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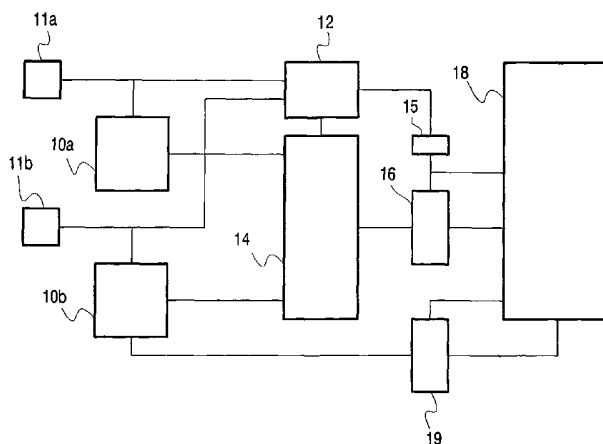
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[Continued on next page]

(54) Title: DATA PROCESSING CIRCUIT WITH MULTIPLEXED MEMORY



(57) Abstract: A data processing apparatus contains several processing circuits each operating under control of its own periodic clock signal, so that the clock signals may have different frequencies and/or can be autonomous. The several processing circuits each have an output for outputting memory access requests, which remain at the output for a validity duration interval defined by the clock signal of the particular processor. A multiplexing circuit multiplexes the access requests to a memory. The memory needs a minimum memory repetition period before it can accept an access request following acceptance of a preceding access request. The clock periods of the processing circuits are longer than the minimum memory repetition period. A timing circuit selects acceptance time points at which each particular access request from a first data processing circuit is accepted. The time point at which the particular request is accepted is always within the validity duration interval in which the particular access request is made. The timing circuit varies the position of the acceptance time points within the validity duration intervals, so that the position is delayed to make room for previously accepting an access request from another processor. The position is subsequently moved back toward a start of the validity duration interval in successive steps during application of successive access requests from the first data processing circuit.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6 412 049 B1 (PAWLOWSKI STEPHEN S ET AL) 25 June 2002 (2002-06-25) abstract column 1, line 6 - column 2, line 37	1-12
X	US 5 202 973 A (HO STEVEN ET AL) 13 April 1993 (1993-04-13) abstract; figures 1,4 column 3, line 7 - line 20 column 5, line 66 - column 6, line 9 claim 1	1-12
A	EP 1 253 518 A (MATSUSHITA ELECTRIC IND CO LTD) 30 October 2002 (2002-10-30) abstract; figure 6	1-12
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/061459 A1 (MADAVARAPU VAMSEE K ET AL) 27 March 2003 (2003-03-27) abstract; figure 3 -----	1-12
A	US 6 247 104 B1 (SUZUKI KAZUMASA) 12 June 2001 (2001-06-12) abstract; figures 3A-3C -----	1-12
A	US 6 205 524 B1 (NG DAVID WAY) 20 March 2001 (2001-03-20) abstract column 4, line 19 - column 5, line 11 -----	1-12

INTERNATIONAL SEARCH REPORT

IB2004/050871

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6412049	B1	25-06-2002	NONE
US 5202973	A	13-04-1993	NONE
EP 1253518	A	30-10-2002	CN 1383066 A 04-12-2002 EP 1253518 A1 30-10-2002 JP 2003016024 A 17-01-2003 US 2002161956 A1 31-10-2002
US 2003061459	A1	27-03-2003	EP 1481326 A2 01-12-2004 WO 03027867 A2 03-04-2003
US 6247104	B1	12-06-2001	JP 3444154 B2 08-09-2003 JP 11096072 A 09-04-1999 DE 19842677 A1 18-03-1999
US 6205524	B1	20-03-2001	US 6157978 A 05-12-2000