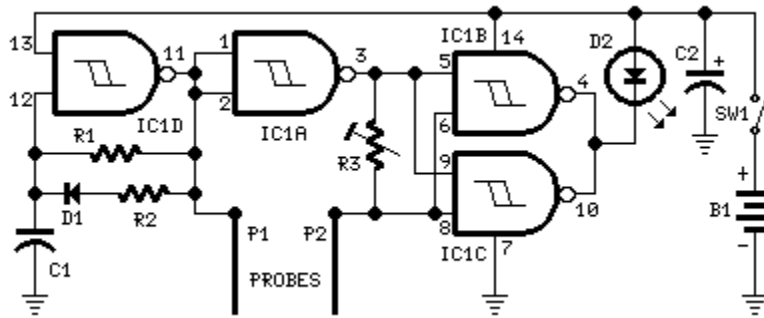


# Plants Watering Watcher

Varying brightness LED signals the necessity to water a plant  
Very low consumption, 3V powered circuit

## Circuit diagram:



## Parts:

R1_____470K	1/4W Resistor
R2_____3K3	1/4W Resistor
R3_____100K	1/2W Trimmer Cermet
C1_____1nF	63V Polyester Capacitor
C2_____47µF	25V Electrolytic Capacitor
D1_____1N4148	75V 150mA Diode
D2_____5mm.	Red LED
IC1_____4093	Quad 2 input Schmitt NAND Gate IC
P1,P2_____Probes	(See text)
SW1_____SPST	Slider Switch
B1_____3V	Battery (2 AA 1.5V Cells in series)

## Device purpose:

This circuit is intended to signal when a plant is needing water. A LED illuminates at maximum

brightness when the ground in the flower-pot is too dry: it dims gradually as the water's content in the pot grows, turning off when the optimum moisture's level is reached. This condition is obtained trimming R3.

### **Circuit operation:**

IC1D forms a square wave oscillator with approx. 10/90 mark-space ratio. It feeds the output probe P1 and its signal, inverted by IC1A is compared with that picked-up by P2 in the NAND gates IC1B & IC1C in parallel, driving the LED. When a low resistance exists between the probes, due to an high water's content in the flower-pot, the LED is off, turning gradually on as the resistance between the probes increases.

### **Notes:**

- | A square wave is used to avoid probes' oxidization.
  - | Probes can be long nails, carbon rods obtained from disassembled exhausted 1.5V batteries, or even a couple of screwdrivers.
  - | The probes must be driven in the pot's ground a few inches apart.
  - | Due to 3V supply, the LED needs not a limiting resistor.
  - | Power consumption: LED off = 50 $\mu$ A; LED full on = 1mA.
  - | To switch-off the circuit, you can short the probes. In this case SW1 can be omitted.
  - | Using an high-efficiency LED, brightness variations are better emphasized. In this case a limiting resistor could be necessary.
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