



RAMTERA

TECHNICAL WHITE PAPER SERIES · PHYSICAL IMPLEMENTATION (PRE)

RAMTERA-WP13

Command-Level Compatibility for P&R; Flows

120+ industry-convention Tcl commands: migrate scripts, not people

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Command-Level Compatibility as a Migration Strategy for Physical Implementation Flows

Adopting a new physical implementation tool usually means rewriting flow scripts, retraining operators, and revalidating methodology documents. PRE takes a different route: its Tcl command surface follows industry-standard implementation-tool command conventions — the same command names, the same option handshakes, the same acknowledgement style — so that existing scripts run with minimal or no modification. This paper describes the compatibility layer as an engineering discipline and quantifies its current surface.

120+	19	7	1
registered Tcl commands	development passes to date	flow stages covered	command set to learn

What compatibility means in practice

Every PRE command is implemented against the publicly documented option grammar of the corresponding industry-standard command: positional values, option lists in braces, boolean true/false options, and multi-corner list forms are parsed the same way. Where PRE's engine does not yet implement an option, the option is accepted, recorded, and echoed in the acknowledgement rather than rejected — a flow script keeps running, and the log states exactly what was honored.

Coverage by flow stage

Stage	Representative commands
Floorplan	die/core definition, rows, tracks, halos, blockages, regions, pin constraints (30+ commands)
Placement	place_design, place_opt_design, setPlaceMode, refinePlace, legalizePlacement, checkPlace
Clock tree	create_clock_tree_spec, ccopt_design, setCTSMode, create_route_rule, clock_tree_debugger
Routing	globalRoute, routeDesign, verifyProcessAntenna, attachDiode
Timing	create_clock, set_input_delay, set_false_path, set_multicycle_path, set_max_delay, timeDesign, report_timing, optDesign (setup and hold), full MMMC view definition
Power	UPF subset (native Tcl), power planning, rail analysis, report_power, optPower
Data / signoff	read/write LEF, DEF, Verilog, SPEF (spefIn), liberty, SDC; addFiller/addWellTap/addEndCap; hierarchical GDS stream out

DESIGN CHOICE — SDC and UPF are themselves Tcl. PRE registers their commands natively on the interpreter, so constraint and power-intent files are sourced directly — no translation step, no sidecar format.

Why acceptance-and-record beats rejection

A migration flow rarely fails on the big commands; it fails on the twentieth optional flag of an obscure one. By accepting unknown or not-yet-implemented options as recorded no-ops with explicit acknowledgement text, PRE turns a hard script failure into a reviewable log line. Teams migrate a flow in hours, then read the log to see which recorded options matter for their methodology.

Object accessors complete the picture

Constraint files wrap selectors in object accessors — `get_ports`, `get_pins`, `get_cells`, `get_clocks`, `get_nets`. PRE registers these as name-echoing accessors, which makes stock constraint files source-able unchanged while PRE's engines match by name internally.

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.