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WIRELESS OBJECT LOCATOR

A Mini Project report

Submitted in partial fulfillment of the requirement

For the award of the degree of

BACHELOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION ENGINEERING

By

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ABSTRACT

An object locator is a device designed to assist its user in finding misplaced household and personal objects in a home. We probably spend hours every month looking for items around the home, often in a similar situation. In fact, almost every person in the world suffers this problem. But now this is not really a big problem because now there's an inexpensive gadget to help people quickly find important items by tagging them and using an RF locator to pinpoint their position in seconds. Advantages of such locators include extensibility and low maintenance.

In the past few decades, an unprecedented demand for wireless technologies has been taking place. Mobiles, Laptops, assistants (PDAs), and mobile phones, to name just a few examples, are becoming part of the everyday life of a growing number of devices that communicate wirelessly. Radio and infrared (IR) are currently the main parts of the electromagnetic spectrum used to transmit information wirelessly. IR is becoming more popular every day and it is being preferred due to its inherent advantages like low power requirements, security, effective short distance communication as compared to its Radio counterpart. So we are using this technology in our project.

In this project we aim to design and build a hardware model of IR receiver and simple TV remote can be used as the transmitter

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INTRODUCTION

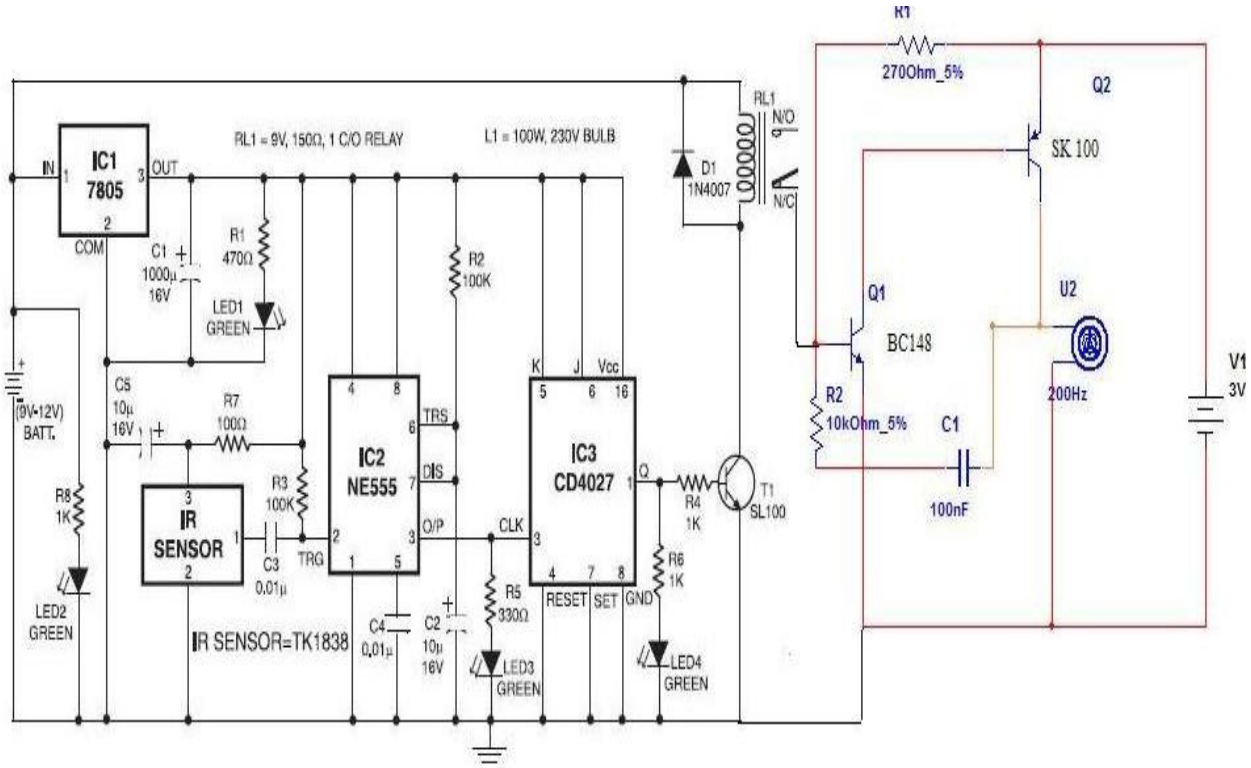
"Where did I put my car keys?" is a question that we must have heard many times in our life! How often have you put something down and then spent ages looking for it? Well, our group decided to invent a gadget that would end this frustration!

The idea was to develop small "tags" that could be clipped onto items which are often misplaced. These tags would be designed so that if they received a uniquely coded signal from an IR transmitter, they would emit a bleeping sound. A simple TV remote could be used to do this.

The idea being, if you are looking for an item which has the tag attached, you could go to the transmitter and press the associated button. The transmitter would then send out a coded signal for a specific tag and voila, our item has been located!

An object locator system comprises an activation unit and a remote locator where the remote locator may be attached to an easily misplaced object, such as a key or key-ring. The activation unit comprises additional functionality to induce the operator to carry it routinely so that it might be available at distant sites if needed. In one embodiment, the activation unit comprises a cellular telephone. In another embodiment, the activation unit comprises a wrist watch with an integral transmitter. The activation unit, when triggered, generates an activating signal. The remote locator receives the activating signal and announces its location. Communication from the activation unit to the remote locator may be direct or indirect, and may be via radio frequency electromagnetic, optical, or acoustic means. We can use a simple TV remote as a transmitter

CIRCUIT DIAGRAM



CIRCUIT OPERATION

The IC's NE555, CD4027 and the IR sensor TK1838 get the supply voltage from IC 7805 which in turn gets the supply from the 9V battery. The capacitor C1 which is connected between the output terminal and common terminal (i.e. gnd) of the IC LM7805 is used to improve the transient response and the out put impedance.

The output of IR sensor TK1838 is normally high. It responds to a frequency of 38khz.When it detects IR light of appropriate frequency the output goes low. The capacitor C5 is connected to avoid noise and false triggering.

The timer IC NE555 is used in monostable mode of operation. The timing period is triggered (started) when the trigger input (555 pin 2) is less than 1/3 V_{CC}, this makes the output high ($+V_{CC}$) and the capacitor C2 starts to charge through resistor R2. Once the time period has started further trigger pulses are ignored. The threshold input (555 pin 6) monitors the voltage across C2 and when this reaches 2/3 V_{CC} the time period is over and the output becomes low. At the same time discharge (555 pin 7) is connected to 0V, discharging the capacitor ready for the next trigger. The reset input (555 pin 4) overrides all other inputs this instantly makes the output low and discharges the capacitor. The reset function is not required, hence the reset pin is connected to $+V_{CC}$.

Output of the IR sensor acts as a trigger for the timer IC .The resistance R2 (100k) and capacitance C2 (10μF) determine the ON time of the IC which is given by:-

$$T_{ON}=1.1RC$$

Therefore the ON time is 1.1 second .The capacitor C4 is connected to ground noise pickup while the combination of R3, C3 is used to avoid false triggering of the monostable NE555.The IC CD4027 is a Dual J-K Master/Slave flip flop. Each flip flop has independent J, K, Set, Reset and clock inputs. These flip-flops are edge sensitive to the clock input and change state on the positive-going transition of the clock pulse. Set and reset are

independent of the clock (grounded in this case). The J-K flip-flop is used in the toggle mode. Both the J and K terminals are connected to $V_{CC.}$

Relays allow one circuit to switch a second circuit which can be completely separate from the first. There is no electrical connection inside the relay between the two circuits, the link is magnetic and mechanical. The relay RL1 is 9V, 100Ω SPDT (i.e. Single Pole Double Throw) switch. The current requirement for the relay is given by (Voltage rating)/ (Coil Resistance). In this case the current requirement is 90mA.

Back-EMF diode 1N4007 is connected across the relay for the protection of transistors and IC's from the brief high voltage spike produced when the relay is switched off. Diode is connected 'backwards' so that it will normally not conduct. Conduction only occurs when the relay coil is switched off, at this moment current tries to continue flowing through the coil and it is harmlessly diverted through the diode. Without the diode no current could flow and the coil would produce a damaging high voltage 'spike' in its attempt to keep the current flowing.

SL 100 is an npn transistor enclosed in a metal casing (better heat dissipation) and is used in a open collector mode. The output current of the J-K flip-flop is low (0.88 mA at 25˚ C) which is much less than that required by the relay, SL 100 is used to amplify the current.

LED2, LED3, and LED4 are used to display the status of each output stage during circuit operation.

WORKING:

- The IR sensor detects the IR light from the transmitter and its output goes low.
- This acts as a trigger for the timer IC555 which is used in the monostable mode of operation. The output of the timer IC goes high.
- This toggles the J-K flip flop, whose Q output drives the relay through SL100 npn transistor
- The second part of the circuit is basically a two-stage amplifier with a feedback arrangement.when the loop is connected the base of the T1 is shorted to its emitter.Hence the base current cease to flow and the circuit doed bot oscillate.When the loop os broken base current flows through T1 and the circuit starts oscillating,sounding an alarm.

ADVANTAGES:

- Can be controlled by any ordinary TV/VCR/VCD remote.
- Can be used to switch device's which require high voltage and high current.
- Can be used to switch any other 9V logic device by using the output across the relay coil terminal
- In the buzzer cuircuit since both the transitors are made from the silicon very little power is drawn from the battery.

LIMITATIONS:

- The operating distance is limited by the transmitting power of the IR source.
- Two units (not needed to operated simultaneously) cannot be juxtaposed.
- Requires external DC power supply.
- Due to the relay the circuit becomes bulky and requires high input power

FUTURE SCOPE:

We can further improve the circuit in that instead of using the simple IR, which is a highly directional, we can further incorporate the technologies like BLUETOOTH or RFID so that we can operate this from very high distance

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