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Remote Locatıon Of Land Mınes

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SUMMARY
Inthisstudy, a remotelycontrolled 4x4 toy jeep (car) wasusedtolocatelandmines. Itperformsautonomous mine searchoperationsbymeans of a metal detectorplaced on the car. The car is operatedremotelyby an operatorviathereceiverplaced on it. The metal sensorplaced in thevehicledetectsthelocation of the mine bygiving a signal.
KEYWORDS: *Mine detector, car, receiverandtransmitter*

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I. INTRODUCTION

Thefactthat mine production is gettingeasierand it is a highlyeffectivedefenseweapon has madetheuse of mineswidespread. Placingmines in a geographicarearequireslesseffortthandetectingandthendestroyingthem[1]. A version of the semi-autonomousminesweeper is alsodescribedbyIshikawa et al. given in thework of [2]. Operatorsusingthis robot evaluatewhether a shadow in thepicture is a real mine bylooking at theundergroundimagepictures [3]. Therehavealsobeenstudies on detectingandneutralizingminesusinghighpressurewater [4]. Another robot used in mine clearanceforhumanitarianpurposes is thework of Gonzalez et al[5]. Inaddition, therearemilitarystudiesconductedforfasterrouteplanning [6,7]. A Cartesian platform has alsobeenproposedforlandminedetection. Inthisstudy, the robot can regulatetheposition of mine clearancesensorswhilesearchingformines [8,9]. Therearealsoairbornemethodstosolvetheminesweeping problem forhumanitarianpurposes [10,11]. Landmines, whichareusedaroundtheworldtodetertheenemyandreducetheirmobility, pose a seriousthreatanddangertobothpeopleandvehicles[12]. Therearemanystudies on mine scanningandbombdisposalsystems, and in suchapplications, short-rangeandlow-securitycommunicationmethodssuch as RF orinfraredaregenerallypreferred[13].

Withthisstudy, thelocation of explosiveobjectswasdeterminedandthedamagestheywouldcausewhentheyexplodedwereprevented. Metal detectorwasusedbecauseexplosivematerialsarecomposed of metal materials. Theworkingprinciple of the metal detector is relatedtothemagneticfieldchange. Whenthe metal detectordetectsthe metal, itsmagneticfield is disturbedandthe metal detectorconnectedto it gives an audibleresponsethankstothespeaker in thecircuit. BFO (BeatFrequencyOscillator) type metal detectorwasused in thisstudy. The metal detectorused can findminesundertheground at a distance of uptoabout 30 cm. A continuouswave metal detectoroperating in thefrequencyrange of 400Hz-420Hz withremotecontrolled mine detection has beendesigned.

II. MATERİALSUSED İN REMOTE CONTROL APPLİCATİON OF MAYIN

Intheproject, an attemptwasmadetodesign a metal detectorthatdetectsexplosives. Itsdesignwasanalyzed in twoparts. Part 1 is thehardwareanddesignphase. Thesecondpart is theassemblystage. Duringthehardwareandassemblyphase, how eachpart is usedwasexplained.

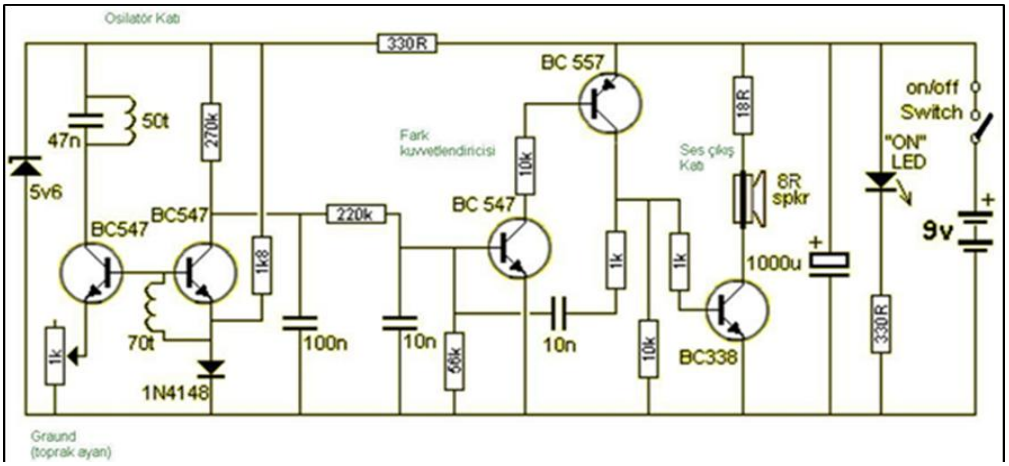

Figure 2.1. BFO (BeatFrequencyOscillator) circuitused in thisstudy.

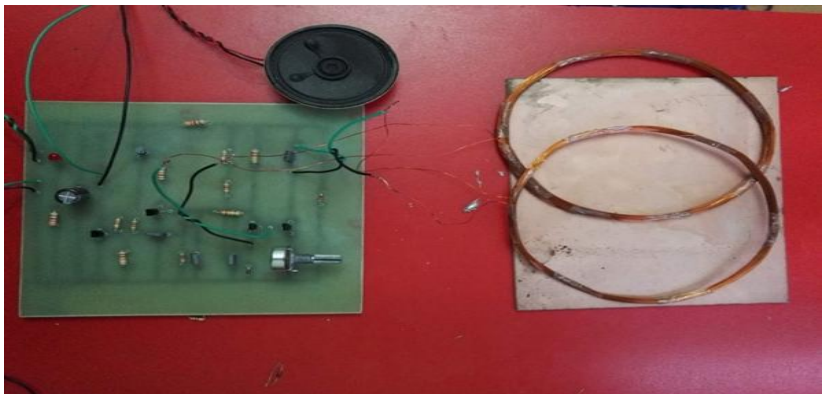

Figure 2.2. Completedstate of thecircuit

Figure 2.3. Ourcircuitmounted on thevehicle

III. CONCLUSION

Inthestudy, explosiveswereredetectedremotelywith a remote-controlledvehicle. Detection of mineswascarriedoutwiththe metal sensorplaced in thevehicle. Theworkingprinciple of themagneticdetectorgives an audibleresponsethankstothespeaker in thecircuit as a result of thedeterioration of themagneticfield. Withourvehicle, whichenablesmovement in difficultterrainconditions, mines at a distance of upto 30 cm weredetected. It has beentried on asphaltandsimilarlandtypesandsuccessfulresultshavebeenobtained. BFO (BeatFrequencyOscillator) type metal detectorwasused in thisstudy. Withthisprototypevehiclewemade, mineswereredetectedbymakingourcircuitmoreusefulandefficientwithtoday'stechnology.

It has beentested in differentfieldconditions as seen in thefigure. Metal objectwasdetectedfrom 30 cm in drysoil. A metal objectwasdetectedfrom 25 cm on thewetfloor. Testshavebeencarriedoutsuccessfully in asphalt, roughterrainandotherdifferentenvironmentsandtheresultshavebeenobtained.

Figure 3.1. Mine detection of thevehicle in differentterrainconditions

Figure 3.2. Operation of thevehicle in differentterrainconditions

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