



## Distortion-free links to manufacturers

Manufacturable designs ensue only when the layout design data has been properly prepared and transferred to a manufacturing environment. Achieving consistent yields within cost and time targets requires special attention to the critical juncture between design and manufacture.

The combination of dw-2000™ and our manufacturing module provides a proven path from layout data to manufacturing implementation. This optional module is specifically designed to initiate problem-free hand-offs to a choice of mask makers, direct control of electron beam lithographic equipment and it fully supports formats used in the manufacture of unconventional products.

Unlike the questionable practice of other companies that offer to “convert” your data, which can introduce yield limiting distortions, *Design Workshop Technologies* is focused on direct creation of the required output formats. Our dependable approach ensures that intended designs become manufactured reality.

### Mask Manufacturing

The GDSII format is the standard in hierarchical layout data exchange – and this is the native data format used by dw-2000.

### GDSII Highlights

- Stream in/out structures with specific names or “wild-card” match
- Output streams with differing resolutions
- Remap layers and types
- Output (merge) structures in external reference libraries
- Control overwriting based on matching names, creation dates and last modification dates
- Full properties and attributes support
- Filter layers or text
- Merge data
- Support for GDSII V6.0 format

### EBEAM Readable Formats

The support of MEBES, JEOL and Cambridge formats provides layout designers with two powerful options. First, designer control over design data cost is extended. Second, the designer can evaluate the impact of lithographic equipment on design data, allowing adjustments to the original data to ensure the highest conformity in matching design intent with layout reality.

### Product Highlights:

- Mask formats including GDSII and CIF
- Machine readable formats
- Ability to create output data filters to manage design data
- Direct creation of output formats without data conversions

### Key Formats:

- GDSII
- MEBES
- Cambridge
- JEOL-xx
- Gerber



## Unconventional Formats

Although semiconductor manufacturing formats conform to well known standards, new devices frequently try new processes and techniques. This option provides support for both CIF and GERBER formats.

## And more ...

Design Workshop Technologies is experienced at developing specialized formats under contract. Should you require a format that is not listed, please contact our professional consulting services.

## Related Services

- Test structure generators
- Relationships with key mask makers and mask data preparation service bureaus
- Staff experienced in device fabrication and lithography
- Custom formats available

### JEOL-01 Highlights

- Manufacturing limit: 1 nanometre to 1 millimetre
- Shot rank modulation based on layer or data types
- Reference descent commenting
- Supports line outputs as zero width paths
- Scaling, sizing and inversion of data

### MEBES Highlights

- Conversion type: I (0.5  $\mu$ ); II (0.25  $\mu$ ); extended and reticle modes
- Resolutions: 0.025  $\mu$  to 1.1  $\mu$
- Stripe height of 256, 512 and 1024 address units
- Scaling, sizing and inversion of data

### JEOL-51 Highlights

- EOS selection (I-16)
- Independently X and Y field size and sub-field sizes
- Shot rank modulus by 16 or 64 on data types
- Byte reordering for older PDP-11 compatibility
- ID name insertions for post-processing compatibility (PREAD)
- Scaling, sizing and inversion of data

### Cambridge Highlights

- Manufacturing limit: 1 nanometre to 1 millimetre
- Clock statements insertion based on layer or data types
- Fracturing control selection from none to full trapezoidal
- Reference descent commenting
- Rectangle inseting for zero-width line scans
- Scaling, sizing and inversion of data