RF-POWERED MICROMECHANICAL CLOCK GENERATOR

Tech ID: 25814 / UC Case 2016-157-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,867,757	12/15/2020	2016-157

BRIEF DESCRIPTION

Realizing the potential of massive sensor networks requires overcoming cost and power challenges. When sleep/wake strategies can adequately limit a network node's sensor and wireless power consumption, then the power limitation comes down to the real-time clock (RTC) that synchronizes sleep/wake cycles. With typical RTC battery consumption on the order of 1μW, a low-cost printed battery with perhaps 1J of energy would last about 11 days. However, if a clock could bleed only 10nW from this battery, then it would last 3 years.

To attain such a clock, researchers at UC Berkeley developed a mechanical circuit that harnesses squegging to convert received RF energy (at -58dBm) into a local clock while consuming less than 17.5nW of local battery power. The Berkeley design dispenses with the conventional closed-loop positive feedback approach to realize an RCT (along with its associated power consumption) and removes the need for a sustaining amplifier altogether.

SUGGESTED USES

- Ulta-low power oscillators for clocking applications that benefit from replacing power hungry clocks in any electronic system.

- Clocking in harsh environments (e.g. radioactive, extreme heat) where conventional electronic clocks can't operate, but this all-mechanical clock can operate.

ADVANTAGES

- Low power

- Low cost

- All mechanical design

RELATED MATERIALS

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Communications**
» Internet
» Networking
» Wireless
» **Computer**
» Hardware
» **Environment**
» Sensing
» **Imaging**
» Remote Sensing
» **Semiconductors**
» Assembly and Packaging
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» **Sensors & Instrumentation**
» Biosensors

RELATED CASES

2016-157-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Zero-Quiescent Power Transceiver

- High Electromechanical Coupling Disk Resonators
- Micromechanical Frequency Divider
- Active Resonator System with Tunable Quality Factor, Frequency, And Impedance
- Piezoelectric Filter with Tunable Gain

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