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How to Find and Insert Text on a Layer Using a Calibre DESIGNrev Script

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Outline

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Objective

At the end of this Support Kit, you should be able to do the following:

- Find the center coordinates of the extent of any polygon on a specific layer in a specific cell in microns
- Find the text that overlaps with a specified polygon layer, along with its x and y coordinates in a specific cell in microns

Included Files

File	Description
layout.gds	Sample GDS file
layout.gds.layerprops	Layer properties file to annotate layer names
script.tcl	Tcl script to run Calibre DESIGNrev
runme	Script to invoke Calibre DESIGNrev in batch mode with the Tcl script

Description

- Getting the center coordinates of polygons can be used to later inject text on these polygons, in case it doesn't already exist. Hence, checking whether a text already exists on these polygons or not would be a useful pre-step

- Calibre DESIGNrev **$L iterator poly** command is used to get the center coordinates of polygons, as it returns polygon and box objects including the objects' property attributes, vertices coordinates, in addition to the path of the cell in which the polygon exists and the cell's bbox information

- Calibre DESIGNrev **$L query text** command is used to get the texts which overlap with returned polygon objects. It returns information on the identified text, including the displayed string and its x and y coordinates

Description
>> Layout

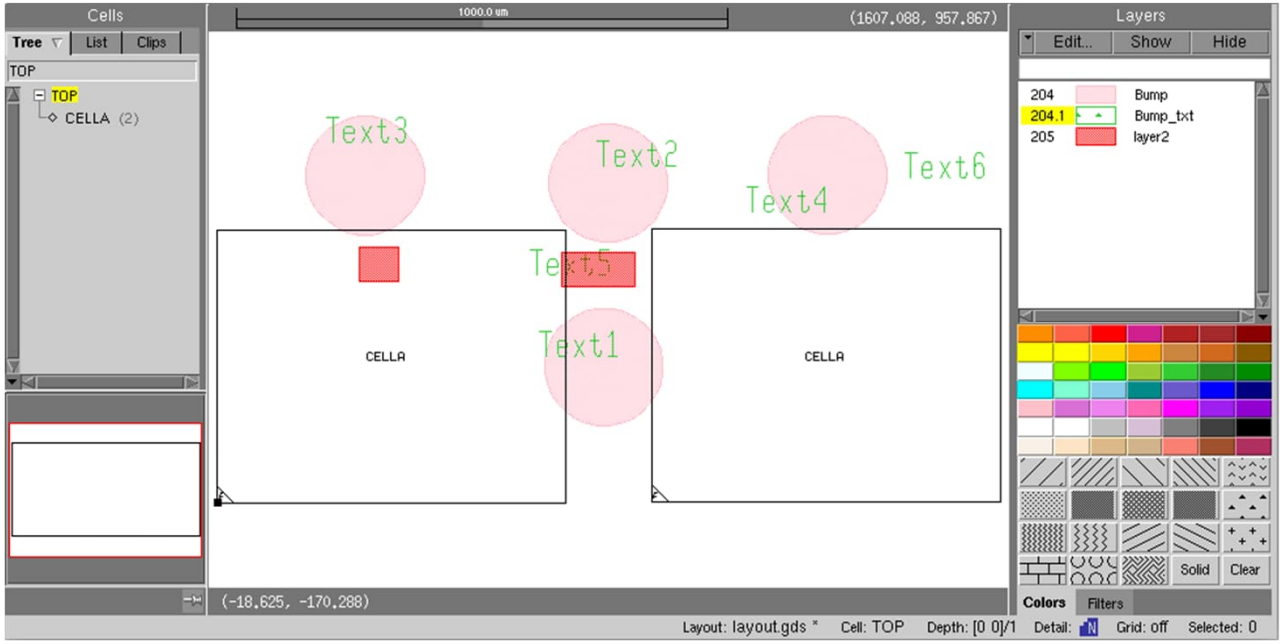
- View the sample layout file with the command:

  calibredrv layout.gds

- Note that the layout has two levels of hierarchy. To view all levels, press 9

- The layout is mainly constituted of
  - bump polygons layer (layer number 204)
  - text layer (layer number 204.1)
  - another polygon layer (layer number 205)

- After investigating the layout, close Calibre DESIGNrev



Description
>>Tcl script

- The script is invoked by a Calibre DESIGNrev batch run as such:

  calibredrv script.tcl <layout_name> <cell_name> <layer_number> [-center | -text]

- The Tcl script takes four required arguments:
  - **layout_name:** the first input argument is the layout file
  - **cell_name:** the second input argument refers to the cell in which the polygon or text coordinates are reported
  - **layer_number:** the third input argument refers to the layer number that contains the polygons of interest
  - **-center | -text:** specify one word only
    - **-center:** prints the center coordinates of polygons' extent on a specified layer
    - **-text:** prints the text that overlaps with the polygons on a specified layer

Description
>>Tcl script

- The script is invoked by a Calibre DESIGNrev batch run as such:

  calibredrv script.tcl <layout_name> <cell_name> <layer_number> [-center | -text]

- The script creates an output text file “report.txt” that contains either the center coordinates of polygons on a specified layer (**-center**) or the text that overlaps with the polygons on a specified layer (**-text**)**.**

Note:

- All the input arguments are case-sensitive.
- All the coordinates (polygons’ center coordinates/text coordinates) are reported in the specified cell space.

Description >>runme

- This runme file invokes two Calibre DESIGNrev batch runs with the Tcl script.

```
#!/bin/csh

calibredrv script.tcl layout.gds TOP 204 -center

mv report.txt report_center_coordinates_of_polygon.txt


calibredrv script.tcl layout.gds TOP 204 -text

mv report.txt report_text_on_polygon.txt


calibredrv layout.gds
```

- This script is run on a specified layer (**204**) in a specific cell (**TOP**) that contains the polygons
- The output of the first run (**-center**) will be renamed to: report_center_coordinates_of_polygon.txt
- The output of the second run (**-text**) will be renamed to: report_text_on_polygon.txt
- At the end of the runme, Calibre DESIGNrev will be opened

Directions

- Type the following command in your terminal to run the runme file:

  source runme

- In another terminal, open the following two text files using any file editor:
  - report_center_coordinates_of_polygon.txt
  - report_text_on_polygon.txt

Directions
>> output from -center

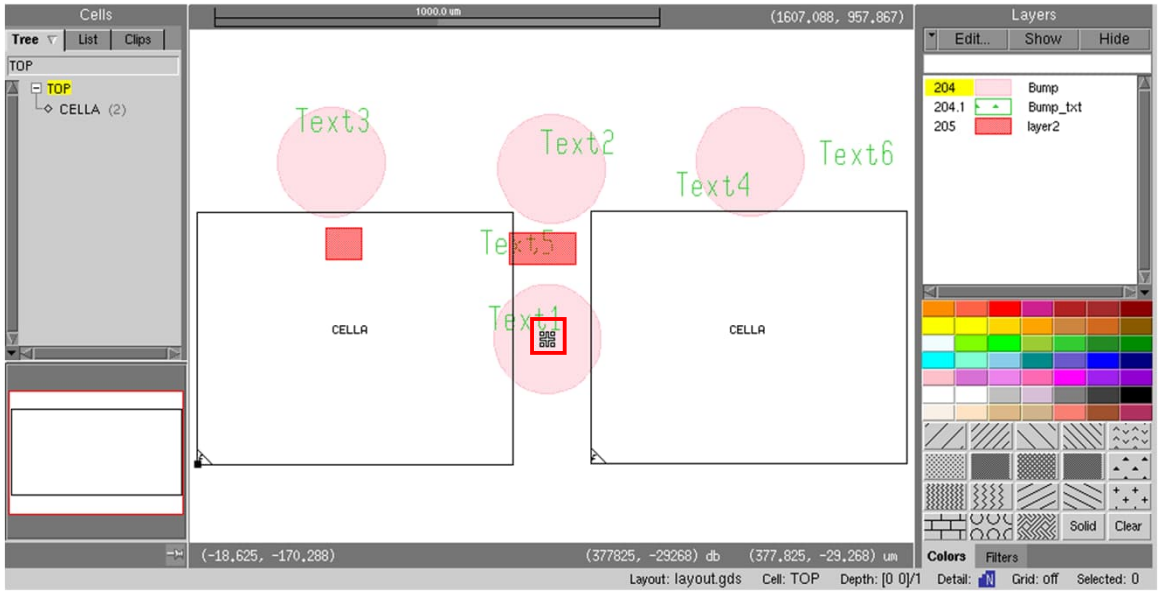
a) report_center_coordinates_of_polygon.txt

```
(X, Y) = (1241.2 ,668.6)
(X, Y) = (299.2 ,666.6)
(X, Y) = (794.2 ,651.6)
(X, Y) = (785.7 ,277.6)
```

Note:

- The output is the center coordinates of the four polygons of the bump layer (layer 204) in the cell (TOP)
- There are no coordinates from any other layer or any other level of hierarchy as we specified cell (TOP) and layer (204)

- To check the output coordinates in cell “TOP”, go to one of the locations as shown (refer to Appendix):



Directions
>> output from -text

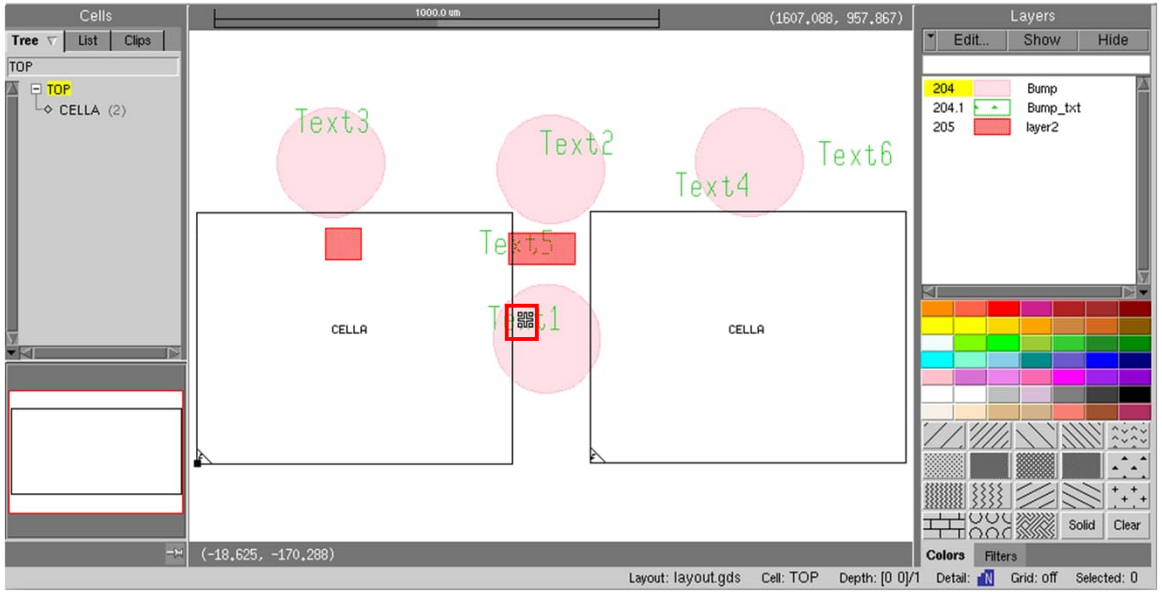
b) report_text_on_polygon.txt

```
Text : Text4 ; (X,Y) : (1158.5 ,613.0)
Text : Text3 ; (X,Y) : (303.0 ,755.0)
Text : Text2 ; (X,Y) : (854.0 ,707.0)
Text : Text1 ; (X,Y) : (737.0 ,319.0)
```

Note:

- The output is the text overlaps with the four polygons of the bump layer (layer 204) in the cell (TOP) with its x and y coordinates
- There are no texts reported that overlap with any other layer or any other level of hierarchy as we specified cell (TOP) and layer (204)

- To check the output coordinates in cell “TOP”, go to one of the locations as shown (refer to Appendix):

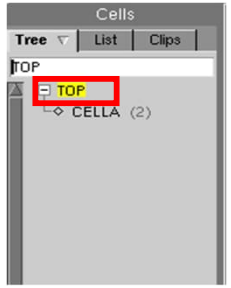


Conclusion

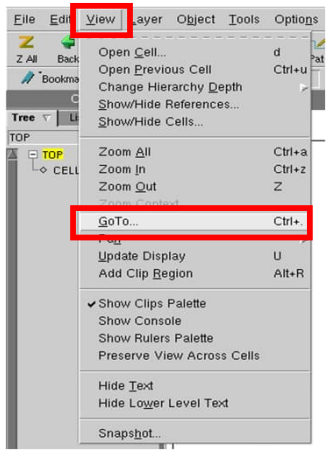
- Finding the center coordinates of polygons can be used to later inject texts on these polygons, especially for bump layer applications
- Moreover, checking that the injected text overlaps with the designated polygon layers can serve as a check to avoid problems in the design during the verification phase
- **$L iterator** and **$L query** are very powerful Calibre DESIGNrev commands, with vast optional arguments, which enable returning information of coordinates of objects
- Please refer to **Calibre® DESIGNrev™ Reference Manual** for additional information

Appendix
>> Going to a Specific Location in Calibre DESIGNrev

- To view a specific location in Calibre DESIGNrev you need to follow the steps:
  1. Click on the specified cell



  2. Choose **View > Go To**



  3. Fill the field with the coordinates of the specific location. Make sure to select **um**. Select **Set Marker.** And hit apply

  4. You may need to zoom out to see the location that the marker points at