Unity™ Signal Planner

HIERARCHICAL SIGNAL PLANNING AND ROUTING FOR CUSTOM DESIGNS

As custom integrated circuits (ICs) grow in size and functionality, both manual routing and semi-automated routing using traditional routers have reached their practical limits. Partitioning large designs into discrete hierarchical blocks, each assigned to a separate layout team, fails to address the complexity of routing between the blocks, completing top-level routing, and resolving congestion at each level of hierarchy. Pulsic Unity Signal Planner, the only product to offer truly hierarchical, automated signal planning and routing, enables fast, constraint-driven routing of today's advanced custom designs.

## A CHALLENGE GROWN TOO COMPLEX FOR MANUAL SOLUTIONS

The ever-increasing size and complexity of custom ICs has driven chip designers to create several discrete teams to handle the manual routing of the many blocks and hierarchical layers that comprise an advanced design. These teams must not only handle the routing within their assigned block, but also integrate the routing between each of the blocks and address the challenge of completing DRC/LVS-correct top-level routing within the assigned die area. With only schematics and verbal reports to support this complex process, manual routing of a large custom chip becomes a labor-intensive and time-consuming process. Add the need to resolve congestion issues on multiple layers of hierarchy, to handle advanced-node parasitic effects and design rules, and to respond to frequent design changes, and a manual routing process becomes a daunting challenge.

Traditional routers are unable to address top-level routing challenges fully because they were not designed to handle the complex combination of specialized topologies, hierarchical design rules, and design-for-manufacturing (DFM) requirements (such as via redundancy, via orientation, via enclosures, and wire spreading) that are required to achieve successful, on-time design closure for custom ICs.

UNITY SIGNAL PLANNER: A NEW APPROACH TO ROUTING

Pulsic has worked closely with leading-edge, custom-design teams creating high-volume semiconductors for over 10 years. This experience has given Pulsic unique insights into the challenges of the traditional, largely manual, custom-design process, and into how to use automation to overcome these challenges. Unity Signal Planner represents a new, flexible approach to signal routing, designed from the ground up to deliver a complete and robust solution to the specific routing challenges of custom ICs.

Signal Planning Flow
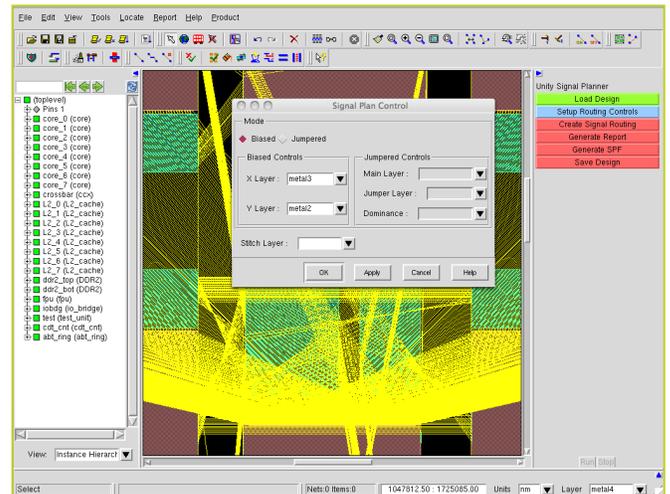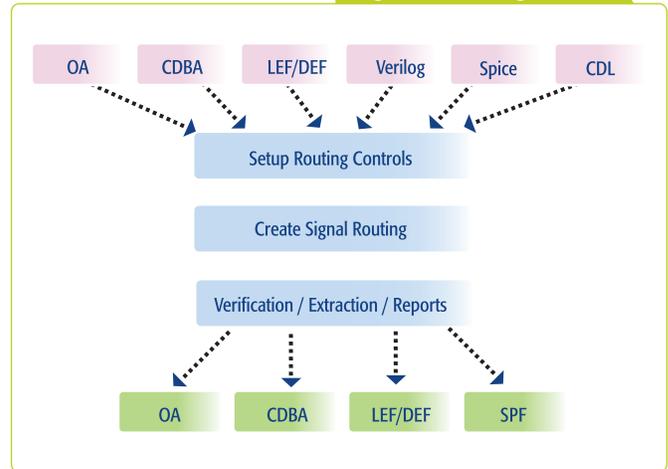
Unity Signal Planner with setup dialog

Integrated for Maximum Productivity

Unity Signal Planner integrates seamlessly with the Pulsic Unity Chip Planner block placer and its finely tuned pin-placement algorithms to address multi-topology routing problems. Tight integration also enables fast prototyping; designers can explore the routing ramifications of multiple placement alternatives before converging on an optimal solution, in a fraction of the time needed to route a single solution manually. Integration, along with the high-performance routing of Unity Signal Planner, enables design teams to optimize floorplanning schedules and accommodate major changes in the schematics automatically.

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High-Performance, Constraint-Driven Routing

Unity Signal Planner routes thousands of nets in minutes, rather than days, enabling it to handle the complex top-level and block routing challenges of advanced custom ICs. It produces a Manhattan routing style to avoid jogs, reducing the number of vias required, and minimizing wire length. Minimizing wire length reduces parasitic effects and thus power consumption and signal-timing delays. Nets are sorted optimally during routing to avoid crossing routes, which in turn, reduces noise. Users can define constraints for the router, such as net metal width, shielding requirements, maximum and minimum layer width, and signal-pair matching.

Support for Complex Routing Topologies

Unity Signal Planner supports multiple-bias routing, as well as strictly biased X-Y routing. Unity Signal Planner also features a "jumpered" mode. This mode enables designers to define complex schemes where all routes in both the vertical and horizontal biases can use the same metal layer efficiently while allowing for a different metal layer to be used as a "jumper layer" for areas where a layer change is needed to complete the routing. Unity Signal Planner also supports the many specialized complex routing topologies required for optimized inter-block connection. It delivers optimizations for bus routing and compact signal routing leveraging unique via optimization technology to correctly align multi-cut preferred-rule vias that enable more compact routing and die-area savings.

This powerful combination of features enables designers to route hierarchically complex custom chips in a fraction of the time required using manual, or even semi-automated, routing approaches. The automated signal planning and routing process provided by Unity Signal Planner is consistent, repeatable, and accommodates inevitable last-minute design changes quickly and easily.

BENEFITS

- Boost productivity and efficiency
- Obtain early access to parasitics data (SPF file) for critical datapath simulations
- Accelerate design closure through fast prototyping
- Support for complex-topology routing
- Compact routing
- Minimize crosstalk and noise
- Reduce congestion and chip area
- Accommodate design changes quickly and easily
- Minimize risk of DFM issues

FEATURES

- High-performance routing
- Constraint-driven routings
- Fast prototyping
- Seamless integration with the Pulsic Unity custom design suite
- Manhattan routing style to avoid jogs
- Automatic net sorting to avoid crossing routes and minimize noise
- Multiple bias routing
- Specialized routing topologies to deliver optimum routing patterns for individual nets, groups of nets, or buses
- Unique via optimization technology for compact routing and maximum yield

SPECIFICATIONS/SYSTEM REQUIREMENTS

- Linux: x86 and x86_64
- Solaris: Sparc 64 and x86_64
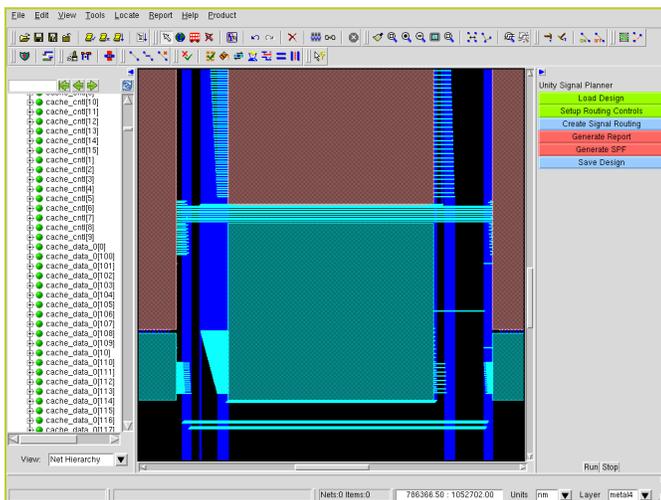
Signal routing created with Unity Signal Planner
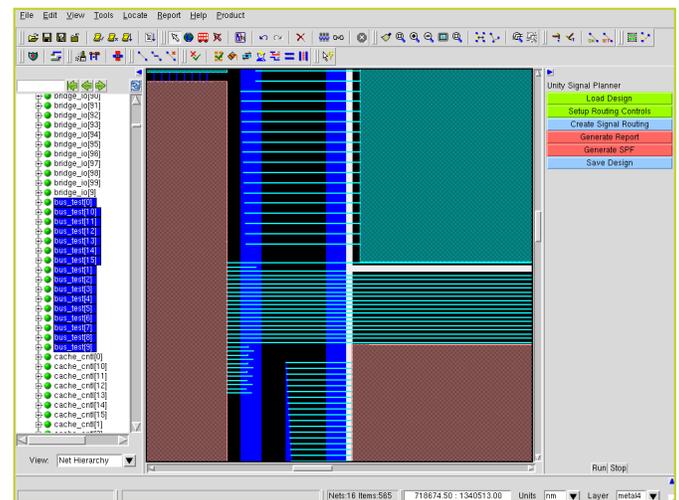
Signal routing close up using Unity Signal Planner

for more information, please go to our website at
www.pulsic.com or email us at sales@pulsic.com

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