

Mechanical Results

P1003 Dynamic Keyboard: Phase 2

Joshua Locke and Robert Piccirillo

Test Type	Pre-load	Josh		Robert		Test Rig
		Hard	Finger Type	Hard	Finger Type	
Existing Keyboard Rubber Extrusions:	0	144	15	135	17	34
Existing Keyboard Rubber Extrusions w/ foam cylinder (medium):	0	593	126	592	291	238
Foam Cylinder (medium):	0	594	55	594	115	334
Just Cylinder (long):	33	594	181	594	195	315
1/4" Red Cell Silicone Sponge (Red):	0	152	25	275	35	37
1/4" Red Cell Silicone Sponge (Red) w/ Foam Cylinder:	10	594	85	594	65	58
1/4" Red Cell Silicone Sponge (Red) button flush w/ Foam Cylinder:	0	594		594		46
1/4" Cast Silicone Foam (Black):	0	120	25	101	34	26
1/4" Cast Silicone Foam (Black) button flush w/ Foam Cylinder:	0	455	50	525	94	75
1/4" Cast Silicone Foam (Black) w/ Foam Cylinder:	0	593	61	593	75	103
Compression Spring:	0	172	45	172	50	95

Sensor Saturated

Test Type	Comments
Existing Keyboard Rubber Extrusions:	Poor force sensor readings, Softer than regular keystroke
Existing Keyboard Rubber Extrusions w/ foam cylinder (medium):	Nice but can do better
Foam Cylinder (medium):	Picks up all forces, rests on sensor matrix, nice linearity but short range of motion
Just Cylinder (long):	Preloaded with a longer range of motion
1/4" Red Cell Silicone Sponge (Red):	Absorbs almost all key force but depresses nicely
1/4" Red Cell Silicone Sponge (Red) w/ Foam Cylinder:	Picks up light presses, filters medium presses and enhances the hard presses
1/4" Red Cell Silicone Sponge (Red) button flush w/ Foam Cylinder:	Very bad keystroke response
1/4" Cast Silicone Foam (Black):	Nice soft feeling but doesn't max out the sensor
1/4" Cast Silicone Foam (Black) button flush w/ Foam Cylinder:	Best linear feel, does not max out . Greatest range
1/4" Cast Silicone Foam (Black) w/ Foam Cylinder:	Very nice keystroke response, soft, maxes out the sensor reading
Compression Spring:	Nice keystroke response, similar to keyboard without assist, very linear

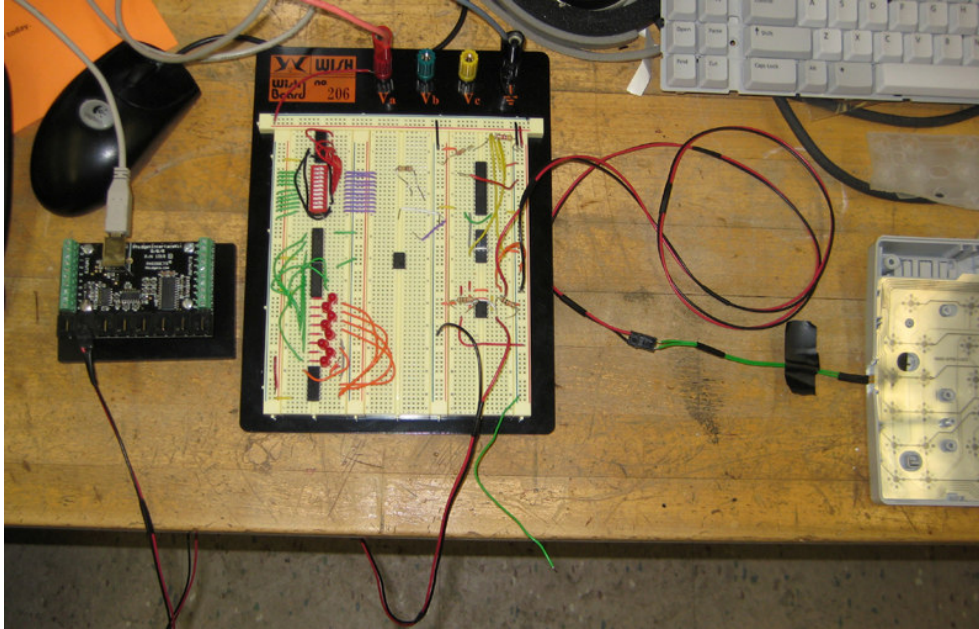
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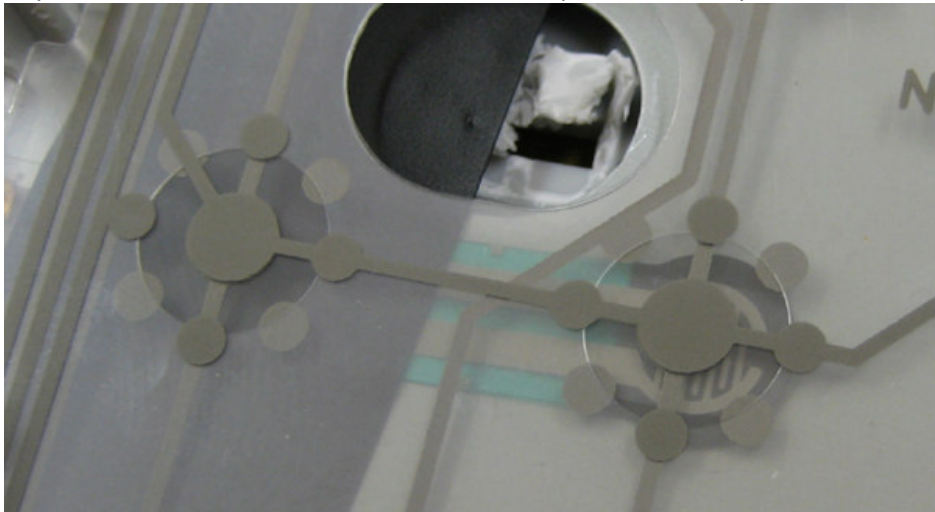
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Pictures from testing:

Electrical test setup for force sensor readings.



Keyboard electrical matrix with force sensor taped to hold its position under the key.

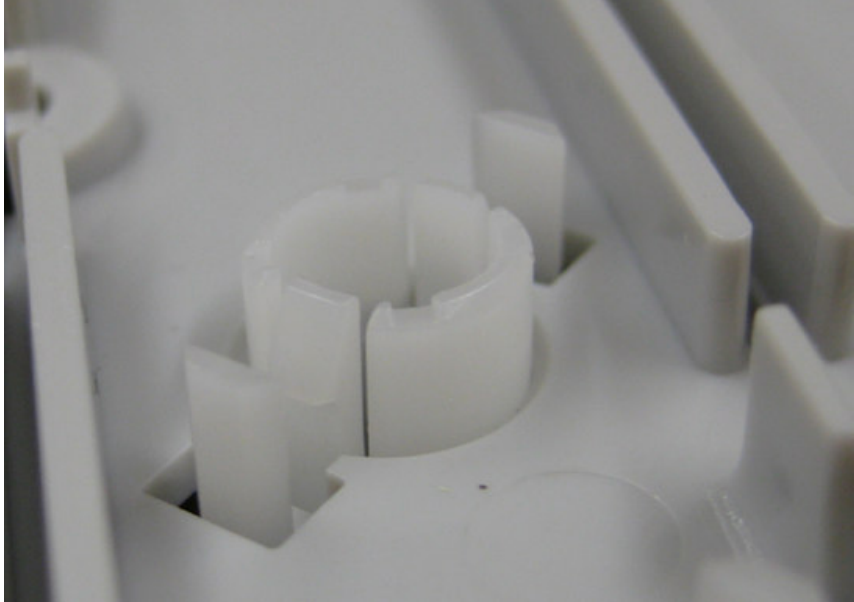


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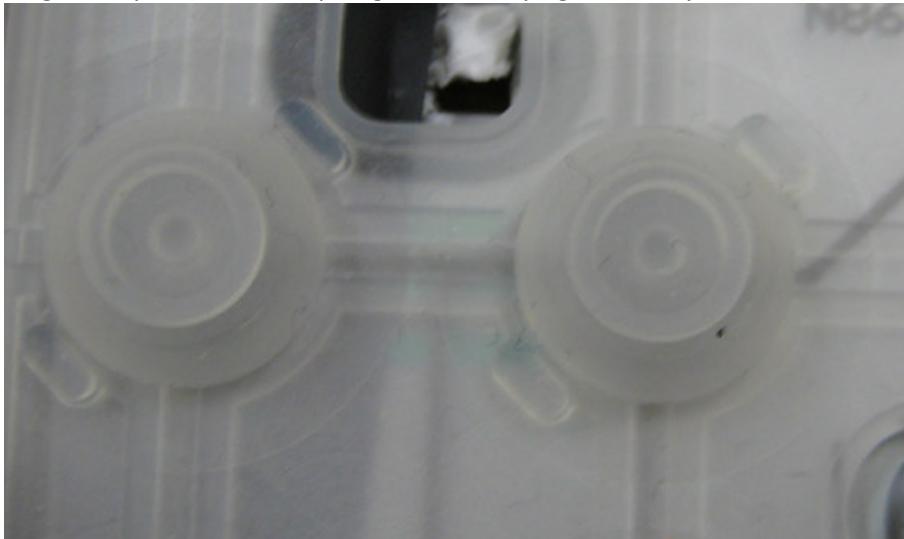
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Existing keyboard plunger



Original keyboard silicone plunger matrix laying above key matrix.



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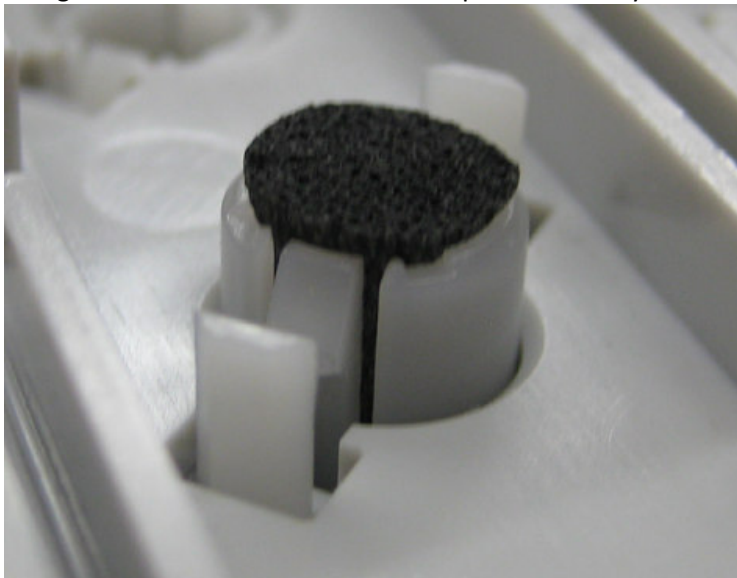
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Finger tester to test the key material while removing the variability of a finger keystroke.



Plunger filled with foam to eliminate open area in key and allow for a different keystroke feel.

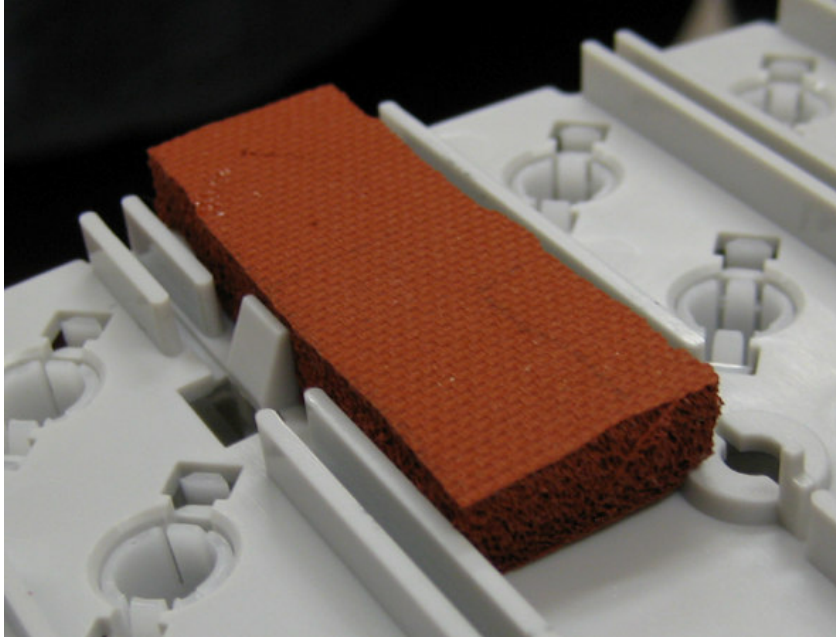


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1/4" Red Cell Silicone Sponge in place to be tested.



Labview .vi showing the force histogram and Analog Input reading

