Project 254

Novel Egg Timer 'bleats' when your egg is ready

Jonathan Scott is generally otherwise occupied while his breakfast eggs are on the boil — or so he tells us. "Having to get up in the morning is tedious enough without having to keep your eyes peeled for when the egg timer runs out", he says. An interesting argument, and an interesting solution . . .

OKAY, so you've *got* an egg timer. Odds on it's nothing like this one!

Conventional egg timers – the coloured-granules-in-a-three-minute-hour-glass variety – do their job efficiently, but silently. You have to watch them to see when your egg is ready. Either you stand and stare at it for the duration or you need sharp wits to instinctively 'know' when the time's up. Lack of audible indication on conventional egg timers is a consequence of inadequate design. Lack of sharp wits in the morning is a consequence of soft living.

This project tackles the first problem, the second is up to you!

Features

Conventional egg timers (even electronic ones we've seen) lack the option of 'hard' or 'soft' timing. Even if the electronic ones have an audible indication, they have the disadvantage of including an on/off switch.

This egg timer project includes the hard/soft option, does not include an on/off switch and 'bleats' when your egg is ready. We could have had it go 'cluck, cluck' or even 'cock-a-doodle-doo', but considered this a little *too* corny, and besides, it complicated the project unnecessarily!

Operation is very simple. First, you pick it up and shake it – the device lets you know with a soft bleep when it's been shaken enough. You then put it down on one end. Which end depends on whether you want a long time period (for a hard egg) or a shorter period (for – you guessed it – a runny one). After the appropriate period has elapsed the timer will issue a one second-long bleat and turn itself off until shaken awake again.

Has it got a microprocessor inside?

The egg timer is 'set' by giving it a few good shakes and setting it down on one end. The ends are labelled 'hard' and 'soft' – according to how you like your egg, you set it down on either one end or the other. An on/off switch is unnecessary.

No, it's all done with one CMOS IC, a couple of transistors and a dollar's worth of mercury switch.

Construction

The project is best constructed on the printed circuit board designed for it. Be sure to get the IC, transistor and diodes correctly oriented when inserting the components in the board. Take care also with the electrolytic capacitors

Carefully follow the overlay diagram and you should experience little difficulty.

The choice of a housing for the project depends a little on your kitchen decor – select a container that's large enough to enclose the pc board and battery though. We've used a plastic jar and a salt shaker as examples.

However, that plastic ornamental

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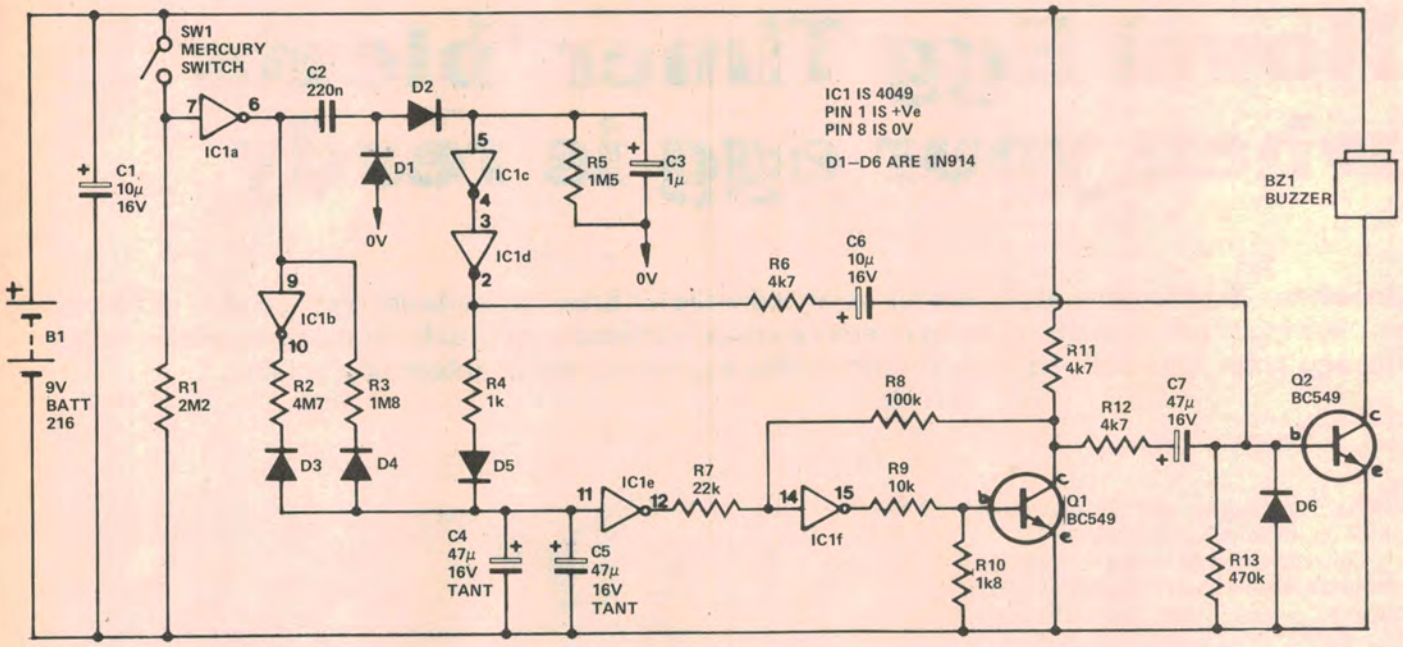
Project 254



One CMOS IC, two transistors and a handful of components make up this timer. No on/off switch is necessary.

emu's egg that Aunt Aggie gave you for Easter may do just as well – assuming it will stand securely on either end (. . . maybe that's not such a good idea after all).

The buzzer may be mounted either onto the outside of the container or on the inside. The latter will result in a loss of volume though. A few holes in the case will allow the buzzer to be heard better if you wish to mount it inside.

The whole assembly should be packed in the container chosen using sponge rubber scraps – it has to stand a lot of shake, rattle and roll.

When you do this, make sure that the metal case of the battery does not come in contact with the copper side of the pc board.

Adjustments

If you like your eggs super hard – or perhaps extremely runny, or even somewhere between these extremes, the time periods may be changed by altering the value of R2 or R3 – one will alter the softness of the 'hard' egg, the other the density of the 'soft' egg. See 'How it Works' for an eggsplanation of the circuit operation (these puns will have to stop . . . Ed.). ●

ETI 254 – HOW IT WORKS

The timing period is initiated by shaking the egg timer. Initially, C3, C4 and C5 are discharged and both transistors are biased off. IC1a is a buffer whose output is high when SW1 is open and low when it is closed. Shaking the timer will therefore cause an alternating voltage to appear on the output of IC1a. C2, C3, D1 and D2 form a rectifying network which charges C3 using this output of IC1a. Once C3 has charged past the threshold voltage of IC1c (indicating that the timer has been shaken), two things will happen: Firstly, C6/R6 will pass current to turn-on Q2 and thus the buzzer, to indicate that it has been shaken enough. Secondly, C4 and C5 start charging via D5 and R4. When C4 and C5 have charged to the threshold voltage of the Schmidt trigger formed by IC1f and Q1, Q1 will turn on and terminate the bleep.

Meanwhile, C3 will have discharged through R5 (assuming you're not still shaking the thing) and IC1c and IC1d will have reverted to their original state.

C4 and C5 will then discharge via either R2/D3 or R3/D4, depending on whether SW1 is closed or open. This is the really clever part. SW1 is now only used to start the timing period but, depending on which end of the device is uppermost during that timing period SW1 will either be open or closed and either R2 or R3 will determine the length of the period.

When C4/C5 have discharged sufficiently, Q1 will switch off, charging C6 via the base of Q2, causing the final one-second beep.

Not bad for one CMOS IC, eh?

PARTS LIST – ETI 254

Resistors all ¼W 5%

R1	2M2
R2	4M7
R3	1M8
R4	1k
R5	1M5
R6	4k7
R7	22k
R8	100k
R9	10k
R10	1k8
R11, R12	4k7
R13	470k

Capacitors

C1	10µ 16V electro
C2	220n greencap
C3	1µ 16V electro
C4	47µ 16V tant
C5	47µ 16V tant
C6	10µ 16V electro
C7	47µ 16V electro

Semiconductors

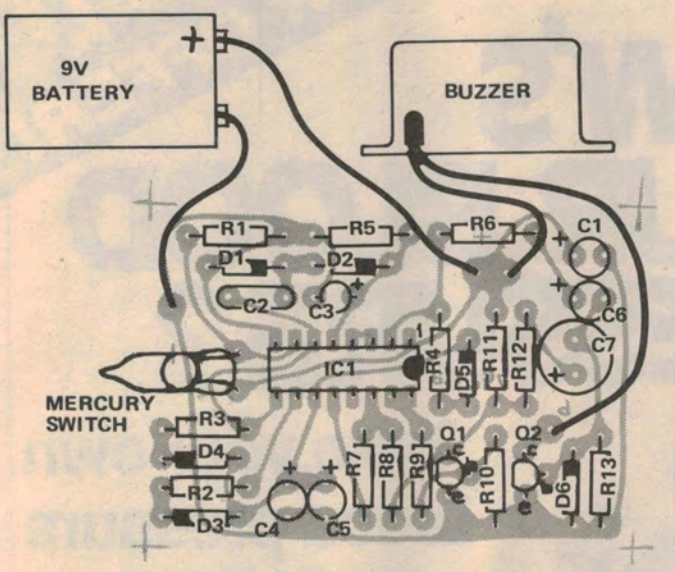
D1-D6	IN914 or sim
Q1, Q2	BC549, DS549, BC109, etc.
IC1	4049

Miscellaneous

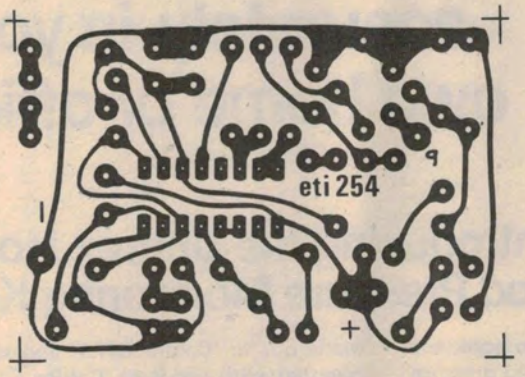
B1	9 volt, No. 216 battery
BZ1	piezo electric buzzer (such as DS, No: 6-7009)
SW1	Mercury switch

Suitable container, battery clip, packing material, ETI 254 pcb.

Egg Timer



Printed circuit board overlay. (overLAY?). Take care with the orientation of the diodes and electrolytic capacitors.



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ETI 254 EGG TIMER

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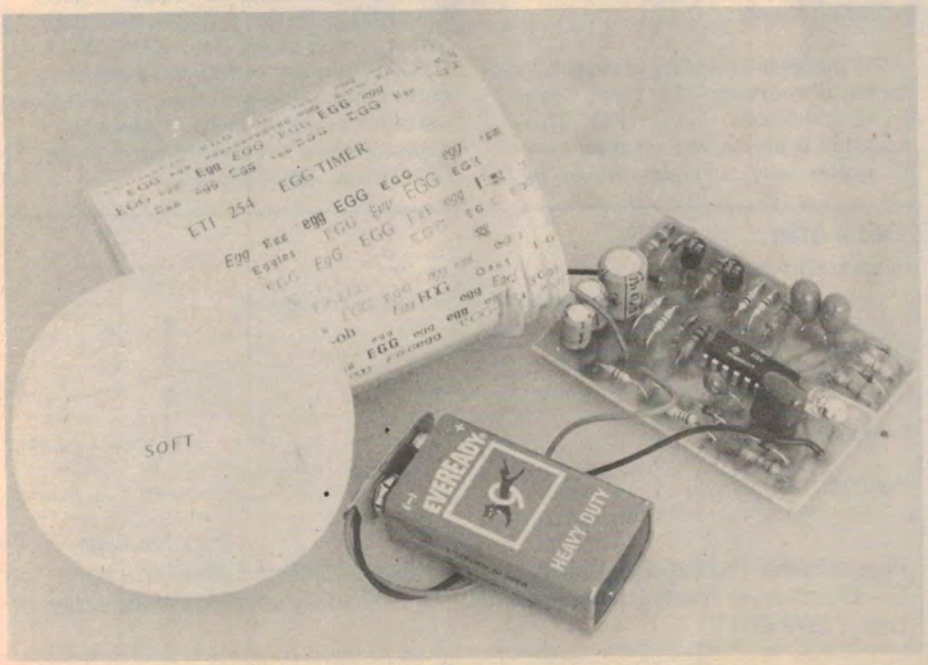
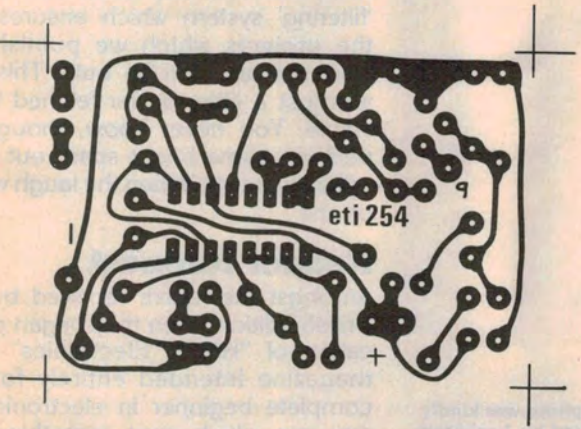
This is the front panel of the egg timer. As there are no controls, the front panel design is rather a matter of taste. But then, eggs are rather a matter of taste, also.



The pcb and the battery should be protected against the shaking which this project is bound to receive. We suggest stuffing the case well with something soft.



Using ETI PCB Artwork

This method can be used to make negatives of ETI artwork from October 1977 on, provided the reverse of the page is printed in blue. The film used is Scotchcal 8007 which is UV sensitive and can be used under normal subdued light.

Cut a piece of film a little larger than the PC board and expose it to UV light through the magazine page. The non emulsion side should be in contact with the page. This surface can be detected by picking the film up by one corner - it will curl towards the emulsion side. Exposures of about 20 minutes are normally necessary.

The film can now be developed by placing it emulsion side up on a table, pouring some Scotchcal 8500 developer on the surface and rubbing it with a clean tissue.

Further information on Scotchcal and PCB manufacture can be found in the September and December 1977 issues of ETI. Please note also, that occasionally pressure on space may unfortunately prohibit the printing of blue type behind all PCB's, in which case the reader must resort to more conventional photographic techniques for PCB manufacture.