Guide to using SnP Component Models in SiPro/PiPro

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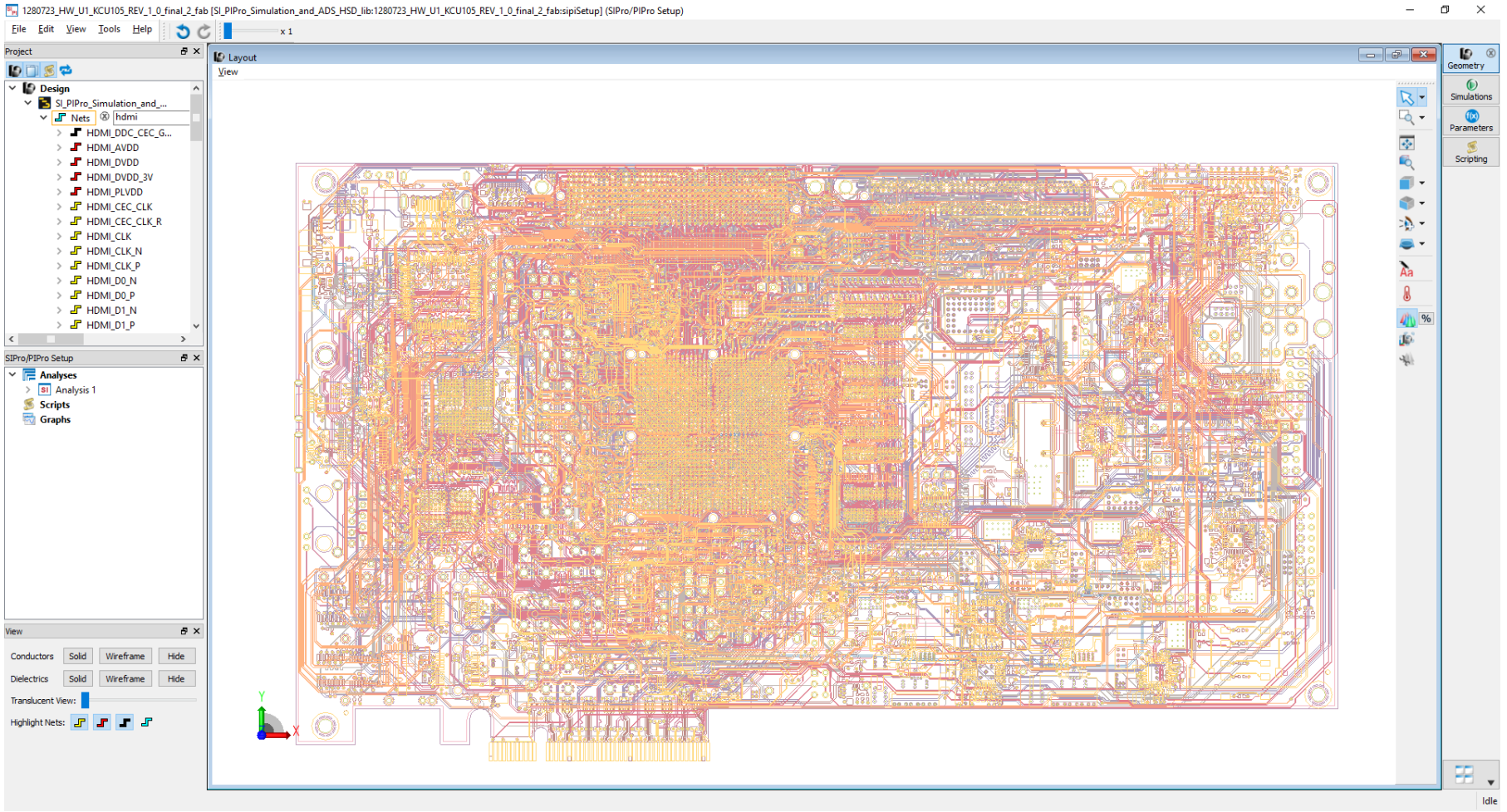
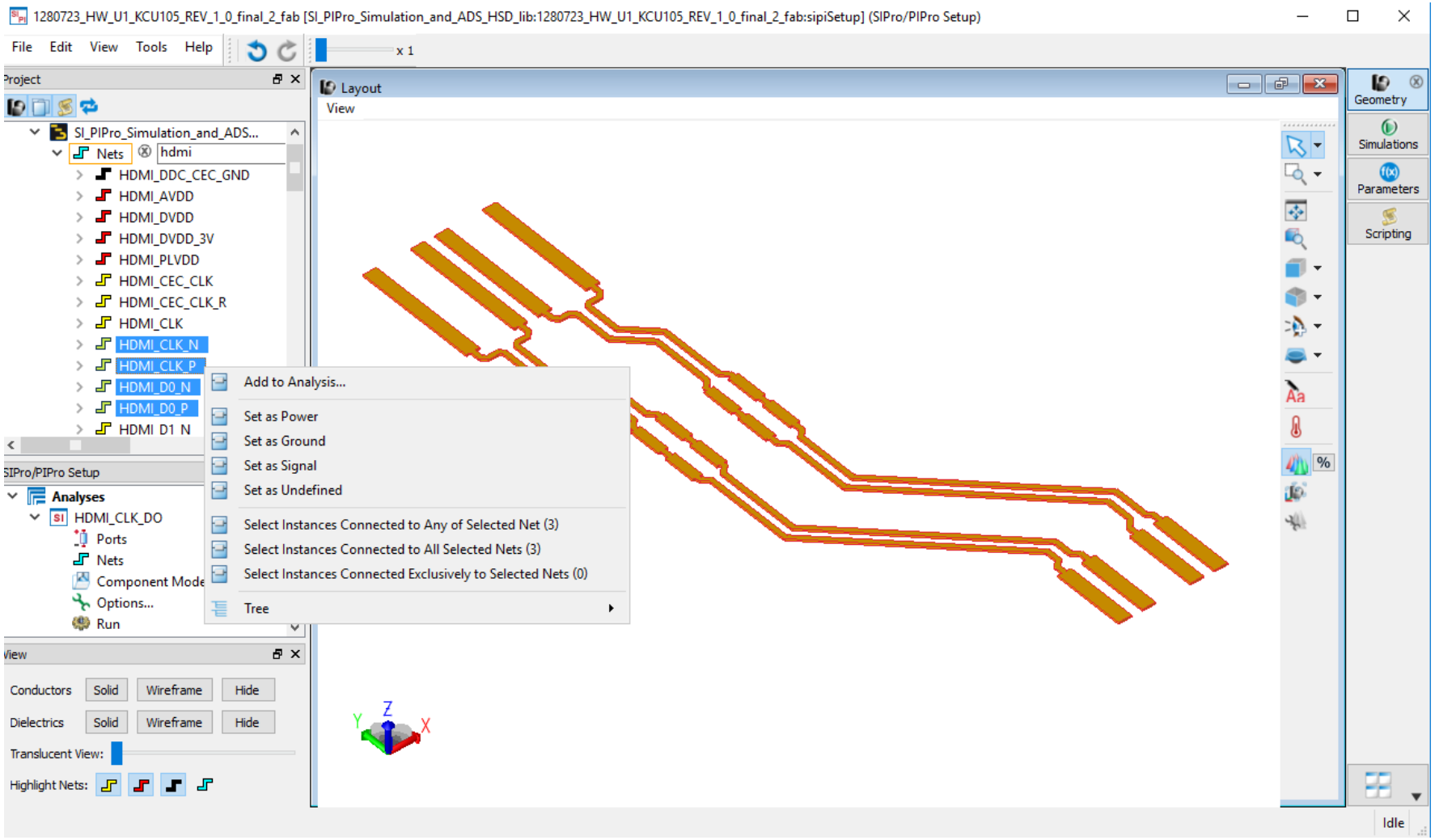
KEYSIGHT TECHNOLOGIES

Demo Board

Xilinx Board – Development environment for evaluating FPGA's



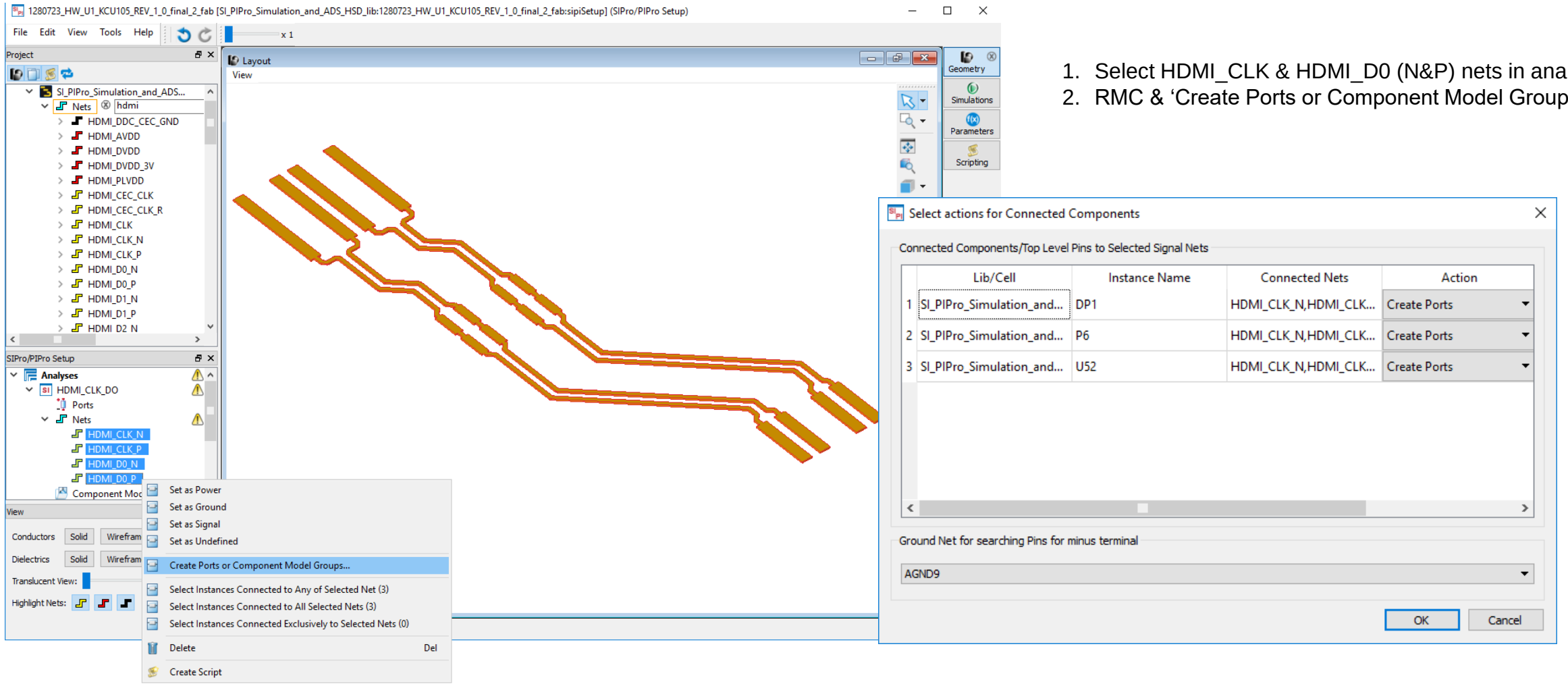
Sample HDMI nets selected



1. Create a new ‘Power Aware SI Analysis’
2. Rename analysis as required
   – I used ‘HDMI_CLK_D0’
3. Filter nets for HDMI
4. Select HDMI_CLK & HDMI_D0 (N&P) nets
5. RMC & add to selected nets to analysis

Add Ports & Components to Analysis

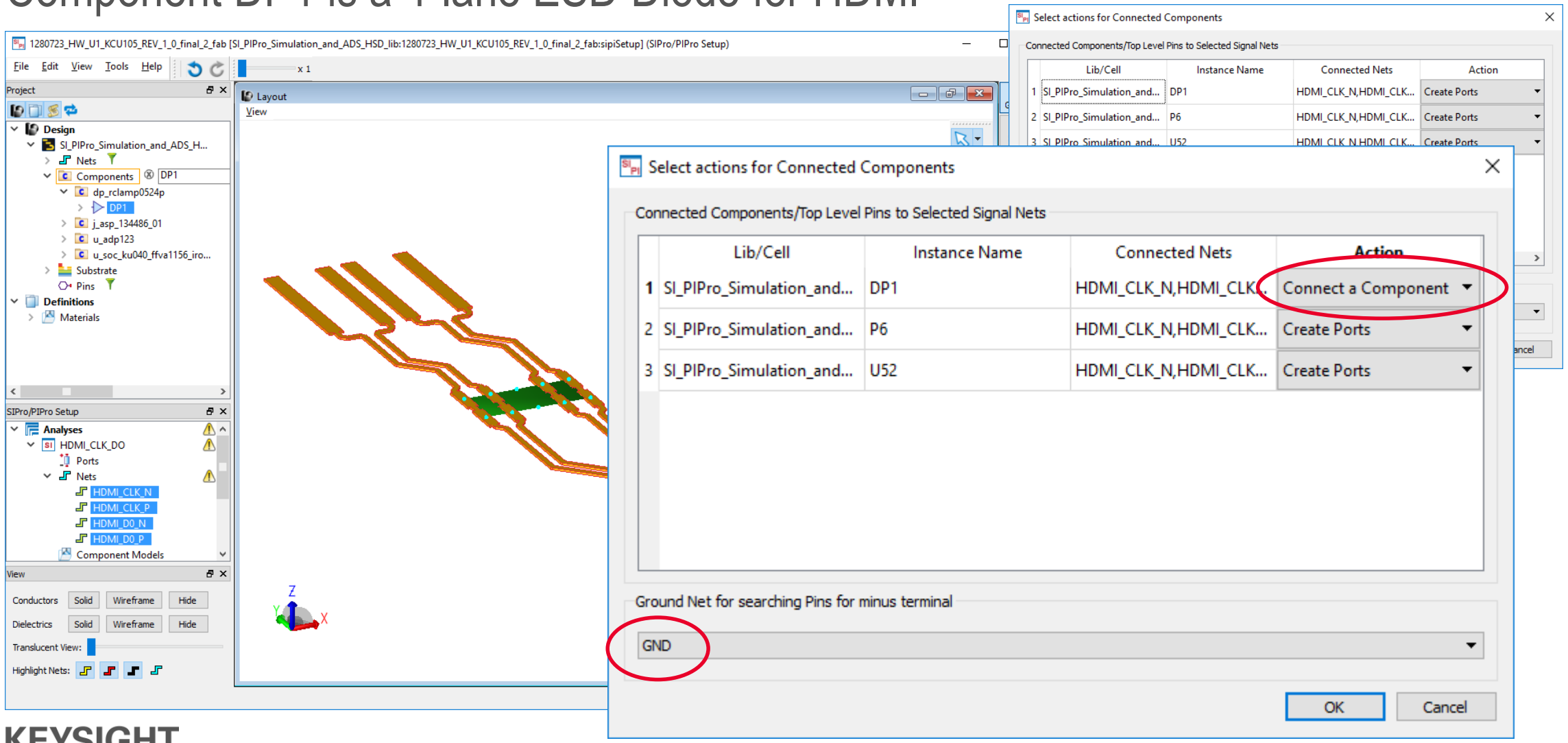
More detail on next slide…



1. Select HDMI_CLK & HDMI_D0 (N&P) nets in analysis
2. RMC & ‘Create Ports or Component Model Groups’

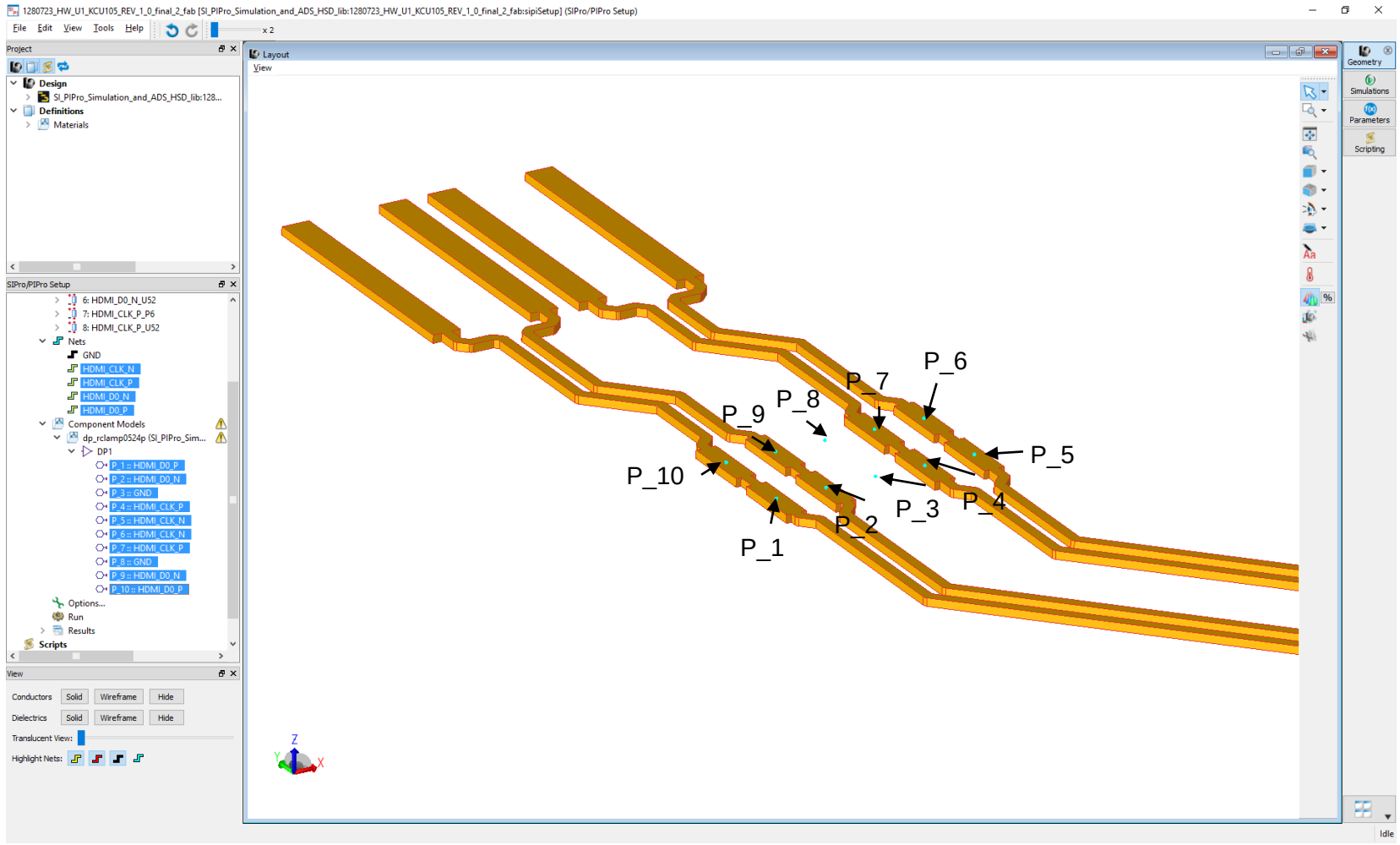
Add Ports & Components to Analysis

Component DP1 is a 4-lane ESD Diode for HDMI



Identify where each of the pins on component DP1 are connected

Hint : CTRL & Click on pin name in analysis setup…



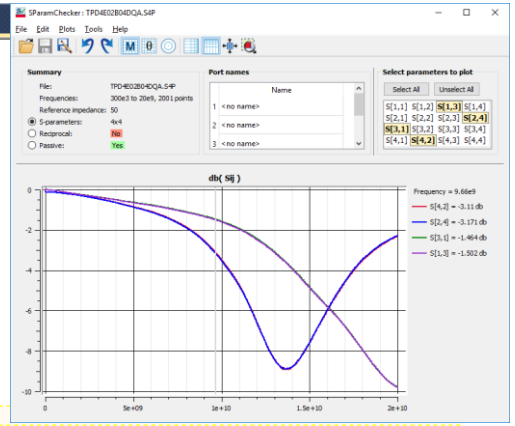
Manufacturer supplies 4-port s-parameter data

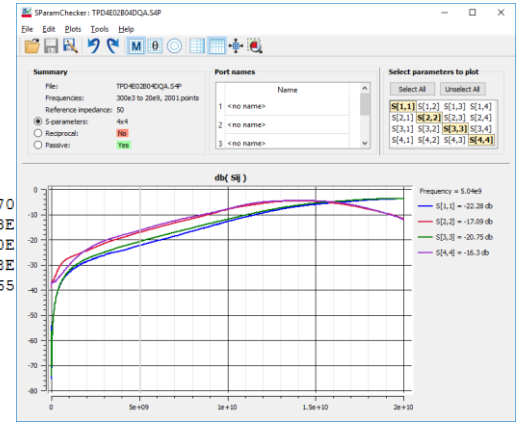
The Touchstone (.s4p) file can be opened in text editor to see explanation of connectivity

TPD4E02B04DQA.S4P

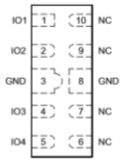
```
!  4-Port S-parameters saved by WinCal
! VAR MeasName=S-Parameters (CALIBRATED_DATA) read from VNA (N5230A)
! VAR MeasDate=8/26/2015 1:38:57 PM
! VAR NAME=A_U4_CD 3
! VAR FILENAME=TPD4E02B04DQA.S4P
! VAR DATE=8/26/2015 1:38:57 PM
! VAR PHYS_PORTS=1,2,3,4
! VAR ObjTypeName=DATASET
! VAR IndexType=Frequency
! Port data:
!!!Port 1: Pin 1_In (alternately Pin 5)
!!!Port 2: Pin 2_In (alternately Pin 4)
!!!Port 3: Pin 1_Out (alternately Pin 5)
!!!Port 3: Pin 2_Out (alternately Pin 4)
! Demo:
!                                        TPD4E02B04DQA
!                                  ----------------------------------
!                                  |                                |
!                                  |                                |
!              <Port 1>------------o-| 1   (short Pin 1 to Pin 10)   10 |-o------------<Port 3>
!                                  |                                |
!                                  |                                |
!              <Port 2>------------o-| 2   (short Pin 2 to Pin 9)    9 |-o------------<Port 4>
!                                  |                                |
!                                  .                                .
!                                  .                                .
!                                  .                                .

# Hz S MA R 50
300000.000 +1.9443348116E-003 -4.1691194029E+001  +1.9334281494E-004 +1.5166591441E+002  +9.98567370
       +9.5991881219E-005 +8.0006378930E+001  +1.1305186189E-002 +2.7266229810E+001  +2.0461832933E
       +9.9944882387E-001 +6.7970694656E-002  +2.5271878111E-004 -1.2003216094E+002  +1.4791139180E
       +1.1557003699E-004 -1.4338930349E+002  +9.9195132382E-001 -4.1693291175E-001  +1.0808070848E
10299850.000 +1.6580530842E-004 -9.0079740259E+001  +5.5736603074E-004 +6.6230060330E+001  +9.998865
```



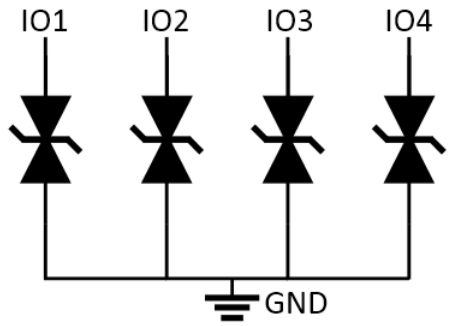


DQA Package
10-Pin USON
Top View



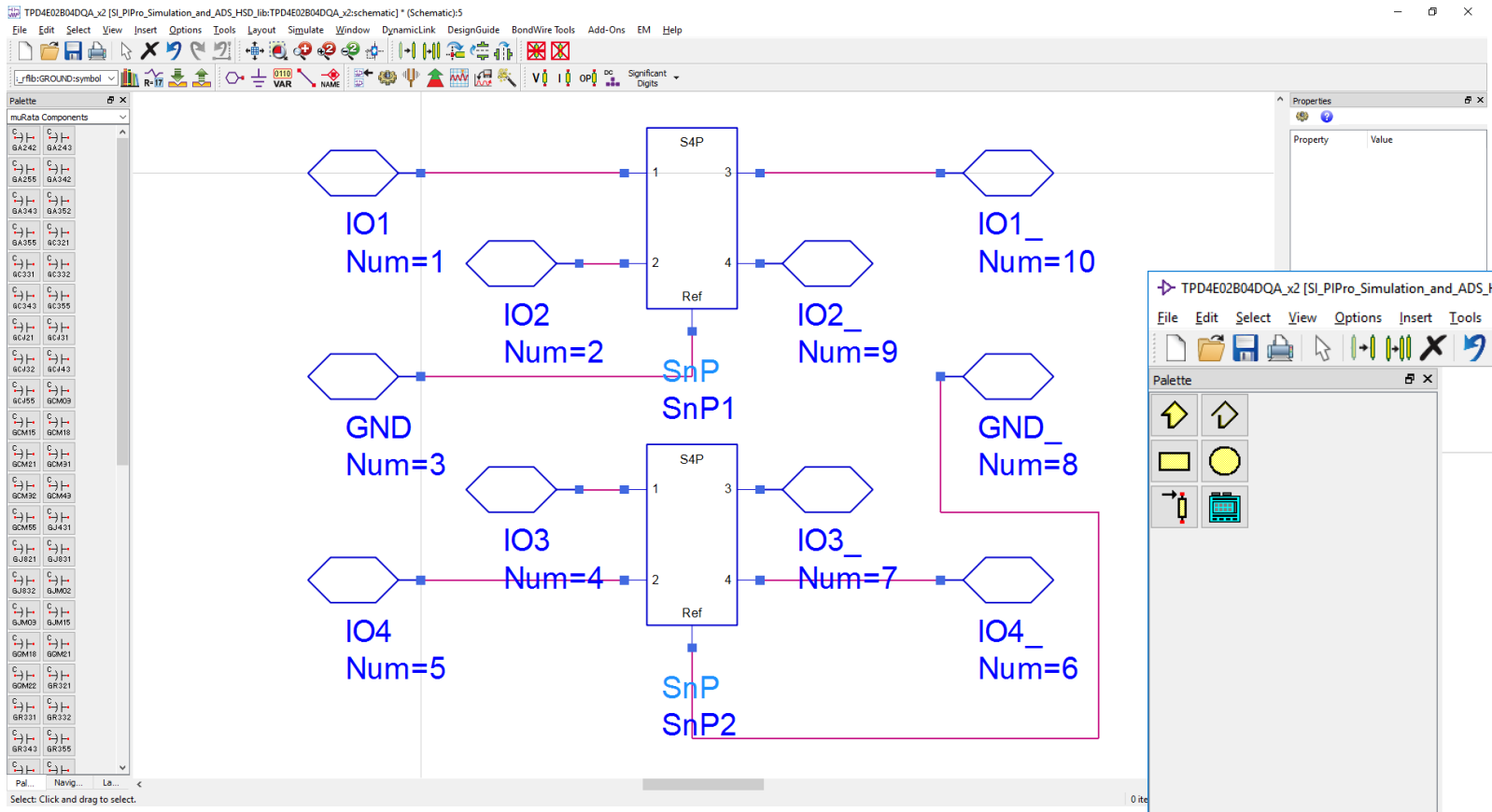
Pin Functions

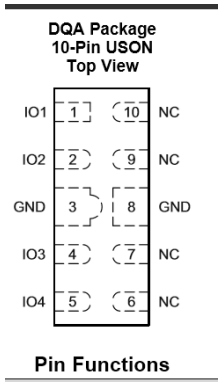
PIN		TYPE	DESCRIPTION
NAME	NO.		
GND	3	Ground	Ground. Connect to ground
GND	8		
IO1	1	I/O	ESD protected channel
IO2	2		
IO3	4		
IO4	5		
NC	6	NC	Not connected; Used for optional straight-through routing. Can be left floating or grounded
NC	7		
NC	9		
NC	10		

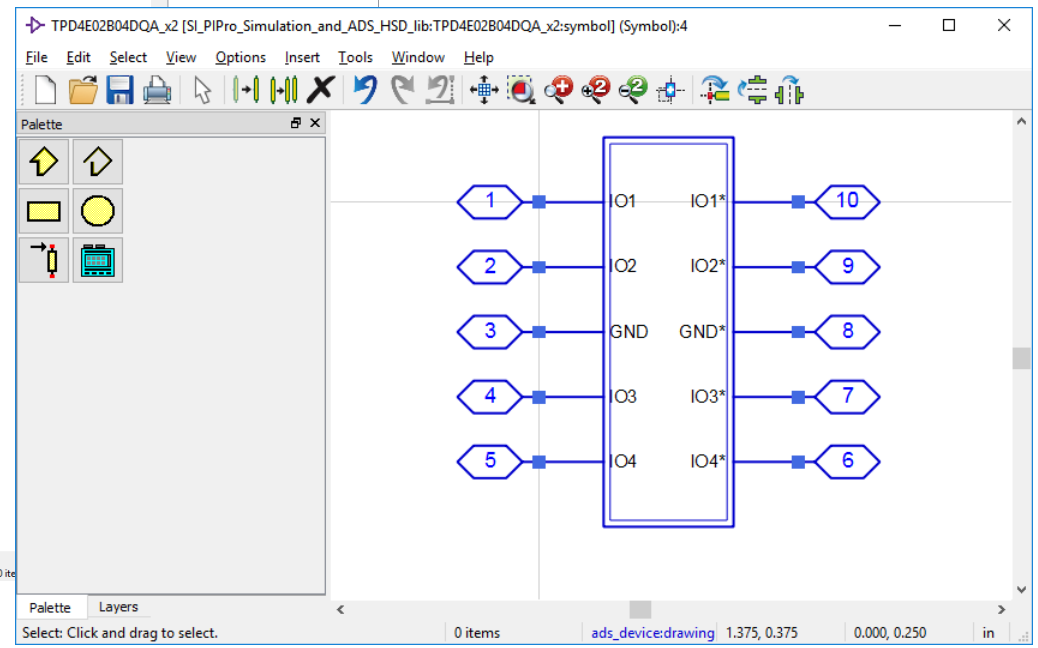


Create an ADS Schematic Model which reads-in Touchstone (s-parameter) data for the ESD Component

Create a Symbol for the model

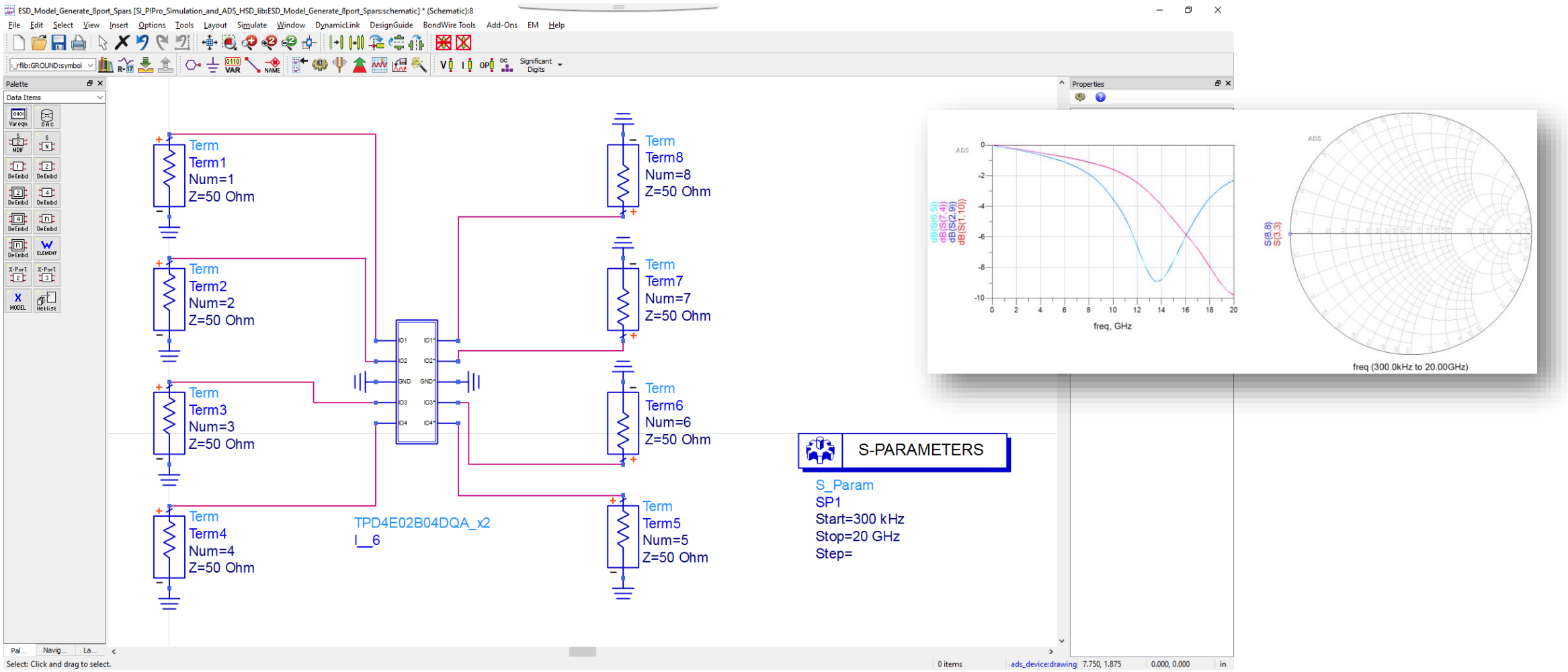






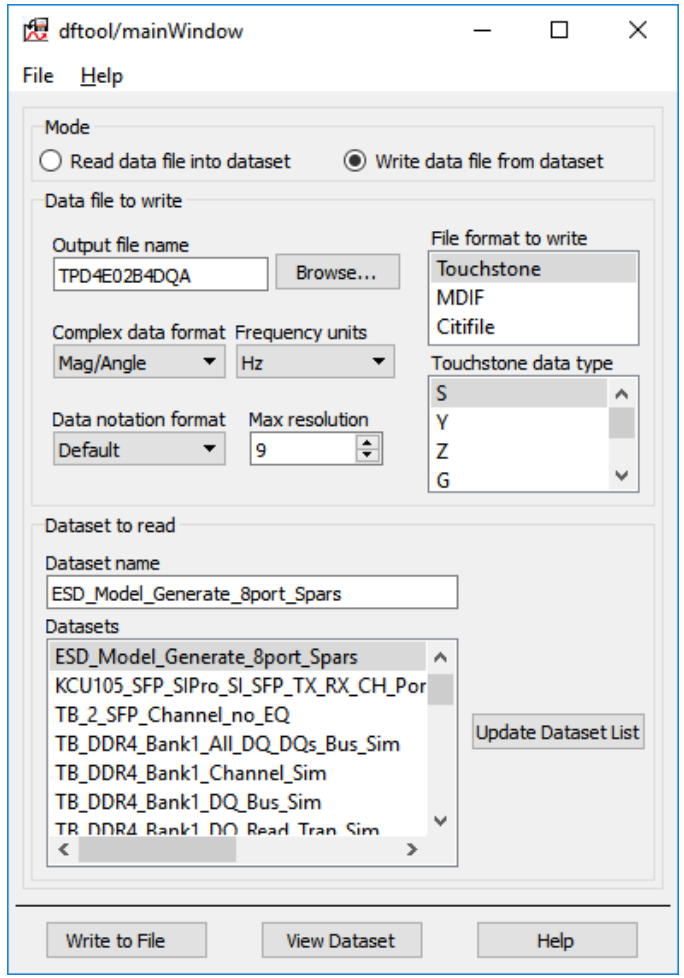
Simulate the complete 8-port ESD Model to create 8x8 S-parameter matrix

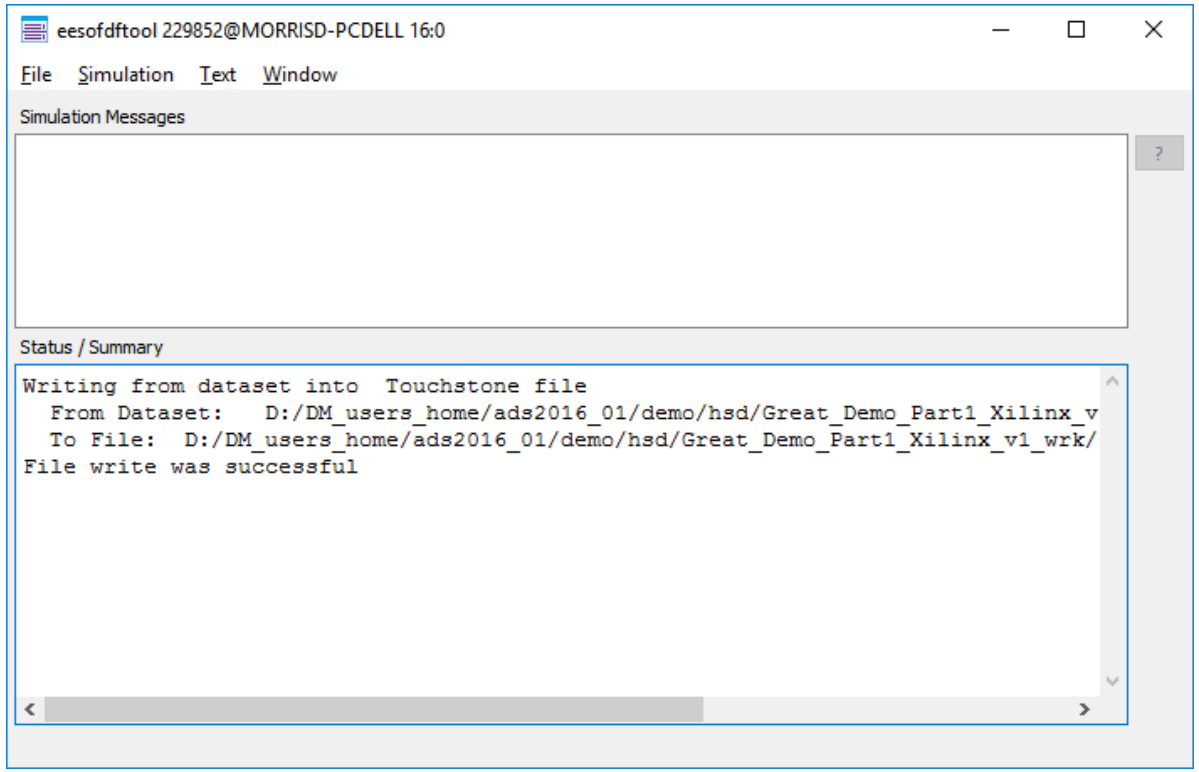
Hint : Check results correlate with initial imported data



Convert 8-port simulation data into Touchstone format

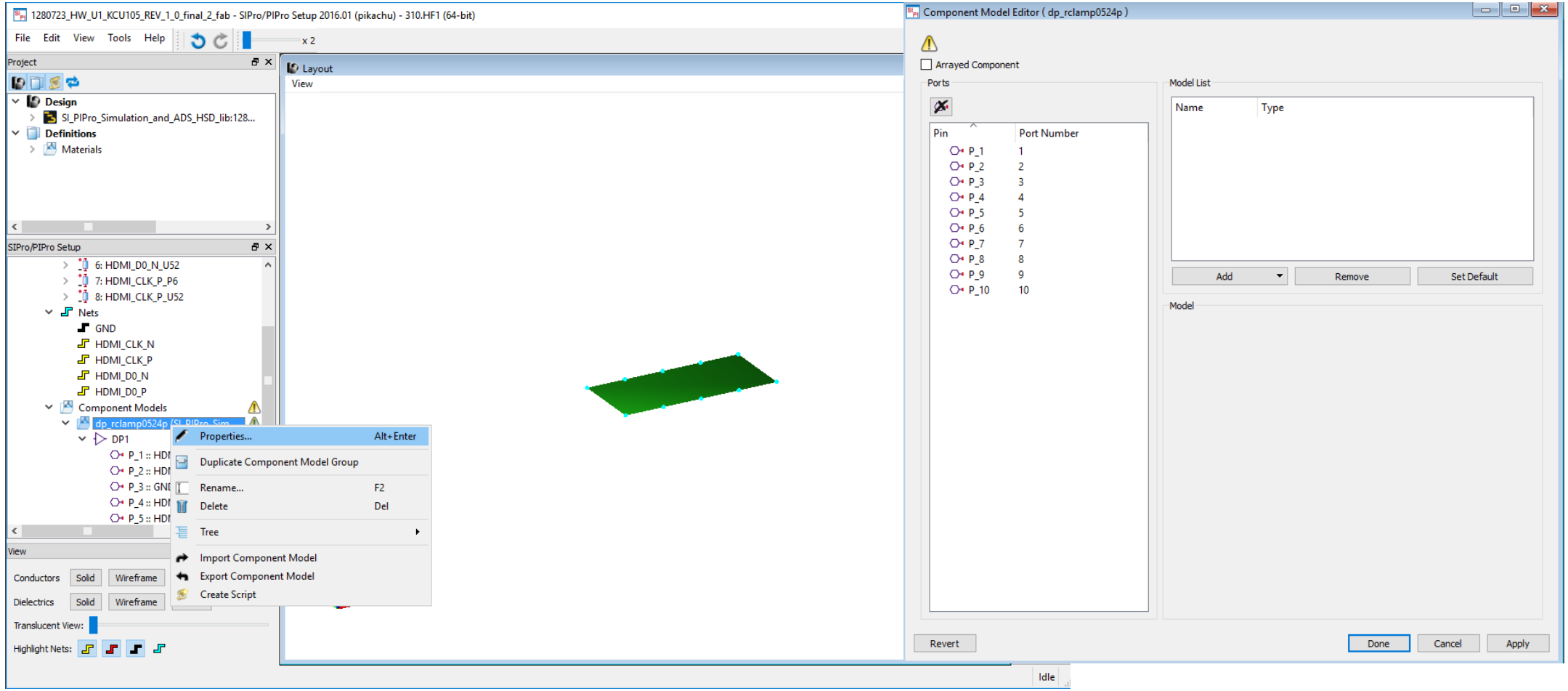
Hint : Use Data File Tool available from ADS schematic or data display





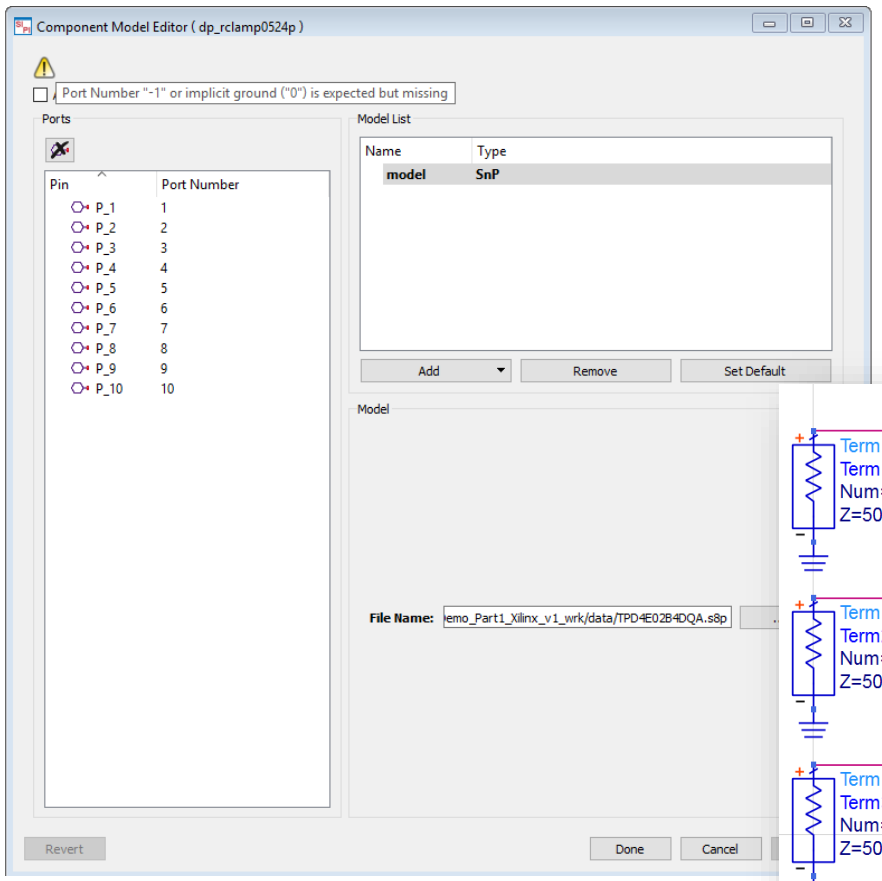
Assign 8-port S-parameter model to Component instance DP1

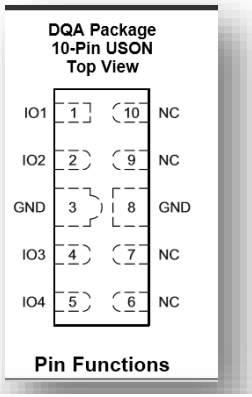
Use Add > SnP and browse to 8-port S-parameter file

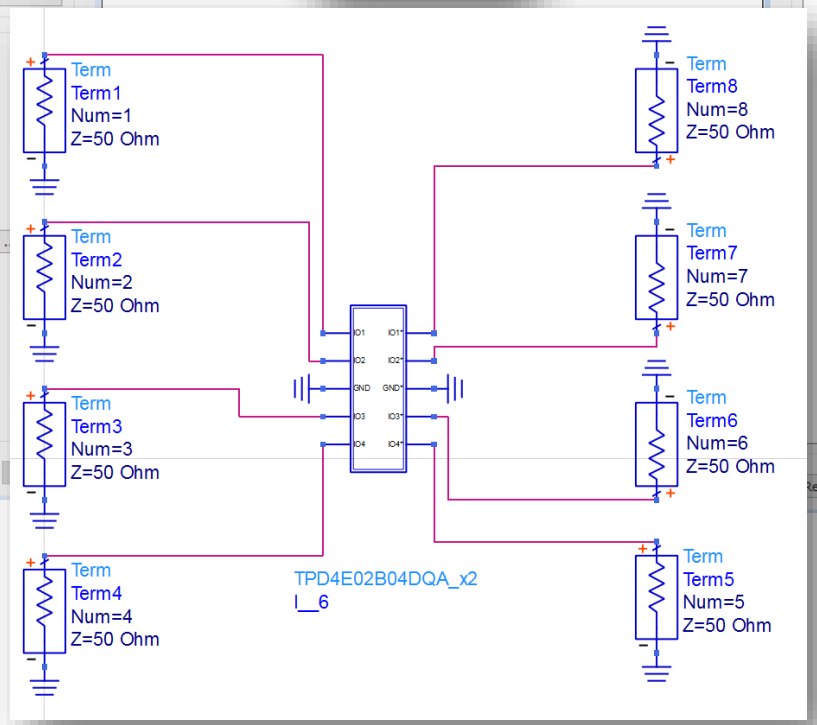


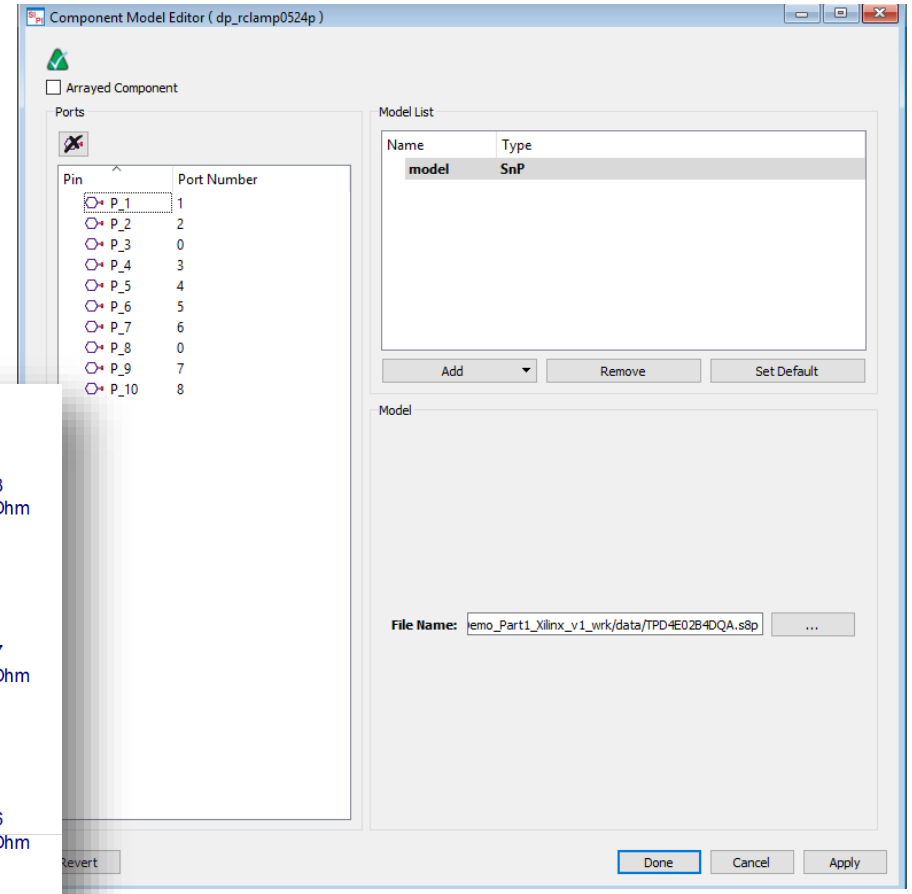
Finally Map the Component Pin numbers to the model port number

Before & After correctly setting Pin/Port number pairs… (note '0' used for ground)









All simulation warning messages now cleared…