

Company Name: Tracer Inc.	Revision Number: 03
Title of Document: Printed Circuit Board Specifications	Effective Date: 5/11/2023
Document ID Number: E001	Reviewed and Approved by: Rutuja Mhatre

PRINTED CIRCUIT BOARD SPECIFICATIONS

PURPOSE

To define the requirements of PCB Fabrication in such a way that optimize Tracer’s assembly process

SCOPE

All of Tracer’s PCB Fabricators/Suppliers, to include Customers who consign PCBs to Tracer for assembly.

SPECIFICATIONS

1. BOARD SIZE

- a. MIN: L 50mm x W 50mm (~2” x 2”)
- b. MAX: L 570mm x 480mm (~22.5” x 19”)

2. BOARD THICKNESS

- a. MIN: 0.1mm (~0.004”)
- b. MAX: 4mm (~0.157”)

3. BOARD WARP LIMIT

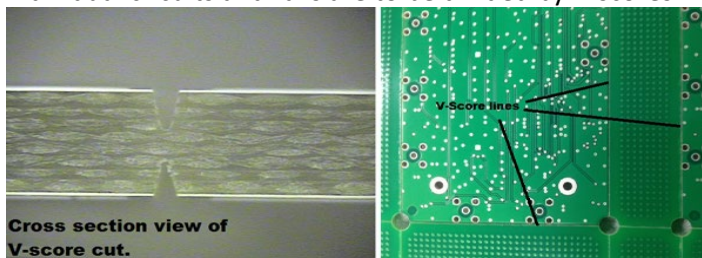
- a. FREE STATE*:
 - i. Upward Max: 1mm (~0.039”)
 - ii. Downward Max: 1mm (~0.039”)
 - iii. *With maximum board size; for other sizes, the value is proportional to the diagonal length of the PCB

4. RAILS

- a. Tracer **requires** that rails be added to **all boards unless otherwise specified**. Tracer requests that the following items be adhered to in respect to rails:
 - i. Rails are required only along the X edge (longer dimension) of board
 - ii. Rails are to be a minimum of 5.84 mm (0.23”) wide
 - iii. Rails must include two 3.18mm (0.125”) tooling holes (one on opposite ends of the rails)
 - iv. Rails must have **3** fiducials (2 fids on one rail and 1 fid on the other). See fiducial specs below in #6.

5. PANELIZATION

- a. Individual circuits and rails are to be divided by V-scores whenever possible (example below).

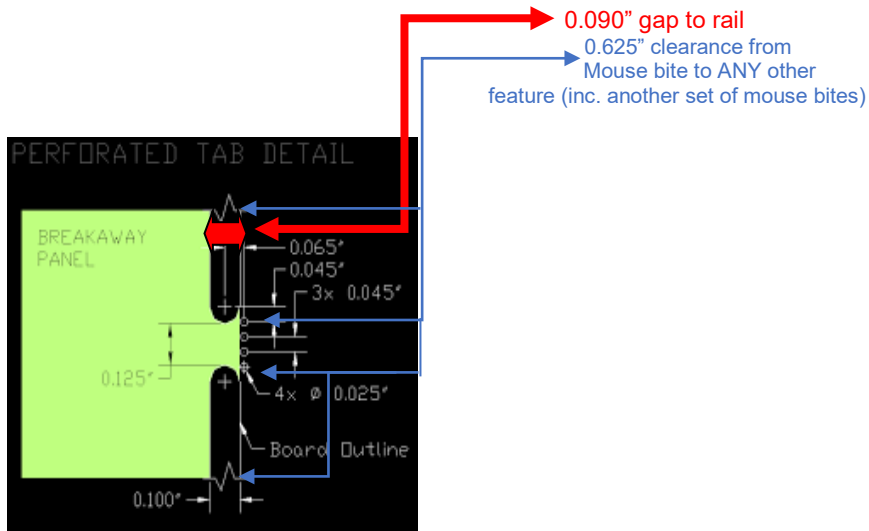


Cross section view of V-score cut.

- b.
- c. If tabs must be used, route channels must be 0.125” wide and,

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- i. There must be a gap of at least 0.090" between PCB and rail
- ii. There must be at least 0.625" clearance between mouse bites or any other feature
- iii. Mouse bites must be present, and be 0.025" diameter



6. FIDUCIALS

- a. Fiducials (a.k.a. "Fiducial Markers") **are required on all PCB arrays** unless otherwise specified.
- b. Add fiducials to both sides of the PCB for all double-sided SMT assemblies.
- c. For Circuits smaller than L 50 mm x W 50 mm, two (2) Fiducials are to be added per circuit.
- d. For Circuits larger than L 50 mm x W 50 mm, three (3) Fiducials are to be added per circuit.
- e. Fiducial size is to be 1 mm inner diameter (round), with a 2mm masking area around each one.
- f. **Any "Clip" into the silkscreen by Fiducials must first be reported to and approved by Tracer before fabrication.**

7. WORKING GERBER & ARRAY GERBER REQUIREMENTS

- a. Tracer requires that all its PCB fabrication suppliers provide **Pre-Fab** working gerbers or array gerbers as soon as they are available for **approval** by Tracer, Inc. These working gerber and array gerber files must be sent to the following email addresses, and if in a compressed file format, **must** be in .zip format:
 - i. eng@tracerpcba.com; QA@tracerpcba.com
 - ii. cc: Purchasing@tracerpcba.com
- b. Please reference the Job # in the subject line of the e-mail to expedite approval.
 - i. For PCB Fabrication manufacturers, this is the first seven (7) digits of Tracer's PO #.
 - ii. For Customers Consigning PCBs, this will be Tracer's Quote # and/or Sales Order #.
- c. Tracer *cannot approve* working or array gerbers from a .png, .jpeg, .gif etc. (i.e. an image capture) format solely. This also includes drawings made in .doc or .pdf files, or any other type of non-vector format drawing.
- d. Tracer must receive Working/Array Gerber files in either the RS-274-X, or RS-274-D formats.
- e. **Overhanging parts/components** will generally require special panelization, and therefore Tracer, Inc. must *always* be consulted for Array approval prior to manufacture.

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8. **E-TEST**
a. All PCBs supplied to Tracer, Inc. must be 100% Electrically Tested.
9. **ELECTRICAL TEST and CERTIFICATE OF CONFORMANCE**
a. ELECTRICAL TEST DATA must be supplied with all deliveries of PCBs
b. CERTIFICATE OF CONFORMANCE – signed and dated copy must be supplied with all deliveries of PCBs
c. Hard or Soft copies are acceptable
10. **SURFACE FINISH**
Tracer can accept all surface finishes but favors ENIG for its superior solderability, planar surface and shelf life characteristics.

For Suppliers:
Tracer reserves the right to not accept nor receive any PCBS that do not meet the above requirements or have not been pre-approved by Tracer prior to their production.

For Customer’s Consigning PCBs:
Non-pre-approved arrays may lead to job delays, extra charges, or in extreme cases, inability to assemble using existing PCBs. Thank you.

Revision History			
Revision	Effective Date	Description of Change	Approval
Prior release of this document was uncontrolled	3/2/2021	Optimized Max Board Size Modification to Rail Requirements	Tyler Toth
02	5/5/2021	Updated instances of “Array Gerbers” to include “Working Gerbers” as it applies to approval requirements before fabrication.	Tyler Toth
03	5/11/2023	Added 10. Surface finish	Rutuja Mhatre