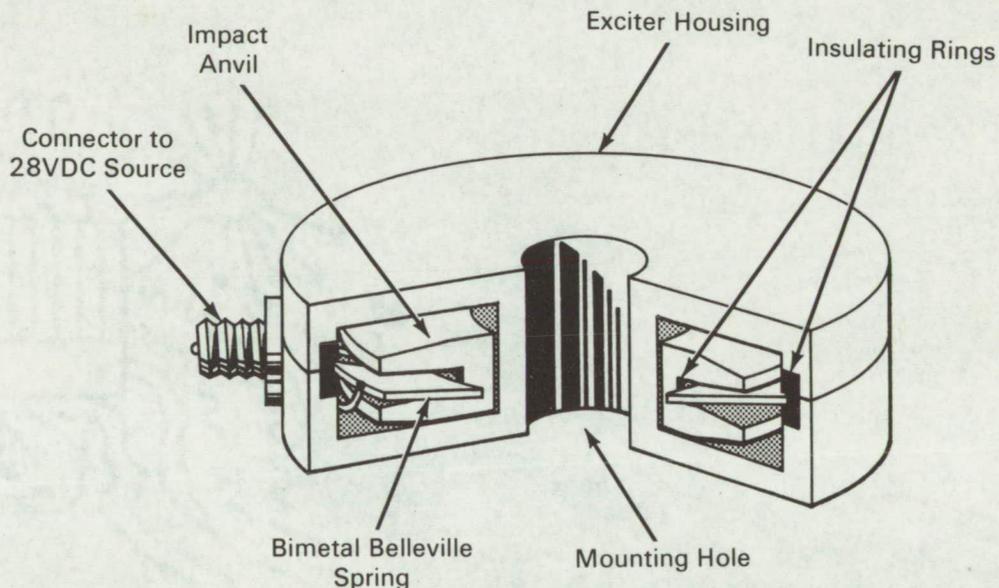


NASA TECH BRIEF



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Simple Device Produces Accelerometer Calibration Pulse



The problem: To provide a simple device for remote checkout of the amplitude calibration and frequency response of a piezoelectric vibration accelerometer. Devices which use an ac-excited second piezoelectric crystal in the accelerometer housing are not dependable because of difficulties in controlling the ac signal amplitude.

The solution: A shock-impulse exciter employing a bimetal spring to apply a mechanical acceleration pulse of a known amplitude and frequency to the accelerometer.

How it's done: The exciter (0.75-in. i.d. \times 0.25-in. thick) is mounted as a washer between the accelerometer and the surface of the equipment to be tested.

The exciter anvil is normally held firmly against one surface of the exciter housing by the bimetal Belleville spring. The spring is electrically insulated from the housing and the anvil by the insulation rings. When a dc voltage from a remote source is applied to the bimetal spring, a current flow through the spring causes it to heat and deflect slowly until it snaps into a negative deflection, pulling the anvil away from the housing. At this point the voltage is interrupted and the spring begins to slowly deflect toward its original position. This deflection continues until the spring snaps back into its original position, impacting the anvil against the housing. The shock impact is transmitted through the housing to the accelerometer, which provides an electrical output pulse to a readout.

(continued overleaf)

The acceleration amplitude due to the exciter shock is determined by a laboratory calibration of the accelerometer-exciter combination. The frequency response can be checked by observing the accelerometer's output rise time or ringing frequency.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
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Huntsville, Alabama, 35812
Reference: B65-10269

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated by NASA.

Source: Lockheed Missiles and Space Company
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