SIEMENS

Calibre® 3DSTACK Quick Reference
Software Version 2021.2

Command Line Invocation

calibre -3dstack [-help] [-turbo [*number_of_processors*]]
{[-create_assembly *assembly_name* [-system {OASIS | GDS}]]
| [-use_assembly *assembly_path*] | [-assembly *assembly_name*] }
[-run_dir *directory*] [-compile_only] ***rule_file_name***

Calibre Interactive 3DSTACK

Launch Calibre Interactive 3DSTACK, use this command:

```
calibre -gui -3dstack [-runset runset_file]
```

Launch Calibre Interactive 3DSTACK from Calibre DESIGNrev:
Verification > Run 3DSTACK

Calibre 3DSTACK Output Files

The following output files are created in your working directory:

3dstack_assembly.oas — assembled view of the chip stack.

3dstack_assembly.oas.layerprops — layer properties file.

3dstack_assembly.oas.layermap — SVRF layer definitions generated from the assembly process.

3dstack_cross_section.oas — x, y, and z view of your stack.

3dstack_cross_section.oas.layerprops — layer properties file

3dstack_overlay_generator.tcl — a Tcl script used to generate the chip stack layout view from the individual layouts.

3dstack.rdb — RDB file containing analysis results. RDB files are also created for each layout file in the chip stack.

***3dstack.dfmdb* (directory)** — DFMDB analysis results.

<3dstack+_rules>.3dstack — compiled 3DSTACK+ rule file.

3dstack.log — transcript of the complete run.

3dstack.warnings — collection of all warnings issued by the run.
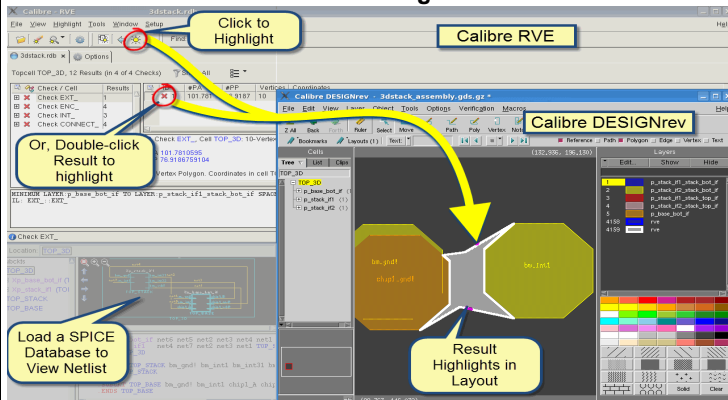
readerprefs — saved exception settings.

Browse 3DSTACK Results in Calibre RVE

Calibre RVE highlights Calibre 3DSTACK results to the associated geometry in the layout viewer.

Enter the following command to open the results in Calibre RVE:

```
calibre -rve 3dstack.rdb
```

Database Results Browsing with Calibre RVE

Opening a 3DSTACK DFMDB in Calibre RVE

Cross-referencing between source and layout is supported in Calibre RVE if a source netlist is specified at runtime.
1. Open *3dstack_assembly.oas* in a supported layout editor.
2. Start Calibre RVE from the layout editor's interface:
   o Calibre DESIGNrev — **Verification > Start RVE**.
   o Other supported layout viewers — **Calibre > Start RVE**.
3. In the Calibre RVE dialog box, select **DFM** database and enter the path to your *3dstack.dfmdb* database.

4. Set up the Internal Schematic Viewer to display source and layout netlists as follows:
   o Choose **Setup > Options** and click **Schematic Viewer**.
   o Enable **Show netlist schematics when highlighting connectivity objects**.
   o Enable **Schematic, Hierarchy and Text** and click **Apply**.
5. Choose **View > Schematics > All**.

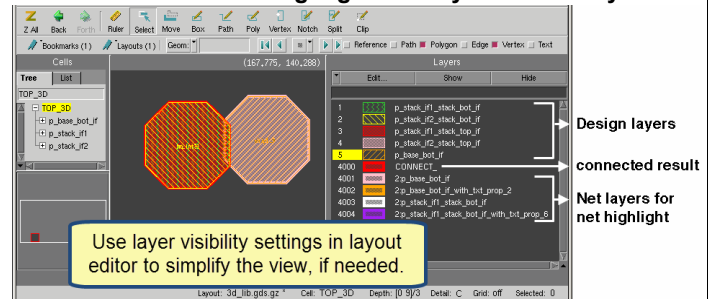### Cross-Reference Database Results in Calibre RVE
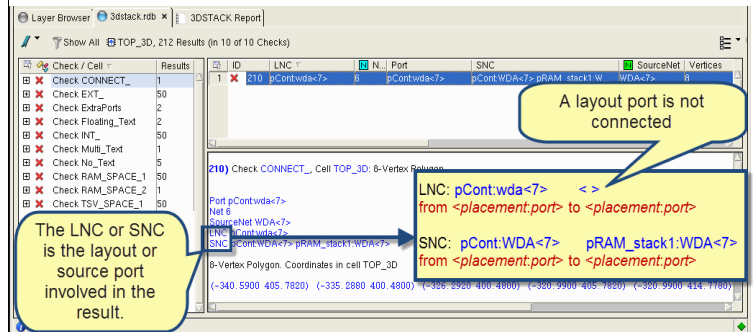
Click on the layout net and source net icons to highlight them in the Internal Schematic Viewer. The layout net is also highlighted in the layout viewer.
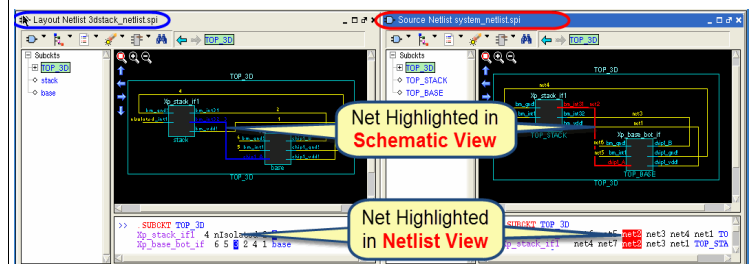
The highlight button (☀) in the highlight toolbar browses directly to the result in the layout viewer.

Click Schematic Nets to Highlight the Layout Geometry

3DSTACK+ Command Reference

The 3DSTACK+ command file defines the physical assembly of a 3D or 2.5D IC. It follows these formatting and syntax rules:

- The file must consist only of Calibre 3DSTACK commands and standard Tcl constructs.
- The file must begin with the following two statements:

```
#!3dstack+
set_version -version 1.0
```

- The assembly commands are die, config, and stack.
- All distances are specified in microns.

config and process Commands

Specifies system configuration and control options for the run.

config [-layout_primary *name*] [-layer_props_file *props_file*]
[-netlist '{'-file *file_name* -format {SPICE | VERILOG *version* | CSV
  | MGC} [-case {YES | NO}] [-hier] [-wrap *name*] '}'] [-order {*list*}]
  [-subckt_pins {*type*}] [-apply_bboxing *cell_list*]
[-report '{'-file *report_path* [-max_results *value*]
  [-child_rdbs {NO | YES }] -report_ignored_pins {NO | YES} '}']
[-ignore_trailing_chars *char_list*] [-layout_case {no | yes}]
[-export_connectivity '{'-file *output_file* [-format {VERILOG | AIF
  | MGC | SPICE | XSI }] …
[-pin_map -pins *pins* -to *name*] [-import_pin_map -file *file*]
[-net_map -nets *nets* -to *name*] [-import_net_map -file *file*]
[-svrf_specs *svrf_file*] [-set_rve_cto_file *cto_file*]
[-set_auto_rve_show_layers {NO | YES}] [-units [-distance {um
  | mm | nm}] [-power {W | mW | uW}] [-time {s | hr | min | ms | us}]]

process *process_layer_information*

die Command

Specifies information about a single die in the assembly.

die -die_name *die_name*
{**-layout** '{' **-path** *layout_path* [-type {gdsii | oasis}]
  [-primary *name*] [-depth {all | top-only}] [-precision *value*]'}'
  | **-lefdef** '{' **-lef** *tech_lef* [*lef_file* …] **-def** *def_file* '}' }
[-thickness *die_thickness*]
-process *name* | {**-layer_info** '{' **-type** *type* **-name** *name*
  {**-layer** '{' *layer_numbers* [-depth {all | top-only}] '}'
    | **-svrf** '{' *layer_derivation* '}' [-show]
    [-text '{' *layer_numbers* [-depth {*number* ...}] [-no_update]
      | [-net_text *layers*] '}' [-pex_map *layer_name*] [-rc_model]
    [-ext_connect *die_name* ...] [-icrx -file *file* | -mipt -file *file*]
    [-texted] [-texttype] [-top | -bottom] [-virtual] [-via] } …
'}' } …
[-anchor '{'-name *anchor_name* {-placement *x_offset* *y_offset*
  | -layer *number* -text *label*}'}'] …
[-interposer | -package | -laminate | -substrate]
[-import_text_labels *file* {*xsi_args*}] [-rename_text "*expression* ..."]
[-wb_connect *layer1* *layer2* [BY *layer3*] [-use_in_svrf]]

component Command

Allows you to define objects in your assembly that are not dies. The
syntax is the same as die with one additional option (-swappable).

component -component_name *name*
  { *die_command_options* … [-swappable *pin_list*] **}**

stack Command

Defines the locations of dies and stacks of dies in an assembly.

stack -stack_name *name* {*die_stack* | *tier_spec* | *stack_ref* }…

die_stack Usage

stack -stack_name *stack_name*
{*die_stack* | *tier_spec* | *stack_ref* }…
{**-die** | **-component** | **-package** | **-laminate** | **-substrate**}
'{' -name *die_name*
  [-anchor *die_anchor_name* from_anchor_name to_anchor_name
    | -placement *location*] [-mag *factor*] [-rotate *angle*] [-flip {x | y}]
  [-invert] [-rename_text "*expression*" …]
  [-ignore_pin "*expression*" …] [-source *source_name*]
'}' [-z_origin *vertical_height*]

tier_spec Usage

stack -tier '{' {*die_stack* | *stack_ref* }…'}'

stack_ref Usage

stack -stack *stack_name*

Rule Check Commands

The following options apply to geometrical rule check commands:
[-comment "*comment*"] [*rve_option* …]

centers -check_name *check_name*
-layer_type1 *type1* [-same_die] [-layer_type2 *type2*]
-constraint "*constraint_value*" [-overlapping]
[-alignment {octagonal_only | orthogonal_only }] [-square]

connected -check_name *check_name* {{-layer_type1 *layertype*
[-layer_type2 *layertype*]} | {-die1 *die* {[-standalone [-short_only
  | -open_only]] | [-die2 *die*}}
[-black_box | -white_box] [-net_mismatch {ALL | MULTI_NAME |
  MISMATCH | MISSING_NAME}] [-no_dangling_ports]
[-no_extra_ports] [-no_missing_ports] [-isolate_path]
[-pin_list *pins_to_report*]

copy -check_name *check_name* -layer_type *placed_layertype*

custom_check -check_name *check_name*
[-stack *stack_list*] [-direction {up | down | both}]
-layer_type1 '{' *placed_layer_type1*… [-merge] **'}'**
[-layer_type2 '{' *placed_layer_type2* … [-merge] '}']
-tvf '{' *tvf_body* '}'

{ **dangling_ports** | **dangling_no_text** | **extra_ports** |
missing_ports } -check_name *name* -layer_types *types_list*

unconnected_ports-check_name *name*
{-layer_types *types_list* } | {-dies *die_list*}

density -check_name *check_name*
-layer_types {*placed_layertype* …}
[-expression "*density_expression*"] **-constraint** "*expression*"
[-window {*wxy* | *wx wy*}] [-step {*sxy* | *sx sy*}]]
[-window_type {truncate | backup | ignore | wrap}]
[-inside { extent | *placed_layer* }] [-centers *value*]

{**enclosure** | **external** | **internal** } -check_name *check_name*
-layer_type1 *type1* [-layer_type2 *type2*] **-constraint** "*value*"

floating_pads -check_name *name* -layer_type *layer_type*

{ **floating_texts** | **multi_texts** | **no_texts** }
-check_name *check_name* **-layer_types** *layer_types_list*

locations -check_name *check_name*
{**-layer_type1** *placed_layertype* [-layer_type2 *placed_layertype*]}
[-constraint "*constraint_value*"] [-text_only | -overlap_only]
[-direction {both | up | down} | {both | direct | reverse}]]

offgrid_centers -check_name *check_name*
-layer_type *placed_layertype* **-resolution** {*resolution_value* |
x_resolution_value y_resolution_value } [-hint]

overlap -check_name *check_name* -placement1 *placed_layer1*
{ **-layer_type** *placed_layertype* [*placed_layertype*] } **-constraint**
"*constraint_expression*" [by_area] [-intersection] [-merge]

same_size -check_name *check_name*
-layer_type1 *placed_layertype* **-layer_type2** *placed_layertype*

{**select_checks** | **unselect_checks**}
{ -check_names '{'*chk_pattern* [*chk_pattern*…]'}'
| -layer_types '{'*type_pattern* [*type_pattern* …] '}' }

3dstack_block '{' *body* '}'
  '{' *3dstack_cmds* '}'— Block of standard syntax commands

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