ELECTRONICS CLUB ,,IIT KANPUR.

POV GLOBE

Md. Shadab Alam
Amit Barjatya
Prabhat Verma
Mukul Singh

MENTORED BY: JOY BHATTACHARJEE

INTRODUCTION

POV Globe is basically a circular array of light emitting diodes, rotating at a very high angular speed to produce a spherical screen.

By synchronizing the blinking speed of led's with angular speed of motor we can generate a very fine 3-D display on spherical screen.

UNDERLYING PRINCIPLE: As the name suggest it is Persistence of vision(POV)

"What we see is a blend of what we are seeing and what we have seen a fraction of second before"

HARDWARE

Our hardware consists of

:: Circular strip

:: DC motor

CIRCULAR STRIP

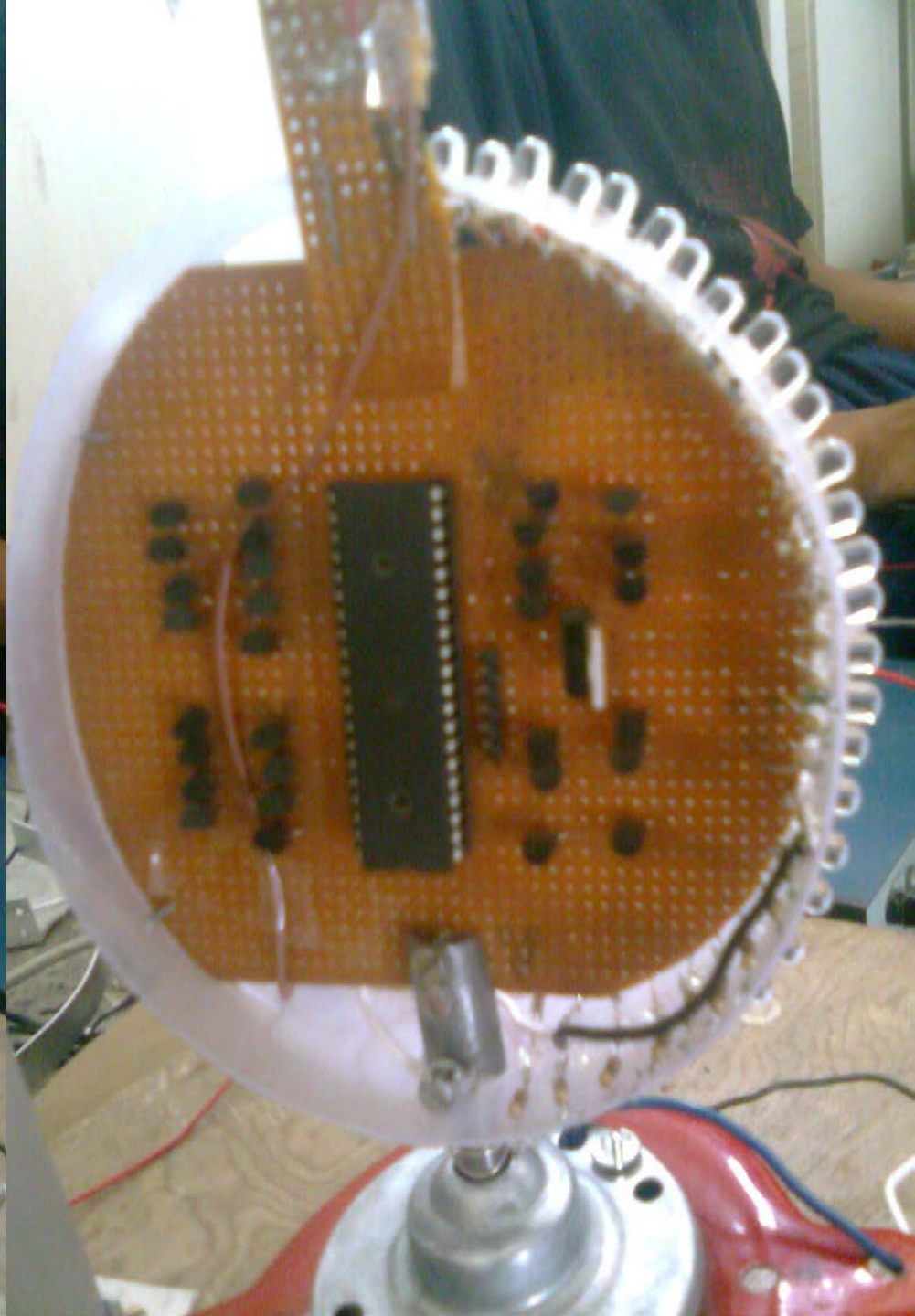
It is a plastic circular strip with high bright led's on half of circle (radially) .Inside it we have our GPCB with ATmega and transistors (as current amplifier).On the other side we attached a TSOP sensor to have an eye on current time period of motor . This time period is used to synchronize led's depending on what to be displayed.

DC MOTOR

A 12v,1500rpm DC motor is screwed on a heavy wooden plank.

Another structure is made to support the circular strip from top side.

Power to atmega was given by two slip rings:.one attached to motor shaft and another on metal structure



SOFTWARE

Software incorporates use of two interrupts : one external and one internal.

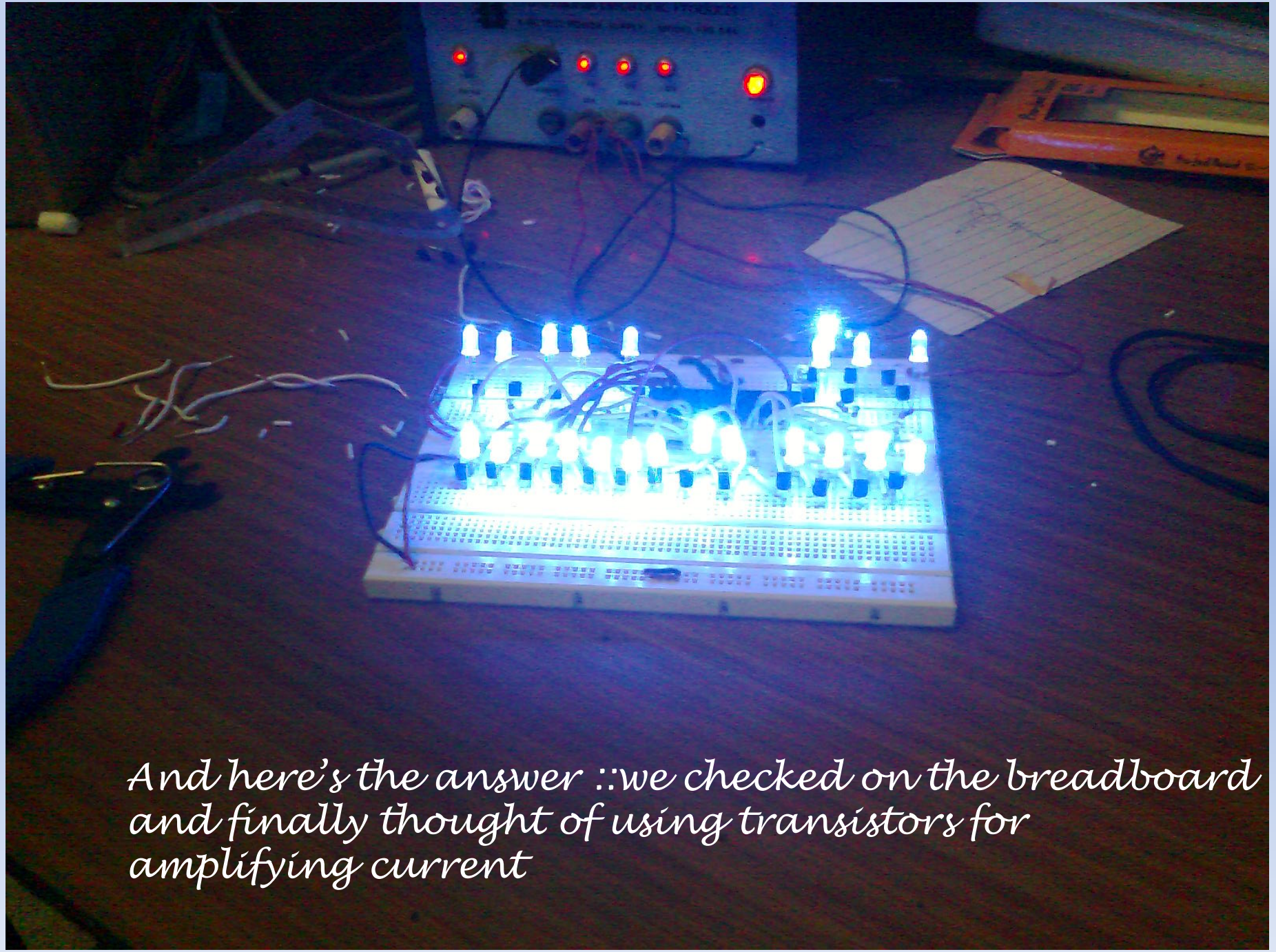
External interrupt triggers the start of the internal interrupt and also keeps a note on the time between two consecutive external interrupts ,which is time period of our motor{time period is not constant , depends on air resistance}.

Internal interrupt is for changing the mode of LED's according to what we want to display.

We worked with a resolution of 75*30 for our globe So frequency of internal interrupt is set so that it occurs 75 times before another external interrupt occurs

HARD TIME

- Hardware part was really tough for us because we have to control a motor rotating with a speed of 1500 rpm ,we made our base heavy and attached two rubber bases as shock absorbers.
- **Connecting circular strip with motor shaft** ::a lot of suggestions were given , but we finally decide to make a collar. It worked.
- **Giving power to ATmega** ::our mcu was rotating, hence power can not be given directly, we made our own slip rings and then attached one from top and one to motor shaft.
- **Will Atmega provide us sufficient current for lighting 30 high bright LED's simultaneously??**


And here's the answer ::we checked on the breadboard and finally thought of using transistors for amplifying current

HARDWARE part was causing too much difficulty for us,, since motor rotates at speed of 1500 rpm ,it was difficult for hardware to be stable , we tried our best but still it was not very stable.

Wooden plank that we used was heavy, but the motor was powerful than we thought it would be , as a result our system still wobbles.

These wobbling of system creates some problem in interrupt calling due to which image is not moving at constant frequency.

APPLICATIONS

- Our project is not just a globe , it's a really cool technique of displaying any images or text in 3-D.
- Moreover, display's resolution can be changed according to our need.

CREDITS

The ELECTRONICS CLUB CO-ORDINATORS.

Our mentor JOY BHATTACHARJEE

MME LAB, PHYSICS LAB,TA 201 LAB….