

# MPI TITAN™ Probe Calibration for WinCal XE Users

Quick How-To Reference



# Guide

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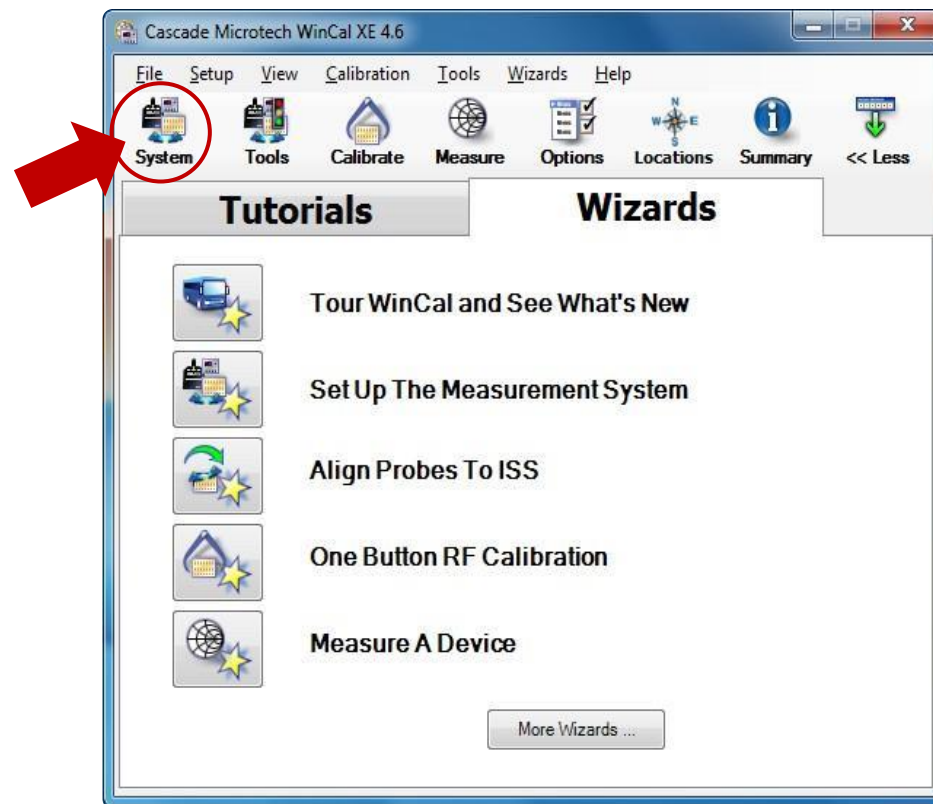
- This document is a reference guide for user who have bought RF probes from **Allstron** and **MPI TITAN Probes** and **MPI Calibration Substrates**
- Customer who want to use these Probes with WinCal XE Calibration SoEware

# 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

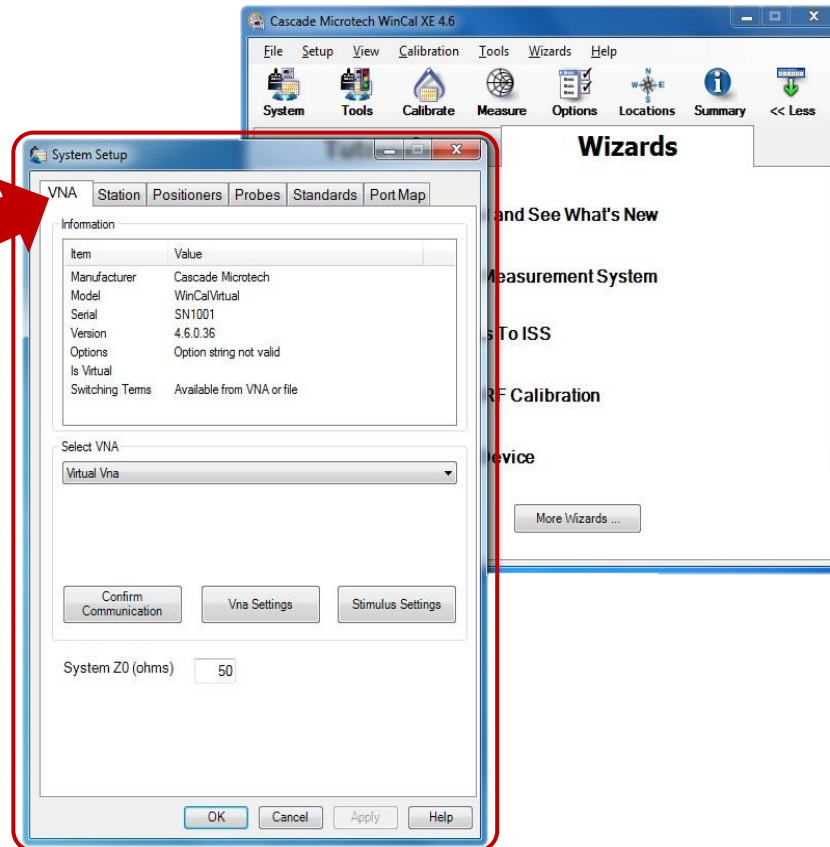
# Configuring “Generic” Probes

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



# Configuring “Generic” Probes

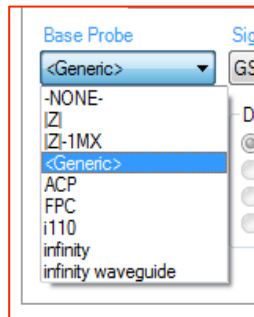
System Setup  
Window



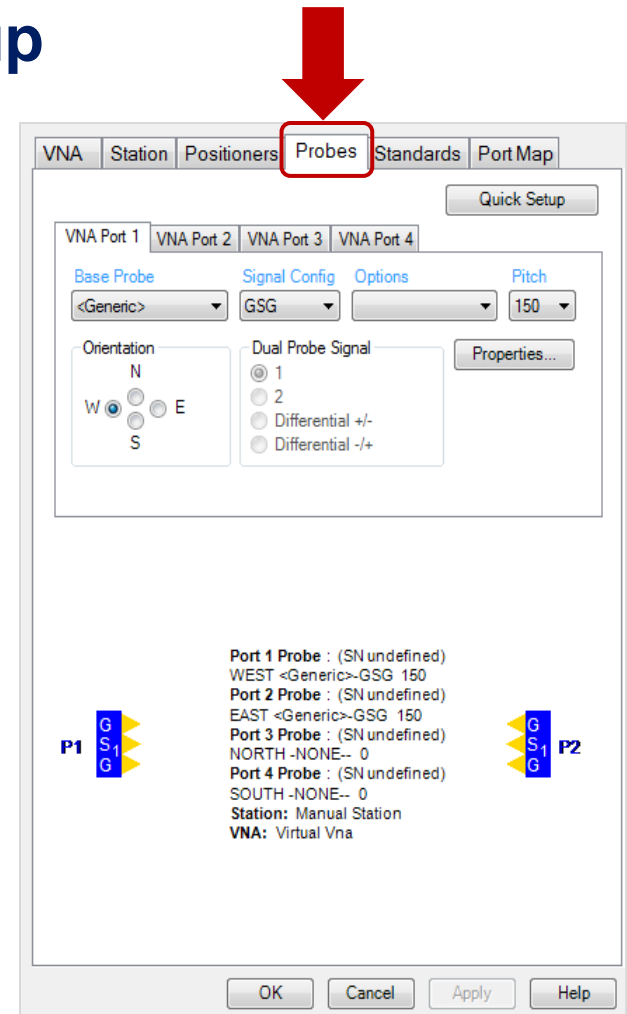
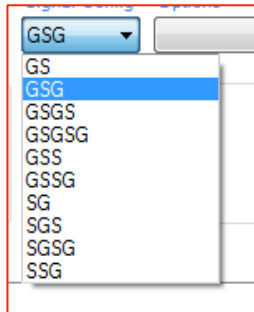
# Configuring “Generic” Probes

## ■ Probes Setup on the **System Setup**

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

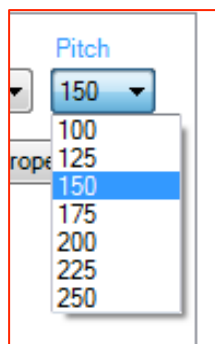


- Select **Signal Config** type (e.g. GSG)

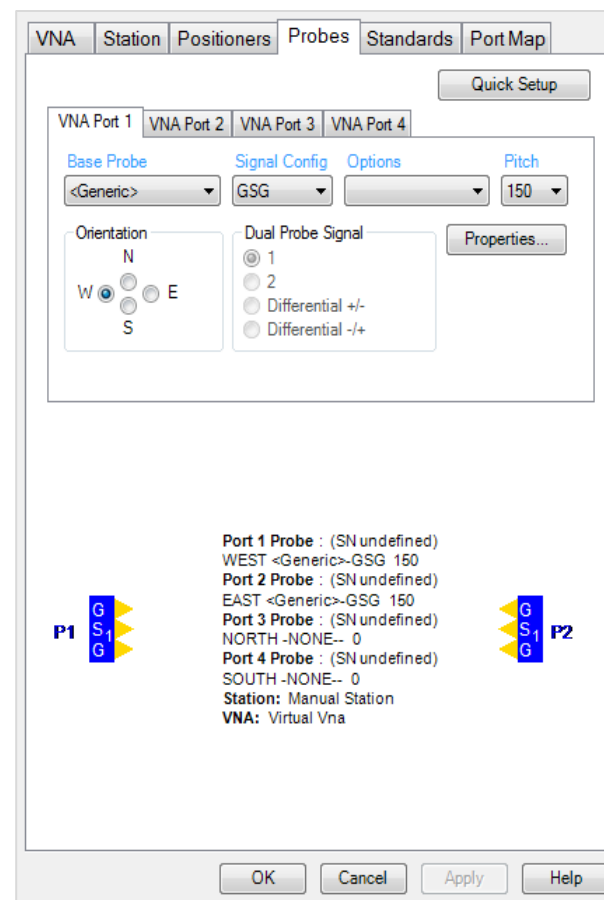
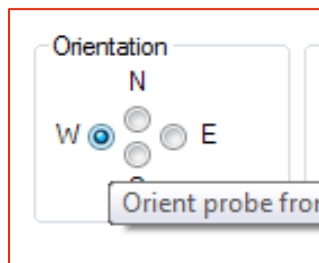


# Configuring “Generic” Probes

- Probes Setup on the **System Setup**
  - Select Pitch Value

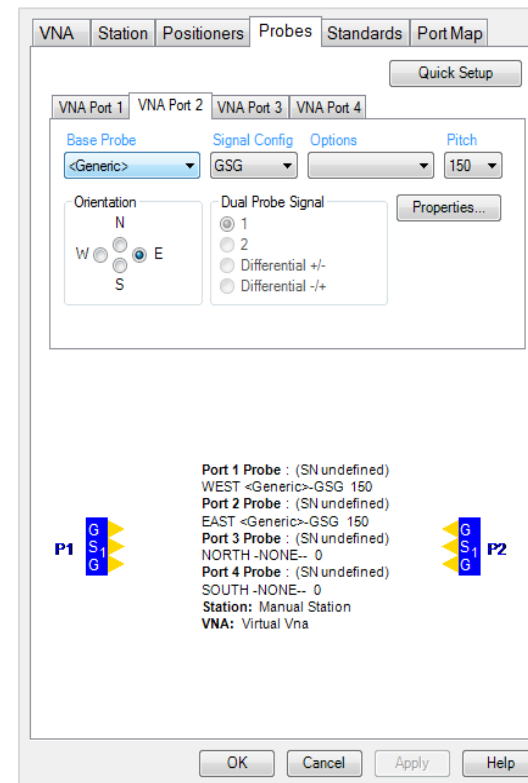
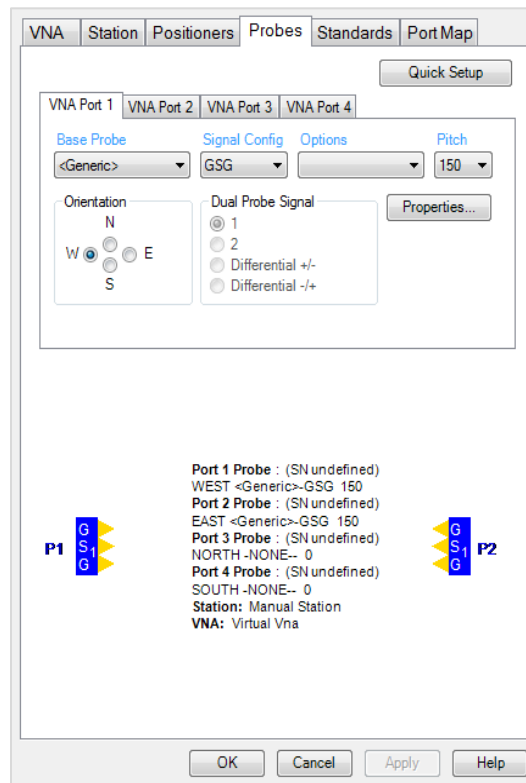


- Select **Orientation**



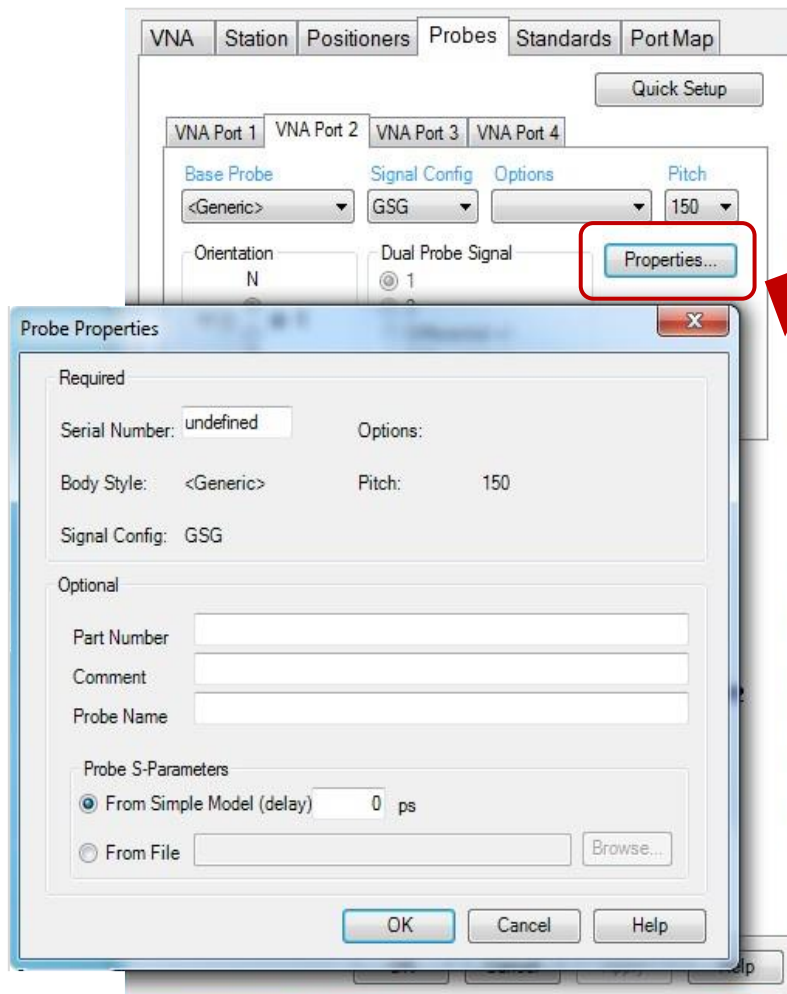
# Configuring “Generic” Probes

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





# Configuring “Generic” Probes

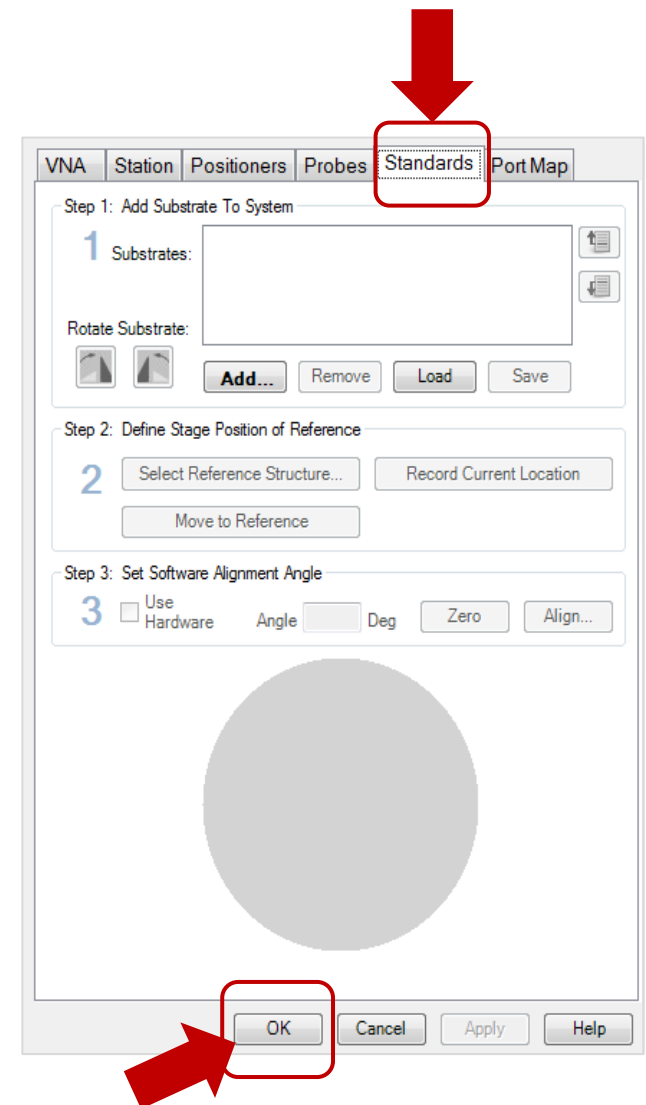


This is optional

- 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

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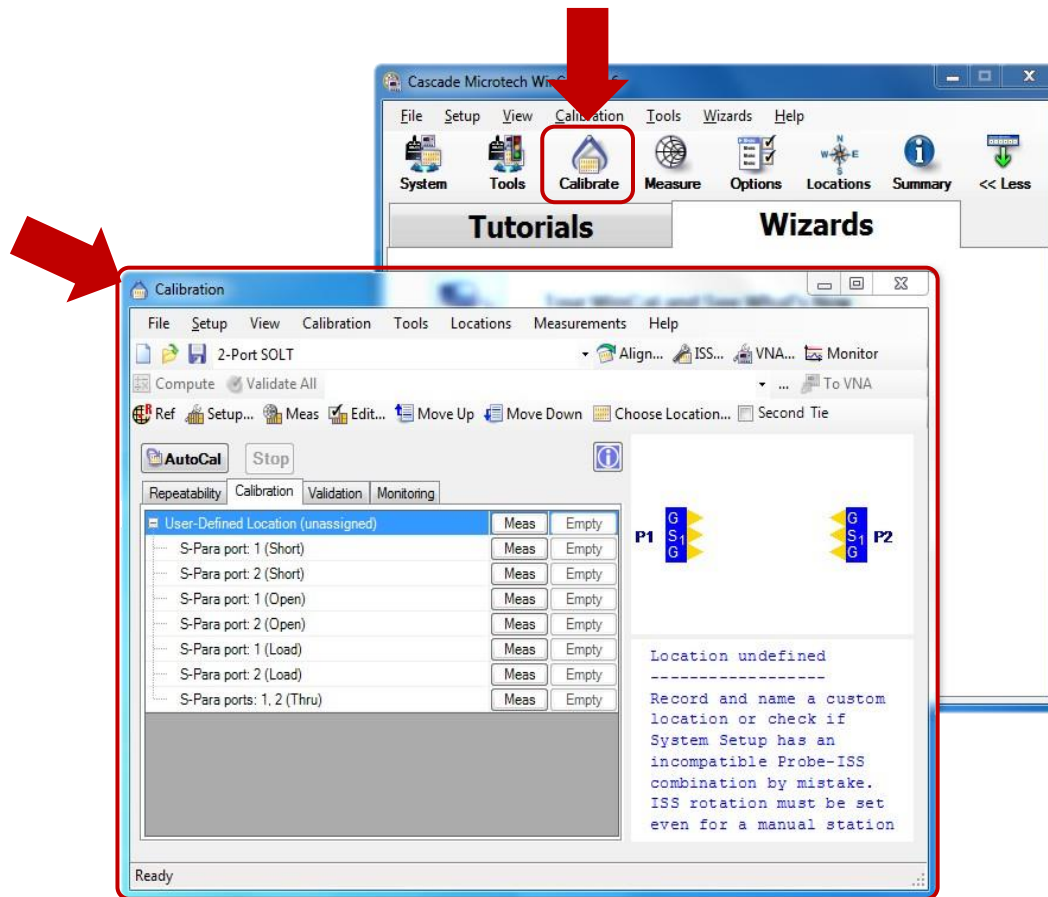
- Define probe correction coefficients, as:
  - Open Capacitance,  $C_0$
  - Short Inductance,  $L_0$
  - Load (Termination) Inductance,  $L_0$
  - Thru Delay and Loss

# 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

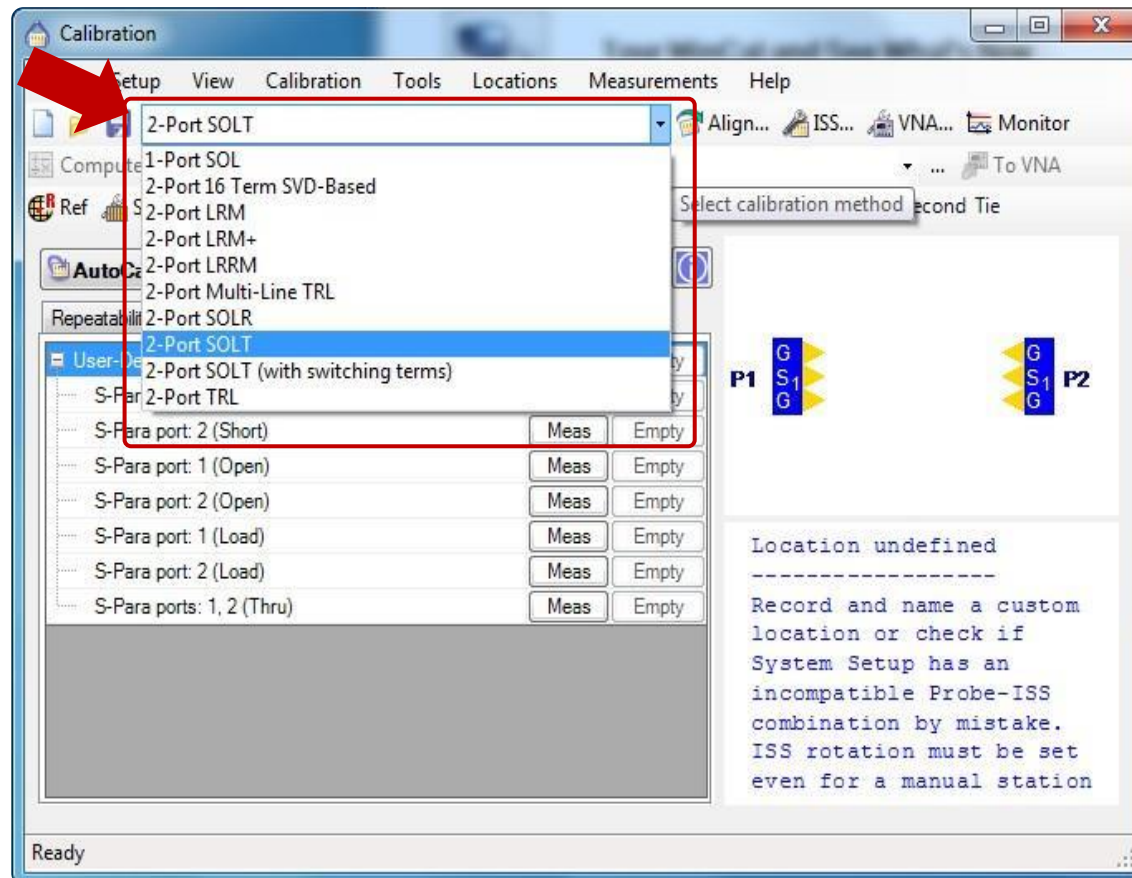
# Call Calibration Window

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



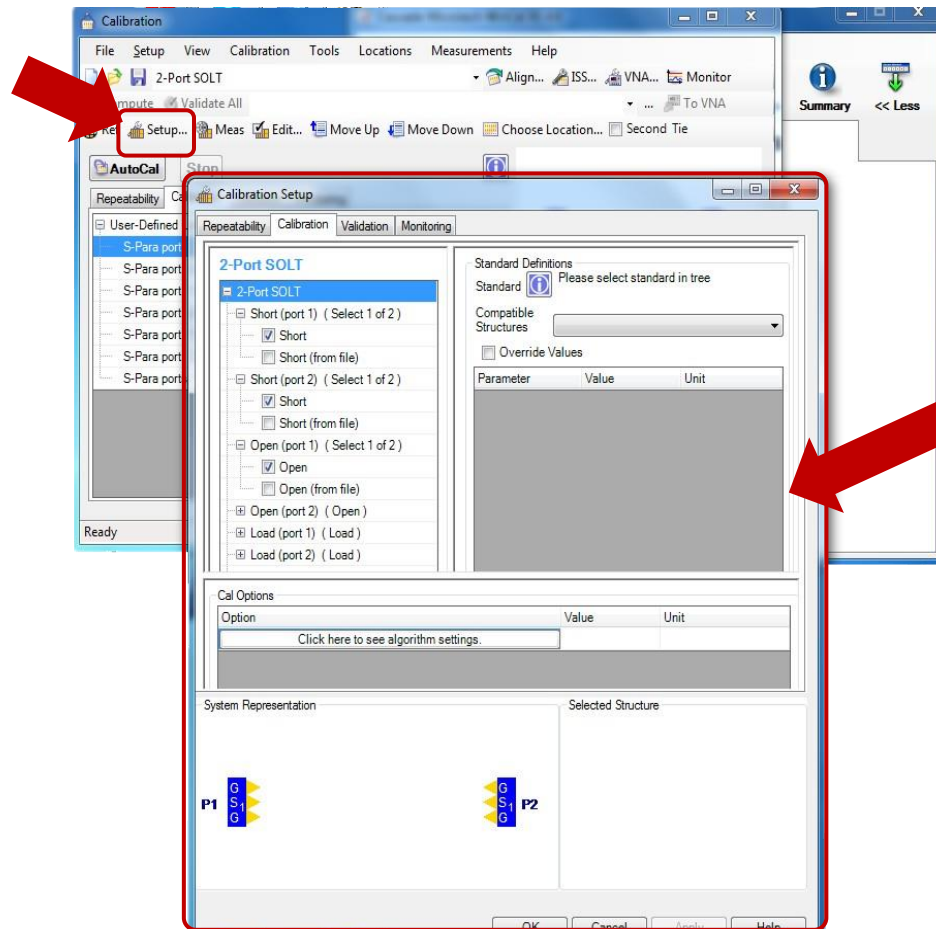
# Call Calibration Window

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



# Call Calibration Setup

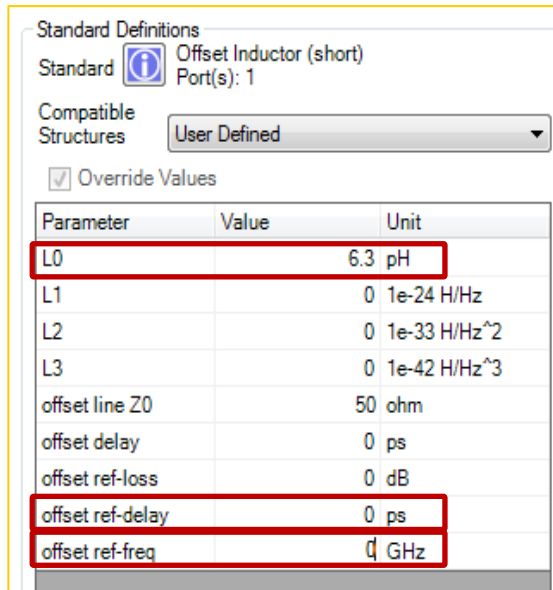
- Click on “**Setup**” to open up the Calibration Setup Window



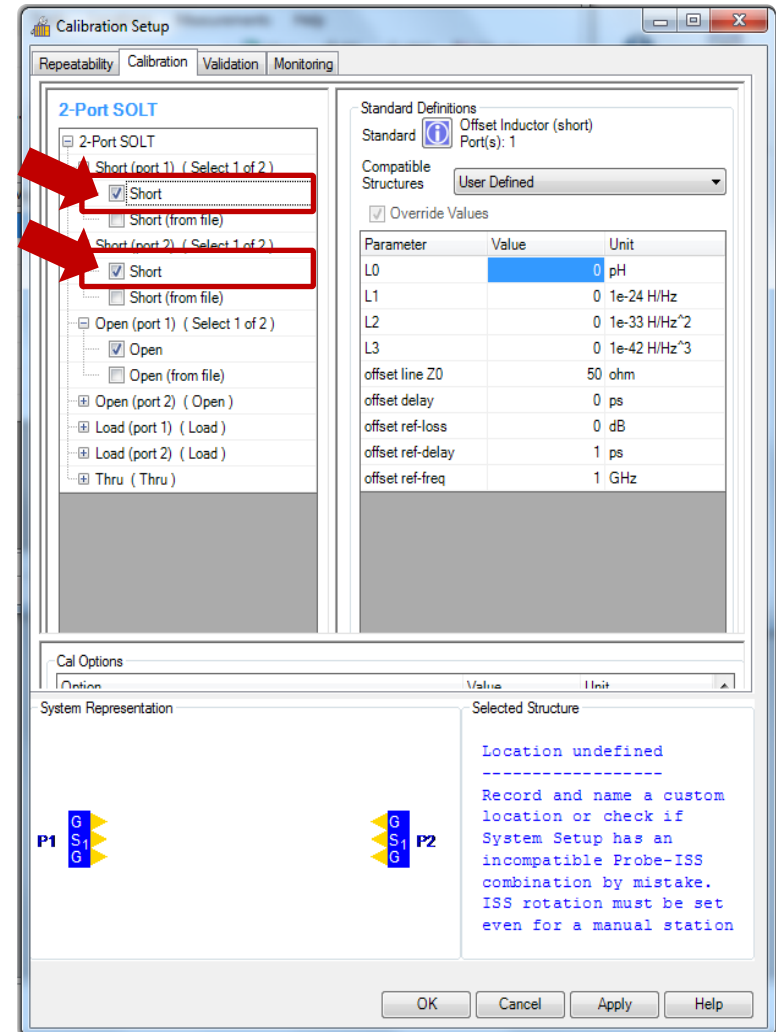
This window is where the calibration coefficient are being input for calibration

# 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



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





# 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

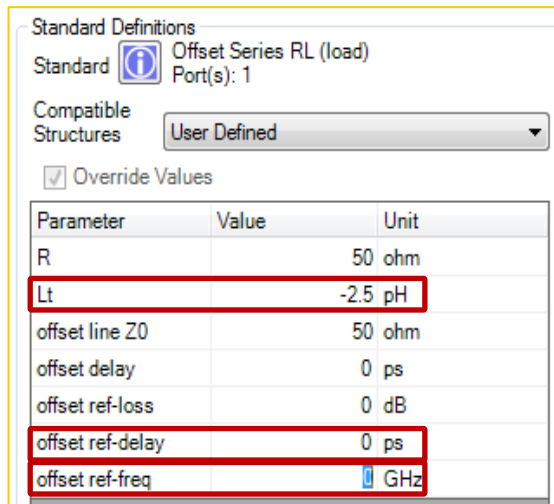
Parameter	Value	Unit
C0	5.2	fF
C1	0	1e-27 F/Hz
C2	0	1e-36 F/Hz <sup>2</sup>
C3	0	1e-45 F/Hz <sup>3</sup>
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	0	ps
offset ref-freq	0	GHz

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

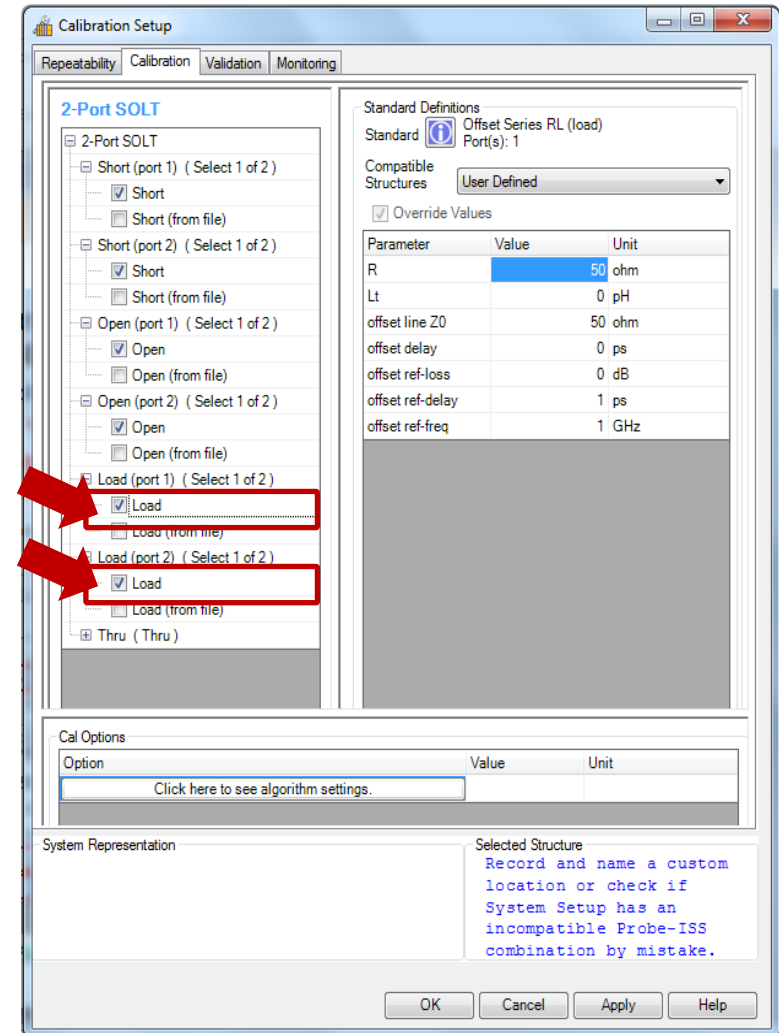
Parameter	Value	Unit
C0	0	fF
C1	0	1e-27 F/Hz
C2	0	1e-36 F/Hz <sup>2</sup>
C3	0	1e-45 F/Hz <sup>3</sup>
offset line Z0	50	ohm
offset delay	0	ps
offset ref-loss	0	dB
offset ref-delay	1	ps
offset ref-freq	1	GHz

# Call Calibration Setup

- Click on “**Load**” to input the calibration coefficient in “**Standard Definition**”
  - Key in the **Load Inductance Value (pH)** in **C0**
  - Set **offset ref-delay** to “**0**” ps
  - Set **offset ref-freq** to “**0**” GHz

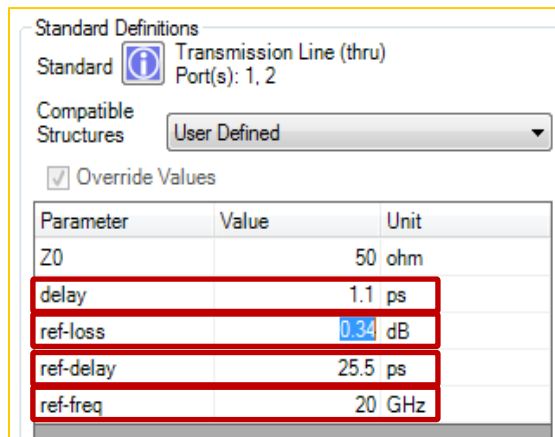


*\*Refer to probe or calibration coefficient table in Appendix A*

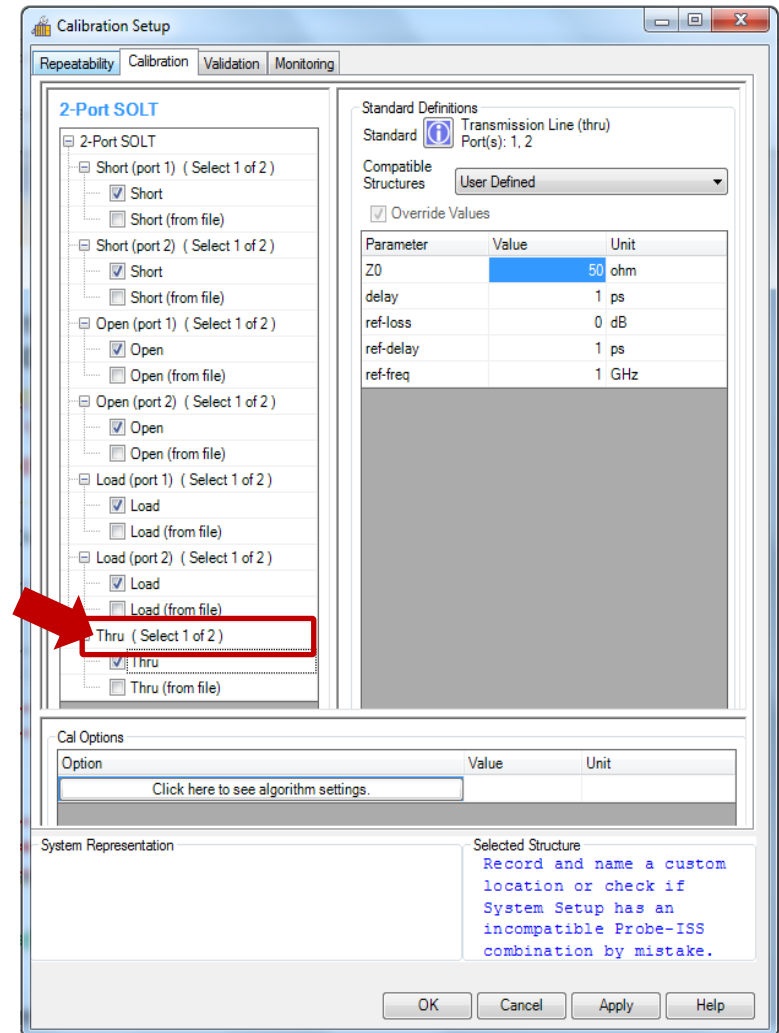


# Call Calibration Setup

- 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)**

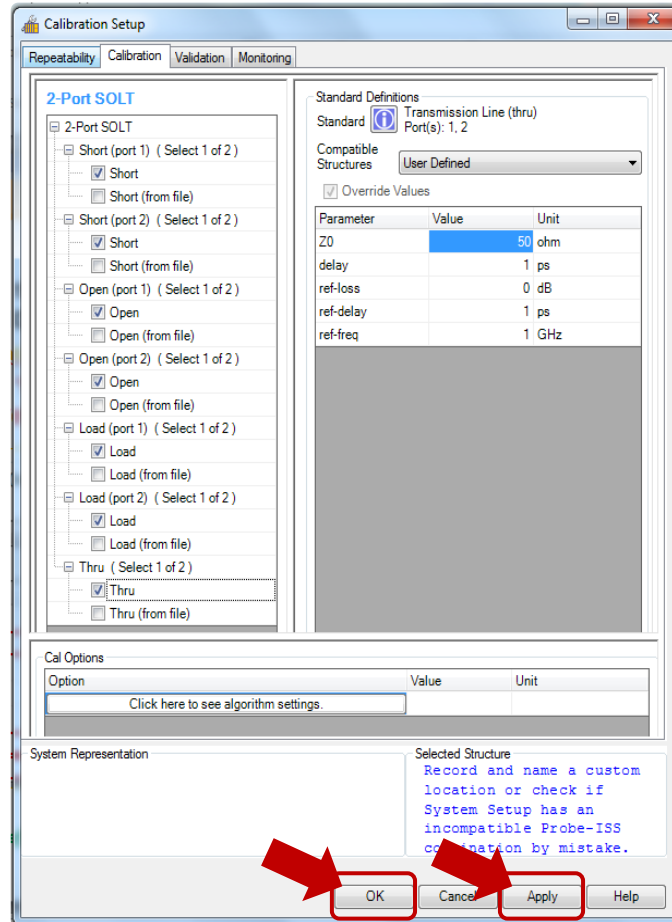


*\*Refer to AC-2, AC-3 and AC-5 datasheet*



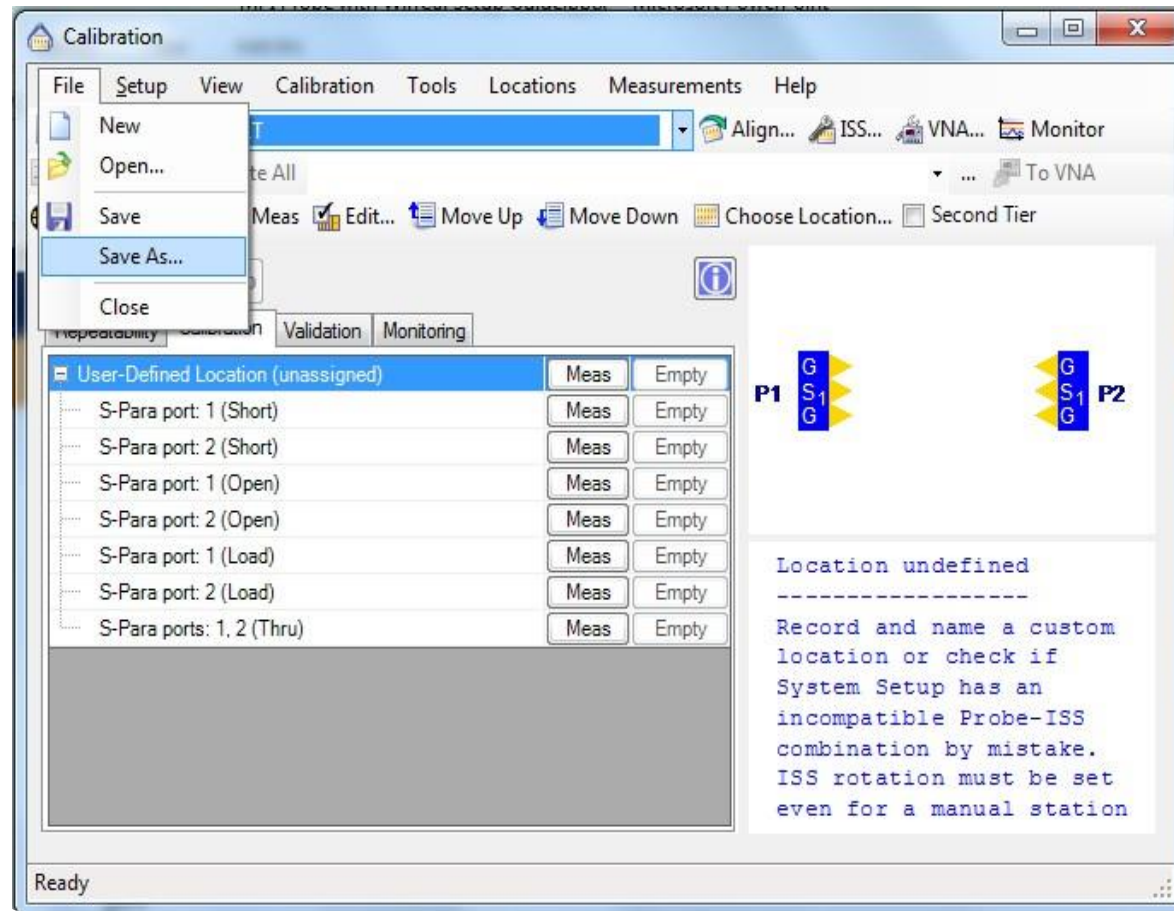
# Confirm Modifications

- Click on “Apply” and then “OK”



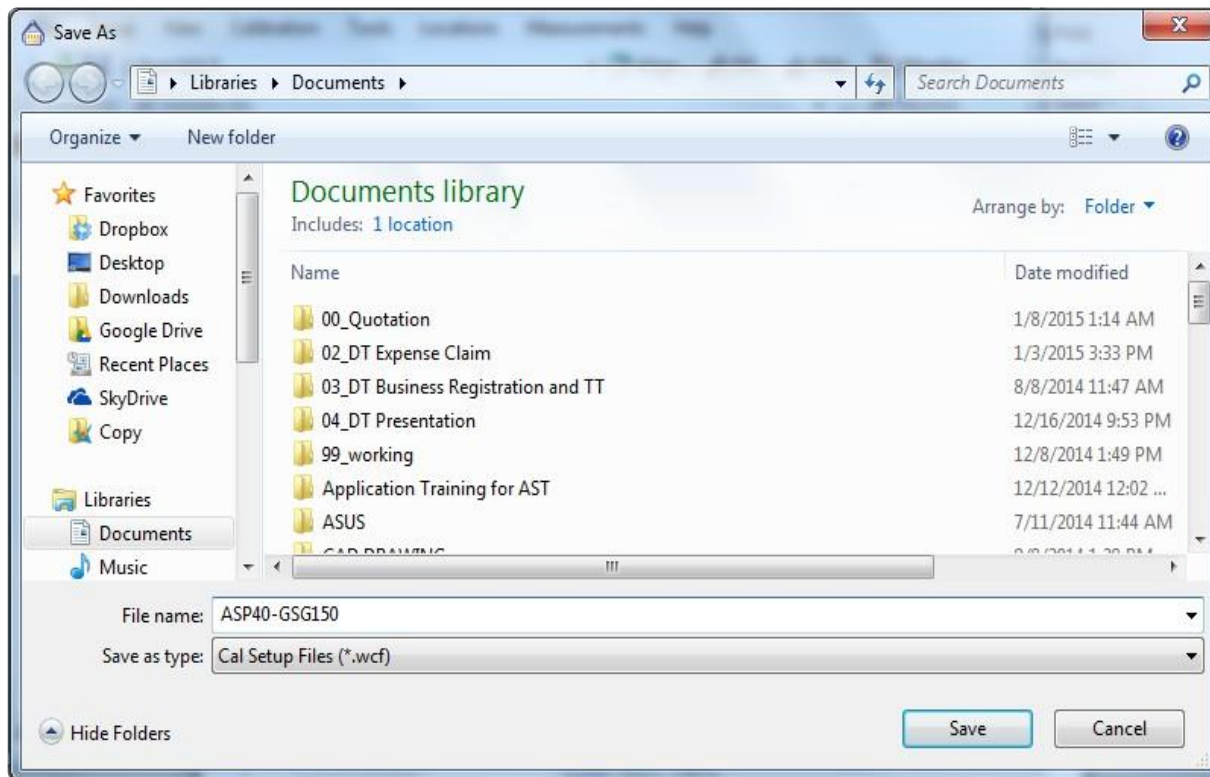
# Save Project

- 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 ASP 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 $\Omega$
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**

**MPI**CORPORATION