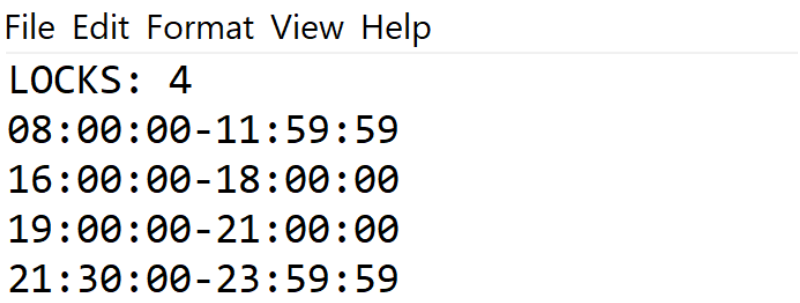
Developer Guide Electrical Pet Door

- **System Overview**
  The whole system contains multiple parts, which are sensing, SD card, power, mechanical motor, and speaker. The fundamental goal for our system is the motor-driven is large enough to slide the electric door vertically, and the hall-effect sensor is exact for controlling the input signal.

- **Electrical Specifications**
  L298N Dual H-Bridge Motor Driver: 12 V
  Arduino: 12V
  TT motor(connect with L298N): 12V
  US1881 Hall Effect Sensor: 5V
  Single Pole Ferrite Speaker: 5V

- **User Guide**
  All parts in the system overview are required for setting up the system. For setting up this system successfully, there is a list of things that need to do:
  1. Buy kits (Arduino Nano, Hall effect sensor, speaker, motor, Audio Amplifier, SD card, door enclosure material)
  2. Write code on Arduino
  3. Design a PCB
  4. Solder everything onto PCB
  5. Testing

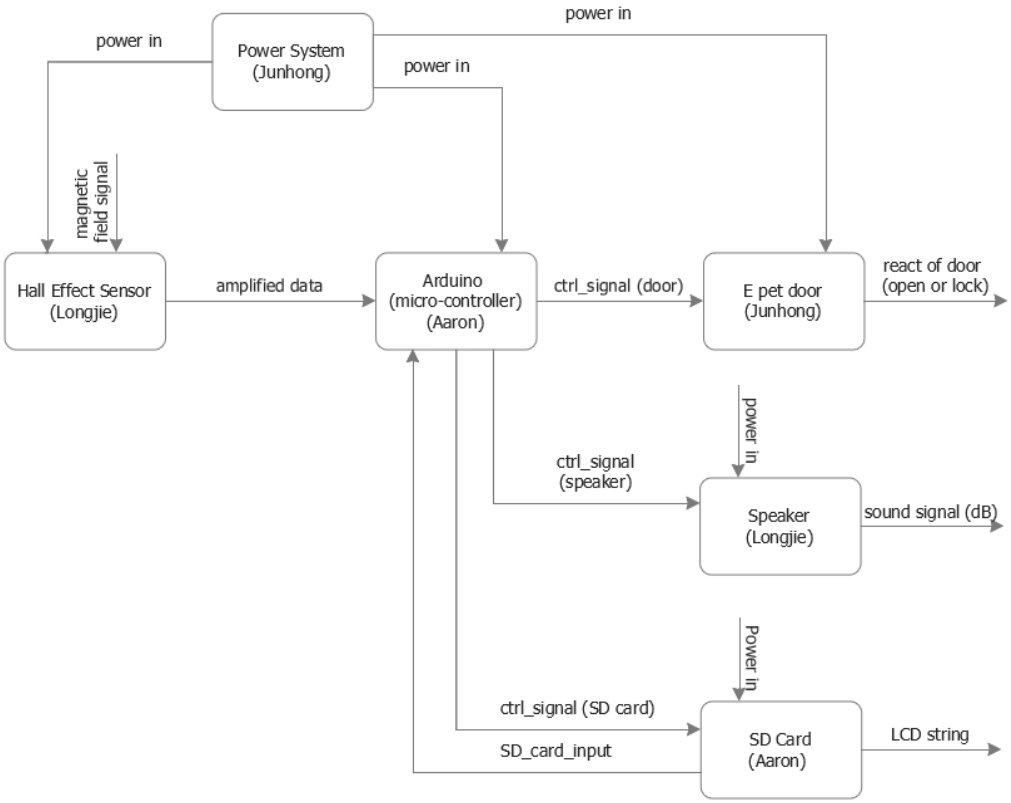
  A couple things to note:
  1. Before powering on the door, the MicroSD card must be put in. If it is not, the system will not work.
  2. For the “LOCKS.txt” file, you must first put the number of locks in the first row, then the locks in the second. The format should be hh:mm:ss-hh:mm:ss. An example image is shown below. This format follows [LOCK FROM]-[LOCK TO] meaning that if a lock is desired to be set from 4PM to 7PM, the user should put in “16:00:00-19:00:00.”



- **Design Artifact Figures**

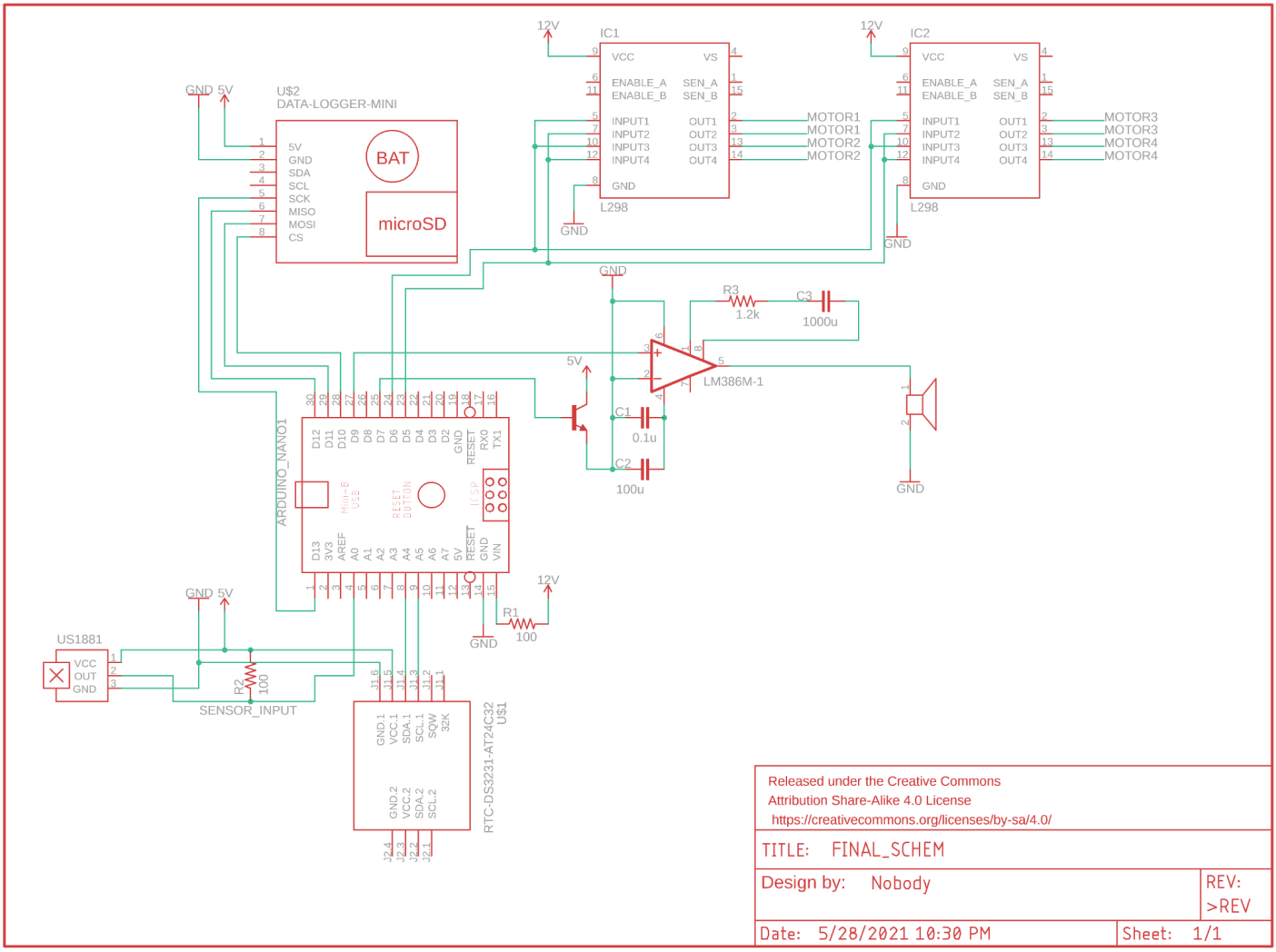
  This top-level block diagram guides the main direction to build the electrical pet door. Follow each part and do not ignore any details.

Top-Level Block Diagram



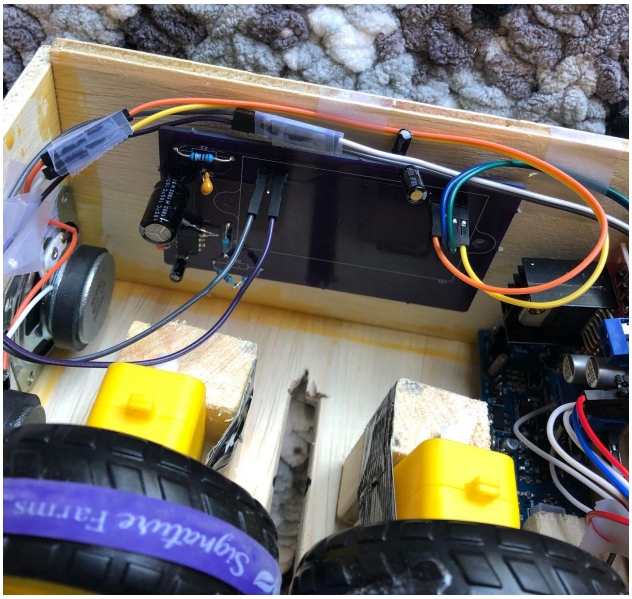
For designing the circuit, this electrical schematic part should be followed because it covers all detail information, even all interface information. By connecting all of them in an integrating PCB, the core technical issue should be fixed.

Electrical Schematic



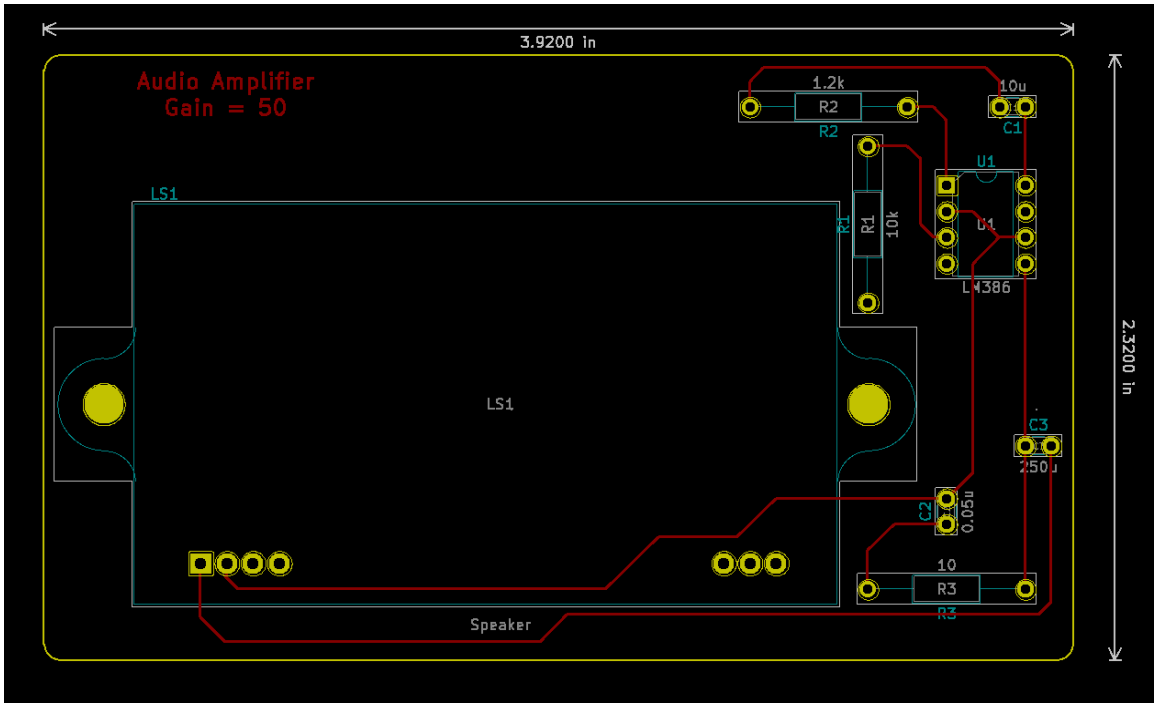
The next 2 pictures show the inner and outer 3D model of our design. The material we use is wood because of restriction. However, it is free to use other materials instead of wood. The benefit of using other tough materials is that increasing the security of the door. If metal was used, the door can afford more lbs of force obviously. Also, compound material is suggestable to increase the visual feeling.

Real 3D model



- **PCB information**
  This PCB design works for an audio amplifier with roughly 3.92 inches in length and 2.32 inches in width. It covers a complete design for the speaker part and works correctness. The gain for this design is 50dB.

Top Layer PCB



- **Part Information**

Item	Price ($)
PCB	45.65
Single Pole Ferrite Speaker	3.95
LM386	1.59
Audio Jack	6.99
US1881	1.2
Magnet	7.99
Arduino Nano	9.99
TT motor	3.49
L298N Dual H-Bridge Motor Driver	6.99
TPS54232	2.45

Didoes	2.38
Wires	7.50
All resistors, capacitors & LEDs	5
¼ inch pine plywood	28.00
2 L298N Motor Drivers with motors	19.95
DS3231 Real Time Clock RTC	7.99
MicroSD card adapter	6.99
	168.01