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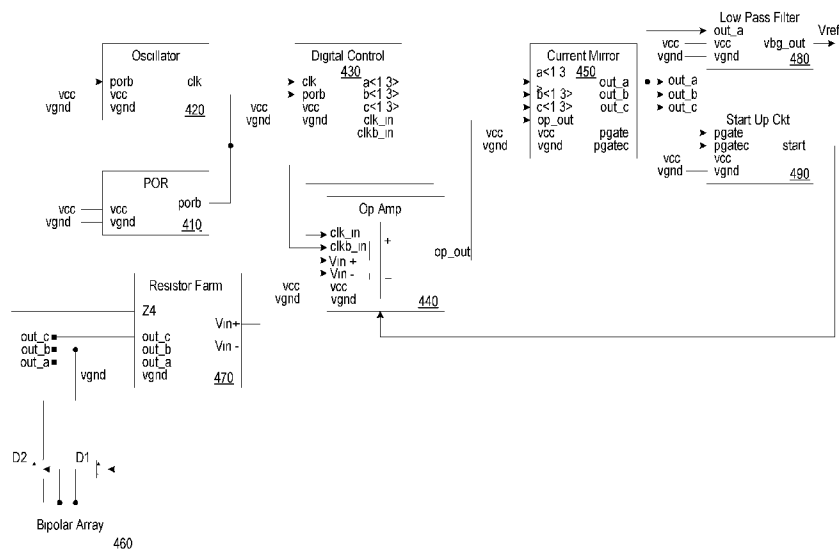
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(54) **Title:** LOW POWER BANDGAP REFERENCE CIRCUIT WITH INCREASED ACCURACY AND REDUCED AREA CONSUMPTION



(57) **Abstract:** Bandgap reference (BGR) circuits and methods are described herein for providing high accuracy, low power Bandgap operation when using small, low voltage devices in the analog blocks of the BGR circuit. In some cases, chopped input stabilization and dynamic current matching techniques may be combined to compensate for input voltage offsets in the operational amplifier portion and current offsets in the current mirror portion of the Bandgap circuit. When used together, the chopped stabilization and dynamic current matching techniques provide a significant increase in accuracy, especially when using small, low voltage devices in the analog blocks to reduce layout area and support low power supply operation (e.g., power supply values down to about 1.4 volts and below).

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**INTERNATIONAL SEARCH REPORT**

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**A. CLASSIFICATION OF SUBJECT MATTER**  
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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)  
G05F

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
X	WO 2004/077192 A (ANALOG DEVICES INC [US]; MARINCA STEFAN [IE]) 10 September 2004 (2004-09-10) the whole document	1, 12, 17
X	US 2005/231270 A1 (WASHBURN CLYDE [US]) 20 October 2005 (2005-10-20) the whole document	1, 12, 17
A	US 6 052 020 A (DOYLE JAMES T [US]) 18 April 2000 (2000-04-18) abstract	1-20
A	US 5 867 012 A (TUTHILL MICHAEL G [IE]) 2 February 1999 (1999-02-02) abstract	1-20

Further documents are listed in the continuation of Box C

See patent family annex

\* Special categories of cited documents

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Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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