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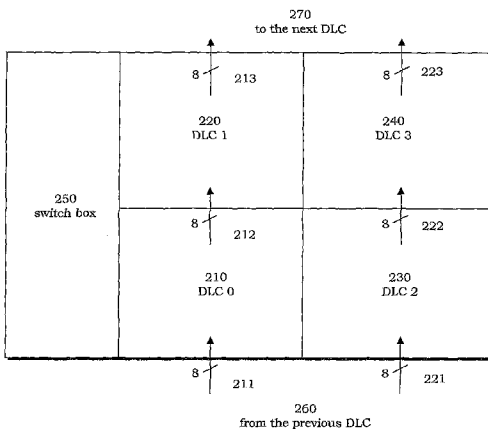
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(54) Title: CONFIGURABLE DEDICATED LOGIC CELLS IN PROGRAMMABLE LOGIC AND ROUTING BLOCKS WITH DEDICATED LINES AND LOCAL CONNECTIONS



200

260 from the previous DLC

(57) Abstract: A programmable logic structure is disclosed that has a set of dedicated lines (212, 222) which extends internally throughout different dedicated logic cells (210, 260) within a logic and routing block, extends from a previous logic routing block (260) to the present logic and routing block, or extends from the present logic and routing block to the next logic and routing block (270). One set of dedicated lines (212) from a first logic and routing block can be stitched to another set of dedicated lines of a second logic and routing block for extending the reach as well as bypassing a logic and routing block, or bypassing a dedicated logic cell in the same logic and routing block. The dedicated lines between logic and routing blocks allow a logic and routing block to receive more inputs from its own switch box or to drive more outputs than provided by the logic and routing block as specified by a given function.

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**Declaration under Rule 4.17:**

— *as to applicant's entitlement to apply for and be granted a  
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ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/00640

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC: **H03K 19/177**( 2006.01)

USPC: 326/41,47  
 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)  
 U.S. : 326/37-41, 47

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)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,335,634 B1 (REDDY et al.) 01 January 2002 (01.01.2002), Figs 1 and 4a	1,11,13-15,20-22
A	US 6,897,680 B2 (SCHLEICHER et al) 24 May 2005 (24.05.2005)	
A	US 6,833,730 B1 (GANESAN et al) 21 December 2004 (21.12.2004)	

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	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"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
"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	"&" document member of the same patent family

Date of the actual completion of the international search 02 April 2007 (02.04.2007)	Date of mailing of the international search report <b>16 APR 2007</b>
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer James H. Cho <i>Aydia Saul Tor</i> Telephone No. 571-272-1650

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/00640

## 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:  
Please See Continuation 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 additional fees, this Authority did not invite payment of any 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.: 1-23
- 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.

**BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING**

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claims 1-23, drawn to a programmable logic structure having dedicated lines extending through logic and routing blocks.

Group II, claims 24-32 and 41-44, drawn to a programmable logic structure for point to point local connections of multiplexers in a different level.

Group III, claims 33-40, drawn to a programmable logic structure for stitching connection with logic cells.

Group IV, claims 45-46, drawn to a dedicated logic cell in logic and routing cells having a configurable logic function, a dedicated logic function and a sequential logic function.

Group V, claims 47-50, drawn to a dedicated logic cell in a configurable logic function structure

Group VI, claims 51-57, drawn to a dedicated logic cell in a dedicated logic function structure

Group VII, claims 58-69, drawn to a programmable logic circuit with arithmetic operation.

Group VIII, claims 70-71, drawn to a dedicated logic cell in logic and routing cells having a configurable logic function, a dedicated logic function and a sequential logic function.

Group VIII, claims 72-75, drawn to a dedicated logic cell in a sequential logic function structure.

Group X, claims 76-91, drawn to a dedicated logic cell in a configurable logic function having a first, second and third control logic functions.

The inventions listed as Groups I - X do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the programmable logic structure is. Group I is to use one or more dedicated lines extending through different logic and routing blocks, Group II is for point to point local connections of multiplexers in a different level, Group III is for stitching logic cells, Group IV is a dedicated logic cell in logic and routing cells having a configurable logic function, a dedicated logic function and a sequential logic function, Group V is a dedicated logic cell in a configurable logic function structure, Group VI is a dedicated logic cell in a dedicated logic function structure, Group VII is a programmable logic circuit with arithmetic operation, Group VIII is a dedicated logic cell in logic and routing cells having a configurable logic function, a control logic function and a sequential logic function, Group VIII is a dedicated logic cell in a sequential logic function structure, and Group X is a dedicated logic cell in a configurable logic function having a first, second and third control logic. Each Group claims its own unique special technical features as discussed above which is not common.