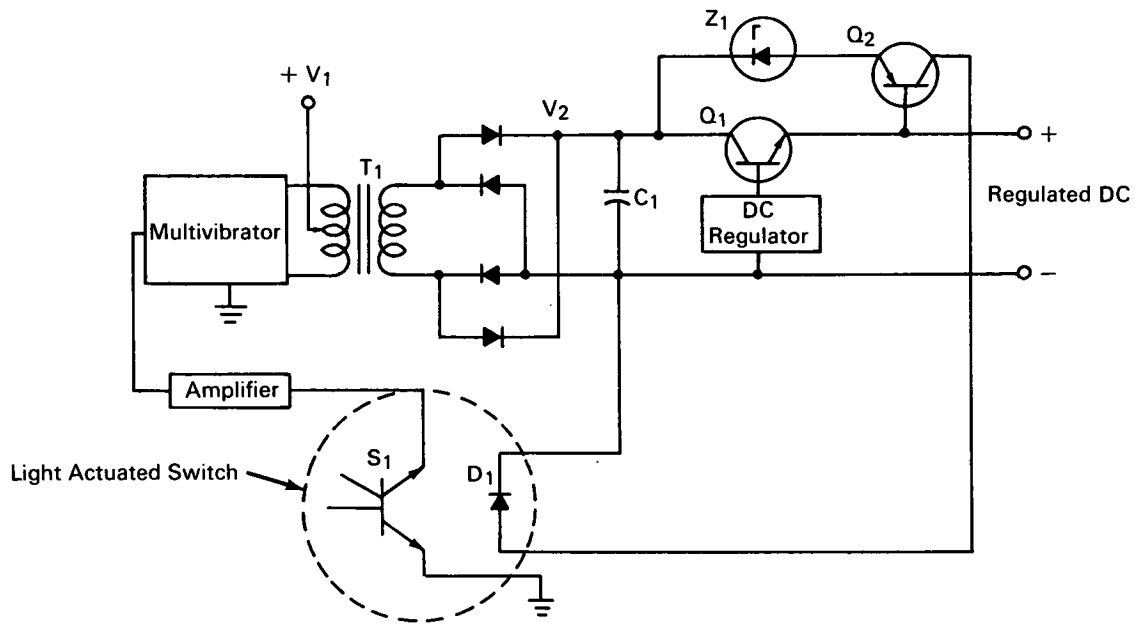
NASA TECH BRIEF

Preregulator Feedback Circuit Utilizes Light Actuated Switch



The problem:

To provide a simple and efficient feedback device in a power supply preregulator which maintains dc isolation between input and output grounds. Because the series regulator transistor in a conventional series regulated supply has a tendency to overheat during a high input voltage condition, it is desirable to provide a means of protection. A zener shunt regulator has been utilized to reduce the transistor load, but is very inefficient. While preregulation can be made efficient, conventional feedback techniques will not provide the required dc isolation.

The solution:

A preregulator feedback circuit employing a Light Actuated Switch (LAS). The LAS consists of a diode PN junction infrared source close to, but electrically isolated from, a photodetector with characteristics of a symmetrical bilateral switch. Its function is to maintain dc isolation between the input and output while transferring a signal used to control applied power.

How it's done:

The circuit shows the application of a LAS as a feedback device. During high voltage operation of the power supply, overvoltage sensor Q_2, sensing the voltage across series regulator Q_1, provides a control signal to the LAS. As the current increases through the input diode D_1 of the LAS, switch S_1 will turn on and control the biasing of the multivibrator to inhibit its operation. Thus, with no voltage induced

(continued overleaf)

in the secondary of T_1, the charge on C_1 will decrease, lowering the voltage across Q_1 to the normal regulation level. As this level is attained, the LAS switches off permitting the multivibrator to resume operation. The circuit will continue to cycle through off periods to prevent excessive series regulator voltage as long as a high input voltage condition exists.

Note:

Inquiries concerning this innovation may be directed to:

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Reference: B66-10542

Patent status:

No patent action is contemplated by NASA.

Source: T. P. Hayser
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