Pick N Place Robot

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PICK N PLACE ROBOT

INTRODUCTION

✓There are many places where man cannot go to do any type of work like where there is very high temperature or not more space etc. we are working for making a small size ROBO car which can go at any place.

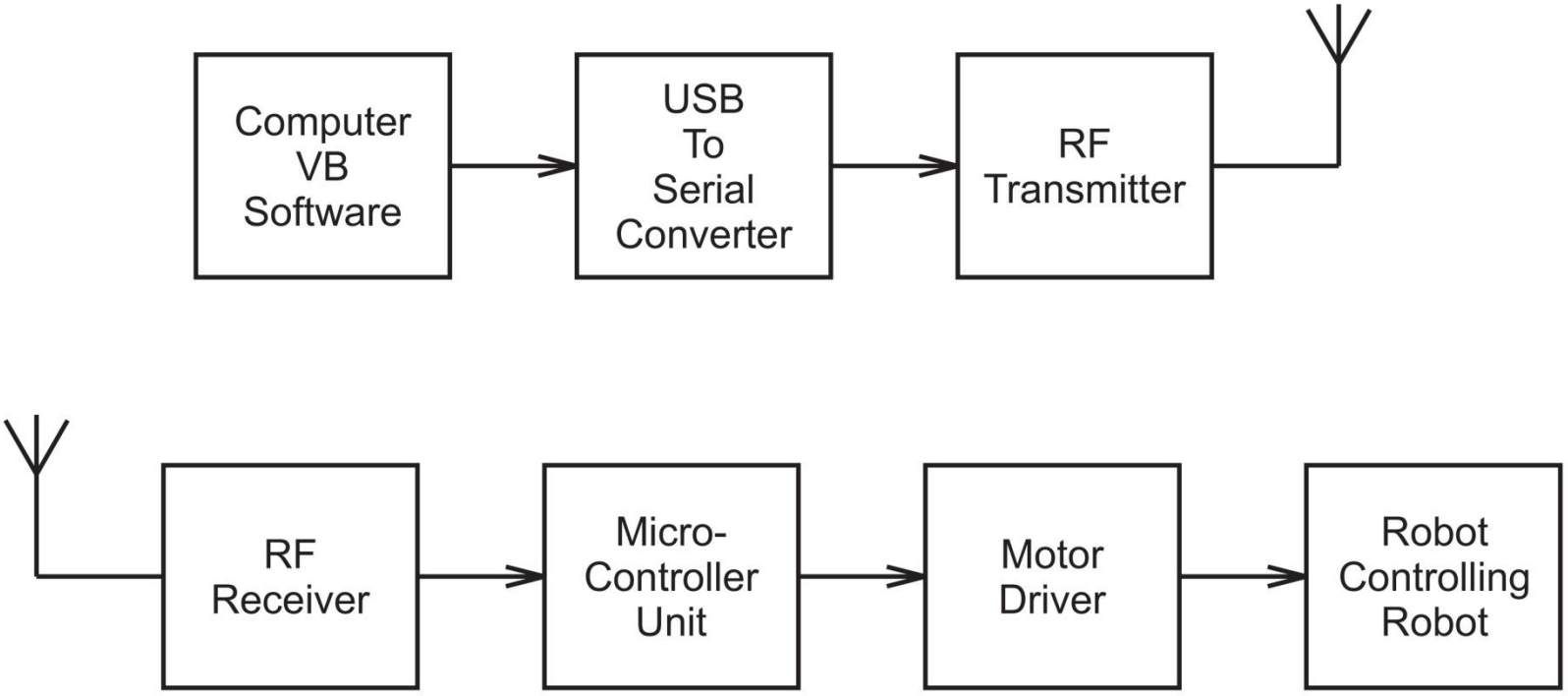
✓We have planned to make matrix by which robot can identify where its own position and direction is and where to go for pick and where to go for place. We have planned to operate this ROBO car remotely from computer by wireless technology.

✓On the computer there will be a matrix of 10-10. Just clicking on the square for pick and place and pressing the start button it will complete the work and it will be back to its starting location by itself.

✓The output of COMPUTER VB SOFTWARE is connected to USB TO SERIAL CONVERTER and goes through RF transmitter. RF transmitter transmits the data in 100meter range through 433MHz frequency.

✓The transmitted data will receive by RF receiver in 100meter range. This data will fetch by Microcontroller and gave the command to Robot controlling motor & Car motor on the bases of timing for deciding ON/OFF time of the motor. And control the robotic arms.

Block Diagram :



Description Of Block Diagram :

Computer VB Software:

There will be computer software which will get input from user about picking space and placing space. It will transmit the information on serial port of the computer.

USB to Serial Converter:

In new computer there is no serial port on board. So we have to convert it using USB because all computer having easily available this port.

RF Transmitter:

All data will be transmitted to Radio Frequency Transmitter. It will receive directly serially data so we can connect directly it to the USB to serial port.

MCU (Micro Controller Unit):

Microcontroller will fetch the data received from the RF receiver. It will command to motor driver circuit on the bases of timing and it will complete the operation provided by the user of pick and place operation.

RF Receiver:

It will receive the data form RF transmitter and gives controller with serial communication.

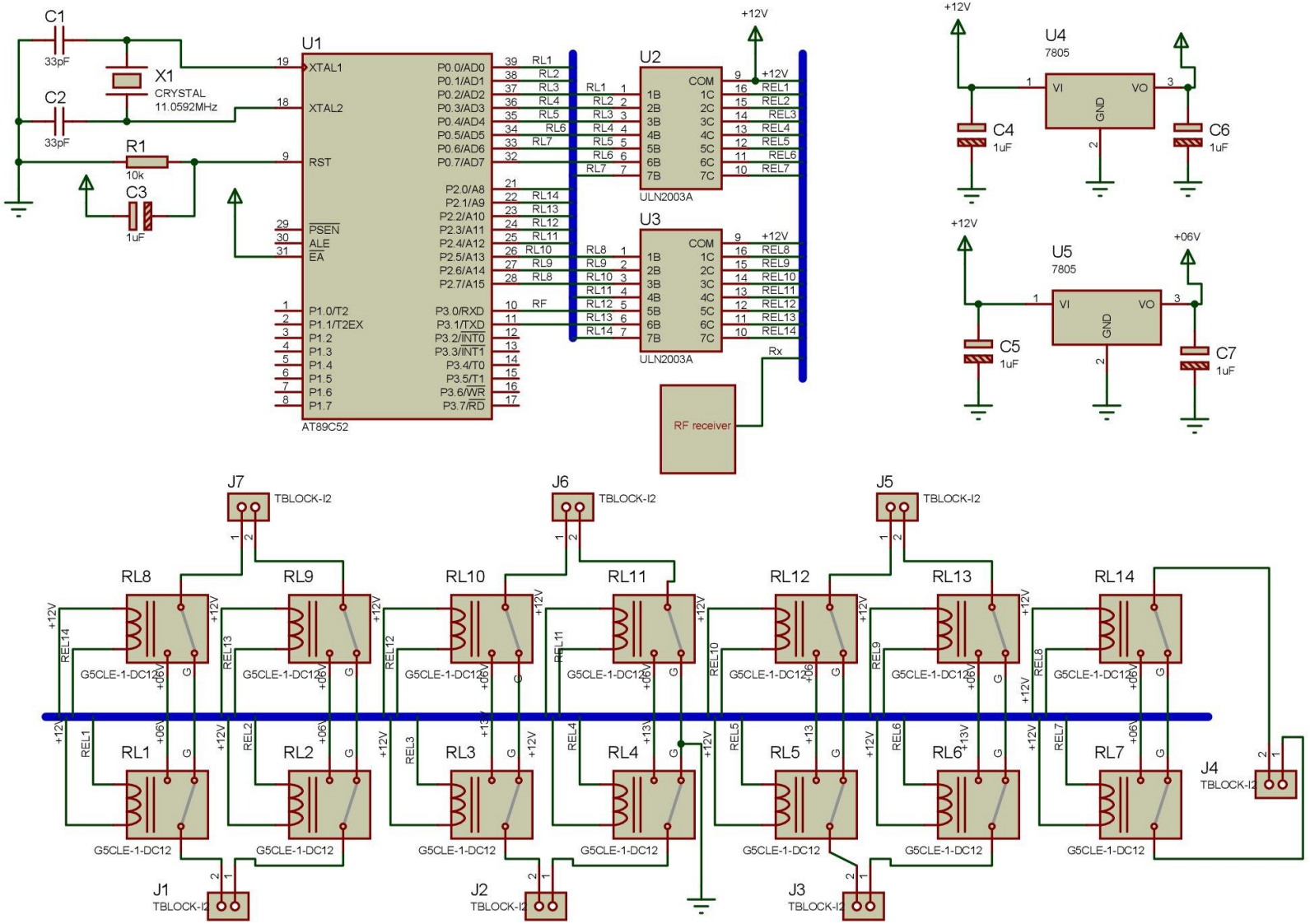
Motor Driver: (ULN 2003A)

Motor is an inductive load. Generally all inductive needs much more current than other load. Microcontroller can provide maximum 10-15 mA of current from any input/output pin. Motor needs more than 200mA of current. Another problem is about voltage level. Microcontroller can output of only 5Volt but motor will be operated on 5Volt and 12V. So we need motor driver circuit driver to control the DC motor.

Robot Controlling Motors:

Here we may have more than 7 motor. two motor are for driving the car. And five motor for controlling the robotic arm. Car motors will be operated on 12VDC and other motors will be operated on 5VDC.

Circuit Diagram :


C1
33pF
C2
33pF
X1
CRYSTAL
11.0592MHz
R1
10k
C3
1uF
U1
AT89C52
XTAL1
XTAL2
RST
PSEN
ALE
EA
P1.0/T2
P1.1/T2EX
P1.2
P1.3
P1.4
P1.5
P1.6
P1.7
P0.0/AD0
P0.1/AD1
P0.2/AD2
P0.3/AD3
P0.4/AD4
P0.5/AD5
P0.6/AD6
P0.7/AD7
P2.0/A8
P2.1/A9
P2.2/A10
P2.3/A11
P2.4/A12
P2.5/A13
P2.6/A14
P2.7/A15
P3.0/RXD
P3.1/TXD
P3.2/INT0
P3.3/INT1
P3.4/T0
P3.5/T1
P3.6/WR
P3.7/RD
RL1
RL2
RL3
RL4
RL5
RL6
RL7
RL14
RL13
RL12
RL11
RL10
RL9
RL8
RF
U2
U3
ULN2003A
COM
+12V
REL1
REL2
REL3
REL4
REL5
REL6
REL7
REL8
REL9
REL10
REL11
REL12
REL13
REL14
Rx
RF receiver
U4
7805
U5
7805
VI
VO
GND
C4
1uF
C5
1uF
C6
1uF
C7
1uF
+06V
J7
J6
J5
J4
J1
J2
J3
TBLOCK-I2
G5CLE-1-DC12

Description of Circuit Diagram:

✓Computer will transmit the signal by RF and the circuit will receive the transmitted signal.

✓We have selected AT89S52 IC as a microcontroller. It will get the received data from the RF Receiver. It has only this input. Computer will transmit the command to the microcontroller for all operation one by one. Microcontroller will follow the instructions given by the computer.

✓Now we have to control the seven different motors. To drive the motors we have used relays for isolated operation between the microcontroller power supply and motor supply. So we need 2 relays per motor that is we need 14 relays.

✓To drive the relay we need relay driver also. There is a chip especially for drive relay is ULN2003A. This chip can drive 7 relay. So we need 2 chips.

✓Car will be driven by two motors which will be run on 12V DC. All other motors will work for the movement of the robotic arm and they will be run on 5V DC.

Component List :

- Microcontroller : AT89S52
- RF Transmitter & Receiver
- Relays

Component Description :

Microcontroller AT89S52 :

- There are four ports available in this micro controller.
- Each ports has its different functions.
- In this micro controller 32 pins for I/O.
- 256bytes data memory.
- 8kb program memory.
- Other function is Timer/Counter is inbuild.

RF Transmitter & Receiver:

- It is wireless communication device.
- It can transmit & receive the data through radio frequency at carrier frequency of 433MHz.
- It gets data from microcontroller serially at 9600 baud rate.
- Its range is 100m.

Relays :

- A Relay is an electrically operated switch.

- It is a simple switch which we are generally use to on/off the light or fan but that switch is manual operated and it can be operated with electrical signal.

- There is a coil inside and it acts as electromagnet. By this magnetic field the metallic contact attracted and it acts as switching operation.

Advantage :

- We have designed robot working with wireless communication.
- It can go where man cannot go.
- Fully automatic operation.
- Easy to use.

Disadvantage :

- We have designed this on the bases of timing not with feedback.
- Limited area of work.

Application :

- It can be used where the temperature is very high or man cannot go.

- At any place where we have requirement of movement of physical objects from one place to other.

Future Scope :

- We can increase accuracy be getting feedback.

- We can increase the working area.

THANK YOU