

Unity™ Physical Design Suite for Extreme Custom Design

Achieving success in the highly specialized field of Custom Design requires balancing the key commercial priorities of yield, area and performance. The Pulsic Unity custom design suite addresses each of these challenges. Its advanced automation capabilities enable semiconductor companies to maintain a competitive edge by delivering high yield and high performance while reducing time to market.

Today's custom design teams require an integrated set of physical design tools that is architected from the ground up to address the needs of complex custom digital and mixed-signal designs at the 45nm and below process node. Pulsic Unity delivers the industry's the most comprehensive automated physical design solution for custom design.

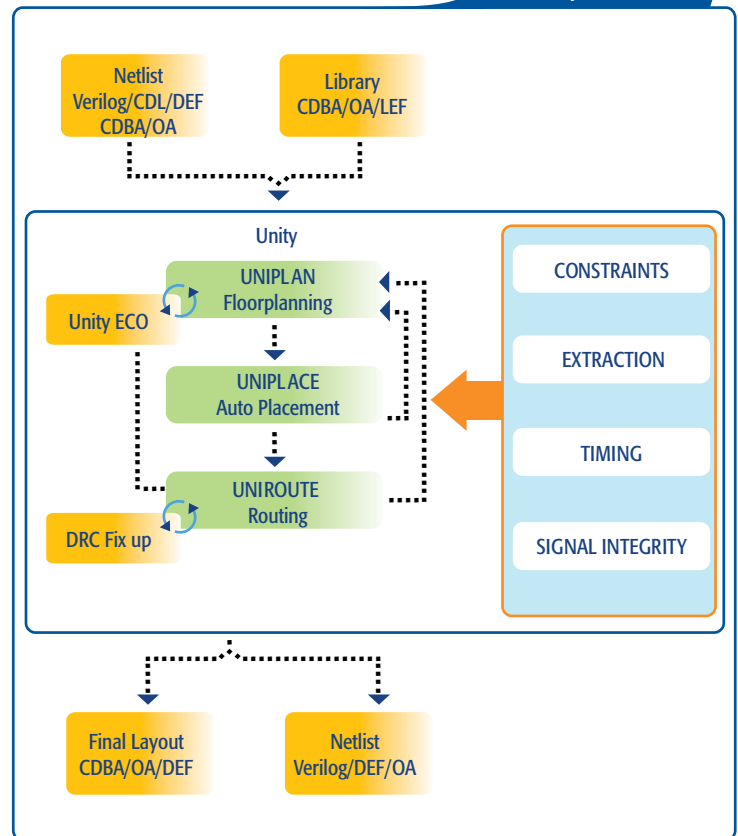
From a hierarchical floorplanner to a specialized custom placement capability to the most comprehensive custom router on the market, Unity provides all the components required for physical design. It is integrated with industry-standard databases and libraries, and adheres to advanced-node process rules below 45nm. The world's largest semiconductor companies use its patented Unity Spine and Stitch router to achieve design closure and faster time to market for extreme layouts in the various custom design markets.

UNIPLAN™ – HIERARCHICAL FLOORPLANNING

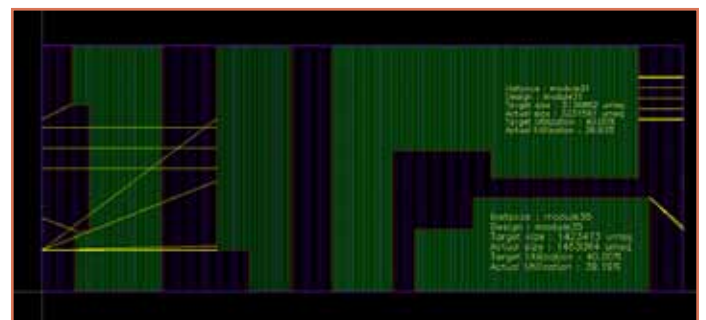
Pulsic UniPlan hierarchical floorplanning makes it easy to estimate overall chip size and individual block sizes, top-down or bottom-up floorplanning (with power planning), soft or hard block placement, pin placement and legalization, and traversing of the hierarchy. This capability allows designers to not only place cells and instances but also route nets within the same environment. UniPlan accepts input in cdba (DFII), OpenAccess (OA), Verilog—flat or hierarchical—LEF/DEF, .lib, SDC and SDF. In addition to these formats, it outputs DSPF to UniSignal Timing and other PrimeTime compatible STA engines.

UniPlan also makes it possible to develop the most flexible floorplan shapes. Arbitrarily shaped cell row regions can be generated for arbitrary shaped and variable height cells, and continuously reshaped and developed for optimum area efficiency. Custom cells can be accommodated in rows—horizontal, vertical or a combination of the two.

Unity Flow



The integration of floorplanning with placement and routing means that design decisions can be made instantly without having to move between different tools. This integrated environment enables teams to rapidly create area-efficient designs.



UniPlan provides rapid feedback after block placement for rectilinear blocks with area and utilization.

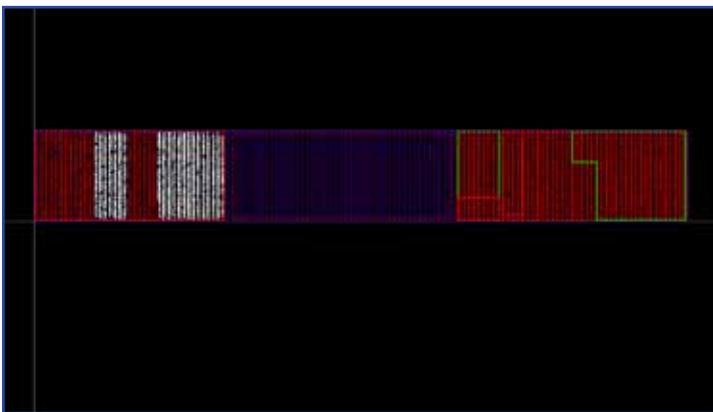
UNIPLACE™ – AUTOPLACEMENT

As the custom placement component of the Unity solution, Pulsic UniPlace is specifically designed to accommodate the unique needs of the custom designer. It enables placement of macros, devices (transistor-level with contact sharing), standard cells or irregular custom cells all in one area.

UniPlace delivers full automatic detailed placement for standard-cell and custom-cell type designs to address memory, datapath and custom-digital designs. Various options and features enable designers to control the placement engine behaviour, including creation/deletion of filler cells, variable cell height/width support and unplace of regions. Designers can easily create detailed floorplan information (such as regions and rows) which is needed to drive the placement engine, or import it through DFII, OA, or DEF.

For additional optimization, a 'cluster' placement feature enables logically coupled cells to be automatically prioritized. This makes it possible to identify them so that hierarchical clustering of cells (including clusters of clusters) can be placed automatically while ensuring quality equivalent to that of manual placement.

Additional features include support for pre-route biased placement (useful for placing devices close to critical signals that may have been "pushed-down" in the floorplan), Congestion-Driven automatic placement and Timing-Driven placement.



UniPlace includes placement of soft and hard fences and clustering of logically coupled cells

UNIROUTE™ – AUTOMATIC ROUTING

Pulsic UniRoute offers the most comprehensive, automated shape-based routing for today's custom designers. At the core of the solution, a flexible, highly configurable and easy-to-use shape-based router provides automated and interactive capabilities for custom digital routing of standard cell designs, and specialized analog routing of complex analog circuits. UniRoute operates in a mixed-signal environment, which facilitates simultaneous automated routing of analog and digital nets in the same design using the same features and database.

UniRoute also includes specialized routing functions for extreme aspect ratio designs—such as those found in the peripheral logic of NAND, NOR, DRAM or other memory layouts. It provides configurable and easily maneuverable bus routing for LCD/LED designs. An interactive and automatic Template Routing feature further enables top-level routing of processors and other complex designs where flexibility and adherence to foundry process rules are critical to optimizing design area.

In addition, its structured routing capability provides users with the ability to impose a 'topology' for nets that would otherwise be unstructured. For example, Bus routing, Power Nets and special nets, such as Clock Nets, can be routed in an orderly and highly configurable pattern to increase performance and reduce space used.

Density Fill, featuring PowerFill is a unique feature that allows minimum density fill to be undertaken using power nets. PowerFill allows designers to reinforce power nets, by configuring metal fill by area.

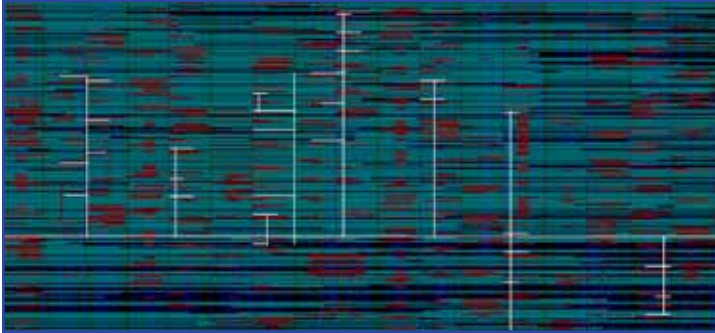


UniRoute provides simultaneous automated routing of analog and digital nets

▲ SPINE AND STITCH ROUTING

The patented Unity Spine and Stitch router—an integral component of UniRoute—completes the routing of complex, extreme aspect ratio custom designs areas, where area and metals are limited and performance is critical. It places long ‘jogless’ spines routes in areas that are heavily congested yet still require every nanometer of space to be used within minimum spacing rules.

The Unity Spine and Stitch router is used by leaders in the design of logic for NAND, NOR, DRAM, FPGA and LCD/LED applications.



Spine and Stitch Routing increases performance and optimizes area in extreme aspect designs

▲ UNIEDIT™ – HIGH PERFORMANCE, DRC CORRECT, INTERACTIVE ROUTING

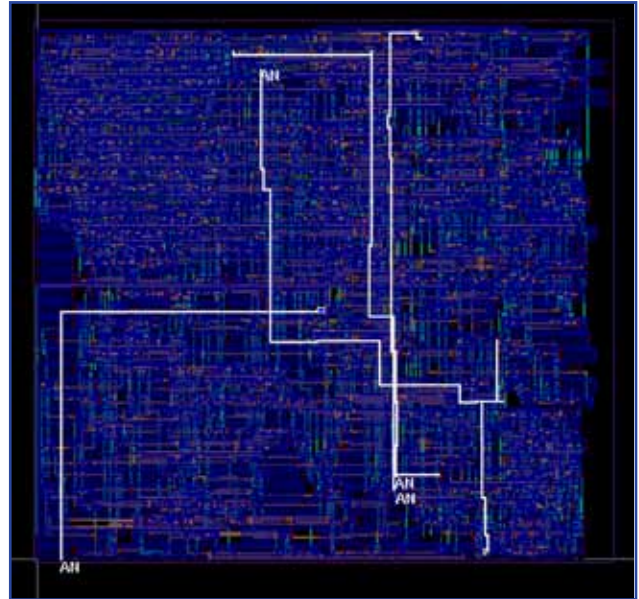
Pulsic UniEdit is a powerful interactive and semi-automatic editing and routing technology that provides online DRC/LVS-aware editing. This allows layout designers to complete interactive placement and routing operations, error free, DRC correct every time. The unique ‘Push’ feature allows wires to be moved while interactively routing—yet at the same time maintains the DRC correctness of the layout.

UniEdit includes an auto finish capability so that designers can start routing manually but allow the router to auto finish the route if the optimum route is not easily visible due to congestion. As a key feature of the Unity solution, UniEdit also provides unlimited Undo/Redo for fast iterations of editing and routing. A comprehensive set of shape-editing features allows users to edit shapes in UniEdit.

▲ UNISIGNAL™ – BUILT-IN SIGNAL INTEGRITY

Pulsic UniSignal includes built-in extraction and parasitic analysis capabilities for addressing signal integrity issues. These include full 3D automatic shielding and differential-pair routing.

UniSignal is a curative tool for detection and correction of any violations of antenna rules, crosstalk and current-density rules. UniSignal also matches constraints for R and C where required.



UniSignal includes a curative tool for detection and correction of any antenna rules violations

▲ UNITY ECO – INCREMENTAL, HIERARCHICAL ECO FLOW

The Engineering Change Order (ECO) is an accepted part of the custom design flow. As designs change on an almost daily basis, the need for ‘last-minute’ ECOs becomes almost inevitable. The Unity ECO feature comprises a comprehensive flow for implementing ECOs in a timely and efficient manner, without impacting the integrity of the design.

Conventional ECO files can be imported to Unity, and an ECO file with human readable statements informs designers of the changes to be implemented prior to executing the ECO. An incremental Unity ECO is then output.

■ INTEGRATION WITH INDUSTRY STANDARDS

Unity was designed to be integrated with all industry-standard physical design tools, including the Cadence Virtuoso® custom design system and Galaxy Custom Designer. Unity can read a technology file directly from the Cadence environment or from an OpenAccess database. Interfaces with LEF/DEF, Verilog and also provide integration with most digital flows for floorplanning, placement or incremental routing or ECOs.

■ ADVANCED NODE SUPPORT

Leading fabless and IDM semiconductor companies have used Unity to successfully complete tapeouts at 45nm/40nm and below. Several advanced features enable Unity to conform to deep submicron process rules. Parallel rules, wire fattening, Dense Line Ends rules, and Via Enclosure rules are all encapsulated in Unity's built in constraints capabilities. And with hierarchical support of options and attributes, rules can be set at the design level, layer level or all the way down to an individual net or class of nets.

Unity supports a diverse array of via types and formats, including Cadence tech file vias, OpenAccess vias, and all standard LEF/DEF vias.

■ EASE OF USE

- Unity 'Themes' provides a customizable GUI so only the feature buttons required are visible on the toolbar
- Context-sensitive online Help documentation provides comprehensive feature descriptions, including illustrated examples of feature usage and terminology
- Configurable Bind keys enable seamless operation between Unity and other layout tools
- Python scripting language provides 'batch' usage to optimize use of licenses
- C++ API capability enables users to manipulate database for post-processing functions

■ FEATURES

UNITY

- Single, integrated suite of features incorporating
 - Floorplanning (UniPlan)
 - Placement (UniPlace)
 - Shape-based routing (UniRoute)
 - Layout editing (UniEdit)
 - Signal integrity and ECO
- Single, unified, graphical user environment, ensures ease of use and familiarity among all components
- Hierarchical constraint-driven system enables use of configurable constraints to drive all components in Unity from design level to individual net (or group of nets)
- Tightly integrated to industry-standard interfaces, including, CDBA/DFII, OpenAccess, LEF/DEF, Verilog, CDL, .lib. DSPF and other timing libraries (input and output)
- Built-in RC extraction
- Flexible programming interface using Python provides access to all components in Pulsic Database (PDB) and allows intelligent and scriptable operations on database
- System-wide scripting environment allows the user to script the entire flow using a combination of components
- Platforms: Linux (Red Hat, SUSE) 32-bit, 64-bit, Solaris 32-bit, 64-bit

UNIPLAN

- Hierarchical floorplanning
- Hierarchical area estimation
- Automatic soft and hard block placement with simultaneous automatic soft macro shaping
- Generic (polygonal) soft macro editing
- Automatic soft macro pin optimization and placement
- Power planning

- Automatic ring and mesh tools
- Power and critical/global signal net push-down capability
- Ability to handle multiple height cells and macro blocks
- Vertical and horizontal rows
- Support for generic (polygonal) floorplan and row definitions
- Comprehensive report capability

UNIPLACE

- Full-featured placement engine with specific features for custom design
- Horizontal or vertical (or both) row definition and placement supported
- Generic (polygonal) placement regions supported
- Creation and deletion of filler cells
- Variable cell height/width support
- Simultaneous placement of standard and non-standard cell data in one area
- Placement of standard cells and macro blocks within the same environment
- Unique cluster placement according to logical hierarchy
- Congestion-driven placement
- Variable height cell placement
- Routing-based placement

UNIRoute

- Comprehensive shape-based routing capability production proven with successful tapeouts at 65nm (TSMC and IDM), 45nm/40nm (TSMC) and 34nm (IDM)
- Patented Spine and Stitch router provides high-performance 'jogless' routing for extreme custom designs
- Current density driven routing and wire sizing
- Structured routing for all topology routes, template and bus routing

- Comprehensive via support, including Cadence tech file vias, OpenAccess vias and all standard LEF/DEF vias
- Range of 'Analog' routing operations, including shielding, net matching, differential pairs, mirror (symmetry) routing
- Density fill, including PowerFill—a highly configurable capability for reinforcing and extending power nets—which is configurable by area and net name
- Matched length and layer of nets
- Handles optimal spacing and minimum spacing simultaneously
- Support for DFM
- Integrated RC extraction engine
- GUI-driven power ring and mesh for automation of all power routing
- Constraint-driven routing
- Global routing and congestion-driven 'heat chart' analysis

UNIEDIT

- Easy-to-use, intuitive environment
- Online DRC-correct capability
- Full connectivity-driven interactive editing
- Continuous DRC checking for interactive operation
- Unique push feature provides a very fast way of creating or compacting space in the layout
- Comprehensive shape-editing suite
- Unlimited undo/redo capability
- Interactive bus and template routing
- DFM-specific layout capabilities and checking, including density and slotting

▲ BENEFITS

- Fully integrated suite of physical design tools in a single, unified environment delivers fast turnaround, and iterative chip planning capabilities for increased productivity and faster time to market
- Support of advanced-node process rules provides designers with silicon-proven confidence of design closure and completion
- Simultaneous support for custom digital and analog environments reduces costs by circumventing the need for separate tools to route digital and analog nets
- Unique Spine and Stitch capability provides superior performance for custom designs, especially extreme aspect ratio and highly congested areas that require minimal use of routing area
- Unity ECO option facilitates quick turnaround of incremental, hierarchical ECOs
- Seamless integration with other flows and adherence to industry-standard and de facto industry-standard interfaces and databases provides customers with ability to use a best in class tools integrated into flow from other EDA vendors

▲ SUPPORT SERVICES

Pulsic provides outstanding support from 'day one' to enable its customers to be productive with Unity as quickly as possible.

- Onsite training during evaluation phases enables new customers to receive customized training adapted for their own needs
- Implementation support from Pulsic enables users to put Unity to work in a production flow in minimal elapsed time
- Online ticket system allows customers to file their own bug fix and enhancement tickets, and monitor progress through email alerts as ticket status is progressed and completed



For more information or to schedule a demo, contact your local Pulsic representative

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