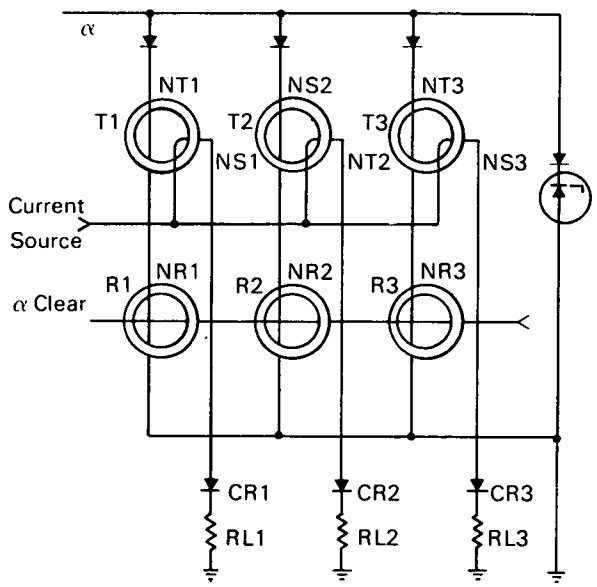
July 1970

Brief 70-10046

NASA TECH BRIEF

Constant-Voltage Drive Current-Steering Switch



Simplified Shift Register Schematic Diagram

The problem:

To design a ferrite-core coincident-current memory for use in a constant-current commutator.

The solution:

A magnetic switch consisting of dual ferrite-core shift registers is regulated by a two-element voltage control system. The heart of the system consists of a magnetic, two-core-per-bit, voltage-controlled shift register. It is characteristic of this type of shift register that if a single "one" is being shifted, all the transmit cores except that containing the "one" are switching. If a current pulse is applied to all transmit cores in parallel, the single core that is not switching will offer no impedance to the pulse and all the current will flow in that path.

How it's done:

The figure shows one phase of a three-stage shift register which demonstrates the principle involved. Assume that a "one" is stored in the T2, R2 set of cores. Under this condition T1 and T3 are set and T2 is reset. When an α cycle is initiated, an α-clear pulse is generated, followed by the α pulse. The α-clear sets cores R1, R2, and R3. When the α pulse occurs, T1 and T3 start switching and, since T2 is reset, R2 starts switching at a rate determined by the zener diode. If a current pulse is applied to the "Current Source," input, it will find that CR1 and CR3 have been back-biased by the switching of T1 and T3. Since T2 is not switching, CR2 has no back-bias. If the number of turns on NS1, NS2, and NS3 have been chosen correctly, all the current will flow through CR2 and RL2.

Notes:

1. This innovation may be useful in commercial telephone applications as core memories for stored-program electronic switching systems.
2. Requests for further information may be directed to:

   Technology Utilization Officer
   NASA Pasadena Office
   4800 Oak Grove Drive
   Pasadena, California 91103
   Reference: B70-10046

(continued overleaf)

Patent status:

This invention is owned by NASA, and a patent application has been filed. Royalty-free, nonexclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

Source: Russell K. Caplette of
Caltech/JPL
under contract to
NASA Pasadena Office
(NPO-10743)