

## **1RE01 & Blue Thunder**

### **Self Balancing Single axle robot**

1. How much percentage of work has been left in the project completion? What is the expected date of finishing up the project?

Just calibration is remained .

2.According to your Plan of Action, what work was planned to be completed till 1 st June?

We were going to finish assembling and calibration part . We were going to replace simple 60 rpm dc motors by 150rpm fast response Johnson motors and do calibration by using these new motors .

3.What work has been actually completed?

We completed assembling of the robot in the first two days. After that we tried for the calibration next 3-4 days. But we could not fix the values of Kp and Kd (parameters in the Arduino code). This is because the motors which we used did not have fast response as we needed. Those motors were of 60 rpm. We realized we would need motors of higher rpm (150 rpm) and having fast response. We have attached Johnson motors (having fast response) to the robot. We have made PCB with new IC L298N (replacing L293D). This PCB (with IC L298N )was need because of high current requirement of Johnson Motors . we are just going to start final part (ie, calibration)

4.What purchases were made till 1st June?

- sharp Sensors GP2D120
- Arduino Duemilanove w/ atmega328,
- Li-on battery,
- NiMH battery
- Motors 60 rpm 12 V,
- Johnson motors,
- L293D,L298,
- IC 7805,7809,
- Motor driver (supporting 2 dc motors and 2A current for each motor)
- two wheels (diameter =10.5cm),
- two wheels (diameter =7cm),
- acrylic sheets, L-clamps, connecting wires, connectors, pcb, double sided tape,wire joining tape,

5. What problems did you face with respect to project work in this week? Did you find a solution to them or are they still pending? What was the solution to these problems?

We were not able to fix Kp and Kd after a lot of tries. With the help of our mentor and senior mentor we decided to change motors from 60 rpm dc motors to 150 rpm Johnsons motors having sufficiently

fast response. After trying with 60 rpm dc motors we tried to calibrate with 300 rpm dc motor but these motors were running too fast so the robot failed to acquire control over itself. Johnson motors take much more current (about 2A) than normal dc motors. But IC L293D motor driver can not supply such high amount of current. If used it gets heated and after some time it bursts. It can supply at most 0.6A per motor. So we need to replace L293D by L298 (high current supplying motor driver IC, abt 2A per motor). This will consist of making the PCB again by using IC L298 instead of L293D.

6. Contribution made by each team member in this week?

All team members are contributing equally.

7. What was discussed in the meetings with your mentor this week?

We discussed about how to fix Kp and Kd in the calibration part (the method of fixing Kp and Kd). But we were not able to fix these two parameters to the appropriate values. So we discussed about the improvements (in hardware, code etc.) those should be done in order to get some values of Kp and Kd.

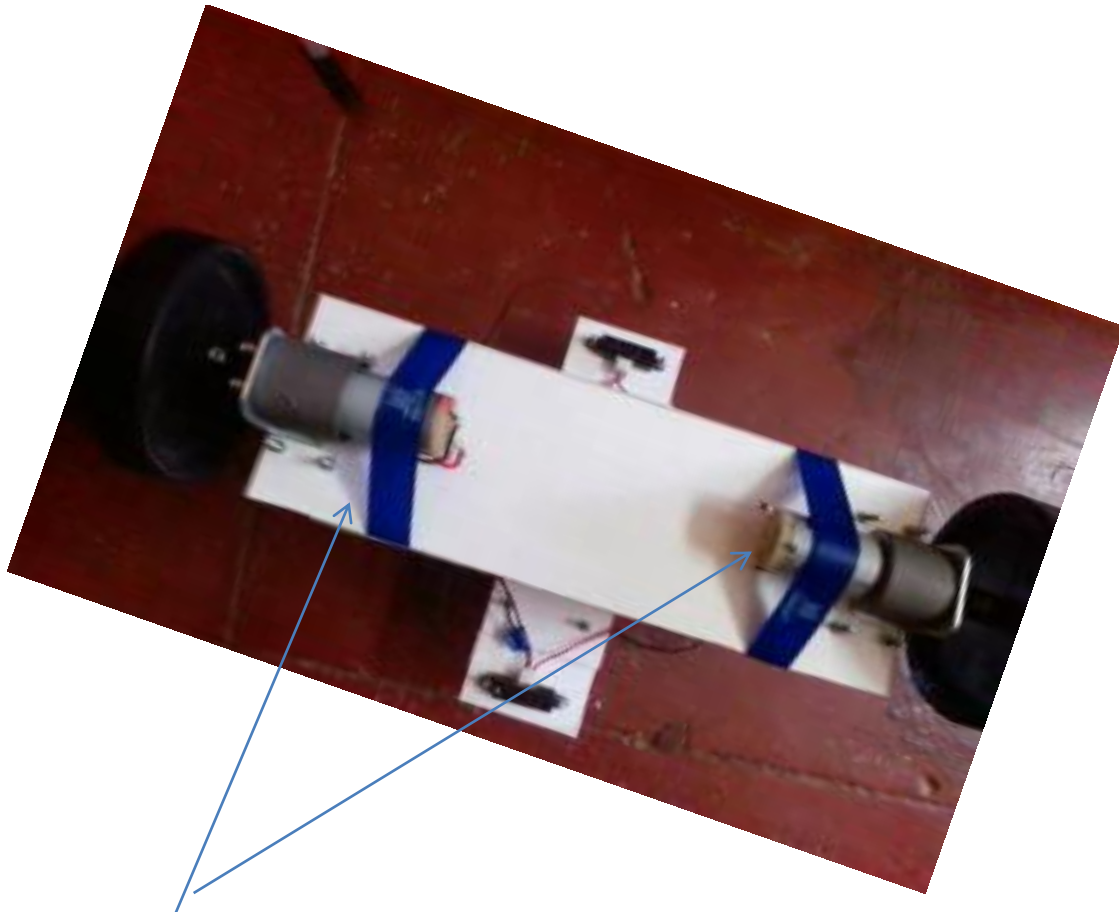
By using Johnson motors IC L293D was constantly getting heated. We discussed about this with the mentor and came to the conclusion that we need to replace it by L298 (high current supplying motor driver IC).

8. What is the work-plan for the next week?

Just to keep on calibrating and make accordingly necessary changes to robot body, code.

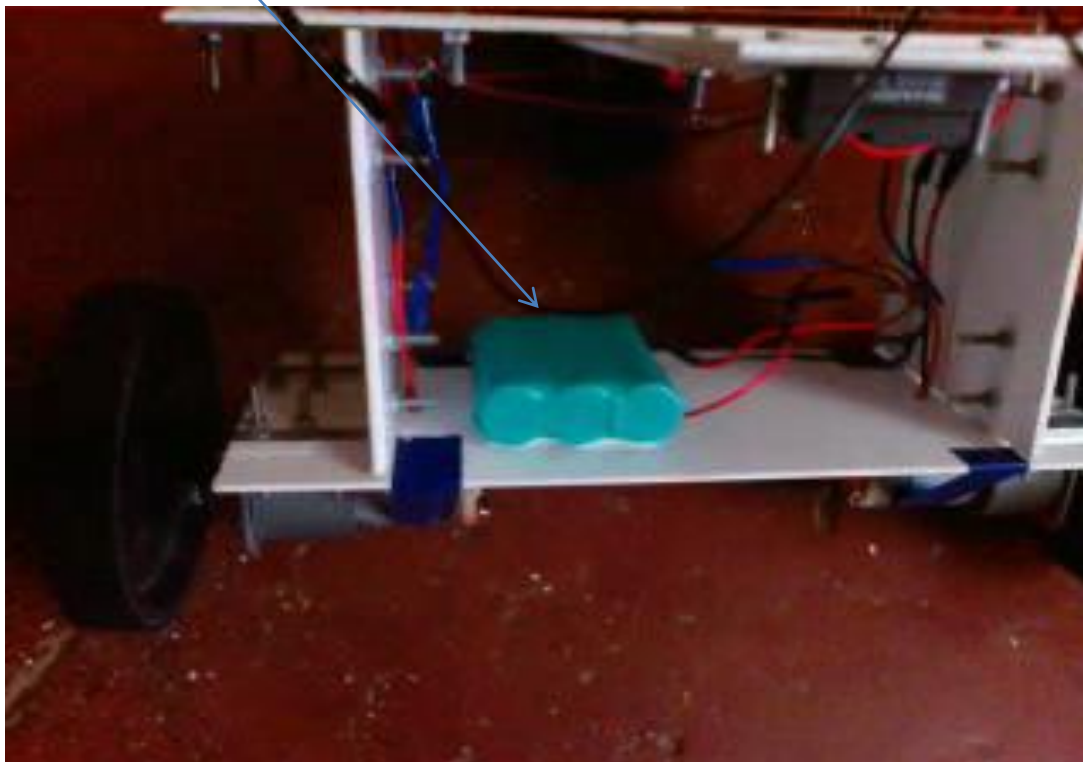
9. Project Pictures (Compulsory) - Upload these pictures on the facebook group (ITSP

2012) also.

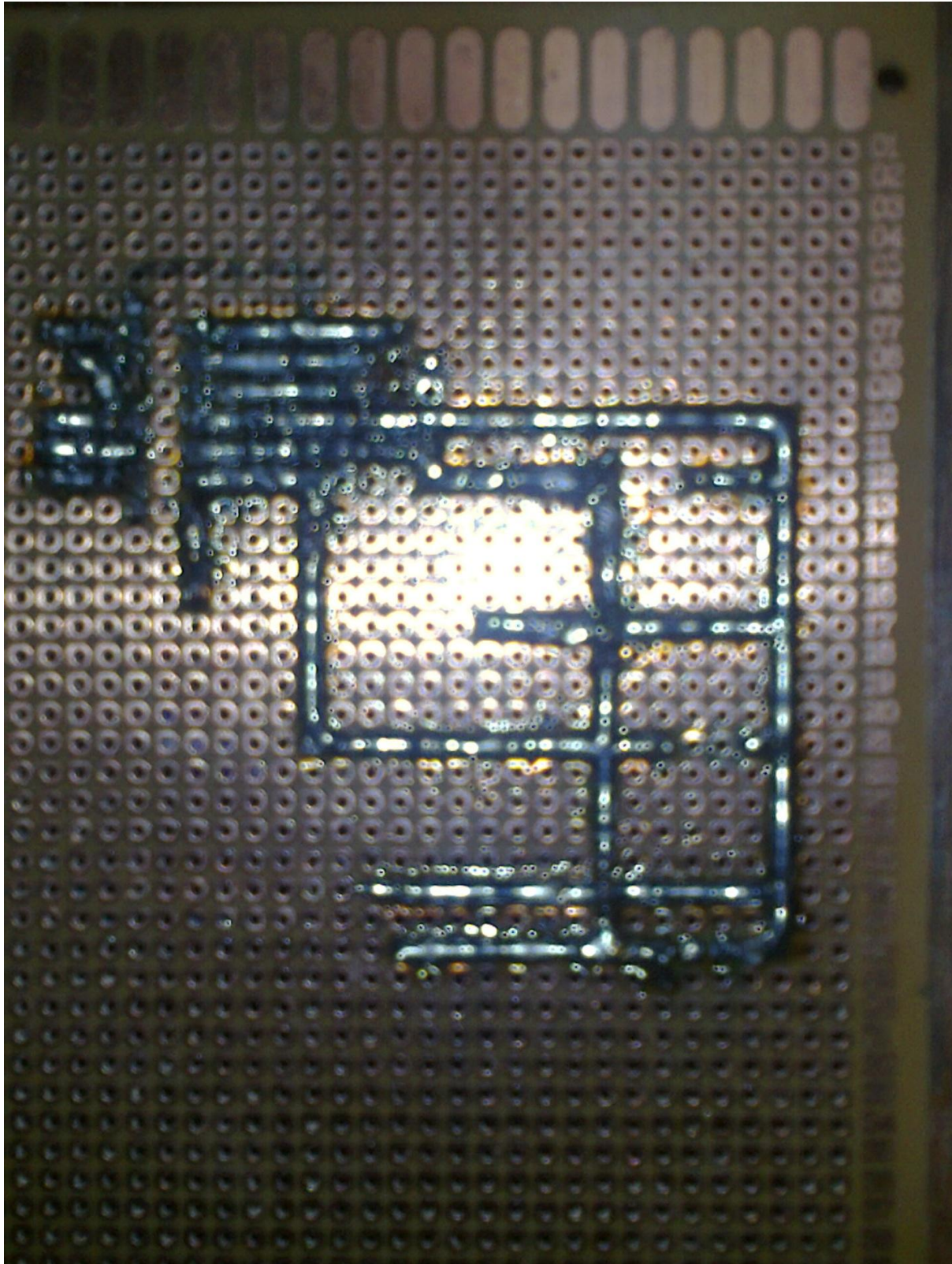


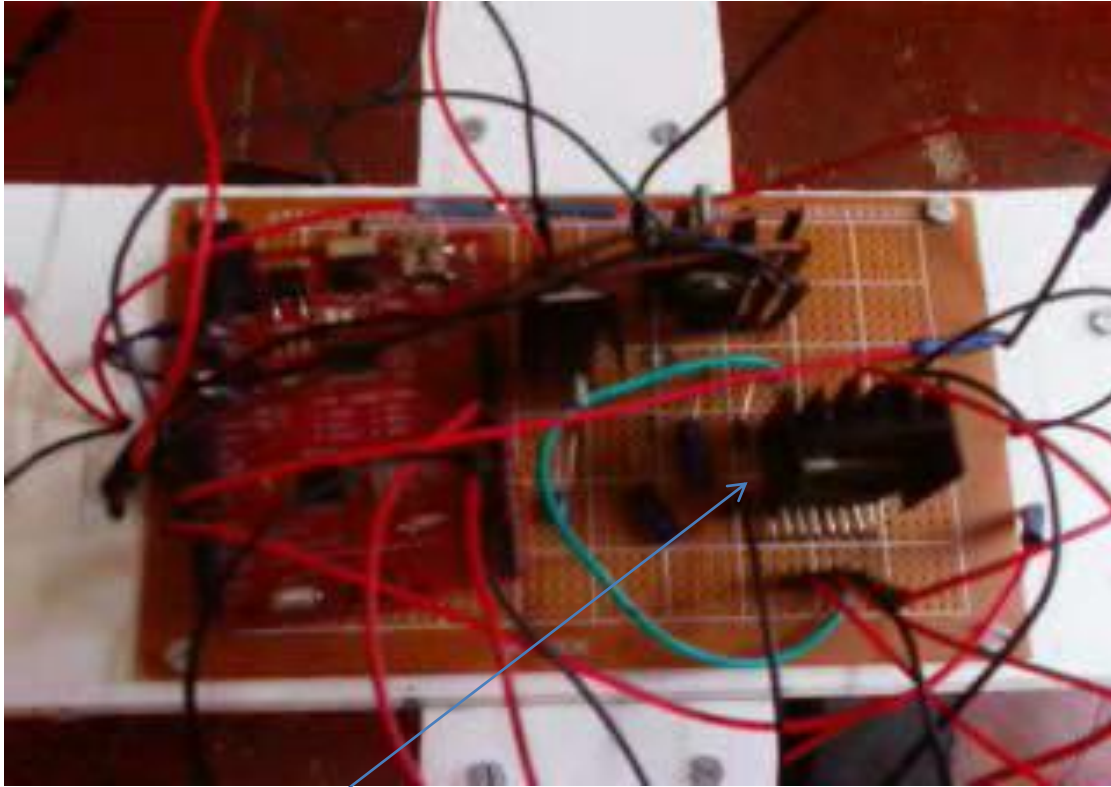
NEW Johnson motors

Li ion battery









L298N Motor driver circuit