

Re: Regulate pendulum clock with quartz crystal?

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- *From:* "jmorris@xxxxxxxxxxx" <jmorris@xxxxxxxxxxx>
 - *Date:* Wed, 07 Nov 2007 21:33:59 -0800
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On Nov 7, 11:44 pm, Bill Bowden <wrongaddr...@xxxxxxx> wrote:

On Nov 6, 6:24 pm, tadchem <tadc...@xxxxxxxxxxx> wrote:

On Nov 5, 11:59 pm, Bill Bowden <wrongaddr...@xxxxxxx> wrote:

Is it possible to regulate pendulum clocks for quartz crystal accuracy without adjusting the length of the pendulum?

Short answer: No.

Longer answer: It is not possible. The main driver for the period of a pendulum is gravity, as first demonstrated by Galileo. Gravity varies with the time of the solar day and the phase of the moon, as demonstrated by the tides. We still don't know how to manipulate gravity.

The strength of the moon's gravity is a large enough fraction of the earth's gravity that the difference in the period of the pendulum between having the moon at the nadir (adding to earth's gravity) and the moon at the zenith (subtracting from earth's gravity) is easily measured with quartz crystal clocks.

So, with a strong enough magnetic field acting on a permanent magnet

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mounted to the pendulum, the force of gravity can be altered, and the clock regulated. I was just wondering if a very brief change in gravity at some particular position of the pendulum would change the period?

–Bill– Hide quoted text –

– Show quoted text –

Many, many years ago there was an amateur scientist project in Scientific American, on this very idea.

Their solution was to fasten a small (3 cm ?) bar magnet on the back of the pendulum shaft, near the bob, and then readjust the pendulum so that the clock naturally kept accurate time again.

Then they put a magnetic coil on the back of the case, so the bar magnet would be closest to the coil when it was at bottom dead centre of its swing. The coil was energized by a circuit controlled by a quartz crystal, but today, you could pull 1 Hz pulses of a GPS satellite!

The pendulum would "lock" onto the coil pulse frequency. If the pendulum started to get ahead, it would be retarded more than advanced by the pulses, and vice-versa

See:

Quartz-crystal clock,

1957 Sep, pg 233

1961 Jun, pg 181

Quartz-crystal oscillator for pendulum clock,

1974 Sep, pg 192

found at

<http://amasci.com/amateur/sciamdx.html#52-QQ>

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