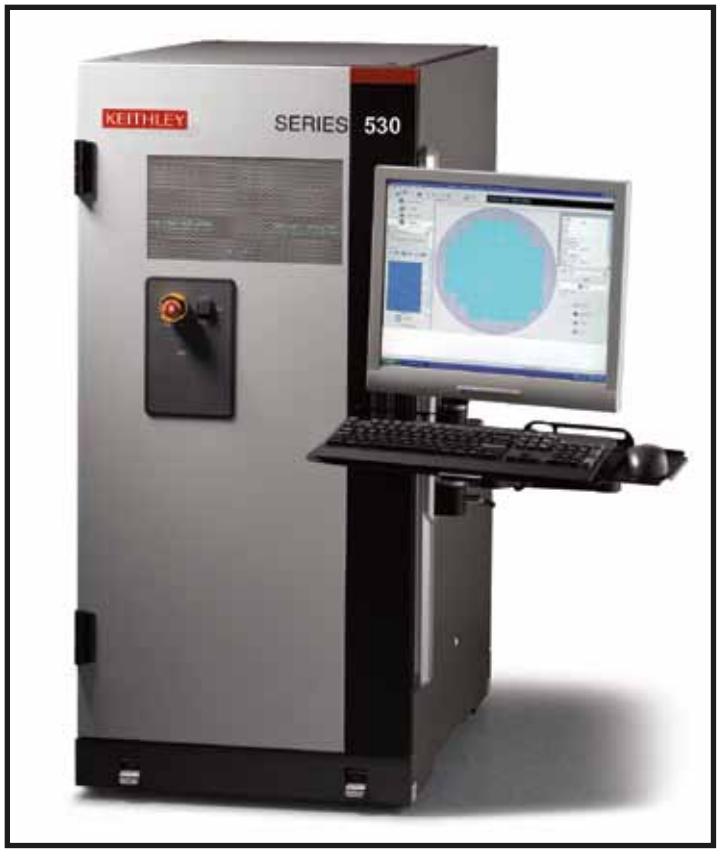
S530

Parametric Test Systems

- **Semiconductor industry's most cost-effective fully automatic parametric testers**
- **Optimized for use in environments with a broad mix of products, where high flexibility and fast test plan development are critical**
- **Choice of low current or high voltage system configurations**
  - **Low current configuration supports measurement of low current characteristics such as sub-threshold leakage, gate leakage, etc.**
  - **High voltage configuration is optimized for monitoring processes used for GaN, SiC, and Si LDMOS power devices**
- **Compatible with popular fully automatic probe stations**
- **All systems configured with high power 20W SMUs: 1A@20V, 100mA@200V, 20mA@1000V (1000V range available only on high voltage S530 systems)**
- **Cabled-out tester configuration maximizes prober interface flexibility and expands voltage range**
  - **Compatible with Keithley's Model 9139A Probe Card Adapter**
  - **Supports reuse of existing five-inch probe card libraries**
- **Proven instrumentation technology ensures high measurement accuracy and repeatability in both the lab and the fab**



Keithley's S530 Parametric Test Systems can address all the DC and C-V measurements required in process control monitoring, process reliability monitoring, and device characterization because they are built on proven sourcing and measurement technology.

Optimized for High-Mix Test Environments

S530 Parametric Test Systems are designed for production and lab environments that must handle a broad range of devices and technologies, offering industry-leading test plan flexibility, automation, probe station integration, and test data management capabilities. Keithley has brought more than 30 years of expertise in delivering a wide range of standard and custom parametric testers to customers around the world to the design of these test solutions.

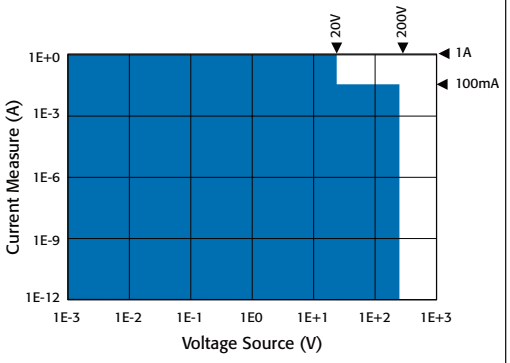
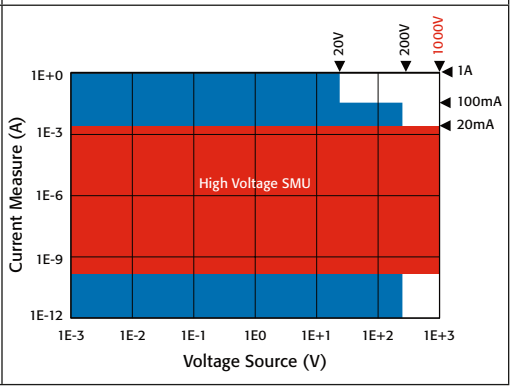
Simple Software Migration and High Hardware Reuse

S530 systems are designed with capabilities that speed and simplify system startups and maximize reuse of your existing test resources. For example, the Automated Characterization Suite (ACS) software that controls these systems is compatible with many new and legacy automatic probe stations, so you may be able to eliminate the cost of a new one. In addition, the S530's cabled-out configuration typically allows continued use of your existing probe card library. Several optional applications services can help you keep getting the full value of your existing prober and probe card investments. Keithley can also provide assistance to speed the development of new test recipes or conversion of your existing ones for use with S530 systems.

Semiconductor Industry's Most Powerful Standard Parametric Test System

Two different system configurations are available to address different parametric test application environments. The S530 Low Current System, which is configurable from two to eight Source-Measure Unit (SMU) channels, provides sub-picoamp measurement resolution and low current guarding all the way to the probe card, which makes it ideal for characterizing sub-micron silicon MOS technologies. The S530 High Voltage System, configurable from three to seven SMU channels, can source up to 1000V for use in the difficult breakdown and leakage tests that automotive electronics and power management devices demand.

Table 1. S530 System Selector Guide

	Description	Typical Use Cases/Settings	Key Range and Offset Performance
S530 Low Current System	Ideal for both mature and emerging technologies that demand pico-amp current measurement capability	• Source up to 200V or 1A • Measure current with atto-amp resolution with pico-amp offset • Measure voltage with microvolt resolution and millivolt offset	
S530 High Voltage System	Optimized for power electronics and display technologies that require testing at high voltages	• Source up to 1000V or 1A • Measure current with atto-amp resolution with pico-amp offset[1] • Measure voltage with microvolt resolution and millivolt offset	

1. Using 200V SMU. The 1000V SMU provides 10pA resolution with nanoamp-level offset.

All Series S530 systems are equipped with Keithley's proven high power SMUs, which provide up to 20W source or sink capability on both the 200V and 20V ranges. This level of power is essential for complete characterization of the high power devices and circuits prevalent in today's mobile devices. Whether the application is testing LDMOS Si or GaN BJTs, this higher power capability provides greater visibility into device performance. That means S530 systems can handle high power device testing without compromising the low current sub-picoamp sensitivity needed to monitor mainstream device processes. In contrast, competitive parametric test systems are limited to medium power 2W SMUs, so they cannot match the S530 systems' range of applications.

Full Kelvin Standard Configurations

All too often, currents higher than a few milliamps lead to measurement errors as a result of voltage drops across the interface cables and pathways. To prevent this drop in measurement integrity, both the low current and high voltage S530 systems provide full Kelvin measurements (also known as remote voltage sense) at the probe card. Full Kelvin measurements are particularly critical to ensuring measurement accuracy given the 20W capability of the high power SMUs used in S530 systems. For test environments in which minimizing system cost is of higher importance than absolute accuracy, S530 testers can be configured as non-Kelvin systems.

Industry's Most Powerful High Voltage Parametric Test System

The S530 High Voltage Semiconductor Parametric Test System is the only parametric tester available that's capable of full Kelvin high voltage performance on up to 24 pins, a capability that's invaluable for characterizing today's higher power devices. The system incorporates a high voltage SMU that sources up to 1000V at 20mA (20W max.). Two high voltage pathways allow making either direct high-side current measurements (in which a single SMU is used to both source and measure the high side of the DUT) or higher sensitivity low-side low current measurements (in which one SMU is used to source high voltage to the high side of the DUT and a different SMU is used to force 0V and measure the current of the low side).

System Architecture

Each S530 system configuration is made up of five layers:

- Instruments layer – This layer includes the SMUs, the capacitance-voltage instrumentation (CVU), and any auxiliary instruments configured into the system.
- Pathways layer – S530 systems provide high fidelity signal pathways that can be dynamically reconfigured to allow any instrument to be connected to any pin or set of pins during test.
- Cable interface layer – All system interconnects are constructed of fully shielded and guarded triaxial low leakage, high voltage cables to ensure higher measurement integrity.
- Probe card adapter (PCA) layer – This layer extends the shield and guard to the probe card to ensure measurement integrity. Also, the PCA provides auxiliary inputs for instruments that require direct access to the probe card and must bypass the signal path switch matrix.
- Probe card layer – This layer includes the custom cards supplied by your probe card vendors.

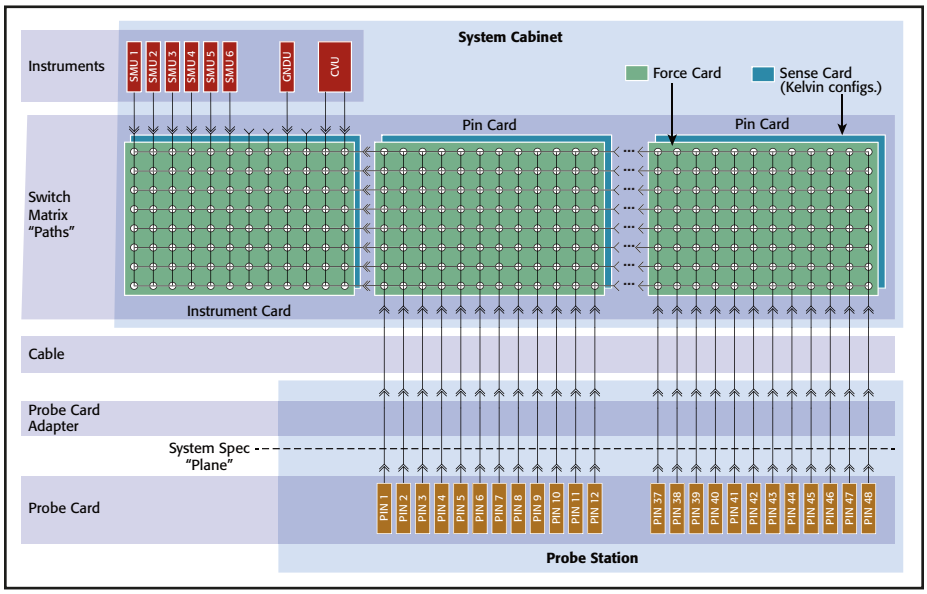
Signal Pathways

The core of each S530 test system is a set of high fidelity signal pathways that direct signals between instruments and test pins. The performance of these pathways directly influences the performance of the test system as a whole by setting upper current and voltage ranges, and limiting low-level measurements due to current offsets. The S530 has eight high fidelity pathways that can be used to route instruments to pins dynamically. For example, up to eight SMUs can be routed to any pin (or number of pins) at one time. The S530 Low Current System delivers uniform performance across all eight pathways; the S530 High Voltage System provides two high voltage/low leakage pathways, four general-purpose pathways, and two C-V pathways. Both system options support C-V measurements up to 2MHz.

Table 2. S530 Pathway Performance

Pathway Type	Key Characteristics	Maximum Voltage	Maximum Current	Comments
Low Current I-V [1]	Ultra low leakage	200V	1A	Limited to 200V max. Provides best low-level signal performance and excellent C-V performance.
High Voltage I-V [2]	1300V	1300V	1A	Supports low-level measurements but not quite as low as the Low Current pathway.
General-Purpose I-V [2]		200V	1A	Suitable for the majority of parametric tests, except for very low current and/or high voltage tests.
C-V [2]		200V	1A	Excellent C-V performance but not suitable for DC I-V measurements.

1. Available only on low current system.
2. Available only on high voltage system.



Every S530 system is made up of five layers: instruments, pathways, cable interface, probe card adapter, and probe card.

Proven SMU Technology

All source-measure units (SMUs) built into S530 Parametric Test Systems are based on Keithley's production-qualified instrument technology to ensure high measurement accuracy and repeatability and extended hardware life. The SMUs are four-quadrant sources, so they can source or sink current or voltage. In addition to precision sourcing circuits, they include programmable limits (compliance) across all ranges, which helps protect both devices and probe tips from damage due to device breakdown. Each SMU also measures both voltage and current while sourcing, which ensures that parameter calculations reflect actual conditions rather than simply the programmed conditions.

Capacitance-Voltage (C-V) Unit

All S530 systems can be equipped with an optional high speed capacitance-voltage measurement unit for C-V measurements up to 2MHz to any pin. This C-V unit can measure a 10pF capacitor at 1MHz with 3% accuracy.

Ground Unit (GNDU)

All source-measure units are referenced to the ground unit or GNDU. During a test, the GNDU provides both a common reference and a return path for current sourced by the SMUs. The GNDU signal is formed by combining all the Source LO and Sense LO signals and referencing them to system ground. The system can easily be configured for a range of ground system configurations to accommodate various probe station ground schemas.

Table 3. System Capabilities Comparison

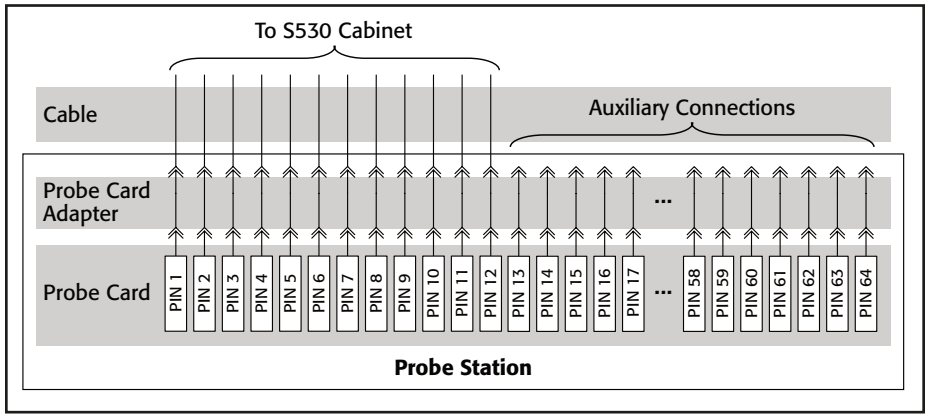
	S530 Low Current	S530 High Voltage
Pin Count	Up to 60*	Up to 60*
SMU Channels	2 to 8	3 to 7
Vmax	200V	1000V
Imax	1A	1A
Vmin Resolution	1μV	1μV
Imin Resolution	1fA	1fA (100pA at 1000V)
CVU	1kHz to 2MHz	1kHz to 2MHz

*Maximum of 24 pins with full-Kelvin option.

Standard 9139A Probe Card Adapter

The standard probe card adapter (PCA) for the S530 parametric test systems is the proven Model 9139A. Several key features and performance advantages have made it the industry's leading choice of PCA for more than 20 years:

- Low offset currents that maximize low current performance.
- Low noise performance that helps ensure the integrity of low-level voltage measurements.
- Minimally invasive, low profile design that allows easy camera integration.
- 64 inputs – Configurable to support both standard cable connections from the tester and auxiliary inputs for instruments that bypass the pathway matrix.
- 500V pin-to-pin isolation (1000V when connecting only to every other pin).



The Model 9139A PCA can be configured for auxiliary I/O connections, allowing instruments to be connected to it directly, bypassing the switch matrix signal paths. This provides for maximum bandwidth to the test structure with a minimum number of variables.

High flexibility cabled-out configuration

S530 systems are "cabled-out" configurations to provide the broad interconnect flexibility that high-mix fab and lab environments demand. These systems can be interfaced to a variety of probing solutions, including high performance circular probe cards, cost-effective rectangular edge-connector probe cards, and even special high performance cards for applications that involve extreme temperatures or demand high durability.

Table 4. S530 System Cabling Options

Cabling Options	Probe Card Type	Features	Benefits
Standard Keithley 9139A PCA (S400-type)	Circular ceramic	Extends driven guard to probe pin	Superior low current measurements. Supports up to 64 pins; easily configured for auxiliary inputs for additional instrument options
Custom Cabled to Existing PCA Type	Typically for five-inch rectangular probe cards using edge card connectors	Compatible with existing probe card library	Reduces migration cost by reusing existing probe cards
Unterminated Cables	Cables connected to pathway output with unterminated cable ends	Ready to cable to existing interface or fixture	Provides recommended cable to optimize system performance
No Cables	Custom probe card	No need to purchase a cable solution	Use cable system provided by custom probe card vendor

The Model 9139A Probe Card Adapter has been trusted by the industry for more than 10 years. Its combination of low current performance and high voltage capability make it the ideal companion to the S530 Parametric Test Systems.

Alternative Probe Card Adapters (PCAs)

Optional probe card adapters are available for all S530 configurations. In the simplest form, the edge connector used to interface to a rectangular probe card (typically referred to as five-inch probe cards) is a PCA. This type of PCA provides the most cost-effective solution for applications involving mid-range signal levels. If desired, the Model 9139A PCA can be configured into any S530 system as an option. This PCA is designed for interfacing the system to circular probe cards (from Keithley-approved vendors) via pogo pin connections. Probe-station-specific adapter plates can be specified during ordering to ensure the Model 9139A's compatibility with a variety of popular probe stations.

Probe Cards

Unlike testhead-based systems, S530 systems are easily adaptable for use with a wide range of probe card types, so you likely won't need to replace your existing (and expensive) probe card library. Although Keithley recommends the use of the Model 9193A PCA and approved probe card vendors, we recognize you have made a major investment in your current cards. If probe card reuse is critical to your capital equipment strategy, consult an applications team member to learn about connection options that can protect your probe card investment.

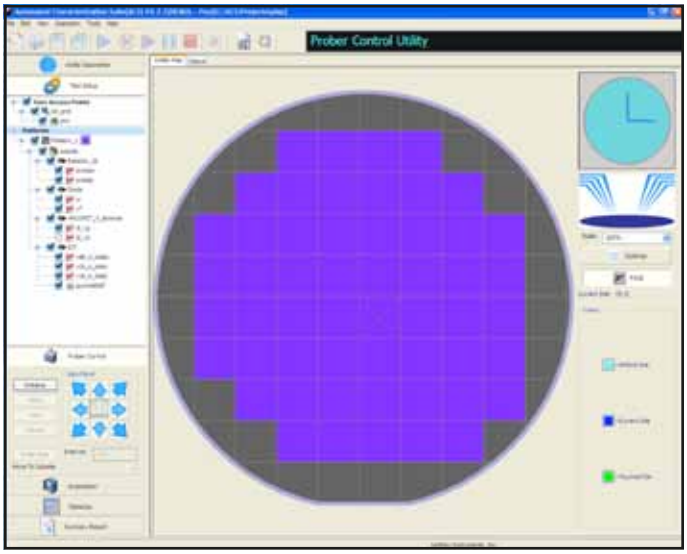
System Software

Keithley's ACS software maximizes the efficiency and flexibility of our S530 systems, bringing together all the key elements for automated parametric testing in a single integrated package. All the key operations are included:

- Wafer description and cassette sample plan
- Limits setting and binning definition
- Test plan development
- Interactive probe station control
- Fully and semi automatic wafer/cassette testing
- Test data management
- Integrated statistical analysis

Probe Station Automation and Control

ACS software provides a unique interactive probe station control capability that simplifies wafer navigation while developing a test or analyzing a lot on hold. There's no need to retest an entire wafer; ACS allows moving probe pins freely from site to site or subsite to subsite, then executing a test or test sequence and reviewing the results immediately.



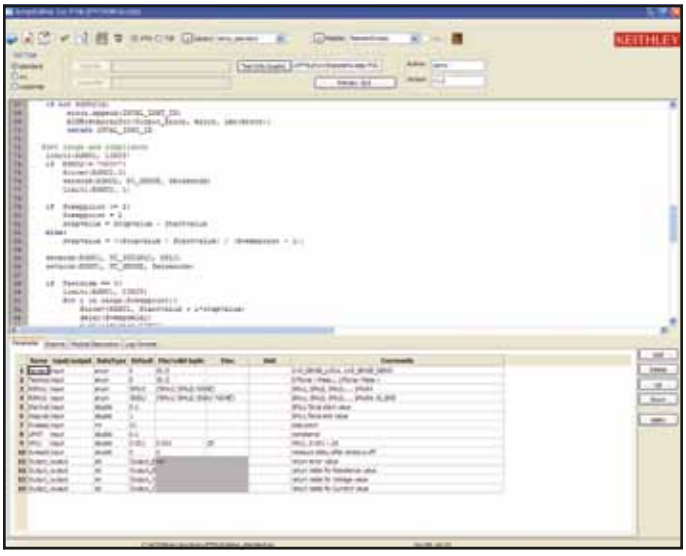
This *Prober Control* screen supports dynamic navigation at both the wafer and cassette levels, as well as interactive test execution. By freeing the engineer from the constraints of the conventional linear test flow, this capability greatly accelerates test plan development by allowing for immediate verification of the test results; it also speeds lot disposition by allowing engineers to examine a problem in detail or perform selective retesting to identify or quantify problems.

Test Plan Development

Developing a test plan for a new product doesn't have to be time-consuming. ACS provides tools specifically designed to maximize test plan development efficiency. They are integrated into a single interface that makes it simple and quick to evaluate the effects of test plan changes so you can continue to refine them with confidence.

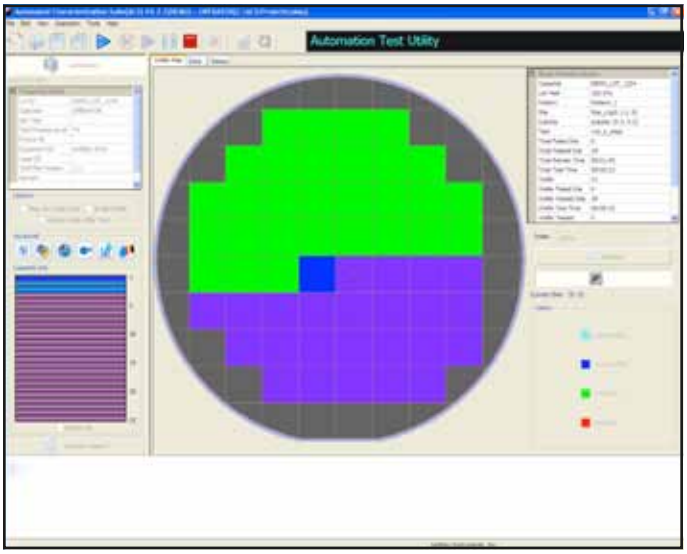
- *Interactive Probe Station Control* – ACS makes it simple to move the probe pins from site to site to execute tests interactively during test plan development.
- *Real-Time Data Plotting* – As a test is executed, the resulting measurements are automatically fed to a spreadsheet. From there, the data is automatically plotted according to the rules you've defined.
- *Formulator* – Many parametric measurements require extracting parameters from raw measurements. Most often, these measurements are sweeps (vector data). ACS's built-in formulator can execute both standard and user-defined mathematical operations on the data to extract the parameters (scalar data) desired. Once fed to the spreadsheet, the resulting data can be plotted just by clicking a tab.
- *Script Editor* – The test script editor is fully integrated within ACS's test plan development environment. There's no need to use an external editor and compiler to build a script, so you can judge the effect of your test plan changes immediately.
- *Test Sequencing and Reuse* – ACS provides two ways to organize a test plan: the *Test Tree* provides a root and hierarchical branch scheme that's well-suited for creating simple test plans for a handful of subsites quickly; the Test Map allows mapping to or logically connecting sites, devices, and tests. The Test Map is most useful for developing complex test plans that include large numbers of unique subsites and devices mapped to a few tests. Although the Test Tree requires cutting/pasting tests for reuse, the Test Map requires only logical links, which the GUI supports building and modifying quickly.

Together, these tools form a highly interactive test plan development environment that accelerates lot analysis, troubleshooting, and disposition of "hold" lots dramatically. They also help ensure you'll be testing successfully from your first full cassette of wafers.



To minimize errors during test plan development, ACS's integrated *Script Editor* combines an efficient editor with a special variable management tool. ACS also allows linking an interactive GUI to the script using the *Script Editor and GUI Builder* toolset.

Wafer- and Cassette-Level Automation



The *Automation* screen provides real-time statistics on lot and wafer yields, overall test progress, and color-coded die binning information. The *Operator Mode* screen shown here limits access to some tools to prevent unauthorized modifications to test plans and reports.

Engineer and Operator User Modes

When used in *Engineering Mode*, ACS software offers maximum control and flexibility; in *Operator Mode*, access is limited to only those controls and dialogs required to initiate and terminate fully automatic testing. In Engineering Mode, engineers can block access to specific entry fields in the automation set-up screen on a field-by-field basis. This allows engineers to limit selectively the way in which operators can initiate a lot. Additionally, ACS supports a command line interface to allow other software and systems to control ACS. This allows customer-developed operator interfaces to control ACS.

System Diagnostics and Reliability Tools

Diagnostics are performed routinely to ensure the system is performing as expected and won't generate false failures or false passes. The S530 systems' diagnostics capability verifies system functionality quickly and easily. Key steps in the diagnostics process include configuration verification, communications pathway tests, signal pathway testing, and SMU source-measure tests. Even the cable interface and PCA are included in the diagnostics process to ensure complete system functionality. This diagnostics process is designed to detect and localize a wide range of system problems, speed troubleshooting, and maximize uptime.

High Voltage Instrument Protection Modules

Some S530 instrumentation can produce high voltages that other system instruments are not designed to withstand. If a test sequence or a failed DUT presents too much voltage at the inputs to a low voltage instrument, serious instrument damage is possible. To minimize the potential for these problems, Keithley engineers have developed protection modules that prevent damaging voltages from harming sensitive instruments without compromising their low-level measurement capabilities. In addition to the system's SMUs, these modules protect the system's optional capacitance-voltage instrumentation against high voltage damage.

Industrial PC with RAID Mirror Drive

Even the highest quality disk drives are subject to routine failures, so regular system backups are critical. S530 systems incorporate a high reliability industrial controller including the RAID (Redundant Array of Independent Disks) option, designed to maintain a mirror of the master drive at all times. In the event of a drive failure, the mirror drive becomes the master and the user is notified that a drive replacement should be scheduled immediately. With a RAID mirror drive, a failed drive represents a scheduled repair rather than a downed system.

Support Services and Contracts

Keithley's worldwide network of service and applications professionals provides expert support services ranging from initial installation and calibration to repairs and test plan migration services. These services maximize system utilization and uptime while reducing your overall cost of ownership.

- *Installation and Probe Station Integration Services* – Includes the setup and verification of the system, as well as probe station integration. This includes setting up probe station communications and installing the probe card adapter.
- *Calibration Services* – All S530 Parametric Test Systems are calibrated onsite by a certified Keithley field service engineer.[1] Keithley provides a range of internationally recognized accredited calibration services, including A2LA (American Association for Laboratory Accreditation) accredited calibration.[2]
- *Repair Services* – Repair services ranging from on-site service contracts to self-service module-swaps are available.
- *Test Plan Migration Services* – Keithley's experienced applications engineers are skilled at converting your existing test plans to the S530's ACS software environment. This includes conversion of data objects like user test libraries, wafer description files, cassette plans, etc.
- *Correlation Studies* – Keithley applications engineers can perform correlation studies, comparing your existing parametric test system's capability to the S530's and analyzing the underlying performance differences.

1. While most components of the system are calibrated on site, certain components are calibrated at one of Keithley's worldwide network of service facilities.
2. A2LA accredited calibration services are available in the United States and Germany.

Documentation

A comprehensive manual set is pre-installed on the system; it is also provided on CD:

- *S530 Administrative Guide* – Information on site preparation, installation, etc.
- *ACS Users Reference Manual* – A detailed reference and instruction manual on the operation of the ACS software.
- *ACS Programmers Guide* – Provides a detailed reference to developing test scripts, using standard libraries, building and maintaining custom libraries, etc.
- *Prober Manual* – Assists in automatic probe station setup and programming. It includes driver details and usage instructions.

System Performance Specifications

All system specifications are to the system reference plane, which is located between the pogo pins of the Model 9139A PCA and the probe card.

Customization in Layers

The S530 provides a number of hardware and software customization layers for adapting the system to a wide range of test needs:

- Instrumentation – Standard Options
- Custom instrumentation
- Auxiliary instrument connections on PCA
- Customizable load board in PCA
- User Access Points (to customize test sequence framework)

User Access Points (UAPs) for Added Flexibility

User Access Points or UAPs can be used to modify the operational flow of the test sequence at key events like "load wafer," "start test," "end cassette," etc. They are useful for adding system capabilities like reading wafer cassette RFID tags or reading wafer IDs using an OCR system. During test operation, an enabled UAP triggers the execution of one or more custom operations defined in a script or executable program.

Condensed Specifications

Low Current System

Current Range	Max. Voltage	MEASURE Resolution	MEASURE Accuracy	SOURCE Resolution	SOURCE Accuracy
1 A	200 V	10 µA	0.03% + 1.5 mA + 1.3 pA/V	20 µA	0.05% + 1.8 mA + 1.29 pA/V
100 mA	200 V	1 µA	0.02% + 20.0 µA + 1.3 pA/V	2 µA	.03% + 30.0 µA + 1.29 pA/V
10 mA	200 V	100 µA	0.02% + 2.5 µA + 1.3 pA/V	200 nA	0.03% + 6.0 µA + 1.29 pA/V
1 mA	200 V	10 nA	0.02% + 200.0 nA + 1.3 pA/V	20 nA	0.03% + 300.0 nA + 1.29 pA/V
100 µA	200 V	1 nA	0.02% + 25.0 nA + 1.3 pA/V	2 nA	0.03% + 60.0 nA + 1.29 pA/V
10 µA	200 V	100 nA	0.03% + 1.5 nA + 1.3 pA/V	200 pA	0.03% + 5.0 nA + 1.29 pA/V
1 µA	200 V	10 pA	0.03% + 500.6 pA + 1.3 pA/V	20 pA	0.03% + 800.6 pA + 1.29 pA/V
100 nA	200 V	1 pA	0.06% + 100.6 pA + 1.3 pA/V	2 pA	0.06% + 100.6 pA + 1.29 pA/V
10 nA	200 V	100 fA	0.15% + 3.6 pA + 1.3 pA/V	200 fA	0.15% + 5.6 pA + 1.29 pA/V
1 nA	200 V	10 fA	0.15% + 880.0 fA + 1.3 pA/V	20 fA	0.15% + 2.6 pA + 1.29 pA/V
100 pA	200 V	1 fA	0.15% + 760.0 fA + 1.3 pA/V		

Voltage Range	Max. Current	MEASURE Resolution	MEASURE Accuracy	SOURCE Resolution	SOURCE Accuracy
200 V	100 mA	1 mV	0.02% + 50.1 mV + 0 V/A	5 mV	0.02% + 50.1 mV + 0 V/A
20 V	1 A	100 µV	0.02% + 5.1 mV + 0 V/A	500 µV	0.02% + 5.1 mV + 0 V/A
2 V	1 A	10 µV	0.02% + 480.0 µV + 0 V/A	50 µV	0.02% + 730.0 µV + 0 V/A
200 mV	1 A	1 µV	0.015% + 355.0 µV + 0 V/A	5 µV	0.02% + 505 µV + 0 V/A

Capacitance	100kHz	1MHz	2MHz
10 pF	0.50%	3.00%	10.0%
100 pF	0.50%	2.00%	10.0%
1 nF	0.50%	7.00%	18.0%
10 nF	0.50%	5.00%	14.0%
100 nF	1.00%	5.00%	10%

High Voltage System

Current Range	Max. Voltage	MEASURE Resolution	MEASURE Accuracy	SOURCE Resolution	SOURCE Accuracy
1 A [1]	200 V	10 µA	0.03% + 1.5 mA + 4.54 pA/V	20 µA	0.05% + 1.8 mA + 4.54 pA/V
100 mA [1]	200 V	1 µA	0.02% + 20.0 µA + 4.54 pA/V	2 µA	0.03% + 30.0 µA + 4.54 pA/V
20 mA [1]	1100 V	100 µA	0.04% + 1.2 µA + 4.54 pA/V	500 nA	0.05% + 4.0 µA + 4.54 pA/V
10 mA [1]	200 V	100 µA	0.02% + 2.5 µA + 4.54 pA/V	200 nA	0.03% + 6.0 µA + 4.54 pA/V
1 mA [1]	1100 V	10 nA	0.03% + 200.1 nA + 4.54 pA/V	50 nA	0.03% + 300.1 nA + 4.54 pA/V
100 µA [1]	1100 V	1 nA	0.03% + 25.1 nA + 4.54 pA/V	5 nA	0.03% + 60.1 nA + 4.54 pA/V
10 µA [1]	1100 V	100 nA	0.03% + 1.6 nA + 4.54 pA/V	500 pA	0.03% + 5.1 nA + 4.54 pA/V
1 µA [1]	1100 V	10 pA	0.03% + 580.1 pA + 4.54 pA/V	50 pA	0.04% + 880.1 pA + 4.54 pA/V
100 nA [2]	200 V	1 pA	0.06% + 104.1 pA + 0.94 pA/V	2 pA	0.06% + 104.1 pA + 0.94 pA/V
10 nA [2]	200 V	100 fA	0.15% + 7.1 pA + 0.94 pA/V	200 fA	0.15% + 9.1 pA + 0.94 pA/V
1 nA [2]	200 V	10 fA	0.15% + 4.4 pA + 0.94 pA/V	20 fA	0.15% + 6.1 pA + 0.94 pA/V
100 pA [2]	200 V	1 fA	0.15% + 4.3 pA + 0.94 pA/V		

High Voltage System (continued)

Voltage Range	Max. Current	MEASURE Resolution	MEASURE Accuracy	SOURCE Resolution	SOURCE Accuracy
1000 V	20 mA	10 mV	0.02% + 50.2 mV + 0 V/A	50 mV	0.02% + 100.2 mV + 0 V/A
200 V	100 mA	1 mV	0.02% + 50.0 mV + 0 V/A	5 mV	0.02% + 50.1 mV + 0 V/A
20 V	1 A	100 μV	0.02% + 5.0 mV + 0 V/A	500 μV	0.02% + 5.1 mV + 0 V/A
2 V	1 A	10 μV	0.02% + 374.0 μV + 0 V/A	50 μV	0.02% + 680.0 μV + 0 V/A
200 mV	1 A	1 μV	0.015% + 324.0 μV + 0 V/A	5 μV	0.02% + 680 μV + 0 V/A

[1] Using general purpose signal paths.
[2] Using high performance signal paths.

Capacitance	100kHz	1MHz	2MHz
10 pF	0.50%	3.00%	10.0%
100 pF	0.50%	2.00%	10.0%
1 nF	0.50%	7.00%	18.0%
10 nF	0.50%	5.00%	14.0%
100 nF	1.00%	5.00%	10%

Specification Conditions

23°C ±5°C, 1 year.
RH between 5% and 60% after 1 hour warm-up.
All specs assume 4-wire (Kelvin) option.
V/A errors can be eliminated when used as a 4-wire system.
All specs are based on 1 year calibration cycle for individual instruments.
Measurement Specifications @ 1 PLC (Power Line Cycle) unless otherwise noted.

General I/V Source Specifications

MAXIMUM OUTPUT POWER PER SMU: 20W (four quadrant source or sink operation).
COMPLIANCE: Compliance resolution and accuracy are determined by the corresponding range used.

KEITHLEY

A GREATER MEASURE OF CONFIDENCE

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