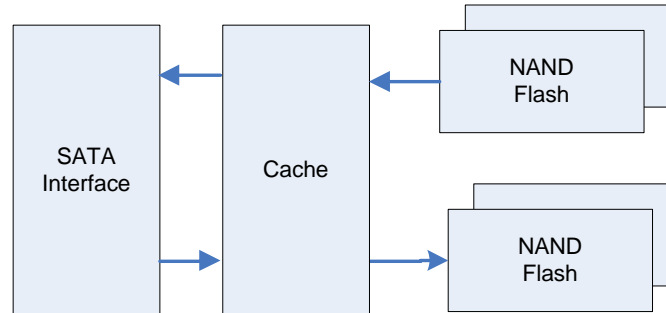

Xcel-10 Cache Technical Bulletin

Introduction

Xcel-10 (A25FD-30N) drives contain write cache and a super capacitor (supercap) circuit. These two components improve drive performance and prevent data loss in the event of a power failure as described in this document.

Cache

All data to and from the drive flows through the cache, consisting of synchronous dynamic RAM (SDRAM). This 32 MByte cache resides between the SATA interface and the flash (see the following illustration). Using cache not only increases performance, but helps extend the life of the drive through the use of a complex scatter/gather algorithm.



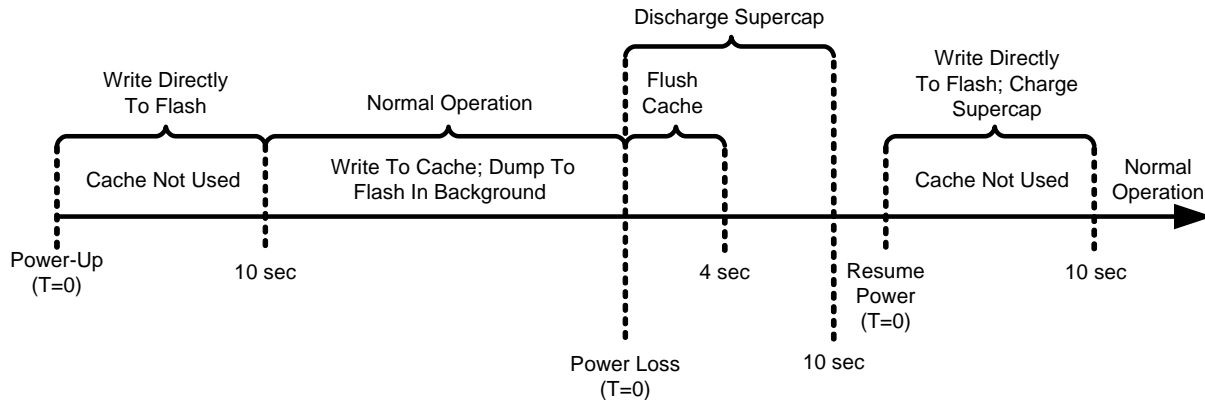
Although the drive allows the host to issue Disable Cache and Flush Cache commands, the drive ignores these commands (that is, they return a GOOD status without performing any operation). Because the supercap-based circuit provides enough power to flush the cache to the flash in the event of power loss, there is no need to rely on the host to initiate the process.

Supercap

To help ensure the drive does not lose data residing in the cache during a power interruption, the Xcel-10 drives contain a supercap-based circuit. This circuit is designed to retain power on the drive long enough for the drive to write the cache data to the flash. When the drive detects a power loss, the supercap maintains the voltage for up to 10 seconds. During this time, the drive writes all data from the cache to the flash. Because writing the cache to flash takes less than four seconds, the supercap provides more than enough power to flush the cache completely, leaving no data in the volatile memory. If power is lost while the host is transferring data, only the data the drive acknowledged is stored in cache. In other words, if the drive does not send the host an acknowledgement of a successful write, the data is not saved to the cache.

When power resumes, the supercap charges and reaches full power capacity within 10 seconds. As a safeguard to prevent data loss, the drive does not write to the cache while the supercap is charging. Although the host may send write requests to the drive during this time, the drive may not acknowledge the write until the supercap is fully charged.

To ensure the supercap is functional, the drive monitors the supercap voltage during power cycles. If this voltage is too low after a power-up, the drive enters a read-only state. This prevents the host from writing data to the cache, which may be lost during a subsequent power interruption. See the following illustration for a sample timeline.



Notice

This manual describes the features of the A25FD-30N. Adtron Corporation reserves the right to modify, amend, or in any way change the contents and/or products described herein, at any time, without notification.

The information contained in this document is provided for reference only. Adtron does not assume any liability arising out of the application or use of the products described herein. This document may contain or reference information or products protected by copyrights or patents and does not convey any license under the patent rights of Adtron Corporation, nor the rights of others.



Adtron Corporation
 4415 E. Cotton Center Blvd.
 Phoenix, AZ 85040
 Tel: U.S. 602-735-0300
 Fax: U.S. 602-735-0349
<http://www.adtron.com>
<http://www.smartm.com>

Adtron is a wholly-owned subsidiary of SMART Modular Technologies.

Copyright © 2009 Adtron Corporation. All rights reserved.