METRICS™

ICV I-V, C-V Characterization System

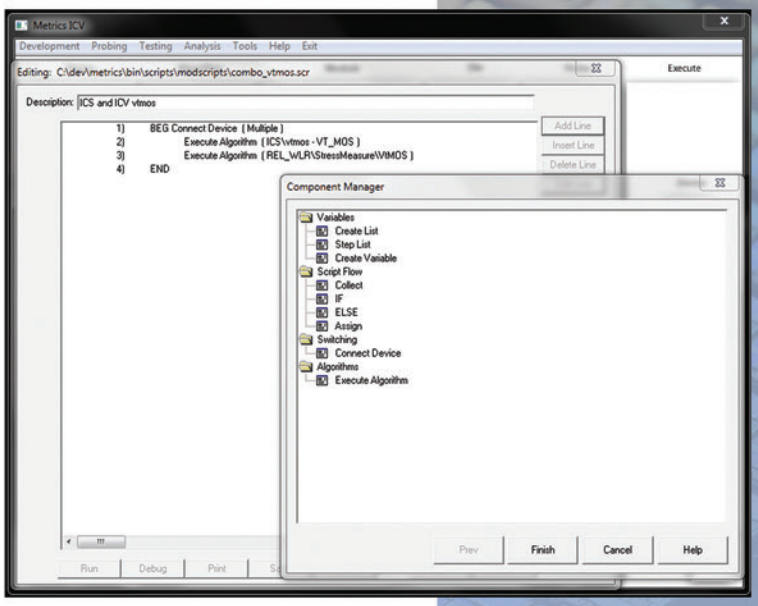
Point, Click, Measure.

It's as simple as that.

Metrics ICV software supports all aspects of parametric test, from basic measurements using a test fixture or manual prober to full test automation across the wafer utilizing a switching matrix, probe card and automated probe station.

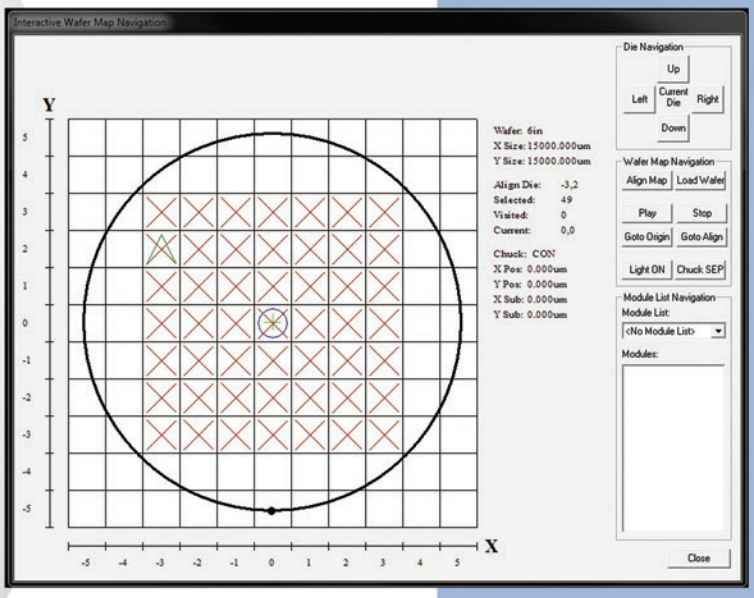
Fast and Easy Test Sequencing

Wizard-based script editors enable you to quickly perform test sequencing without programming. Using the built-in editor you can select existing script functions and then copy, paste, re-arrange, and edit items for device connections, algorithm parameters, user-defined variable lists and global variables. Once you have saved your scripts then simply select them from the run-time parameters window.



Complete Wafer Test Automation

All popular semi-automatic and full automatic probers are supported by Metrics ICV prober tools. You can define the wafer, die, and sub-die information for probing across an entire wafer or a complete cassette of wafers on supported automatic wafer probers.



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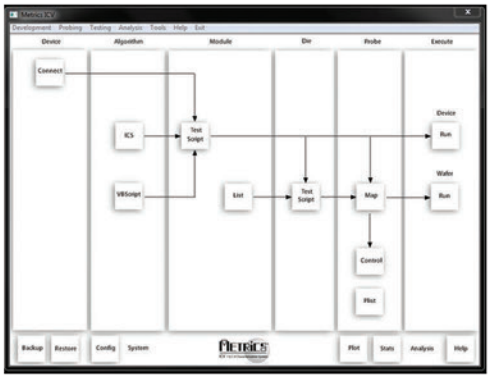
Simple Workflow Based Interface

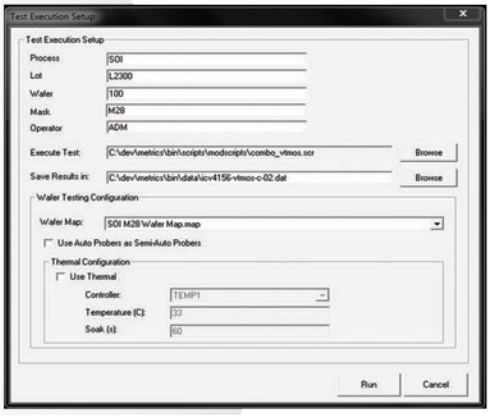
Metrics ICV improves productivity and reduces the time to implement complex tests using point and click editors for setting up each aspect of the test. This single unified environment allows for specifying everything from switch matrix device connections, module level actions, die navigation including sub-die definitions and wafer plan setup and execution.



This workflow interface is separated into logical steps defining the sequence necessary to set up a device level or full wafer level test methodology. Perform system configuration and maintenance functions like backup and restore as well as launch other provided tools from the same common user interface.

Operator Runtime Environment

The interface allows simple run-time parameter setup and execution. Record all pertinent process information along with test conditions in the test data file.



Start, Pause, Stop

Test and monitor run-time status output that provides easy to understand information about the test in progress.

The Metrics Technology Advantage

CONTINUITY IN THE LAB

Metrics software allows you to implement a common software interface throughout the lab across multiple vendor's instruments. Your learning curve is greatly reduced because all instruments are presented in a unified and similar manner so you can begin making productive parametric measurements immediately with the latest or legacy equipment and instruments. The use of one software platform to cover a diverse equipment set improves communication and training time is reduced.

EASE OF USE

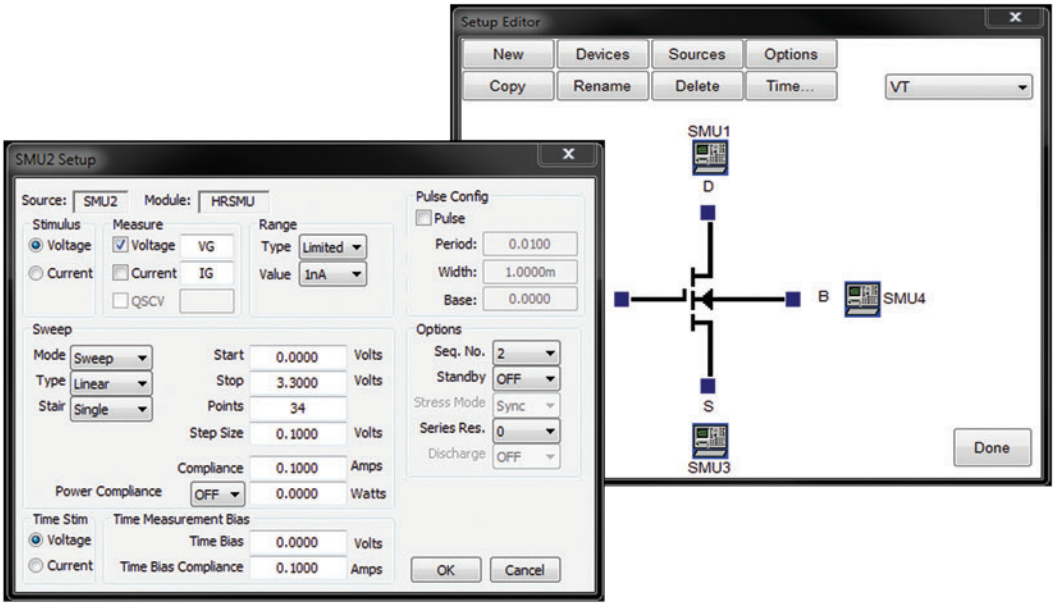
Metrics software provides easy setup for complex instrumentation through an interactive graphical user interface, and requires no programming by the end user. It has a full suite of data analysis tools and provides quick transfer of data to popular software packages. All this capability allows the engineer to focus on testing, not on writing and maintaining custom code.

DEDICATION

Metrics Technology's products have been created "by engineers for engineers". Our knowledge and products are specific to the semiconductor engineering laboratory. This is why our instrument drivers are more capable and flexible than our competitors. We understand the tests you are performing and the equipment you use. We work to address end-user challenges to create a better software platform. Our business is software and only software. Our products have been an industry standard for more than 20 years and have often been copied, but never duplicated.

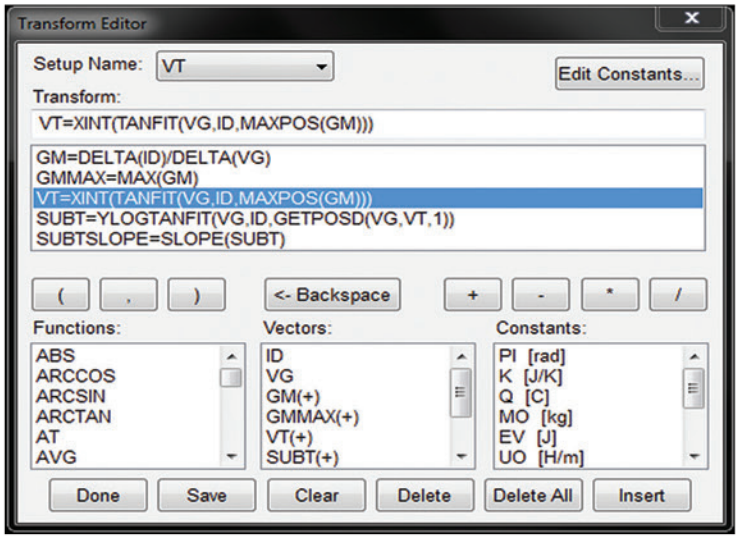
Graphical Test Generation

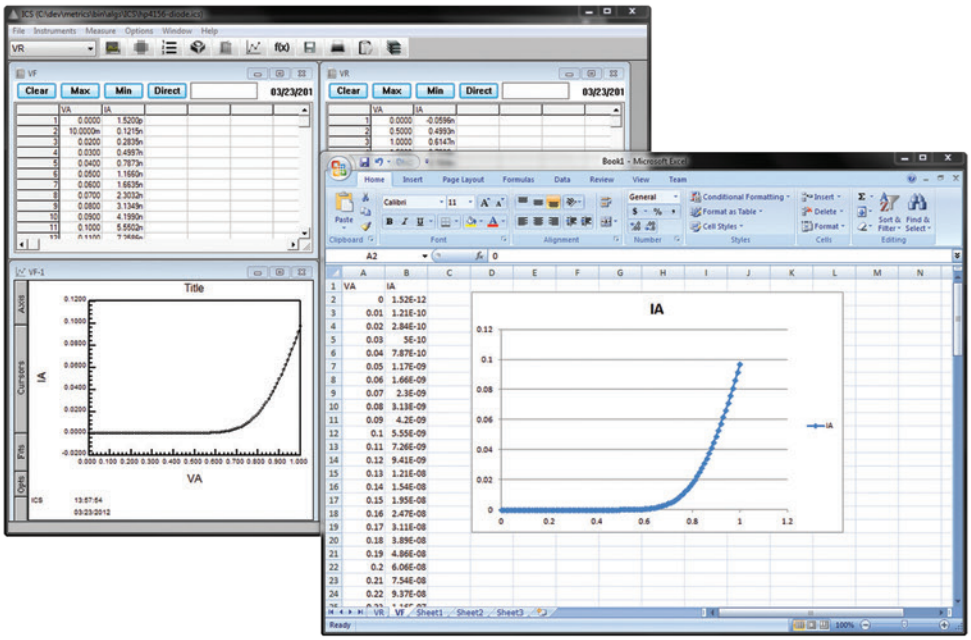
This integrated feature provides the utmost in flexibility for instrument control and requires no programming. Simply select the device type then point and click to set up your test. Save the settings and then you are ready to execute the tests across the wafer.



Numerical Transform Editor

Specify additional analysis functions using the built-in numerical transform editor to apply lists of equations to the measured data. Included are common numerical operators, line fitting, user-defined constants as well as other specialized functions specific to extracting parameters for semiconductor characteristics.





Automatic Data Collection and Report Generation

Metrics ICV has the ability to automatically export data in comma or tab-delimited ASCII format which can be easily imported into analysis tools such as Microsoft Excel, and other popular software packages such as spreadsheets, word processors, and databases. You can save data to any drive connected to the PC including shared volumes on the local area network. This allows you to view the test results on your desktop PC.

Test Applications

DEVICE CHARACTERIZATION

Automatically characterize new devices using sequential execution of measurements defined by easy to configure scripts which support switch matrix connections and test conditions as well as conditional branching. Data is stored in real-time including attributes such as process, lot, wafer, die location and more.

PROCESS MONITORING

Solve in-line production problems by tracking device parameters. Automatically export results to generate early warning reports using the built-in feature to create color wafer maps and statistical reports.

PROCESS DEVELOPMENT

Automate parameter extraction such as V_{th} (Threshold Voltage) using the numerical Transform Editor. The Transform Editor defines nested equations used to extract parameters from raw measured data.

RELIABILITY

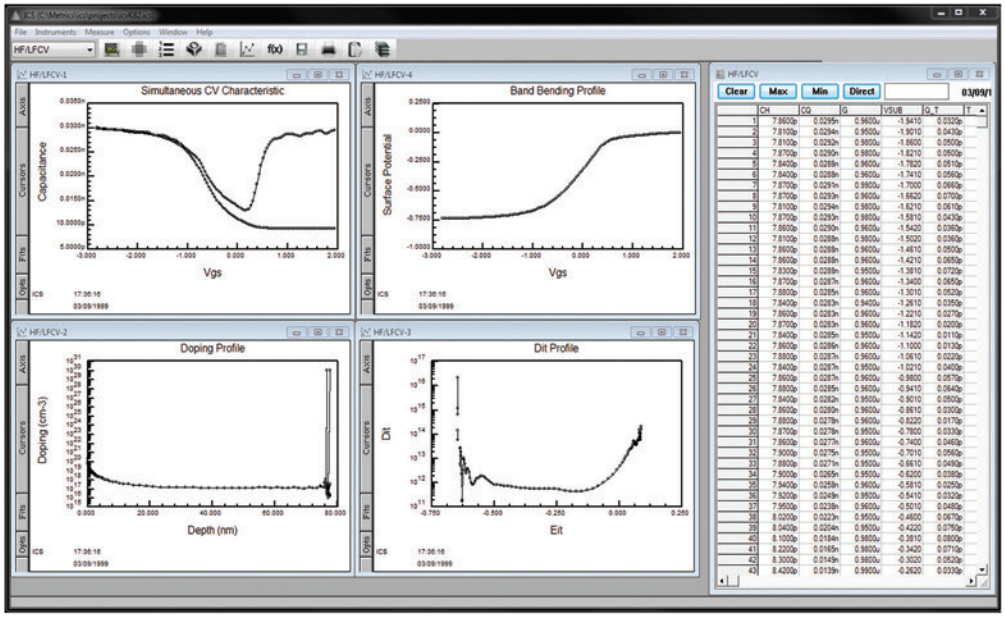
Perform on-wafer reliability tests such as TDDB (Time Dependent Dielectric Breakdown) and HCI (Hot Carrier Injection) with the WLR suite of algorithms included in the optional IDE (Integrated Developer Environment) license.

CV ANALYSIS

The IDE license also offers a suite of CV Algorithms that provide support for several popular CV meters. The algorithms are designed to provide simple access via VBScript to implement several testing methodologies including Bias Sweep, Time Sweep, Frequency Sweep, and Thin Oxide tests.

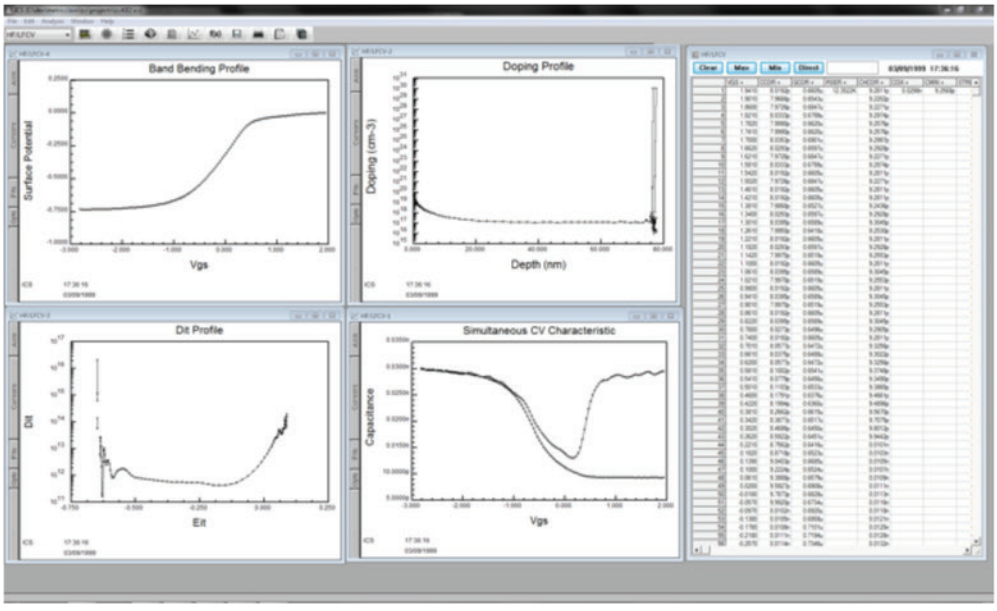
Combine IV and CV Testing

Using a switch matrix you can fully automate your IV and CV testing on wafer. Several supported CV instruments have special compensation algorithms provided for making accurate measurements through the high-frequency CV paths of the paired switch matrix.



NMOS IV Characteristics

CV drivers provide support for standard cable length and phase shift compensation. Open, short and load calibration routines are also provided for achieving maximum accuracy.



Simultaneous CV Analysis – (using supported equipment)

ICV Instrument Support

Model	Description
Agilent(HP) 4140B	pA Meter/DC Voltage Source
Agilent(HP) 4142B	Modular DC Source/Monitor
Agilent(HP) 4145A/B	Semiconductor Parameter Analyzer
Agilent(HP) 4155A/B/C	Semiconductor Parameter Analyzer
Agilent(HP) 4156A/B/C	Semiconductor Parameter Analyzer
Keysight E5270B	8-slot Precision Measurement Mainframe
E5280B	High Power Source/Monitor Unit (HPSMU)
E5281B	Medium Power Source/Monitor Unit (MPSMU)
E5286A	High Resolution Source/Monitor Unit (HRSMU)
E5287A	Atto Level High Resolution Source/Monitor Unit
E5288A	Atto Sense and Switch Unit
Keysight 5272A	2-slot High Speed Source Monitor Unit
Keysight 5273A	2-slot High Speed Source Monitor Unit
Keysight E5260A	8-slot High Speed Measurement Mainframe
E5290A	High Power Source/Monitor Unit (HPSMU)
E5291A	Medium Power Source/Monitor Unit (MPSMU)
Keysight 5262A	2-slot High Speed Source Monitor Unit
Keysight 5263A	2-slot High Speed Source Monitor Unit
Keysight B1500A	Semiconductor Device Analyzer
B1510A	High Power Source/Monitor Unit (HPSMU)
B1511A	Medium Power Source/Monitor Unit (MPSMU)
B1514A	50 us Pulse Medium Current Source/Measure Unit (MCSMU)
B1517A	High Resolution Source/Monitor Unit (HRSMU)
Keysight B1505A	Power Device Analyzer/Curve Tracer
B1512A	High Current Source/Monitor (HCSMU, DHCSMU)
B1513A	High Voltage Source/Monitor Unit (HVSMU)
N1258A	Module selector
Keysight B2900A	Precision Source/Measure Unit
B2901A	100 fA Single Channel Precision Source/Measure Unit
B2902A	100 fA Dual Channel Precision Source/Measure Unit
B2911A	10 fA Single Channel Precision Source/Measure Unit
B2912A	10 fA Dual Channel Precision Source/Measure Unit

Model	Description	
Agilent(HP) 4275A	10 Hz-10 MHz	Multi-frequency LCR Meter
Agilent(HP) 4280A	1 MHz	C-Meter/CV Plotter
Agilent(HP) 4284A	20 Hz-1 MHz	Precision LCR Meter
Agilent(HP) 4285A	75 Hz-30 MHz	Precision LCR Meter
Agilent(HP) 4192A Anaylzer	5 Hz-13 MHz	Low Frequency Impedance
Keysight E4980A	20 Hz-2 MHz	Precision LCR Meter

*When using more than one of these instruments together, you will need the 2361 TCU and all connectors

Keithley Model 236*	Source Measure Unit
Keithley Model 237*	High Voltage Source Measure Unit
Keithley Model 238*	High Current Source Measure Unit
Keithley 2400 Series*	Digital Source Meter
2410*	Digital High Voltage Source Meter
2420*	Digital High Current Source Meter
2430*	Digital High Power Source Meter
Keithley 6430*	Sub-fA Source Meter
Keithley 2600A Series	Digital Source Meter
2601A	20W Single Channel Source Meter
2602A	20W Dual Channel Source Meter
2611A	200V Single Channel Source Meter
2612A	200V Dual Channel Source Meter
2635A	1 fA 20W Single Channel Source Meter
2636A	1 fA 20W Dual Channel Source Meter
Keithley 4200-SCS	Semiconductor Characterization System
Keithley Model 82	C-V Characterization System
Keithley Model 90	I-V Semiconductor Test System
Keithley Model 590	C-V Analyzer
Keithley Model 595	C-V Quasi-static CV Meter
QualiTau DSPT9012	Desktop Semiconductor Parametric Tester
Tektronix 370A/B	Curve Tracer
Tektronix 371A/B	High Power Curve Tracer

Probe Stations

All stations are controlled via GPIB. Metrics software should not reside on the probe PC due to resource conflicts.

Cascade Summit 10000 Nucleus v.4.x or Velox 2.0	Semi-automatic Probe Station
Cascade Summit 12000 Nucleus v.4.x or Velox 2.0	Semi-automatic Probe Station
Cascade S300 with Nucleus v.4.x or Velox 2.0	Semi-automatic Probe Station
Cascade Elite-300 Nucleus v.4.x or Velox 2.0	Semi-automatic Probe Station
Cascade PS-21	Full Automatic Probe Station
Alessi (Cascade) with Galaxy version 5.20H	Semi-automatic Probe Station
Suss Microtech PA200, PA300 with Prober Bench Software v.7.x	Semi-automatic Probe Station
Suss Microtech PS200, PS300 with Prober Bench Software v.7.x	Semi-automatic Probe Station
Micromanipulator 8860 with pcProbe 2.6 and pcBridge	Semi-automatic Probe Station
Micromanipulator 4460 with NetProbe	Semi-automatic Probe Station
Micromanipulator 9920 with NetProbe	Semi-automatic Probe Station
Vector Semiconductor VX-3000SV	Semi-automatic Probe Station
Vector Semiconductor AX-2000	Semi-automatic Probe Station
Signatone Stations (must be GPIB capable)	Semi-automatic Probe Station

Or (Stations with an Interlink Controller and GPIB control installed)

TEL P-8XL	Automatic Probe Station
TEL P-12XL	Automatic Probe Station
TEL 19S	Automatic Probe Station
Accretech UF300	Automatic Probe Station
Accretech UF2000	Automatic Probe Station
Accretech UF3000	Automatic Probe Station
Electroglas 1034 (with Option D)	Automatic Probe Station
Electroglas 2001 Series	Automatic Probe Station
Electroglas 3001 Series	Automatic Probe Station
Electroglas 4085	Automatic Probe Station
Electroglas 4090	Automatic Probe Station

Switch Matrices

HP 4084A/4085A	Switch Matrix Controller and Matrix
Agilent(HP) E5250A	Low-Leakage Switch Mainframe
Agilent B2200A	fA Low-Leakage Switch Mainframe
Agilent B2201A	Low-Leakage Switch Mainframe
Keithley 706	Scanner Mainframe
Keithley 707	Switch Matrix Mainframe
Keithley 707A	Switch Matrix Mainframe
Keithley 708A	Single Slot Switch Mainframe
Keithley 7001	Switch Control Mainframe
Keithley 7002	Switch Control Mainframe
MRD 4x28 MUX	Multiplexer Switch Matrix

Minimum System Requirements

3 GHz Pentium 4-class Processor (or equivalent)
1 Gbyte RAM
Windows 7 or 10 Professional, 32-bit or 64-bit
500 Mbyte available for product installation, plus additional capacity for test data
2 USB port (Security Dongle, USB->GPIB supported interfaces)
SXGA Monitor (1280 x 1024) minimum resolution
Ethernet – LXI (TCP/IP) interface support

One of the following GPIB cards and the listed software:
NI GPIB-PCI NI-488.2 Software version 16.0 oe later
NI GPIB-USB-B/HS NI-488.2 Software version 16.0 or later

Agilent 82350 B/C	Keysight IO Libraries Suite version 17.0 or later
Agilent 82357 A/B	Keysight IO Libraries Suite version 17.0 or later