

# FIRE ALARM CIRCUIT

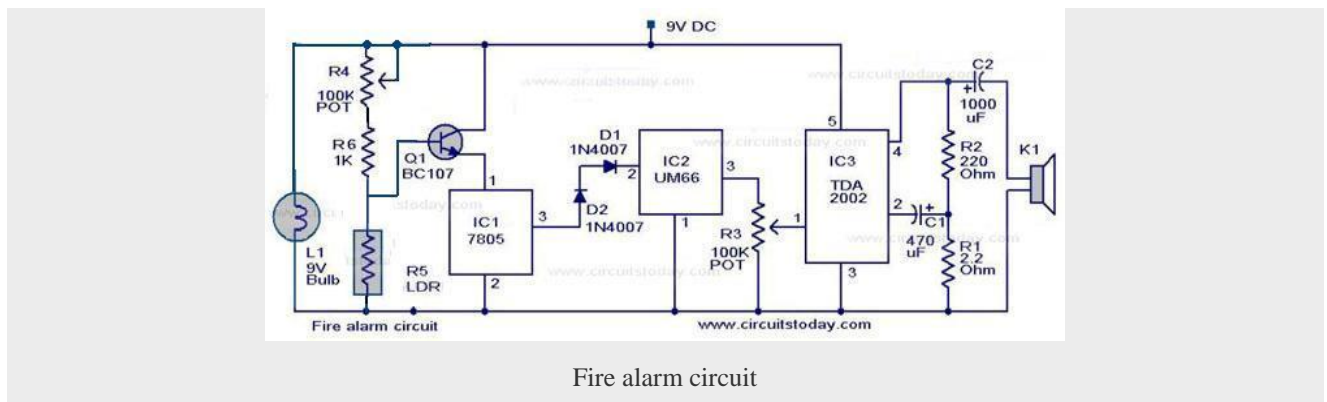
## Description.

Here is a simple fire alarm circuit based on a LDR and lamp pair for sensing the fire. The alarm works by sensing the smoke produced during fire. The circuit produces an audible alarm when the fire breaks out with smoke.

When there is no smoke the light from the bulb will be directly falling on the LDR. The LDR resistance will be low and so the voltage across it (below .6V). The transistor will be OFF and nothing happens. When there is sufficient smoke to mask the light from falling on LDR, the LDR resistance increases and so do the voltage across it. Now the transistor will switch to ON. This gives power to the IC1 and it outputs 5V. This powers the tone generator IC UM66 (IC2) to play a music. This music will be amplified by IC3 (TDA 2002) to drive the speaker. Resistor R6 is meant for protecting the transistor when R4 is turned towards low resistance values. Resistor R2 and R1 forms a feedback network for the TDA2002 and C1 couples the feed back signal from the junction of R1 & R2 to the inverting input of the same IC.

The diode D1 and D2 in combination drops 1.4 V to give the rated voltage (3.5V) to UM66. UM 66 cannot withstand more than 4V.

## Circuit diagram with Parts list.



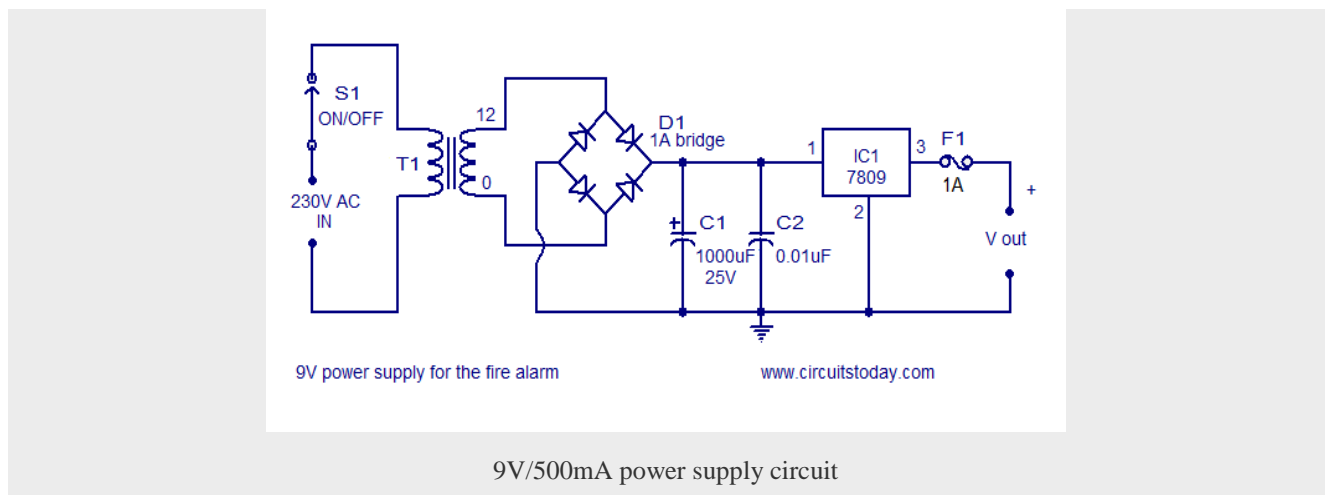
## Notes.

- ♣ The speaker can be a 32Ω tweeter.
- ♣ POT R4 can be used to adjust the sensitivity of the alarm.

- ♣ POT R3 can be used for varying the volume of the alarm.
- ♣ Any general purpose NPN transistor(like BC548,BC148,2N222) can be used for Q1.
- ♣ The circuit can be powered from a 9V battery or a 9V DC power supply.
- ♣ Instead of bulb you can use a bright LED with a 1K resistor series to it.

## Power supply for the circuit.

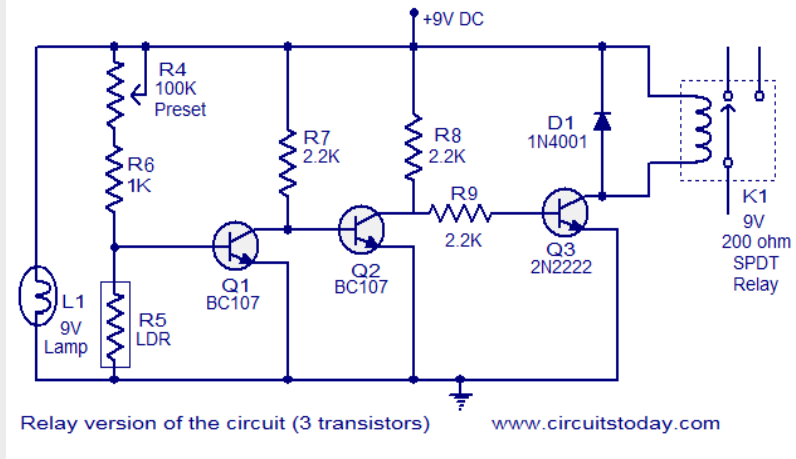
A well regulated power supply is essential for this circuit because even slight variations in the supply voltage could alter the biasing of the transistor used in the fire sensing section and this could seriously affect the circuit's performance.



A regulated 9V/500mA power supply that can be used for powering the basic fire alarm circuit and its modified versions is shown above. Transformer T1 is a 230V primary, 12V secondary, 500mA step down transformer. D1 is a 1A bridge which performs the job of rectification. Capacitor C1 filters the rectifier output and C2 is the AC by-pass capacitor. IC1 (7809) is a 9V fixed positive voltage regulator. The output of the rectifier+filter section is connected to the input of 7805 and a regulated steady 9V is obtained at its output. S1 is the ON/OFF switch. F1 is a 500mA safety fuse.

## Relay version of the circuit.

Here the above fire alarm circuit is modified to operate a relay when the fire breaks out. The usage of relay makes the circuit able to switch high power warning devices like alarms, bells, beacon lights etc that operates from the mains.



Relay version of the circuit

Two additional transistors are used with the basic fire sensing circuitry (consisting of Q1, R4, R5 and L1) to attain the target. Whenever the fire breaks out the transistor Q1 is switched ON. The collector voltage of Q1 drops to 0.2V and the transistor Q2 gets switched OFF. This makes the collector voltage of Q2 rise towards 9V and this result in the switching ON of transistor Q3. The relay connected at the collector of Q3 is activated and the load connected through the relay contact is driven. Resistors R7 and R8 limits the collector current of Q1 and Q2 respectively. D1 is a freewheeling diode which protects Q3 from the voltage spikes induced when the relay is switched. Resistor R9 controls the base current of transistor Q3 (2N2222)

Source : <http://todayscircuits.blogspot.com/2011/06/fire-alarm-circuit.html#.VUCkptKqqko>