

RF Controlled Robot Using AVR Micro-Controller ATmega328p

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ABSTRACT

Hypothetical—Survey undertaking to assemble information about regular parameters is an unpreventable part in various cases. Nevertheless, manual data logging by human is dangerous in unsafe spots. This paper oversees diagram and execution of a RF Controlled Robotic Environmental Survey Assistant System for remote audit exercises, which can help remote data getting of regular parameters like temperature, clamminess and the closeness and level of LPG gas recognizable all around. Truth be told, two individual units make up the aggregate outline associate structure. Beginning one is the remote-control unit for controlling and watching the survey methodology, while the second one is a remote-controlled data specialist robot unit which executes the examination system. The survey robot is equipped with sensor units required for estimation of temperature, clamminess and ignitable gas level as environmental parameters of the review zone, ultrasonic sensor for impediment acknowledgment in the method for the robot and GPS beneficiary for social event information about position of the robot. A Radio Frequency (RF) Amplitude Shift Keying (ASK) handset channel engages the correspondence between the robot and control board. The robot can be worked in two exceptional modes. In self-decision mode, the robot voyages a subjective route depending upon obstacle avoidance technique and stores or accumulates and imparts live data stream to the control board. Each time the robot is set to self-decision mode, after summit of a confined time diagram movement, the robot comes back to its starting position where self-decision mode was started. Obstacle sensor units presented in the robot makes it recognize and avoid obstructions in its way. The consistent data portrayal is expert on a Liquid Crystal Show (LCD) in the control board and the strategy for undertaking.

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

1. INTRODUCTION

Study exercises frequently wind up critical to accumulate information about natural parameters for various purposes. Most by far of the cases, the survey errands incorporate manual data logging by direct human effort to achieve more noticeable exactness and immovable quality. Regardless, a portion of the time it winds up perilous for mankind to be accessible physically in the zone of review assignment. Review errand in risky spots like old rejected mine or in radio-unique zones can be dangerous for physical closeness of individual. So nowadays human are being supplanted by mechanical structure in testing works what's increasingly, dangerous condition. This paper depicts a model of audit movement system with the help of a remote-controlled robot which can play out a course of action of survey in a remote place and conveys the information to its control unit. The natural outline partner systems can be used inside folded structures, radioactive zones, mines et cetera. In this structure, sogginess, temperature and combustible gas level are picked as review parameters. There are a couple of existing systems which are fit for performing such examination practices with for the most part confounding and over the top equipment. Notwithstanding the way that having capacity of a long-range correspondence, these systems habitually wind up expensive for light outline exercises. This assignment work was proposed to decide a sharp remote investigation errand system with a moderate

correspondence expand (100 meters-from datasheet) using locally open parts. The structure includes two extraordinary units-the remote control unit and the robot unit outfitted with a game plan of sensors and remote propelled correspondence module. Capacity of passing on with various devices gives office of controlling various robots in the meantime through a singular control unit. Also, the proposed structure offers two phenomenal strategies for movement autonomous and manual, which in turns makes the system more accommodating and dynamic exactly when subjected to long assignment time, or in the radio dropout zones.

2. METHODOLOGY

The system generally involves a remote control unit what's more, (something like one) robot unit for review movement in remote zones. The remote control unit goes about as the eye of the chairman while working the audit mission. A live remote relationship between the control unit and the robot unit/units can be set up using present day low power modernized RF handset contraption NRF24L01P, composed in both the units of the system. This module offers smooth remote data access up to 100 meters of go, with 2.4 GHz conveyor repeat and a most extraordinary of 2Mbps data rate. A LCD demonstrate fills in as the visual interface for the manager, in which the request blueprint and response of the remote unit are appeared. Manager gives the correct request to the robot using a keypad interfaced with the control unit. Keypad in the control units gives solitary gets to particular advancements of the robot moreover with additional control gets for changing of modes, anchoring data et cetera. Microchip's midrange PIC microcontroller fills in as the processor of the control unit, which runs the presented firmware at 20Hz clock rate. LCD and keypad in the unit are gotten to through worked in mechanized info yield module of the microcontroller. The RF handset NRF24L01P is gotten to by understood MSSP module of the microcontroller using SPI (Serial Peripheral Interface) correspondence tradition. The microcontroller gains to solitary power and data registers and read from/stay in contact with them as shown by executed course of action for utilization of the module.

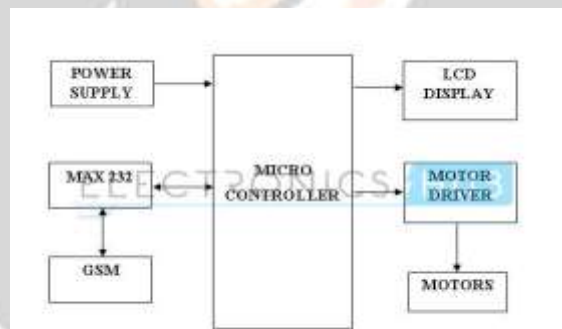


Fig -1: Block Diagram Of Wireless Control Unit

The robot unit/remote survey unit goes about as the focal point of system, responsible for appropriate execution of the audit movement. This unit is outfitted with an essential arrive vagabond for exploring the outline district, a remote handset module NRF24L01P for passing on with the remote control unit, a GPS device for overall arranging, moistness, temperature and LPG gas sensors what's more, related instrumentation circuits for evaluating biological parameters, a ultrasonic sensor for revelation of obstacles in it's way and a central planning unit subject to midrange PIC microcontroller. There are two different action modes for this unit oneself decision mode and the manual mode. The robot switches between these modes by the headings of the director. In the event that there ought to be an event of long time correspondence breakdown, the robot normally changes to self-administering mode, plays out a subjective investigation movement all through the region, and stores them into memory and returns back to its fundamental position using GPS. In the manual mode, the robot works as per the directions got from the control unit.

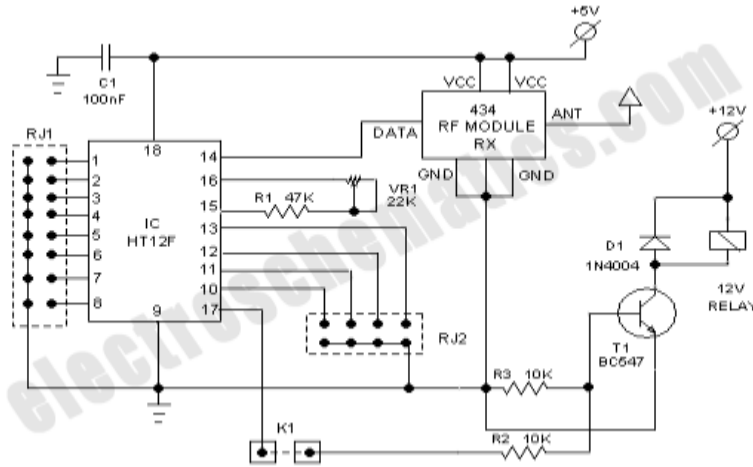


Fig -2: Circuit Diagram For Wireless Control Unit

The processor of the robot unit reliably screens the data packs gained from the power unit, orders them and executes required assignment for each critical word. Words are for the most part designated control words (for controlling the improvement of the Robot), acquiring word (for starting remote data Obtaining technique) and mode change word (for changing the mode among manual and independent). While in manual mode, the robot reliably streams It's circumstance to the control unit which it gets from the GPS beneficiary, appropriately helps the director of the robot picking the accompanying phase of movement. A 12V battery pack inside the robot structure gives the electrical essentialness required for an aggregate movement.

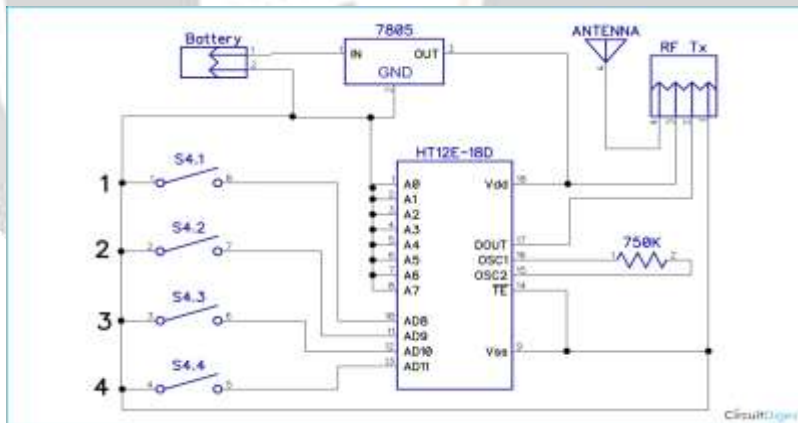


Fig -3: Block Diagram Of Remote Survey Unit

3. 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.

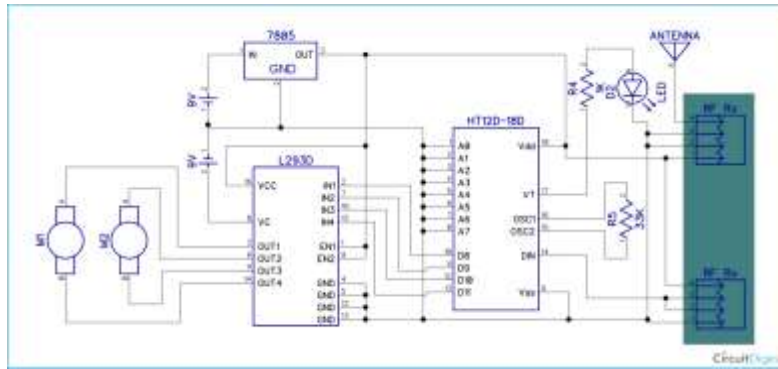


Fig -4: Circuit Diagram For Robot Unit

4. FIRMWARE DESCRIPTION

The firmware headway for the audit structure can be part into two segments making firmware for the remote control unit and another for the robot unit. The firmware for the control unit requests remote affiliation establishment when started first. Subsequent to working up a productive relationship among robot and control unit, the control unit firmware executes two unmistakable series of exercises. In one string, it searches for the remote data picked up by the robot on remote correspondence terminal, gets them and introductions them on the LCD. In the other string, it takes customer contribution from the head (given using keypad), names the data arrange and transmits them to the robot through remote terminal.



Fig -5: Algorithm For Control Panel

The firmware for the robot unit is bit jumbled by then that of the control unit. At whatever point started, it at first foresees for the control unit request to set the mode. After the mode is set by the chairman (by remote request), it starts executing the exercises as shown by the mode. In manual mode, the firmware runs a program string searching for remote request constantly, and after a request is gotten, it executes the critical assignment as demonstrated by the request. This headings incorporate the advancement control of the robot, data anchoring bearing et cetera. If a heading for changing the technique for the robot is gotten, it changes to oneself administering strategy for action, and takes the coordinating of the audit itself. From the ultrasonic sensor information, it recognizes pediments in the method for the robot and controls the improvement with the true objective that the robot can avoid them. In the wake of playing out a discretionary survey movement for demonstrated day and age, it drives the robot to come back to the starting stage with the help of GPS beneficiary regard. Differing customer described limits are delivered for interfacing with different periphery modules interfaced to the microcontroller.

5. PERFORMANCE EVALUATION

The diagram errand system portrayed in this paper is a structure with guided range which disguises an area to 100 meters of range. Where by far most of the present review action systems are of relative high extent of movement, they consistently wind up expensive for uses in by and large less propelled circumstances, or in situations where a long extent of exercises are not for the most part the key issue. The proposed structure offers a by and large insignificant exertion course of action in such cases. This furthermore allows self-control in discretionary survey movement, which makes the structure more pleasing in application field. Worked in GPS device can be used to allow an independent returning to starting stage, which gives extra security of the robot in reality, even in the most critical situation in radio dropout zones.

6. CONCLUSION

The characteristic survey right hand game plan of the paper has been sketched out and completed for the convenience of the individual in any parlous spots. It can work both manual and self-decision mode which will give extra great position in the diagram action in any condition. In spite of the way that a couple of structures existing for this kind of remote examination undertakings, anyway execution of this system shows a fiscally shrewd and capable investigation structure made up from financially open sections and realized with keen control computations.

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