

Active Suspension System Test Platform (hardware)

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October 30, 2003

Overview:

The Active Suspension System Test Platform will consist of a voltage controlled linear actuator to control the movement of a test bed platform based on inputs provided by the user interface. The control system will ensure that the platform will move in a vertical fashion with the desired displacement. The system will consist of hardware that controls the actuator and a feedback network, and control software.

Initially, the hardware system will receive inputs through the microcontroller keypad to obtain the desired vertical displacement information. The output of the system will simply be platform motion between the desired maximum and minimum position of the platform, while the state of the platform will be shown on the microcontroller LCD display. Figure 1 below, is the initial system block diagram:

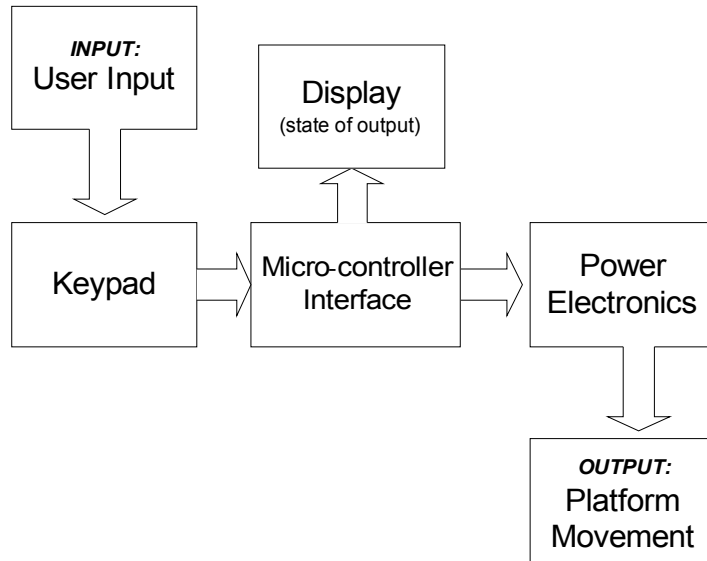


Figure 1: Initial System Block Diagram

Inputs and Outputs (initial system):

	Microcontroller	
Microcontroller Inputs	Outputs	Platform Output
User input indicating vertical displacement	LCD display	Various vertical displacement

If time permits, a feedback control portion developed by Jerry Campbell will be implemented into the initial system. The hardware system with feedback control shown in figure 2, will have the ability to provide different specified waveforms by virtue of the closed loop system. The closed loop system will monitor the behavior of the linear actuator to ensure the desired motion is generated. The load weight of the system will affect

the behavior of the linear actuator platform. For example, a load weight of 200 pounds will significantly affect the platform motion when compared to the system containing no load.

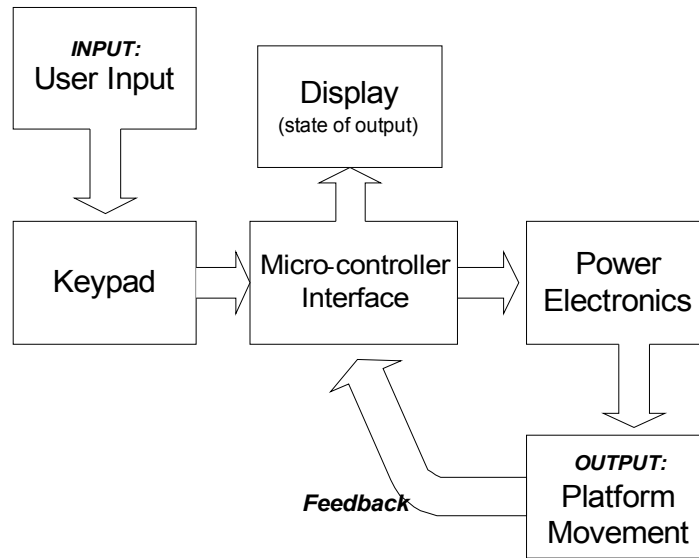


Figure 2: System Block Diagram with Feedback Control

Inputs and Outputs (system with feedback control):

Microcontroller Inputs	Microcontroller Outputs	Platform Output
User input indicating actuator movement	LCD display	Various vertical displacement
Feedback sensor		Various frequencies
		Various waveforms

Parts:

- Platform
- DC or AC motor
- Screw Linear Actuator
- Microcontroller
- Keypad
- Display
- Feedback Sensor

Below are specifications that have been set based on research that have been completed thus far and figure 3 shows the actuator platform orientation:

Specifications:

- Platform vertical displacement of twelve inches
- Platform speed of twenty inches per second
- Load capacity of two hundred pounds

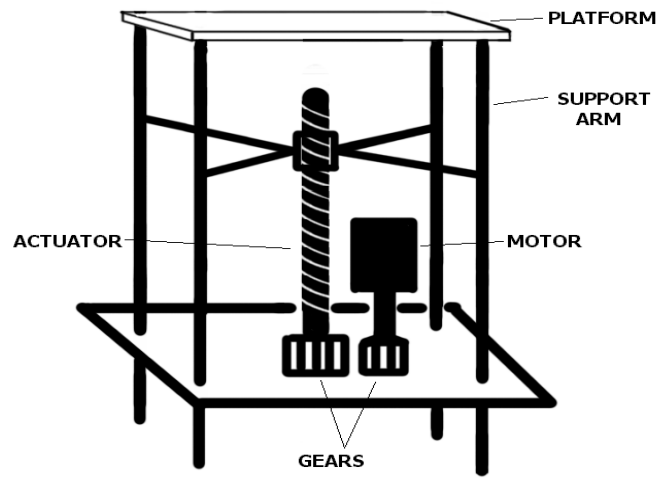


Figure 3: Actuator Platform Orientation