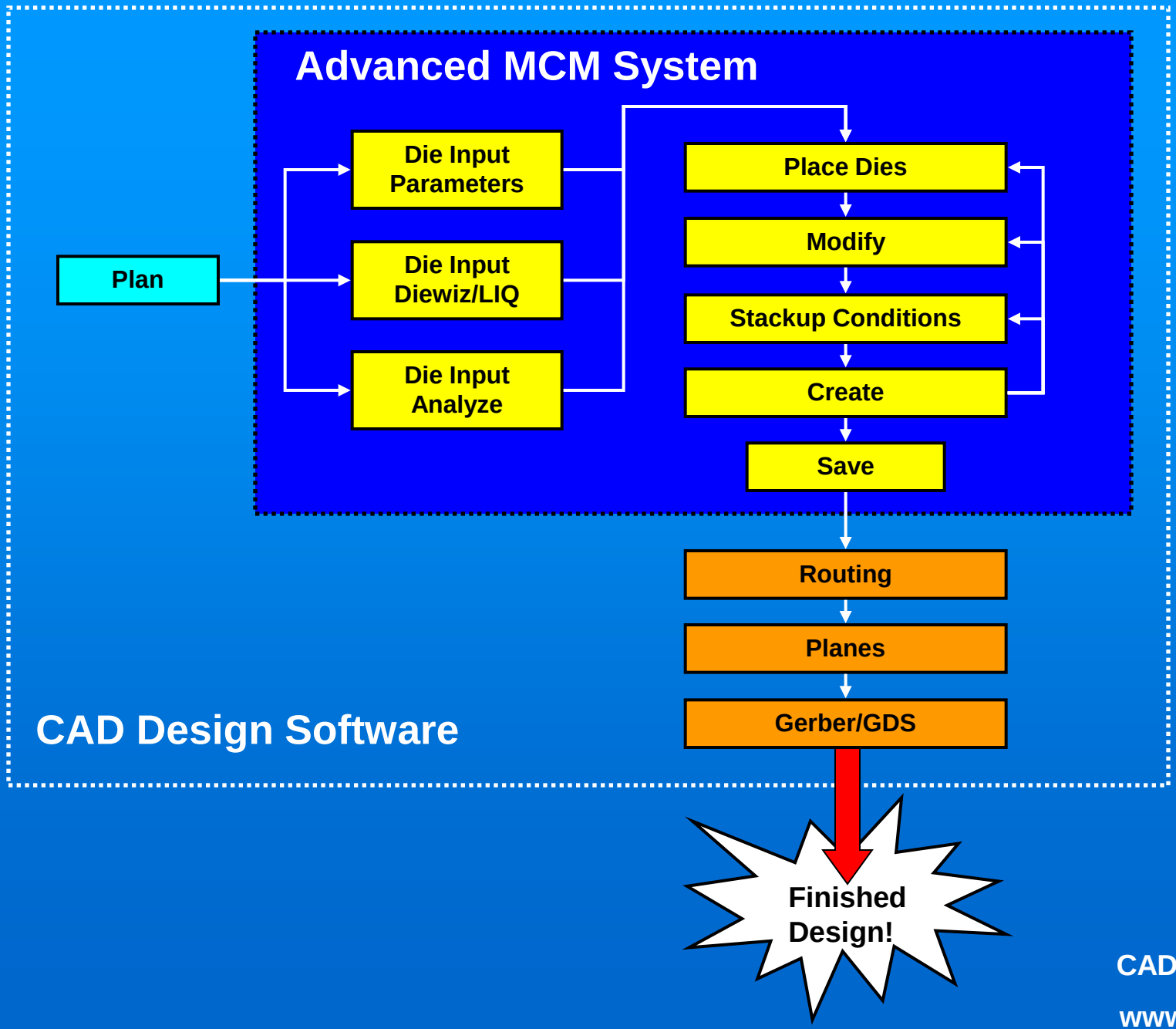
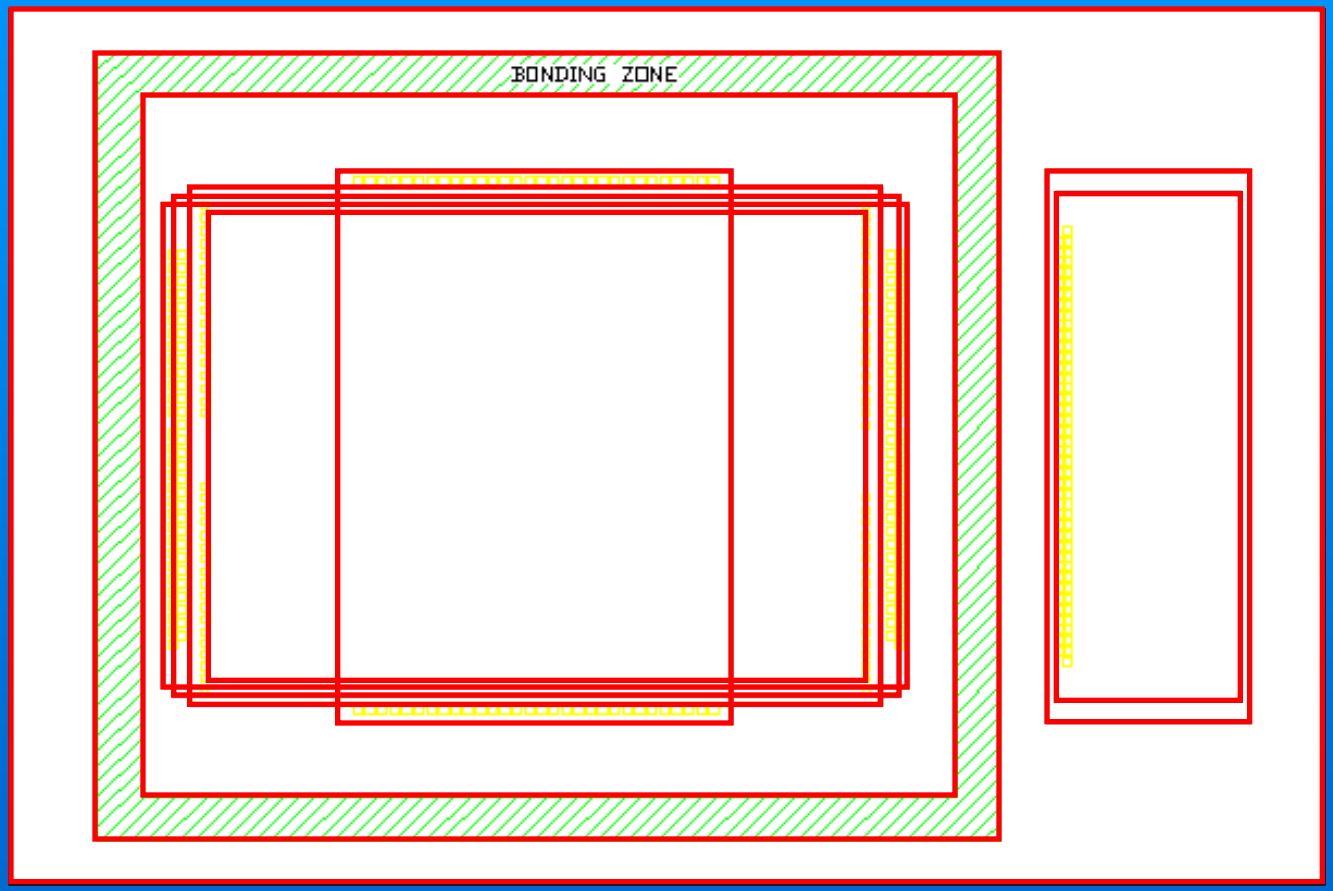

Advanced MCM System
Plan
Die Input Parameters
Die Input Diewiz/LIQ
Die Input Analyze
Place Dies
Modify
Stackup Conditions
Create
Save
Routing
Planes
Gerber/GDS
CAD Design Software
Finished Design!

STEP 1: Planning the stackup construction

Plan

First, the package size and die configuration is determined.
Then, the layout and stackup conditions are decided:
On the bottom level, two similar dies will be used

This is followed by a spacer on level 2… Another die on level 3… And another die on level 4.



Two similar dies will be used on the right side on level 1.

A common bonding area will be used.

STEP 2: Input the die information

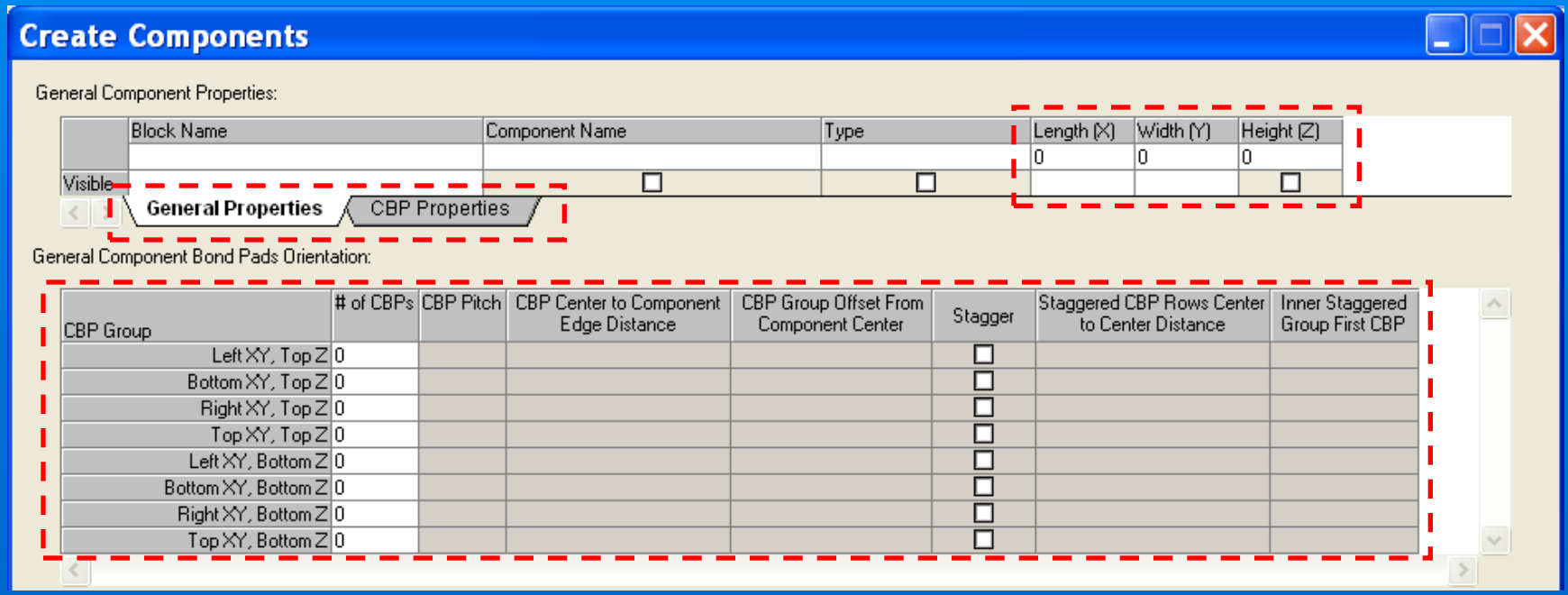
Die Input Parameters

Die Input Diewiz/LIQ

Die Input Analyze

Dies can be created parametrically,…

- **Regular Dies**
- **Dummy Dies**
- **Spacer Dies**



STEP 2: Input the die information

Die Input Parameters

Die Input Diewiz/LIQ

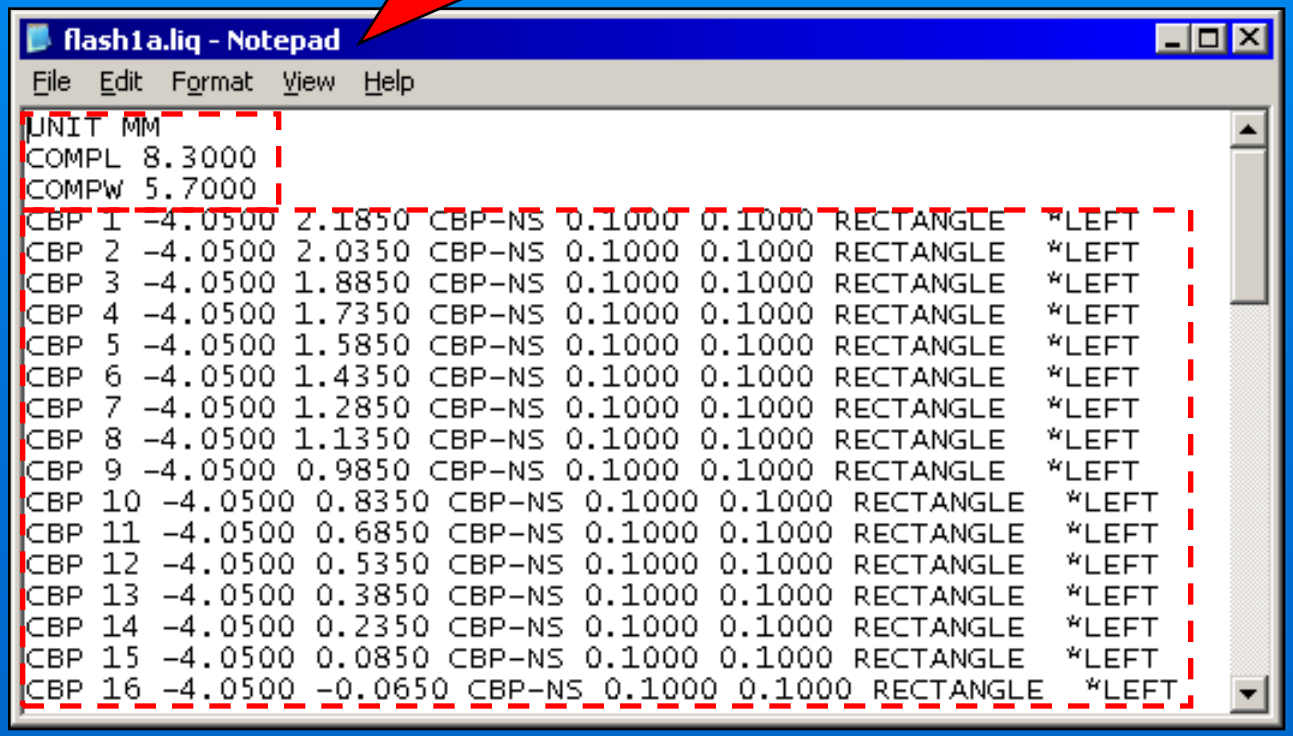
Die Input Analyze

By using X,Y coordinates,…

Excel/TXT data (through DieWizard)

LIQ format

MCM format



STEP 2: Input the die information

Die Input Parameters

Die Input Diewiz/LIQ

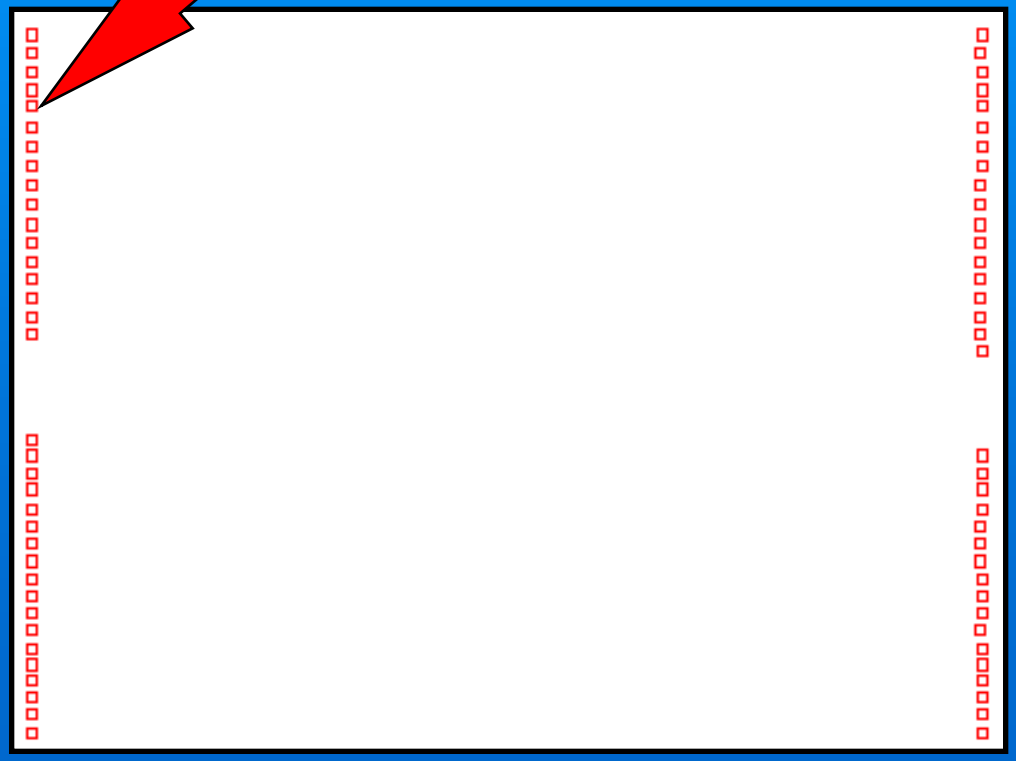
Die Input Analyze

Or by analyzing CAD data.

DWG

DXF

GDSII



STEP 3: Save the die data

Die Input Parameters

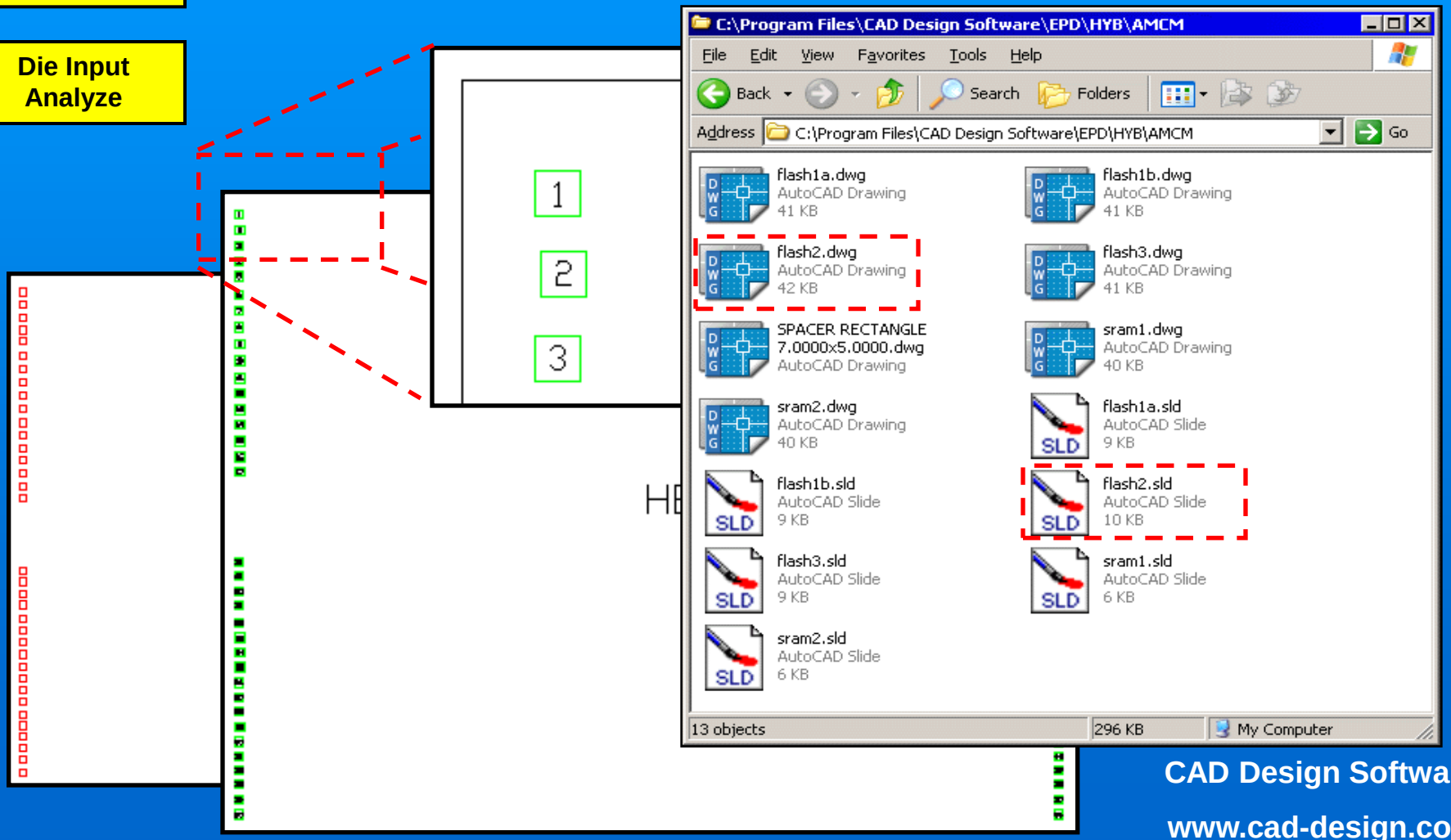
Die Input Diewiz/LIQ

Die Input Analyze

Once all data has been processed,…

It becomes intelligent, with pin numbers, netnames, etc.,…

And it is saved in a standard die library, ready for Advanced MCM.



STEP 4: MCM-Start the command

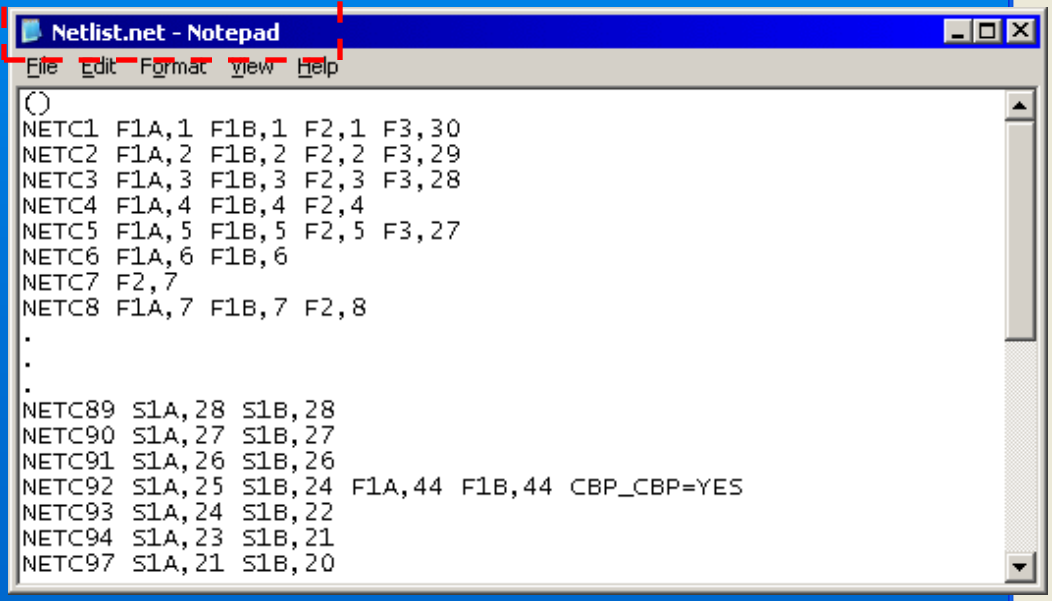
- Place Dies
- Modify
- Stackup Conditions
- Create
- Save

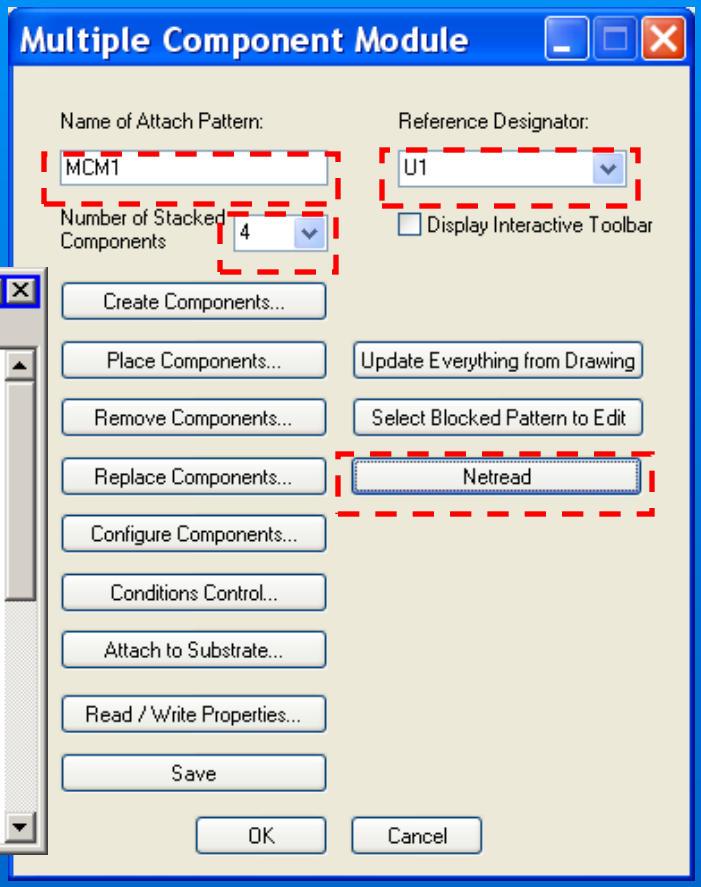
In AMCM, first a fanout name is specified,…

A designator is assigned,…

The total number of die levels is selected,…

And the netlist is read into the design.





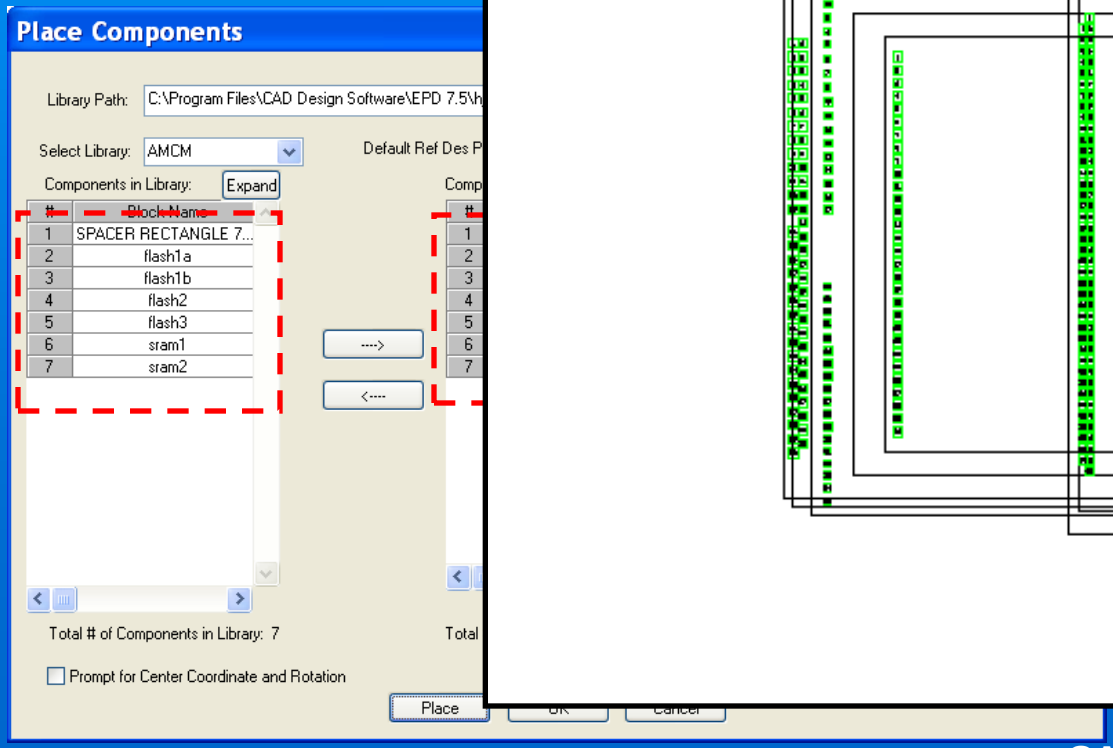
STEP 4: MCM-Place the dies in the stackup

- **Place Dies**
- **Modify**
- **Stackup Conditions**
- **Create**
- **Save**

In AMCM, the dies are selected from the die library,…

Then, some basic information is entered,…

And the initial stackup is created.



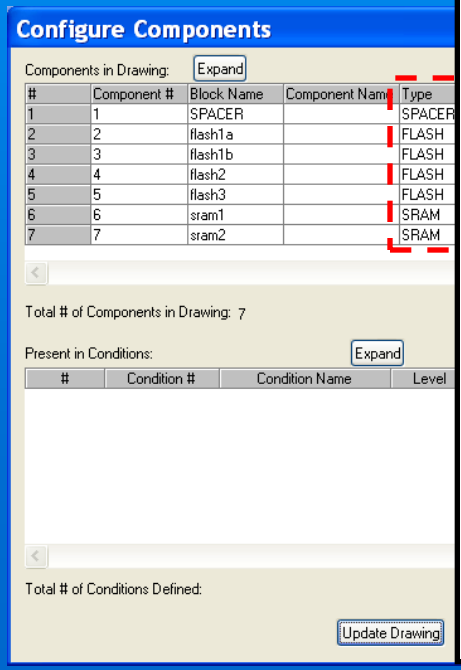
Next, some details about the dies are specified,…

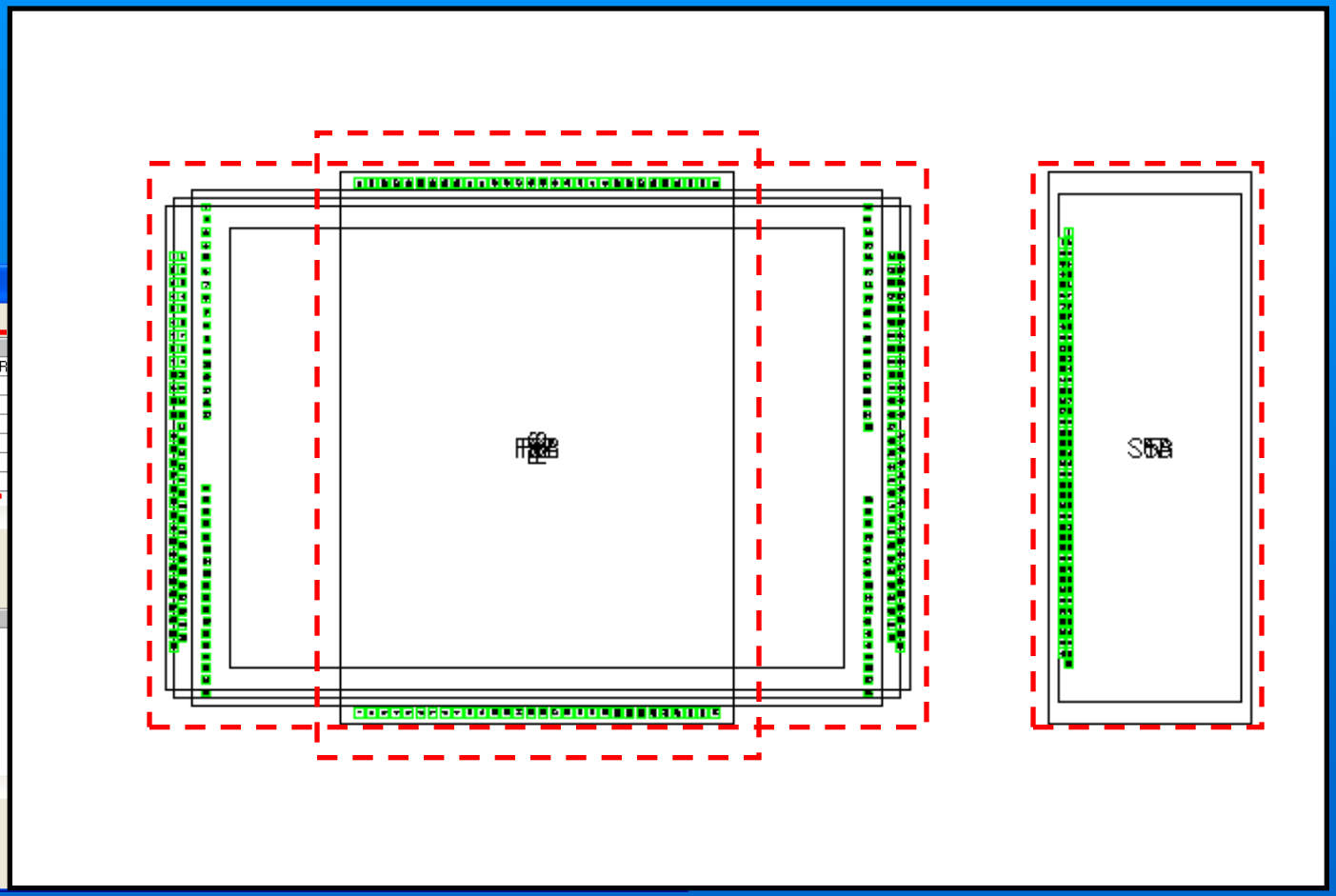
STEP 5: MCM-Modify the stackup (fix location/rotation of the dies)

- Place Dies
- Modify
- Stackup Conditions
- Create
- Save

Two separate die stackups, with Flash3 rotated 90 degrees,…

And the stackup is ready.





STEP 6: Specify the Stackup Conditions

- Place Dies
- Modify
- **Stackup Conditions**
- Create
- Save

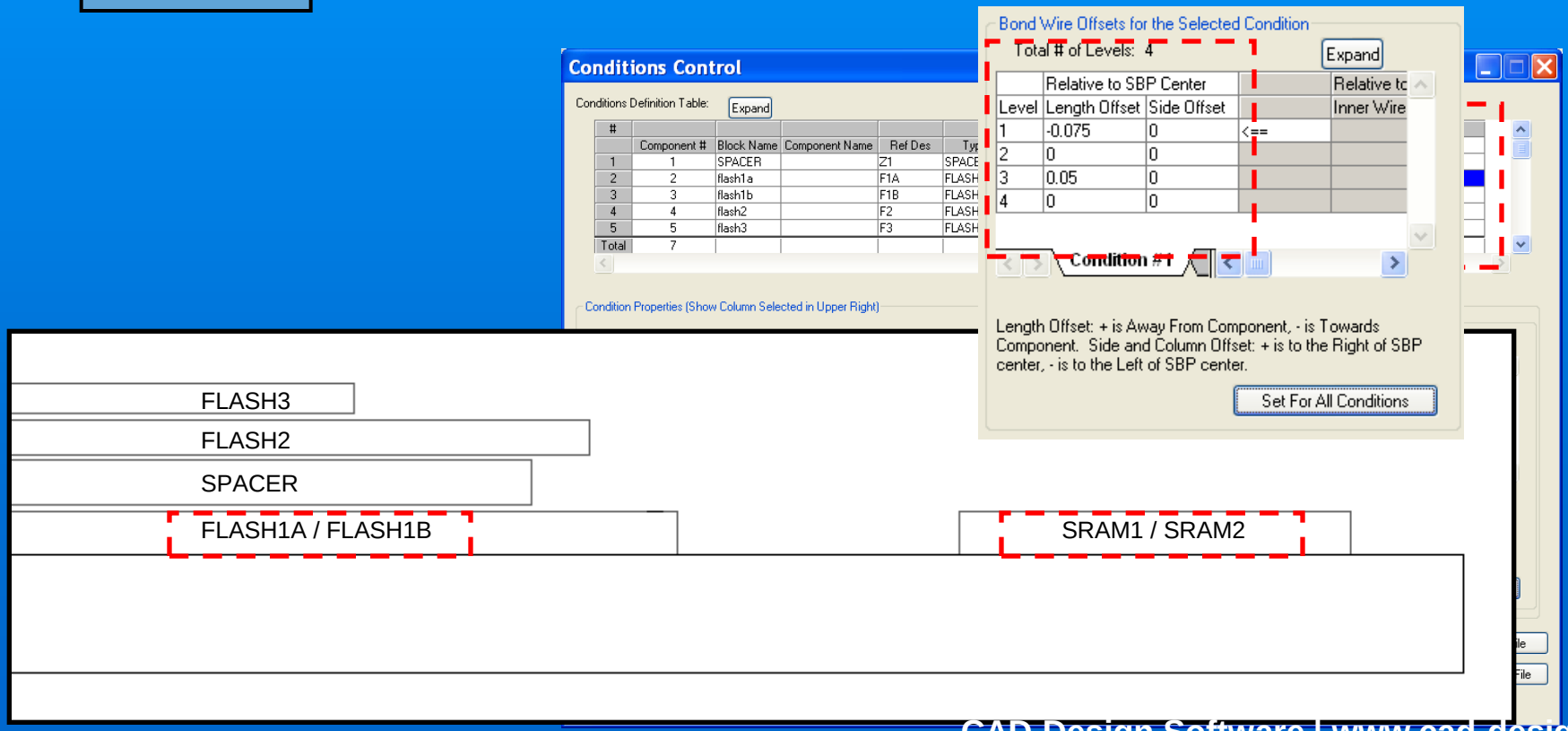
In this case, two separate FLASH dies are used in the main stackup,…

And two separate SRAM dies are used as stand-alone die,…

Therefore, 4 separate conditions are possible.

The conditions are specified, and saved in the database.

The user can also specify the exact bonding points for each level.



STEP 7: Setup the global Fanout Pattern settings

- Place Dies
- Modify
- Stackup Conditions
- **Create**
- Save

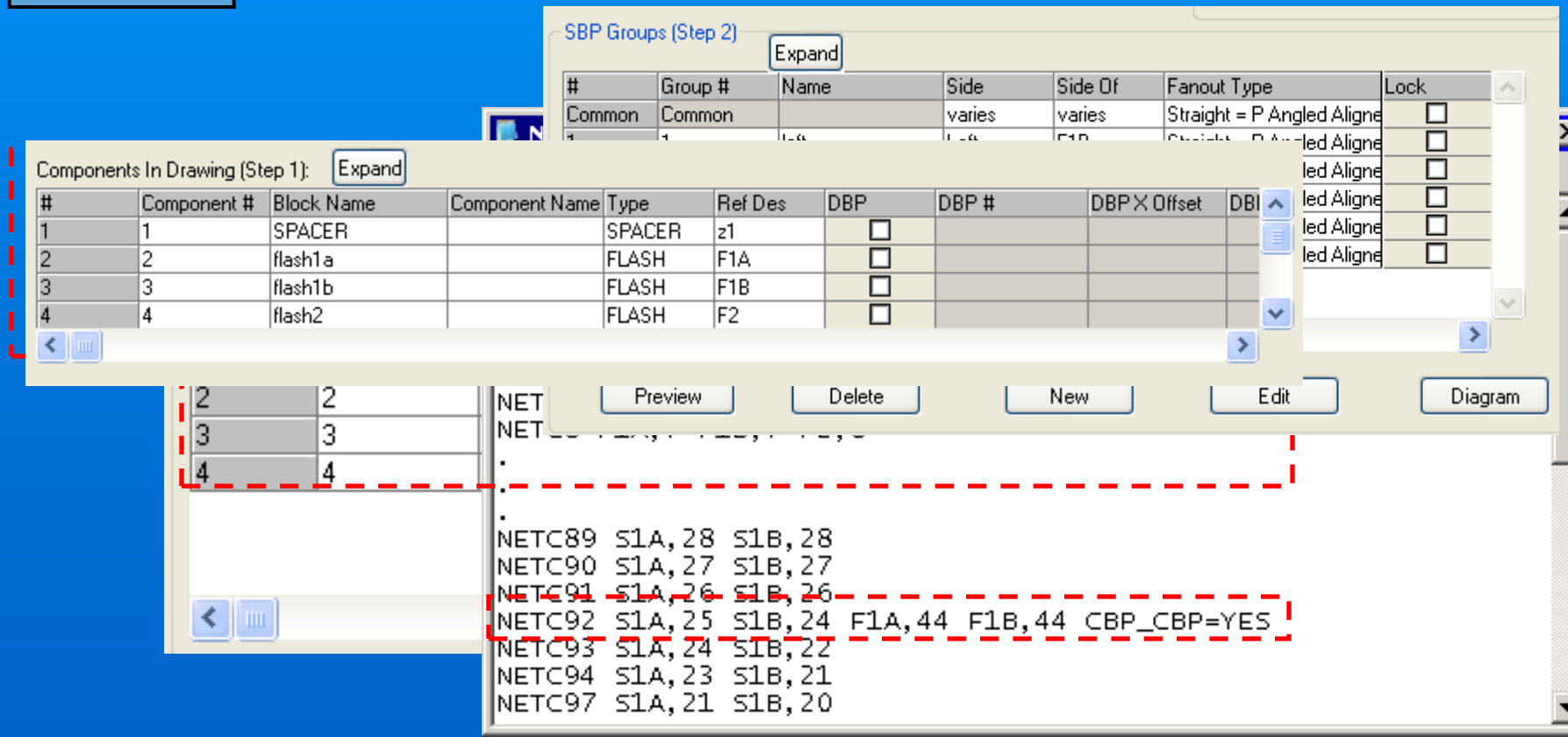
First, the die information is confirmed (no die bond pad for this sample)

Next, the design rules and fanout preferences are specified

Next, the dies are connected according to the reference netlist,…

Which contains die pad sharing information,…

Including direct die-to-die bonding.



STEP 7: Create the initial Fanout Pattern

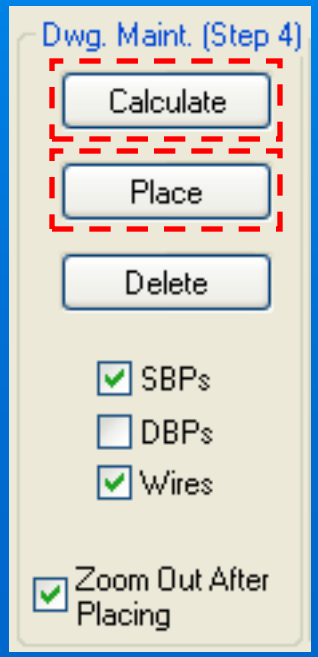
- Place Dies
- Modify
- Stackup Conditions
- **Create**
- Save

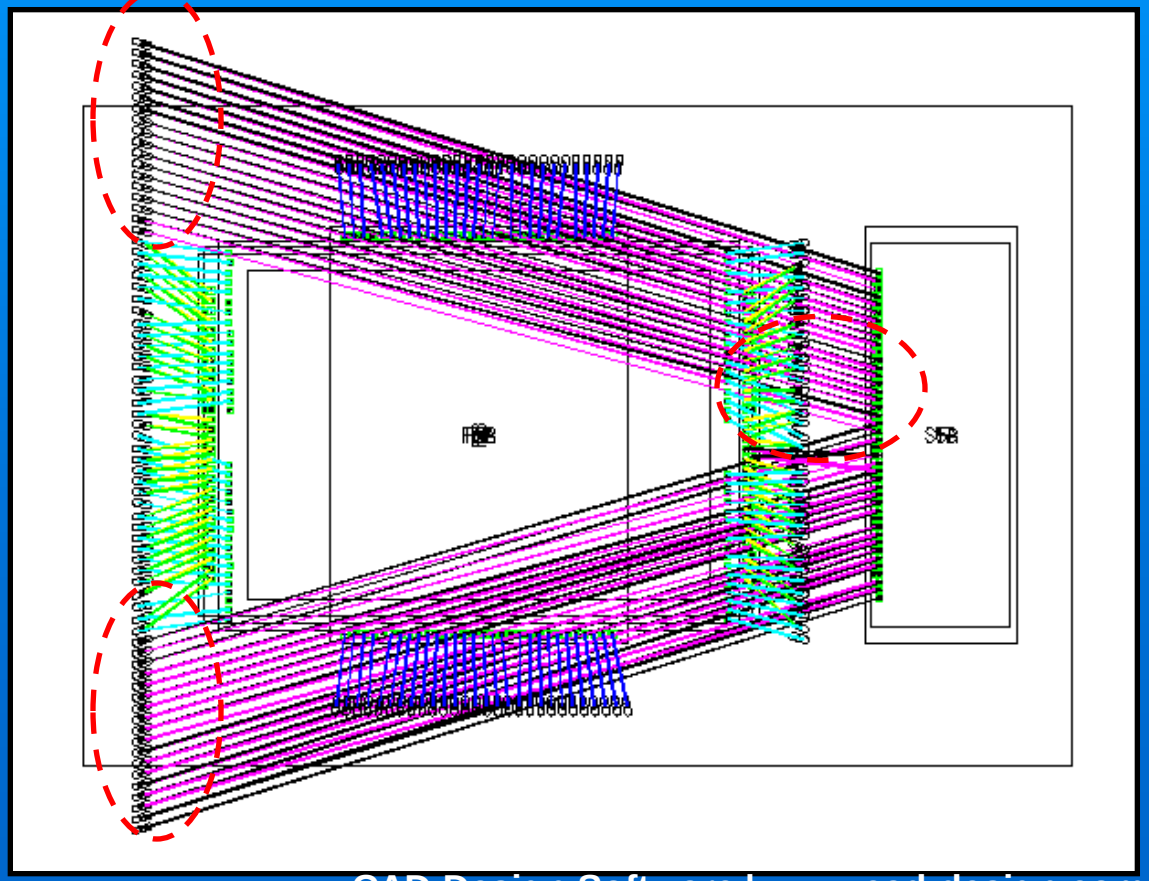
Next, the pad locations, angles, wires, etc. are calculated,…

And the pads are placed in the design for the initial fanout pattern.

Very good start, but there is still work to be done:
Some wires are crossing,…

And the SRAM wires need their own bonding location.





STEP 7: Adjust the Fanout Pattern

- Place Dies
- Modify
- Stackup Conditions
- Create
- Save

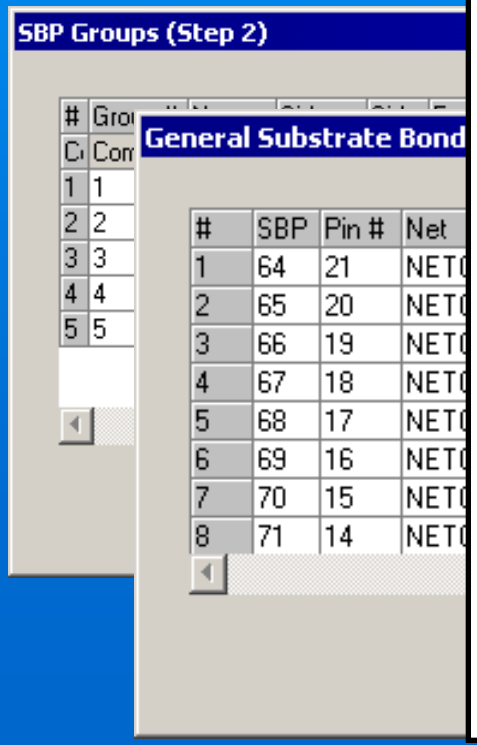
First, a new group is defined (left2),…

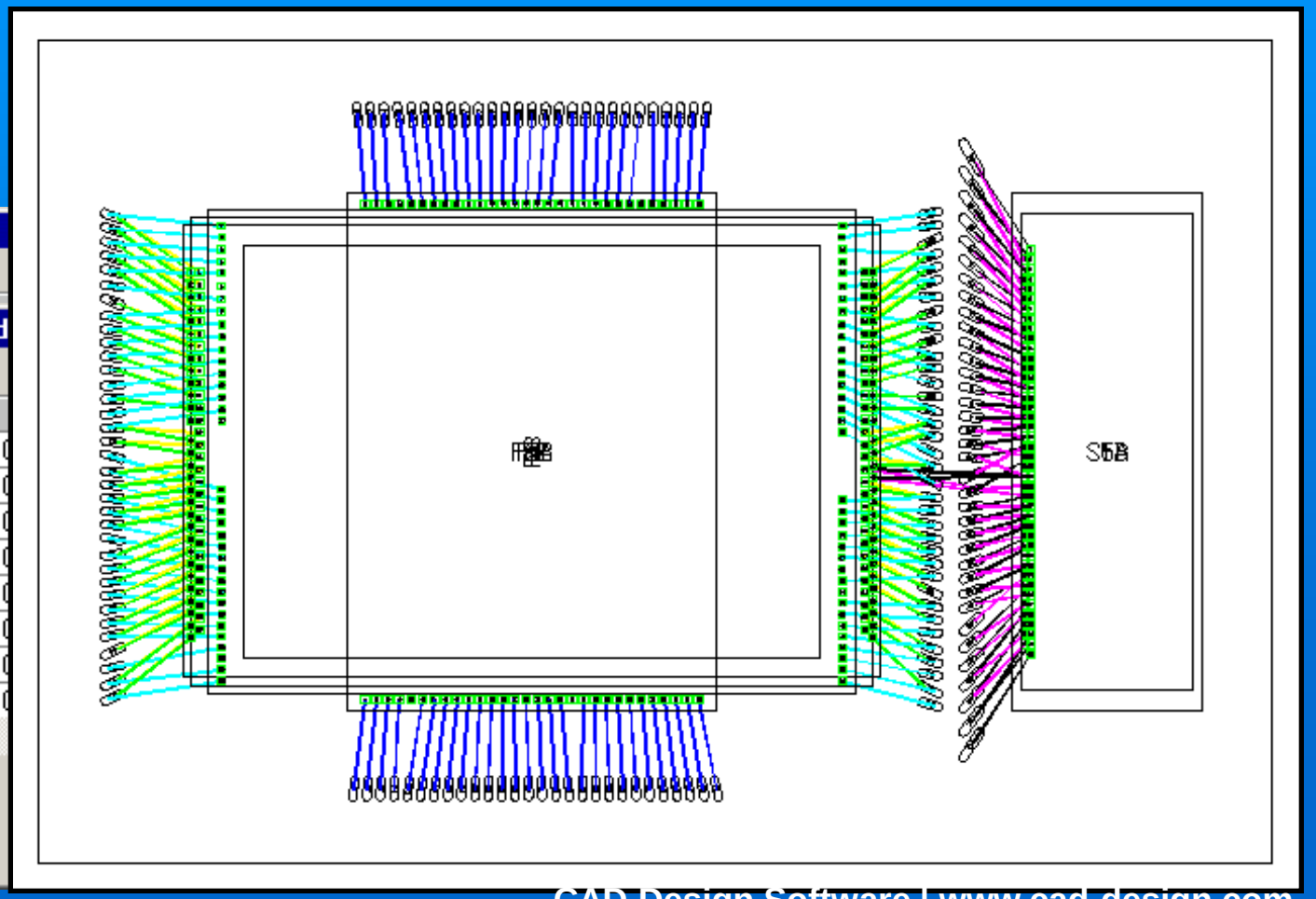
Then, new parameters are specified for the new group.

Now, the pads for the SRAM are selected,…

And changed to the new group.

After a new Calculate pass, the pads are placed once again.





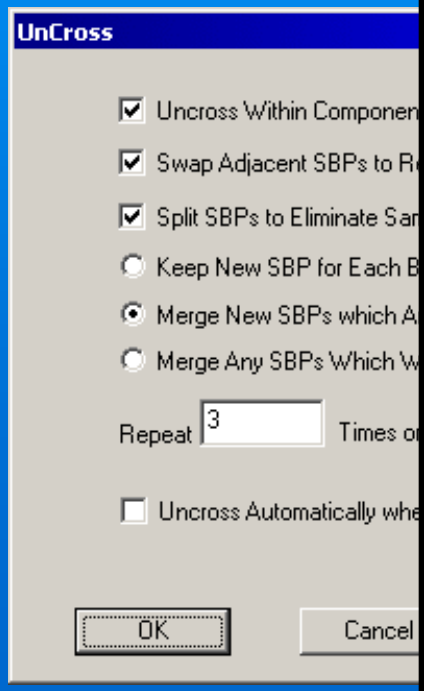
STEP 7: Optimize the Pattern (remove crossovers)

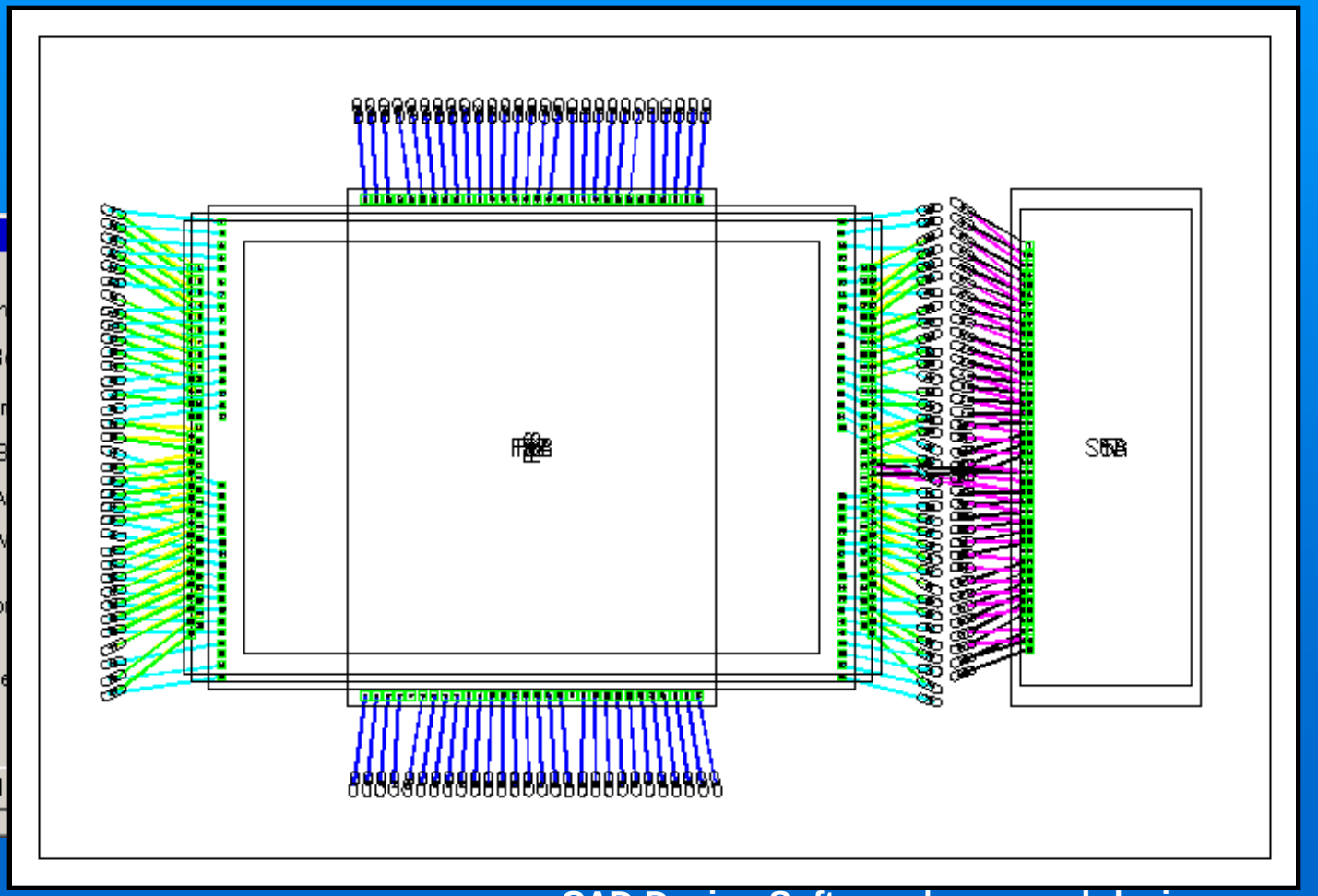
- Place Dies
- Modify
- Stackup Conditions
- Create
- Save

But there are still some crossover problems,…

The Uncross function is used,…

And the system automatically sorts and uncrosses the wires.





STEP 8: Save the MCM pattern

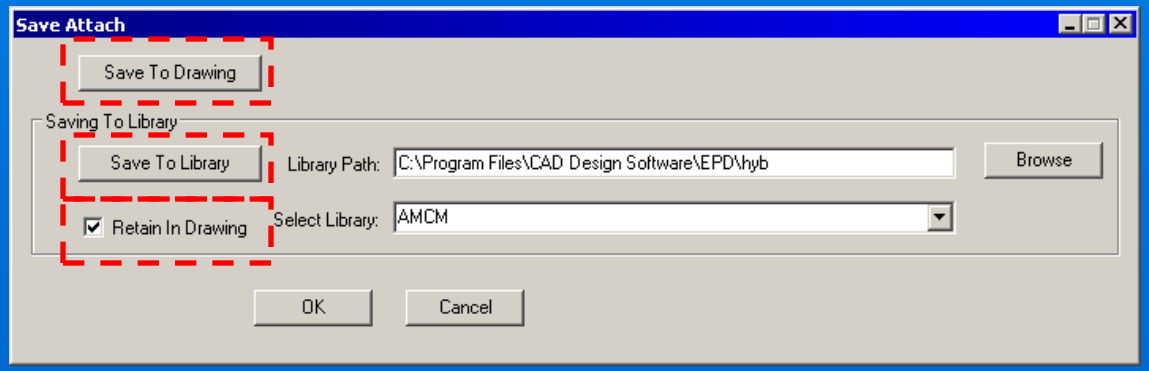
- Place Dies
- Modify
- Stackup Conditions
- Create
- **Save**

Now that the pattern is complete, it is saved,…

Either to the current drawing,…

To the die library,…

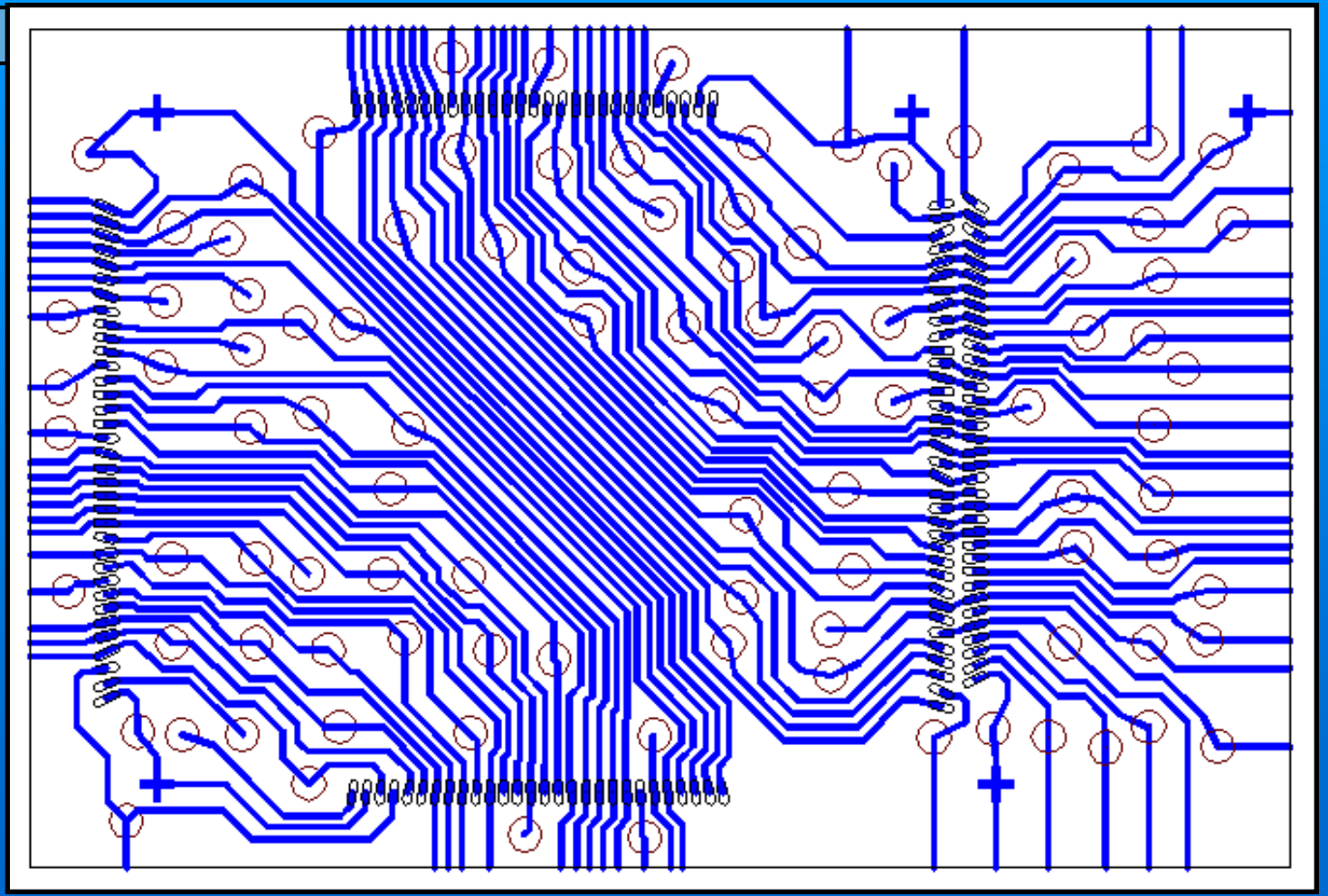
Or to both.



STEP 9: Substrate Design

- **Routing**
- **Planes**
- **Gerber/GDS**

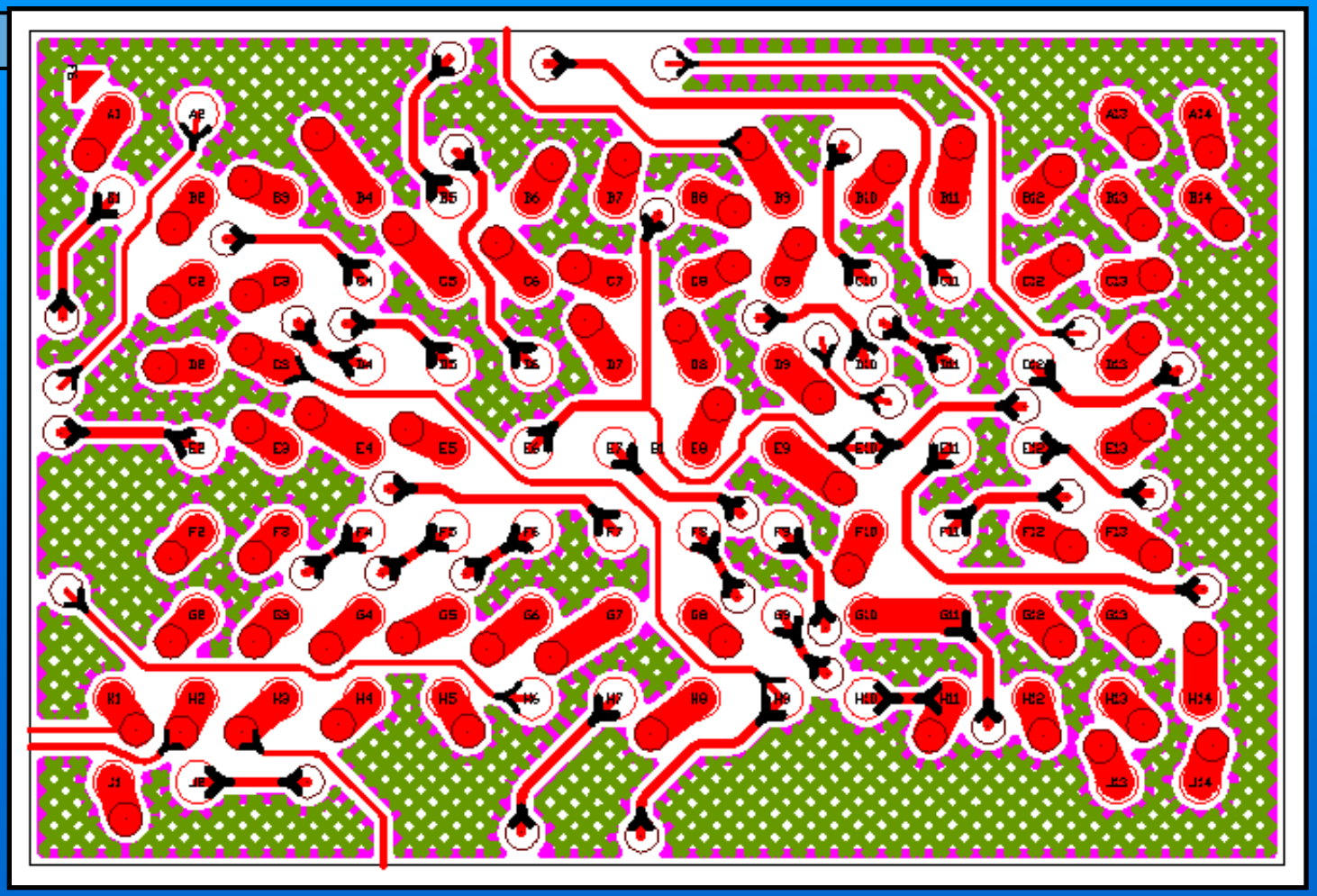
After bondwire analysis, the package is ready for routing,…



STEP 9: Substrate Design

- Routing
- Planes
- Gerber/GDS

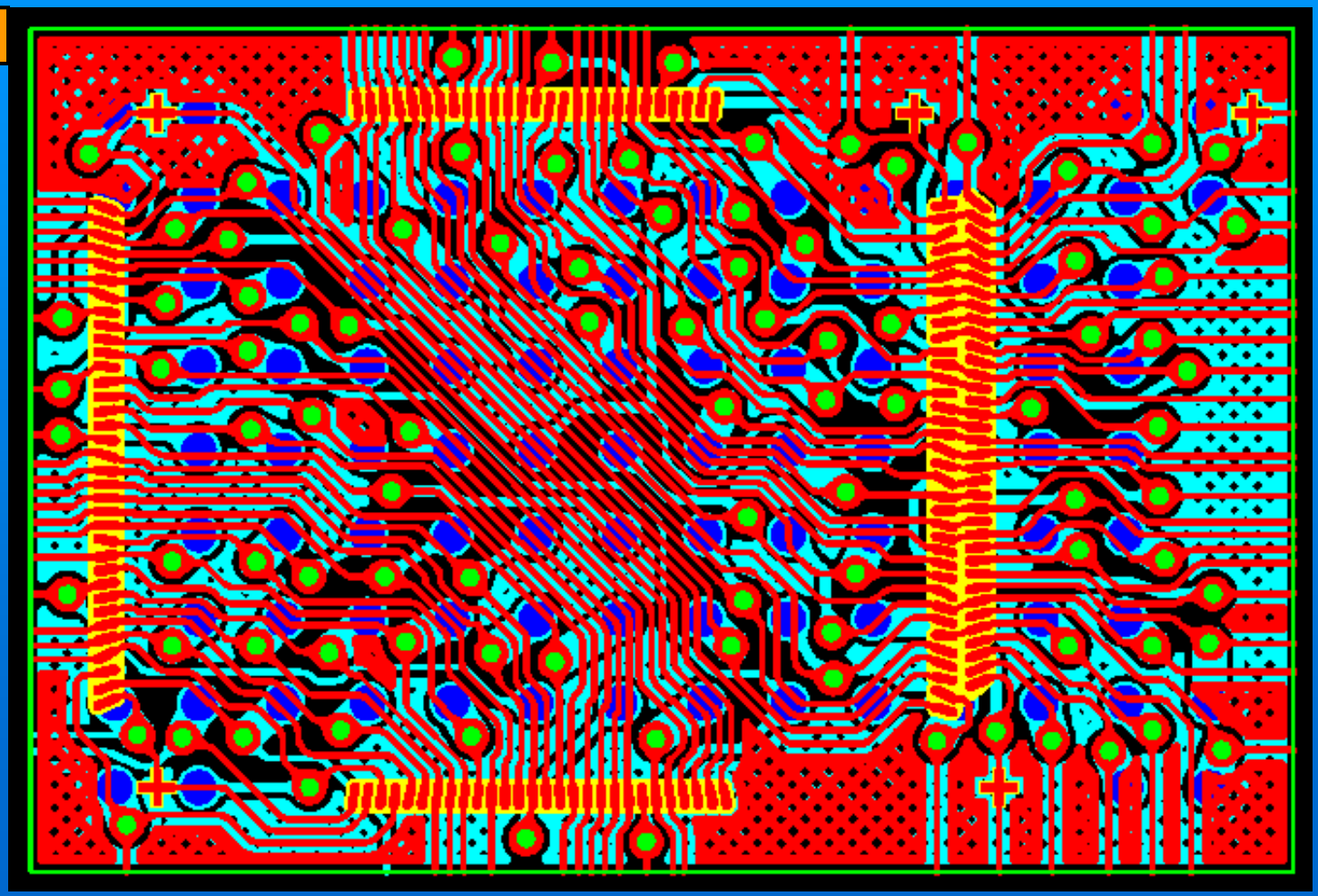
Ground Planes,…



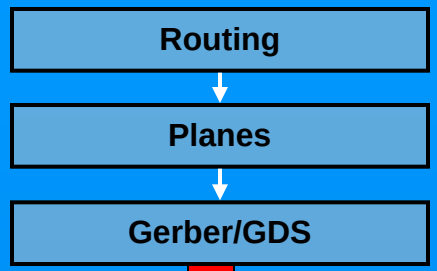
STEP 9: Substrate Design

- Routing
- Planes
- Gerber/GDS

And fabrication artwork.



STEP 9: First to market!



The design is finished ahead of the competition, thanks to a concurrent design methodology.

The design is finished correctly the first time,…

Without multiple design spins,…

As a result of collaboration between all designers and engineers involved in the project.