

Feedback Subsystem – Angles of LED Activation

The purpose of this test is to verify the range of angles at which the feedback system operates within. Determine correct set-point voltages for AD8564 Comparators.

Start Date: 5/13/08

Finish Date: 5/13/08

Engineers set-up experiment: Jonathan Bawas & Jeffrey Tempest

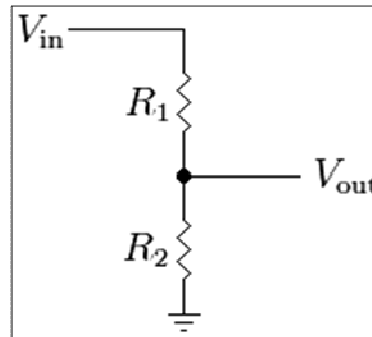
Equipment Needed:

1. Power Supply
2. Multimeter
3. Electronic Enclosure Mounted on Balance Training Bicycle

Experiment Set-up:

- 1.) Connect Multimeter to sensor output and circuit ground.
- 2.) Monitor output voltage and record the voltages required to light each LED.
- 3.) Compare to known angle levels and determine if values are appropriate, refine and adjust values until appropriate angles are complete.

	LED	V _{out} [V]
Right Half LED's	Green LED 1	1.32
	Green LED 2	1.44
	Yellow LED 3	1.65
	Red LED 4	2.00
Left-Half LED's	Green LED -1	1.44
	Green LED -2	1.21
	Yellow LED -3	0.93
	Red LED -4	0.66



*R₂ = potentiometer

Using the above set point voltages in Table A yields the following LED activation angles in Table B below:

Table B - Angles of LED Activation			
	Angle [Degree]	Sensor Output Voltage [V]	LED Activity
Right	11	1.77	
	10.5	1.80	Red LED ON
	10	1.83	
	9.5	1.87	
	9	1.90	
	8.5	1.93	
	8	1.97	
	7.5	2.00	
	7	2.03	
	6.5	2.07	
	6	2.10	
	5.5	2.13	
	5	2.17	
	4.5	2.20	Yellow LED ON
	4	2.23	
	3.5	2.27	
	3	2.30	
	2.5	2.33	Green LED ON
	2	2.37	
	1.5	2.40	
1	2.43		
0.5	2.47	Green LED ON	
Center	0	2.5	
Left	0.5	2.53	Green LED ON
	1	2.57	
	1.5	2.60	
	2	2.63	
	2.5	2.67	Green LED ON
	3	2.70	
	3.5	2.73	
	4	2.77	
	4.5	2.80	
	5	2.83	Yellow LED ON
	5.5	2.87	
	6	2.90	
	6.5	2.93	
	7	2.97	
	7.5	3.00	
	8	3.03	
	8.5	3.07	
	9	3.10	
9.5	3.13		
10	3.17		
10.5	3.20	Red LED ON	
11	3.23		

Conclusions:

The performance of the feedback circuit shows a fairly symmetric response for both right and left sided tilt. The red LED's are active at about 10.5 degrees of tilt. The Yellow LED's are active at about 5 degrees of tilt, with a slightly more sensitive response for right sided tilt. The Green LED's are lit at 2.5 and 0.5 degrees, however, the center position may require additional fine tuning when the winch is reattached to the pulley assembly.