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Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

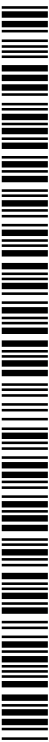
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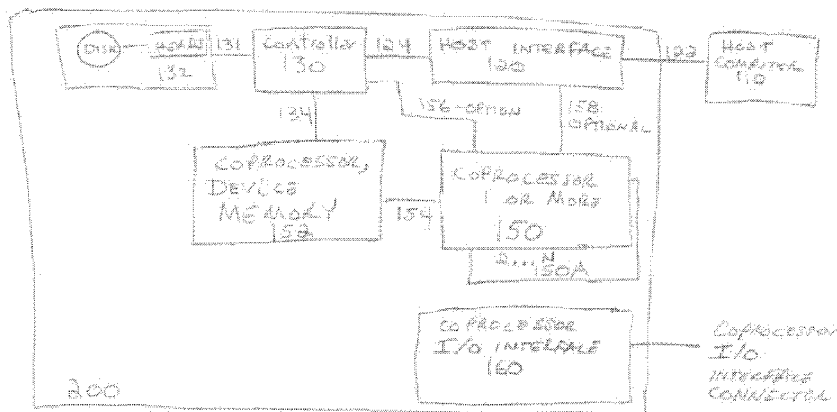
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(54) Title: CONTROLLER DEVICE COPROCESSOR ARCHITECTURE



(57) **Abstract:** Device controllers are enhanced with application processors or coprocessors and additional input/output interfaces are added to the device. Coprocessors running application code allowing the device to serve as application servers for data stored on the device. Coprocessors include an application processing framework allowing access to device storage and optionally include additional memory busses and additional memory chips to reduce bus contention allowing coprocessors to achieve high throughput rates for inputting or outputting or processing device data. Coprocessors include software to access and process stored data without processing support from the host system interfacing to the device. Access to stored data is managed to prevent simultaneous access corruption when the data is being changed.

A. CLASSIFICATION OF SUBJECT MATTER**G06F 13/16(2006.01)i, G06F 9/44(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; G06F 9/54; G06F 12/00; G06F 9/46; G06F 13/36; G06F 13/00

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: (storage*,memory*)+(controller*)+(coprocesso*,co-
process*,application*,processor*)+(arbit*,share)**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	US 6421760 B1 (MCDONALD; JAMES ARTHUR et al.) 16 July 2002 See abstract, col.5 line51-col.7 line49 ,fig.2	1 2-5
A	US 2004-0088467 A1 (LEE A. BURTON) 06 May 2004 See abstract, paragraph[25-30], fig.2	1-5
A	WO 2007-004374 A1 (SONY COMPUTER ENTERTAINMENT INC. et al.) 11 January 2007 See abstract, paragraph[25-32],fig.3	1-5
A	US 2008-0244156 A1 (PATEL MUKESH K.) 02 October 2008 See abstract, paragraph[17-31], fig.1b	1-5

 Further documents are listed in the continuation of Box C. See patent family annex.

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Date of the actual completion of the international search

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6421760 B1	16.07.2002	AU 1998-96898 A1	07.06.1999
		EP 1031091 A1	30.08.2000
		EP 1031091 A4	06.11.2002
		JP 2001-523860 A	27.11.2001
		US 06098114A A	01.08.2000
		US 06134630A A	17.10.2000
		US 06138176A A	24.10.2000
		US 2002-0174297 A1	21.11.2002
		US 2003-0120865 A1	26.06.2003
		US 6301625 B1	09.10.2001
		US 6549981 B2	15.04.2003
		WO 99-26150 A1	27.05.1999
		US 2004-0088467 A1	06.05.2004
AU 2001-45761 A1	12.11.2001		
AU 2002-303661 B2	03.04.2008		
AU 2003-272583 A1	07.06.2004		
AU 2003-286693 A1	25.05.2004		
AU 2003-296986 A1	10.08.2004		
AU 2004-258478 A1	27.01.2005		
CA 2313462 A1	24.06.1999		
CA 2313462 C	18.07.2006		
CA 2403675 A1	08.11.2001		
CA 2448223 A1	03.01.2003		
CA 2448223 C	12.06.2007		
CA 2456179 A1	27.02.2003		
CA 2491923 A1	13.05.2004		
CA 2492970 A1	21.05.2004		
CA 2508344 A1	29.07.2004		
CA 2515283 A1	24.06.1999		
CA 2515283 C	05.04.2011		
CA 2531846 A1	27.01.2005		
CN 100538848 C	09.09.2009		
CN 1627423 A	15.06.2005		
CN 1627423 C0	15.06.2005		
EP 1038253 A2	27.09.2000		
EP 1038253 A4	28.11.2007		
EP 1297441 A1	02.04.2003		
EP 1297441 A4	07.03.2007		
EP 1402392 A1	31.03.2004		
EP 1442378 A1	04.08.2004		
EP 1442378 A4	24.05.2006		
EP 1442378 B1	10.12.2008		
EP 1556771 A1	27.07.2005		
EP 1559021 A2	03.08.2005		
EP 1588272 A2	26.10.2005		
EP 1652058 A1	03.05.2006		
EP 1652058 B1	25.05.2011		
JP 04-128956 B2	30.07.2008		

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/055022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		JP 04-210252 B2	14.01.2009
		JP 2002-509302 A	26.03.2002
		JP 2003-532224 A	28.10.2003
		JP 2004-537106 A	09.12.2004
		JP 2005-251372 A	15.09.2005
		JP 2005-500621 A	06.01.2005
		JP 2006-505046 A	09.02.2006
		JP 2006-505054 A	09.02.2006
		JP 2006-505054 T	09.02.2006
		JP 2006-513492 A	20.04.2006
		JP 2007-527565 A	27.09.2007
		JP 2009-080799 A	16.04.2009
		JP 2010-102719 A	06.05.2010
		US 06076152A A	13.06.2000
		US 2001-0014937 A1	16.08.2001
		US 2002-0019926 A1	14.02.2002
		US 2002-0056033 A1	09.05.2002
		US 2003-0061432 A1	27.03.2003
		US 2003-0097187 A1	22.05.2003
		US 2004-0019703 A1	29.01.2004
		US 2004-0236877 A1	25.11.2004
		US 2005-0055537 A1	10.03.2005
		US 2005-0076152 A1	07.04.2005
		US 2005-0083817 A1	21.04.2005
		US 2005-0091434 A1	28.04.2005
		US 2005-0256994 A1	17.11.2005
		US 2005-0283546 A1	22.12.2005
		US 2007-0283054 A1	06.12.2007
		US 6247110 B1	12.06.2001
		US 6339819 B1	15.01.2002
		US 6961841 B2	01.11.2005
		US 6996656 B2	07.02.2006
		US 7003593 B2	21.02.2006
		US 7197575 B2	27.03.2007
		US 7237091 B2	26.06.2007
		US 7373440 B2	13.05.2008
		US 7421524 B2	02.09.2008
		US 7424552 B2	09.09.2008
		US 7565461 B2	21.07.2009
		US 7602686 B2	13.10.2009
		US 7680968 B2	16.03.2010
		WO 01-84344 A1	08.11.2001
		WO 03-001396 A1	03.01.2003
		WO 03-017118 A1	27.02.2003
		WO 2004-040413 A2	13.05.2004
		WO 2004-040413 A3	13.05.2004
		WO 2004-042588 A1	21.05.2004
		WO 2004-064413 A2	29.07.2004
		WO 2004-064413 A3	29.07.2004
		WO 2005-008464 A1	27.01.2005

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/055022

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		WO 99-31617 A2	24.06.1999
WO 2007-004374 A1	11.01.2007	JP 2007-018195 A	25.01.2007
		US 2009-0307701 A1	10.12.2009
		US 2009-307701 A1	10.12.2009
		WO 2007-004374 A1	11.01.2007
US 2008-0244156 A1	02.10.2008	AU 2003-248682 A1	19.01.2004
		CN 1592894 A	09.03.2005
		CN 1592894 C0	09.03.2005
		EP 1412852 A1	28.04.2004
		EP 1516259 A1	23.03.2005
		JP 2004-522236 A	22.07.2004
		JP 2005-531863 A	20.10.2005
		JP 2005-531863 T	20.10.2005
		KR 10-2004-0034620 A	28.04.2004
		KR 10-2005-0013525 A	04.02.2005
		US 2003-0023958 A1	30.01.2003
		US 2004-0024955 A1	05.02.2004
		US 2004-024955 A1	05.02.2004
		US 2008-244156 A1	02.10.2008
		US 7290080 B2	30.10.2007
		WO 03-014921 A1	20.02.2003
		WO 2004-003759 A1	08.01.2004