RAMTERA

TECHNICAL WHITE PAPER SERIES · PHYSICAL IMPLEMENTATION (PRE)

RAMTERA-WP17

Tapeout-Shaped Hierarchical GDSII

Structure, units, and validation by an independent record walker

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Tapeout-Shaped Hierarchical GDSII: Structure, Units, and Independent Validation

A placement database is not a mask database. PRE streams out hierarchical GDSII — one structure per library cell, structure references per placed instance, pin text labels, die outline, and routed wires — with a user layer map, and validates the byte stream with an independent record-walking parser rather than the writer's own code. This paper documents the stream contract and the validation.

10	125	exact	stable
structures on the reference design	structure references (SREF)	UNITS record round-trip decode	byte-identical output across runs

Stream contents

Element	Detail
Library header	HEADER/BGNLIB/LIBNAME/UNITS; user unit and database unit derived from the requested resolution (default 1000 database units per micron)
Per-cell structures	cell outline, pin port rectangles and obstructions on their mapped layers
Top structure	die boundary, one SREF per placed component (standard cells, fillers, taps, end caps alike), IO pin TEXT labels, routed wire boundaries
Layer mapping	map file of 'layer gdsLayer datatype' lines; special names remap outline, die, and label layers; sensible defaults otherwise

Independent validation

The output is checked by a separate parser that walks raw records: framing to end-of-library, structure inventory, reference counts, text counts, and an eight-byte-real decode of the UNITS record. On the reference design the walker reports 10 structures, 125 SREFs, 3 pin labels, and UNITS of 0.001 user units and 1×10■■ metres database units — the exact values the resolution setting implies. Map-file relayering is confirmed in the stream itself (outline shapes observed on the remapped layer/datatype).

GUARANTEE — Output stability is a stated property: the same design produces a byte-identical stream regardless of the machine's thread count, verified by checksum. Mask data that depends on scheduling is not mask data.

```
streamOut chip.gds -mapFile tech.map -libName RAMTERA \
          -structureName top -units 1000
# independent walker:
# structures: [BUF, DFF, ENDCAPL, ENDCAPR, WELLTAP, FILL8, FILL4,
#              FILL2, FILL1, top]   SREFs 125   TEXTs 3
# UNITS user=0.001  dbInMeters=1e-09   ends with ENDLIB: True
```

About Ramtera

Ramtera Inc. (Delaware, USA), with R&D at Ramtera Design Automation India Pvt Ltd (Bangalore), builds electronic design automation software for physical verification and physical implementation. LVR is Ramtera's physical verification engine (DRC, LVS, ERC, XOR, parasitic extraction); PRE is Ramtera's physical implementation environment (floorplanning, placement, clock tree synthesis, routing, timing analysis and optimization), built on industry-standard command conventions so existing flow scripts and operator skills transfer directly. The company holds granted patents and registered copyrights covering its engines.

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This document reports measurements from Ramtera's engineering environment (Ubuntu 24.04, GCC 13.3, Tcl 8.6) unless stated otherwise. Product behavior and figures are subject to change; no compatibility, certification, or endorsement by any third party is stated or implied.