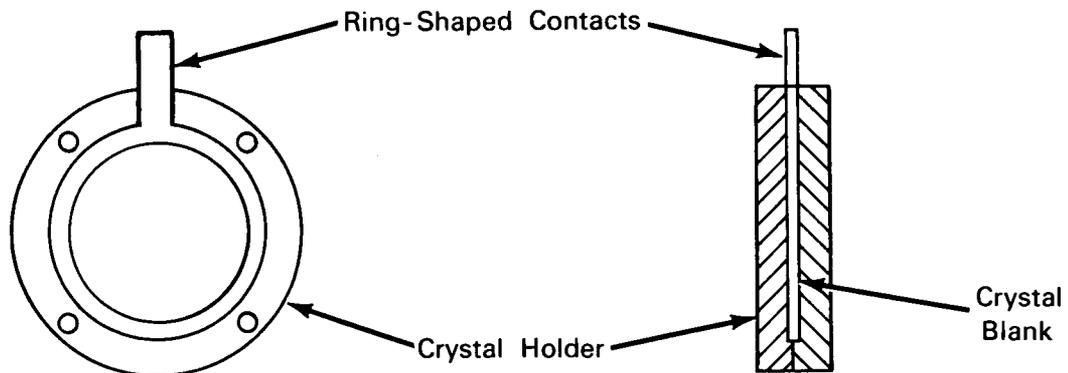


# NASA TECH BRIEF



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## Improved Holder Protects Crystal During High Acceleration and Impact



**The problem:** Piezoelectric crystals are used as the frequency determining elements in most electronic communication and computer equipment. Since mechanical stress of these crystals produces electrical potential changes on their surface, they must be protected from impact and vibration to assure reliable operation. The problem of mounting these crystals becomes acute when they are operated in electronic equipment which undergoes high accelerations and impacts.

**The solution:** A crystal holder incorporating the best features of pressure mounting and contact mounting to protect a crystal's mechanical and electrical characteristics in a high acceleration and impact environment.

**How it's done:** A crystal blank (A-T cut) with standard silvered contacts is sandwiched between two ring-shaped copper contacts 0.002-inch thick. The crystal blank and contacts are retained in a plastic holder with a 0.007-inch bore. This permits a 0.003-inch total excursion of the crystal blank to allow required motion during oscillation.

### Notes:

1. Four units have been impact tested in two planes at average acceleration levels of approximately 12,000 g without damage.
2. These units exhibit approximately 30% of the impedance of the other best known impact-resistant units and the ability to withstand about twice the impact acceleration.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
 Jet Propulsion Laboratory  
 4800 Oak Grove Drive  
 Pasadena, California, 91103  
 Reference: B65-10037

**Patent status:** NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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 (JPL-463)

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