# WORKOUT

In the last instalment of Workshop we set some simple exercises to test your knowledge of the topics we have covered. Here we present the answers. Our answers may not match yours exactly, as there are numerous ways of designing a circuit to perform a particular task. However, you will be able to prove that your circuits work by testing them against the truth tables given in the problem.

1) Resistors

The values of the resistors illustrated are: a) 6,400K-ohm and b) 150K-ohm. A 150-ohm resistor has brown-green-brown colour bands (reading towards a gold or silver band).

2) NOR Gate

The most obvious method for building a NOR gate is to combine the two circuits for OR and NOT together as shown below:
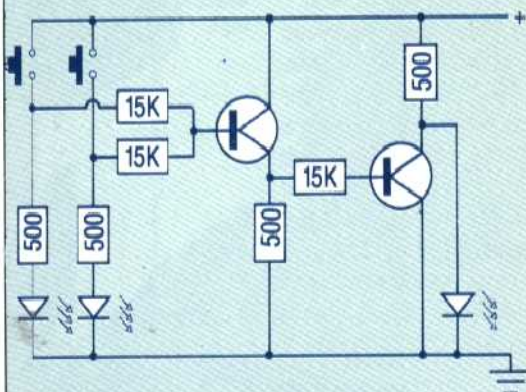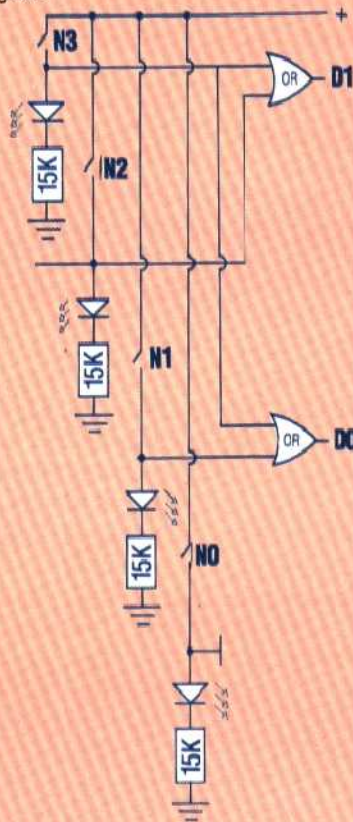

However, the short-cut method is to use the circuit for an OR gate and take the output signal from the collector of the transistor rather than its emitter, in a similar way to the NOT gate circuit:
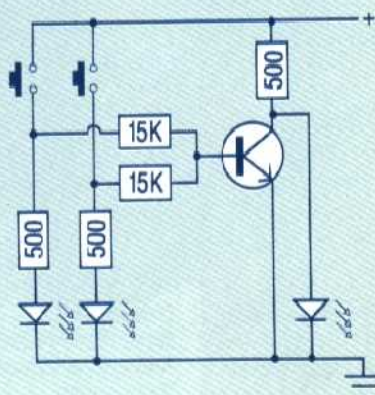
3) Decimal To Binary Converter

This requires only one integrated circuit — a TTL chip with four OR gates.

4) BCD Validator

Valid BCD codes are in the range 0000 to 1001 and invalid codes are from 1010 to 1111. We derived the necessary circuit as follows: