



RE: IPC-2581

June 27, 2013

As of today the IPC-2581 data format is not supported by The Bare Board Group, Inc. (BBG) and its manufacturing facilities. IPC-2581 is a new data transfer specification where development of the standard started in early 2001 and was initially released by the IPC in March 2004. Revision 1 (Amendment 1) was released in May 2007. Revision A of the specification was released in May of 2012. There are plans for a Revision B of the specification to be released in 2013. At this point in time the IPC-2581 data format is currently under development and should be used at your own risk. BBG and its manufacturing facilities accept no responsibility for any data translation errors that may occur while the data format is still under development. More information on the IPC-2581 data format may be found at <http://www.ipc2581.com/>

There are two concerns with the database format.

- 1) The database has been and is essentially a new industry format. Different CAD and CAM software providers are currently programming to different revisions of the IPC-2581 specification. The following revision table is available on the IPC-2581 Consortium web site as of the date of this paper...

Company Name	Software Name & Release	Support Status	IPC-2581 Release
ADIVA	ADIVAnet Revision 8.7	Q2 2013	IPC-2581A
	ADIVADRC Revision 8.7	Q2 2013	
	ADIVAvue Revision 8.7	Q2 2013	
Cadence	Allegro PCB Designer 16.5/ 16.6	YES	IPC-2581 Rev1 and IPC-2581A
	OrCAD PCB Designer 16.6	YES	
Downstream Technologies	CAM350	YES	IPC-2581A
	Blueprint PCB 3.2	YES	
	DFMStream	YES	
EasyLogix	PCB-Investigator 3.4.4	YES	IPC-2581 Rev1 and IPC-2581A
Numerical Innovations	FAB 3000 Version 7	Q3 2013	IPC-2581A
	ACE 3000 Version 7.1	Q3 2013	
	PreflightPCB Version 1.0	Q3 2013	
Polar Instruments	Speedstack	After IPC-2581B release	IPC-2581B
PTC	PTC Creo View ECAD 2.0 M040	YES	IPC-2581A
Siemens	Test Expert 9.3	YES	IPC-2581 Rev1
	UniCam FX 9.2	YES	
	UniDoc FX 9.2	YES	
Ucamco	Ucam V10.1 + 3 months ARO	YES	IPC-2581A
	UcamX V1.1 + 3 months ARO	YES	
	Integr8tor V7.3 + 3 months ARO	YES	
Vayo	VayoPro-DFM Expert V4.0	YES	IPC-2581A
	VayoPro-SMT Expert V3.0	YES	
	VayoPro-Test Expert V3.0	YES	
	VayoPro-Document Expert V3.0	YES	
WISE	VayoPro-View Expert V3.0	YES	IPC-2581A
	VisualCAM V16.3	YES	
	GerbTool V16.2	YES	
Zuken	WISE2581Viewer V16.2	YES	IPC-2581 Rev1
	CR-5000 13/14/15	YES	
	CR-8000 2012 and 2013	YES	

The implication is that there shall be a difference in levels of compatibility since different solution providers are not all on the same page. Data errors between platforms are a real possibility.

- 2) When the Gerber data format (RS-274-D) switched over to the extended format (RS-274-X) there were many documented instances of programming errors on both the CAD and CAM sides of the supply chain. The program errors typically resulted in custom features for solder pads being improperly converted. Even though everyone did their jobs correctly the end result were boards that could not be assembled. Over time, both the CAD and CAM programmers were able to import and export reliable versions of the RS-274-X format. Data errors with Gerber are a very rare occurrence. This is mainly due to the fact that the format has not changed for a long time. For all intended purposes, Gerber may be considered a dead language that is still used by the industry at large.



IPC-2581 may be considered a living language and is prone to all of the growing pains that occurred with Gerber. The IPC-2581 is literally in its infancy and is only now just being released to the industry for use. BBG and our facilities have experienced these growing pains first hand with the ODB++ format. ODB++ is a data format that accomplishes the same functions of the IPC-2581 specification. Whereas IPC-2581 is an open source format controlled by the industry at large the ODB++ format is essentially open sourced but the rights are privately held. The ODB++ format has been in use for years and we are still finding data translation errors between solution providers on an ongoing basis. IPC-2581 is now just arriving to the market. Data translation issues between solution providers are to be expected.

Unfortunately this is a case where change is bad. When a major revision of the database format is released all of the CAD/CAM programmers have to decipher the IPC-2581 programming specification and write code for it. The problem here is that programmers are people and people make mistakes. A misinterpretation or difference of interpretation of the specification typically results in a non-conformance on the finished product. Data issues of this nature are typically thrown back at the bare board manufacturer. Hence our reluctance to welcome IPC-2581 with open arms.

Understanding that the IPC-2581 database format is going to have another version released in the near future should be noted by all in the supply chain. Precautions should be taken by all parties involved to ensure that the non-conformances if they arise are minimized.

- 1) The return of check plots. In the old days board fabricators used to provide photo plotted images for designers to review. Where plotted film is not logistically feasible due to source location and manufacturing lead times, exporting Gerber files or even PDF views of the working data for review is not a problem. Designers may review areas of concern or custom features readily enough through these data formats.
- 2) Build a small qualification batch prior to building the production order. The pain is less if data errors are found on a few boards as opposed to many.
- 3) When supplying IPC-2581 as a format, consider sending a backup format to compare against. Gerber as a backup is a wise choice. CAM systems can perform a layer to layer image compare. Load in the IPC-2581 data and Gerber and then have the fabricator compare the two prior to proceeding. Any differences would be reported. Providing a net list of the design database in the IPC-356 format is also a good choice to compare against.

At this point in time BBG does not accept this data format. It is the position of BBG that this data format is too new to the industry and is subject to change and differences of interpretation. The potential for non-conformances is too great for it to be used in volume manufacturing at this time. BBG and its manufacturing facilities are currently reviewing the possibility of accepting the IPC-2581 data format at a future date.

Regards,
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