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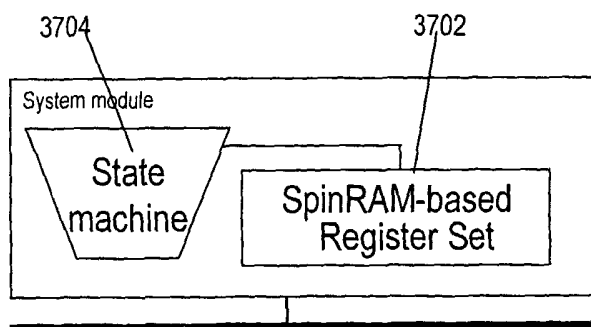
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(54) Title: NONVOLATILE SEQUENTIAL MACHINES



System module with SpinRAM registers

(57) Abstract: A nonvolatile sequential machine is described which includes a semiconductor controller operable to control operation of the nonvolatile sequential machine according to a state machine comprising a plurality of states. The nonvolatile sequential machine further includes a plurality of state registers operable to store the plurality of states. The state registers comprise nonvolatile random-access memory operation of which is based on giant magnetoresistance.

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# INTERNATIONAL SEARCH REPORT

International application No.

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G11C 11/15, 11/16; G05B 19/045  
US CL : 365/158, 171, 173; 326/46; 712/232

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 365/158, 171, 173, 228; 326/46; 712/232

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 practicable, search terms used)  
EAST, IEEE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,986,962 A (BERTIN et al.) 16 November 1999 (16.11.1999), column 2, lines 10-46, Figure 7.	1-6, 8, 9, 12-21 and 27-29 (as renumbered)
Y	US 6,542,000 B1 (BLACK et al.) 01 April 2003 (01.04.2003), column 6, lines 30-37.	1 and 15
Y	US 6,493,257 B1 (COUGHLIN, Jr. et al.) 10 December 2002 (10.12.2002), the figure.	1-6, 8, 9, 12-21 and 27-29 (as renumbered)
Y	US 5,682,345 A (ROOHPARVAR et al.) 28 October 1997 (28.10.1997), Figure 1.	1-6, 8, 9, 12-21 and 27-29 (as renumbered)
Y	US 6,034,886 A (CHAN et al.) 07 March 2000 (07.03.2000), Figures 2 and 4.	1-6, 8, 9, 12-21 and 27-29 (as renumbered)
Y	US 4,980,859 (GUTERMAN et al.) 25 December 1990 (25.12.1990), Figure 1.	1-6, 8, 9, 12-21 and 27-29 (as renumbered)
Y	US 6,483,740 (SPITZER et al.) 19 November 2002 (19.11.2002), Figures 6 and 13-15, column 2, line 38 - column 3, line 21, column 6, lines 51-57.	7, 10, 11 and 22-26
Y	US 5,929,636 A (TOROK et al.) 27 July 1999 (27.07.1999), column 2, line 53 - column 4, line 41.	10, 11 and 23-26

☒ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

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