapter PCI(02h,00h,00h)` In addition, the card does not appear in the server device tree.	Reboot the server a second time. The card is recognized after the second reboot.
6881281	FMod support clips may break if pressed too far during FMod removal.	Loosen the clip screws when replacing an FMod, as described in the *Sun Flash Accelerator F20 PCIe User's Guide*.
6809711	Under heavy I/O load in Solaris, a large number of messages may be seen indicating I/O retries (such as incomplete read- retrying). These messages occur due to a hardware bug in the LSI SAS controller that may incorrectly detect underrun conditions and report them to the driver. Overall data integrity is not compromised, but a performance impact may be observed due to the messages logged and retries required.	Ignore the retry messages or use an external means to throttle I/O throughput down to a level where these messages are not being produced in great numbers. The method required to throttle I/O will be very configuration and workload specific.

CR ID	Description	Workaround
n/a	If there is a significant unexpected drop in card performance, the supercap module on the ESM should be checked.	Look at the back panel of the card to determine if the amber ESM Service Required LED is lit. Service the ESM as described in the *Sun Flash Accelerator F20 PCIe User's Guide*.
6881856	On occasion, the system BIOS may not give the card firmware enough time to load. When this situation occurs, the card cannot be seen by host server.	Reboot the server.
6951778	Repeated power cycling with minimum traffic causes DOM to zombie.	Do not run continuous power cycle tests with minimum traffic to the DOM. If power cycling is needed for qualification either ensure there is no traffic to the DOM including SMART transactions or allow the SuperCap to fully charge and run transactions to the DOM. Because the pre-existing state of a DOM is unknown, it could have been power cycled previously, the number of power cycles cannot be specified.

Documentation Errata

The label on the card faceplate might read "SuperCap" instead of "ESM".