

Date: October 13, 2012

Statement of Work
PWB-IPC-6012
For
Rigid
Printed Wiring Boards

REV.	DESCRIPTION
B	Update SOW with superseded spec, added cover page, approval page and table of contents.
C	Added V-Score and Laser marking silkscreen requirements and AOI requirements
D	Added 4.8 Gerber archiving process & updated 4.5 to indicate must for 3 panel fids. Added 5.1.3.1 and 5.1.3.2 for X-outs

Signatures on File

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1.0 PURPOSE

The purpose of this Statement of Work is to provide our Supplier with the minimum requirements and instructions to comply with the Purchase Order on which it is referenced.

2.0 SCOPE

This Statement of Work is applicable to all Purchase Orders for the Procurement of Rigid Printed Wiring Boards. This Statement of Work applies to all Purchase Orders purchased after the release date of new revision. The Printed Wiring Boards shall meet the requirements of IPC-6012 Class II.

NOTE: Should another Specification or classification be required by the Procurement Documentation/Drawing, the Procurement Documentation/Drawing will take precedence.

3.0 REFERENCES

IPC-6012 QUALIFICATION AND PERFORMANCE SPECIFICATION
FOR RIGID PRINTED BOARDS

IPC-A-600 ACCEPTABILITY OF PRINTED BOARDS

IPC-9252 GUIDELINES AND REQUIREMENTS FOR ELECTRICAL TESTING
OF UNPOPULATED PRINTED BOARDS

4.0 PWB Panelization DFM

4.1 **General** - The following specifications and guidelines are to be used in the DFM process for all PWB's procured by Amphenol Borisch Mfg. All PWB's are to be in an array when economically applicable and/or the component to board edge set back is less than .250", at a minimum must have rails on two sides. (ref figure 1, para 4.5)

Note: If the PWB fabrication drawing provided by Amphenol Borisch specifies a panel layout, the drawing takes precedence over section 4.0 of this document.

4.2 Panelization of PWB's

4.2.1 **Board Outline** – Where possible, the shape of a panelized PWB should be square or rectangular in nature. This allows, for more economical material use than boards with complex shapes and projections.

4.2.2 **Minimum and Maximum Panel Sizes** – The minimum panel size to be 4.00" long x 4.00" wide for all board thicknesses, the maximum panel size to be 10.00" long x 8.00" wide for board thickness that are .062" or less and 14.00" long x 12.00" wide for board thicknesses greater than .062".

4.2.3 **Minimum Panel Margins** – The minimum panel margin from the outer panel edge to the nearest routed slot is .375”.

4.2.4 **V-Score Versus Route** – All PWB arrays are to be V-score unless PWB design dictates an irregular shape (ref figure 2, para 4.5).

4.3 **Irregular Shaped Boards** - All PWB’s with irregular shapes should have all open voids filled with material, (ref Figure 1, para 4.5).

Note – No mouse bites allowed

4.4 **Tooling Hole Locations** – Four non-plated tooling holes .125” diameter are required to be located at the center of all four corners of panel. (ref Figure 1, para 4.5).

4.5 **Global Panel Fiducial Marks** – *All panels must include three global panel fiducials, .079” diameter pad with a .1575” diameter clearance to be located per Figure 1 below.*

Figure 1

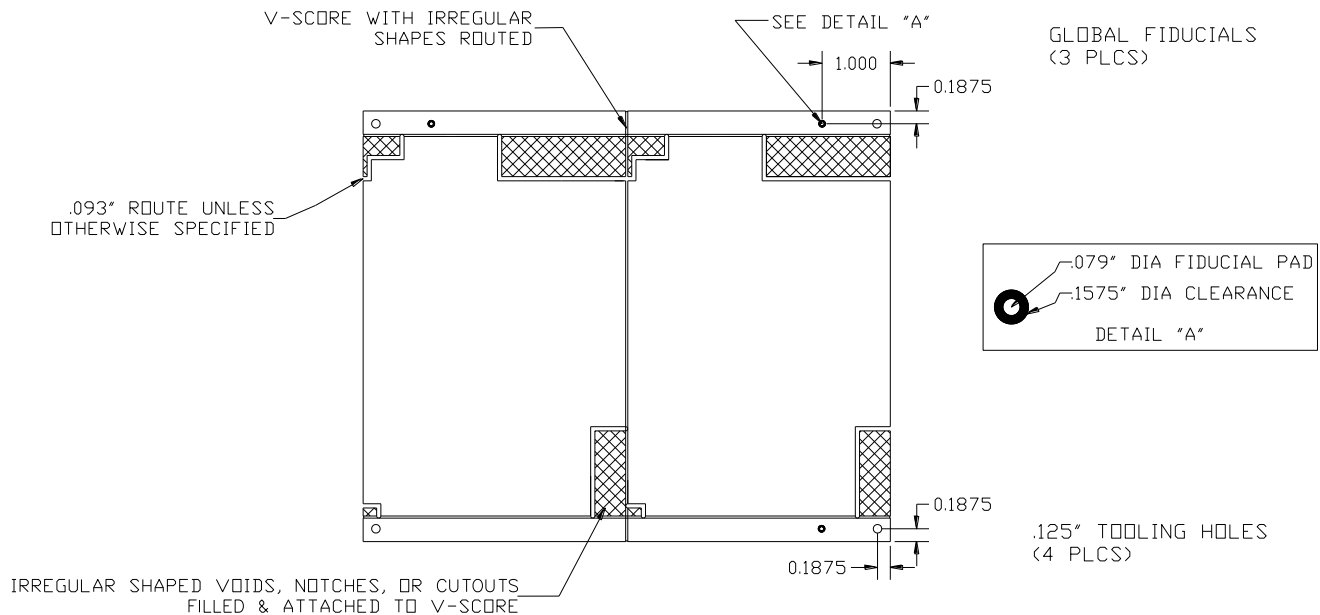
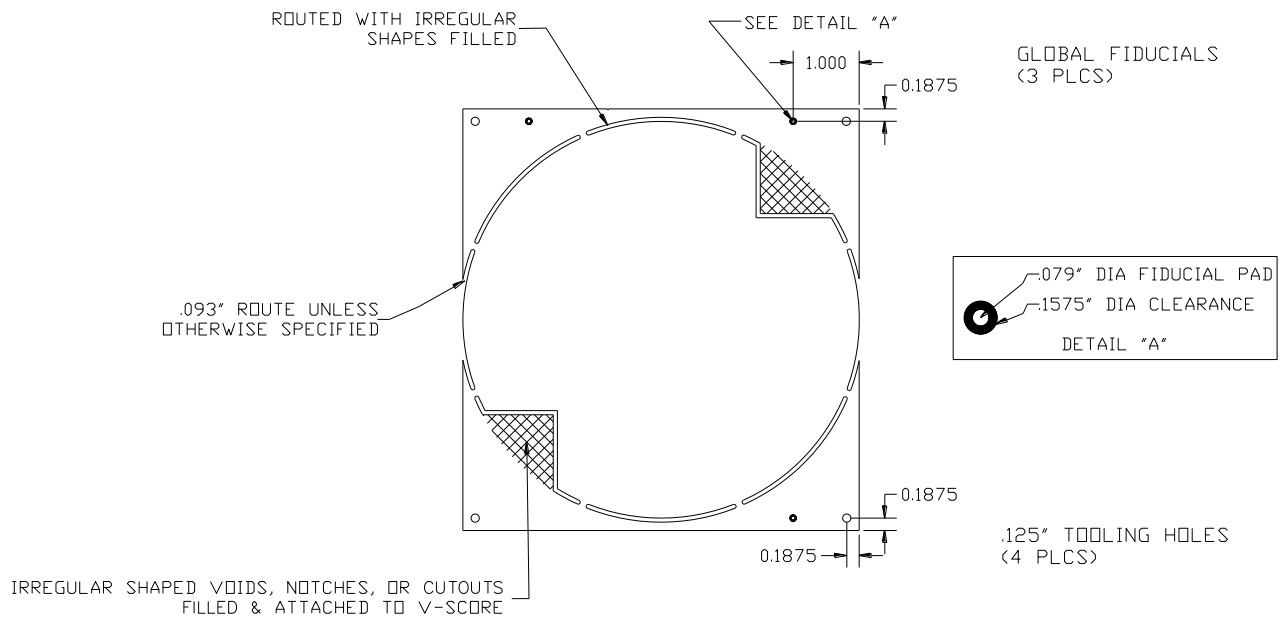


Figure 2



4.6 Laser Marking Silkscreen Locations – If applicable, the PWB Gerber file will be accompanied by an additional SILKSCREEN Gerber file labeled as XXXlasersst.gbx and/or XXXlaserssb.gbx. This SILKSCREEN layer must be included in the Customer Approval Process as indicated in Section 4.7.

4.7 Customer Approval Process – Upon completion of PWB panel layout Gerber files must be submitted to Amphenol Borisch Mfg for approval. All PWB panel layout Gerber files shall be formatted as follows: “part number revision (array)” example: 536-2807-01_rA (array). At this time the applicable buyer will seek the approval from engineering management or delegate. This process must be completed prior to the PWB manufacture proceeding with developing tooling and or production.

4.8 Array Gerber Archiving Process (Applies to ABT) – All approved array Gerber files must be cleaned up by approving engineer, removing all layers less the panel configuration (route, v-score, drill, laser silkscreen and panel fiducial layers). Array Gerber is sent to Configurations manager or their designate for archiving on the network. FilePro description for PCB is then updated to indicate array size and depanel configuration (example: 2x3 array, v-score).

5.0 REQUIREMENTS

- 5.1 All Printed Wiring Boards required to comply with this Statement of Work must be Manufactured, Processed, Inspected, Tested and Marked (Identified) in accordance with IPC-6012, CLASS II. All boards must be marked with date code.

NOTE: Should another Specification or classification be required by the Procurement Documentation/Drawing, the Procurement Documentation/Drawing will take precedence.

5.1.1 Acceptance criteria, as applicable, must meet the requirements of IPC-A-600.

5.1.2 The Electrical Testing (Continuity and Isolation, 100%) must be performed in accordance with IPC-9252.

5.1.3 Continuity testing must be performed using the Gerber Net List Test method in accordance with IPC-9252.

5.1.3.1 *Each X-out board shall be marked in a manner that makes the X-out obvious. Markings must be indelible and if the board is two sided must be applied to both sides.*

5.1.3.2 *Panels that include X-outs shall be segregated from non X-outs if included with a normal shipment.*

5.1.4 Each lot shall have micro section evaluations performed for hole integrity and verification of plating thickness. Micro sections must be shipped with each lot or with the first lot of each date code shipped. Micro sections will be retained by Amphenol Borisch for a minimum of 10 years unless otherwise requested in writing by the seller.

5.1.4.1 Micro sections used for evaluation by seller must be obtained from the actual lot produced and cannot be taken from other production lots.

5.1.4.2 Prior to micro sectioning the seller is to perform the required thermal stress testing in accordance with IPC-6012 samples will then be subjected to the test per paragraph 3.6.1 of IPC-6012.

5.1.4.2.1.1 If sample fails electrical testing due to open circuits, then 100% thermal cycle at 300°F for 1 hour is required prior to testing in para 5.1.3.

5.1.5 Coupons, Micro Sections and PWBs must be serialized (by panel) for traceability.

- 5.1.6 Supplier is required to perform 100% inspection of the circuitry for all layers using AOI methods.
- 5.2 Documentation and Data must be maintained by the manufacturer for a period of 10 years, or as required by your internal procedures, whichever is greater.
- 5.3 The Printed Wiring Boards must be packaged in such a way that will prevent damage during shipping and storage. PWBs must be packaged in VACUUMED, HEAT SEALED MOISTURE BARRIER BAGS.
 - 5.3.1 All packaging will contain a humidity indicator card (HIC) & desiccant.
 - 5.3.2 Desiccants must be located on the edges of the PWB, NOT on the PWB surface.
- 5.4 Repairs done that result in the addition of track material may not be done without written approval of Amphenol Borisch Quality Manager.

6.0 CERTIFICATION

- 6.1 In addition to the certification requirements listed on the purchase order the certification must reflect the date code and indicate that the quantity of shipment has passed the required Net List testing. Certification must reflect the number of boards tested and the quantity of pass and fail. *Certification must also include the results of the evaluation of the micro section inspections.*

SHOULD YOU HAVE ANY QUESTIONS PLEASE CONTACT JUNE PELLERITO, QUALITY MANAGER.

Italics and yellow are used to indicate changes.