

WinCal XE™

High-performance RF Calibration Software

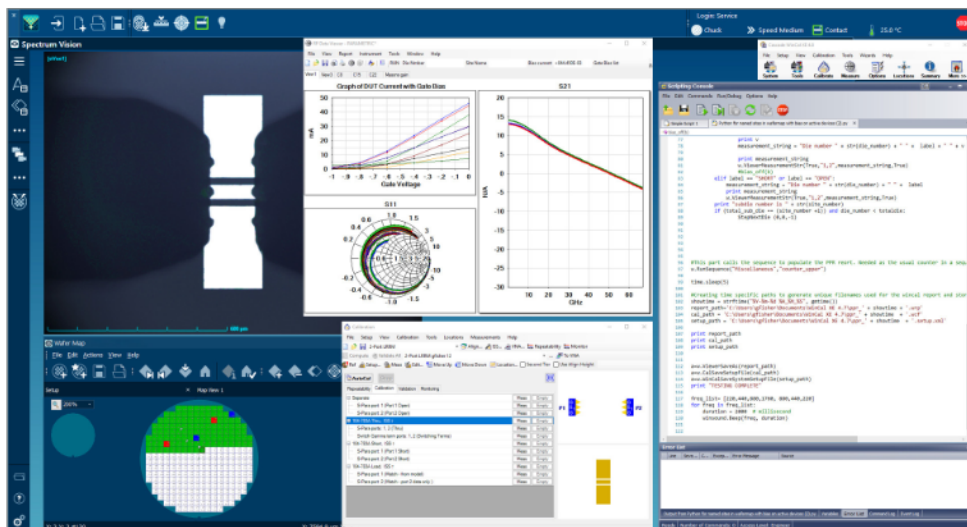
Overview

WinCal XE software from FormFactor is a comprehensive and intuitive on-wafer RF measurement calibration tool to achieve accurate and repeatable S-parameter measurement, which is crucial for precision device modeling/ characterization and engineering RFIC test.

The WinCal XE features a guided system setup complete with customizable Wizards to ensure fast and easy access to reliable VNA calibration and repeatable data. Automated and intelligent functions minimize operator errors and troubleshooting time, resulting in reliable and accurate results and higher productivity.

The WinCal XE features include exclusive 1-, 2-, 3-, and 4-port calibration algorithms, immediate and live data measurement and viewing, LRRM™, LRM+™, SOLT, SOLR, hybrid LRRM-SOLR and NIST-style multi-line TRL calibrations, as well as an Error Set Management capability for data comparison and augmentation.

The latest version, WinCal XE 4.9, covers all of FormFactor's probe families - T-Wave™ Probes, Infinity Probes®, ACP™ probes, FPC™ probes and IZI Probes®, and is compatible with Velox™ prober control software.



Features / Benefits

Automatic calibration setup, measurement, result data conversion and report creation

- Extensive guidance facilitates correct system setup and calibration
- Error Set Manager provides error-set augmentation and error-set comparison tools
- ISS management function prevents accidental navigations to the invalid calibration sites
- S-parameters can be converted to a device-appropriate or preferred format
- Display templates and Wizards can be customized for your specific needs

Accurate and advanced multi-port calibrations

- Hybrid LRRM-SOLR calibration method enables precision 4-port calibrations
- Multi-line TRL cal compares your preferred calibration methods to a NIST style calibration
- Second-tier calibration capability simplifies mixed-connector/probe-tip reference plane calibration
- Supports up to 12 VNA ports that can be mapped to four logical ports for calibration

Achieve the most repeatable calibrations every time

- Automatic Load inductance compensation removes any probe placement errors experienced during the calibration procedure

➤ Compatible System Configurations

- FormFactor's semi- and fully-automated probe stations with Velox 2.3 or later, optional programmable positioners and VNA
- Manual probe stations with VNA
- Virtual mode – simulated VNA, with manual, semi- or fully-automated probe station
- Compatible with a wide variety of probes and calibration standards
- Supports T-Wave, Infinity, ACP, FPC and IZI Probe families
- Supports ISS and CSR calibration standards
- Compatible with most industry standard network analyzers
- Supports Keysight (formerly Agilent), Anritsu, Rohde & Schwarz, Copper Mountain analyzers

➤ VNA Support

Supported VNAs	Tested Models and Firmware Version (FW)
Keysight 8510C	8510C - 7.14, 7.16, 8.10 (8510B is not supported)
Keysight PNA and PNA-X	PNA FW 5.0 - 9.3 can only use "PNA, Legacy support for FW 5.0 - 9.3 (VISA)" PXI chassis based PNA, FW 3.0 or later and any port configuration of PNA or PNA-X. FW 9.43 or later can use "PNA, current FW (VISA)"
Keysight ENA	E5070/71-B FW 6.01 or later E5070/71-C FW 9.3 or later E5061-B FW A.02.06 or later E5063A FW A.01.02, SOLT only E5070/71 needs FOM option for advanced calibrations E5072A A.01.06 or later ENA-L is not supported E5080A uses the PNA current FW driver
Keysight	8719, 8720, 8722, 8753 FW 6.x or later
Anritsu Lightning™	37xxx-series 2-port, FW 5.03 or later
Anritsu Scorpion®	MSxxx-series 2-, 3- or 4-port, FW TA2.03 Sensor-only ports will not be calibrated
Anritsu VectorStar™	46xx series 2-port and 4-port (with external test set), FW 1.2 or later
Anritsu ShockLine™	MS46522B 2-port performance VNA MS46524B 4-port performance VNA
Copper Mountain	All VNA models supported All FW supported S2VNA SW min version 18.3.1 S4VNA SW min version 18.3.2
Rohde & Schwarz	ZVA, ZVB (FW 2.02 or later), ZNA (FW 2.31 or later) and ZNB (FW 2.6 or later)

WinCal XE should work with all models similar to those tested.

➤ System Requirements

Minimum	5 GB hard disk space available 1024 x 768 display resolution and medium color quality (16-bit) Windows 10 (32 or 64-bit) 1 GHz CPU
Semi-automated probe station control	Velox 2.3 or later
Connected VNA and/or probe station using VISA-based GPIB, LAN or USB	National Instruments hardware: NI-VISA and NI-488.2 version 15.0 or later Keysight hardware: IO Libraries 17.1 or later
Tutorials requirements	Internet Explorer 8.0 or later Windows Media Player 9.0 Sound card and speakers
Recommended requirements for optimal performance	A modern, high-performance CPU 4 GB RAM or more 1280 x 1024 display resolution or better, high color quality (32-bit) Three-button or scroll-wheel mouse to enable panning in RF Data Viewer graphs

** No support given on systems with old drivers- suggest downloading free upgrades available from vendor. A warning is displayed at runtime if an older driver is found.*

➤ Ordering Information

Part Number	Description
168-690	WinCal XE (Version 4.9) Calibration Software, Software License
168-691	WinCal XE (Version 4.9) Calibration Software, 30-day Demo, Software License
168-692	WinCal XE (Version 4.9) Calibration Software, Upgrade from 4.x to 4.9, Software License
168-693	WinCal XE (Version 4.9) Calibration Software, University copy, Software License

➤ ISS Support: T-Wave, Infinity, ACP, FPC Probes

	Pitch (μm)	P/N	Recomm. Upper Freq. (GHz)	Note
GSG	25	165-731	1.1 THz	T-Wave Probes WR1.0, Multiline TRL substrate
	50 to 75	162-641		Verification Lines [0.5, 1, 1.1, 1.4, 1.9, 2.3, 2.7, 3, 3.2, 3.8, 4.5, 7, 14, 27, 40] ps
	50 to 75	138-356	325 GHz*	
	50 to 150	104-909	67 GHz	Mix of GSG & GS/SG
	75 to 150	104-783	145 GHz*	
	100 to 150	114-456	67 GHz	For probes with contact widths < 30 μm
	100 to 150	138-357	325 GHz*	
	100 to 250	143-033	145 GHz*	
	100 to 250	101-190	67 GHz	
	100 to 500	109-531	67 GHz	Right Angle standards; N-E, N-W, E-W
	250 to 1250	106-682	67 GHz	
	150 to 3000	108-010	67 GHz	Recommended > 1250 μm pitch

*Supports Probe for full range coaxial ranges up to 145 GHz and banded Waveguides to 145 GHz or 325 GHz

	Pitch (μm)	P/N	Recomm. Upper Freq. (GHz)	Note
GS/SG	50 to 150	104-909	67 GHz	Mix of GSG & GS/SG
	100 to 250	103-726	67 GHz	
	250 to 1250	106-683	67 GHz	
	150 to 3000	108-011	67 GHz	Recommended > 1250 μm pitch

	Pitch (μm)	P/N	Recomm. Upper Freq. (GHz)	Note
GSGSG	100 to 125	129-239	67 GHz	Also supports SGS, SGSG, GSGS configurations
	150	126-102	67 GHz	Also supports SGS, SGSG, GSGS configurations
	150 to 225	129-240	67 GHz	Also supports SGS, SGSG, GSGS configurations
	250	129-241	67 GHz	Also supports SGS, SGSG, GSGS configurations
THRU	300 to 650	129-248	67 GHz	General Purpose THRU substrate (Straight, Loop Back, Cross)
	700 to 1250	129-249	67 GHz	General Purpose THRU substrate (Straight, Loop Back, Cross)

	Pitch (μm)	P/N	Recomm. Upper Freq. (GHz)	Note
GSSG	100 to 150	129-246	67 GHz	Also supports SSG, GSS configurations
	175 to 250	129-247	67 GHz	Also supports SSG, GSS configurations
THRU	300 to 950	129-248	67 GHz	General Purpose THRU substrate (Straight, Loop Back, Cross)
	1000 to 1250	129-249	67 GHz	General Purpose THRU substrate (Straight, Loop Back, Cross)

Wide Pitch: (> 250 μm) differential / multiport calibration, additionally use the wide pitch, single-ended ISS (106-682 or 106-683)

Narrow Pitch: For dual probe with pitches <100μm, please use the matching singled-ended (GSG or GS / SG) ISS

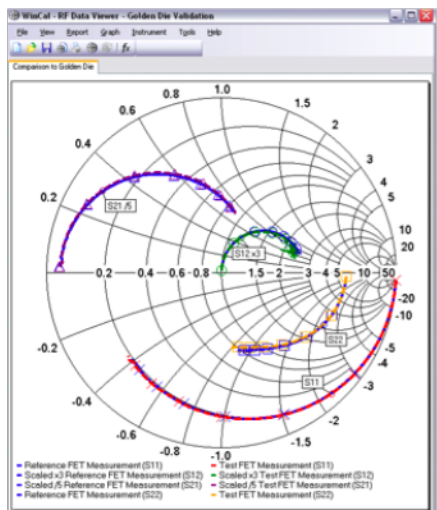
GSG	Pitch (µm)	P/N	CSR
	50 to 150	73319	CSR-9
	100 to 250	62025	CSR-8
	100 to 300	71392	CSR-101, Mix of GSG & GS/SG
	250 to 500	41702	CSR-4
	500 to 1250	62563	CSR-15
	1000 to 2500	71391	CSR-17

GS/SG	Pitch (µm)	P/N	CSR
	50 to 250	56407	CSR-6
	100 to 300	71392	CSR-101, Mix of GSG & GS/SG
	250 to 500	41704	CSR-5
	500 to 1250	69061	CSR-16
	1000 to 2500	67074	CSR-18

GSGSG	Pitch (µm)	P/N	CSR
	100	51077	CSR-30
	125	51082	CSR-35
	150	51078	CSR-31
	200	51079	CSR-32
	250	51080	CSR-33
	500	51081	CSR-34

GSSG	Pitch (µm)	P/N	CSR
	100	52379	CSR-40
	125 to 150	51874	CSR-41
	200 to 250	51875	CSR-43
	400 to 600	51876	CSR-44

SGS	Pitch (µm)	P/N	CSR
	100	53527	CSR-50
	125 to 150	53528	CSR-51
	200 to 250	53529	CSR-53
	400 to 500	53530	CSR-54



When the corrected S-Parameter measurements are acquired from the device under test, WinCal XE offers a variety of options for formatting, transforming and displaying the result.

© Copyright 2023 FormFactor, Inc. All rights reserved.
FormFactor and the FormFactor logo are trademarks
of FormFactor, Inc. All other trademarks are the property
of their respective owners.

All information is subject to change without notice.

WINCAL XE-DS-0423

Corporate Headquarters
7005 Southfront Road
Livermore, CA 94551
Phone: 925-290-4000
www.formfactor.com