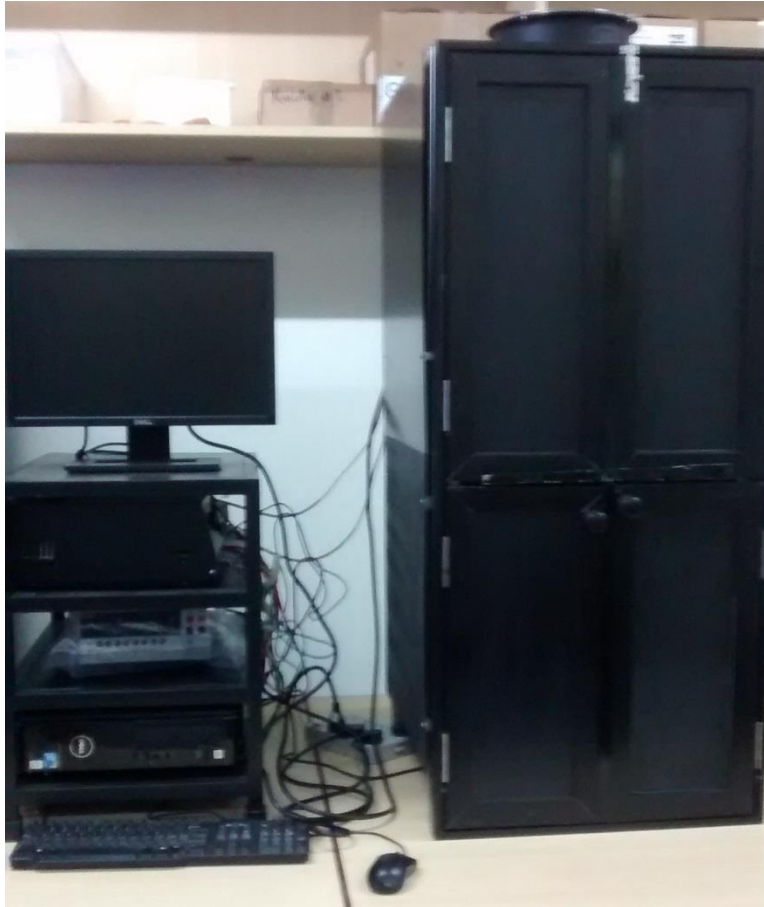


# **Standard Operating Procedure – NOVA Solar Simulator**



By

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**Location of the system:**

NCPRE Characterization Lab

3<sup>rd</sup> floor, Nanoelectronics building.

**Contamination Category:**

Litho/Analytical

**Safety Precautions:**

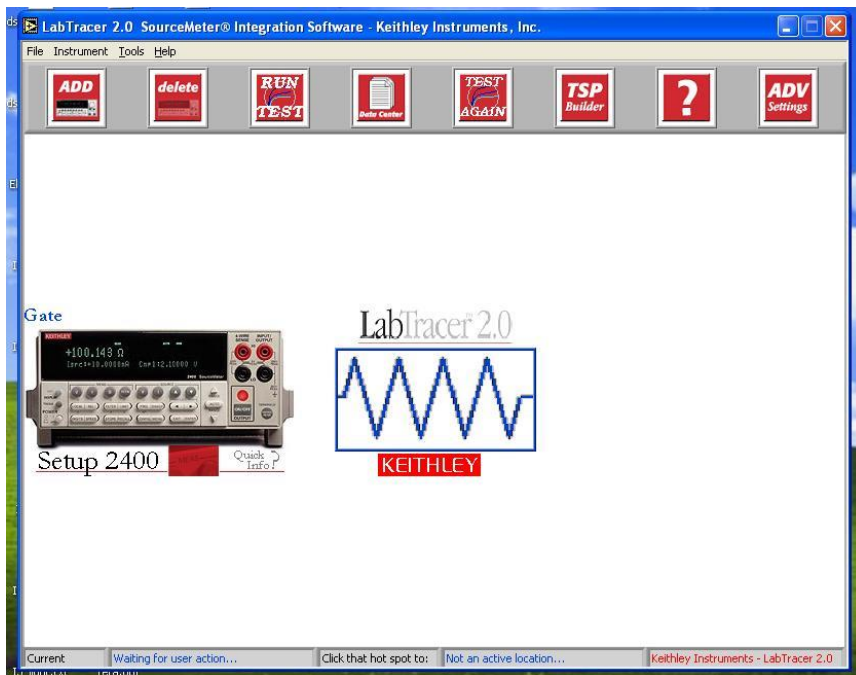
- Do not look directly onto the light source. If under any circumstances you need to look in the light, please wear the UV protection goggles placed near the system.
- Do not bring or place any liquid especially water near the system. Please take all necessary cautions needed when working with electrical equipments.



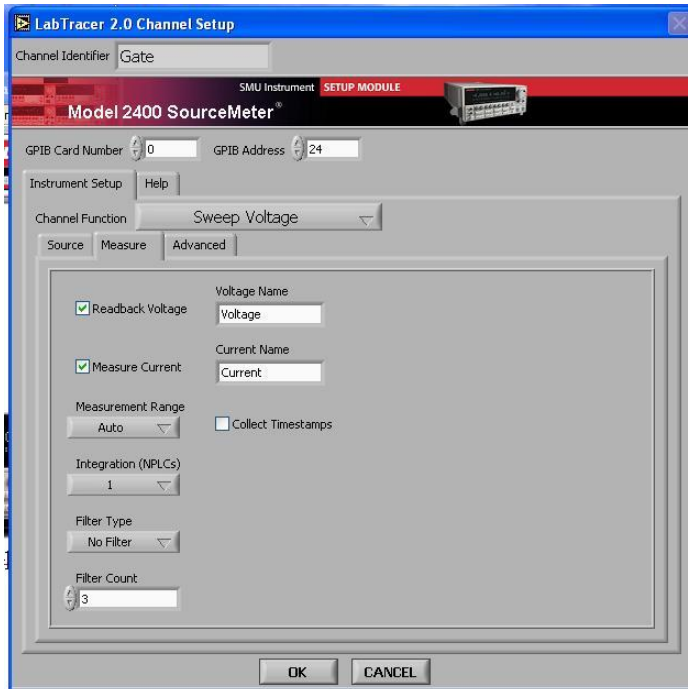
## Operating Instructions:

### TURN ON Sequence:

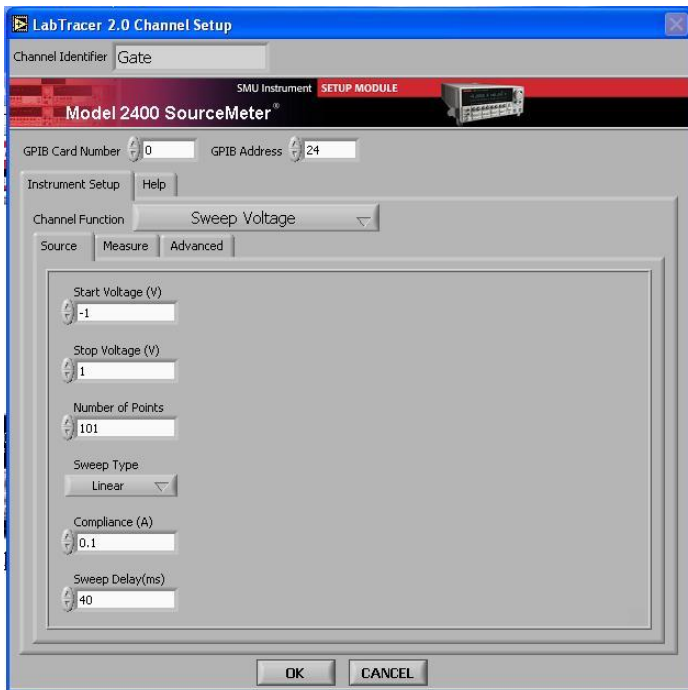
1. Turn the Lamp Fan ON.
2. Turn the power switch (15A) to the lamp ON. Before turning this switch ON, check that the power knob in the power supply is at “o”. This is to ensure that the power supply is OFF.
3. The LED on the power supply will be set appropriately such that 1 Sun is obtained atleast at one location. Turn the lamp switch ON (“I”).
4. Wait for atleast 15mins and the lamp is ready to use.
5. Switch ON the power supply to the computer, Keithley 2400 SMU and the Vacuum pump.
6. Switch ON the Keithley 2400 SMU by pressing the Power switch located on the front panel.
7. **At all times, the top door MUST be closed when lamp is ON. This is extremely important!!**
8. Place your sample onto to the chuck and start the measurement by press the “LAB TRACER” icon.
9. Connect the 4-probe wire’s red clip to manipulator and the black clip to the screw provided on the chuck. Connect the other end of the 4probe to the panel of Keithley 2400 SMU.
10. Switch ON the PC and click icon “Lab Tracer 2”
11. You will be getting a screen as shown below:



12. Check the settings before performing the IV sweep by clicking on “Setup 2400” icon. You will get the window shown below.



13. Make sure that the entries for “Measure” are as shown in the image above. Click on the “Source” tab. The source tab is shown below.



14. Make sure that the entries for “Source” are as shown. More sweep delay is useful only for devices like organic solar cells.

15. After making sure the Settings are correct, click “Run Test” to start the sweep.

16. By default, the I-V plot will be displayed at the end of the sweep. You can save the graph if needed. To save the data, click on the “Datasheet” tab. On this tab, there is a “Save data” button. On clicking that, you will be asked for the filename against which you want to save the

data. Data can be saved in “.txt” format. Please save data in a directory having your name in E:\. Please do not save data on the desktop.

17. The GPIB connects the Labtracer setup to the Keithley 2400 SMU.
18. On clicking “Run Test”, the Keithley 2400 SMU should start the sweep. If this does not happen, refer to Annexure I for troubleshooting.
19. To Measure DARK IV, please cover the light source with the black board / box provided with the setup and continue from step 13.

#### **TURN OFF Sequence:**

1. Turn the lamp switch OFF.
2. Turn the power supply to the lamp (15A) OFF.
3. Wait for atleast 10mins for the lamp to cool down.
4. Then turn the Fan OFF.

#### Annexure – I

Troubleshooting for Keithley 2400 issues.

1. Click “Menu”. In the “Main Menu” enter “Communication”.
2. In “Communications setup”, click “GPIB”.
3. Make sure that the “Address” is seen as “24”. If “24” is seen blinking, then it is OK.
4. Press “ENTER” and you will get “GPIB Protocol”. If “488.1” is blinking, then it is OK.
5. Press “EXIT” to come out of the “Main Menu”