

The Design and Performance of a Low-Cost Strong-Motion Sensor Using the ICS-3028 Micromachined Accelerometer: USgs Open-File Report 98-109



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THE DESIGN AND PERFORMANCE OF A LOW-COST STRONG-MOTION SENSOR USING THE ICS-3028 MICROMACHINED ACCELEROMETER: USGS OPEN-FILE REPORT 98-109



Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****.The severity of earthquake ground shaking varies tremendously over very short distances (Figures 1a-c). Within a distance of as little as 1 km from the nearest station, one knows little more than what can be obtained from an attenuation relation, given only distance from the fault rupture and the geology of the site. For example, if some station measures 0.5 g peak ground acceleration (PGA), then at a distance of 1 km from that site, under otherwise identical conditions, the shaking has one chance in three of being under 0.36 g or over 0.70 g, based on the curve shown in Figures 1a, c. Similarly, pseudovelocity (PSV) response spectra have a 5 chance of differing by 2? at 1 km distance (Figure 1 b). This variance can be the difference between moderate and severe damage. Hence, there are critical needs, both in emergency response and in mitigation (prediction of shaking strength, building codes, structural engineering), to sample ground shaking densely enough to identify individual neighborhoods suffering localized, strong shaking. These needs imply a spatially dense network of strong-motion seismographs, probably numbering thousands of sites in an urban region the size of the San Francisco Bay Area, California (Figure 1 c). It has not been economically feasible to field that many instruments, since existing ones cost many thousands of dollars apiece. For example, there are currently just a few dozen digital free-field instruments in the Bay Area. This paper is one step toward a solution to this conundrum. I demonstrate that a recently developed class of accelerometers, those constructed from silicon by micromachining (a process similar to integrated circuit fabrication), is now capable of resolving ground motion with the...

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