

# Automatic Railway Gate Control & Power Generation

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**ABSTRACT:** In our paper we are minimizing accident of level crossing between the railroads & highway. This types of accidents are happens due to the miss communication of workers. So, to overcome this difficulty we are implementing this project. In this paper PIC16F877A microcontroller is used to minimize the human effort & control the whole circuit. Two types of sensors is used & output of the first IR sensor are placed near to gate it receives the signal from arrival of the train then send output signal to microcontroller. Microcontroller output to motor driver then motor rotates in clockwise direction, then gate is close. Second sensor is placed another side of gate those are sense departure of the train & send signal to microcontroller. Microcontroller send signal to motor driver, motor rotates in anticlockwise direction & gate is open. Also to generate the power with the help of mounting the motor at base of the train. Motor shaft is take outside placed at track of rail through pulley. When train is running at that time shaft is also rotating at same speed & power is generated. Generated power is store in battery for run the train.

**KEYWORDS:** IR Sensor, Microcontroller, DC Generator, L293D.

## I. INTRODUCTION

In our country having a large railway network. railway is very important for transportation of good carrier and people, Every one day number of trains running on the track. We know that it is not possible to quick stop the running train and miss communication between gate operator and human. Railway accidents are happens, these railway accident is very harmful than other accident to minimize that accident. And this manually operated railway gate control is largely affected by road user. We are implementing automatic railway gate control using microcontroller & that microcontroller operate power given through solar panel. Now a day's in every railway gate operate by gate operator close the gate & indicate green flag to proceed the train. In our project , we have to develop alternative energy source. now present rate of fossil fuel usage is very high ,they lead to energy crisis .we have to minimize that energy crisis .in our project to develop renewable energy, using dc motor. Early level crossings gatekeeper is present near by both who would, on the approach of a train, wave a red flag and lantern to stop all rush and clear the railroad. Operator or remotely closable gates that barricaded the roadway were later introduced.

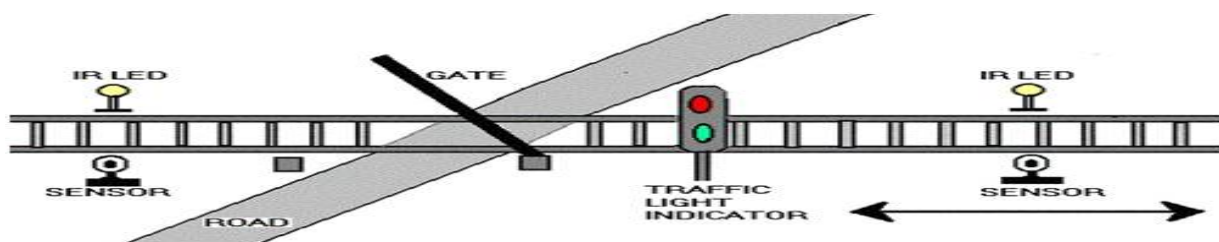


Fig 1- Railway Track

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Vol. 5, Issue 2, Februray 2016

Railway travelling cost is low than other travelling. In daily newspaper we have observe lot of railway accident due to operator are not present of railway crossing. This happens due to misbehaviour of man operation. We in this paper minimize that accident use of many electronic equipments for this purpose such as automatic railway gate. Two IR sensors is used & output of the first IR sensor is locate near to the gate it receives the signal from arrival of the train. And send output signal to microcontroller. This send signal to motor driver then motor rotates in clockwise direction, and gate is closed. Second sensor is locate another side of gate this are sense departure of the train & send signal to microcontroller. Microcontroller send signal to motor drive (L293D). This motor drive rotate motor for open or close gate.

## II. RELATED WORK

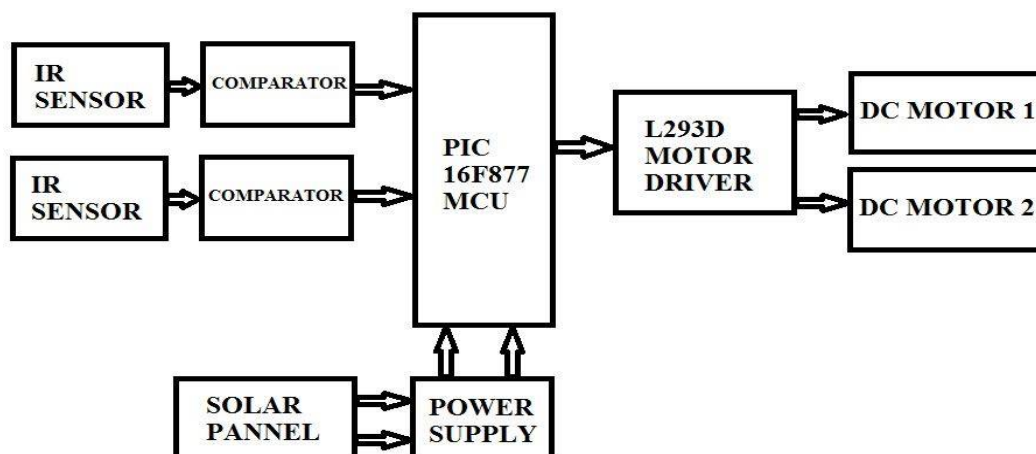


Fig 2- block diagram

Automatic railway gate control using microcontroller PIC 16F877A .fig 2 divided into 4 main part .first part is PIC16877A ,second is photo interrupter ITR9813 IR sensor, third is DC motor & fourth is solar panel .this system operate easily. Detail of these component are in follow IR sensor are place both side of gate at few km in level crossing these sensor sense the optical between the ray's as like incoming train sensor sense signal given to UC through comparator. The operation of comparator in to compare two voltage level that is detection voltage compare to reference voltage when reference voltage greater than detection voltage generate output is in the pulse form then these output given to UC. Two pin of comparator is joint to PIC 16F877A microcontroller used to control all over system. microcontroller output given to L293D motor drive it connect to DC motor. It generate specified voltage to drive DC motor. DC motor is joint to gate, when motor rotates in clockwise direction gate is open and when motor rotate in anticlockwise direction gate will close. For whole system supply is given through solar panel, it have two terminal, positive & negative. Positive terminal is joint to protective circuit and negative is to ground. Both terminals are joint to the battery.

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Vol. 5, Issue 2, Februray 2016

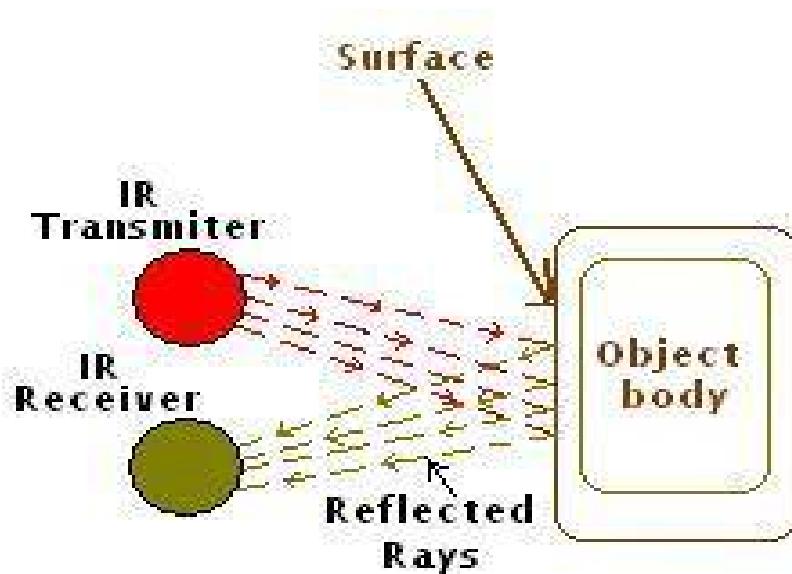


Fig 3- IR Sensor

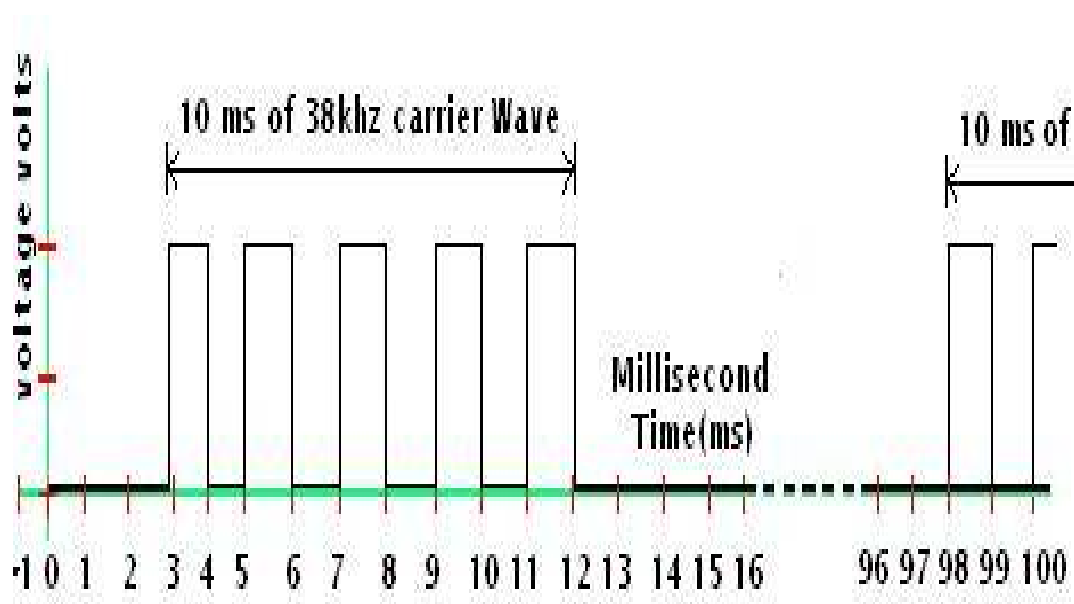


Fig 4 -Waveform of IR sensor

In this waveform diagram the main concept of IR sensor to detect the object and reflect rays from the object. IR transmitter sensor detects the object and transmitted the signal to IR receiver.

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Vol. 5, Issue 2, February 2016

### PIC16F877A MICROCONTROLLER

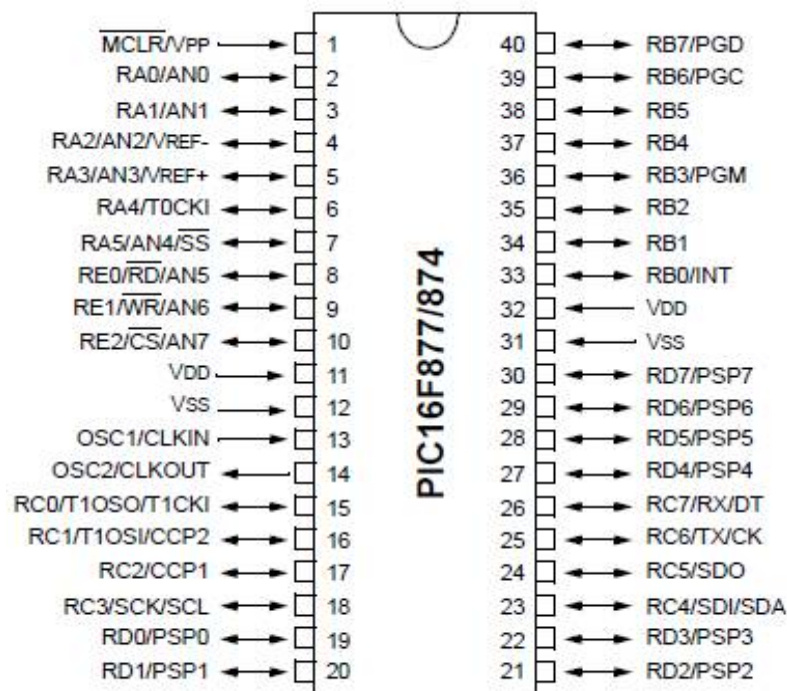


Fig 5- PIC16F877A Microcontroller pin diagram

#### Features:

- High performance RISC CPU
- Only 35 single word instructions to learn
- All single cycle instructions except for program branches which are two cycle
- Operating speed: DC - 20 MHz clock input DC - 200 ns instruction cycle
- Up to 8K x 14 words of FLASH Program Memory, Up to 368 x 8 bytes of Data Memory (RAM) Up to 256 x 8 bytes of EEPROM Data Memory
- Interrupt capability (up to 14 sources)
- Direct, indirect and relative addressing modes
- Power-on Reset (POR)
- Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
- Programmable code protection
- Power saving SLEEP mode
- Low power, high speed CMOS FLASH/EEPROM technology

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Vol. 5, Issue 2, Februray 2016

Fully static design

In-Circuit Serial Programming(ICSP) via two pins

Single 5V In-Circuit Serial Programming capability

In-Circuit Debugging via two pins

Processor read/write access to program memory

Wide operating voltage range: 2.0V to.5V

High Sink/Source Current: 2525 MA

## III. MOTOR DRIVE L293D

### PIN CONNECTIONS (Top view)

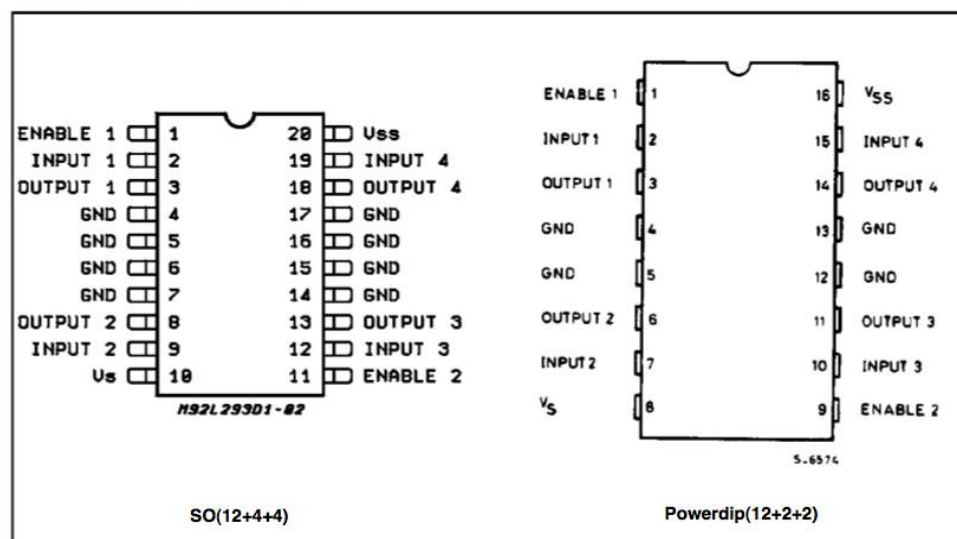


Fig 6- Motor Driver Pin diagram

The L293D integrated high voltage, high current 4 channel driver device. Use to receive standard DTL or TTL logic levels and to rotate inductive loads (such as relays solenoids , DC and stepping motors) and switching power transistors To Elaborately use as two bridges each pair of channels is equipped with an enable input.

A provided apart supply for the logic, due to the operation at a lower voltage and internal diodes are add. This device is suitable for use in switch applications at frequencies up to 5 kHz. The L293D is agglomerate in a 16 lead plastic package which has 4 centre pins connected jointly and used for heat sinking The L293D is agglomerate in a 20 lead surface mount which has 8 centre pins connected jointly and used for heat sinking.

### Working of L293D:

There are 4 input pins for L293D, the pin 2and 7 on the left side and pin 15 regulate the rotation of motor connected beyond left side and right input for motor on the right hand side. The motors are moving on the basis of the inputs provided beyond the input pins as LOGIC 0 or LOGIC 1.In easy to provide Logic 0 or 1 beyond the input pins for rotating the motor.

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Vol. 5, Issue 2, February 2016

### L293D Logic Table:

Now consider a Motor output pins connected on left side (pin 3,6). For rotating the motor in clockwise direction the input pins provided with Logic 1 and Logic 0.

### Logic table motor drive

Pin	Logic & Pin	Logic	Direction of Rotation of Motor
Pin 2	Logic1 & Pin 7	Logic 0	Clockwise Direction
Pin 2	Logic 0 & Pin 7	Logic 1	Anticlockwise Direction
Pin 2	Logic 1 & Pin 7	Logic 0	No Rotation

### IV. POWER GENERATION

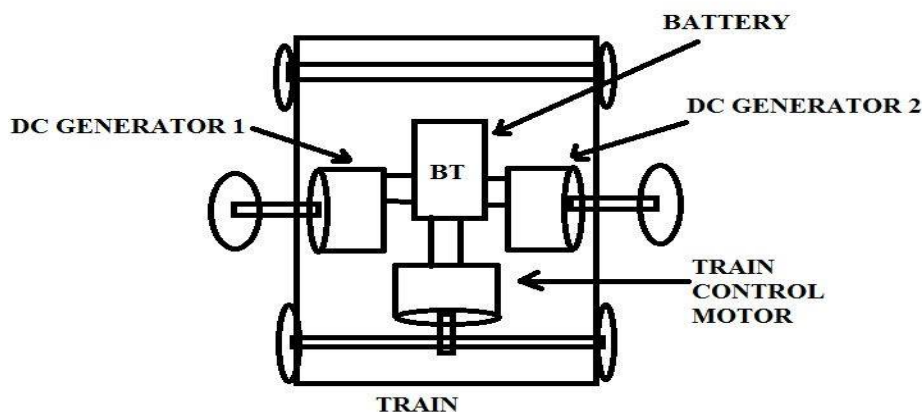


Fig 7- DC motor power generation

The electrical power generation system is used to generate electrical power with the help of movement of train. This method provides electrical power by using railway road track and DC generator. In this method mechanical energy converted into electrical energy. This energy is renewable energy, we know that train needs more amount of power to accelerate the power required is more and this power generation is more costly. Due to this in our project used new method to generate power. In this circuit some electrical device such as to DC generator, battery storage, train control motor. In our circuit DC generator is mounted on the base of railway bogies on both side and shaft of this DC generator through outside. And it moves track of train proportional to the movement of train. Due to moving of pulley, shaft of DC generator also rotated. And electrical power is generate, this power stored in battery and this power to accelerate the train

### V. FEATURE OF PROPOSED SYSTEM:

- 1) The system will consist of 2IR trans-receiver pairs.
- 2) Micro controller based circuit design.
- 3) Automatic train sensing & gate controlling.



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- 4) Bidirectional gate controlling or Bidirectional train sensing.
- 5) The gate will be closed till the whole train passes out.
- 6) The opening of gate will be sensor based on delay based.

## VI. EXPERIMENTAL RESULTS

In our project automatic railway gate control to avoid the several accident we have to use latest technology that is automatic railway gate control to avoid maximum number of accident on railway crossing

Now a day's automatic system used in each and every sector. Therefore, system is more reliable, accurate and less time consume.



Fig 8. Model hardware implimentation Of automatic railway gate controller.

## VII. CONCLUSION

We have designed in our project automatic railway gate control system. Small improvement in it. Automatic railway gate control system is more sensitive and also reduces railway accident to provide more secure life for road users. This system provides very large benefit for road user and railway management. Our system is completely automatic is suitable in rare area and also forest area at that place no station master is available it reduce railway accident. Second concept of our project to generate renewable energy using DC generator shaft is moving on railway track.

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