# Open AT Template Guide

## Preface

Good documentation is hard to create and is often the last thing a designer wants to do. Writing out documents explaining your work, figuring out how to word things for a novice maker, and formatting things nicely is often less fun than tinkering and perfecting your design. We understand that documenting a project for someone else to make may be a barrier for some designers, and we're trying to make it as painless as possible to go through the documentation process.

Good documentation is crucial for open source designs. Imagine getting a piece of IKEA furniture, but no screws or step-by-step instructions were included. Instead of getting the screws, you were just told you needed "a few screws" and had a picture of the assembled furniture. Would you end up putting that together, and if so, how much more frustrating would that be compared to if you knew the exact screws and steps to put it together? We've found many open source designs suffer from a lack of detailed documentation, making it hard for people to help others by making useful devices others have designed.

This Open AT Template Guide is meant as a detailed guide for new designers to learn how to use our document templates, why the information we've included is important, and how to build off these templates to document their own designs. We recognize it's long and might be intimidating, but do not feel you need to read through it fully. Feel free to use it as a reference, jumping to whichever sections you need to use. The templates we've created for each document include basic instructions, but if you get stuck you can always look here for much more detailed instructions.

If you have any questions or feedback for us regarding these templates, please feel free to reach out to info@makersmakingchange.com. You can also create an Issue on the Open AT Template GitHub.

# Table of Contents

## Introduction

Open Assistive Technology (Open AT) designs are intended to provide a cost-effective, customizable option for people who need assistive technology. The designs need to be easy to build by a maker, easy to use by a user, and easy to improve upon by a designer. To meet these goals, it is critically important that all the know-how – the documentation, drawings, digitals models, source code, other media, etc. - is complete, comprehensive, and publicly available.

## Objective and Scope

This playbook is designed to help someone who is planning to submit an assistive device to the Makers Making Change Library prepare their submission. It will illustrate the minimum requirements and other recommended elements for documentation of the device. Templates have been created to direct the flow of documentation to produce consistent and useful information.

The templates can be found hosted on the [Makers Making Change GitHub](#).

The templates we've created encompass what we feel are the most important documents for open source designs to have. The templates are based on the requirements from the Open Know-How Manifest (OKH), the Open Source Hardware Association (OSHWA), and our own experience. As a company, we'd like all our devices to meet the requirements for both OKH and OSHWA, but recognize those requirements may be above and beyond what a designer may want to document their device as.

This playbook is intended for a designer, or someone submitting a design on behalf of someone else for:

1. Design projects that haven't started yet. (i.e., Document as you go)
2. Designs that are complete and are ready for submission to the library.

This guide contains a brief description of each document template, as well as detailed instructions for completing each document. The detailed descriptions include what information is required for each document and where it should be presented. Additionally, there are suggestions for the order to complete the documentation.

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# Documentation Overview

This section briefly introduces the purpose of each document, the primary user for the document, and whether it is required or recommended to be included. There is a more detailed set of instructions on filling in the documentation templates in the Documentation Instructions section.

There are documents that are necessary for device submission. These documents are required to allow future makers, users, and updaters to understand the project. All other templates should be used if your project requires it. For example, if your project does not require 3D printing then that template can be left out, but the Bill of Materials (BOM) must be included in every submission.

*Table 1: List of documents and their audience which are required for submissions.*

| Required Item | Primary Audience | Purpose (file types) |
|---|---|---|
| **Documents** | | |
| **Device Summary** | All | Summarize key features and who may benefit from using the device (PDF) |
| **Bill of Materials** | Maker | Breakdown cost, required components, and where to get them (spreadsheet) |
| **User Guide** | User | Explain how to use the device (PDF) |
| **Maker Guide** | Maker | Explain how to build the device (PDF) |
| **Open source license** | All | Explain how to legally distribute the device (PDF) |
| **Other Files** | | |
| **Device Photos** | All | Images to show what the device looks like (JPG, PNG, etc.) |
| **Build Files** | Maker | Files required to build and operate the device (STL, .ino, etc.) |

*Table 2: List of documents and their audiences which are recommended for submissions.*

| Recommended Item | Primary Audience | Purpose (file types) |
|---|---|---|
| **Documents** | | |
| **Change Log** | All | Track key changes to the design over time (TXT) |
| **Design Workbook*** | Designer | Explain how the device was designed (PDF) |
| **Design Rationale*** | Designer | Explain how the device was designed in more detail (PDF) |
| **README** | All | Populate the main page of the GitHub repository (Markdown, .md) |
| **Quickstart Guide**** | User | Briefly explain how to use the device (PDF) |
| **Open Know-How Manifest (OKH.yml)** | Designer, maker | Standardize documentation of the open source device (.yml) |
| **Other Files** | | |
| **Design Files** | Designer, maker | Make it easier for someone to modify the original design by providing CAD models, etc. (STEP, etc.) |

*Either the Design Workbook OR the Design Rationale is required for a submission, not both. The two documents and their differences will be described in their respective sections.

**The Quickstart Guide is recommended for devices that have long User Guides (seven (7) pages or longer).

## Device Summary (required)

**Purpose**

The Device Summary will form the basis of the device listing in the Makers Making Change library. It should include a description of what the device is, how it works/is used, and for whom it is intended. It should also include a basic summary of what is required to build the device.

**Primary Audience**

Anyone who views device website post.

**Required Information**

- Name and overview of the device
- Intended Use
- Usage explanation (i.e., target users, what the device supports)
- Attribution
- Designer
- Download Link
- Project Link
- License(s)
    o Hardware
    o Software
    o Documentation

**Recommended Information**

- Intended User
    o Conditions / Disabilities
- Device material cost
- Build Summary
    o Assembly time
    o 3D Printing Time
    o Build Instructions
    o Skills required
    o Tools required

**Instructions**

Fill out the information under the headings in the template. Include any other important information you think an individual (maker, user, someone interested) who is looking at the device page on the website should have. See the Device Summary instructions section for detailed instructions.

## Design Workbook (recommended)

**Purpose**

This document is intended to provide a place for the designer to track progress throughout the timeline of a project. It is essentially a less structured and simpler version of the Design Rationale, meant for designers who find filling out the Design Rationale challenging.

You only need to complete the Design Workbook OR Design Rationale, not both.

**Primary Audience**

Designers, Makers

**Required Information**

- Introduction
    o Why device was being designed
- Include requirements for the device to be considered successful
- Record your work as you complete it

**Recommended Information**

- Introduction
    o What needs the device must meet
    o Description of intended end-user
- Research
    o Look for and record existing commercially available or DIY options for meeting the user's needs

**Instructions**

Complete the initial sections by filling out the provided tables. Create a chronological record of your work as you go. Feel free to include notes and work however you work best (pictures of hand written notes/notebooks, typed notes, screen captures of other work on a computer, etc.).

See the Design Workbook instructions section for detailed instructions.

## Design Rationale (recommended)
**Purpose**

This document is intended to give an overview of the device's design from ideation to complete design. This will give future viewers of this document perspective into the choices that were made in the design process and give future updaters information about the challenges of the design.

You only need to complete the Design Workbook OR Design Rationale, not both.

**Primary Audience**

Designers, Makers

**Required Information**

- Introduction
    o Why device was being designed

- o What needs the device must meet
- o Description of intended end-user
- Requirements
  - o Goals of what the device will do
  - o Functional requirements – What the device must do to work properly
- Research
  - o Summary of any existing commercial options
  - o Summary of any existing DIY options
- Prototyping
  - o What prototypes were created?
  - o What decisions were made about the prototypes?
- Detailed Design
  - o Breakdown of final design explaining why choices were made

**Recommended Information**

- Requirements
  - o Non-functional requirements – Other requirements for the device to be a success
  - o Constraints – Restrictions that limit the possible design of the device (size, weight, materials, etc.)
- Ideation
  - o Initial ideas brainstormed to meet the goals of the device
  - o Decisions made about the initial ideas
- Conceptual Design
  - o What concepts were considered?
  - o What criteria was used to decide amongst them?
- Testing
  - o Any testing that was done to make sure the design meets the goals of the device
- Opportunities for Improvement
  - o Descriptions of how the device could be improved in future iterations

**Instructions**

Fill out the design rationale template as you work. If the design has been completed, then going through each stage of this template document allows one to review choices made. By filling out the template all requirements should be covered but since every design is different, please add any information you think was valuable within the design process.

## Build Files (required)

**Purpose**

The build files are the files required for a maker to build the device. These would be any files required for 3D printing components, custom printed circuit board (PCB) files, firmware files, or laser cutting files.

**Primary Audience**

Makers

**Required**

- 3D printing .STL files (if 3D printing is required)
- Firmware files (if firmware is required)*
- Software files (if software is required)*
- Gerber files (if making a custom PCB)
- Laser cutting files (if laser cutting is required)

*Firmware and software are often used interchangeably. These are differentiated here based on function. Firmware is the code loaded onto a device that a user will not interact with directly, whereas software would be any code/program a user would interact with directly while using a device. Most devices currently on the MMC library use only firmware to control them (ex: the code loaded onto the LipSync is firmware, not software).

**Instructions**

Include all the files a maker would need to make the device. Gerber files should be in a zipped folder with the device and PCB name, and the date the filers were created in the folder name (<Device_Name>_<PCB_Name>_YYYY-MM-DD.zip).

## Device Photo(s) (required)

**Purpose**

To give individuals interested in making or using this device an idea of what the final product looks like. A variety of photos, videos, or GIFs of the device in use and on its own allows an individual to get a good idea of the device.

**Primary Audience**

Device User, Device Maker

**Requirements**

- At least one, clear, focused image that illustrates the device.
- Image(s) must be at least 500 x 350 pixels and up to 1000 x 800 pixels
- Rename image(s) with descriptive names (not IMG_XXXXX, etc.)

**Recommendations**

- Save photo(s) as .JPG or .PNG files
- Include image(s) of device in context of use

**Instructions**

Take at least one photo of the device that meets the above requirements.

For more tips on taking good photos, please see the Device Photo(s) instructions section.

## Maker Guide (required)

**Purpose**

The Maker Guide provides clear, step-by-step instructions on how to build the device. Enough detail should be included so that makers with a range of different skill levels can successfully build the device independently. The maker should be able to follow this document from the beginning to end of the build and to use as a final check at the end of the project to make sure they covered everything.

**Primary Audience**

Maker

**Requirements**

- List of parts required for the build
    - List of 3D printed parts
    - List of off the shelf components
- Tools list
    - List all tools required to build the device (ex: wire cutters/strippers, soldering irons, etc.)
    - List consumable supplies required for the build (ex: solder, glue, etc.)
    - List of personal protective equipment (PPE) a maker should use while building the device
- 3D printing guide (if 3D printing parts)
    - 3D printer settings
        - Infill density
        - If supports are required
- Assembly guide
    - Step-by-step instructions on how to build the device
- Tests a maker should complete to ensure the device works (if necessary for the device)

**Recommended**

- Maker checklist
    - To-do list to complete the device from start to finish
    - List of items to give to the end-user
- Customization Guide
    - Information to ask the end-user about customization/customization options
- Custom Printed Circuit Board (PCB) guide (if using a custom PCB)
    - Include how to order a custom PCB
- 3D printing guide (if 3D printing parts)
    - 3D printing summary
        - Total time for printing
        - Total number of components
        - Total mass of components
        - Typical number of print setups
    - 3D printer settings
        - Nozzle size
        - Layer height
        - Print orientation information
        - Build plate adhesion information (if brims are required, etc.)

- o Post processing
  - ▪ Any post processing a maker needs to do on a device (removing support material, etc.)
- o Examples of quality prints
  - ▪ Images of good quality printed parts
- Maker component list
  - o Names and images of each part used in the device
- Assembly guide
  - o Photos or graphics that illustrate each step
- Troubleshooting information for makers (if necessary for the device)

**Instructions**

Fill out the Maker Guide template, completing the sections indicated. Delete any sections that are not relevant to your design (PCB guide if not using a PCB, firmware flashing steps if there is no firmware, etc.).

Imagine yourself as a novice maker who is unfamiliar with the device, and may be unfamiliar with some of the tools and techniques used (such as ordering custom PCBs, 3D printing, or using Arduino).

## Bill of Materials (required)

**Purpose**

The Bill of Materials (BOM) provides an accurate, comprehensive list of all the materials required to build a device and information on where the materials may be obtained. It also includes the estimated cost of a device, and can be used by someone updating the device to identify how the device may be made more affordable, or how to switch out components if parts become unavailable.

**Primary Audience**

Maker, user, designer

**Required Information**

- Detailed name of component (e.g., 3.5 mm Female Stereo Cable – 6ft)
- Quantity of the component needed
- Price of component
- Link to purchase the component

**Recommended Information**

- Part ID used in Maker Guide
- Manufacturer name
- Supplier name
- Alternative sources (suppliers) for each purchased component

**Instructions**

Fill in the BOM template Excel sheet with the information required for each component, including 3D printed parts. Save the Excel file both as an Excel sheet and as a .CSV file. See the Bill of Materials instructions section for detailed instructions.

## User Guide (required)

**Purpose**

This document will be used to provide clear instructions and details of how to use the device to the user. Describing how all components of the design work is important as for many devices the use cases can be very different. This document should allow the user to get using the device and understand all its capabilities.

**Primary Audience**

Device User, Health Professional, Design Tester

**Required Information**

- Introduction
    - o Brief description of what the device is and what it does
- Features
    - o Describe important features of the device
- Compatibility
    - o Include any information about other devices the assistive device works with (if necessary for the device)
- Usage
    - o Describe how to use the device

**Recommended Information**

- Overview
    - o Brief description and image of device
- Specifications
    - o Include important technical details of the device, like size, weight, operating force, etc.
- Usage
    - o Include images that will help with usage
- Cleaning
    - o Include how to clean the device properly
- Care
    - o How to properly maintain the device
- Disposal
    - o Any information on how to properly dispose of the device

**Instructions:**

Fill out the User Guide template.

This will include:

- Taking a picture of the complete device and labeling the important components the user will be interacting with.
- Measuring the specifications of the device such as mass, size, etc.

- Testing out compatibility if the device requires interacting with other devices.
- Making sure that there has been input from users who would use this device on language used and to understand more of usage cases.

## Changes (recommended)

**Purpose**

This document allows individuals to track the development of the device. Intended to communicate the changes between versions and what versions have been created.

**Primary Audience**

Device makers, Design updaters

**Required Information**

- V1.0 key features
- If there are future versions: version number and key features of that version
- Date finalized for each version

**Instructions:**

Fill out the Change Log template. If you are just starting the design, please use this template to make notes while prototyping to catch any important decisions/features that were made for each version. For original version state any key components of the device.

Make point form notes of key changes that have been made for new versions.

## README File (recommended)

**Purpose**

The README file is a markdown file that is rendered and displayed automatically on the GitHub repository for the device. It is used as the landing page on the GitHub repository, and mirrors the MMC website device page.

**Primary Audience**

Everyone who interacts with the GitHub repository.

**Required Information**

- Device name
- Links to device documentation and website
- Licensing information
- Original designer(s)

**Instructions**

Find and replace the information outlined at the beginning of the README. Add a brief description of the device, and summarize the general steps to create the device. Read through the document to see if there are any other fill in spots you may have missed (indicated by all caps text in angled brackets <LIKE THIS>).

## Design Files (recommended)

**Purpose**

The design files are the original models designed, ideally saved in a neutral file format (not a proprietary software format). For example, if designing an assistive device to be 3D printed, the .STEP files should be submitted as well as the .STL files for 3D printing. If it is not possible to export as .STEP files, the original software files (Fusion 360, SolidWorks, etc.) should be included.

Including the design files allows makers to more easily customize or update the device than if only .STL files are provided.

**Primary Audience**

Makers, designers

**Required Information**

Include the CAD model files along with the .STL files for printing. Ideally, include them as .STEP files for easy use across different CAD software.

**Instructions**

Save the CAD model as a .STEP file and add it to the Design_Files folder in the CAD_Design_Files subfolder.

## Open Know-How Manifest (recommended)

**Purpose**

The Open Know How project is an initiative designed to promote and facilitate the sharing of open-source hardware documentation. It aims to provide standardized tools and formats to make it easier for creators to share their designs and for users to access and build upon these resources. Central to the project is the Open Know How Manifest (OKH.yml), a structured format for documenting open hardware projects that ensures consistency and comprehensiveness. By fostering a collaborative environment, the project seeks to enhance innovation and accessibility in the open hardware community, enabling more individuals and organizations to contribute to and benefit from open-source hardware.

**Primary Audience**

Makers, designers, users

**Required Information**

- Name of hardware
- Description of hardware
- Link to project (website, GitHub, etc.)
- Licenses
- Author (name and email)

**Recommended Information**

- Intended use of hardware
- Keyword(s) for searching for the project
    o Disability types, assistive device type, etc.
- Affiliation of author
- Contact details for the device
- Social media links related to the device/author
- List of contributors
- Version information
- Development stage
- Design files
- Bill of Materials
- List of Tools
- Maker Guide
    o Assembly guide
    o Examples of quality prints/testing information
- Risk assessment (if completed)
- User Guide
    o Operating instructions
    o Maintenance instructions
    o Disposal instructions
- Firmware files

**Instructions**

Go to the Open Know-How website and complete the form to generate the Open Know-How manifest.

# Documentation Instructions

This section goes through the recommended order for creating documentation, and gives more detailed instructions of what to include in each document. Each document template includes the relevant section headings and point-form instructions, but this document includes additional detail if you require it. The suggested order for completing the documentation is the order in which the sections appear.

Again, don't feel you need to read this from top to bottom, use this as a more detailed reference when you aren't sure what to include or where to include it.

## Common Instructions Across Multiple Documents

This section lists some instructions which are common across multiple document templates.

### File Name Convention

File names should be short and descriptive. Someone should be able to look at the file name and understand what they will see when they open it.

For ease of use across multiple software suites and systems, we recommend using underscores in filenames over hyphens, spaces, or camel case (camelCase). Some software does not allow for spaces in file names, and we feel underscores are more easily legible to people than using hyphens or camel case. Hyphens and underscores are also useful in search engine optimization, which makes the device more likely to be found when people search for related things on the internet.

The file name convention should be followed for all files (documents, build files, design files, etc.).

### Help Text

Help text is minimal in the actual document templates themselves. Once documentation is complete, the help text needs to be removed before the design is posted. To help find all help text, it has been written between angle brackets, <like this> (often in all caps).

### Headers and Footers

Each Word document has the same header and footer layout. The headers include the device name, document name, year and month the document was created, and the version. The footer contains the year the document was created, the author of the document, the license information, and the link to the MMC webpage for the device. The following need to be updated in all headers and footers. The placeholder for updating the information is shown is brackets beside each line.

- Version of the device (V<X.Y.Z>)
- Device Name (<DEVICE NAME>)
- Date the device was posted (<MONTH><YEAR>)
- Year(s) of the copyright (<YEAR>)
- Author of the document (<AUTHOR>)
- Website link (<REPLACE WITH MMC GITHUB LINK>)

### Overview

The overview is a quick description of the document, a one-line description of the device, and a photo of the device. The text in the document template can remain the same, just changing the device name (<DEVICE NAME>) and adding the one-line description of the device.

The overview can be copy and pasted across documents, and the one-line description from the overview can be used in the README overview section.

## Table of Contents

Each document should contain a table of contents. The table of contents needs to be updated before publishing.

## Versioning

Files should contain version information to effectively track updates. One standard versioning method is semantic versioning, which uses the version X.Y.Z numbering format. The first number (X) represents large scale version changes which introduce incompatibilities with previous versions. The second number (Y) represents backwards compatible functional changes, and the third number (Z) represents backwards compatible bug fixes.

All major version numbers (X) should be updated together across the documents, physical components, electronics, and code. The other numbers (Y.Z) can differ. Where to version different files and types is outlined in the table below.

| Project Files | Place to version |
|---|---|
| Documents | Headers (VX.Y.Z) |
| Code | Comments at the beginning of the code |
| CAD models | File name |
| .STL files | File name |
| PCB files | File name |

Alternatively, date versions can be used if semantic versioning is too burdensome. Date versioning appends the date of a revision / change to the end of the file name, adds it in the header, or in a comment at the beginning of code. The date format must be YYYY-MM-DD to follow international convention.

## Tables and Images

Tables and images should be referenced before they appear, and / or have captions which introduce them and provide the necessary context to understand them. Another person should be able to look at the document and understand what the table and images mean without additional explanation from the author of the document.

## Design Workbook

### Overview

The Overview only requires the device name (<DEVICE NAME>), a short description of the device (<INSERT ONE-LINE DESCRIPTION OF DEVICE>), and an image of the device <DEVICE_IMAGE> to be added. The other text can be left unchanged.

### Introduction

The Introduction section should give the background of the design. This should include where the idea for the device came from (design challenge, user request, etc.), what needs the device is being created

to meet, and a description of intended end-users of the device. If known, specific conditions which may benefit from people with those conditions using the device should be named, otherwise general conditions could be used (ex: people with cerebral palsy vs people with limited fine motor control).

Do NOT include identifying information on a specific end-user if they requested the device be designed (ex: name, age, gender, sex, location).

### Requirements
List any requirements for the device that need to be met for the device to be considered successful. These can be point form, and may include size and weight limits, function requirements, or customizability of the device.

### Research
Include links to and descriptions of existing devices that might meet the needs of someone using this device. Briefly describe why an existing device might be a good or bad option for a user.

### Working Notes
Keep a log of the work you complete on the device. This is not meant to be detailed list of everything done whenever you work on the design, but just summaries of key work you did. Examples of important information may be images of different CAD models, major design decisions, and any testing that was done to make sure the device works properly.

If you prefer working with pen and paper, feel free to take photos of your hardcopy notes and upload them to this document.

## Design Rationale
The Design Rationale will vary depending on the type of device being created. Complex devices will require more in-depth records of the work that was completed, whereas a simple device may require a minimal Design Rationale.

### Overview
The Overview only requires the device name (<DEVICE NAME>), a short description of the device (<INSERT ONE-LINE DESCRIPTION OF DEVICE>), and an image of the device <DEVICE_IMAGE> to be added. The other text can be left unchanged.

### Introduction
The Introduction section should give the background of the design. This should include where the idea for the device came from (design challenge, user request, etc.), what needs the device is being created to meet, and a description of intended end-users of the device. If known, specific conditions which may benefit from people with those conditions using the device should be named, otherwise general conditions could be used (ex: people with cerebral palsy vs people with limited fine motor control).

Do NOT include identifying information on a specific end-user if they requested the device be designed (ex: name, age, gender, sex, location).

## Requirements

The Requirements section outlines what is required for the device to be considered successful. These requirements are intended to assess if existing devices meet the needs of the intended users, inform the development of the device, and can be used to determine if a design is complete.

### Goals

The goals of a project reiterate what needs are to be met by the device. The goals should be specific, and cover all the requirements a user has identified for the project.

### Functional Requirements

Functional requirements are specific requirements related to how the device works to meet the goals of the project. These requirements should be specific and quantifiable. Ideally, each goal can be translated into a functional requirement to more easily guide the development of a device and assess if it has met the needs of the end-user. These requirements could include:

- How the device interfaces with other devices (wireless connection, wired connection, etc.)
- Weight / size of the device
- How the device is set up and put away (independently, with help from a caregiver, etc.)

### Non-functional Requirements

Non-functional requirements are requirements that do not relate to how the device works, but are still related to the device meeting the goals of the project. These could include:

- Aesthetic customizability (colour, adding text, adding patterns to a device surface)

### Constraints

Constraints are any limits on the design that would reduce the number of possible solutions to the problem. These could include:

- Cost constraints
- Time constraints (if applicable)
- Material types
- Compatibility with other devices
- Weight / size of the device

Constraints and functional requirements may overlap, but ideally will be separate.

## Research

The Research section describes the initial research into devices that already exist to meet the needs outlined in the Introduction. This section should also include a brief explanation of how and when the research was conducted (ex: Google searches were completed between May and June, 2024, searching for switch interfaces for computers).

The devices can be split into commercially available and DIY options. If there are no devices that were found to meet the needs of the users, state so in this section.

### Commercially Available Options

This section summarizes commercially available options that may meet the goals of the project. The summaries should be brief and include only information that will inform the suitability of the device to meet the goals of the project, and inform the design of the new device. This section includes tables that you can fill out to concisely summarize the information about the device. You should also include:

- A picture of the device
- A brief description of the device (how it works and what it does)

Each device should have its own subsection, and the tables, help text, and headings can be copy and pasted to be filled in for each device.

### DIY / Maker-Friendly Options

This section summarizes DIY / Maker-friendly options that may meet the goals of the project. The summaries should be brief and include only information that will inform the suitability of the device to meet the goals of the project, and inform the design of the new device. This section includes tables that you can fill out to concisely summarize the information about the device. You should also include:

- A picture of the device
- A brief description of the device (how it works and what it does)

Each device should have its own subsection, and the tables, help text, and headings can be copy and pasted to be filled in for each device.

## Ideation

This section covers the initial brainstorming and concepts considered to meet the goals of the device. These concepts should be the broad ideas, and do not require specific ideas for how to create them. For example, the Ideation level of an assistive switch would include the way the switch is activated (motion sense, light sensing, physical switch) but not specific parts that would allow these switches to be made.

Each idea should include the minimum required information to understand the idea. A reader should understand the basic desired function, how the device would work, and any decisions made about that idea (if it was abandoned, combined with other ideas, or brought to the next step of the design process).

This section should include:

- Sketches of ideas
- Basic descriptions of desired function
- Basic descriptions of how the idea would work
- Any decisions made on the ideas before moving to conceptual designs
  - Why an idea was abandoned, why it was continued with, etc.

The organization of this section will change based on the complexity of the device, and is left open for the designer to organize.

*Ideation Decisions*

However the rest of Ideation section is organized, there should be a section which explains any decisions made about which ideas are moving forward to the Conceptual Design stage. Reasoning for why some ideas were abandoned and others were moved along should be justified.

## Conceptual Designs

The Conceptual Designs are where you take the ideas from the Ideation section and start to flesh them out. This section is where you would start selecting components, designing any parts, and outlining code. There should be enough detail here to justify any decisions about the conceptual designs that were continued to prototypes, or abandoned.

If different concepts use the same subsections (ex: if the code structure / function is the same between three different physical devices), that subsection can be broken out and referenced in each concept, rather than being written out under each concept.

*<CONCEPT 1>*

Each concept should be named with a descriptive name that will help differentiate them when comparing them, or referring to them later. This section should be completed for each concept considered.

Start with a brief description of the concept. This description should include how the concept works, the components of the concept, and any useful images.

### Physical Component / Enclosure

Describe the physical components of the design, and / or the electrical enclosure for the device. Include sketches and / screen captures of CAD models at this stage.

### Electrical Components

Include the electrical components used in the concept. You do not need to include all technical specifications for each component, but should include links to purchasing and the data sheets for each component.

### Code Structure / Function

If there is code involved in the design, describe its function and general structure. This should also include links to any required software, libraries, or other components. Again, the descriptions only need to be detailed enough to inform the decisions of what is taken forward for prototyping.

### Concept Decisions

Summarize and justify any decisions made about continuing with or abandoning different concepts outlined above. Any concepts that are continued with will continue to the prototyping stage.

## Prototyping

The prototyping section describes designs that were made and tested. This section describes the different prototypes created, and summarizes the prototyping process. Small changes, like adjusting tolerances for parts, does not need to be described in detail. Different versions of prototypes would include changes that make different designs incompatible with each other (ex: major changes in size or shape, change of microcontroller, etc.).

*<Prototype 1>*

This section should be completed for each prototype. Be careful and use discretion when deciding what is a new prototype versus what is a minor change.

Describe the prototype (how it meets the goals / requirements of the project). Include images of the prototype as well as descriptions.

## Prototype Decisions

Identify the successes and areas of improvement for this prototype. If you used it to inform another prototype, identify the changes you made in the description of the next prototype. Include any decisions to proceed, abandon, or modify the design and justify those decisions.

## Testing

The Testing section outlines any testing that was completed on the device. The section should be detailed enough to allow another designer to come back and repeat the same tests on the device, or a new version of it. These tests should be restricted to what was important when designing the device, not the tests a maker should complete to ensure an assembled device is working properly.

Important tests could include:

- Testing that the code on the device works as intended
- Strength tests on parts
- Clearance tests
- Measuring output of a device (ex: cursor speed on a joystick device, sound on an audio device, etc.)

Tests could also include user testing. If there was testing done with users, DO NOT include identifying information such as name, age, or location of the users. You should include specific conditions the users had (if important for the device).

If tests were not performed or not necessary, state so in this section. If there are tests you feel should be completed on the device, describe them so another designer would be able to complete them.

### *Test Methods*

Describe what the tests are for, how they are conducted, and how to assess the results of any tests. For example, if conducting a strength test, include the description of what part is being tested, how the strength is being tested, and how you will say the part is "strong enough". Ensure you include enough information for another designer to complete the same tests.

If there is code used for testing, include links to the code used for testing.

### <Test 1>

Label tests with descriptive names. Complete these sections for each test completed.

### *Testing Results*

Summarize the results of each test, including any relevant data, and stating if the device passed or failed any tests where that is applicable.

## Detailed Design

The Detailed Design section focuses on the version of the design that will be released. This section must include what the device does and how it works. The layout of this section will depend on the complexity of the device, and is left at the discretion of the designer to organize as they see fit.

Ensure that all important features are described, how the device works, and what it does is explained, and include any goals / requirements the device does not meet. If there are unmet goals / requirements, justify why the design is still complete without meeting those.

### *Physical Component / Enclosure*

Describe the features of the physical components and / or electrical enclosure. Include images if possible. Include important technical details for any parts that require those details.

### *Electrical Components*

Describe the features of the electrical components. Include images if possible. Include important technical details for any parts that require those details.

### *Code Structure / Function*

Explain the code structure and function, as well as any important features. Provide links to external libraries (if used). Make sure your code is also commented for others to understand.

## Opportunities for Improvement

This section provides details on how to improve the device in future versions. These opportunities could be extra functionality that was not originally created, highlighting current weak points of the design, or any unmet goals / requirements. Opportunities for improvement could impact the functionality or buildability of the device, or the user experience with the device.

### *Physical Component / Enclosure*

Add any opportunities for improvement to the physical components / electrical enclosure.

### *Electrical Components*

Add any opportunities for improvement to the electrical components.

### *Code Structure / Function*

Add any opportunities for improvement to the code.

## Design Files

Design files should have descriptive names, so other makers and designers can easily understand what they are looking for and editing. File names should use underscores ( _ ) instead of spaces, hyphens, or camel case (camelCase).

The best format for a design file name would be <Device_Name>_<Part_Name>_V<Version_Number>. If, however, the device has a long name, the <Device_Name> can be shortened. For example, the first version of the front cap for the newest (fourth) version of the LipSync would be titled LS4_Front_Cap_V1 instead of LipSync_4_Front_Cap_V1.

## CAD Files

Ideally, submit CAD files as .STEP files. These are a neutral CAD file extension that most CAD software recognizes. If it is not possible to submit the files as .STEP files, submit them as the original software files (Fusion 360, SolidWorks, etc.).

If a design has multiple components, the files can be submitted as an assembly, but other designers should be able to separate the parts and edit them if needed.

Include versioning information in the file name as well.

Before exporting the CAD files as .STL files, it is best practice to orient the parts so they get imported into slicers in the orientation intended for printing.

### CAD Files Checklist
- Files names are unique and descriptive
- File names include versioning information
- File names use underscores, not hyphens or camel case
- Parts are oriented so .STL files import into slicers in intended orientation
- Files have been exported as .STEP files
- Files have been exported as .STL files
- Add design files to **Design_Files -> CAD_Design_Files**

## PCB Files

Submit PCB files in the native format from the software used to design them.

Include versioning information in the file name as well.

### PCB Files Checklist
- Files names are unique and descriptive
- File names include versioning information
- File names use underscores, not hyphens or camel case
- Gerber files have been created for fabrication
    - Create a zipped folder of the Gerber files
    - Name the folder using the following convention: <Device_Name>_<PCB_Name>_YYYY-MM-DD.zip
- Add design files to the PCB Design Files subfolder in the Design Files folder (**Design_Files -> PCB_Design_Files**)

## Testing Code

Submit any code used to test and verify the device as it was being designed. These files are not ones used to test if an assembled device is working (part of the maker process), but code that was developed and used as part of the design process.

### Testing Code Checklist
- File names are unique and descriptive
- All required libraries are included in the folder or referenced for others to download
- Versioning information is in a comment at the beginning of the code

- Licensing information is in a comment at the beginning of the code
- Add code to **Design_Files -> Testing_code**

## Bill of Materials (BOM)

### Document Information

- Device: Replace the <DeviceName> with the name of the device.
- Version: Create or update with the design version.
- Last Updated: Update with the date the document was last updated

### Commercial Parts

Create a line for each unique commercially available component in the device. Include as much information as possible on the vendor, manufacturer, etc., so a future maker can find a comparable part if the one you list is no longer available. Include at least one website link.

For each part, you'll need to enter the quantity used in the design (QTY / Device), the quantity the part is sold in (QTY / PKG), and the cost of each package ($ / PKG). The spreadsheet will automatically calculate the number of packages required to order (PKGs), the cost of just the components required to make the device ($/device) and the total cost of supplies to be ordered (Total Estimated Cost).

Don't forget to include ALL components used in the design, such as fasteners like machine screws and nuts.

E.g., A device requires 6 LEDs. The LEDs are sold in packs of 5 for $4. 6 is entered into QTY / Device, 5 is entered into QTY / PKG, and $4 is entered for $/PKG. The spreadsheet automatically calculates the number of packages required (PKGs), cost per device, and total estimated cost for the LEDs.

| Part | Description | | Manufacturer | Supplier | QTY / Device | QTY / PKG | PKGs | $/ PKG | $ / Device | Total Estimated Cost |
|------|-------------|--|--------------|----------|--------------|-----------|------|--------|------------|----------------------|
| LED | | | | | 6 | 5 | 2 | $ 4.00 | $ 4.80 | $ 8.00 |

Add the part ID from the Maker Guide for makers to reference between the documents.

We have also created a BOM for our most commonly used components. This BOM has all the information required for each component, in the layout used in a new BOM. If you are using components that are listed on this BOM, you can just copy and past the useful information into those lines (including the price and links to components). The BOM is available on our website [INSERT LINK HERE].

### Custom Printed Circuit Boards

Create a line for each custom printed circuit board in the device. Indicate the quantity required per device (QTY / Device) and the quantity per package / order (QTY / PKG). The minimum order size for many custom PCB manufacturers is five (5). Add a separate line for shipping costs.

Add the part ID from the Maker Guide for makers to reference between the documents.

### 3D Printed Parts

Create a line for each 3D printed component in the device. Indicate the filament type, and whether a given component needs to be a specific color. Use the slicing software to estimate the material usage for each part using the intended print settings. An estimated or actual price per kilogram ($ / kg) for each filament should be added to calculate material cost.

The spreadsheet will automatically calculate the cost per device and total estimate cost (which generally should be the same.)

Add the part ID from the Maker Guide for makers to reference between the documents.

## Tools

Create a line for each tool used in the assembly. This can be adapted from the list in the Maker Guide.

Add the part ID from the Maker Guide for makers to reference between the documents.

## Alternatives

Use this section to list any known alternative sources for the commercially available parts (such as the same part from a different vendor). Use the same ID as the part in the main part of the BOM to make it easy to cross reference. Include the same information.

## Bill of Materials Checklist

- Double-check that all components are listed
- Double-check that the quantities per device are correct
- Double-check that the link goes to the correct part

## Device Photo(s)

There are plenty of resources online which can help you learn best practices for taking photos. Here we have some general best practices for photos, as well as specific details relevant to Open AT documentation and MMC.

### Photo Guidelines

#### *Taking Photos*

Some best practices for taking photos, whether they are used for assembly instructions or the device photos, include:

- Taking photos in landscape instead of portrait format
- Making sure there is good light on the device, minimizing reflections and shadows on the device
    - Natural light is best
- Reducing clutter in the image by removing background clutter/taking photos on a neutral background
- Taking a variety of photos (closeup and further back photos)
- Putting devices in context with other relevant devices (ex: switch adapted toys with an assistive switch)
- Centering the device in photos
- If 3D printed, using a neutral filament colour that shows details well in photos (not black or white filament)
- Ensuring there is adequate contrast between the device and the background
    - Follow the WCAG guidelines. You can use the WebAIM Contrast Checker to make sure you're following the guidelines.
    - Using complimentary colours helps improve contrast (ex: red on green)
- Avoid taking photos where someone is identifiable (don't include people's faces, etc. in images of devices)

#### *Storing / Saving Photos*

Some of the best practices on image storage / saving are based on our internal preferences at MMC, and others are based on best practices for search engine optimization (SEO). It's important for us to consider SEO for users around the world to be able to easily find our website and devices when looking for assistive technology.

- Save images as .JPG files
- Crop and edit images so they are 1 MB or less
    - Ideally, keep images below 500 KB
- Name files (not IMG_XXXX.jpg)
    - Give files descriptive names so someone can understand what it will be
- Following the underscore naming convention
- Keep images in a 4 x 3 aspect ratio
- Strip metadata from photos (geotags, etc.) before posting them anywhere

#### *Using Photos*

Some general best practices for using photos include:

- Including alt text on images
- Making sure any added text or shapes also follow the WCAG contrast guidelines
- Making sure images are sized properly for their purpose
    - Small details should be zoomed in on to make them easier to see

## Device Photo(s) Checklist

- At least one clear image of the device is included in the **Photos** subfolder
- Ideally, include an image of the device in the context of use
- Device photo(s) have been given descriptive names
- Photo(s) are between 500 x 350 and 1000 x 800 pixels
- Photo(s) are saved as .JPG or .PNG files
- Images have descriptive alt text

## Maker Guide

The Maker Guide will follow the same structure for all devices, but will only contain the relevant sections.

## Overview

The Overview only requires the device name (<DEVICE NAME>), a short description of the device (<INSERT ONE-LINE DESCRIPTION OF DEVICE>), and an image of the device <DEVICE_IMAGE> to be added. The other text can be left unchanged.

## Maker Checklist

Most of the Maker Checklist can remain the same for all devices.

### Maker To Do List

Much of the to do list can remain the same for all devices. Remove any irrelevant steps, and add any specific customization options for that device (if they exist).

### Items to Give to User

Update the list of components / device to send to the user. Include the number of each component that needs to go to the user. Also, mention that the parts must be assembled and tested prior to sending them out to the user.

## Tool List

### Tools / Equipment

Fill in the table in the template. Each tool should appear in a single row of the table, and each tool should have an ID (T01, T02, etc.). Add the name of the tool and any specifics, such as size or shape of a screwdriver. State if the tool is required or recommended and add any notes that may be useful about what the tool is used for in the assembly.

### Supplies

The supplies are consumables that go into building the device, such as solder or glue. Fill in the table similarly to the Tools / Equipment table, including the quantity of the supplies (if possible).

### Personal Protective Equipment (PPE)

Fill in the table with any PPE required to safely assemble the device.

## Customization Guide

Go through detailed information on how the device can be customized. This section should summarize customization which can be completed for the device, and links to instructions for common types of customization, such as multicoloured printing. If there are specific instructions on how to complete customization, include those instructions in this section.

If there are no special customizations, this section can be removed.

## Custom Printed Circuit Board (PCB) Guide

Include this section if the device uses a custom printed circuit board (PCB).

The paragraph in the template can just be updated with the device name (<DeviceName>), and the number of PCBs (<NumberOfPCBs>). The remaining information can be kept as is.

### Ordering the Custom PCB

This section can also be updated with the relevant information for this particular device. The steps can remain the same, but update information like the number of layers of the PCB, the quantity, etc.

## 3D Printing Guide

The 3D printing guide includes all the information that someone would need to 3D print the device.

Include slicer setting information at the beginning of this section to explain where the print time and mass information comes from. Only include relevant print settings that would change the print time significantly, such as the print speed, number of shells/walls, or print head acceleration.

### 3D Printing Summary

The 3D printing summary has a table that includes the print time, number of components, mass, and typical number of print setups for a device. If the device has multiple sub-assemblies, like the LipSync Joystick and Hub, the table can be split up into each sub-assembly and the total device.

### 3D Printing Settings

The 3D printing settings table outlines the important information for printing each individual part of a device. Complete the table for each file / part that needs to be printed.

Fill out the information required in the table. If a part should be printed in a material other than PLA, add that to the "Notes" column.

### Post-Processing

Include any post-processing information, such as removing support material.

There is a short paragraph that outlines common post-processing for any 3D printed part which can remain the same for all devices.

### Examples of Quality Prints

Complete the table as necessary for the device. Add or remove rows / columns as needed for the number of parts, and to keep the images large enough to be useful. The images should allow a maker to compare their prints to the parts to see if they are of acceptable quality for assembling the device.

If the device has multiple sub-assemblies, like the LipSync Joystick and Hub, the parts can be split up into each sub-assembly.

If there are specific parts that need to be of exceptional print quality, such as areas with tight printing tolerances, make sure those are highlighted and there is an explanation of what type of defect would require the maker to reprint the part.

Choose a filament colour that shows detail well. Avoid white or black filament.

## Maker Component List

These tables summarize and label all the components (3D printed parts, other hardware, electrical components, etc.) that go into the device. They also include the quantity of each part.

Complete the table, adding / removing rows and columns as necessary. If the device has multiple sub-assemblies, like the LipSync Joystick and Hub, there can be tables for each sub-assembly.

## Assembly Guide

The assembly guide consists of all the information someone would need to build a device, after getting the parts, tools, and PPE.

If the device has multiple sub-assemblies, like the [LipSync Joystick and Hub](#), there can be sections for each sub-assembly. Add a table with the sections linked in the table to make navigation easier on soft copies of the instructions.

### Part A: <Sub-Assembly Name>

If there is only one assembly (no sub-assemblies of the device), remove the "Part A:" from these sections.

### Part A: Required Components

Copy and paste the Part A table from the Maker Component List section.

### Part A: Required Tools and Supplies

Make a bullet list of required tools and supplies for this section. Ensure they have also already been included in the Tool List section.

### Part A: Required Personal Protective Equipment

Make a bullet list of required PPE for this section.

### Part A: <Sub-Assembly Name> Assembly Steps

This section has the step-by-step instructions to assemble the device for the first sub-assembly. Each step should have a descriptive name, a concise description of how to complete the step, and image(s) that show how to complete the step. Follow the naming convention in the steps already laid out in the template.

Follow the best practices for the images, laid out in the [Device Photos instructions](#) section, and make sure the text and image(s) are on the same page.

Add more sub-assembly sections, using the same format as the Part A sections if there are more sub-assemblies.

### Part C: Flashing Firmware to <Device Name>

Much of this section can be kept the same, and only specific library names will need to be updated.

Make sure these steps are written so that novice users can understand how to complete the installation of all necessary software on their computers, and flash the firmware to the device.

Since this section is mostly filling in the necessary information, the instructions are directly in the template.

## Testing

The testing section includes any testing the maker should complete to ensure the device is working as intended.

## Troubleshooting

Include any troubleshooting tips for common errors or issues that may occur. Format them like Frequently Asked Questions sections. For example:

1. **My device is not showing up on the Arduino IDE when I look for the ports.**

Check the connection between the device and the computer. Unplug and plug it back in.

# User Guide

## Overview

The one-line description of the device and image of it can be copy and pasted from the Design Rationale.

## Introduction

The Introduction can also be copy and pasted from the Design Rationale.

## Features

List the key features of the device, including labelled images. Highlight the important features for functionality and use of the device.

## Specifications

List the technical specifications of the device that would be important for a user. There is a table to fill out and change as necessary. At a minimum, the size and weight of the device should be included. Some devices may require other information, such as the operating force and movement range of the device.

## Compatibility

Describe any other devices the new device is compatible with / interacts with. Include how the device communicates / interacts with those other devices as well (e.g. wirelessly, through a USB-C cable, etc.).

## Usage

Explain how a user would use the device. If necessary, break it into the following sections. If not required, delete the unnecessary sections.

## Setup

Explain how to setup the device for use. This could include mounting, calibrating, connecting, or selecting operating modes of the device.

## Regular Use

Explain how the user would use the device on a regular basis. This includes any operating instructions, such as how to change operation modes or settings, what the output will be for different inputs to the device, and how the user would interact with the device.

## Takedown / Storage

If required, explain how to takedown and properly store the device. This could include any required disassembly, removing mounts, powering off the device, and where it should be stored to increase device longevity.

## Cleaning

Include any necessary cleaning instructions. Since many devices are 3D printed plastic, there is already standard cleaning information for 3D printed plastics included in the template.

## Care

Include any necessary care instructions for the device. Since many devices are 3D printed plastic, there is already standard care information for 3D printed plastics included in the template.

## Disposal

Include any necessary disposal instructions for the device. Since many devices are 3D printed plastic, there is already standard disposal information for 3D printed plastics included in the template.

## Change Log

Changes should follow the versioning used for the rest of the project, and the Change Log should be updated whenever the versioning would be updated for any of the parts of the project (design files, documentation, etc.).

- Update version number (Version X.Y.Z)
- Update date (YYYY – MM – DD)
- Summarize key features of the device / version in point form
- Include only the updates and versioning information for changed aspects of the device (ex: if the User Guide is unaffected by a version update, don't include the User Guide in the summary of the changes)

## Device Summary

The Device Summary will follow the same format for all devices, but will be filled out corresponding to the specific device details.

### Overview

The Overview only requires the device name (<DEVICE NAME>) and an image of the device <DEVICE_IMAGE> to be added. The other text can be left unchanged. This can be copied directly from the Design Rationale.

### Product Information

*Product Name*

This section only requires the device name (<DEVICE NAME>)

*Device Category*

Mark any relevant categories for the device with an "X" in the table.

*User Value Statement*

Include a description of how the device will help the user.

*Designer*

Include the name of the individual that designed the device.

## Device Information

### *Overview*

Create a detailed description of what the device is and who it is intended for.

### *Disability Type*

Select any disability types that would benefit from this device in the table with an "X" in the table.

### *Disability Type Description*

Include any additional descriptions to which type of individuals would benefit from this device, especially if "Other" is selected above.

### *How To Use*

Include description on how the device is to be used.

### *Estimated Cost*

Provide an estimated cost of materials for the device.

### *Attribution*

If any components or part of the device's design are created by other individuals, list the device name, author, and license of their work.

## Maker Information

### *Project Skills*

Select any relevant project skills with an "X" in the table.

### *Skills Description*

Provide additional detailed descriptions for any particular skills to build this device

### *Tools Needed*

Select any tools that are required to build this device using an "X" in the table.

### *Print Time*

Include the estimated total print time for all printed components for the device, in hours.

### *Assembly Time*

Include the estimated total assembly time for the device, in hours.

### *Build Instructions*

Provide a summary of the device build and any additional information about 3D printing, programming, custom PCBs, and parts.

### *Download Link*

Include a link to a direct download for all the files corresponding to your device.

### *Project Link*

Include a link to the device GitHub repository.

## License

Attach the correct licenses (hardware, software and/or documentation) for the device. Note that depending on the device, it may not need all of these licenses, just the ones that are suitable for the device.

## README File

There are many resources on the markdown format, but this is a quick syntax reference. Much of the README file can be left the same among different devices, so completing it is mostly finding and replacing values, and modifying existing steps as needed.

### README Completion Checklist
- Find and replace the values shown in the comments at the top of the template
    - o <Device_Name>
    - o <DeviceName>
    - o <DesignerName>
    - o <RepositoryLink>
    - o <MMCWebLink>
    - o <MaterialCost>
    - o <ShippingCost>
- Add the one-line description of the device
- Modify the line that states what comprises the device (as needed)
- Update Build Instructions so general steps match the build
    - o Remove unnecessary sections
    - o Add any missing sections
- Update the version of the documentation in the table, as necessary
- Update / change licenses (if required)
- Update contributors
- Remove irrelevant sections / headers
    - o Ex: references to PCBs if no custom PCB is used

## Build Files

The build files are the files a maker would require to be able to build the device (.STL files for 3D printing, Gerber files for custom PCBs, firmware files, etc.).

### 3D Printing Files

Make sure that all 3D printing files are included for the device. Ideally, include all files separately so other makers can easily import them into their slicers as single objects. Individual files will allow makers to print off single parts as replacements, rearrange parts on a build plate, and more easily customize devices in multiple colours.

Before exporting the CAD files as .STL files, it is best practice to orient the parts so they get imported into slicers in the orientation intended for printing.

When saving the .STL files for 3D printing, make sure they are saved as BINARY rather than ASCII, as BINARY works more easily with GitHub.

*3D Printing Files Checklist*
- Make sure files are exported as .STL files in BINARY format
- Make sure files have descriptive names with versioning information
- Save files to the **Build_Files -> 3D_Printing_Files** subfolder

## Firmware Files

These are the files a maker would need to upload to the device so the device works properly. Ensure that any firmware files are well-commented, and makers can access any of the required libraries (including custom-written ones) easily. Arduino has style guides to help with commenting.

*Firmware File Checklist*
- Add the following information in comments at the beginning of the code
    o License information
    o Version information
    o Author information
    o Brief description of device/code use
- Ensure code is adequately commented for someone else to understand and edit later
- Save firmware to **Build_Files -> Firmware_Files** subfolder
    o Include any custom written libraries in the same folder

## Custom Printed Circuit Boards (PCBs)

The files required for ordering a custom PCB are the Gerber files, and makers will also need to know any other special settings/requirements of the PCB. As the designer, you'll need to provide a zipped folder of all the PCB Gerber files.

*Custom Printed Circuit Board Checklist*
- Once the design is complete, create the Gerber files
- Compress the Gerber files into a zipped folder, using the naming convention <Device_Name>_<PCB_Name>_YYYY-MM-DD.zip
- Add the zipped folder to the **Build_Files -> PCB_Build_Files** subfolder

## Open Know-How Manifest (OKH.yml)

Completing the Open Know-How Manifest only requires filling in the information on the form and saving the output (OKH.yml), then adding it to the repository.

# Final Documentation Checklist

This is a final checklist you can use to make sure all documents are complete and included before you get ready to submit a device.

1. At least one open source license has been applied

2. Alt text added to all images in documents all documents

3. Device Summary completed

4. PDF created for User Guide

5. PDF created for Maker Guide

6. PDF created for Design Workbook or Design Rationale

7. Bill of Materials created and saved as a .CSV file

8. All image files renamed (ex: not "IMG_XXXX.jpg")

9. CAD Design files added

10. STEP files added

11. 3D Printing files added

    11.1.    STLs oriented in intended print orientation

12. Custom PCB design files added (if required)

13. Custom PCB build files added (if required)

14. GitHub Repository created

15. Any unnecessary folders/files removed (if using template for GitHub repository)

16. GitHub ReadMe complete

17. Open Know-How Manifest Complete

# Appendix

## Search and Replace Terms

These placeholders are used throughout the template to make it easy to make changes in multiple places. Search and replace functionality can be used to automatically replace these items. The following table provides a list of the placeholder, a description of what it should contain and an example.

*Table 3. Placeholder Terms*

| Term | Description | Example |
|---|---|---|
| <Device_Name> | Filename-friendly version of the device with underscores and no spaces. | Open_Wobble_Switch |
| <DeviceName> | Human-readable name of the device with spaces. | Open Wobble Switch |
| <Designer> | The person or organization responsible for the design | John Doe |
| <INSERT ONE-LINE DESCRIPTION OF DEVICE> | A concise description of the device. | The Open Wobble Switch is a cost-effective assistive switch that is activated by pushing the |
| <Repository_Link> | Web address for the public repository. | https://github.com/makersmakingchange/Open-Wobble-Switch |
| <MMC_WebLink> | Website address including an alphanumeric id for the Makers Making Change Website. This will come from MMC staff. | https://www.makersmakingchange.com/s/product/open-wobble-switch/01tJR000000698oYAA |
| <Number_Of_PCBs> | The number of custom PCBs used in the design | 0 |

| <Device_Image> | A product-like photo of the device. |  |
|---|---|---|
| **<YEAR>** | Year when the document is created / released. | 2024 |
| **<MONTH>** | Month when a document is released. | July |