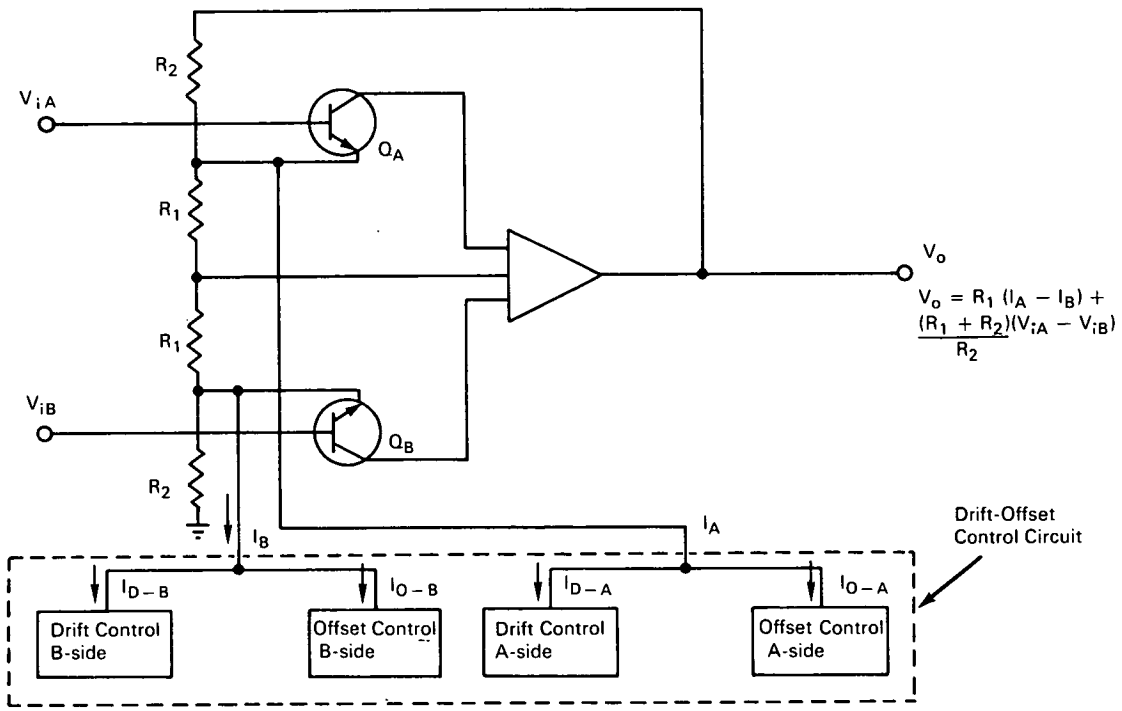
NASA TECH BRIEF

Improved Compensation Circuit for Direct-Coupled Amplifiers



I_{O-A} and I_{O-B}: Temperature—Independent Currents

I_{D-A} and I_{D-B}: Linearly Temperature—Dependent Currents

An improved drift- and offset-control circuit (indicated in the blocked portion of the diagram) has been designed to compensate the inherent temperature drift and offset of a closed-loop feedback amplifier. The improved control circuit overcomes the disadvantages (chopping spikes, undesirable dynamic characteristics, and bulk due to large capacitors) of conventional chopping circuits used to minimize drift in low-level, direct-coupled amplifiers. This circuit has kept equivalent input drifts down to 0.05 microvolt per degree centigrade over a −40° to +100°C temperature range. The power turn-on time and overload settling time are orders of magnitude faster than for chopping-type amplifiers, thus allowing the amplifier to be power gated. The circuit inherently allows monolithic integration of the entire amplifier in a 3/8-inch-square flat package.

In the diagram, Q_A and Q_B are the input transistors of the amplifier. Resistors R_1 and R_2 form the overall emitter feedback network. Currents are drawn from the R_1–R_2 nodes by the drift-offset control circuit to compensate the inherent linear temperature

(continued overleaf)

drift of the amplifier. Post-fabrication adjustment of the resistors (cermet thin film) are made as required to compensate a particular amplifier.

Patent status:

Title to this invention has been waived under the provisions of the National Aeronautics and Space Act [42 U.S.C. 2457 (f)], to the TRW Space Technology Laboratories, One Space Park, Redondo Beach, California 90278.

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