Preliminary Design
RC car project

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1.0 INTRODUCTION

What is this project?

➢ This project is the creation of a typical RC car from scratch. The RC car is remote controlled, so the end user can control the car's operation remotely. On the car, a custom PCB houses all the circuitry needed to control and drive the movements of the RC car. On the remote, a custom PCB similarly houses all the circuitry needed to control and drive the movements of the RC car wirelessly. For both remote and car assemblies, a custom body/enclosure is produced to hold all parts and components together. A wireless module on both remote and car PCBs provides wireless communication for control of the RC car and an Arduino NANO is used on both remote and car PCBs for the brains of operation.

2.0 APPLICATION

Where and what can it be used for?

➢ This RC car can be used for and in a wide variety of applications. For example, it could be used as a child's toy (in entertainment environments) or it could be used as a student's tool, while learning about electronics and software (in learning environments). The limitations are endless.
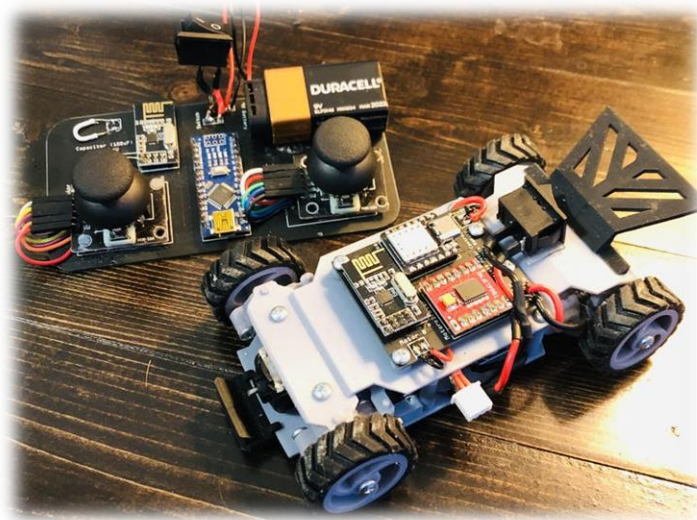

Figure 1. Typical custom RC project shown above.
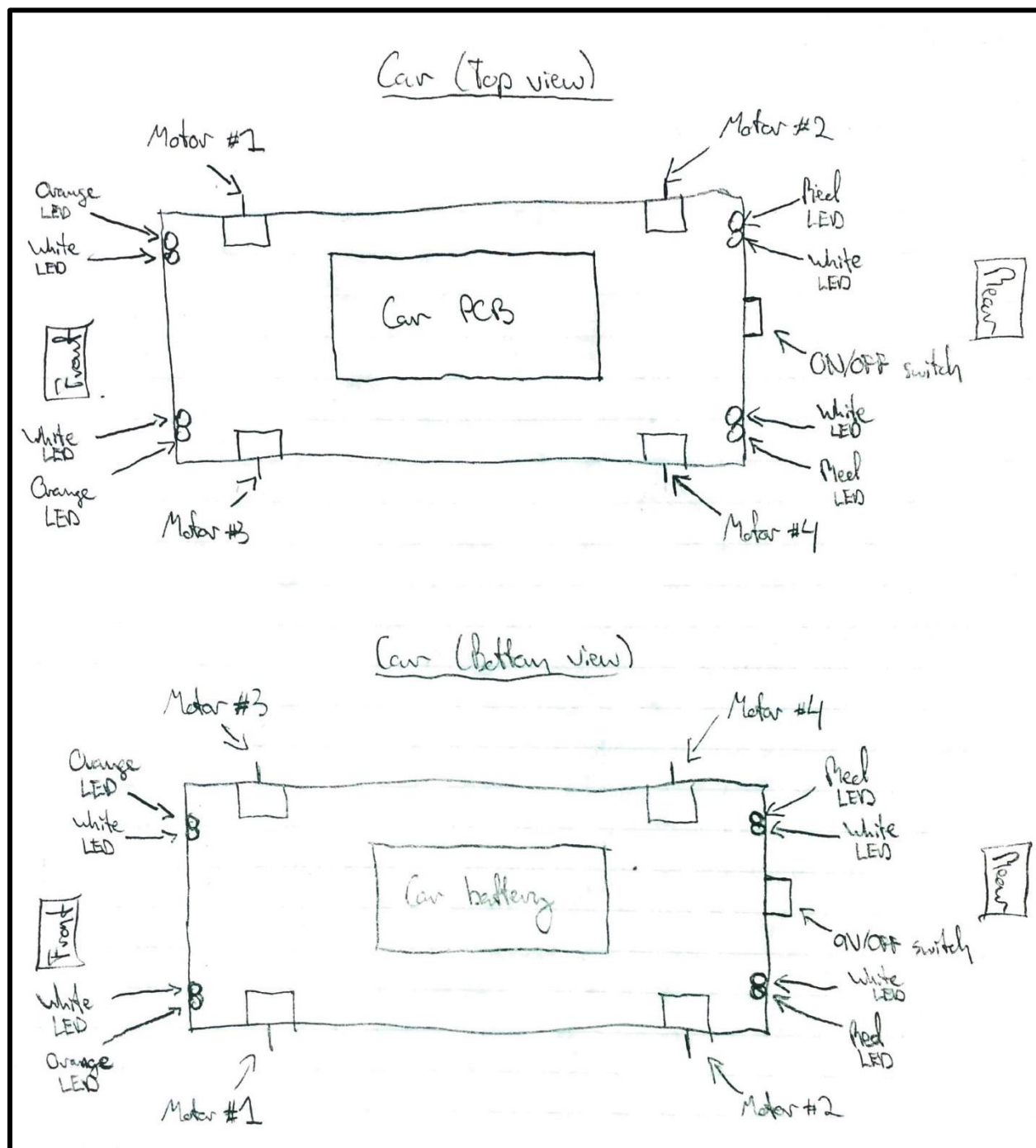
3.0 ROUGH DESIGN

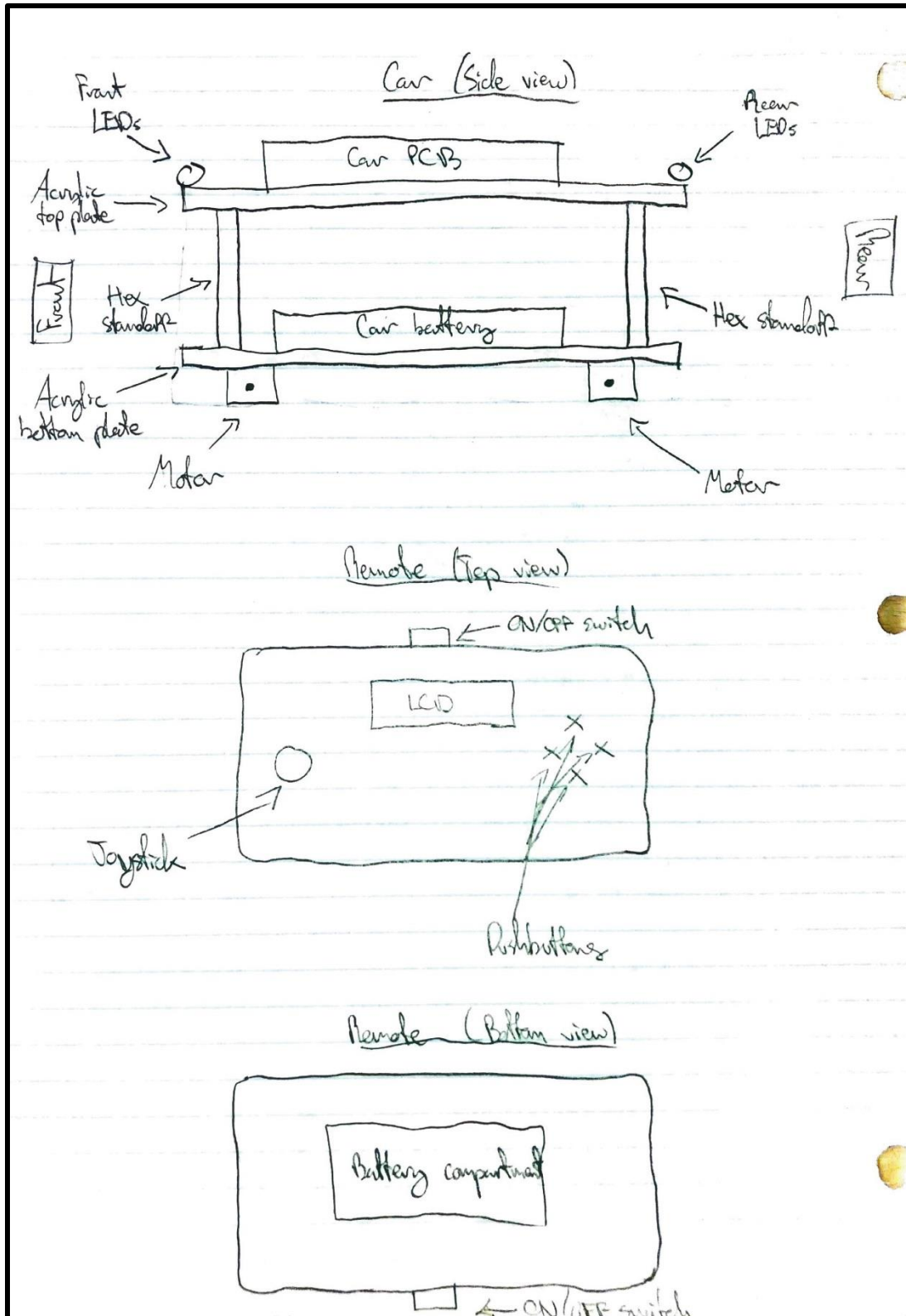**Basic Overview**

Figure 2. Handwritten sketch (page 1).

Figure 3. Handwritten sketch (page 2).

4.0 PARTS REQUIRED & BUDGET

Project Parts Required

Car:

- ➢ (2x) L298N Dual-H bridge motor drivers.
- ➢ (2x) Multiwatt 15 heatsinks.
- ➢ (1x) 7805CV regulator.
- ➢ (1x) TO-220 heatsink.
- ➢ (1x) Arduino NANO.
- ➢ (16x) 1N5822 Schottky diodes.
- ➢ (1x) 220uF @ 10V electrolytic capacitor.
- ➢ (1x) 330nF @ 50V ceramic capacitor.
- ➢ (7x) 100nF @ 50V ceramic capacitor.
- ➢ (3x) 10uF @ 10V electrolytic capacitor.
- ➢ (2x) 470uF @ 50V electrolytic capacitor.
- ➢ (1x) 20x1 2.54mm pin header (male).
- ➢ (2x) 15x1 2.54mm pin header (female).
- ➢ (2x) 4x1 2.54mm pin header (female).
- ➢ (5x) 2x1 5mm screw terminal block.
- ➢ (1x) 10x 330Ω resistor network.
- ➢ (2x) 10x1 2.54mm screw terminal block.
- ➢ (1x) NRF24L01 wireless transceiver module.
- ➢ (1x) 5mm green LED.
- ➢ (1x) 7448 driver.
- ➢ (4x) white LEDs.
- ➢ (2x) orange LEDs.
- ➢ (2x) red LEDs.
- ➢ (1x) SPST illuminated rocker switch.
- ➢ (1x) ¼ watt 330Ω resistor.
- ➢ (?x) 22-gauge multi-color wire.
- ➢ (4x) 12V ~1A DC motors.
- ➢ (4x) wheels.
- ➢ (2x) custom cut and shape acrylic pieces.
- ➢ (4x) 2mm hex stand-offs.
- ➢ (4x) 2mm hex bolts.
- ➢ (4x) 2mm screws.
- ➢ (1x) custom car body.
- ➢ (1x) 12V ~2AH rechargeable battery.
- ➢ (1x) custom PCB.

Remote:

- ➢ (1x) Arduino NANO.
- ➢ (1x) NRF24L01 wireless transceiver module.
- ➢ (1x) 7805CV regulator.
- ➢ (1x) SPST illuminated rocker switch.
- ➢ (1x) ¼ watt 330Ω resistor.
- ➢ (4x) ¼ watt 10KΩ resistors.
- ➢ (1x) 5mm green LED.
- ➢ (1x) 16x2 LCD display with i2c module.
- ➢ (1x) 330nF @ 50V ceramic capacitor.
- ➢ (5x) 100nF @ 50V ceramic capacitor.
- ➢ (1x) Arduino joystick module.
- ➢ (4x) pushbuttons.
- ➢ (1x) 220uF @ 10V electrolytic capacitor.
- ➢ (1x) custom PCB.
- ➢ (4x) 2mm hex stand-offs.
- ➢ (4x) 2mm hex bolts.
- ➢ (4x) 2mm screws.
- ➢ (1x) custom enclosure.
- ➢ (1x) 12V ~500mAH rechargeable battery.
- ➢ (?x) 22-gauge multi-color wire.

Budget: $150.00 CAD.