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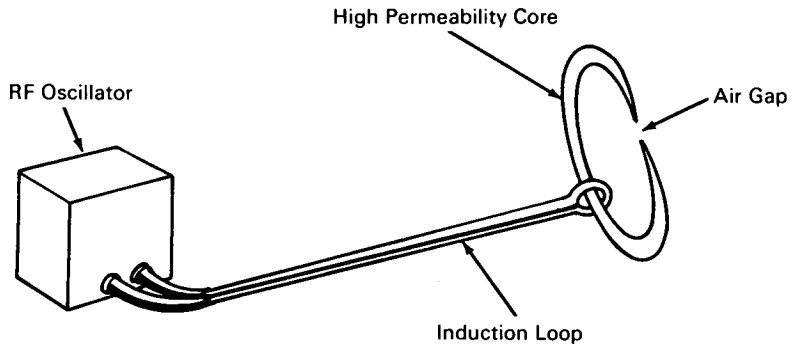
Brief 65-10134

NASA TECH BRIEF

High Permeability Semiconductors Permit Close-Tolerance Soldering



The problem: Welding or soldering small components has been accomplished by heating with a concentrated magnetic field using R-F induction coils. This method is limited by an inability to accurately concentrate the magnetic field energy within extremely small areas.

The solution: High permeability semiconductors (ferrites or yttrium garnets) are used to concentrate the magnetic field energy effectively in areas of several square milli-inches.

How it's done: Magnetic field energy from the oscillator is coupled to the induction loop which transfers it by induction into the ferrite or yttrium garnet core material. The magnetic field flows to the variable air gap where the metallic specimen to be heated, tempered, soldered, or melted is positioned. The magnetic field energy flows across the gap to heat the specimen. The magnetic field energy geometry and flux density are accurately controlled by machining the semiconductor air gap to the dimensions desired.

Notes:

1. Metallic films, one square milli-inch in area and spaced 0.050 inch apart, can be soldered effectively without affecting nearby parts.
2. This device should be of interest to manufacturers using microminiature components in thin-film fabrication.
3. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Goddard Space Flight Center
   Greenbelt, Maryland, 20771
   Reference: B65-10134

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.

Source: Hughes Aircraft Company
under contract to Goddard Space Flight Center
(GSFC-319)

Category No. 05