Chip Assembly

Using the Virtuoso Chip Assembly Router (vcar)

Yet Another Tool...

- This is a tool you can use to connect large blocks that have been designed separately
  - Like placed and routed blocks from SoC, or memories, or custom register files, etc.
- Also useful for wiring a fully-connected core to the pads
- Hand-placement, but automated wiring...
- Chapter 12 in CAD book
Outline

1. Start with a schematic to define connectivity
2. Then generate a layout template into Virtuoso-XL
3. Place blocks by hand and adjust floorplan
4. Wire vdd and gnd by hand
5. Export to vcar for signal routing
6. Import back into Virtuoso for DRC, LVS, GDS

Example

- Start with schematic that defines connectivity
Generate layout from schematic

Generate Layout

Generate layout from schematic

Generate Layout
Drag to place floorplan

Floorplan before routing
View with just Flight Lines

Export to vcar
Export to vcar

Layout after routing
Example of Core to Pad Routing

Example Pins on Pad (layout)
Core and Frame in Virtuoso-XL

Make Vdd and Gnd connections
Send to vcar

After vcar routing
Check GND

Check VDD
Add Fill

Now generate gdsII (stream)

- The binary format that MOSIS wants
- Use `export->stream`
  - Make sure to load `stream4gds.map` as the Layer Map File
One Final Tweak

- If you’re fabbing, before you generate your final fab-read gdsII (stream) file...
  ...You need to add blocks of poly, M1, and M2 to meet the minimum density requirements
  - Take open areas of your chip and add large blocks of those layers
  - Remember to DRC and LVS to make sure you didn’t mess anything up!

Example Chip (4tcu)