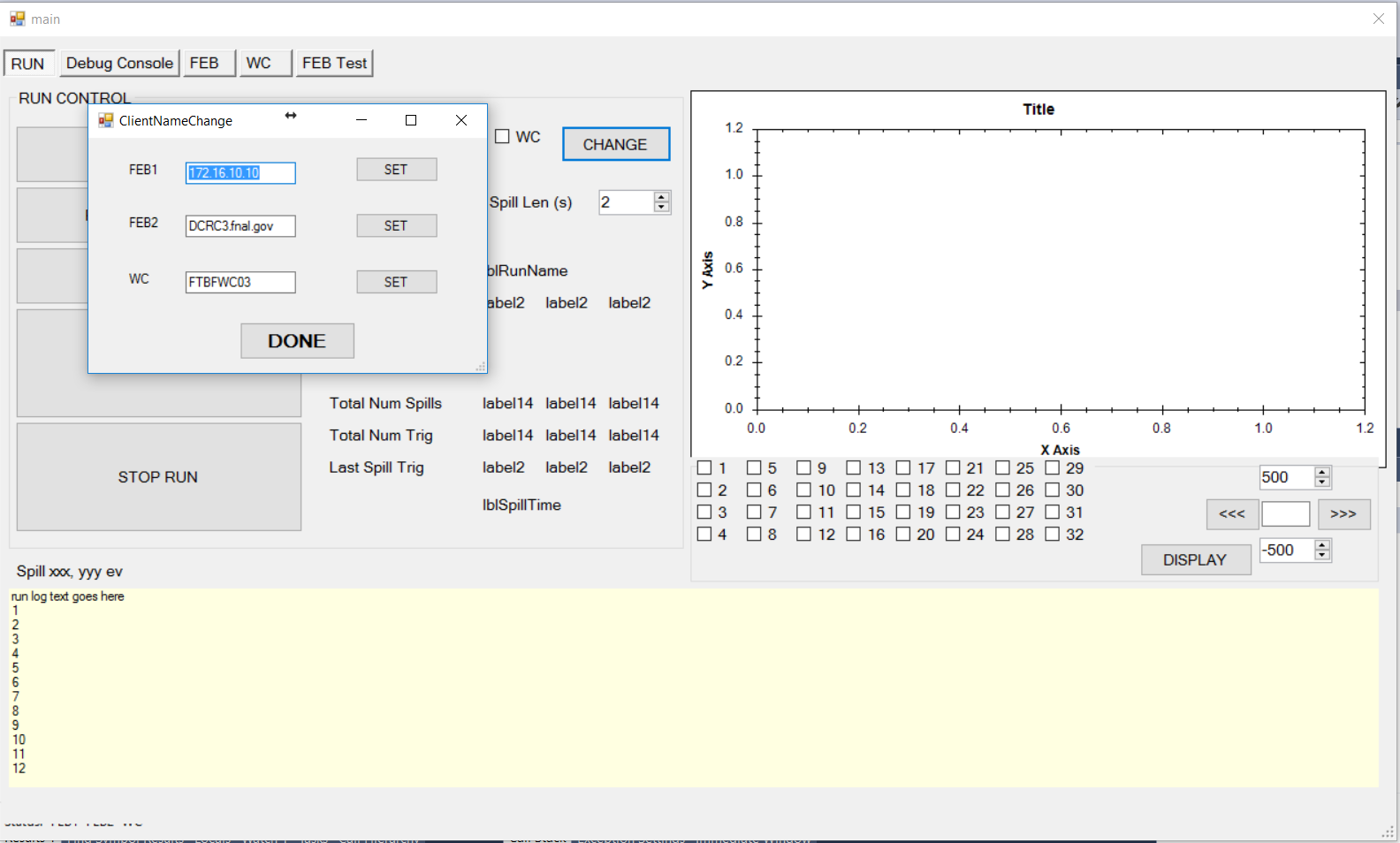
FEB Interface Software User Guide

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# Connecting the software to the FEB

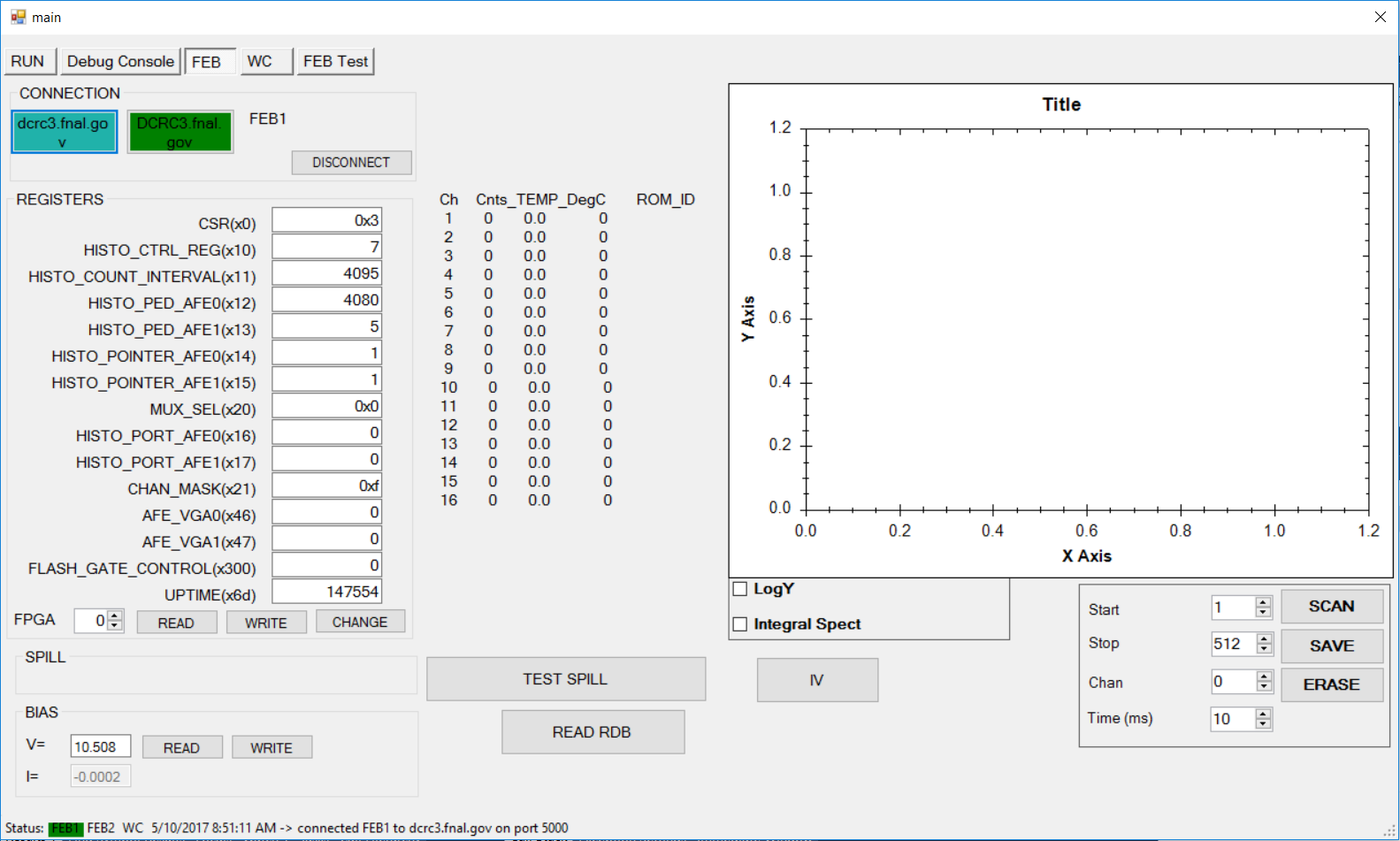
1. Launch the TB\_mu2e application.
2. In the “FEB” tab, check that one of the buttons in the “CONNECTION” box shows the address 172.16.10.10. If so, click this button. If the connection is successful, the button will turn green. If not, it will turn red.
3. If the button does not display this address:
   1. Go to the “RUN” tab.
   2. Click the “CHANGE” button (approximately in the top center of the page). A new dialog box will open.
   3. Enter the address 172.16.10.10 into the “FEB1” box, click the “SET” button beside this box, then click “CLOSE.”
   4. Go back to the “FEB” tab and retry the connection.
4. If the button does display this address but the connection fails:
   1. Check the connection of all ethernet cables to the FEB, computer, and router.
   2. Check that the board is powered on.



# Initial checks

If the board is connected and functioning properly:

1. The temperature and ID number for each CMB should appear in the center of the “FEB” tab (these values will be zero for any unconnected CMB channels).
2. The text boxes in the “REGISTERS” panel should display numbers, although most will likely be zero.

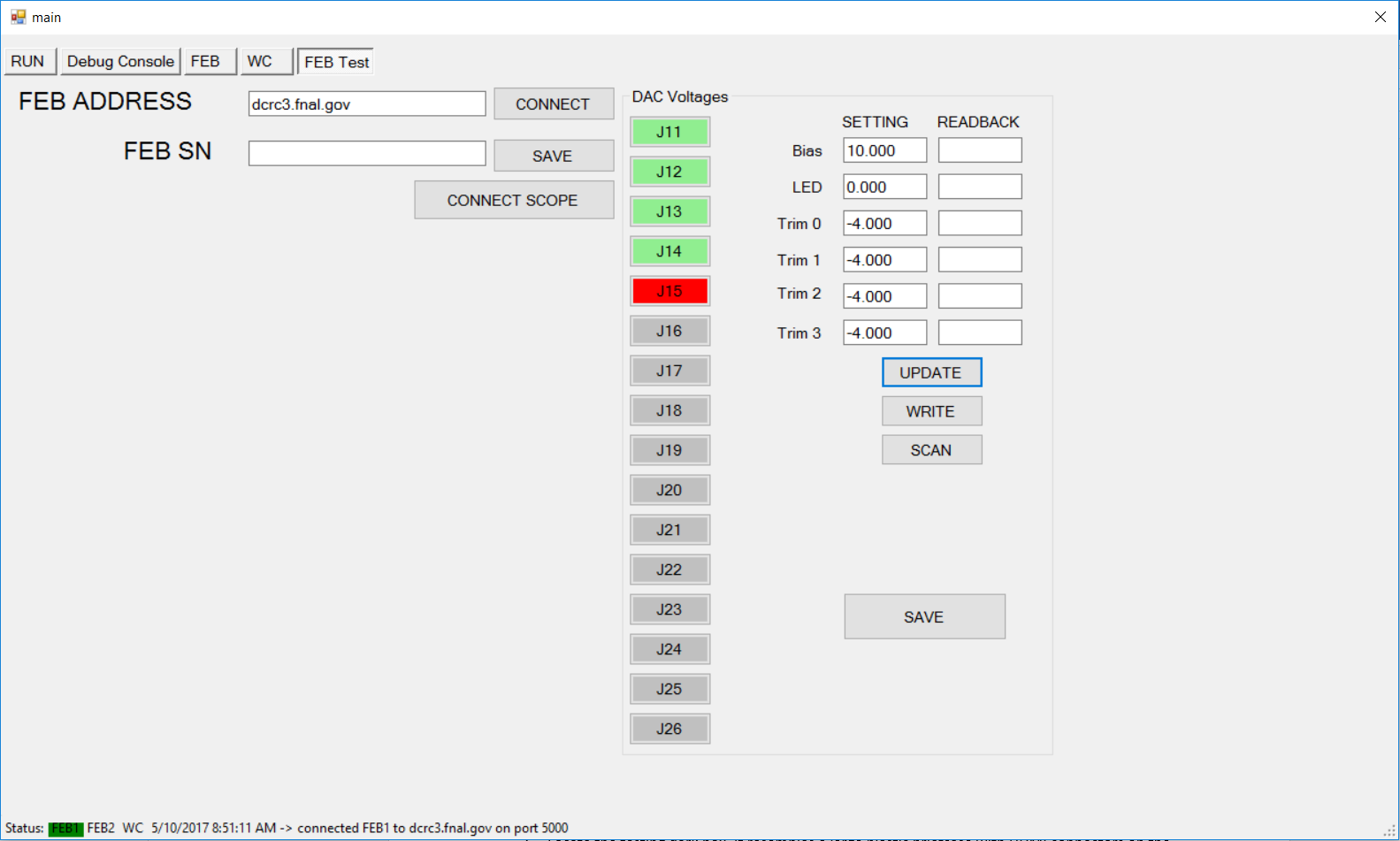


# DAC voltage test

1. Connect the HDMI test cable to the channel to be tested. It is recommended to begin with channel J11 (leftmost when viewing FEB so that HDMI ports are at the bottom) and test sequentially.
2. Change to the “FEB Test” tab.
3. Type the serial number of the FEB into the “FEB SN” box.
4. Click the “CONNECT SCOPE” button. If the oscilloscopes are connected properly, you should immediately see values in the “READBACK” boxes.
5. Click on the button corresponding to the channel to be tested. The label on the button, J11 through J26, should match the label of the HDMI port on the FEB. The clicked button will turn red and values will appear in the “SETTING” boxes.
6. As a quick check, or to do manual testing, you can try setting one of the voltages to a value in the ranges listed below and make sure the readback approximately matches the setting. To do this, type the voltage setting into a box in the “SETTING” column and click “WRITE.” The voltage ranges for the DACs are:
   1. Bias: 0 – 70.8V
   2. LED: 0 -- 14V
   3. TRIM: -4.096 -- +4.095V
7. Click the “SCAN” button. This will cycle through each of the six DACs (bias, LED, and four trims) setting each to a value and checking the readback voltage. This will be done for three voltages for each DAC. The process takes about 20 seconds. The button will turn green when finished.

If an error message appears, it is because the voltages read out by the scopes are significantly different from those set by the FEB microcontroller. This could mean that some component of the test jig is not properly connected (such as the HDMI connector or scopes). If after checking all connections the error still occurs, it could indicate a faulty FEB.

1. Move the test cable to the next HDMI port and click the corresponding button in the UI. The selected channel button should turn red if untested, and previously tested channels should turn light green. Repeat the testing process
2. Once all 16 channels are tested (all buttons are green or light green), click the “SAVE” button. This will write the results of the voltage scans to a text file in the data directory. Make sure a serial number is entered before clicking “SAVE,” as this determines the name of the file.



# Histogram test

1. Disconnect the voltage scan HDMI connector.
2. Locate the testing dark box. It resembles a large plastic briefcase with HDMI connectors on the side. [NOTE: as of 5/24/17, the dark box is still WIP.]
3. If doing the histogram test for the first time, check inside the dark box to confirm that all 16 CMBs (small PCBs, approximately 1”x4”, containing SiPMs) are in place and connected to the HDMI feedthroughs.
4. Connect the 16 HDMI channels on the FEB to the corresponding HDMI ports on the exterior of the dark box. [note: we should label the HDMI connectors on the dark box so we’re consistent about which CMBs are used each time.]
5. Change to the “FEB” tab in the test application.
6. Now that all CMBs are connected, the temperature readback should be nonzero for all channels. (They will probably be in the 20o – 30o C range.)
7. Click the “SCAN” button on the lower right.
8. The button will turn blue while it’s scanning.
9. Once the scan is complete, click “SAVE.”
10. A file will be created titled with the FEB serial number and the date.