Magic VLSI Cheatsheet

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This cheat sheet compiles useful commands (to be entered in the Tcl console) and bind keys (in the layout window) as well as a summary of the mouse operations for the different tool modes. This compilation relates to Magic 8.3 (see https://github.com/RTimothyEdwards/magic).

A comprehensive Magic documentation and description of all macros can be found at http://opencircuitdesign.com/magic/userguide.html.

The command `macro layout` in the Magic Tcl console lists all defined macros.

Useful commands:	
addpath [*path*]	add search *path* of cells
array *xsize ysize*	array the selection *xsize*-times in X, *ysize*-times in Y, spacing by box
contact *type*	create contact inside box of intersecting layers
corner *dir1 dir2*	draws a corner inside box, first in *dir1*, then in *dir2* (cf. `fill`)
drc find	locate DRC error
drc why	explain DRC errors in box
dump *cell*	copy given *cell* into current layout cell
erase *layers*	erase comma-separated list of *layers* in box
erase *	all layers but not labels
erase $	erase everything (like `CTRL-D`)
erase labels	erase selected label(s) in box
fill *dir*	extend layers from one side of box to the other in the given *dir*ection (cf. `corner`)
findlabel *label*	center the box on the *label*
flatten *cell*	flatten the current edit cell incl. hierarchy into a new *cell*
flush	revert edit cell to last state on disk
get *cell*	instantiate *cell* into current edit cell
help [*pattern*]	shows help for various commands
identify *cell-id*	name the selected cell as *cell-id*
iroute	interactive point-to-point router, from cursor to box
label *string* [*position* [*layer*]]	create a point, line or box label
load *cell*	open the *cell* in the layout window
macro [*window_type*] [*key* [*value*]]	new macro definition
measure [hor|ver|auto]	create a ruler in the box
paint *layers*	paint the comma-separated list of *layers* in box
plow *dir*	move layout structures incl. connectivity in *dir*ection, see manual
port make	create a port from selected label
port index *number*	assign a port index (must match the number from schematic)
quit [-nocheck]	exit magic (using `-nocheck` discards unsaved changes)
see [no] *layers*	show or hide comma-separated list of *layers*
see [no] *	show or hide all layers
select save *file*	Save selection as new *file*.mag
straighten *dir*	try to repair jogs by pulling in *dir*ection
tool	changes the currently used `tool` to (box, wiring, netlist, pick)
redraw	redraws the window
unmeasure	remove all rulers in box
what	print information about the current selection
xload *cell*	open the *cell* in the layout window unexpanded
xview	full view, with unexpanded cells

Bind keys:	
a	select everything in box
A	select additional objects in box
CTRL-A	deselect objects in box
b	print information about the `box`
B	center window on the box
c	`copy`
d	`delete` selection
CTRL-D	delete all layers and labels in box selected by cursor
e	makes the selected cell the new `edit` cell
F	flip the selection upside-down
g	toggle `grid`
G	toggle `grid 2`
i	select instance under cursor
I	select additional instance under cursor
CTRL-I	deselect instance under cursor
m	`move` selection to cursor position
o	`openwindow` (with current selection)
r	`rotate 90`
R	`rotate -90`
s	`select` objects under cursor
S	`select` additional objects under cursor
CTRL-S	deselect objects under cursor
u	`undo` the last operation
U	`redo` the last undo
v	`view`, full view of layout
w	`writeall` changed cells to disk
x	`expand` cells (make visible) in box
X	`unexpand` cells (hide) inside the box
CTRL-X	toggle the visibility of cells in box
y	`drc why`
z	zoom out
Z	zoom in
CTRL-Z	zoom in on box
>	edit the selected cell in layout window (cf. <)
<	return from editing a cell (cf. >)
,	clear selection
:	directly jump to command window (like VI)
SPACE	change the tool
SHIFT + SPACE	change to the box tool
KEYPAD-2	move selection south, equivalent to 'move s 1'
SHIFT + KEYPAD-2	stretch selection south, equivalent to 'stretch s 1'
KEYPAD-4	move selection west, equivalent to 'move w 1'
SHIFT + KEYPAD-4	stretch selection west, equivalent to 'stretch w 1'
KEYPAD-6	move selection east, equivalent to 'move e 1'
SHIFT + KEYPAD-6	stretch selection east, equivalent to 'stretch e 1'
KEYPAD-8	move selection north, equivalent to 'move n 1'
SHIFT + KEYPAD-8	stretch selection north, equivalent to 'stretch n 1'

Bind keys (IIC add-on):	
`f`	full layout view
`CTRL-F`	flip the selection sideways
`k`	measure (ruler)
`K`	remove rulers
`p`	draw a wiring path
`q`	open poperty dialog of p-cell
`?`	show what is contained in box
`0`	show locali
`!`	show metal-1
`@`	show metal-2
`#`	show metal-3
`$`	show metal-4
`%`	show metal-5
`9`	show all layers

Mouse operations:	
Box tool:	
LEFT	set lower-left corner of box
RIGHT	set upper-right corner of box
MIDDLE	`paint` layer pointed with cursor in box
SHIFT + MIDDLE	`erase` layer pointed with cursor in box
Layer selection tool:	
LEFT	show selected layer, cf. `see`
RIGHT	hide selected layer, cf. `see` no
Wiring tool:	
LEFT	pick wire material and size from cursor
MIDDLE	place wire at cursor
RIGHT	cancel wire
SHIFT + LEFT	change to higher layer (e.g. m1 to m2)
SHIFT + RIGHT	change to lower layer (e.g. m2 to m1)
SHIFT + MIDDLE	place a contact at cursor and continue on higher layer
Pick tool:	
LEFT	remove current selection and follow cursor
MIDDLE	place a copy and continue
RIGHT	cancel
SHIFT + MIDDLE	make a copy of selection and follow cursor