Introduction
The purpose of an active suspension is to minimize the vertical acceleration force on a mass. In Figure 1-1, the rotating camshaft supplies the disturbance simulating an acceleration that a mass may experience. The linear actuator will actively cancel the disturbances caused by the camshaft. The canceling effect of the linear actuator will minimize the accelerating force on the mass.

High Level System Block Diagram
The high level system block diagram for the active suspension system is shown in Figure 1-2. The disturbance input is caused by the camshaft rotation. The system is designed to compensate for the disturbance in order to reduce the accelerating force experienced by the upper platform and the mass. The new upper platform position is then the output of our system.
Internal System Block Diagram
Figure 2-1 shows the internal system block diagram. The error signal is the disturbance summed with a set point. The set point is defined as half of the total stroke of the camshaft. It is used as a reference to provide ample stroke to cancel the disturbance. The error signal combined with the velocity data will enable the system to track the disturbance as well as the rate of disturbance.

![Internal System Block Diagram](image)

Figure 2-1: Internal System Block Diagram

The Micropac 535 will be used as the controller to send the proper signals to the plant so the correct speed, amount, and direction is applied to the actuator minimizing the accelerating force. The output from the plant is the new upper platform position.

Controller Block Diagram
The controller block diagram for this system is shown in Figure 2-2. The input is the error signal generated from the first summer shown in the internal system block diagram. That signal will be converted using an A/D before being input to the microprocessor. The microprocessor will use the error signal as well as the velocity signal to generate a PWM.

![Controller Block Diagram](image)

Figure 2-2: Controller Block Diagram
**Plant Block Diagram**
As in Figure 3-1, the plant of this system consists of power electronics, a motor, and a linear actuator. The PWM output of the controller block is the input to the power electronics which will primarily consist of an H-bridge. The H-bridge will provide the necessary current and voltage to drive the linear actuator motor. Finally, the linear actuator compensates the disturbance input by moving the upper platform.

![Figure 3-1: Plant Block Diagram](image-url)