Servo motor control with Simulink

On Arduino Uno

Hardware & Software:

- Arduino Uno
- Micro servo motor
- Arduino USB & Jumper cables
- Potentiometer (100K recommended)
- MATLAB student suite
- MATLAB & Simulink Arduino support package
Getting started with **Arduino Uno** and **MATLAB**

Step 1

Install the MATLAB and simulink arduino support packages from MATLAB add-on installers
Step 2

Log in to Mathwoks account and “accept” the license agreement.

Step 3

Install all the support packages required. After successful installation, MATLAB will prompt user to install the USB drivers for Arduino. Proceed to install these as well. Once done, user can start using the Arduino board with MATLAB.

Note: User will be prompted to reinstall if they had already installed the package. Otherwise, proceed with the fresh install and click “next”.
Step 4
Connect the Arduino board to the development machine.

Step 5
Click on the Home Tab on the menu bar, click on the New tab and select Simulink Model.

Step 6
Choose a “Blank Model” in the Simulink Start Page (where users can browse available examples, create new models/libraries etc). This opens a new editor window where users can place Simulink blocks as below.
Step 7

Open up the Simulink Library browser and navigate to “Simulink Support Package for Arduino Hardware > Common”
Drag the Analog Input block into the model. Double-click the block and set the Pin number to 0, and the Sample time to 0.01 second.

Drag the Standard Servo Write block into the model. Double-click the block and set the Pin number to 4.

Connect the Analog Input and the Standard Servo Write blocks. Place your mouse cursor on the tiny arrow on the outer right side of the Simulink block and click and drag to connect.

From Simulink Math Operations library, drag the Gain block into the model and drop it on the line connecting the Analog Input and the Standard Servo Write block. Double-click the Gain block and set its value to 0.1760 (maximum servo motor displacement in degrees divided by analog input digital resolution i.e. 180/1023).
In the Simulink model, click Simulation > Model Configuration Parameters to open Configuration Parameters dialog.

Select the Hardware Implementation pane and select the required Arduino hardware from the Hardware board parameter list. Do not change any other settings.
Click OK and do not change any parameters at this point and save the Simulink model with a convenient name.

Deploy the model to the hardware.
While the model is being built, click on the “View Diagnostics” link to bring up the Diagnostics window. If there is an error, follow these steps:

**Step 13**

In the Simulink model, click Simulation > Model Configuration Parameters to open Configuration Parameters dialog. Under the Data Validity parameters in Diagnostics menu, set the “Detect precision loss” to “None” and click OK.

**Step 14**
Step 15

Save the model and Deploy to hardware again. Once the build process completes, view the diagnostics viewer again to check a successful build as below:
Step 16

Turn the potentiometer knob to control the servo motor between 0 and 180 degrees!!