

# Multi-cal-slave Test

Apr 29, 2010

# Estimated Test Time

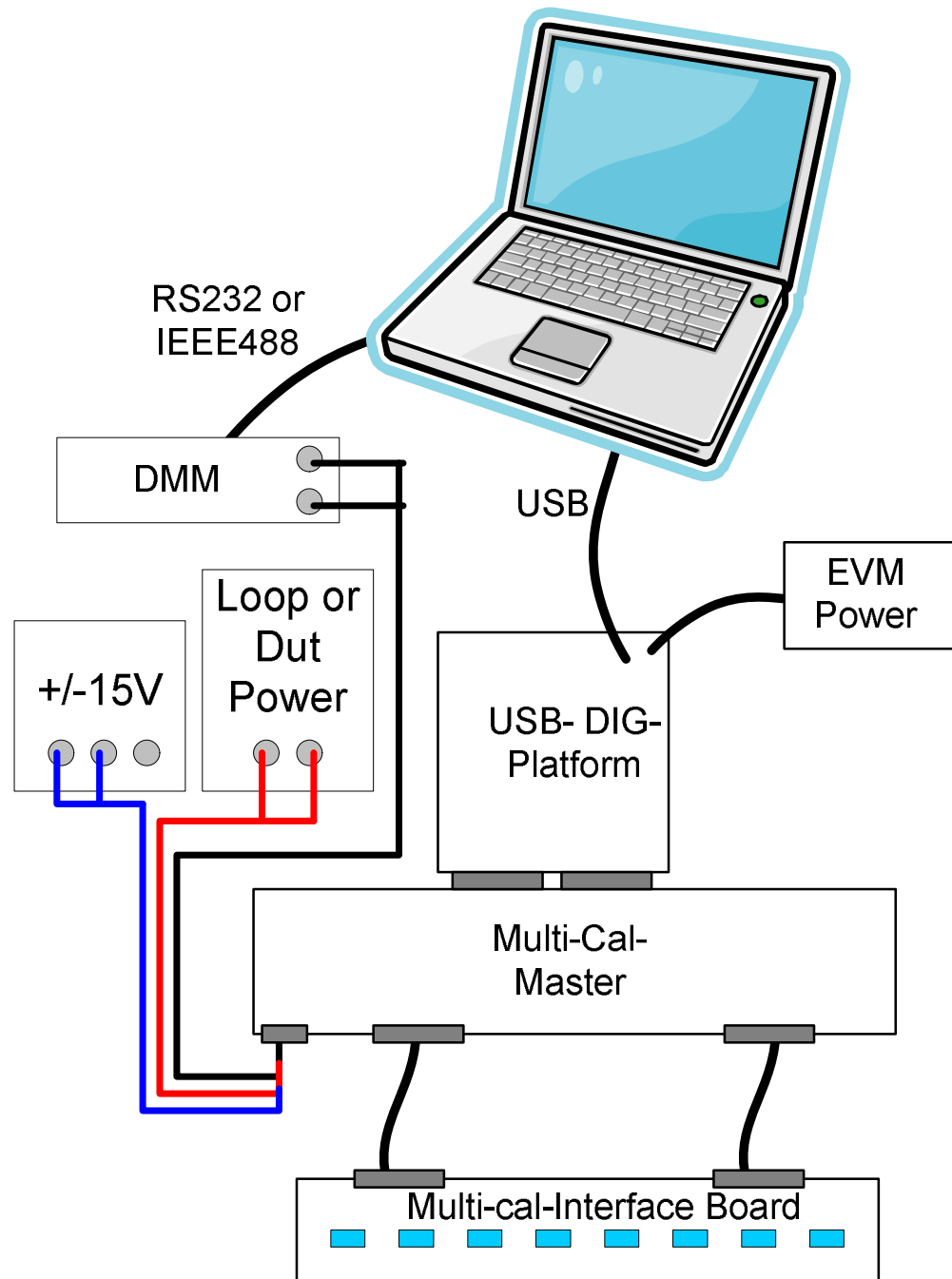
Disconnect Hardware	3min
Current Mode Test	3min
3 Wire Test	3min
4 Wire Test	3min
Re-connect Hardware	3min
Total	15min / board
Initial Setup	15min

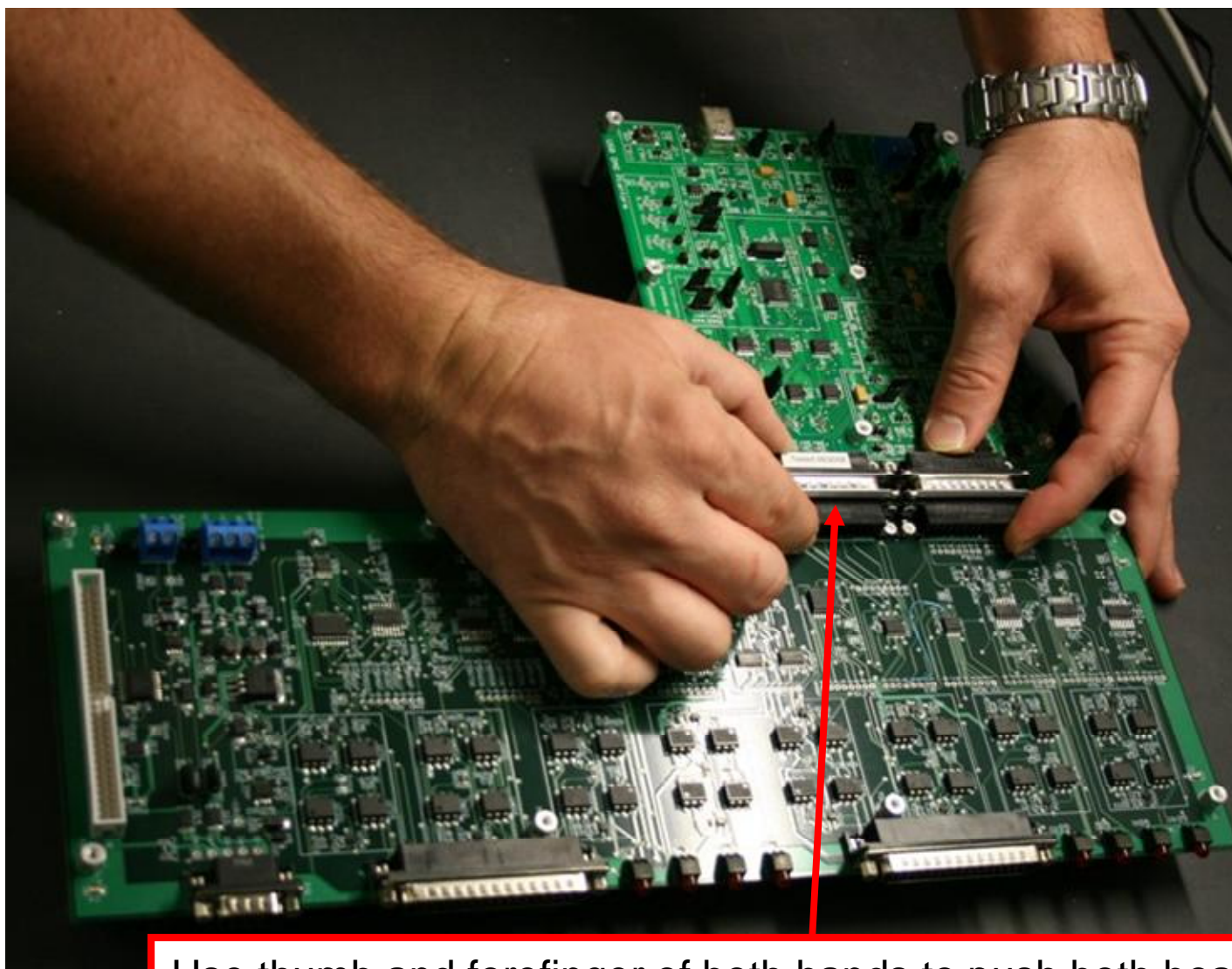
# Recommended Sequence

1. Set jumpers on all 8 test boards for current mode.
2. Connect Hardware for current mode.
3. Test all boards for current mode.
4. Troubleshoot failures. Send passing boards to step 5.
5. Set jumpers on all 8 test boards for 3 wire voltage mode.
6. Connect Hardware for 3 wire voltage mode.
7. Test all boards for 3 wire voltage mode.
8. Troubleshoot failures. Send passing boards to step 9.
9. Set jumpers on all 8 test boards for 4 wire voltage mode.
10. Connect Hardware for 4 wire voltage mode.
11. Test all boards for 4 wire voltage mode.
12. Place label on and ship all passing boards.

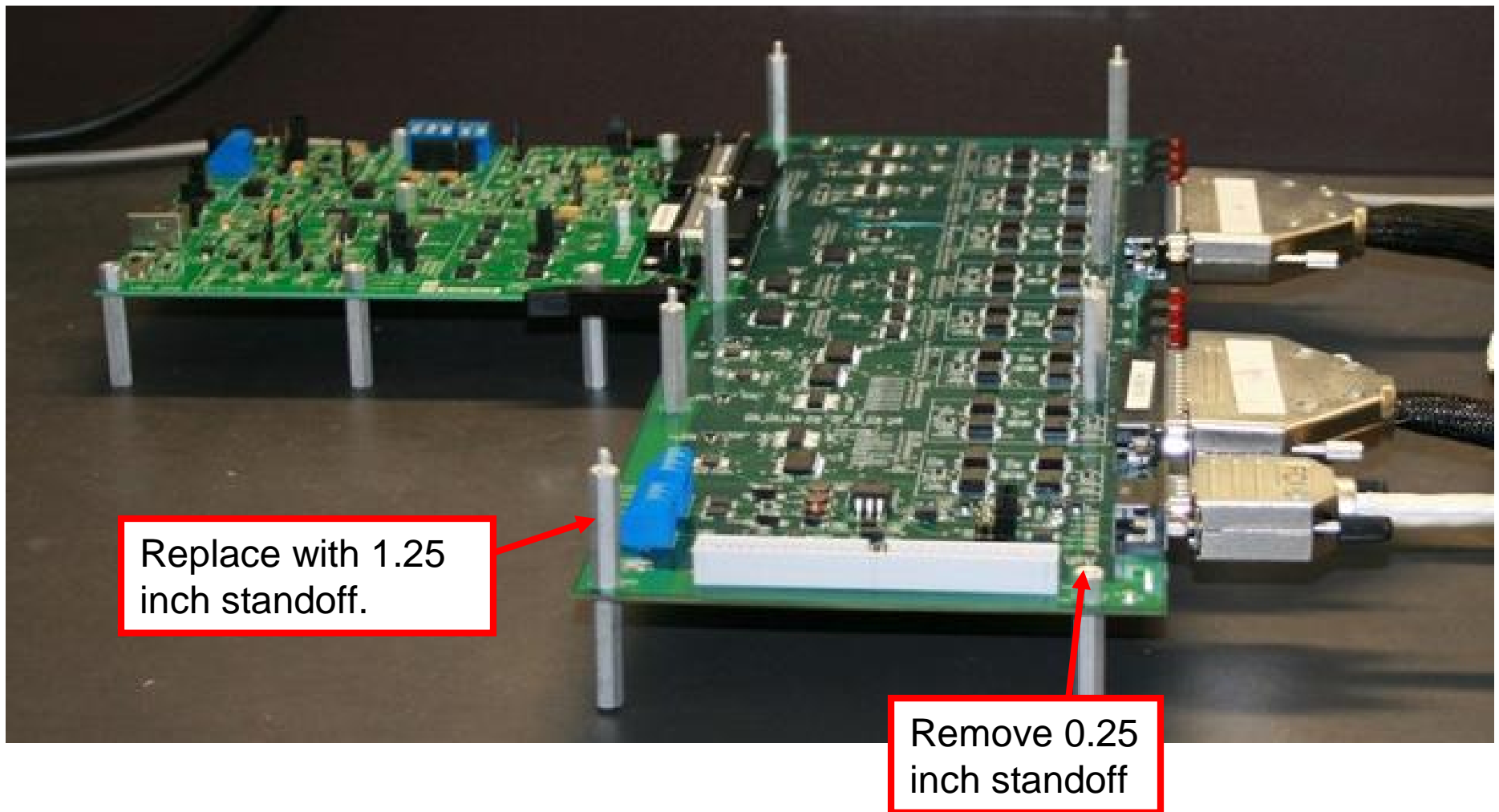
**Install The  
Software**

# Current Mode Hardware Setup

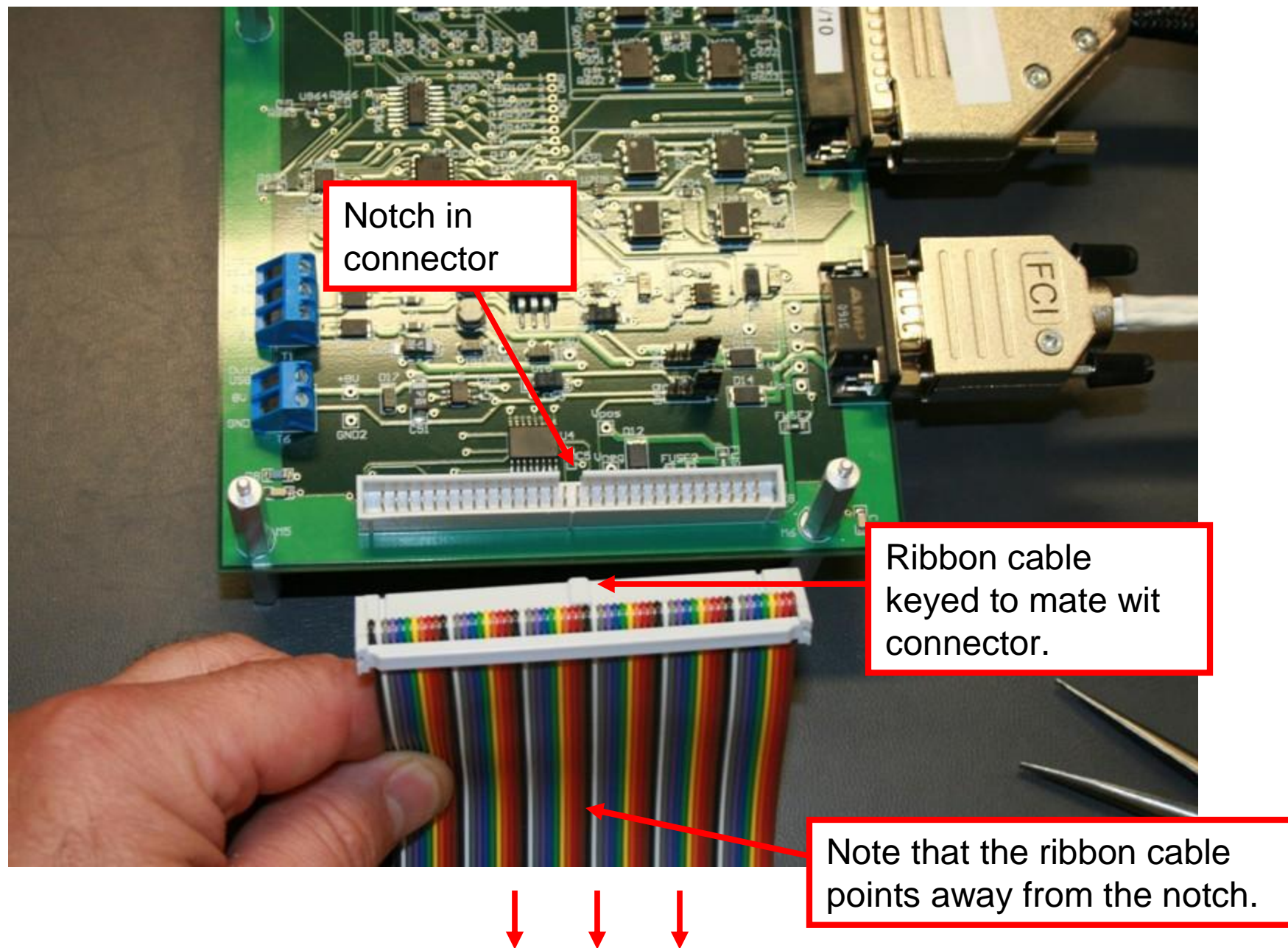




Use thumb and forefinger of both hands to push both boards together. Make sure the connectors are fully together.





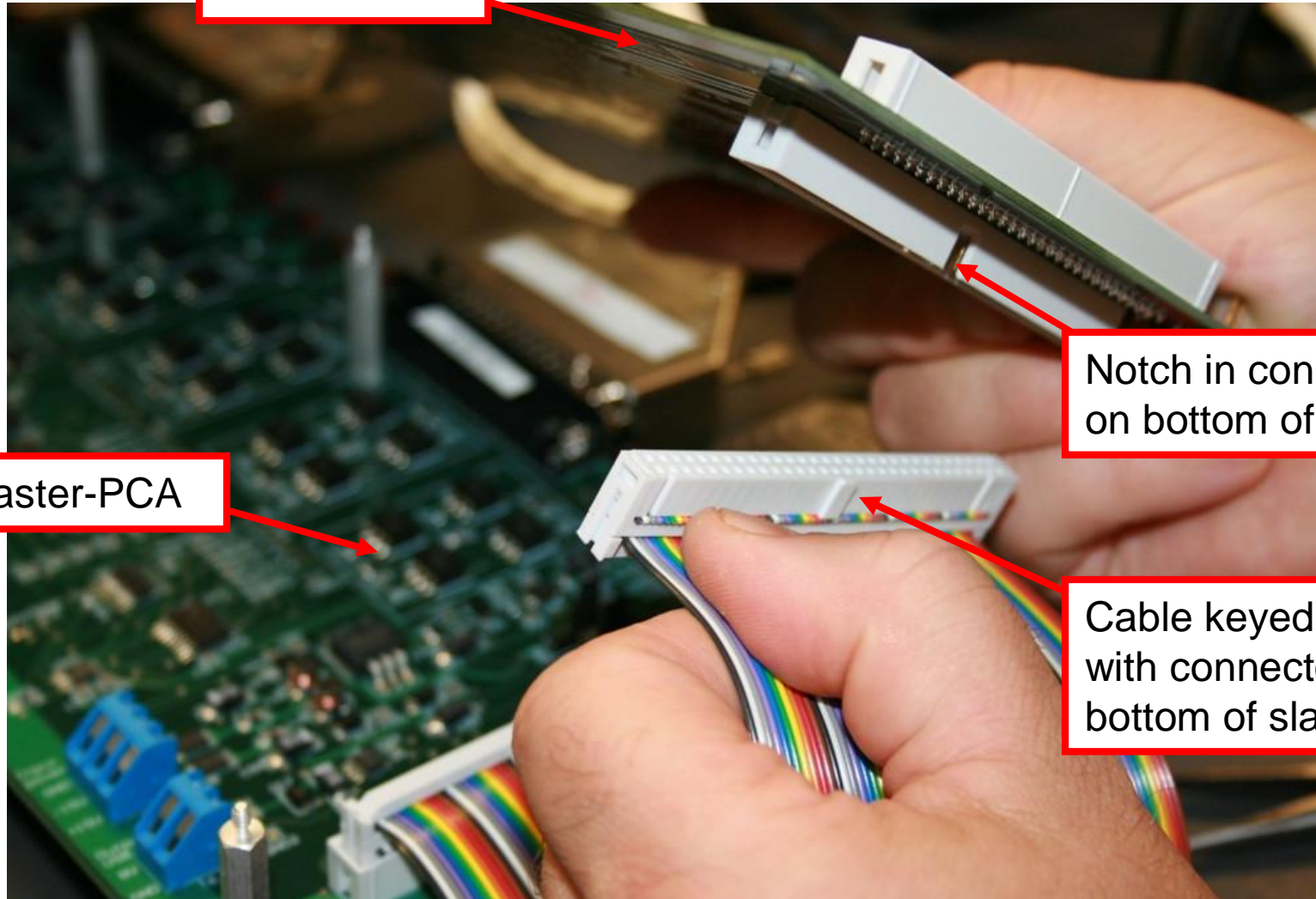


Slave-PCA

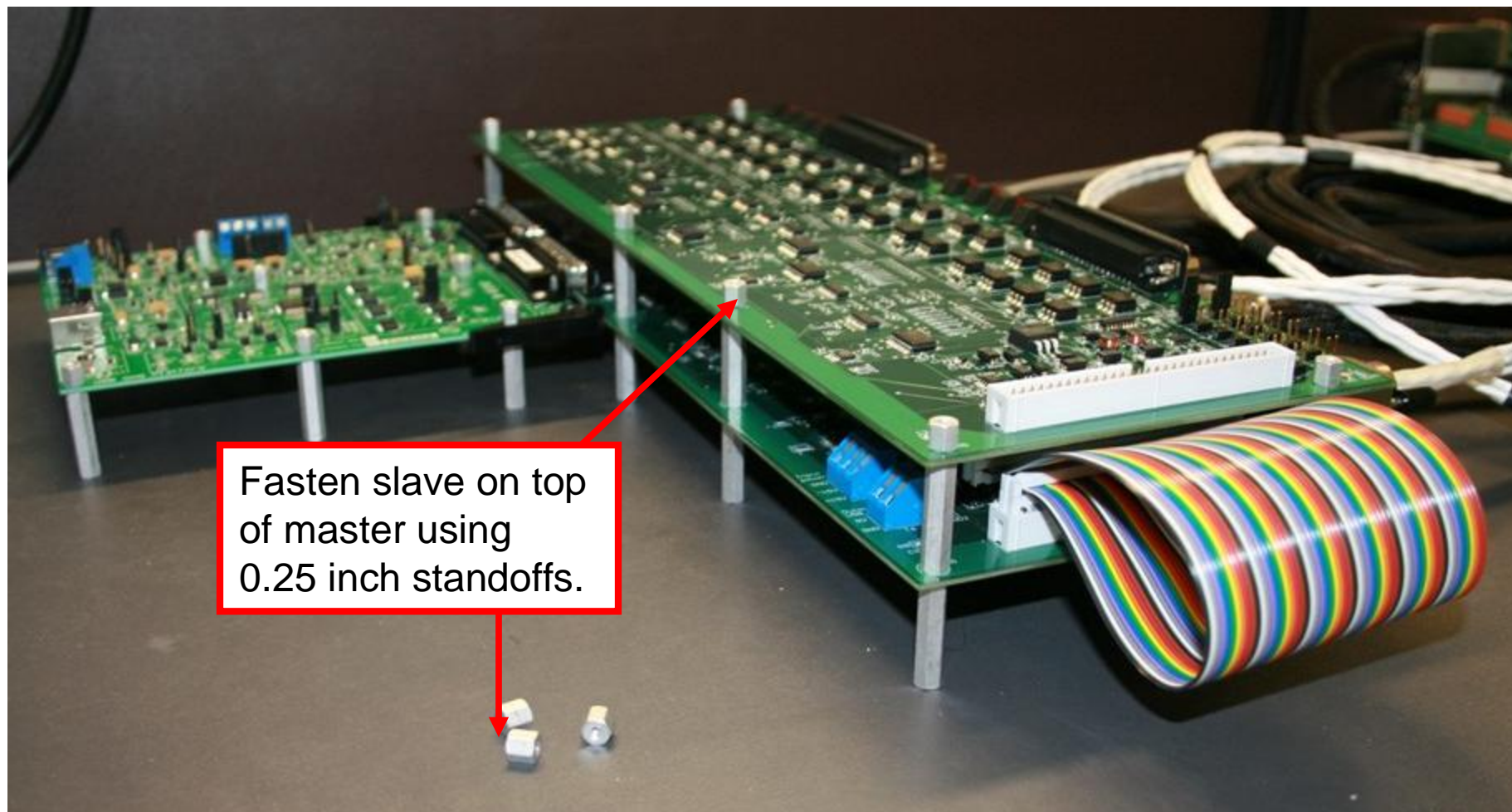
Notch in connector  
on bottom of slave.

Master-PCA

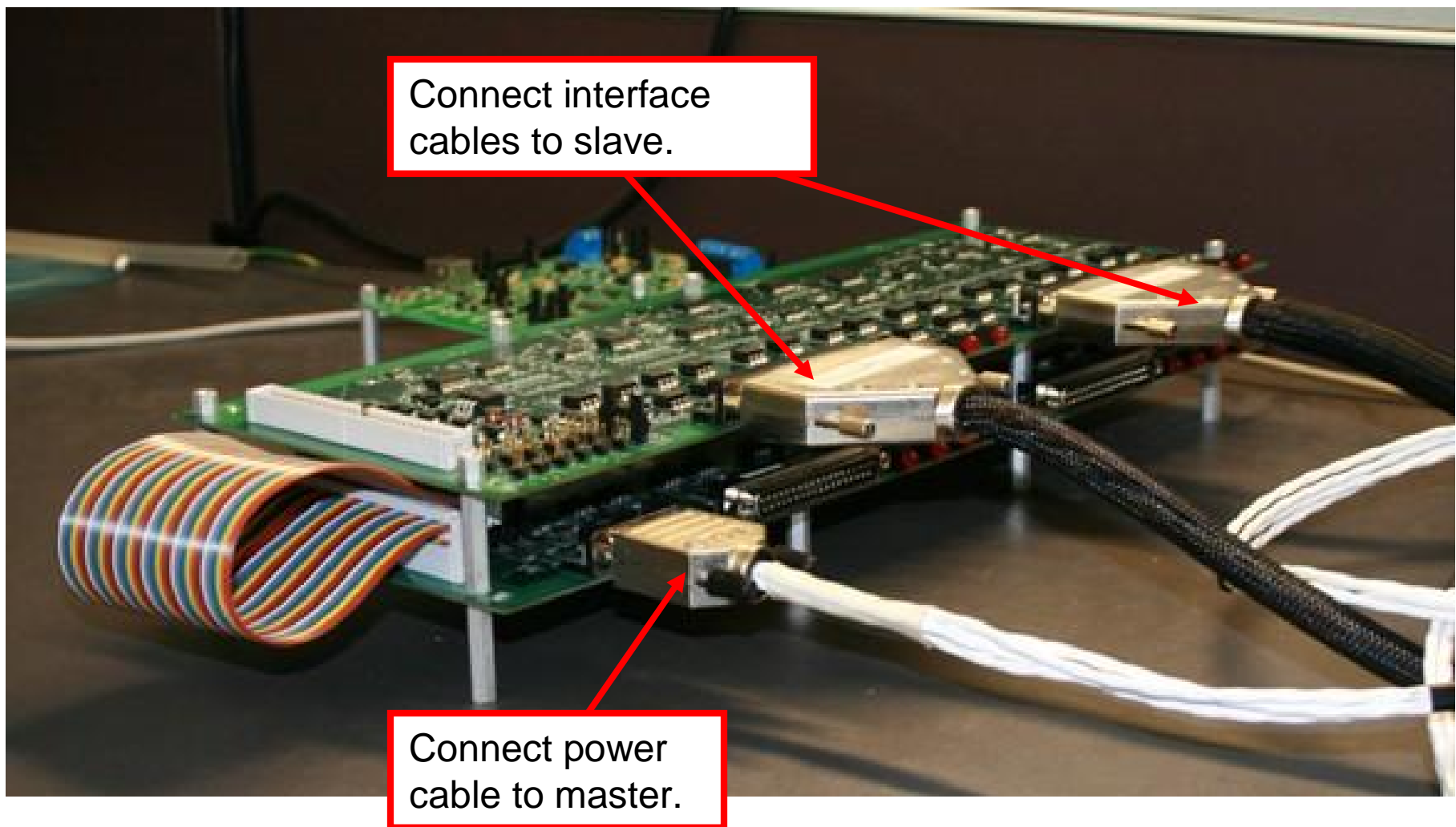
Cable keyed to mate  
with connector on  
bottom of slave.



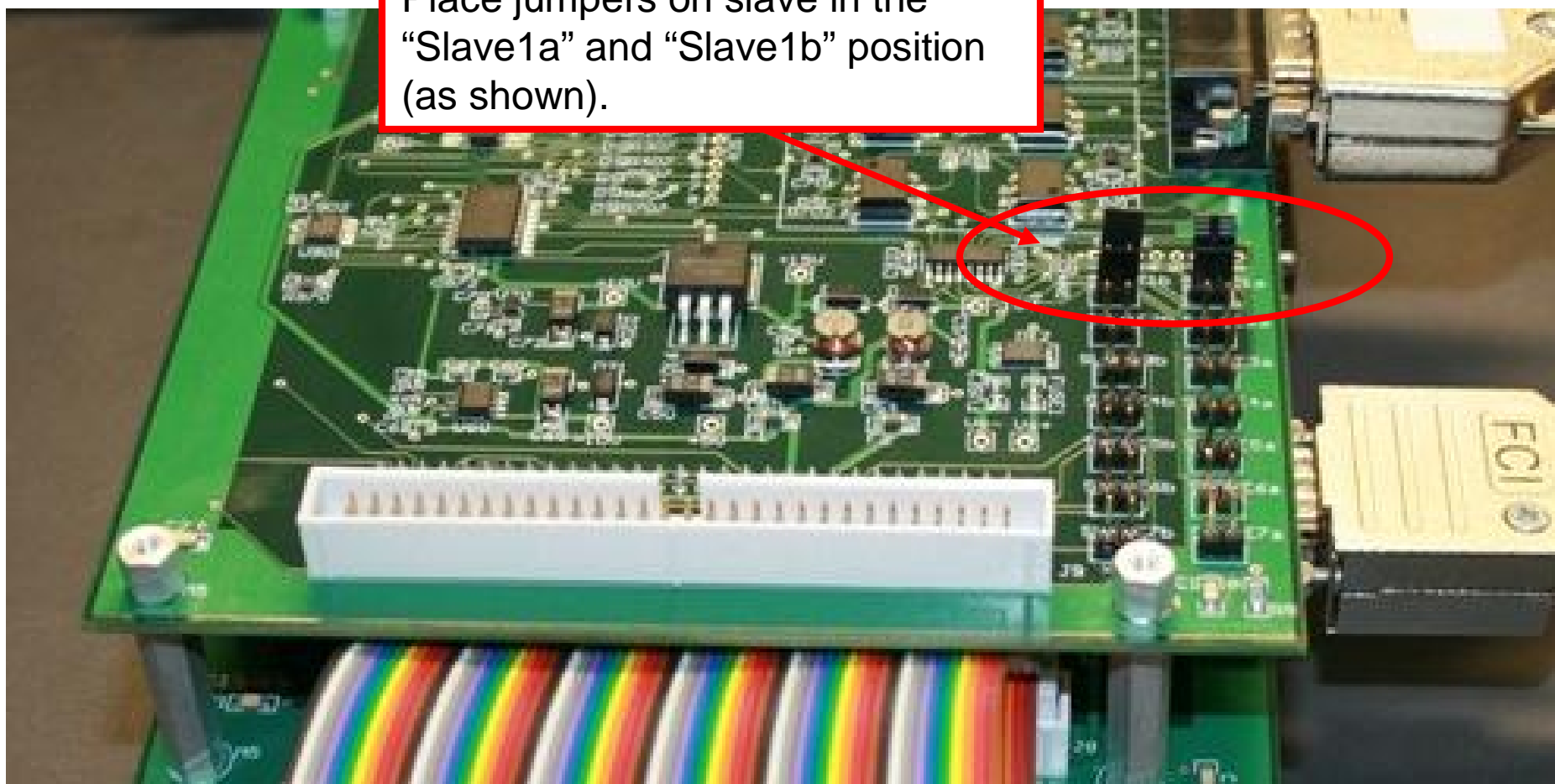


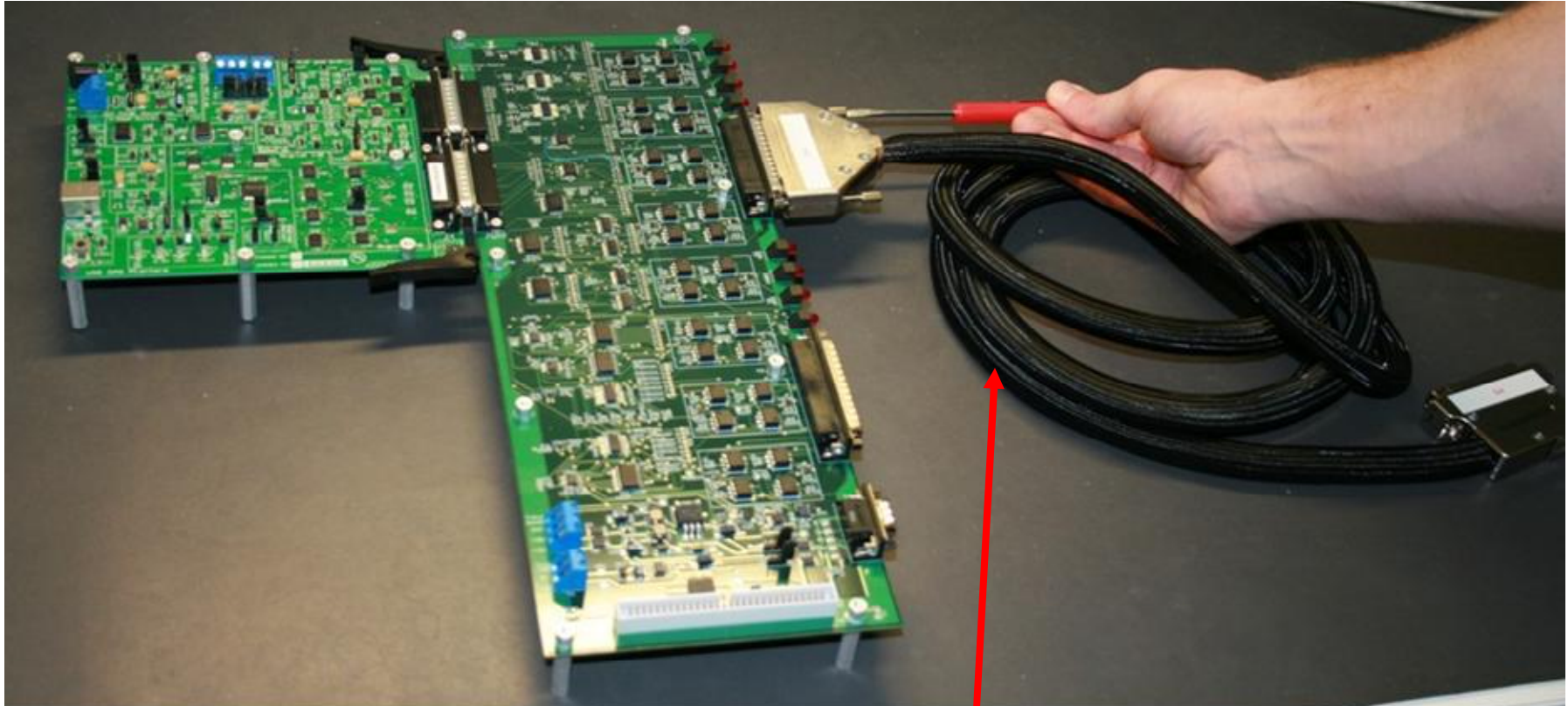


Fasten slave on top  
of master using  
0.25 inch standoffs.



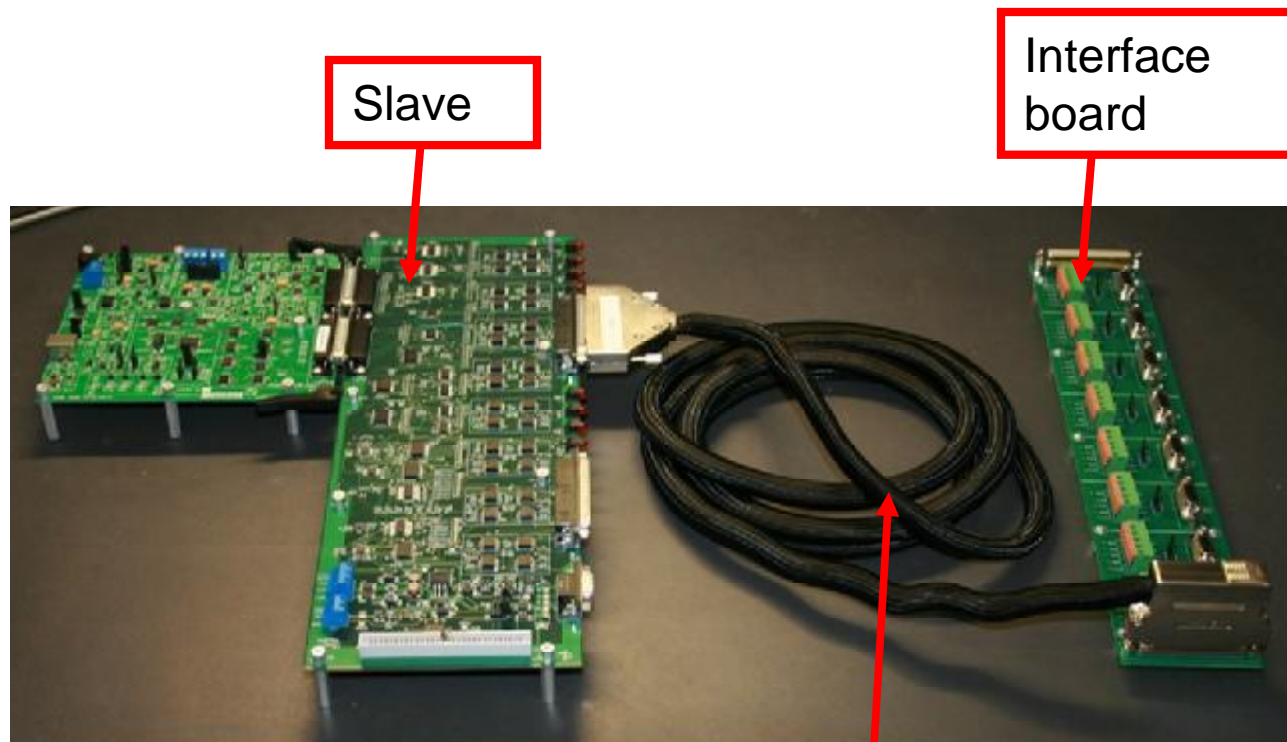
Place jumpers on slave in the  
“Slave1a” and “Slave1b” position  
(as shown).





Connect Interface-Cables to the multi-cal master. Make sure that the connect is not seated crooked. Make sure thumb screws are fully tightened.

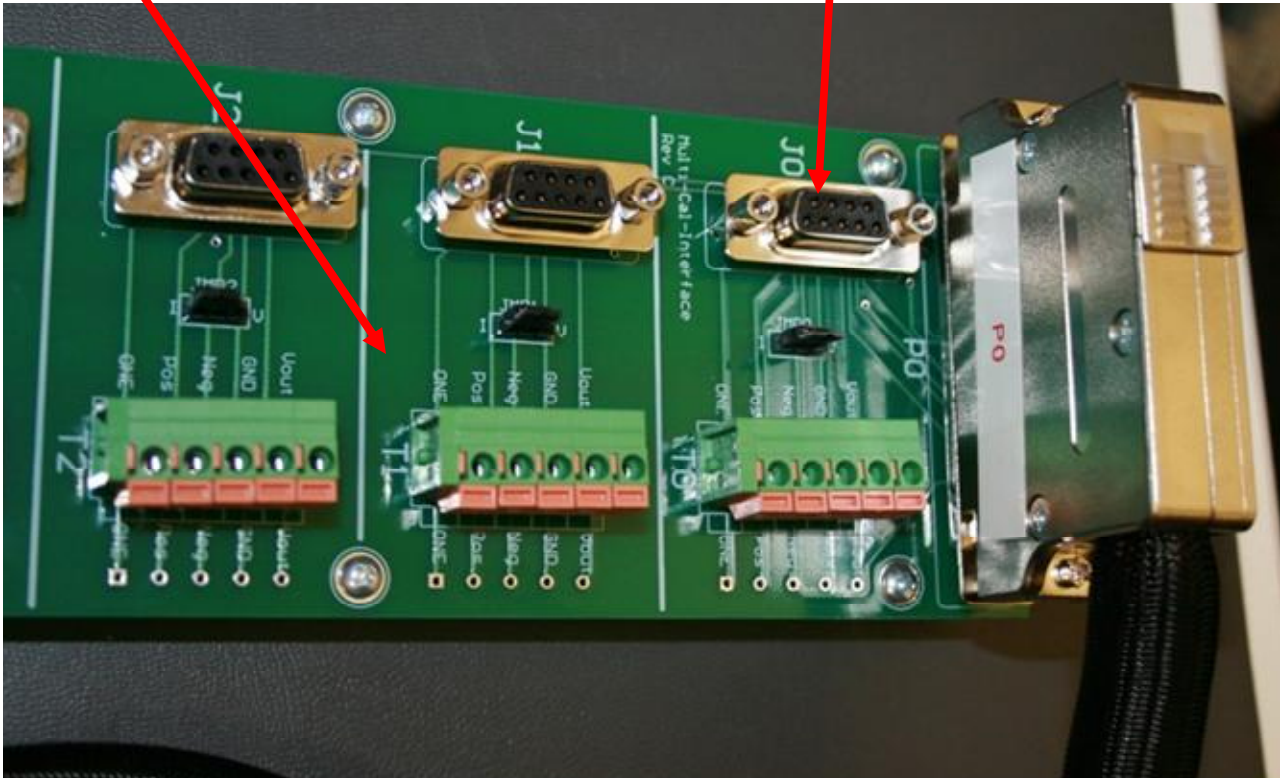




Make sure that J0 of the Master board connects to P0 of the interface board.  
Follow the same procedure for J1 and P1.

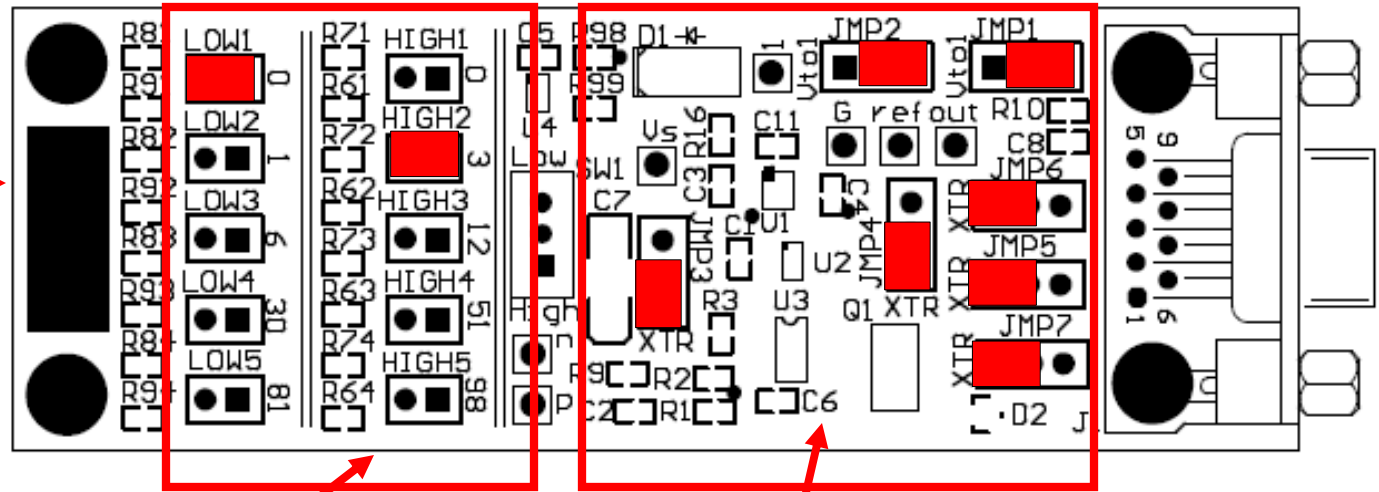
Interface  
Boards

Connect Test  
boards here





Set jumpers on Test board

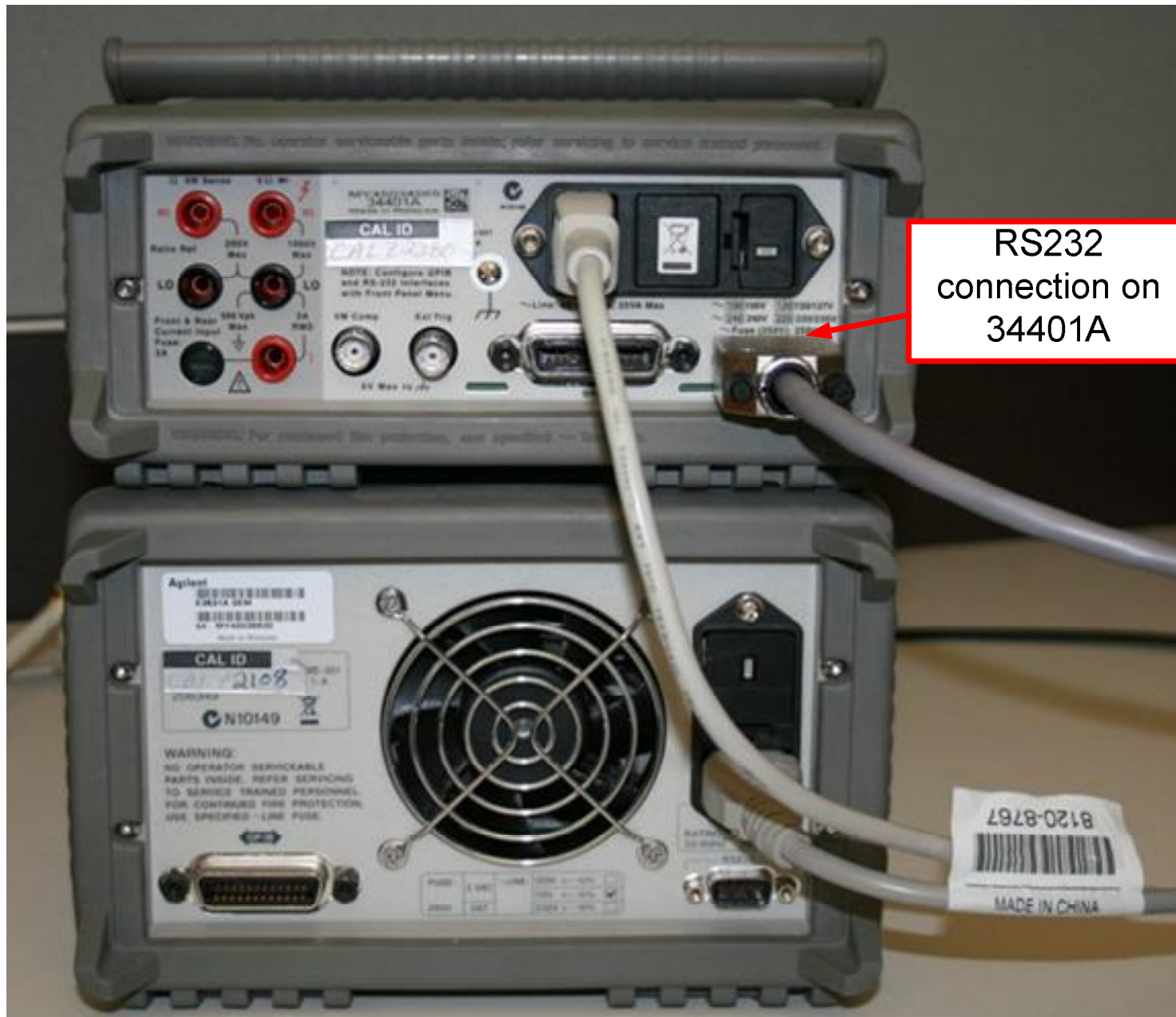


Interface Board Channel	Jumper Positions for sensor emulator
0	As shown above LOW1 (0mV), HIGH2 (3mV)
1	LOW2 (1mV), HIGH3 (12mV)
2	LOW3 (6mV), HIGH4 (51mV)
3	LOW4 (30mV), HIGH5 (98mV)
4	LOW5 (81mV), HIGH4 (51mV)
5	LOW4 (30mV), HIGH3 (12mV)
6	LOW3 (6mV), HIGH2 (3mV)
7	LOW2 (1mV), HIGH1 (0mV)

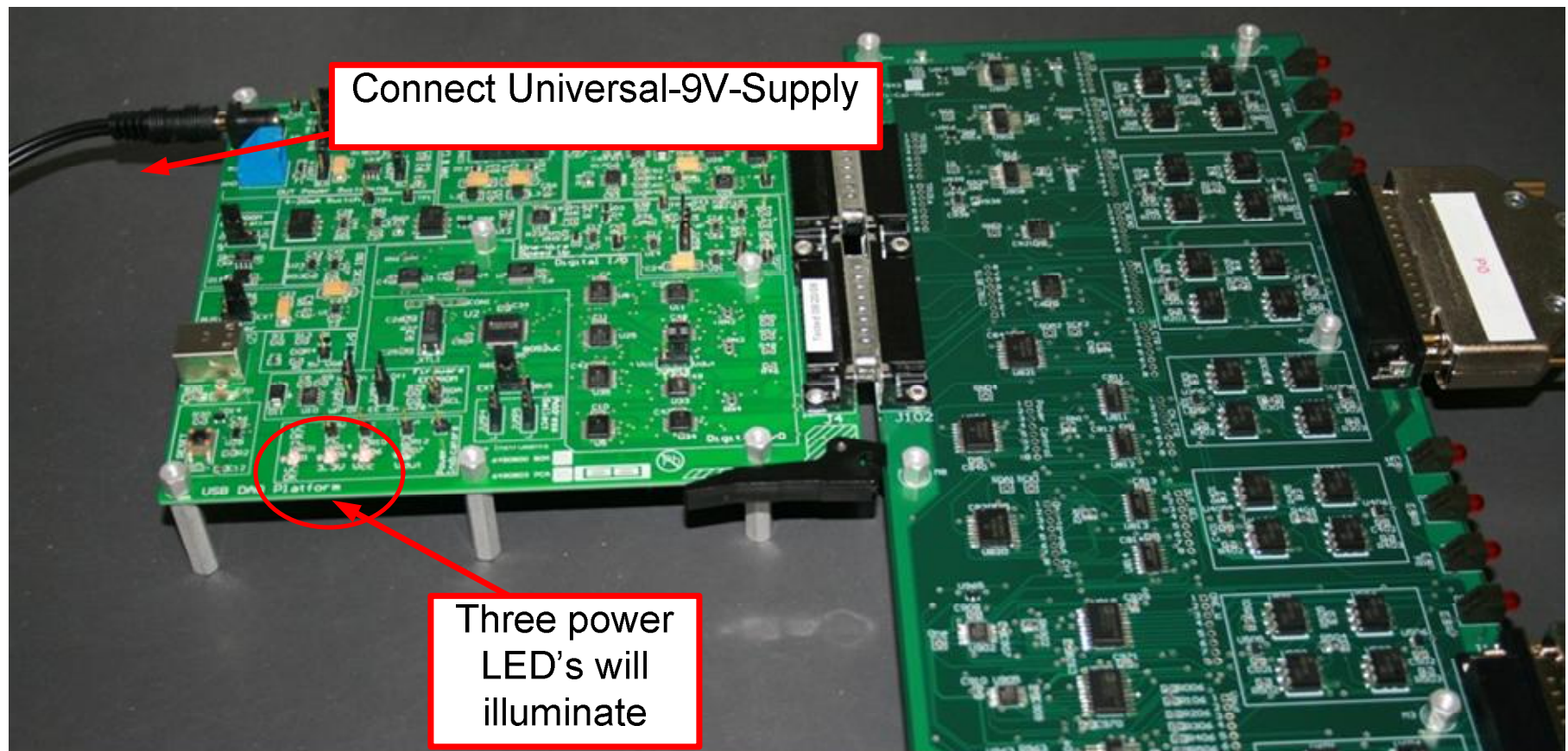
Mode	Jumper Positions for Mode
Current Output	JMP1 = Position without label JMP2 = Position without label JMP3 = XTR JMP4 = XTR JMP5 = XTR JMP6 = XTR JMP7 = XTR

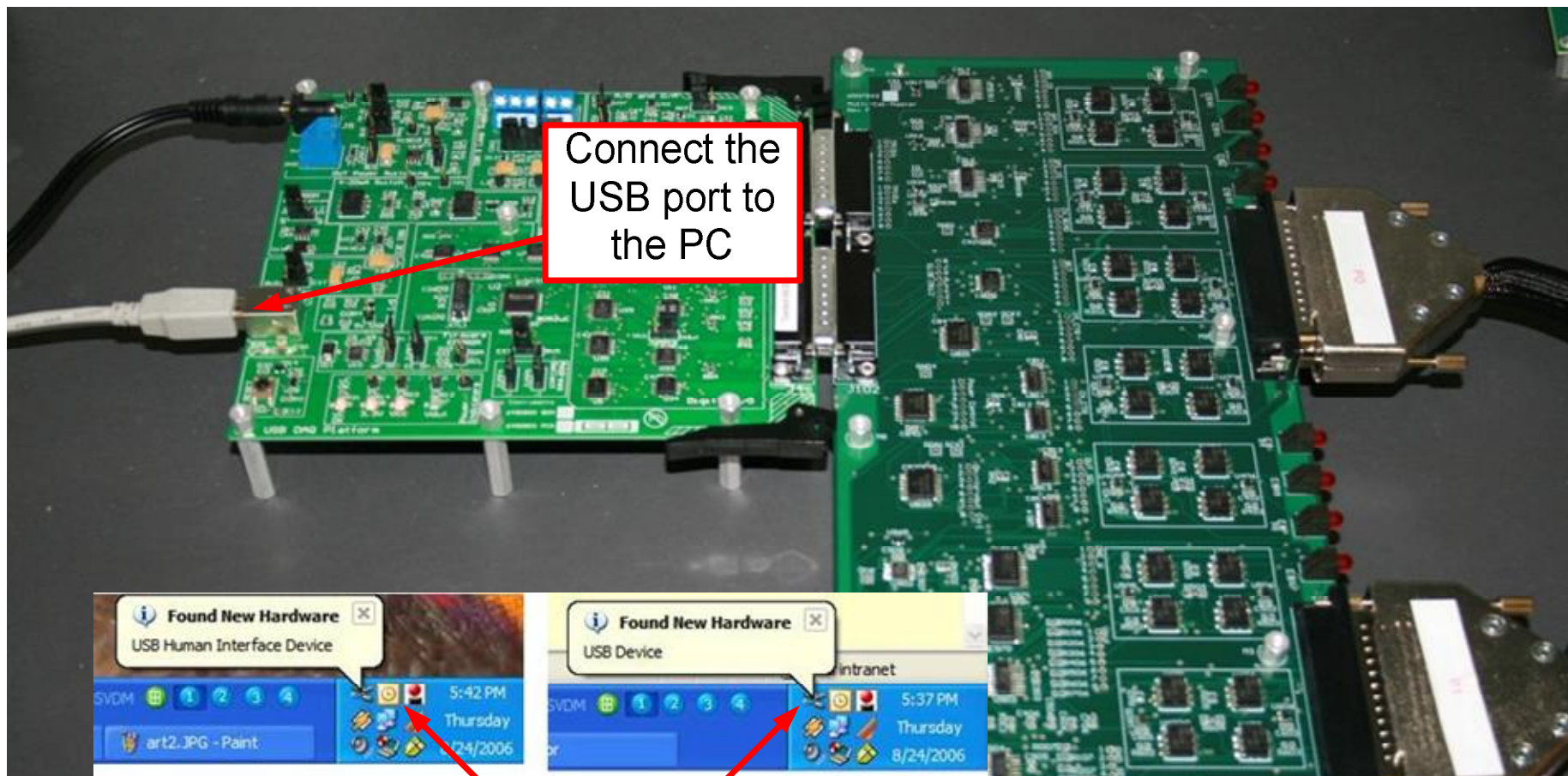
Label the test boards according to the channel they will test. Each test board has unique jumper settings for HIGH1 – HIGH5, and LOW1 – LOW5. Each test board has the same settings on JUMP1 – JUMP7. See previous slide for jumper settings.





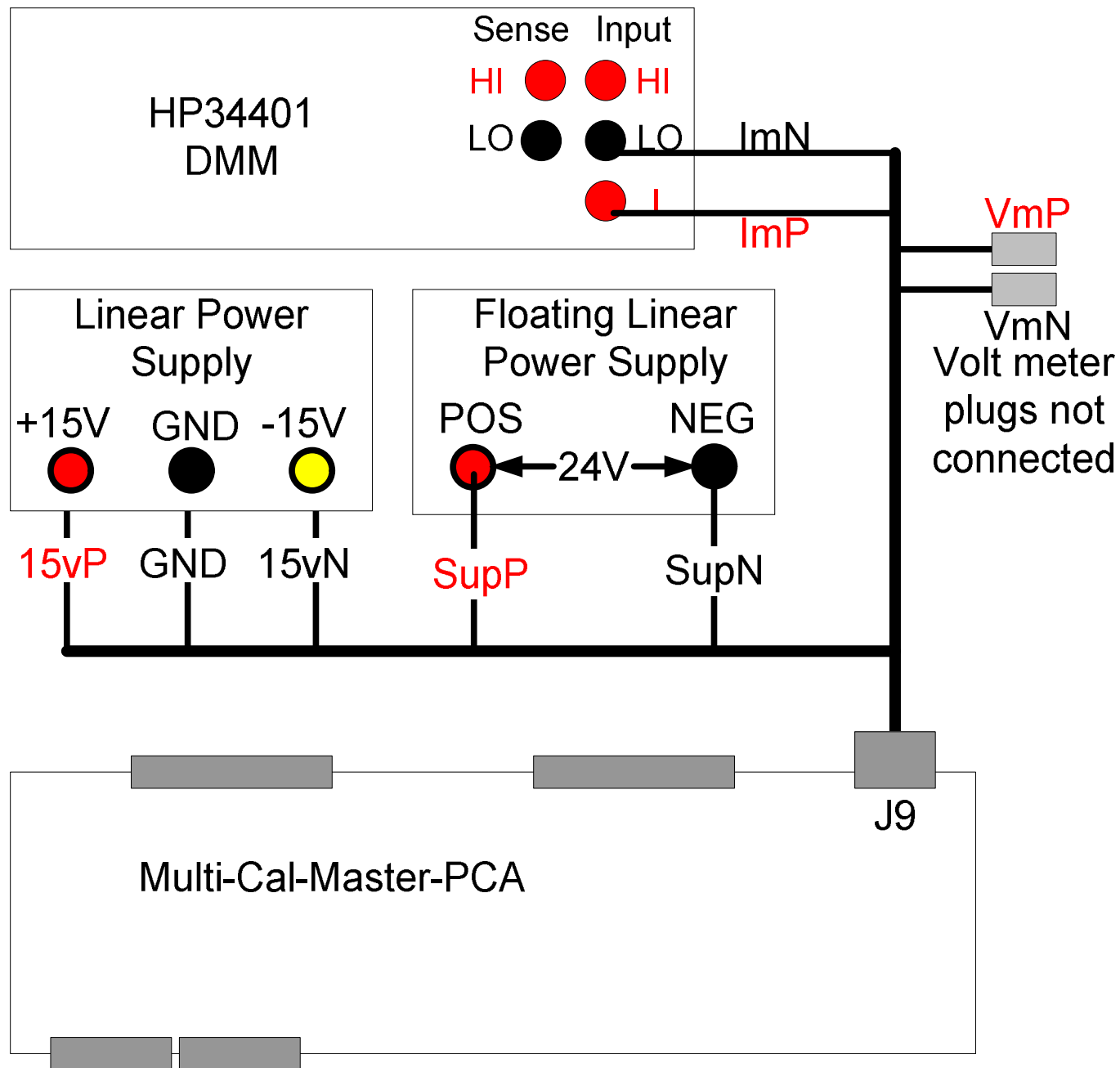




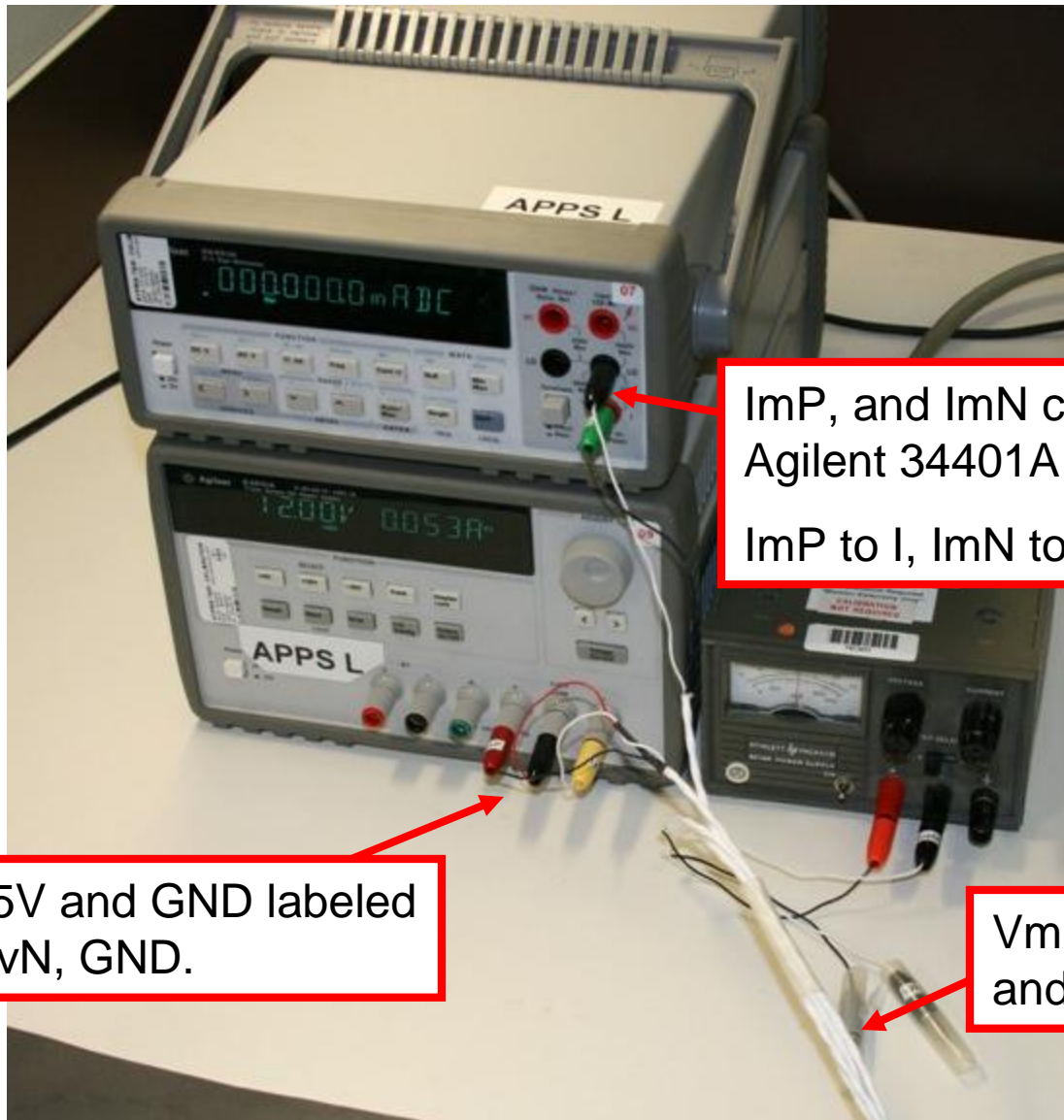


Connect the  
USB port to  
the PC

The computer may respond  
with the following messages







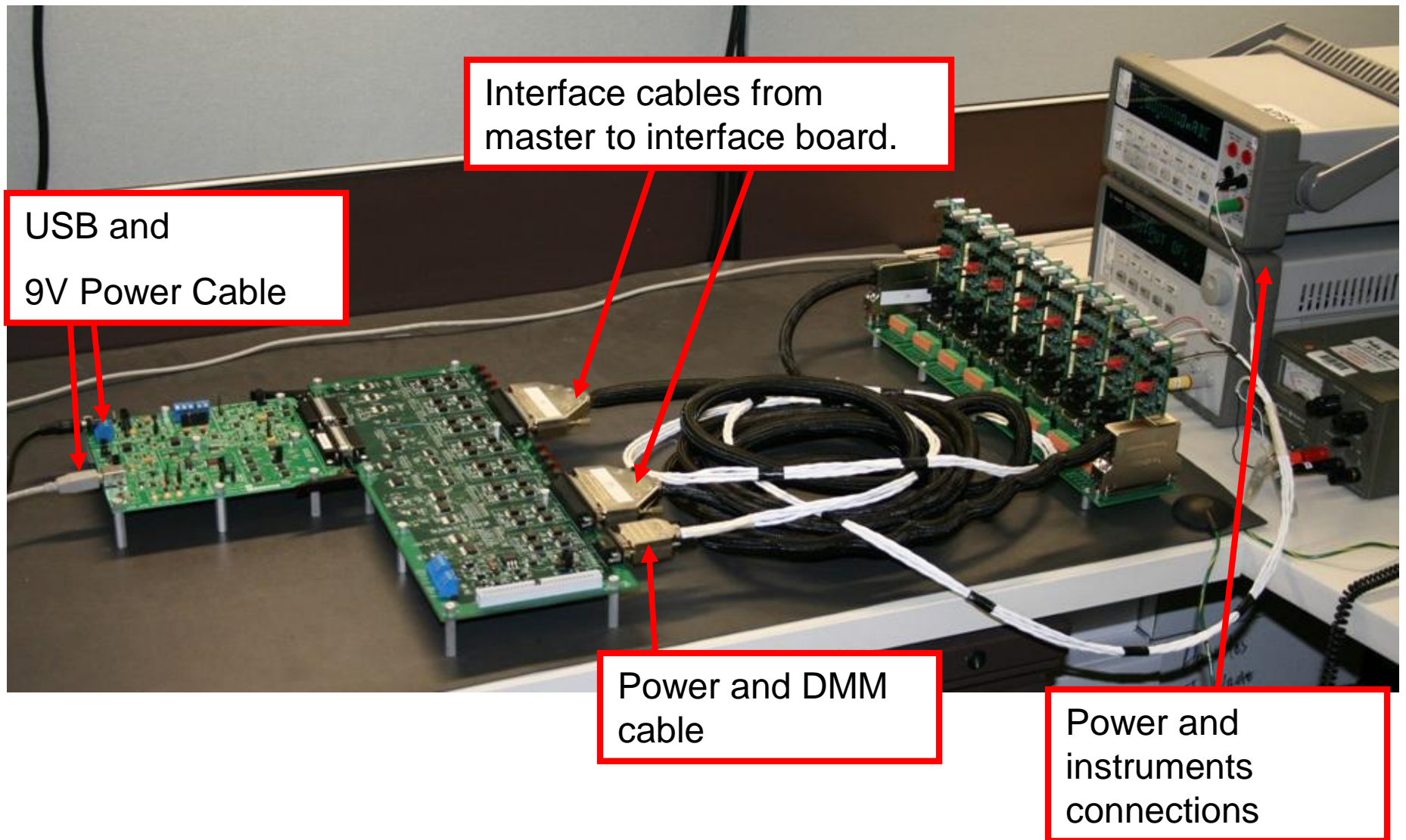
ImP, and ImN connected to  
Agilent 34401A

ImP to I, ImN to LO

+15V, -15V and GND labeled  
15vP, 15vN, GND.

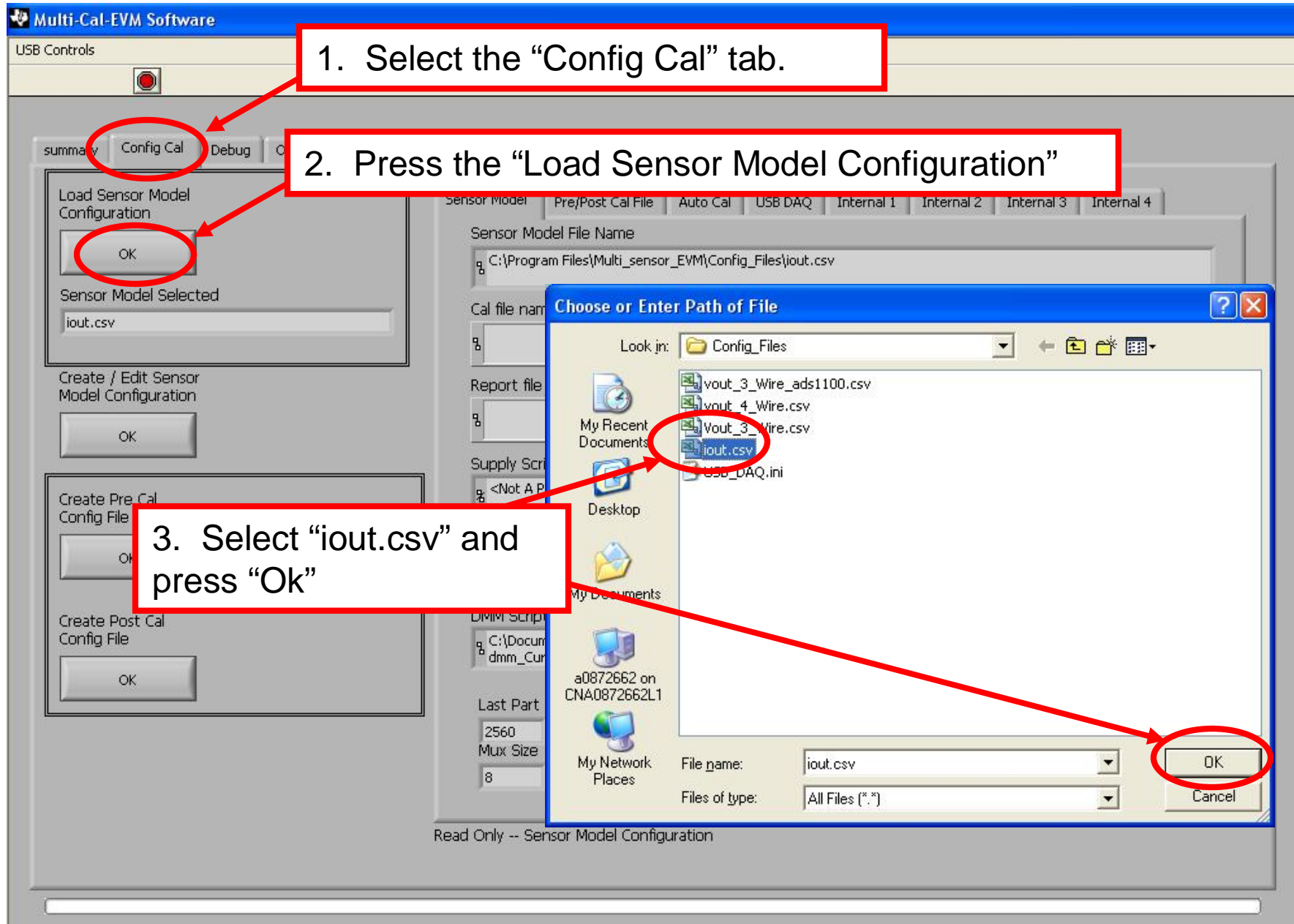
VmP, and VmN insulated  
and not connected.

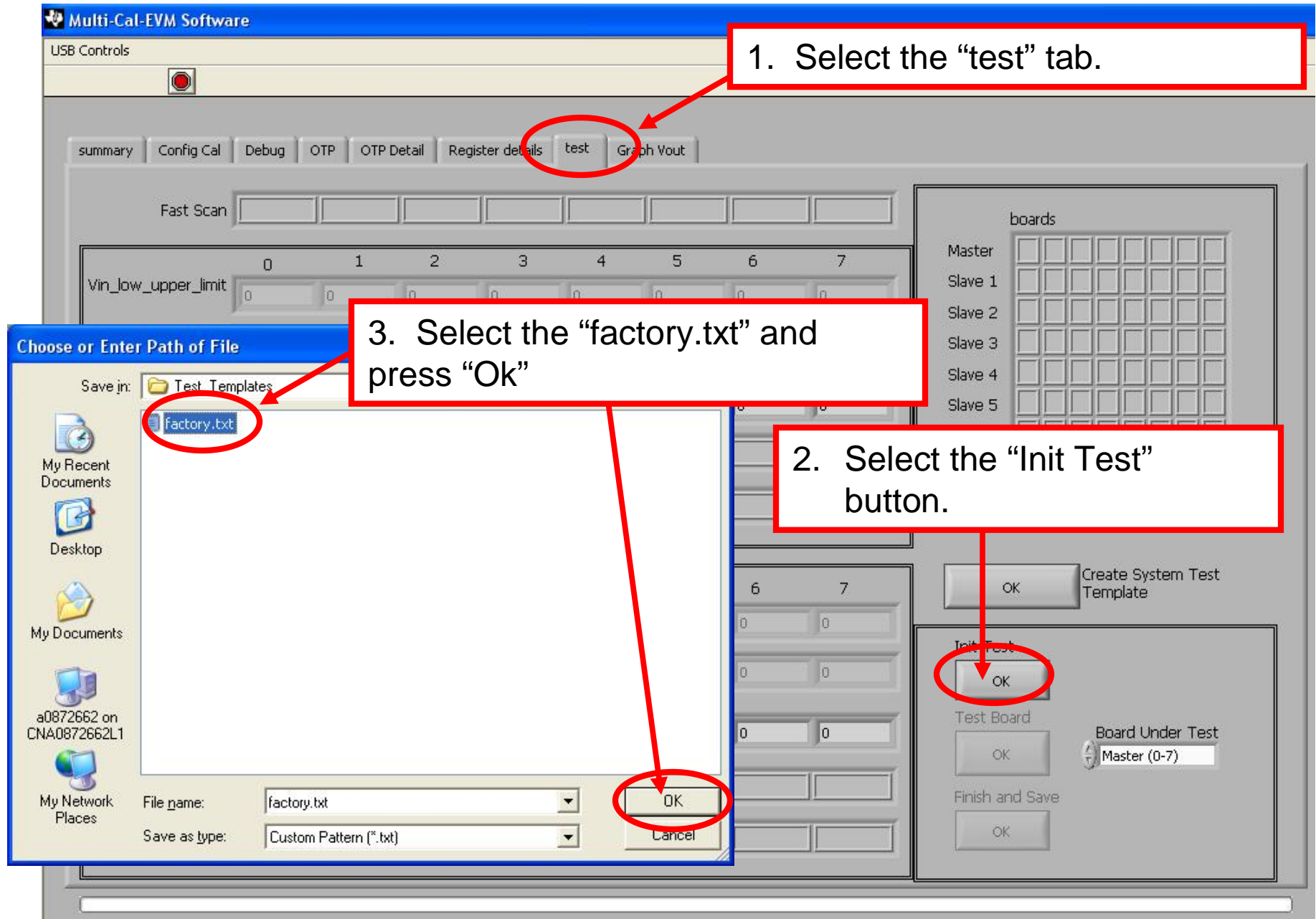
# Final Connections.

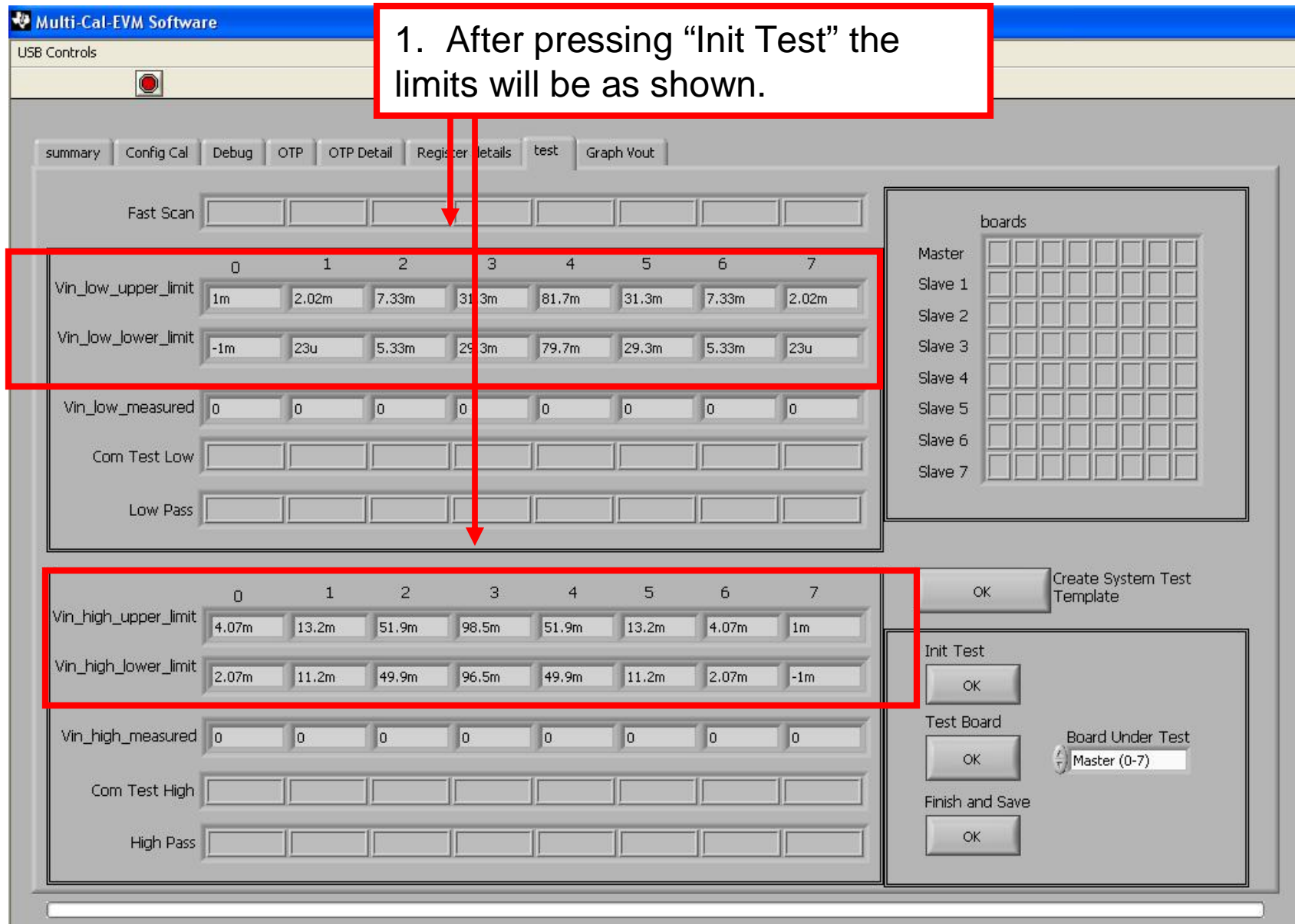


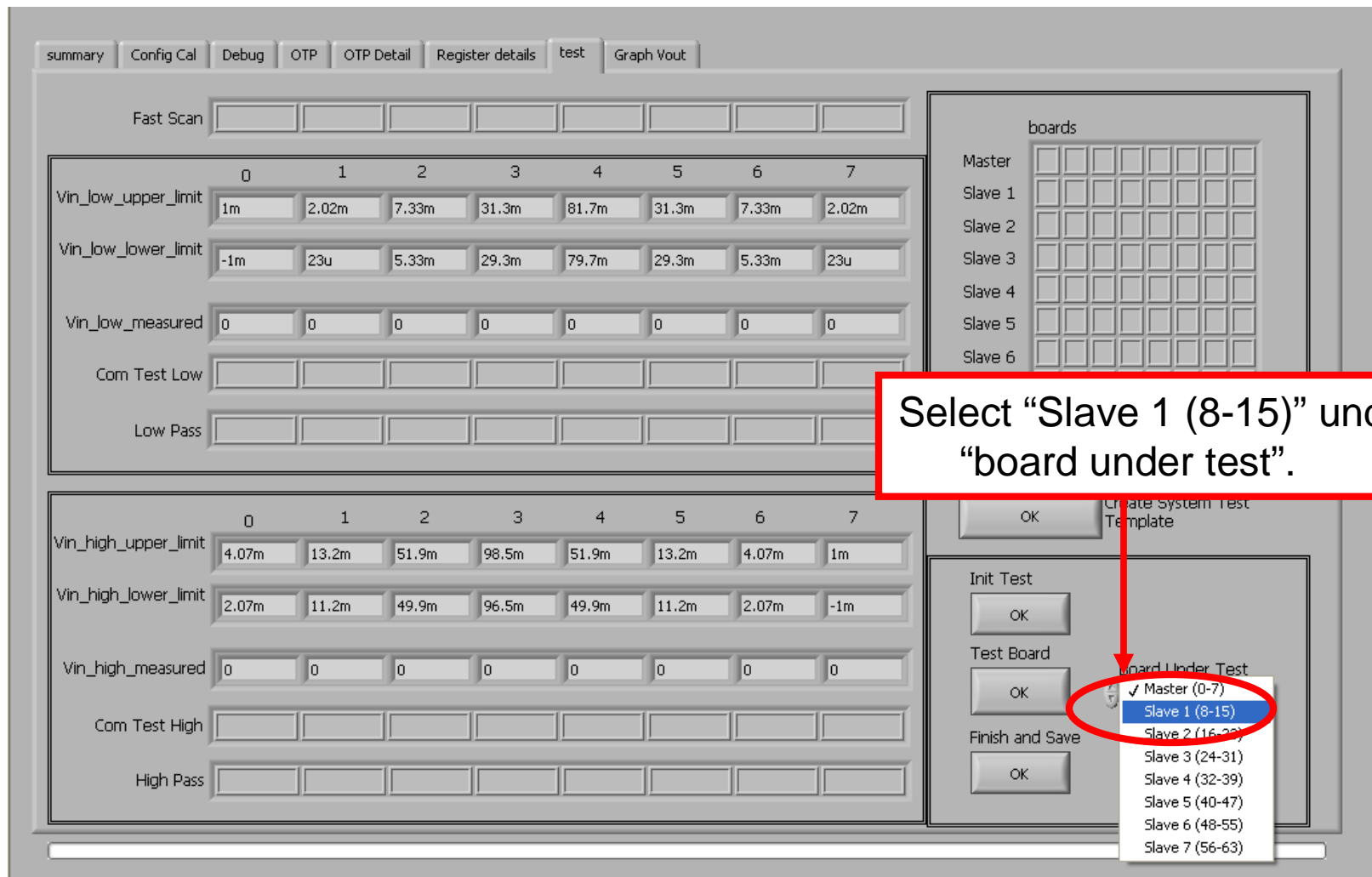


**Run the  
current Mode  
Test**











2. The "Fast Scan" test will start. Passing units will be shown in green. Failures in red.

summary Config Cal Debug OTP OTP Detail Register details test Graph Vout

Fast Scan



	0	1	2	3	4	5	6	7
Vin_low_upper_limit	1m	2.02m	7.33m	31.3m	81.7m	31.3m	7.33m	2.02m
Vin_low_lower_limit	-1m	23u	5.33m	29.3m	79.7m	29.3m	5.33m	23u
Vin_low_measured	0	0	0	0	0	0	0	0
Com Test Low								
Low Pass								

boards

Master									
Slave 1									
Slave 2									
Slave 3									
Slave 4									
Slave 5									
Slave 6									
Slave 7									

1. Press "Test Board"

	0	1	2	3	4	5	6	7
Vin_high_upper_limit	4.07m	13.2m	51.9m	98.5m	51.9m	13.2m	4.07m	1m
Vin_high_lower_limit	2.07m	11.2m	49.9m	96.5m	49.9m	11.2m	2.07m	-1m
Vin_high_measured	0	0	0	0	0	0	0	0
Com Test High								
High Pass								

OK Create System Test Template

Init Test

OK

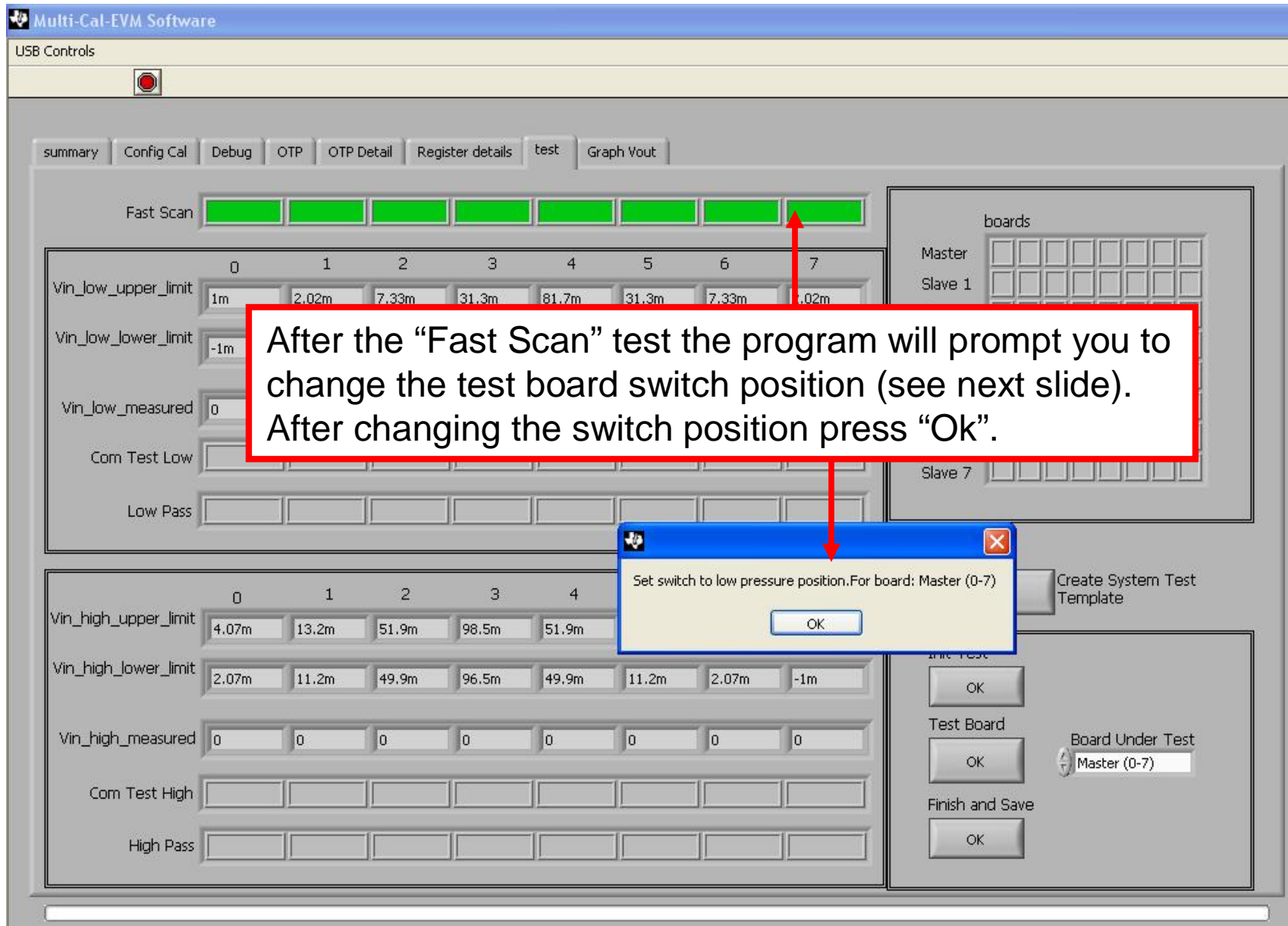
Test Board

OK

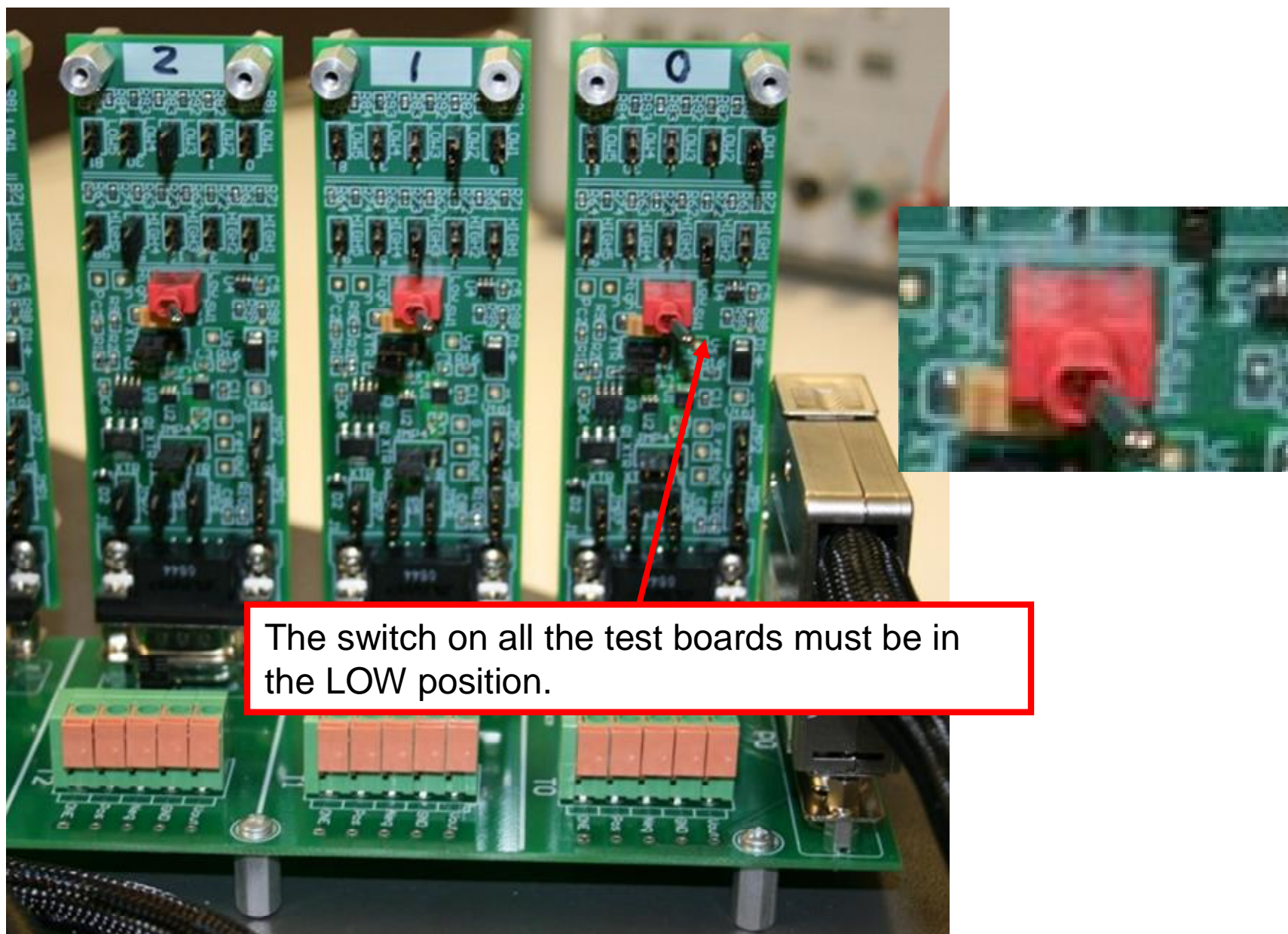
Board Under Test  
Master (0-7)

Finish and Save

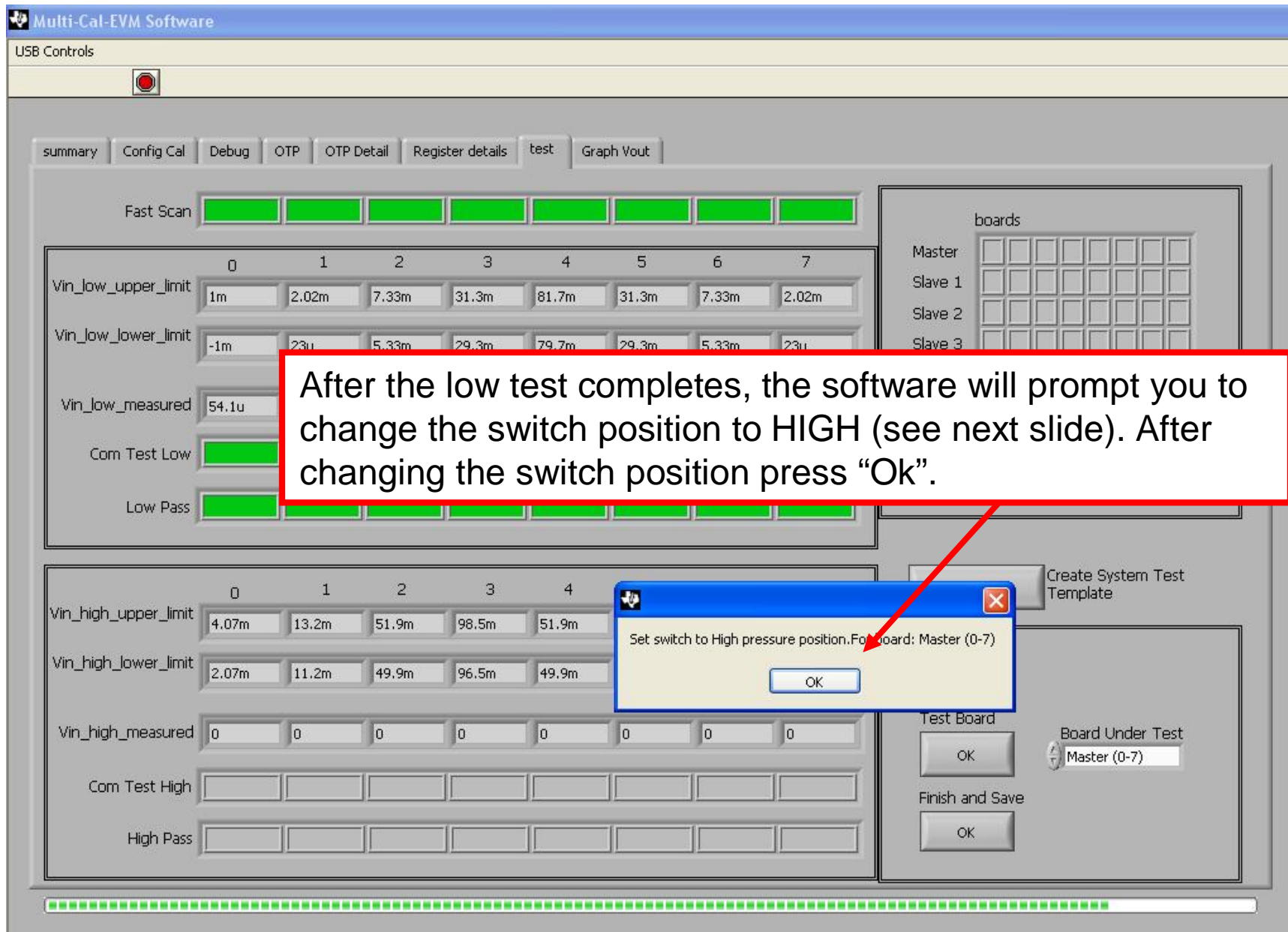
OK

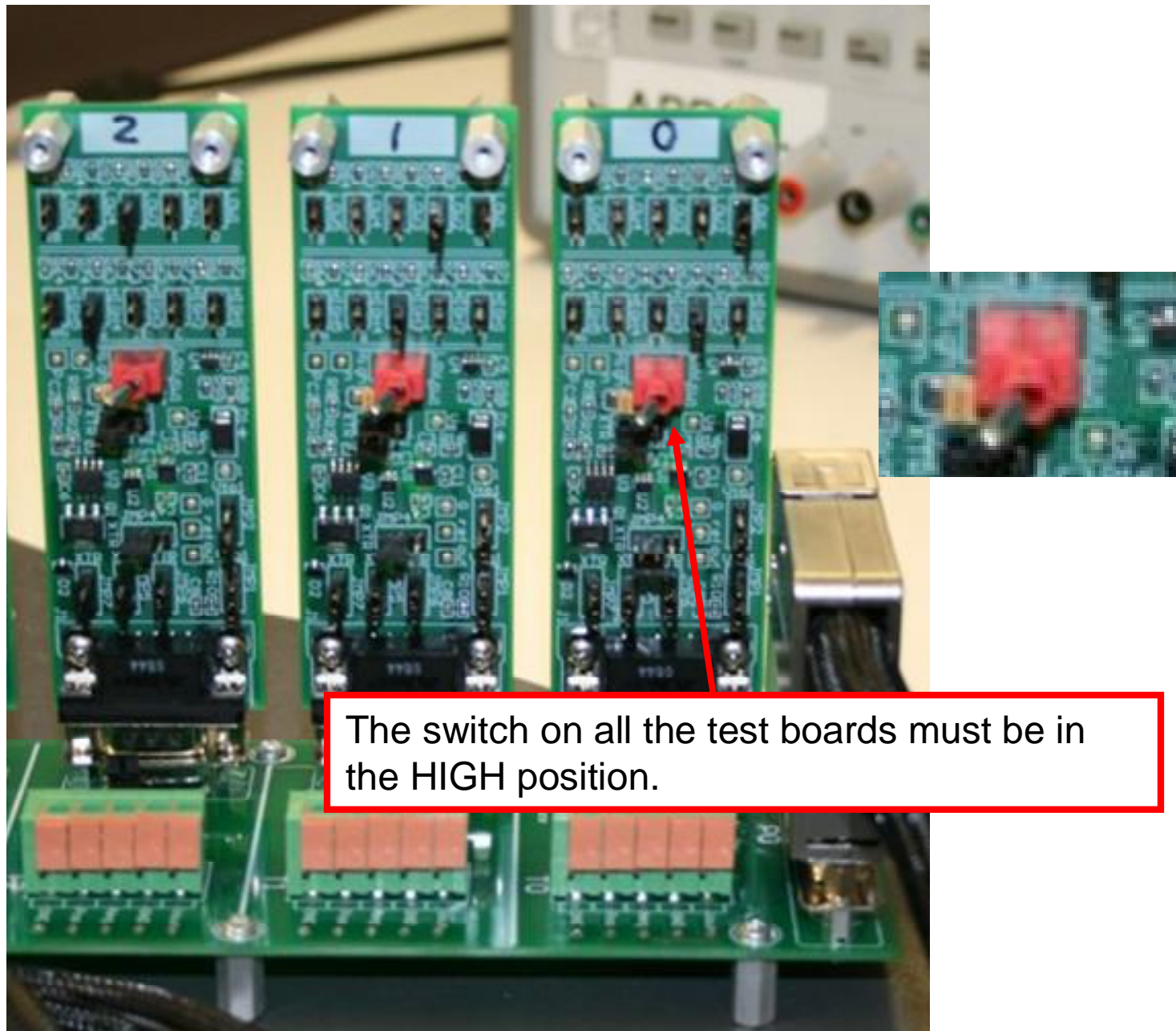




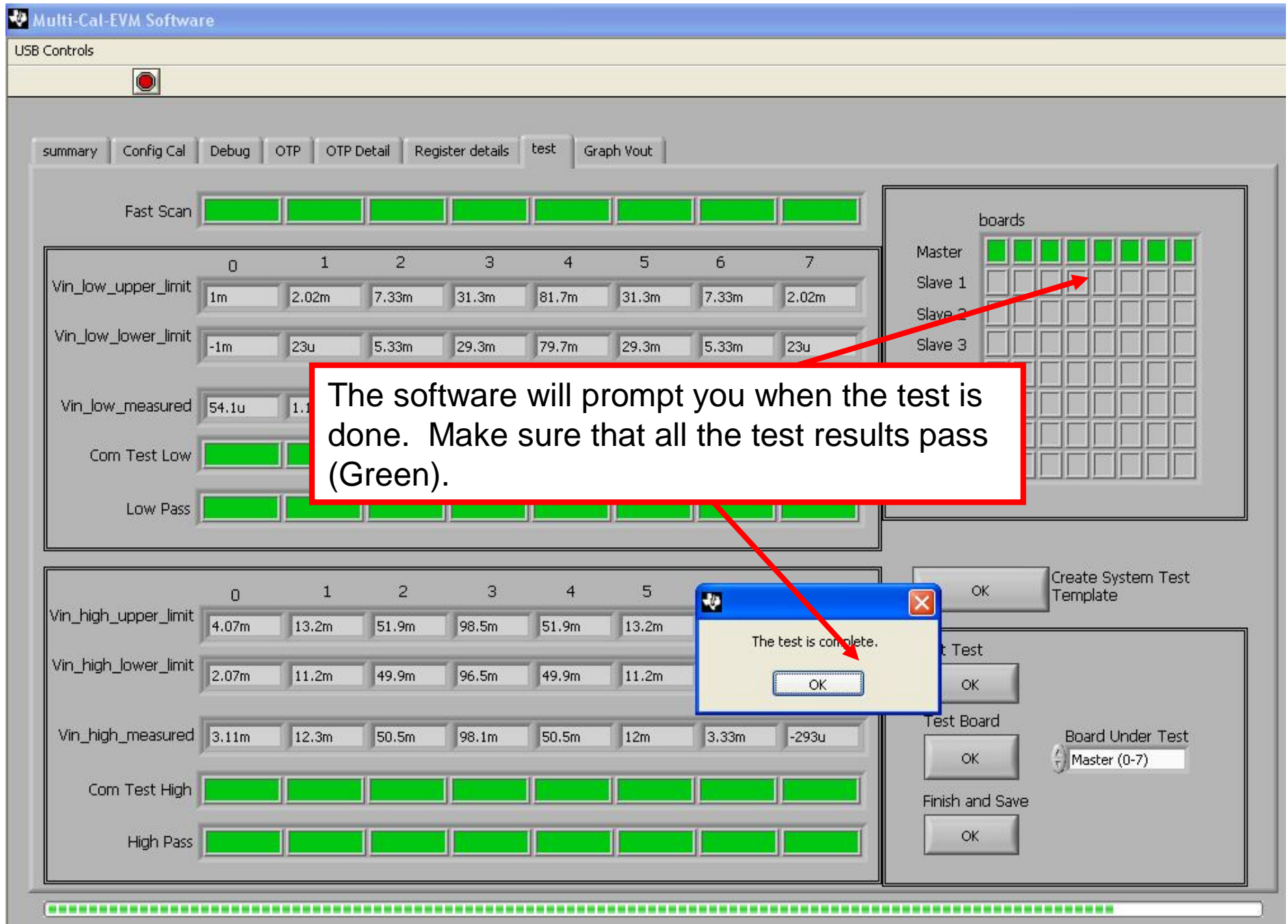


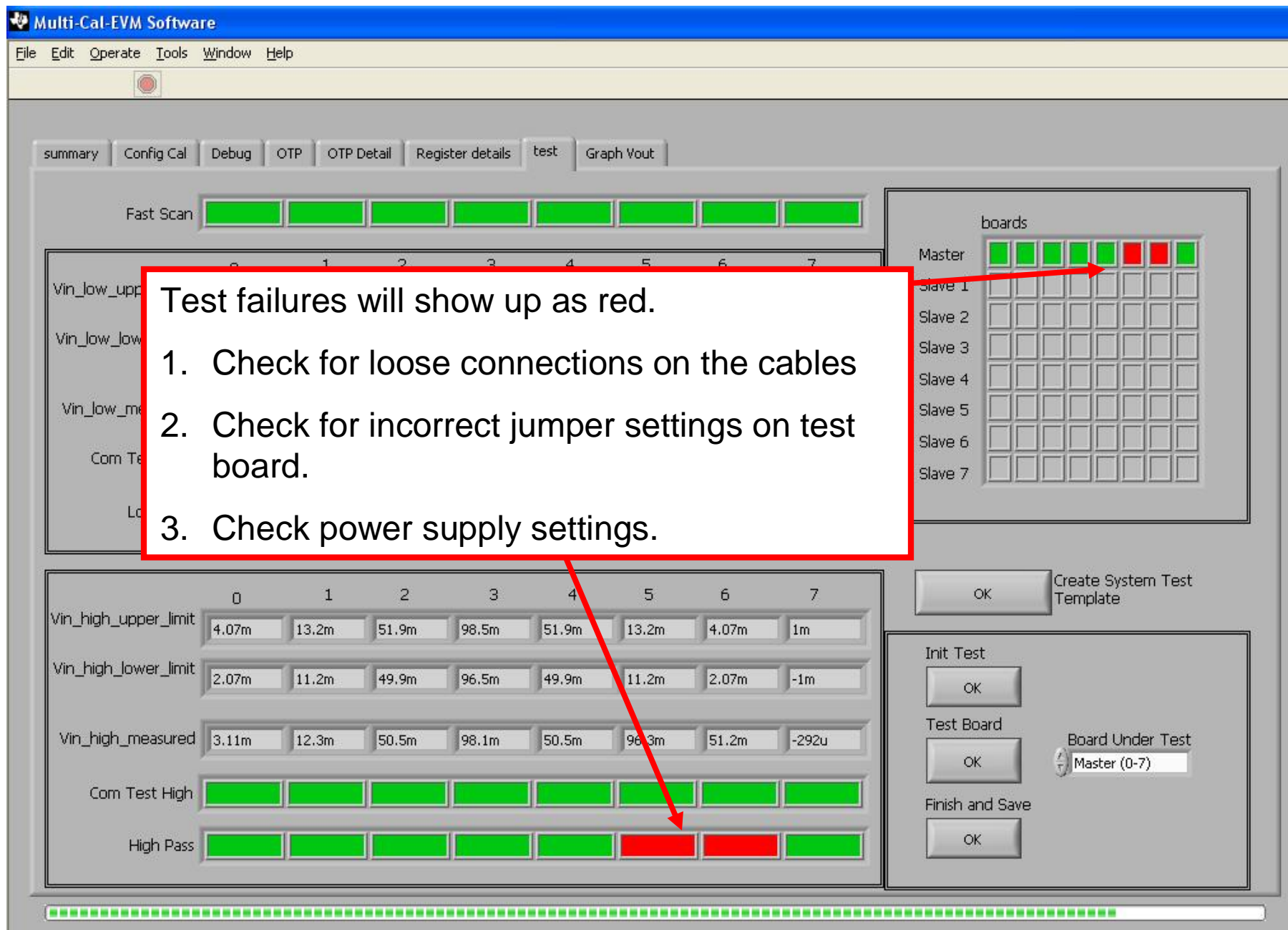




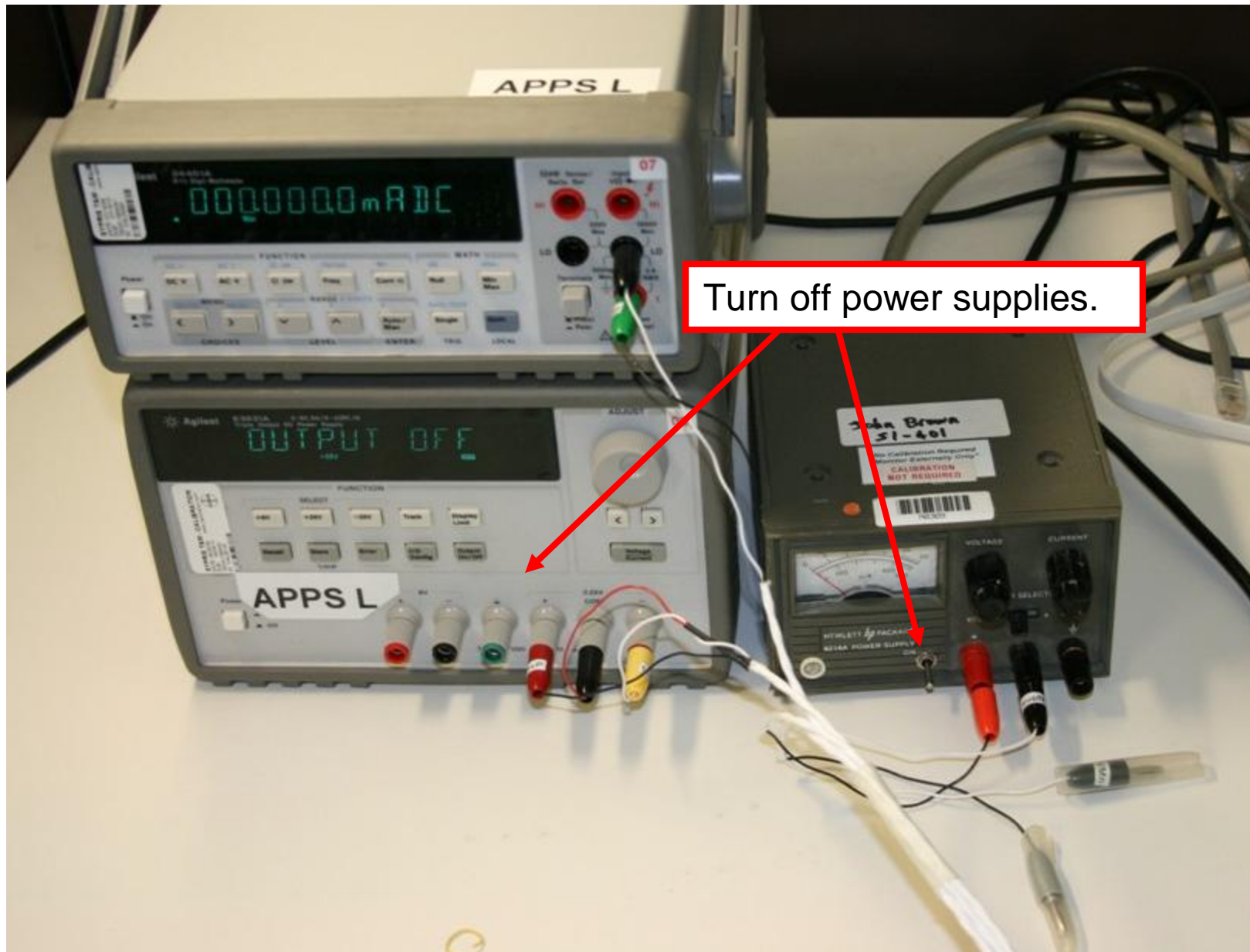


The switch on all the test boards must be in the HIGH position.





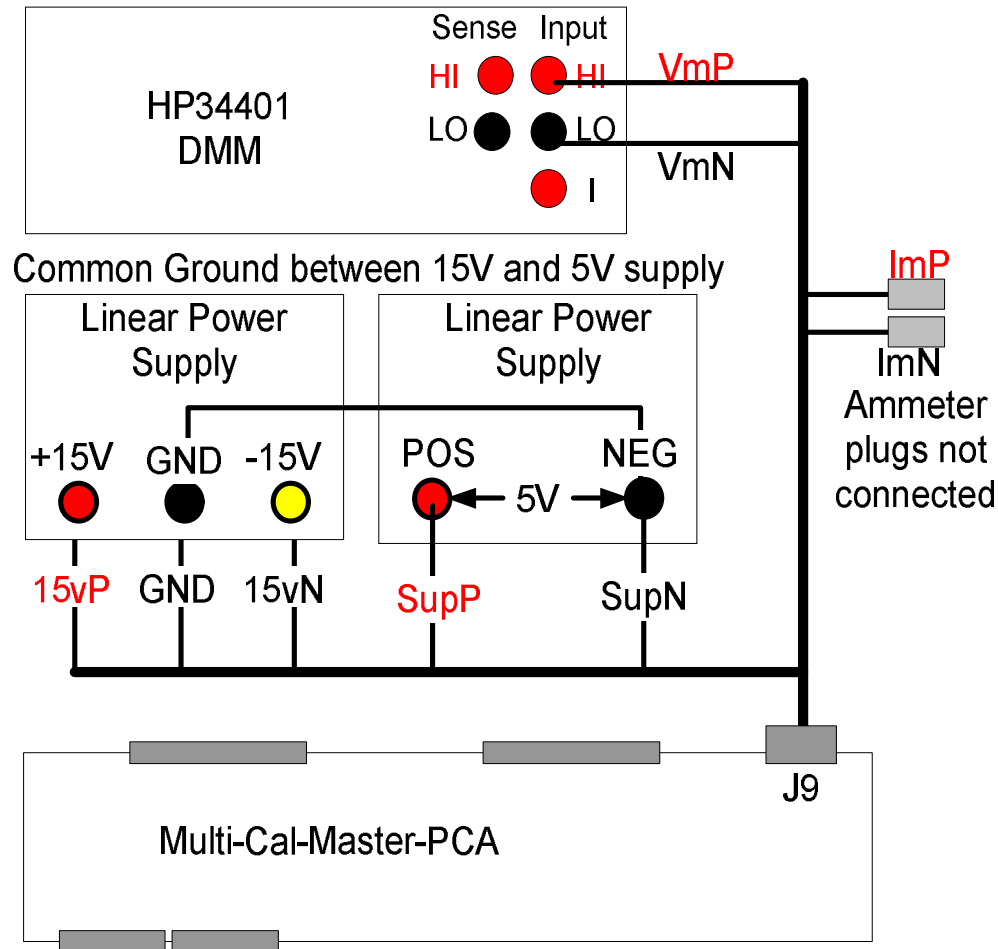


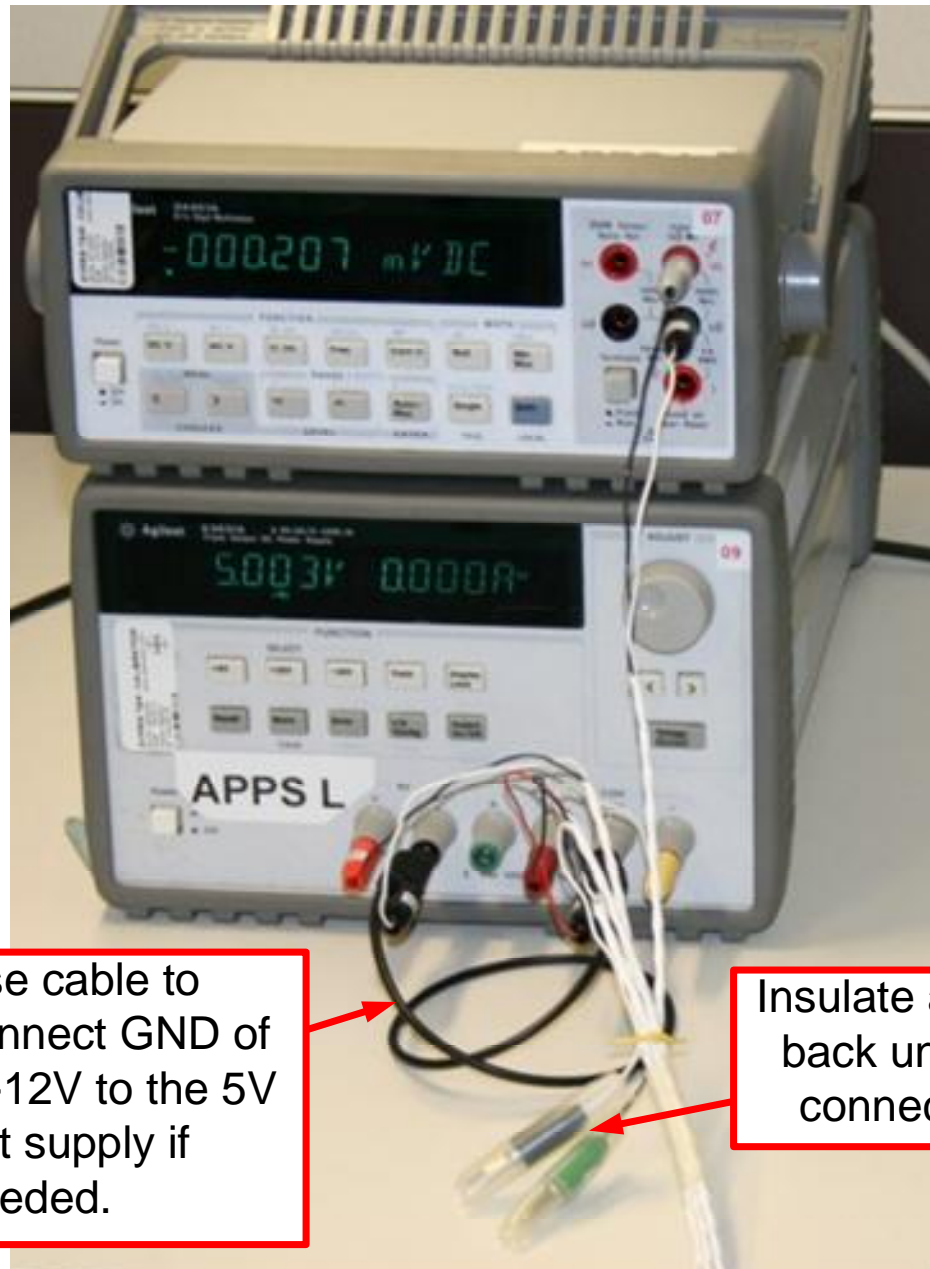


# Run the 3 Wire Voltage Mode Test

**Connect: Power and DMM as shown below.**

**Important: Reduce Loop/Linear Supply to 5V and connect negative terminal to the +/-15V ground (GND).**

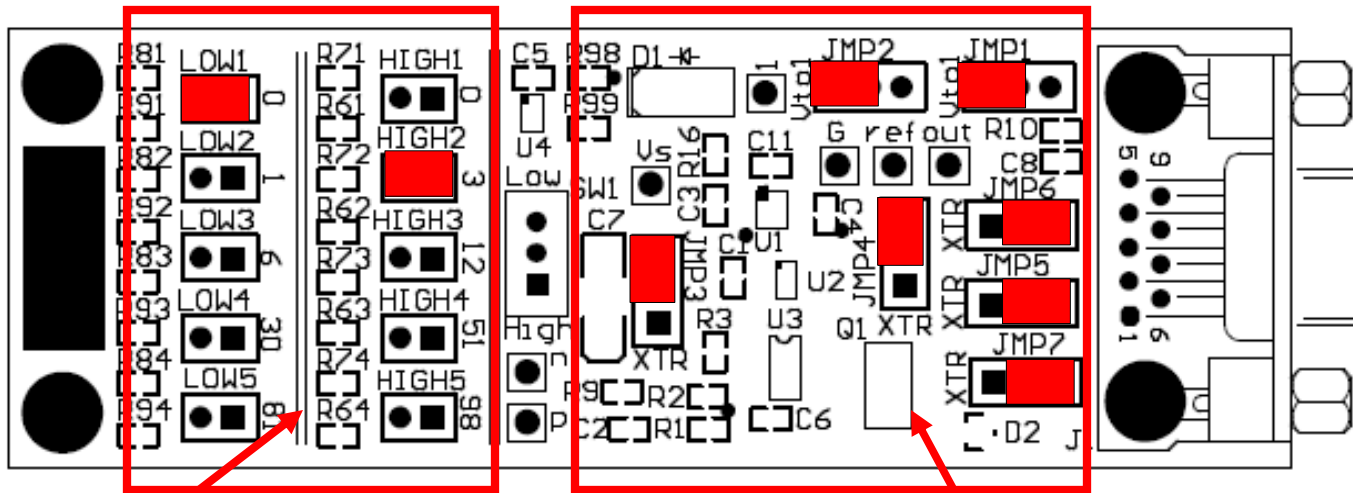




Use cable to connect GND of +/-12V to the 5V dut supply if needed.

Insulate and tie back unused connectors

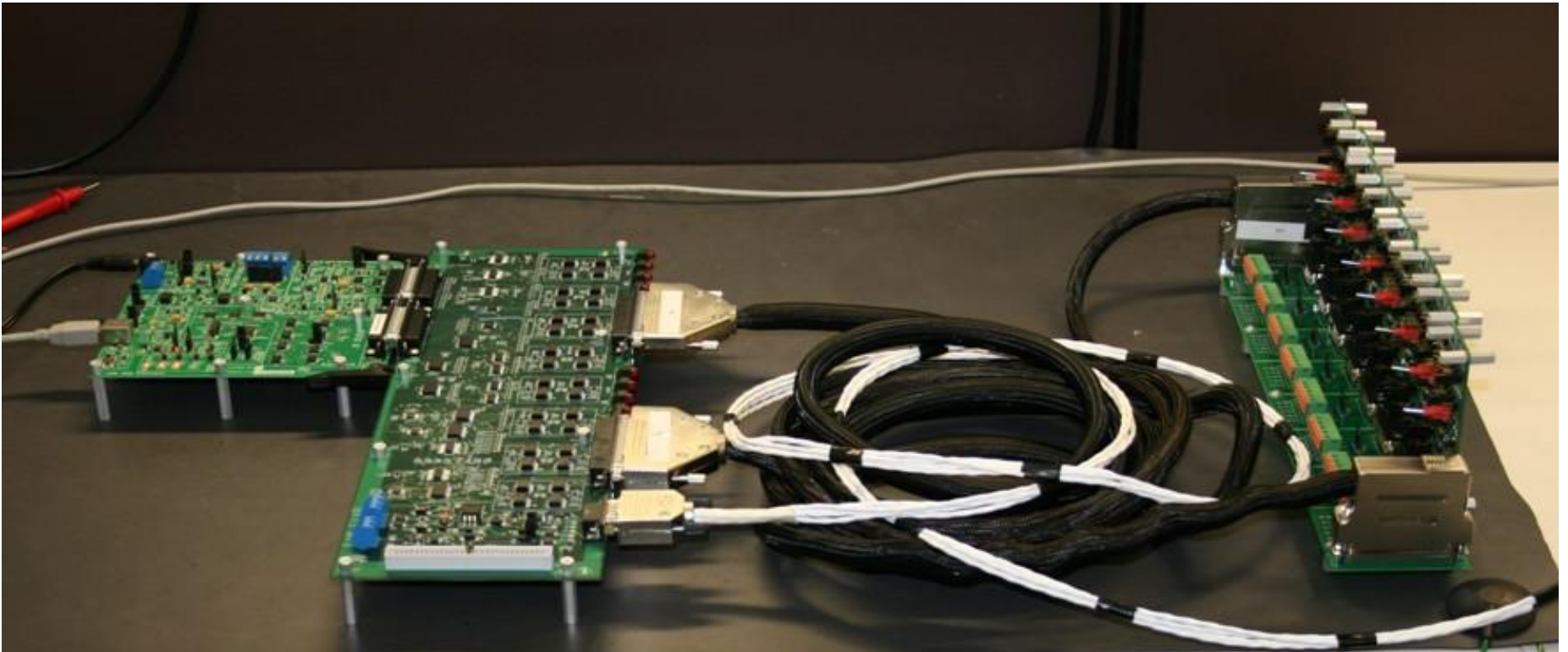


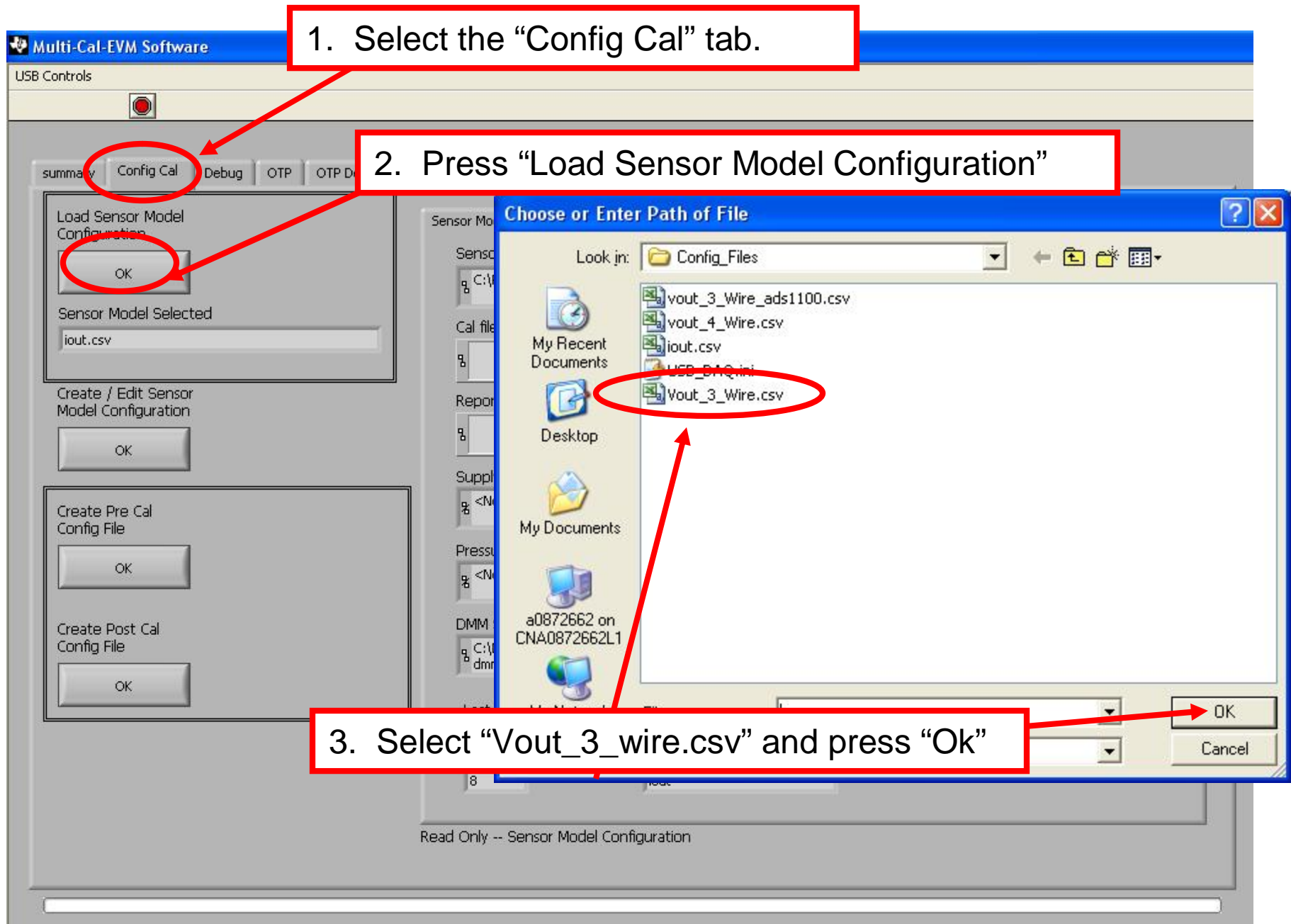


Interface Board Channel	Jumper Positions for sensor emulator <b>(same as last test)</b>
0	As shown above LOW1 (0mV), HIGH2 (3mV)
1	LOW2 (1mV), HIGH3 (12mV)
2	LOW3 (6mV), HIGH4 (51mV)
3	LOW4 (30mV), HIGH5 (98mV)
4	LOW5 (81mV), HIGH4 (51mV)
5	LOW4 (30mV), HIGH3 (12mV)
6	LOW3 (6mV), HIGH2 (3mV)
7	LOW2 (1mV), HIGH1 (0mV)

Mode	Jumper Positions for Mode
Vout 3-wire	JMP1 = Vto1 JMP2 = Vto1 JMP3 = Position without label JMP4 = Position without label JMP5 = Position without label JMP6 = Position without label JMP7 = Position without label

**Connect all other cables as shown in “Current Loop Test”**





# Run Test as shown in “Current Loop Test”

The screenshot shows the 'Multi-USB Controls' software interface. At the top, a red-bordered box contains the title 'Run Test as shown in “Current Loop Test”'. Below this, the software's main window has a tabbed interface. The 'test' tab is selected and circled in red, with a red arrow pointing to it from a text box that says '1. Select the “test” tab.'.

Below the tabs, there are several input fields and buttons. A red-bordered box with the text '2. Select the “Init Test” button.' has a red arrow pointing to the 'Init Test' button, which is also circled in red.

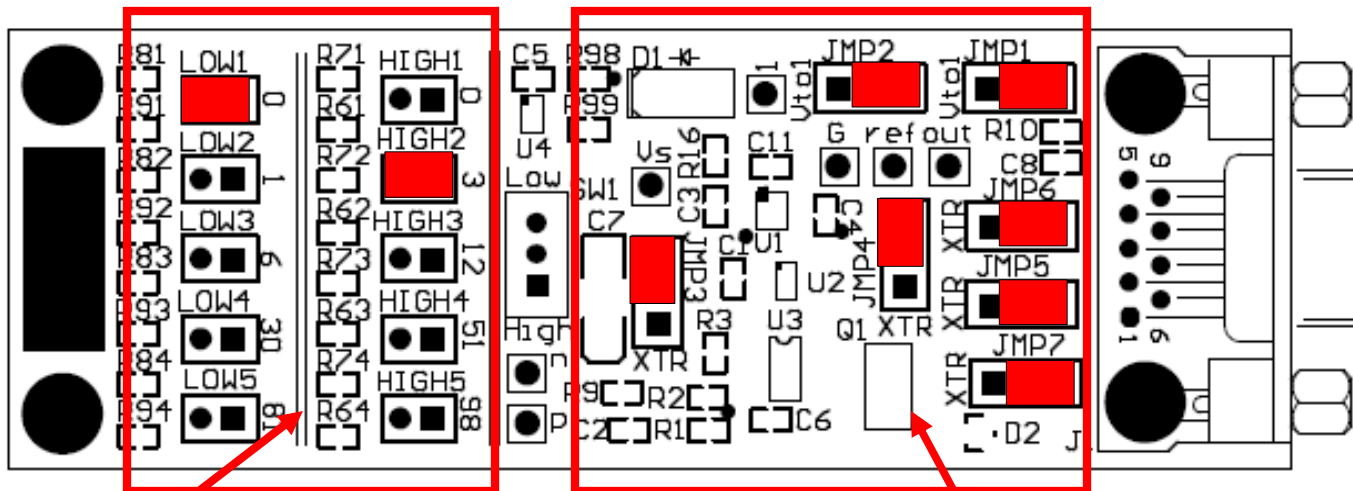
Overlaid on the main window is a 'Choose or Enter Path of File' dialog box. A red-bordered box with the text '3. Select the “factory.txt” and press “Ok”' has two red arrows: one pointing to the 'factory.txt' file in the 'Test Templates' folder, which is circled in red, and another pointing to the 'OK' button at the bottom of the dialog, which is also circled in red.

The background software interface includes a 'Fast Scan' section with a row of buttons labeled 0 through 7. Below this is a 'boards' section with a grid of buttons for 'Master', 'Slave 1', 'Slave 2', 'Slave 3', 'Slave 4', and 'Slave 5'. At the bottom right, there are buttons for 'Create System Test Template', 'Test Board', 'Board Under Test' (with a dropdown menu showing 'Master (0-7)'), and 'Finish and Save'.

# Run the 4 Wire Voltage Mode Test

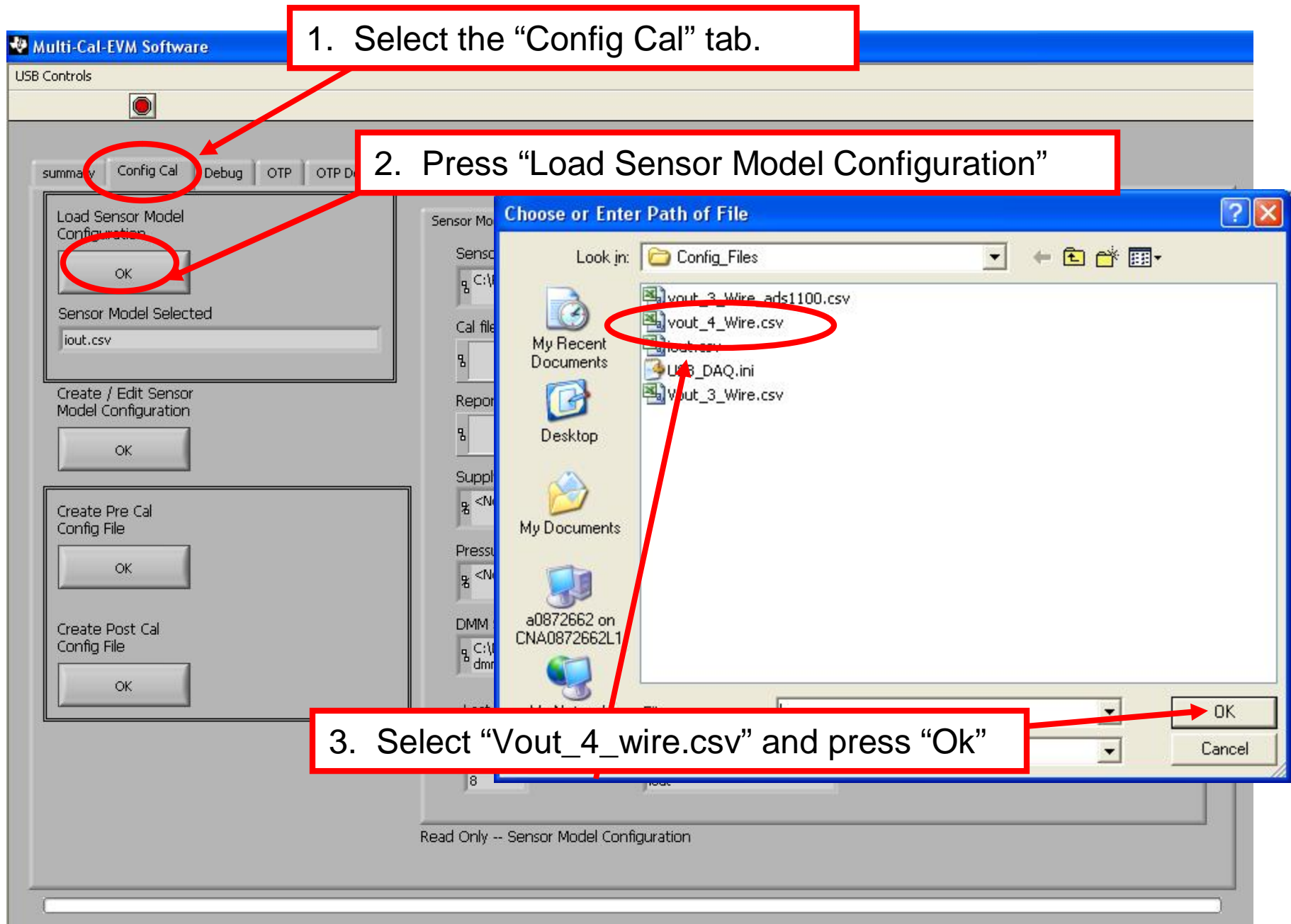


1. Power settings for this test are the same as the previous test.
2. Jumper settings on the test boards is different (see next slide).
3. A different configuration file needs to be loaded (see in future slide)
4. Cable connection and test operation is the same.



Interface Board Channel	Jumper Positions for sensor emulator <b>(same as last test)</b>
0	As shown above LOW1 (0mV), HIGH2 (3mV)
1	LOW2 (1mV), HIGH3 (12mV)
2	LOW3 (6mV), HIGH4 (51mV)
3	LOW4 (30mV), HIGH5 (98mV)
4	LOW5 (81mV), HIGH4 (51mV)
5	LOW4 (30mV), HIGH3 (12mV)
6	LOW3 (6mV), HIGH2 (3mV)
7	LOW2 (1mV), HIGH1 (0mV)

Mode	Jumper Positions for Mode
Current Output	JMP1 = Position without label JMP2 = Position without label JMP3 = XTR JMP4 = XTR JMP5 = XTR JMP6 = XTR JMP7 = XTR



# Run Test as shown in “Current Loop Test”

The screenshot shows the 'Multi-USB Controls' software interface. At the top, a red-bordered box contains the title 'Run Test as shown in “Current Loop Test”'. Below this, the software's main window has a tabbed interface. The 'test' tab is selected and circled in red, with a red arrow pointing to it from a text box that says '1. Select the “test” tab.'.

Below the tabs, there are several input fields and buttons. A red-bordered box with the text '2. Select the “Init Test” button.' has a red arrow pointing to the 'Init Test' button, which is also circled in red.

Overlaid on the main window is a 'Choose or Enter Path of File' dialog box. A red-bordered box with the text '3. Select the “factory.txt” and press “Ok”' has two red arrows: one pointing to the 'factory.txt' file in the 'Test Templates' folder, which is circled in red, and another pointing to the 'OK' button at the bottom of the dialog, which is also circled in red.

The background software interface includes a 'Fast Scan' section with buttons for channels 0-7, a 'boards' section with a grid for Master and Slave boards, and a 'Test Board' section with a dropdown menu showing 'Master (0-7)'.



2. The “Fast Scan” test will start. Passing units will be shown in green. Failures in red.

summary Config Cal Debug OTP OTP Detail Register details test Graph Vout

Fast Scan



	0	1	2	3	4	5	6	7
Vin_low_upper_limit	1m	2.02m	7.33m	31.3m	81.7m	31.3m	7.33m	2.02m
Vin_low_lower_limit	-1m	23u	5.33m	29.3m	79.7m	29.3m	5.33m	23u
Vin_low_measured	0	0	0	0	0	0	0	0
Com Test Low								
Low Pass								

boards

Master									
Slave 1									
Slave 2									
Slave 3									
Slave 4									
Slave 5									
Slave 6									
Slave 7									

1. Press “Test Board”

	0	1	2	3	4	5	6	7
Vin_high_upper_limit	4.07m	13.2m	51.9m	98.5m	51.9m	13.2m	4.07m	1m
Vin_high_lower_limit	2.07m	11.2m	49.9m	96.5m	49.9m	11.2m	2.07m	-1m
Vin_high_measured	0	0	0	0	0	0	0	0
Com Test High								
High Pass								

OK Create System Test Template

Init Test

OK

Test Board

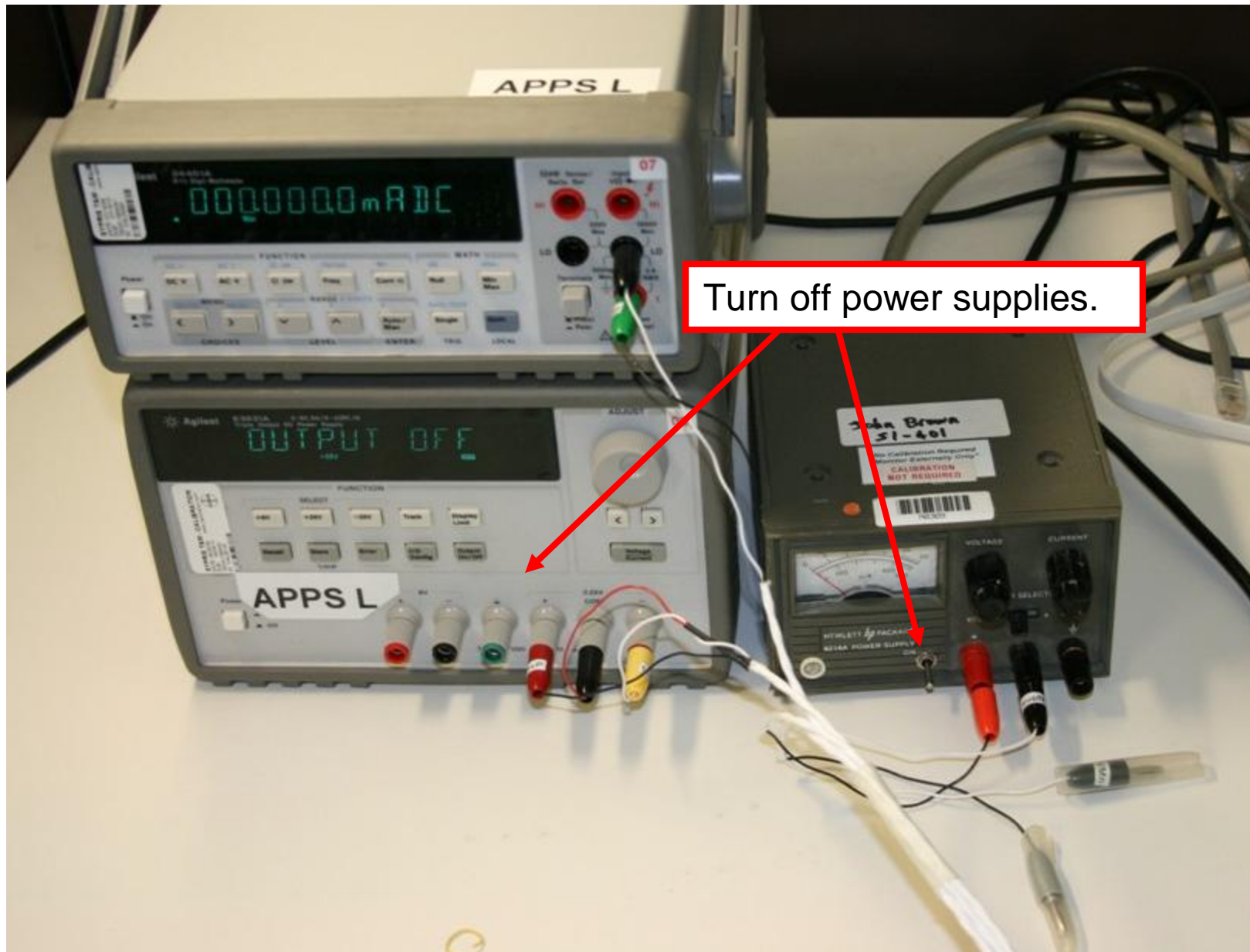
OK

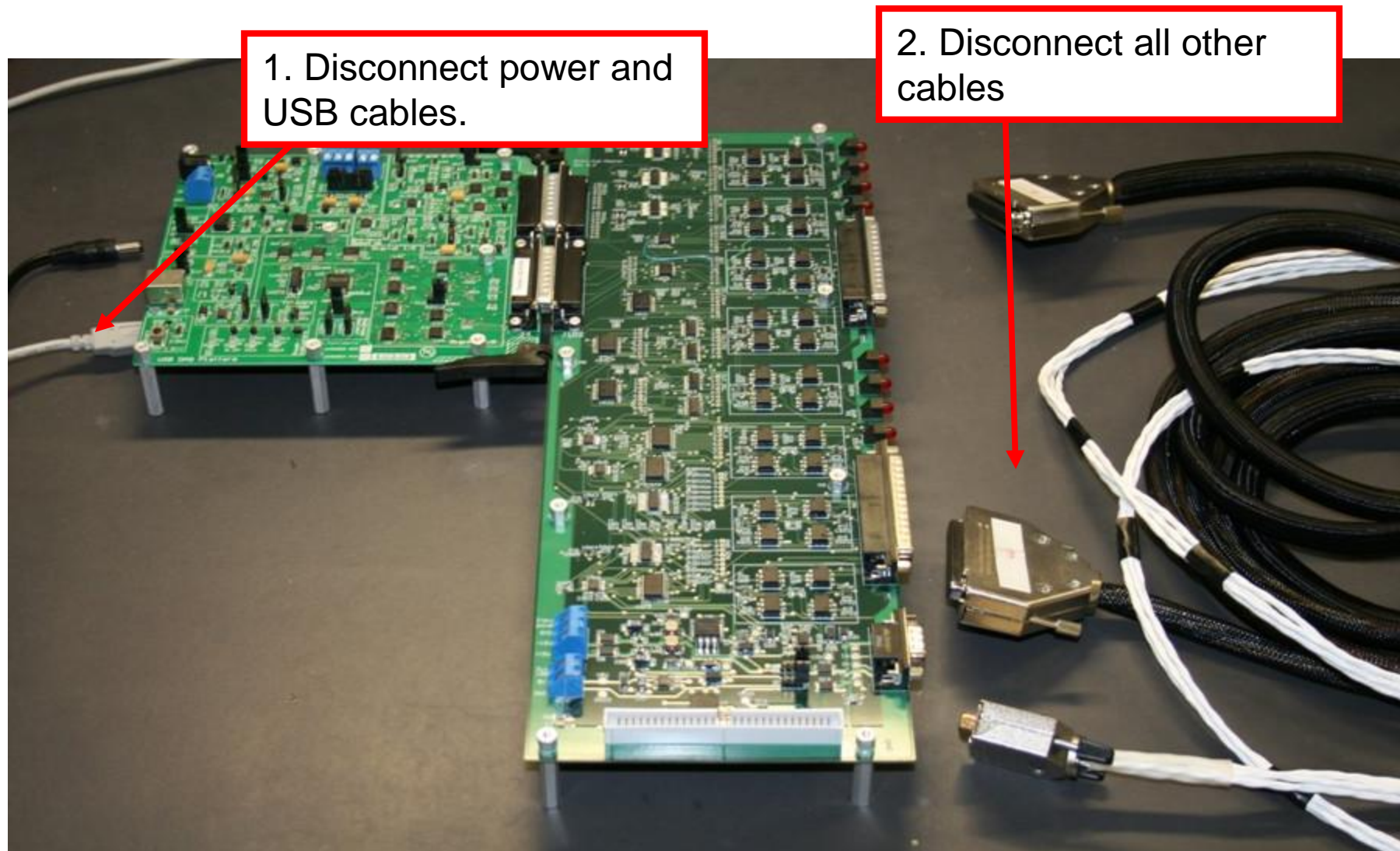
Board Under Test  
Master (0-7)

Finish and Save

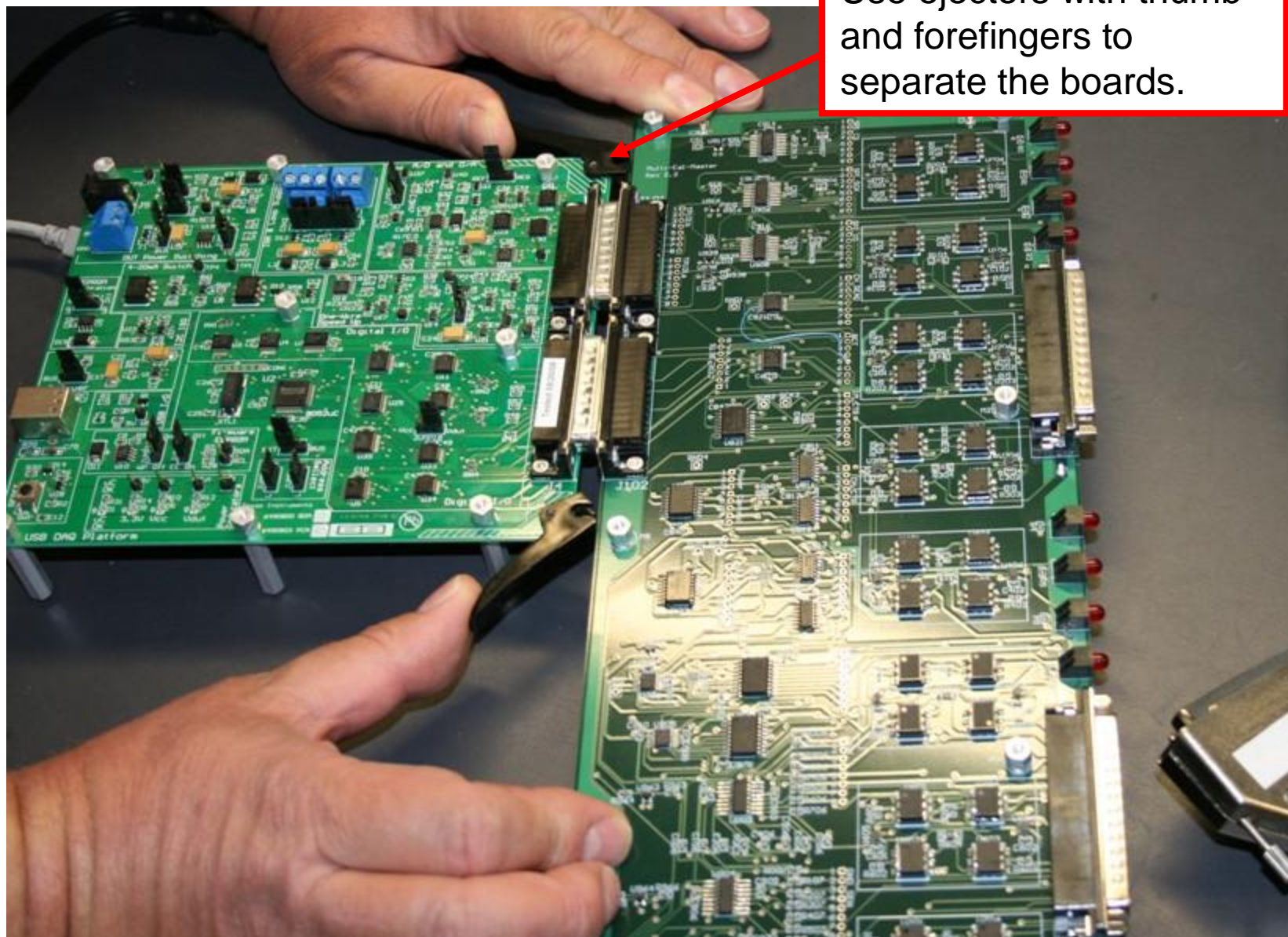
OK





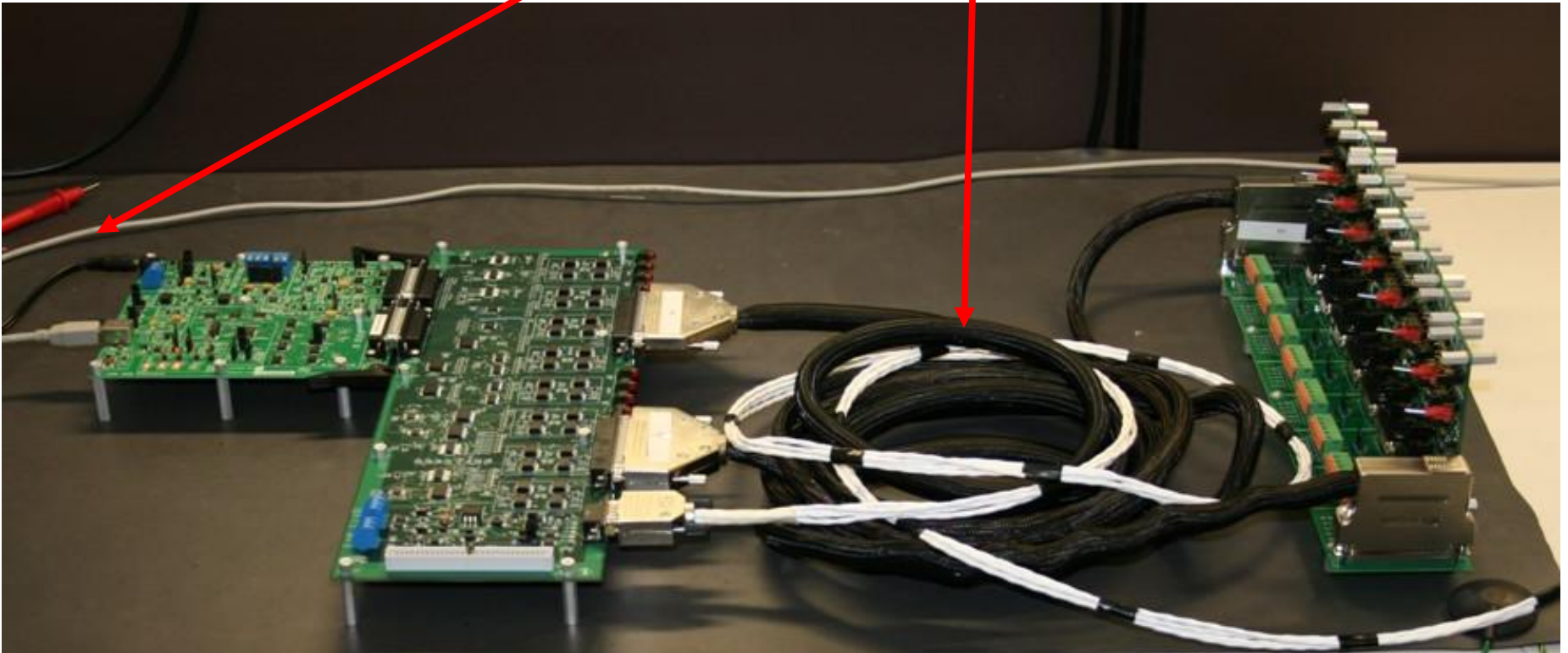






Use ejectors with thumb and forefingers to separate the boards.

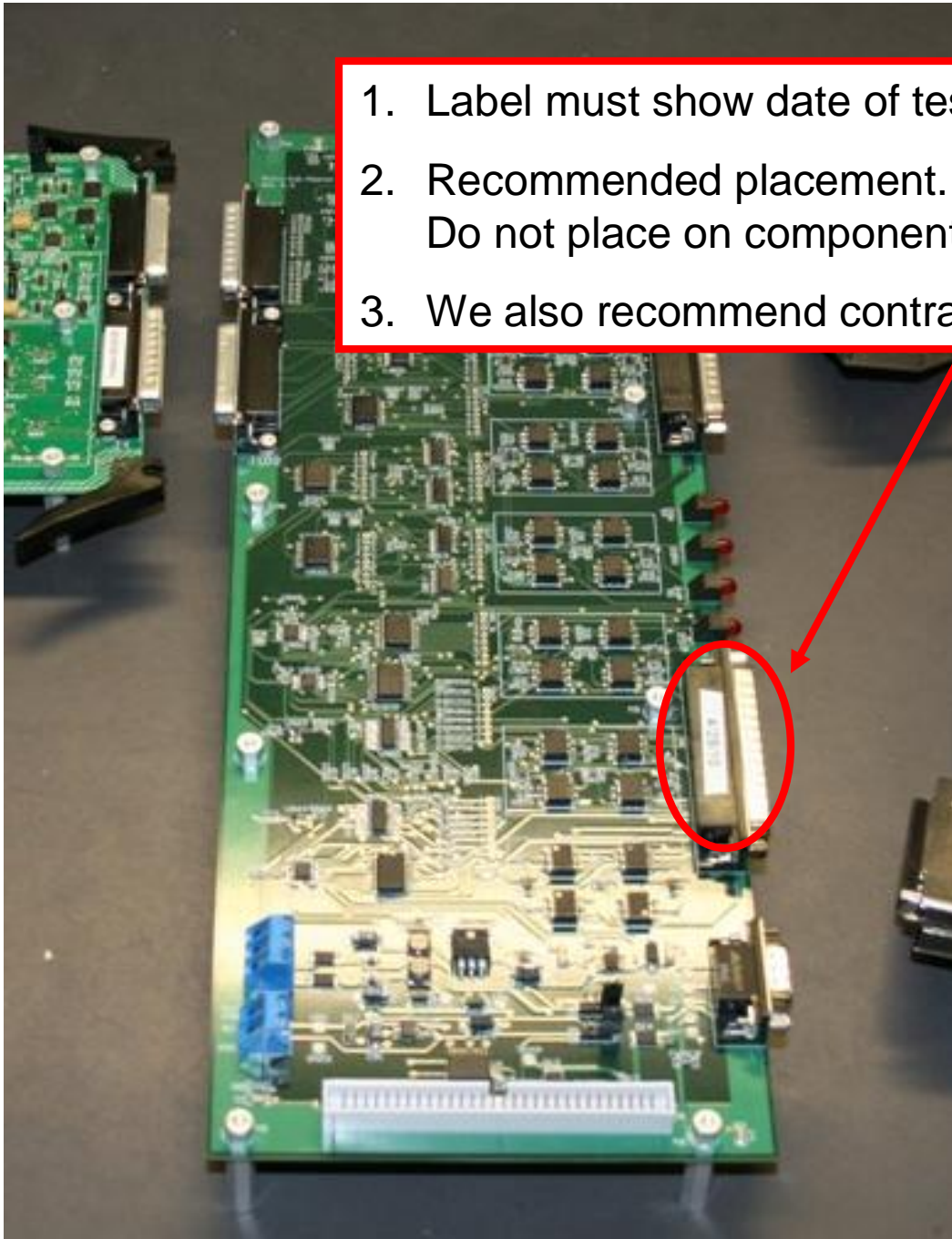
1. Select the next untested slave board to test.
2. Re-connect cables.
3. Turn on-power
4. Repeat all tests with the new board.
5. Continue this cycle until all boards have been tested.



**Label and Ship**  
**Good Units**



1. Label must show date of test.
2. Recommended placement. You can choose another location. Do not place on component or exposed trace.
3. We also recommend contract manufacture name or logo.



**End of  
Test**