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Title:	Smart PCB Digital Factory
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Problem:

Electronic computer-aided design (ECAD) software used to design printed circuit boards (PCBs) continues to evolve and PCB manufacturing processes continue to advance, but the transfer of data between PCB designers and manufacturers has changed very little in the last 15 years. PCB build data today is comprised of a combination of electronic and paper documents spread across many files and multiple formats, (i.e. PDF, HPGL, JPEG, STEP, IGES, Excellon, ODB, ASCII, Gerber RS-274X, IPC-D-356, etc.). This “shopping cart” of files, shown in Figure 1-1, is unintelligently linked making data transfer and more importantly design intent difficult to communicate and interpret. As a result, today’s PCB manufacturers must review, translate and/or re-enter the data, causing their manufacturing processes to be labor intensive and prone to error.

Summary:

The “Smart PCB Digital Factory”, sponsored by MxD, set out to eliminate the multiple file formats and the error-prone manual intervention required today by demonstrating that a single data file, IPC-2581 Rev B (or IPC-2581B), containing the ECAD, Mechanical Computer-Aided Design (MCAD) and Bill of Materials (BOM) information could be successfully used to manufacture a PCB from design through fabrication, assembly and test.

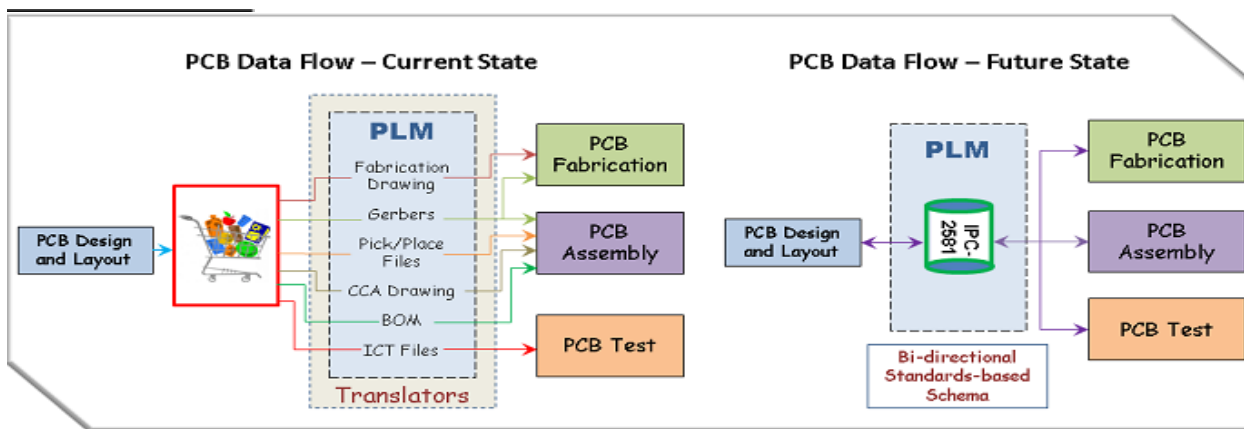


Figure 1-1: PCB Data Flow – Present-state vs. Future-state

In 2013, Fujitsu demonstrated that IPC-2581A could be used to fabricate a PCB. The Smart PCB Digital Factory team consisting of Lockheed Martin, Fujitsu, Sanmina, Siemens PLM, ZukenUSA, the Rochester Institute of Technology (RIT) and IPC, expanded upon that effort and used IPC-2581B to not only fabricate several PCBs but demonstrated that it could be used for assembly and test as well.