

## Intelligent Metro System

**Sandeep Malhotra**

B.Tech Student  
Department of ECE  
SRM University NCR Campus  
Modinagar

**Abhishek Chauhan**

Assistant Professor  
Department of ECE  
SRM University NCR Campus  
Modinagar

### ABSTRACT:

In this paper I have introduced a new method that can be adopted to run a train over a track. The idea is to replace the engine that pulls the train by burning diesel or electricity. In case of metro train system, the idea is to provide rapid service trains covering a short distance. In general metro systems, each bogey has wheels which are all powered by a source of energy. To run these motors and stop them too at small intervals, a large amount of energy is consumed. Thus in this paper I introduce a sensor based train system that runs on an automated track without the help of an engine. The track will have a set of motors which will be connected to a circuit operated by dark sensor circuits to selectively activate motors to run the train. The LDR would be used as dark sensor which will be placed on the track. As soon as the train will come on a portion of the track, the dark sensor circuit will be activated and will hence run the set of motors and hence the set of belt drives connected to them, thus gliding the train forward. In this way we can extend the usage of such automation tracks to different areas. The train can also be used as a source of transport in large scale industries to transport the goods from one place to another with convenience and consuming low power.

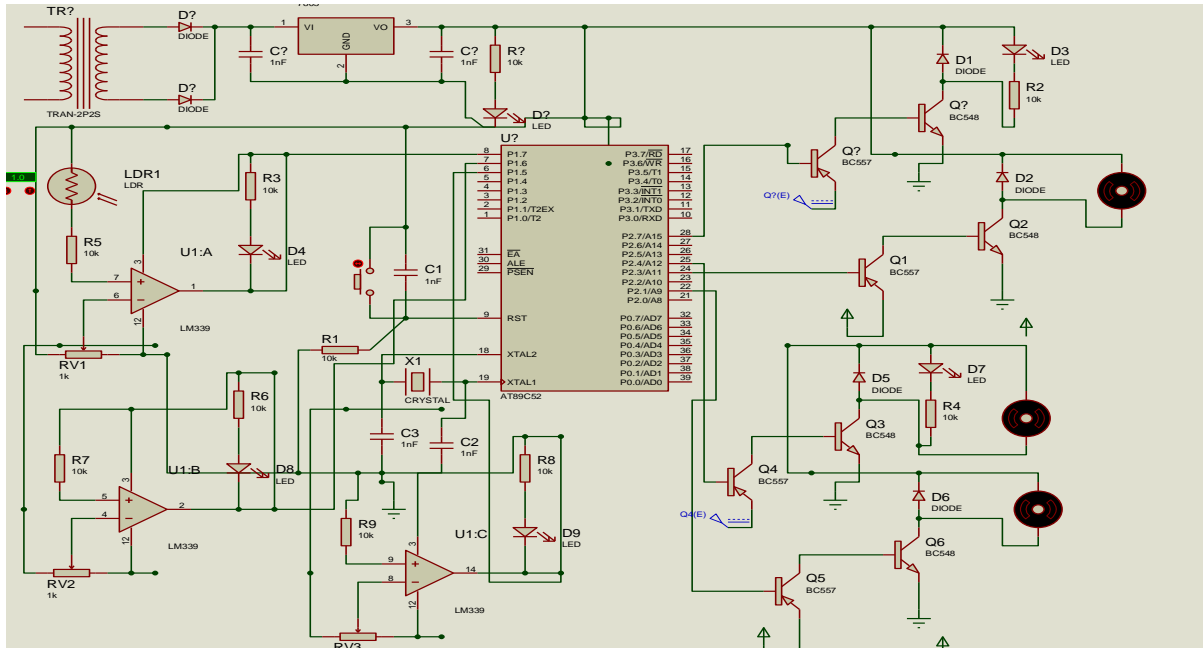
**Keywords**— LDR, belt drive, motor, train, dark sensor

### INTRODUCTION:

There are various problems that are faced by the industries to transfer the goods from one place to another at a distance of 4 to 8 km. To transfer these goods the overall cost to the company increases so we need to come up with some alternate method to do so. This project can be considered as that alternative. Also in the near future there will be a condition wherein we will be short of the resources that drive these companies and form the backbone of the industrial growth. These resources are non-renewable resources so we need to come up with innovative ideas to save these. This project is one such initiative. We can't expect to replace the current system with these ideas instantly, it will take some time. Also we can't depend on man force to get our work done as this increases the human error. In this project I have introduced a new method to run the train. The system uses beltdrives, motors, and sensors to drive the train. Here the engine is replaced as diesel usage is then reduced drastically. The train runs with the help of the dark sensor action of the LDR.

### LDR CONCEPT:

LDR (light dependent resistors) are devices that reduce their resistance depending on the quantity of the light that falls on them. If the quantity of the light is more than the resistance reduced is also more and more current flows through them then. Here the LDR works in dark condition, which means that if the quantity of the shadow that falls is more than the current also increases. The LDR are used greatly and they are of various types and the specifications change according to the requirement.

**CIRCUIT:**

The components required are

1. Microcontroller (AT89C52).
2. Comparator(Lm-339).
3. Transformer(9-0-9).
4. Diode(in4007)
5. Resistor(1k,470ohm,10k,270ohm).
6. Capacitor(10uf,1000uf,27pf).
7. IC Regulator(7805).
8. Transistor(Npnbc-547,bc-557pnp).
9. LDR.
10. Pcb.
11. Battery .
12. Switch.
13. Relay
14. Power Supply

The power supply is formed with the help of a step-down transformer, full wave rectifier(centre tapped), filter capacitor and regulator IC(7805).

The transformer converts 220 V ac to 9V ac, the full wave rectifier performs ac to dc rectification; there is some portion of ac still remaining so we use a filter capacitor. The regulator IC converts 9V to 5V.

We use comparator and the LDR is connected to the positive and resistance to the negative terminal, when there is light the LDR has low resistance hence current flows through the positive terminal and positive reaches the microcontroller, which does not react to positive. In darkness the LDR has high resistance hence the output of the comparator and the output of the comparator is negative which is fed to the microcontroller. The microcontroller gets activated by negative input. Next we use a Darlington pair formed by two transistors pnp and npn. The first

pnp transistor has negative input and gives positive output which switches on the relay supply. The motors are connected in parallel to the relay which runs the motors when there is darkness.

## RESULTS AND DISCUSSIONS

It was found that when the power supply was turned on the train did run with the help of the belt drive only when there was darkness on the circuit. The current prototype is a small scale project, the number of the coaches can be increased with an increase in the number of motors and sensors. This project will be of great interest not only to the industries but also the government authorities. The train runs on the dark sensors which can pose a problem for the night time and the brakes can also be problematic. For the brake operation there are LED'S on the lower part of the train, the switch of these LED'S is provided to the driver. Whenever the brakes have to be applied these LED'S can be switched on and the belt drive stops. For night operation, a slight change in the circuit can be used to sense light instead of dark, and the LED'S placed at the bottom of the train will be switched on.

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### Switching and Applications

- High Voltage: BC546, VCEO=65V
- Low Noise: BC549, BC550