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

|  |
| --- |
| **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> |

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# Purpose

This document provides steps for developing new miniPCBs.

# Scope

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

# Responsibilities

**Nolan Manteufel** 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 |

# Procedure

## Design Standard

Adhere to the **miniPCB™ Design Standard** throughout the following activities:

* Board Design, Layout, and Revision
* Interface Design
* Part Numbering
* Engineering Documentation
* Branding
* Open Dissemination

## Product Catalog

Maintain the **miniPCB™ Product Catalog** spreadsheet for all idea and product changes.

## CAD Tools

Use each of the following CAD tools.

|  |  |
| --- | --- |
| CAD TOOL | DESCRIPTION OF USE |
| EAGLE | EE Development |
| FUSION 360 | ME Development |

## Document Control

Control miniPCB documentation with each of the following methods.

### Revision History Table

Maintain a revision history table within datasheets and schematic sheets.

### Review and Approval

Review, approve, and sign engineering documentation prior to official release.

### Electronic Signatures

Use one of the following signature formats.

* NM.ddmmmyyyy
* N. MANTEUFEL
* NM

### TESTbase

Create and maintain a simple test management system called TESTbase.

### ECObase

Create and maintain a simple engineering change order system called ECObase.

### Engineering Records

Create the following records for each product.

|  |  |
| --- | --- |
| RECORD | DESCRIPTION |
| Source Files | Gerbers, CAD files, Word documents, Excel documents, etc. |
| Schematics | PDF document (from CAD) |
| Datasheets | PDF document (from Word) |
| FMEA Reports | PDF document |
| Testing Procedure | PDF document |
| Testing Report | PDF document |
| Engineering Change Orders | PDF documents |

### File Repository

Commit all engineering files and records to a GitHub repository.

### YouTube Channel

Create and maintain a channel on YouTube with videos that record significant engineering CAD work.

### Public Disemination

Use GitHub to disseminate engineering files and records.

Table – GitHub Repository

|  |  |
| --- | --- |
| REPOSITORY | LOCATION |
| GitHub | https://github.com/miniPCB |

## Purchasing

Purchase boards from any of the approved PCB vendors.

Table – Approved Vendor List

|  |  |
| --- | --- |
| VENDOR NAME | VENDOR WEBSITE |
| SeeedStudio Fusion | <https://www.seeedstudio.com/fusion_pcb.html> |

# 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 specification does not constitute permission to use the miniPCB trademark.

|  |  |  |
| --- | --- | --- |
| 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 |
|  |  |  |  |