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 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.
Complete masks can be created in DESIGNER

Automatic solid model creation and partitioning

Process editor for process definitions

**DESIGNER - MEMS-Specific Tools**

**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 makers for two levels of display
- Edges, corner, arc, and stretch/fit 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 mesh for each layer
- Provides immediate feedback on mesh quality
- Meshing options available: extruded, Manhattan, and mapped bricks; tetrahedrons and surface meshing with quad 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 thermoelctromechanics, 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 KCH, TMAH, and others

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