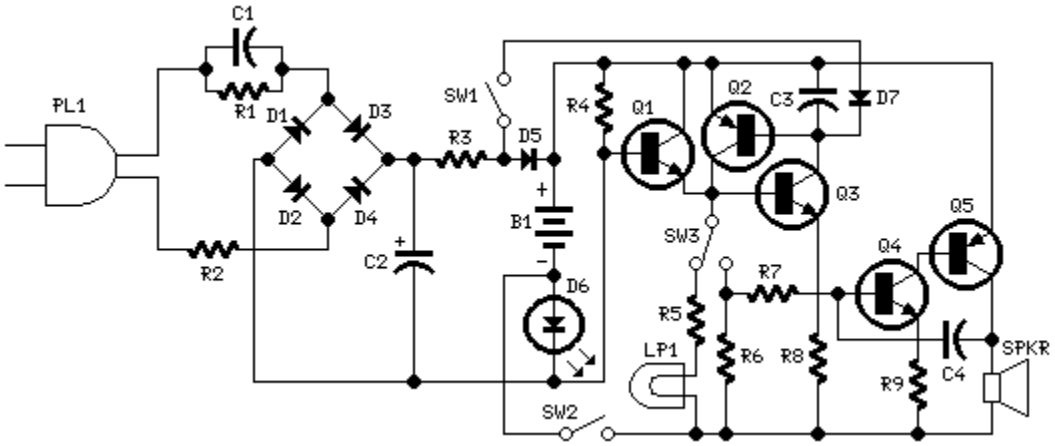
# *Emergency Light & Alarm*

**Powered by two AA NI-CD batteries**
**Four switchable options**

## Circuit diagram:




## Parts:

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R1_____________220K   1/4W Resistor
R2_____________470R   1/2W Resistor
R3_____________390R   1/4W Resistor
R4_____________1K5    1/4W Resistor
R5_____________1R     1/4W Resistor
R6_____________10K    1/4W Resistor
R7_____________330K   1/4W Resistor
R8_____________470R   1/4W Resistor
R9_____________100R   1/4W Resistor

C1_____________330nF  400V Polyester Capacitor
C2_____________10µF    63V Electrolytic Capacitor
C3_____________100nF   63V Polyester Capacitor
C4_____________10nF    63V Polyester Capacitor

D1-D5_________1N4007 1000V 1A Diodes
D6_____________LED   Green (any shape)
D7_____________1N4148   75V 150mA Diode

Q1,Q3,Q4_______BC547    45V 100mA NPN Transistors
Q2,Q5__________BC327    45V 800mA PNP Transistors

SW1,SW2_________SPST Switches
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SW3_____________SPDT Switch

LP1_____________2.2V or 2.5V 250-300mA Torch Lamp

SPKR____________8 Ohm Loudspeaker

B1______________2.5V Battery (two AA NI-CD rechargeable cells wired in series)

PL1_____________Male Mains plug
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## Device purpose:

This circuit is permanently plugged into a mains socket and NI-CD batteries are trickle-charged. When a power outage occurs, the lamp automatically illuminates. Instead of illuminating a lamp, an alarm sounder can be chosen.
When power supply is restored, the lamp or the alarm is switched-off. A switch provides a "latch-up" function, in order to extend lamp or alarm operation even when power is restored.

## Circuit operation:

Mains voltage is reduced to about 12V DC at C2's terminals, by means of the reactance of C1 and the diode bridge (D1-D4). Thus avoids the use of a mains transformer.
Trickle-charging current for the battery B1 is provided by the series resistor R3, D5 and the green LED D6 that also monitors the presence of mains supply and correct battery charging.
Q2 & Q3 form a self-latching pair that start operating when a power outage occurs. In this case, Q1 biasing becomes positive, so this transistor turns on the self latching pair.
If SW3 is set as shown in the circuit diagram, the lamp illuminates via SW2, which is normally closed; if set the other way, a square wave audio frequency generator formed by Q4, Q5 and related components is activated, driving the loudspeaker.
If SW1 is left open, when mains supply is restored the lamp or the alarm continue to operate. They can be disabled by opening the main on-off switch SW2.
If SW1 is closed, restoration of the mains supply terminates lamp or alarm operation, by applying a positive bias to the Base of Q2.

## Notes:

- Close SW2 **after** the circuit is plugged.
- **Warning!** The circuit is connected to 220Vac mains, then some parts in the circuit board are subjected to **lethal potential!**. Avoid touching the circuit when plugged and enclose it in a plastic box.

**This circuit was awarded with publication in ELECTRONICS WORLD "Circuit Ideas", September 2001 issue, page 708.**

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