

These CAD/CAM guidelines provide the information necessary for quoting and/or laser processing services for printed circuit boards or laser fabrication of parts. Supplying data according to these suggested guidelines will prevent unnecessary and costly non-conformances and shipment delays. Most CAD / CAM artwork or data is customer generated and supplied. Micron Laser Technology can generate CAD artwork and designs at additional cost.

CAD Data Formats

MLT can accept CAD data in the following formats:

- Gerber RS-274X format (embedded aperture).
- RS-274D Gerber data with separate, detailed aperture list can be used, but is not preferred.
- AutoCAD DXF (2D)
- AutoCAD DWG (2D)
- EX2 or Excellon drill data
- Other formats may be acceptable — contact MLT for details.

Transferring data to MLT

You can transfer your data to MLT in the following forms:

- E-mail: Email sales@micronlaser.com or MLT Sale & Service at 503-439-9000.
- FTP Site: <http://www.micronlaser.com/ftp-uploader/>
- Flash drive

Guidelines for Gerber

You can transfer your data to MLT in the following forms:

- An aperture listing (when required)
- A list of layers with descriptions.
- The number of files supplied.
- Single entity draws are preferred. No splines.
- Single pad flashes are required.

Guidelines for DXF / DWG

- Place artwork data, part outline, and all layers on separate, individual CAD system layers.
- Separate laser processing data onto its own dedicated layer to for clarity of scope.
- Polygons or zero width line draws for irregular pad shapes and shield area outlines are preferred (instead of filling in these shapes).
- Supply arcs and circles. Do not convert arcs or circles into segmented lines.
- Provide unscaled data. MLT will make the appropriate offsets and scale factors to meet part dimensions and tolerances per provided part drawings.

Guidelines for Drill Data

- Submit the file noting the units used and any scaling. No scaling is preferred.
- Files should be in standard ANSI/IPC-NC-349 format, Excellon II (EX2), or DXF formats. Please note that we can only support a subset of the EX2 commands.
- Use the job or part number to name the drill file, along with the layer number if possible.
 "laserdrill.ex2" is not an informative name
 Filenames like "ig88mv_1-2.ex2" or "thx1138__11-9.ex2" are better
- Use different tool identifier for each separate via-depth and hole diameter.
- All drill coordinates should be positive.
- Files for all layers should be in a top-down panel view. We will mirror if necessary.
- Indicate the top and bottom layers using tooling holes, chamfered corners, or other.
- List fiducials as a separate tool in the EX2 file (e.g. T1, T12) or a different layer in DXF files. Four fiducials are needed for each layer with one fiducial out of rectangular alignment (asymmetrical) to ensure panel orientation. For multi-layer drilling, please specify which layer to be aligned upon.
- For multi-depth drills, do not overlay fiducials from one layer to the next to prevent incorrect layer recognition during drill.
- Preferred fiducials are 'butterflies' or 'bowties' that have a maximum diameter of .030".

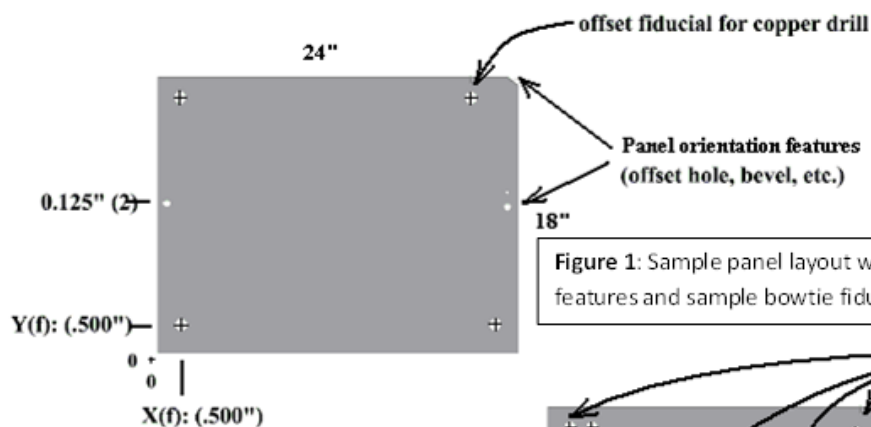
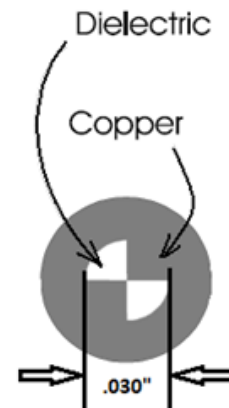


Figure 1: Sample panel layout with orientation features and sample bowtie fiducial

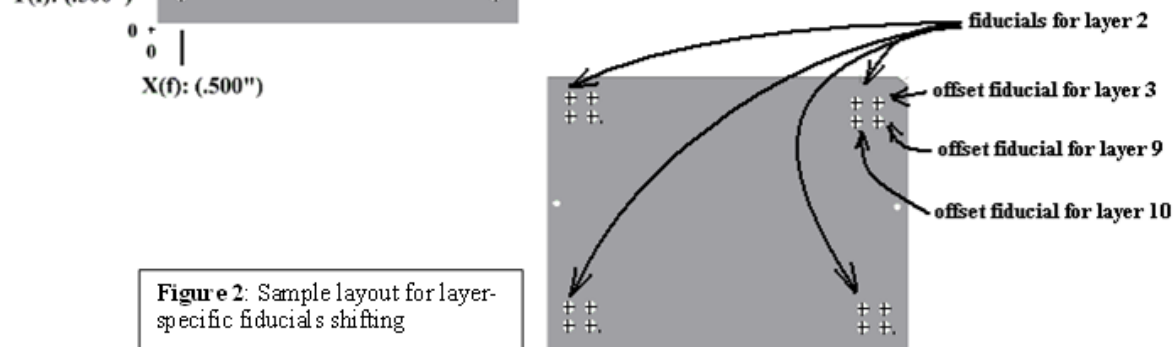


Figure 2: Sample layout for layer-specific fiducials shifting