



RF Controlled Robot Using AVR Micro-Controller ATmega328p

Pradeep Doss¹, Sandeep Singh Chauhan², M Sai Dilip³

Assistant Professor¹, Student^{2,3}

Department of ECE

SRM IST, Ramapuram, Chennai, India

Abstract:

Survey task to gather data about natural parameters is an inescapable part in different cases. Be that as it may, manual information logging by human is risky in hazardous places. This paper manages outline and execution of a RF Controlled Robotic Environmental Survey Assistant System for remote review activities, which can aid remote information obtaining of natural parameters like temperature, dampness and the nearness and level of LPG gas noticeable all around. In fact, two individual units make up the total overview collaborator framework. Initial one is the remote control unit for controlling and observing the review procedure, while the second one is a remote controlled information authority robot unit which executes the study procedure. The review robot is outfitted with sensor units required for estimation of temperature, dampness and ignitable gas level as ecological parameters of the overview zone, ultrasonic sensor for hindrance recognition in the way of the robot and GPS recipient for gathering data about position of the robot. A Radio Frequency (RF) Amplitude Shift Keying (ASK) handset channel empowers the correspondence between the robot and control board. The robot can be worked in two unique modes. In self-ruling mode, the robot voyages an arbitrary way relying upon impediment evasion method and stores or gathers and communicates live information stream to the control board. Each time the robot is set to self-ruling mode, after culmination of a restricted time overview activity, the robot returns to its beginning position where self-ruling mode was begun. Impediment sensor units introduced in the robot causes it to distinguish and dodge impediments in its way. The constant information representation is accomplished on a Liquid Crystal Show (LCD) in the control board and the method of task.

Keywords: RF Controlled Robot, ATmega328p, HT12E, HT12D, L293D, Radio-Frequency, Servo-Motors

I. INTRODUCTION

Study activities regularly end up important to gather data about ecological parameters for different purposes. The vast majority of the cases, the review tasks include manual information logging by direct human exertion to accomplish more prominent precision and unwavering quality. In any case, some of the time it ends up hazardous for humanity to be available physically in the zone of overview task. Overview task in hazardous spots like old rejected mine or in radio-dynamic zones can be hazardous for physical nearness of person. So these days, human are being supplanted by mechanical framework in testing works what's more, hazardous condition. This paper portrays a model of review activity framework with the assistance of a remote controlled robot which can play out an arrangement of review in a remote place and communicates the data to its control unit. The ecological overview colleague frameworks can be utilized inside crumpled structures, radioactive zones, mines and so on. In this framework, moistness, temperature and flammable gas level are chosen as overview parameters. There are a few existing frameworks which are fit for performing such study exercises with generally perplexing and exorbitant hardware. Despite the fact that having ability of a long range correspondence, these frameworks frequently end up costly for light overview activities. This task work was proposed to determine a savvy remote study task framework with a moderate correspondence extend (100 meters-from datasheet) utilizing locally accessible parts. The framework involves two unique units-the remote control unit and the robot unit furnished with an arrangement of sensors and remote advanced correspondence module. Ability of conveying with

numerous gadgets gives office of controlling numerous robots at the same time through a solitary control unit. Additionally, the proposed framework offers two extraordinary methods of activity independent and manual, which in turns makes the framework more helpful and dynamic at the point when subjected to long task time, or in the radio dropout zones.

II. METHODOLOGY

The framework for the most part comprises of a remote control unit what's more, (at least one) robot unit for overview activity in remote zones. The remote control unit goes about as the eye of the administrator while working the review mission. A live remote association between the control unit and the robot unit/units can be set up utilizing present day low power computerized RF handset gadget NRF24L01P, coordinated in both the units of the framework. This module offers smooth remote information access up to 100 meters of go, with 2.4 GHz bearer recurrence and a most extreme of 2Mbps information rate. A LCD show fills in as the visual interface for the administrator, in which the order outline and reaction of the remote unit are shown. Administrator gives the proper order to the robot utilizing a keypad interfaced with the control unit. Keypad in the control units gives singular catches to singular developments of the robot likewise with extra control catches for changing of modes, securing information and so forth. Microchip's midrange PIC microcontroller fills in as the processor of the control unit, which runs the introduced firmware at 20MHz clock rate. LCD and keypad in the unit are gotten to through worked in computerized input yield module of the microcontroller. The RF handset NRF24L01P is gotten to by implicit MSSP module of the microcontroller utilizing

SPI (Serial Peripheral Interface) correspondence convention. The microcontroller gets to singular control and information registers and read from /keep in touch with them as indicated by executed arrangement for use of the module.

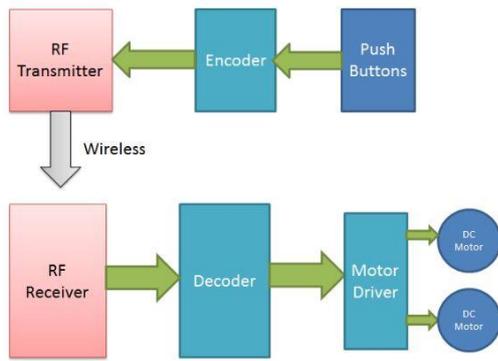


FIG 1: BLOCK DIAGRAM OF WIRELESS CONTROL UNIT

The robot unit/remote review unit goes about as the center of framework, in charge of proper execution of the review activity. This unit is furnished with a basic arrive wanderer for investigating the overview region, a remote handset module NRF24L01P for conveying with the remote control unit, a GPS gadget for worldwide situating, dampness, temperature and LPG gas sensors what's more, related instrumentation circuits for estimating ecological parameters, an ultrasonic sensor for discovery of snags in its way and a focal preparing unit dependent on midrange PIC microcontroller. There are two diverse activity modes for this unit the self-ruling mode and the manual mode.

The robot switches between these modes by the directions of the administrator. If there should be an occurrence of long time correspondence breakdown, the robot naturally changes to self-governing mode, plays out an arbitrary study activity all through the area, and stores them into memory and returns back to its essential position utilizing GPS. In the manual mode, the robot operates according to the commands received from the control unit.

The processor of the robot unit consistently screens the information bundles got from the control unit, orders them and executes required task for each significant word. Words are mostly delegated control words (for controlling the development of the Robot), obtaining word (for beginning remote information Obtaining procedure) and mode change word (for changing the mode among manual and self-sufficient). While in manual mode, the robot consistently streams. It's situation to the control unit which it gets from the GPS recipient, accordingly helps the administrator of the robot choosing the following stage of activity. A 12V battery pack inside the robot structure gives the electrical vitality required for a total activity.

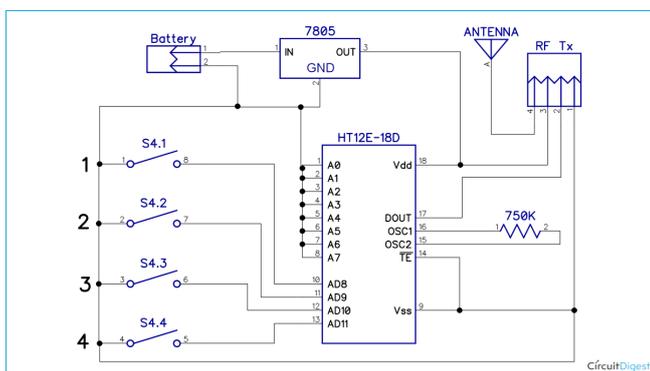


FIG 2: BLOCK DIAGRAM OF REMOTE SURVEY UNIT

III. ROBOT UNIT CIRCUITRY

A circuit chart having every part of the robot segments has been portrayed in the accompanying graph. Here the associations of the diverse sensors with the microcontroller also, the power supply of the robot hardware have been delineated.

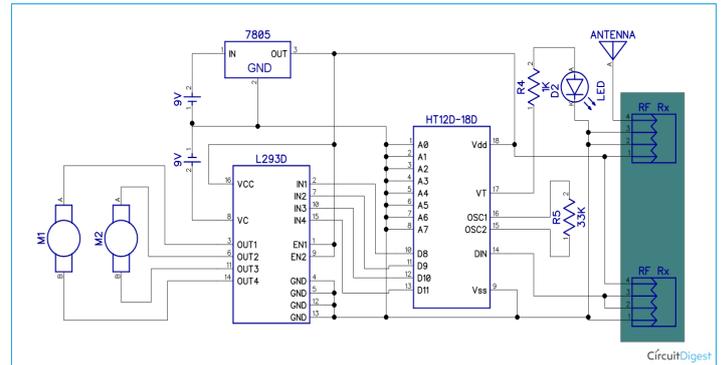


FIG 3: CIRCUIT DIAGRAM FOR ROBOT UNIT

IV. FIRMWARE DESCRIPTION

The firmware advancement for the review framework can be split into two sections creating firmware for the remote control unit and another for the robot unit. The firmware for the control unit demands remote association foundation when begun first. After building up a fruitful association among robot and control unit, the control unit firmware executes two distinctive strings of activities. In one string, it looks for the remote information gained by the robot on remote correspondence terminal, gets them and presentations them on the LCD. In the other string, it takes client input from the administrator (given utilizing keypad), labels the info order and transmits them to the robot through remote terminal.

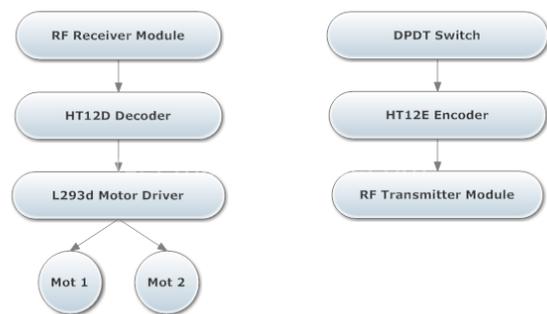


FIG 4: ALGORITHM FOR CONTROL PANEL

The firmware for the robot unit is bit muddled at that point that of the control unit. Whenever began, it initially anticipates for the control unit order to set the mode. After the mode is set by the administrator (by remote order), it begins executing the activities as indicated by the mode.

In manual mode, the firmware runs a program string looking for remote order ceaselessly, and after an order is gotten, it executes the significant task as indicated by the order. These directions include the development control of the robot, information securing direction and so on.

In the event that a direction for changing the method of the robot is gotten, it changes to the self-governing method of activity, and takes the directing of the review itself. From the ultrasonic sensor data, it distinguishes pediments in the way of the robot and controls the development with the end goal that the robot can stay away from them. After playing out an

arbitrary review activity for indicated day and age, it drives the robot to return to the beginning stage with the assistance of GPS recipient esteem. Diverse client characterized capacities are produced for interfacing with various fringe modules interfaced to the microcontroller.

V. PERFORMANCE EVALUATION

The overview task framework delineated in this paper is a framework with directed range which conceals territory to 100 meters of range. Where the vast majority of the current overview activity frameworks are of relative high scope of activity, they regularly end up costly for utilizations in generally less advanced situations, or in cases where a long scope of activities is not generally the key issue. The proposed framework offers a generally minimal effort arrangement in such cases. This additionally permits self-rule in arbitrary review activity, which makes the framework more agreeable in application field. Worked in GPS gadget can be utilized to permit a self-sufficient coming back to beginning stage, which gives additional security of the robot indeed, even in the most pessimistic scenario in radio dropout zones.

VI. CONCLUSION

The natural review right hand arrangement of the paper has been outlined and actualized for the accommodation of the person in any parlous spots. It can work both manual and self-ruling mode which will give additional favorable position in the overview activity in any condition. Despite the fact that a few frameworks existing for this sort of remote study tasks, however execution of this framework demonstrates a financially savvy and proficient study framework made up from monetarily accessible segments and actualized with astute control calculations.

VII. REFERENCES

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