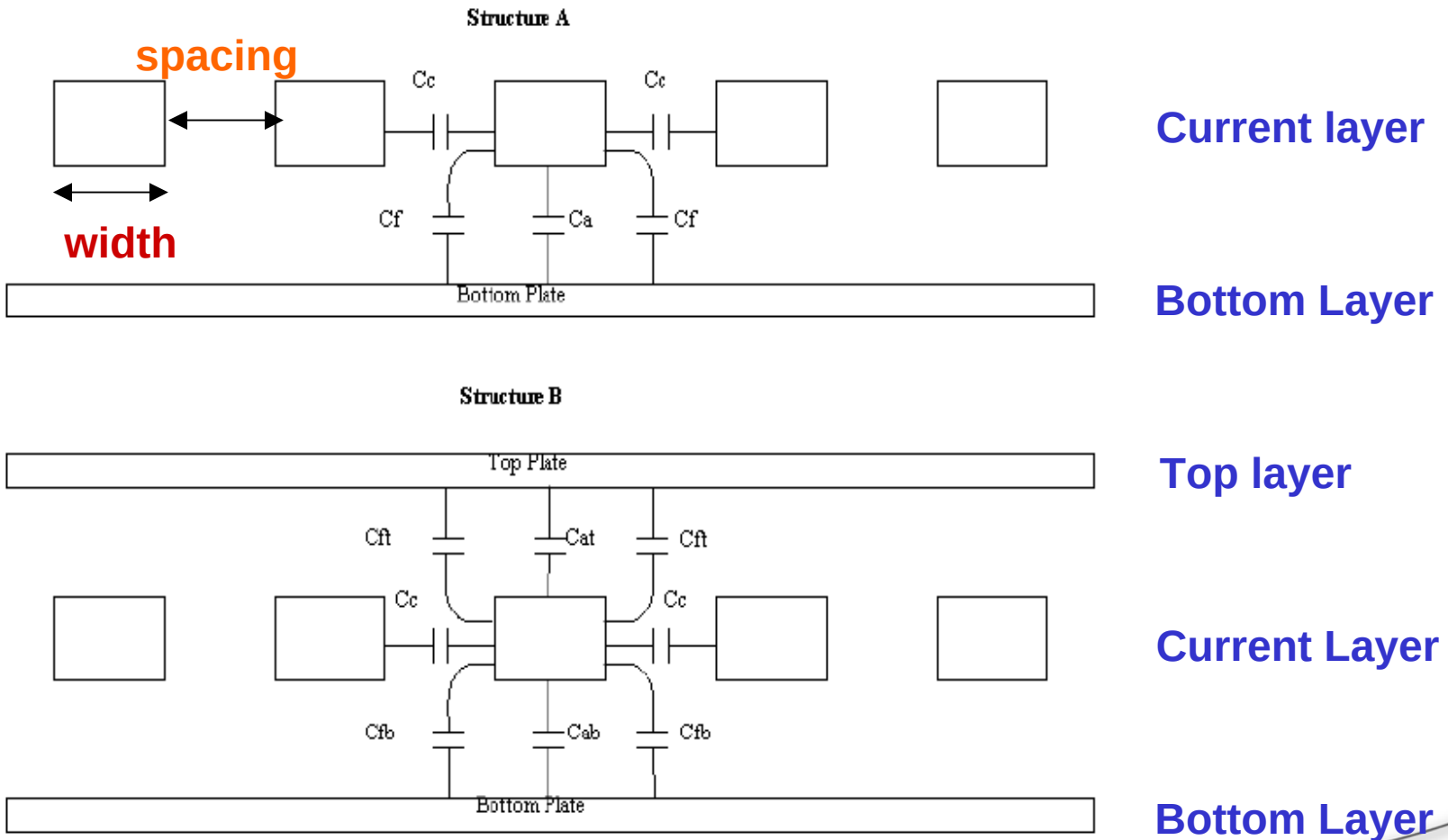
3T Parasitic device use guide
2007/09/20

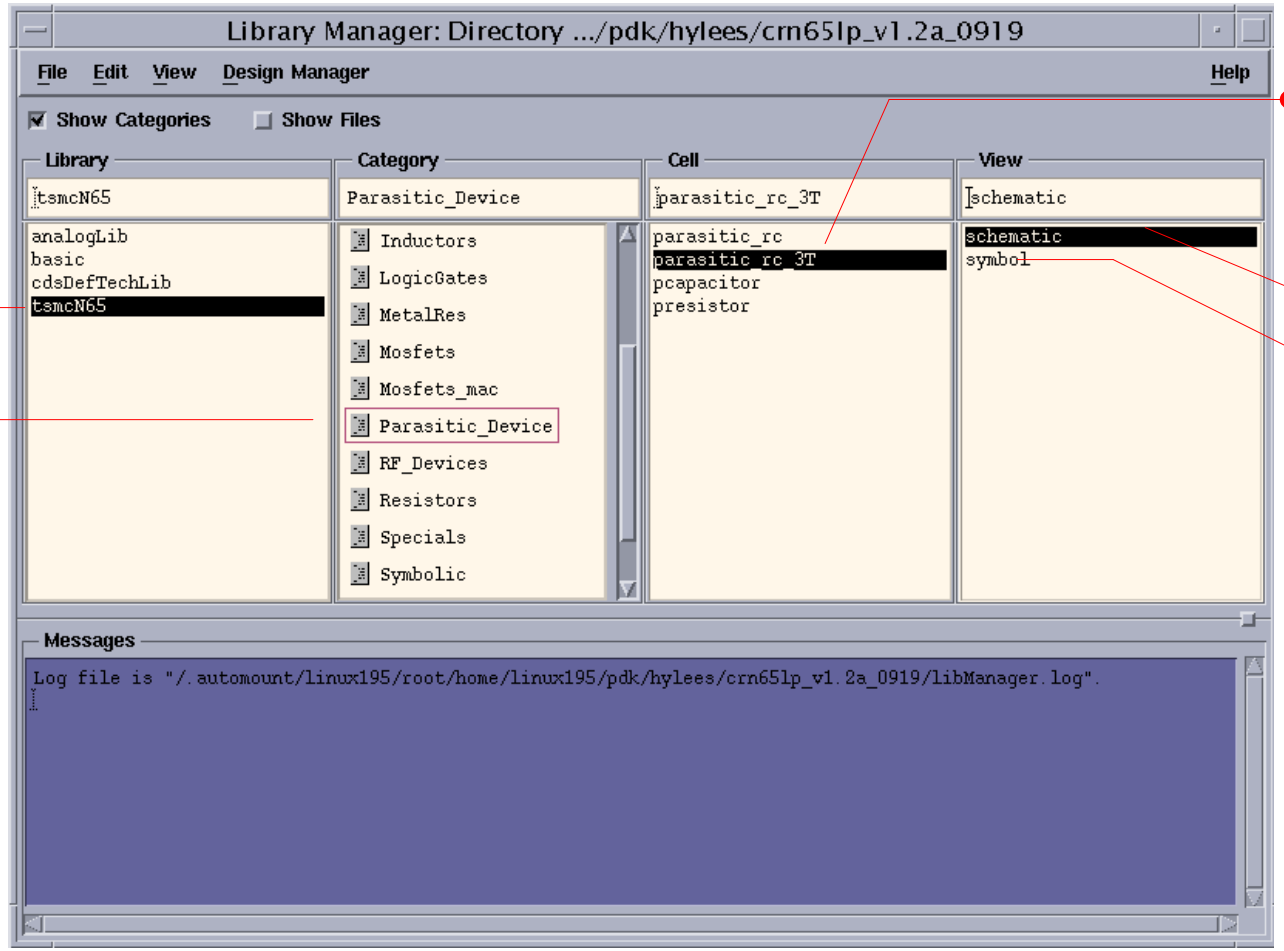
Parasitic RC Estimation Engine *Raphael model:*



Parameters Parasitic RC Estimation Engine

Parameter	Description
Model	TopLayer_CurrentLayer_BottomLayer CurrentLayer_BottomLayer CurrentLayer
Length	Length of current layer(um)
Width	Width of current layer(um)
Spacing	Space to adjacent line(um)
Temperature	Temperature(C)
Res	Line resistance(ohm)
CT	Line total capacitance(fF)
CC	Line coupling to a single adjacent line(fF)

Open Library Manager of Cadence tool



Library Name:
tsmcN65

Category:
Parasitic_Device

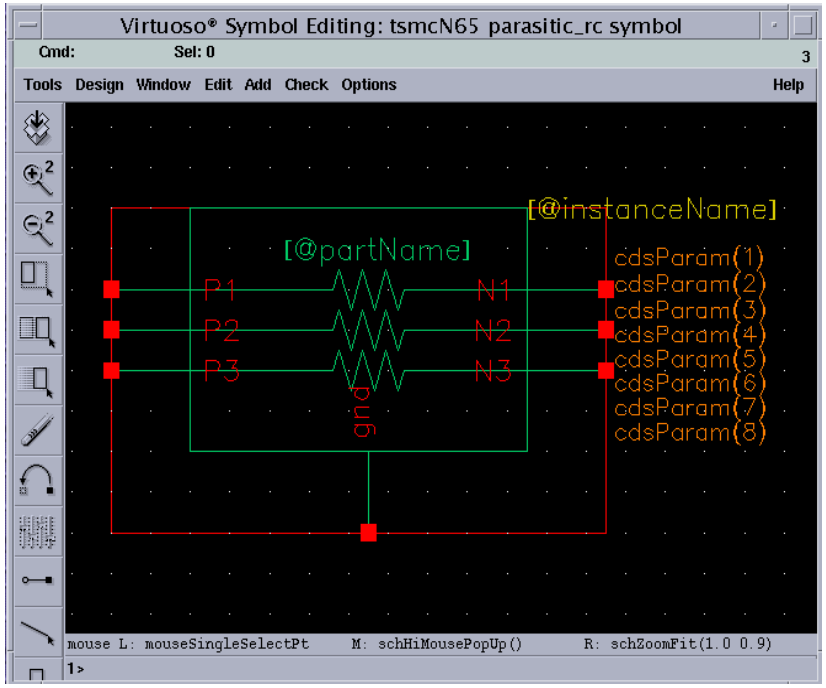
Cell Name:
parasitic_rc_3T

Schematic view

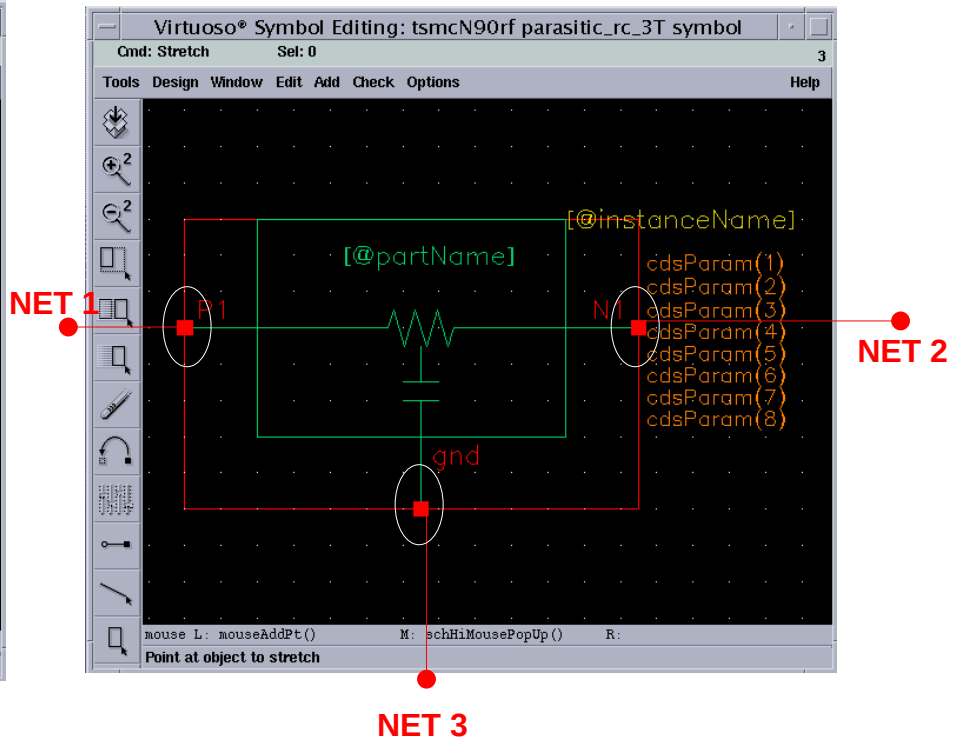
Symbol view

Symbol view of 7T and 3T parasitic device

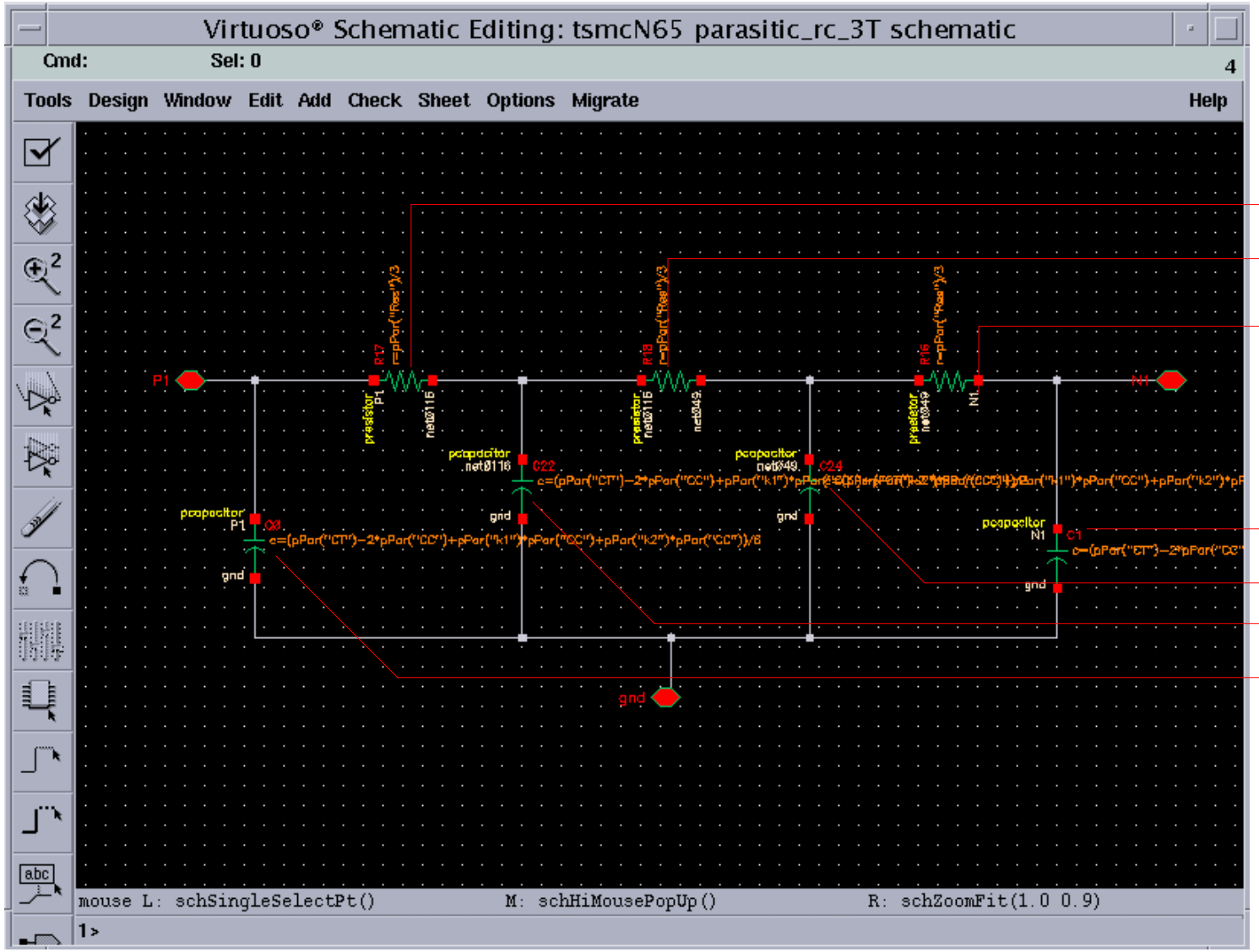
7T parasitic device



3T parasitic device



Schematic view of 3T parasitic device



R 1
R 2
R 3
C1
C2
C3
C4

Open schematic ~add instance

Raphael Table
Get the legal model and range

Chose the corner type of interconnect

Define line width

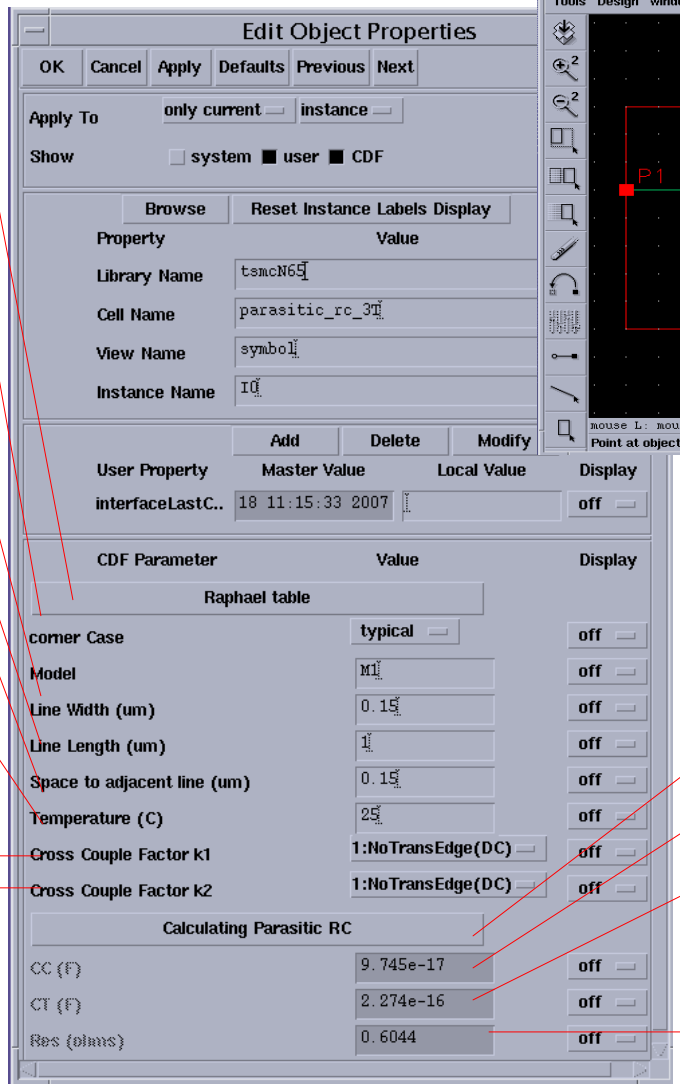
Define line length

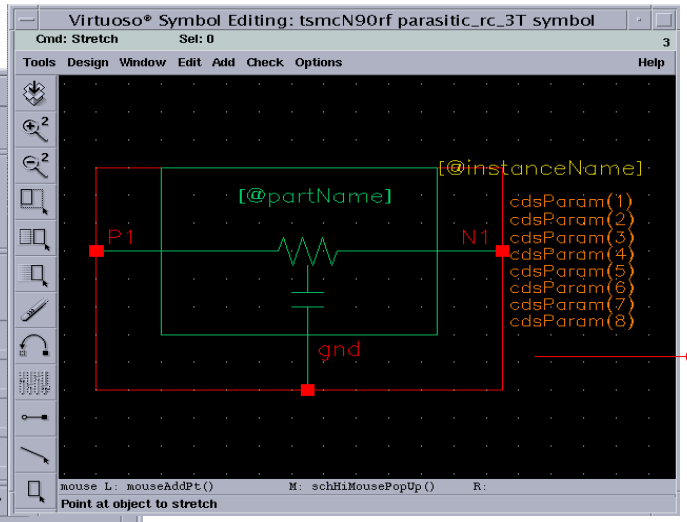
Define line space

Define temperature

Define cross couple Factor K1

Define cross couple Factor K2





Instance cell From Library

Calculate parasitic RC

Calculate coupling cap. Cc

Calculate total cap. CT

Calculate total Res (ohms)

Add instance parameters of 3T device

Raphael Table
Get the legal model and range

Chose the corner type of interconnect

Define line width

Define line length

Define line space

Define temperature

Define cross couple Factor K1

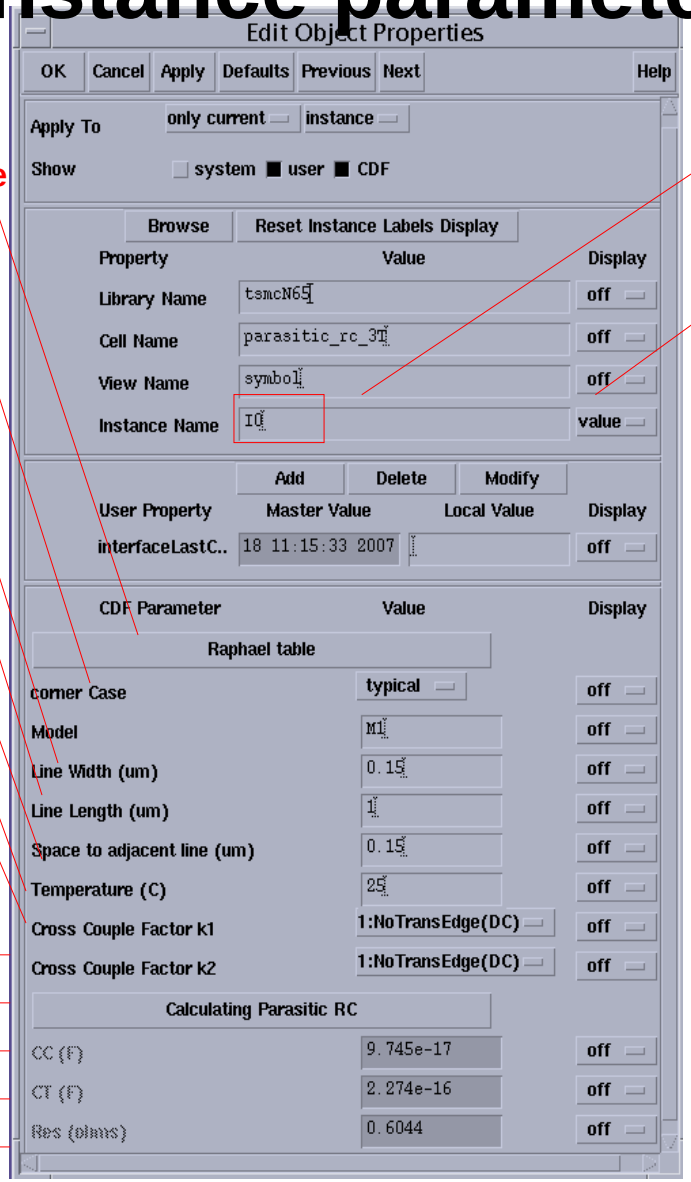
Define cross couple Factor K2

Calculate parasitic RC

Calculate coupling cap. Cc

Calculate total cap. CT

Calculate total Res (ohms)



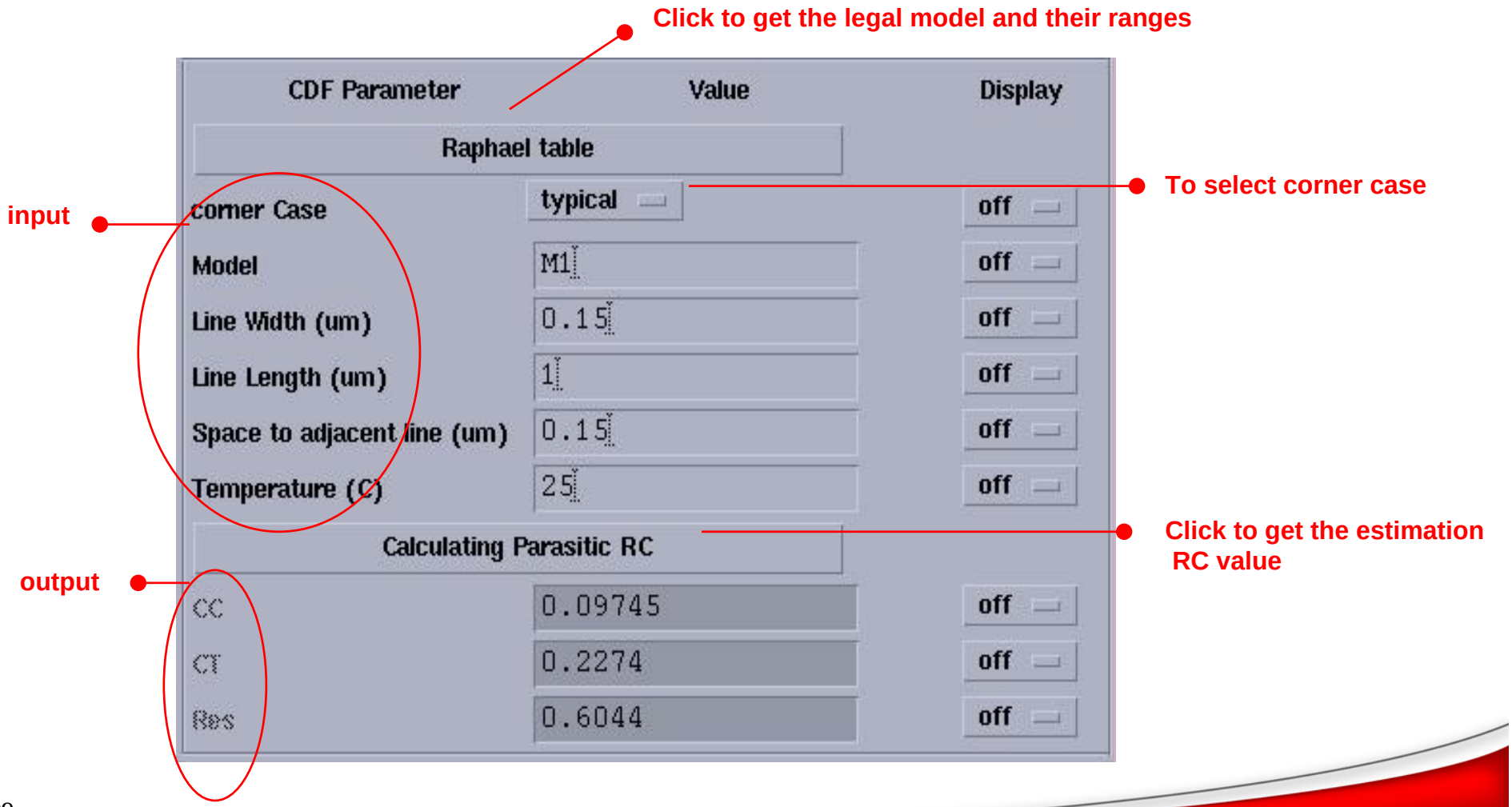
The instance name

The instance view

The CDF parameters of this new device “parasitic_rc” contain eight parameters (five inputs and three outputs), one cyclic button(choose the corner case) and two click button (get Raphael table list and calculating Parasitic RC)

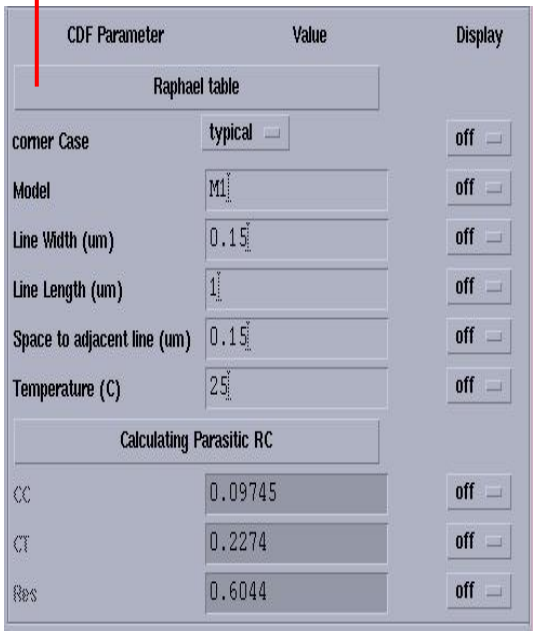
The corner case cyclic button contain five different choices. (typical, rc_best, rc_worst, c_best and c_worst)
The defaulted setting value is “typical”.

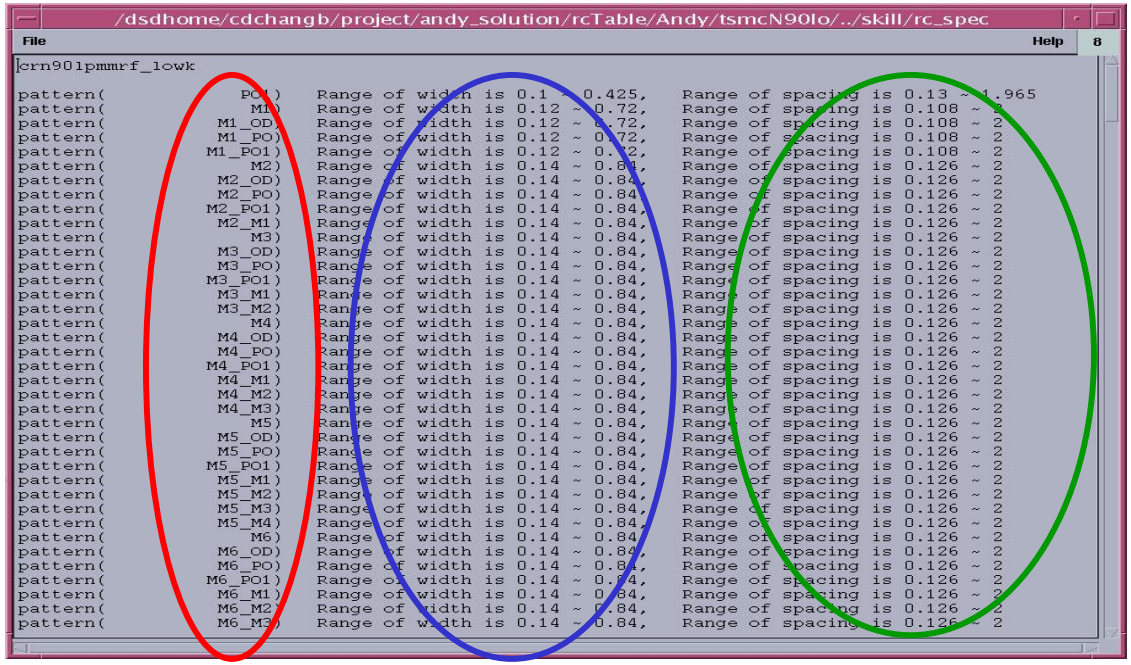
CDF parameters for Parasitic RC Estimation Engine



Parasitic RC Raphael table list

Click this button to get the legal model and their ranges





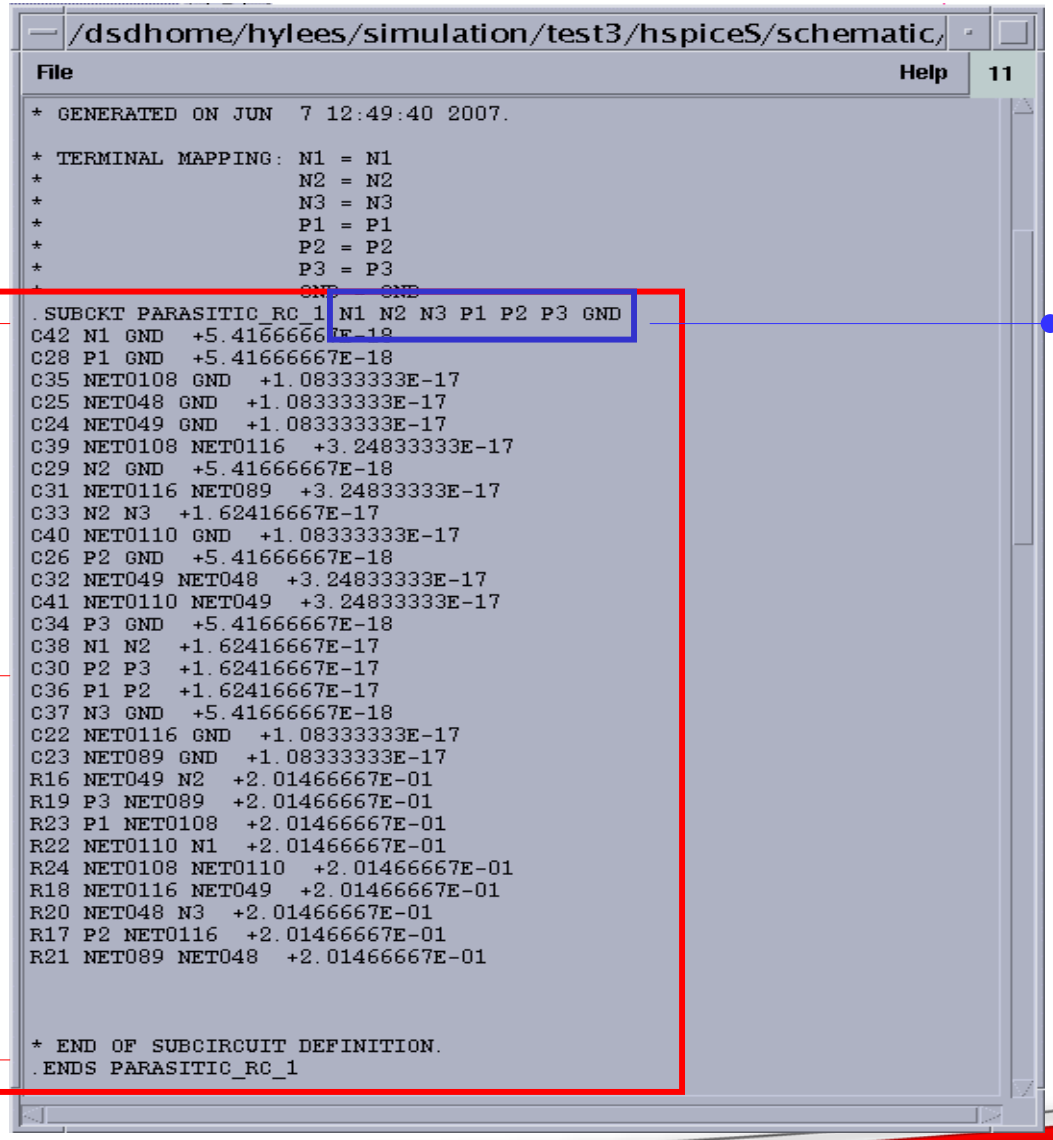
Legal Model Range of width Range of spacing

7T parasitic device netlist out

Start of Sub-circuit

Sub-circuit

End of Sub-circuit



7 nets of 7T parasitic device
N1,N2,N3
P1,P2,P3
GND

3T parasitic device netlist out

Confidential
Security C

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/dsdhome/hylees/simulation/test2/hspiceS/schematic/n
File                                                Help  8

XI0 NET3 NET1 NET2 LSUB1

* FILE NAME: TSMCN65_PARASITIC_RC_3T_SCHEMATIC.S.
* SUBCIRCUIT FOR CELL: PARASITIC_RC_3T.
* GENERATED FOR: HSPICES.
* GENERATED ON SEP 20 12:02:46 2007.

* TERMINAL MAPPING: N1 = N1
*                   P1 = P1
*                   GND = GND
.SUBCKT LSUB1 N1 P1 GND
R16 NET049 N1  +2.01466667E-01
R18 NET0116 NET049  +2.01466667E-01
R17 P1 NET0116  +2.01466667E-01
C0 P1 GND  +3.79000000E-17
C1 N1 GND  +3.79000000E-17
C24 NET049 GND  +7.58000000E-17
C22 NET0116 GND  +7.58000000E-17


* END OF SUBCIRCUIT DEFINITION.
.ENDS LSUB1



* INCLUDE FILES


.lib "/.automount/linux195/root/home/linux195/pdk/hylees/crn65lp_v1.2a_091
.lib "/.automount/linux195/root/home/linux195/pdk/hylees/crn65lp_v1.2a_091
.lib "/.automount/linux195/root/home/linux195/pdk/hylees/crn65lp_v1.2a_091
.lib "/.automount/linux195/root/home/linux195/pdk/hylees/crn65lp_v1.2a_091
.lib "/.automount/linux195/root/home/linux195/pdk/hylees/crn65lp_v1.2a_091
.lib "/.automount/linux195/root/home/linux195/pdk/hylees/crn65lp_v1.2a_091
.lib "/.automount/linux195/root/home/linux195/pdk/hylees/crn65lp_v1.2a_091
```

Start of Sub-circuit

Sub-circuit

End of Sub-circuit

3 nets of 3T parasitic device
N1
P1
GND

Compare the netlist of 7T and 3T device

7T parasitic device

3T parasitic device

/dsdhome/hylees/simulation/test2/hspiceS/schematic

File Help 9

```
* # FILE NAME: /DSDHOME/HYLEES/SIMULATION/TEST2/HSPICES/SCHEMATIC/NETLI:
* TEST2.C.RAW
* NETLIST OUTPUT FOR HSPICES.
* GENERATED ON SEP 20 12:07:33 2007

* FILE NAME: TSMCN65_TEST2_SCHEMATIC.S.
* SUBCIRCUIT FOR CELL: TEST2.
* GENERATED FOR: HSPICES.
* GENERATED ON SEP 20 12:07:33 2007.

XI1 NET06 NET05 NET04 NET03 NET02 NET01 NET07 PARASITIC_RC_1
XI0 NET3 NET1 NET2 LSUB1

* FILE NAME: TSMCN65_PARASITIC_RC_SCHEMATIC.S.
* SUBCIRCUIT FOR CELL: PARASITIC_RC.
* GENERATED FOR: HSPICES.
* GENERATED ON SEP 20 12:07:33 2007.

* TERMINAL MAPPING: N1 = N1
*                   N2 = N2
*                   N3 = N3
*                   P1 = P1
*                   P2 = P2
*                   P3 = P3
*                   GND = GND
.SUBCKT PARASITIC_RC_1 N1 N2 N3 P1 P2 P3 GND
R16 NET049 N2  +3.16543210E-01
R19 P3 NET089  +3.16543210E-01
R23 P1 NET0108  +3.16543210E-01
R22 NET0110 N1  +3.16543210E-01
R24 NET0108 NET0110  +3.16543210E-01
R18 NET0116 NET049  +3.16543210E-01
R20 NET048 N3  +3.16543210E-01
R17 P2 NET0116  +3.16543210E-01
R21 NET089 NET048  +3.16543210E-01
C42 N1 GND  +4.57777778E-18
C28 P1 GND  +4.57777778E-18
C35 NET0108 GND  +9.15555556E-18
C25 NET048 GND  +9.15555556E-18
C24 NET049 GND  +9.15555556E-18
C39 NET0108 NET0116  +2.50518519E-17
```