



Work Instruction

SUPPLIER PRINTED CIRCUIT BOARD REQUIREMENTS

Revision Date	Summary of Change
05/05/11	Sections 3.3.6 was added, 3.4.1 and 3.4.8 have changed dimensional formats, and 3.6.4 - 3.6.8 were removed
02/23/11	Changed 'panel' to 'lot' section 3.3.3
02/15/11	Formal Release of this Master Document for Location on the Server



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Approved by: **Dale Sevrey**

- 1.0 Purpose: This instructs all suppliers that provide Arc-Tronics with printed circuit boards what requirements apply to every a purchase order is placed. This also instructs our incoming inspection personnel who enforce these requirements.
- 2.0 Scope: This instruction only applies to the procurement of printed circuit boards.
- 3.0 Instruction:
 - 3.1 **Printed Circuit Board Supplier Requirements**
 - 3.1.1 All suppliers of Printed Circuit boards, rigid and flexible shall adhere to the industry standards noted below, as well as, requirements detailed in this document.
 - 3.1.2 Any non-compliance without specific prior written approval from Arc-Tronics will be grounds for rejection of material.
 - 3.1.3 All supplier panelized photo-tooling (Gerbers, etc.) must be approved by Arc-Tronics' Production Engineering Department prior to fabrication of any printed circuit boards. Failure to acquire approval prior fabrication will result in the rejection of material at incoming inspection. **No exceptions.**
 - 3.1.4 When drawings are provided to the PCB supplier, the notes on the drawing(s) are to be carefully reviewed. Any discrepancies between the notes in those drawings and any other documentation, either provided or referred to in this specification, is to be brought to the attention of Arc-Tronics' Production Engineering Department for resolution and approval. Failure to adhere to drawing notes requirements will be grounds for rejection of material.
 - 3.1.5 Acceptance of the terms and conditions set forth in this document, and its referenced documents, are requirements of doing business with Arc-Tronics, Inc. This document must be signed by an officer of the PCB supplier and returned to Arc-Tronics and filed with the Purchasing Department.
 - 3.2 **Applicable Industry Standards**
 - 3.2.1 Reference Documents – Unless otherwise indicated, the latest released revision of each document shall be used.
 - 3.2.1.1 IPC-6011 Generic performance specification for printed boards
 - 3.2.1.2 IPC-6012 Qualification & performance specification for Rigid printed boards
 - 3.2.1.3 IPC-6016 Qualification & performance specification for high density interconnect



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- 3.2.1.4 IPC-9252 Guidelines and requirements for electrical testing for unpopulated PCB's.
- 3.2.1.5 IPC-A-600 Acceptability of Printed Circuits
- 3.2.1.6 IPC-TM-650 Test Methods Manual
- 3.2.1.7 IPC-SM-840 Acceptability of Solder mask
- 3.2.1.8 J-STD-003 Solderability Tests for Printed Boards

3.3 First Article Documentation Requirements

- 3.3.1 Supplier is to provide a Dimensional first article – for first time run products and for any revision changes, which addresses all notes, specifications and material/ink requirements along with the dimensions. The supplied first article report will address all measurements and print notes including any specifications noted. Any dimensional discrepancies must be clearly noted in the report. If there is a discrepancy the PCB supplier must notify Arc-Tronics Purchasing and Quality for resolution. Arc-Tronics will seek a print change/deviation or written authorization from Arc-Tronics' customer prior to approving any deviation as acceptable.
- 3.3.2 Supplier must provide a Certificate of Compliance that addresses material, plating, ounces, or any special requirements noted on the print with each shipment. This report must include the specific data for each requirement identified in notes on the print, or items identified in this document.
- 3.3.3 Ionic Contamination acceptance to IPC-TM -650 – Test data for each lot to be included with each shipment.
- 3.3.4 Tape test to be performed as per IPC test method for solder mask adherence, the results to be included with each shipment.
- 3.3.5 Electrical Test report – Supplier is to provide the test yields from each run, to run, the kinds of problems that were found, how many out of the run did not pass electrical test. The results to be included with each shipment.
- 3.3.6 **All electrically tested individual PCBs shall be marked with a “T”, or “ET” in indelible ink that will resist board cleaning system chemistries. NO EXCEPTIONS**
- 3.3.7 Solderability report – Supplier must provide the results of the float test or test slug with each shipment. X outs can be used for this.
- 3.3.8 No process changes can be made without notifying Arc-Tronics. If there are any changes to ink, plating baths, chemicals, drilling, routing etc., Arc-Tronics must be notified in advance of fabricating parts. Arc-Tronics maintains the option of acceptance when process changes are identified.



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- 3.3.9 Supplier must provide a Certificate of Compliance from their raw board laminate supplier that includes the materials, thicknesses, etc. applicable to the laminate specification requirements as evidence that the raw laminate material was used to fabricate each lot shipped.

3.4 PCB Panel and Board Layout Requirements

- 3.4.1 Minimum panel size is 2.5 x 2.5 in² (50 x 50 mm²) maximum panel size is 18"x 18"
- 3.4.2 (457 x 457mm²). Please contact Arc-Tronics, Inc. for panel dimensions beyond 18"x 18".
- 3.4.3 Preferred Panel Sizes for FR4 type material:
- 3.4.4 .031" thick PCB's should be kept to 6"x 6" or under.
- 3.4.5 .062-.093 thick PCB's should be kept to 10"x 10" or under.
- 3.4.6 Best utilization of the panel material should always be taken into consideration during panel layout along with the quantity and density of large heavy items to be placed on the panel during the production process. (If component weight information is available, it will be supplied to the PCB manufacture at time of order)
- 3.4.7 Two opposing PCB handling edges (conveying edges) shall have a minimum of 3mm free of components from the outer edge of the board for conveyor handling. These opposing edges should be straight, continuous and parallel to one another.
- 3.4.8 All boards/panels will require six (6 qty.) 1mm dia. (0.0394"dia) solid copper circular fiducials, three (3 qty.) on the component side, and three (3 qty.) on the solder side of the PCB. All fiducials shall have a 1mm clearance from any other copper traces, legend features, stamps and solder mask. The fiducials should be located 0.3750"x 0.1600" from the corners of the board/panel on the breakaways. If tooling holes are not required then the fiducials may be located 0.1600"x0.1600" from the corners.
- 3.4.9 Qty. 4, 0.125: diameter non-plated thru tooling holes should be located in each corner of the panel spaced an equal amount from the outer edge of the panel, 0.1969" on the breakaways. This is a requirement for automated Thru-Hole insertion.

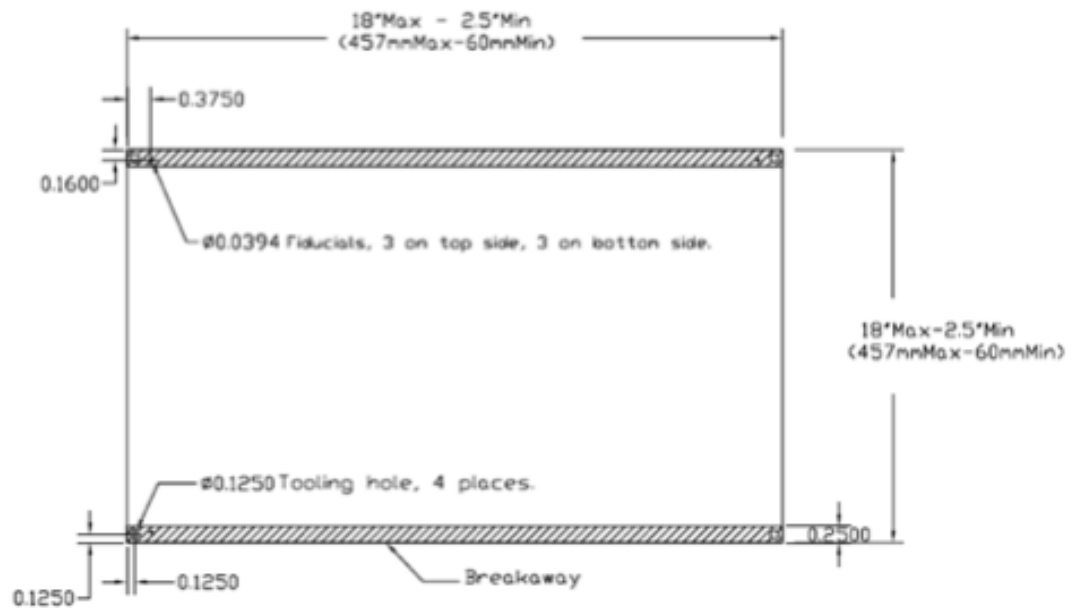
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3.5 X-Outs

- 3.5.1 If Arc-Tronics has agreed to allow x-outs, the following conditions apply to the specific part numbers that x-outs would be acceptable.
- 3.5.1.1 One out of every six parts on a panel may be an “x-out”. Not to exceed 10% of panels on any order.
 - 3.5.1.2 Each defective part in the panel is to be marked on both sides in an indelible ink.
 - 3.5.1.3 Panels that have an x-out in the same position will be packaged separately. All packages containing x-outs to be packaged separately from panels without defects.

3.6 Array and Panel Configurations

- 3.6.1 A 0.250” wide, scored breakaway must be added around the entire panel perimeter.
- 3.6.2 NO components shall overhang the original PCB outline into the breakaway area.



- 3.6.3 Typically a 0.250” scored breakaway rail around the perimeter of each panel. panelize as follows.



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3.7 Acceptance of requirements

- 3.7.1 All suppliers of printed circuit board must acknowledge receipt and acceptance of these instructions by completing the following form and forwarding a signed copy of this entire instruction to their Buyer.

Supplier Company _____

Address _____

Phone number _____ Fax Number _____

Officer Signature _____

Printed name of Officer _____