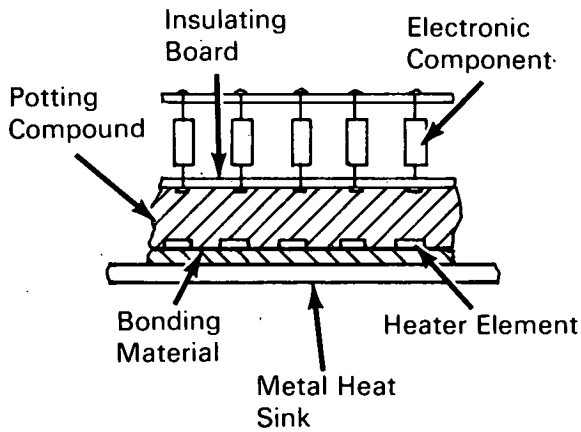
NASA TECH BRIEF

Method of Disjoining Adhesively Bonded Electronic Cordwood Modules



Cordwood modules used for high-density, low-weight packaging of electronic components have presented a maintainability problem in aerospace service. Removal of a specific module from a dense component package requires separation of the adhesive bond between the module and the surface of a metal heat sink and also between the module and the surface of the potting material. Mechanical means which are generally used for disjoining the modules from the bonded heat sink and potting material surfaces often result in destruction of the module.

A method has been developed for disjoining electronic modules which are adhesively bonded to a heat sink surface without damaging the module to be removed or surrounding modules. The method involves the embedment of resistive heating elements arranged in an analytically derived pattern in the module. When a specific module is to be removed from a dense electronic package, a short burst of electrical power is applied across the embedded heater elements. The resulting heat pulse localizes the corresponding high temperature so that breakdown of the bonding material occurs without affecting the electronic components. The electronic module may then be easily removed and subjected to failure analysis. The repaired module or another one in good working order can be bonded to the same heat sink surface from which the defective module was removed.

The spacing of the heater elements, the pulse height (temperature), and pulse width (time interval) of the heat pulse to be applied to specific modules was determined from the solution of differential equations relating the aforementioned parameters to the thermal conductivity, specific heat, and density of the material.

Note:

Complete technical details may be obtained from:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B68-10086

Patent status:

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