

<b>Related Products</b>	DIMM-PC/386-B (D101) MOPSPplus (P386) MOPSIcd3 (P388) MOPS/386A (P389) MOPS/586 and MOPSIcd4 (P489)
<b>Subject</b>	Flash reorganisation and SSDs under Windows or other operating systems
<b>Document Name</b>	SSDInfo_E111.doc
<b>Usage</b>	Common

## 1. REVISION HISTORY

<b>Date</b>	<b>Document Name</b>	<b>Subjects added, changed, deleted</b>	<b>Changed by</b>
09-Jul-98	JAP0015.DOC	Initial release	H. Bruhn
11-Oct-00	JAP0015.DOC	Change of layout	M. Unverdorben
23-Aug-02	JAP0015.DOC	Changed to Kontron style	H. Bruhn
09-Dec-02	SSDInfo_E111.DOC	Reformatted and added minor changes	H. Bruhn

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## **3. BASIC INFORMATIONS**

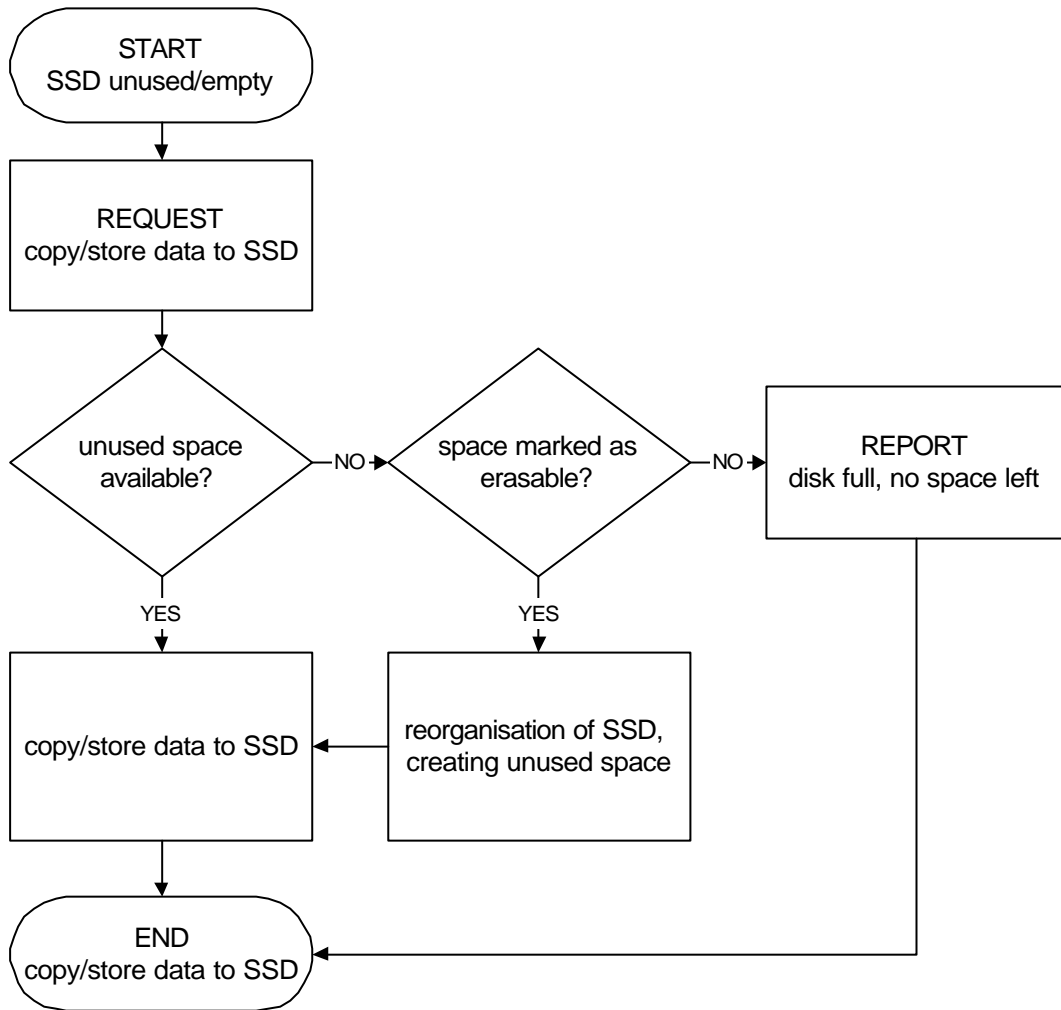
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To get a better understanding of the SSD feature integrated onboard of some **Kontron Embedded Modules GmbH** boards it is necessary to know about some basic aspects of flash technology in general.

A new flash device can store data, depending on the used storage mechanisms like drivers or direct BIOS support, without any restrictions. Problems will occur, if data files should be overwritten or new files should be stored while there are deleted files on the flash device.

Storing data on a flash device means, you can change single bit cells from 1 to 0 but not vice versa. This is caused by the flash cell storage technology itself and can't be changed by **Kontron Embedded Modules GmbH**. Therefore every flash controlling unit does not overwrite files in fact, it stores the data in an unused area of the flash if possible and marks the flash cells already used of the data to be overwritten as "erasable". Deleted files will be treated the same way, they will be marked as "erasable", too. Flash space is limited and so it's quite clear that this procedure will lead to a „full“ flash device sooner or later. The sketch on next page shows you, what will happen then on a board with onboard SSD.



You don't have to worry about reorganisation, the extension BIOS of **Kontron Embedded Modules GmbH** devices will handle this for you automatically, e.g. selecting flash blocks to program, switching the +12V generator and so on.

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## **4. ASPECTS AND RESTRICTIONS**

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### **4.1. General aspects and restrictions when using the SSD**

Here are the general aspects and restrictions, one must remember when using the SSD:

1. There is no possibility to determine the length of a reorganisation cycle, it depends on too many factors like amount of stored data, the file size to be written, type of storing data (direct sector write or DOS write), age/use of flashes...
2. The reorganisation of a SSD can last up to 13s, typically it is up to 2.5s-3s
3. While reorganizing, the **Kontron Embedded Modules GmbH** module locks all IRQs and handles the complete process itself, which will perhaps lead to lost IRQs of other devices
4. A power-off event during reorganisation will cause faulty data or destroy the complete SSD structure

So the SSD is not designed and suitable for writing data very fast and often. For this purpose it is better to use a special SRAM card or a PCMCIA device, able to deal with SRAM cards.

Please also remember that every flash device is limited in the amount of erase/write cycles that can be done to the single flash cells.

### **4.2. Restriction using the SSD under special operating systems**

Here are the restrictions using the SSD which are caused by Windows and other operating systems:

Meanwhile there are lots of operating systems for different purposes available, especially in the industrial or embedded market, such as Windows 3.1/3.11, Windows 95/98, Windows NT/XP, QNX, VxWorks and so on. They all together have the same behaviour:

While executed, they replace the BIOS functions with special drivers, with which the OS is handling the hardware.

Kontron Embedded Modules GmbH decided for memory concerns (drivers are using memory space) and user convenience to design the onboard SSDs „BIOS controlled“. A customer don't has to care about how to get data through the driver on the SSD or reorganizing the used Flash blocks. The disadvantage herein is the need for special drivers for each operating system (except DOS) or the need for a good programmer on the customers side, who is able to use the INT15h BIOS extensions to control the SSD.

One solution to avoid this problem is the usage of the Kontron Embedded Modules GmbH chipDISK, which is also a flash based storage medium but is "operating system independent" through the implemented IDE standard interface.