Active Suspension System
Functional Description

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October 30, 2002

Overview

The project team is designing a system using voltage controlled linear actuators to control the movements of a platform to be used in the testing of active suspension systems. A platform will be mounted above the actuators, and will enable the platform to raise, lower or gyrate. This plate will be controlled using a microcontroller with a keypad and display. Desired motions will be entered using the keypad of the microcontroller and the display will show the maximum distance the platform moves about the datum level, the maximum velocity and acceleration of the platform, and the type of motion is undergoing (i.e. up, down, or gyration). Sensors will also permit monitoring and recording of the platform motion.

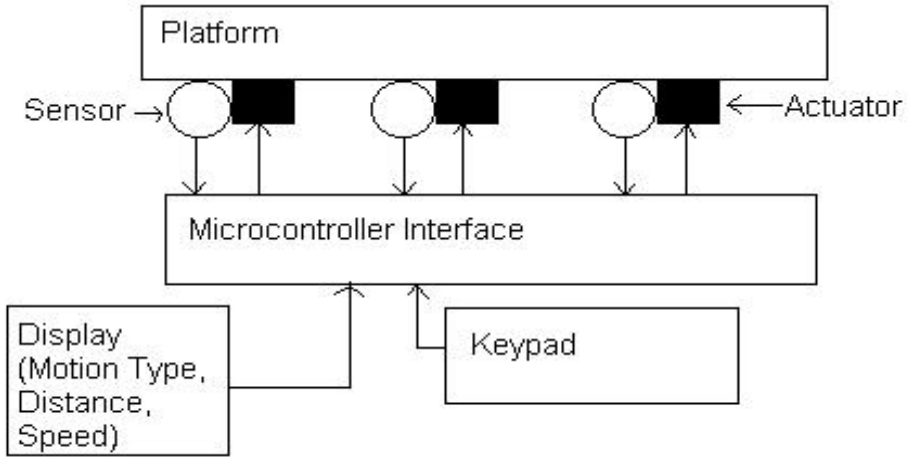

Figure 1: Block Diagram of Project

Parts

The parts that will be used to create the active suspension system are an aluminum platform, four actuators, four motion sensors, a microcontroller, keypad, and display.

Specifications

Based on the research completed thus far on the current design, some specifications have been solidified.

- Electrically driven linear actuators
- Sensors to be separate from the actuator
- Rod type linear actuators
- Motor to form a ninety-degree angle with the rod type actuator
- Stroke to be above twelve inches
- Load capacity to be approximately 1500 pounds
- Rate speed to be three inches per second or greater
- DC voltage to be between twenty-four to thirty volts

Since no hydraulic fluids will be permitted in the laboratory electrically driven linear actuators will be utilized. A low voltage linear actuator has been chosen because high voltage could be potentially dangerous to the design engineers. A rate speed of three inches per second was solidified to allow for a swift movement of the platform.

Inputs and Outputs

Inputs	Outputs
Keypad	Linear Actuator
Sensor	Display

Figure 2: Inputs and Outputs of the Active Suspension System.

The user will input the desired motion on the keypad. Information will be interpreted by the microcontroller and will cause the linear actuator to move a certain distance. The sensors will sense any motion made by the platform and report it to the microcontroller. After that the microcontroller will process the signal from the sensor and display the measurements on the display.

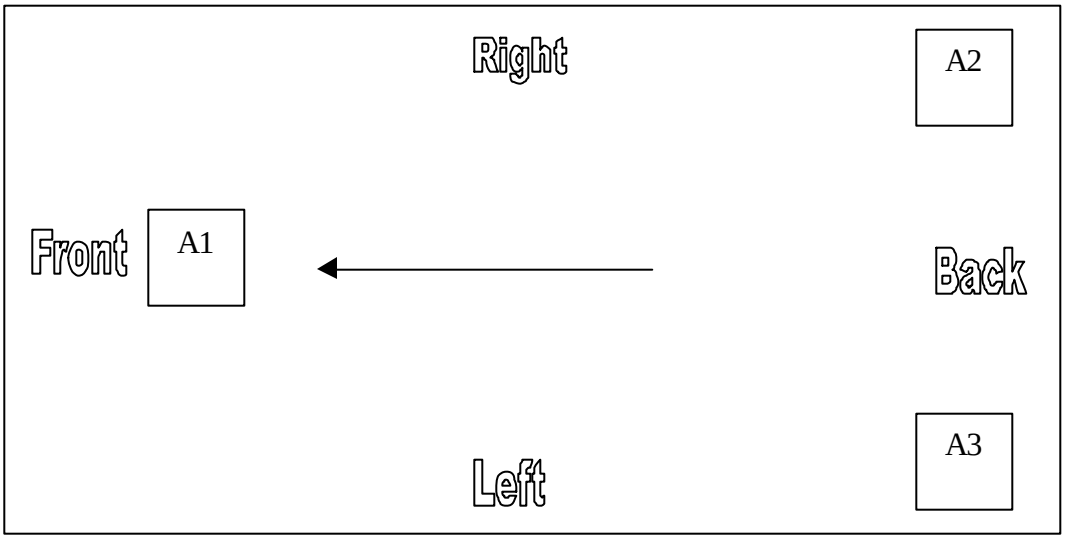

Figure 3. Arrangement of Actuators on Platform

Figure three shows the arrangement of the actuators on the platform and the corresponding directions that the platform will move in.