ConnectEDA

ELECTRA DO file examples

The adaptive routing strategy method generally requires many routing passes and involves selection of the right commands to build the best strategy.

Commands are used to define the **routing strategy** and to change **design rules constraints** that are originally embedded in the DSN file.

Here are examples of widely used commands:

DESIGN RULES CONSTRAINTS

- Setting PCB width and clearance:
  rule pcb (width 8)
  rule pcb (clearance 8)
  rule pcb (clearance 6 (type wire_via))

- Setting a layer rule applying to all nets in a design:
  rule layer s1 (width 6)

- Setting a special net rule:
  rule net sig1 (clearance 12)
  rule net sig2 (clearance 10 (type via_pin))

- Limiting wrong way routing distance:
  rule net clk (limit_way 150)

  Note: *This will force the router to use a via if it exceeds the wrong way limit.*

- Limiting number of vias per connection:
  rule pcb (limit_vias 4)
  rule class fast (limit_vias 1)

- Defining a net class:
  define (class power net1 net2)

- Using fewer routing layers:
  unselect layer s4

- Preventing a net to be autorouted:
  select all nets
  unselect net n1

- Controlling via location under SMD pads:
  rule pcb (via_at_smd on)

- Prevent via use per net class:
  rule class c1 (limit_via 0)

- Prevent using of vias on entire design:
  unselect all vias

- Routing a net / class to specific layers
  circuit net sig1 (use_layer L1 L2)
  circuit class fast (use_layer M1 M2)

- Assigning routing priority
  circuit net sig1 (priority 200)

Note: *The use_layer rule will override a layer unselection rule.*

- Cost controls:
  cost layer S1 forbidden
  cost layer S2 high (type way)
  cost via high

- Disable usage of specific layer for routing:
  unselect layer s1

- Assigning one or more layer to a net or net class
  circuit net sig1 (use_layer s1 s2)
  circuit class fast (use_via s2)

- Assigning one or more via to a net or net class:
  circuit net sig1 (use_via V1)
  circuit class fast (use_via VF)

- Limits each net to no more than 3 vias:
  limit via 3

- Limits routing in the wrong direction by 300:
  limit way 300

- Resets routing limit to default value:
  limit way –1

- Minimize usage of a layer for routing:
  cost layer 2 high (type length)

- Control the minimum fanout distance:
  rule pcb (clearance 25 (type smd_via_same_net))

Note: *Rules set by using the rule command also affect fanout:*

smd_to_turn_gap	*Sets the minimum distance to the first bend point in a wire from an SMD pad.*
smd_via_same_net	*Sets the minimum distance from an SMD pad to the first via in the wire.*

- Forces t-junctions at vias and pins only
  rule pcb (junction_type term_only)

- Setting clearance from edge of smd pad to edge of first 90-degree turn
  rule pcb (clearance 5 (type smd_to_turn_gap))

- Setting clearance from any pin/via to edge of first 90-degree turn
  rule pcb (clearance 5 (type pad_to_turn_gap))

ROUTING STRATEGY

- How to autoroute a specifc net or class:
  select net n1
  select class clocks

- How to autoroute nets attached to a specifc component:
  select comp n1

Note: *Autorouting gets applied to selected nets only. If no net is select then the whole design nets are assumed. Use the command* **unselect all nets** *to assume all the nets for autorouting.*

- Set cost for router to exit SMD pads on the long side to be forbidden
  cost side_exit forbidden

- Set cost for router to exit or enter SMD pads off center to be forbidden
  cost off_center forbidden

- Set cost for router to route in wrong layer direction to be high
  cost way 50

- Set cost for router to use vias to be low
  cost via low

- Set cost for router to route on layer S1 to be high
  cost layer S1 high (type length)

- Set cost to route in wrong layer direction on layer S2 to be high
  cost layer S2 high (type way)

- Decrease the default cost to use vias by 20%
  tax via .8

- Route 25 passes :
  route 25

- May want to reduce via grid to help on via starved designs:
  grid via 1

- Run two clean passes to reroute every wire and change problem:
  clean 2

- Route 50 passes starting at cost schedule for pass 16:
  route 50 16

- Prevent autorouter from ripping-up and rerouting existing wires and vias:
  protect all wires

- Set via grid to allow ONE wire between vias:
  grid via *via_grid_value*

via_grid_value = (2 x wire_via clearance) + wire width + via diameter

- Set via grid to allow TWO wires between vias:
  grid via *via_grid_value*

via_grid_value = (2 x wire_via clearance) + (2 x wire width) + wire_wire clearance + via diameter

- What are the controls available for the recorner command:

    recorner pin 200
    recorner slant 500
    recorner bend 400

Note: *Pin, slant and bend options can be used to control which corner type is changed and you can override the default setback values as well. Pin option is for wires that are connected to pin or via. Slant is two consecution 90 degree bends.*