PHOTOMASKS

**magic Layers vs. Mask Layers**

- magic allows designers to work with logical layers
- Chip fabrication requires more detailed layers
- magic captures all necessary information and generates the rest
- Example magic layout with m1-m2 via

```
  m1   m2
  X
```

Example m1-m2 via pattern in actual mask

```
  m1   m2
```

EEC 116, B. Baas  
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How a Photomask is Made

1. Generate Pattern
   - Convert circuit design data to image in resist through e-beam/laser exposure.

2. Develop Resist
   - Develop temporary pattern in resist to serve as a match for etching.

3. Etch Chrome
   - Define permanent pattern in chrome.

Source: www.photomask.com; Toppan Inc.

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How a Photomask is Made

4. Remove Resist
   - Remove temporary masking layer.

5. Measure Critical Dimensions
   - Ensure features are the proper size.

6. Measure Feature Placement
   - Ensure features are in the proper position.

Source: www.photomask.com; Toppan Inc.
How a Photomask is Made

7. Initial Clean
   - Clean for defect inspection.

8. Inspect for Defects
   - Ensure no unetched chrome or pinholes are present.

9. Repair
   - Repair any defects found.

Source: www.photomask.com; Toppan Inc.

How a Photomask is Made

10. Pre-Pellicle Clean
    - Remove any particulates before pellicle application.
    - *Pellicle* is a protective cover that shields the photomask from damage and dirt.

11. Apply Pellicle
    - Provide a particle barrier to ensure the integrity of the pattern from particles.

12. Audit
    - Final check.

Source: www.photomask.com; Toppan Inc.