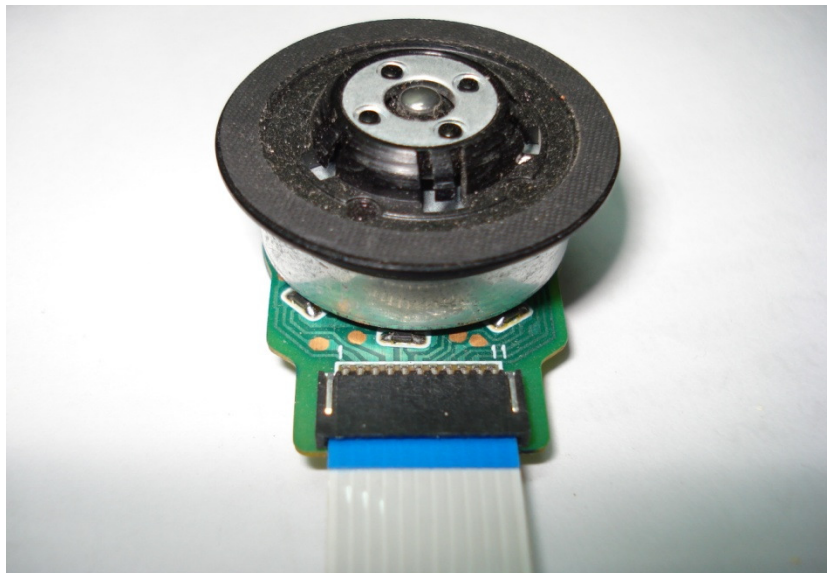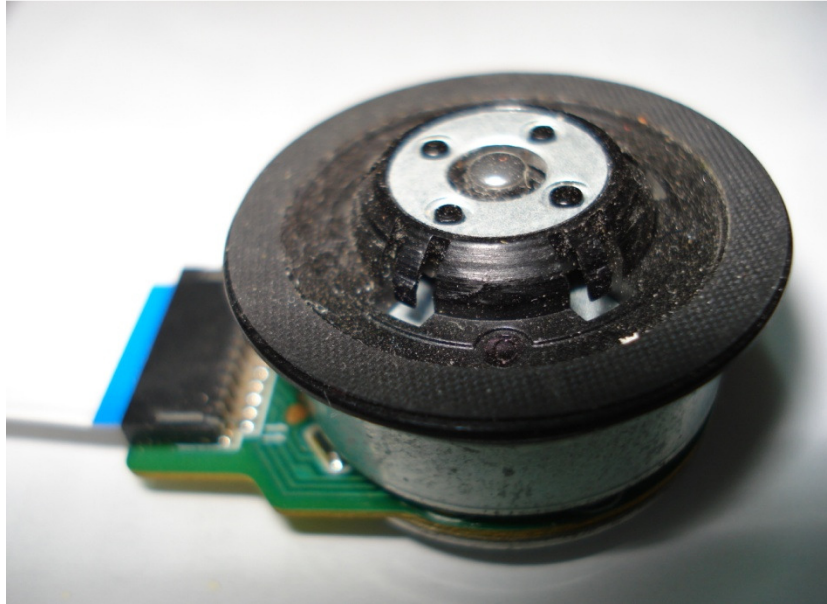# Brushless 3-Phase Motor Speed Control:

Brushless 3-Phase Motor (CD ROM Drive Motor) Speed Control using **Higher Order Sliding Mode Control (Super Twisting Algorithm)**.

Brushless 3-Phase Delta Winding Motor (11 wires)

Experimental Results:

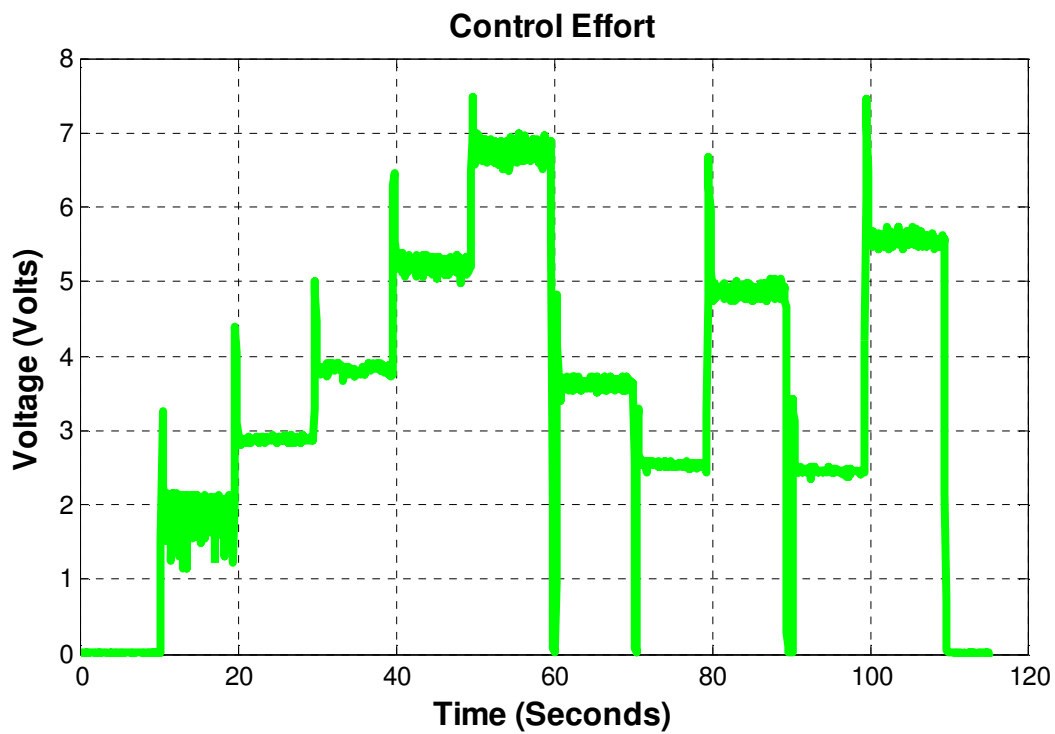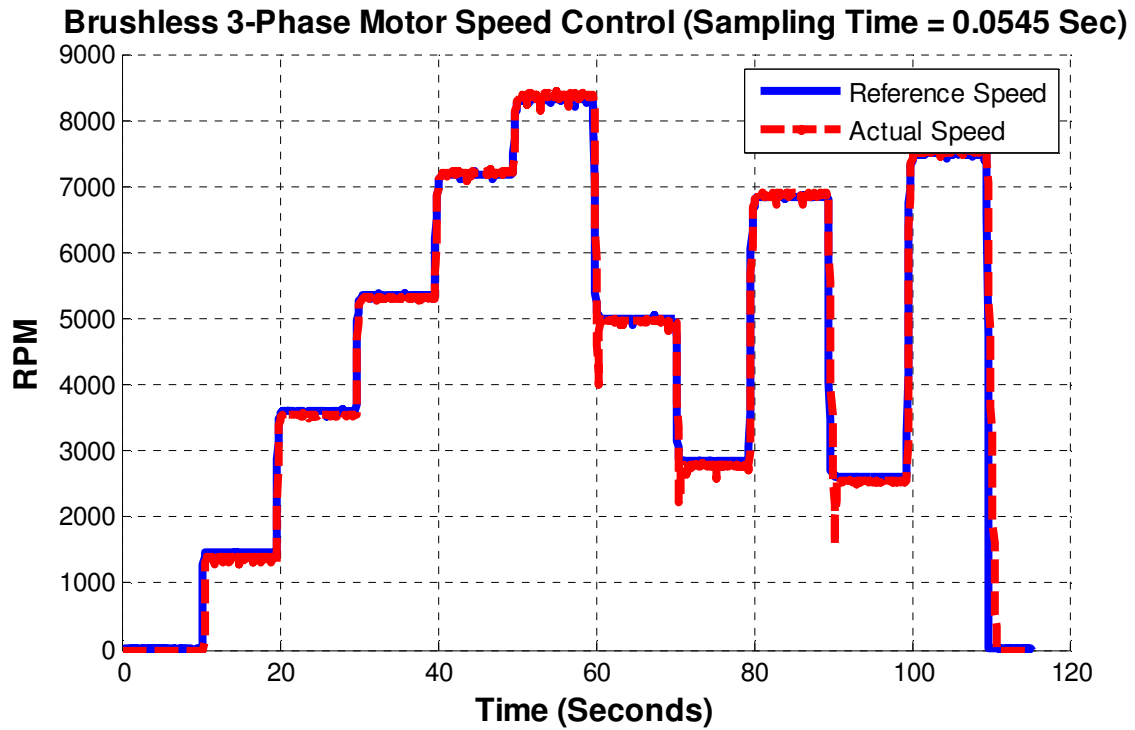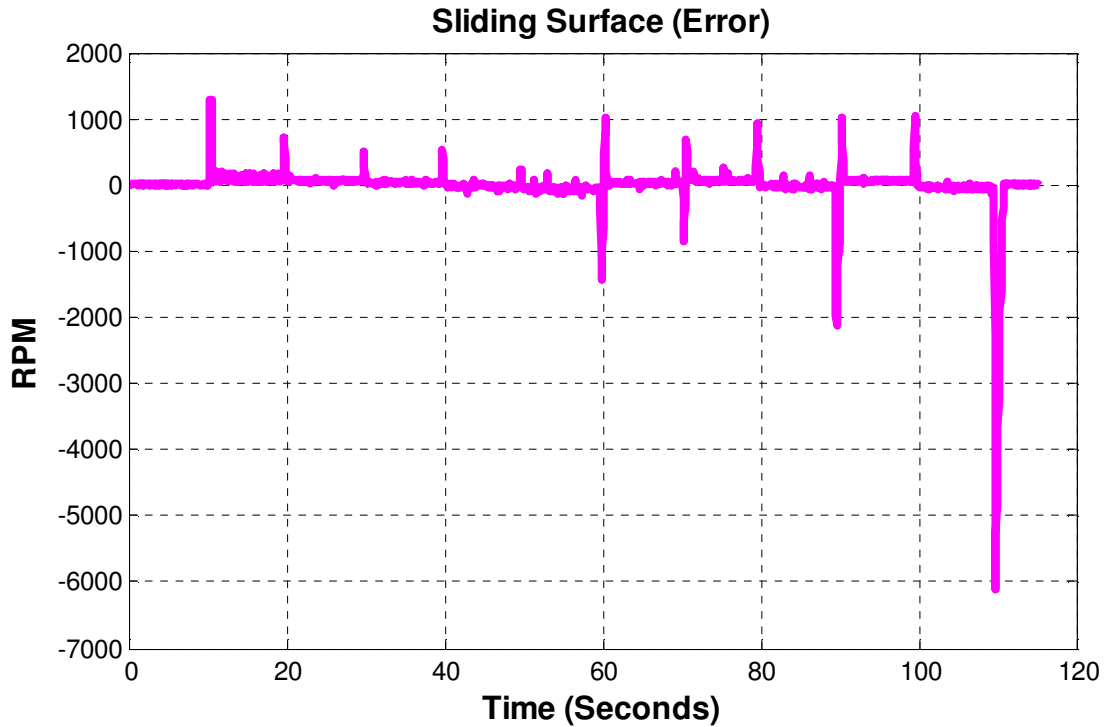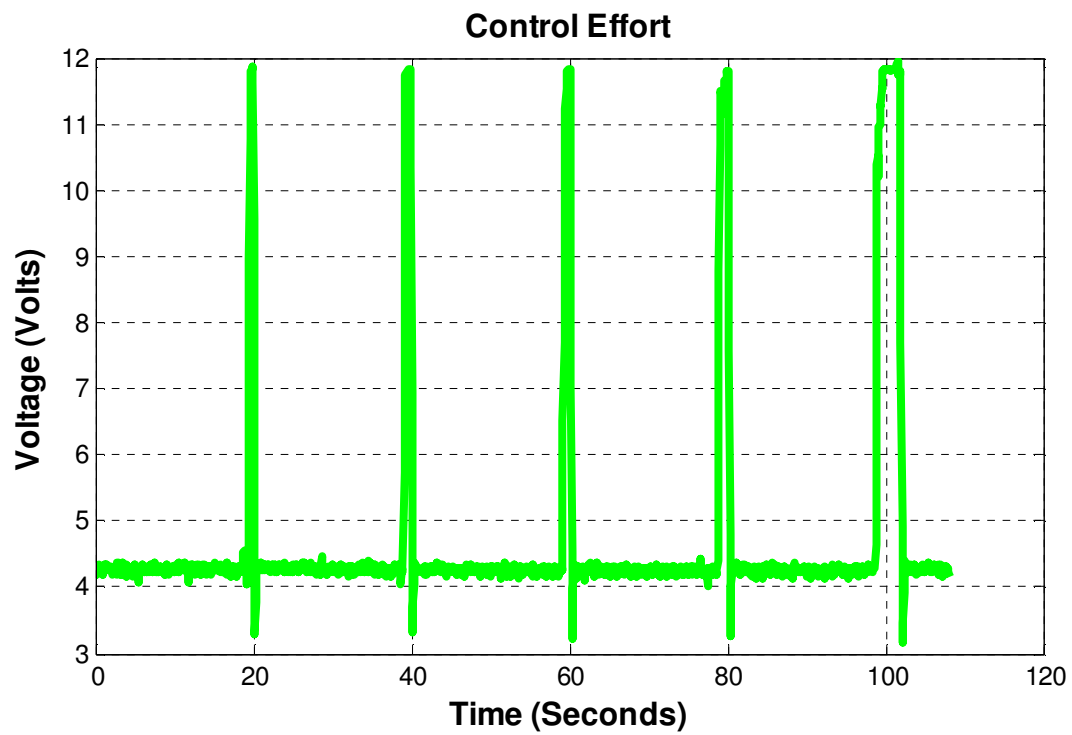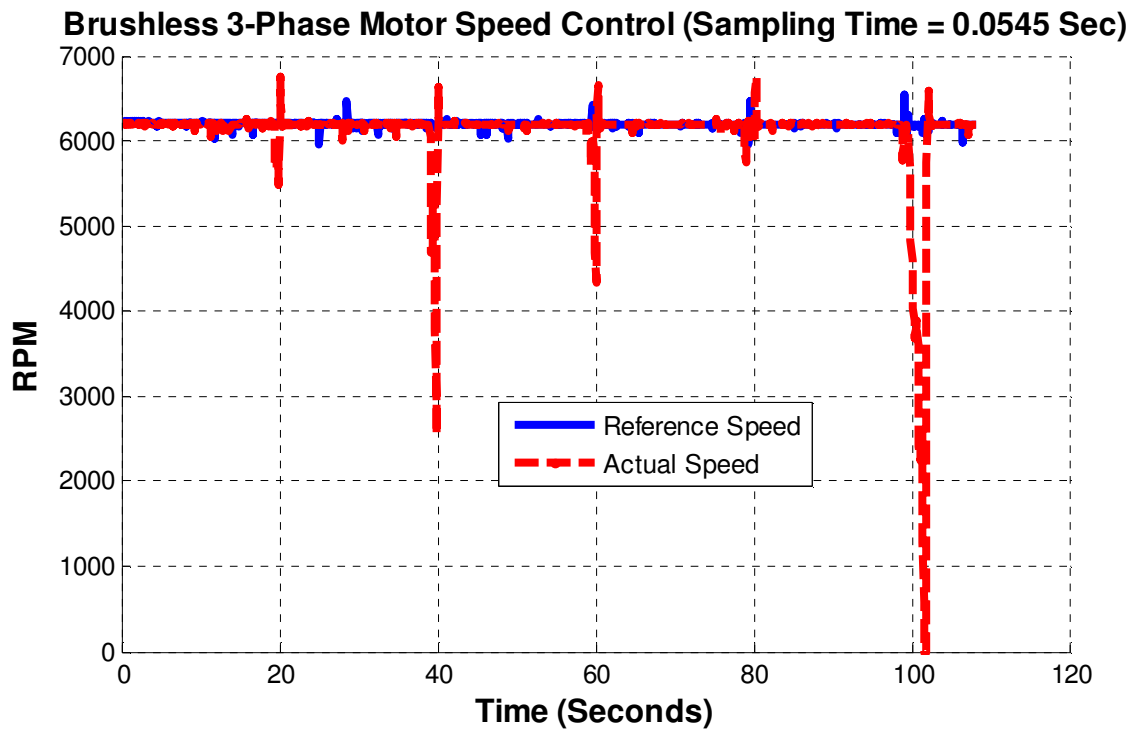## Experiment # 1 (Varying Reference Speed at no Load Condition)

Brushless 3-Phase Motor Speed Control (Sampling Time = 0.0545 Sec)

Control Effort
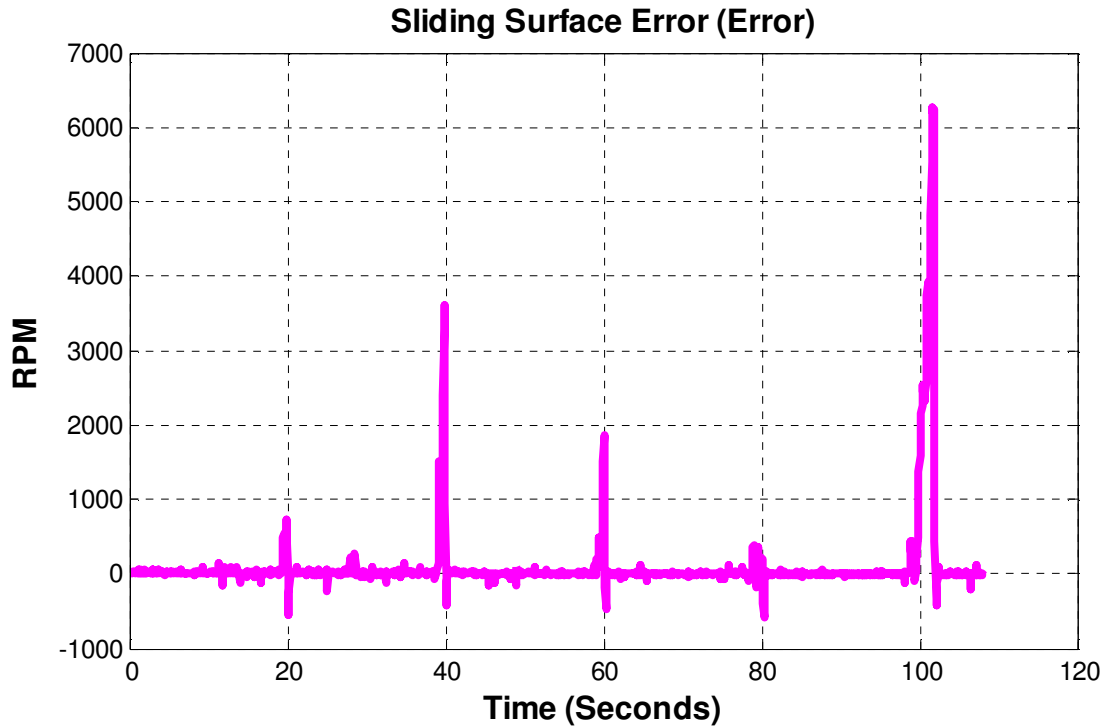
Sliding Surface (Error)

As it can be observed from the above figures that the Motor is tracking the Reference RPM in pretty impressive approach, the performance can be further improved or enhanced by fine tuning the controller. In this experiment # 1 no Load is applied on the motor just the Reference RPM is varied just to observer the tracking possessions. Hence it can be concluded that the Motor is tracking the Reference RPM, to see how the Controller behaves in the presence of disturbance Experiment # 2 is conducted as under.
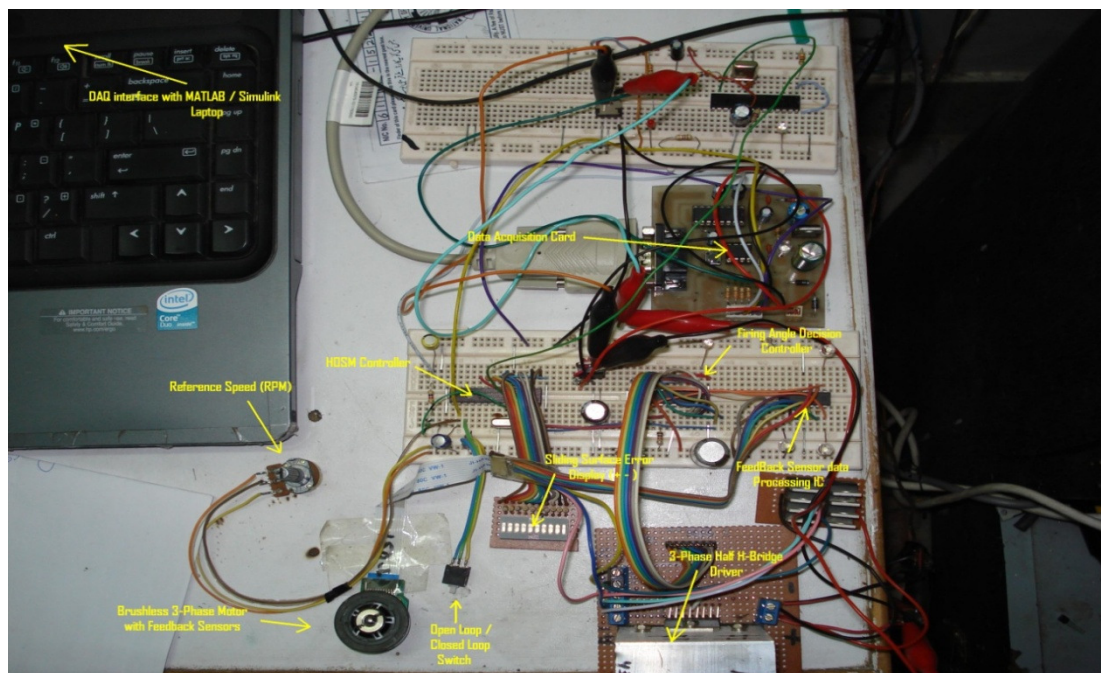
Experiment # 2 (Fixed Reference Speed with Load)

Brushless 3-Phase Motor Speed Control (Sampling Time = 0.0545 Sec)

Control Effort
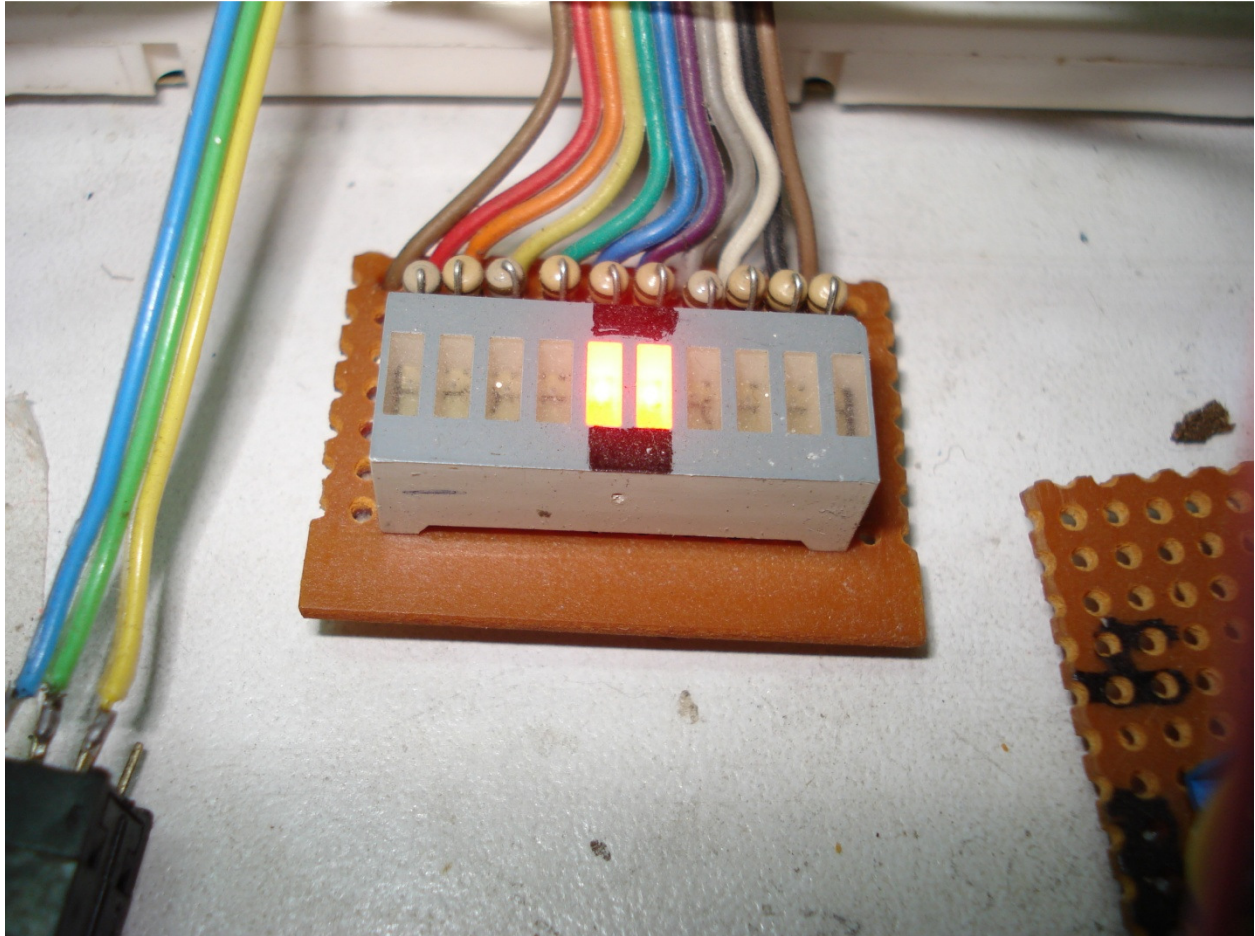
Sliding Surface Error (Error)

A load is applied on the Motor Shaft with Hand in order to slow down the motor speed & then released it can be seen from the above figures of Experiment # 2 load is applied at 20, 40, 60, 80 & 100 Seconds. At 100's second the motor shaft is completely stopped via hand. The Effort applied by the HOSM controller is noticeable in order to maintain the RPM under applied load.

Hardware Setup:

Sliding Surface Error on BAR-LED Display

Center 2-LEDs shows that sliding surface is at zero, left LEDs show negative Error & Right LEDs show positive Error.

I made all this Project just for fun . . .

To Watch the Experiment Video:

http://www.youtube.com/watch?v=IdVuIaZJI1o