(19) World Intellectual Property Organization

International Bureau



(10) International Publication Number WO 2011/082070 A3

(43) International Publication Date 7 July 2011 (07.07.2011)

(51) International Patent Classification: *G06F 11/16* (2006.01) *G11C 29/42* (2006.01)

(21) International Application Number:

PCT/US2010/061835

(22) International Filing Date:

22 December 2010 (22.12.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/651,910 4 January 2010 (04.01.2010)

US

- (71) Applicant (for all designated States except US): MI-CRON TECHNOLOGY, INC. [US/US]; 8000 So. Federal Way, Boise, Idaho 83716-9632 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): JEDDELOH, Joe M. [US/US]; 4302 Reiland Lane, Shoreview, Minnesota 55126 (US).
- (74) Agents: MADDEN, Robert B. et al.; Schwegman, Lundberg, & Woessner, P.A., P.O. Box 2938, Minneapolis, Minnesota 55402-0938 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ,

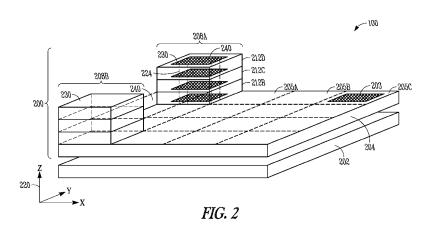
- CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
- (88) Date of publication of the international search report:

13 October 2011

(54) Title: ERROR CORRECTION IN A STACKED MEMORY



(57) Abstract: Electronic apparatus, systems, and methods to construct and operate the electronic apparatus and/or systems include a stack of memory dies with user data and/or first level error correction data stored in a stripe across the memory dies. One such stack can include a second level error correction vault, such as a parity vault, to store parity data corresponding to the user data and/or first level error correction data. Additional apparatus, systems, and methods are disclosed.





International application No. **PCT/US2010/061835**

A. CLASSIFICATION OF SUBJECT MATTER

G06F 11/16(2006.01)i, G11C 29/42(2006.01)i

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)

G06F 11/16; G06F 15/00; G11C 5/06; G06F 15/76; G11C 11/00; G11C 29/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS(KIPO internal) & Keywords: memory, stack, error correct, parity

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2007-0058410 A1 (SURESH N. RAJAN) 15 March 2007 See abstract; paragraph 51 - paragraph 78 and figures 6-9	1-35
A	US 2006-0164882 A1 (ROBERT NORMAN) 27 July 2006 See abstract; paragraph 19 - paragraph 27; claims 1-10 and figure 1	1-35
A	US 2008-0010435 A1 (MICHAEL JOHN SEBASTIAN SMITH et al.) 10 January 2008 See abstract; paragraph 36 - paragraph 43, paragraph 58 - paragraph 85 and fi gure 2	1-35
A	US 2002-0083390 A1 (THOMAS H. LEE et al.) 27 June 2002 See abstract; paragraph 17 - paragraph 23 and figures 2,3	1-35

	Further documents are	listed in the	e continuation of Box	хC.
--	-----------------------	---------------	-----------------------	-----

See patent family annex.

- * Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent 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 citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other
- "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

02 AUGUST 2011 (02.08.2011)

Date of mailing of the international search report

08 AUGUST 2011 (08.08.2011)

Name and mailing address of the ISA/KR



Korean Intellectual Property Office Government Complex-Daejeon, 189 Cheongsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

KIM, JONG TAEK

Telephone No. 042 481 5983



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/061835

	information on patent family members		PCT/US2010/06183	
Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2007-0058410 A1	15.03.2007	GB 2444663 A JP 2009-507324 A KR 10-2008-0039466 A US 2008-0170425 A1 US 2010-020585 A1 US 7379316 B2 US 7599205 B2 W0 2007-028109 A2 W0 2007-028109 A3	11.06.2008 19.02.2009 07.05.2008 17.07.2008 28.01.2010 27.05.2008 06.10.2009 08.03.2007	
US 2006-0164882 A1	27.07.2006	US 2006-0018149 A1 US 2006-0028864 A1 US 2006-0245241 A1 US 2008-0002461 A1 US 2008-0002473 A1 US 2008-0002483 A1 US 2009-0175084 A1 US 2010-0142248 A1 US 7075817 B2 US 7227775 B2 US 7327600 B2 US 7382644 B2 US 7382644 B2 US 7457147 B2 US 7649788 B2 US 7961527 B2	26.01.2006 09.02.2006 02.11.2008 03.01.2008 03.01.2008 03.01.2008 09.07.2009 10.06.2010 11.07.2006 05.06.2007 05.02.2008 12.02.2008 03.06.2008 03.06.2008 25.11.2008 19.01.2010	
US 2008-0010435 A1	10.01.2008	None		
US 2002-0083390 A1	27.06.2002	TW 578159 A TW 578159 B US 6591394 B2 WO 02-052577 A1	01.03.2004 01.03.2004 08.07.2003 04.07.2002	