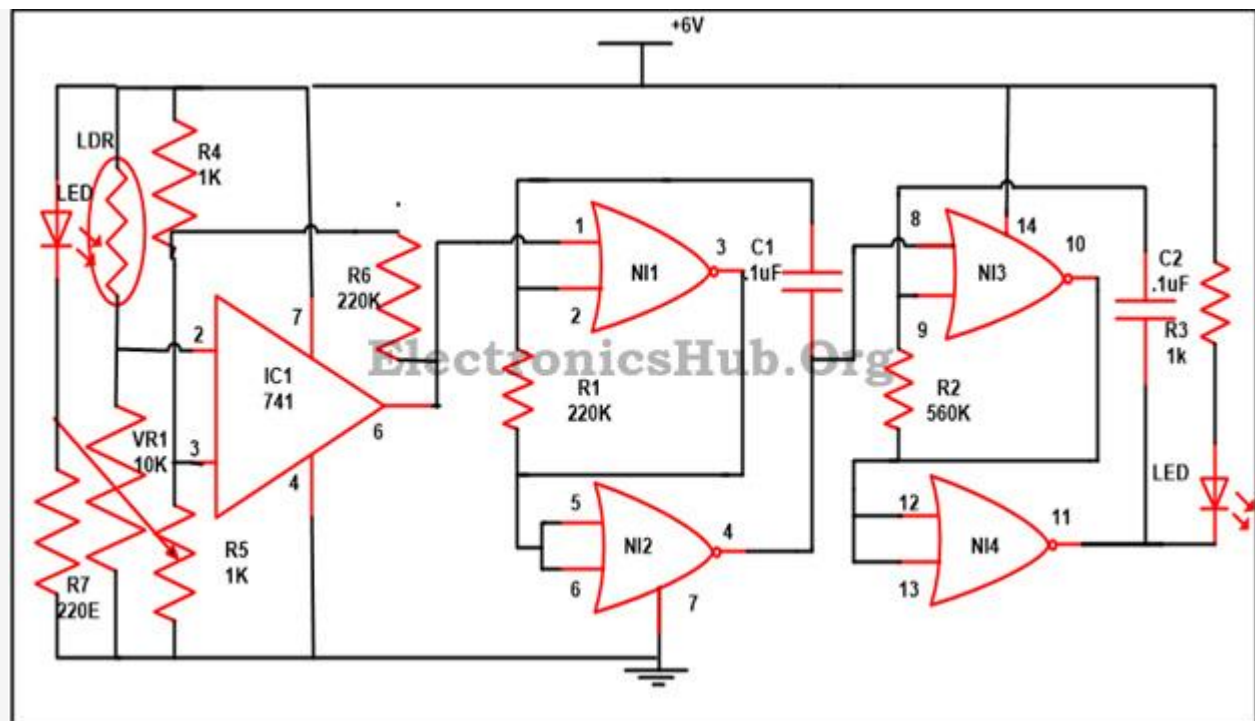


Electronic Letter Box Project Circuit

The circuit which is explained below is been employed as an Electronic Letter Box. When letter drop by someone into the letter box then the LED attached at the output stops blinking which indicates that there is a letter in your letter box. To identify the presence of a letter in the box we have connected a LDR as well as source of light. LDR is a special kind of resistor whose action based on the intensity of light declining on it. In the time of total darkness LDR resistance is approx 1 mega ohm while at the time of bright light its resistance is 2-5 ohm. In this circuit the light source is adjusted with the LDR in such a way that the light will directly drop on the LDR so that when any letter comes inside the letter box it will chunk the light beam and LDR will be beneath darkness.

Electronic Letter Box Circuit Diagram:



Circuit Diagram of Electronic Letter Box – ElectronicsHub.Org

Circuit Components:

- IC
- LM741 – 1
- CD4001 – 1
- Resistors
 - R1(2.2M) – 1
 - R2(560K) – 1
 - R3,R4,R5(1K) – 3

- R6(220k) – 1
- R7(220E) – 1
- C1,C2(.1uF) – 2
- Miscellaneous
 - LED1 – 2
 - Vr1(10K) – 1
 - LDR – 1

Component Description:

- **LDR** - It is a device whose sensitivity is based on the strength of the light incident on it. With the increase in the strength of the light, resistance of the LDR decreases and vice versa. When there is no light or in darkness, resistance of LDR is in the range of mega ohms while in the presence of light it moves down to few hundred.
- **LED** - It consists of semiconductor which produces various colours of light as its output. LED produces narrow-spectrum light at the time it is electrically biased in the p-n junction at the forward bias state. When it is in the on mode, combines the electrons with holes and in the form of light energy releases.
- **LM741** - It is basically all-purpose operational amplifier which is basically used to enhance the performance of the circuit over industry standards. They are straight forward plug-in substitute for the IC like 709C, LM210 also for MC1439 as well as 748 in many of the applications. There are many applications which make it almost foolproof. One is the overload guard on the input and output. Another one is the no latch-up at the time common mode range is beyond and independent from oscillation.
- **Resistor - Resistor** is attached in any of the circuit to restrict the flow of current. There are two varieties of resistors which are mentioned below.
 - **Fixed Resistor** - Its value of resistance is fixed.
 - **Variable Resistor** - Its value of resistance can vary. Suppose we have resistor of 5K then its value varies from 0-5K ohm.

Electronic Letter Box Circuit Explanation:

When anyone drops a letter in your letter box, then this circuit will produce a visual alarm. Operational amplifier LM741, CD4001 and as well as LDR are the basic building block of the circuit. The voltage that is generated at the output of the op-amp is hundreds of thousands times more than the difference of voltage between the input points.

Operation of this circuit is very much easy, you just need to install the LDR as well as LED at the different corners of the box so that LED light will regularly fall on the LDR as a effect of it, device stay off since light beam is declining on LDR and its resistance will low which in turn the IC1 pin 2 moves to high. Therefore, output of IC1 pin 6 stay on high and this high signal is given to CD4001 pin1 which is basically a NOR gate and it produces output as 1 when all the inputs are at low state (which you can find in the truth table) so the LED will keep on glowing point out that in the drop box there is no letter.

As quickly as someone drops the letter in the box, light declining on the LDR is blocked and its resistance reaches high. Due to which IC1 pin 2 moves to the low state which also turns pin 6 into low state and this low is given to pin1 of NI1. Due to this, we will get logic 0 in output pin3. Hence we will get logic 1 in the pin 4, output as 0 is given to NI2 gate, input by the pin 3 so whatever can be the input by the pin 2, we will get high state at pin 4. This implies that we will get 6V at pin 4.

Whatever can be the state of voltage on the pin9, we will get high voltage on pin 8 and get low at pin 10 of NI3 which also turns pin 12 as well as 13 of NI4 to low also we will get high on pin 11 which you can find from the truth table while LED coupled to it will not blink. This implies that we have letter in the drop box.

Source: <http://www.electronicshub.org/electronic-letter-box-project-circuit/>