swissbit®

X-500 Series
Power Fail Protection

White Paper

BU: Flash Products
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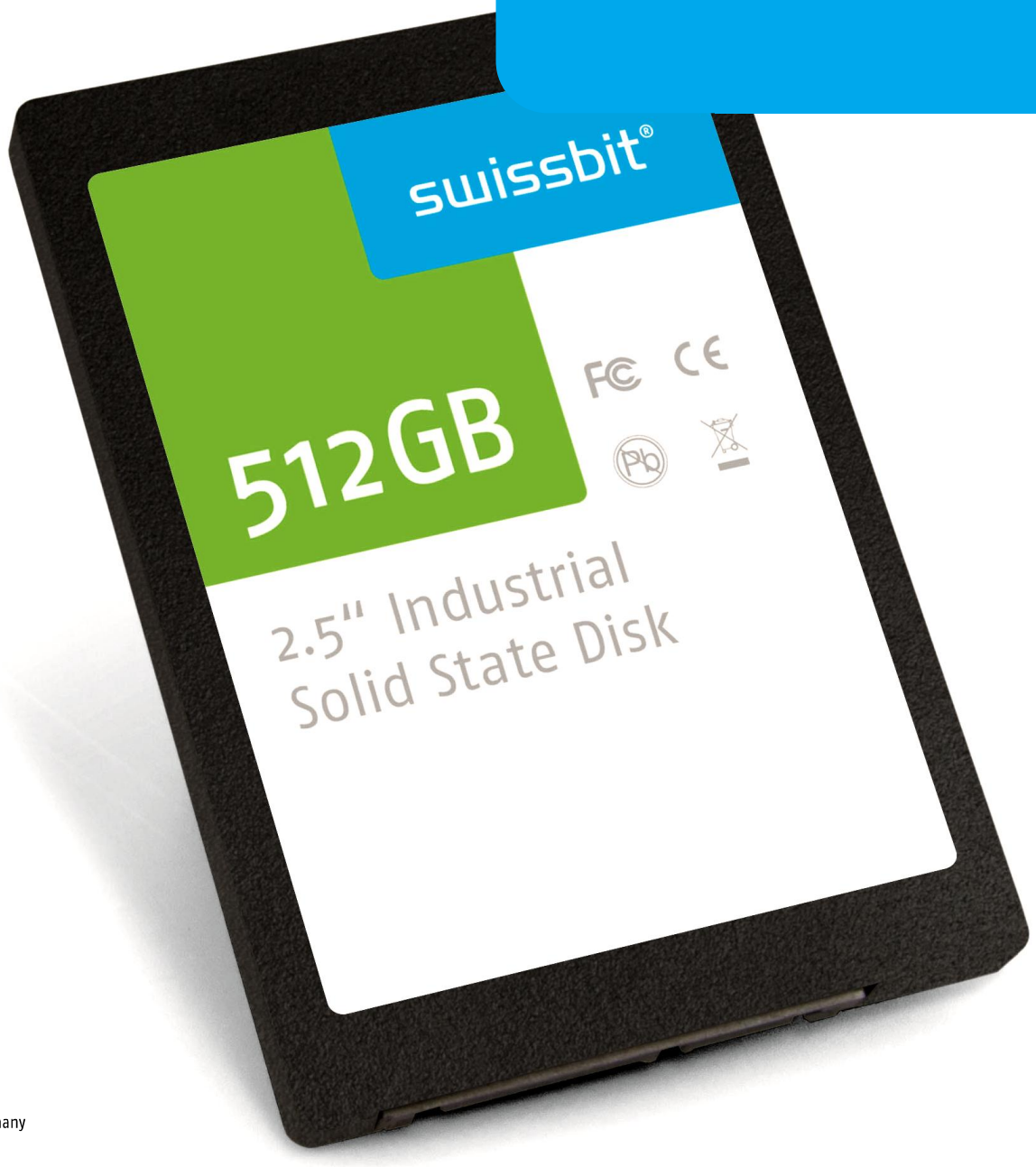

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1 Power Fail Protection

1.1 Internal power fail management

The X-500 SSDs use an internal DRAM, but NO user data is cached in this DRAM (as done in other SSDs), only management data is cached in the DRAM. User data is always stored from the small internal controller cache directly into the flash chips. With this storage of the user data also the page mapping information are stored into the flash simultaneously. The information in the DRAM is a working copy of management data for better read / write speed.
If the power is switched off the management data in the DRAM is lost, but it will rebuilt after power on with 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 resetted, i.e. all operations are cancelled. After 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 energy/capacity 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 these data are lost.

⇨ If a sudden power fail of the application is likely, operating system write cache should be disabled.

Detail 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 FAT1, FAT2, directory and file 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.

Detail description see: Application Note Design In Guide

2 General Recommendations

Please study the "Application Note Design In Guide" from Swissbit to optimize your application for SSD usage. This guide get a lot of information about OS settings, file system, partitioning and cluster size.

3 Document History

Table 1: Document Revision History

Date	Revision	Details
22-March-2013	1.0	First release