

SS7000[™]

SFA7700[™]

Interposer Issue with SanDisk Lightning SSDs

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Issue Summary

SanDisk Lightning Ascend and Lightning Eco solid-state drives (SSDs) installed with carriers shipped prior to November 2016 may experience command timeouts that cause SFA OS to fail the drives. The error message seen in the event log resembles the following:

```
LOG_IOF_AUTO_QUIESCED IOF AUTO QUI PD:00047 STS:JS_AMPD_IOC_CMD_TIMEOUT
```

When the failed SSD is removed from its carrier and inserted directly in a drive slot on the enclosure baseboard, it performs as expected. In these cases, the timeout issue has been traced to the interposer in the original SS7000 carrier.

In SFA7700 and SS7000 enclosures, the original carrier used with 2.5-inch form factor drives contains an interposer that corrects for an offset between the drive mounting position in the carrier and the

SAS socket position on the enclosure baseboard. That interposer is designed to operate at 3 Gbps to 6 Gbps. The SAS connections on the SS7000 baseboard also operate at 6 Gbps. However, SanDisk Lightning SSDs are optimized for operation at 12 Gbps. SFA OS negotiates the speed of these drives down to 6 Gbps to match enclosure requirements. But SS7000 interposers do not always accommodate the narrow timing tolerances of these high-speed-capable drives and can sometimes introduce signal errors.

Affected Products

The interposer issue occurs with the SanDisk Lightning SSDs (bare drives) listed in Table 1. These drives are identified in SFA reports by the SanDisk *model* number shown in the table.

Table 1. SanDisk Lightning Ascend and Eco SSD Models Affected

MODEL	SANDISK PART NUMBER	DDN PART NUMBER	DESCRIPTION
LT0400MO	SDLTODKM-400G-5Cxx	08-00198-400	Ascend mixed-use SAS 2.5" 512/4K 400 GB
LT0800MO	SDLTODKM-800G-5Cxx	08-00198-800	Ascend mixed-use SAS 2.5" 512/4K 800 GB
LT1600MO	SDLTOCKM-016T-5Cxx	08-00198-1R6	Ascend mixed-use SAS 2.5" 512/4K 1.6 TB
LT0800RO	SDLTODKR-800G-5Cxx	08-00199-800	Eco read-intensive SAS 2.5" 512/4K 800 GB
LT1600RO	SDLTOCKR-016T-5Cxx	08-00199-1R6	Eco read-intensive SAS 2.5" 512/4K 1.6 TB

Prior to November 2016, the bare drive models above were installed in SS7000 and SFA7700 enclosures using the drive carriers listed in Table 2. These carriers and drive/carrier assemblies included the 6 Gbps interposer.

Table 2. Part Numbers for Affected SanDisk SSD Models by Configured Sector Size

DRIVE MODEL	SECTOR SIZE	CARRIER PART NUMBER	DRIVE/CARRIER ASSEMBLY PART NUMBER	DRIVE/CARRIER ASSEMBLY SALES PART NUMBER
LT0400MO	512 b	89-00314-400	89-01314-400	S07M0040225NDD3
	4 K	89-00281-400	89-01281-400	S07M0040224NDD3
LT0800MO	512 b	89-00314-800	89-01314-800	S07M0080225NDD3
	4 K	89-00281-800	89-01281-800	S07M0080224NDD3
LT1600MO	512 b	89-00314-1R6	89-01314-1R6	S07M0160225NDD3
	4 K	89-00281-1R6	89-01281-1R6	S07M0160224NDD3
LT0800RO	512 b	89-00318-800	89-01318-800	S07R0080225NDD4
	4 K	89-00285-800	89-01285-800	S07R0080224NDD4
LT1600RO	512 b	89-00318-1R6	89-01318-1R6	S07R0160225NDD4
	4 K	89-00285-1R6	89-01285-1R6	S07R0160224NDD4

These part numbers are used with both the original SS7000 carrier for 2.5-inch drives as well as a new, interposer-free carrier introduced in November 2016. **Only drive/carrier assemblies shipped before November 2016 include an interposer** and are subject to the interposer timeout issue. Carriers shipped November 2016 or later do not include interposers and are not affected.

Only SFA7700 storage arrays and SS7000 expansion enclosures are affected by the interposer issue.

Resolution

This issue is resolved by replacing older SS7000 carriers for 2.5-inch drives a new SS7000 carrier. The new carrier uses a mechanical adapter to position any 2.5" form factor SAS drive so that it connects directly to the SS7000 enclosure baseboard. No interposer is required. All new SSD shipments destined for SS7000 enclosures or SFA7700 head enclosures now use the new carrier.

The DDN part number for the new carrier when ordered separately as an RMA is **FRU-SS7K-ADPT**.

Identifying Affected Drives

To determine whether you have any affected SSDs installed, perform the following steps.

Step 1. Get a list of candidate SanDisk SSDs by running the CLUI command:

```
show pd *
```

The resulting report will look similar to the following:

EncL	Slot	Vendor	Product ID	Type	Cap GB	RPM	Revision	Serial Number	Pool	State	Idx	State	...	Size
1	1	SanDisk	LT0400MO	SAS	372	SSD	P324	40346984	SFXR	GOOD	362	NORM	...	512
1	2	SanDisk	LT0400MO	SAS	372	SSD	P324	40347396	SFXR	GOOD	361	NORM	...	512
.
.

	NUM	Vendor	Product ID	Type	Cap GB	RPM	Revision	Block Size
Found:	2	SanDisk	LT0400MO	SAS	372	SSD	P403	512
Found:	58	Hitachi	HDS723030ALA640	SATA	2794	7.2K	MKAOAAM0	512

The counts at the bottom of the report will quickly identify any SanDisk SSDs installed by model and provide a count for each. Potentially affected drives will have a model number in the **Product ID** field that matches one of the drive models listed in Table 1.

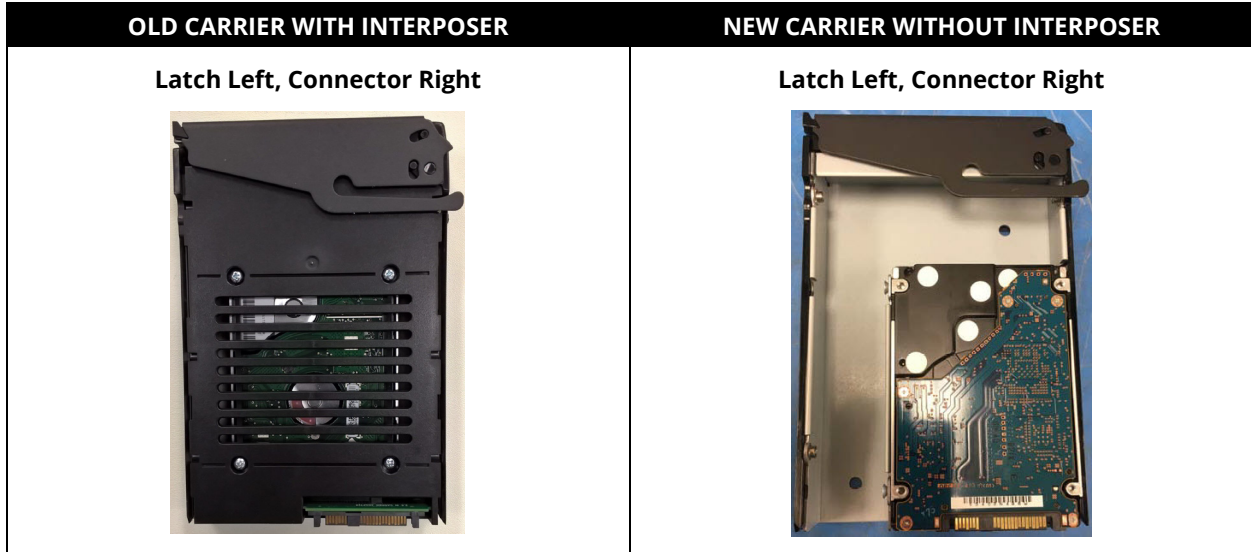
Step 2. Match the candidate drives found in **Step 1** against any physical disk timeouts observed in the system logs. Any SanDisk Lightning SSD for which timeouts are found may be experiencing the interposer issue. Verify that this is the case in **Step 3**.

NOTE *Optionally*, some customers may wish to replace all older SS7000 carriers with new interposer-free carriers on all their SanDisk Lightning SSDs, regardless of timeouts, as a precaution. In this case, visual inspection of the carrier on every SanDisk SSD found in **Step 1** will be required, in order to determine whether the old carrier is installed. See **Step 3**.

Step 3. Verify that the candidate drive is installed in an old carrier with the 6 Gbps interposer. The two carriers can be identified by visual inspection, as shown in Table 3.

If the candidate SanDisk SSD is mounted in the old carrier, contact DDN Support to arrange carrier replacement.

Table 3. Comparison of Old and New SS7000 Carriers for 2.5" SAS Drives



Contacting DDN Technical Support

Please contact DDN Technical Support at any time if you have questions or require assistance. Support can be reached by phone, by email, or on the web as listed below.

Web

*DDN Community Support Portal
Portal Assistance*

<https://community.ddn.com/login>
webportal.support@ddn.com

Telephone

DDN Support Worldwide Directory

<http://www.ddn.com/support/contact-support>

Email

Support Email

support@ddn.com

Bulletins

Support Bulletins

End-of-Life Notices

Bulletin Subscription Requests

<http://www.ddn.com/support/technical-support-bulletins>

<http://www.ddn.com/support/end-of-life-notices>

support-tsb@ddn.com