

# Hipex

## Full-Chip Parasitic Extraction



Hipex is an accurate and fast full-chip hierarchical extraction software that performs extraction of parasitic capacitances and resistances from hierarchical layouts. Hipex is tightly integrated with the Expert Layout Editor for complete design flow of DRC/LVS and RC parasitic extraction.

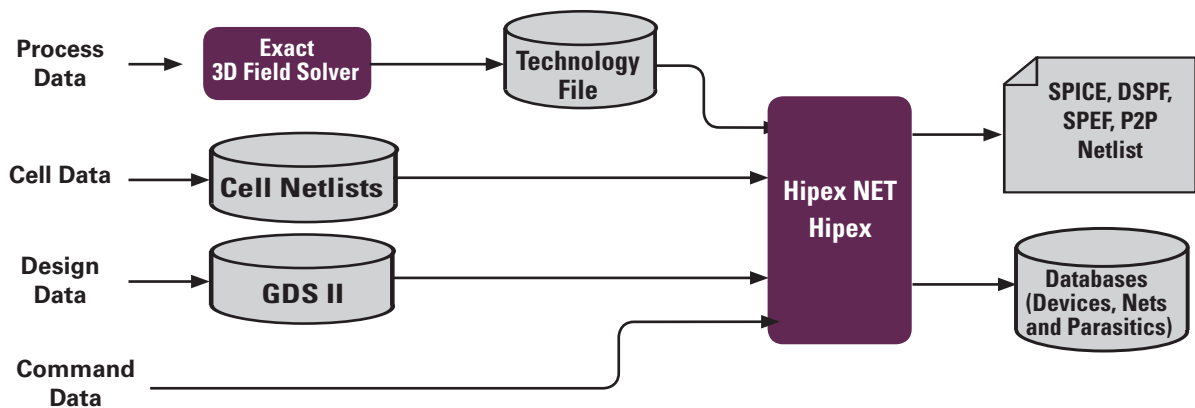
- **User-programmable netlist extraction provides custom set of extracted parameters (e.g. Well Proximity, STI stress effects)**
- **Multiple parasitic extraction models, including lumped RC, C only, R only, coupled C and fully distributed RC**
- **Selected net extraction for fast RC extraction of critical path nets in SoCs and large memories**
- **Efficient network reduction for distributed parasitic RC networks**
- **Output parasitic netlist files in SPICE, DSPF, SPEF, and P2P formats**
- **Automated back annotation enables accurate post-layout simulation and analysis**
- **Field solver mode provides accurate parasitic resistance calculation**

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## Hipex NET Device Extraction

- Integrated into Expert Layout Editor
- Supports custom technologies (i.e. LCD, analog, mixed) and industry-standard PDKs
- Extracts hierarchical netlist preserving original layout hierarchy for easy analysis
- Extracts MOSFET, MESFET, BJT, JFET, diode, capacitor, resistor, and parameterized user-defined devices
- Performs electrical rule checking (ERC) for shorts, opens, dangles
- Provides full customization for a set of extracted parameters
- Accurate device extraction for non-45 and non-90 degrees devices
- Efficient memory usage for handling large designs
- Available in 32 and 64 bit versions
- Maintains netlist data base for back-annotation and device/net probing

### Hipex Full-Chip Parasitic Extractor Product Design Flow

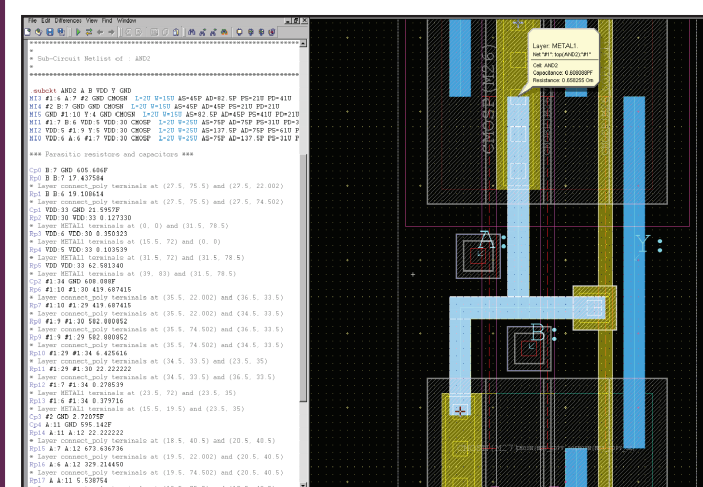


## Hipex Parasitic Capacitance Extraction

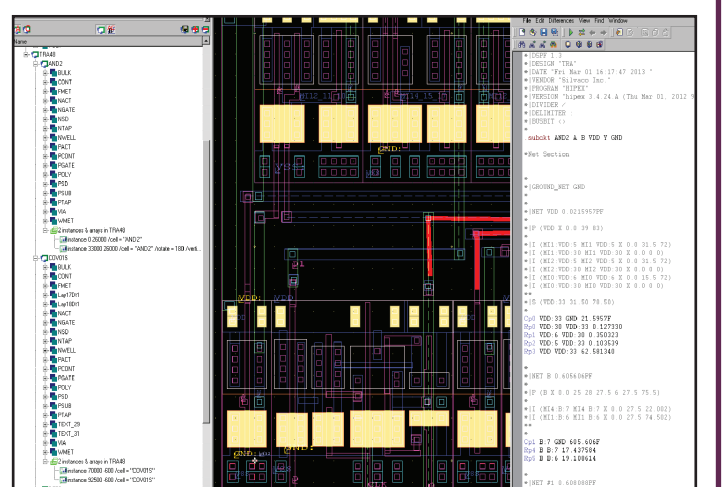
- Driven by rule-based technology file
- Back-annotates the schematic netlist with parasitic capacitors
- Striping algorithm and stripe database enables efficient parallelization for multi-processor machines
- Supports black-boxing for integration with routing tools
- Extracts parasitic coupling capacitors for full chip and selected nets
- Offers user-defined or built-in capacitance models
- Supports external capacitance rule files generated by Exact for 3D accurate mode
- Creates incremental capacitance database on a net-by-net basis
- Extracts selected nets for fast parasitic C computation of critical paths
- Offers non-shielded (multilateral) capacitance model for display designs
- Provides custom corner and overlap models for more accurate capacitance calculation

## Hipex Parasitic Resistance Extraction

- Driven by rule-based technology file
- Back-annotates the schematic netlist with parasitic resistors
- Supports Distance/Width process deviations
- Processes L, T, Cross, and Bend resistor shapes
- Accepts user-defined scripts for custom computing of resistance
- Uses contact over-sizing and clustering to simplify resistor shapes
- Extracts netlist with parasitic resistors hierarchically for full chip or selected nodes
- Creates incremental resistance database on a net-by-net basis
- Multiple extraction models and equation solvers are used for arbitrary shape resistors
- Splits long conducting tracks for more accurate RC distribution
- Provides field-solver mode to obtain precise resistance for difficult areas (such as regions with numerous contacts and multi-layer buses)



**Hipex RC database provides visualization of parasitic elements on Expert layout view.**



**Hipex supports SPICE, DSPF, or SPEF formats.**

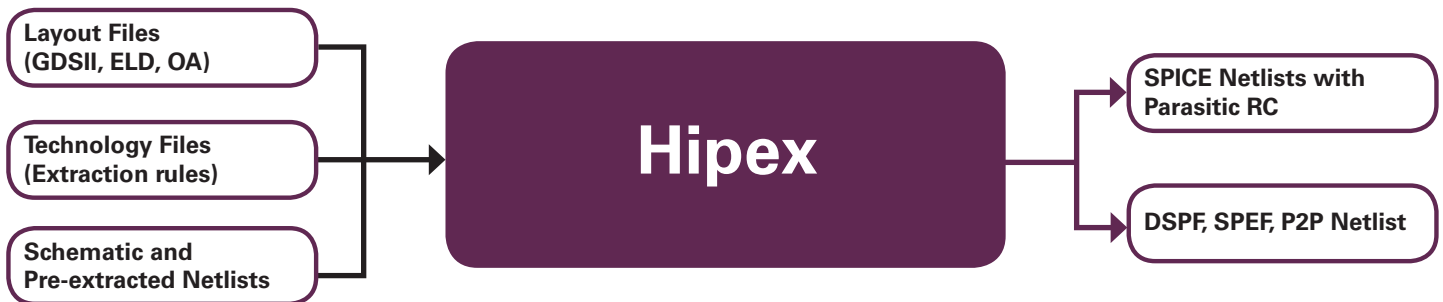
## Hipex Parasitic Network Distribution

- Combines extracted nodes with parasitic resistance and parasitic capacitance
- Distributes both coupling and ground capacitors
- User-defined threshold for minimum resistance and capacitance
- Distributes capacitors over parasitic resistor bodies accurately using stored locations
- Uses thrifty and detailed models for RC network
- Results are output to SPICE, DSPF, SPEF, P2P netlists
- Back-annotates extracted netlist with schematic node names
- Supports P2P format to present per net capacitance and point-to-point resistance

## Hipex-CRC Network Reduction Tool

- Significantly reduces runtime of post-layout and post-route simulations
- Performs reduction using Time Domain and Scattering-Parameter-Based Macromodeling methods
- Eliminates dangling RC elements and elements bounded by user specified threshold; performs parallel/series merging
- Performs networks reduction in linear time
- Handles RC networks with loops
- Preserves the accuracy of simulation for reduced RC networks
- Supports SPICE, DSPF, or SPEF formats
- Custom reduction by variation of settings

## Hipex Inputs/Outputs



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### HEADQUARTERS

4701 Patrick Henry Drive, Bldg. 2

Santa Clara, CA 95054 USA

Phone: 408-567-1000

Fax: 408-496-6080



### CALIFORNIA

sales@silvaco.com

408-567-1000

### MASSACHUSETTS

masales@silvaco.com

978-323-7901

### TEXAS

txsales@silvaco.com

512-418-2929

### JAPAN

jpsales@silvaco.com

### EUROPE

eusales@silvaco.com

### FRANCE

eusales@silvaco.com

### KOREA

krsales@silvaco.com

### TAIWAN

twsales@silvaco.com

### SINGAPORE

sgsales@silvaco.com

### CHINA

cnsales@silvaco.com

[WWW.SILVACO.COM](http://WWW.SILVACO.COM)