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[Continued on next page]

(54) Title: CHARGE TRANSFER MEASUREMENT TECHNIQUES

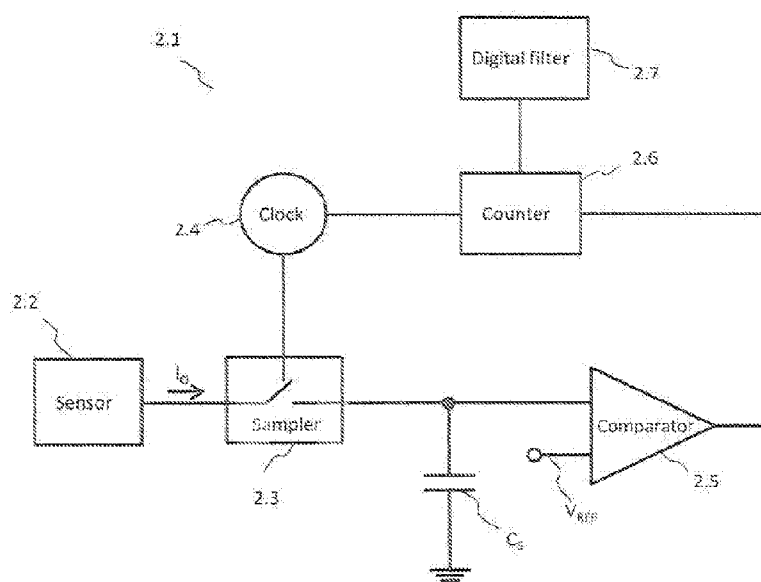


FIG. 2

(57) **Abstract:** A charge transfer measurement system which includes a clock, a capacitor, current mirrors and a counter wherein a signal current which is based on magnetic field, incident light or radiation, acceleration or an external inductance I_s is transferred to the capacitor with the counter recording a count value and wherein the measurement is stopped after a predetermined time or when a voltage on the capacitor exceeds a reference value.



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. G01D5/24 G01J1/44 H01L27/00 H03K17/955 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) G01J H01L H03K G01D		
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		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7 414 234 B1 (TEETER JASON [US] ET AL) 19 August 2008 (2008-08-19)	1-7
Y	the whole document -----	24
X	EP 0 967 794 A1 (HEWLETT PACKARD CO [US]) 29 December 1999 (1999-12-29)	1-7
Y	column 5 - column 9; figures 2-7 -----	24
X	US 8 154 310 B1 (MAHARYTA ANDRIY [UA] ET AL) 10 April 2012 (2012-04-10)	1-7,24
Y	the whole document -----	1-7,24
Y	US 8 531 193 B2 (VAELISUO PETRI [FI] ET AL) 10 September 2013 (2013-09-10)	1-7,24
	abstract; figures 3-5, 8-10 -----	
☐ 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 "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 26 January 2016	Date of mailing of the international search report 11/05/2016	
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 Kallinger, Christian	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ZA2015/000011

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.:

1-7, 24

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/ZA2015/000011

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
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			US	2010283485 A1		11-11-2010
			WO	2009007500 A1		15-01-2009

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-7, 24

... directed to an integrated circuit implementing a charge transfer measurement with filtering and background reduction in order to improve the measurement quality.

2. claims: 8-14, 23

... directed to an integrated circuit implementing a charge transfer measurement with a plurality of Hall plate structures for measuring rotation or orientation of an external magnetic field in a tablet computer or smart phone.

3. claims: 15-18

... directed to an integrated circuit implementing a charge transfer measurement with a PIR diode for measuring temperature in a fire alarm system.

4. claims: 19-21

... directed to an integrated circuit implementing a charge transfer measurement with photodiode placed at an angle to an emitter for measuring light intensity in a smoke detector.

5. claim: 22

... directed to an integrated circuit implementing a charge transfer measurement with two photodiodes for measuring ambient light.
