Layout with Cadence Virtuoso

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Windows

Main Virtuoso Window

LSW (Layer Selection Window)
CMOS Inverter
Layout Steps

- Create N-Well
- Add Power and Ground Rails
- Add P-Islands and N-Islands
- Add Poly for Gates
- Make Source and Drain Connections
- N-Well and Substrate Contacts
- I/O, power and Ground Connections
Create N-Well

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P-Island and N-Island

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Add Poly for Gates

Poly strip for Gate of PFET
CMOS Inverter properties

Press “q” for properties

Gates Connected
Layout Steps

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Bulk, Source, Drain Connections

(M1-N)
Used for N-well contact and NFET source or drain connection

= metal1 + contact + N-island

(M1-P)
Used for P-substrate contact and PFET source or drain connection

= metal1 + contact + P-island
Source & Drain Connections

Layout Steps

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- Add Poly for Gates
- Make Source and Drain Connections
- N-Well and Substrate Contacts
- I/O, power and Ground Connections
N-Well & substrate Contacts

- N-well contact
- Substrate contact

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I/O and Power Connections

Poly to metal 1 connection (M1-Poly)
metal1 contact poly

Poly to metal 1 connection (M1-M2)
metal1 via metal2

Input is M1-M2 connection on top of M1-Poly connection
Output is M1-M2 Connection

I/O and Power Connections

- Vdd and gnd pins should be made from metal1[pn]
- Input and output pins can be made from any [pn] metal layer, in this layout they are made from metal2[pn]
- Vdd and gnd pins should have I/O type of input/output
- The circuit input pin (A) should have I/O type of input while the output pin (Y) should have I/O type of output
Inverter Layout complete!

Cell Instantiation

- Cadence’s method of building with hierarchy
- Remember our AND gate is built from a NAND gate and an INVERTER
- Simply instantiate them both to create the AND gate
Cell Instantiation

- Need to wire up the design and add new pins
- Pins from lower level designs are essentially ignored by Cadence when you instantiate them into larger layouts

Path tool (p) – Very useful for making same layer connection across your design
Contact tool (o) – useful for making connections between layers
Zoom tools
  - Hold down right mouse button and draw a square around the area you want to zoom into to zoom in
  - Shift + z to zoom out
  - f to zoom out so your entire layout fits into view
    • (if this command is acting weird run DRC).
- If caps lock is on you won’t be able to select anything in the LSW window.

Layout Shortcuts and tips