www.sciencetech-inc.com sales@sciencetech-inc.com +1 (519) 644 0135

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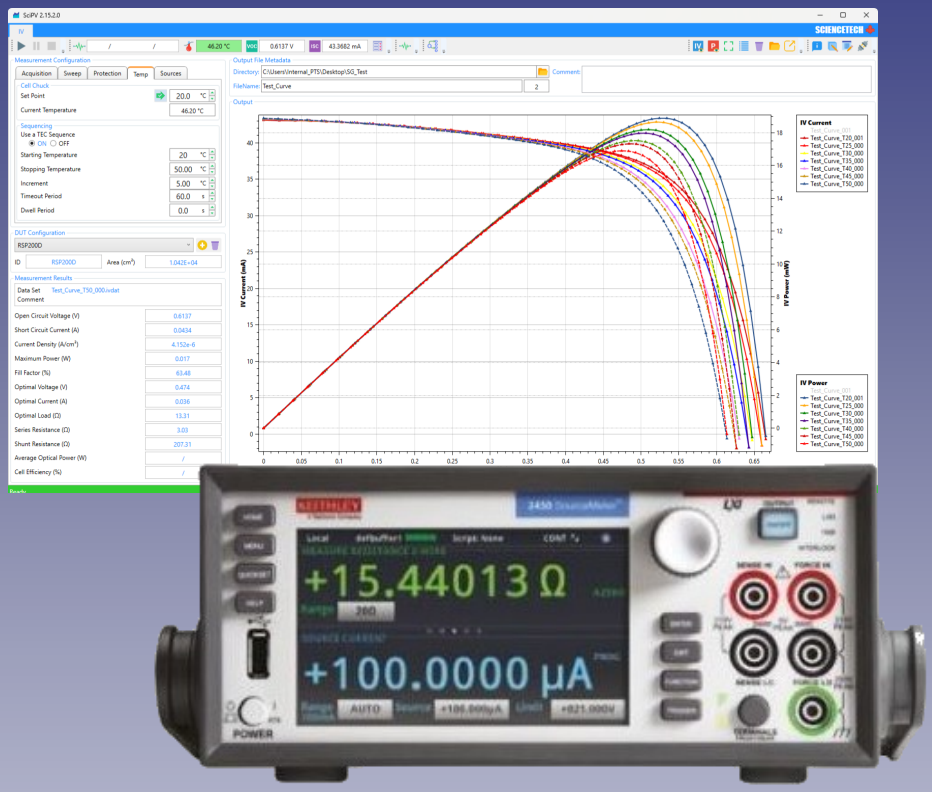
Making Light Work Better



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 SMUs
- Models for continuous or flash operation
- Expandable power range with Sciencetech proprietary load boost technology (flash only)
- Calculates all critical cell performance parameters
- User-friendly exclusive Sciencetech software interface
- Remote operation of Sciencetech flash systems
- Compatible models for all Sciencetech solar simulators

SSIVT - Current Voltage Measurement Systems

MADE IN CANADA
FABRIQUÉ AU CANADA

Version 4.6 2026-05-08

SSIVT - IV Measurement System

OVERVIEW

The Sciencetech model SSIVT is an electrical current-voltage measurement system that uses a Keithley 2400-series graphical source meter 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 200 V, 40 A[1].

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.

1) Attainable with the Sciencetech SSIVT-FT-200-40 (SSIVT-F) Current-Voltage Measurement System for Flash Solar Simulators (IV Tester)

Example of a Full IV Measurement System with a Solar Simulator:

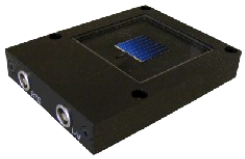
1) **SSIVT-CT-200-1**: I-V Measurement System - (Keithley SMU, Sciencetech Software, RS232 to USB cable, Test cell) (175-9120-C01) *
2) **UHE-NL-200:** Solar Simulator: 20 × 20 cm AAA, 1000 W Lamp (166-9029)
3) **SOL-REF-Q**: Solar Reference Cell, Calibrated, Quartz Window (125-9060)
4) **SCC-6-TE:** 16.5 × 16.5 cm Solar Cell Chuck, TE Cooled, Vacuum Ready (165-8226)
5) **SCP-4G:** Probe Station, 4 Probes, Gold Spring Probes (165-8214)
6) **COMP**: Preconfigured Host PC (560-8002)

* If you're interested in an economical I-V measurement system, the SMU SSIVT-CT-030-1 (I-V Measurement System - S100 SMU, Sciencetech Software, RJ45 LAN communication cable, Test cell) (175-9120-C05) would be the best option for you.

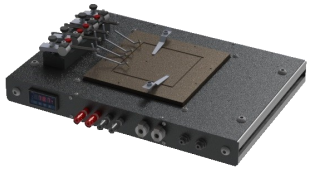
1) SSIVT-CT-200-1

2) UHE NL-200

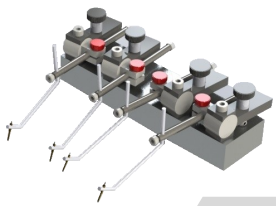
3) SOL-REF-Q
Solar Reference Cell



4) SCC-6-TE with SCP-4G



5) SCP-4G , Probes



6) COMP

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SSIVT - IV Measurement System

SPECIFICATIONS

SSIVT for Steady-State (Continuous) Illumination

Model	SSIVT-CN-020-1 175-9120-C03	SSIVT-CT-200-1 175-9120-C01	SSIVT-CT-100-7 175-9120-C04	SSIVT-CT-030-1 175-9120-C05
Measured Quantities	V_{OC}, I_{sc}, J_{sc}, V_{max}, I_{max}, P_{max}, FF, R_{series}, R_{shunt}, Efficiency			
Maximum Voltage	20 V	200 V	100 V	30 V
Maximum Current	1 A	1 A	7 A	1 A
Maximum Power	20 W	20 W	100 W	30 W
Voltage Measurement Resolution	100 nV	10 nV	100 nV	30 µV
Current Measurement Resolution	1 pA	10 fA	1 pA	10 pA
Running Mode	Continuous			
Source Measure Unit (SMU) Model	Keithley 2401	Keithley 2450	Keithley 2460	S100
Touchscreen	NO	YES	YES	YES
Voltage Source Accuracy at Maximum Voltage (1 Year, 23ºC ± 5ºC)	0.02% + 2.4 mV	0.015% + 24 mV	0.015% + 15 mV	0.1% + 3 mV
Voltage Programming Resolution at Maximum Voltage	500 µV	5 mV	2.5 mV	3 mV
Current Measurement Accuracy at Maximum Current (1 Year, 23ºC ± 5ºC)	0.22% + 570 µA	0.03% + 500 uA	0.150% + 5 mA	0.1% + 2 mA
Connection	4-wire (Remote) Measurement (In/Out + Sense +/-)			
# of Data Points / Scan	No limit			
Software Included	Sciencetech SciPV-IV			
Scan time	5 IV points / second			
Operating System Compatibility	Windows 11			

SSIVT for Pulsed (Flash) Illumination

Model	SSIVT-FT-200-10 175-9221-C01	SSIVT-FT-200-20 175-9221-C02	SSIVT-FT-200-40 175-9221-C03
Measured Quantities	V_{OC}, I_{sc}, J_{sc}, V_{max}, I_{max}, P_{max}, FF, R_{series}, R_{shunt}		
Maximum Voltage	200 V	200 V	200 V
Maximum Current	10 A	20 A	40 A
Voltage Measurement Resolution	10 nV		
Current Measurement Resolution	10 fA		
Running Mode	Pulsed		
Source Measure Unit (SMU) Model	Keithley 2450		
Touchscreen	YES		
LoadBoost Module Included	BI100	BI200	BI400
Voltage Source Accuracy at Maximum Voltage (1 Year, 23ºC ± 5ºC)	0.02% + 24 mV		
Voltage Programming Resolution at Maximum Voltage	5 mV		
Current Measurement Accuracy at Maximum Current (1 Year, 23ºC ± 5ºC)	0.22% + 570 µA		
Connection	4-wire (Remote) Measurement (In/Out + Sense +/-)		
# of Data Points / Scan	2 - 100		
Software Included	Sciencetech SciPV-IV		
Scan time	10 s - 10 min for pulsed illumination		
Operating System Compatibility	Windows 11		

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SSIVT - IV Measurement System

EXPANDABILITY

Sciencetech's SSIVT- series systems can be coupled with a different Sciencetech load booster system 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 10 A up to the full 200 V 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 >1 A.

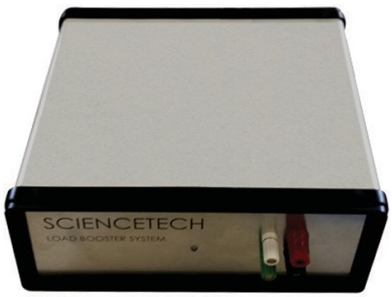
Load Booster Systems

Model	Voltage (V)	Current (A)	Max Energy Dissipation (J)	Max Pulse width FWHM (s)[1]
BI100 (166-9001)	200	10	1.4	1.4 J / P_{peak}
BI200 (166-9010)	200	20	2.8	2.8 J / P_{peak}
BI400 (166-9011)	200	40	4.2	4.2 J / P_{peak}
BI600 (166-9012)	200	60	5.6	5.6 J / P_{peak}
BI800 (166-9013)	200	80	7.0	7.0 J / P_{peak}

[1] P_{peak} (peak module power (W)) = $I_{SC} \times V_{OC} \times$ Fill Factor

P_{Avg} (W) = P_{Peak} (W) × Pulse width (s) × Pulses / S

Per Module : $P_{Avg} < 2$ W

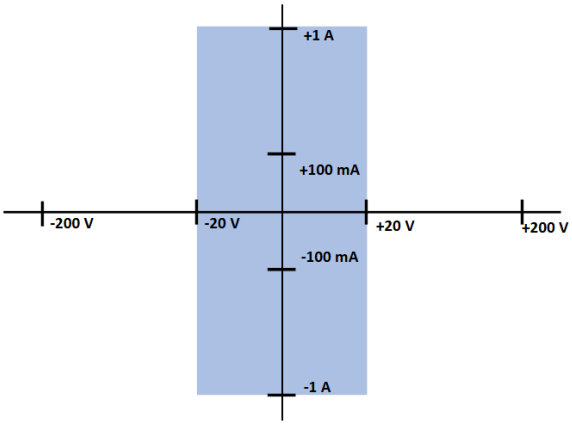


Load boosters are designed to be used as front ends for Keithley 2400-series SMUs. The voltage and current specifications are based on integration of the load booster with a Keithley 2400.

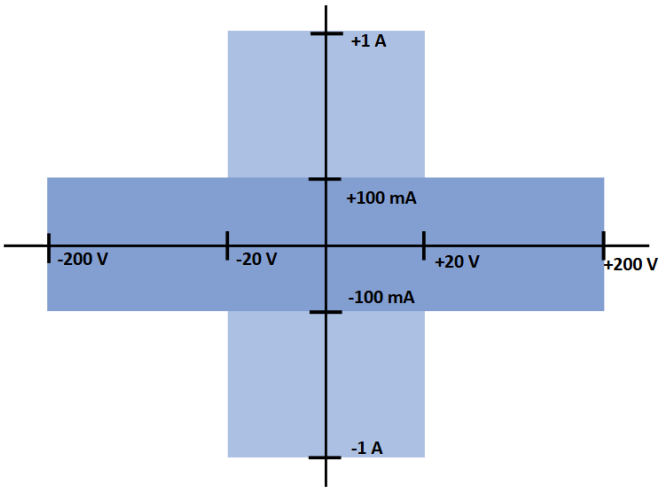
SSIVT - IV Measurement System

SMU Graphical Ranges

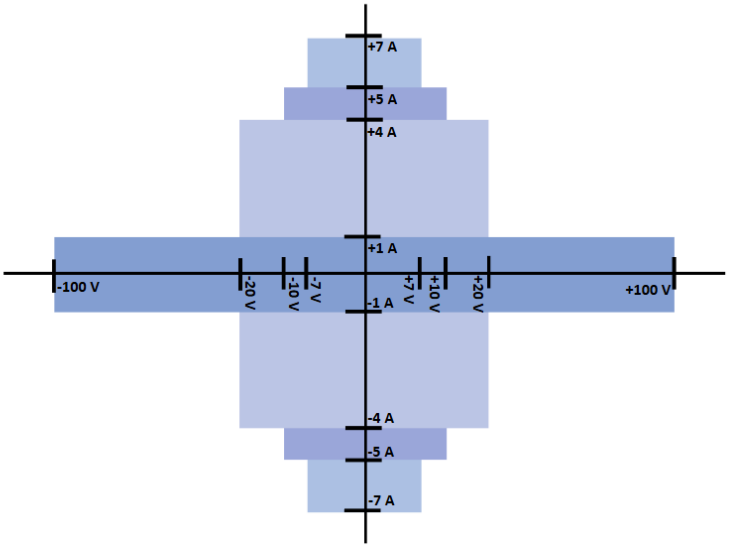
SMU Graphical Voltage and Current Ranges



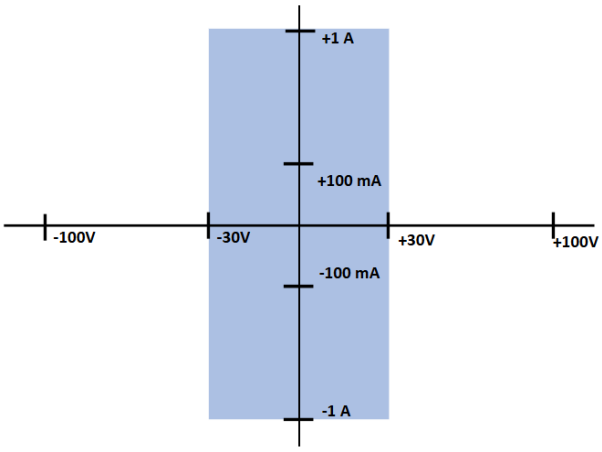
SSIVT-CN-020-1 - (Keithley 2401, V_{max} =20 V, I_{max} = 1 A)



SSIVT-CT-200-1 - (Keithley 2450, V_{max} =200 V, I_{max} = 1 A)



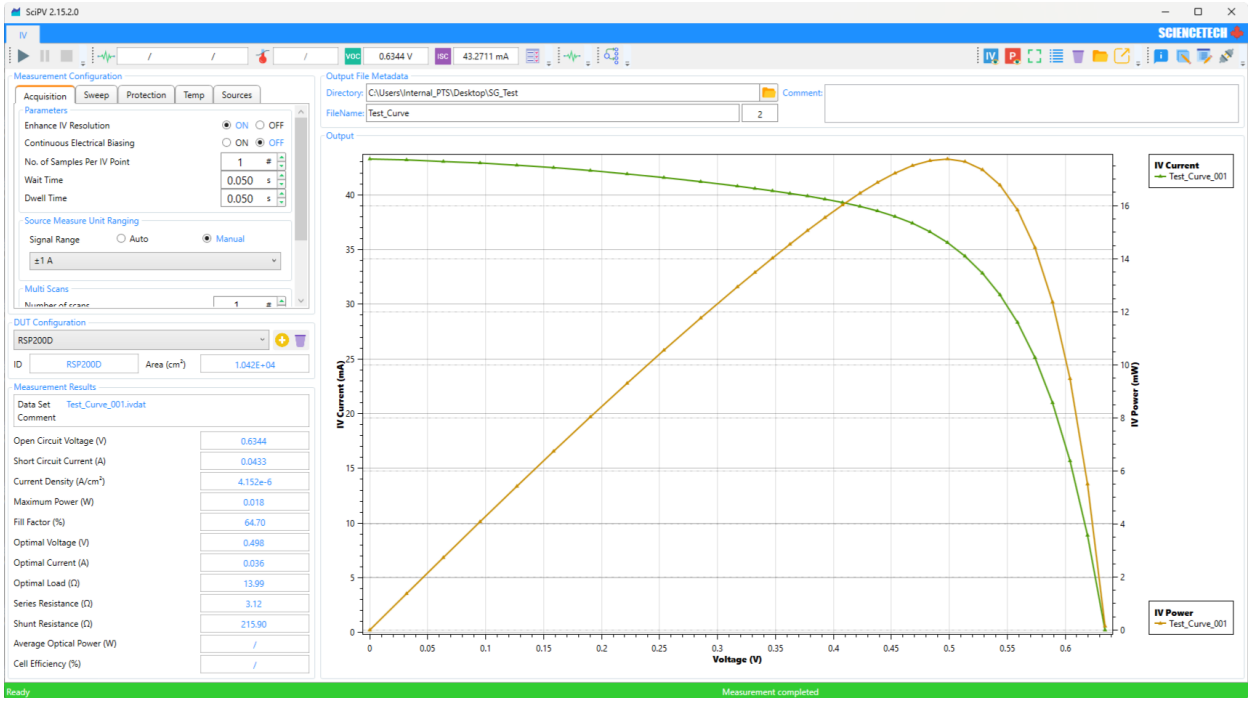
SSIVT-CT-100-7 - (Keithley 2460, V_{max} =100 V, I_{max} = 7 A)



SSIVT-CT-030-1 - (S100, V_{max} =30 V, I_{max} = 1 A)

SSIVT - IV Measurement System

SOFTWARE



SciPV-IV Software (SOFT-0122X)

SciPV-IV Software Features

- Light and dark IV measurements
- Displays reference data
- Manual or automatic range selection
- Allows user calibration of reference detectors
- User-configured DUTs saved to memory
- Graphs current vs. voltage and power vs. voltage
- Overlay curves for comparison
- MPPT functionality
- Measures V_{oc}, I_{sc}, J_{sc}, Vmax, Imax, Pmax, FF, R_{series} and R_{shunt}
- Outputs data to text files readable by all major data analysis software
- Automatic file indexing
- Automatic polarity detection
- Configurable limit tests to assess cell quality
- Linear and non-linear step voltage
- For use with steady-state (continuous) or pulsed (flash) systems
- Cell efficiency calculation
- Temperature logging and control[1]
- Point-by-point irradiance and temperature measurements[1]
- Up to 8-channel multiplexing[2]
- Control of light sources[3]

Computer Requirements for SciPV-IV Software

- Windows 11 Operating system - please inquire about other version compatibility

[1] Temperature logging and control are only available when using a thermoelectrically-cooled Sciencetech cell chuck.

[2] With the addition of a Sciencetech multiplexer.

[3] When using Sciencetech light sources.

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SSIVT - IV Measurement System

MULTIPLEXING DEVICES

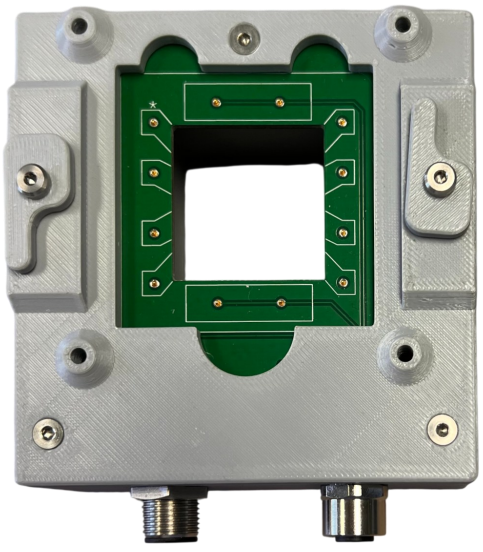
Automatic Multiplexing Operation

With a Sciencetech IV-MUX device or SCC-MUX device plus a modular switch box (model MODQE), Sciencetech's SciPV-IV software capabilities are truly unleashed. Operators can choose to perform automatic measurements on up to 8 outputs. Individual IV measurement files are saved with each IV trace.

Two multiplexers are available to work with the MODQE switchbox:

- SCC-MUX (165-8232)

Sciencetech's SCC-MUX is a customizable multiplexer designed for small device fabricators and testers. Pixels are fabricated onto standardized glass substrates and can be easily mounted into the SCC-MUX device.

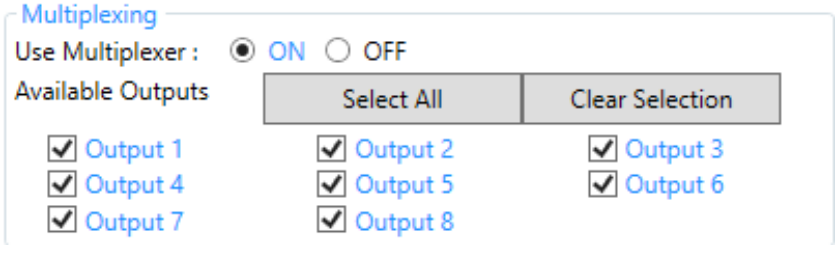


SCC-MUX

- IV-MUX (175-8202)

Sciencetech's IV-MUX is an open-frame, general-use multiplexer. It requires operators to wire device outputs to a terminal block.

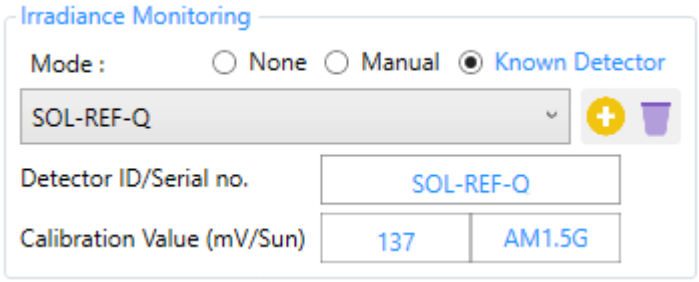
IV-MUX



SSIVT - IV Measurement System

IRRADIANCE MONITOR

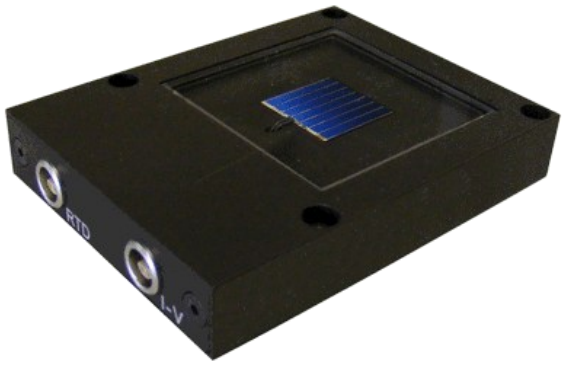
Sciencetech SOL-REF-Q , SSIVT-REF and SCI-MO devices can be coupled to the rear panel of the SSIVT SMU and used as irradiance monitors during IV measurements. Reference devices must be placed in the direct illumination field when used in continuous irradiance monitoring (known detector) mode. When using a calibrated reference device provided by Sciencetech with a Sciencetech SSIVT system and SciPV-IV software, the irradiance monitor function is automatically available.



If an irradiance monitor can't fit into the illumination area, our SciPV-IV software has a solution. A user can still manually enter the irradiance value using the available 'Manual' mode.

For SciPV-IV software to calculate cell efficiency, a value for irradiance and device area must be provided.

SSIVT-REF



SOL-REF-Q

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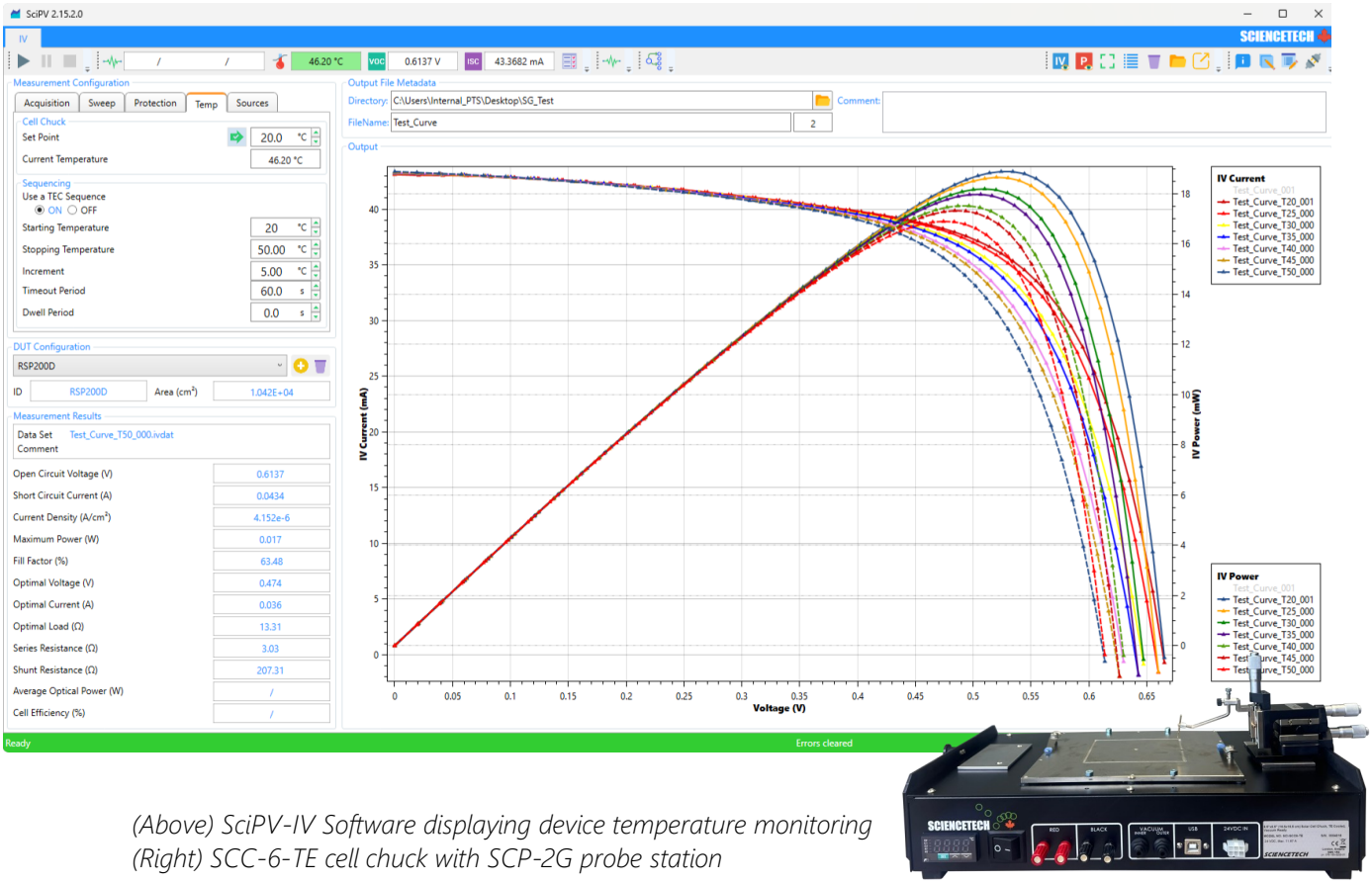
SSIVT - IV Measurement System

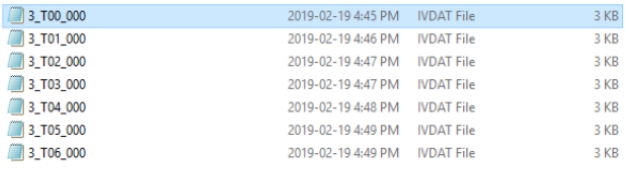
TEMPERATURE MONITOR AND SEQUENCING

When coupling Sciencetech's continuous IV measurement systems with a thermoelectrically-cooled Sciencetech cell chuck, such as the SCC-3-TE or SCC-6-TE, device temperature monitoring and sequencing may be performed.



(Above) SciPV-IV Software displaying device temperature monitoring
(Right) SCC-6-TE cell chuck with SCP-2G probe station

Sequencing allows operators to set a range of temperature set points at which IV measurements must be taken. The IV measurement sequence and temperature settings are completely automatic. Data sets at each temperature set point are automatically produced and saved.



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SSIVT - IV Measurement System

OPTIONAL ADD-ONS

Upgrades of Hardware and Software

Model	Name	Description
175-9110	(IV-TEMP-C)	Intended for use with the SSIVT steady-state (continuous) systems. This upgrade includes a temperature measurement unit wired for RTD devices. The unit connects by USB interface to a PC and interfaces with SciPV-IV. SciPV-IV can be configured to read RTDs connected to the temperature monitor. When the temperature monitor is activated, temperature values are stored in IV measurement files.
175-9111	(IV-TEMP-F)	This upgrade includes a temperature measurement unit wired for RTD devices and rack mounted. It is intended for use with the SSIVT pulsed (flash) systems. It is designed to couple directly to PSS system RTD outputs. With this option temperature is recorded in the IV measurement file with each flash pulse.

Add a preconfigured host PC (560-8002)

Pre-configured, out-of-the-box computer

Get more than just a computer! Our mid-grade PC, complete with a flat-screen monitor and licensed Windows software, is pre-installed with all drivers and fully tested for seamless compatibility with Sciencetech equipment.

We provide drivers, hardware, software, cables, and accessories needed for a smooth setup, ensuring you're ready to go right out of the box.

SSIVT - IV Measurement System

ORDERING INFORMATION

Model	SKU	Description
SSIVT-C	175-9120	Current-voltage measurement system for continuous solar simulators
SSIVT-F	175-9121	Current-voltage measurement system for flash solar simulators
BI100	166-9001	Load booster system for 200 V, 10 A
BI200	166-9010	Load booster system for 200 V, 20 A
BI400	166-9011	Load booster system for 200 V, 40 A
BI600	166-9012	Load booster system for 200 V, 60 A
BI800	166-9013	Load booster system for 200 V, 80 A
SciPV-IV	SOFT-0122X	IV measurement software
SOL-REF-Q	125-9060	Calibrated monocrystalline silicon reference cell, quartz window
SSIVT-REF	125-9021	SSIVT reference detector
SCI-MO	125-9040	Sciencetech monitor detector assembly
SCC-3-TE	165-8310	3.5" × 3.5" (9 × 9 cm) Solar Cell Chuck, TE Cooled, Vacuum Ready
SCC-6-TE	165-8226	15 × 15 cm (6" × 6") Solar Cell Chuck, TE Cooled, Vacuum Ready
SCC-6-L	165-8300	15 × 15 cm (6" × 6") Solar Cell Chuck, Liquid Cooled, Vacuum Ready
SCC-MUX	165-8232	Solar Cell Chuck with 8-Channel Multiplexer, Uncooled
IV-MUX	175-8202	Open-frame 8-channel multiplexer
IV-TEMP-C	175-9110	Temperature measurement upgrade for continuous IV measurement systems
IV-TEMP-F	175-9111	Temperature measurement upgrade for flash IV measurement systems
UHE-NL-200	166-9029	200 × 200 mm target size, class AAA solar simulator
SciSun-AM1.5G	160-9108	SciSun Solar Simulator, AM1.5G, Class AAA, 50 × 50 mm
130-REC	165-8021	Water Recirculating Cooler 500 W capacity
SCP-4G	165-8214	Probe Station, 4 Probes, Gold Spring Probes
COMP	560-8002	Computer Package