

Jason Brown

From: em.jett.0.7ff33c.facb503c@editorialmanager.com on behalf of JOURNAL OF ELECTRONIC TESTING <em@editorialmanager.com>
Sent: Monday, 12 December 2022 4:10 AM
To: Jason Brown
Subject: JETTA Decision on your manuscript

CC: agrawvd@auburn.edu, "Jake Elliot" u1112015@umail.usq.edu.au

Dear Dr. Brown:

We have received the reports from our advisors on your manuscript #JETT-D-22-00194, "An Investigation into the Failure Characteristics of External PCB Traces with Different Angle Bends", which you submitted to Journal of Electronic Testing.

Based on the advice received, the Editor feels that your manuscript could be reconsidered for publication should you be prepared to incorporate major revisions.

When preparing your revised manuscript, you are asked to carefully consider the reviewer comments which are attached, and submit a list of responses to the comments.

Your list of responses should be uploaded as a file in addition to your revised manuscript.

In order to submit your revised manuscript please log on and you will find your submissions is in submissions needing revision box.

Click submissions needing revision, click edit submission, click attach files, and reupload your revised version.

It is essential that you use this process and not submit manuscript as the history of the reviewers reports and AE assignments are necessary. Please make sure to submit a complete set of editable source files (Word, TeX files, .zip directory are acceptable formats) to generate the document.

Your username is: jason.brown2@usq.edu.au If you forgot your password, you can click the 'Send Login Details' link on the EM Login page at <https://www.editorialmanager.com/jett/>.

Please click "Author Login" to submit your revision.

We look forward to receiving your revised manuscript on or before 01 Jan 2023.

Best regards,

The Editorial Office

Journal of Electronic Testing

COMMENTS FOR THE AUTHOR:

Vishwani Agrawal (Editor-in-Chief): Your manuscript has been reviewed by two independent reviewers, who have submitted their comments and recommendations. Having examined those inputs, I am requesting you to submit a revised manuscript.

Kindly make suitable changes to the paper to the extent possible in response to each comment. You should first make changes to the manuscript, and then write a rebuttal statement to tell the editor (and reviewers) where (section, page, column, line, etc.) each change is made and how it addresses the issue that was raised. For convenience of the editor, the changed parts in the manuscript may be highlighted or printed in a different color.

It is important to remember that your responses to reviewers' comments are addressed to the readers of your paper assuming it is published, and not just to the editor or reviewers. Therefore, changes should be made in the manuscript and the rebuttal statement should indicate where they are. Some comments may ask for more details than what you would be adding. In those cases you might acknowledge the need for enhancements suggesting future work.

Additional instructions are:

(a) Conference or workshop names in the reference list should be preceded with "Proc." and the reference should be complete with all author names (avoid using et al.) and page numbers. Journal references must also include volume, number and page-range. Abbreviations, other than ACM or IEEE, in conference or journal names should be expanded, although abbreviations can be additionally included.

(b) If you have presented or published some of this material before, a reference should be included with specific explanation in the paper stating how the present submission differs.

(c) A declaration section must be placed before the reference list under a heading 'Funding, Conflicts of Interests, and Competing Interests.' This mandatory information should be summarized in this section.

(d) Please include your rebuttal as a list of changes with brief explanations. Even though you are given about three weeks to complete the revision, consider submitting it earlier. A thorough and quicker submission on your part will allow us to make a publishing decision sooner.

Thank you for your interest in JETTA.

Reviewer #1: An Investigation into the Failure Characteristics of External PCB Traces with Different Angle Bends

This document examines the failure characteristics of traces of PCBs at various angles of curvature. While the analysis has sufficient merit to be published in the Journal of Electronic testing, the paper lags in the introductory section and the literature review. My suggestion for the authors is to revise the paper by adding more on the reliability issue of the PCBs. Furthermore, addressing the issue of reliability will assist in attracting a large number of audiences to this work.

I. Please address the thermal and vibration effect on PCB trace cracking. You can add this in the literature review. How these traces with 900 bends and 450 bends will help in improving the thermomechanical reliability of the PCBs? Please use the following references as the previous work resulting from the failure in the PCBs due to external thermomechanical loads:

1. Qi, Haiyu, Sanka Ganesan, and Michael Pecht. "No-fault-found and intermittent failures in electronic products." *Microelectronics Reliability* 48.5 (2008): 663-674.
2. Doranga, Sushil, Matthew Schuldt, and Mukunda Khanal. "Effect of Stiffening the Printed Circuit Board in the Fatigue Life of the Solder Joint." *Materials* 15.18 (2022): 6208.

3. Lall, Pradeep, Arjun Angral, and Jeff Suhling. "Board trace fatigue models and design guidelines for electronics under shock-impact." Proc. 12th IEEE Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems. IEEE, 2010.

II. This work is interesting, but lagging references. Failure of PCB traces results in the loss of signal integrity from 1 PCB to another. Please add more references related to signal integrity issues.

III. You have defined PCB as rigid in your paper. Could you please justify why the PCB is assumed as rigid and not flexible?

Reviewer #2: Comparative testing of straight traces with no bends, traces with 45° bends and traces with 90° bends was conducted in this paper. Some shortages in the test design and the analysis of results should be addressed:

1. The results show that the Joule heating of current is the most relevant cause of failure. Since the straight traces have the shortest length, they therefore have the lowest resistance. On the other hand, as the traces with 90° bends have the longest length, small, but systematic differences between the straight traces with no bends, traces with 45° bends and traces with 90° bends in Tab. 2 are expected even without any influence of bends.

2. Fig. 5: Temperature measurement of straight traces is missing and the resolution of the measurement in the critical area (high temperature area and the temperature distribution between bends and straight areas of traces with bends) is too low. That should be the explanation for the facts in Fig. 4 that traces with 45° bends are significantly more likely to fail at the location of a bend than traces with 90° bends, and straight traces take much longer to fail on an average than traces with bends for a given test current.

3. Tab. 2 and 4: Standard variation should also be used for statistical analysis. It should show a good correlation between results in both Tab.

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