dSPACE Board Testing Procedure

LOADING THE DSPACETEST PROGRAM:

- Connect a dSPACE breakout box to the back of the computer. Make sure that the cable is correctly and fully engaged.
- On the dSPACE breakout box, connect DACH1 to ADCH1 using a BNC/BNC cable.
- Copy the files *dspacetest.mdl* and *dspacetest.lay* into a folder on the C:\ drive or on a USB drive connected to the computer.
- Double-click on the Matlab icon on the desktop. If asked about the platform, click on DS1104. Change the Matlab working directory to the folder where the *dspacetest* files were copied.
- In the Matlab window, type *open dspacetest.mdl* or simply double-click on the .mdl file in the working directory. After a short time, a Simulink window should open showing the block diagram of the test program.
- The program outputs the same sinusoid to all the D/A's and reads the A/D's and encoder values. Click on the Simulink window and type Ctrl+B.
- If there are build errors, consult the checklist on the lab web page. Ensure that the settings and adjustments that apply to this test are in place.
- The results of the compilation and loading of the program should appear in the Matlab window. If the model is successfully built, the program generates a .sdf file that is loaded onto the dSPACE board.

CHECKING THE BOARD:

- Open the dSPACE ControlDesk software by double-clicking on the "dSPACE ControlDesk 5.2" icon.
- In dSPACE, click on *New Project + Experiment*. Finish creating the project and experiment in the following windows by entering a name for the project, selecting the root directory as the folder with the .mdl and .sdf files, naming the experiment, ensuring that the selected Platform/Device is the DS1104 R&D Controller Board, importing the previously generated .sdf file (it has the same name as the .mdl file built), and then clicking on *Finish*.
- A workspace with a blank layout should open. Note that a layout file (*dspacetest.lay*) was previously downloaded. So, close the blank layout and click on the *Layouting* tab, then click on the *Import Layout* button and choose the layout file.
- In the dSPACE window, a smaller window should appear with 8 plots (one for each A/D input) and with 2 numerical boxes (one for each encoder input). There should also be a radio button block that allows you to start/stop the program on the DS1104 R&D platform. If needed, resize the window so that all the displays are visible.
- Engage the ControlDesk layout by clicking on the '*Go Online'* button. You will also need to press the *'Start Measuring'* button to initiate the plotters so you are able to see real time signals on them. Next, activate the START option in the radio button block. A sinusoid with magnitude +/- 1 should appear in the first plot. This indicates that A/D channel 1 and D/A channel 1 are working. If it is indeed the case, other channels can be tested by moving the BCN/BNC cable. If not, D/A channel 1 should be tested with a scope. You may initially notice stray disturbances on the A/D channels that are not connected. This is alright as long as they become flat after their tests.
- The encoder input of the dSPACE board and the encoder of a motor can be tested by connecting the encoder to Inc1 or Inc2 on the breakout box. Rotate the shaft of the motor and check that the display changes value.

SHUTTING DOWN:

- Click on the STOP option in the radio button block to stop the program from running.
- Clock on *'Go Offline'* to disengage the ControlDesk layout.
- Close the dSPACE and the Matlab windows.

IN CASE OF FAILURE:

Report the problem to the TA and, if confirmed, report the problem to the stockroom attendant with a note. Note that the board inside the computer is most likely the source if there is a malfunction, not the breakout box. So, be sure to report the problem with the number of the computer.