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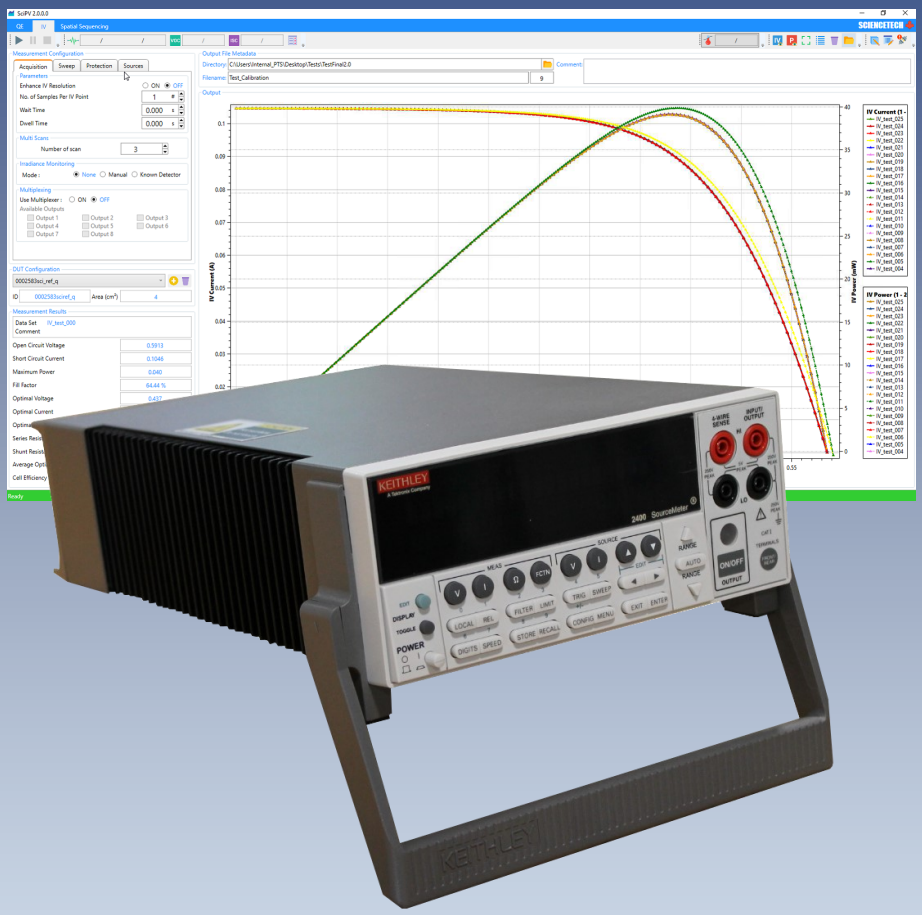
Making Light Work Better



Applications

- IV test and photovoltaic cell performance characterization
- Test applications that demand tightly coupled sourcing and measurement
- Providing precise voltage and current sourcing as well as measurement capabilities

Features

- Features industry standard Keithley 2400 series SMU's
- Available for continuous or flash operation
- Expandable power range with Sciencetech proprietary Load Boost technology
- Calculates all critical cell performance parameters
- User-friendly exclusive Sciencetech software interface
- Remote operation of Sciencetech flash systems
- Works with all Sciencetech Solar Simulators

IV Measurement Instruments for Advanced Characterization

SSIVT Current Voltage Measurement

MADE IN CANADA
FABRIQUÉ AU CANADA

TDB-31.01.01 V3.8 April 2022

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SSIVT Current Voltage Measurement

OVERVIEW

The Sciencetech model SSIVT is an electrical current voltage measurement system that uses a Keithley 2400 series sourcemeter to characterize photovoltaic cell performance. Sciencetech manufactures Solar Simulators and offers a variety of cell measurement accessories such as reference cells, cell chucks and cooling equipment to provide the full PV measurement package.

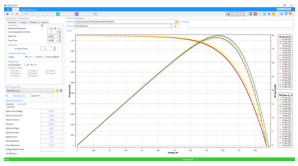
Coupled with Sciencetech's Load Booster system Sciencetech offers industry leading power range. Our maximum measurable panel is up to 200V, 80A. See the BI series modules information below.

Sciencetech's SSIVT systems can be combined with our wide range of flash and steady state solar simulators and accessories to create a customized modular system to meet your exact needs.

Modular measurement systems Setup. Full test system sample:

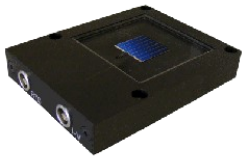
1) I-V Measurement System—(Keithley SMU, Siencetech Software, RS232 to USB cable) SSIVT-20C (175-9103)
2) Solar Simulator: Sciencetech UHE NL-150 500W (166-9028)
3) Calibrated Reference Cell, Quartz Window (585-0154)
4) 16.5x16.5cm Solar Cell Chuck, Liquid Cooled, Vacuum Ready (165-8204)
5) Water Recirculating Cooler 500W Capacity (165-8021)
6) Probe Station, 4 Probes, Tungsten Needle-tip Kelvin Probes (165-8211)
7) Preconfigured Host PC (490-0402)

1) SSIVT-20C

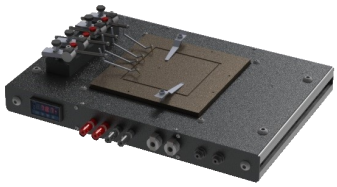


2) UHE NL-150

3) Reference Cell

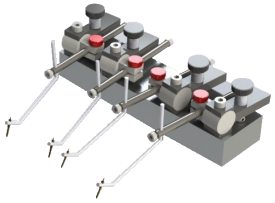


4) Solar Cell Chuck



5) Cooling Water

6) Probe Station



7) PC

SSIVT Current Voltage Measurement

SPECIFICATIONS

SSIVT for Steady State Illumination

Programming Resolution at Maximum Voltage	SSIVT-21C	SSIVT-20C	SSIVT-T20C	SSIVT 100C
Part No.	175-9106	175-9103	175-9108	175-9109
Measured Quantities	Voc, Isc, Vmax, Imax, Pmax, FF, Rseries, Rshunt, Efficiency			
PV Voltage Range	0 - 20V	0 - 200V	0-200V	0-100V
Current Range	0 - 1A	0 - 1A	1A	7A
Power Range	0 - 20W	0 - 20W	0-20W	0-100W
Running Mode	Continuous			
Source Measure Unit (SMU) Model	Keithley 2401	Keithley 2400	Keithley 2450	Keithley 2460
Touchscreen	NO	NO	YES	YES
Voltage Source Accuracy at Maximum Voltage (1 Year, 23ºC ± 5ºC)	0.02% + 2.4mV	0.02% + 24mV	0.015% +24mV	0.015% +15mV
Voltage Programming Resolution at Maximum Voltage	500µV	5mV	5mV	2.5mV
Current Measurement Accuracy at Maximum Current (1 Year, 23ºC ± 5ºC)	0.22% + 570µA	0.22% + 570µA	0.03%+500uA	0.150% + 5mA
Connection	4-wire (Remote) Measurement (In/Out + Sense +/-)			
# of Data Points / Scan*	No limit			
Software Included	Sciencetech SciPV:I-V			
Scan time	5 IV points / Second			
Operating System Compatibility	Windows 10 32/64-bit			

SSIVT for Pulsed Illumination

Model	SSIVT-20F	SSIVT-2kF
Part No.	175-9104	175-9100
Measured Quantities	Voc, Isc, Vmax, Imax, Pmax, FF, Rseries, Rshunt	
PV Voltage Range	0 - 20V	0 - 200V
Current Range	0 - 1A	0 - 10A
Power Range	0 - 20W	0 - 20W
Running Mode	Pulsed	
Source Measure Unit (SMU) Model	Keithley 2400	Keithley 2400
Touchscreen	NO	NO
LoadBoost Module	None	BI100
Expandable Range with LoadBooster Add-ON	YES	YES
Voltage Source Accuracy at Maximum Voltage (1 Year, 23ºC ± 5ºC)	0.02% + 24mV	0.02% + 24mV
Voltage Programming Resolution at Maximum Voltage	5mV	5mV
Current Measurement Accuracy at Maximum Current (1 Year, 23ºC ± 5ºC)	0.22% + 570µA	0.22% + 570mA
Connection	4-wire (Remote) Measurement (In/Out + Sense +/-)	
# of Data Points / Scan*	2 - 100	
Scan time*	10s-10min for pulsed illumination	
Operating System Compatibility	Windows 10 32/64-bit	

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SSIVT Current Voltage Measurement

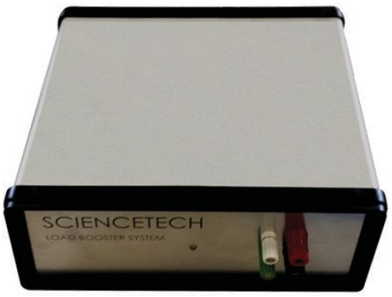
EXPANDABILITY

Sciencetech's SSIVT-2KF systems can be coupled with a Sciencetech load booster system (as shown in the figure on the right) to allow for much higher power measurements. The load booster is inserted between the Keithley and the device under test. The BI100, for example, allows us to measure up to 10A up to the full 200V range of the Keithley.

The load booster systems are only useful when performing pulsed measurements. The load booster cannot dissipate steady state power that would be experienced at input currents >1A. Continuous / steady state input with currents near 1A would destroy the load booster.

Load booster systems

Model	Voltage	Current	Max Energy Dissipation (J)	Max Pulse width FWHM (S)*
BI100 (166-9001)	200V	10A	1.4	1.4 J / Ppeak
BI200 (166-9010)	200V	20A	2.8	2.8 / Ppeak
BI400 (166-9011)	200V	40A	4.2	4.2 / Ppeak
BI600 (166-9012)	200V	60A	5.6	5.6 / Ppeak
BI800 (166-9013)	200V	80A	7.0	7.0 / Ppeak

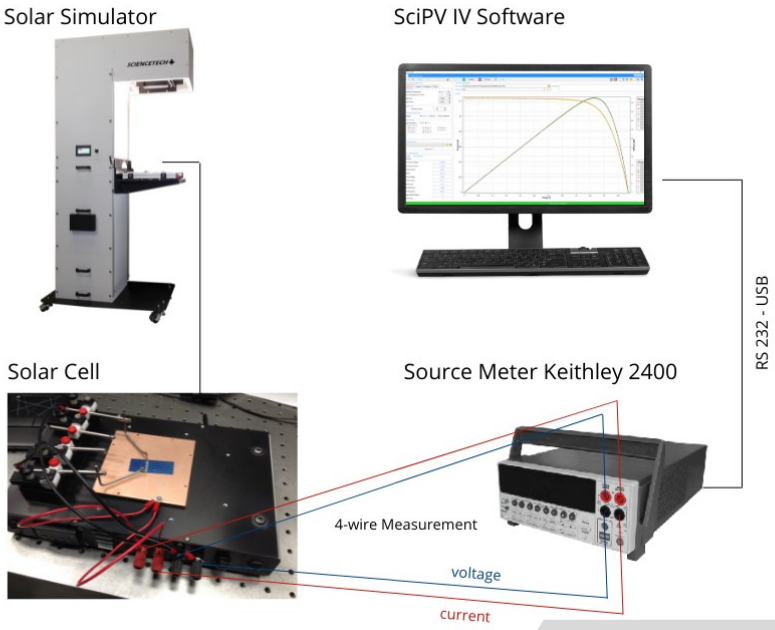


*Where Ppeak = peak module power (W). Usually Ppeak = Isc * OCV * Fill Factor.

Pavg (W) = Ppeak (W) * pulsewidth(s) * Shots / s < 2W (per module)

Loadboosters are designed to be used as front ends for Keithley 2400SMU's. The voltage and current specs are based on integration of the load booster with a Keithley 2400.

SSIVT system configuration



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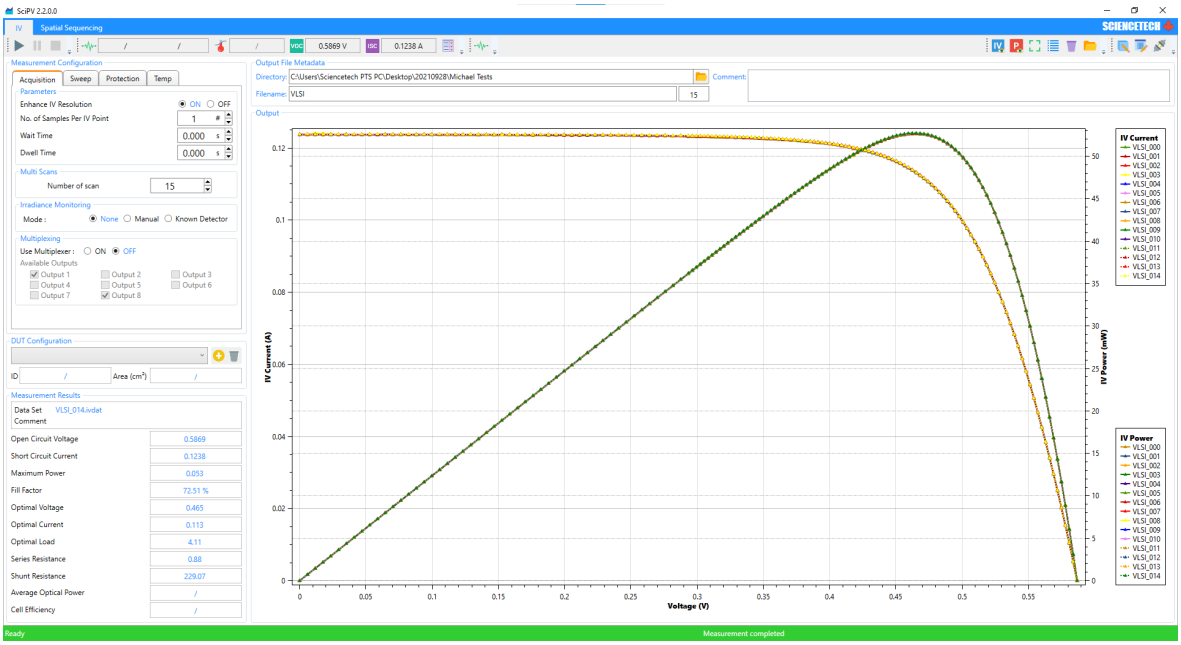
SSIVT Current Voltage Measurement

SCIENCETECH SOFTWARE



SciPV IV Software (SOFT-0102)

Sciencetech Software Features

- Light and dark IV measurements
- Displays reference data
- Manual or automatic range selection
- Allows user calibration of reference detectors
- Graphs Current Vs. Voltage and Power Vs. Voltage
- Overlay Curves for comparison
- Measures V_{OC}, I_{SC}, Vmax, Imax, Pmax, FF, R_{series} and R_{shunt}
- Outputs data to text files readable by all major data analysis software
- Curve smoothing function
- Configurable limit tests to assess cell quality
- Linear and non-linear step voltage
- Records number of flashes for flash systems.
- Temperature logging (optional)
- Cell efficiency calculation (optional)
- Point-by-point Irradiance and temperature measurements (optional)

IV sweep: 150 points in 24 sec

Calibration Scan: 2500 nm in 15 min

Multi scan feature can run 50 sweep without any latency.

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SSIVT Current Voltage Measurement

OPTIONAL ADD-ONS

Upgrades of Hardware and Software

	Name	Description
175-9050	IV Test / PTS Temperature Measurement Upgrade	This is a modification to the Keithley unit used for IV Test measurements to allow the system to measure temperature at the same time as intensity. These Keithley units are used in all of Sciencetech's line of Photovoltaic Testing Systems, as well as our stand-alone IV Test units. Please note that this system requires a calibrated reference cell to operate, and will not function with flash illumination systems.
175-9105	(SSIVT-TU) Point-by-Point Irradiance and Temperature Measurement Upgrade for IV Testers	This upgrade adds the necessary hardware and software modifications to Sciencetech's SSIVT line of IV Testers to allow real-time measurement of temperature, irradiance, and calculations of thermal coefficients for each point of the IV curve. Please note that this upgrade requires a Sciencetech IV Tester in order to function, and will not work if a 3rd party tester is purchased from a different supplier. Please speak with your authorized Sciencetech technical support staff member to discuss specifications and any additional details required.

Add a preconfigured host PC (490-0402)

Pre-configured, Out of the Box

We supply a new mid-grade Personal Computer with a flat screen monitor using licensed Windows Software pre-installed with all drivers.

Not "Just a Computer"

When you purchase a pre-configured host PC from Sciencetech with any Sciencetech equipment, every aspect of the system is tested to ensure smooth operation. With complex systems it can be difficult to select the correct computer and avoid incompatibilities so let us provide a fully tested and operational PC for you. We provide all drivers, hardware, software, cables, etc. needed to get the system up and running.

System requirements

- Windows 10 Operating system, 32/64-Bit
- Intel Core i3 processor or better
- At least 1GB RAM
- Optical Drive
- Screen resolution (1024x768)

Dimensions and Weight

Dimensions

89mm high × 213mm wide × 370mm deep (3 1⁄2 in × 8 3⁄8 in × 14 9⁄16 in)

Bench configuration (with handle & feet)

104mm high × 238mm wide × 3xc70mm deep (4 1⁄8 in × 9 3⁄8 in × 14 9⁄16 in)

Weight

3.21kg (7.08 lbs.)