

EMEA

Grenoble INP PHELMA

Team : FenixxPhelma

15.04.15 in Grenoble

Technical Report - Freescale Cup

Mechanical design

- Original chassis and wheels.
- Support for camera (photo a, b, and c) (3D print).
- Aluminum axle for the camera (photo d).
- Support of electronic device. (3D print)
- Aluminum support for LED and Air-Cooling.



Photo a, b, c and d.

Control Circuit design

- We use the TFC-FRDM-KL25M given in the starting package to control the car.
- We added another PCB between the two existing Freescale boards.
 - To be able to use every GPIO like we want.
 - To connect two Hall Effect sensor.
 - To connect a Bluetooth device to transmit information during practice.

- We also added two little PCBs to install the Hall Effect sensor (CMS).

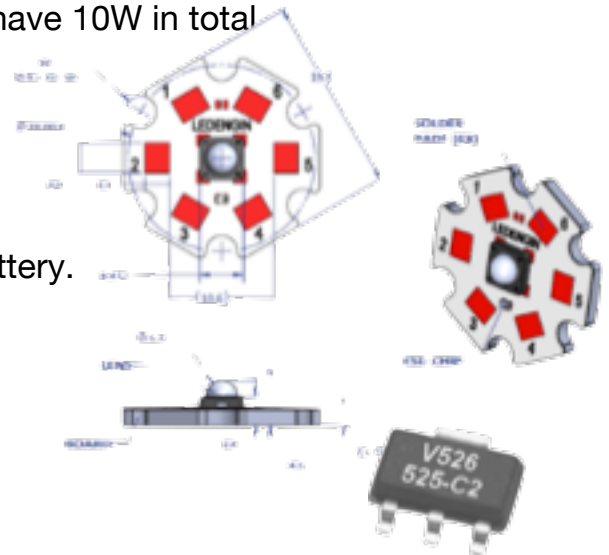
Electronic design

- We added 2 LED of 5W in serial in order to have 10W in total

- We added a resistance of 1,5 ohm

in order to polarize the LED.

- And we connected it directly to the battery.



- We use 2 CMS hall effect sensor :

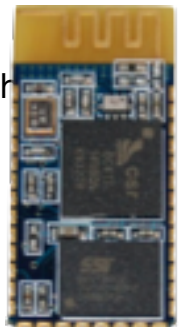
- 2 pull-up resistances of 200ohm.

- This sensor is very useful because it has output an '1' or '0' according to the direction.

- We connected a Bluetooth Module when we want to communicate with car.

- To do it, we use the UART connection of the Cortex M0.

- Module can be removed for racing



Control Software design

- We control the car making code in C with the CodeWarrior IDE.
 - We began with the starting code, and we had a lot of functionality.
 - We made a .c for all element of the car : Camera, sensor, speed control, etc...
 - we tried to optimize the time between two measures of the car's environment.
 - We have one line camera which is constantly scanning for the right and left bands.
 - According to this information, we react on the direction wheels and on the speed of the back wheels.
 - Direction is changed to keep the car in a central position
 - Speed is changed when a turn is detected

Weight and Dimensions

- Total Weight (with battery) :

- Dimensions :

Sensors

- We use 3 different sensors :
 - Camera (the original one)
 - 2 hall effect sensors

Servos

- Just the rudder servos motor original with the vehicle