

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
27 June 2002 (27.06.2002)

PCT

(10) International Publication Number  
WO 02/050666 A3

(51) International Patent Classification<sup>7</sup>: G06F 9/32, 9/38, 9/30

P.; 13305 Tichester Court, Austin, TX 78729 (US).  
OVERKAMP, Gregory, A.; P.O. Box 163442, Austin, TX 78716 (US).

(21) International Application Number: PCT/US01/50506

(74) Agent: HARRIS, Scott, C.; Fish & Richardson PC, 4350 La Jolla Village Drive, Suite 500, San Diego, CA 92122 (US).

(22) International Filing Date:  
20 December 2001 (20.12.2001)

(25) Filing Language: English

(81) Designated States (national): CN, JP, KR, SG.

(26) Publication Language: English

Published:  
— with international search report

(30) Priority Data:  
09/745,104 20 December 2000 (20.12.2000) US

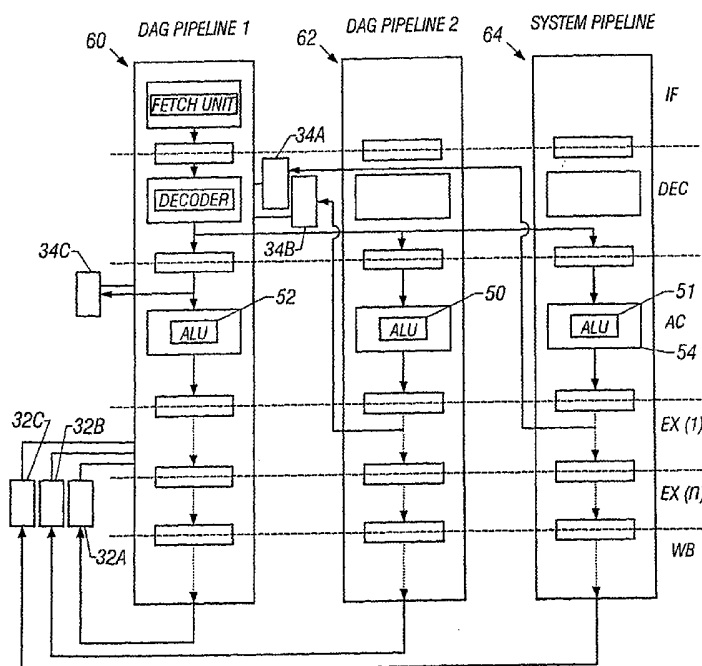
(88) Date of publication of the international search report:  
28 November 2002

(71) Applicants: INTEL CORPORATION [US/US]; 2200 Mission College Boulevard, Santa Clara, CA 95052 (US).  
ANALOG DEVICES, INC. [US/US]; One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 (US).

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.

(72) Inventors: INOUE, Ryo; 10521 Redmond Road, Austin, TX 78739 (US). SINGH, Ravi, P.; 12349 Metric Boulevard, #829, Austin, TX 78758 (US). ROTH, Charles,

(54) Title: METHOD AND APPARATUS FOR PROCESSING PROGRAM LOOPS IN PARALLEL



(57) Abstract: In one embodiment, a programmable processor is adapted to support hardware loops. The processor may include hardware such as a first set of registers, a second set registers, a first pipeline, and a second pipeline. Furthermore, the processor may include a control unit adapted to efficiently implement the hardware when performing a hardware loop.



WO 02/050666 A3

INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 01/50506

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 G06F9/32 G06F9/38 G06F9/30

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	WO 02 37270 A (INTEL CORP ;ANALOG DEVICES INC (US)) 10 May 2002 (2002-05-10) the whole document	1-30
X	EP 0 374 419 A (IBM) 27 June 1990 (1990-06-27) page 2, line 35 - line 55	1
A	page 8, line 25 - line 55	6, 7, 9, 10, 13, 15, 26, 27, 30
A	EP 0 605 872 A (IBM) 13 July 1994 (1994-07-13)  column 6, line 29 -column 8, line 17	1, 2, 5, 8, 11, 12, 14-19, 22, 23, 26-29
	-/--	

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

21 August 2002

Date of mailing of the international search report

30/08/2002

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

Daskalakis, T

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/50506

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 5 734 880 A (BALMER KEITH ET AL) 31 March 1998 (1998-03-31)  column 96, line 1 -column 97, line 54 column 99, line 38 -column 100, line 42 -----	6,7,9, 10,13, 15,26, 27,30
A	US 5 303 355 A (CHAU-LEE KIN K ET AL) 12 April 1994 (1994-04-12)  column 3, line 65 -column 4, line 45 -----	6,7,9, 10,13, 15,26, 27,30

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/50506

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 0237270	A	10-05-2002	WO 0237270 A2	10-05-2002
EP 0374419	A	27-06-1990	EP 0374419 A2 JP 2183831 A US 5898866 A	27-06-1990 18-07-1990 27-04-1999
EP 0605872	A	13-07-1994	US 5421020 A DE 69325086 D1 DE 69325086 T2 EP 0605872 A1 JP 3137157 B2 JP 6236271 A	30-05-1995 01-07-1999 16-12-1999 13-07-1994 19-02-2001 23-08-1994
US 5734880	A	31-03-1998	US 6116768 A DE 69428504 D1 DE 69428504 T2 EP 0660223 A2 JP 8007082 A US 5995748 A US 5761726 A US 5696954 A US 5995747 A	12-09-2000 08-11-2001 16-05-2002 28-06-1995 12-01-1996 30-11-1999 02-06-1998 09-12-1997 30-11-1999
US 5303355	A	12-04-1994	NONE	