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High Quality Data Acquisition and Embedded Control Products

Quick Start
Mablab LinCon Solution

v1.0

This manual only introduces the most basic application of MATLAB LinCon Solution. For more detailed information, please refer to **Matlab_LinCon_Manual.**

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【 Introduction 】

MATLAB Solution Toolkit is a useful tool for you to construct your controller model. With it, you can design your controller in MATLAB/Simulink, and convert it into an executable file easily and quickly.

Note: This manual is written based on MATLAB Solution Toolkit version 1.0.0

【 System requirement 】

Hardware:

Controller ： ICPDAS LinCon-8000.
SDRAM : 64 MB
FLASH : 32 MB

Software:

MATLAB 6.5
Simulink 5.0
Real-Time Workshop 5.0
Real-Time Workshop Embedded Coder 3.0
Stateflow and Stateflow Coder 5.0 (optional)

Notice:

Please make sure that MATLAB, Simulink, RTW and RTW Coder has been installed in your system before you setup this toolkit. Otherwise it will not work properly.

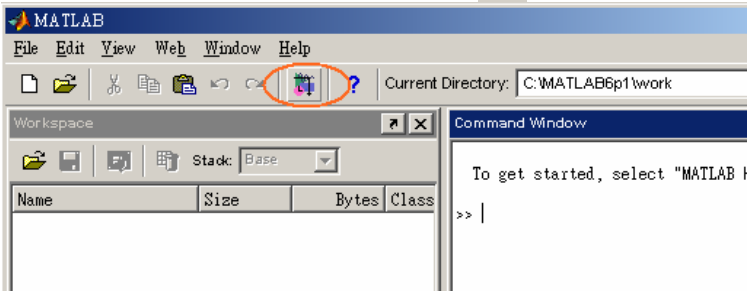
【 Chapter 1　Hardware connection 】

1.) Make sure your PC and LinCon in the same LAN.

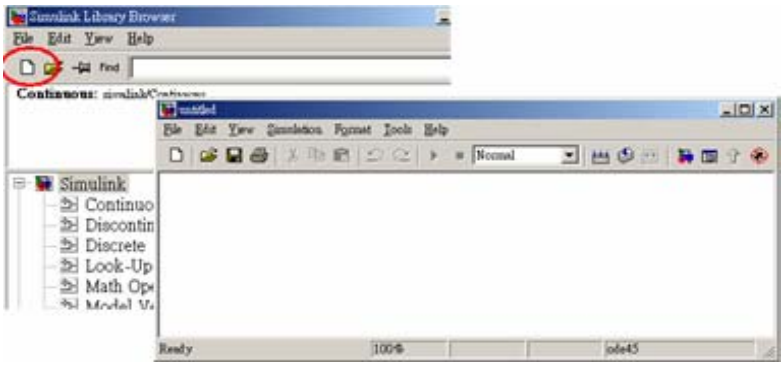
2.) Apply power (+, -) to LinCon-8000. The DC power can be the value from +10V to +30V.

【 Chapter 2　Create a model using Simulink. 】

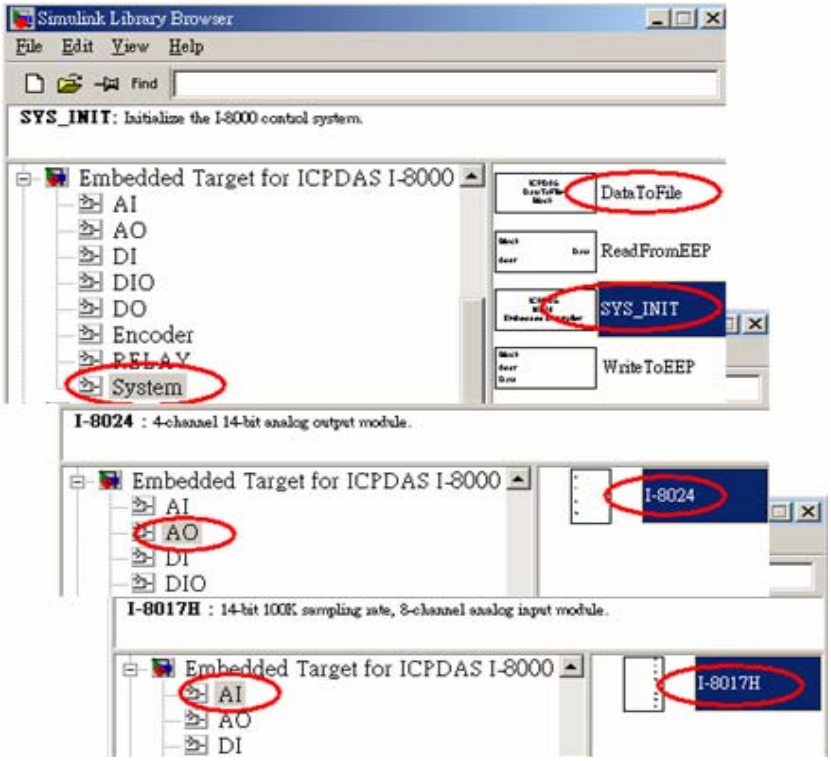
1.) First start **MATLAB** and then click the Simulink icon on the MATLAB toolbar.



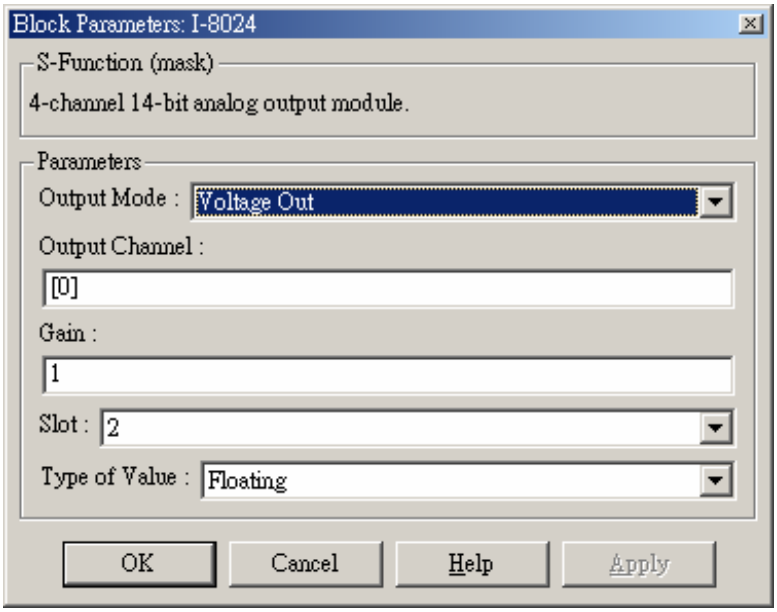
2.) Click on the Library Browser's toolbar (Windows only). Simulink opens a new model window, and then you can start to construct your own control model on the blank area of the window.



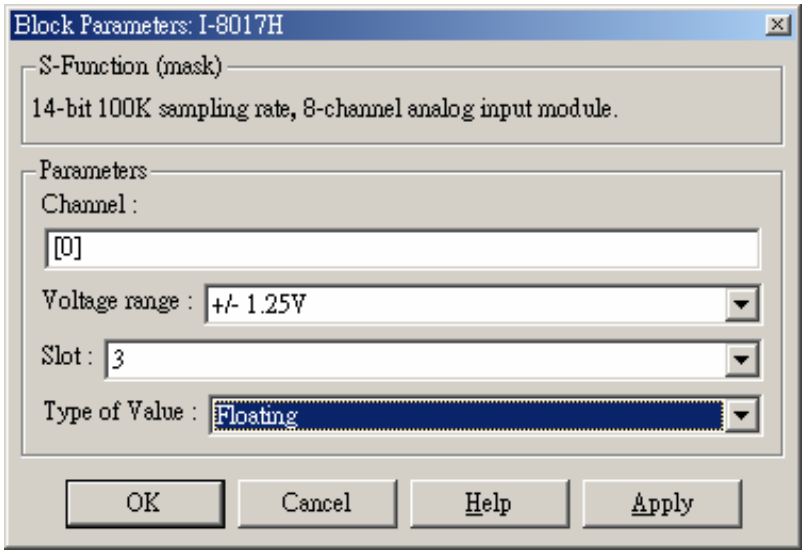
3.) Copy a SYS_INIT, a DataToFile, an I-8024 and an I-8017H block from the System, AO and AI library to the model window respectively.



4.) Double-click on the I-8024 block, and then the dialog box appears. To use channel 0 of I-8024 module, enter **[0]** in the field "Output Channel". And select the slot as **2**, Output Mode as "**Voltage Out**", Gain as **1** and Type of Value as "**Floating**".

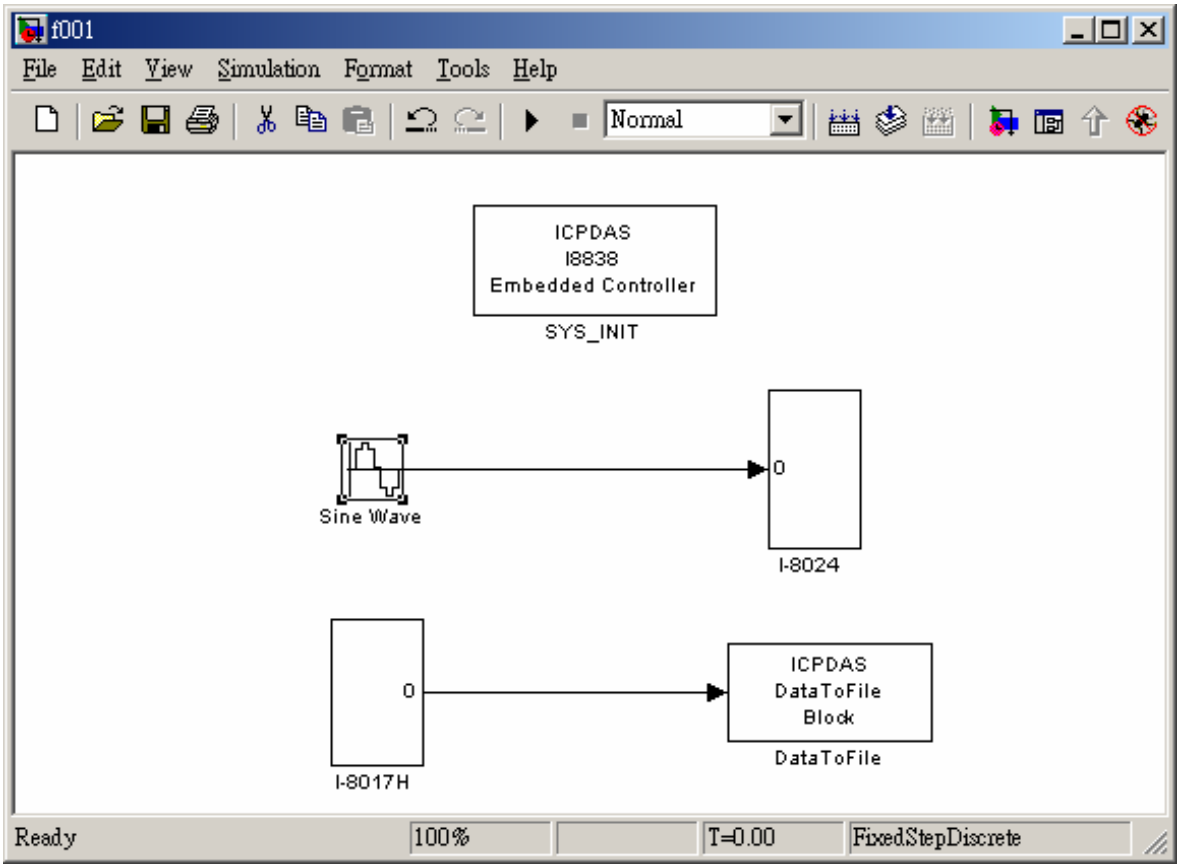


5.) Double-click on the block of I-8017H, enter **[0]** in the field "Channel". And select the Voltage range as **"+/-1.25V"**, Slot as **3** and Type of Value as "**Floating**".



6.) Copy a **Sine Wave** block to the model window from the **Simulink\Sources** library.

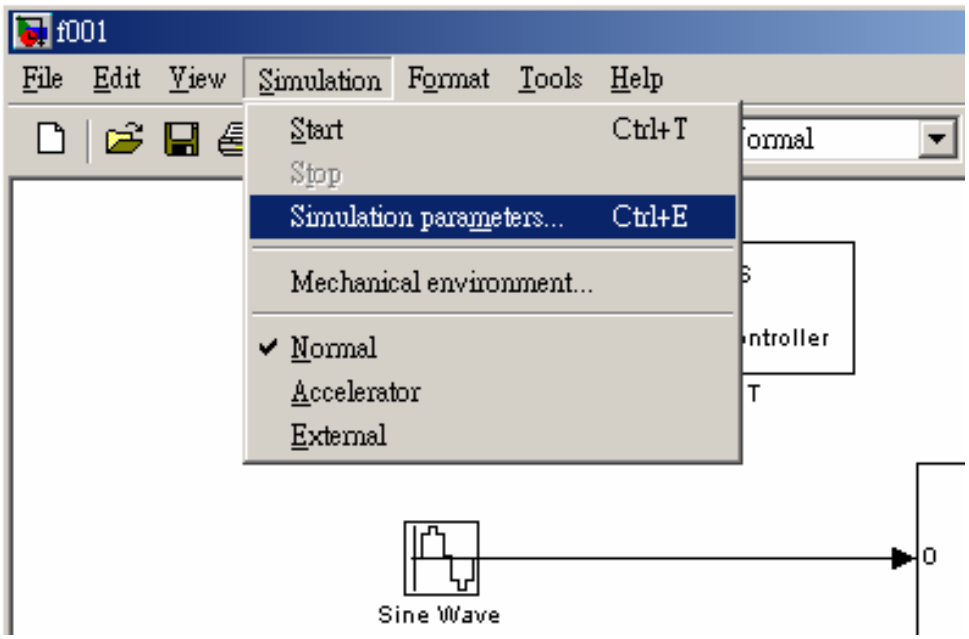
7.) Connect all the blocks as shown in the following figure.


f001
File Edit View Simulation Format Tools Help
Normal
ICPDAS
I8838
Embedded Controller
SYS_INIT
Sine Wave
0
I-8024
0
I-8017H
ICPDAS
DataToFile
Block
DataToFile
Ready
100%
T=0.00
FixedStepDiscrete

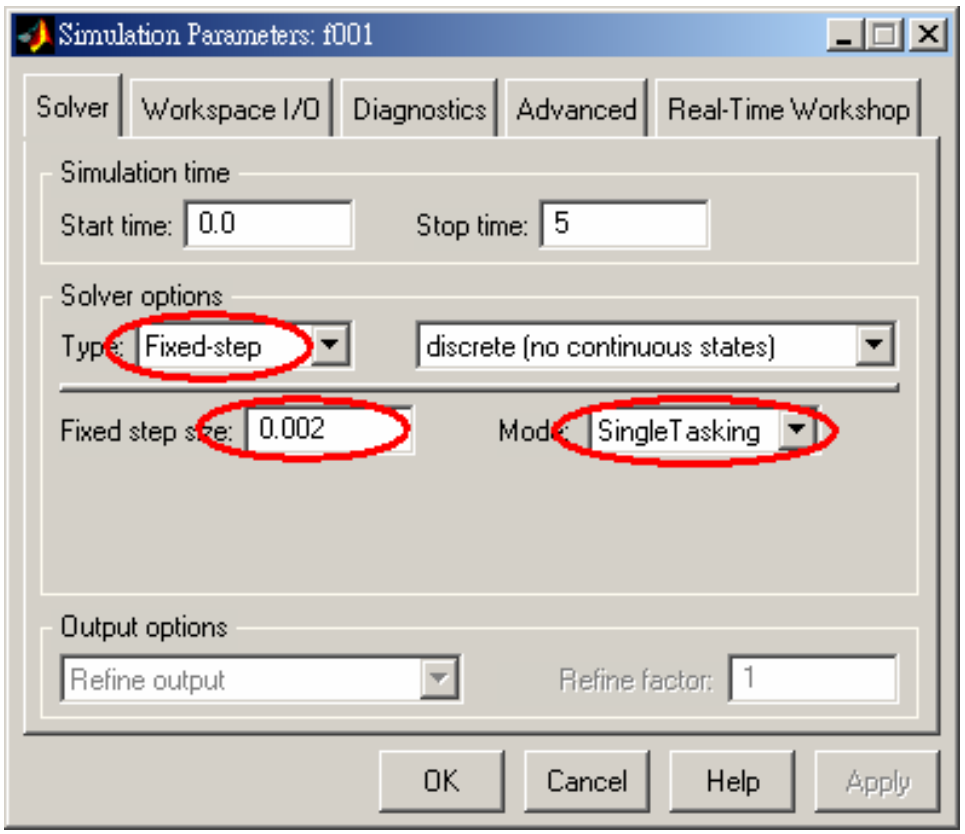
【 Chapter 3　Build the program by RTW 】

In this section, we will demonstrate you how to convert the control model created in the previous section into an .exe by RTW.

1.) Open the Simulation Parameters dialog box by choosing *Simulation parameters* from the *Simulation* menu.

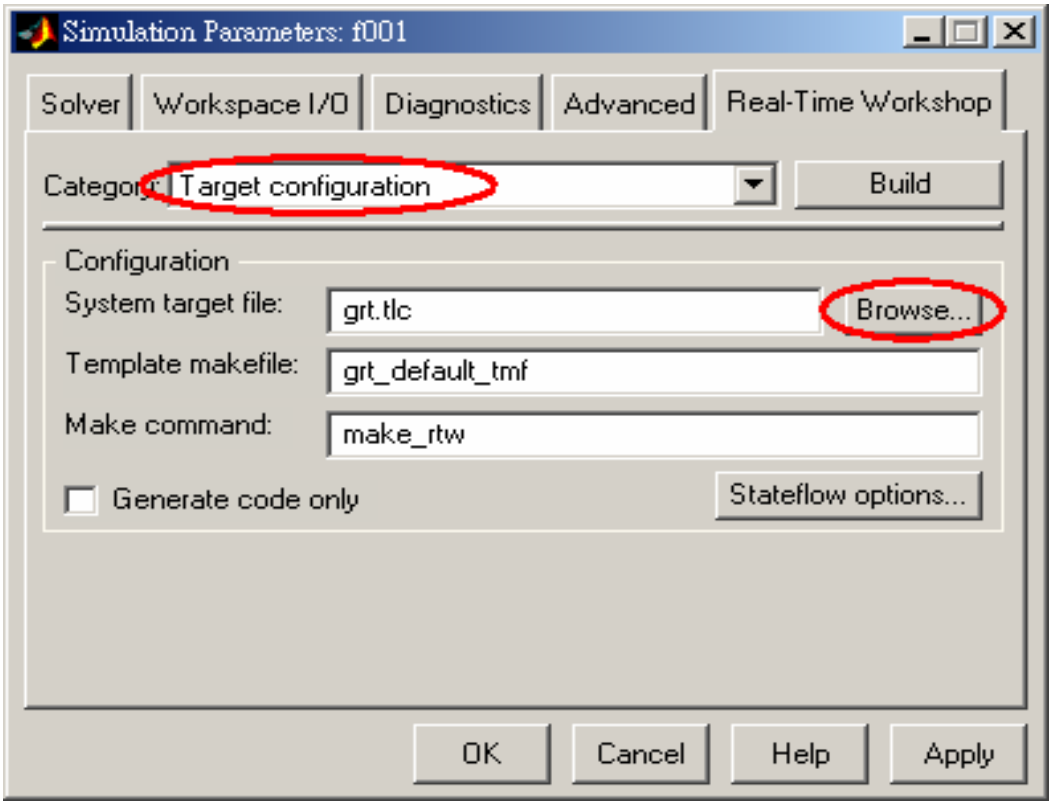


2.) On the dialog box that displays, select Type as **Fixed-step**, Mode as **Single Tasking** and Fixed step time as **0.002** in the field “Solver options”.

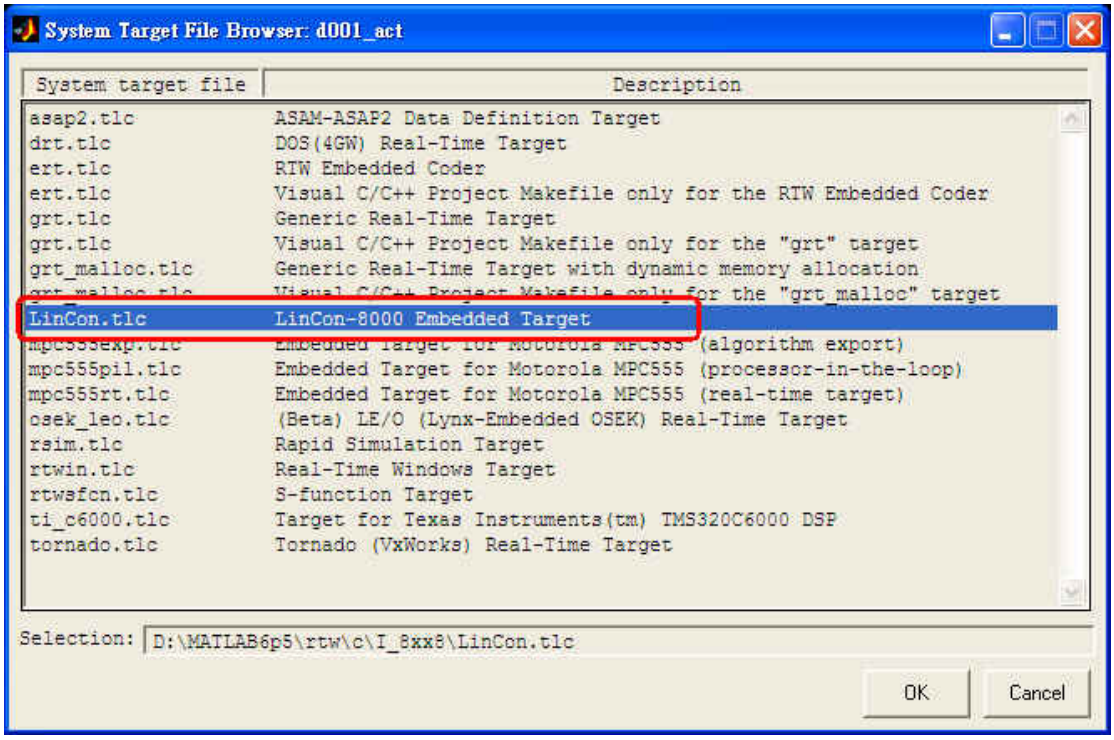


3.) Then click the “Real-Time Workshop” tab and the panel changes. On the panel that

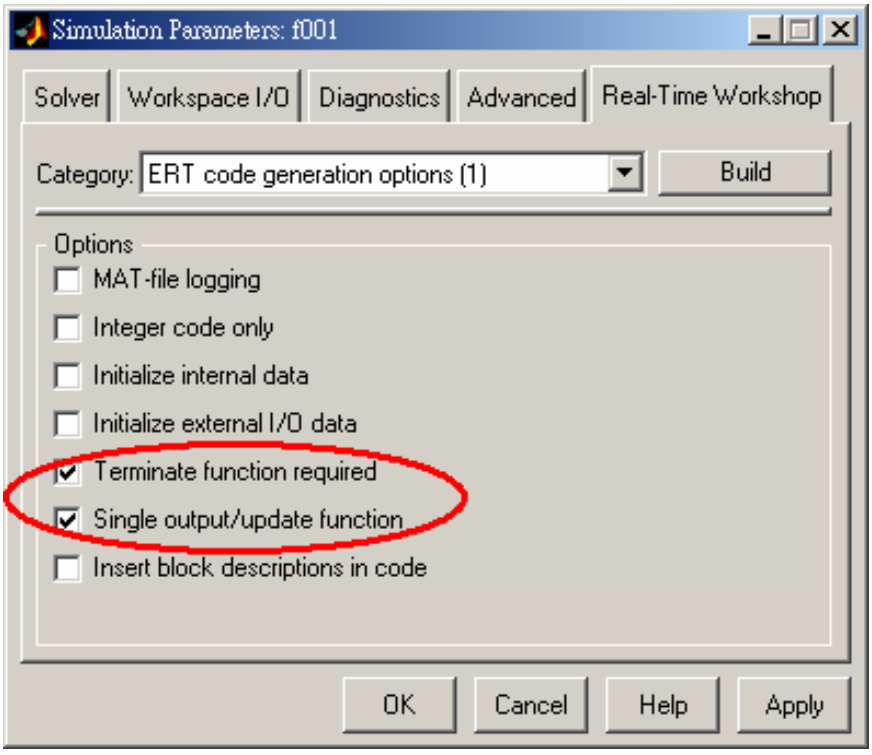
shows up, select **Target configuration** from the Category field. Then click the Browse button to open the “System Target File Browser” window.



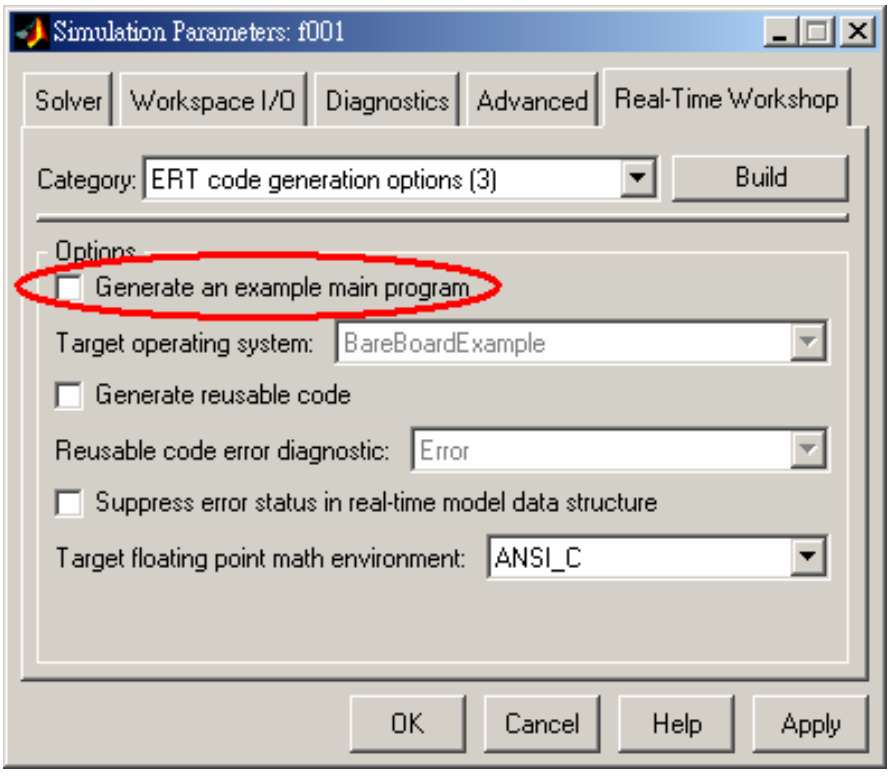
4.) On the System Target File Browser dialog, select the correct system target file from the list and then click the OK button to close the dialog box. Here, we choose **LinCon.tlc**.



5.) And select the “ERT code generation options (1)” in the Category field. Then check the **Terminate function required** and **Single output/update function** options on the pane.



6.) Select “ERT code generation options (3)” from the Category field. Then cancel the option **Generate an example main program**.



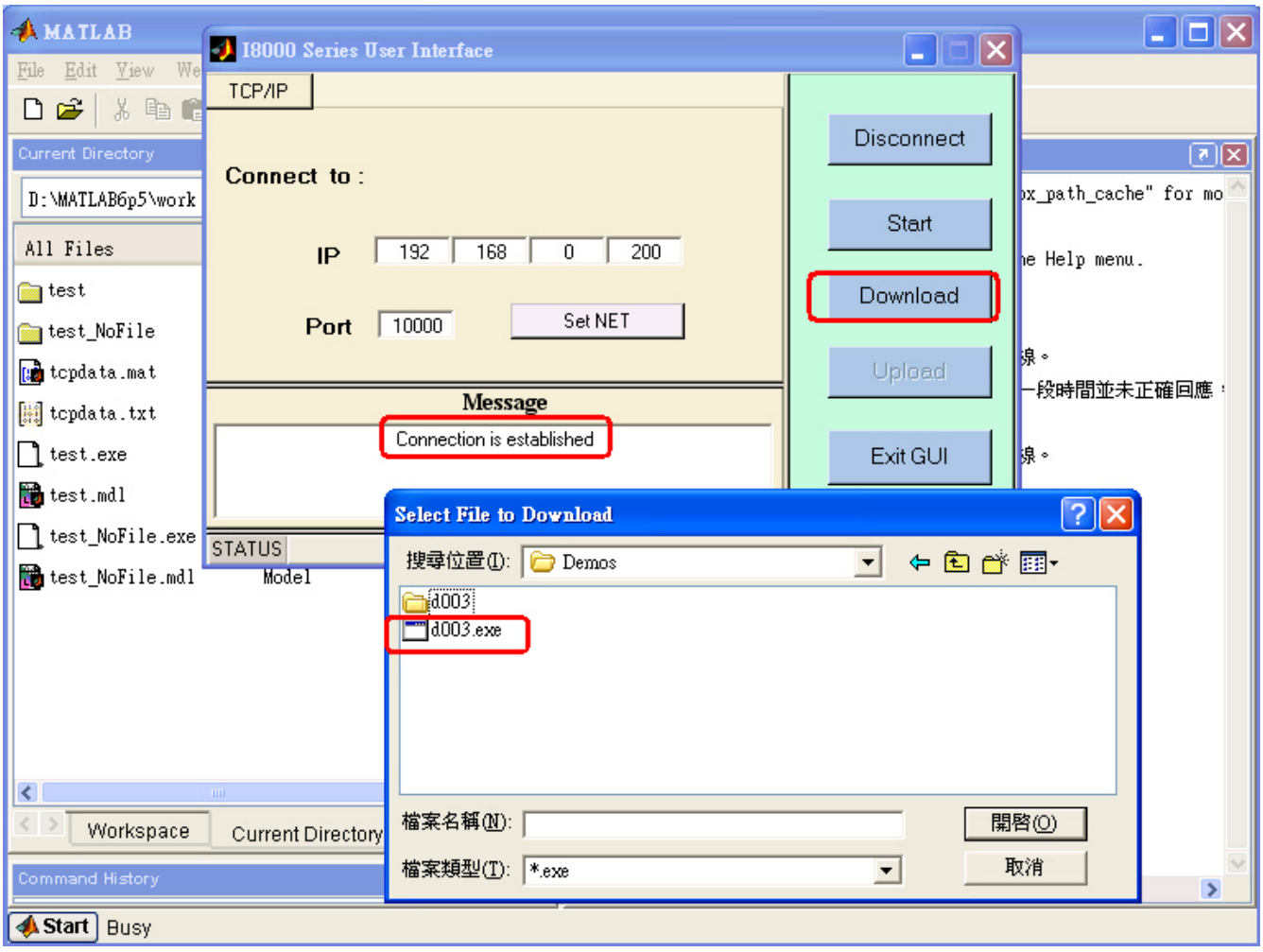
7.) When the above steps are done, save the model and click the Build button to start the build process.

【 Chapter 4　Program downloading & uploading 】

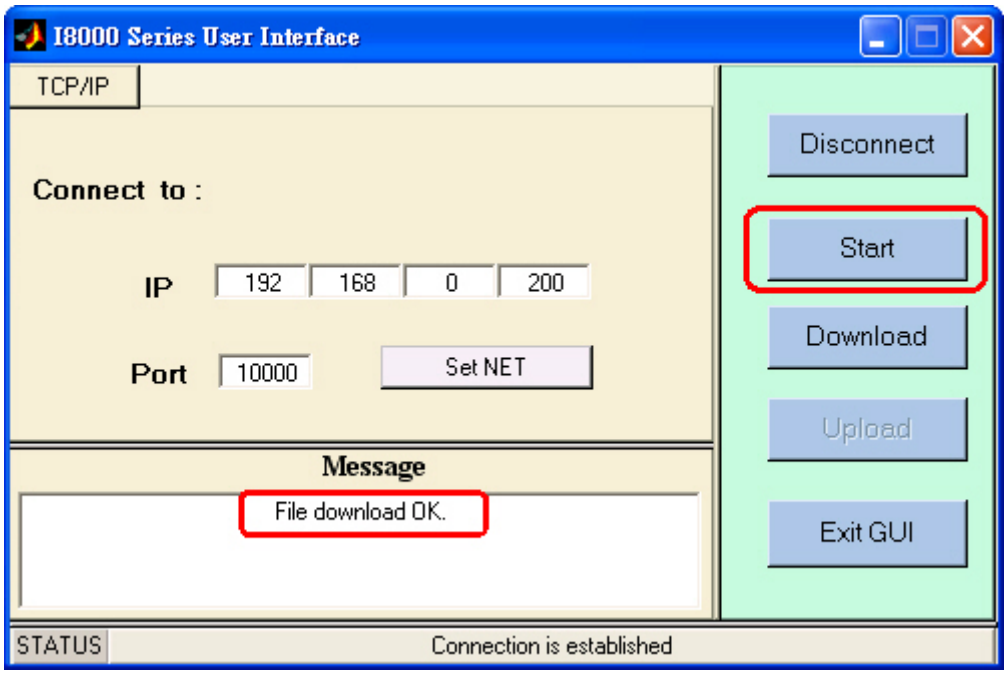
Now we can download the model.exe generated for testing. Please follow the steps:

1.) Enter **gui8000** at the MATLAB prompt to start the GUI. Then specify the correct IP and Port of the LinCon-8000 and press Connect. **Note: The default listening port is 10000.**

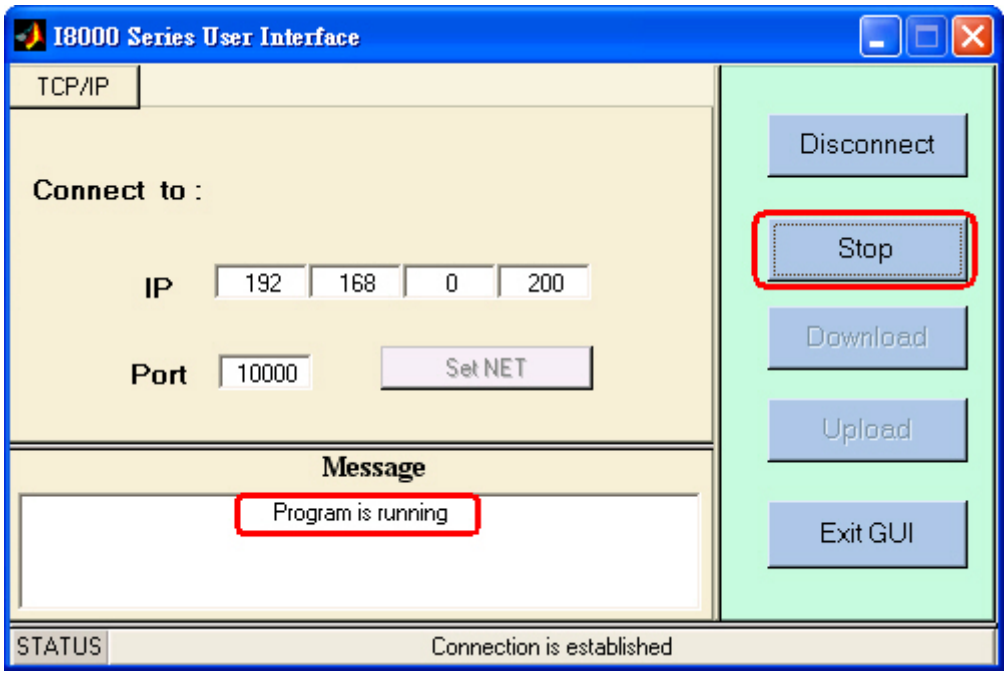
2.) After the connection is established, press Download to select the file and transfer it to the LinCon controller.



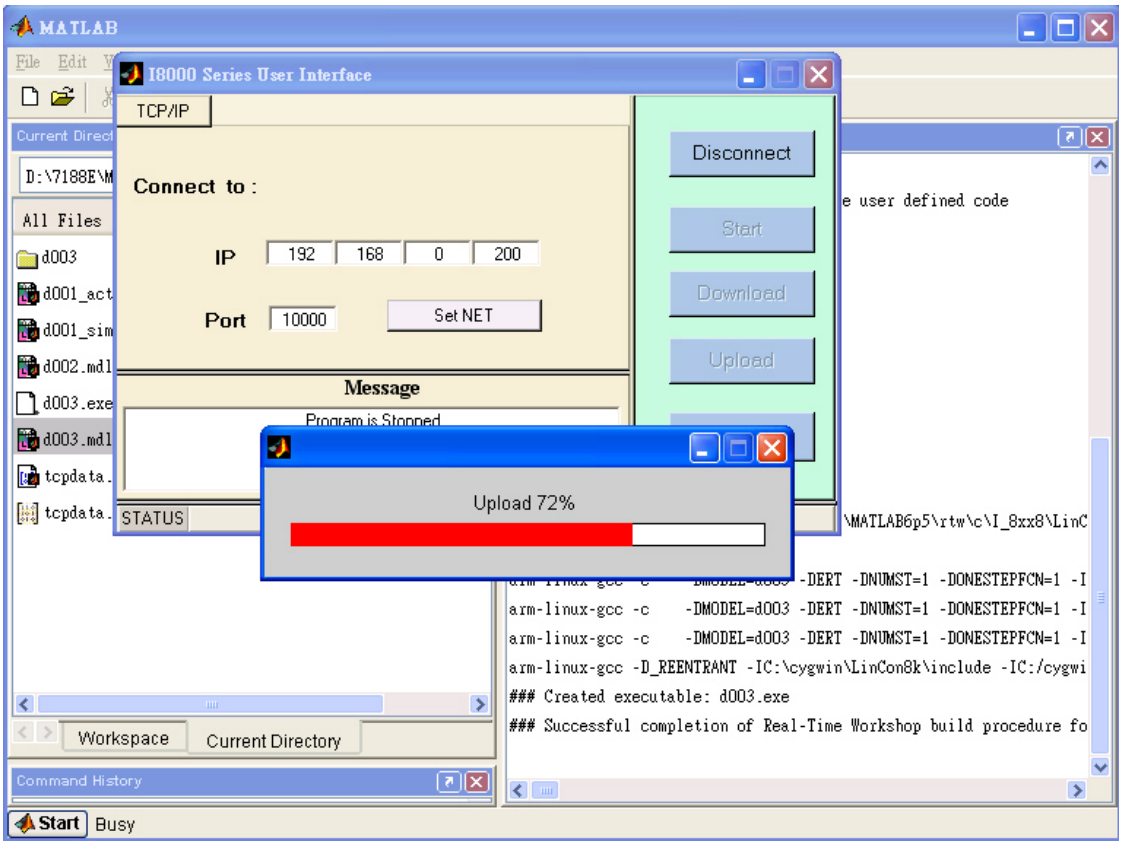
3.) As soon as the download process is completed successfully, you can click Start to execute the program.



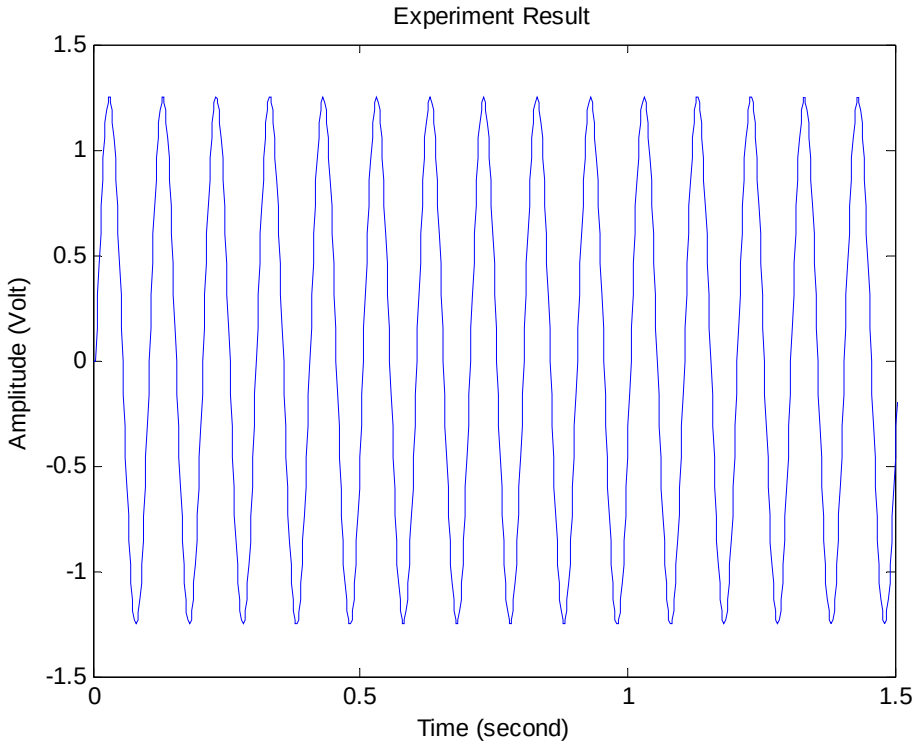
4.) Then the pane changes like the following figure.



5.) After the time that you specified is up, press “Stop” button to stop program. Then click upload button to collect the data for further analysis. After the upload process is completed successfully, data will be saved as **tcpdata.mat** and the name is fixed.



6.) Double-click on tcpdata.mat and then enter **plot(tcpdata(1, :), tcpdata(2, :))** at the MATLAB prompt. The result would look like below:



Note: To run this demo, what you need is that an I-8024 AO module and an I-8017H AI module have been installed on slot 2 and 3 of LinCon-8000 respectively.