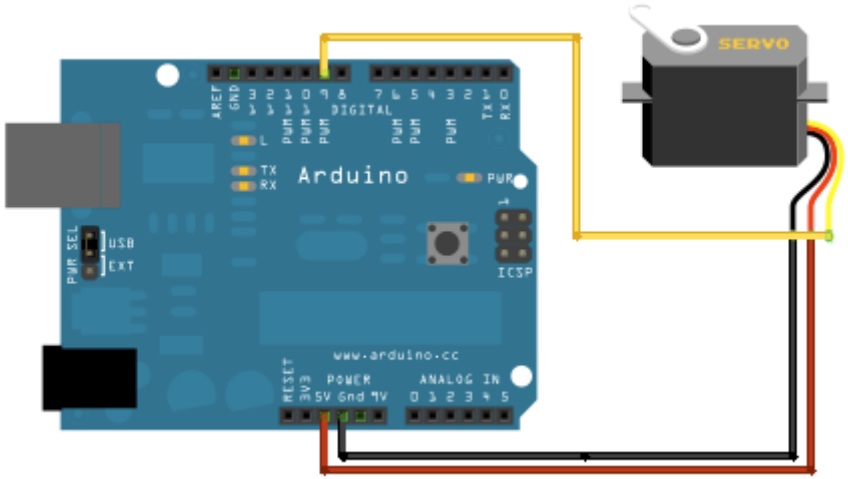
HOW SERVOS WORK

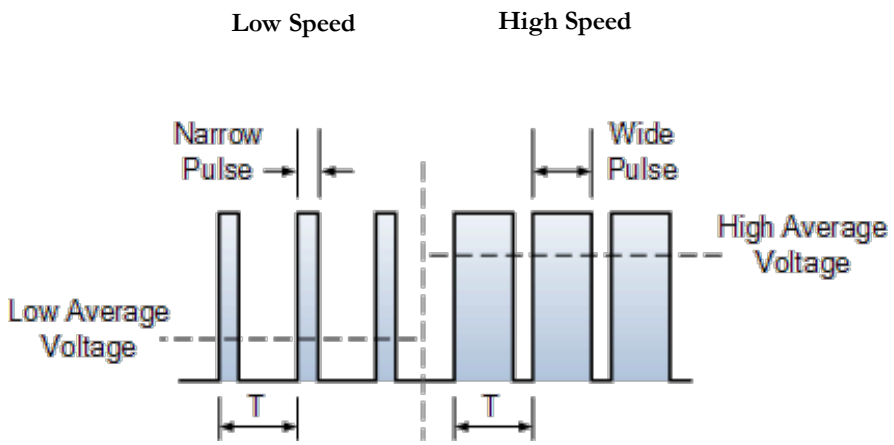
JUSTIN SELIG

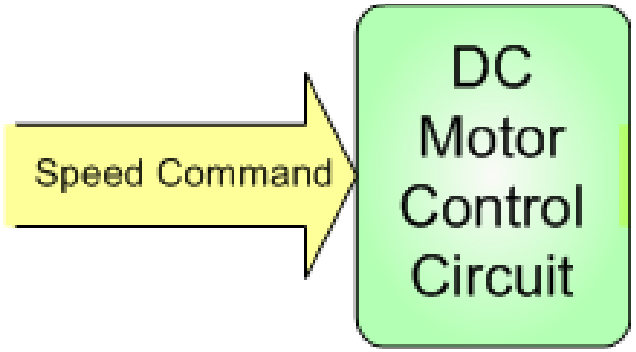
ECE 3400

9-21-2017



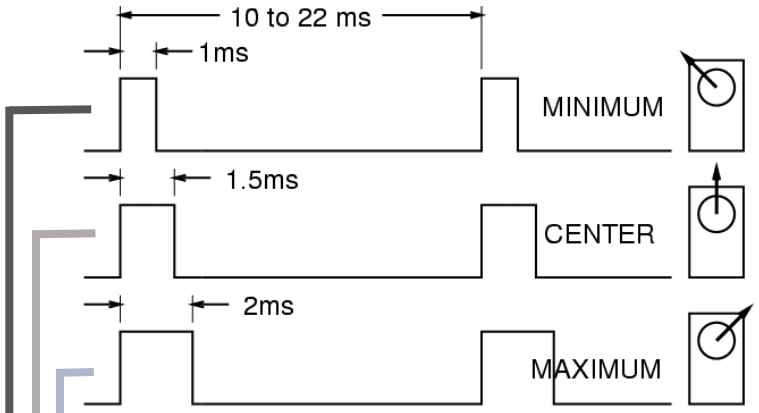
Positional | Continuous





Continuous

https://learn.adafruit.com/analog-feedback-servos/about-servos-and-feedback

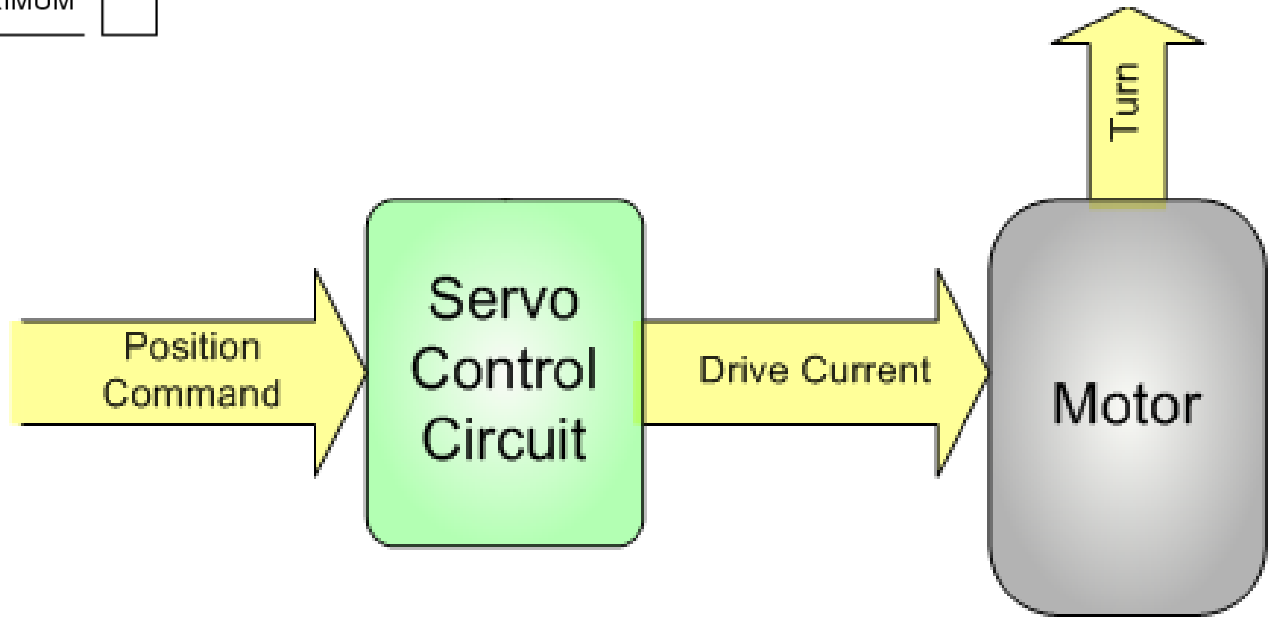


Arduino Code:

myservo.write(0)

myservo.write(90)

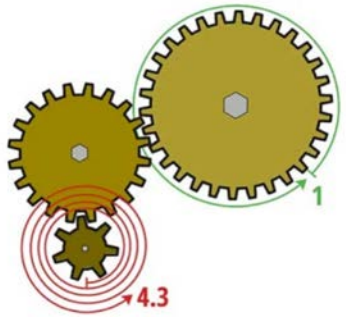
myservo.write(180)



Positional

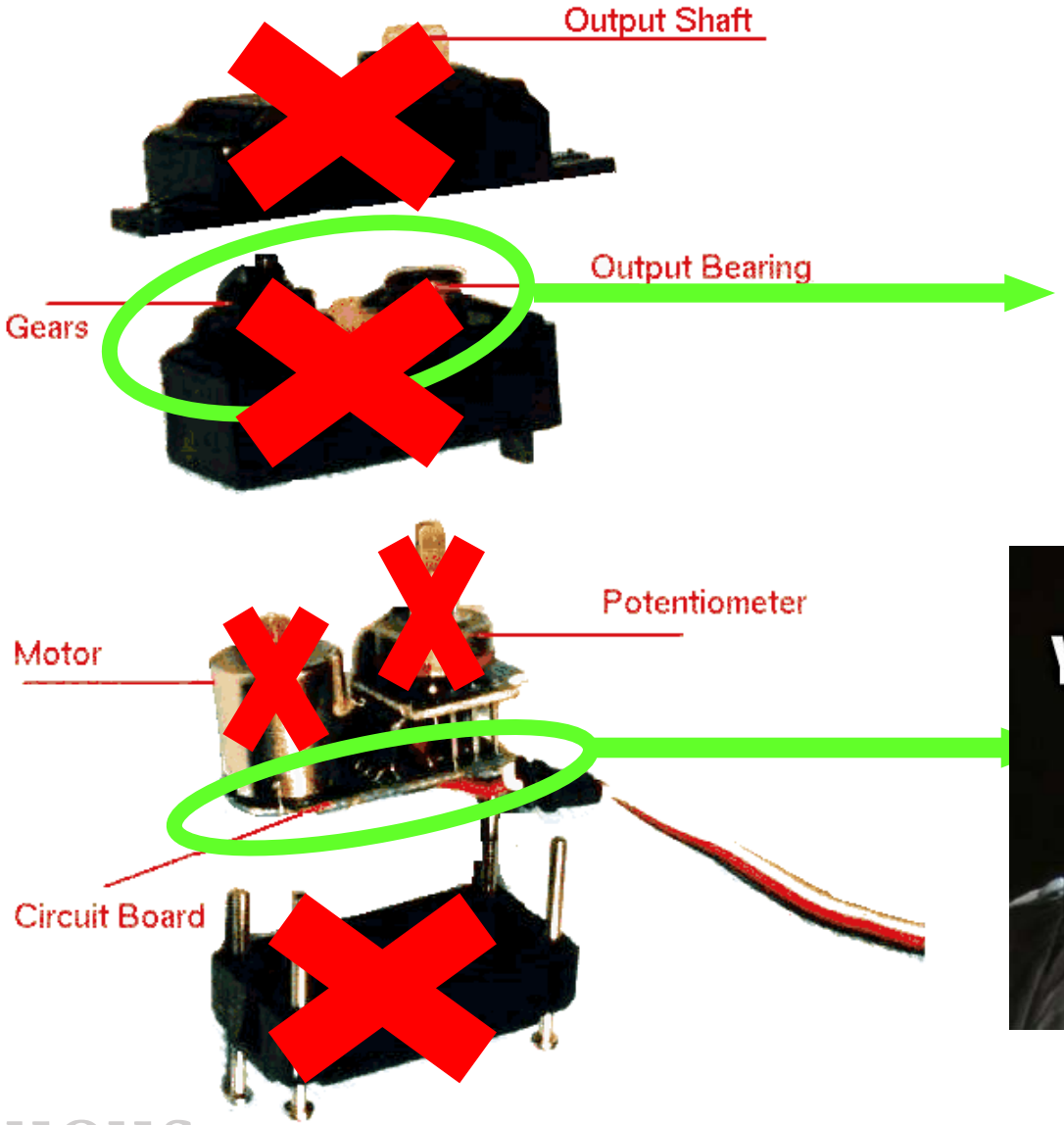
https://learn.adafruit.com/analog-feedback-servos/about-servos-and-feedback

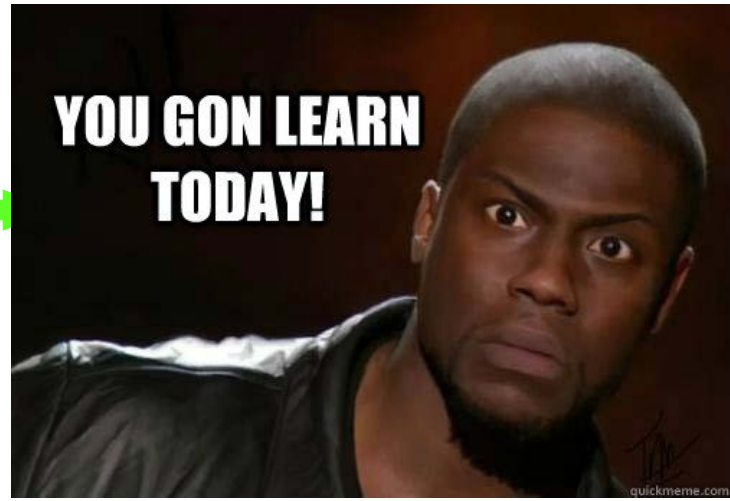
Positional | Continuous



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

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



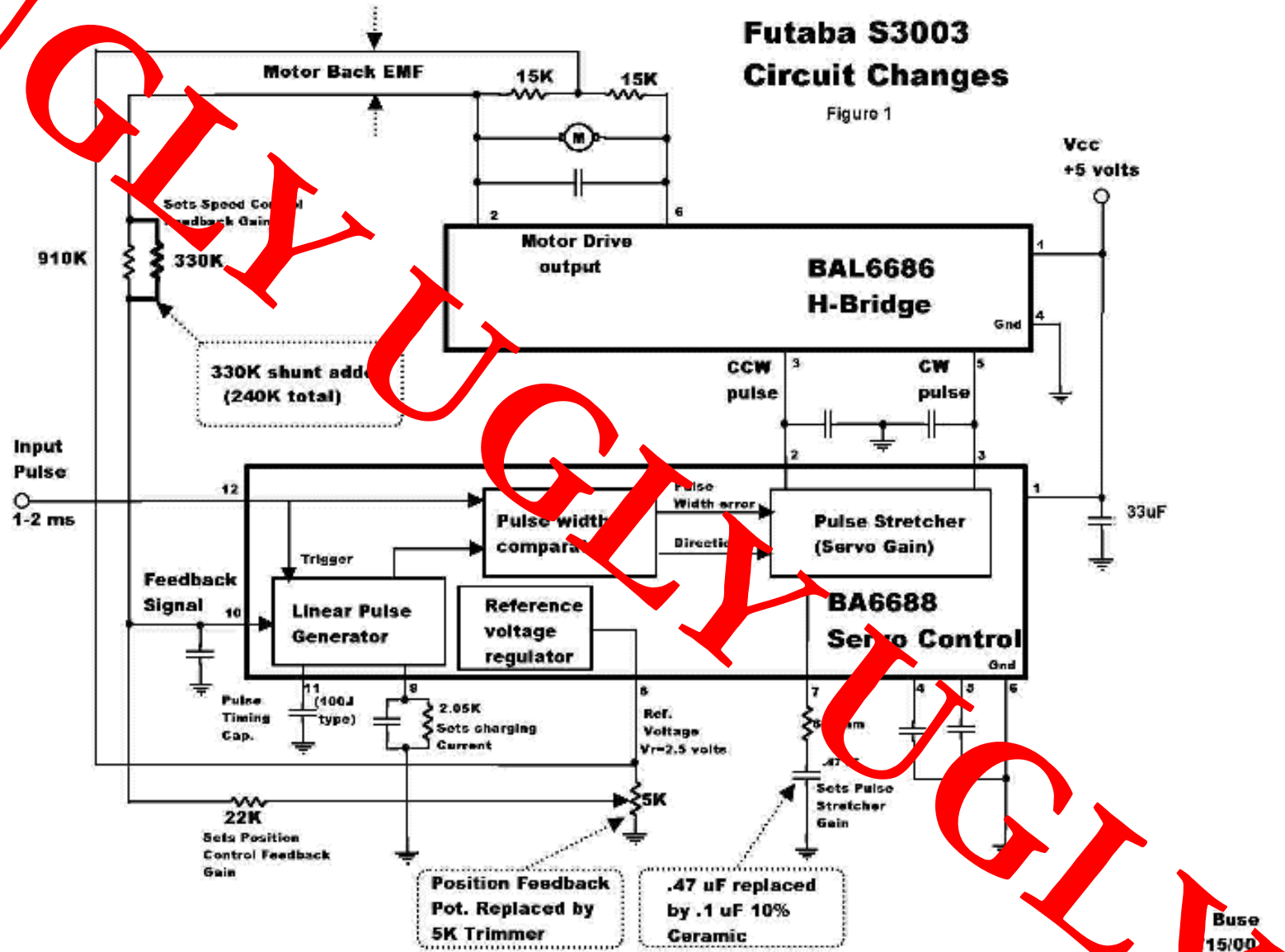


Positional | Continuous

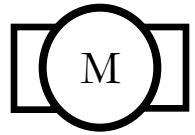
Let’s Take it Apart!

Futaba S3003 Circuit Changes

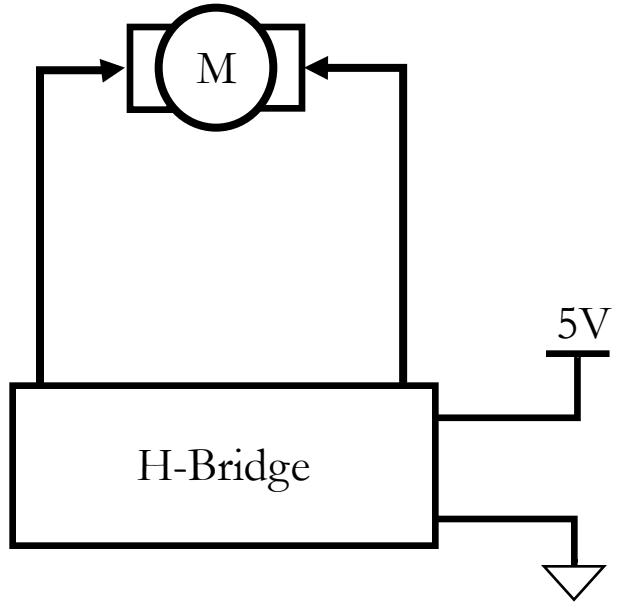
Figure 1



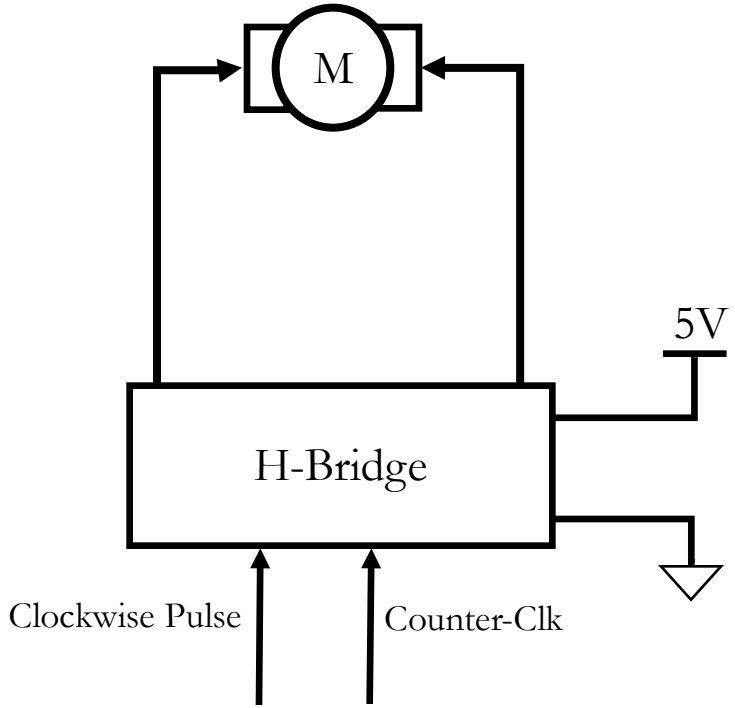
1) How do you control a motor?



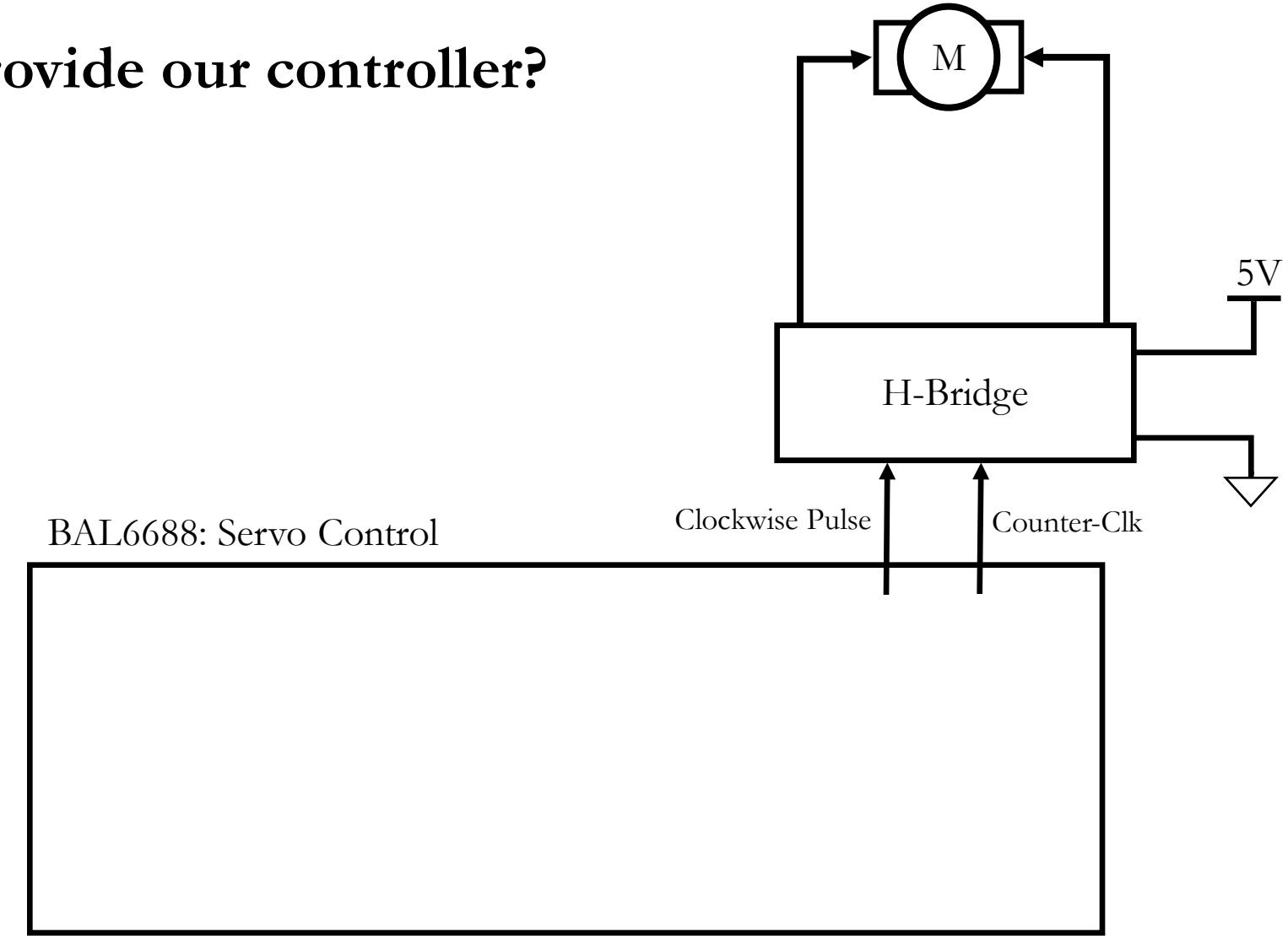
2) What are inputs to an H-Bridge?



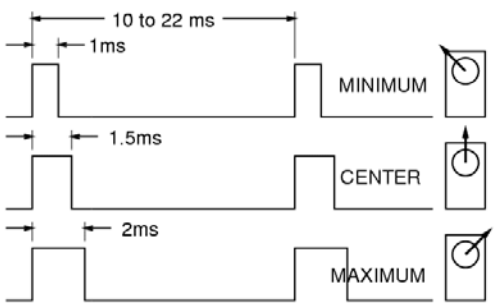
3) What's providing input to the H-Bridge?

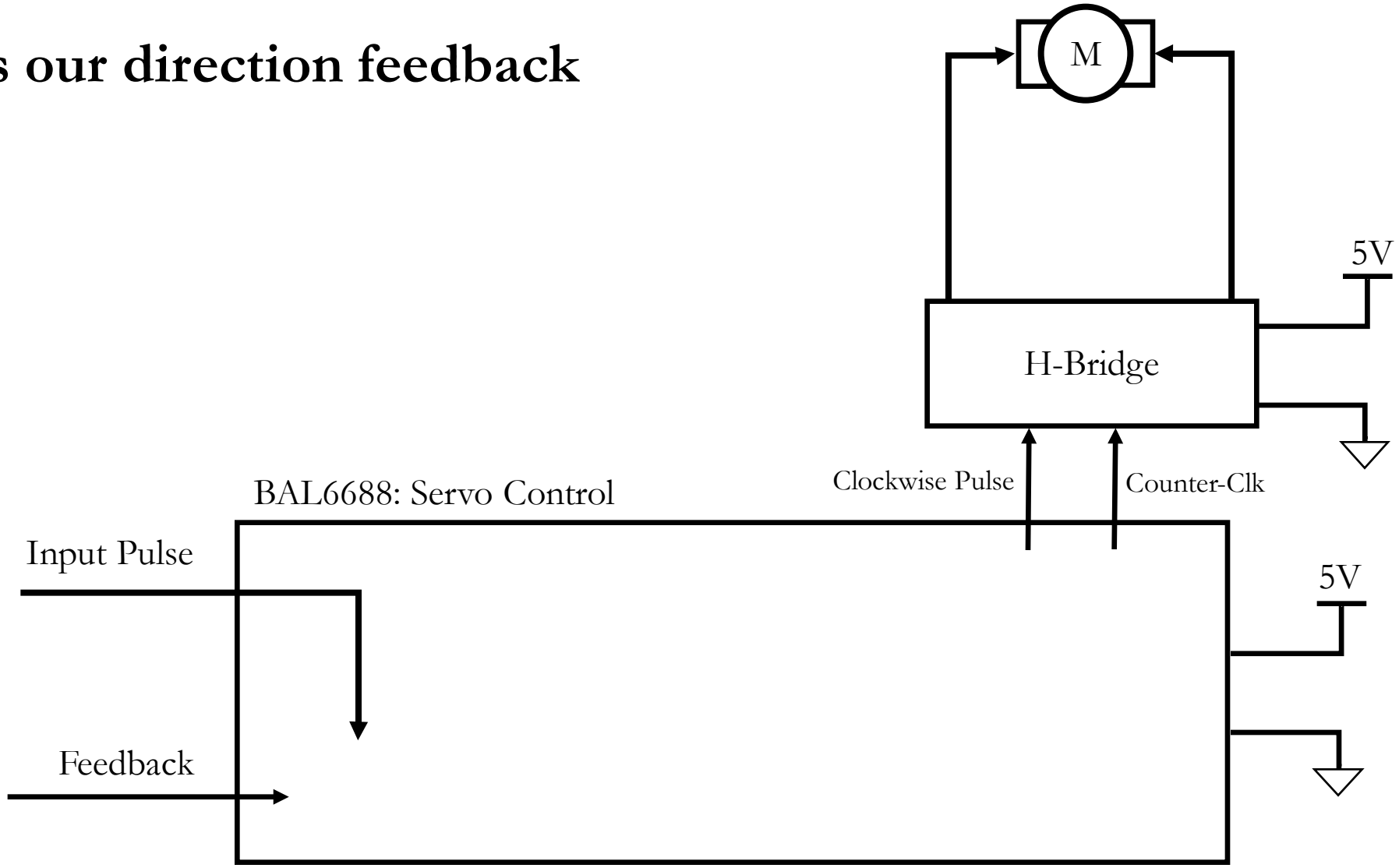


4) What input to we provide our controller?

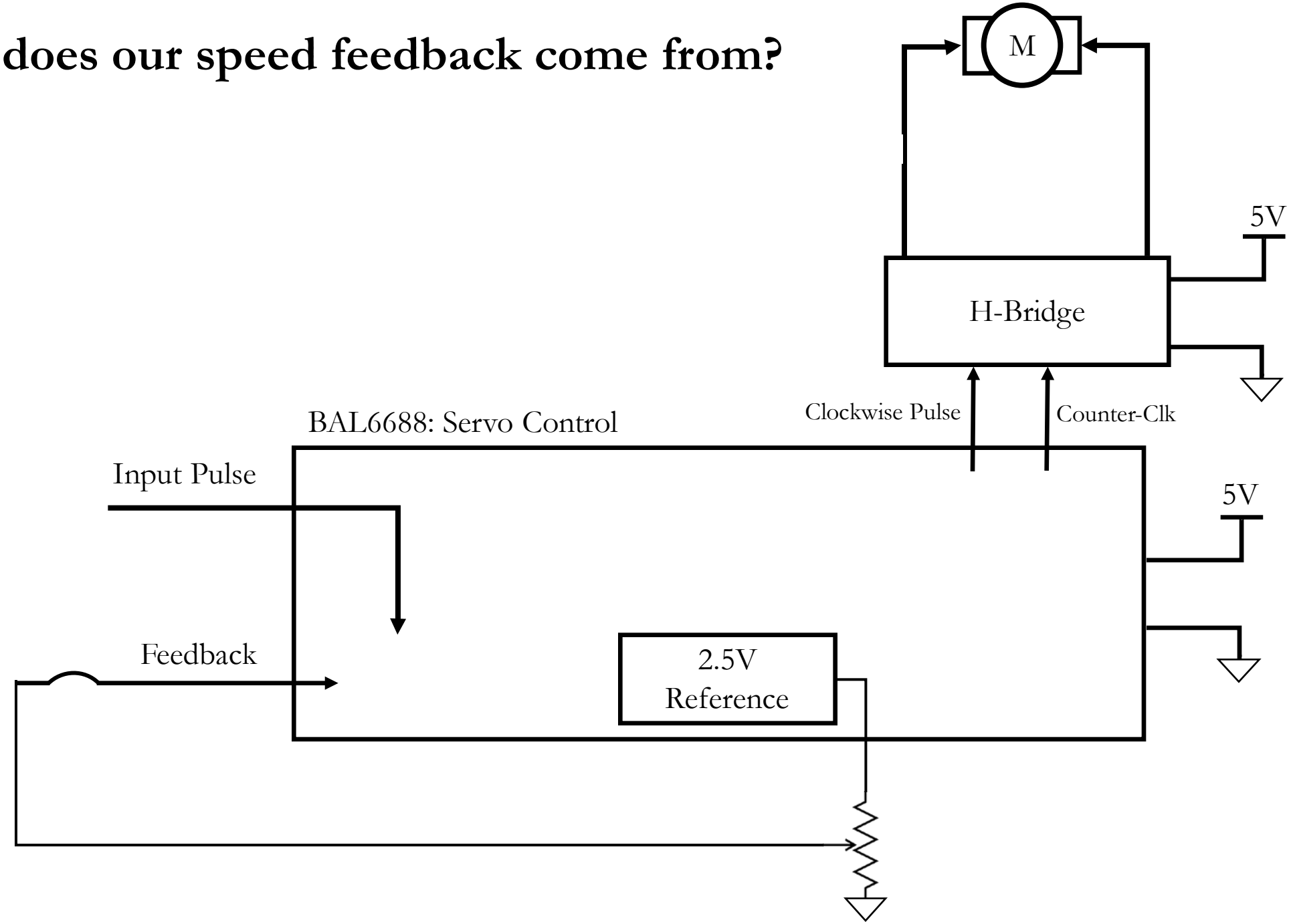


5) Where does our direction feedback come from?

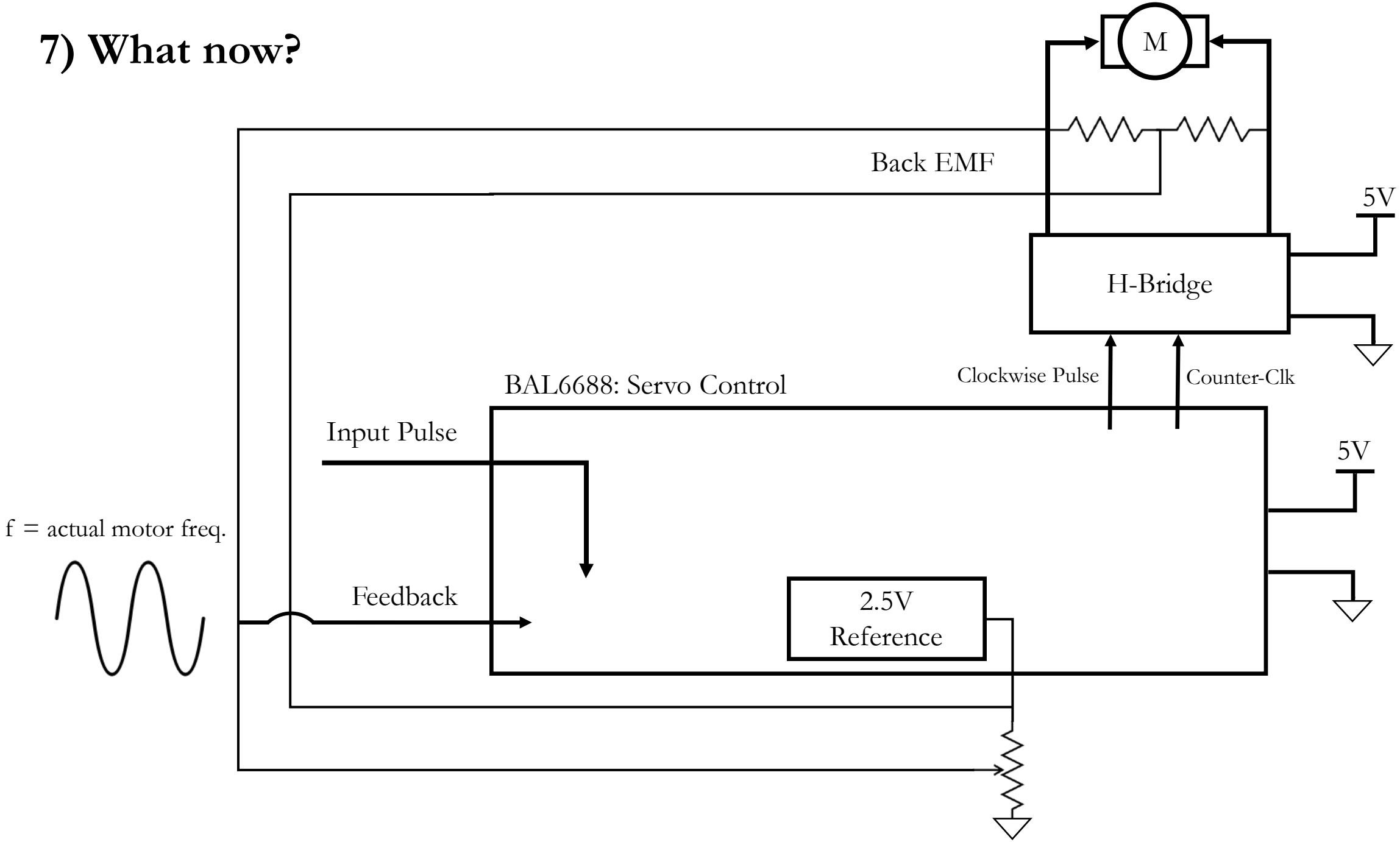




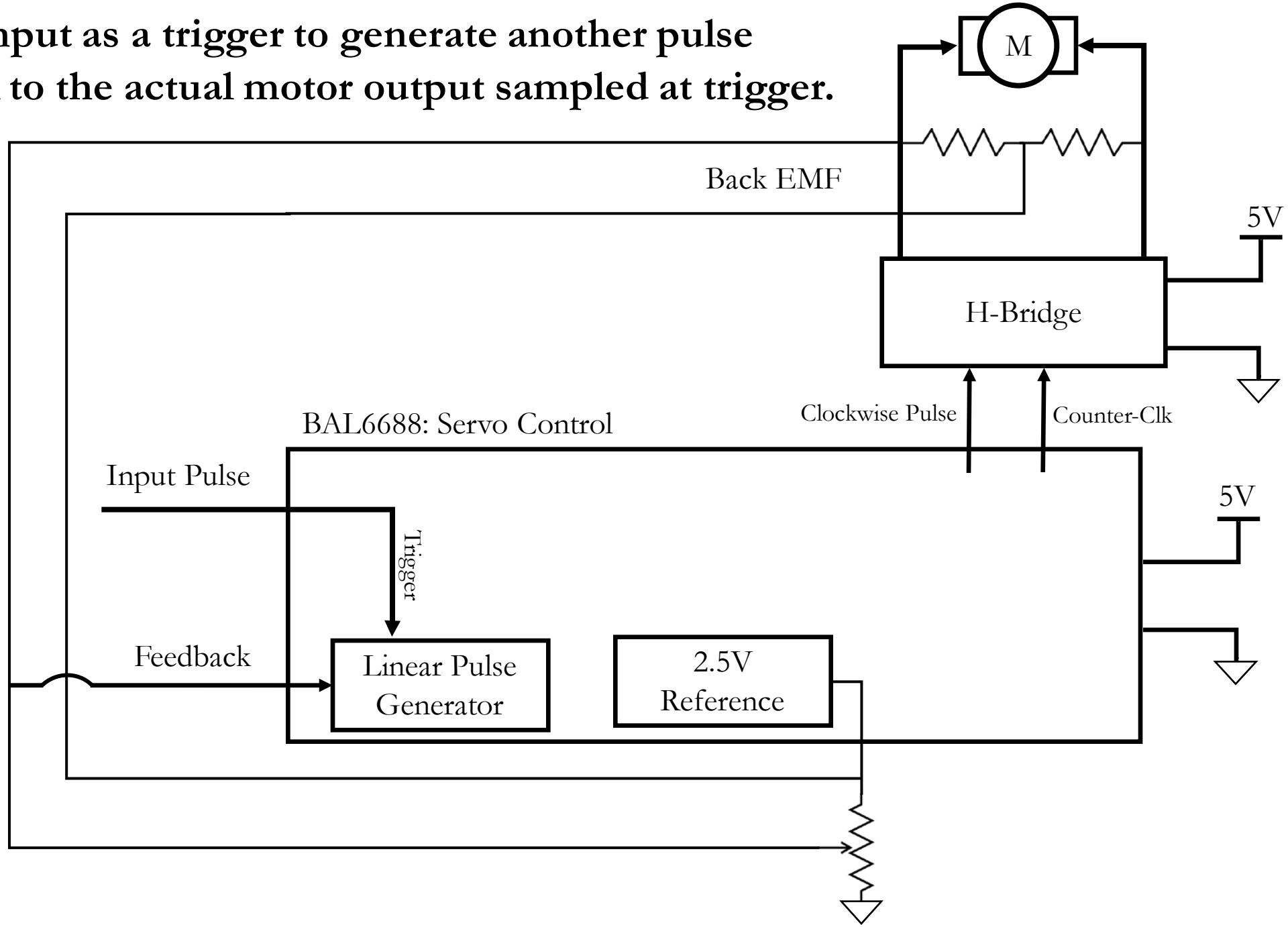
6) Where does our speed feedback come from?



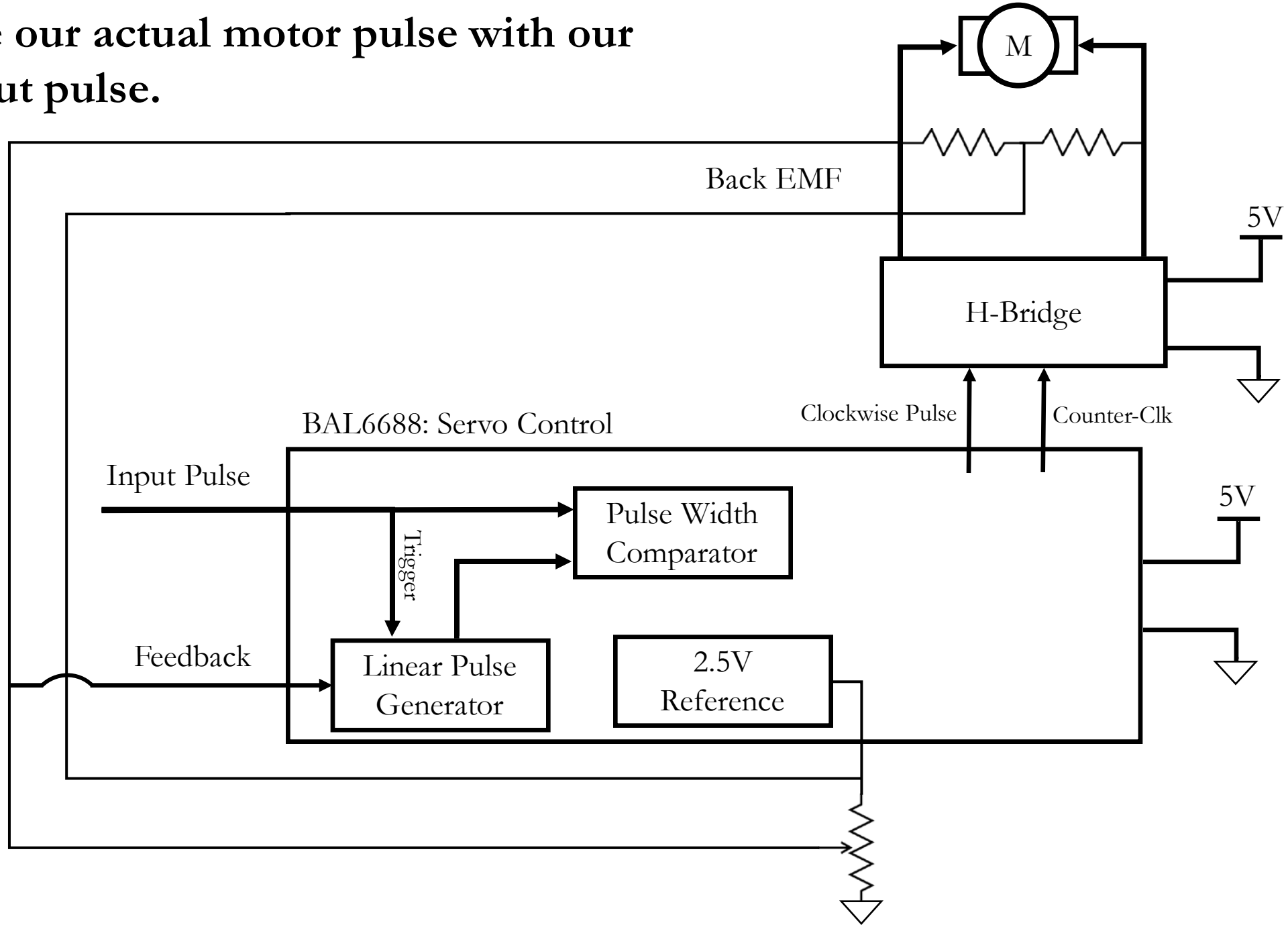
7) What now?


M
Back EMF
5V
H-Bridge
Clockwise Pulse
Counter-Clk
BAL6688: Servo Control
Input Pulse
5V
f = actual motor freq.
Feedback
2.5V
Reference

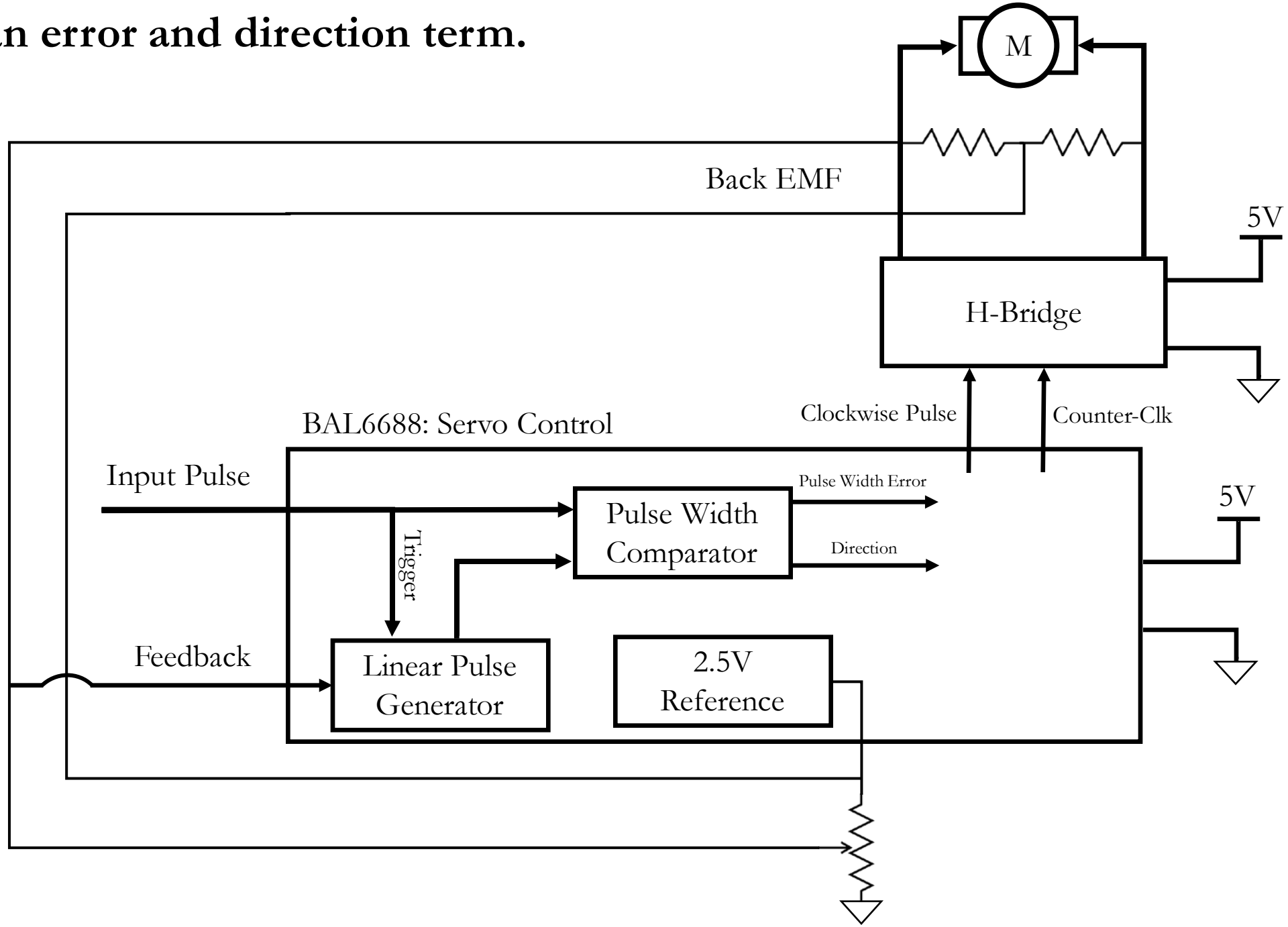
8) Use our input as a trigger to generate another pulse proportional to the actual motor output sampled at trigger.



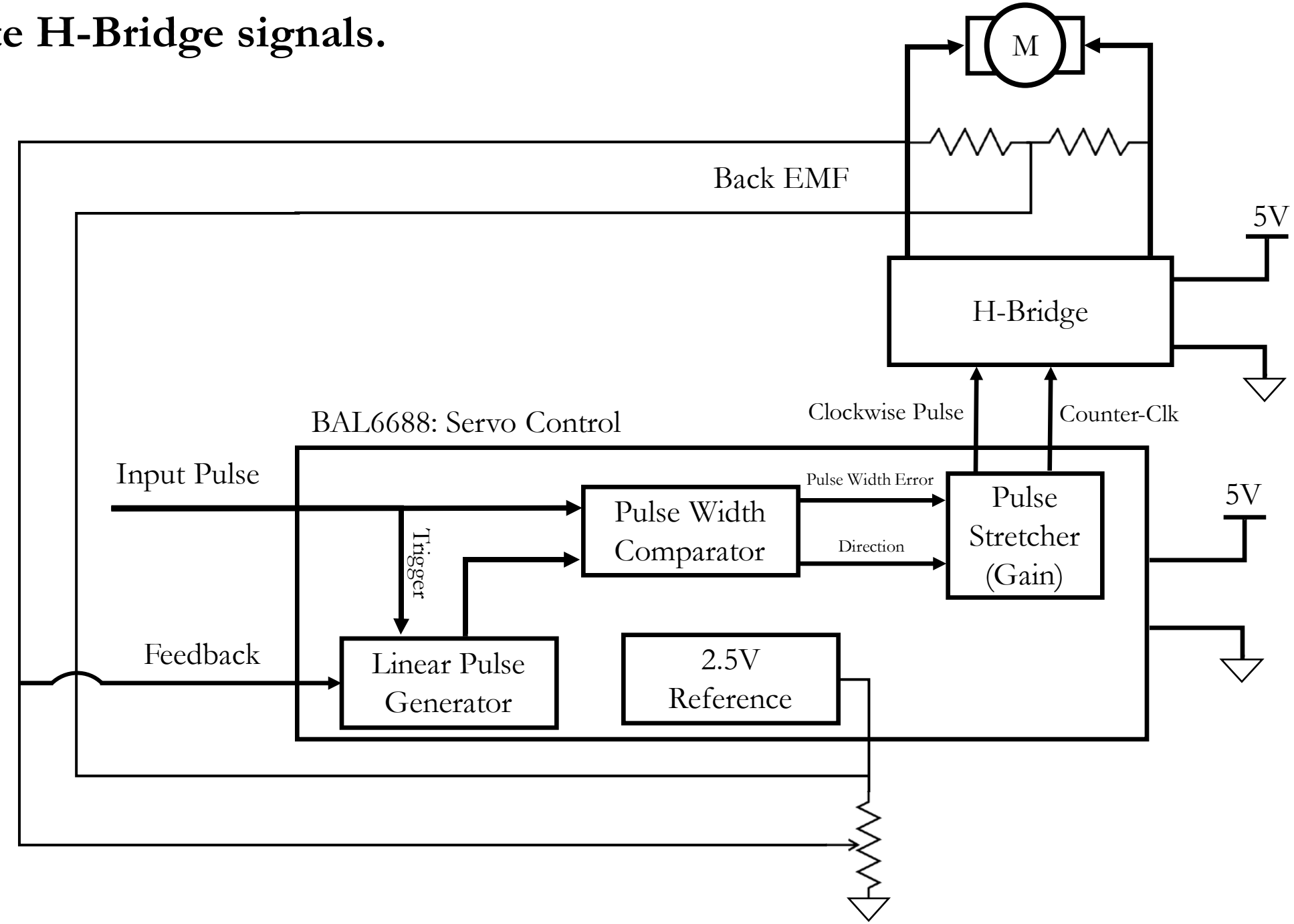
9) Compare our actual motor pulse with our desired input pulse.

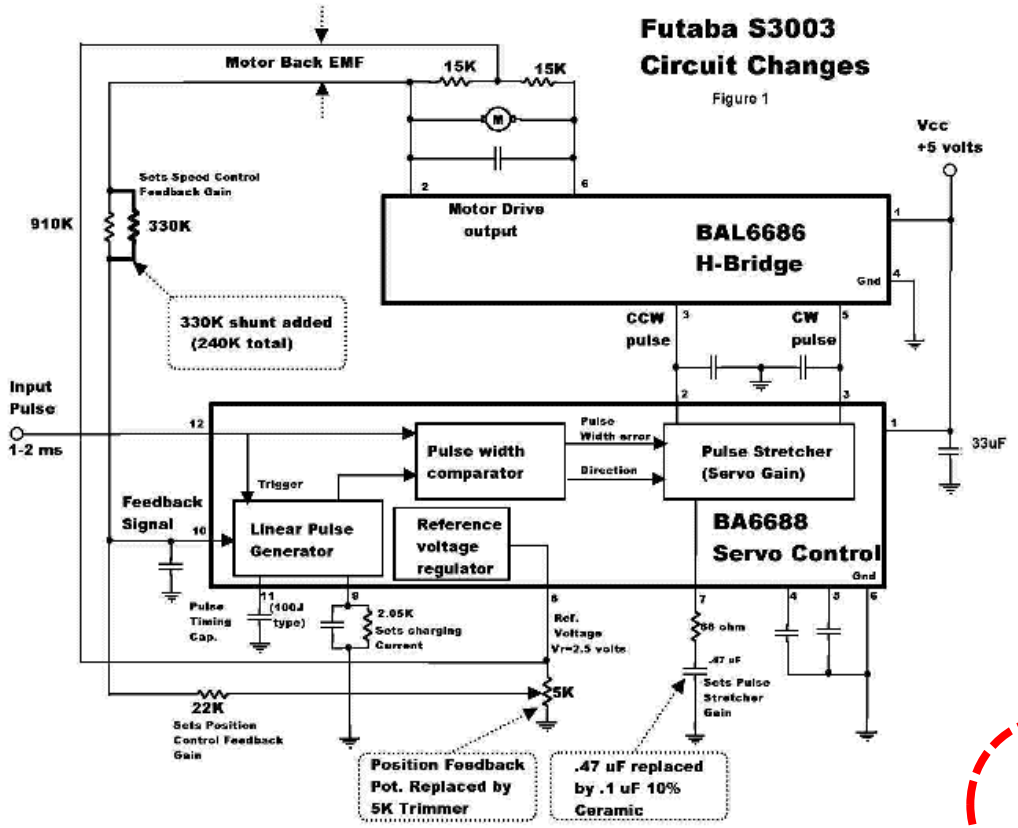


10) Derive an error and direction term.

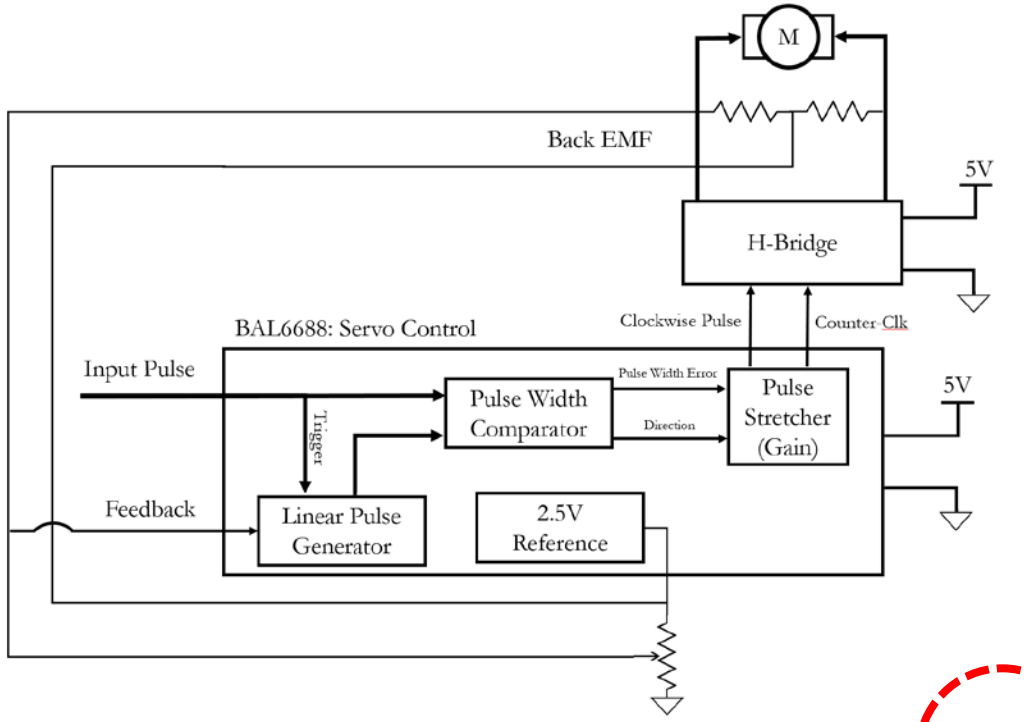


11) Generate H-Bridge signals.

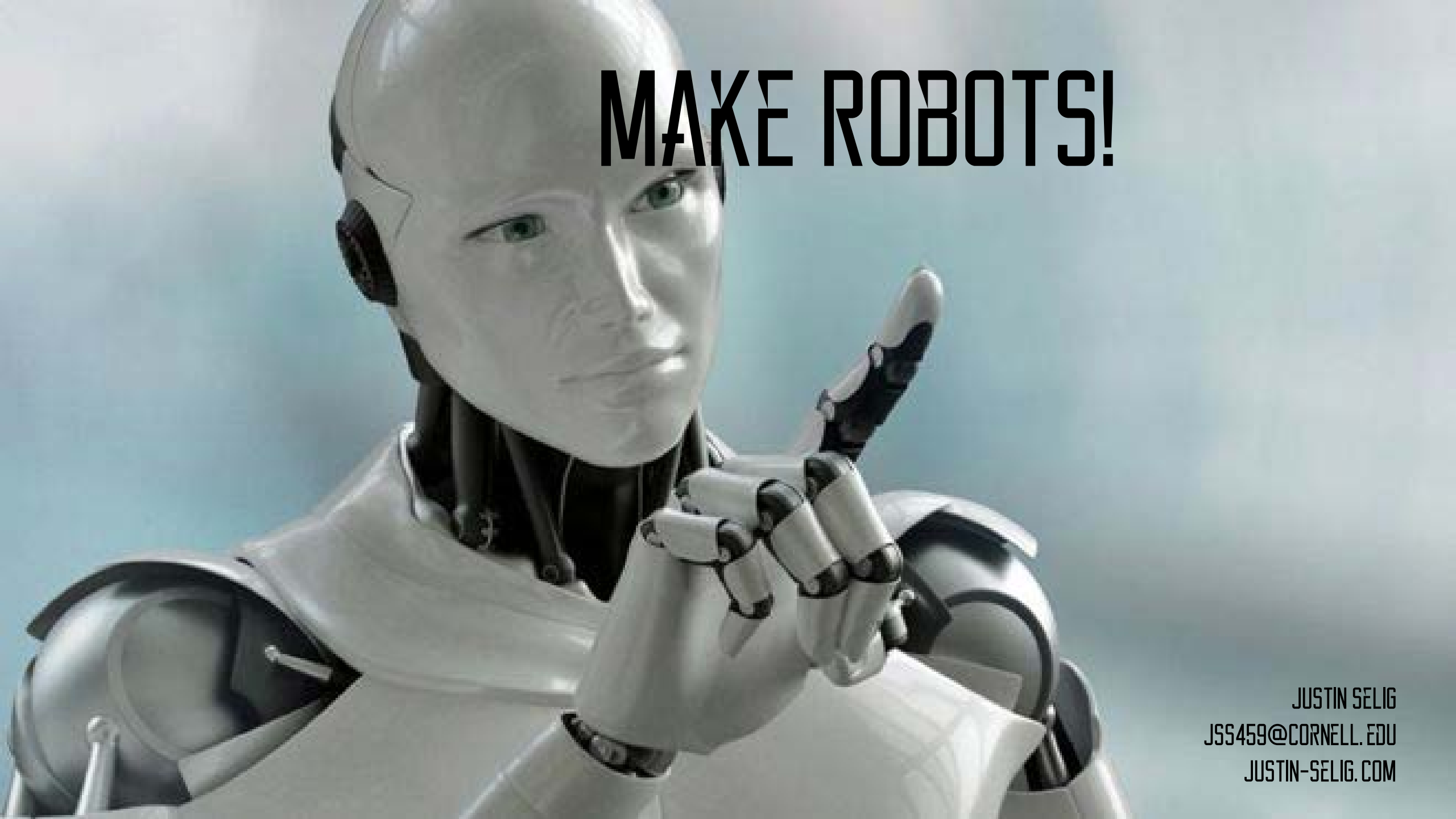




L. Buse
8/15/00



J. Selig
9/22/17



MAKE ROBOTS!

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