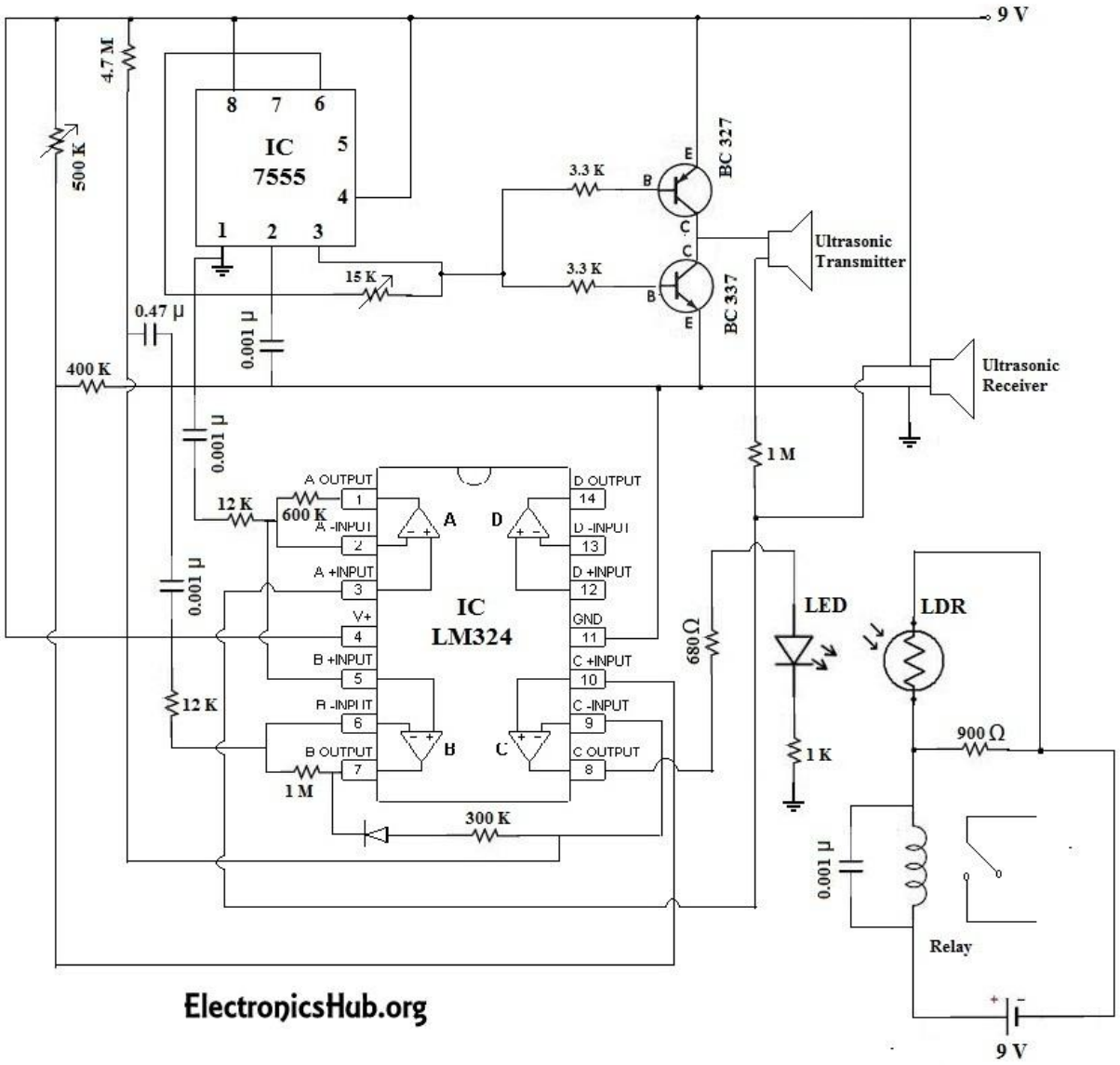
Automatic Door Bell With Object Detection

We all have a doorbell at our homes. When a visitor comes to our house, he searches for the doorbell switch and then rings it to let us know his presence. If the who came to our house cannot find the doorbell or else if the person is so short that he cannot reach the doorbell, what can be done? How will it be if we use an automatic doorbell which rings as soon as a person arrives at our place? There are no more hassles. The person who comes to our house need not search for the doorbell and press it any more. If we install this automatic doorbell using object detection circuit, the circuit will automatically sense the presence of the person and it rings the doorbell.

Circuit Diagram of Automatic Door Bell Using Object Detection:



This circuit operates using a pair of ultrasonic transmitter and receiver modules which are used to detect the person and then if the person is detected, the door bell is automatically turned ON when the person is in-front of the door.

The ultrasonic transmitter operates at a frequency of about 40 Kilo-Hertz. That means it continuously transmits the ultrasonic waves of about 40KHz. The power supply should be moderate such that the range of the transmitter is only about one or two meters. If the transmitting power is less than one meter, then there is a chance that the person who is one meter away is not detected. Also, if the range is set to be very large, then it may lead to false triggering, meaning that, the objects far away from our door are considered as the visitors and the alarm rings. This can be a nuisance for us if the alarm rings for every object or person far away. So, to avoid both the problems, the transmitting power is kept to an optimum level.

The ultrasonic receiver module receives the power at the frequency same as that of the transmitter's so that noise will be eliminated and we get less false triggering. The sensitivity of the receiver can be tuned by using the 500K-ohm variable resistor arranged as a pot in the circuit. By tuning this properly, we can achieve the desired results. The output of our circuit is given to a buzzer circuit which acts as a doorbell in our case. The receiver in this circuit uses IC LM324 which is internally has four op-amps. Out of the four op-amps, we are using only four of them and leaving the other one unused as it is not much required in our case. The three op-amps are used in cascaded arrangement to provide high gain as well as noise free output.

An opto coupler is used at the output to avoid any interaction between our circuit and the door bell.

Assemble the circuit on a PCB as compactly as possible and then attach it to your main door. Thats it! You may provide a power supply using a 9V DC adapter with filtered and regulated output. If the 9V adapter with regulated output is not available, then we recommend you to use a 12V unregulated DC adapter with 7809 voltage regulator.

Source: http://www.electronicshub.org/automatic-doorbell-with-object-detection/