Maximize the value of your Keithley hardware investment

One Powerful Software Solution—A Wide Range of Hardware Configurations

Keithley’s Automated Characterization Suite (ACS) is a comprehensive tool that combines multiple instruments and systems into a unified I-V test environment that is optimized for speed and productivity—it can also be used on stand-alone instruments. ACS supports a wide array of Keithley instrumentation and systems, hardware configurations, and test settings, from a few bench-top instruments for use in a QA lab to fully integrated and automated rack-based parametric testers.

ACS offers exceptional testing and analysis flexibility, plus its intuitive GUI helps novice users be productive almost immediately, regardless of their level of programming experience. The GUI simplifies configuring test instrumentation, making I-V measurements, getting results, and analyzing them quickly because no coding is required. Even if you’re an infrequent user, you can go from creating a new test setup to characterizing new devices in a fraction of the time older test development approaches require. Just as important, ACS provides all the tools you need to set up tests, analyze data, and export your results—without ever leaving the ACS environment.

Automate Your Data Gathering Processes

Need the throughput advantages of a semi-automatic or fully automatic wafer probe station to get lots of data fast? The wafer probe automation option for ACS makes it easy to interface a variety of popular probe stations into your test setup. This option includes a wafer description utility (for creating a virtual wafer to use in creating wafer-level sampling plans), real-time wafer maps with binning capabilities (for designating a device’s disposition before it’s packaged, in die sorting, etc.), a cassette sample plan utility (for designating which wafers are to be tested), and a post-test cassette and wafer review utility (for exploring and comparing test results from multiple wafers interactively).

High precision probing is critical to characterize the reliability and functionality of today’s devices accurately. Keithley works closely with developers of both single-site and multi-site probe cards to ensure our ACS systems are compatible with their cards and to optimize tester/card configurations to deliver accurate results quickly.

APPLICATIONS

Compatible with rapidly growing range of testing configurations for:

- Component test
- Component characterization
- Device characterization
- Parametric test
- Reliability test

• Wide array of hardware configurations for a variety of testing environments—from bench-top instruments in a lab to fully integrated and automated rack-based parametric testers

• No coding needed—ACS’s intuitive GUI simplifies getting I-V tests, analysis, and results quickly

• High test project portability—Sequences created for one Keithley hardware configuration will run flawlessly on compatible setups with few or no modifications

• Support for multiple SMUs and parallel testing speeds test throughput dramatically

• Project deployment utilities simplify sharing projects to leverage project development efforts

• Flexible modular software architecture makes it easy to scale up your system and adapt your applications as new testing needs emerge

• Open file standards simplify modifying test setups to adapt to changes in process flow

• Support for wafer-level and cassette-level automation with semi-automatic and fully automatic probers

• FREE optional off-line software license makes it simple to develop new test sequences on another PC—no need to tie up a system needed for ongoing work

• Software options are available for data analysis for wafer level reliability (WLR) testing

ACS

Automated Characterization Suite Systems
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Many of the tools and capabilities built into ACS enhance automated device characterization:
- Wafer- and cassette-level automation
- Limits file generation tool
- Test results binning, including interactive binning plot
- Test map—map device and tests to sites and subsites

- Interactive probe station control mode
- Real-time plotting
- Single or per-wafer Keithley data file
- SQLite™ database and binning file output options
- Lot summary report generator
- Integrated support for Keithley Series 2600A and 2400 SourceMeter families
- Integrated scripting editor and GUI builder
- Integrated support for C (with 4200-SCS only), Python, and Lua (for Series 2600A) programming languages

Share Tests Projects and Results
ACS offers a common set of key elements that work across a wide range of hardware configurations, which saves time and increases productivity. Systems perform consistently from one hardware implementation to another, so, for example, it’s easy to transfer your knowledge of an ACS-based system used in single-device component characterization to another designed for wafer level testing.

Similarly, test projects and sequences you create for one Keithley ACS hardware configuration will run on compatible setups in other test settings with little or no modification. This portability across a range of configurations reduces the effort involved in transferring a new device from one lab or department to another and simplifies comparing results obtained in various test settings. This is possible because ACS employs common open-standard file interfaces for projects, wafer maps, output files, etc. as well as common test libraries and instrument drivers, which also means you can be confident of high results correlation whether your tests are run on a system with a single Series 2600A instrument or a fully automated custom die sort tool with dozens of these instruments.

Maximize the Productivity of Your Keithley Hardware
The tools in ACS simplify test development and maximize the speed of each Keithley instrument linked into the system. For example, ACS builds on the throughput advantages inherent in Keithley’s newest family of high performance Source-Measure Units, the Series 2600A System SourceMeter instruments. These advantages include:
- The on-board Test Script Processor (TSP®) in each instrument that allows each 2600A to operate independently of the ACS system’s controller
- The TSP-Link® high speed communications bus used to network multiple 2600A instruments together
- True parallel test execution
- Precision timing

Together, ACS and Keithley TSP-based hardware offer the highest throughput in the industry to lower the cost of test without requiring you to spend time learning new programming concepts or languages before getting the data needed to accomplish your goals.
Add More Hardware to Your ACS Test Systems to Adapt to Changing Needs

High scalability and a flexible architecture simplify configuring an ACS system to match your specific testing requirements or to upgrade an existing system to handle new test needs as they evolve. Our wide range of source-measure and switching capabilities provides a solid foundation for configuring customized applications because ACS software can control virtually any instrument or peripheral with a standard hardware interface. For example, third-party LCR meters can be easily integrated into any ACS system and drivers are available for popular instruments. Also, ACS’s integrated scripting environment can control any GPIB instrument the application may require, such as a hot chuck controller.

Many ACS systems are configured using one or more of Keithley’s innovative Series 2600A System SourceMeter instruments, which are optimized for precision sourcing and measurement synchronization to capture high speed events. These systems offer unmatched testing speed and accuracy because they provide an SMU-per-pin architecture. ACS system configurations can support any number from two to more than 40 SMUs in a single rack for true parallel characterization applications.

ACS also makes it easy to integrate other types of Keithley hardware into your system, such as instruments to meet specialized test requirements, such as:

• High channel count switching—Model 707A Six-Slot Switch Mainframe
• Combination of switching and measurement—Series 3700 Switch/Multimeters
• High voltage sourcing—Model 237 High Voltage Source-Measure Unit
• Higher resolution, lower current, or other capabilities such as C-V or pulse testing—Model 4200-SCS
• Wider dynamic range—Series 2400 SourceMeter instruments

Keithley has continually enhanced both the software and hardware that go into ACS systems over since their introduction. This ongoing commitment assures you of a cost effective upgrade path to address new testing needs as they arise, avoiding the need to purchase a new characterization system because your old one is obsolete.

Choose ACS for What It Gives You that Others Don’t

There are many alternatives on the market for creating characterization applications, but ACS offers major advantages that competitive solutions can’t match, such as a choice of three powerful project development options. With ACS, you can create the tests you need in the way that best suits your application’s requirements and own programming preferences.

• You say you’re a researcher and you just need to make a quick test of common parameters and properties on a single device? We’ve packaged the same tests that our semiconductor customers use to verify their products into easy-to-use applications libraries. These libraries help you get the data you need to validate your work quickly so you can get back to your research sooner.

• Need more test development flexibility? Our interactive test development GUI lets you select bias and sweep conditions, acquire raw data, then use the built-in Formulator tool to extract meaningful results—all without writing code.

• For the ultimate test development flexibility, modify one of the existing test scripts in our applications libraries using the embedded script editing and debugging tools.

Broad Range of Applications

ACS-based Integrated Test Systems are complete solutions for applications such as parametric die sort and wafer level reliability testing. When paired with appropriate semi-automatic and fully automatic probe stations, their hardware configurations and test project development can be easily optimized for specific tasks. ACS leverages the on-board test script processors in Series 2600A System SourceMeter instruments into a multi-processor environment that’s ideal for true parallel test in both single- and multi-site configurations. This multi-processor environment provides high parallel throughput while speeding and simplifying test project development. Multi-site testing capabilities are embedded throughout ACS from the wafer description utility to the test results output file or binning file, for example:

• Multi-site parallel testing brings the highest possible throughput for both parametric die sort and WLR applications

The Hardware Foundations of ACS Systems

ACS Systems are built on the foundation of a variety of high integrity Keithley hardware:

• Source-Measure Units (SMUs)
  – Series 2600A System SourceMeter Instruments
  – Model 4200-SCS Semiconductor Characterization System
  – Series 2400 SourceMeter Instruments
• Switching
  – Series 700 Switch Systems (Models 707A and 708A)
  – Series 3700 System Switch/Multimeters

Wafer and binning map tools allow you to browse through the test results on either a wafer-by-wafer or site-by-site basis. You can also overlay traces from multiple sites to make quick comparisons.

• Configurable for special applications like MEMS testing
• Easily customize test flows with User Access Points (UAPs) that execute scripts or call custom utilities

Commitment to Excellence

ACS Integrated Test Systems are designed and built to specification on Keithley’s factory floor to ensure the maximum system performance and measurement integrity. These systems are eligible to receive the system CE mark as well as other optional system certifications, depending on the configuration. Keithley supports ACS systems with a variety of on-site services for installation, training, applications support, and repair.

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