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RESEARCH ARTICLE

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RF CONTROLLED CLIMBING AND SHIFTING ROBO

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ABSTRACT

The main objective of this paper is to design a multipurpose vehicle to shift the load. Now the industries are mainly using conveyor system or cranes to transport the load. But there, functions are limited. Now the industries are developed. Industries are having the main problem of lack of space. So trying to develop a multipurpose robot which has the application of both systems. Our project has the advantage of conveying the load through the land like a crane and across a beam like a conveyor system. This robot will be very useful for the future also. The overall control is based on a micro controller circuit.

The whole process includes shifting load & climbing through a beam and transports the load. And the operation can be controlled through remote by using the RF control. It is very useful in industries.

Key Words—Robot, AT89C51, RF module, DC Geared motor

INTRODUCTION

Industrial automation is becoming popular or essential in this present world where man power is becoming unavailable. Every type of manufacturers and industries are seeking way to make their firm automated. Automation reduces effort, cost of production, time, man power and more. Now also industries are using conventional method like conveyors and cranes. From that got an idea to make RF controlled Climbing and shifting robot. It works in a RF based remote control circuit. This will be the application of both conveyor system and cranes. Application of both will be integrated to make one multipurpose vehicle. The vehicle can travel through land like as crane as well as it can have the property to adjust the arm and climb over beam and can travel over through the beam. This helps to transfer any system from one place to another place without many disturbances. In this project, the body or outer surface of this machine is made of plastic and structure builds by acrylic sheet.

Mechanical Design

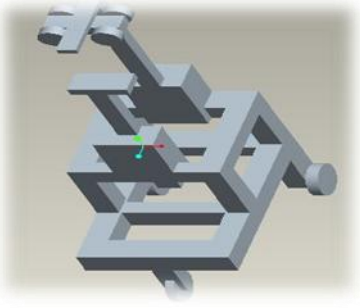

Fig.1. Mechanical Design

HARDWARE REQUIRMENT

- Micro Controller(ATMEL 89C51)
- RF Module
- DC Geared Motor
- Power Supply
- Body
- Wheels

Block diagram

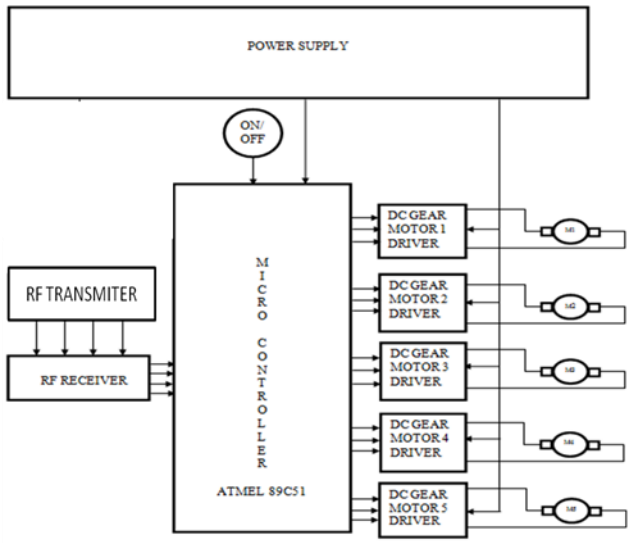

Fig.2. Block Diagram

HARDWARE DEACRIBTION

Microcontroller

The Atmel AT89 series is an Intel 8051-compatible family of 8 bit microcontrollers (µCs) manufactured by the Atmel Corporation. Based on the Intel 8051 core, the AT89 series remains very popular as general purpose microcontrollers, due to their industry standard instruction set, and low unit cost. This allows a great amount of legacy code to be reused without modification in new applications. While considerably less powerful than the newer AT90 series of AVR RISC microcontrollers, new product development has continued with the AT89 series for the aforementioned advantages. More recently, the AT89 series has been augmented with 8051-cored special function microcontrollers, specifically in the areas of USB,I²C (two wire interface), SPI and CAN bus

controllers, MP3 decoders and hardware PWM **PIN DESCRIPTION**

VCC:

Supply voltage

GND:

Ground.

Port 0:

Port 0 is an 8-bit open-drain bi-directional I/O port. As an output port, each pin can sink eight TTL inputs. When 1s are written to port 0 pins, the pins can be used as high impedance inputs. Port 0 may also be configured to be the multiplexed loworder address/data bus during accesses to external program and data memory. In this mode P0 has internal pull-ups. Port 0 also receives the code bytes during Flash programming, and outputs the code bytes during program verification. External pullups are required during program verification.

Port 1:

Port 1 is an 8-bit bi-directional I/O port with internal pullups. The Port 1 output buffers can sink/source four TTL inputs. When 1s are written to Port 1 pins they are pulled high by the internal pullups and can be used as inputs. As inputs, Port 1 pins that are externally being pulled low will source current (IIL) because of the internal pullups. Port 1 also receives the low-order address bytes during Flash programming and verification.

Port 2:

Port 2 is an 8-bit bi-directional I/O port with internal pullups. The Port 2 output buffers can sink/source four TTL inputs. When 1s are written to Port 2 pins they are pulled high by the internal pullups and can be used as inputs. As inputs, Port 2 pins that are externally being pulled low will source current (IIL) because of the internal pullups. Port 2 emits the high-order address byte during fetches from external program memory and during accesses to external data memory that use 16-bit addresses (MOVX @ DPTR). In this application, it uses strong internal pullups when emitting 1s. During accesses to external data memory that use 8-bit addresses (MOVX @ RI), Port 2 emits the contents of the P2 Special Function Register. Port 2 also receives the

high-order address bits and some control signals during Flash programming and verification.

Port 3:

Port 3 is an 8-bit bi-directional I/O port with internal pullups. The Port 3 output buffers can sink/source four TTL inputs. When 1s are written to Port 3 pins they are pulled high by the internal pullups and can be used as inputs. As inputs, Port 3 pins that are externally being pulled low will source current (IIL) because of the pull-ups.

RST:

Reset input. A high on this pin for two machine cycles while the oscillator is running resets the device.

ALE/PROG:

Address Latch Enable output pulse for latching the low byte of the address during accesses to external memory. This pin is also the program pulse input (PROG) during Flash programming. In normal operation ALE is emitted at a constant rate of 1/6 the oscillator frequency, and may be used for external timing or clocking purposes. Note, however, that one ALE, pulse is skipped during each access to external Data Memory. If desired, ALE operation can be disabled by setting bit 0 of SFR location 8EH. With the bit set, ALE is active only during a MOVX or MOVC instruction. Otherwise, the pin is weakly pulled high. Setting the ALE-disable bit has no effect if the microcontroller is in external execution mode.

PSEN:

Program Store Enable is the read strobe to external program memory. When the AT89C51 is executing code from external program memory, PSEN is activated twice each machine cycle, except that two PSEN activations are skipped during each access to external data memory.

EA/VPP:

External Access Enable. EA must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset. EA should be strapped to VCC for internal program executions. This pin also receives the 12-volt programming enable voltage (VPP) during Flash programming, for parts that require 12-volt VPP.

XTAL1:

Input to the inverting oscillator amplifier and input to the internal clock operating circuit.

XTAL2:

RF Module

An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio castor signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and/or receiver

Fig.3. RF Module

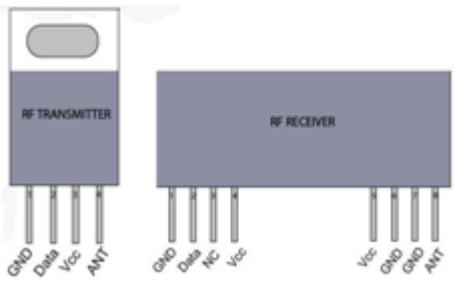

Fig.4. RF Module Pin Diagram

Table.1.RF Transmitter

RF Transmitter

Pin No	Function	Name
1	Ground (0V)	Ground
2	Serial data input pin	Data
3	Supply voltage; 5V	Vcc
4	Antenna output pin	ANT

Table.2. RF Receiver

RF Receiver

Pin No	Function	Name
1	Ground (0V)	Ground
2	Serial data output pin	Data
3	Linear output pin; not connected	NC
4	Supply voltage; 5V	Vcc
5	Supply voltage; 5V	Vcc
6	Ground (0V)	Ground
7	Ground (0V)	Ground
8	Antenna input pin	ANT

DC Geared Motor

Geared DC motors can be defined as an extension of DC motor which already had its Insight details demystified here. A geared DC Motor has a gear assembly attached to the motor. The speed of motor is counted in terms of rotations of the shaft per minute and is termed as RPM .The gear assembly helps in increasing the torque and reducing the speed. Using the correct combination of gears in a gear motor, its speed can be reduced to any desirable figure. This concept where gears reduce the speed of the vehicle but increase its torque is known as gear reduction. This Insight will explore all the minor and major details that make the gear head and hence the working of geared DC motorThey come in two types, brushless and servo. It has a rotor, a stator with permanent magnets and a gearbox. The magnetic field is generated by permanent or electromagnets. They are used in applications with variable torque and speed. Gear motors are selected by the speed of the shaft, continuous torque, current, output power and other specifications. Other specifications include the gear ratio, types of gears and the maximum torque transferred at the output shaft. Motor speed is generally measured in revolutions per minute (RPM). Rotating force is called torque, measured in Newton-meters Nm. Remember that the higher the number of gears the harder the motor turns. Gearing down a motor reduces its RPMs (speed) but increases its torque. Conversely, gearing up a motor increases its RPMs but decreases its torque.Gears are generally contained within a housing that protects the gears from interference and which provides a bearing surface for the various gear shafts and drive shafts. The term gear box generally refers to the entire system of gears, shafts, bearings and housing.When you apply energy to a motor it spins as fast and hard as its design allows for that energy level and output load. If you increase the energy supply it spins faster and harder. If you attach a load the motor will slow down. If you continue increasing the load it slows ever more until the motors capability to work is exceeded. When the extreme load causes the motor to stop it is said to be stalled. Reducing the load causes the motor spin faster. If you entirely remove the load the motor is said to be "free running" and operates at its maximum speed for that input energy level.Because of the influence of the load, you cannot absolutely control the speed of the motor by controlling the input energy level. If you need to precisely control the motor speed you must consider the load. Because it is difficult to measure load, the most practical way to precisely control motor speed is to directly measure the speed. A device which detects the rotation of a shaft is called a shaft encoder. By counting rotations for a period of time you can determine motor speed.

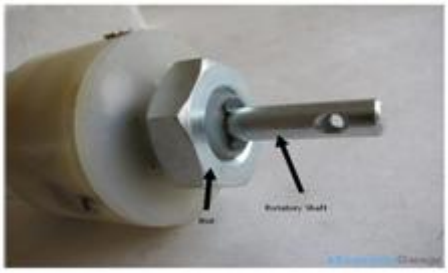

Fig.5. DC Geared motor

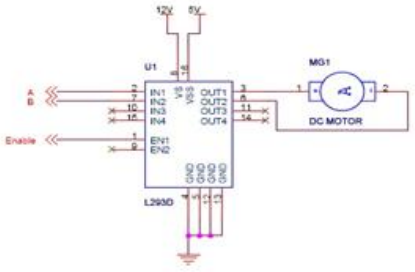

Fig.6. Driver Circuit

D. Power Supply

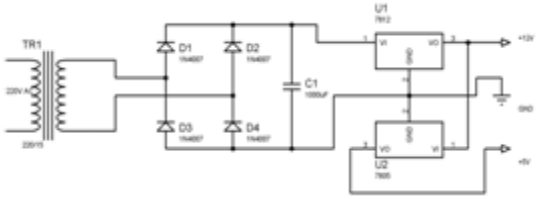

Fig.7. Power supply Circuit

E. Body

The body is mainly made up of acrylic sheet and aluminum. This is to reduce the weight of the robot. The base part and chase body we are used the acrylic sheet. The vehicle is approximately 200mm in length and 170mm in width and 450 mm in height.

F. Wheels

The vehicle having 8 wheels out of which the rear wheels is wheel. The tires are made up of plastic with 2 mm rubber coating over it and have a 70mm dia. The 12v motor is attached with rear wheels.

VI. OPERATION OF 4 SWITCHES

Table.3. Operation of 4 Switches

Button	Operation
A	Forward
C	Reverse
B	Right side
D	Left side
AB	Right arm move up
AD	Left arm move up
CB	Right arm movedown
CD	Left arm move down
AC	Auxiliary vehicle moves forward.
BD	Auxiliary vehicle moves forward.
ABC	Arms up simultaneously
ADC	Arms down simultaneously

VII. Keil Software

Assembly language program using the popular Keil Compiler. Keil offers an evaluation package that will allow the assembly and debugging of files 2K or less. This Package is freely available at their web site. Keil's website address is www.keil.com.This tutorial will assist you in writing your first 8051.

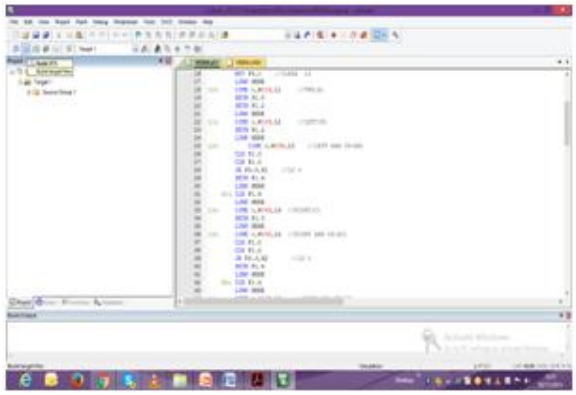

Fig.8.Snap 1

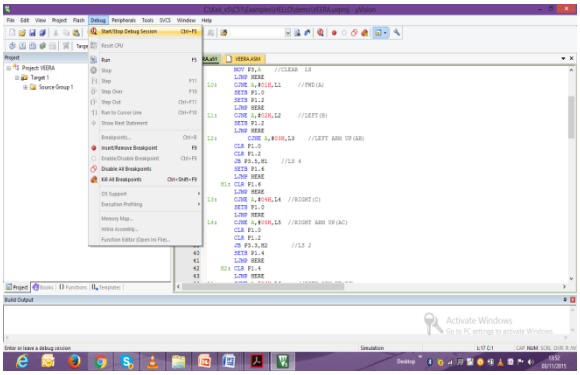

Fig.9.Snap 2

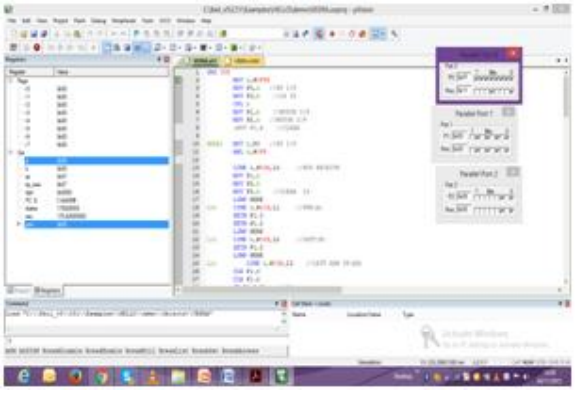

Fig.10. Snap 3(Output)

VIII EXISTING SYSTEM

RCA system consists of four core systems as follows; (1) Monitoring and control system, (2) Material assembly system, (3) Beam assembly system, (4) Construction Factory (CF) system. In the monitoring and control system, all data from the system sensors are gathered through the integrated system protocol. Then the real-time progress management (RTPM) and visualization system (RTVS), which are the sub-system of the monitoring and control system, examine the construction.

Monitoring and control system progress and display the status of the construction progress in 3D. In the material assembly system, materials and structural steel frames are transported into the CF using a tower crane installed at the core of building and then they are assembled automatically by Design for Automation (DFA). Beam assembly system transports the bolting robot system to the working space in CF and it executes the bolting process.

But in this system I can't able crane as well as conveyor, but in our RF CONTOLLED CLIMBING AND SHIFTING ROBO can make both.

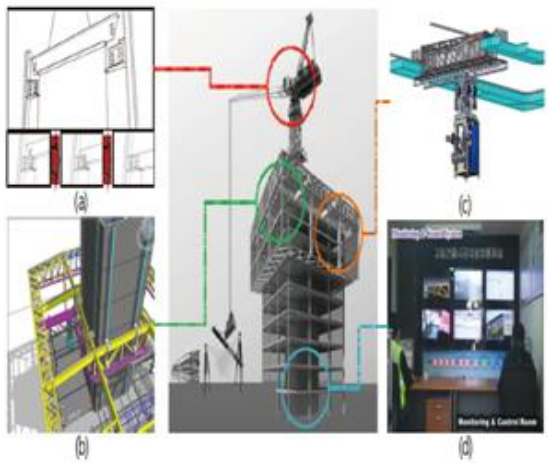

Fig. 11 Existing system

CONCLUSION

This paper addresses the behavior of each node present **"RF CONTROLLED CLIMBING AND SHIFTING ROBO"** is multipurpose robot to convey the load in industry. The vehicle can travel through land like as crane as well as it can have the property to adjust the arm and climb over beam and can travel over through the beam. This helps to transfer any system from one place to another place without many disturbances.

Confident that the knowledge gained at this prestigious organization shall rest beside us in every challenge could face in our engineering carrier ahead.

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