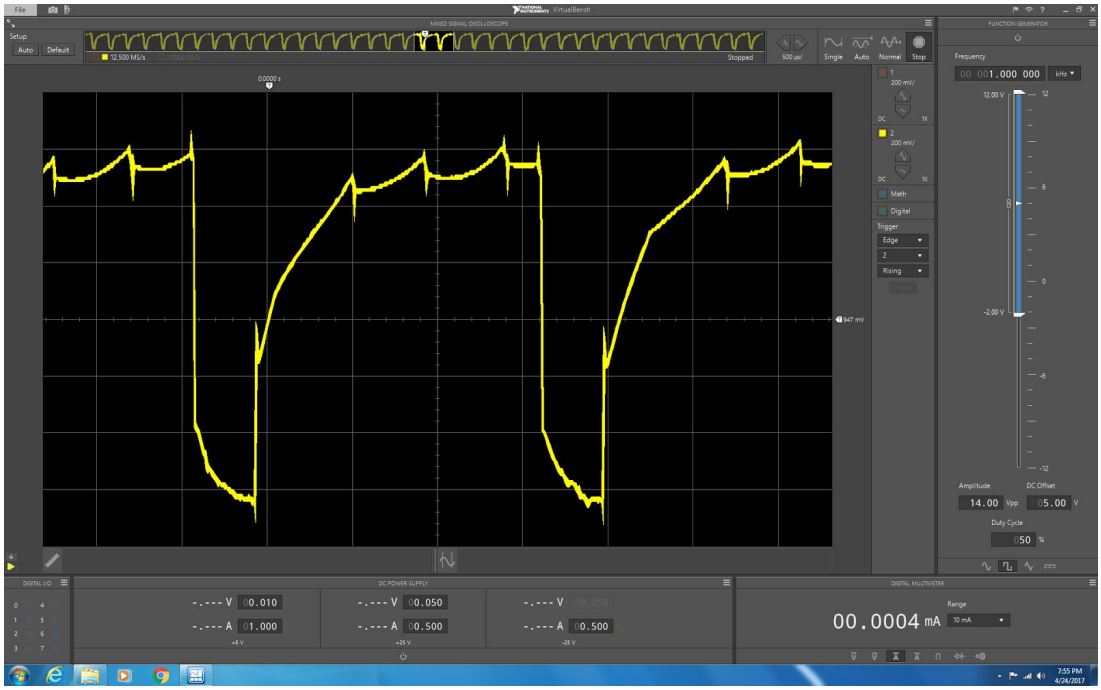
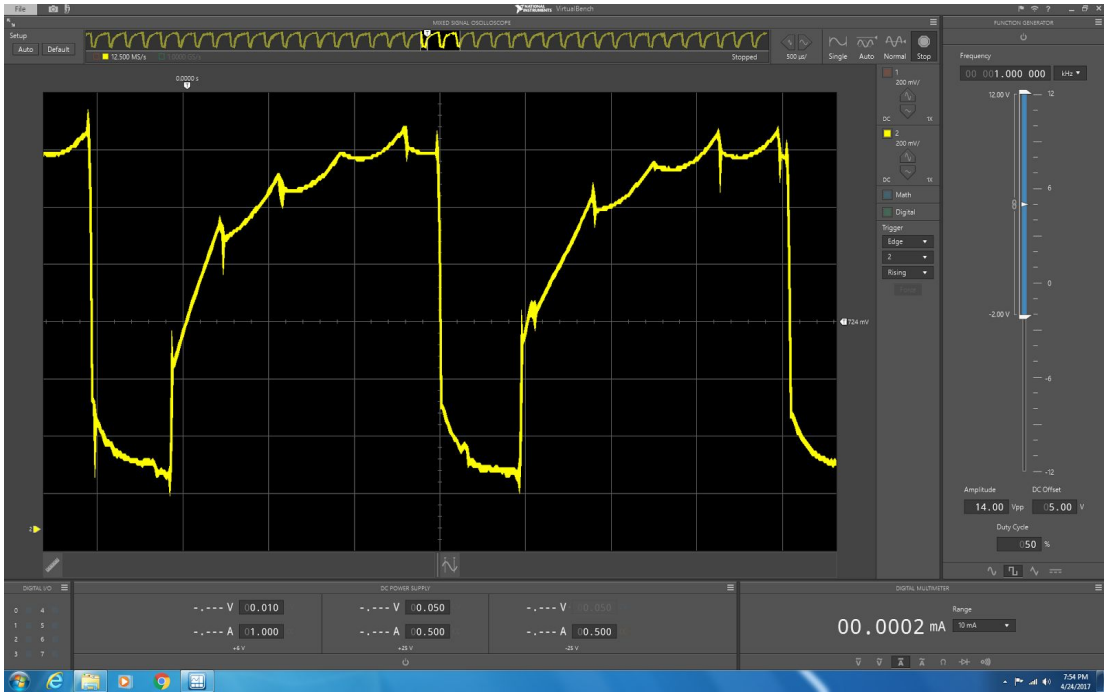
1. The voltage at flyback while the motor is running without the flyback diode is 1.2 V peak to peak (peaks at about 1.6 V above ground). With the diode, the voltage is 1.1 V peak to peak (peaks at about 1.3 V above ground).

Flyback without Diode

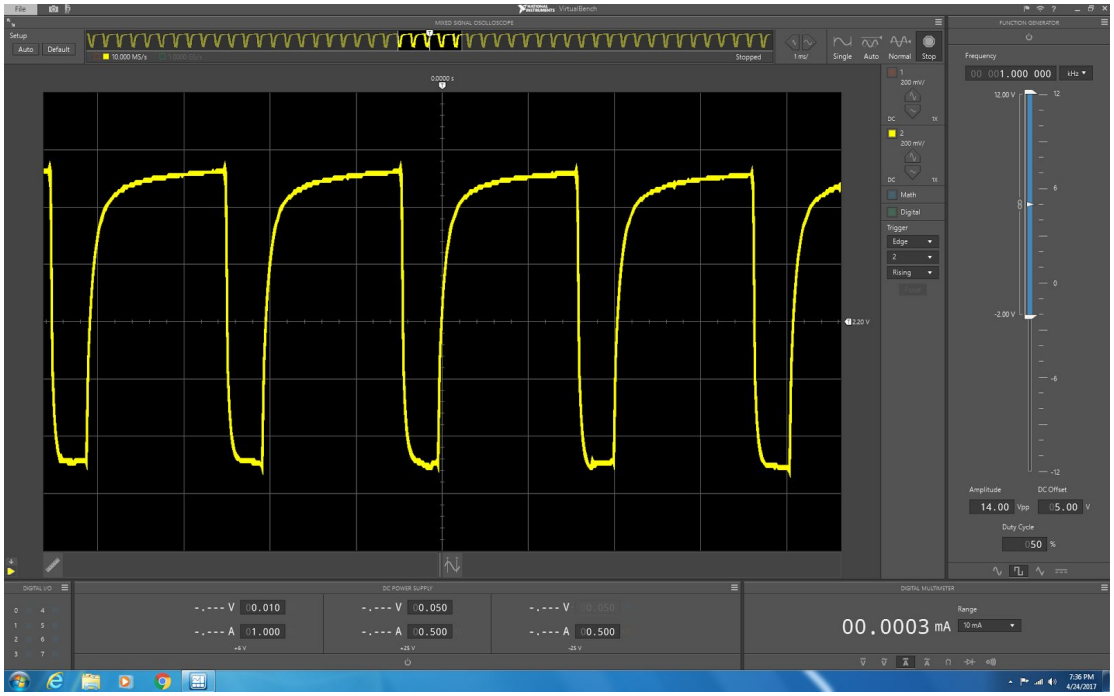


Flyback with diode

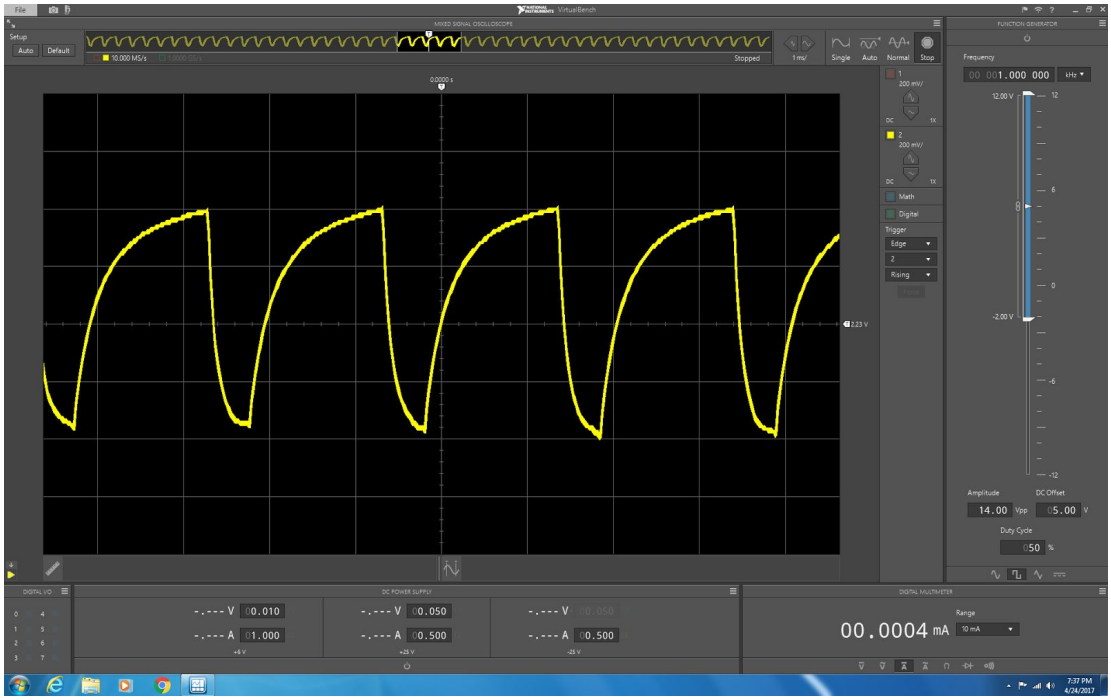


2. Min voltage on VCC while motor is running without cap is 1.7 V. Min voltage on VCC with decoupling cap is 1.8 V

VCC without decoupling cap

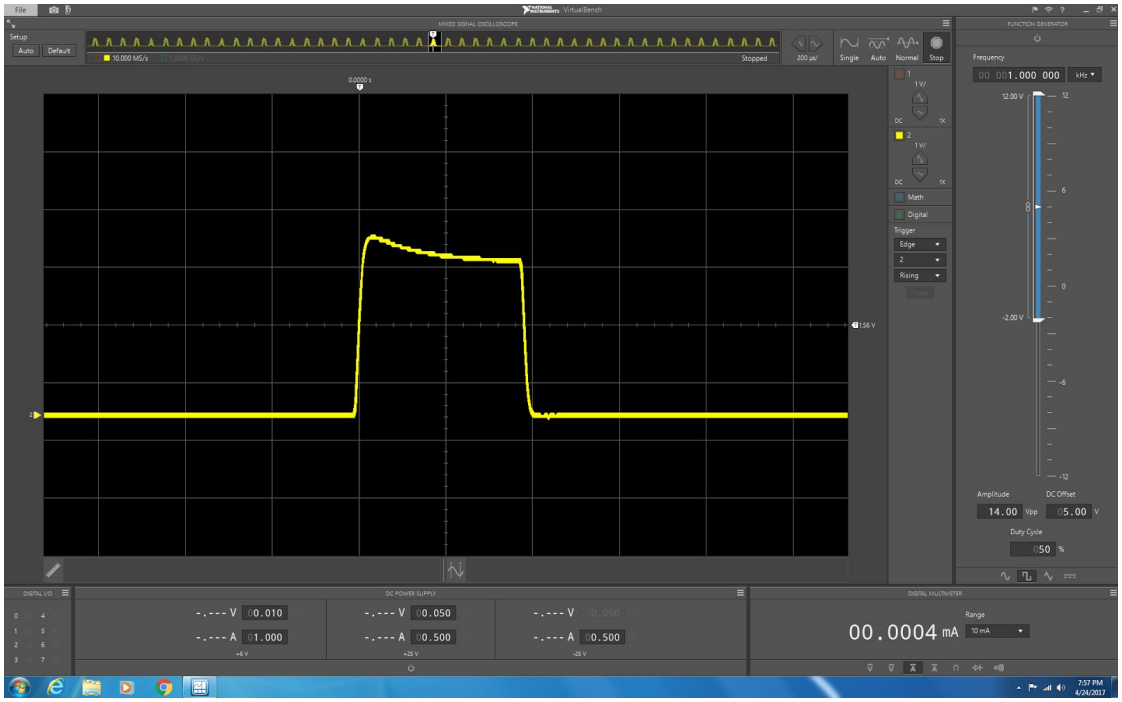


VCC with decoupling cap

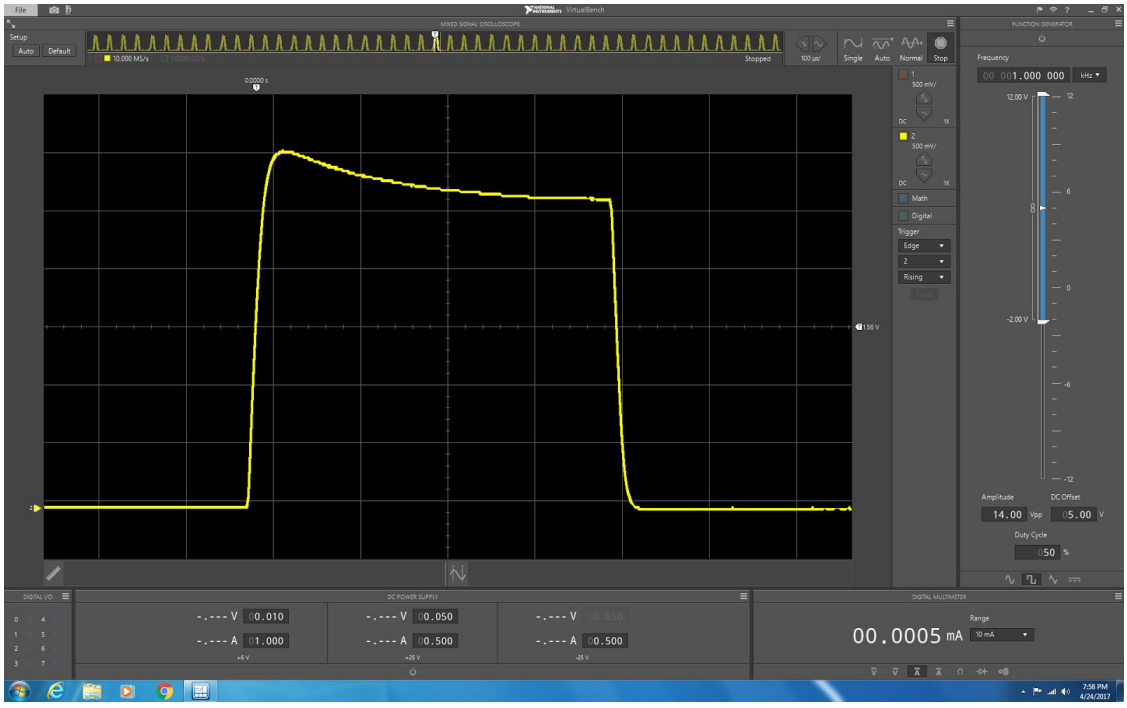


3. There's very little difference, but the edges are slightly more smooth when filtered

Signal at pwm

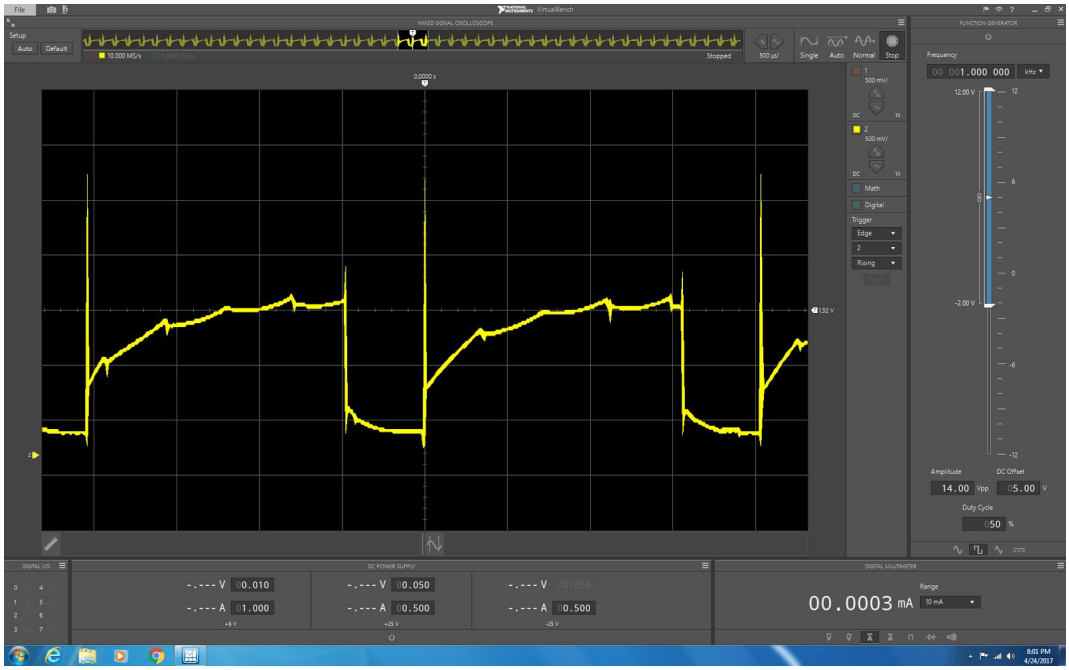


Signal at filtered



4.The voltage range at flyback is much smaller with the filter in place. Removing the filter results in some pretty extreme peaks in the signal at flyback. This is understandable, as without the filter the input is less regulated.

Flyback without filter



Flyback with filter (for reference, also shown above)