Following are basic instructions for creating a Matlab Real Time Windows application:

1. Open up the Simulink model that you wish to run in real time (or create a new model file).
2. Under the Simulation Menu, Select Simulation Parameters. On the Solver Tab as shown below, do the following:
   a. Select a fixed step integrator,
   b. Select an integrator such as ode5,
   c. Select fixed step size (this determines the sampling rate)
   d. Select “Single Tasking”
3. Now select the “Real-Time Workshop” tab. Click on the “Browse” button and select the “Real Time Workshop” target as shown in the figures below. Click OK on both windows when completed.
As an example of a system to simulate, consider the model of a first order transfer function shown below.

4. In order to display more than 1000 data points in the scope of this simulation several settings must be made:
   a. Open the scope window properties and turn off “Limit data points to last:” as shown below:
   b. Under the Tools menu, select “External Mode Control Panel”. In the window that opens, select the “Signal and Triggering” button. In the window that opens, change the Duration setting. If you are sampling every 0.001sec (i.e. your step size), then a setting of 10000 will show 10 seconds of data in the scope.
5. In order to run the simulation in the “Real-Time Windows Interface”, you must do the following.
   a. Set the Simulation type to “External” from the pull down shown below:

   ![Simulation Settings]

   b. Now you must build the application from by selecting the “Tools” menu and then the “Realtime Workshop” item, and finally the “Build Target” option as shown below. In the Matlab command window the output of the compiler will be shown.

   ![Build Target]

   c. The compiled model becomes an application that will run in the background. In order to load the application, select the “Simulation” menu and then the “Connect to Target” option shown below:

   ![Connect to Target]

   d. Now select the “Simulation” menu again and select the “Start Real Time Code” option. Simulink will disconnect from the target after the simulation has completed.
6. To interface your model with data acquisition hardware connected in the computer, you must do the following.
   a. Add an “Analog Input” or “Analog Output” block to the model. This is found in the “Library Browser” window under “Real Time Windows Interface” as shown below:

   ![Library Browser Screenshot]

   b. After adding the block, you must configure it to use the data acquisition card. The card in the computer is a National Instruments PCI 6024E if the option is not available. This is shown below after double clicking the Analog Output block:

   ![Analog Output Configuration Screenshot]

   c. You can now rebuild the real time model, transfer it to the target, and then run it as described in the previous step.

   Note: Any changes made to the model require that the model is rebuilt and transferred to the Real Time Windows Target before they will take effect.