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X-500 / X-55 Series Power Fail Protection

White Paper

BU: Flash Products
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1 Power Fail Protection

1.1 Internal power fail management

The X-500 & X-55 SSDs use an internal DRAM, but only management data is cached in the DRAM, no user data (as done in other SSDs). User data is always processed through the small internal controller cache directly into the flash chips. Together with the user data, also the page mapping information is saved into the flash. The information in the DRAM is merely a copy of the management data for better performance. If the power is switched off this management data in the DRAM is lost, but it will rebuilt upon power restoration using the page mapping information stored in the flash. If data was not written correctly due to power fail, the X-500 returns the data stored before in these logical sectors, but never undefined data.

1.2 SSD Reset below 4.1V

If the 5V input voltage falls below 4.1V the SSD controller is reset and all operations are cancelled. Once power rises above 4.1V, the controller is reinitialized. The data in the controller cache was lost, but the data already transferred to the flash chips was stored into the flash cells. The SSD's internal energy buffer is large enough to complete the ongoing flash write command (page program).

1.3 Power-off recommendations

1.3.1 Cache of the operating system

Operating systems may cache file system data before they are sent to the SSD. At a sudden power fail this data is lost.

- ⇒ If sudden power fails are likely to occur in the application, the operating system write cache should be disabled.

For detailed description see: Application Note Design In Guide

1.3.2 File system inconsistencies

Old file systems may be getting inconstant due to sudden power fail, because in FAT1 and FAT2, directory and files were written sequentially. After a sudden power fail it should be checked and repaired (e.g. with chkdsk or scandisk).

- ⇒ After a sudden power fail, the file system should be checked and repaired.

For detailed description see: Application Note Design In Guide

2 General Recommendations

Please study our "Application Note Design In Guide" in order to optimize your application for SSD usage. This guide contains helpful regarding OS settings, file systems, partitioning and cluster size.

3 Document History

Table 1: Document Revision History

Date	Revision	Details
22-March-2013	1.0	First release

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