Motor Control is a challenge for many people taking on their first projects. Our team has designed a digital motor controller that will allow a user to set the speed of a low voltage brushed DC motor and then the controller will maintain that speed even when the motor meets resistance. Think of it like cruise control for a small motor. Our team built this controller as an example for future students to follow when they decide to use motors in their own projects.

The proposed device is a Digital Motor Controller (DMC). The DMC is designed to maintain a set RPM of a low voltage Brushed DC motor (BDC) under various load conditions. The DMC consists of a plastic case which contains a battery, PCB, and screw down terminals. The screw down terminals will be used to connect the DMC to a low voltage BDC.

On the lid of the DMC, there is a power switch, control knob, and LCD. The motor itself is mounted to a motor carriage that is separate from the DMC. The motor carriage holds the motor in place during operation and also holds the infrared emitter and receiver in place.

**Model Components**
- PCB Components
- Testing

**Total:** $276.2

**Problems & Solutions**
- 7 Segment -> LCD
  - LCD is much easier to use, efficient for reading results and could display more information. Also, allow us using less I/O pins.
- AC -> BDC
  - Originally, the team had planned to use a brushless AC motor but our sponsor requested we change the design to accommodate a Brushed DC motor. This gave the team a much more simple design requirement as well as significantly reducing projected costs.
- 555 Timer -> Atmega328p
  - Using Atmega328p to generate PWM and process feedback loop is helpful by adding voltage regulators and a crystal oscillator.

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