Frequency Addressible Microactuator

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BRIEF DESCRIPTION

The present invention relates to an actuator that is driven using a harmonic driving force, the use of resonant frequency for addressing the actuator, and use of such a device in different state-based applications such as an electrical switch or micromirror.

FULL DESCRIPTION

This invention consists of one or more movable resonating elements, which can be forced into oscillation. The movable structure is designed to latch at a certain amplitude using one of several latching techniques. After latching, the moving element does not move, and is thus placed in a fixed state. In the intended operation, the movable element is driven into resonance, thereby producing a large amplitude, which in turn results in the structure latching. In this manner, through resonance, a small force applied in a repeating manner can result in the latching of the actuator for example, an operation which would normally require a large force. Furthermore, if two or more of these units, each with different harmonic frequencies, are placed under the same influence, only the one with a harmonic response to the driving force will latch. In this manner, a single influencing signal may be used to latch more than one device on demand by tuning the frequency to match the natural frequency of the device of interest.

SUGGESTED USES

This invention has utility in the area of the telecommunication, radar and satellite systems for many applications, such as switch network controlling, modularity and expansion.

ADVANTAGES

The current invention requires only a single actuation wire to control several actuators (a control bus). Since a single wire can carry electrical signals of different frequencies, it may be used to safely actuate specific actuators on the control bus without significantly actuating others. Thus multiple actuators may share a single control bus. This results in a great space savings and a simplified routing design for multiple actuators on a board. The same approach may be used to drive one or more actuators into a latched state by providing a broadly acting force, such as an oscillating magnetic field in the presence of multiple magnetic actuators. This approach may be used to produce frequency addressable magnetically actuated electronic switches, optical devices (such as mirrors), and other systems which require multiple mechanical structures to be addressibly moved into a given latched state.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,685,291	06/20/2017	2011-571

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OTHER INFORMATION

KEYWORDS

Network switching, Microactuator

CATEGORIZED AS

- **Communications**
  - Networking
  - Wireless

RELATED CASES

2011-571-0

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