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| |  | | --- | | **Development Procedure** | |  | |
| **FOR EDUCATIONAL USE ONLY** |

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| **What is a miniPCB?** |
| A miniPCB is a printed circuit board that contains a layout of an electronic circuit. |
| A miniPCB has a mechanical design that is consistent with numerous similar miniPCBs. |
| A miniPCB has an interface connector that is simple and economical. |
| A miniPCB has educational documentation that is approved by an engineer. |
| A miniPCB is sold in minimum-order-quantities determined by the PCB panel size. |
| This document is available for free as a download from the GitHub repository: <https://github.com/miniPCB>  This document is associated with the miniPCB Channel on YouTube:  <https://www.youtube.com/@minipcb> |

TABLE OF CONTENTS

[1. Purpose 4](#_Toc128500440)

[2. Scope 4](#_Toc128500441)

[3. Responsibilities 4](#_Toc128500442)

[4. Terminology and Abbreviations 4](#_Toc128500443)

[5. Procedural Notes 5](#_Toc128500444)

[6. Procedure 6](#_Toc128500445)

[7. References 7](#_Toc128500446)

[8. Change and Liability Notice 8](#_Toc128500447)

[9. Trademark Notice 8](#_Toc128500448)

[10. Revision History 8](#_Toc128500449)

[11. Related Content 9](#_Toc128500450)

TABLE OF FIGURES

**TABLE OF TABLES**

[Table 1 – Definitions and Abbreviations 4](#_Toc128496484)

# Purpose

This document provides a deliverables-at-milestone process for developing new miniPCBs.

# Scope

This document applies to development activities related to the miniPCB project.

# Responsibilities

**miniPCB Chief Engineer** is responsible for maintaining this procedure.

**Anyone** developing a miniPCB is responsible for adhering to this procedure.

# Terminology and Abbreviations

Terminology and abbreviations used throughout the miniPCB project are consistent with the definitions presented in this section.

Table – Definitions and Abbreviations

|  |  |
| --- | --- |
| TERM | DEFINITION |
| PCB | Printed Circuit Board, Bare Board |
| PCBA | Printed Circuit Board Assembly, Bare Board + Parts + Assembly |
| SMD | Surface mount device |
| THD | Through hole device |

# Procedural Notes

## Order of Operations

The development procedure starts at kickoff, EE0.0, and proceeds forward through the milestones EE1.0, EE2.0, EE3.0, and EE4.0. Any milestone may be repeated as many times as necessary, and any project can be cancelled, to ensure that Quality Objectives are satisfied.

## Design Standards

Deliverables shall be reviewed for consistency with the current miniPCB Design Standard.

## Collaboration

Collaborator(s) may proceed through all development activities.

## Engineering Release

Approval on the ECO is the engineering action that releases the miniPCB product.

# Procedure

## EE0.0 Kickoff

At the conclusion of the EE0.0 video, an ECO should be created.

* Engineering Change Order requested
* GitHub update

## EE1.0 Preliminary Design Review

At the conclusion of the EE1.0 video, prototypes should be ordered.

* EAGLE project
* Schematic
* Layout
* Datasheet
* Fabrication files
* GitHub update
* Datasheet with Parts List

## EE2.0 Critical Design Review

At the conclusion of the EE2.0 video, testing should be complete.

* Developmental Test Plan created
* Developmental Test Report created
* Datasheet with Test Results

## EE3.0 Final Design Review

At the conclusion of the EE3.0 video, documentation should be ready for release.

* Developmental Test Plan
* Developmental Test Report
* Datasheet complete
* Engineering Change Order reviewed

## EE4.0 Hardware Release

At the conclusion of the EE4.0 video, the work of the miniPCB development engineer is complete.

* Engineering Change Order approved

# References

miniPCB™ Design Standard

miniPCB™ Product Catalog

ECObase Template

TESTbase Template

# Change and Liability Notice

This document is subject to change without notice. While effort has been made to ensure the accuracy of the material contained within this document, Nolan Manteufel shall under no circumstances be liable for incidental or consequential damages or related expenses resulting from the use of this document.

# Trademark Notice

miniPCB is a trademark of Nolan Manteufel.

This document does not constitute permission to use the miniPCB trademark.

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| WORDMARK | FIGUREMARK | FIGUREMARK |
| miniPCB™ | A picture containing drawing  Description automatically generated™ | Icon  Description automatically generated™ |

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| REV | DESCRIPTION | ECO | DATE |
| A | Initial Release | 1013 | 15JAN2023 |
| B | Moved sections included in Initial Release to the miniPCB Quality Manual.  Added sections Idea, Prototype, Released, and Obsolete phases. | 1015 | 16JAN2023 |
| C | Removed sections related to product life cycle and added procedural notes, EE# milestones with lists of deliverables, incorporated ECObase, and added related content section. | 1022 | 28FEB2023 |
|  |  |  |  |

# Related Content

|  |  |  |  |
| --- | --- | --- | --- |
| # | TYPE | DESCRIPTION | LOCATION |
| 1 | Video | Initial drafting | https://youtu.be/Nu3xy9QKs2k |
| 2 | Video | Initial release | https://youtu.be/nyEXWn2ROAk |
| 3 | Video | Drafting, Rev C | https://youtu.be/oAd69bdk28s |
| 4 | Video | Release, Rev C | https://youtu.be/yXWtaEAUBHY |