

RMC150E UI/O Simulator

RMC150E UI/O cards can be used as a servo simulator. Each card can simulate two axes. This document outlines the procedure for setting up a UI/O card as a servo simulator.

Axis setup

1. In the Axis Definitions create a new Axis
2. Select Cascading Outer Loop as the axis type
3. Select Single Control Loop, Position feedback
4. For the Position Input, select Custom
5. Click Finish to create the axis. Not that this axis does not use any hardware inputs or outputs.

Simulator Setup

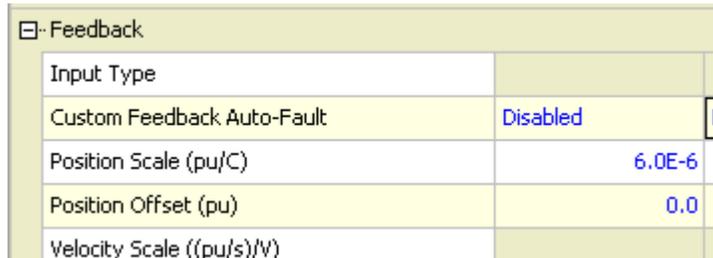
1. Open the Axis Tools
2. On the Parameters side, switch to the All tab

Simulator		
Simulate Mode	<input checked="" type="checkbox"/>	
Simulator Order	2nd Order	2r
System Gain ((pu/s)/V)		3.0
Natural Frequency (Hz)		20.0
Damping Factor		0.75
Pos. Physical Limit (pu)		99.9
Neg. Physical Limit (pu)		0.1
Output Deadband (V)		0.0
Output Null (V)		0.0
Weight (lb)		1000.0
Maximum Force (lb)		10000.0
Maximum Compression (pu)		0.1
Position/Velocity Control		
Output		
Setup	Tune	All

3. Set the System Gain, Natural Frequency, Damping factor and physical limits.
4. Click the checkbox to enable simulate mode

Simulator Scaling

1. In the Feedback section of the Axis Parameters, set the position scale.

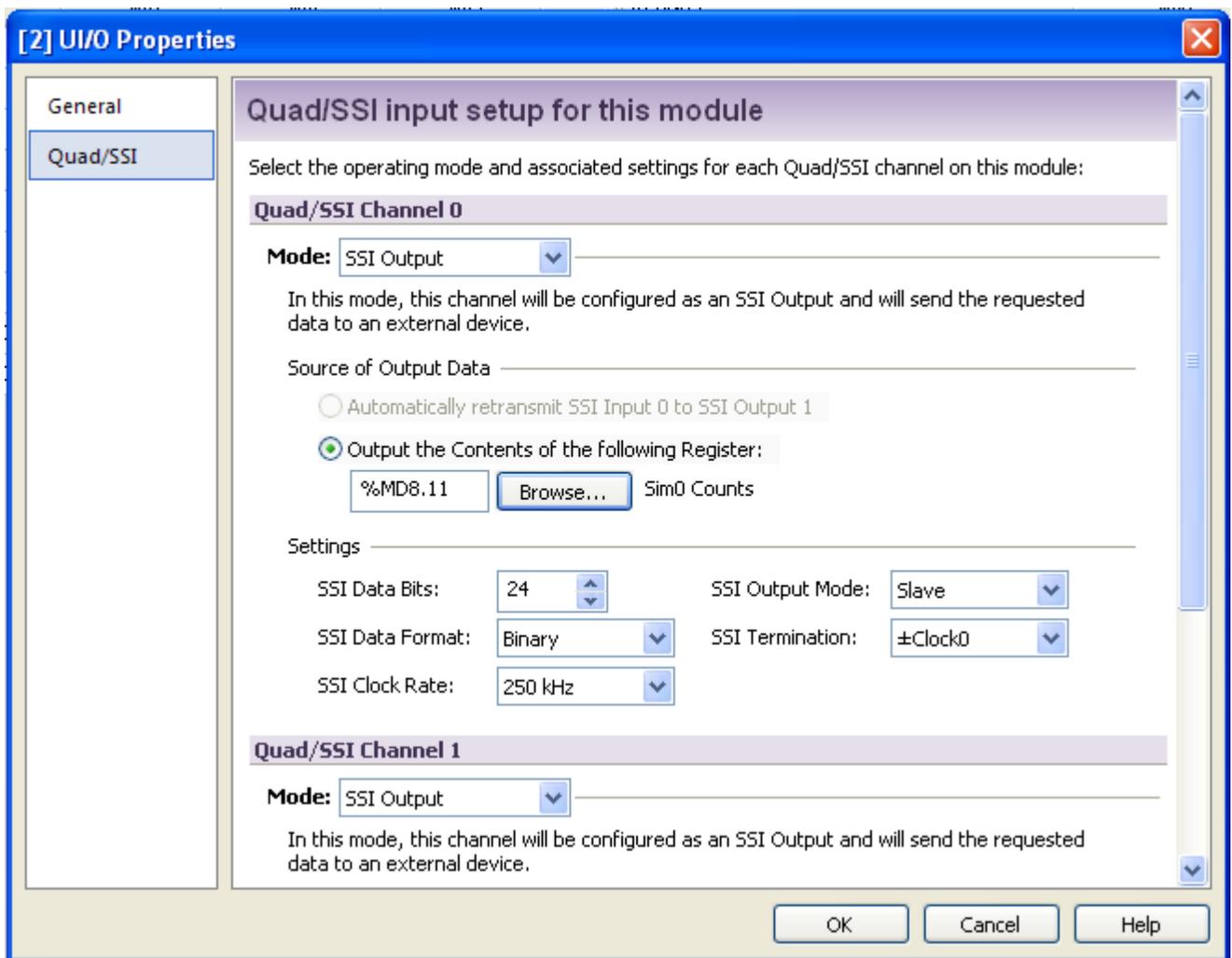


Feedback	
Input Type	
Custom Feedback Auto-Fault	Disabled
Position Scale (pu/C)	6.0E-6
Position Offset (pu)	0.0
Velocity Scale ((pu/s)/V)	

2. The maximum number of counts will be the positive physical limit divided by the position scale.
3. In this example, $100 / 6e-6 = 16,666,667$ which is slightly less than 2^{24} , the maximum number of counts for 24 bit SSI.

Set up the SSI Output

1. In the Modules section of the Project Tree, right click on the UI/O card and click properties
2. Switch to the Quad/SSI tab
3. Change the Mode to SSI Output
4. Under Output the Contents of the following Register, click Browse
5. Select Axes->Outer0->Status->Feedback-Primary->Counts
6. Set the SSI Data bits, Binary/Gray code, SSI Clock rate, output mode and termination



Create Reference Inputs

1. In the Axis Definitions, create a new axis
2. Select Reference Axis
3. For the Feedback type, select Velocity
4. From the Velocity Input drop down, select a UI/O analog input
5. Click Finish to create the axis

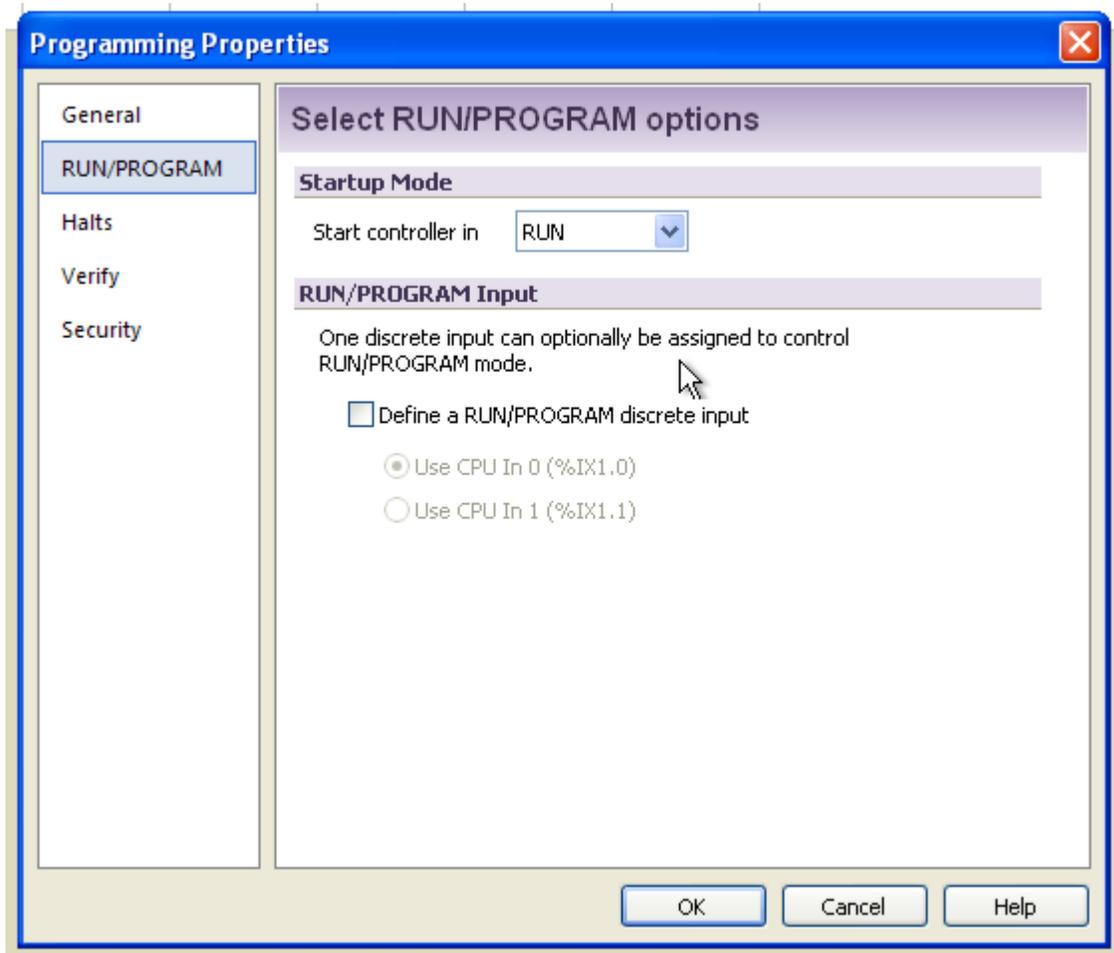
Create the User Program

1. A user program is necessary to get the voltage from the analog inputs to the simulator.
2. Import the SimulateSSI program or create a new program with the following step:

3. Set the program to run automaticall on all axes by adding it to the program triggers on the FirstScan condition.

Condition	Task 0	Task 1	Task 2
_FirstScan	SimulateSSI	SimulateSSI	SimulateS!
*			

4. Set the controller to start in Run mode by right clicking on Programming and clicking Properties. On the Run/Program tab, select Start Controller in Run mode.

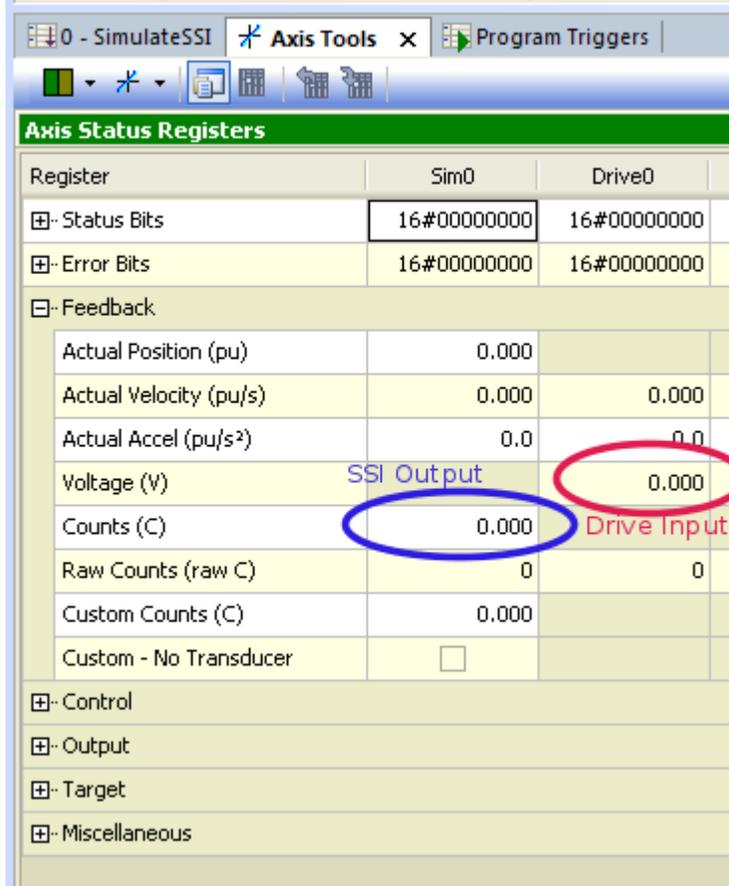


Download to the Controller

1. From the Controller menu, select Download All To Controller
2. From the Controller menu, select Update Flash
3. Switch the controller into Run mode. The program will now start on all axes.

Monitoring Positions

1. To check the Drive input, open the Axis Tools and select the All tab on the Status side
2. Expand Feedback.
3. The drive input will be the Voltage (V) register on the Reference Axis
4. The SSI Output will be the Counts (C) register on the simulator Outer Loop Axis.



Register	Sim0	Drive0
Status Bits	16#00000000	16#00000000
Error Bits	16#00000000	16#00000000
Feedback		
Actual Position (pu)	0.000	
Actual Velocity (pu/s)	0.000	0.000
Actual Accel (pu/s ²)	0.0	0.0
Voltage (V)		0.000
Counts (C)	0.000	
Raw Counts (raw C)	0	0
Custom Counts (C)	0.000	
Custom - No Transducer	<input type="checkbox"/>	
Control		
Output		
Target		
Miscellaneous		

5. You can show a graphical view of the simulated axes by selecting Actuator View from the View menu.

