

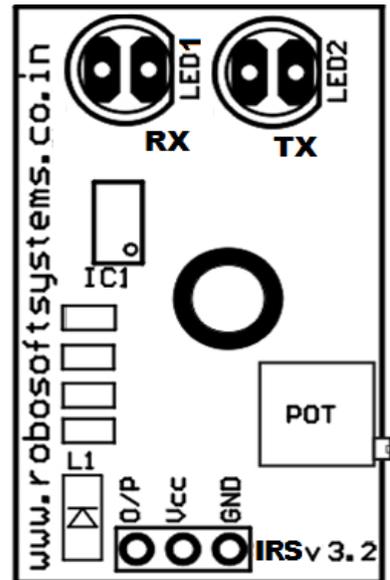
IR Sensor - Single

General Description

The IR Sensor-Single is a general purpose proximity sensor. Here we use it for collision detection. The module consists of an IR emitter and IR receiver pair. The high precision IR receiver always detects an IR signal.

The module consists of a 358 comparator IC. The output of the sensor is high whenever the IR frequency is low and low otherwise. The on-board LED indicator helps the user to check the status of the sensor without using any additional hardware.

The power consumption of this module is low. It gives a digital output.



Pin Configuration

The figure to the right is a top view of the IR Sensor module. The following table gives its pin description.

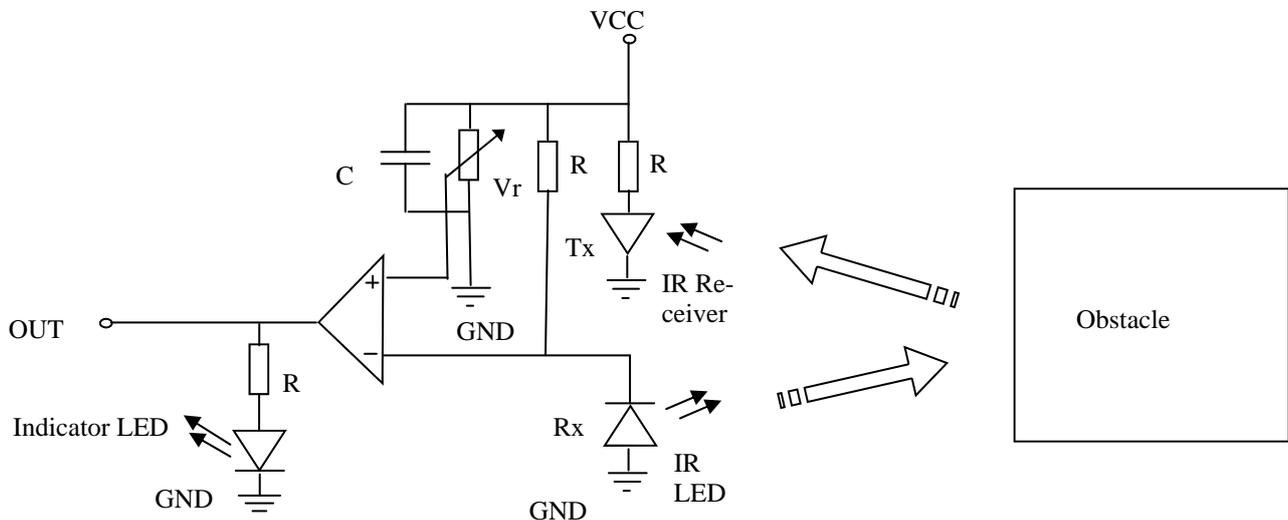
Pin No.	Connection	Description
1	Output	Digital Output (High or Low)
2	VCC	Connected to circuit supply
3	Ground	Connected to circuit ground

Application Ideas

- Obstacle detection
- Shaft encoder
- Fixed frequency detection

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Functional Block Diagram /Schematic Diagram



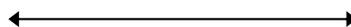
Overview of Schematic

The sensitivity of the IR Sensor is tuned using the potentiometer. The potentiometer is tuneable in both the directions. Initially tune the potentiometer in clockwise direction such that the Indicator LED starts glowing. Once that is achieved, turn the potentiometer just enough in anti-clockwise direction to turn off the Indicator LED. At this point the sensitivity of the receiver is maximum. Thus, its sensing distance is maximum at this point. If the sensing distance (i.e., Sensitivity) of the receiver is needed to be reduced, then one can tune the potentiometer in the anti-clockwise direction from this point.

Further, if the orientation of both Tx and Rx LED's is parallel to each other, such that both are facing outwards, then their sensitivity is maximum. If they are moved away from each other, such that they are inclined to each other at their soldered end, then their sensitivity reduces.

Tuned sensitivity of the sensors is limited to the surroundings. Once tuned for a particular surrounding, they will work perfectly until the IR illumination conditions of that region nearly constant. For example, if the potentiometer is tuned inside room/building for maximum sensitivity and then taken out in open sunlight, its will require retuning, since sun's rays also contain Infrared (IR) frequencies, thus acting as a IR source (transmitter). This will disturb the receiver's sensing capacity. Hence it needs to be retuned to work perfectly in the new surroundings.

The output of IR receiver goes low when it receives IR signal. Hence the output pin is normally low because, though the IR LED is continuously transmitting, due to no obstacle, nothing is reflected back to the IR receiver. The indication LED is off. When an obstacle is encountered, the output of IR receiver goes low, IR signal is reflected from the obstacle surface. This drives the output of the comparator low. This output is connected to the cathode of the LED, which then turns ON.

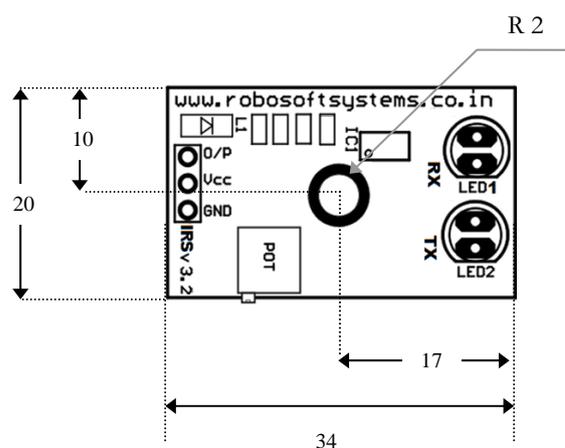


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Maximum Ratings

Symbol	Quantity	Minimum	Typical	Maximum	Unit
o/p	Output Voltage	0	-	5	V
V _{CC}	Operating Voltage	4.5	5	5.5	V
GND	Ground Reference voltage	-	0	-	V

Pin Out Dimensions



Note : All dimension in mm
Error of $\pm 5\%$ is subjected because of component soldering