

DEPT. OF ELECTRONICS AND TELECOMMUNICATION  
BHILAI INSTITUTE OF TECHNOLOGY, DURG



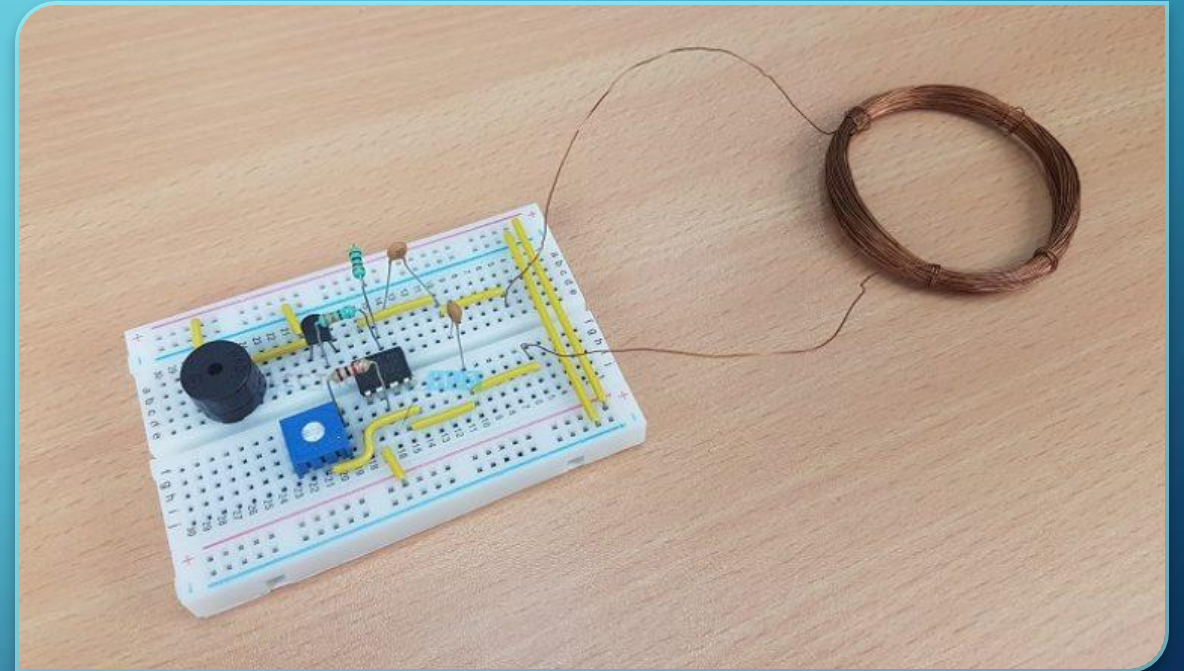
# METAL DETECTOR

BY –

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# OUTLINE

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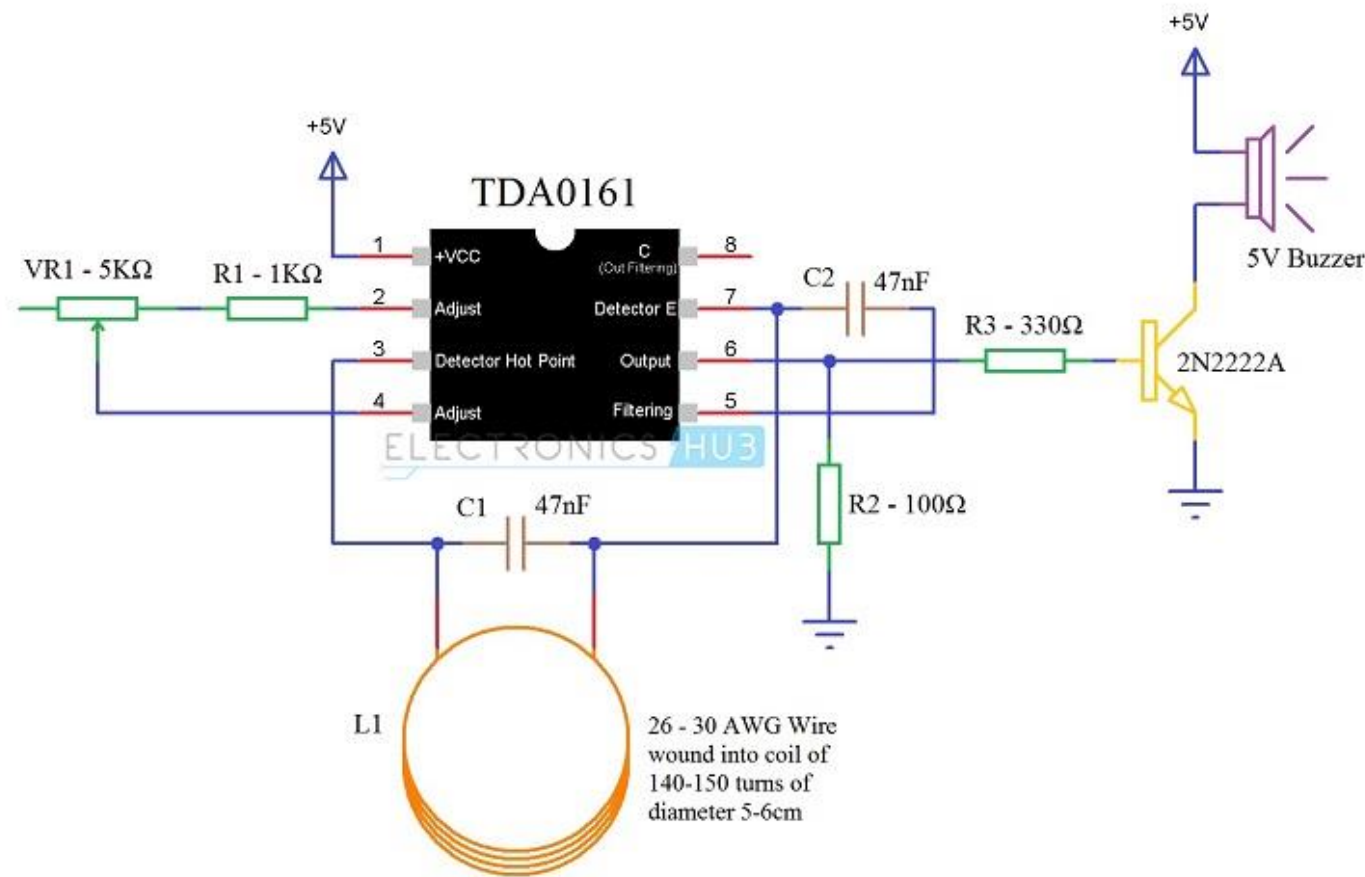
# INTRODUCTION

- Metal detector is a very common device that is used for checking persons, luggage or bags in shopping malls, hotels, cinema halls, etc. to ensure that person is not carrying any metals or illegal things like guns, bombs etc. Metal Detectors detect the presence of metals.
- There are different types of metal detectors like hand held metal detectors, walk through metal detectors and ground search metal detectors.

# COMPONENTS

- TDA0161 Proximity Detector IC
- 47nF Capacitors (Ceramic Capacitor code 473)
- 1 K $\Omega$  Resistor
- 330  $\Omega$  Resistor
- 100  $\Omega$  Resistor
- 5 K $\Omega$  Potentiometer
- 2N2222A (NPN Transistor)
- 5V Buzzer
- Coil (copper wire of 26 – 30 AWG is taken and it is wound in to a coil of diameter 5 – 6 cm and 140 – 150 turns)

# CIRCUIT

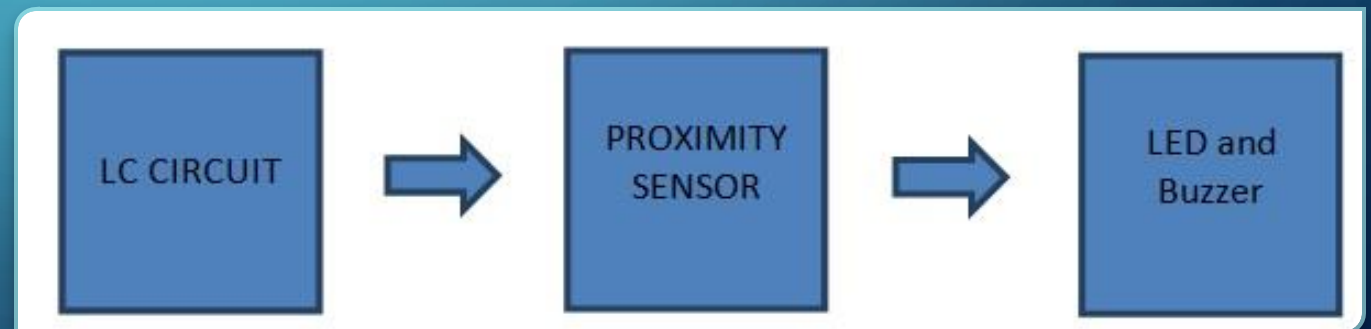


# WORKING OF METAL DETECTOR

- When the RC circuit, that is a capacitor and an inductor, are at any resonating frequency from any metal which is near to it, electric field will be created which will lead to induced current in the coil and changes in the signal flow through the coil. When the metal is detected in the LC circuit, it will have produce a change in the input signal or current. The changed signal is given to the proximity detector (TDA 0161), which will detect the change in the signal and react accordingly.

## WORKING OF METAL DETECTOR

When output of the proximity sensor will be of 1 mA, which is the output at normal state, there is no metal detected. It will be around 10 mA when coil is near to the metal. When the output pin is high, the resistor R3 will provide positive voltage to transistor, which will be turned on and led will glow and buzzer will give the buzz.





# APPLICATION

- Metal detectors are used in airports to screen passengers, checking bags in public places and in public events.
- Since it is a simple project, we can use this in our home to scan for nails, metal scraps etc. which are not easily spotted by naked eye.
- They are used in food processing industries to detect fragments of metal so as to avoid food contamination.
- Archaeological use in antique detection.



# BIBLIOGRAPHY

- <https://www.electronicshub.org/metal-detector-circuit/>
- <https://www.google.co.in/>

An abstract graphic on the left side of the image, featuring a dark grey background with a network of light blue lines and small circles, resembling a circuit board or a stylized tree structure.

THANK YOU