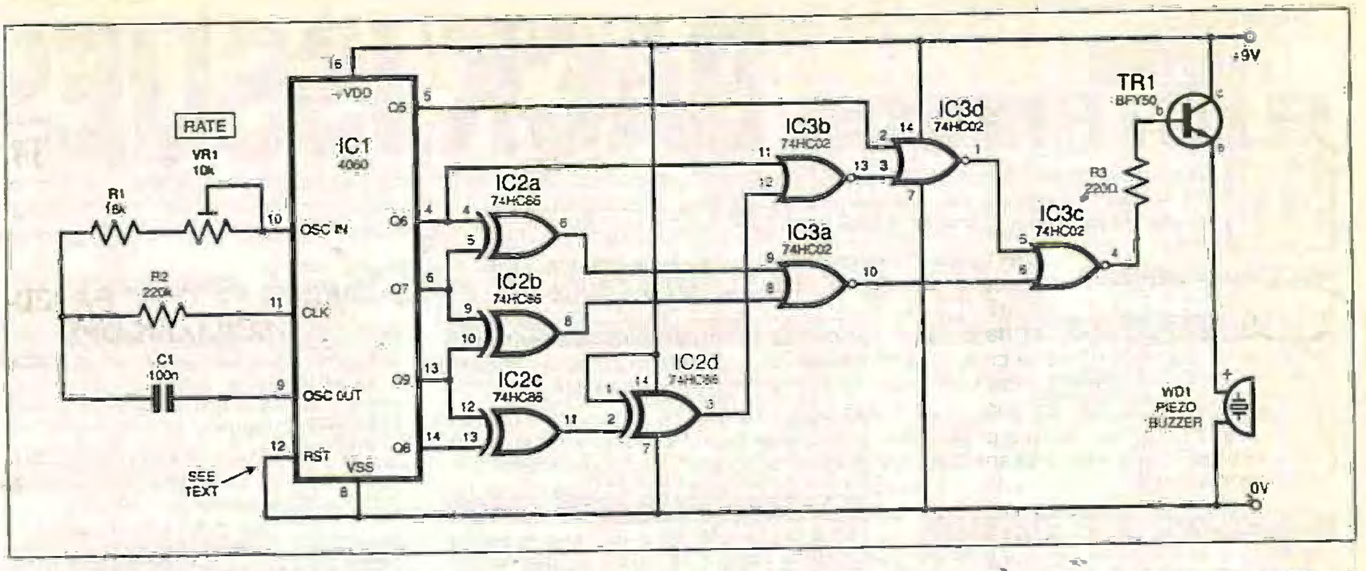


Mayday Module – Distress Call

A MAYDAY circuit for sending out an S.O.S in Morse code is shown in Fig.2a. The self-running binary counter IC1 generates a low-frequency divide-by-32 across the five selected outputs Q5 to Q8. Encoding logic then passes a series of pulses from Q5 through to the transistor TR1, suppressing or merging them to form the well-known "S.O.S" sequence in Morse. This is sounded on the piezo buzzer WD1. Fig.2b illustrates the counter states used to generate the code.

The encoder divides the 32-count field into four. The first and last quarters are distinguished by Q8 and Q9 being equal, a condition decoded at IC2d pin 3 of the exclusive-OR. This signal is the "letter-select flag" – when high, a sequence of Q5 pulses representing letter "S" is sent, and when low the letter "O" is formed by merging pulses from Q5 and Q6.

A NOR gate IC3a detects the condition (Q6=Q7=Q9) at pin 10. This occurs at the beginning and end of the first and last quarters, where it helps generate the required inter-word and inter-character spacing, and ensuring that "S" consists of three pulses and not four.

Although the timing for the characters and inter-character spacing is correct, the spacing between Mayday signals is only five units in this design instead of the standard seven. Adding the three-diode circuit of Fig.2c. extends the count by three if desired, taking advantage of the fact that states 0, 1 and 2 (=32, 33 and 34) do not produce an output. This emphasises the word-gap.

A start/stop module is shown in Fig.2d. After 16 cries for help, Q14 (pin 3) of the counter will re-set the flip-flop and disable the counter. This circuit *cannot* be used with the "word-gap extender" circuit Fig.2c.

Lastly, on the subject of Morse SOS signals, did anyone notice the "peeps" from *HMS Titanic*'s radio room in the latest movie? And this in 1912! At least the 1958 film was realistic with crashing radio sparks.

Trevor Skeggs, Milton Keynes.

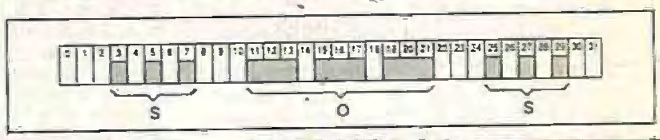
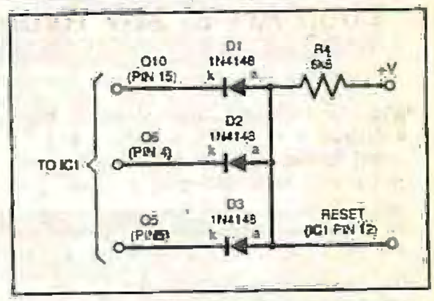


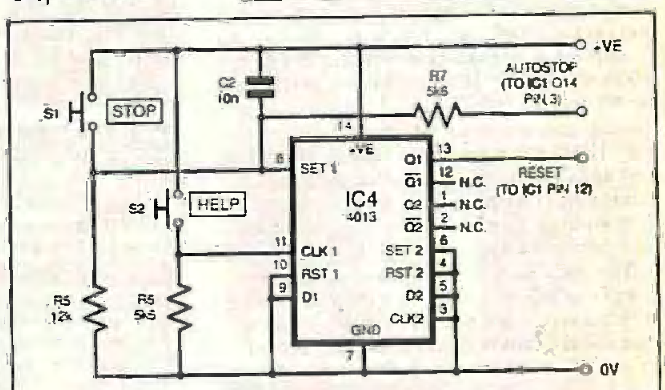
Fig.2a (top) Mayday circuit.

Fig.2b (above) Morse SOS sequence.

Fig.2c (right) Word-gap extender.

Fig.2d (below) Stop control.





NiCad Discharge Unit – In The Dark

IF NiCad cells are used in series, the problem of reverse charging of the weaker cell can arise if the unit is allowed to totally discharge. However, if the cells are not allowed to run down sufficiently, "memory" may set in, reducing the cell's useful working life. This is a particular problem in my pastime of caving, where a flat battery is a nuisance, and two flat batteries can be very dangerous.

Circuit diagram Fig.3 is designed to discharge a 5-cell "Fx5" battery unit which outputs 5×1·2=6V. It should work on four cells, but the relay will not hold for 3·6V (3 cells).

The push-to-make switch S1 allows the Darlington pair, made up of transistors TR1 and TR2, to latch the relay RLA. Current passes through the "load" resistors R4 and R5, which were set to pass about 1A. As each cell delivers 1·2V, the potentiometer was set to turn off the Darlington pair at 5·0V by using a variable supply.

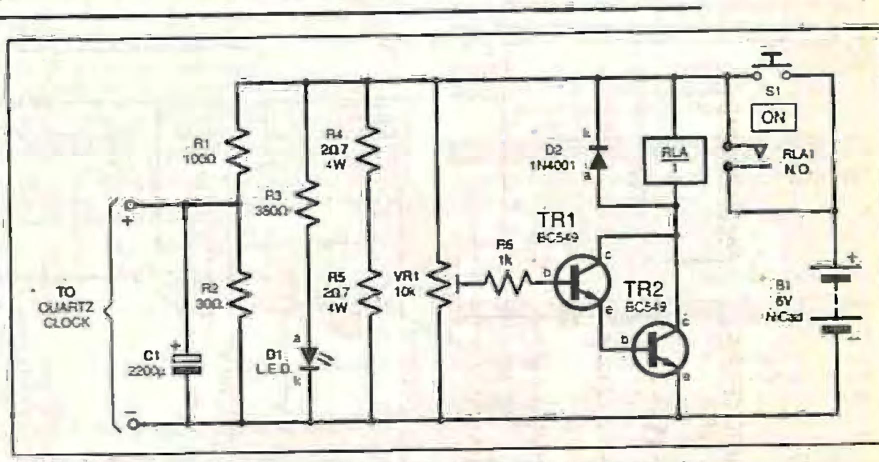


Fig.3. Circuit diagram for a NiCad Discharge Unit.

Current to a cheap quartz clock from the potential divider resistors R1 and R2 enables one to find out how long the unit has been running. Now I can completely discharge the "Fx5" unit without having to watch for the bulb dimming, and while saving the bulb, an expensive halogen type, from unnecessary use.

Mark Lavendar, Catforth, Preston.