

Digital-to-analog converter is built from low-cost parts

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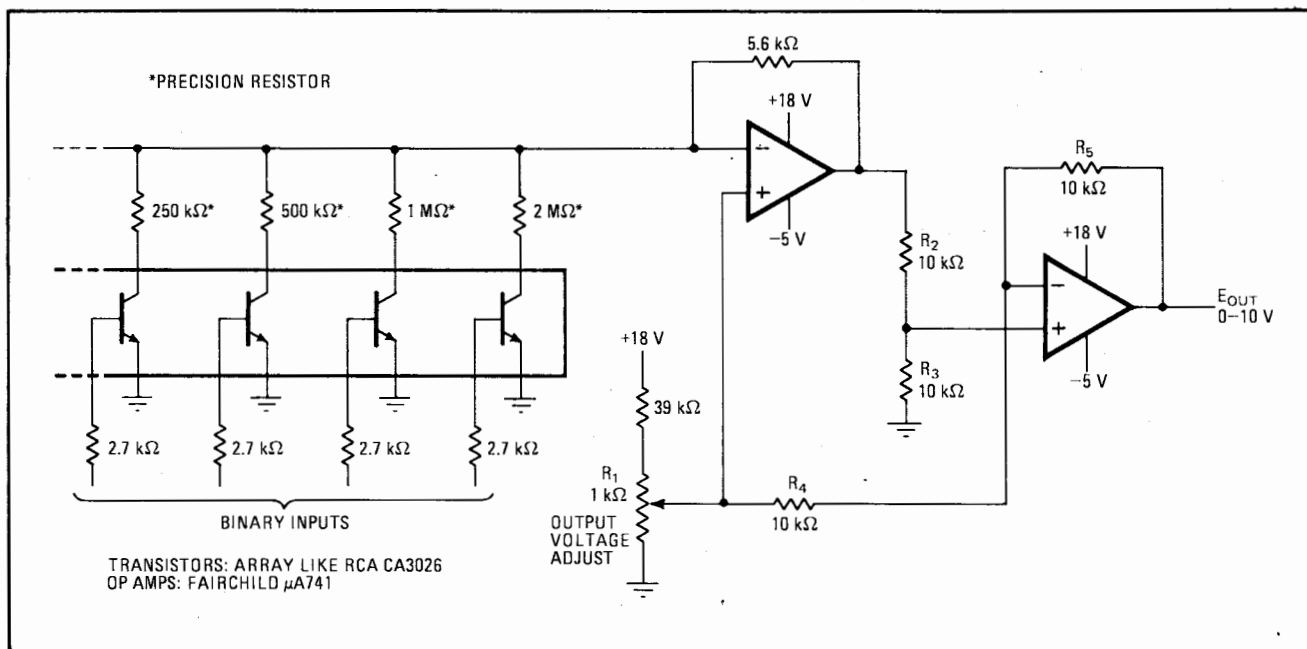
An economical but reliable digital-to-analog converter can be made from readily available IC transistor arrays and general-purpose op amps. The converter is intended to interface with decimal or hexadecimal up/down counters, as well as directly addressed memories. It provides a positive-going output voltage that ranges from 0 to 10 volts and that can be used to control

audio attenuators or light-dimmer units.

Each input transistor clamps its precision resistor to ground when a binary bit is applied to that input line. Input words can be up to 8 or 12 bits in length. Potentiometer R_1 allows the maximum output voltage to be varied about the nominal 10-v level. Additionally, as long as resistors R_2 through R_5 have at least a 1% tolerance, the output dc offset voltage will be only on the order of millivolts.

The converter works best within the frequency range of 3 hertz to 1 kilohertz, but can operate at clock rates as high as 100 kHz. However, output glitches become evident at the faster clock rate. □

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Ready-made DAC. This digital-to-analog converter can almost be put together from a spare-parts box, since it is made up of components that are usually right on hand. Input words can be 8 or 12 bits long, and the positive-going analog output varies from 0 to 10 volts. If 1% resistors are used in the output stage, the output offset voltage is within millivolts of zero without any prior adjustment.