

ELG3331: Mechatronic Experiment A Myoelectric Controlled Partial-Hand Prosthesis Project Signal Processing Circuit

Figure 1 shows a block diagram of myoelectrically controlled partial-hand prosthesis system.

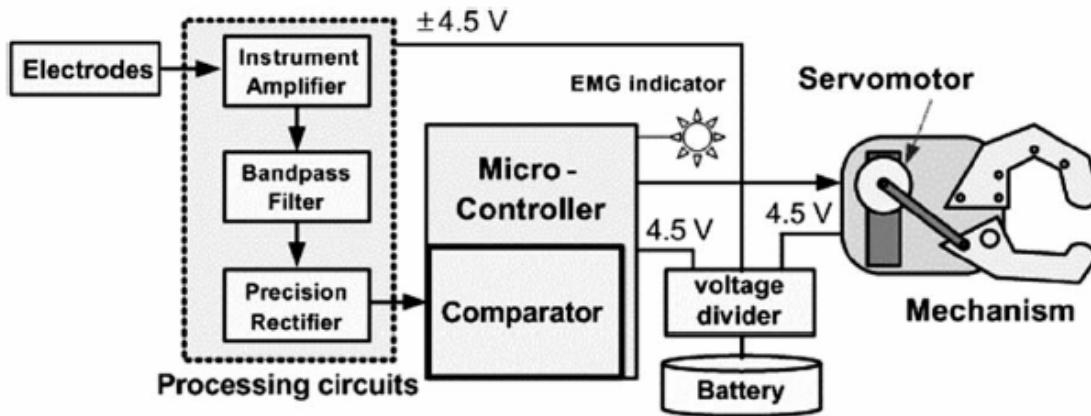


Figure 1 Block diagram of the proposed prosthesis system.

Figure 2 shows the electromyogram (EMG) signal-processing circuit. Three electrodes are required to acquire the EMG signal. Two of these electrodes (electrodes I and II) are attached to the biceps and serve as the differential inputs to the instrumentation amplifier, while the third (ground, GND) is arbitrarily attached to a different location on the arm as a ground reference and is connected to the ground of the system.

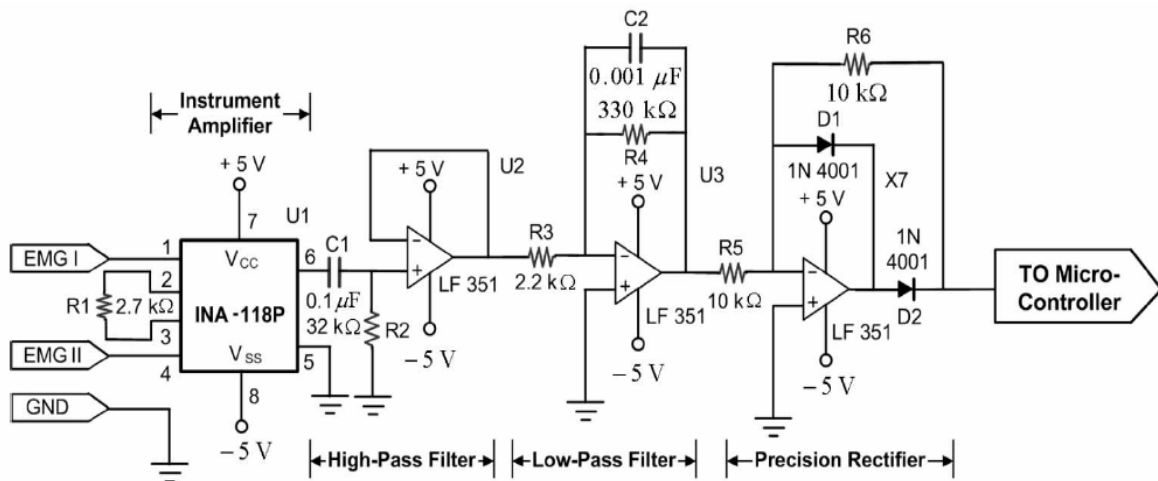


Figure 2 Processing circuit for EMG signals.

Simulation

Use MULTISIM to simulate the circuit shown in Figure 2. Use appropriate signals for electrodes I and II. Assume the cutoff frequency of the low-pass filter as 500 Hz while that of the high pass filter as 50 Hz. The total gain of the combination of the instrumentation amplifier and the filter should be 3000. Record EMG output signals from the precision rectifier output for different values of electrode signals. EMG signals should be in microvolts since they represent signal strengths of muscle.

Report

Write a 3-page report about the above subject explaining each part of the block diagram. Include your simulation results in the report as extra pages.