Chapter Five
Simulation and Result

5.1 Introduction:

The system was simulated using Multisim, Bascom and Proteus software. The Multisim software is used to design pickup circuit that to simulate the muscle signal.

The Bascom combines project management, make facilities for source code editing, program debugging, and complete simulation in one powerful environment. For the purpose of coding the software package used is Bascom. The Bascom editor and debugger are integrated in a single application that provides a seamless embedded project development environment. The embedded code was written on BASCOM AVR and then loaded on the ATnega16 microcontroller. Proteus is the software for microprocessor simulation and schematic capture.

5.2 pickup circuit simulation results:

The figure below have taken that to be show input voltage to the pickup circuit, the signal output from the instrumentation amplifier and the signal output from the pickup circuit. These cases as shown in the figures below taken at different input voltages.

- The figure 5.1. (A, B and C) has taken at input voltage equal 2volt and 150HZ.

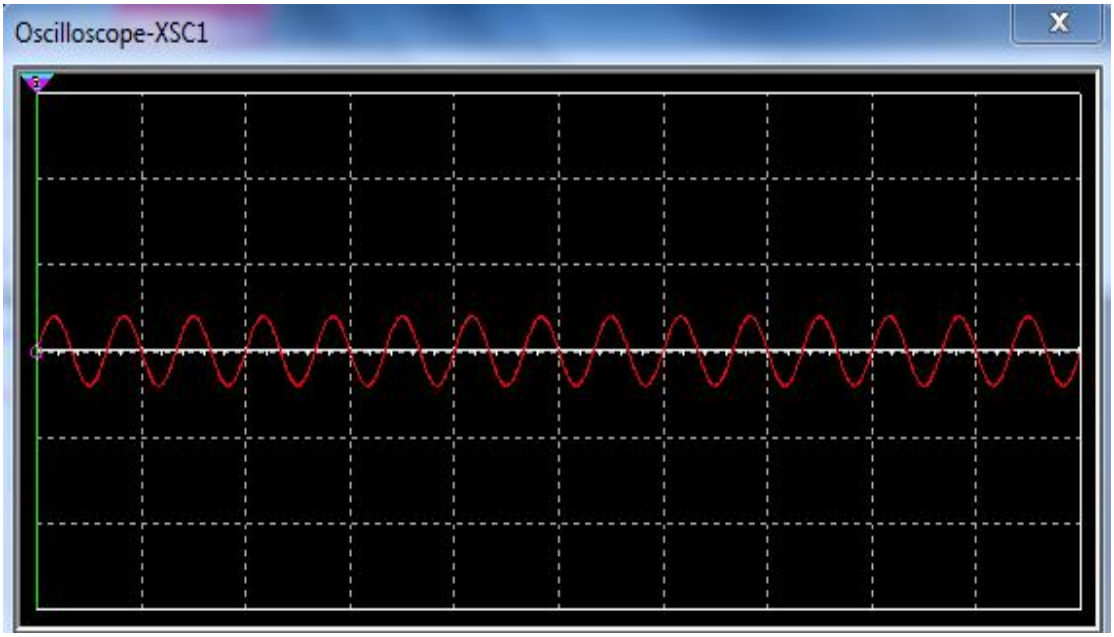

Figure 5.1(A): The input voltage to pickup circuit

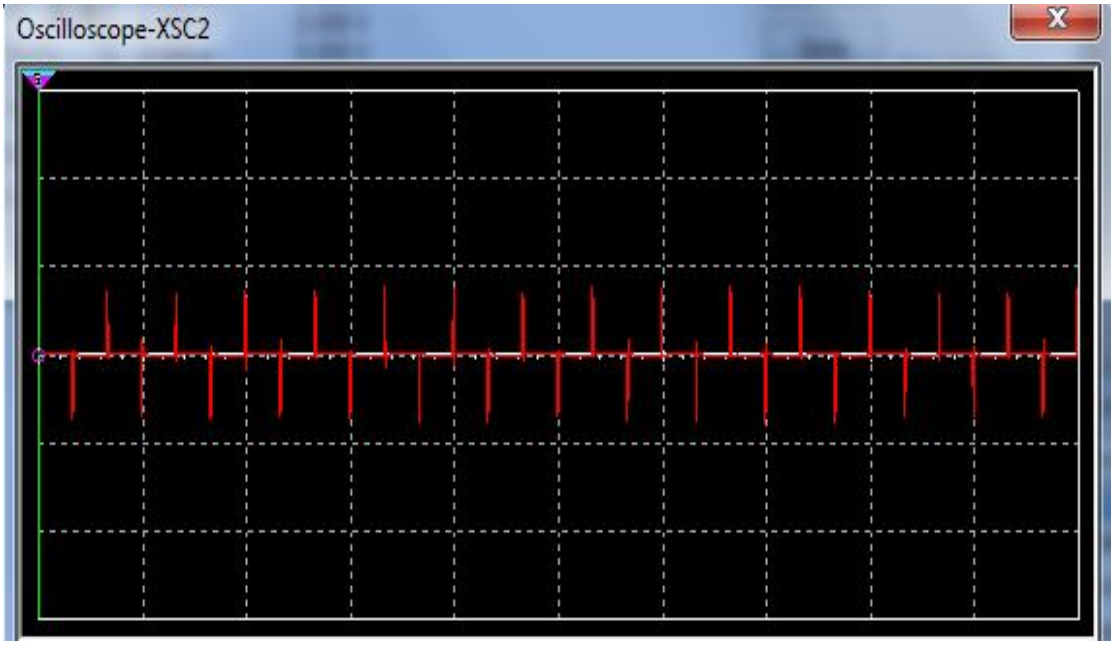

Figure 5.1(B): The signal output from the instrumentation amplifier

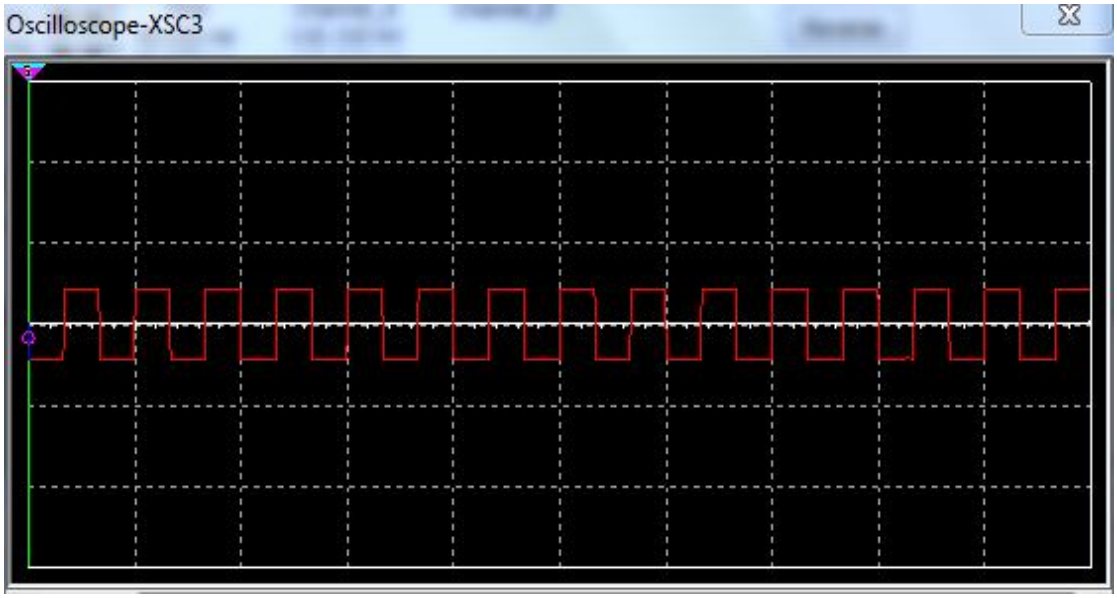

Figure 5.1(C): The signal output from the pickup circuit

- The figure 5.2. (A, B and C) has taken at input voltage equal 5volt and 150HZ.

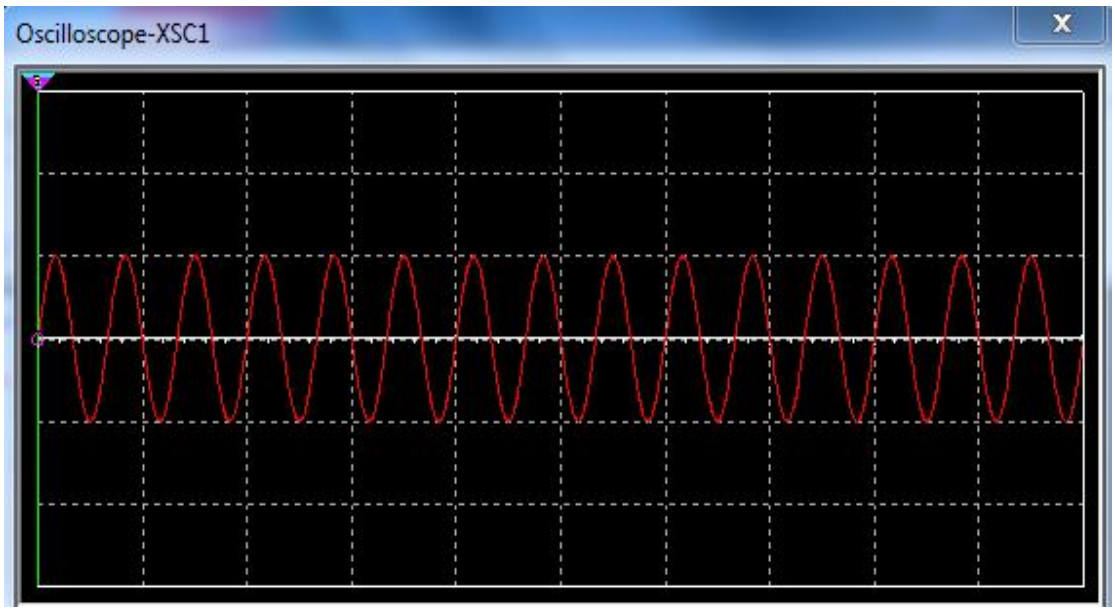

Figure 5.2 (A): The input voltage to pickup circuit

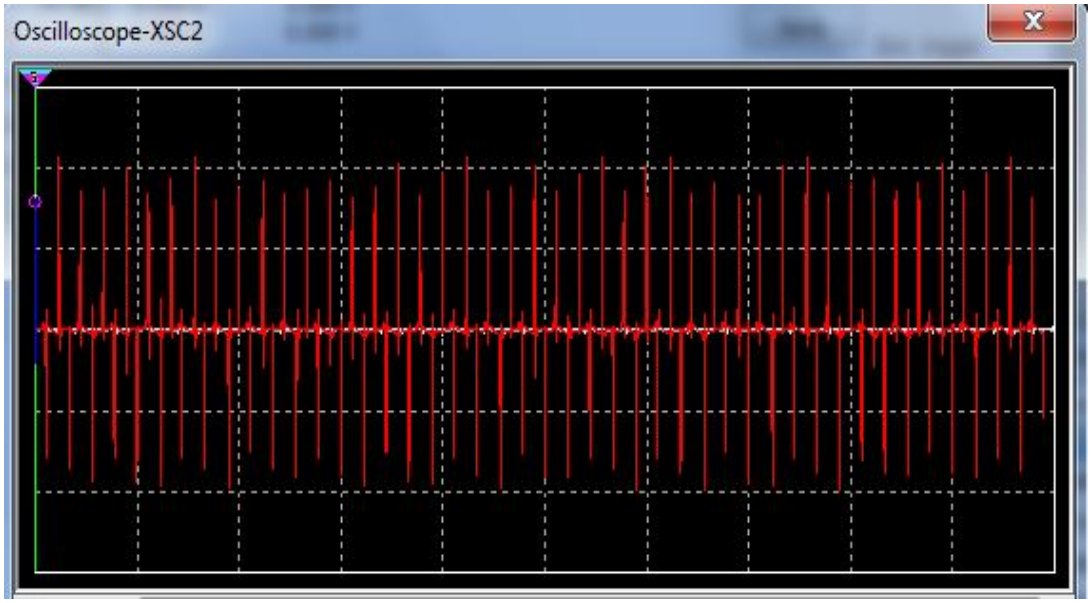

Figure 5.2 (B): The signal output from the instrumentation amplifier

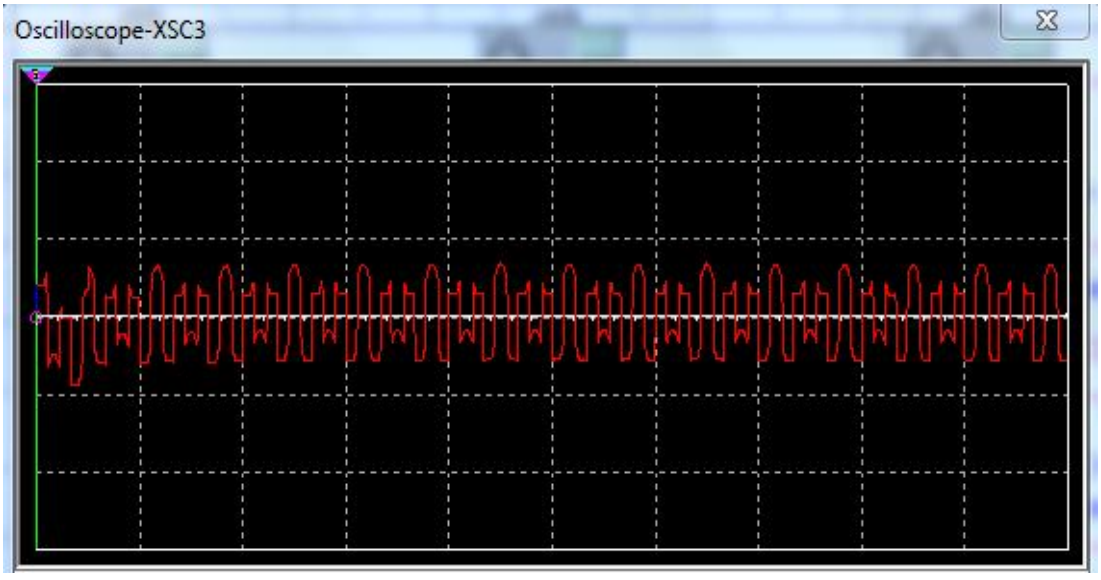

Figure 5.2 (C): The signal output from the pickup circuit

5.3 Full system simulation:

Some cases were taken from the system as shown in figures 5.3(A,B and C) below:

Motor1 (M1) and motor2 (M2) used for elbow but motor3 (M3) and motor4 (M4) used for hand.

- ***Case one:***

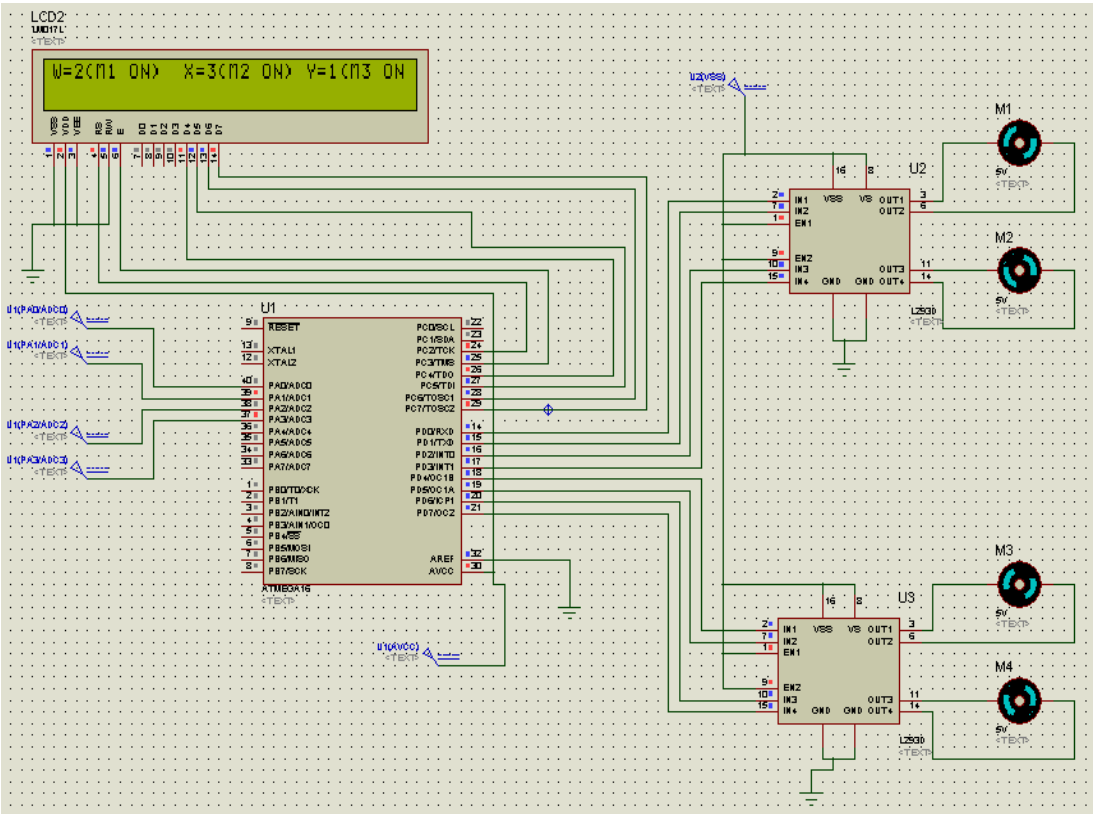

Figure 5.3 (A): Movement of elbow and hand

When:

W = 2volt: Motor 1 rotate right (Elbow Down)

X = 3volt: Motor 2 rotate left (Elbow Anticlockwise)

Y = 1volt: Motor 3 rotate right (Hand Down)

Z = 5volt: Motor 4 rotate left (Hand Anticlockwise)

- ***Case two:***

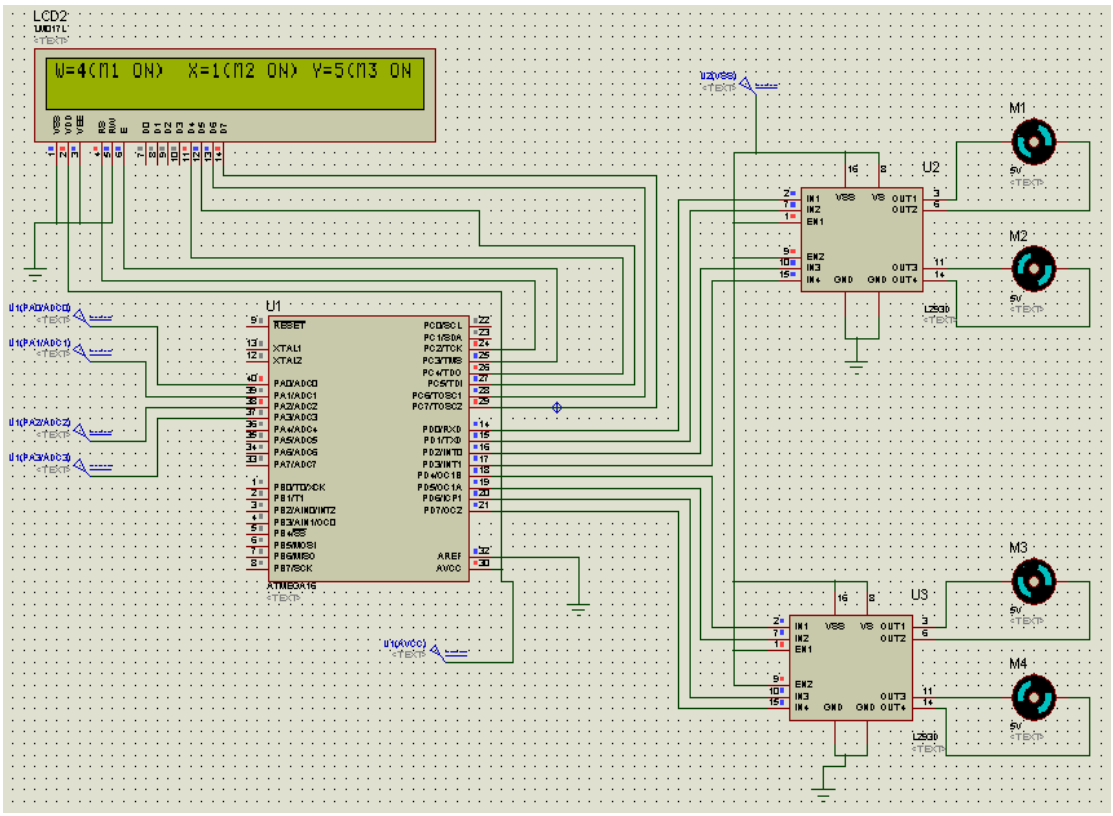

Figure 5.3 (B): Movement of elbow and hand at different values

When:

W = 4volt: Motor 1 rotate right (Elbow UP)

X = 1volt: Motor 2 rotate left (Elbow clockwise)

Y = 5volt: Motor 3 rotate right (Hand UP)

Z = 2volt: Motor 4 rotate left (Hand clockwise)

- ***Case three:***

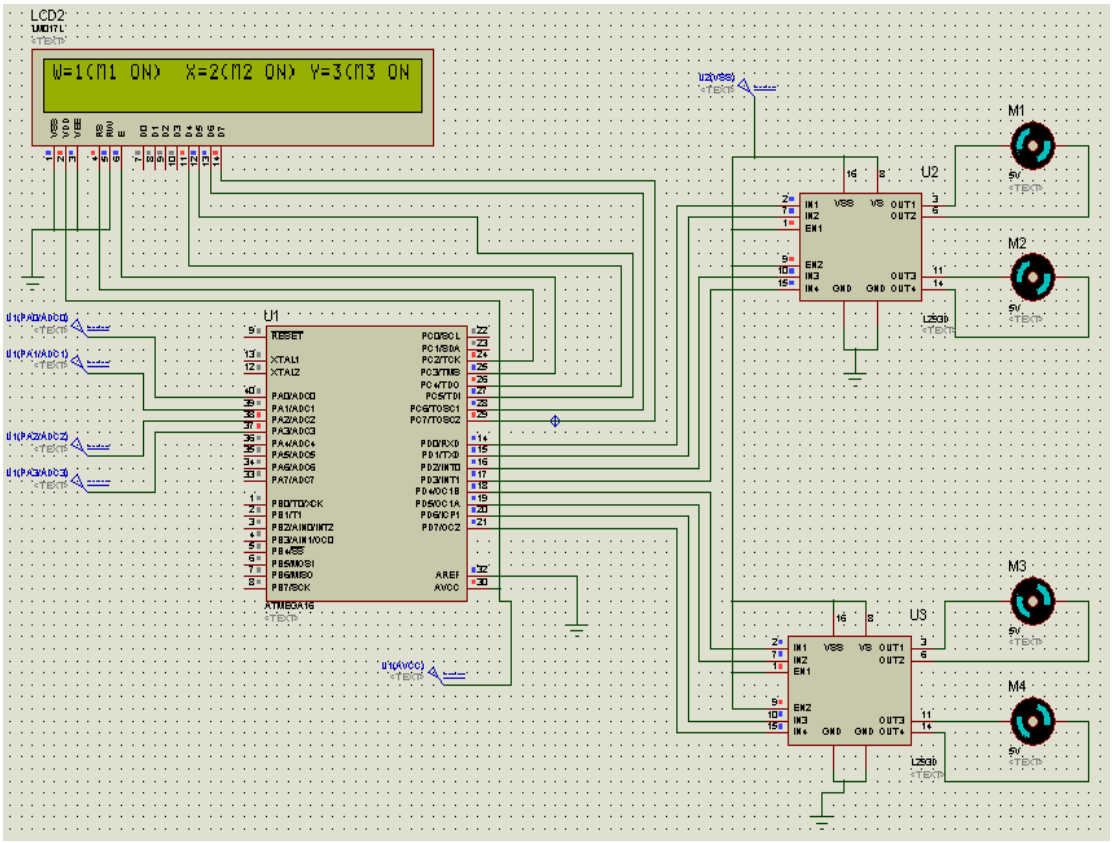

Figure 5.3 (C): Movement of elbow and hand at different values

When:

W = 1volt: Motor 1 rotate right (Elbow Down)

X = 2volt: Motor 2 rotate left (Elbow clockwise)

Y = 3volt: Motor 3 rotate right (Hand Up)

Z = 4volt: Motor 4 rotate left (Hand Anticlockwise)