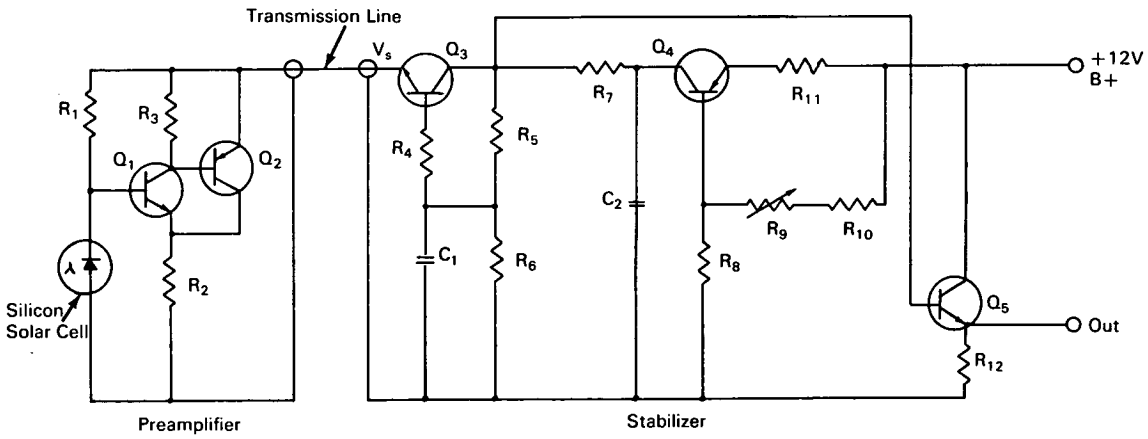
NASA TECH BRIEF

Remote Preamplifier Circuit Maintains Stability Over Wide Temperature Range



The problem:

To design a circuit that will remain stable over a relatively wide temperature range (0°C to 100°C) while preamplifying light signals falling on a photocell and transmitting them through a transmission line to a remote amplifier.

The solution:

A circuit in which the preamplifier consists of a grounded emitter NPN stage followed by a PNP emitter follower which drives the signal into the transmission line. The preamplifier gets its dc power source over the same transmission line which carries the photocell signals.

How it's done:

The circuit is stabilized by dc power from a high impedance source. This same power source acts as an amplifier to ac and has an ac impact impedance equal to the characteristic impedance of the transmission line. If the amplifier were powered from the usual constant voltage supply, it would soon bias itself off because of its high sensitivity to temperature fluctuations. The stabilizer circuit provides equal currents to both preamplifier transistors over a wide temperature range. These currents are initially balanced by adjustment of R_9. When properly adjusted, the preamplifier will remain balanced over a temperature range from 0°C to 100°C. The preamplifier has voltage gain of 12 db, and the stabilizer 32 db. The low frequency response is limited only by the size of C_1 and C_2. The high frequency limit is fixed by the quality of the transistors used and the amount of gain required.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Western Operations Office
150 Pico Boulevard
Santa Monica, California 90406
Reference: B66-10432

(continued overleaf)

Patent status:

No patent action is contemplated by NASA.

Source: R. G. MacNaughton
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under contract to
Western Operations Office
(WOO-278)