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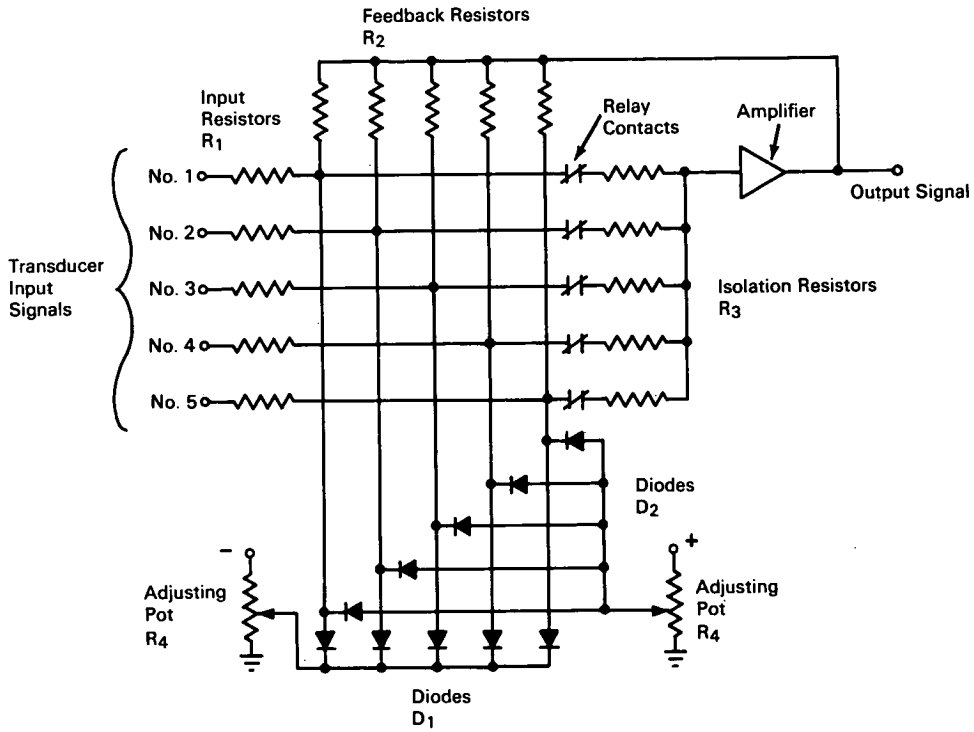
Brief 66-10282

NASA TECH BRIEF

Simple Circuit Provides Reliable Multiple Signal Average and Reject Capability



The problem:

The control of a system required that one function be monitored in a redundant manner by a number of transducers. It was necessary that these multiple signals be "averageable" to take individual deviations into account without shutting down the entire system because of such deviations.

The solution:

A summation average and reject circuit based on diode clamping.

How it's done:

The circuit uses an amplifier having separate transducer input resistors R_1, feedback resistors R_2, and isolation resistors R_3 for each signal to be averaged.

(continued overleaf)

Automatic reject action is provided by the positive or negative diodes (D_1 and D_2) at the R_1 and R_2 resistor junctions which clamp or short out the junction when a signal varies a sufficient amount from the average selected. The diodes D_1 and D_2 may be grounded or biased by the adjusting pots R_4 depending on how much deviation from the average is permissible before rejection is desired. Relay contacts are provided at the isolation resistors to allow the operator, from observation of instrumentation, to manually remove a failed signal from the averaging circuit.

Values of input and feedback resistance may be selected to provide gain or attenuation. The value of isolation resistance R_3 will affect the amount of signal deviation from the average before signal rejection occurs. The higher the isolation resistance value the less it will load the junction and the diode bias will significantly affect the range over which averaging occurs.

Notes:

1. A bias source with very low impedance must be used to prevent bias shift when the diodes conduct. The input and the feedback resistors must be high precision (preferably 0.1%) to ensure accurate averaging.
2. Inquiries concerning this innovation may be directed to:

   Technology Utilization Officer
   AEC-NASA Space Nuclear Propulsion Office
   U.S. Atomic Energy Commission
   Washington, D.C. 20545
   Reference: B66-10282

Patent status:

No patent action is contemplated by NASA.

Source: R. L. Openshaw
of Aerojet-General Corporation
under contract to
Space Nuclear Propulsion Office
(NU-0069)