



(51) International Patent Classification:

G11C 5/04 (2006.01) G11C 7/10 (2006.01)
G06F 13/16 (2006.01) H01L 27/00 (2006.01)
G06F 13/42 (2006.01) G06F 12/10 (2006.01)
G11C 5/06 (2006.01)

(21) International Application Number:

PCT/US2013/043714

(22) International Filing Date:

31 May 2013 (31.05.2013)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/654,156 1 June 2012 (01.06.2012) US
13/752,427 29 January 2013 (29.01.2013) US

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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, BN, 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, 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, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, 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, KM, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: INTER-CHIP MEMORY INTERFACE STRUCTURE

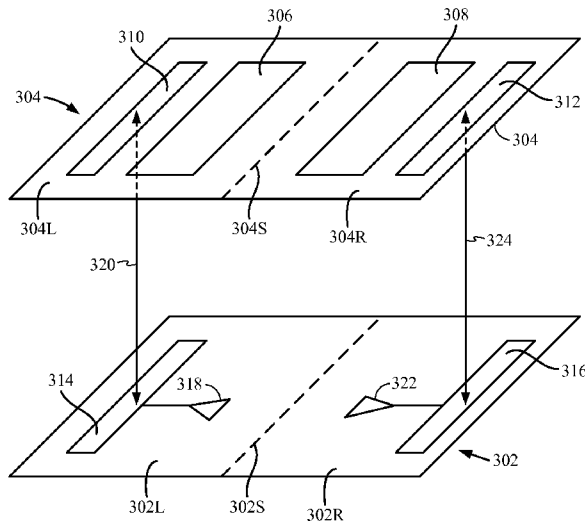


FIG. 3

(57) Abstract: In an embodiment, a stacked package-on-package system has a memory die (102; 104) and a logic die (106). The memory die comprises a first memory (306) and a second memory (308), each operated independently of the other, and each having an inter-chip interface (310; 312) electrically connected to the logic die. The logic die has two independent clock sources (318; 322), one to provide a first clock signal to the first memory, and the other clock source to provide a second clock signal to the second memory.





Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*
- *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:
27 February 2014

Published:

- *with international search report (Art. 21(3))*

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2013/043714

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G11C5/04 G06F13/16 G06F13/42 G11C5/06 G11C7/10
 H01L27/00 G06F12/10
 ADD.
 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)
 G11C G06F H01L

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)
 EPO-Internal, WPI Data, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/051171 A1 (SWANSON TRAVIS E [US] ET AL) 1 March 2012 (2012-03-01) paragraph [0017] - paragraph [0029]; figures 1,2 -----	1-4
X	US 2012/137090 A1 (BISWAS SUKALPA [US] ET AL) 31 May 2012 (2012-05-31) paragraph [0053] - paragraph [0068]; figures 1-5 -----	5-15
A	US 2010/082911 A1 (DAS RIPAN [US]) 1 April 2010 (2010-04-01) paragraph [0014] - paragraph [0028]; figures 1,2 -----	1-4

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 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 19 December 2013	Date of mailing of the international search report 14/01/2014
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Lindquist, Jim
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2013/043714

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.:
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:

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 fees, this Authority did not invite payment of additional fees.

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/US2013/043714

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2012051171	A1	01-03-2012	CN 103119652 A	22-05-2013
			EP 2612326 A1	10-07-2013
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			WO 2012030381 A1	08-03-2012

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			US 2011216613 A1	08-09-2011

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-4

The first group of inventions concern a stacked package-to-package memory system having a first die with a first and a second memory, and a second die having a memory management unit, first and second clock signal sources. The clock signal sources are independent from each other and each source supplies one memory. This improves the problem of skewing.

2. claims: 5-15

The second group concerns a method of addressing and accessing a physical memory, wherein the addresses are translated either into a first physical address space or into a second physical address space. When the address is translated into the first memory space, data are written or read in only the first physical address space. Correspondingly, when the address is translated into the second memory space, data are written or read in only the second physical address space. This improves the problem of long address and access lines.
