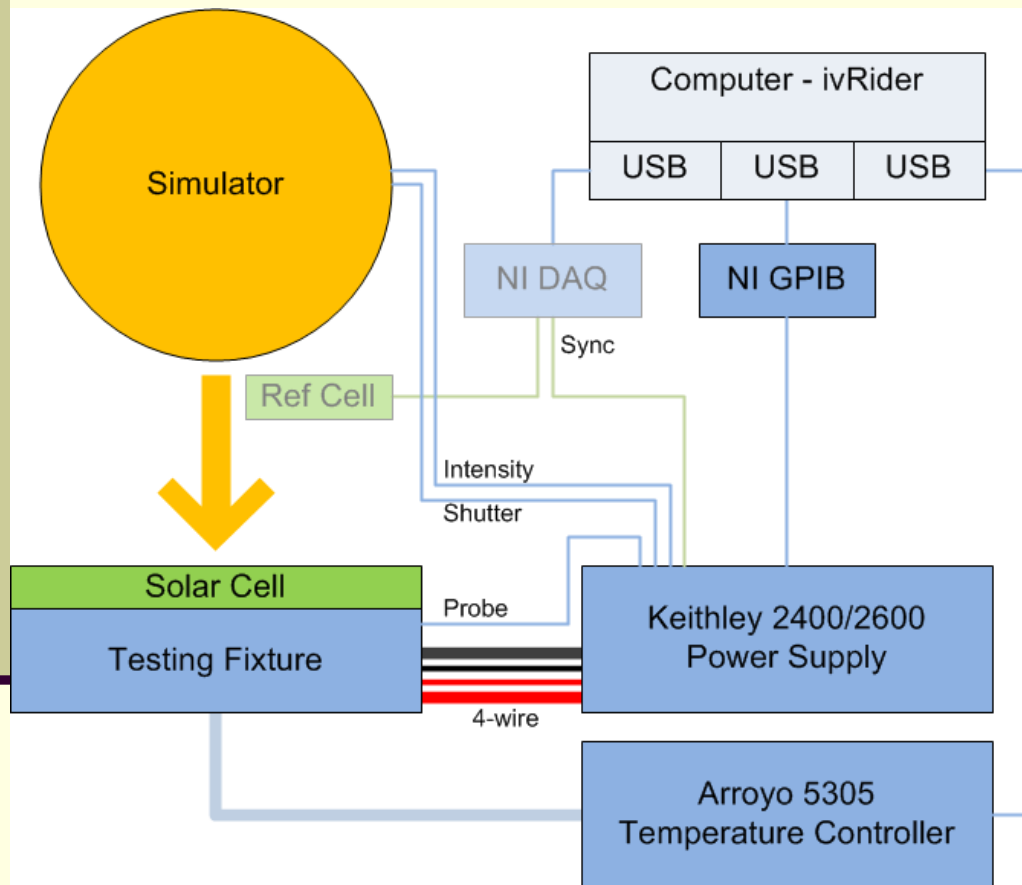


Solar Cell IV Testing Solution

W2 Laboratories, LLC
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Basic Configuration



Key Features

- AAA DC Solar Simulator
- Pneumatic testing fixture with temperature controller
- Bipolar power supply measuring 3 quadrants
- Reference cell for simulator temporal instability normalization
- Flexible software supporting different hardware configurations

Measurement Parameters

- IV curve IV curve at specified sample points
- Voc Open circuit voltage
- Isc Short circuit current
- Pmax Maximum power from the IV curve
- Vmax Voltage at Pmax
- I_{max}* Current at Pmax
- Fill Factor $P_{max} / V_{oc} / I_{sc}$
- R_{series}* Serial resistance, fit from IV curve around Voc
- R_{shunt}* Shunt resistance, fit from IV curve around Isc
- Efficiency $P_{max} / \text{Irradiation}$
- *Correction factors:*

spectrum mismatch, temporal instability, temperature

* Can be configured for current density and resistivity

Hard Configurations

■ Power Supply

- Bipolar power supply at different current/voltage rating
 - Keithley 2600, up to 20A
 - Keithley 2400, up to 5A
 - Jmida SC-110, up to 3A
 - Kepco BOP, up to 1kW at various current and voltage
- Optional temperature monitor
- Optional switching box (low power, multi-cell serial)
- Optional shunt board (low power, multi-cell parallel)

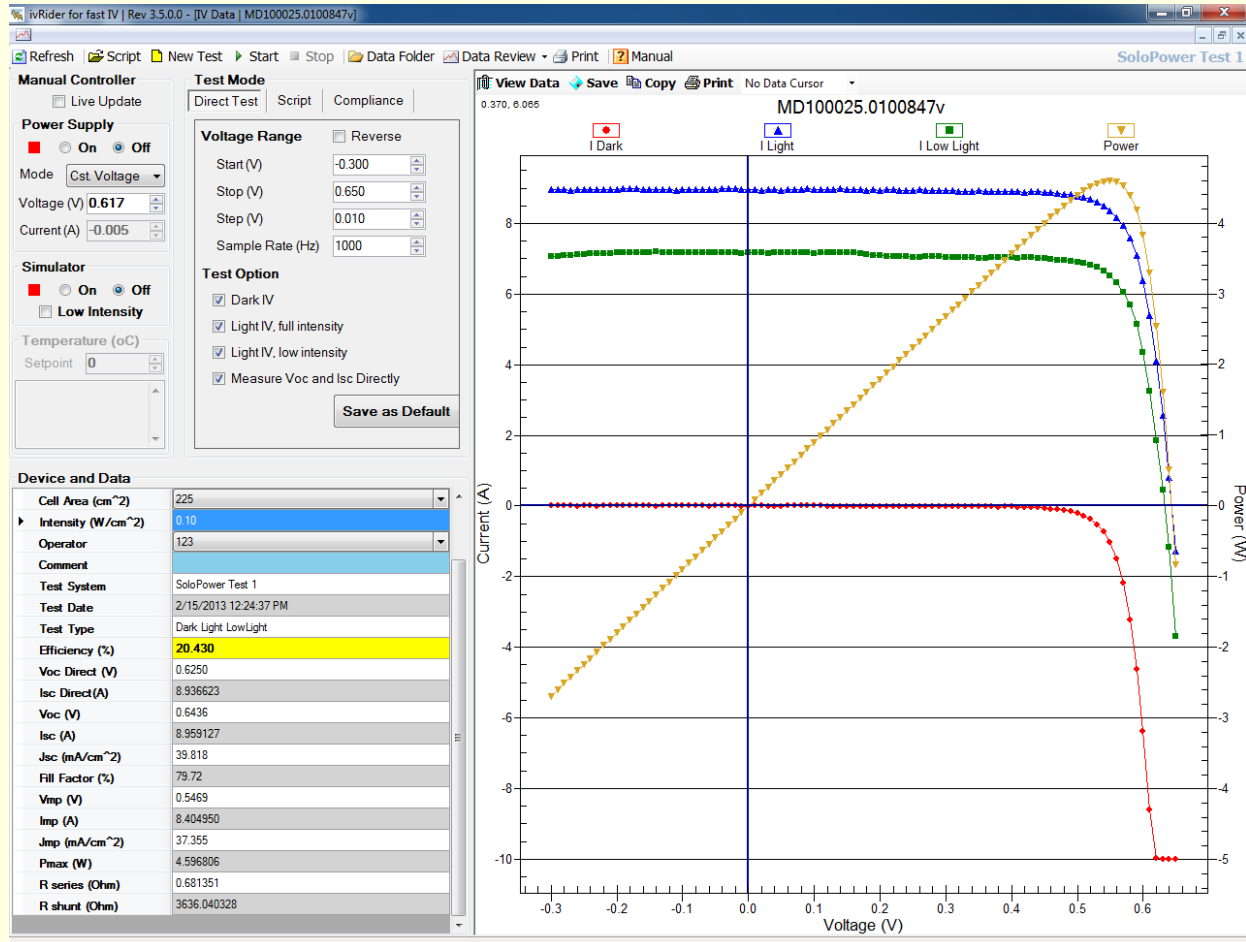
■ Auxiliary Hardware

- Multiplexing box for multi-sample testing
- Reference cell for simulator temporal instability correction
- Temperature controller/reading for temperature correction
- Digit IO for fixture probe, auto load/unload, and etc

Software Features

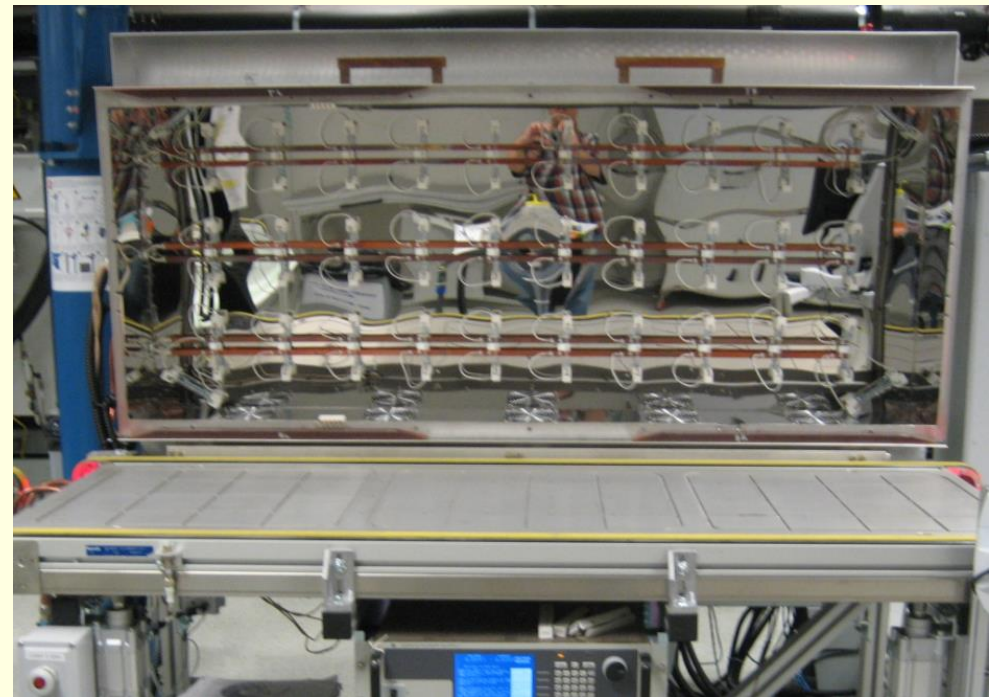
- Fast sweep with adjustable sample rate to accommodate difference types of cells
 - e.g. high capacitance cell requires slower sample rate to get accurate fill factor, thus efficiency.
- Fully automated interface with one button to start
- User configurable parameters for different requirements
 - With or without reference cell correction
 - Directly measured Voc and Isc at static condition
- Synchronization with simulator and production line
- Scripting capability for tests with different configurations
 - e.g. repeated IV measurement with temperature ramp
- SQL database for R&D analysis and production SPC

Software Interface



Example - Inline Test

Station, Simple (China), ThinFileSolar



Why Inline Testing

- An inline testing is needed to sort the panel before they are assembled.
- A short sun soaking is necessary for CIGS thin film material before reliable data can be measured.
- W2Lab developed inline simulator can achieve the intensity, informality, and repeatability for the production requirement.

