NASA TECH BRIEF

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Braid Read-Only Memory

The Braid memory is a transformer-type of read-only memory (ROM) which has been developed expressly for a computer installed on board a spacecraft. It is a fault-tolerant array of independent ROM units, each of which provides storage of 16,384 32-bit words. Also, each unit performs fault detection and sets questionable output bits to zero, so that the logical OR formed by the output bus will form a correct word, provided all units do not suffer from the same fault and that no faults go undetected.

The storage medium in each unit is a Braid transformer memory, where the information pattern is "written" by weaving wires through an array of linear (nonswitching) transformers. The presence or absence of a bit is determined by whether a given wire threads or bypasses a given transformer. The principal advantage of the Braid memory is the ease and speed with which it can be manufactured. Since the magnetic material is linear, small gaps do not affect parameters to any great degree and two-piece cores may be used; manufacture thus does not involve the threading of cores. In fact, memory arrays have been manufactured on a modified Jacquard loom which handles 256 wires simultaneously and accomplishes a wire "pick" in approximately 10 seconds. A million-bit memory can be woven and fully terminated in 48 working hours.

The information field for the prototype ROM used as a subsystem for the JPL-STAR computer consists of an array of 128 sense-positions threaded by a word-line bundle of 4096 wires. An additional sense-field of 28 cores provides checking information and four special wires are added to provide testing functions. A complete ROM unit is comprised of the Braid memory, input and output registers (and interface circuits), fault-detecting and masking logic, a power supply, and (for ground use) a display panel. The organization of the ROM is described in detail in a series of reports.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
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Patent status:

NASA has decided not to apply for a patent.

Source: John F. McKenna of
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