# N65/N55 Assura LVS/LPE Deck Usage

## PDKD/TSMC

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# Switch and Variable Setting

# Assura Switches(I)

- **?set (“DFM_LPE”)**
  - This switch is used for DFM action required rules.
  - Turn on this switch to enable LPE to consider four DFM effects.
- **?set (“ZERO_NRDS”)**
  - Turn on this switch to force NRS=NRD=0.
- **?set (“extract_dnwdio”)**
  - Turn on this switch to extract RW/DNW and DNW/PSUB diodes.
  - NPN devices will not extract “pwdnw” (model has covered) even turn-on this switch.
- **?set (“top2_thick”)**
  - Turn on this switch to set Mtop-1 as thick metal.
  - Mtop of 1P9M process is always thick metal, no this switch.
- **?set (“NW_RING”)**
  - Turn on this switch to enable NW ring to separate the node from BULK.
- **?set (“spice_extraction”)**
  - Turn on this switch to omit savePropery about model name for spice extraction.
- **?set (“Skip_Soft_Connect_Checks”)**
  - Turn on this switch to skip soft-connect check.

# Assura Switches(II)

- **?set ("CELLIMP")  ;; default off**
  - This switch added after version 1.4a, only for using N65 LP SRAM devices usage. (corresponding model: CLN65LP SRAM, released in Oct. 13st. 2006, version 1.2)
  - In N65G SRAM, we named nchpd_sr, but it seperated into two devices nchpd_wisr and nchpd_wosr in N65LP SRAM. We will set this switch as default off.
- **?set("AP_UT")  ;; default off**
  - N65LP model cards include rmap_ut device for thick ALRDL (28k) resistor
  - Turn-on it can extract ALRDL resistors as "rmap_ut" model name, instead of rm10
- **? set ("FILTER_DGS_TIED_MOS")**
  **;; uncomment this line to filter MOS with D, G and S tied together**
  **(default comment it and filter MOS with all pins tied)**
  - In compare.rul file :

```
if( avSwitch("FILTER_DGS_TIED_MOS") then
   filter("X")      ;; filter MOS with D, G and S tied together
else
   filter("XW")   ;; ;filter MOS with all pins tied (default)  );
```

- **Strongly recommend to comment FILTER_DGS_TIED_MOS switch in LVS.rsf file when running Assura LVS.**
  - filter("XW")  -- default filter MOS with all pins tied and this function and it will support above version AV317_USR2.
  - filter("X")  -- trun-on this switch to filter MOS with D, G and S; and other devices(BJT/RES/CAP/DIO/GENERIC) will be filtered if all pins tied together.

# Assura Switches(III)

- **About ERC rule switches:**
  We provide 5 switches for important ERC checking rules, and we have suggestion for default on or off. These switches will existed in LVS.rsf.
  - **?set (" WELL_TO_PG_CHECK")**
    Default is on. Turn on to highlight if nwell connects to ground or psub connects to power.
  - **?set (" GATE_TO_PG_CHECK ")** :
    Default is off. Turn on to highlight if a mos gate directly connects to power or ground.
  - **?set (" PATH_CHECK ") :**
    Default is off. Please refer in the deck for detailed conditional situation.
  - **?set (" DS_TO_PG_CHECK ") :**
    Default is on. Turn on to highlight if drain connects to power and source connects to ground.
  - **?set (" FLOATING_WELL_CHECK ") :**
    Default is on. Turn on to highlight if well does not connect to power or ground, and the NW of moscaps and nwell-resistor are excluded.

# Assura Variables

- **scale**
  - Scale factor for WPE and DFM effect.
  - For N65 process, scale = 1.0 ; for N55 process, scale = 0.9.
  - Please do not change the default value.
- **wped**
  - Variable of maximum WPE boundary.
  - For N65 process, wped = 5.0 ; for N55 process, wped = 5.556.
  - Please do not change the default value.

# Runset Options

- **Virtual connection setting:**
  - By default,**"?joinPins top"** is set for virtual connection.
  - Please set to "nil" in LVS.rsf file as doing full-chip checking.
  - ?joinPins top → ?joinPins nil

# DFM LPE Setting

# DFM LPE Setting

- **DFM switches**
  - Set DFM_LPE in the rsf file for DFM LPE extraction.
  - ?set (“DFM_LPE”)
- **DFM folder**
  - Fill in full DFM path in the extract.rul if DFM files are not located in current run directory.
  - load “./DFM/constant.txt”
  - load “./DFM/dfm_device.rul.1”
- **DFM variable file**
  - Under the folder “DFM”, there is a variable file named “constant.txt”. There are three additional variable files. Their file names are “constant_g.txt”, “constant_g+.txt”, and “constant_lp.txt” respectively. By default, the content of “constant.txt” is for G+ process. If customers want to use other processes, please overwrite “constant.txt” with the correct variable file. For example, if customers use LP process, please use “constant_lp.txt” to overwrite “constant.txt”.
- **ZERO_NRDS switch in DFM**
  - The definition of NRS/NRD in DFM LPE deck is

    NRS = NRS1(original)+NRS2+NRS3  NRD = NRD1(original)+NRD2+NRD3
  - If set ZERO_NRDS, the deck will only force NRS1=NRD1= 0

# Assura LVS/QRC Flow

# Assura LVS Flow

- **Run LVS :**
  - Include “source.added” file in your source netlist for subcircuits.
    - .include source.added
  - Prepare a LVS.rsf file for Assura LVS run in batch mode.
    - avParameters(
      ?inputLayout ( "GDS2" “top_cell.gds" ) ; specify full path gds name
      ?cellName “top_cell" ; specify top cell name
      ?rulesFile "./1p9m/extract.rul“ ; specify assura deck
      ?runName “top_cell" ; specify run name
      ?workingDirectory "./rundir" ; specify run directory
      ) ; end of avParameters
      load( "./1p9m/compare.rul" ) ; load compare.rul
      avLVS()
  - Uncomment the line “preserveCells” and fill in the correct path of file “hcell” in the compare.rul for RC cell blocking of RF devices.
    - avParameters(
      ?preserveCells ( file("./1p9m/hcell"))
      )
  - Run Assura
    - **% assura LVS.rsf**
    - Files top_cell.cls, top_cell.err and top_cell.csm are LVS result and path check report.

# Assura/QRC FLOW(I)

- **Run QRC:**
  - Prepare a rcx.rsf file For Assura QRC Flow in batch mode.
    - avParameters(

```
 ?workingDirectory "./rundir"                    ; specify run directory
 ?runName "<run_name>"                           ; specify run name
 ?inputLayout ( "GDS2" "<gds_name>" )            ; specify gds name
 ?cellName "<cell_name>"                         ; specify top cell name
 ?viewName "layout"
 )
rcxParameters(
 ?rcxSetupDir "."
 ?outputFormat   "spice"
 ?output "<output_name>"                          ; specify output name
 ?runName  "<run_name>"                          ; specify run name
  .
  .                                              ; customize RC extraction setting
)
load( "./rcxrsf" )                               ; hcell for RC blocking in RF devices
avRCX()
```

  - Uncomment the line “load(“./rcxrsf”)” and fill in the correct path of file “rcxrsf” to specify a hcell file for RC blocking by cell.
    - load(“./1p9m/rcxrsf”)

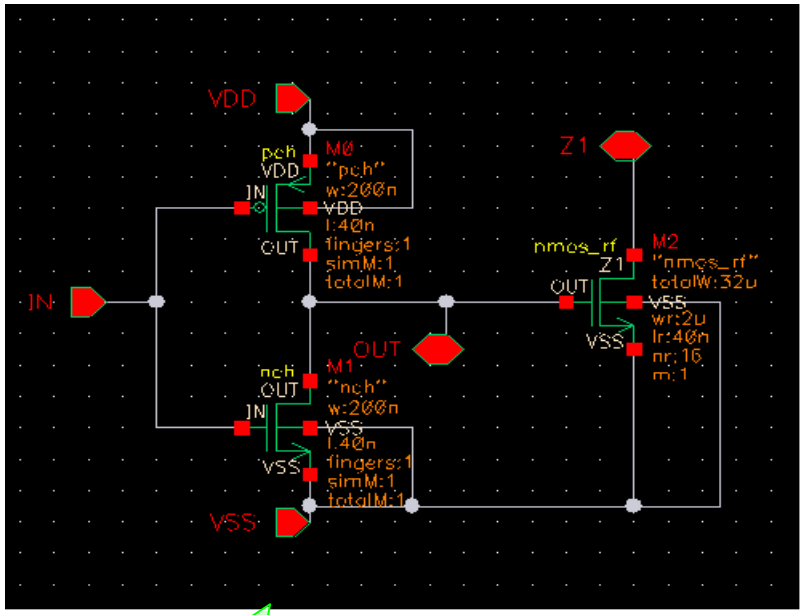
# Assura/QRC FLOW(II)

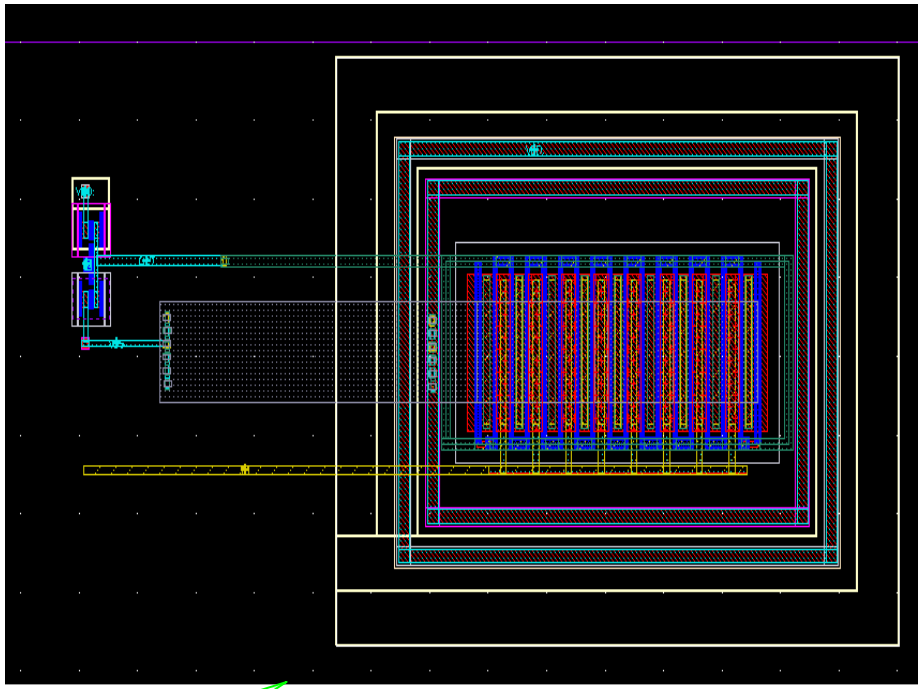
- Open the file “rcxrsf” and fill in the correct path of file “hcell” for RC cell blocking of RF devices.
  - rcxParameters(
    ?parasiticBlockingDeviceCellsFile "./1p9m/hcell"
    )
- Run QRC
  - Download (and un-tar) the QRC tech files.
  - Create lvsfile under QRC techdir.
  - For Assura LVS/QRC flow, run Assura LVS and copy the runname.xcn file to the QRC techdir and call it lvsfile.
  - **% capgen.cmd**
  - **% qrc -cmd rcx.rsf**

# Assura LVS/QRC GUI Flow

# Data Preparation

- The library includes schematic view and layout view.
- There are two logic mos devices and one rf device.



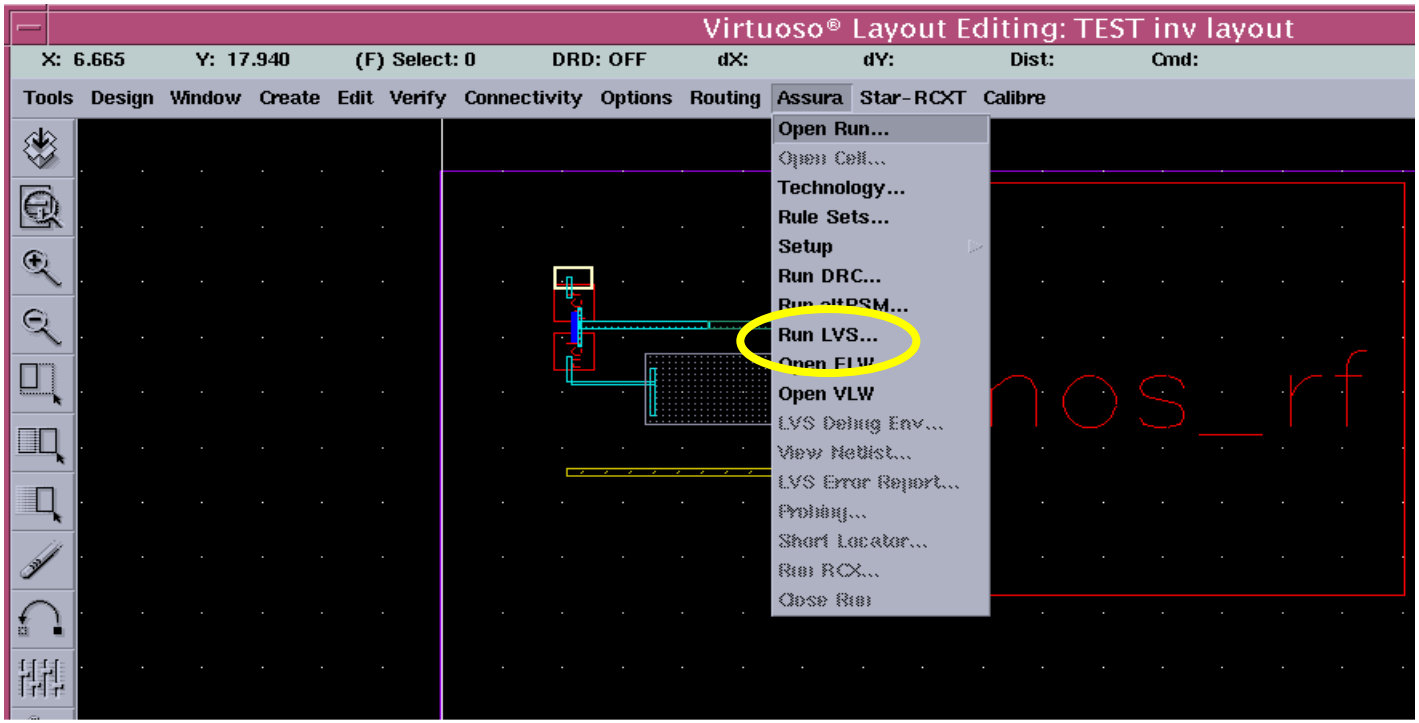



Schematic view

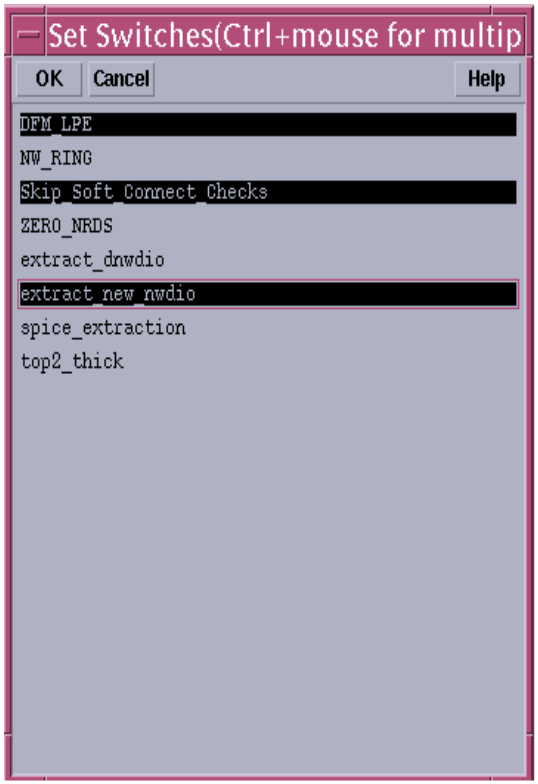
Layout view

# Assura LVS GUI Flow(I)

- **Trigger the “Run LVS” in the Assura pull down manual.**



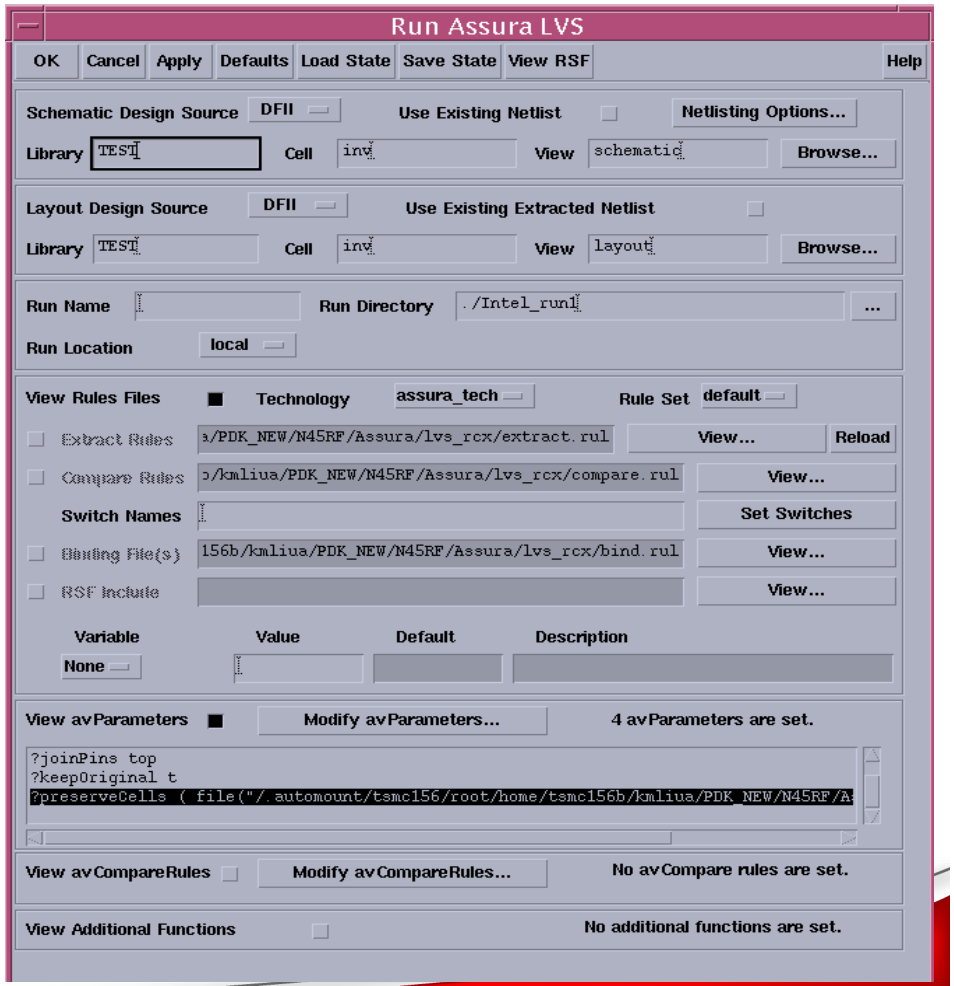
# Assura LVS GUI Flow(II)




- There is a pop-up manual when the “set Switches” is triggered.
- Switch description
  - DFM_LPE: The four DFM action require rules will be enable.
  - NW_RING: The NWELL ring could isolate the psub.
  - Skip_Soft_Connect_Checks: It will not do the soft-connect check.
  - ZERO_NRDS: The NRS/NRD will set to zero which it will take care by the RC extraction.
  - extract_dnwdio: Extract RW/DNW, DNW/PSUB diode.
  - spice_extraction: When do the spice extraction, this option has to turn on.
  - top2_thick: If the metal top and metal top-1 are thick, please turn on this switch.

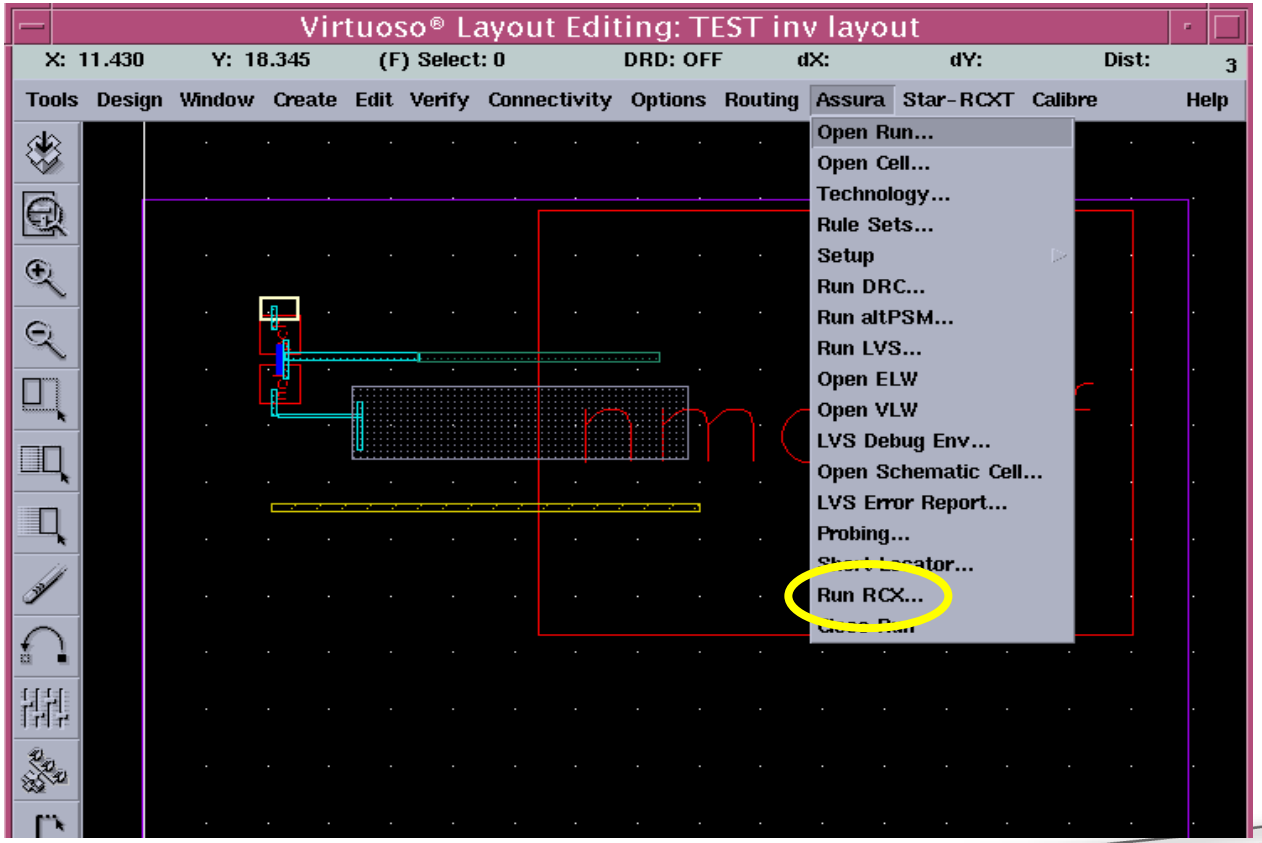
# Assura LVS GUI Flow(III)

- Turn on “Modify avParameters”.
- The option “?joinPins” means to turn on virtual connect.
- The option “?preserveCells” means to do the RF gray box extraction.
- The gray box extraction uses to avoid the RF device parasitical RC double counted.
- Please check “run_name.cls”, “run_name.err”, and “run_name.csm” files after the LVS check.



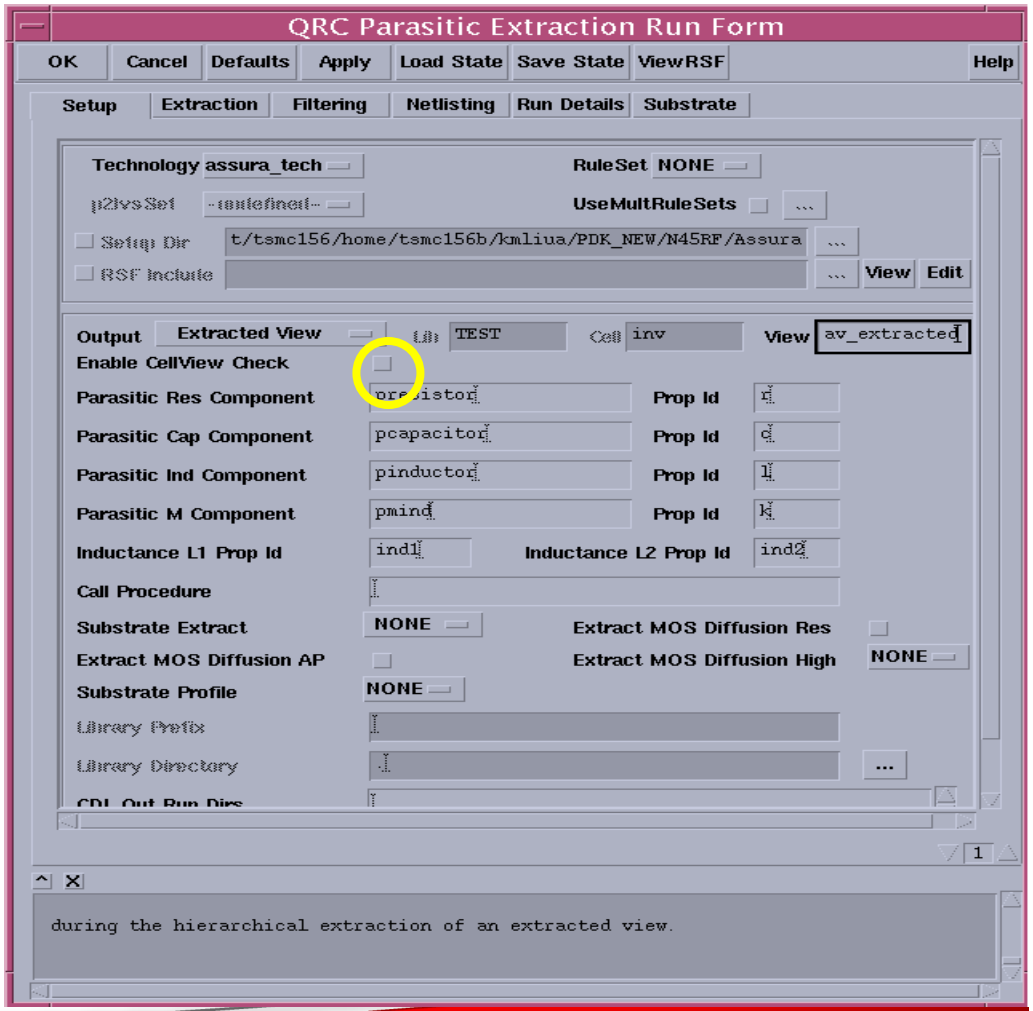
# Assura QRC GUI Flow(I)

- **Trigger the “Run RCX” in the Assura pull down manual.**



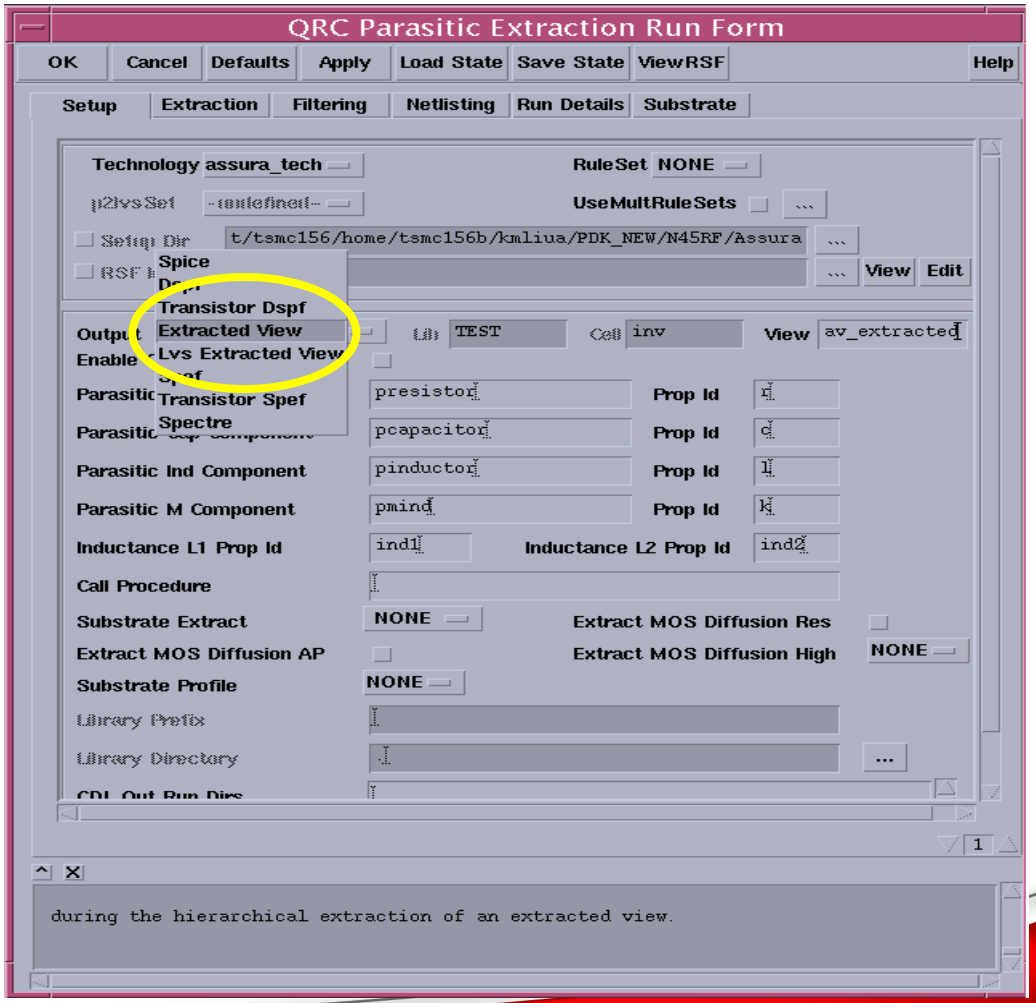
# Assura QRC GUI Flow(II)

- Please turn off the “enable CellView Check” when do the QRC extraction in the “setup” folder.



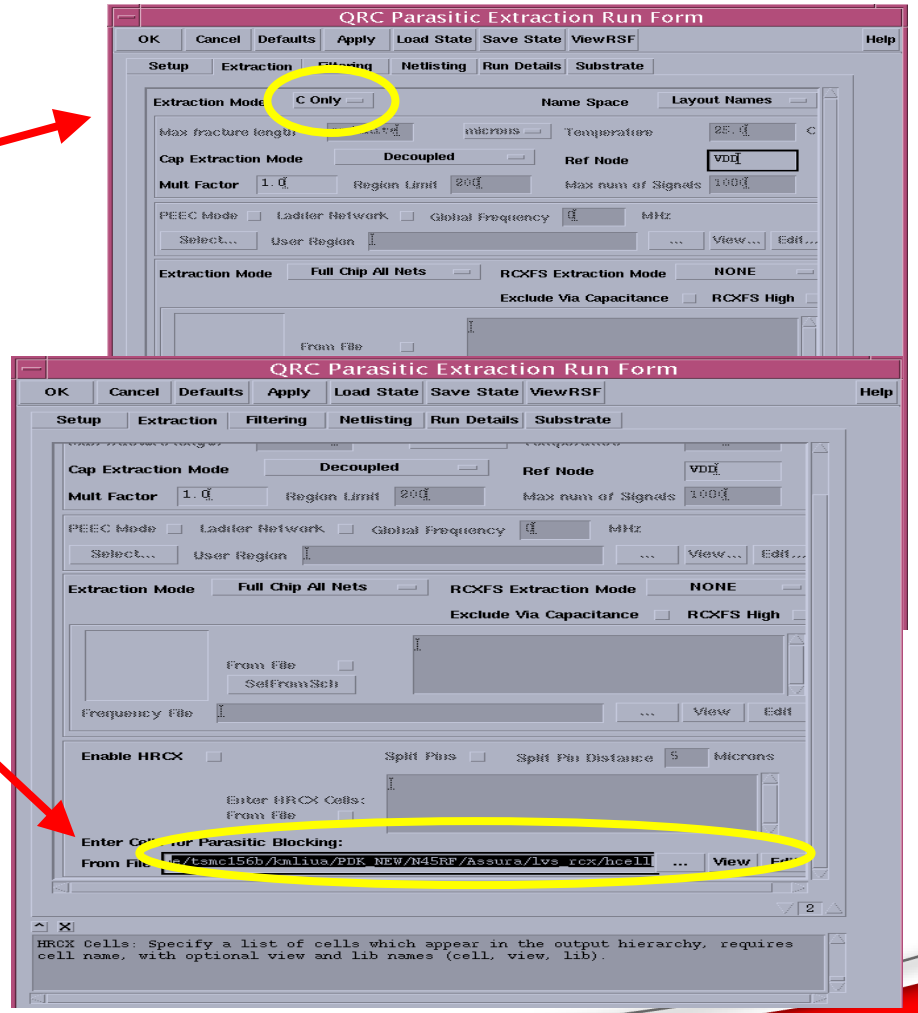
# Assura QRC GUI Flow(III)

- Select “Output” to “Extracted View” in “setup” folder of Assura QRC window to output extract result to “av_extracted” view.



# Assura QRC GUI Flow(IV)

- Please specify the extraction mode in the Extraction folder.
- Please specify the “hcell” file in the “Enter Cells for Parasitic Blocking”



# Assura av_extract view

- RC av_extract view in the library.