AutoCAD Pattern Data

Overview

The Cornell NanoScale Facility has the capability to accept certain pattern data in Auto-CAD format. Auto-CAD is a general drafting program, and many of the pattern constructs have no counterpart in CAD for lithography systems; therefore, only a few, select constructs are acceptable. Also, for certain types of patterns, Auto-CAD is not a good system to use at all. Please check with the CNF staff to find out about other pattern options before you begin.

Notes

- Files must be in Auto-CAD .DXF format (.DWG files are not acceptable.) Save AutoCAD data to version 12 .DXF files. This will make the data more compatible with our converters. (.DXF is an ASCII interchange format, while DWG is a version dependant binary format.)
- Please use Microns as the unit size when preparing your drawing.
- All objects must be drawn as POLYLINES, where the outline of each shape is drawn as a polyline. Note that shapes with 3 vertices are not valid shapes... polylines must include at least 4 vertices.
- Circles, arcs, and other more complex shapes should all be approximated with polylines. Note that polylines should contain fewer than 200 vertices, so large curves may have to be split into smaller segments to meet this limitation.
- Most of the "fancy" drafting features of AutoCAD have no counterpart in microlithographic CAD. Therefore, features such as chamfering, tapering, bezier curves and the like are not supported. If in doubt about a feature, either don\'t use it, or contact the CNF staff before trying it.
- Depending on the details of your design, make use of hierarchy when possible, by using "blocks" and "insert block" for repetitive structures. This is valuable because it is often necessary to make small pattern "tweaks" during the fabrication process, and hierarchical layout makes such changes easier. At the same time, strike a balance between hierarchy and number of blocks, i.e. don't put every single object in a separate block.
- Inserts of arrays of blocks should not have negative displacements.
- Inserts of blocks should avoid magnifications and rotations wherever possible. Under no circumstances are different scaling factors for the x and y axes acceptable. Mirroring is also not acceptable.
- Draw different lithographic layers on different AutoCAD layers, using logical names when defining layers. In addition, it is often useful to put logically distinct types of pattern data on different AutoCAD layers, i.e. huge contact pads on one layer, 20 μm wide connector paths on another layer, and 0.5 μm electrodes on a third layer. It is trivial to expose multiple layers in a single lithography step, but very difficult to separate a combined layer into constituent components. Having different pattern components on different layers allows us to optimize exposure options (especially for e-beam lithography), and can greatly simplify future pattern changes (e.g. it is a much simpler task to change all contact pads to a different size if they are on a layer by themselves.)

Converting:

Converting AutoCAD Pattern Data can be done with either of two pieces of software available at the CNF:

- LinkCAD
- GenISys LayoutBEAMER