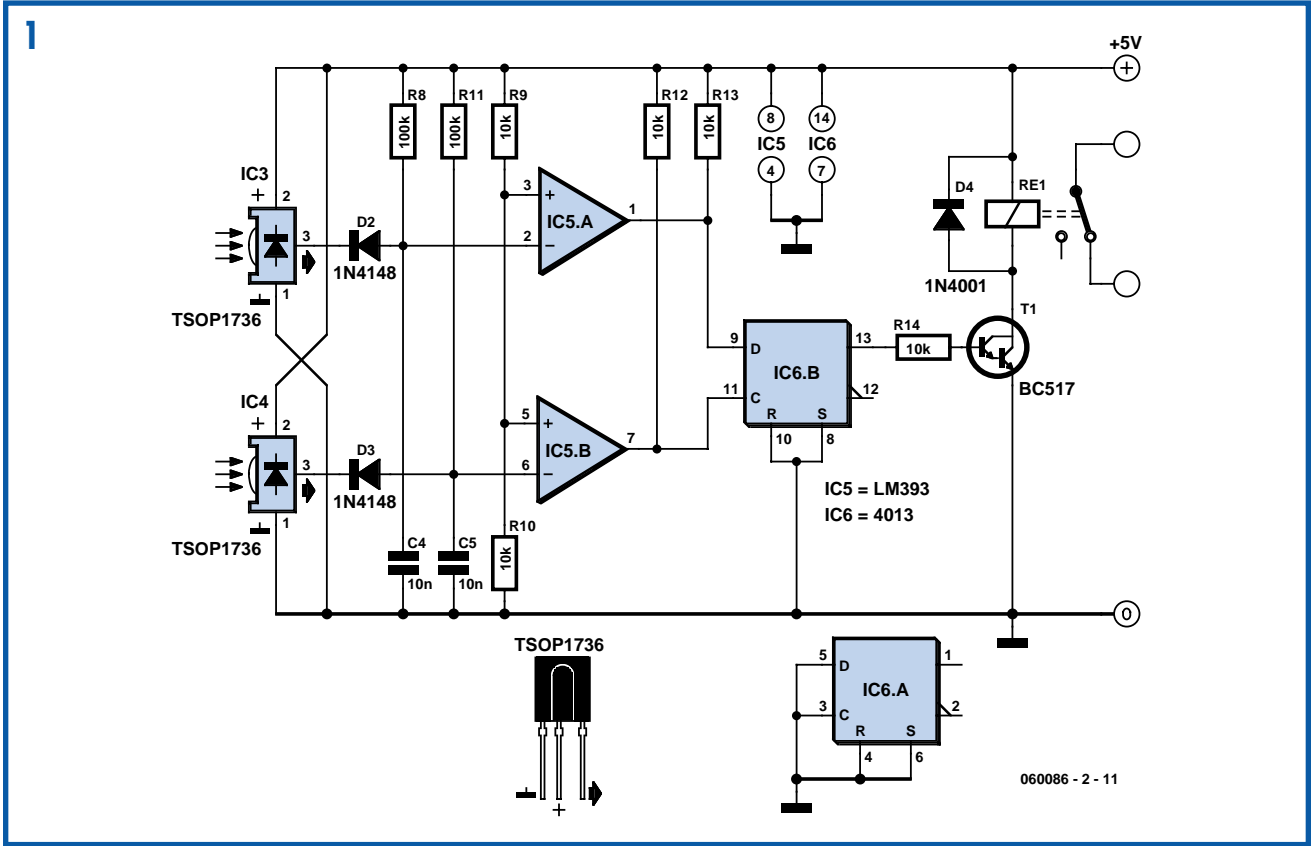


Direction Sensitive Light Barrier

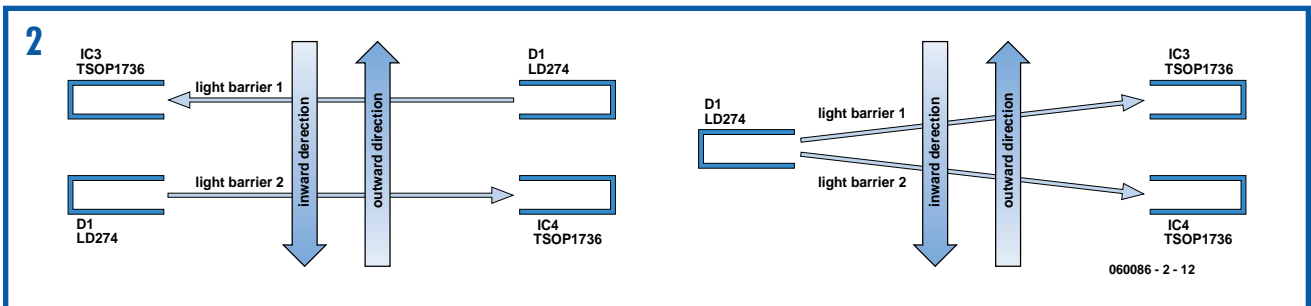


Heino Peters

With two light barriers closely positioned one after the other it is possible to establish in which direction they have been crossed. If, for example, you place it at the entrance of the toilet then you can use it to control the lights: on when entering

and off when leaving the room. The circuit for this has many similarities with the modulated light barrier appearing elsewhere in this Summer Circuits issue. There are two ways to position the light barriers, namely a completely duplicated installation in opposing directions (this to prevent mutual interference) and a ver-

sion with one IR transmitter and two receivers. Both types of installation are shown here, which one is most suitable depends on the actual application. When used in a doorway, one transmitter is sufficient if the receivers are placed about 5 cm apart. With a wider passage, an installation with two separate



IR-transmitters is a better solution. This circuit has a range of several meters, even if the sun shines directly on the receiver!

We use the exact same IR-transmitter(s) as for the modulated light barrier. For the installation with two separate IR-transmitters it is sufficient to duplicate R6, T1, D1, C3 and R7 from the circuit of the modulated light barrier. Output OUT (pin 3) of IC2 can drive two of these IR-drivers without any difficulty. The receivers are

slightly different than those of the modulated light barrier and the circuit is the same for both types of installation.

We again use the TSOP1736, which is sensitive to IR-light that is modulated at a frequency of 36 kHz. D2, R8 and C4 ensure that the received pulses from IC3 at the output of IC5a result in a '1' when the beam is not interrupted. When the beam is interrupted this output will become a '0' within about 1 ms. In the same way IC5b generates a '0' when

IC4 stops receiving IR-light. The 4013 CMOS-IC used here contains two D-flipflops, of which we use only one. The instant that light barrier 2 (IC4) is unblocked again, is used to clock the state of light barrier 1 (IC3) through to output Q1. This signal drives the relay via T2, which operates the light in the room. The circuit therefore turns the light on or off the moment that light barrier 1 is uninterrupted.