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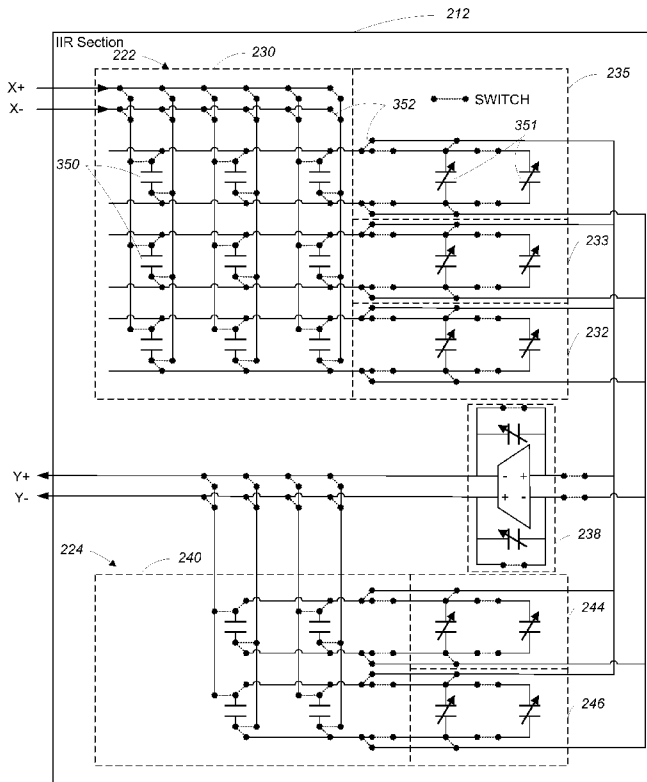
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(54) Title: CHARGE SHARING TIME DOMAIN FILTER



(57) Abstract: An approach to time domain filtering uses a passive charge sharing approach to implement an infinite impulse response filter. Delayed samples of an input signal are stored as charges on capacitors of a first array of capacitors, and delayed samples of the output signal are stored as charges on capacitors of a second array of capacitors. Outputs are determined by passively coupling capacitors of the first and second arrays to one another, and determining the output according to a total charge on the coupled capacitors. In some examples, a gain is applied to the total charge prior to storing the output on the second array of capacitors. In some examples, a charge scaling circuit is applied to the charges stored on the arrays prior to coupling capacitors to form the output.

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# INTERNATIONAL SEARCH REPORT

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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. H03H15/02 ADD.				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols) H03H				
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, WPI Data, INSPEC, COMPENDEX				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 2010/225419 A1 (PAN CHENGZHI [US] ET AL) 9 September 2010 (2010-09-09) abstract paragraph [0068] - paragraph [0087]; figures 7-10 paragraph [0103] - paragraph [0112]; figures 14-16 paragraph [0125] paragraph [0127] - paragraph [0129]; figure 20 paragraph [0032] - paragraph [0060]; figures 1-4 <div style="text-align: center; margin-top: 10px;">                     -----                      -/--                 </div>	1-19		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <span style="margin-left: 150px;"><input checked="" type="checkbox"/> See patent family annex.</span>				
* Special categories of cited documents : <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; vertical-align: top;">                     "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                      "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                 </td> <td style="width: 50%; border: none; vertical-align: top;">                     "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                      "&amp;" document member of the same patent family                 </td> </tr> </table>			"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 "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
"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 "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	Date of mailing of the international search report			
16 November 2012	27/11/2012			
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Trafidlo, Renata			

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2012/041101

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>Cameron B. Lacy: "Design of a programmable switched-capacitor analog FIR filter",  1 January 1999 (1999-01-01), XP55044242, Toronto, Canada  Retrieved from the Internet:  URL:https://tspace.library.utoronto.ca/bitstream/1807/14967/1/MQ46200.pdf  [retrieved on 2012-11-14]  page 22, line 1 - page 26, line 11;  figures 8-10  page 30, line 8 - page 36, line 7; figures 14-18</p>	1-19
A	<p>-----  US 2003/050027 A1 (MUHAMMAD KHURRAM [US] ET AL) 13 March 2003 (2003-03-13)  paragraph [0041] - paragraph [0046];  figure 3  paragraph [0061] - paragraph [0064];  figure 8  paragraph [0070]; figure 3A  -----</p>	1-19
A	<p>-----  EP 0 933 870 A2 (TEXAS INSTRUMENTS INC [US]) 4 August 1999 (1999-08-04)  abstract  paragraph [0020] - paragraph [0033];  figures 1-6  -----</p>	1-19

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No  
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