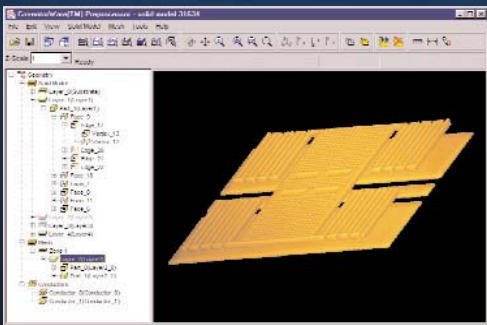


DESIGNER from Coventor, Inc.

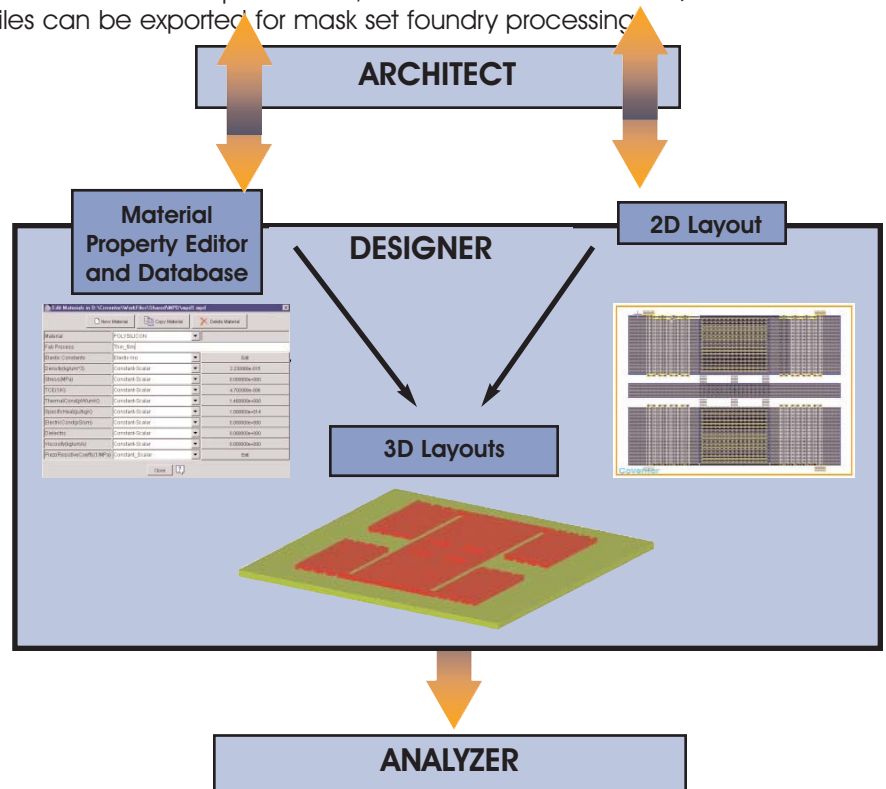
- Creates manufacturable MEMS devices and systems efficiently
- Generates 3-D models automatically
- Supports many import and export formats for compatibility with Coventor and third-party tools
- Works with ARCHITECT and ANALYZER to provide complete design environment: high-level models extracted into layout form can be simulated and verified with FEM/BEM techniques
- Includes process editor and material properties database for complete MEMS definition
- Stores foundry content from design handbooks including example process descriptions of MPW-runs and example DRC and DRC



Preprocessor showing 3-D model and tree view of structure

2-D layout and 3-D modeling for MEMS

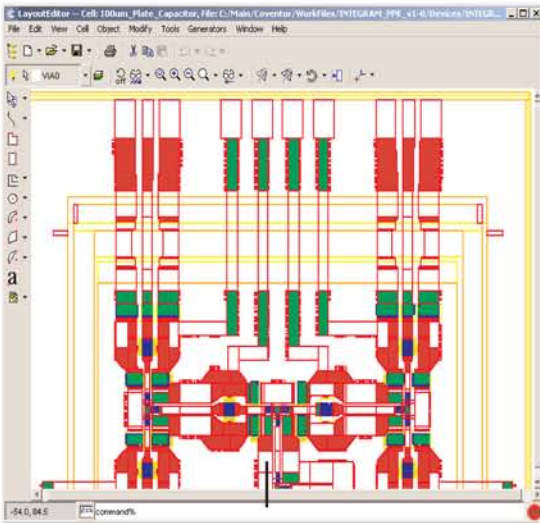
Coventor's DESIGNER is an efficient front-end design tool for creating models of MEMS devices. It combines a fully functional 2-D mask layout program, process editor, materials properties database, and a preprocessor module for 3-D model generation and viewing. The models can be used for export to FEM/BEM simulation verification, while the 2-D files can be exported for mask set foundry processing.



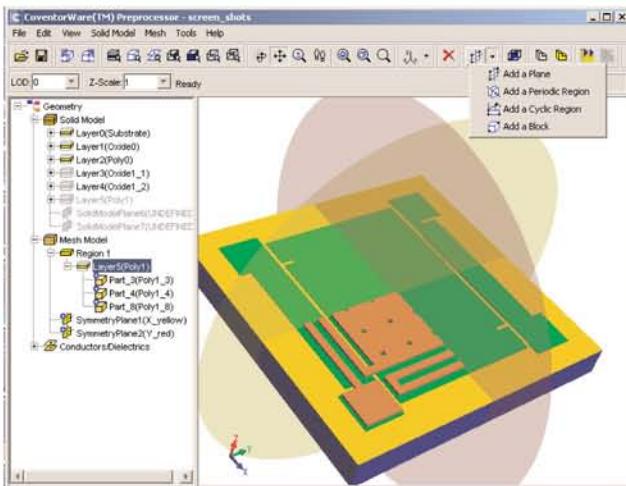
DESIGNER works seamlessly with other Coventor tools to provide a complete MEMS design and simulation verification environment, but is designed to interact with third party layout, solid modeling and finite element tools as well.

DESIGNER assists users in designing MEMS devices in the following ways:

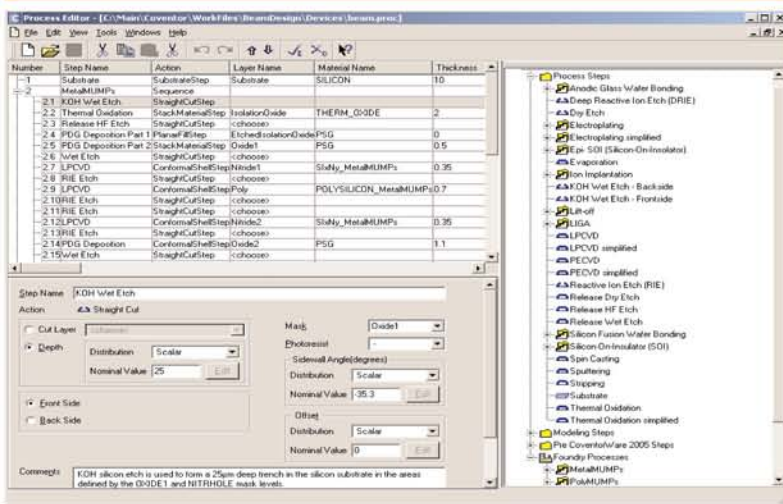
- **2-D layouts** created, imported, generated, or exported
- **Material properties database** to store characteristics of the materials used in the fabrication process. Properties may be specified as scalars, polynomials, or in table format. The database is shared by other Coventor software
- **Process editor** allowing real foundry steps to be emulated, including etching through multiple layers and partial backside etching. The process editor is used in 3-D model creation and in creation of layouts from high-level circuit schematics
- **3-D models** automatically created from a 2-D description and process information and viewed in Preprocessor
- **Optional 3-D meshes** can be created in the Preprocessor using separate meshing software that automatically meshes FEM and BEM volumes and surfaces and interactively names faces and conductors for simulation in ANALYZER or third-party software



Automatic solid model creation and partitioning



Process editor for process definitions



Layout Editor

- Produces analytically defined "true" curves and angle drawings.
- Cell-based hierarchical layout with unlimited layers
- Editor functions include layer, cell and object browsers
- True color viewing
- All-angle Boolean and grow operations
- Design rescaling
- Major and minor grid markers for two levels of display
- Edge, corner, arc, and stretch editing
- Unlimited undo, redo options
- Snap to grid
- Object rotation
- Able to generate forms from an equation
- Imports from GDSII, CIF, or DXF formats
- Full scripting language capabilities
- MEMS Design Rule Checking (DRC)

3D Preprocessor

- Provides easy and convenient model viewing and manipulation
- Patch and conductor names survive re-meshing
- Enables intuitive synchronized "tree view" of the solid model and the mesh
- Applies best mesher for each layer
- Provides immediate feedback on mesh quality
- Meshing options available; extruded, Manhattan, and mapped bricks; tetrahedrons and surface meshing with quads or triangles
- Local mesh refinement and mesh biasing

Coventor products

CoventorWare is ideal for developing MEMS and microsystems for an unlimited variety of applications including optical communications, RF/wireless communications, biotechnology, automotive, and sensors

- **ARCHITECT:** Multi-domain technology simulator for device, component or system level products including physical models, control models and Electronics
- **DESIGNER:** MEMS device construction tool; generates 2-D mask layouts and 3-D solid models; includes material property database, process editor and import/export capabilities
- **ANALYZER:** Group of field solvers for detailed physical analysis requiring thermoelectromechanics, optics, fluidics, electromagnetics, and more
- **INTEGRATOR:** Tools to extract detailed design-specific behavioral models from Finite Element straight into Saber, Cadence or Matlab-Simulink
- **MEMulator™:** A versatile virtual prototyping tool used to emulate complex MEMS processes
- **Etch3D™:** A 3D simulator for anisotropically etching Silicon in any orientation with etchants such as KOH, TMAH, and others



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