	TechTip. No. Sil-TT-0021	Rev. B00	Page 1 of 4
	Title: Sil3xxx Write Cache Configuration		

Product: *Sil3112, Sil3512, Sil3114, Sil3124, Sil3132, Sil3512*

Category: *Storage*

Department Name: *World Wide Customer Services and Support*

Title: *Sil3xxx Write Cache Configuration*

Technical Tip Overview

This document identifies a registry key to control write caching for Sil3xxx drivers, and summarizes typical performance to data loss trade offs for the write cache feature.

Support Limitations

The Sil3xxx drivers enable write cache by default without a GUI or operating supported mechanism to disable this feature. This Technical Tip documents a registry key used to control write caching for Sil3xxx drivers.

Resolution

The Sil3xxx Windows drivers allow explicit control of write caching for a specified hard disk drive model and firmware through the Windows registry.

Controlling Write Caching through the Windows Registry

To control write caching:

1. Open regedit
2. Select key HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\<DRIVER NAME>ProblemDevices

where driver name has the format:
 Si<controller id>[r | r5]


controller id = 4 digit part number assigned to controller (ex. 3112, 3114, 3124, 3132)
 (for the 680 controller this should be PnP680)

r = signifies a SATARAID driver (Legacy RAID) capable of RAID levels 0, 1, and 10
 r5 = signifies a SATARAID 5 driver capable of RAID levels 0,1, 5, and 10

If neither r or r5 is specified the driver is a non-RAID driver.

3. For the Problem devices key add a String value. In the name of the value include the 40 byte Model Number and 8 byte Firmware Revision as they appear in the drive's IDENTIFY DATA and are presented by the Sil31xx BIOS POST during start up.

Note: The driver supports partial matching for the String value. The first few characters of a model number in the String value name will suffice to allow write cache control. For example, if you add the key "Maxtor", then any drive attached to a Sil3xxx with

	TechTip. No. Sil-TT-0021	Rev. B00	Page 2 of 4
	Title: Sil3xxx Write Cache Configuration		

IDENTIFY DATA containing "Maxtor" for the model name will match applying the configuration to an entire family or just one specific drive/firmware type.

4. Right click on the created String value and select Modify from the pop-up menu.
5. In the Value data field enter EnableWriteCache or DisableWriteCache.

During driver initialization, EnableWriteCache value will instruct the driver to send a SET FEATURES command with an enable write cache sub command as described in the ATA specification.

During driver initialization, DisableWriteCache value will instruct the driver to send a SET FEATURES command with a disable write cache sub command as described in the ATA specification.

Write Cache related trade offs


Hard disk drive write caching provides a performance improvement in exchange for increased risk of data loss in case of power out. A hard disk drive with write caching enabled responds with a completion message to a write command immediately after a write request and before data is actually written. The immediate response allows the host to proceed directly with a following write request for an overall write performance improvement. This gain comes at an increased risk of data loss in case of power out. If the hard disk drive should lose power before it completes the actual write, the cached data will be forever lost.

General Recommendation

Because hard disk drive write caching provides sufficient performance gain without significantly increasing data loss or corruption risk, this feature should be enabled or left in the default state specified by the hard disk drive manufacturer. While write caching increases data loss risk, risk of write-related data loss or data corruption may not be avoided in case power loss. Inherently a chance exists that the hard disk drive may lose power as the data is being written to the hard disk drive platter.

Rather than inconsequentially manage data loss risk through write caching control, use a universal power supply to prevent system power loss. UPS products will protect a host from complete power failure and allow the user to shut the system down or automatically notify the operating system to shutdown without user intervention.

Hard disk drive write caching should be controlled to troubleshoot repeated operating system or hard disk drive failure to flush write cache. Operating systems have been documented to incorrectly flush write cache during shutdown. While no known problems exist within the latest patched operating system as of April 2006, future service packs or operating system releases might introduce regressions. Similarly, a possibility exists that hard disk drive firmware may incorrectly handle flush commands to write cached data to the platter. In either case, explicit control of write caching may confirm the problem and help work around the issue.

	TechTip. No. Sil-TT-0021	Rev. B00	Page 3 of 4
	Title: Sil3xxx Write Cache Configuration		

Reference Products

Sil3112, Sil3512, Sil3114, Sil3124, Sil3132, Sil3512

Referenced Documents


None

Internal Documents

Sil31xx: How to apply the parameter to an entire family or just one specific drive/firmware type in Windows registry.

External Documents

msdn.microsoft.com

	TechTip. No. Sil-TT-0021	Rev. B00	Page 4 of 4
	Title: Sil3xxx Write Cache Configuration		

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Revision history

REV.	DATE	ECN	TYPE	ORIGINATOR	DESCRIPTION
A00	4/15/2006		Info	Mikhail	Initial content
B00	7/5/2006		Modified	Mikhail	Changed the title and made a minor change to include BASE drivers.