

Test Engineering Calibration Procedure		DOCUMENT NUMBER 735000521
TITLE TE82720, Universal Front End Tester Calibration Procedure	REVISION A	REVISION DATE
DOCUMENT TYPE CALIBRATION PROCEDURE		PAGE NUMBER 1

REFERENCED DOCUMENTS 735000522 Test Specification and Procedure, Universal Front End Tester	SPECIAL NOTES
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1. Source Measure Units (SMU)

There are two Keithley Model 236 Source Measure Units (SMU) in this tester, which require yearly calibration. Calibration due dates are entered into the system and when a calibration becomes due a prompt is displayed on the testers Main Menu page. The calibration due dates are staggered as much as possible so that when an SMU must be sent out for calibration a spare, which must also have a valid calibration sticker, can be installed to eliminate down time. The tester refers to the SMUs as Reference and Sample. In addition, the SMU's front panel display identifies itself as Reference and Sample. The only difference between the two instruments is the GPIB address, which must be manually entered through the instruments front panel keypad. The exact location of the SMUs in the tester chassis or stack up, is not fixed. Either instrument can be located on top or underneath the other as long as the signal cables, also labeled Reference and Sample, are connected to the correct SMU. Refer to Figure 1 during removal and installation of the SMUs.

1.1. SMU Removal:

1.1.1. Start up the tester. If already running, skip to step 1.1.2.

1.1.1.1. Connect Universal Front End Tester to an AC line using the line cord provided.

1.1.1.2. Toggle the Tester's main power switch on rear power distribution panel. Switch will illuminate when on.

1.1.1.3. Open disk drive bay door on PC. Depress round, black power button. Green LED will illuminate when power is on. **Note:** Key is required to open disk drive bay door.

1.1.1.4. Logon to system and tester boots automatically.

1.1.2. Remove the four screws that secure the lower rear, louvered access panel to the tester chassis rails.

1.1.3. Remove the access panel.

1.1.4. Identify the two SMUs and make note of the instrument stack up. "Reference SMU" and "Sample SMU" is displayed on the instruments front panel display.

1.1.5. Shut down the tester:

1.1.5.1. Select and Enter "Exit to Windows" from the Main Menu.

1.1.5.2. Point and click on Start in the lower left corner of the windows desktop.

1.1.5.3. Point and click on Shut Down from the start menu.

1.1.5.4. Select "Shut down the computer" from the pop-up menu then point and click on the Yes button.

1.1.5.5. Wait for windows to display the dialog box "It is now safe to turn off your computer", then toggle the Tester's main power switch on the rear power distribution panel.

1.1.5.6. Unplug the tester's AC line cord.

1.1.6. Remove the top SMU:

1.1.6.1. Remove the four screws that secure the instrument to the chassis rails.

1.1.6.2. Slide the top instrument approximately half way out of the chassis.

1.1.6.3. Reach around back of the instrument and remove the two signal cables and AC line cord. Signal cables are labeled Reference and Sample.

1.1.6.4. Remove the instrument.

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1.1.6.5. If the top SMU is the one that requires service, skip to step 1.2, SMU Installation.

1.1.7. Remove the bottom SMU:

1.1.7.1. Set aside the top SMU making note of which SMU it is, Reference or Sample.

1.1.7.2. Remove the four screws that secure the instrument to the chassis rails.

1.1.7.3. Pick up and pull the bottom instrument approximately half way out of the chassis.

1.1.7.4. Reach around back of the instrument and remove the two signal cables and AC line cord. Signal cables are labeled Reference and Sample.

1.1.7.5. Remove the instrument.

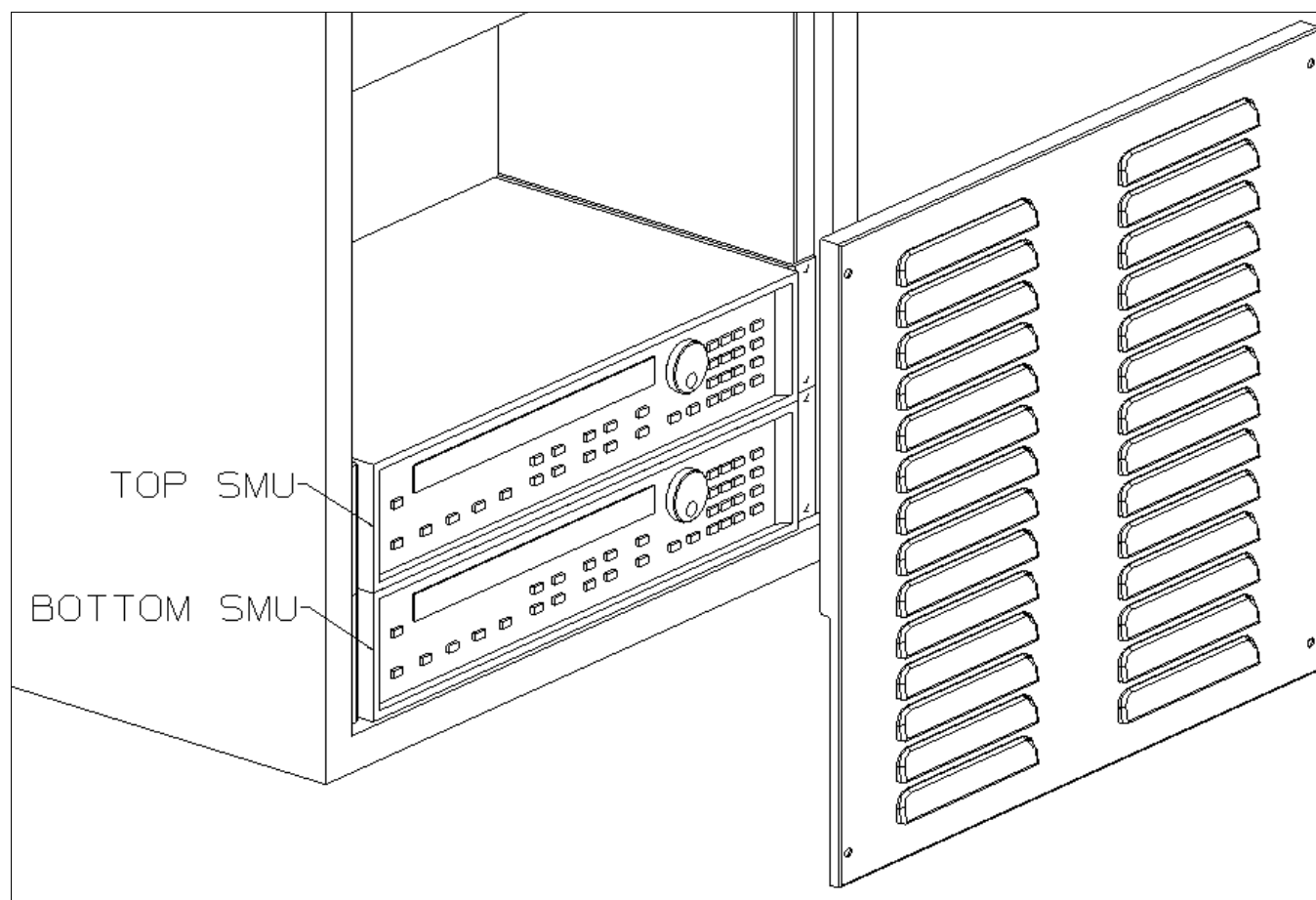


Figure 1

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1.2. SMU Installation:

1.2.1. Install bottom SMU:

1.2.1.1. If the bottom SMU was not removed jump to step 1.2.2.

1.2.1.2. Place the SMU, which was previously on top, in position on the bottom of the tester approximately half way inside the chassis.

1.2.1.3. Connect the AC line cord and signal cables to the rear panel of the instrument.

Note: The same signal cables that were removed from the SMU must be reinstalled to that same SMU. Signal cables are labeled Reference and Sample. You must reconnect the Sample cables to the Sample SMU and the Reference signal cables to the Reference SMU.

1.2.1.4. Lift and insert the instrument into the tester chassis to its fully seated position. Mounting ears should be flush to the chassis rails.

1.2.1.5. Reinstall the four chassis mounting screws.

1.2.2. Install top SMU:

1.2.2.1. Make note of the next calibration due date, you will need this later.

1.2.2.2. Place the new SMU in position on top of the bottom SMU approximately half way inside the tester.

1.2.2.3. Connect the remaining AC line cord and signal cables to the rear panel of the instrument.

1.2.2.4. Slide the instrument into the tester chassis to its fully seated position. Mounting ears should be flush to the chassis rails.

1.2.2.5. Reinstall the four chassis mounting screws.

1.3. GPIB configuration:

1.3.1. Power up the tester:

1.3.1.1. Connect Universal Front End Tester to an AC line using the line cord provided.

1.3.1.2. Toggle the Tester's main power switch on the rear power distribution panel. Switch will illuminate when on.

1.3.1.3. At this point, both SMU's should be powered up, and displaying "+0.0000 nA ST.BY" on the front panel display. If not, check the SMU's power switch, located in the lower left hand corner of the front panel, and insure the line cord is fully seated.

1.3.2. Set primary IEEE address (GPIB):

1.3.2.1. Working on the top SMU only. The top SMU replaced the SMU that requires calibration.

1.3.2.2. Press the Menu button, and then rotate the circular knob until the current GPIB address is displayed. For example, if the current primary address is 16 the following message will be displayed: "16 IEEE ADDR".

1.3.2.3. To change the primary address, use the numeric buttons and press ENTER. This stores the new address. If the Sample SMU is being configured, set the IEEE address to 4. If the Reference SMU is being configured set the IEEE address to 5.

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1.3.2.4. Press the MENU button again to exit.

1.4. Verification:

- 1.4.1. Open disk drive bay door on PC. Depress round, black power button. Greed LED will illuminate when power is on. **Note:** Key is required to open disk drive bay door.
- 1.4.2. Logon to system and the Universal Front End Tester application boots automatically.
- 1.4.3. If no errors are displayed during initialization then the SMUs are configured properly.
- 1.4.4. Install a fixture and load a known good UUT.
- 1.4.5. Navigate to the Debug Menu.
- 1.4.6. Select and Enter Data Acquisition.
- 1.4.7. Verify cable connections by changing Channel A, (Sample) SMU's output current while plotting UUT channel A data. Observe plotted output data changes with input current.
- 1.4.8. Exit the Data Acquisition window.
- 1.4.9. Exit to the Main Menu.

1.5. Reset Calibration Due Date:

- 1.5.1. Navigate to the System Configuration Menu.
- 1.5.2. Select and Enter Calibration from the Configuration Menu.
- 1.5.3. Enter the next calibration due date, Day, Month and Year as printed on the calibration sticker on the instrument using the Testers keyboard and trackball.
- 1.5.4. Point and click on the SAVE button at the bottom of the screen to save the new calibration due date.
- 1.5.5. Exit to the Main Menu.

2. PCI-6025E

The Tester's PC contains a National Instruments Data Acquisition Board, PCI-6025E. This multifunction I/O board provides 16 analog inputs, 2 analog outputs, 32 digital I/O lines, and 2 timer/counters. Self-calibration is performed every time the Tester enters ATE and/or Debug Modes as part of the initialization process. This is accomplished by means of an on-board voltage reference. Internal offsets and gain errors are compensated for during self-calibration. However, an external calibration of the onboard voltage reference is required yearly.

2.1. Equipment required:

- 2.1.1. Calibrated voltage source accurate to +/- 500uV @ 10VDC output.

2.2. Start up the tester. If already running skip to step 2.3 below:

- 2.2.1. Connect Universal Front End Tester to an AC line using the line cord provided.
- 2.2.2. Toggle the Tester's main power switch on rear power distribution panel. Switch will illuminate when on.
- 2.2.3. Open disk drive bay door on PC. Depress round, black power button. Greed LED will illuminate when power is on. **Note:** Key is required to open disk drive bay door.

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- 2.2.4. Logon to system and tester boots automatically.
- 2.3. System must be allowed to warm up for at least 1 hour before calibration.
- 2.4. If a fixture is installed on the Tester, remove it while at the Main Menu.
- 2.5. Select System Configuration from the Main Menu.
- 2.6. Select Calibration from the Configuration Menu.
- 2.7. Toggle the Calibrate button from the PCI-6025E Calibration Date data box.
- 2.8. Remove the two screws that secure the hinged Receiver access panel to the Receiver base
- 2.9. Lift the Receiver access panel up and prop panel open.
- 2.10. Locate terminal block TB1 on Fixture Interface Board. See Figure 2 below.
- 2.11. Disconnect one side of jumper from TB1-4 and wire to TB1-1.
- 2.12. Connect calibrated, precision voltage source:
 - 2.12.1. Connect the positive output of the voltage source to TB1-2.
 - 2.12.2. Connect the negative output of the voltage source to TB1-5.
- 2.13. Set voltage source output to 9.6VDC +/- 500uV.
- 2.14. Toggle the "GO" button. After the calibration is complete the window closes and reverts back to the Edit Instrument Calibration Dates window. Notice the PCI-6025E Calibration Date changed to 1 year after the current date.
- 2.15. Toggle the "SAVE" button. **Note:** If you toggle the "CANCEL" button the new PCI-6025E Calibration Date will not take affect and the board will need to be recalibrated.
- 2.16. Disable and disconnect the voltage source.
- 2.17. Reconnect jumper from TB1-1 to TB1-4.
- 2.18. Close and secure the Receiver access panel.
- 2.19. Navigate back to the Main Menu.

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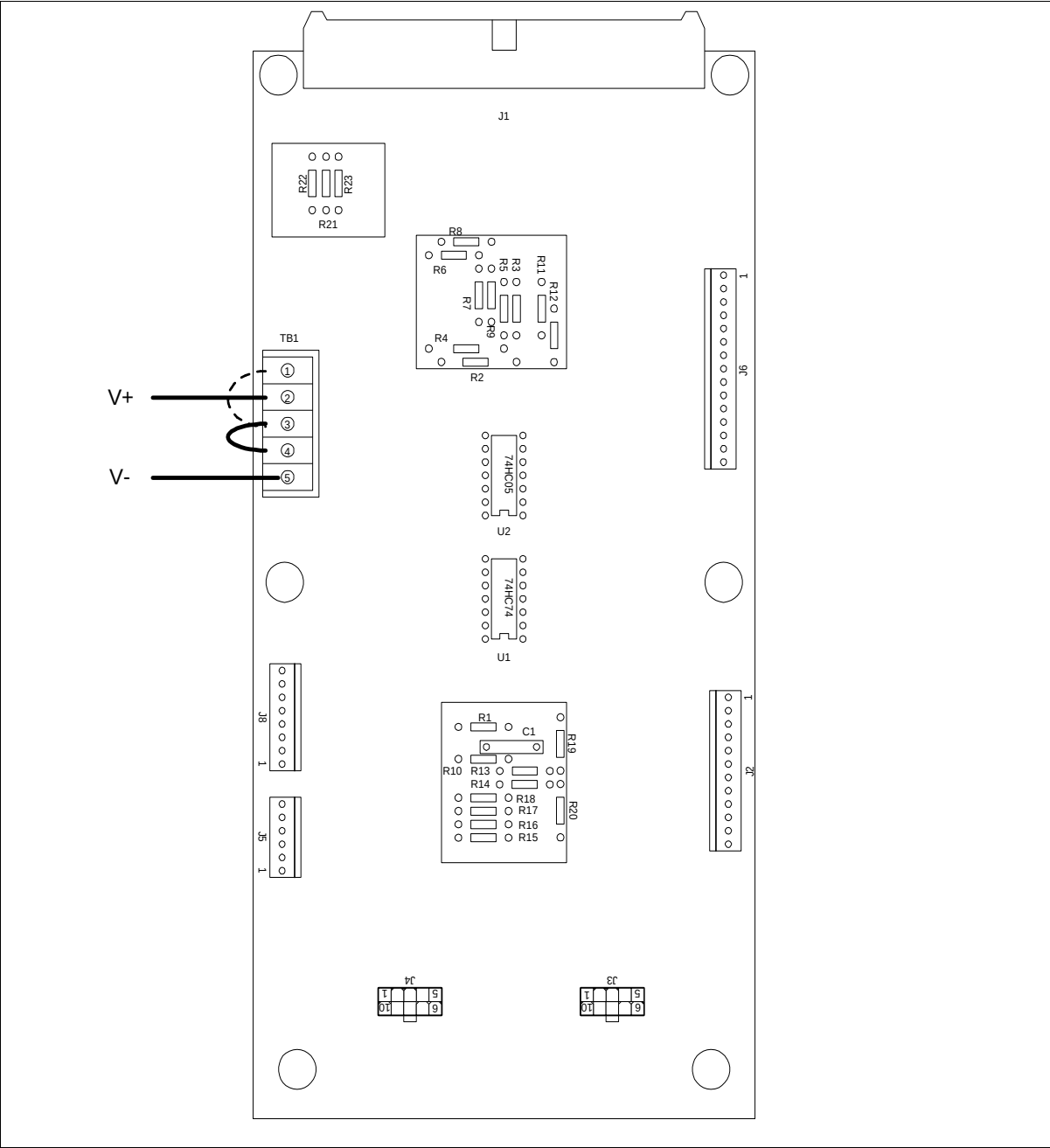


Figure 2