

**Statement of Work**  
**PWB-IPC-6012**  
**For**  
**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B	Update SOW with superseded spec, added cover page, approval page and table of contents.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 Array fids. Added 5.1.3.1 and 5.1.3.2 for X-outs
E	Added 5.1.3.1.1 thru 5.1.3.1.4, 5.1.3.2.1, 5.1.3.2.2 and 5.1.3.3
F	Revised V-Score to Route and removed '(example: 2x3 array, v-score)' from the end of paragraph 4.8, changed rail size, updated figure 1, added provision for development of economical array, removed page numbers from Table of Contents, removed 4.6 and 4.8, add flex PWB to array requirement, remove rigid notation

**Signatures on File**

PREPARED BY	CHECKED BY	QA APPROVED	DATE
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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 Printed Wiring Boards (**PWB**). This Statement of Work applies to all Purchase Orders purchased after the release date of **the current** 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 Array DFM**

4.1 **General** - The following specifications and guidelines **shall** be used in the DFM process for all PWB procured by Amphenol Borisch Technologies (ABT).

**All PWB with any of the following conditions shall be delivered as an array:**

4.1.1 **Component to board edge set back is less than 0.250" on two parallel sides. Rails are required on two sides at minimum.**

4.1.2 **The PWB design contains no two parallel sides.**

4.1.3 **The PWB construction requires semi-rigid and/or flexible material.**

4.1.4 **It is economically applicable.**

4.1.5 **If an economical array solution cannot be achieved per this document, the Supplier shall develop a solution with ABT.**

**Note:** If the PWB fabrication drawing provided by ABT specifies an **array** layout, the drawing takes precedence over section 4.0 of this document.

## 4.2 **PWB Array Configuration**

4.2.1 **Printed Wiring Board Outline** – Where possible, the shape of an **PWB array** **shall** be square or rectangular in nature.

4.2.2 **Minimum and Maximum Array Sizes** – The minimum array size shall be 4.00” long x 4.00” wide for all board thicknesses, the maximum array size shall be 10.00” long x 8.00” wide for board thickness that are .062” or less and 16.00” long x 14.00” wide for board thicknesses greater than .062”.

4.2.3 **Minimum Array Margins** – The minimum Array margin from the outer Array edge to the nearest routed slot is .300”.

4.2.4 **Route Guidelines** – All PWB shall exhibit tabbed 0.093” route between PWB and Array Frame.

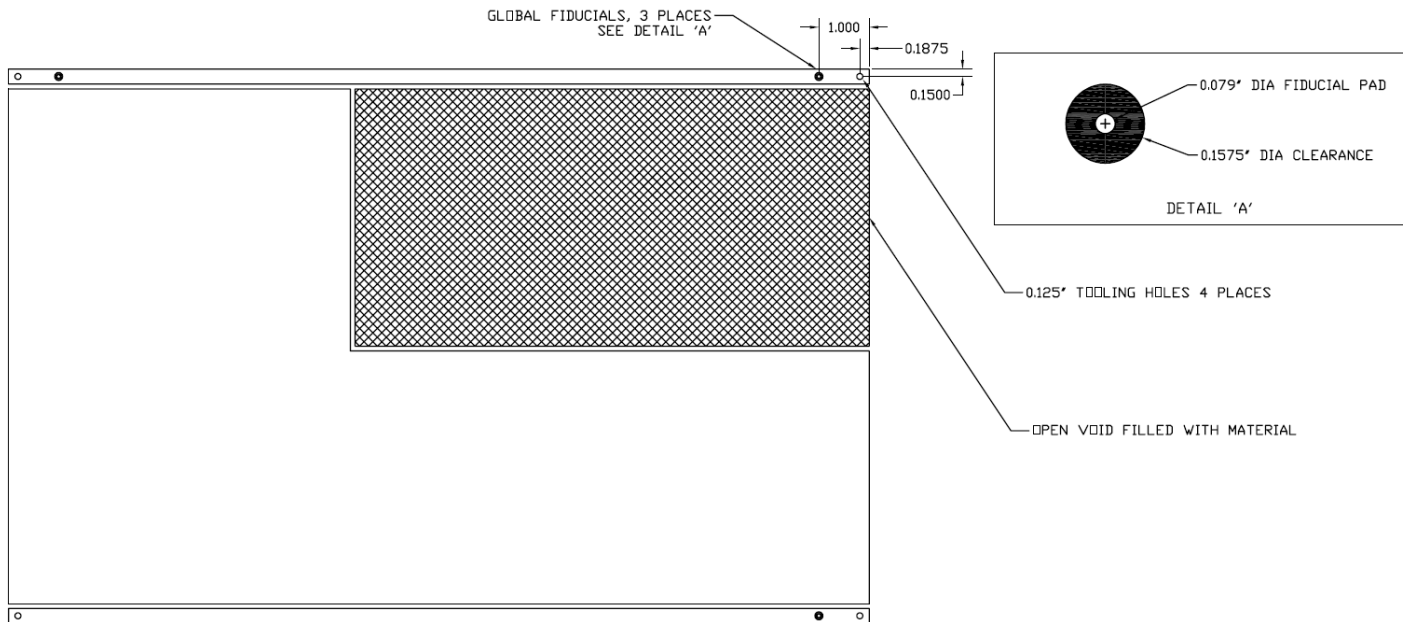
**Note:** No mouse bites allowed.

4.3 **Irregular Shapes** - All PWB with irregular shapes shall have all open voids filled with material, (ref Figure 1, para 4.5).

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 Array. (ref Figure 1, para 4.5).

4.5 **Global Array Fiducial Marks** – All Arrays must include three global Array fiducials, 0.079” diameter pad with a 0.1575” diameter clearance to be located per Figure 1 below.

**Figure 1**



4.6 **Customer Approval Process** – Upon completion of PWB Array layout, Gerber files must be submitted to ABT for approval. All PWB Array layout Gerber files shall be formatted as follows: .art, .gbx, .ger, .rs-274-x, .tar or similar formats. **Upon submission**, the applicable Buyer shall obtain the approval from Engineering Management or **their designate**. This process shall be completed prior to the PWB Supplier proceeding with developing tooling and/or production.

## 5.0 REQUIREMENTS

5.1 **General** - All PWB 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 the date code.

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

5.2 **Acceptance** - As applicable, the PWB shall meet the requirements of IPC-A-600.

5.3 **Electrical Testing** - Continuity and Isolation shall be performed in accordance with IPC-9252.

5.3.1 **Continuity** – Testing shall be performed using the Gerber Net List Test method in accordance with IPC-9252.

5.4 **Micro Sections** - 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 ABT for a minimum of 10 years unless otherwise requested in writing by the seller.

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

5.4.2 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.

5.4.3 Coupons, Micro Sections and PWBs must be serialized (by **array**) for traceability.

- 5.4.4 Supplier is required to perform 100% inspection of the circuitry for all layers using AOI methods.
- 5.5 **Failures** - Each X-out board shall be marked in a manner that makes the X-out obvious. Markings must be permanent and if the board is two sided must be applied to both sides.
  - 5.5.1 Each PWB that is intended to be an X-out shall be conspicuously and permanently identified.
  - 5.5.2 The use of permanent markers (such as a Sharpie ®) is not considered permanent identification.
  - 5.5.3 There shall be no more than 20% of a Purchase Order line item containing X-outs.
  - 5.5.4 Arrays that include X-outs shall be segregated from non X-outs if included with a normal shipment.
  - 5.5.5 Each sealed package within the shipping container shall indicate the quantity of X-out boards and the quantity good usable boards.
  - 5.5.6 Accompanying shipment paperwork shall indicate the quantity of X-out boards and the quantity good usable boards in each shipment.
  - 5.5.7 PWBs being sent out to a refinish supplier after their original manufacturing shall continue to keep PWBs segregated and documented above.
- 5.6 **Data Retention** - Documentation and data must be maintained by the Supplier for a period of 10 years, or as required by internal procedures, whichever is greater.
- 5.7 **Packaging** - The PWB shall be packaged in such a way that will prevent damage during shipping and storage. The PWB must be packaged in VACUUMED, HEAT SEALED MOISTURE BARRIER BAGS.
  - 5.7.1 All packaging shall contain a humidity indicator card (HIC) & desiccant.
  - 5.7.2 Desiccants shall be located on the edges of the PWB, NOT on the PWB surface.
- 5.8 **Repair Authorization** - Repairs that result in the addition of track material are not authorized without written approval of the ABT Quality Manager.

## 6.0 CERTIFICATION

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

***PLEASE CONTACT THE ABT QUALITY MANAGER WITH ADDITIONAL QUESTIONS.***

*Italics and yellow are used to indicate changes.*