NASA TECH BRIEF

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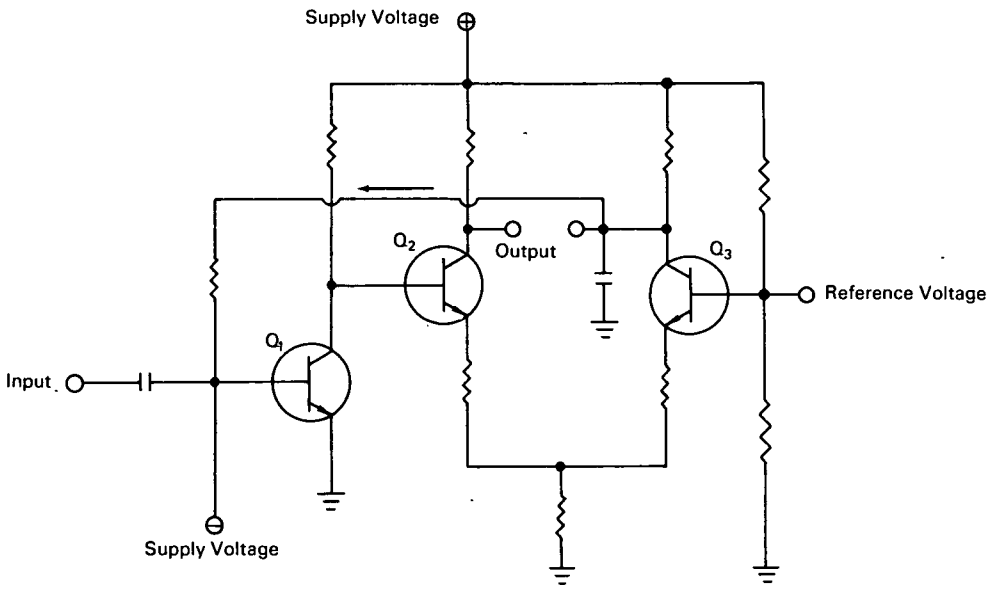
High-Gain Amplifier Has Excellent Stability and Low Power Consumption



The problem: High-gain transistorized amplifiers have been relatively unstable. Most circuits designed for both high gain and stability draw excessive power. For many equipment applications, a need exists for an amplifier combining high gain with stability and low power consumption.

The solution: A transistorized amplifier in which gain is controlled by an external reference voltage. Closed-loop gain is about 15,000, and power consumption is very low.

How it's done: Gain of the amplifier (Q_1) is stabilized by using a difference amplifier circuit (Q_2 and Q_3) to sense and correct changes in its operating point. The ac gain of Q_1 is controlled by its dc operating point. This dc operating point is controlled by the difference amplifier Q_2 and Q_3 through the feedback loop from the collector of Q_3 to the base of Q_1. Varying the reference voltage to the base of Q_3, therefore, varies the ac gain of the amplifier Q_1.

Notes:

1. Stability of this circuit depends on the use of quality components including transistors with Beta greater than 100.
2. This circuit should be of interest to manufacturers of electronic servo equipment and portable audio devices.
3. The amplifier can be used as a variable gain modulator if a varying signal is applied to the base of Q_3.

(continued overleaf)

4. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland, 20771
Reference: B65-10138

Patent Status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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