

MPI TITAN™ Probe Calibration for WinCal XE Users

Quick How-To Reference



Guide

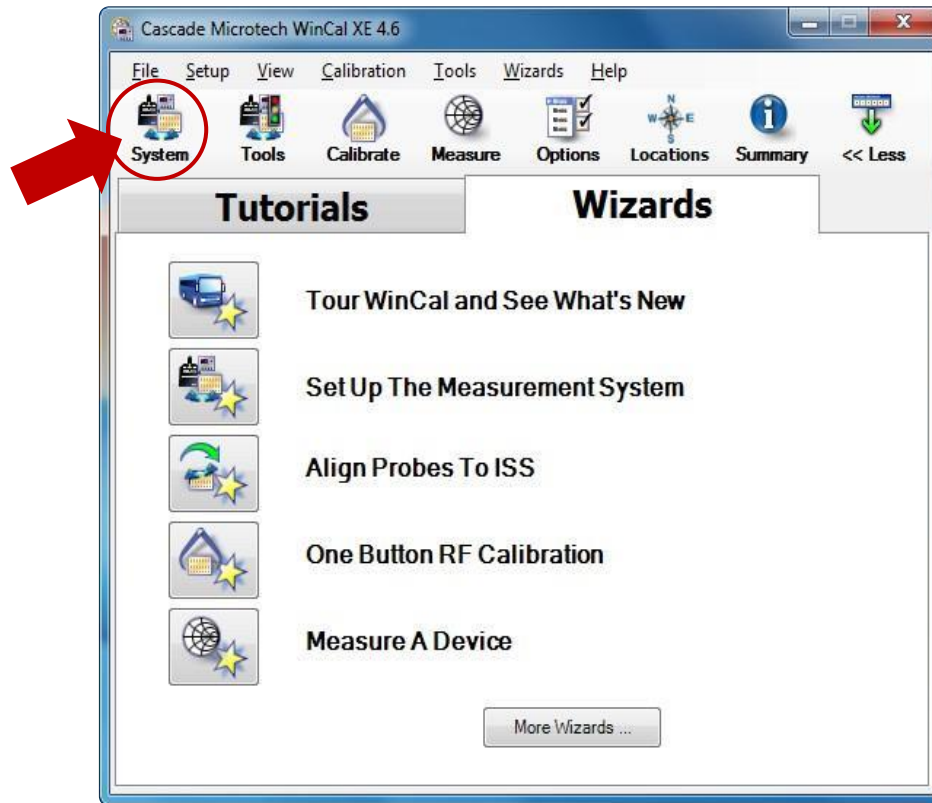
- This document is a reference guide for user who have bought RF probes from **Allstron** and **MPI TITAN Probes** and **MPI Calibration Substrates**
- Customer who want to use these Probes with WinCal XE Calibration Software

The Goal

- WinCal XE supports RF probes and standards manufactured only by Cascade Microtech
- Probes and standards from other vendors can be described manually by:
 - Chose “Generic” probe type
 - Delete calibration substrate from the substrate list
- Next slides will show how to do it

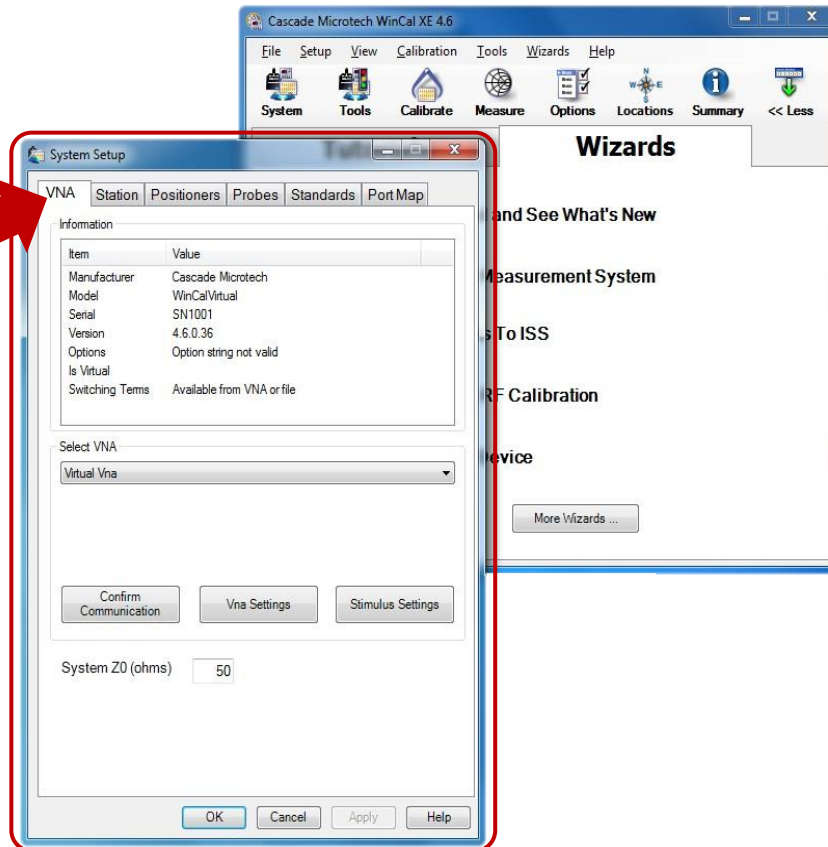
Configuring “Generic” Probes

- Click on “System”, System setup window will pop up



Configuring “Generic” Probes

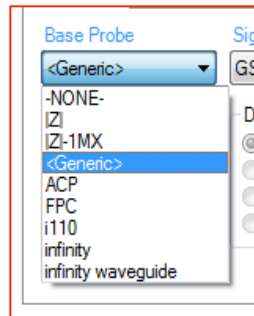
System Setup
Window



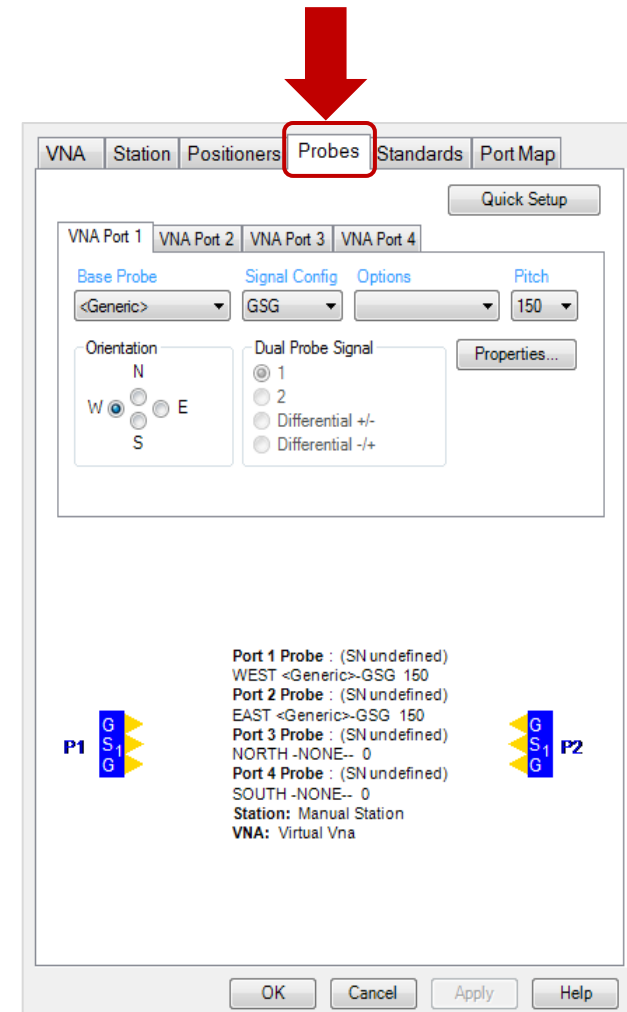
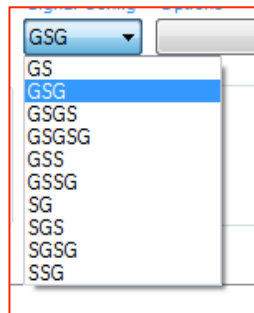
Configuring “Generic” Probes

■ Probes Setup on the System Setup

- Click on “**Probes**”
- Select **VNA Port** Number
- Select “<Generic>” on Base Probe



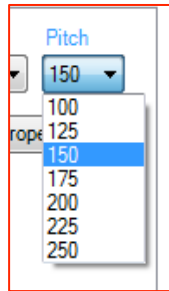
- Select **Signal Config** type (e.g. GSG)



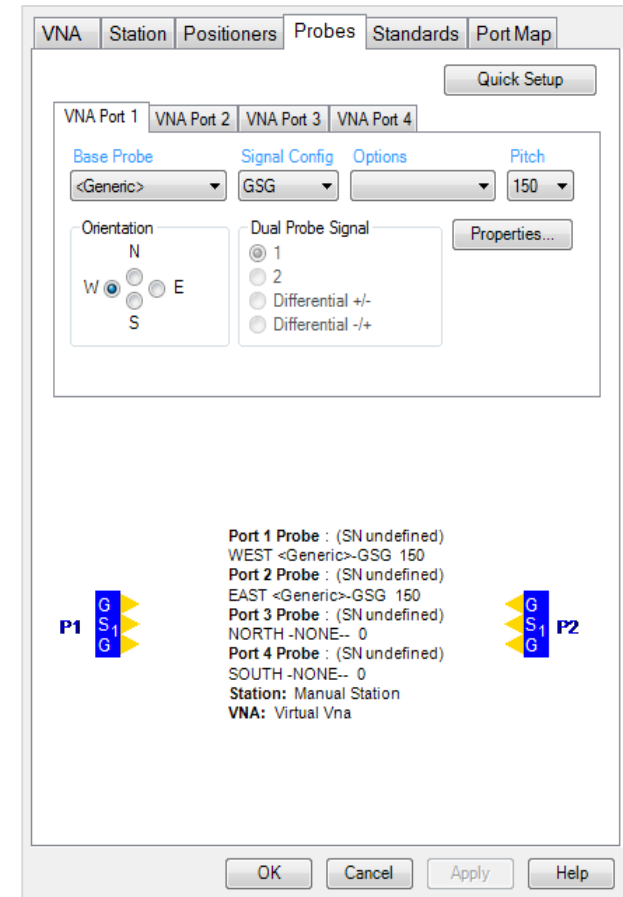
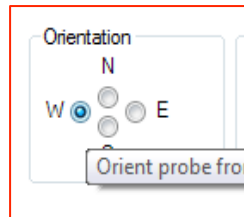
Configuring “Generic” Probes

■ Probes Setup on the **System Setup**

- Select Pitch Value

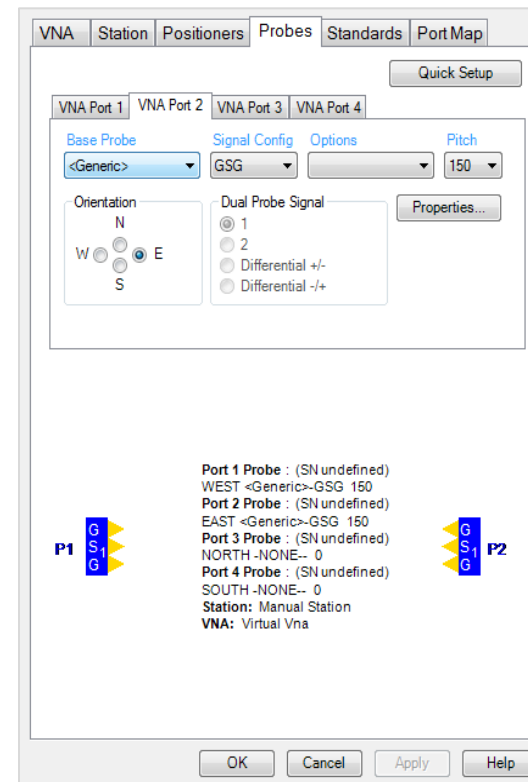
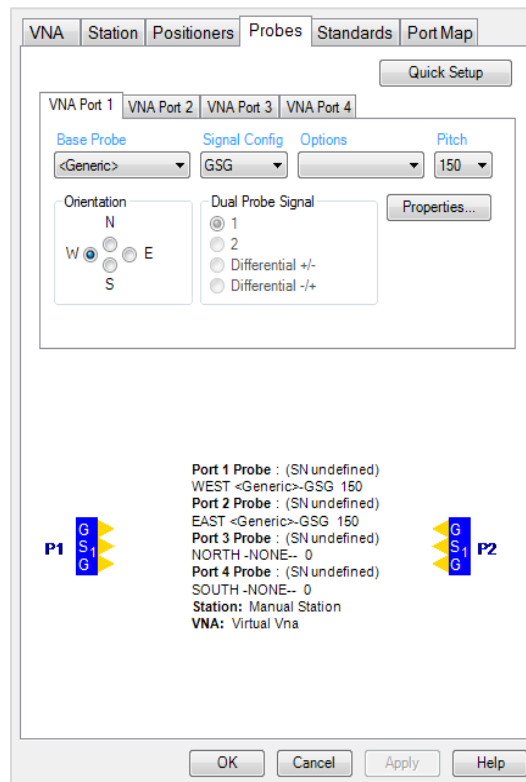


- Select **Orientation**

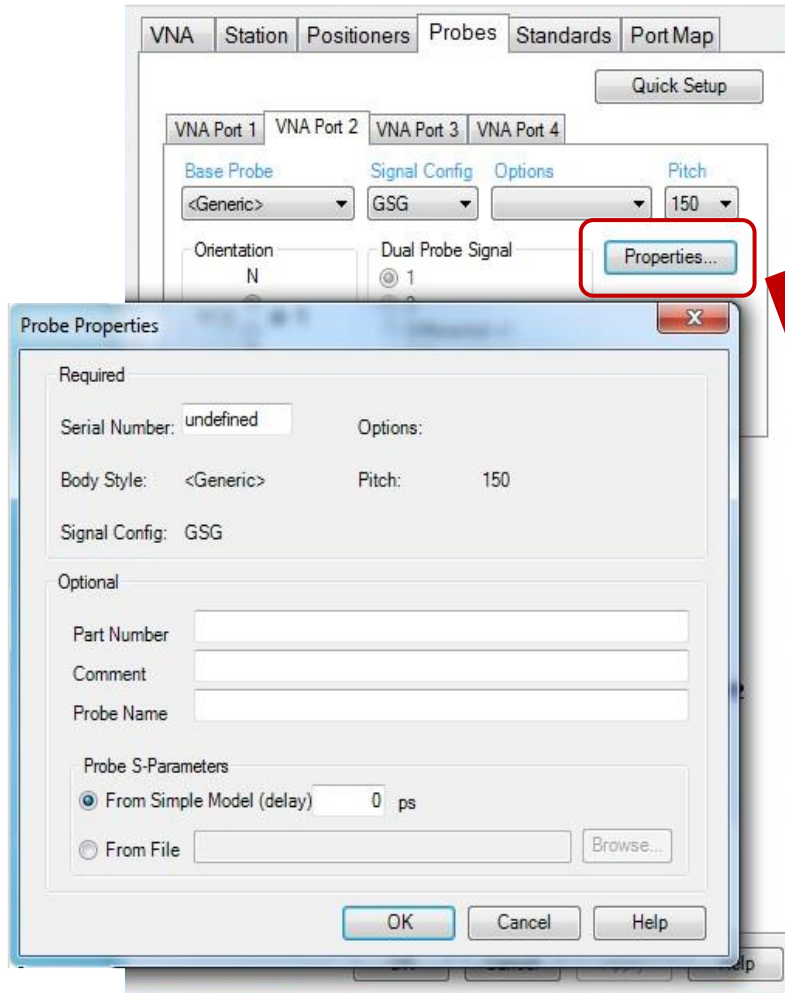


Configuring “Generic” Probes

- If required, repeat the above steps defining the second probe



Configuring “Generic” Probes

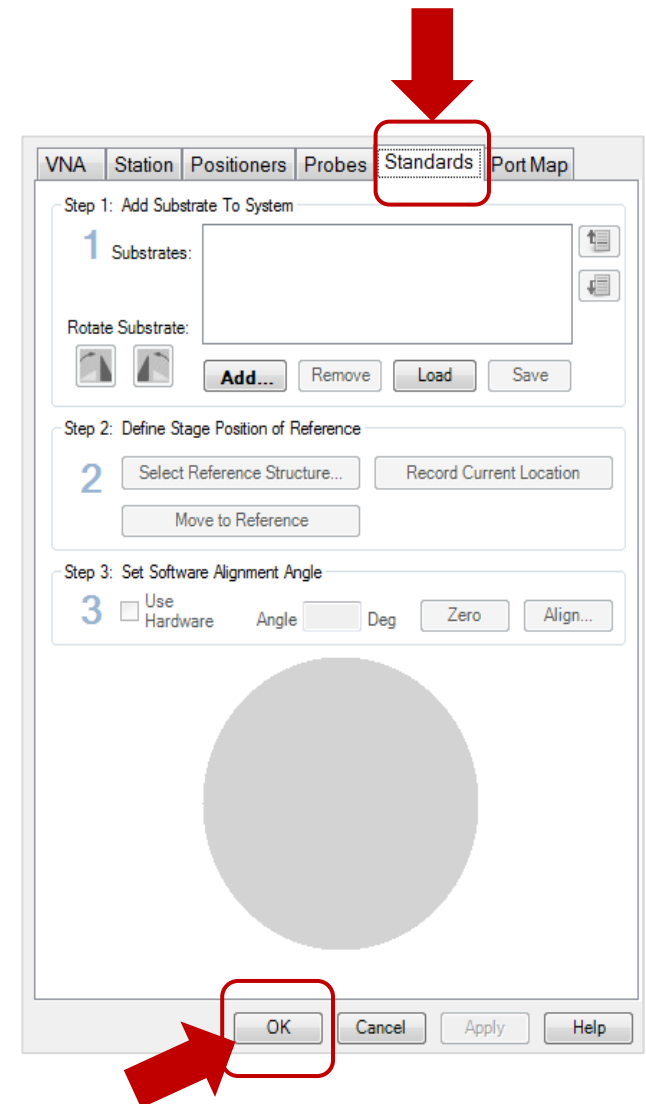


This is optional

- If you want to edit the name and probes information, click on “**Properties**”. A Probe Properties Window will pop up for you to key in the information

Setup Empty Substrate List

- Click “**Standards**” tab
- Delete all calibration substrates if any presented
- Leave the “**Substrate**” empty
- Click “**OK**” to close System setup window



Next Step

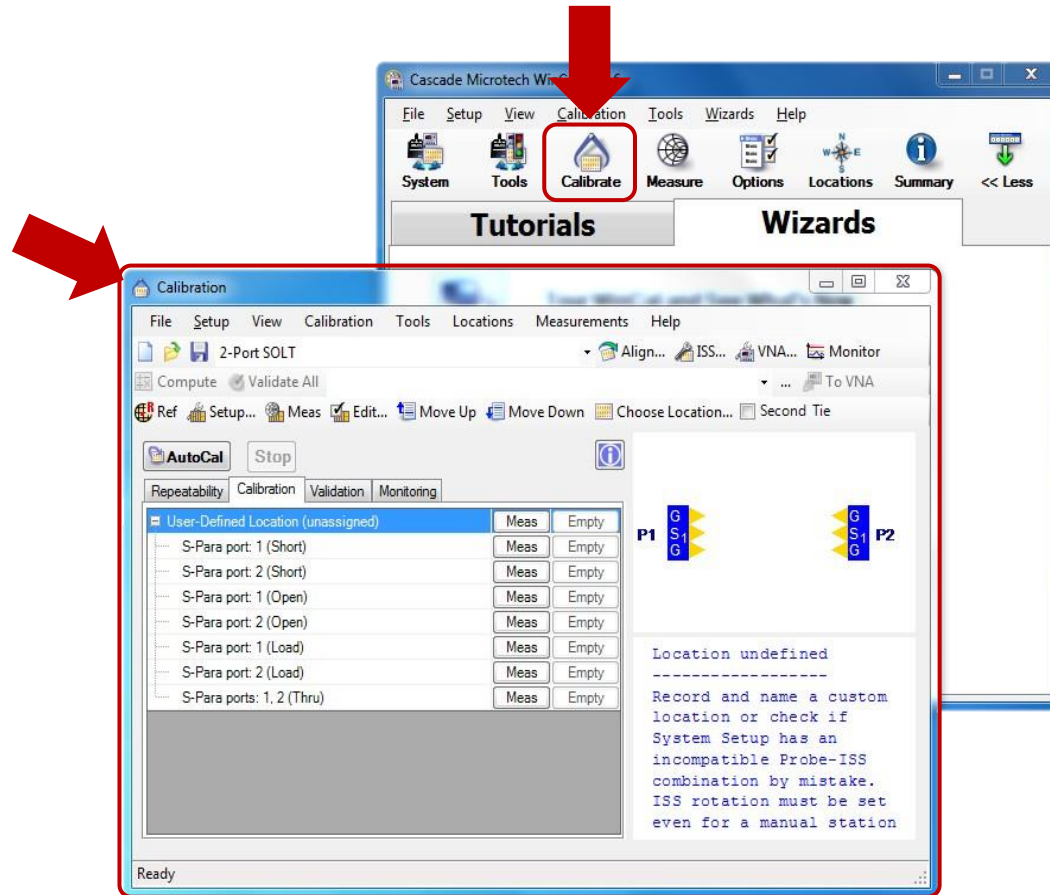
- Define probe correction coefficients, as:
 - Open Capacitance, C_0
 - Short Inductance, L_0
 - Load (Termination) Inductance, L_0
 - Thru Delay and Loss

Important Note

- Open, Short and Load offset have to be omitted, following definitions:
 - Offset impedance, Z_0 : 50 Ohm
 - Offset delay: 0 ps
 - Offset loss: 0 dB

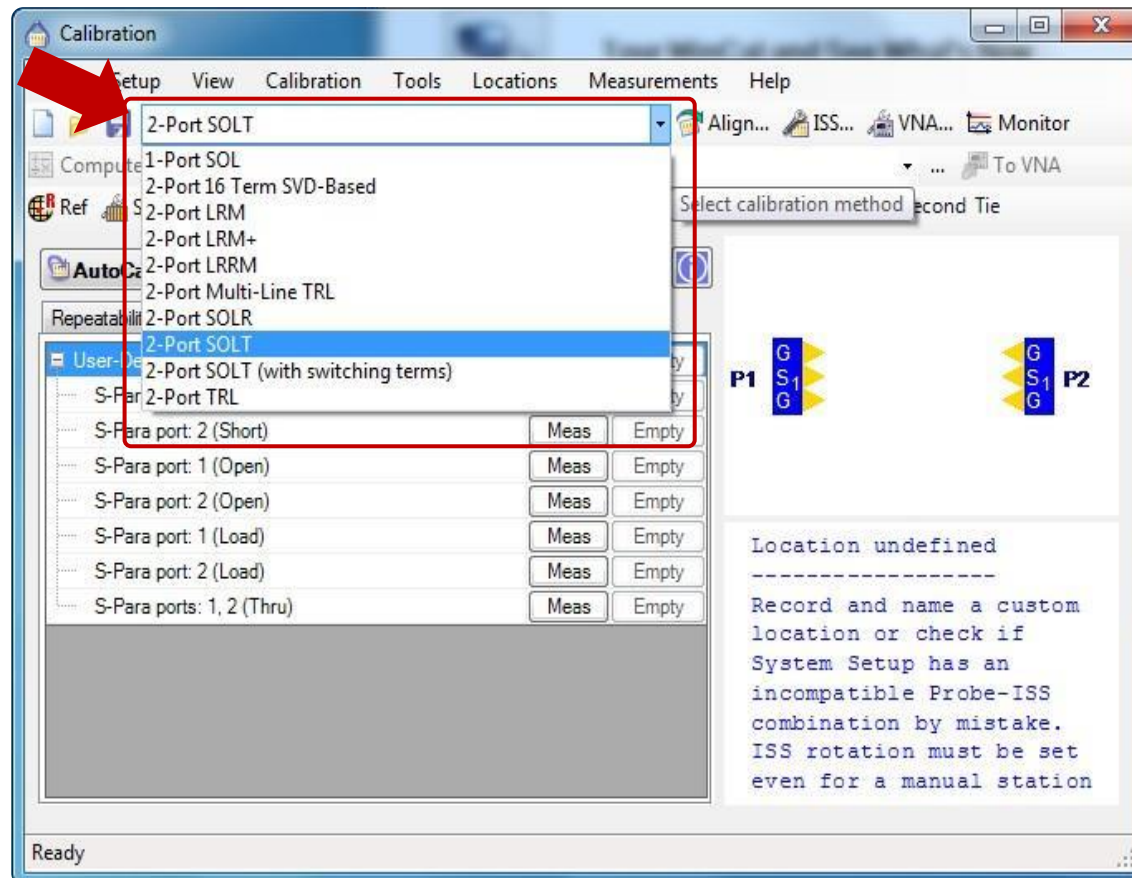
Call Calibration Window

- In Main Menu, Click on “**Calibrate**”. Calibration window will pop up



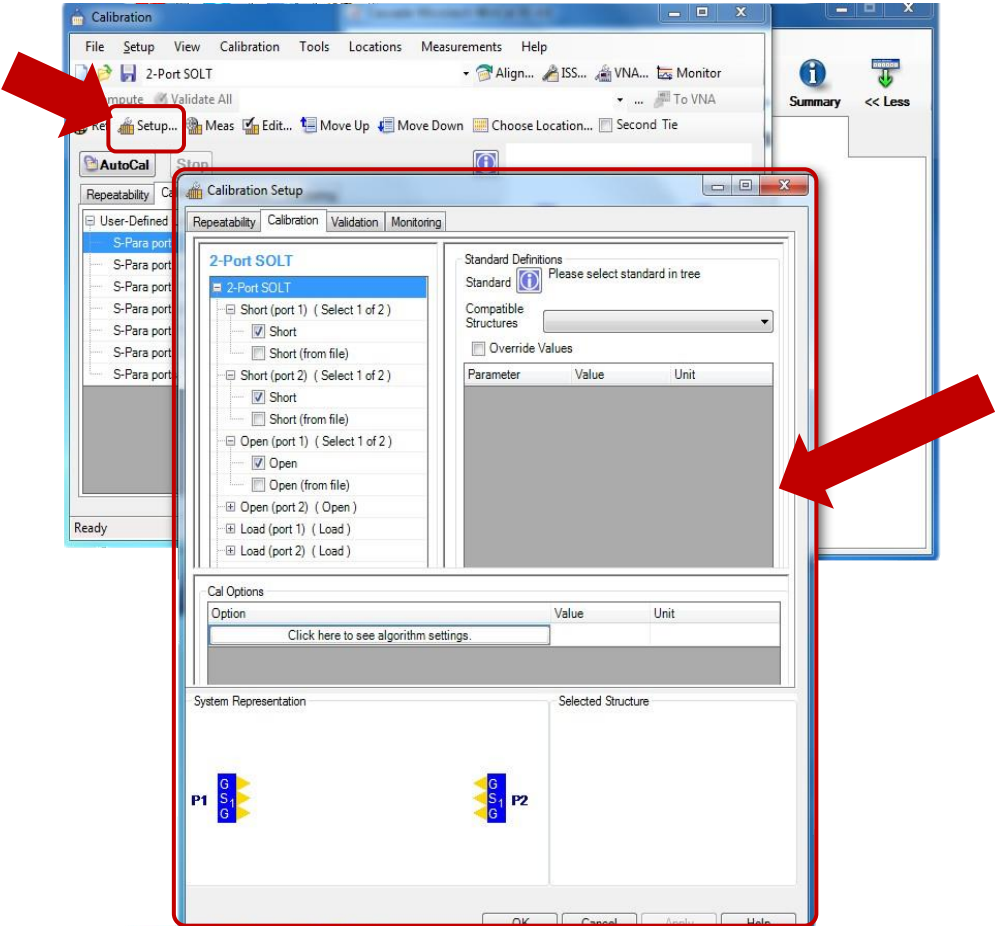
Call Calibration Window

- Select the “**Calibration Method**” that you will like to calibrate with



Call Calibration Setup

- Click on “Setup” to open up the Calibration Setup Window

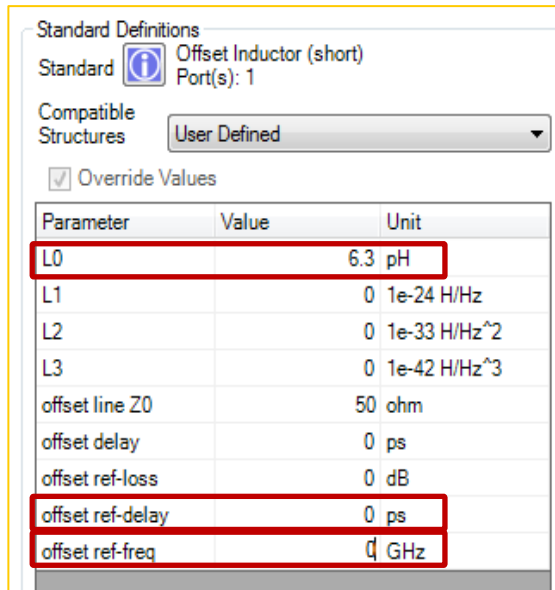


This window is where the calibration coefficient are being input for calibration

Call Calibration Setup

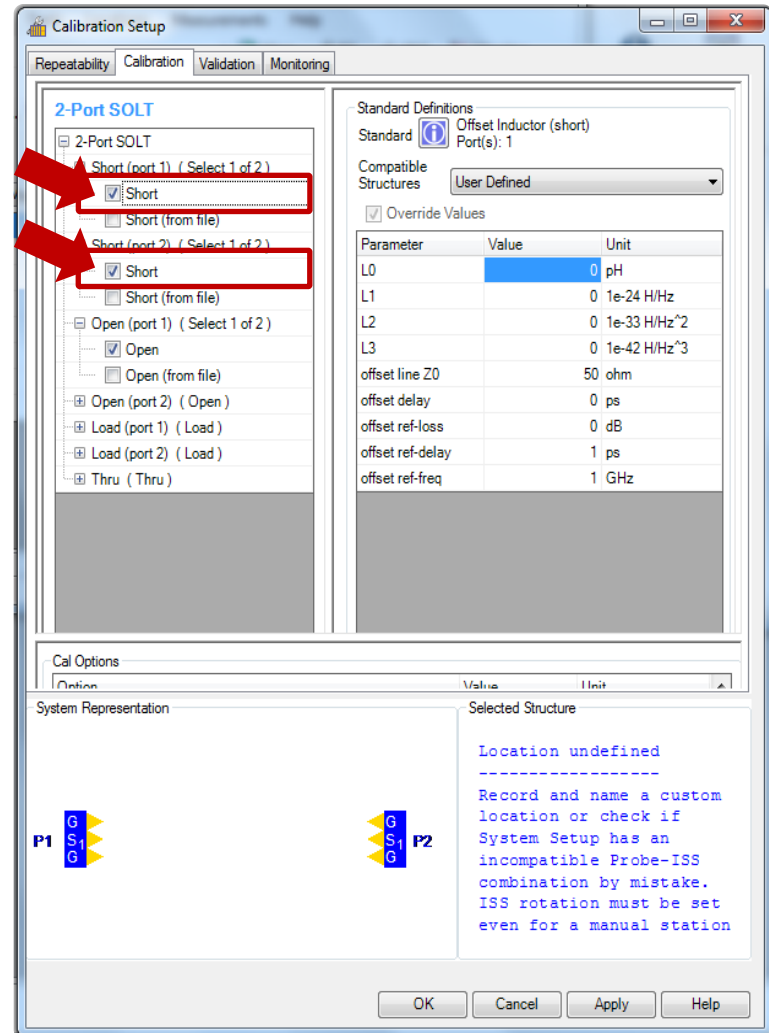
- Click on “Short” to input the calibration coefficient in “Standard Definition”

- Key in the Short Inductance Value (pH) in L0
- Set offset ref-delay to “0” ps
- Set offset ref-freq to “0” GHz



Parameter	Value	Unit
L0	6.3	pH
L1	0	1e-24 H/Hz
L2	0	1e-33 H/Hz ²
L3	0	1e-42 H/Hz ³
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	0	ps
offset ref-freq	0	GHz

**Refer to probe or calibration coefficient table in Appendix A*



Parameter	Value	Unit
L0	0	pH
L1	0	1e-24 H/Hz
L2	0	1e-33 H/Hz ²
L3	0	1e-42 H/Hz ³
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	1	ps
offset ref-freq	1	GHz

Call Calibration Setup

■ Click on “Open” to input the calibration coefficient in “Standard Definition”

- Key in the Open Capacitance Value (fF) in C0
- Set offset ref-delay to “0” ps
- Set offset ref-freq to “0” GHz

Parameter	Value	Unit
C0	5.2	fF
C1	0	1e-27 F/Hz
C2	0	1e-36 F/Hz ²
C3	0	1e-45 F/Hz ³
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	0	ps
offset ref-freq	0	GHz

**Refer to probe or calibration coefficient table in Appendix A*

Parameter	Value	Unit
C0	0	fF
C1	0	1e-27 F/Hz
C2	0	1e-36 F/Hz ²
C3	0	1e-45 F/Hz ³
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	1	ps
offset ref-freq	1	GHz

Call Calibration Setup

- Click on “**Load**” to input the calibration coefficient in “**Standard Definition**”

- Key in the **Load Inductance Value (pH)** in **CO**
- Set **offset ref-delay** to “**0**” ps
- Set **offset ref-freq** to “**0**” GHz

Standard Definitions

Standard Offset Series RL (load)
Port(s): 1

Compatible Structures User Defined

Override Values

Parameter	Value	Unit
R	50	ohm
Lt	-2.5	pH
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	0	ps
offset ref-freq	0	GHz

**Refer to probe or calibration coefficient table in Appendix A*

Calibration Setup

Repeatability Calibration Validation Monitoring

2-Port SOLT

2-Port SOLT

- Short (port 1) (Select 1 of 2)
 - Short
 - Short (from file)
- Short (port 2) (Select 1 of 2)
 - Short
 - Short (from file)
- Open (port 1) (Select 1 of 2)
 - Open
 - Open (from file)
- Open (port 2) (Select 1 of 2)
 - Open
 - Open (from file)
- Load (port 1) (Select 1 of 2)
 - Load
 - Load (from file)
- Load (port 2) (Select 1 of 2)
 - Load
 - Load (from file)
- Thru (Thru)

Standard Definitions

Standard Offset Series RL (load)
Port(s): 1

Compatible Structures User Defined

Override Values

Parameter	Value	Unit
R	50	ohm
Lt	0	pH
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	1	ps
offset ref-freq	1	GHz

Cal Options

Option	Value	Unit
Click here to see algorithm settings.		

System Representation

Selected Structure

Record and name a custom location or check if System Setup has an incompatible Probe-ISS combination by mistake.

OK Cancel Apply Help

Call Calibration Setup

■ Click on “Thru” to input the calibration coefficient in “Standard Definition”

- Base on AC-2, AC-3 and AC-5 datasheet
- Key in the Thru(Line) Calibration Coefficient into the definition
- Key in the **delay(ps)** for Thru
- Key in the **ref-loss(dB)**
- Key in the **ref-delay(ps)**
- Key in the **ref-freq(GHz)**

Parameter	Value	Unit
Z0	50	ohm
delay	1.1	ps
ref-loss	0.34	dB
ref-delay	25.5	ps
ref-freq	20	GHz

**Refer to AC-2, AC-3 and AC-5 datasheet*

Calibration Setup

Repeatability Calibration Validation Monitoring

2-Port SOLT

- 2-Port SOLT
 - Short (port 1) (Select 1 of 2)
 - Short
 - Short (from file)
 - Short (port 2) (Select 1 of 2)
 - Short
 - Short (from file)
 - Open (port 1) (Select 1 of 2)
 - Open
 - Open (from file)
 - Open (port 2) (Select 1 of 2)
 - Open
 - Open (from file)
 - Load (port 1) (Select 1 of 2)
 - Load
 - Load (from file)
 - Load (port 2) (Select 1 of 2)
 - Load
 - Load (from file)
 - Thru (Select 1 of 2)**
 - Thru
 - Thru (from file)

Standard Definitions

Standard Transmission Line (thru)
Port(s): 1, 2

Compatible Structures User Defined

Override Values

Parameter	Value	Unit
Z0	50	ohm
delay		1 ps
ref-loss		0 dB
ref-delay		1 ps
ref-freq		1 GHz

Cal Options

Option	Value	Unit
Click here to see algorithm settings.		

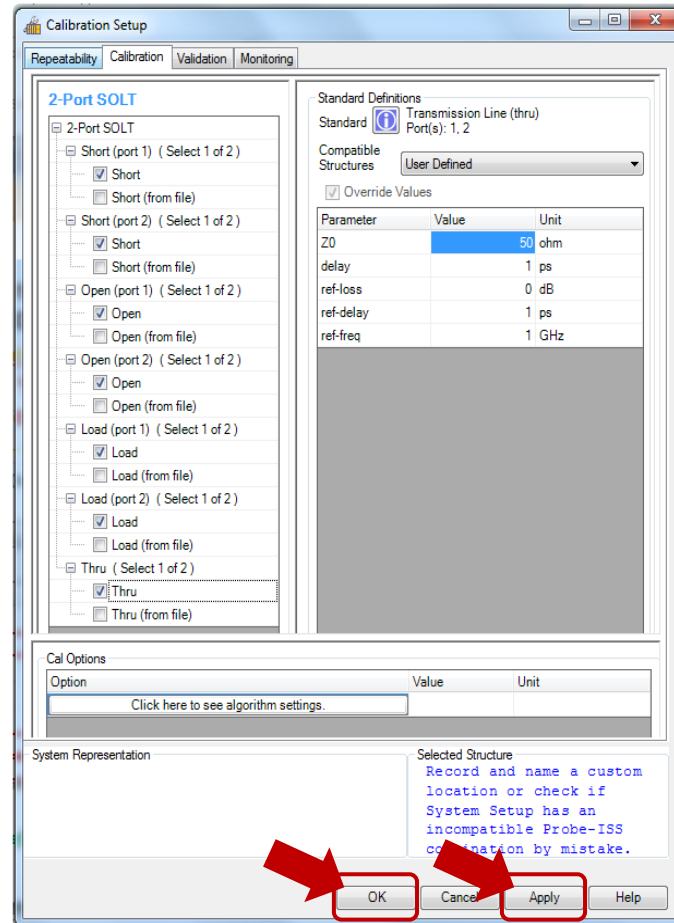
System Representation

Selected Structure
Record and name a custom location or check if System Setup has an incompatible Probe-ISS combination by mistake.

OK Cancel Apply Help

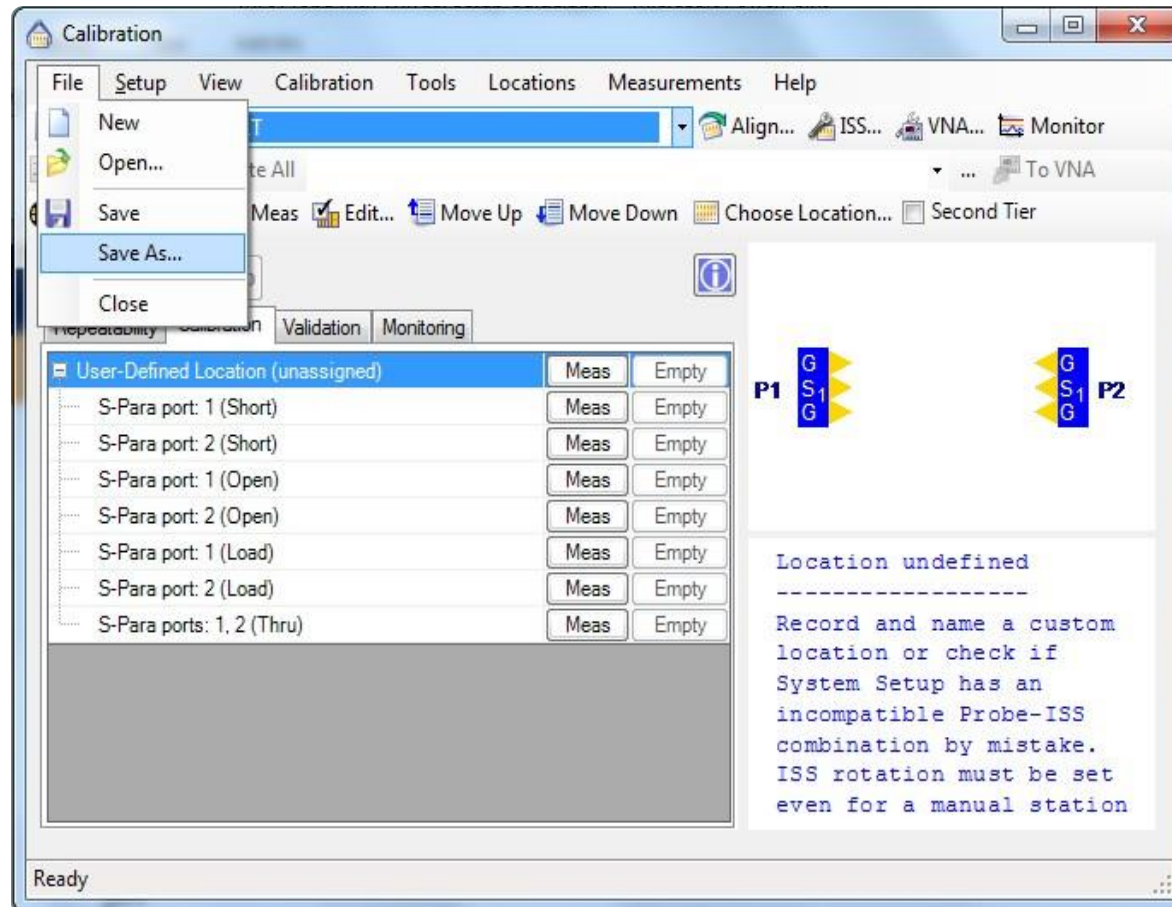
Confirm Modifications

- Click on “Apply” and then “OK”



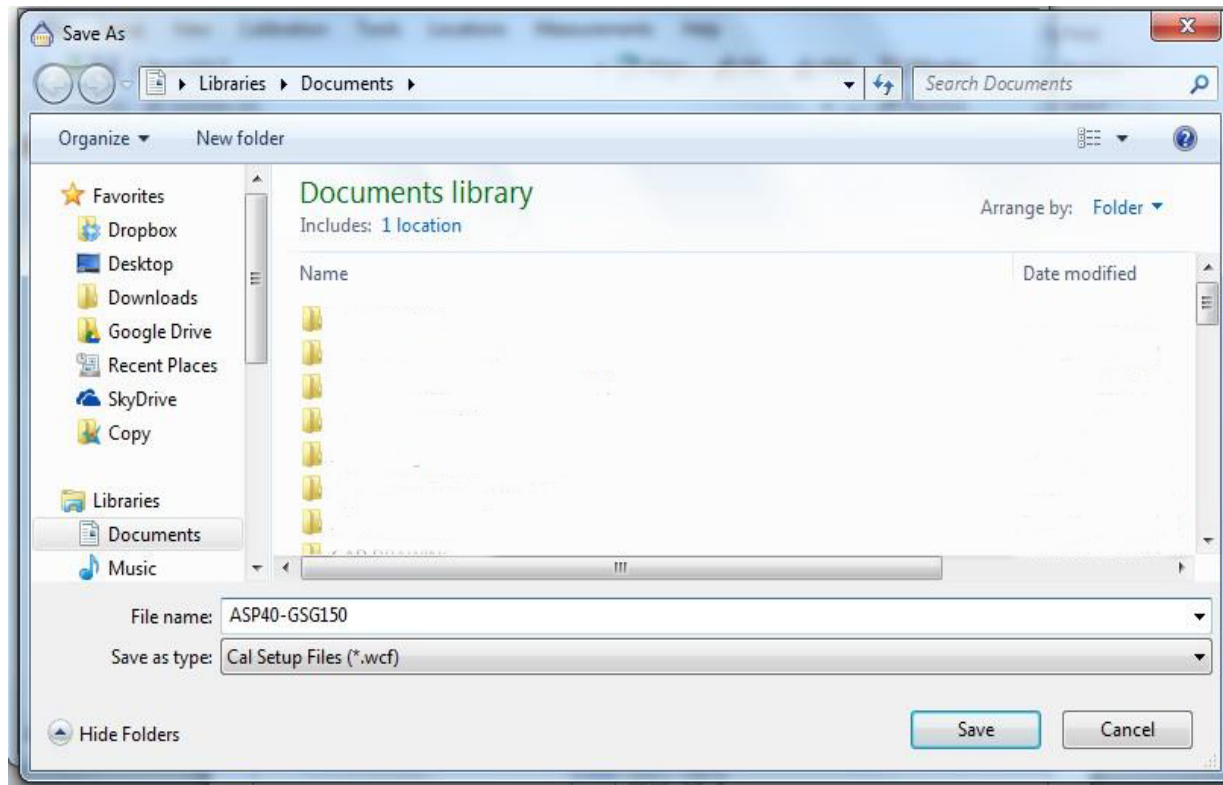
Save Project

- Click on “**Save As**” to save your correction coefficient for future use



Calibration Setup

- Setup the filename for this probe setup. In future you can just open the *.wcf without the need to rekey in the calibration correction information.



Appendix A. Open, Short, Load

- Calibration Coefficient for MPI TITAN GSG 100 to 250 Probe with AC-2 Cal-Substrate

Pitch/Parameter	100	125	150	200	250
C-OPEN, fF	5.2	5.25	5.3	5.5	5.7
L-SHORT, pH	6.3	9.8	12.3	16.0	20.0
L-LOAD, pH	-2.5	0	1.5	8.0	11.5

Appendix B. Thru

AC-2 Calibration Substrate

Electrical Characteristics of CPW Line Standards

Nominal capacitance per unit length, pF/cm	1.492
Nominal characteristic impedance @20 GHz	50 Ω
Effective dielectric constant @20 GHz, real part	4.94
Effective velocity factor @20 GHz	0.45
Parameters of the simplified model of line losses	
Reference loss, dB	0.34
Reference delay, ps	25.5
Reference frequency, GHz	20
Electrical length of line, ps	
Thru	1.10
Line 1 (0309)	3.00
Line 2 (0509)	6.50
Line 3 (0709)	13.00
Line 4 (1309)	25.50
Line 5 (0101)	38.50

AC-3 Calibration Substrate

Electrical Characteristics of CPW Line Standards

Effective dielectric constant @20 GHz, real part	4.94
Effective velocity factor @20 GHz	0.45
Parameters of the simplified model of line losses	
Reference loss, dB	0.34
Reference delay, ps	25.5
Reference frequency, GHz	20
Electrical length of line, ps	
Thru	1.10
Line 1 (0110)	3.00
Line 2 (0310)	6.50
Line 3 (0510)	13.00
Line 4 (1110)	25.50
Line 5 (0101)	38.50

Appendix B. Thru (cont.)

AC-5 Calibration Substrate

Electrical Characteristics of CPW Line Standards

Effective dielectric constant @10 GHz, real part 6.13

Effective velocity factor @10 GHz 0.40

Parameters of the simplified model of line losses

Reference loss, dB 0.21

Reference delay, ps 42

Reference frequency, GHz 10

Electrical length of line, ps

Thru 5

Line 1 (0109) 26

Line 2 (0309) 42

Line 3 (1009) 47

**THANK YOU
FOR YOUR ATTENTION**

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