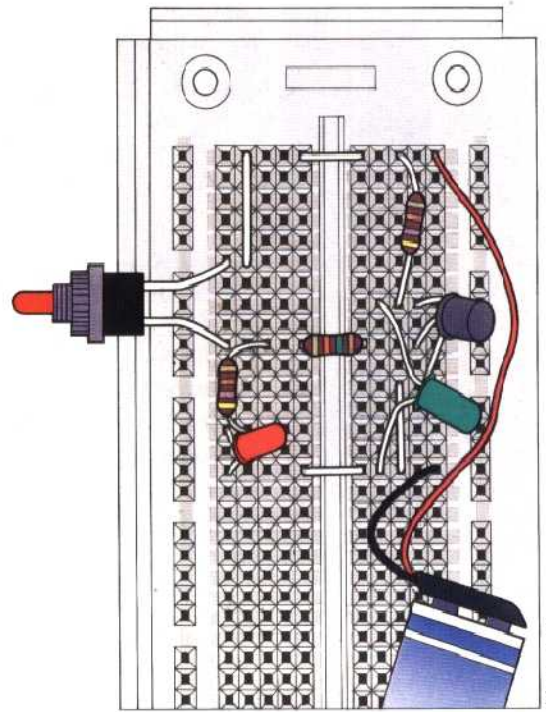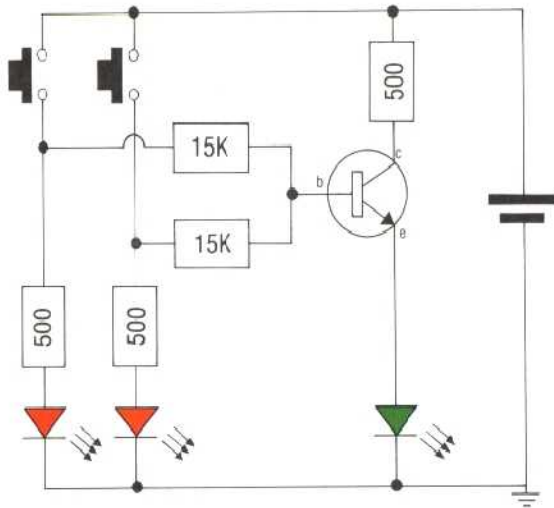## The NOT Gate

This is the simplest of logic gates, with only a single input (indicated by the red LED and switch) and a single output (the green LED). With the switch open, no current can flow through the base to the emitter of the transistor. This makes a high resistance at the collector and as a result the current flow takes the alternative route through the green LED. Therefore, when the button is not pushed (that is, an input of 0), the green LED lights up (an output of 1). Pushing the button feeds a current into the base of the transistor, removing the resistance from the collector. The current now flows through the transistor, avoiding the LED. So when the button is pushed (an input of 1), the LED doesn't light (an output of 0).
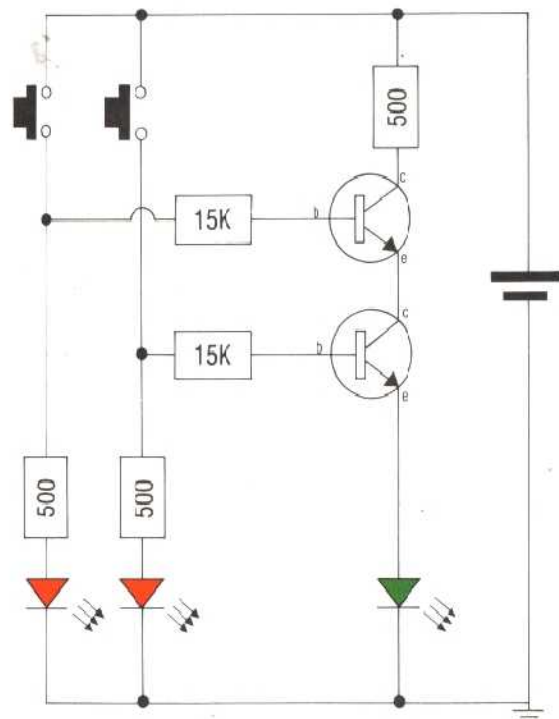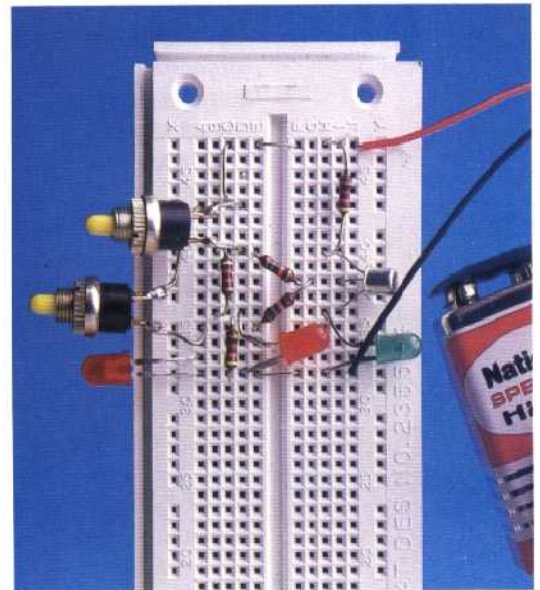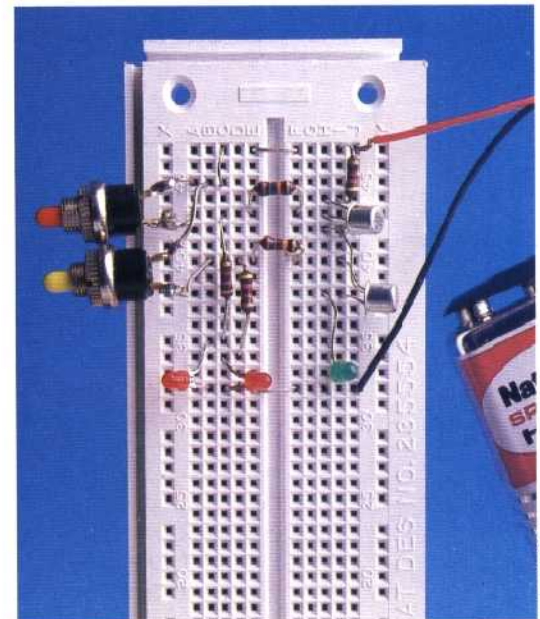

The OR Gate

The circuit used for the NOT gate can be simply adapted to become an OR gate. The first change is to place the output LED so that it will be driven by a current *through* the transistor. There are two inputs to an OR gate, each with a switch and LED. When either switch feeds a signal into the base, it switches the transistor to allow current through to the LED.

The AND Gate

To create an AND gate, we need two transistors on the route to the output, each with its own input. Only when both switches are held down (that is, both inputs are 1) will both transistors be open, allowing the current to flow through to the LED.

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