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**Chakravorty**

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(54) **ELECTRONIC ASSEMBLIES AND SYSTEMS**  
**COMPRISING INTERPOSER WITH**  
**EMBEDDED CAPACITORS**

(75) Inventor: **Kishore K. Chakravorty**, San Jose,  
CA (US)

(73) Assignee: **Intel Corporation**, Santa Clara, CA  
(US)

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H05K 7/08; H05K 7/10

(52) U.S. Cl. .... **361/782**; 361/764; 361/765;  
361/306.3

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361/306.1, 306.2, 306.3; 174/259-261; 257/700-704,  
257/723-724; 29/25.42

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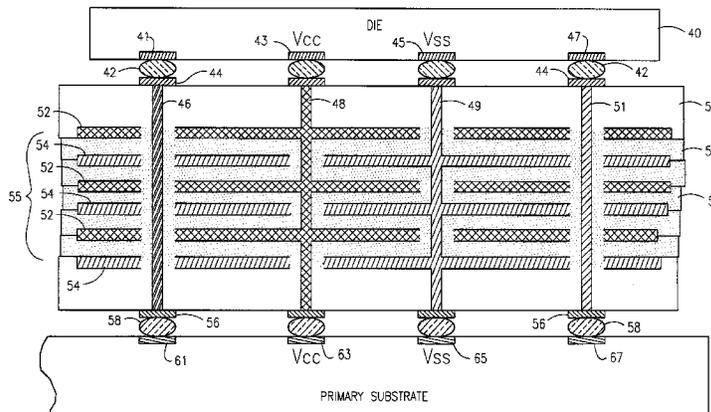
*Assistant Examiner*—Tuan Dinh

(74) *Attorney, Agent, or Firm*—Schwegman, Lundberg,  
Woessner & Kluth, P.A.

(57) **ABSTRACT**

To reduce switching noise, the power supply terminals of an integrated circuit die are coupled to the respective terminals of at least one capacitor embedded in an interposer that lies between the die and a substrate. In an embodiment, the interposer is a multilayer ceramic structure that couples power and signal conductors on the die to corresponding conductors on the substrate. The capacitor is formed of at least one high permittivity layer and in an embodiment comprises several high permittivity layers interleaved with conductive layers. Alternatively, the capacitor can comprise at least one embedded discrete capacitor. Also described are an electronic system, a data processing system, and various methods of manufacture.

**24 Claims, 8 Drawing Sheets**



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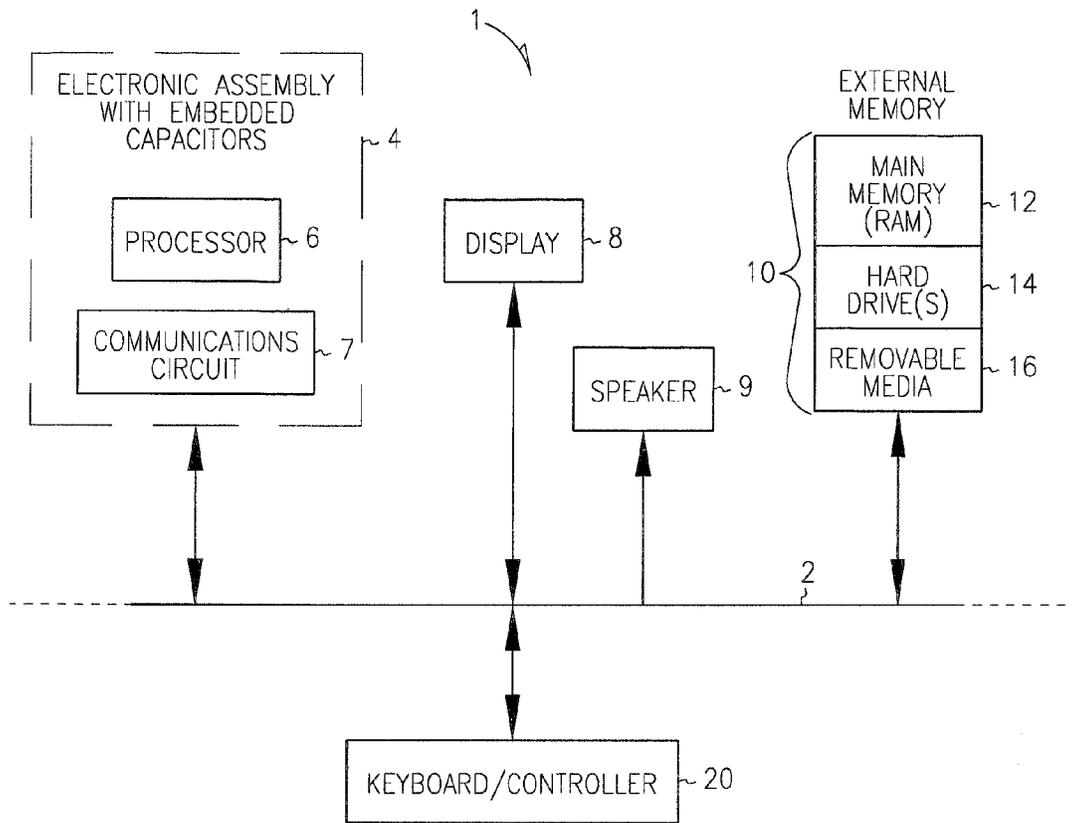


Fig. 1





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