fUNCTIONAL rEQUIREMENT dOCUMENT

# **Explorer robot**

23-07-2019

Author(s)

Richa Bajpai

Prateek Kumar

Pinwheel Robotics

|  |  |  |
| --- | --- | --- |
| Sl. No. | Revision | Date |
| 1. | Initial Draft | 23-07-19 |
| 2. |  |  |
| 3. |  |  |
| 4. |  |  |
| 5. |  |  |

This document is confidential document and subject to copyright by Pinwheel Robotics.

**Introduction:**

A Robotic Arm based All Terrain Remote Controlled Car, with various probe attachments to explore and find various materials in a universe using different laws of electricity and magnetism.

**Functions:**

1. Robotic arm consists of various probe attachments like (Exploring Function):

|  |  |  |
| --- | --- | --- |
| No. | Attachment | Use |
|  | UM66 with buzzer | (to check conductivity) conductors/insulators and humidity |
|  | Wire wound Cu coil as electromagnetic probe | Magnetic and non magnetic materials |
|  | Drill motor probe | to drill |
|  | Electrostatic Probe | Differentiate different electrostatic material. |

1. Wheels: (Movement Function)

Two types of wheels:

1. Normal wheel- For regular surface
2. Caterpillar wheels-For different terrains
3. Headlights: (Visibility Function Day-Night Exploration)

Pair of headlights (LEDs)

1. Activated by light sensitive LDR/IR sensor.
2. Activated by direct switch.
3. Remote: (Controlling Function)

Wire connected remote to regulate the movement of the robot.

Can use DPDT switch, Push button & Limit Switch for the purpose.

Movements:

1. Forward
2. Backward
3. Left
4. Right
5. Arm lift
6. Arm down
7. Arm swivel

Working:

Forward Lift Swivel

Left Right

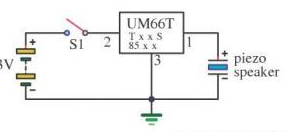
Reverse Drop

**Wheel Motor movement Arm motor movement Arm Swivel Movement**

**Components:**

**Probes:**

1. Electromagnet probe:
2. 21-24 gauges insulated Cu wire.
3. Iron nail/ rod for core 8cm long



1. 9V battery
2. Conductor probe:
3. UM66t IC
4. Piezo speaker/buzzer
5. Drill probe:
6. Toy motor
7. Screw (to resemble drill bit)
8. Electrostatic Probe :
9. Plastic Stick and rubbing material.

**Headlight:**

1. 2 xLEDs
2. 1x LDR or IR sensor
3. Required electronics

**Remote:**

1. 3x DPDT switches (2 for wheel motors and 2 for arm)
2. Connecting wire for switch with respective motors

**Wheels:**

1. 4x Normal or caterpillar car/robot wheels
2. 6x BO motors (4 for car base and 1 for Arm)

**Power:**

1. Pinwheel Robotics Power module that consists of Buck-Boost Amplifier and LiIon charger circuit.
2. Single Li Ion Battery 3.7V of Lexel or Samsung.

**PCB’s Required :**

1. **LDR based LED Light (Headlight Purpose)-Glow in dark**
2. **Conductivity Sensor with UM66T and a buzzer.**
3. **Motor Driver board- 4 motors , 2 pairs**
4. **Power module**
5. **Remote board**
6. **Pulse-switch for Swivel and Arm , need to turn step wise .**