

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 January 2004 (29.01.2004)

PCT

(10) International Publication Number
WO 2004/010316 A3

(51) International Patent Classification⁷: **G06F 13/28**

(21) International Application Number:
PCT/US2003/022941

(22) International Filing Date: 23 July 2003 (23.07.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/205,663 24 July 2002 (24.07.2002) US

(71) Applicant: **INTEL CORPORATION** [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).

(72) Inventors: **SMITH, David**; 4117 East Mountain Sage Road, Phoenix, AZ 85044 (US). **BISSESSUR, Sailesh**; 1621 West Frye Road, Phoenix, AZ 85045 (US). **MACKEY, Richard**; East White Aster Street, Phoenix, AZ 85044 (US). **SCHMISSEUR, Mark**; 1402 East Amberwood Drive, Phoenix, AZ 85048 (US).

(74) Agents: **VICTOR, David, W.** et al.; Konrad, Raynes, Victor & Mann, 315 South Beverly Drive, Suite 210, Beverly Hills, CA 90212 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW.

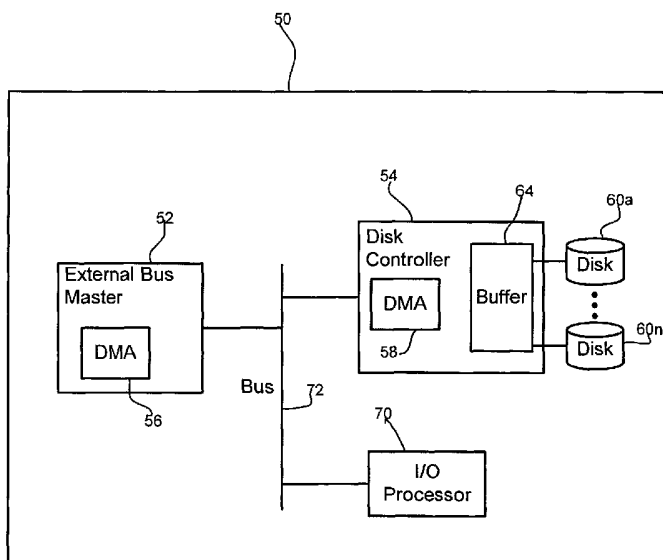
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: METHOD, SYSTEM, AND PROGRAM FOR HANDLING INPUT/OUTPUT COMMANDS



(57) Abstract: Provided are a method, system, and program for handling Input/Output (I/O) requests. A bus enables communication with an initiator, target device and device controller, wherein the device controller accesses the target device to execute I/O commands directed to the target device. An I/O request command is received to access the target device. The initiator is configured to transmit at least one data request on the bus to one memory address in a predefined address window of the device controller. To device controller is enabled to claim the data request to the memory address in the predefined address window from the initiator on the bus to execute the data request against the target device.

WO 2004/010316 A3



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

27 May 2004

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.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/22941

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06F13/28

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)

IPC 7 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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 653 711 A (ADVANCED MICRO DEVICES INC) 17 May 1995 (1995-05-17)	1,2,6,8, 17,20, 21, 24-26, 30,32 3,9,27, 33
A	abstract column 1, line 20 - line 49 column 4, line 2 - line 58 -----	
X	US 6 209 042 B1 (TANIGUCHI MASAYOSHI ET AL) 27 March 2001 (2001-03-27)	1,2,6,8, 17,20, 21, 24-26, 30,32 3,9,27, 33
A	abstract column 3, line 46 - column 4, line 60 column 5, line 61 - column 6, line 63 -----	

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in 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 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

22 December 2003

Date of mailing of the international search report

02/04/2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Rudolph, S

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 03/22941

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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.:
1-3, 6, 8, 9, 17, 20, 21, 24-27, 30, 32, 33

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

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

1. claims: 1-3,6,8,9,17,20,21,24-27,30,32,33

A method according to claim 1 (or corresponding system or article of manufacture), wherein the initiator includes a DMA engine and the processor configures the device controller to disable the DMA engine when processing the data requests the initiator transmits over the bus, whereby preventing collisions.

2. claims: 4,5,10-14,18,19,22,23,28,29,34-40

A method according to claim 1 (or corresponding system or article of manufacture) further comprising specific features in order to enhance read and write transactions.

3. claims: 7,15,16,31

A method according to claim 1 (or corresponding system or article of manufacture), wherein the data requests are transmitted in burst mode and wherein the device controller is a disk controller, whereby accelerating the data transfer and enabling the bus system to access a mass storage device.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/22941

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0653711	A	17-05-1995	US 5561821 A	01-10-1996
			DE 69427334 D1	05-07-2001
			DE 69427334 T2	02-05-2002
			EP 0653711 A1	17-05-1995
			JP 7182276 A	21-07-1995

US 6209042	B1	27-03-2001	JP 3403284 B2	06-05-2003
			JP 9179812 A	11-07-1997
			US 5878272 A	02-03-1999
