

METAL DETECTOR

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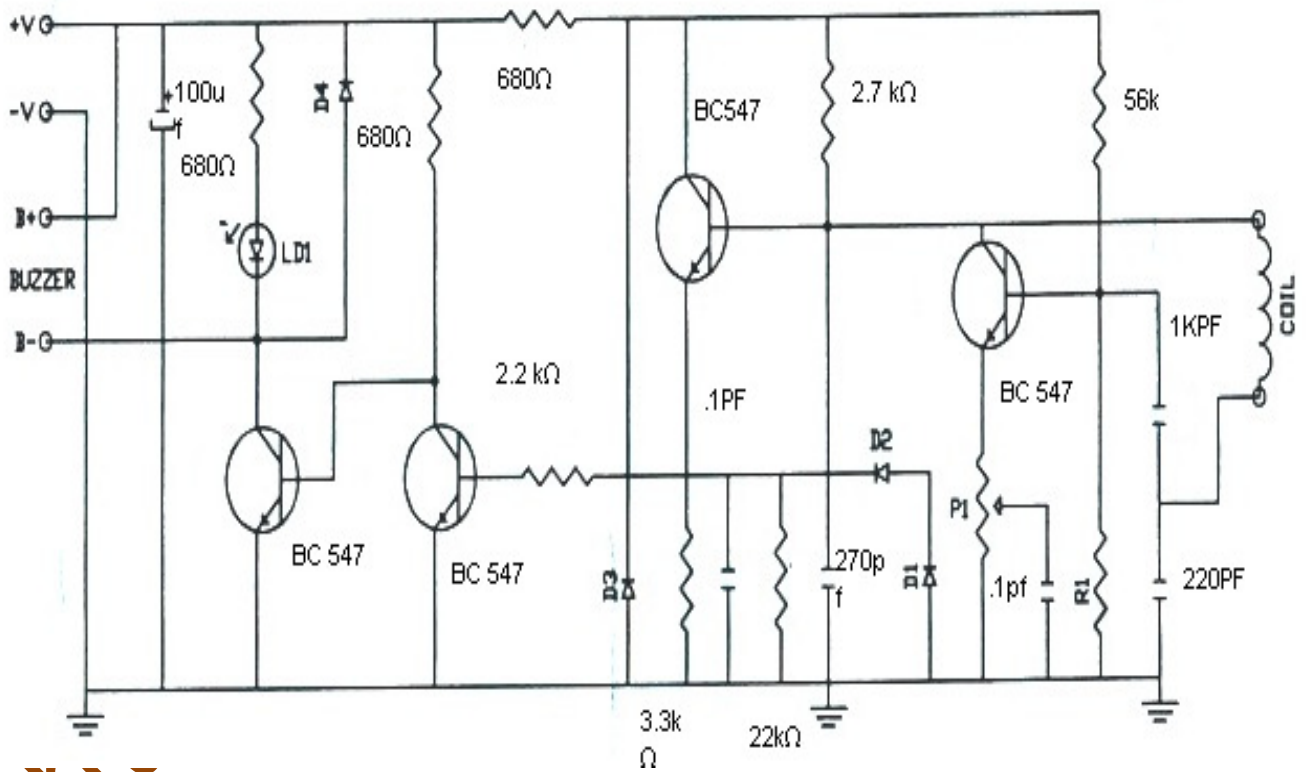
INTRODUCTION

In this busy world, security has become a major concern in many areas. In order to provide security minimizing human effort and time is a major challenge. This Metal detector is mainly used for this security purposes. It is a cost effective device. It can detect slightly big size metallic objects.

The simplest form of a metal detector consists of an oscillator producing an alternating current that passes through a coil producing an alternating magnetic field. When ever a metal is brought nearer to the coil then buzzer turns on. Initially buzzer is in the off state until a metal is brought nearer to the coil.

If a piece of electrically conductive metal is close to the coil, eddy currents will be induced in the metal, and this produces an alternating magnetic field of its own. Thus magnetic energy is absorbed and the oscillator fails to work. When the oscillator fails a final transistor which is connected to the negative terminal of buzzer and LED conducts and buzzer is activated. Initially only positive voltage is given to both buzzer and LED, when the transistor conducts only negative voltage is supplied to both buzzer and LED and then only both of them work.

CIRCUIT DIAGRAM



D1,2,3,4 -IN 4148L formula ra multilayer air -core type coil me coil . $L=0.8r^2*N^2/(6*r+9*l+10*d)$

P1 -5K 3386 Trim

CIRCUIT OPERATION:

This circuit automatically turns on a buzzer whenever a metal is detected. This circuit consists of a coil, two oscillators, one LED, one Buzzer. Out of two oscillators one is a Colpitt's oscillator and the other one is used for tuning purpose. A 5k potentiometer is also used for tuning purpose. A transistor is also used in this circuit as a switch.

The basic principle on which a metal detector works is when an electric current is passing through a coil it produces a magnetic field around it. The simplest form of a metal detector consists of an oscillator producing an alternating current that passes through a coil producing an alternating magnetic field.

If a piece of electrically conductive metal is close to the coil, eddy currents will be induced in the metal, and this produces an alternating magnetic field of its own. Thus magnetic energy is absorbed and the oscillator fails to work. When the oscillator fails, the transistor which is connected to the negative terminal of the buzzer and LED conducts and the buzzer is activated. Initially only positive voltage is given to both the buzzer and LED, when the transistor conducts only negative voltage is supplied to both the buzzer and LED and then only both of them work.

APPLICATIONS

- Airport security
- Building security
- Event security Item recovery
- Archaeological exploration
- Geological research

CONCLUSION

This project 'Metal Detector' automatically detects a metal which is brought nearer to its coil. Whenever a metal is brought nearer to the coil then automatically buzzer activates which is a signal that metal is detected. This a low cost device which can be used to detect big size metallic objects. This is mostly used for security checking.

REFERENCE

- Electronic devices and circuits – J.Millman, C.C.Halkies
- <http://www.wikipedia.org>
- <http://www.electronicsforu.com>

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