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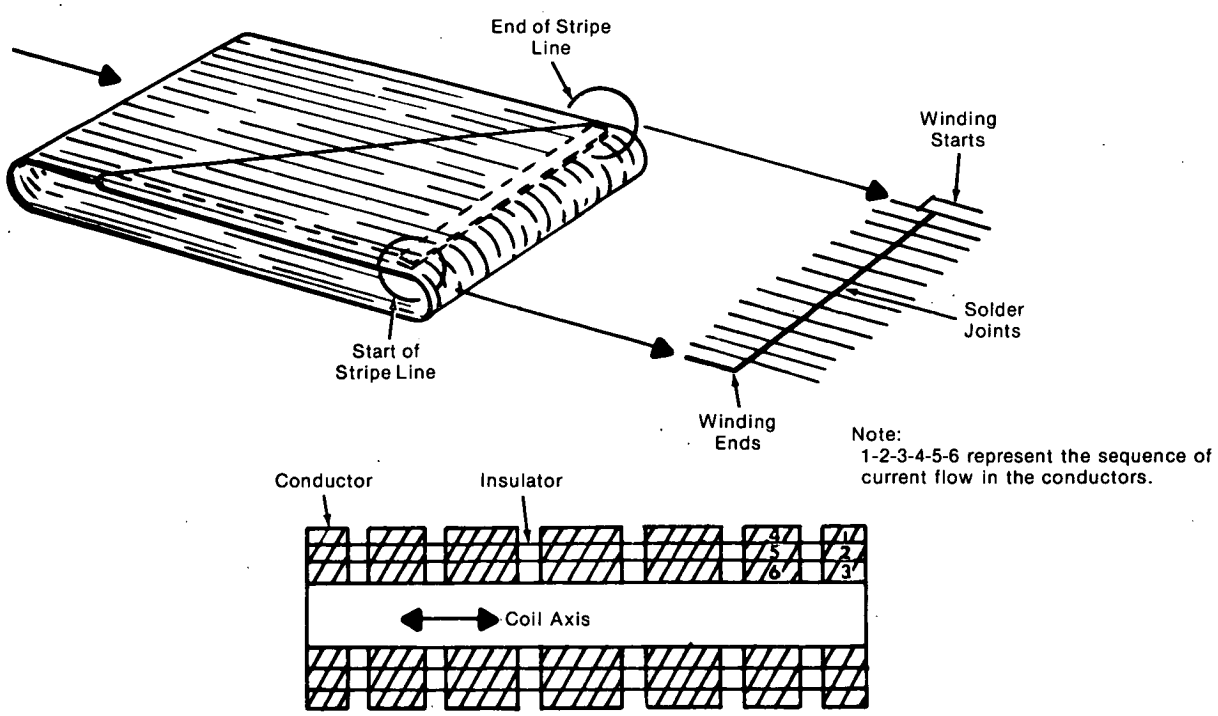
NASA TECH BRIEF

Langley Research Center

Stripe-Line Coil for Magnetic-Field Generation in Bubble Memory Devices

An improved coil for magnetic bubble memory devices consists of a stripe-line coil pattern with varying widths of conductor etched from a conductive film supported on a polyamide film. The multiple-layer stripe-line coil has conductors in series along the layer direction, rather than in the axial direction, which minimizes potential differences. The stripe-line layer is wrapped around a fixed coil form, and the outer ends of the conductors are electrically connected as a single loop to form a field coil (see illustration). Conductor length, width, and spacing are controlled by the etched pattern, resulting in coil parameters, such as size, shape, and the like, with less variation from run to run than in wire-wound coils. The stripe-line coil arrangement is also simpler, easier to wind, and has better field uniformity inside the coil and less coil loss at high-frequency operation.

The printed-circuit magnetic-field coil is produced on a flexible conductor substrate by etching the desired stripe-line pattern on a conductor foil supported on an insulating film. Preferably, this consists of cold-rolled copper on a polyamide film. Photolithographic techniques provide one method of forming the stripe-line pattern of the conductor layer. The copper surface is coated with a thin layer of light-sensitive photoresist, and the coated surface is exposed to light through a photomaster with the desired stripe-line design. The conductor material is then developed and etched to produce the pattern.



Stripe-Line Coil for Magnetic Bubble Memory Devices

(continued overleaf)

The multiple-layer stripe-line coil structure substantially reduces the high-frequency loss in two ways: Sufficient spacing between the layers or columns of conductors can be provided to reduce the interwire coupling, and secondly, with the winding in the coil connected in series, the current will flow through adjacent vertical arrays or columns of conductors. This winding arrangement minimizes the potential differences between neighboring turns, thereby minimizing high-frequency loss due to interwire coupling. The arrangement also helps to minimize the unequal current distribution at high frequencies which occurs in coils with parallel-wound layers. The effective turns in this winding scheme can be controlled by varying the conductor width. (By increasing the conductor width, the number of effective turns in the winding is decreased.)

Note:

Requests for further information may be directed to:

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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 the Rockwell International Corporation, Anaheim, California 92803.

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Categories: 01 (Electronics - Components and Circuitry)
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