



ASSOCIATION CONNECTING
ELECTRONICS INDUSTRIES

IPC-2524

PWB Fabrication Data Quality Rating System

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A standard developed by IPC

PWB Fabrication Data Quality Rating System

1 SCOPE

This document describes a PWB fabrication data quality rating system used by fabricators to evaluate the incoming data package integrity. Printed board designers can also use this system as an output quality check.

2 DATA CLASSIFICATION & RATING

2.1 Data Rating Level Categories There are four data rating category levels. These levels correspond to a hierarchy of data integrity. The conformance to each level is provided using a rating scale ranking from zero to ten. A “10” rating requires no modifications to the PWB data. A “0” score implies that the fabrication tooling process is halted until the issues are completely addressed. The data rating categories are presented in Table 1.

Table 1 Data Rating Classifications

| Level | Description | Scale |
|-------|--|--------|
| 1 | Package completeness | 0 - 10 |
| 2 | Data completeness | 0 - 10 |
| 3 | Conformance to customer design rules (DRC) | 0 - 10 |
| 4 | Conformance to fabricator design rules (DFM) | 0 - 10 |

2.2 General Requirements Data integrity issues are classified into two categories:

Critical — The data that is provided is insufficient to create fabrication tooling. The tooling process is halted until these issues are resolved. Any critical issue automatically generates a maximum deduction of “10.” Evaluation of non-critical issues is not required.

Non-Critical — These problems may reduce the printed board quality and/or fabrication yield and slow down the tooling process. Although not show stoppers, the CAM engineer will be required to stop the tooling process to address these issues. These problems may also require manual editing of the PWB database. They will increase the fabrication tooling time. Non-critical issues are weighted to reflect their severity.

All categories start with a base rating of ten (10). Any critical issue automatically decrease the rating score to the minimum of zero (0). Non-critical issues have points subtracted for each discrepancy down to a value of one (1). For example, if there are no critical issues and four non-critical issues (with a severity weighting of 1) noted in the same category, the rating will be “6” (10 - 4).

3 PACKAGE COMPLETENESS (LEVEL 1)

Printed board fabricators use electronic data to generate production tools utilizing CAM systems. A minimum set of data is required to proceed with tool generation. If this minimum is not contained in the data package, the tooling process is halted while the missing information is requested and delivered. Data that is not provided electronically must be manually entered into the CAM system or copied and distributed into manufacturing. Missing files also enhance the probability of errors being incorporated during tooling and fabrication. Manual data editing and entry may inadvertently incorporate errors.

3.1 Critical Problems The following critical problems are those that cannot be resolved without customer involvement. Customer involvement and contact is generally conducted via faxes, direct meetings and e-mail. Table 2 presents the minimum files and information that is required to create fabrication tooling. The minimum rating of zero (0) is required if any of these problems are encountered.

Table 2 Complete Package Critical Problems

| Critical Problems |
|--|
| Missing PWB artwork file(s) |
| Missing fabrication drawing/file(s) |
| Missing README file |
| Missing aperture information/file for 274-D artwork files |
| Missing netlist, when a netlist test is required |
| Drill file(s) and layer connectivity (blind and buried via layer combinations) not specified |
| Sender not identified |
| Bad or unknown compression |
| Corrupted files |

3.1.1 Missing PWB Artwork File(s) The PWB artwork files are required to provide the electronic data which is required to fabricate each layer, such as copper, drill and solder mask layers.

3.1.2 Missing Fabrication Drawing/File The fabrication file presents mechanical board information and critical dimensioning. Fabrication notes are also included. It is required in conjunction with the artwork files.

3.1.3 Missing README File The README file is created in ASCII and provides information on what each of the electronic files is used for and how many should be included. It may also include special instructions for how to combine files.

3.1.4 Missing Aperture Information/File for 274-D Artwork Files The aperture file is used to provide D-Code