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DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, 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, SA,
SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM,
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[Continued on next page]

(54) **Title:** MEMORY-NETWORK PROCESSOR WITH PROGRAMMABLE OPTIMIZATIONS

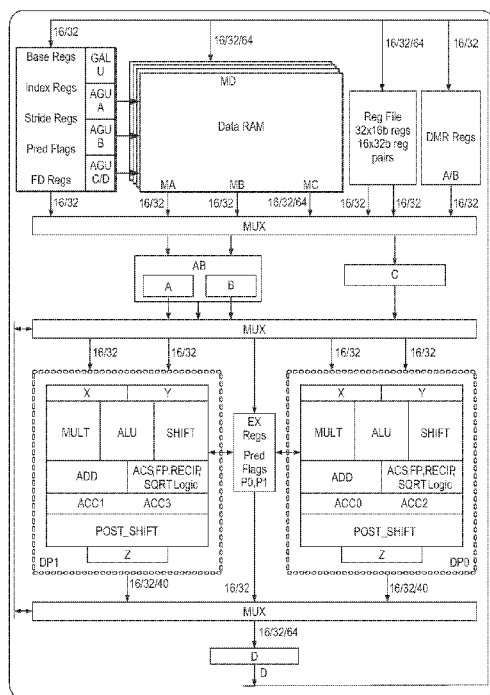


FIG. 20

(57) **Abstract:** Various embodiments are disclosed of a multiprocessor system with processing elements optimized for high performance and low power dissipation and an associated method of programming the processing elements. Each processing element may comprise a fetch unit and a plurality of address generator units and a plurality of pipelined datapaths. The fetch unit may be configured to receive a multi-part instruction, wherein the multi-part instruction includes a plurality of fields. A first address generator unit may be configured to perform an arithmetic operation dependent upon a first field of the plurality of fields. A second address generator unit may be configured to generate at least one address of a plurality of addresses, wherein each address is dependent upon a respective field of the plurality of fields. A parallel assembly language may be used to control the plurality of address generator units and the plurality of pipelined datapaths.



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INTERNATIONAL SEARCH REPORT

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PCT/US2014/039345

A. CLASSIFICATION OF SUBJECT MATTER
 INV. G06F9/30 G06F9/38
 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)
 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 practicable, 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	WO 2010/093828 A1 (QUARTICS INC [US]; AHMAD MOHAMMAD [US]; USMAN MOHAMMAD [US]; AHMED SHE) 19 August 2010 (2010-08-19) page 47, line 76 - page 49, line 18 -----	1-10
X	US 6 453 405 B1 (HOYLE DAVID [US] ET AL) 17 September 2002 (2002-09-17) paragraphs [0038], [0039] paragraphs [0061], [0063] -----	1-10
A	HINTON G ET AL: "PERFORMANCE ENHANCEMENTS OF THE SUPERSCALAR I960 PROCESSOR FAMILY", WESCON TECHNICAL PAPERS, WESTERN PERIODICALS CO. NORTH HOLLYWOOD, US, vol. 34, 1 November 1990 (1990-11-01), pages 463-466, XP000227912, *Page 464: "Superscalar Dispatch opportunities"* -----	1,6



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

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"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

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/039345

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.:

1-10

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-10

VLIW processor comprising multiple address generation units,
and method of processing.

2. claims: 11-15

Apparatus comprising a plurality of VLIW processors and
configurable communication elements.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/039345

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010093828 A1	19-08-2010	CN 102804165 A	28-11-2012
		EP 2396735 A1	21-12-2011
		US 2010321579 A1	23-12-2010
		WO 2010093828 A1	19-08-2010

US 6453405 B1	17-09-2002	NONE	
