# Completion Checklist (DELETE BEFORE POSTING)

* Update <MONTH> and <YEAR> in header
* Update V<X.Y.Z> in header
* Update <DEVICE NAME> in header
* Add logo to or remove the “Place Logo Here” textbox in header
* Update <YEAR> in footer
* Update <Author> in footer
* Update webpage link in footer
* Complete Overview page
* Update Maker Checklist
  + Maker To Do List
    - Remove irrelevant steps
    - Add specific customization options (if necessary)
  + Items to Give to User
    - List components of the device and quantities needed
    - State that the parts need to be tested, if that is necessary
* Add tools to Tool List
* Add supplies to Supplies table
* Complete relevant parts of Customization Guide
* Remove irrelevant parts of Customization Guide
* Complete 3D Printing Guide
  + Complete summary
  + Complete settings
  + Complete post-processing instructions
  + Add images of quality prints
* Complete Assembly Guide
  + Add required components table
  + Add required tools
  + Add required PPE
  + Complete step-by-step instructions
* Complete Testing section (if necessary)
* Complete Troubleshooting section (if necessary)
* Remove any help text
* Update Table of Contents
* Delete Completion Checklist

For detailed instructions on completing the Maker Guide, please see the [OpenAT Documentation Guide](https://github.com/makersmakingchange/OpenAT-Template/blob/main/OpenAT_Template_Guide.pdf).

# Examples of “Gold Standard” Maker Guides

* [LipSync](https://github.com/makersmakingchange/LipSync) (for complex devices)

# Overview

This document contains the necessary information to build the <DEVICE NAME>, <INSERT ONE-LINE DESCRIPTION OF DEVICE>.

<INSERT IMAGE OF DEVICE>

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# Maker Checklist

This list provides an overview of the steps required to build and deliver the <DEVICE NAME>.

## Maker To Do List

* Read through the Maker Guide to become familiar with required components, tools, supplies, safety gear, and overall assembly steps.
* Talk to the User about customization options
  + <COLOUR OF PRINTS. LIST OUT DIFFERENT PARTS TO CUSTOMIZE>
  + <ADD OTHER SPECIFIC CUSTOMIZATION OPTIONS FOR THE DEVICE>
  + How they would like to receive the “User Guide” (PDF or physical copy)
* Order custom PCBs <REMOVE IF NO PCBs ARE USED>
* Order hardware components
* Gather tools, supplies, and safety equipment.
* Assemble the device <BREAK INTO SUB ASSEMBLIES IF NECESSARY>
* Flash firmware to <DEVICE NAME> <REMOVE IF NOT USED>
* Test the <DEVICE NAME>
* Print “User Guide” (if the User would like a physical copy)

## Items to Give to User

* <LIST COMPONENTS / DEVICES TO SEND. STATE THEY NEED TO BE ASSEMBLED AND TESTED>
* “User Guide”

# Tool List

## Tools / Equipment

<COMPLETE THE BELOW TABLE. TOOLS SHOULD BE GIVEN AN ID (T01, T02, ETC.)>

|  |  |  |  |
| --- | --- | --- | --- |
| Tool ID | Description | Required / Recommended | Notes |
| T01 | <TOOL NAME, SIZE, ETC.> | <IF REQUIRED OR RECOMMENDED> | <WHAT THE TOOL IS USED FOR> |

## Supplies

<COMPLETE THE BELOW TABLE. SUPPLIES SHOULD BE GIVEN AN ID (S01, S02, ETC.). SUPPLIES ARE CONSUMABLES LIKE GLUE, SOLDER, ETC.>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Supplies ID | Description | Quantity | | Notes |
| S01 | <SUPPLIES NAME> | <AMOUNT NEEDED> | <WHAT THE SUPPLIES ARE FOR> | |

## Personal Protective Equipment (PPE)

<Complete the below table. PPE should be given an ID (P01, P02, etc.)>

|  |  |  |
| --- | --- | --- |
| PPE ID | Description | Notes |
| P01 | <PPE NAME> | <WHAT THE SUPPLIES ARE FOR> |

# Customization Guide

The device can be printed in the user’s desired colour.

<information on standard 3D printing customization options>

# Custom Printed Circuit Board (PCB) Guide

<This section is included if the device has one or more custom printed circuit boards (PCBs).>

The <DeviceName> uses <NumberOfPCBs> custom circuit board/boards.

The Custom PCB can be ordered from one of a variety of PCB Manufacturers. Typically, the minimum quantity for a custom PCB is five. Shipping options vary significantly in cost and shipping time. Plan on at least a week from the time of order to the PCBs arrival.

## Ordering the Custom PCB

1. Select a PCB Fabrication Company
   1. [JLPCB](https://jlcpcb.com/)
   2. [PCBWay](https://www.pcbway.com/)
   3. [OSH Park](https://oshpark.com/)
   4. [Seeed Fusion PCB](https://www.seeedstudio.com/fusion_pcb.html)
2. Create an account or use a guest login.
3. Upload the Gerber Files (e.g., <Device\_Name>\_<PCB\_Name>\_YYYY-MM-DD.zip).
4. Select the fabrication options:
   1. PCB Layers: <NumberOfLayers> Layers
   2. PCB Quantity: <NumberOfPCBsPerOrder>
   3. PCB Thickness: <ThicknessOfPCB> mm
   4. Surface Finish: <SurfaceFinishRequired>
   5. PCB Color: Choose what you like. Note that certain colours may impact build time and cost.
   6. The default settings for the other settings should work.
5. Select shipping option.
   1. Shipping options and costs vary significantly. Select the best option based on your budget and timing.
6. Submit the order.

# 3D Printing Guide

The device was originally printed on a <3DPrinter> using <SlicerSoftware>.

<Include relevant information on the slicer settings (e.g. if it was a default printer profile from the slicer, if the acceleration or speeds were changed, etc.)>

## 3D Printing Summary

|  |  |
| --- | --- |
| **Metrics** | **Single Unit** |
| Total Print Time (hour min) | <PrintTime (e.g. 1h10m)> |
| Total Number of Components | <NumberOfComponents> |
| Typical Total Mass (g) | <TotalMassOfAllParts> |
| Typical Number of Print Setups | <NumberOfPrintSetups> |

## 3D Printing Settings

Note that the 3D printing material should be assumed to be PLA unless otherwise noted in the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Print File Name** | **Qty** | **Total Print Time (hr:min)** | **Mass (g)** | **Infill (%)** | **Support(Y/N)** | **Layer Height/ Nozzle Diameter(mm)** | **Notes** |
| <Device\_Name>\_<Component>.stl | <Qty> | <Time> | <Mass> | <Infill> | <If supports are needed> | <layer Height/Nozzle diameter> |  |

## Post-Processing

Inspect the 3D printed parts for any printing defects, sharp edges, or burrs. Sharp edges and burrs can be removed with sanding or deburring tools.

<Add any additional processes that must be done after print, such as removing supports>

## Examples of Quality Prints

Compare your 3D prints to the images here. If there are significant differences, you may need to reprint the part.

<The table below can be expanded (adding rows), or compressed (removing columns) as needed, depending on the number of parts in the device>

|  |  |  |
| --- | --- | --- |
| <Sub-Assembly Name> | | |
| <Device\_Name>\_<Component>.stl | <Device\_Name>\_<Component>.stl | <Device\_Name>\_<Component>.stl |
| <INSERT IMAGE OF PART> | <INSERT IMAGE OF PART> | <INSERT IMAGE OF PART> |

# Maker Component List

<Fill in the table below. Continue the labeling convention for other added parts. Copy the table for another sub-assembly, if required, and label the parts as B<PartNumber>.>

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| <Sub-Assembly Name> | | | | | | | | |
| A01 | <Part Name> | QTY: <#> | A02 | <Part Name> | QTY: <#> | A03 | <Part Name> | QTY: <#> |
| <INSERT IMAGE OF PART> | | | <INSERT IMAGE OF PART> | | | <INSERT IMAGE OF PART> | | |

# Assembly Guide

<Describe sub-assemblies and order of assembling them (if necessary)>.

|  |  |
| --- | --- |
| Assembly Section | |
| [Part A: <Sub-Assembly Name>](#_Part_A:_<Sub-Assembly) | <INSERT IMAGE OF SUB-ASSEMBLY> |
| Part B: <Sub-Assembly Name> | <INSERT IMAGE OF SUB-ASSEMBLY> |
| Part C: Flashing Firmware to <Device Name> | <INSERT IMAGE OF SUB-ASSEMBLY>  <remove this row if there is no firmware to be flased> |

## Part A: <Sub-Assembly Name>

### Part A: Required Components

<Copy and paste the first sub-assembly table from the [Maker Component List section](#_Maker_Component_List)>.

### Part A: Required Tools and Supplies

<Add a bullet list of the required tools and supplies for this sub-assembly>

### Part A: Required Personal Protective Equipment (PPE)

<Add a bullet list of the required PPE for this sub-assembly>

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

#### Step A-01: <Step Summary>

<Explain step simply in words. Make sure the image(s) of the step are on the same page as the text.>

<INSERT IMAGE OF STEP>

#### Step A-02: <Step Summary>

<Explain step simply in words. Make sure the image(s) of the step are on the same page as the text.>

<INSERT IMAGE OF STEP>

## Part B: <Sub-Assembly Name>

### Part B: Required Components

<Copy and paste the second sub-assembly table from the [Maker Component List section](#_Maker_Component_List)>.

### Part B: Required Tools and Supplies

<Add a bullet list of the required tools and supplies for this sub-assembly>

### Part B: Required Personal Protective Equipment (PPE)

<Add a bullet list of the required PPE for this sub-assembly>

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

#### Step B -01: <Step Summary>

<Explain step simply in words. Make sure the image(s) of the step are on the same page as the text.>

<INSERT IMAGE OF STEP>

#### Step B -02: <Step Summary>

<Explain step simply in words. Make sure the image(s) of the step are on the same page as the text.>

<INSERT IMAGE OF STEP>

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

<Make sure to change the C if this is not the third sub-assembly.>

### Part C: Required Components

<Copy and paste the firmware sub-assembly table from the [Maker Component List section](#_Maker_Component_List)>.

### Part C: Required Tools and Supplies

<Update the bullet list with any tools and supplies required>

* Computer that is able to install Arduino IDE and other Arduino libraries to flash firmware

### Step C-01: Connect <Device Name> to the Computer

<State how to connect device to computer, referencing part IDs from the component list.>

### Step C-02: Setup Arduino IDE on Computer

1. Download Arduino IDE for your operating system at <https://www.arduino.cc/en/software>.
2. Install the Arduino IDE.

### Step C-03: Setup Arduino IDE for <Microcontroller>

1. Open Arduino IDE.
2. Click on **File -> Preferences**
3. Locate the text field that reads **Additional Boards Manager URLs** beside it.
4. Copy and paste the following link into the field as a new line:

<Insert link to board URL>

1. Click on **OK**.
2. Restart the Arduino IDE by closing and opening the program.
3. Open the **Boards Manager** option from the **Tools -> Board -> Boards Manager…** menu.
4. Search for “<Search string for the board>” and select “<Board Name>” by <Creator of board / board library>. Make sure you select the exact board manager name stated as there may be some with similar names that will not work.
5. Click **Install** to install the board.

### Step C-04: Install Libraries

1. Go to the **Tools -> Manage Libraries…** menu.
2. For each library in the table below, search for the name. Ensure the Author and Version is correct, then install the library. If prompted to install any dependent libraries, click **OK**.

|  |  |  |
| --- | --- | --- |
| Library Name | Author | Version |
| <Library Name> | <Library Author> | <Version of the Library> |

### Step C-05: Setup Local Code Directory

1. Download the Firmware\_Files from the GitHub Repository

<Insert link to GitHub firmware files zip file>

1. Extract / unzip the folder to a known location on your computer.
2. Confirm you have the following folder structure:

* <Folder\_Name> (folder)
  + <List files that should be in the folder, with file extensions (.ino, .h, etc.)>

### Step C-05: Flash Firmware to the <Device Name>

1. Open the <File\_Name> with Arduino IDE.
2. Select <Microcontroller> from the **Tools -> Board -> <Boards Type>** menu
3. Connect the <Device Name> to the computer using the <Connection cable>.
4. Select the correct port from the **Tools -> Port** menu.
5. Verify and upload to code by clicking the arrow in the top-left corner of the Arduino program.

# Testing

<Explain any testing the maker will have to complete to make sure the device is working properly>

# Troubleshooting

<Include any common errors / issues the maker may encounter and suggestions how to solve them.>