NASA TECH BRIEF

Queuing Register Uses Fluid Logic Elements

FLUID LOGIC MODULE

FIVE-ELEMENT QUEUING REGISTER
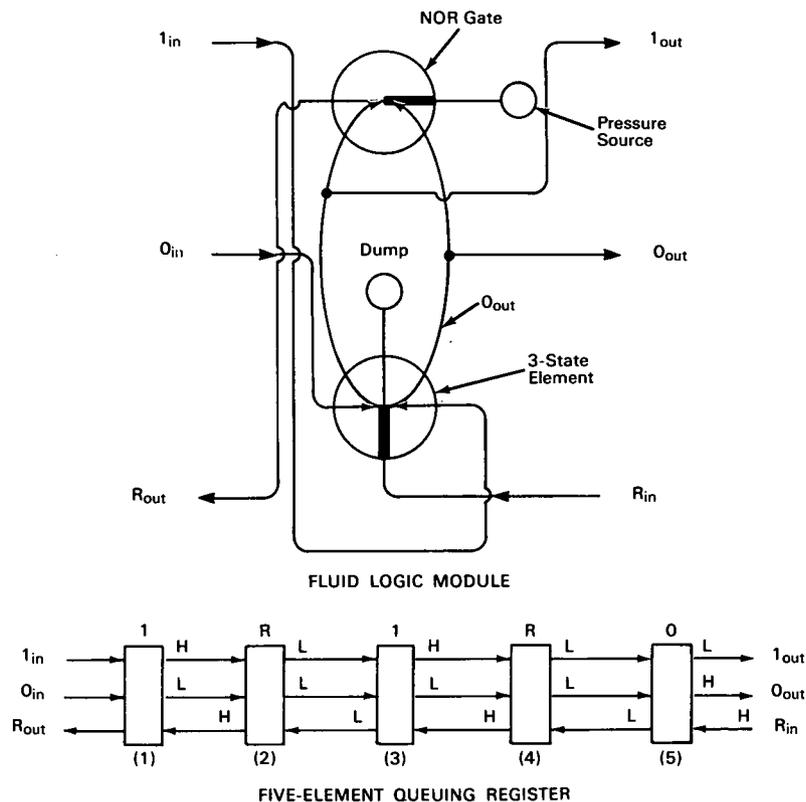
The problem:

To design a queuing register (a multistage bit-shifting device) using a series of pure fluid elements to perform the required logic operations.

The solution:

Connect several stages of three-state pure fluid elements in combination with two-input NOR gates.

How it's done:

Each fluid logic model of the queuing register consists of a three-state fluid element and a two-input NOR gate. Fluid supplied to the system is represented by R_{in}. Two of the (1,0) outputs, 1_{out} and 0_{out}, of the three-state element are branched to the inputs of the two-input NOR gate, which is connected to a pres-

(continued overleaf)

sure source. If either 1_{out} or 0_{out} goes high (fluid pressure available from control-signal inputs 1_{in} or 0_{in}), the NOR gate will switch off and output R_{out} will be low. When R_{in} goes high (fluid flowing in input channel) in the absence of the control-signal inputs, the output fluid is discharged into the dump connected to the three-state element, and the outputs 1_{out} and 0_{out} remain low. If either 1_{in} or 0_{in} goes high while R_{in} remains high, the corresponding outputs 1_{out} or 0_{out} will go high.

A five-element register with data 110 stored in elements (1), (3), and (5), respectively, is illustrated. As soon as the bit in element (5) has been passed on, its input (R_{in}) goes low and its output R_{out} goes high. As a consequence, element (4) exhibits high R_{in} and 1_{out} and low R_{out}, and element (3) exhibits low 1_{out} and 0_{out} outputs. This process continues until the input information is consumed. More elements become available for new information as the bits progressively shift to the right.

Note:

Inquiries concerning this invention may be directed to:

> Technology Utilization Officer
> Marshall Space Flight Center
> Huntsville, Alabama, 35812
> Reference: B66-10100

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C., 20546.

> Source: UNIVAC Division of Sperry Rand
> Corporation under contract to
> Marshall Space Flight Center
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