

## Simple digital to analogue converter

Transistors  $Tr_1$  to  $Tr_4$  are either saturated or cut off by the outputs of the 7490 b.c.d. counter. By simply adding portions of the emitter voltages in the ratios 1:2:4:8 for the DCBA outputs the analogue output can be obtained. Summing is performed by the 741 op-amp.

A converter with a 1 in 100 output definition may be made by using a second

similar circuit with its clock input connected to the D output of the first circuit. The new summing resistors which are also connected to the inverting input of the 741 are then 10k, 20k, 40k and 80k $\Omega$  for the D', C', B' and A' outputs.

Such a circuit has been used for a simple two-digit d.v.m. with the transistors suitably matched for  $V_{CEsat}$  and using 1% summing resistors.

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