EDM Printed Circuit Board Supplier Requirements

This document contains the specifications set forth for all bare Printed Circuit Board (PCB) that are supplied to EDM. This document contains panelization information, panel fiducial type and location information, panel scoring and tab requirements, allowable X outs and PCB storage and shipping standards applicable to our PCB vendors.

It is the responsibility of the PCB fabricator to meet all requirements expressed in the Purchase Order, Gerber files, fabrication drawings, applicable IPC standards, fabrication instructions (such as "readme" files), and this document (ESR-001) unless specific written permission for deviation is issued by EDM Engineering.

A Certificate of Conformance shall be provided with each shipment to EDM on Form 800-066 (current revision) with every field completed. Vendor format for this certificate may be used if it contains ALL the information and certification language included on Form 800-066 (see form on last page).

Panelization

Rails and Fiducials:

All EDM PCBs must have ½ inch (12.7mm) rails or be panelized with ½ inch rails unless otherwise specified by EDM Engineering. See board files &/or Purchase Order for individual board panelization specifications. The rails are to have fiducial marks (plated over copper) added at three corners (at least 1/4" in from outside of rails, both sides of board) with the fiducials forming a right triangle. The preferred fiducial is a 50-mil (1.28mm) round surface pad (see individual board file). No silk screen or copper shall be allowed within 0.100 inches of the edge of any fiducial unless circuitry is specifically designed into that area by the customer. Please see Diagram "C" for further illustration. Tooling holes shall be .090 inches in diameter unless specified. (2) additional holes .0625 inches in diameter are required on the rails of boards panelized using breakout tabs at the location specified on Diagram "C".

Scoring:

Scored arrays are to have a remaining web thickness in the score of .012" to .016" to facilitate separation without damage to the assembly. The score lines shall be equally deep on both sides of the PCB, and the point of the score line grooves shall be in line with each other within .002". See Diagram "A" for further illustration. Score angles over 45 degrees may be used only with prior written consent of EDM Engineering for each instance.

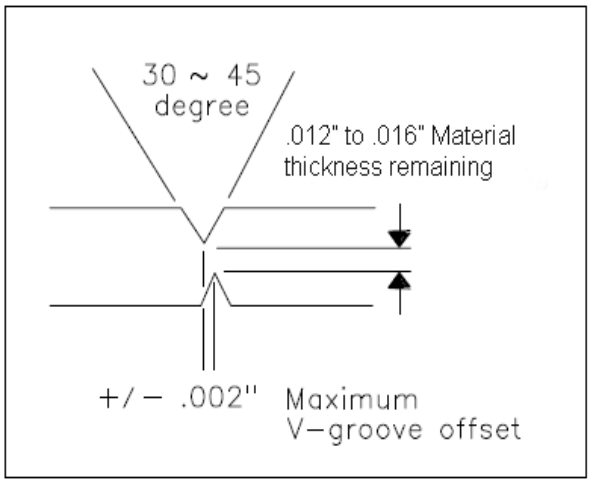


Diagram A

Breakaway tabs:

Breakaway tabs (or mouse bites) may only be used with explicit permission from EDM engineering. EDM requires the breakaway tabs leave a clean smooth edge after break away. Recommended patterns are shown in Diagram B below. The preferred pattern has a .020 inch diameter hole with the center point inset .003 inches from the routing /board edge. If traces or planes will interfere with the minimum electrical clearance requirements, the acceptable patterns may be used. Other sized tabs can be used if board size does not permit use of the patterns below, but require EDM Engineering approval. Breakaway tabs placement should also avoid areas where thru holes (mounting or tooling) might be damaged at singulation.

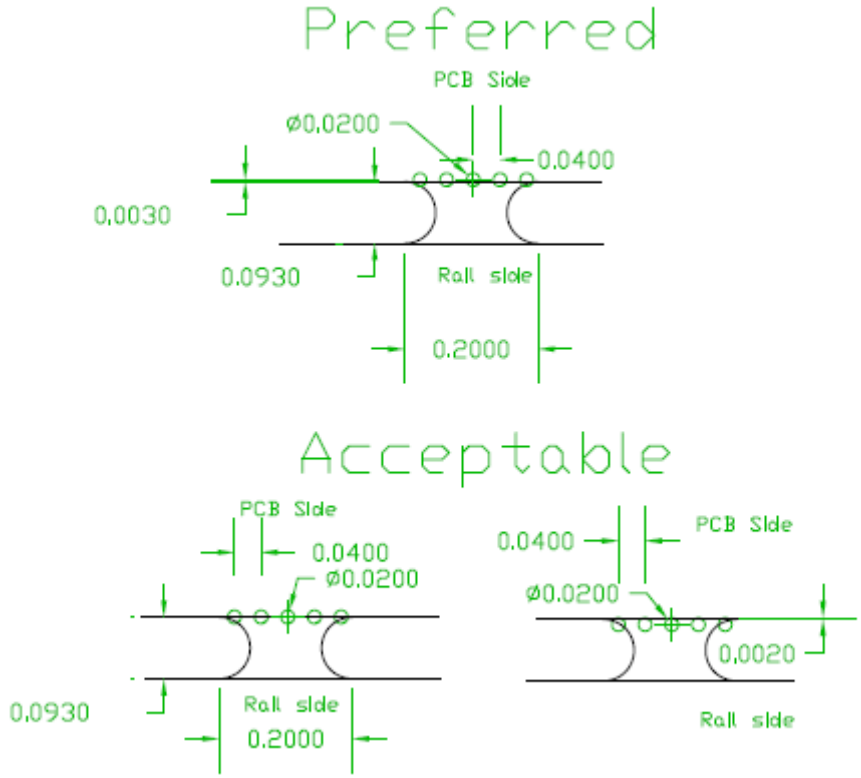


Diagram B

Panel Approval:

EDM Engineering must receive and approve files for any array prior to production to establish the presence of acceptable rails and fiducials and to enable the purchase of stencils. The maximum size panel allowable at EDM is 17.5 x 14 inches (444.5 x 355.6mm). If a different array arrangement than specified would be more cost-effective or convenient in some way, do not hesitate to contact us.

X Out Policy:

EDM will allow for the receipt of X outs on PCB panels with the following conditions:

A. Each panel will contain no more than "N" number of X outs of PCBs per panel:

# PCBs per Panel	Allowable # of X Outs
<=5	1
6-10	3
11-20	4
>20	6

B. Each X-Out board to be marked in a manner so as to make the X out obvious. Marking shall be indelible, and if parts are to be attached to both sides, the marking applied to both sides of the X out board.

C. Panels that include X-Outs shall be segregated from non X-Outs, if included with a normal shipment.

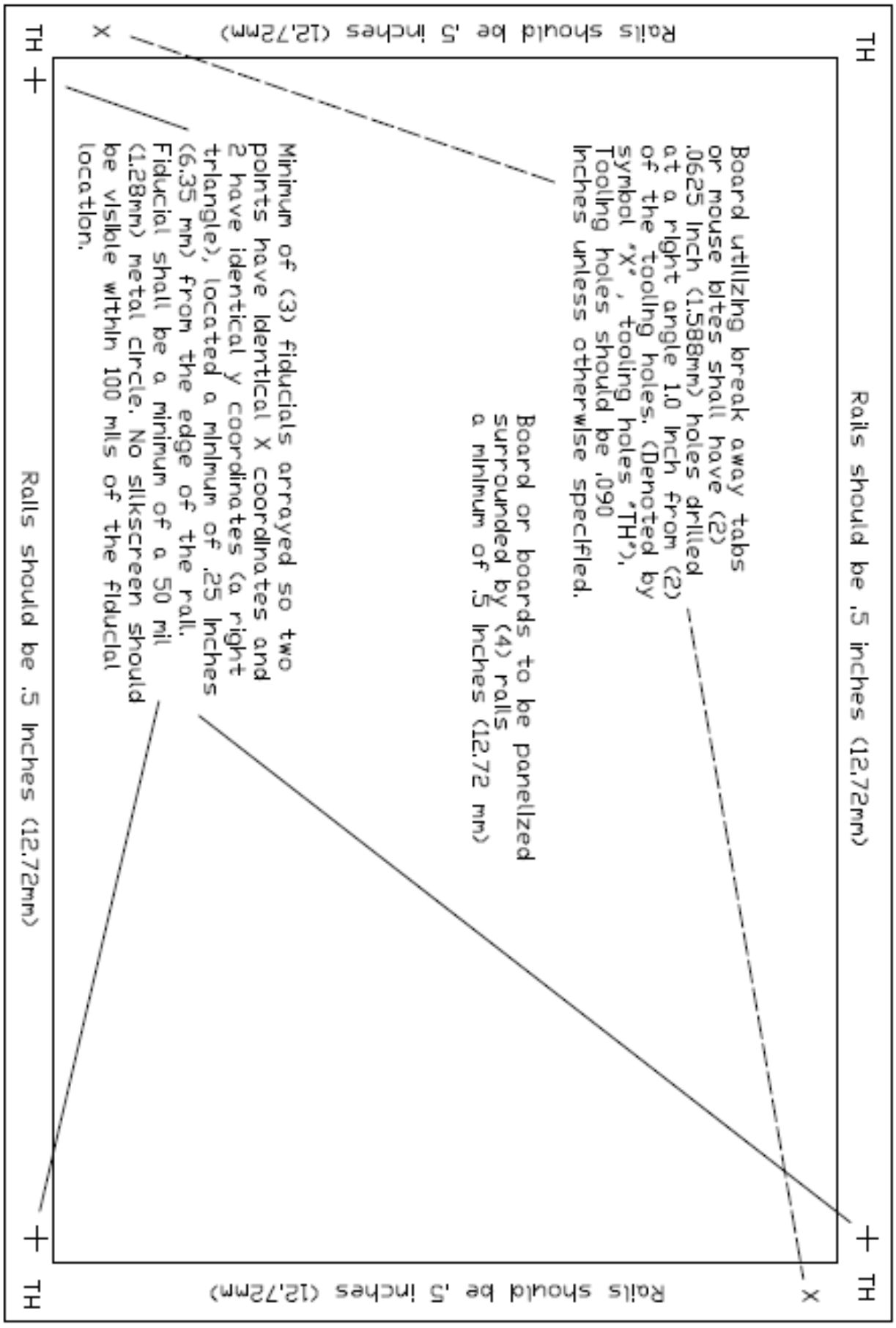
D. Panels with different X-Out schemes shall be sorted into groups and each group packaged separately.

Electrical Testing of PCBs

Unless otherwise specified, all printed wiring boards (PWB) are to be electrically tested, and shall bear a mark stamped in indelible ink after test to show that each unit so marked has passed electrical testing. Any such mark that appears on the board prior to testing does not demonstrate adequate control of untested product.

Materials

All RoHS compliant printed wiring boards (PWB) are to be fabricated from FR-4 material with a Tg of at least 170C. No RoHS compliant board is to be fabricated for EDM using S1000-2 from Shengyi Sci. Tech. Co., Ltd.



Note: Drawing not to scale!

Diagram C

Storage and Packaging of PCBs

To help ensure board performance at the critical soldering and reflow stages, EDM requires that all PCB vendors follow the guidelines set forth in (IPC-1601_2010 *Printed Board Handling and Storage Guidelines*) for the storage and packaging environments of PCBs.

Due to the higher reflow and dwell times found in the lead free manufacturing processes, as well as the increased sensitivity to absorbed moisture and the detrimental effects of trapped moisture, EDM Engineering has determined all PCB suppliers must provide PCBs in a sufficiently dry state to allow normal processing while avoiding the need to bake the PCBs. The IPC-1601_2010 Standard defines maximum acceptable moisture content of the PCB to be between 0.1% and 0.5% of moisture weight to resin weight (*IPC-1601_2010 3.3.6*). If required, PCB suppliers may need to bake PCBs prior to applying the final finish to preserve the solder ability of some finishes.

To ensure that the PCBs supplied to EDM have remained in the sufficiently dry state during storage and transport to EDM, the PCBs shall be packaged with desiccant and a humidity indicator card. The HIC will provide useful information on the performance of the packaging in the environment that the PCB package was transported. PCB shall be packaged in a barrier material that meets the requirements of IPC/JEDEC J-STD-033.

PCB Packaging – Outer Barrier

Materials that meet the J-STD-033 requirements include:

1. Nylon/ Foil/ Polyethylene - outer layer of ESD nylon, aluminum foil middle layer and an inner layer of polyethylene – Example material is 3M Dri-Shield Moisture Barrier 3400.

2. Tyvek / Foil / Polyethylene – Outer layer of Tyvek with aluminum foil middle layer and an inner layer of polyethylene.

3. Aluminized Polyester / polyethylene - acceptable material when used with the proper thickness material. Material thickness > .18mm (0.007 in) thick.

Materials that may require specific permission from EDM Engineering would include clear plastics and polymers that do not contain a metallic film. Plastic films that do not incorporate a metallic layer have been found to provide limited moisture barrier performance. Leave enough excess material to allow for a minimum of (1) resealing of the moisture barrier bag to facilitate incoming inspection.

PCB Packaging – Desiccant

Desiccant material quantity and quality used in the internal packaging shall be in accordance with IPC/JEDEC J-STD-033 and shall be sulfur free. The desiccant materials shall be placed on the edges of the PCB so as not to potentially cause board warping if packages are stacked within the shipping carton. This placement also will prevent the desiccant from interaction with the soldering finish surfaces.

PCB Packaging – Humidity Indicator Card (HIC)

The type included in the PCB packaging shall be in accordance with IPC/JEDEC J-STD-033 and be sulfur free. The HIC shall be packed inside the outer moisture barrier bag along with the desiccant. The HIC will serve as an aid in determining the exposure to moisture to which the PCBs have been subjected.

PCB Packaging – Outer Barrier Bag Sealing

The bag shall be heat sealed to keep out moisture. Full air evacuation is not required or recommended as excessive air evacuation can impede the barrier performance of the packaging material due to punctures, and can also degrade the effectiveness of the desiccant.

Full air evacuation may be used when boards are shipped as loose pieces to avoid damage from shifting and abrasion.

Form 800-066 (04-12-12)

Certificate of Conformance – EDM Printed Wire Boards

Guaranteed characteristics are as follows:

General

EDM Purchase Order Number _____ Quantity _____

EDM Part Number _____ Artwork Revision _____

Drawing Number _____ Drawing Revision _____

RoHS Compliant (Y/N) _____ 100% Test (Y/N) _____

Date of Manufacture _____ Date of Shipment _____

IPC Standard and Class _____

Laminate Material

Manufacturer _____ Mfr. Part No. _____

Lot Code _____ Tg _____ Td _____

Conductors

Top Layer Cu Weight _____ Bottom Cu Weight _____

Inner Layer Cu Weight _____ Pad Finish _____

Filled Vias (Y/N) _____ Type of Fill _____

I, the undersigned Quality representative of ____(Company Name)___ hereby certify that the Printed Wire Boards described above were manufactured according to the specifications detailed above in conformance with the requirements specified in the Purchase Order, fabrication drawings, and ESR-001. Sub-tier Certificates of Conformance are on file.

Signed: _____ Date: _____

Printed Name and Title: _____