

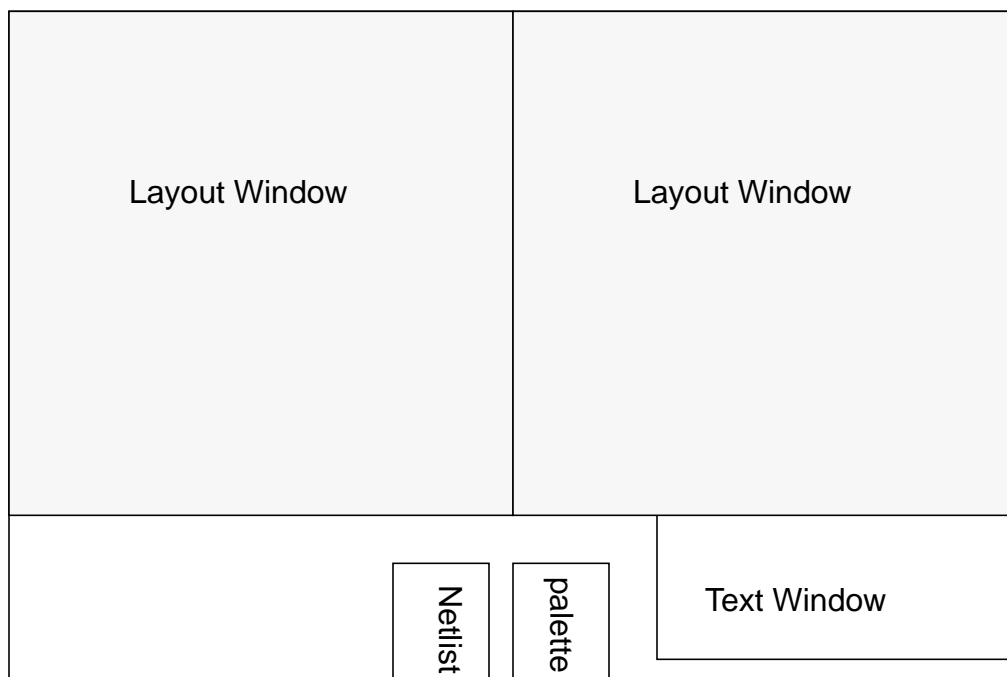
Magic Notes

Magic is a very good layout tool, but layout is still a time intensive task. It is easy to spend hours laying out a cell, only to find out that the topology that you were trying simply will not work. The best way to shorten the time you spend on layout is to make sure that you have stick diagrams of all your cells. This planning stage will save you a bunch of time in the end.

What follows is a description of the setup that I use when I am working with Magic, and the commands that I find most helpful. It is not necessarily the best setup, and if you have one that you are comfortable with, stick with yours. But if you have not used Magic much, this information may be useful. I will not talk about how to use the box and wiring tools, so if you have never used Magic please read the tutorials first.

1.0 Setup

Magic supports multiple windows. Use them. There is no need to have to continuously move the stuff you are working on in the window, or load different cells in the same window. I tend to have two active windows, and one or two other smaller windows that contain the palette and the netlist tool. Since it is often useful to be able to read Magic's text window too, I end up with the situation that is shown below:



The netlist window is generated by the command

- `:specialopen netlist` (short form is `:spe netlist`)

This command opens up a window that makes it very easy to label nodes in the circuit. You type a bunch of names into the window, and then you can place these labels on the circuit

The palette is just a normal display window on the cell called `palette`, which has a little square of all the different layers. Since you can paint a layer by pressing the middle button on that color, I find having all the colors available helpful.

The two main window might be different views of the same cell (one zoomed out, and the other zoomed in) or different cells that you are working on.

2.0 Commands

Magic has a number of long commands which control things from CIF generation to extraction. I use only a fraction of the commands for normal editing. A few that I use are listed below:

- `:see {allSame, no label, no *}`

Controls what magic displays in the window. The keyword 'allSame' means that all layers should be displayed the same, even if they are not in the edit cell. 'no' means don't display that layer, and '*' matches all normal paint layers.

- `:clockwise`, `:upside`, `:sideways`

Rotates the selected object, or flips it around the x or y axis. This works for cells or for hunks of selected paint.

- `:getcell cellName`

Get cell named *cellName* and place it in the current cell. The LL corner of the cell is placed at the LL corner of the box

- `:fill {direction}`

fill the paint at the edge of the box through the box

- `:edit`

Make the currently selected cell the edit cell

- `:writeall`

Find all the cells that have changed, and foreach of these cells ask the user if s/he wants to save them. This is the best way to save cells, since `:save` does not always do what you want.

- `:flush`

Restore the cell to the version stored on the disk. The flush command only works on the edit cell. It does not depend on the cell being displayed

- `:dump`

Dump contents of cell into another cell. This command should be used sparingly since it creates many versions of the same basic thing. It would be better to make a generic base cell and use it, if possible.

- :cif see *CIFLayer*

Display using feedback, the mask layer that will be generated for *CIFLayer*

- :getnode
- :rsim
- :sim

The previous three commands are for the Magic rsim interface. You can run lrsim from Magic, and in this state you can point at geometry and find value. We will talk more about these commands later.

3.0 Macros

Macros are user definable commands that are bound to single keys. Listed below are the default macros, the bold ones are the ones that I use a lot. I have grouped them by function.

3.1 Selection

macro s “select”	select object
macro S “select more”	
macro a “select area”	select paint and cells in box
macro A “select more area”	
macro f “select cell”	select cell cursor is over
macro C “select clear”	

3.2 Deletion

macro d “delete”	delete selected object
macro ‘^D’ “erase \$”	Del layers under cursor from box

3.3 Window Motion / Creation

macro , “center”	center window on cursor
macro v “view”	fit everything into the window
macro z “findbox zoom”	make box fill window
macro Z “zoom 2”	zoom out by 2 times

macro ^X “expand toggle”

expand hier. one level

macro x “expand”

expand everything in box

macro X “unexpand”

unexpand everything

macro o “openwindow”

open new window

macro O “closewindow”

close widow cursor is in

3.4 Motion

macro t “move”

move box to cursor (selection too)

macro T “stretch”

Like move but leave connected

macro q “move left 1”

macro w “move down 1”

macro e “move up 1”

macro r “move right 1”

macro Q “stretch left 1”

macro W “stretch down 1”

macro E “stretch up 1”

macro R “stretch right 1”

macro c “copy”

3.5 Grid

macro g “grid”

toggles grid on and off

macro G “grid 2”

set up grid to display 2units

3.6 Undo

macro u “undo”

best command there is, 20 deep

macro U “redo”

3.7 Random

macro b “box”

give information about box

macro B “findbox”

macro ^L “redraw”

macro y “drc why”

why are there DRC errors

macro ? “help”

list all the long commands