Lab 7B: Calibration of Rotor Position* (For On-Campus Students Only)

EE595S

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*Courtesy of Brandon Cassimere and Brant Cassimere

Why Does Rotor Position Need To Be Calibrated?

- To ensure the q and d-axis of the machine is properly aligned with the magnetic axis of the permanent magnet

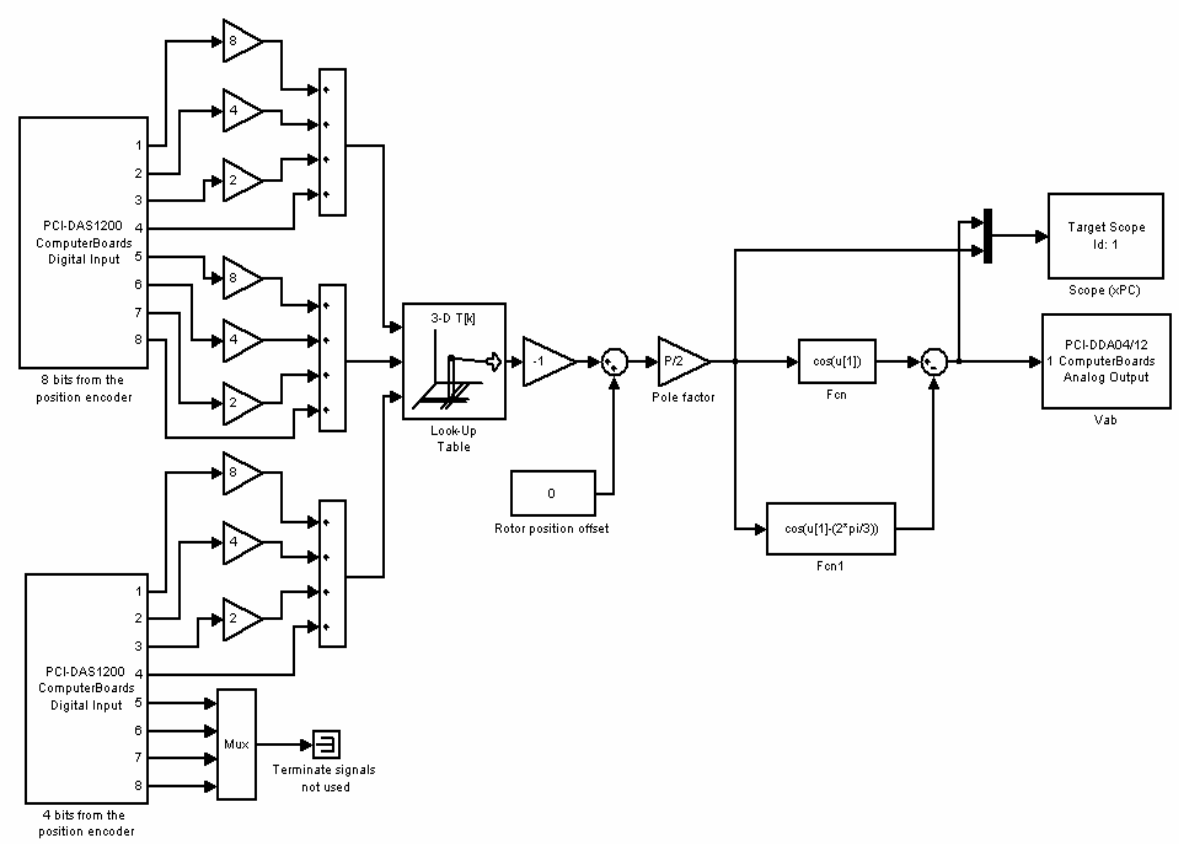
What is XPC Target?

- Commercial software for prototyping, testing, and deploying real-time control systems using standard PC hardware
- Uses a target PC and a separate host PC
- The host PC with Matlab Real-Time Workshop, Stateflow Coder and a C/C++ compiler are used to create executable code
- The executable code is downloaded from the host PC to the target PC running the XPC Target real-time kernel
- After downloading the executable code, the target application is executed in real time.

How To Run XPC Target?

- Step 1: While the Simulink diagram is on screen, use the Ctrl+B command to run XPC target
  - ➢ This will take a couple of seconds
- Step 2: After typing in the above command, type "+tg" at the Matlab prompt to execute in real time
- Step 3: "-tg" stops running XPC target
- Note: If you make a change to your Simulink diagram, repeat Steps 1-3

Simulink Code To Be Used (rotoroffset.mdl)



Equipment

- TDS 400A Series Oscilloscope Probe
- TDS420A Digitizing Oscilloscope
  - Used For Data Acquisition
- P5200 High Voltage Differential Probe
  - Used to Make Differential, Isolated, High Voltage Measurements.
  - Never Measure Voltages Without This Probe !
  - Divide By 50 and By 500 Settings

Assignment

- Construct v_{ab} using θ_r
- Energize the modulator shelf
- With the offset set to 0, run the Simulink diagram using XPC target as described previously
  - Set sampletime to $1e^{-4}$ in the Matlab workspace
  - Set P=4.0 in the Matlab workspace
  - Load grayconvmat
- Run the induction machine and record the measured value and simulated value of v_{ab} using the scoperead command in Matlab
  - Run the scoperead2 command twice
- Extract the phase angle for both values of v_{ab} using the phaseangle.m file in Matlab
- Compare these values and adjust the offset term in Simulink until the two phase angles are essentially equal

Lab 7B Comments

- Be very careful when connecting the TDS 400A Series Oscilloscope Probe to the interface board
  - Connect the probe to the interface board while the power is off