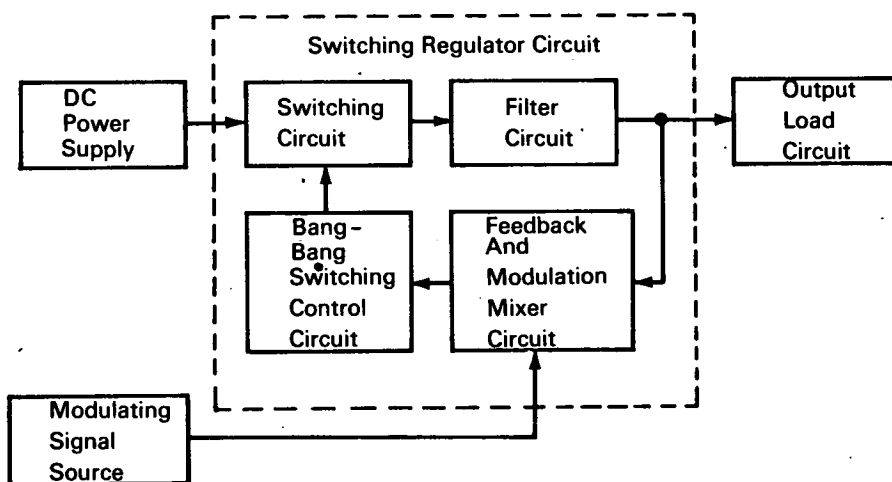


NASA TECH BRIEF



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Voltage Regulator/Amplifier Is Self-Regulated



The problem:

In modulated regulator systems, the output B+ voltage must be very closely regulated if input power requirements are to be held to a reasonable level. Loss type dc regulators, for example, while operable in such systems, are quite inefficient, dissipate appreciable power through heat loss, and require a considerable power supply system.

The solution:

A signal modulated, self-regulating voltage regulator/amplifier using self-oscillation with feedback to a control circuit with a discontinuous amplitude action feedback loop. Maximum frequency response is assured plus a substantially continuous regulating action by mixing of the output and input signals in a combining network within the feedback loop.

How it's done:

The switching regulator circuit is powered by a dc supply and modulated by an external rf signal input. The dc supply is connected directly to a switching

circuit that is controlled by a "bang-bang" type switching control circuit in the filtered feedback loop that incorporates a feedback and modulation mixer circuit. This latter circuit combines the outputs of the regulator/amplifier circuit and the switching control circuit. A filter circuit converts the output signal to a dc regulating voltage as it is routed through the feedback loop. Operating impedance of the feedback circuit to the dc regulating voltage levels is much higher than output load circuit impedance. This provides the required regulator amplifying action and, in conjunction with high modulating signal input impedance that is matched to the feedback signal impedance, a very large signal amplification. The regulator/amplifier is thus self-regulating with the output both controlled by the input and regulated to it.

Notes:

1. This circuitry provides a relatively large signal power gain; for example, 10 milliwatts of audio can effectively control a 50-watt dc output.

(continued overleaf)

2. Various alternate circuit configurations are possible for obtaining a variety of outputs, all of which will exhibit similar close control and high gain.
3. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
Houston, Texas 77058
Reference: B67-10156

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: Willis E. Day and Donald E. Phillips
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