

If you're not currently providing intelligent CAD files to your contract manufacturing partner, you're absolutely missing out on financial savings and quality benefits.

One of the most effective means of reducing manufacturing costs and ensuring product quality is by sharing intelligent CAD Data with your manufacturer. That's because using intelligent CAD data in manufacturing:

- Substantially speeds up manufacturing set-up
- Reduces mistakes and omissions as a result of human error
- Allows revisions to be more quickly integrated into the manufacturing cycle
- Supports the gathering of quality data for process and product improvements
- Simplifies communications between engineering and manufacturing
- Assures accurate parts placement

In this short paper we explain what intelligent CAD data is (hint: it's not just Gerber files), and how we as manufacturers use this data.

Types of CAD Data & What's "Intelligent"

CAD systems allow for a variety of file formats to be generated. The four main types of data are:

1. **Gerber Files**, which are used for PCB production. These are akin to photographs and contain no intelligence. They are useful for producing PCBs but not much else from a manufacturing perspective.
2. **Centroid Data**, which identifies component placement location on a circuit board, along with some rotational information. Since there is no standard for rotation, mounting angles will often be incorrect. As with Gerber files, Centroid data is very limited and does not specify other characteristics such as the body shape, size, lead count, land sizes/spacing or any other component information.
3. **Binary CAD**, which is used by the CAD system exclusively to store information for your CAD application and tools – this has no use from a manufacturing perspective. It is read only by the CAD software. *This is an example of intelligent CAD data but it is **not** accessible by your CM partner.*
4. **Open CAD Data**, which contains a cohesive description of the PCB design in ASCII format - component locations, sizes, land sizes, routing, fiducials, vias, test points, board outlines, drilling, and many other properties are provided in the Open CAD data file. ***This is an example of intelligent CAD Data that your CM partner can use.***

Open CAD data can be in several different formats, including GenCAD, ODB++, or in an ASCII version of your Binary CAD data.

How We Use It

With a customer's Open CAD data in hand, we are able to rapidly set up manufacturing processes and part placement for a product, with minimal to no errors. We also use the data to:

- Assess the product for DFM issues
- Merge the CAD data with the Bill of Materials to find errors or omissions
- Quickly and accurately assess the product to estimate labour effort for quotation



- Review the paste stencil and wave pallet designs
- Create drawings and visual tools as production aids
- Create a bar code scanning plan to enforce product routing and
- Rapidly program production assembly, inspection, and test equipment
- Improve efficiency of debug and repair activity
- Communicate efficiently and accurately with the design team
- Simplify a variety of other product life cycle related tasks

Open CAD data allows us to create a single database of product information to help us build a product in the most effective and cost-conscious manner.

Barriers to Providing Open CAD Data

You may be hesitant or unable to provide your manufacturer with the Open CAD data – the intelligent data – that we describe in this paper.

You don't know how to get the data

Perhaps Open CAD Data is available from your CAD system but you don't know how to produce the files in a proper format. If this is the case, talk to us. We can help you provide CAD design information in the proper ASCII format or show you how to generate files in the standardized open source formats.

You outsourced your PCB layout

The best practice is to require one of the standard open formats (ODB++ or GenCAD) from your layout partner if you are outsourcing new work. In some instances, OEM outsource PCB layout to third parties and have not received Open CAD formats as part of the deliverables package. They may not own the CAD software required to produce the proper formats. You can always ask your layout partner to produce it from the files you have or, if that's not possible, go to another layout providers for help.

You're concerned about your IP security

If you are concerned with the security of your intellectual property, talk to your CM. Non-disclosure agreements and document control/access processes limit the risk here and typically provide more than adequate protection.

Your design data is antiquated

Sometimes, old designs are revived or are moved to a new CM and open CAD data is not part of the archived documentation package. Binary CAD data may be available but the old version of the CAD software is not available to process it to an open format. You may be able to find a third party to create it from your data. If not, or if that's cost prohibitive, your CM will be able to work with the information you have.

Now You Know – Start Reaping the Benefits!

Providing intelligent CAD Data to your manufacturing partner reduces set-up fees, minimizes errors and omissions, and makes your product more cost-effective and more reliable. In addition to saving money, this practice will also reduce unnecessary communications and mitigate overall risk throughout your product's life cycle.

Let us help you make intelligent CAD data part of your communication with us! Simply contact your OCM Program Manager at (613) 736-6556 or 1 (800) 268-3961.