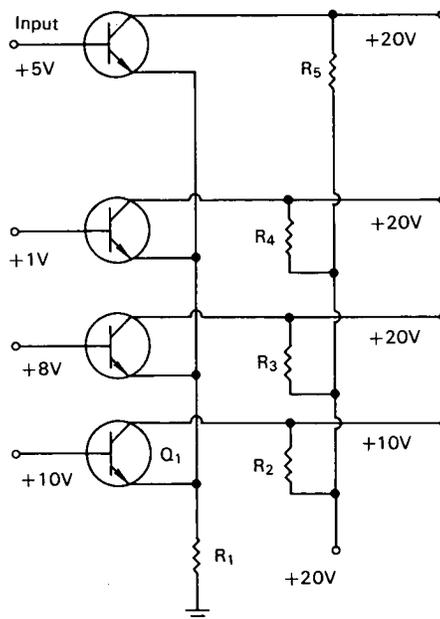


NASA TECH BRIEF



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Transistor Voltage Comparator Performs Own Sensing



The problem: Detection of the highest voltage input among a group of varying voltage inputs. The sensing circuit must function without the aid of external circuits.

The solution: A transistorized circuit that can be directly coupled to a binary encoder for readout.

How it's done: The voltage comparison circuit uses one transistor for each input line being monitored. The base-emitter junctions of the transistors are connected as in a standard diode comparator circuit. The collector circuits of the transistors perform the sensing function.

The emitters of all the transistors are tied to one common resistor R_1 . Each transistor has a load resistor in its collector circuit. With the maximum

input voltage on the base of Q_1 , the base-emitter junction of Q_1 will be the only one forward biased. Transistor Q_1 will be conducting and the voltage at the emitters of all transistors will be equal to the voltage on the base of Q_1 minus the voltage drop across the base-emitter junction of Q_1 . Voltages on the emitters of all transistors except Q_1 will be more positive than the voltages on their respective bases and they will be cut off. The output voltages of these transistors will be very high compared to that of Q_1 .

Notes:

1. Although NPN transistors are shown, PNP may be used with reversed polarities.
2. This circuit could be used to advantage wherever diode comparator gates are presently in use.

(continued overleaf)

3. Input voltage levels will be governed by the transistors used.
4. The individual values of R_2 , R_3 , R_4 , and R_5 are much greater than R_1 .
5. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Goddard Space Flight Center
Greenbelt, Maryland, 20771
Reference: B65-10028

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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(GSFC-228)