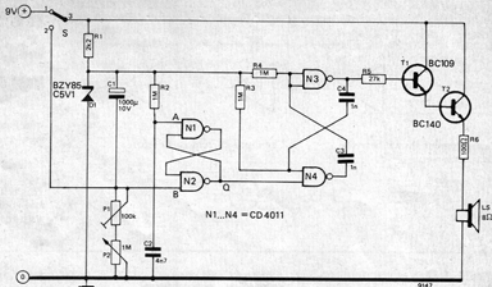


2

J. Wittje

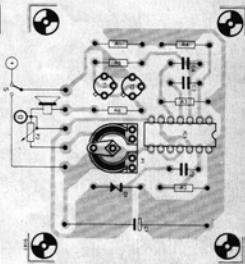
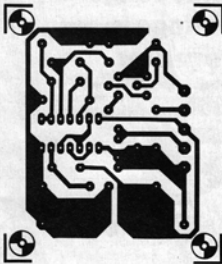
kitchen  
timer

Battery or mains-synchronous kitchen clocks usually have dials large enough to enable short time intervals of a few minutes and fractions thereof to be clearly read (except when they happen to be steamed up), but few have any 'alarm' system to give an audible warning when a preset time interval has elapsed. The timers built into electric (or nowadays gas) cookers supposedly have this facility, but they are not much use for short-interval timing because the scales are either non-existent or very small, the setting dial is mechanically difficult to handle, the termination point of the timing interval is ill-defined, and at least one well-known make is calibrated in quarters of five minutes - i.e. in 1½-minute intervals. These may be good enough for baking a cake but they are of little help to the blancher of twenty successive batches of runner beans, each to be immersed in boiling water for 2 minutes 45 seconds. For this reason it was suggested that an electronic timer should be developed, possibly using valves. However, the technical staff felt that the best way to use these would be to drill holes in them and fill them with sand.

The time switch described here can be constructed at very small cost, and is adjustable between 1 minute and 17 minutes. Other times are possible with small modifications.

Before switching on, capacitor C1 and C2 are uncharged. When the device is turned on with switch S (position 1), input A of flipflop N1/N2 remains briefly at '0', so that output Q of N2 becomes '0' and multivibrator N3/N4 is blocked.

Capacitor C1 charges through poten-



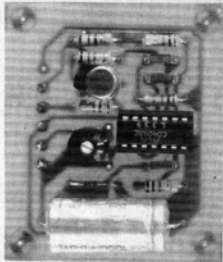
tiometers P1 and P2. When the potential at B drops below the flipflop changeover threshold, the flipflop switches over and the multivibrator is started. The resulting square wave is amplified by T1 and T2 and reproduced through loudspeaker L.

On switching off (S to position 2), capacitor C1 is discharged rapidly through resistor R1 so that, when the timer is once again switched on, there is no residual voltage which would shorten the timing interval.

## Calibration:

1. Set P1 to the middle of its travel and P2 to minimum. Then readjust P1 to give a time of 1 minute.
2. Next set P2 to maximum and measure the time now given by the circuit.
3. Finally calibrate the scale of P2 linearly between 1 minute

(minimum) and the maximum time which has been determined.



3

It is the simplicity of this exclusive OR-gate that makes its application instead of TTL-circuits so attractive. Its functions as follows. When both inputs are

unequal, the output signal is always HIGH. Equal input signals give a low output level because in that case both transistors are either 'on' or 'off', so that the output signal is governed by input A.

EXOR

