



(51) International Patent Classification:  
*G06F 13/16* (2006.01) *G06F 13/38* (2006.01)

(21) International Application Number:  
PCT/US2010/045751

(22) International Filing Date:  
17 August 2010 (17.08.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
12/546,258 24 August 2009 (24.08.2009) US

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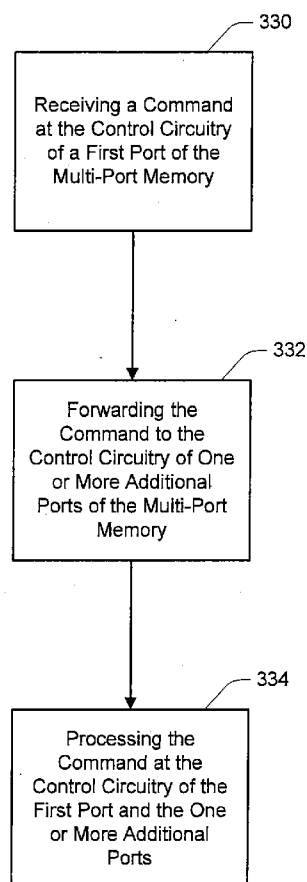
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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, 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,

[Continued on next page]

(54) Title: MULTI-PORT MEMORY AND OPERATION

(57) Abstract: Multi-port memory having an additional control bus for passing commands between ports have individual ports that can be configured to respond to a command received from an external control bus or to a command received from the additional control bus. This facilitates various combinations of ports to vary the bandwidth or latency of the memory to facilitate tailoring performance characteristics to differing applications.



**FIG. 3**



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.

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))

**(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, SE, SI, SK,

**(88) Date of publication of the international search report:**

3 June 2011

**A. CLASSIFICATION OF SUBJECT MATTER****G06F 13/16(2006.01)i, G06F 13/38(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 13/16; G11C 8/16; G11C 8/00; G11C 11/40; G06F 12/00; G06F 12/14; G11C 11/4063; G06F 13/00; G06F 21/00

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) &amp; Keywords: (memory\*) + (((plural\*, mult\*, several\*, many\*, different\*, vari\*)&lt;near/2&gt; (port\*)), multiport\*) + (control\*, , handl\*, manag\*)&lt;near/5&gt;(access\*) + (COMMAND\*)&lt;NEAR/5&gt; (FEED\*TRANS\*, SEND\*)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0175114 A1 (KIM NAM-JONG et al.) 09 July 2009 See Abstract, Fig.2, para.26-30	1-4,7-11,13-17
A	US 7421559 B1 (YADAV RISHI) 02 September 2008 See Abstract, Figs.3-4, col.3 ln.35-col.5 ln.15	1-4,7-11,13-17
A	KR 10-2007-0035209 A (삼성전자주식회사) 30 March 2007 See Abstract, Fig.5, pp.8, 10-11	1-4,7-11,13-17
A	KR 10-2007-0113493 A (엠텍비전 주식회사 et al.) See Abstract, Figs.1-2, para.36-40, 58-68, 110-116	1-4,7-11,13-17



Further documents are listed in the continuation of Box C.



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 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

19 APRIL 2011 (19.04.2011)

Date of mailing of the international search report

**19 APRIL 2011 (19.04.2011)**

Name and mailing address of the ISA/KR

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**INTERNATIONAL SEARCH REPORT**International application No.  
**PCT/US2010/045751****Box No. 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:
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.: 5, 6, 12, 18 and 19  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box No. 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:

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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2010/045751**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2009-0175114 A1	09.07.2009	CN 1988033 A CN 1988033 C0 JP 2007-172811 A KR 10-0655081 B1 US 2007-0147162 A1 US 2010-0232249 A1 US 7505353 B2	27.06.2007 27.06.2007 05.07.2007 08.12.2006 28.06.2007 16.09.2010 17.03.2009
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KR 10-2007-0113493 A	29.11.2007	None	