

The slide features three decorative zigzag lines in a dark gray color. One line starts at the top left and curves downwards towards the bottom center. Another line starts at the top right and curves downwards towards the center. A third line is positioned at the bottom center, extending horizontally across the width of the slide.

HOW SERVOS WORK

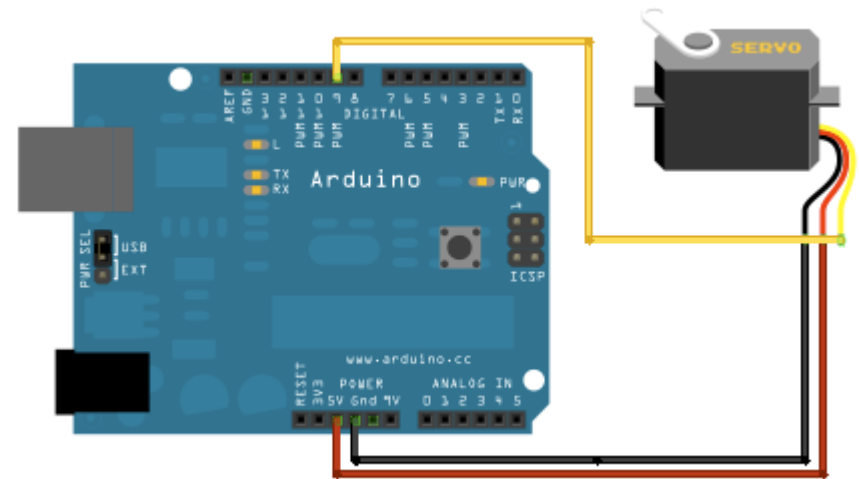
JUSTIN SELIG

ECE 3400

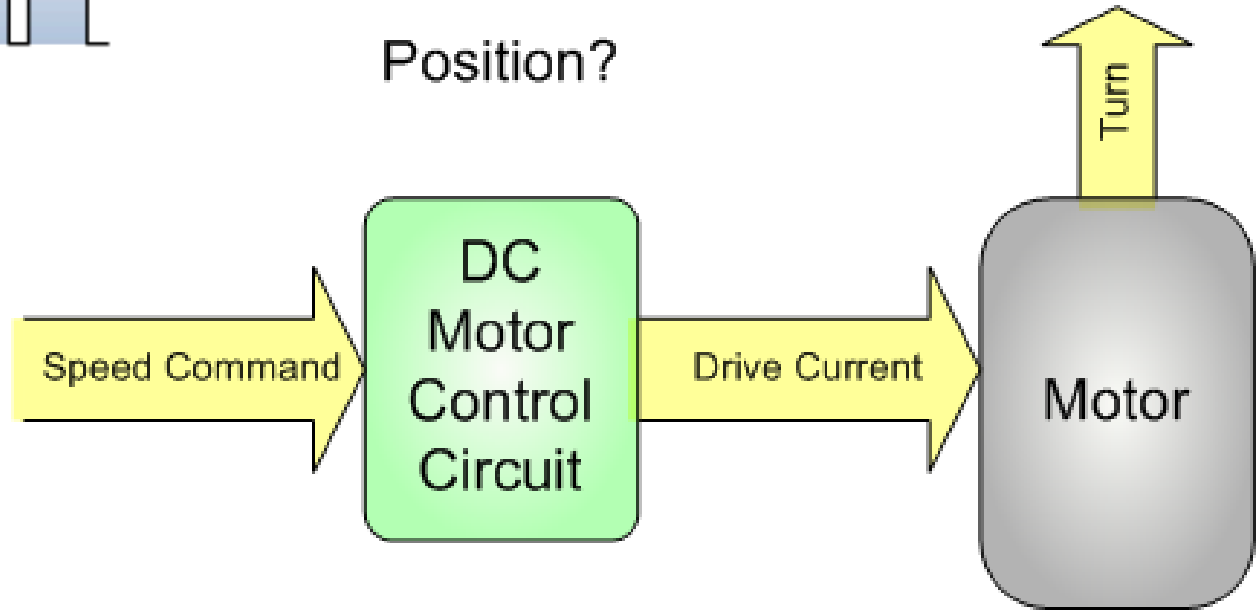
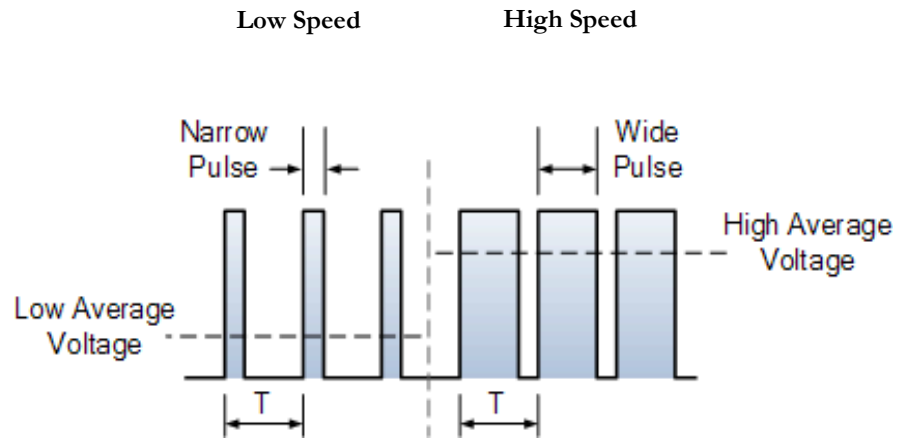
9-22-2017



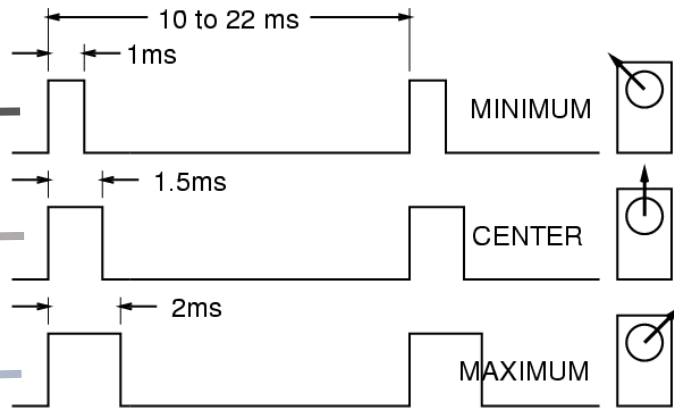
Positional | Continuous



Positional | Continuous

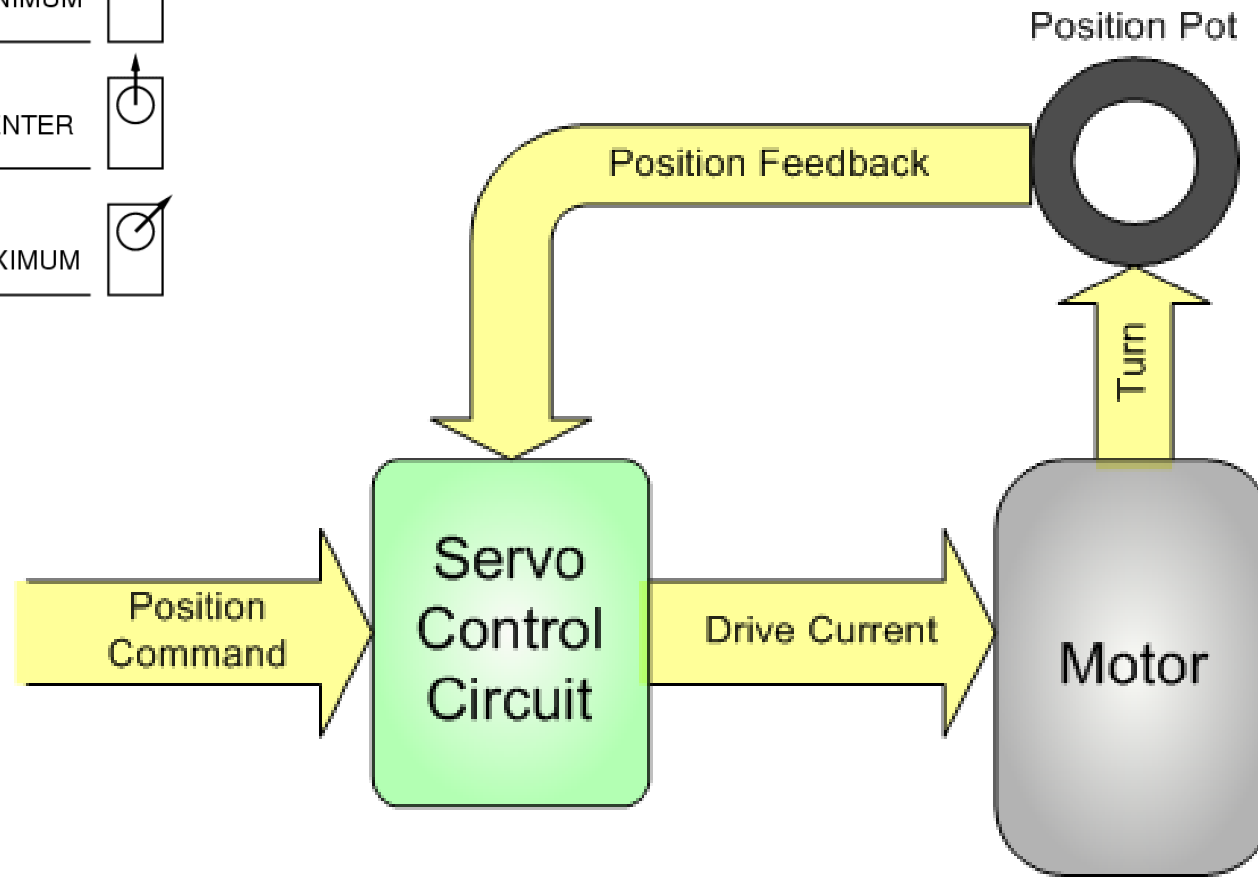


Continuous



Arduino Code:

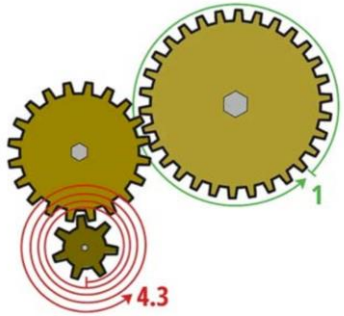
```
myservo.write(0)
myservo.write(90)
myservo.write(180)
```



Positional

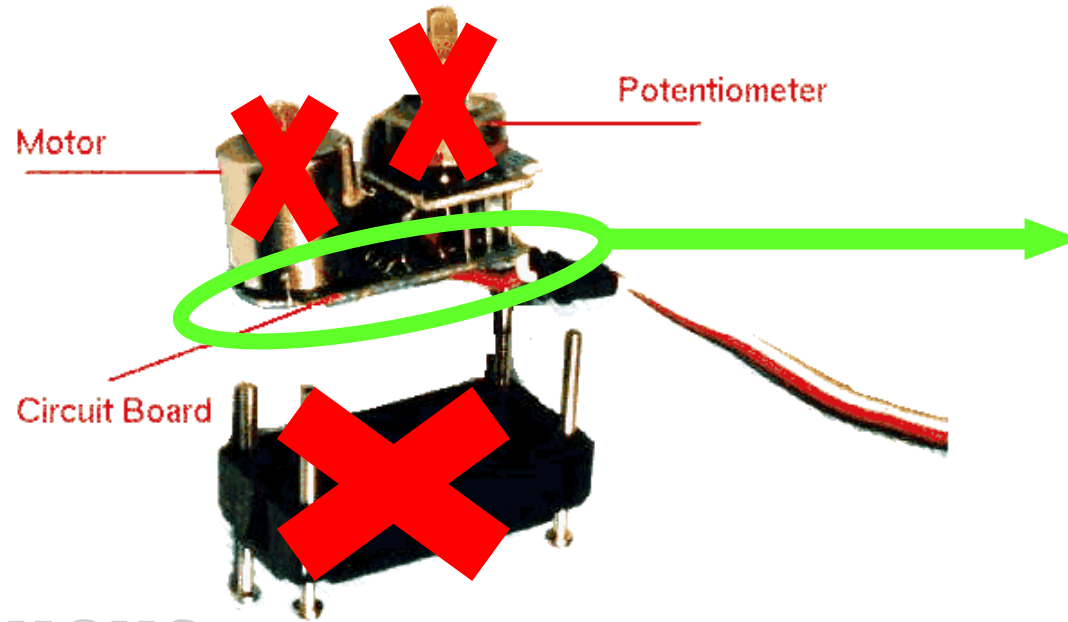
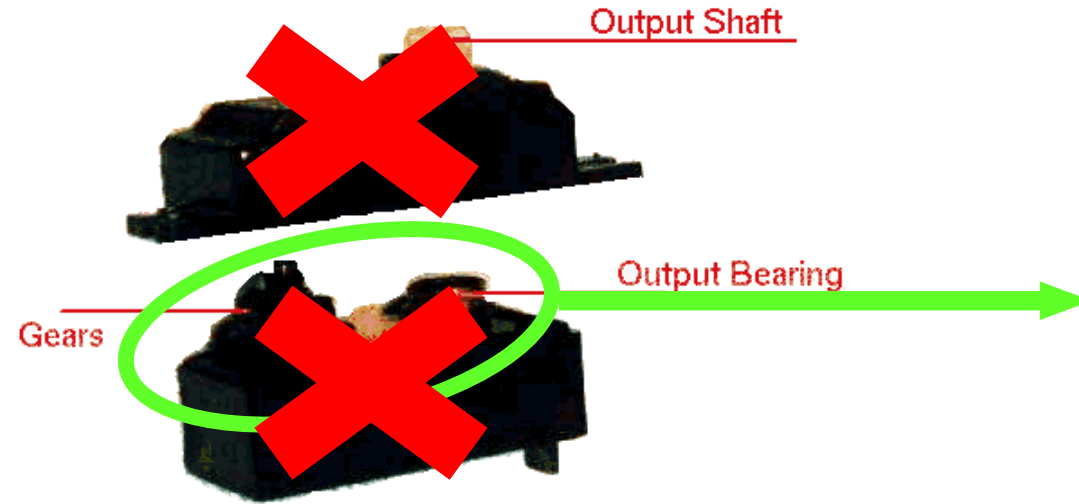


Positional | Continuous



$$v_3 = v_1 \cdot \frac{N_1}{N_3}$$

$$v_3 = v_1 \cdot \frac{N_1}{N_2} \cdot \frac{N_2}{N_3}$$

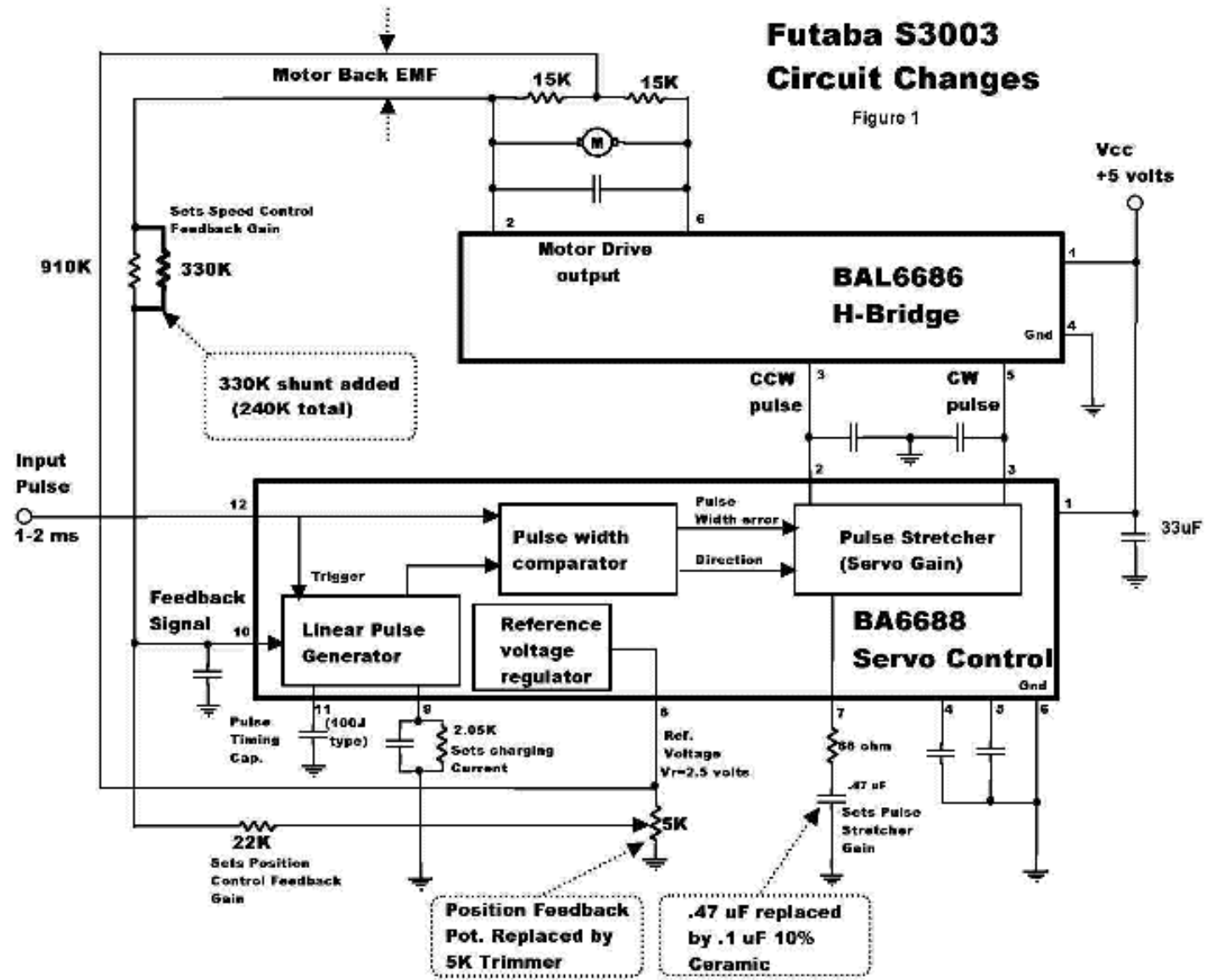


Positional | Continuous

Let's Take it Apart!

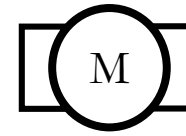
Futaba S3003 Circuit Changes

Figure 1

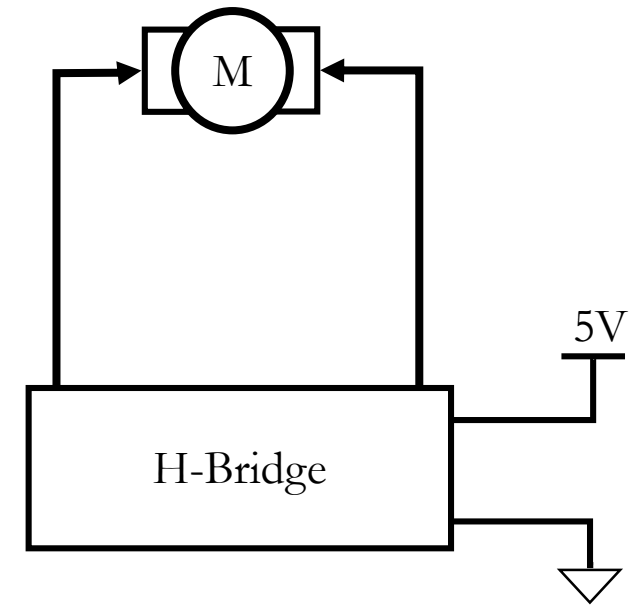


L. Buse
8/15/00

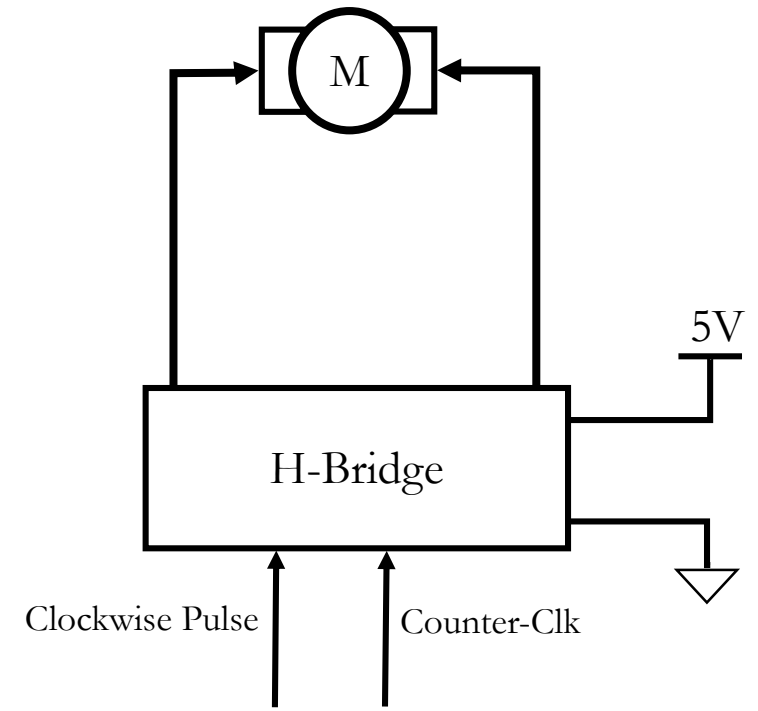
1) How do you control a motor?



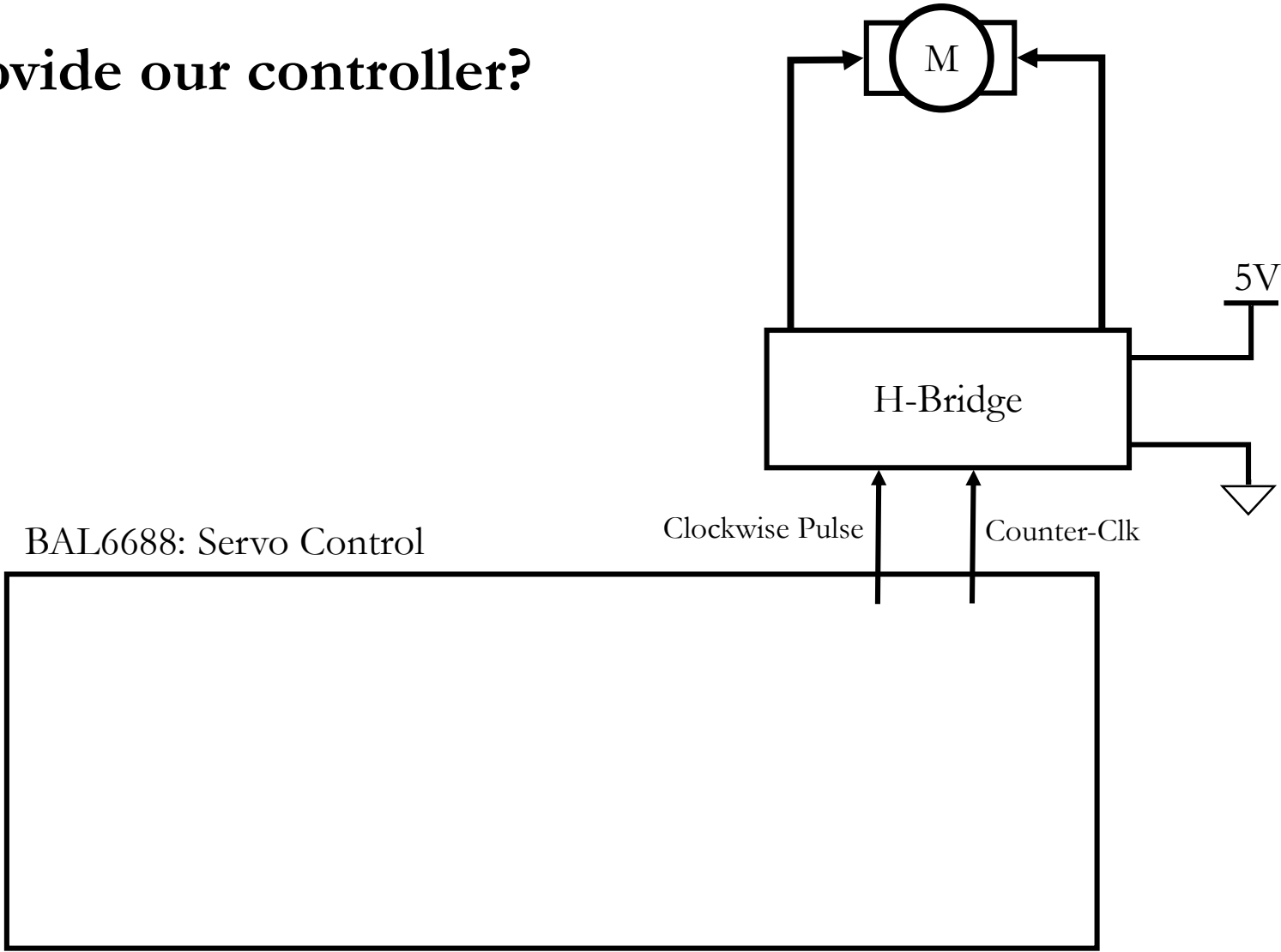
2) What are inputs to an H-Bridge?



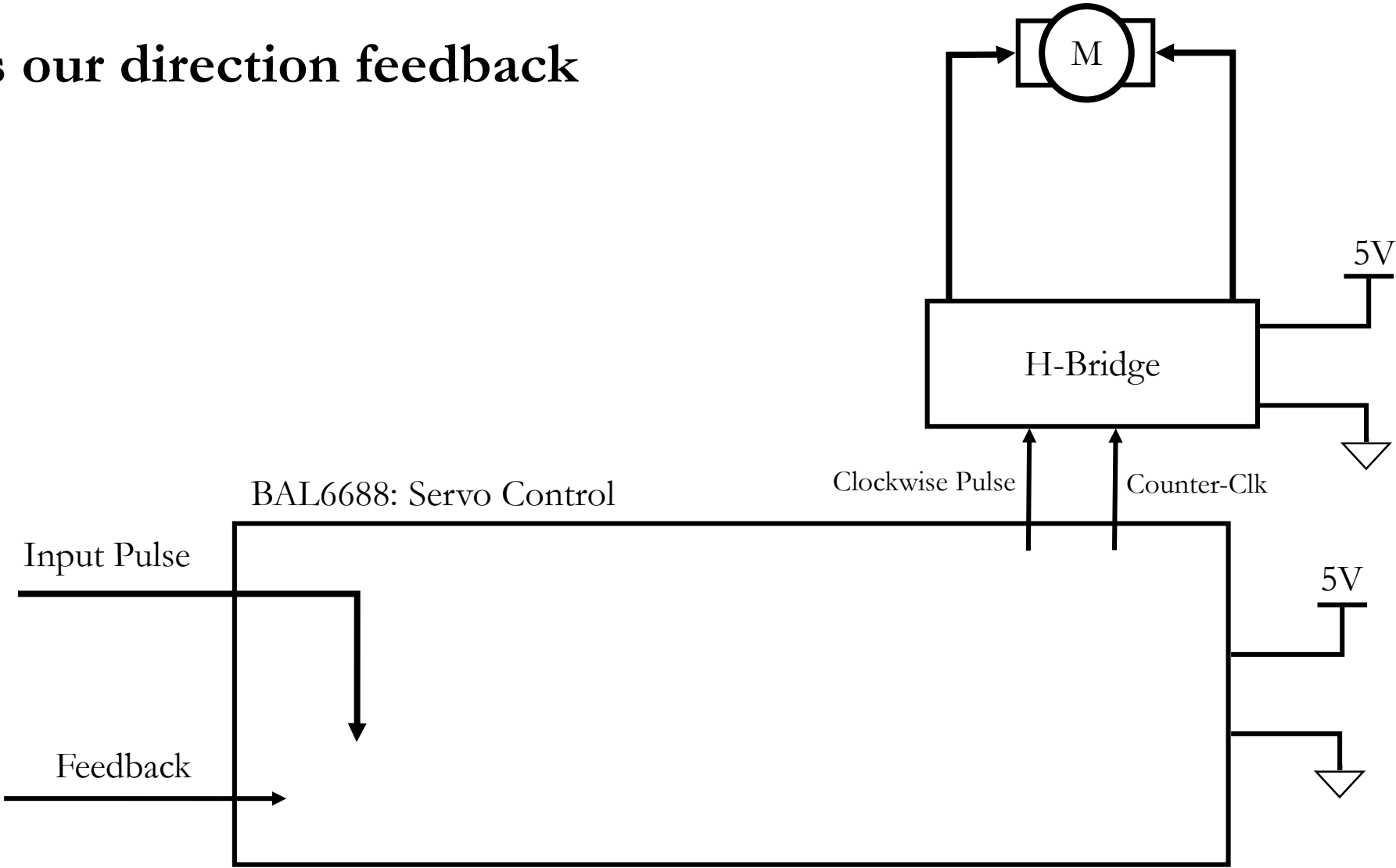
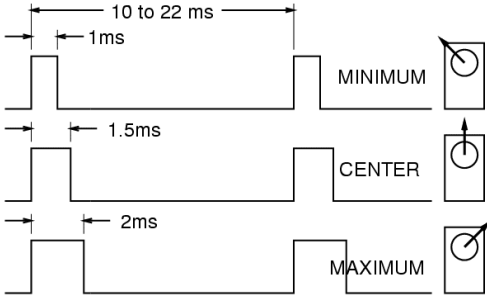
3) What's providing input to the H-Bridge?



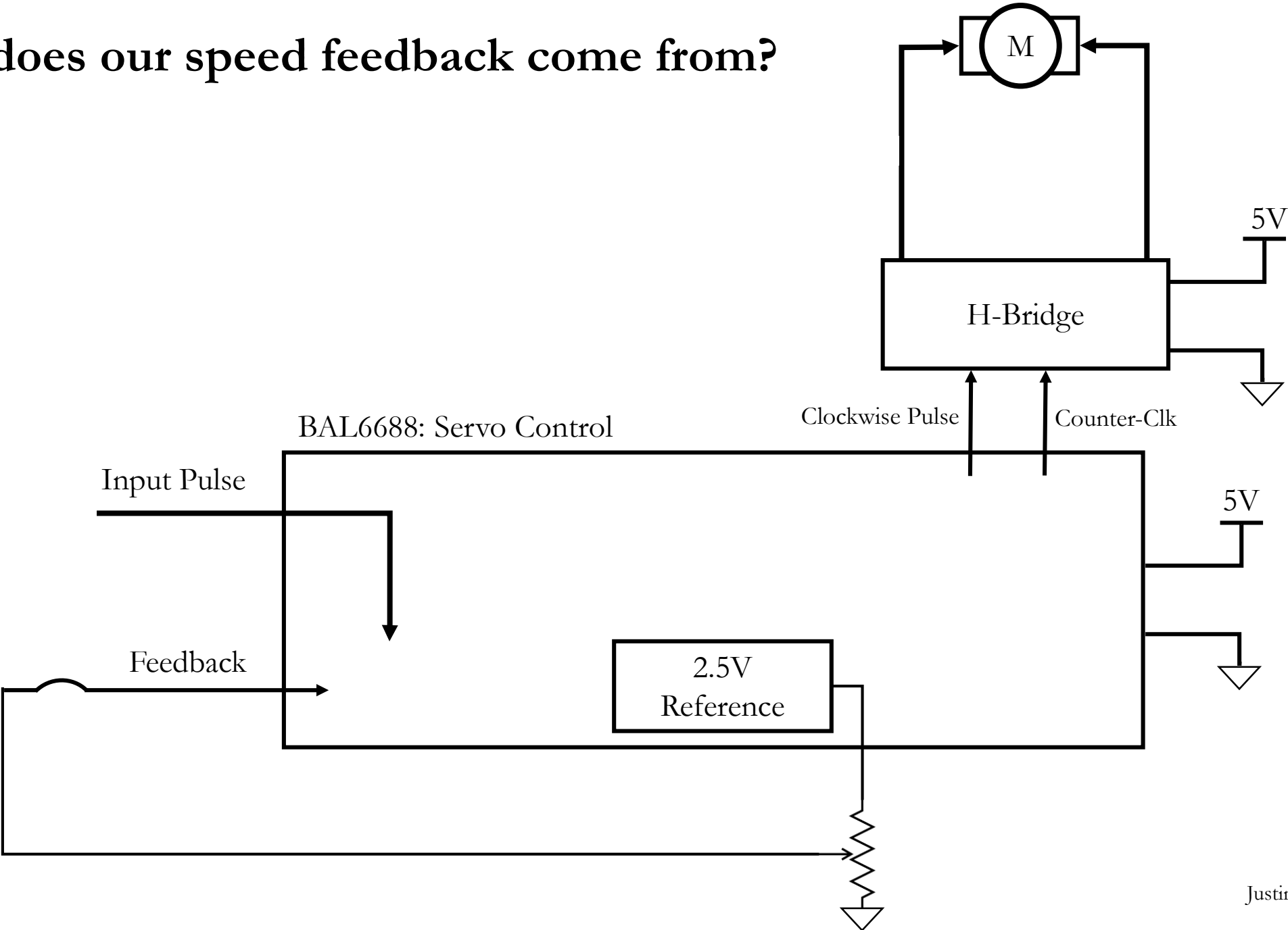
4) What input to we provide our controller?



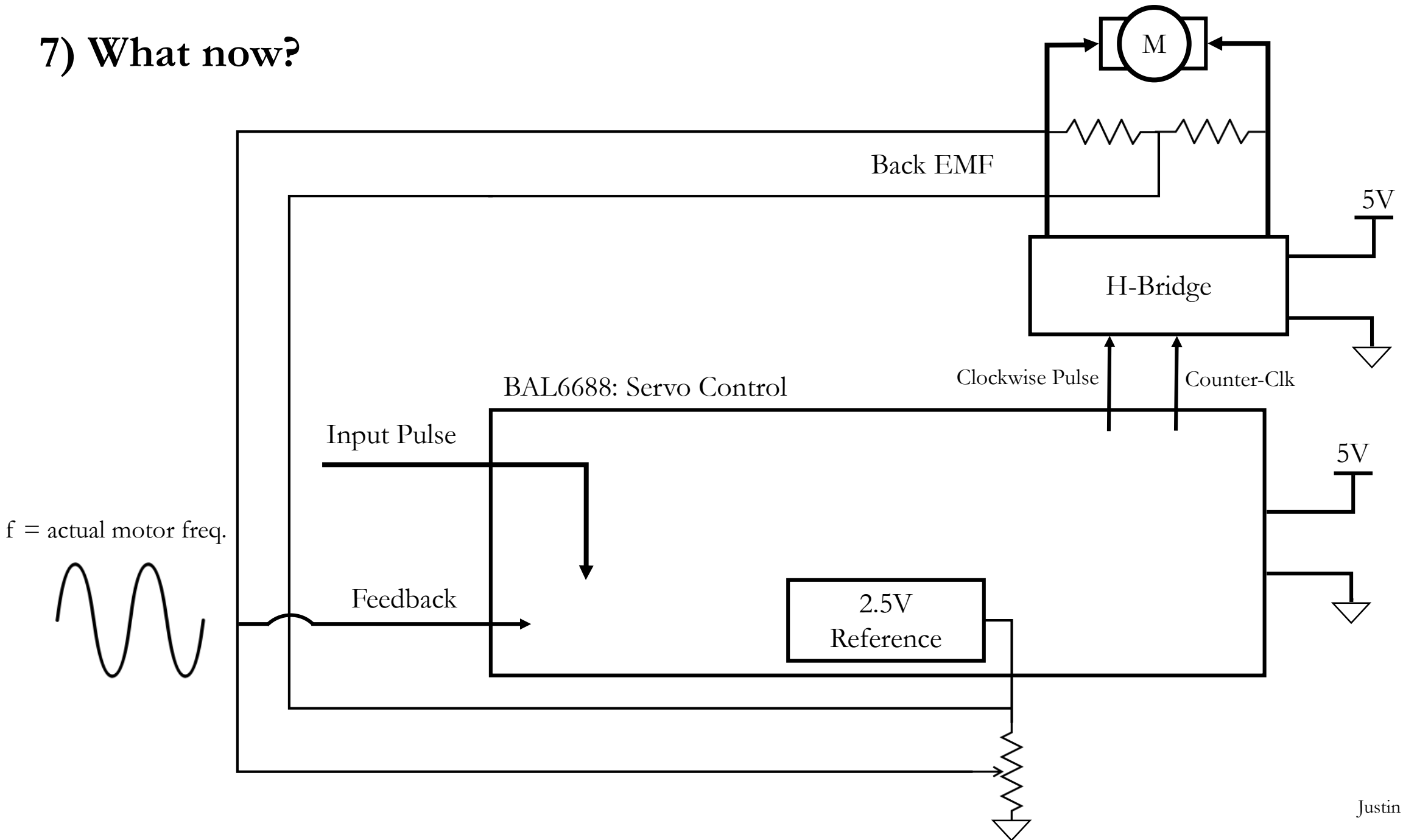
5) Where does our direction feedback come from?



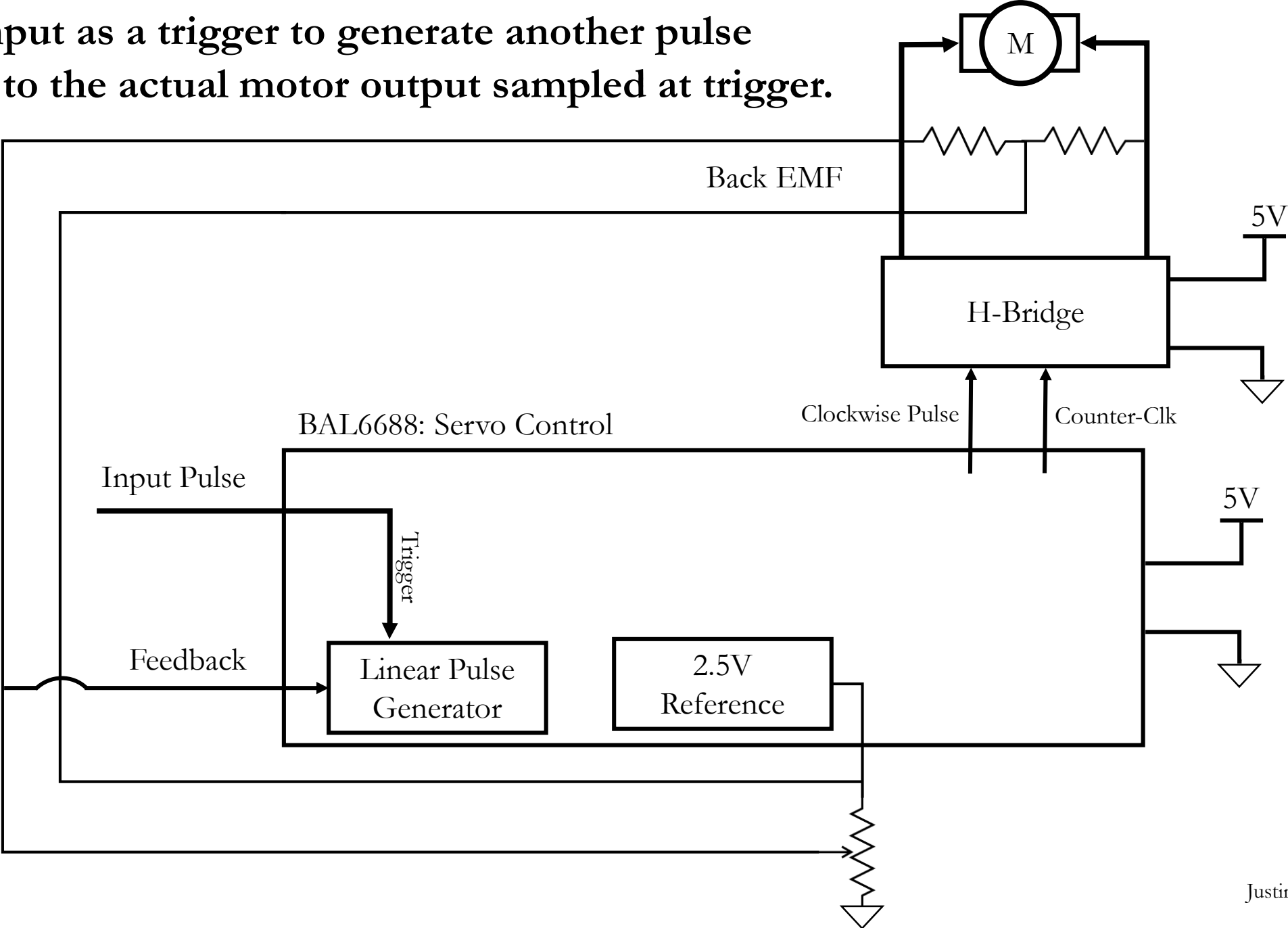
6) Where does our speed feedback come from?



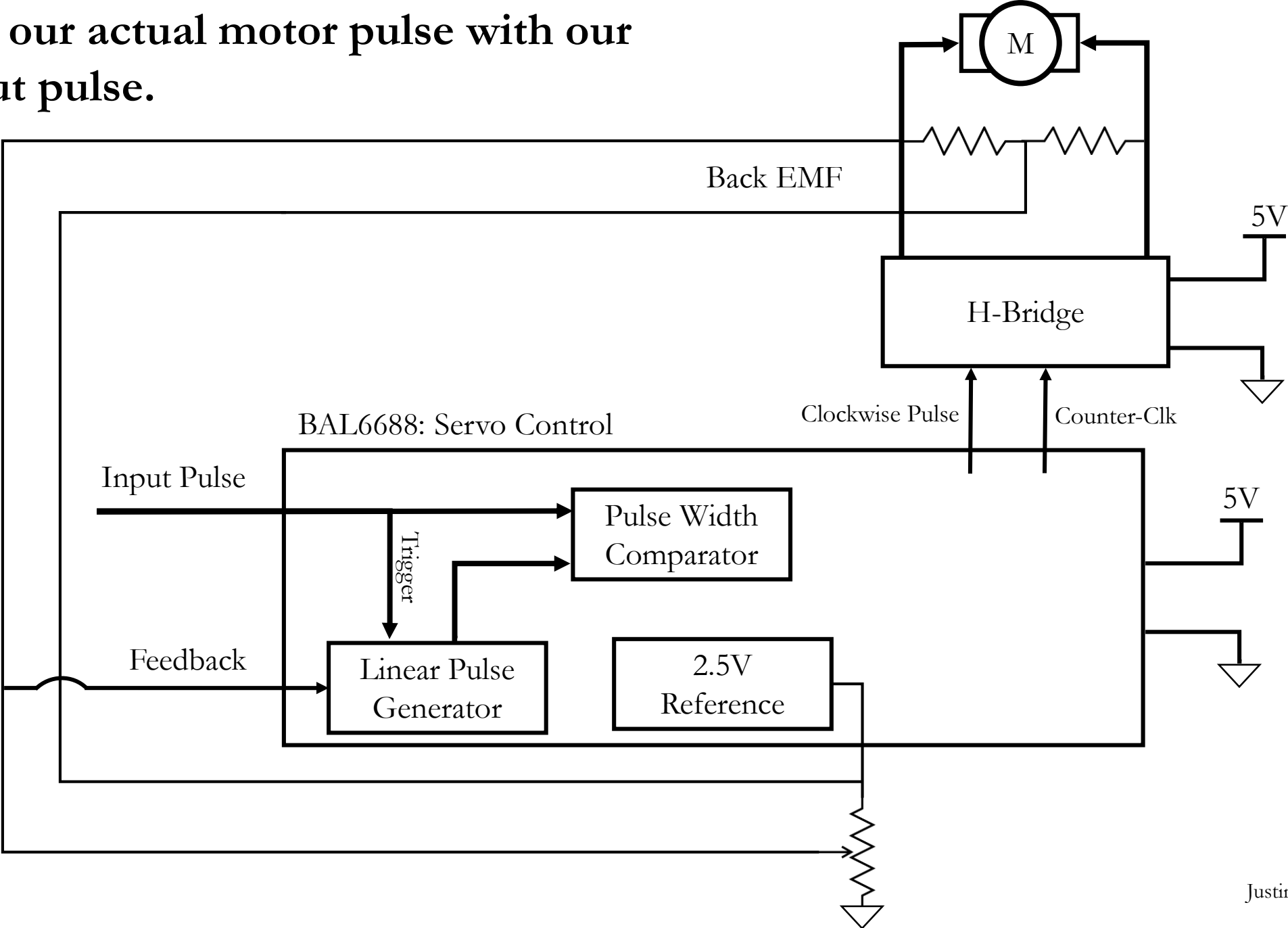
7) What now?



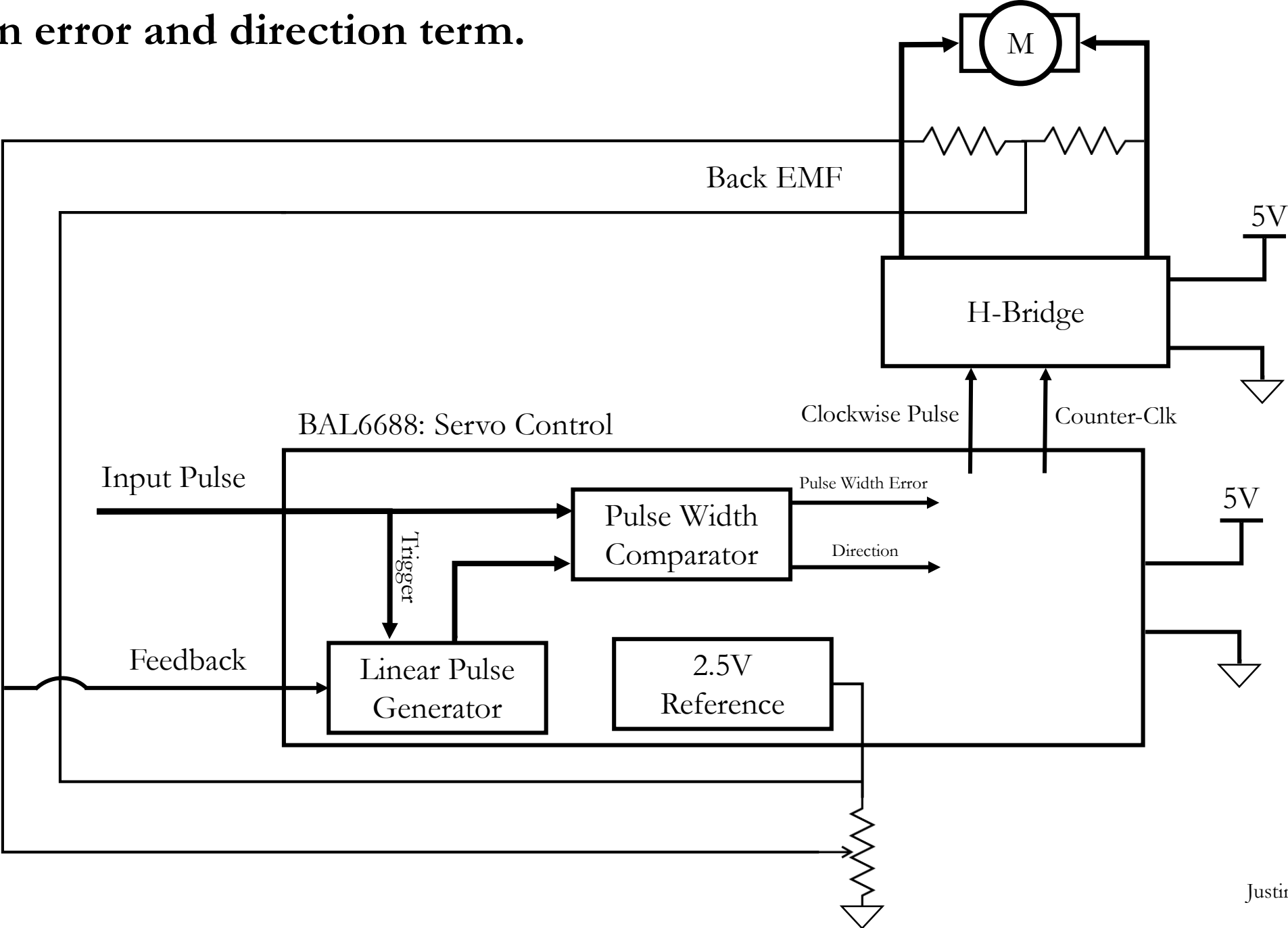
8) Use our input as a trigger to generate another pulse proportional to the actual motor output sampled at trigger.



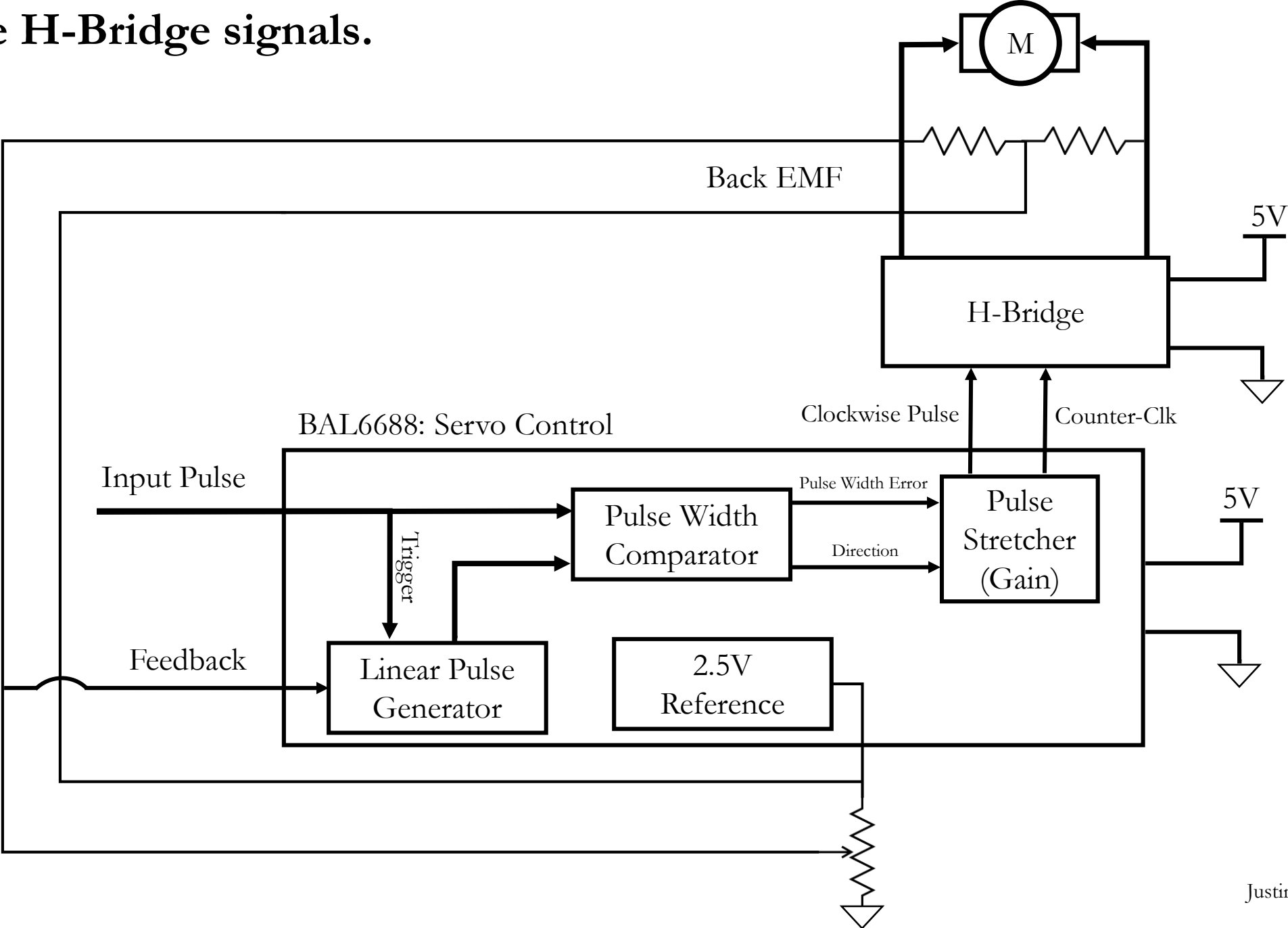
9) Compare our actual motor pulse with our desired input pulse.



10) Derive an error and direction term.

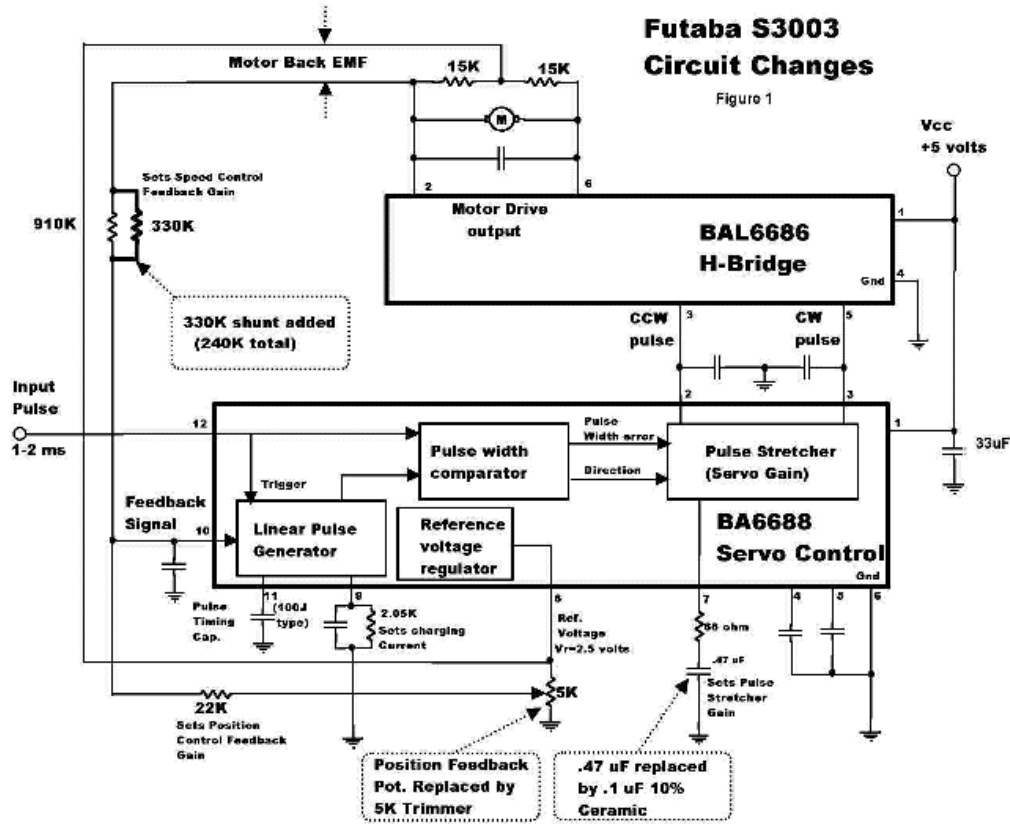


11) Generate H-Bridge signals.

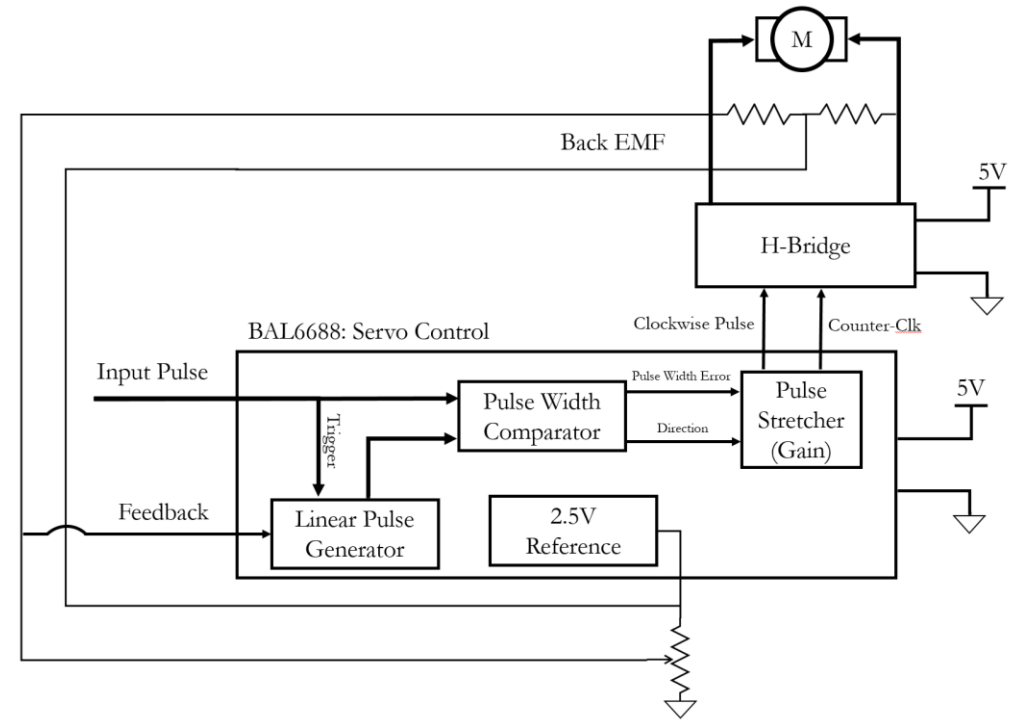


Futaba S3003 Circuit Changes

Figure 1



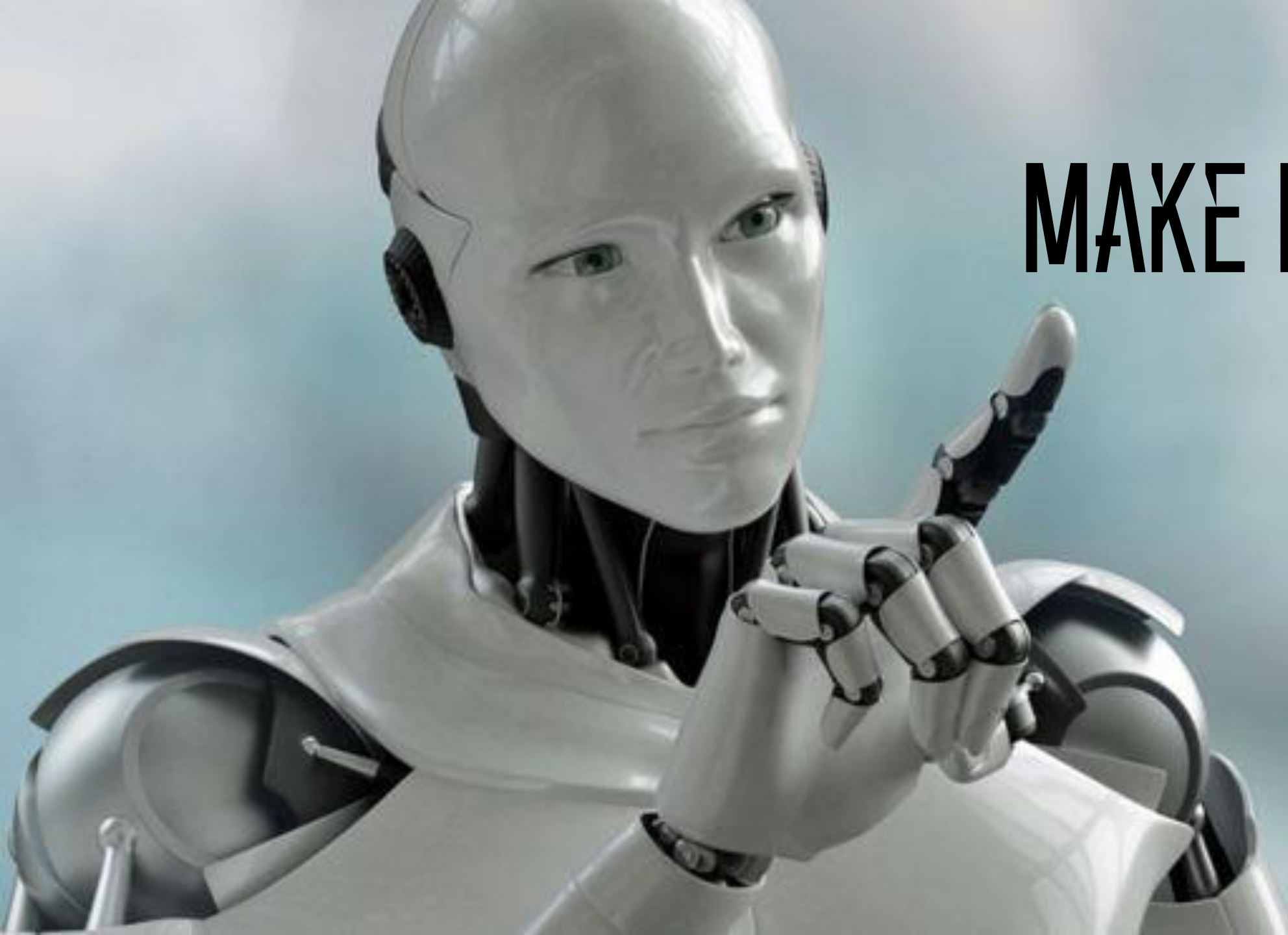
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8/15/00



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9/22/17

Recap

- **Motor feedback involves utilizing direction and speed:**
 - **Direction: Potentiometer**
 - **Speed: Back EMF**
- **Continuous rotational motors are just a special case of positional rotation motors with no feedback.**
- **Taking things apart is fun!**



MAKE ROBOTS!

ANY FEEDBACK?
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