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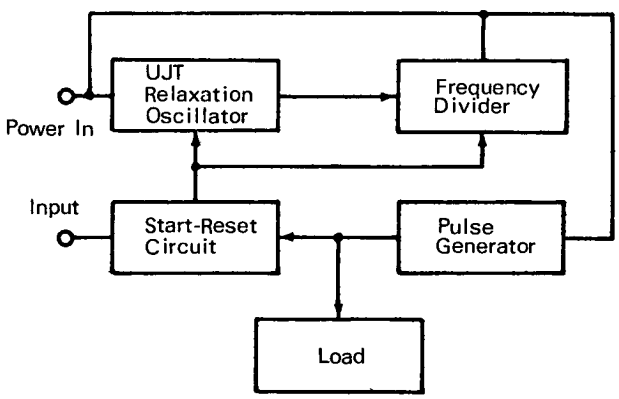
NASA TECH BRIEF

Marshall Space Flight Center

Externally Programmed Variable Timer

A unique timing device, developed to satisfy 1-sec, 5-sec, and 10-min timing requirements, incorporates external programming capability.



Programmable Timer Block Diagram

Operational efficiency of ± 5% over a temperature range of −65°C to +130°C was a design requirement. To reduce the effect of temperature on the programmable timer, the time constant of the unijunction transistor (UJT) oscillator (see fig.) was reduced and the oscillator frequency was divided by using bistable multivibrators (flip-flops). This limited the temperature sensitivity of the timer to that of the UJT oscillator.

The number of flip-flops used at any given time is programmed by interconnecting the desired number of available inputs and outputs. The universal timer can divide the output frequency of the UJT oscillator by 2, 4, 8, 16, 32, 64, or 128. Output of the final flip-flop is connected to a pulse generator circuit that produces a 28 V, 50 msec pulse. This output is routed back to a start-reset circuit that controls the UJT relaxation oscillator and the flip-flops.

Temperature and voltage range tests resulted in an accuracy of ± 3.9% with supply voltage variations of 24 to 31 Vdc over the temperature range of −55°C to +125°C. The programmable timer was within the ± 5% efficiency over the required temperature range with the same supply voltage regulation.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Code A&TS-TU
Marshall Space Flight Center
Huntsville, Alabama 35812
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Patent status:

No patent action is contemplated by NASA.

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