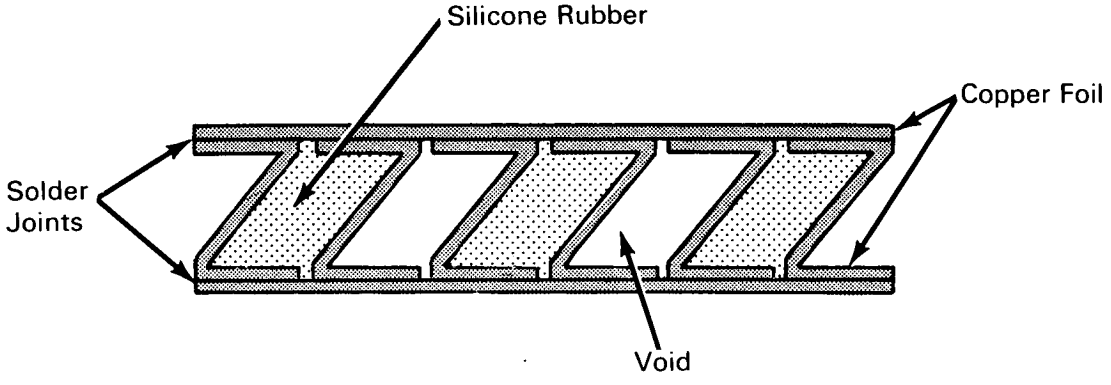
NASA TECH BRIEF

Copper Foil Provides Uniform Heat Sink Path



The problem: In the operation of certain electronic equipment, an appreciable amount of heat must be dissipated to prevent internal temperatures from rising above design levels. Structural bays, racks, or platforms, to which the equipment module is mounted, usually provide sufficient heat sink surface for this purpose. In critical cases, however, the normal microscopic valleys and ridges resulting from machining procedures cause sufficient discontinuities in interface contact to render the heat sink inefficient.

The solution: A thermal path that combines the high thermal conductivity of copper with the resiliency of silicone rubber to fill the voids and discontinuities affecting the equipment-to-heat-sink interface.

How it's done: Soft copper foil 5-mils thick is bent into multiple Z cross-sectional pieces and sandwiched between and soldered to two flat sheets of 5-mil copper foil. Alternate void diagonal areas between Z-shaped foil pieces are filled with a silicone rubber compound. This assembly is placed between the electronic module and its mount interface. When the fastening devices are tightened, the copper foil flows to fill all voids and discontinuities and the resilient silicone rubber compound maintains it in intimate contact.

Patent status: Title to this invention has been waived under the provisions of the National Aeronautics and Space Act (42 U.S.C. 2457 (f)) to North American Aviation, Inc., 12214 Lakewood Boulevard, Downey, California.

Source: I. E. Phillips, Jr. and
F. A. Schreihans of
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Category 02