

<b>PCB Fiducial &amp; General MFG Requirements</b>		Page 1 of 4
Doc. No. DWI-009-002-48	Revision C	Proprietary and Confidential



**Approvals:**

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**Department Manager / Process Owner**

**Revision History**

<b>Date</b>	<b>Change / ECO Notice</b>	<b>Change Description</b>
10/7/2013	A	Original Release.
7/15/2019	B	Update to include detail about X-out markings
4/8/2021	13490	Add PCB packaging requirements. Re-written on new template.

Doc. No. DWI-009-002-48

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## 1.0 Purpose:

- 1.1 To define the methods utilized for fiducials on PCBs purchased by Distron and general manufacturing requirements.

## 2.0 Scope:

- 2.1 All printed circuit boards purchased by Distron unless otherwise noted.

## 3.0 Applicable Documents:

- 3.1 SMEMA Fiducial Mark Standard

## 4.0 Definitions:

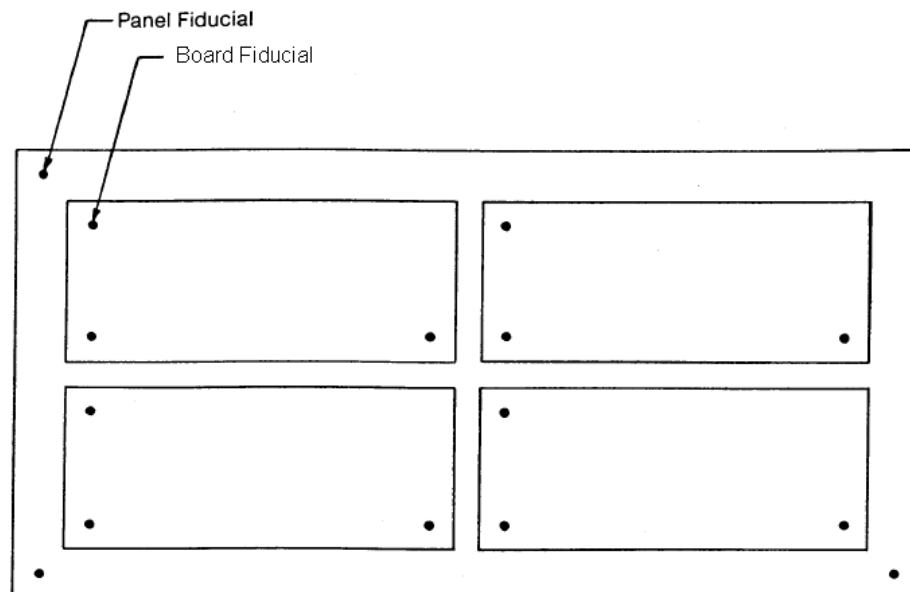
- 4.1 Fiducial – An artwork feature created in the PCB conductive pattern that provides a measurable point for component mounting. The fiducial is used by imaging systems of assembly equipment as a point of reference. Fiducials are placed on the top and bottom copper layers. They should not be placed on the mask or silkscreen layers as they are not as precise as the copper layer.
- 4.2 Board Fiducials – Used to locate the position of all the land patterns on a PCB.
- 4.3 Panel Fiducials – Located on the rails or perimeter of a multi-up panel.

## 5.0 Responsibilities:

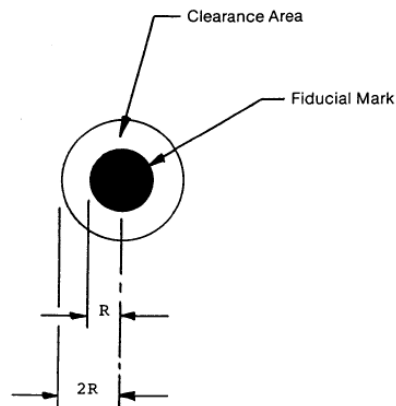
- 5.1 It is the responsibility of the Purchasing Dept and Management Representatives and / or designee to ensure the requirements within this procedure are followed.

## 6.0 Procedure:

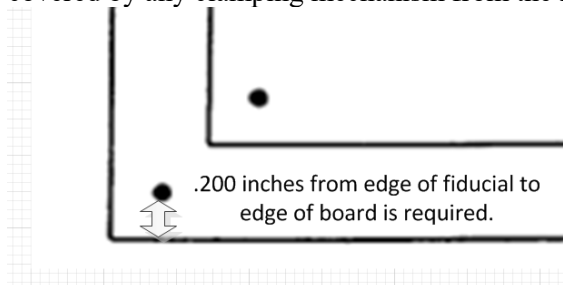
- 6.1 A minimum of three board fiducials shall be provided located in a triangular pattern as far as possible on the PCB. Fiducials located near the corners of the PCB are preferred.
- 6.2 A minimum of three panel fiducials are required on the rails of a single-up and multi-up panels.



- 6.3 The shape of the fiducial shall be a solid filled circle.
- 6.4 Fiducial size can range from .026" to .050"
- 6.5 The fiducial mark tolerances should not vary by more than .001".
- 6.6 Clearance is required around each fiducial. No conductive patterns, silkscreen, soldermask, traces, pad, markings, or text is allowed in this area.
- 6.7 The size of the clearance area shall have a radius that is at least twice that of the fiducial mark and shall be concentric with the center of the fiducial mark.



- 6.8 Fiducials need to be inboard of the panel edge by at least .200" to ensure they are not covered by any clamping mechanism from the manufacturing equipment.



- 6.9 The fiducial mark should be bare or covered copper. There should be a high degree of contrast between the surface of the fiducial mark and the adjacent PCB base material.
- 6.10 For proper recognition, there must not be anything around the fiducial. A stop mask may be used with a keepout area so that no planes or traces are within one diameter length away from the fiducial. A solid plane can be placed under the fiducial.
- 6.11 The surface of the fiducial mark shall not be oxidized or degraded.
- 6.12 The thickness for the bare copper fiducial plating or coating shall be .0002-.0004". If solder coated, do not exceed .001".
- 6.13 Solder resist coatings should never cover a fiducial mark or its clearance area.
- 6.14 The surface of the fiducial mark should be flat within .0006".
- 6.15 Fiducials should be assigned reference designators in the PCB design file

Doc. No. DWI-009-002-48

Revision C

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- 7.1 If a panel does contain X-outs, they must be marked on both top and bottom sides with high contrast.

**8.0 PCB Packaging**

- 8.1 Desiccant shall be placed in each pack and placed at the side so it does not cause problems when stacking individual packs. The desiccant shall be certified as “Sulphur free”.
- 8.2 Packs of boards shall be vacuum sealed using an ESD approved plastic. The plastic (for either single layer or double layer packing) shall fulfill the demands in IEC 61340-5-3 and the static dissipative material shall have a surface resistance  $\geq 1 \times 10^4 \Omega$  and  $< 1 \times 10^{11} \Omega$ .

**9.0 Records:**

- 9.1 Keep records per the Records Control Procedure (DQP-016).

End of Document