SIEMENS Calibre® FDI Mapping Quick Reference

Software Version 2021.2

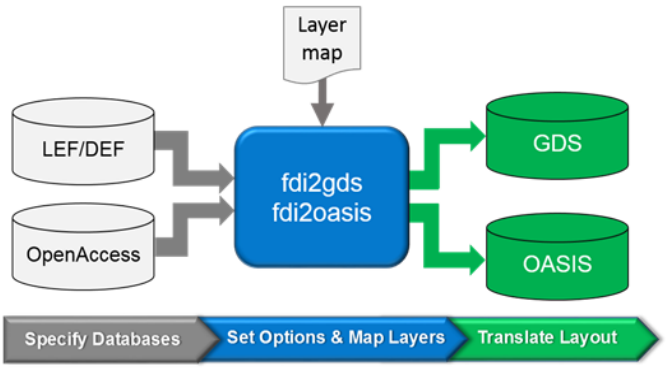
Overview

Calibre includes two command line utilities that translate third-party databases to either GDSII or OASIS format. The utilities are named fdi2gds and fdi2oasis and are also referred to as the FDI (Foreign Database Interface) utilities.

The FDI utilities are located in the *$CALIBRE_HOME/bin* directory.

The FDI utilities are also called by other Calibre processes, such as directly reading third-party databases from your SVRF rule file or from Calibre Interactive and Calibre DESIGNrev.

When using these utilities, a layer map file is optional, but highly recommended to ensure layers and objects are mapped correctly.



Third-Party Database Support

- LEF/DEF 5.8
- OpenAccess oa22.43p006 (default), oa22.60, and oa22.50

Licenses

The FDI utilities check for the presence of licenses only; they do not check out a license. You must have *one* of the following licenses:

```
DESIGNrev  Interactive  nmDRC  LFD  nmLVS
MDPview    WORKbench      xRC  RVE
```

Documentation

See the *Calibre Layout Translation and Comparison Guide* for complete details on fdi2gds and fdi2oasis.

Layer Mapping

The fdi2gds and fdi2oasis utilities support three layer map file formats. These formats are controlled by command-line arguments.

- **-map** — Mapping file that works exclusively with LEF/DEF layers and objects. If you do not specify -map with LEF/DEF inputs, the fdi2gds and fdi2oasis tools automatically generate a mapping file named *fdi.map* in your working directory. You can also generate an automatic mapping file without performing a translation using the -mapOnly command-line option.
- **-oamap** — Mapping file that works with standard OpenAccess layers output by Cadence® tools.
- **-layerMap** — Mapping file that can be used with either LEF/DEF or OA, but it is not recommend for anything other than legacy formats (for example, you already have this file from an existing design). The -layerMap option also supports a number of supplemental mapping file options for objects and cells. These options do not apply to -oamap and -map.

LEF/DEF Usage and Mapping

Use -map to control LEF/DEF to GDS or OASIS mapping.

Command-Line Usage

Minimum LEF/DEF usage for translation to GDS or OASIS:

```
fdi2gds|fdi2oasis -system LEFDEF
  {-lef [filename ...][directory ...]}
  {[-def filename] [directory ...]}
  [-map map_file] -outFile file
```

-map File Reference

The -map file is case-sensitive. Comments start with the # symbol. The file consists of four space-separated columns.

Format

in_lef_obj in_lef_type[:*sub_type*] ***out_lay_num out_dtype***

Fields

- ***in_lef_obj***

  Specifies a LEF layer from the LAYER statement in the LEF technology file. Note, you can also specify DIEAREA or COMP, but the syntax is different:

  ```
  DIEAREA ALL layNum dt
  COMP ALL layNum dt
  ```

- ***in_lef_type***

  Specifies a list of objects to translate for the layer specified in the ***in_lef_obj*** argument. The following objects are supported:

  ```
  ALL BLOCKAGE BLOCKAGEFILL COMP DIEAREA FILL FILLOPC
  LEFOBS LEFOBSVIA LEFPIN NET PIN SPNET VIA VIAFILL
  VIAFILLOPC
  ```

- :*sub_type*

  Optionally refines the ***in_lef_type*** object by filtering by properties, such as via (cut) sizes, net names, or mask colors. The *sub_type* can use one of the following formats:

  ```
  in_lef_type:VIA:SIZE:dimension1xdimension2 …
  in_lef_type:MASK:maskvalue …
  in_lef_type:{NET|SPNET|VIA}:netname …
  in_lef_type:{NET|SPNET|VIA}:TYPE:{ANALOG|CLOCK
              |GROUND| POWER|RESET|SCAN|SIGNAL|TIEOFF}
  ```

- ***out_lay_num***

  Target layer in the output GDS or OASIS layout database.

- ***out_dtype***

  Target datatype in the output GDS or OASIS layout database.

Examples

Translate all objects on LEF layer M1 to layer 11, datatype 0.

```
M1 ALL 11 0
```

Translate all DEF nets on LEF layer “M1” to layer 1, datatype 0.

```
M1 NET 1 0
```

Translate a subset of objects different layer and datatypes.

```
M3 NET,SPNET 3 0
M3 PIN,NET,SPNET 3 1
```

Use the subtype option to translate only the DEF VIA objects on LEF layer “VIA12” that have a cut size of 0.36 by 0.36 units.

```
VIA12 VIA:SIZE:0.36x0.36 5 0
```

Translate nets with the name ADDR_0 on M1 to 11.5.

```
M1 NET:ADDR_0 11 5
```

Translate mask color 1 NET objects on M1 to 4.0 and clocks to 4.1.

```
M1 NET:MASK:1 4 0
M1 NET:TYPE:CLOCK:MASK:1 4 0
```

OpenAccess Usage and Mapping

OA 22.43 is the default OA version. To use OA version 22.50 or 22.60, set the MGC_FDI_OA_VERSION environment variable to “22.50” or “22.60”, respectively, or specify the OA version when applying the -system OA invocation option in fdi2gds or fdi2oasis.

Command-Line Usage

Minimum OpenAccess usage for translation to GDS or OASIS:

```
fdi2gds|fdi2oasis -system OA [version]
  {-design library cell [view]}
  [-oamap map_file]
  -outFile file
```

-oamap File Reference

The file format follows standard mapping files generated by Cadence tools. The file consists of four *required* space-separated columns and five optional columns. One-to-many mapping is not supported. This file can be used to map LEF files and OA databases. It cannot be used for DEF files.

Format

```
layer_name purpose_name stream_layer_num stream_dtype
  [material_type [mask_number]] [qualifier]
  [photomask_color] [color_state]
```

Fields

- ***layer_name***
  Required layer in the input OA database.
- ***purpose_name***
  Required purpose name for the OA layer.
- ***stream_layer_num***
  Required layer number for the output. This can be an integer or a range of positive integers (“5-9”, or “1,6”, or a mix of both).
- ***stream_dtype***
  Required datatype for the output.
- *material_type mask_number*
  Optional material type. This argument is ignored during translation. You must also specify a number for the mask if the material type is included in the mapping file.
- *qualifier*
  Optional keyword that specifies how the shapes are handled. The following keywords are supported: pin, floating, cutsize, ignoreLPP, WSPRegionType.
- *photomask_color*
  Optional color value for the layer. The color is specified using the string “mask<*X*>Color”, where <X> is an integer from 0 to 8 (for example, mask2Color). If you specify this, you must also include the *color_state*. This argument is case-insensitive.
- *color_state*
  Specifies whether the shape is locked. The value must be “locked” or “unlocked.” This argument is case-insensitive.

Examples

An example of an OA mapping file:

```
M1 drawing 15 0
V1 drawing 16 0
M2 drawing 17 0
…
M4 drawing 21 0
M4 pin 21 1 metal 4 mask1Color locked
```

FDI Environment Variables

FDI_DBDIFF_SUPPRESS_VALUES {*message_id number*}…

Limits the number of warnings printed to the transcript from FDI utilities and DBdiff. The default maximum number of warnings for each type of message is 20.

FDI_FDI2OASIS_USE_XYRELATIVE *value*

Set to a non-null value to reduce the file size of OASIS output.

FDI_PRESERVE_ODD_WIDTH_PATHS *value*

Set to a non-null value to preserve odd-width paths in GDS databases, otherwise fdi2gds rounds the coordinates down.

FDI_MAP_DISABLE AUTOMAP_SUPPORT *value*

Set to a non-null value to support the legacy -layerMap option for LEF/DEF in the fdi2gds and fdi2oasis utilities.

FDI_LEFDEF_WARNINGS_AS_ERRORS *value*

Set to a non-null value to handle the following warnings as errors when reading LEF/DEF:

```
[FDI1069] [FDI1070] [FDI1102] [FDI1103] [FDI1104] [FDI1107]
[FDI1111] [FDI1112] [FDI1114] [FDI1117] [FDI1118] [FDI1119]
[FDI1120] [FDI1121] [FDI1122] [FDI1123] [FDI1124] [FDI1126]
[FDI1133] [FDI1135] [FDI1136] [FDI1139] [FDI1142] [FDI1154]
[FDI1157] [FDI1158] [FDI1159] [FDI1169] [FDI1205]
```

CALIBRE_FDI_USE_OA_CDBA_NAMESPACE *value*

Set to a non-null value to enable full support of Cadence CDBA OpenAccess databases in fdi2gds and fdi2oasis. This variable does not support fdiBA.

FDIBA_DFMPROPERTY_AS_NETNAME *value*

Set to a non-null value to use the net names in the DFM property “net_name” instead of the net connectivity info in the database when running fdiBA to backannotate a DFMDB to DEF.

LD_LIBRARY_PATH *path*

If using Calibre 2008.3 or later on a Linux machine that is earlier than RHEL 4u6, this variable specifies the pathname of the libstdc++.so.6.0.8 compiler libraries, which are required to run the tool. This is for OpenAccess database support. Ensure that the path includes the 64-bit libraries.

MGC_CALIBRE_DB_READ_OPTIONS “-optionName *args*”

Sets options for controlling the reading of third-party databases by Calibre tools that support them. These options are read in addition to any that may be specified on the FDI utility command lines. The option list should be quoted and the delimiter between multiple options is the space character.

MGC_FDI_OA_VERSION {22.43 | 22.50 | 22.60}

Sets the OpenAccess version for FDI and DBdiff utilities. OA 22.43 is the default. If you specify the OA version number in the fdi2gds or fdi2oasis utilities, the environment variable value is ignored.

OA_HOME *path*

The default OA library is $CALIBRE_HOME/*shared/pkgs/icv_oa*.If additional plug-ins are needed, use the OA_HOME environment variable to specify the path to an OA library that contains the plug-ins. This variable applies only to DBdiff, fdi2gds, and fdi2oasis.

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