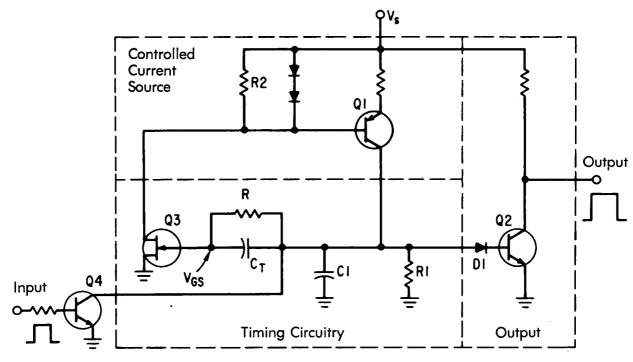
# NASA TECH BRIEF

## Ames Research Center



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## **High Noise Immunity One Shot**



### The problem:

In their usual configurations, multivibrators which deliver pulses of duration longer than a second contain R-C timing components which allow power supply fluctuations to pass through and act as triggers. For certain applications, it is desirable to have a multivibrator that produces output pulses of long duration but is not triggered by transients in the supply lines.

#### The solution:

A one-shot multivibrator circuit which includes a constant current source to isolate line noise from the

timing circuitry, and a field-effect transistor to control the circuit's operational modes.

#### How it's done:

The constant current source, transistor Q1 in the schematic diagram, supplies current to transistor Q2 and resistor R1. The voltage across R1 is fixed by diode D1 and the  $V_{\rm BE}$  drop of Q2. Transistor Q3 is a low pinch-off FET, and is normally conducting ( $V_{\rm GS} = +0.4$  volt) to keep the current source on. When a positive trigger pulse arrives at the input of Q4,  $V_{\rm GS}$  is driven negative approximately to -1.0 volt and the FET is nonconducting. Q1 is thus turned

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off, and this turns off Q2. Resistor R1 holds the timing line at low potential while Q1 is nonconducting. When  $V_{\rm GS}$  of the FET reaches about -0.3 volt due to the discharge of  $C_{\rm T}$ , Q3 conducts and turns on the current source. The circuit is now back in its steady-state condition, ready for another trigger pulse.

Capacitor C1 is needed to prevent misfiring from high-frequency noise spikes on the supply line. A value of 0.01  $\mu$ f is sufficient for most purposes;  $R_T$  should be much larger than R1 for proper operation. A minimum value for  $R_T$  is around 10K. Because of this limitation, the one shot is not capable of short-duration pulses (less than 50  $\mu$ sec).

#### Reference:

Schaffer, G. L.: High Noise Immunity One Shot. EEE Magazine, vol. 17, page 126, March 1969.

#### Notes:

- 1. The circuit has a high immunity to supply line noise; for example, with a supply voltage of 15 volts, supply voltage spikes of ±12 volts will not cause missire.
- 2. For the circuit shown, the supply voltage may vary from 4 to 40 volts. This wide variation in

- supply voltage causes only a 10% change in the timing period.
- 3. If  $R_T = 10M$ , and  $C_T = 330 \mu f$ , a timing period of about 1 hour is obtained.
- 4. Requests for further information may be directed to:

Technology Utilization Officer Ames Research Center Moffett Field, California 94035 Reference: B72-10047

#### Patent status:

This invention has been patented by NASA (U.S. Patent No. 3,584,311) and royalty-free license rights will be granted for its commercial development. Inquiries about obtaining a license should be addressed to:

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