

ICC2 : Placement Automated Script

Tool : Synopsys IC Compiler II (ICC2)

Stage : Placement

Date : 26-01-2026

```
# -----
# Utility: Safe mkdir
# -----
proc safe_mkdir {dir} {
    if {[file exists $dir]} {
        file mkdir $dir
    }
}
safe_mkdir ./reports
safe_mkdir ./reports/placement
safe_mkdir ./reports/PRE_PLACEMENT
#####
# PRE-PLACEMENT CHECKS
#####
proc pre_placement_checks {} {
    set rpt ./reports/PRE_PLACEMENT
    redirect $rpt/pg_checks.rpt {
        check_pg_connectivity -check_std_cell_pins none
        check_pg_drc -ignore_std_cells
        check_pg_missing_vias
    }
    redirect $rpt/mv_checks.rpt {
        check_mv_design
    }
    redirect $rpt/physical_checks.rpt {
        check_physical_constraints
        check_boundary_cells
    }
}
```

```

check_legality -verbose
}

redirect $rpt/qor_summary.rpt{
    report_qor -summary
}

redirect $rpt/utilization.rpt {
    report_utilization -config pl_util
}

puts "INFO: Running pre-placement checks"
pre_placement_checks

check_design -check pre_placement_stage
#####
# READ SCAN + MMMC
#####
remove_scan_def

read_def ./inputs/ORCA_TOP.scandef

source ./inputs/sdc_constraints/MMMC.tcl
#####

# APP OPTIONS & ATTRIBUTES
#####
set_attribute [get_lib_cells -nocase *tie*] dont_use false
set_attribute [get_lib_cells -nocase *tie*] dont_touch false

set_app_options -name place.legalize.enable_advanced_legalizer -value true
set_app_options -name place.legalize.legalizer_search_and_repair -value true
set_app_options -name place.coarse.auto_density_control -value true
set_app_options -name place.coarse.auto_timing_control -value true
set_app_options -name place.coarse.legalizer_driven_placement -value true
set_app_options -list {plan.place.congestion_driven_mode both}

```

Clock ideal for placement

```
set_ideal_network [get_clocks *]
```

Routing limits

```
set_ignored_layers -min_routing_layer M2 -max_routing_layer M6
```

```
set_app_options -name route.common.net_max_layer_mode -value hard
```

```
set_app_options -name route.common.net_min_layer_mode -value allow_pin_connection
```

```
#####
```

FIX MACROS

```
#####
```

```
set macros [get_flat_cells -filter {is_hard_macro && physical_status != fixed}]
```

```
if {[sizeof_collection $macros] > 0} {
```

```
    set_fixed_objects $macros
```

```
}
```

```
#####
```

COARSE PLACEMENT

```
#####
```

```
create_placement
```

```
legalize_placement
```

```
refine_placement
```

```
save_block -as rough_legalized_placement
```

```
#####
```

REPORT PROCEDURE

```
#####
```

```
proc dump_place_reports {stage rpt_file} {
```

```
    redirect $rpt_file {
```

```
        puts "===== $stage REPORT ====="
```

```
        report_constraints
```

```
        report_constraints -max_capacitance -all_violators -scenarios *
```

```
        report_constraints -max_transition -all_violators -scenarios *
```

```
        report_congestion -rerun_global_router
```

```
        report_utilization -config pl_util
```

```
        report_global_timing
```

```

report_net_fanout -high_fanout

}

}

#####
# CELL SUMMARY PROCEDURE
#####

proc cell_summary {prefix {rpt_file ""}}{
    # -----
    # ALL inserted cells
    # -----
    set cells [get_flat_cells -filter "name =~ ${prefix}*"]
    set total_cells [sizeof_collection $cells]
    set total_area 0
    foreach_in_collection c $cells {
        set total_area [expr {$total_area + [get_attr $c area]}]
    }
    # -----
    # Buffers
    # -----
    set buf_cells [get_flat_cells -filter "name =~ ${prefix}* && ref_name =~ *BUF*"]
    set total_buf [sizeof_collection $buf_cells]
    set buf_area 0
    foreach_in_collection b $buf_cells {
        set buf_area [expr {$buf_area + [get_attr $b area]}]
    }
    # -----
    # Inverters
    # -----
    set inv_cells [get_flat_cells -filter "name =~ ${prefix}* && ref_name =~ *INV*"]
    set total_inv [sizeof_collection $inv_cells]
}

```

```

set inv_area 0

foreach_in_collection i $inv_cells {
    set inv_area [expr {$inv_area + [get_attr $i area]}]

}

# -----
# Display on terminal
# -----

puts "-----"
puts "CELL SUMMARY : $prefix"
puts "-----"
puts "Total cells added   : $total_cells"
puts "Total cell area     : $total_area"
puts "Buffers added       : $total_buf"
puts "Total buffer area   : $buf_area"
puts "Inverters added     : $total_inv"
puts "Total inverter area : $inv_area"
puts "-----"

#####
# INITIAL DRC
#####

set_app_options -name opt.common.user_instance_name_prefix -value initial_drc
place_opt -from initial_drc -to initial_drc
dump_place_reports INITIAL_DRC ./reports/placement/initial_drc.rpt
cell_summary initial_drc
save_block -as initial_drc_placement
#####

# INITIAL OPTO
#####

set_app_options -name opt.common.user_instance_name_prefix -value initial_opto
place_opt -from initial_opto -to initial_opto
dump_place_reports INITIAL_OPTO ./reports/placement/initial_opto.rpt
cell_summary initial_opto

```

```

save_block -as initial_opto_placement

#####
# FINAL PLACE

#####
set_app_options -name opt.common.user_instance_name_prefix -value final_place
place_opt -from final_place-to final_place
dump_place_reports FINAL_PLACE ./reports/placement/final_place.rpt
cell_summary final_place
save_block -as final_place_done

#####
# FINAL OPTO

#####
set_app_options -name opt.common.user_instance_name_prefix -value final_opto
place_opt -from final_opto -to final_opto
dump_place_reports FINAL_OPTO ./reports/placement/final_opto.rpt
cell_summary final_opto
save_block -as final_opto_done
puts "INFO: Placement flow completed successfully"

```

PLACEMENT OF STD CELLS

