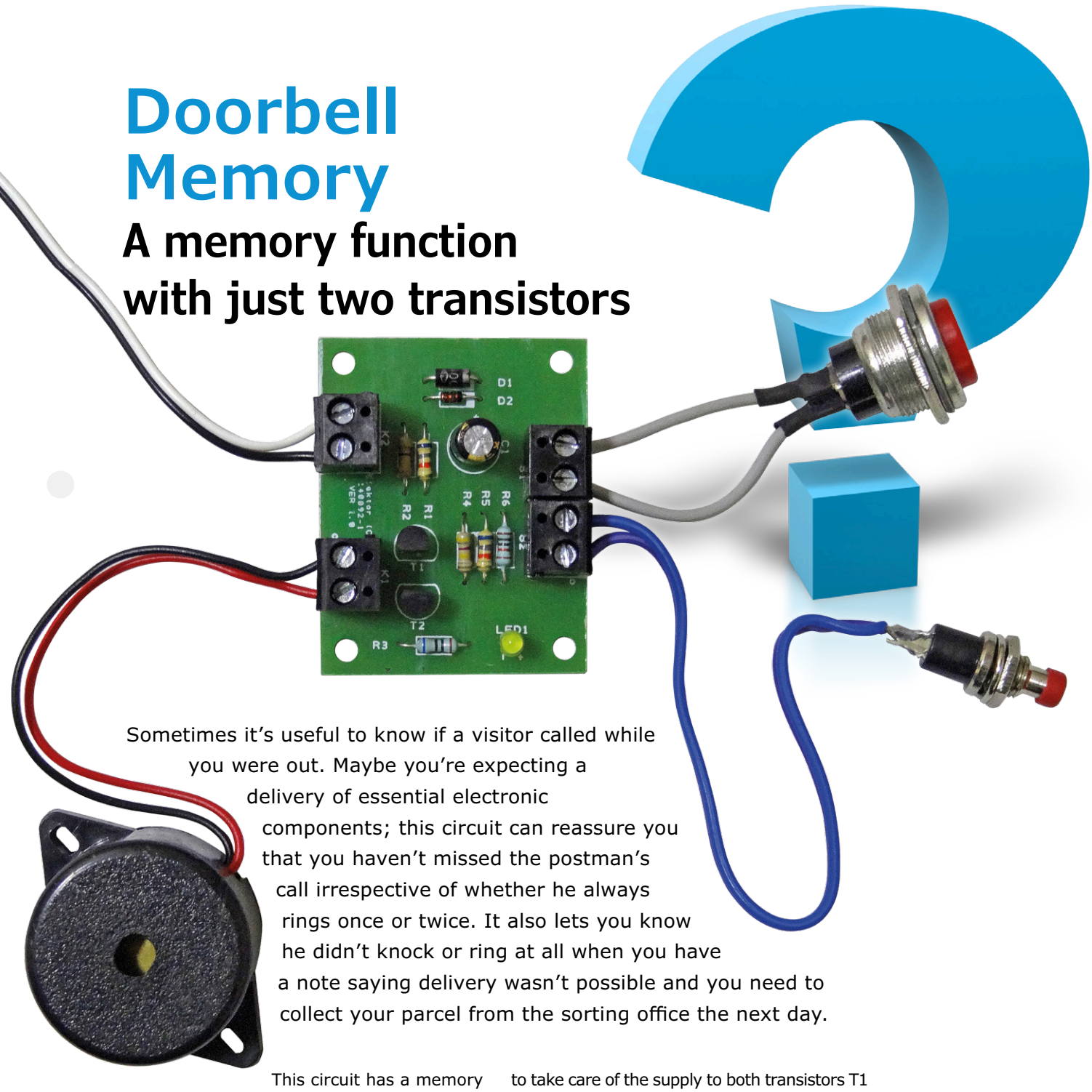
Doorbell Memory

A memory function with just two transistors



Sometimes it's useful to know if a visitor called while you were out. Maybe you're expecting a delivery of essential electronic components; this circuit can reassure you that you haven't missed the postman's call irrespective of whether he always rings once or twice. It also lets you know he didn't knock or ring at all when you have a note saying delivery wasn't possible and you need to collect your parcel from the sorting office the next day.

This circuit has a memory function but there isn't a single microcontroller or line of code anywhere in sight. The circuit (**Figure 1**) uses just a handful of components that you've probably already got kicking around in the bottom of your box of spare components. The low voltage side of a 12 V door bell transformer is connected at K2, the door bell or piezo buzzer is connected at K1 and S1 is the normally-open push button you press to operate the door bell.

The AC voltage produced by the transformer secondary winding is rectified by D1 and smoothed by C1. That really is all you need to take care of the supply to both transistors T1 and T2! When the (normally closed) Reset button S2 is pressed the base of T1 is pulled low by R2. The base current stops and T1 switches off. The voltage level at the collector of T1 rises to the supply and the current flowing through R3 and R4 is sufficient to make T2 switch on. The small amount of current flowing through the base of T2 is too low to cause the LED to light up. With T2 conducting its collector will be low which will now reinforce the low on the base of T1 when S2 is released.

The circuit will now be stable in this state until the door bell pushbutton S1 is pressed. This

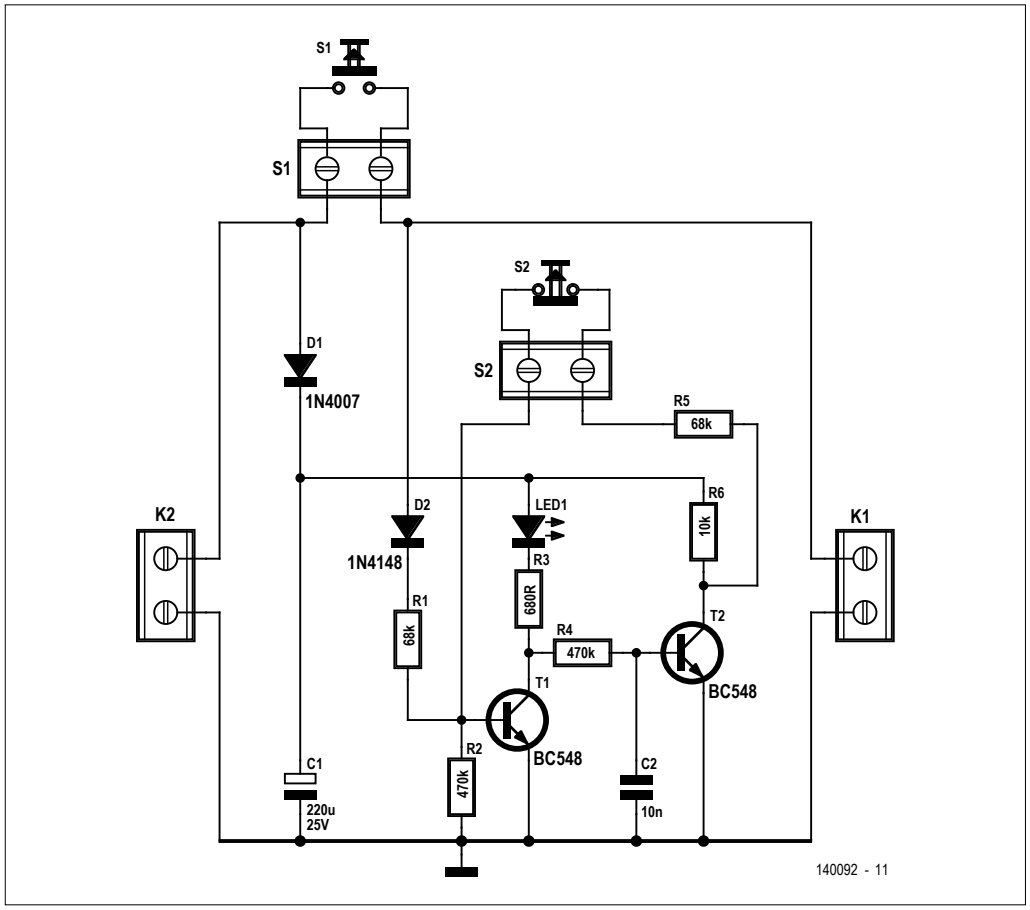


Figure 1.
A memory function using just two transistors.

will produce positive pulses at the base of T1 via D2 and resistor R1 and R2. T1 switches ON and its collector is pulled low. Now sufficient current flows through R3 and T1 so that the LED lights. At the same time the base of T2 is pulled low by the collector of T1. T2 is off and its collector will be high which reinforces the ON state of T1 via R5 and S2 when S1 is released. The circuit is again stable in this state until S2 is pressed.

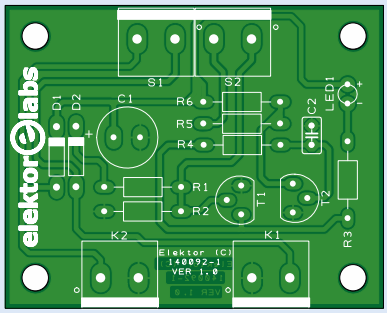
Component List

Resistors
0.25W, 5%
R1,R5 = 68kΩ
R2 = 470kΩ
R3 = 680Ω
R4 = 470kΩ
R6 = 10kΩ

Capacitors
C1 = 220µF 25V, 3.5mm pitch
C2 = 10nF

Semiconductors
D1 = 1N4007
D2 = 1N4148
LED1 = LED 3mm, yellow
T1,T2 = BC548

Miscellaneous
K1,K2 = PCB screw terminal, 5mm pitch



S1 = doorbell pushbutton
S2 = pushbutton, normally closed
Buzzer, e.g. Kingstate KPEG420 (Farnell 2215071) as alternative doorbell
PCB no. 140092-1

Figure 2.
This neat PCB for the doorbell memory is available from the Elektor Store.

Construction

The complete circuit only consists of a few components which can be mounted on the circuit board shown in **Figure 2** to make a really neat finished project. After a close check of all your solder joints you can connect the finished PCB to the 12 V bell transformer (K2), the bell push (S1) and the door bell (K1). The LED should be off but if it isn't just press S2 to reset the circuit. When a visitor presses the doorbell, the LED lights and the door bell sounds. On release the bell stops ringing but the LED remains lit. A press of S2 now resets the LED indicator and the circuit is ready to log the next visitor. They say a picture is worth a thousand words so why not check out the video we've prepared for this project!

(140092)

Video:

https://youtu.be/ky2OwvIfgGc.

PCB:

www.elektor.com/doorbell-memory-140092-1