



**C**  
**OPLAN**  
FOR ADS™

version 3.1

# Tutorial

tutorial version 1.02

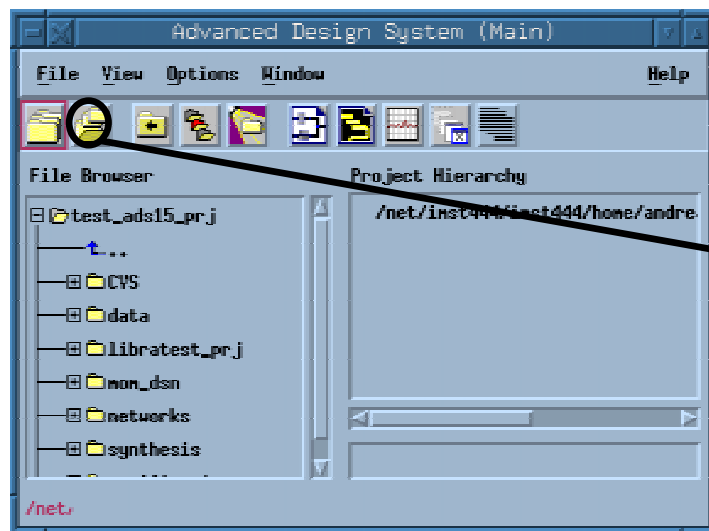


# Open Project

Welcome to the Coplan Tutorial

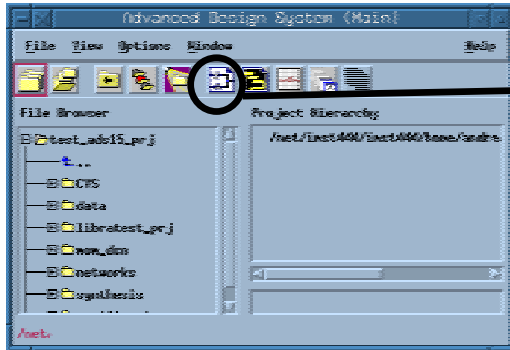
Before you start, please copy the Coplan example project from ADS/custom/imst/coplan\_examples\_prj to your home directory (on PC usual c:\users\default)

If you don't want to use the example project, copy the s2p-files from coplan\_examples\_prj/data to your\_project/data)

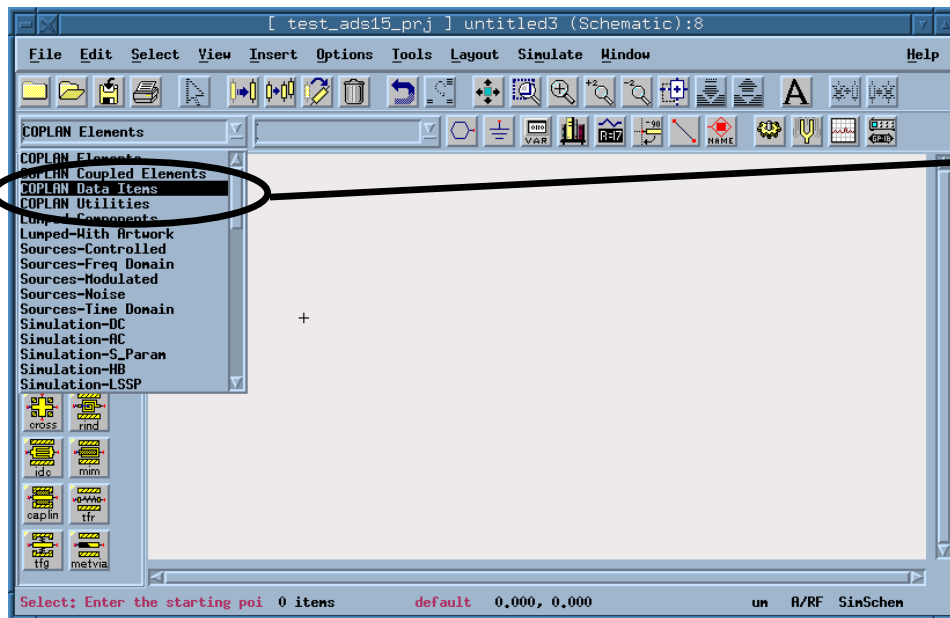


1. Start ADS
2. Open the Coplan example project

# New Schematic Window

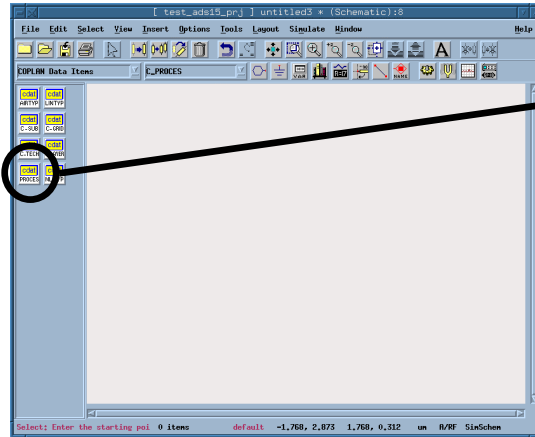


1. Press Button for a new Schematic Window

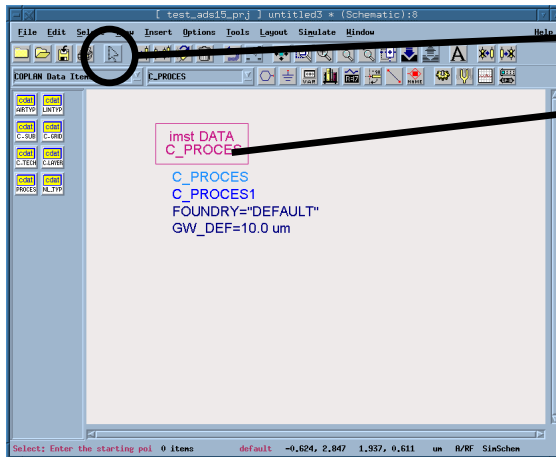


1. Choose COPLAN Data Items from the Component Palette List

# Add C\_PROCES

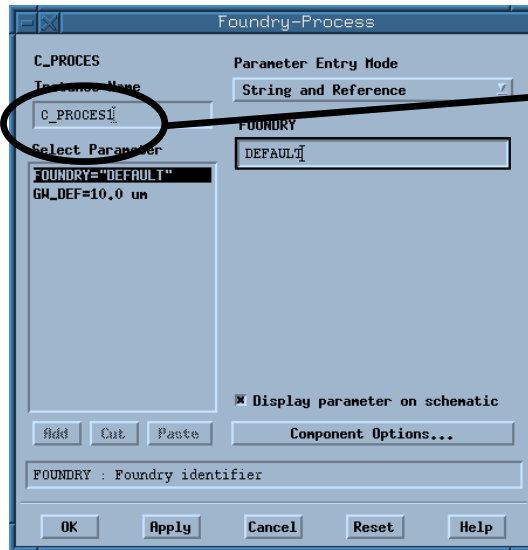


1. Add Proces Data I tem to the window.

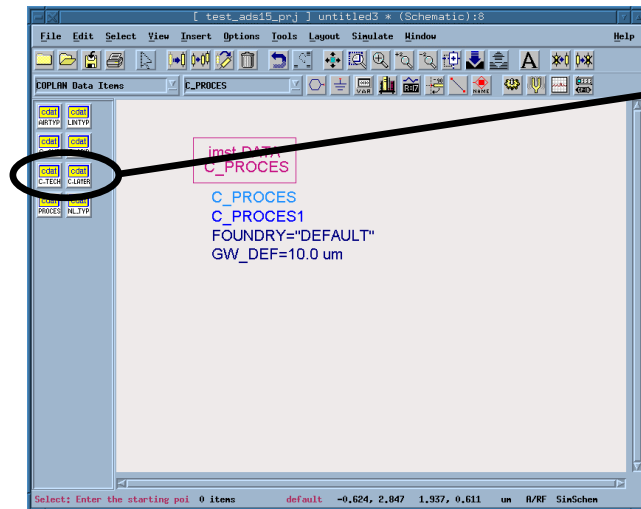


1. Return to Select Mode
2. Double click the Proces Data I tem to open the Parameter Entry mode.

# Edit C\_PROCES

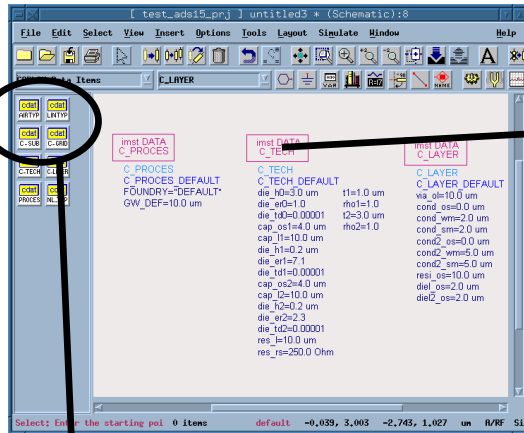


1. Rename C\_PROCES1 to C\_PROCES\_DEFAULT
2. Press OK



1. Add C\_Tech Data and C\_LAYER Data Item
2. Rename C\_Tech1 to C\_Tech\_DEFAULT
3. RENAME C\_LAYER1 to C\_LAYER\_DEFAULT

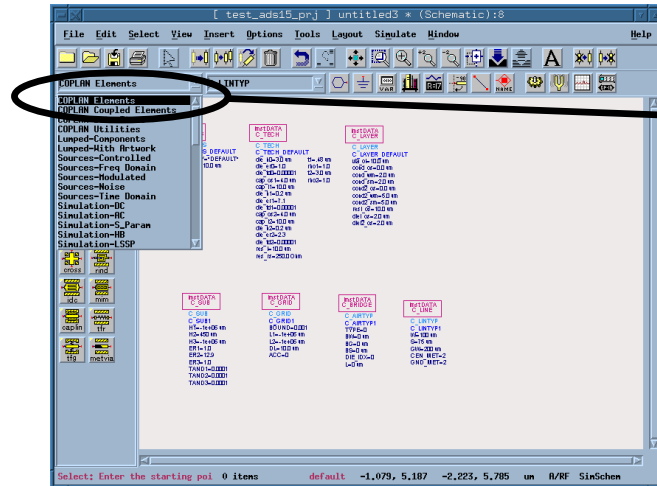
# Last Data Items



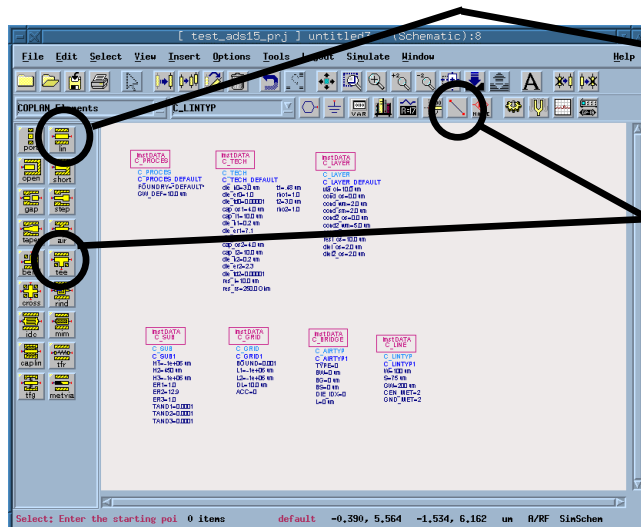
1. Double click on C\_TEC\_DEFAULT
2. Set t1 to  $0.48\mu\text{m}$
3. Set t2 to  $3.0\mu\text{m}$

1. Add C\_LI NTYP, C\_AI RTYP, C\_SUB, C\_GRI D
2. Set H2 from C\_SUB1 to  $450\mu\text{m}$ , H1 & H3 to -1 (unit None)
3. Set TYPE, BW, BG, BS, L from C\_AI RTYP1 to 0
4. Set LI NTYP1 as follows: W= $100\mu\text{m}$ , S= $75\mu\text{m}$ , GW= $200\mu\text{m}$
5. Set L1 & L2 from C\_GRI D1 to -1 (unit None)

# Tee and Feed Lines

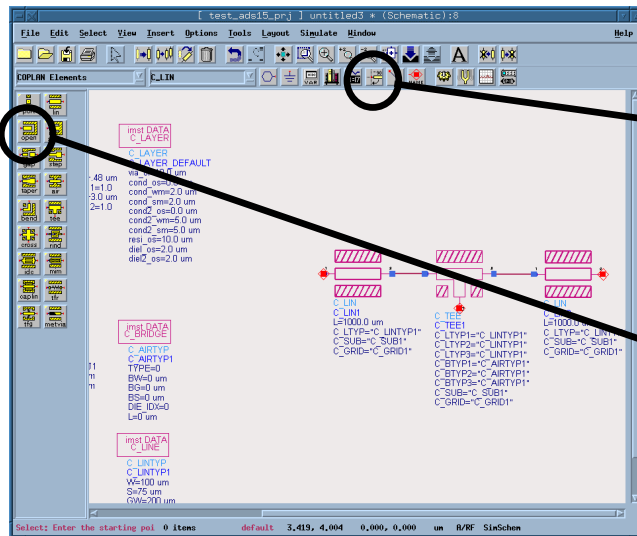


1. Choose COPLAN Elements from the Component Palette List

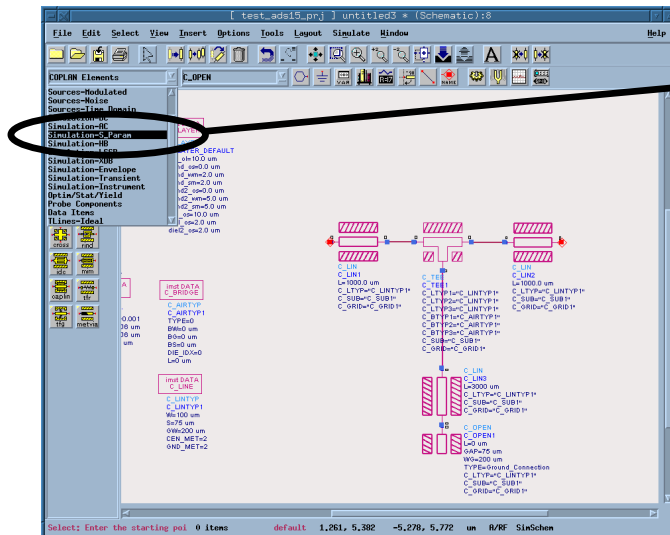


1. Place a C\_TEE in the Schematic
2. Place one C\_LIN right and one C\_LIN left from the TEE (our feed lines)
3. Connect these with the tee arms using wires.
4. Set the L from the 2 C\_LINs to  $1000\mu\text{m}$

# Tee Stub

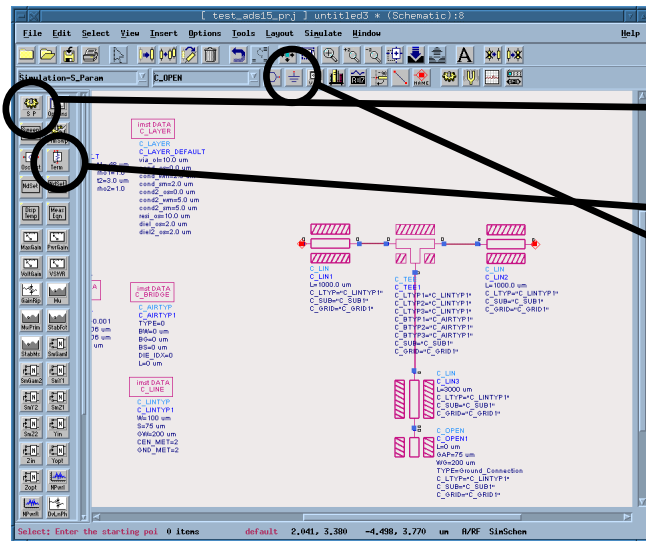


1. Take a 3th C\_LIN, turn it for 90deg connect it with the 3th tee arm (the stub).
2. Set L from this C\_LIN to  $3000\mu\text{m}$
3. Place a C\_OPEN to the second port of this C\_LIN.
4. Set C\_OPEN1 as follows:  $L=0$ ,  $GAP=75\mu\text{m}$ ,  $WG=200\mu\text{m}$
5. Choose Simulation-S\_PARAM from the Component Palette List

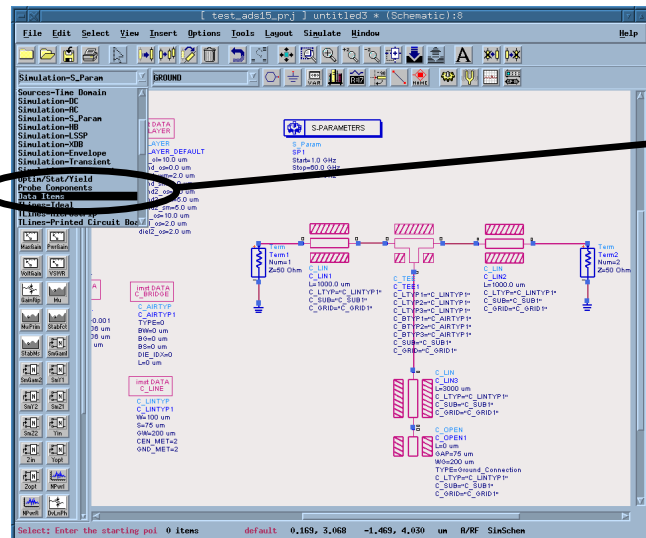




# S-Parameter

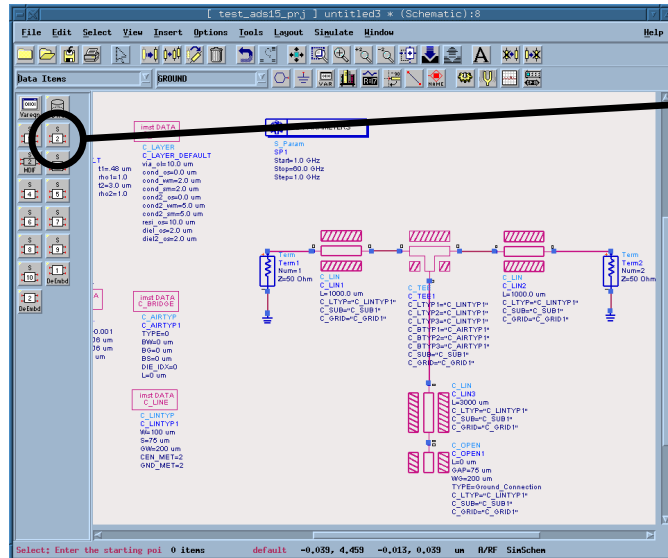


1. Place S\_Param and set stop frequency to 60GHz
2. Place two terminations and connect them with the feed lines.
3. Place and connect Grounds to termination feeds.

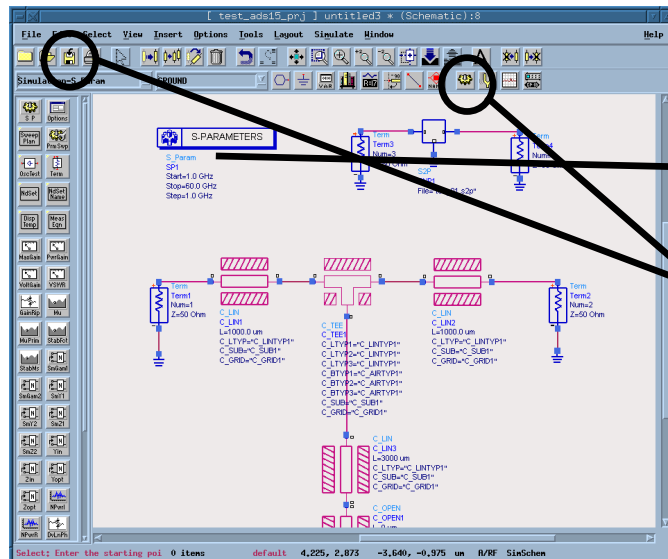


1. Choose Data Items from the Component Palette List

# s2p File

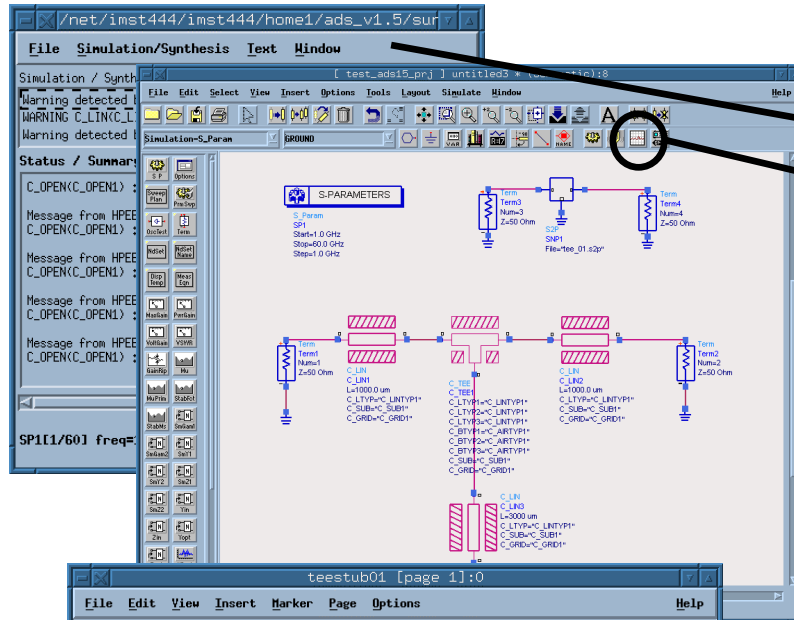


1. Place S2P to your design
2. Put a ground on the bottom port of your S2P
3. Set File to "tee\_01.s2p"
4. Place terminations and ground to the s-parameter icon as you did before.

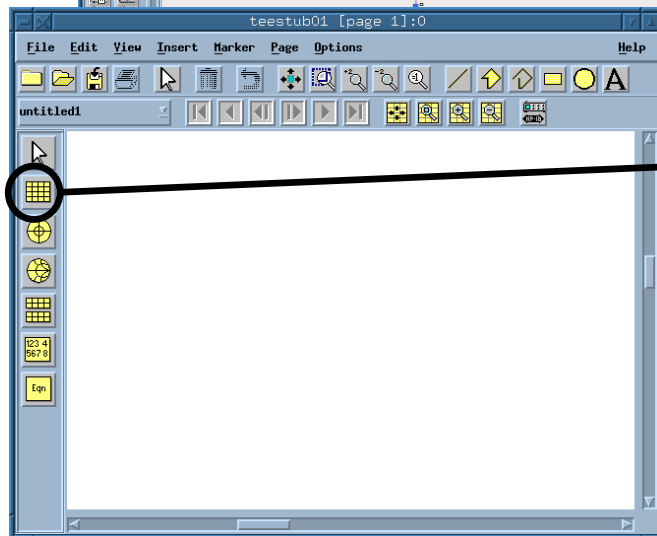


1. Disable S-Parameters -> Parameters -> Enable AC frequency conversion if set
2. Save schematic
3. Start simulation

# Simulation

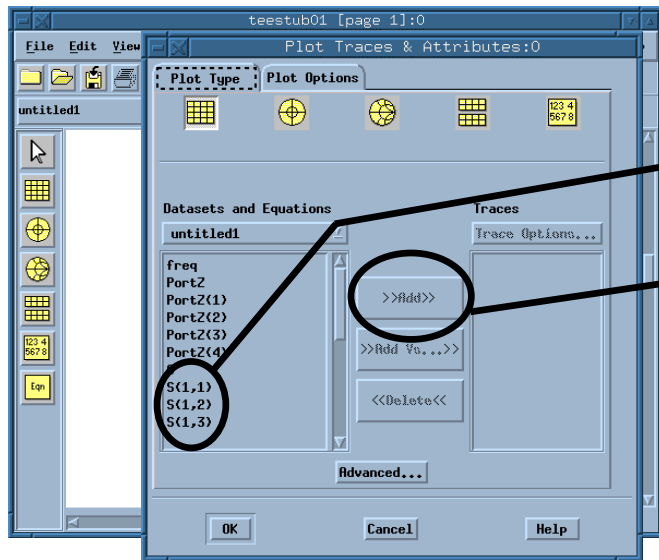


1. Simulation running
2. After simulation finished: New Data Display

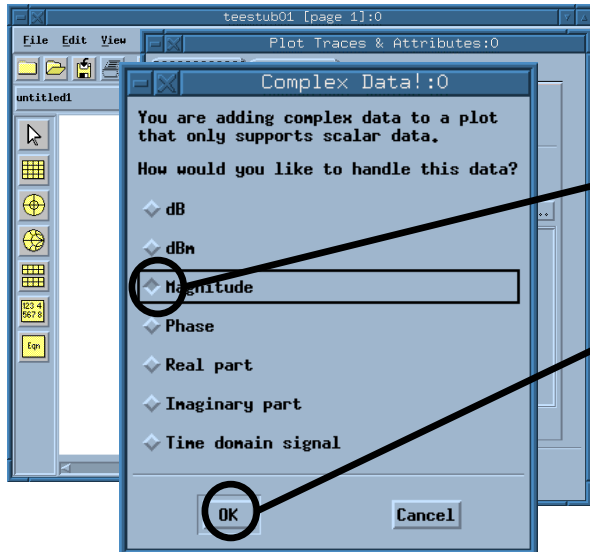


1. Take a Rectangular Plot and place it in the Data Display Window

# Data Display

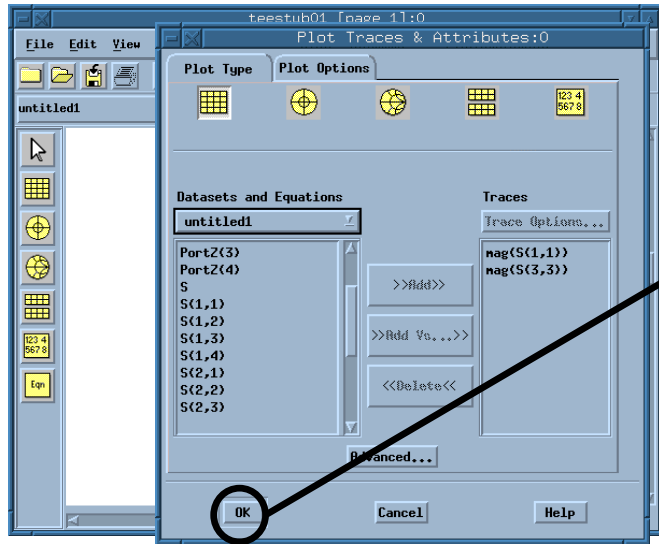


1. Press Control key and choose S(1,1), S(3,3)
2. Press >>Add>>

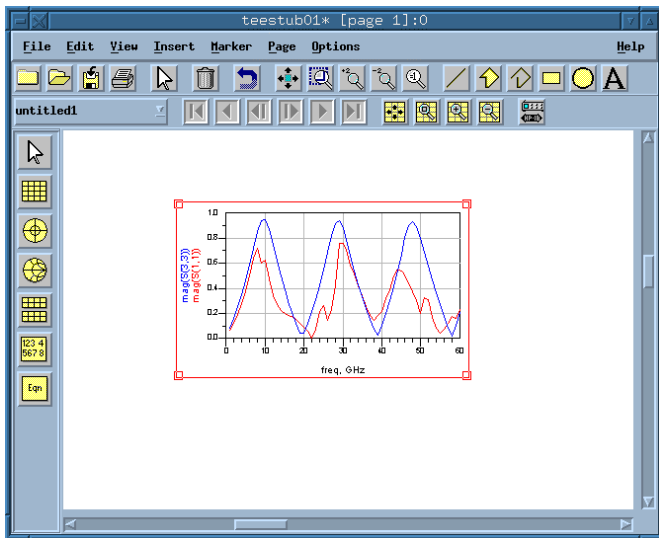


1. Choose Magnitude
2. Press OK

# Additional Plots

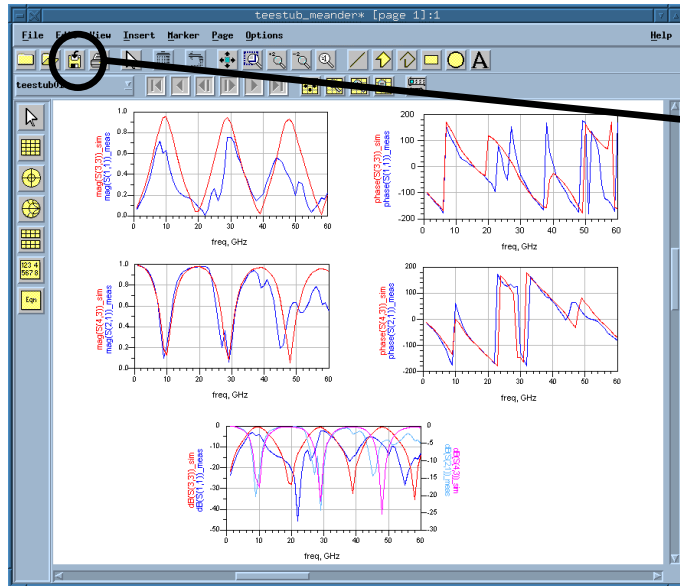


Place additional Plots to the Data Display.



1. S(1,1) and S(3,3) Phase
2. S(2,1) and S(4,3) Magnitude
3. S(2,1) and S(4,3) Phase
4. S(1,1), S(3,3), S(2,1) and S(4,3) dB

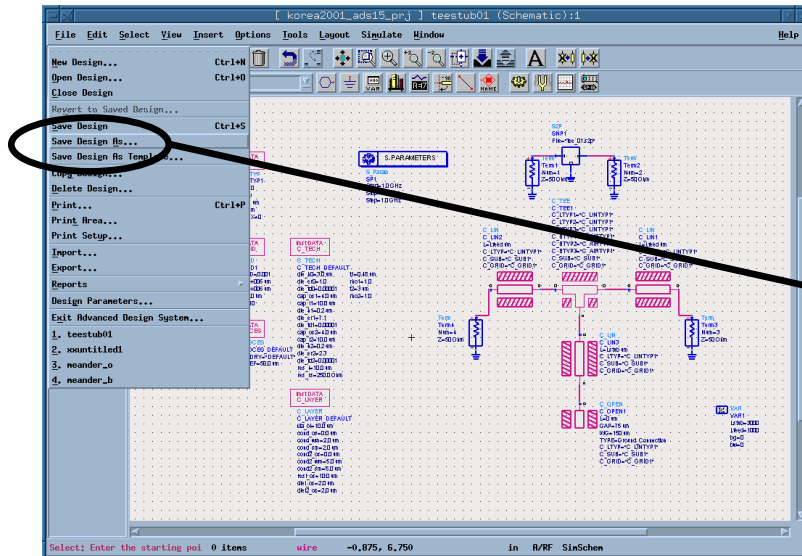
# Save Results



1. Save Data Display

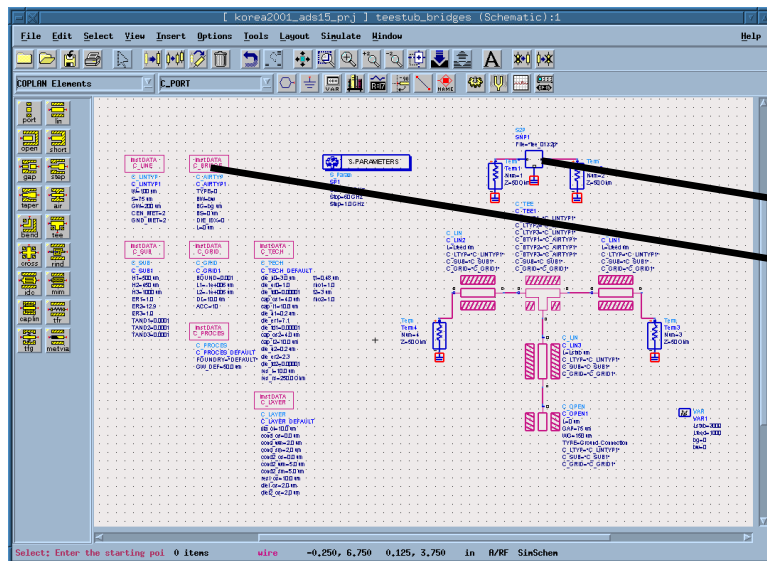
The results are quiet poor.  
The reason is the not suppressed odd-mode.  
We will now create a second Schematic  
for a tee stub with airbridges, which will have  
very good results.

# New Schematic



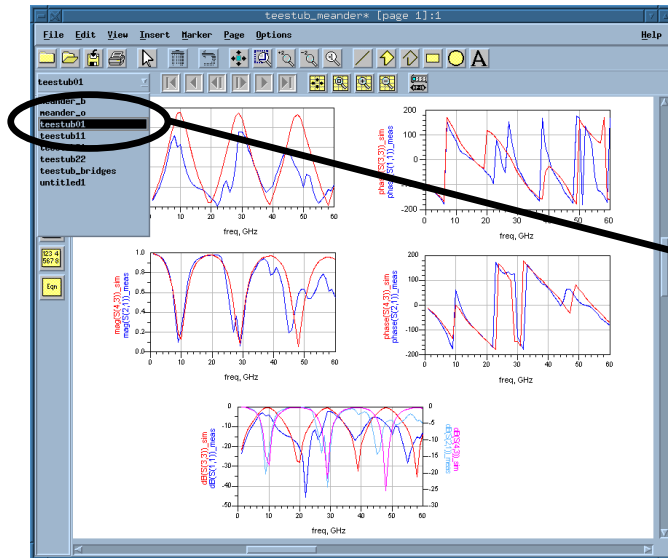
You already saved the Schematic, please do the following:

1. FILE->Save (Design) As...  
Teestub\_with\_bridge

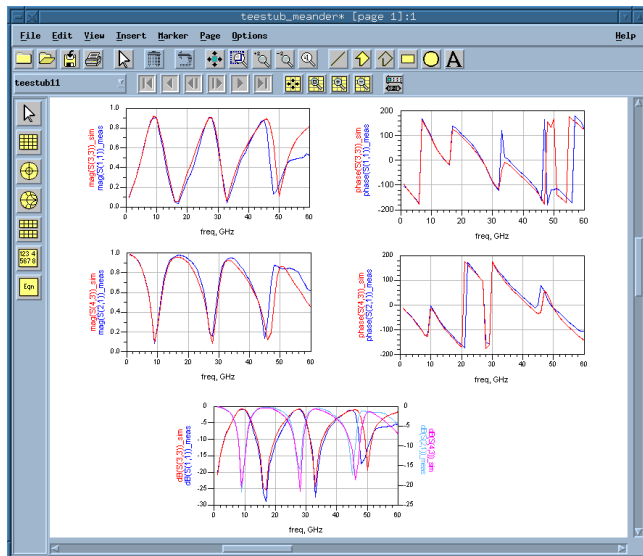


1. Set the S2P file to tee\_21.s2p
2. Edit C\_AI RTYP1: Set TYPE=1, BW=50 $\mu$ m, BG=15 $\mu$ m, BS=8 $\mu$ m
3. Start simulation

# Getting Good Results



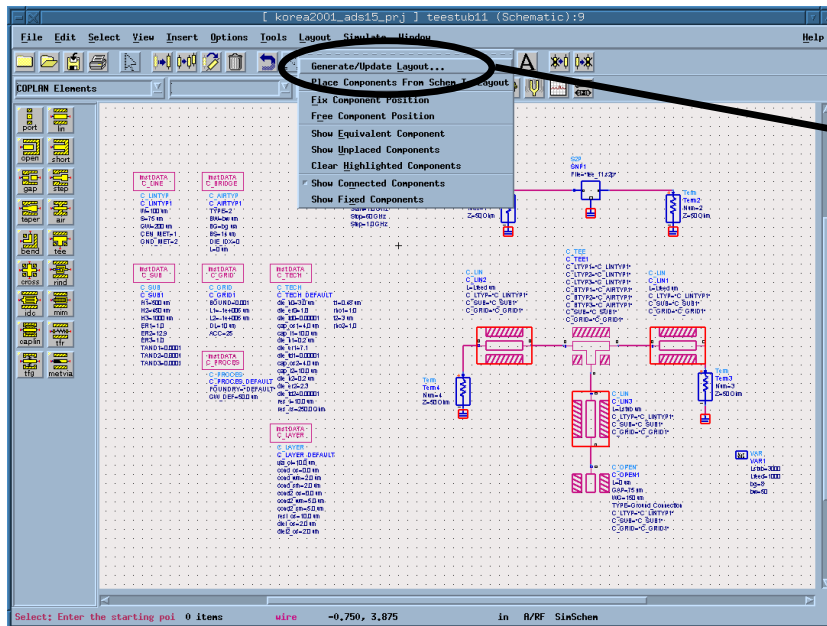
1. Select Data Display & choose Teestub\_with\_bridge



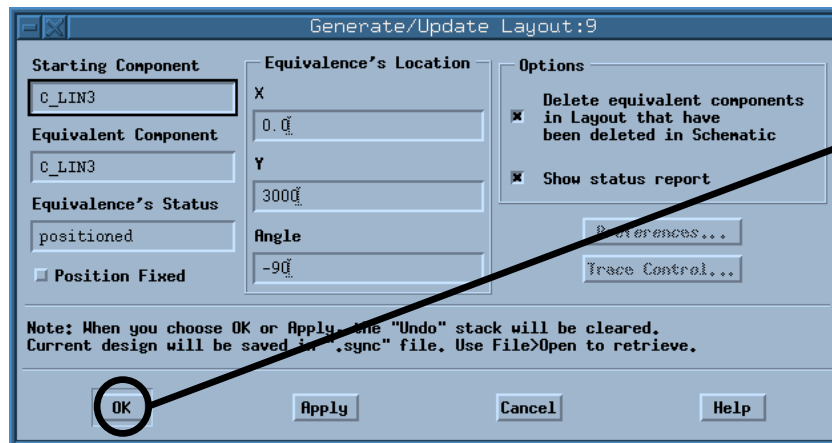
The results are quite good now.



# Generate Layout

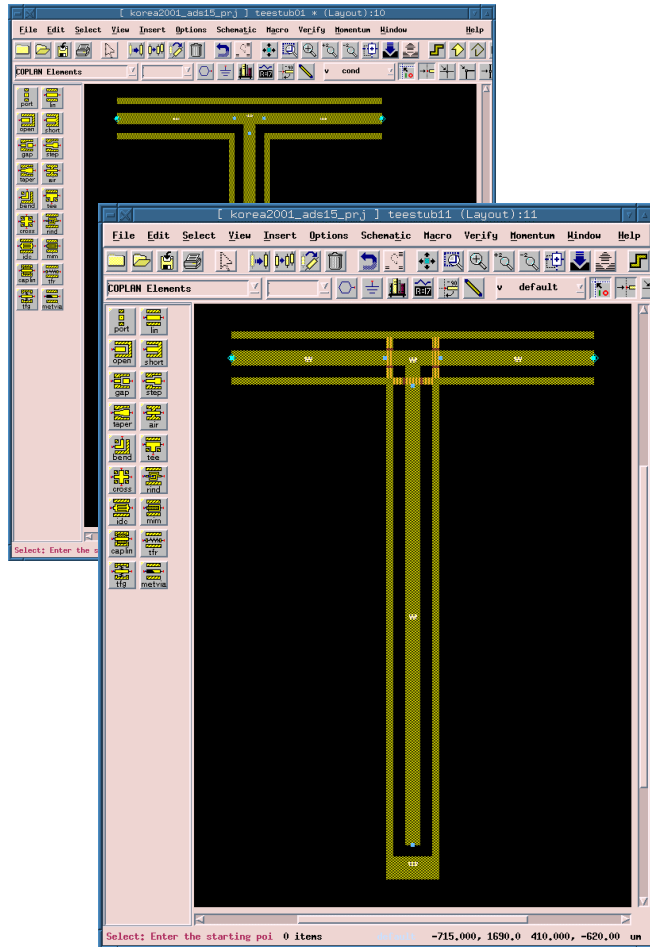


1. Choose 'Layout->Generate/Update Layout...' in the Schematic window



1. OK

# Layout



It is very easy to create the layout.  
The groundplane size for the layout is  
set in the Data Item  
C\_PROCES\_DEFAULT