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(71) Applicant (for all designated States except US): **SAN-DISK CORPORATION** [US/US]; 140 Caspian Court, Sunnyvale, California 94089 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SINCLAIR, Alan Welsh** [GB/GB]; The Cottages, Broadhead, Candie, Maddiston Falkirk FK2 0BU (GB). **GOROBETS, Sergey Anatolievich** [RU/GB]; 1F1, 92 Blackford Avenue, Edinburgh Midlothian EH9 3ES (GB). **BENNETT, Alan David** [GB/GB]; 2 Thorburn Road, Edinburgh Midlothian EH13 0BQ (GB). **SMITH, Peter John** [GB/GB]; 21 Bonnyrigg Road, Eskbank, Midlothian Scotland EH22 3HA (GB).

(74) Agents: **PARSONS, Gerald, P.** et al.; Parsons Hsue & de Runtz LLP, 595 Market Street, Suite 1900, San Francisco, CA 94105 (US).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: NON-VOLATILE MEMORY AND METHOD WITH NON-SEQUENTIAL UPDATE BLOCK MANAGEMENT

(57) Abstract: In a nonvolatile memory with block management system that supports update blocks with non-sequential logical units, an index of the logical units in a non-sequential update block is buffered in RAM and stored periodically into the non-volatile memory. In one embodiment, the index is stored in a block dedicated for storing indices. In another embodiment, the index is stored in the update block itself. In yet another embodiment, the index is stored in the header of each logical unit. In another aspect, the logical units written after the last index update but before the next have their indexing information stored in the header of each logical unit. In this way, after a power outage, the location of recently written logical units can be determined without having to perform a scanning during initialization. In yet another aspect, a block is managed as partially sequential and partially non-sequential, directed to more than one logical subgroup.

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# INTERNATIONAL SEARCH REPORT

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> G06F12/02				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) G06F				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 2003/110343 A1 (HAGIWARA MASATO ET AL) 12 June 2003 (2003-06-12) figures 8,9,11,12B,15 paragraph '0075! paragraph '0077! paragraph '0079! paragraph '0082! paragraph '0085! paragraph '0107!	1-16, 24-37		
A	EP 0 977 121 A (SONY CORPORATION) 2 February 2000 (2000-02-02) figures 14A-14D paragraph '0082! paragraph '0095! paragraph '0097! - paragraph '0099! ----- -/--	1-8, 24-30		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.                 </td> <td style="width: 50%; border: none;"> <input checked="" type="checkbox"/> Patent family members are listed in annex.                 </td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.	<input checked="" type="checkbox"/> Patent family members are listed in annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.	<input checked="" type="checkbox"/> Patent family members are listed in annex.			
° Special categories of cited documents :				
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">                     "A" document defining the general state of the art which is not considered to be of particular relevance                      "E" earlier document but published on or after the International filing date                      "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)                      "O" document referring to an oral disclosure, use, exhibition or other means                      "P" document published prior to the international filing date but later than the priority date claimed                 </td> <td style="width: 50%; border: none;">                     "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention                      "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone                      "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.                      "&amp;" document member of the same patent family                 </td> </tr> </table>			"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the International filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
"A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the International filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family			
Date of the actual completion of the international search <p style="text-align: center; font-size: 1.2em;">7 March 2006</p>		Date of mailing of the international search report <p style="text-align: center; font-size: 1.2em;">03. 04. 2006</p>		
Name and mailing address of the ISA European Patent Office, P.B. 5318 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer <p style="text-align: center; font-size: 1.2em;">Filip, L</p>		

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US2004/043762

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP 0 887 732 A (SONY CORPORATION) 30 December 1998 (1998-12-30) figure 4 column 3, line 25 - column 3, line 43 column 6, line 26 - column 6, line 30 column 7, line 31 - column 7, line 54 column 13, line 56 - column 14, line 2 column 14, line 52 - column 15, line 4</p>	17-23
A	<p>US 5 742 934 A (SHINOHARA ET AL) 21 April 1998 (1998-04-21) the whole document</p>	17-23

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2004/043762

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:  
see FURTHER INFORMATION sheet PCT/ISA/210
2.  Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International Application No. PCT/US2004 /043762

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-16, 24-37

A method of storing and updating data in a nonvolatile ~~memory~~ comprising:

- storing in a first block a first version of logical units of a logical group according to a first order; and
- storing in a second block including subsequent versions of said logical units latest versions of logical units according to a second order different from the first; and
- in response to a predefined triggering event, storing in a third block a directory of logical units stored in the second block since a latest triggering event.

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2. claims: 17-23

A method of storing and updating data in a nonvolatile memory, comprising:

- storing logical units in a first block;
- in response to a predefined triggering event, storing in a portion of the nonvolatile memory a directory of logical units hitherto in the first block;
- providing a header portion for each logical unit; and
- for intermediate logical units being stored in the block since a latest predefined triggering event, storing a directory of the intermediate logical units in the header portion of each said intermediate logical units.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int	nal Application No
PCT/US2004/043762	

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