MikeS11 Proton Pack Code - PCBs - How to Order Guide

Finding the files

Pack and Wand PCBs:

A little history
Along with his code, Mike has provided his PCB designs for people to use the files in order to get have them printed for themselves. However, in my naivety, I rushed to buy the boards not realising there were I couple of issues with the files. As uploaded to the GitHub. While waiting for my "faulty" boards I thought this was a great opportunity to learn a little about PCB design and give something back. I therefore learnt the software and fixed the issue of the original boards so others could avoid having to make physical alterations to the "faulty" boards. Taking this a step further, I wired up the bargraph for the wand to the ht16k33 driver and found it to be a total pain. In addition to this, there is not much room in the wand so I decided to design a PCB to address both these issues.

All these files are available on my fork of Mikes project on GitHub:
https://github.com/rbalboa8/ProtonPack/tree/1.0.1-mychanges/Eagle PCB/PCB Files with corrections

Do I Need the PCBs?

No. You can create this project without using any of the PCBs, but personally, I think it is much easier and neater to use the PCBs. The minimum number of boards you can order are 5 of each design. That would be, 5xPack, 5xWand and 5xbargraph(Optional). However the price is minimal and you either have spares incase of accidental damage, enough for multiple packs or spares to sell.

Part 1 - How to get the files.

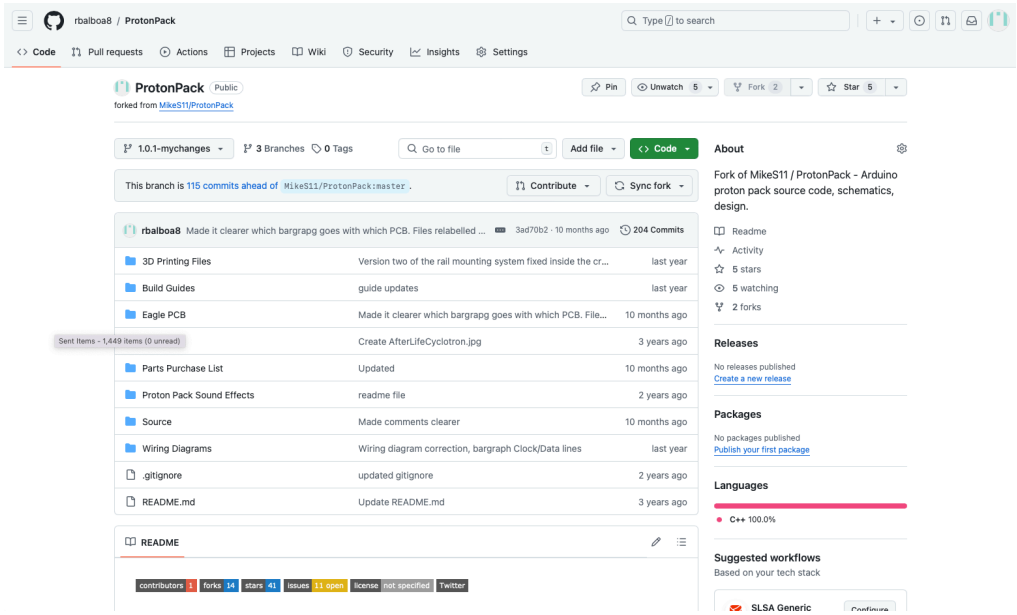
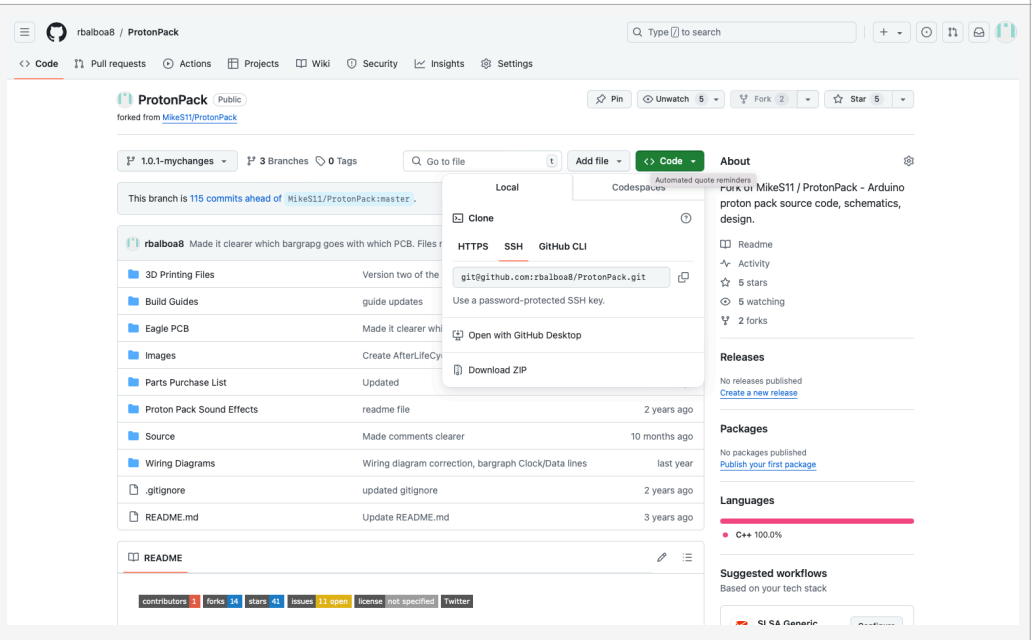
We first need to download some files for the Proton Pack and the wand PCBs
The Pack PCB file name:
GhostbustersR1-FIXED_2022-07-06.zip

The Wand PCB file name:
GBWandR1-FIXED_2022-07-08.zip

To get these files you can either download the entire GitHub Repository or just the individual files.

Download the full repository (recommended)

Go to:
https://github.com/rbalboa8/ProtonPack/tree/1.0.1-mychanges

| | |
|---|---|
| Click on the green button labelled “Code” |  |
| Then click on “Download Zip” option |  |

Download the individual files:

Navigate in your browser of choice to each file and download the RAW .zip file:

Main URL:
https://github.com/rbalboa8/ProtonPack/tree/1.0.1-mychanges/Eagle PCB/PCB Files with corrections

The Pack PCB:
https://github.com/rbalboa8/ProtonPack/blob/1.0.1-mychanges/Eagle PCB/PCB Files with corrections/GhostbustersR1-FIXED_2022-07-06.zip

The Wand PCB:
https://github.com/rbalboa8/ProtonPack/blob/1.0.1-mychanges/Eagle PCB/PCB Files with corrections/GBWandR1-FIXED_2022-07-08.zip

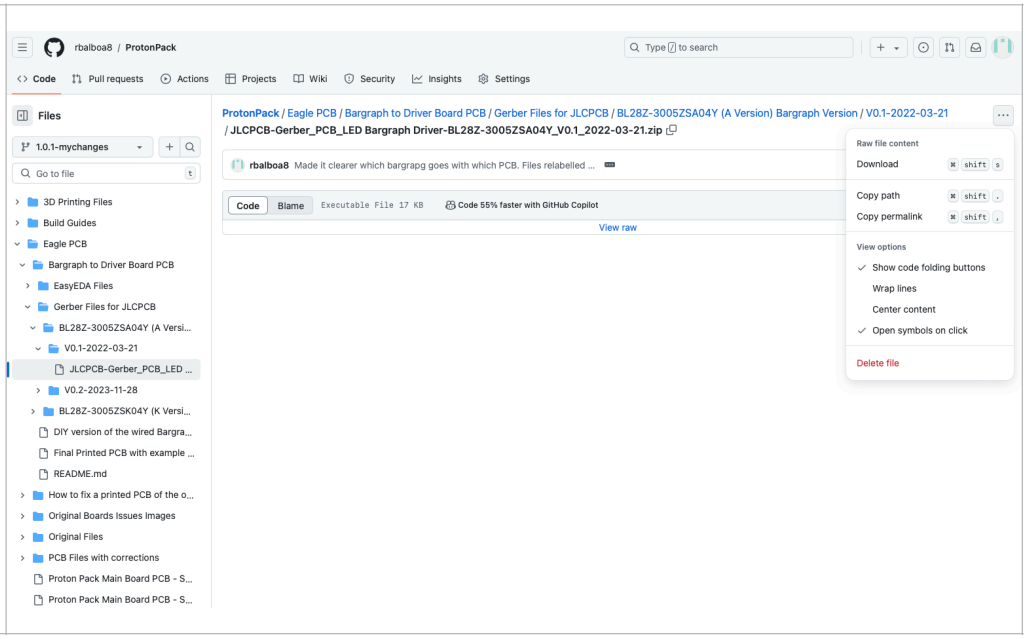
(Optional) Bargraph PCB. (You only need one of these two files and you can find more information about choosing the right PCB for your barograph later in this guide)

Common Anode Bargraph version:
https://github.com/rbalboa8/ProtonPack/tree/1.0.1-mychanges/Eagle PCB/Bargraph to Driver Board PCB/Gerber Files for JLCPCB/BL28Z-3005ZSA04Y (A Version) Bargraph Version/V0.2-2023-11-28

OR

Common Cathode Bargraph version:
https://github.com/rbalboa8/ProtonPack/tree/1.0.1-mychanges/Eagle PCB/Bargraph to Driver Board PCB/Gerber Files for JLCPCB/BL28Z-3005ZSK04Y (K Version) Bargraph Version/V0.2-2023-11-28

Download the RAW .zip file. Example: the Common Anode Barograph

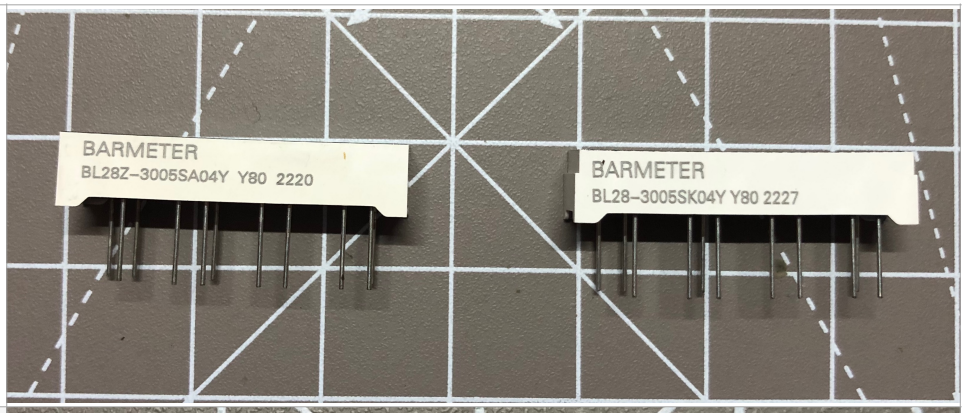
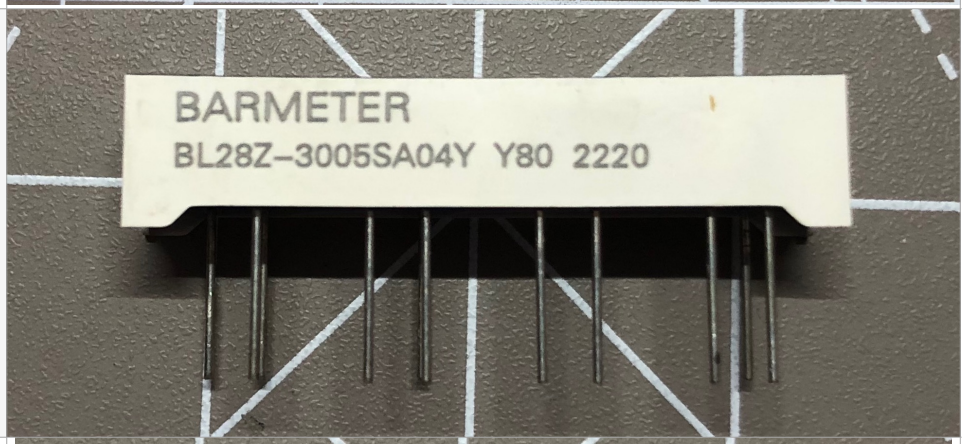



Bargraph PCB:

Before ordering the PCB for the Bargraph it is helpful to confirm which version of the 28 segment LED bargraph you have. There are two models, the Common Cathode and the Common Anode. By default the MikeS11 library for this component is written for the Common Anode version of the

bargraph. If you are unsure if you have purchased the default version or want to make sure you get the right one when ordering you can just look at the part number on the component or in the component description. Look for the ‘A’ or ‘K’ in the product number.

BL28Z-3005S**A**04Y
OR
BL28Z-3005S**K**04Y

| | |
|---|---|
| Side by side comparison |  |
| The Common Anode version which is used by default in the MikeS11 code.<br><br>BL28Z-3005S**A**04Y |  |
| The Common Cathode version which which requires a code change in the barograph library created for the MikeS11 code.<br><br>BL28Z-3005S**K**04Y |  |

It is possible to use either of these components, so, don’t worry if you have purchased a Common Cathode variant. You will just need to make a small code change to do so. In regards to the PCB you will also need to purchase the specific PCB for the bargraph you have.

To download the bargraph PCB follow the method outlined for the pack/wand PCBs. Either download the full repository and navigate to

../1.0.1-mychanges/Eagle PCB/Bargraph to Driver Board PCB/Gerber Files for JLCPCB/

Or download the specific version folder RAW file.

What do I do with the files?

The files you have downloaded are then sent to your PCB manufacturer of choice to produce your PCBs for you. These files are know as GERBER files and have been placed in a zip file ready to go to the manufacturer, making the whole process easier for beginners. The Gerber files have been made in accordance to the rules provided by JLCPCB. JLCPCB are just one manufacturer of PCBs and I am in no way affiliated with them at the point of writing this guide. It is simply who I used in the beginning and I have never had any issue with quality or price so far. The files should work fine with other manufacturers such as PCBWay but I have not tested this myself. So, be aware, that if you choose to use another PCB manufacturer then it may be best to prepare the files again in to Gerber files based on that manufacturers rules. This would be a much larger topic that I may address in another guide but, for now, just be aware.

I will continue to show the purchase process based on JLCPCB as this is my manufacturer of choice. Others should be very similar.

You will need to hand the files we downloaded earlier:

For the Pack PCB:
GhostbustersR1-FIXED_2022-07-06.zip

For the Wand PCB:
GBWandR1-FIXED_2022-07-08.zip

And, if you would like the barograph PCB as well, one of the following files depending which barograph model you have:

Common Anode (works ‘out of the box’)
JLCPCB-
Gerber_PCB_BL28Z-3005ZSA04Y_(A_Version)_Bargraph_Version_to_HT16K33_Driver_PCB_2023-11-28.zip

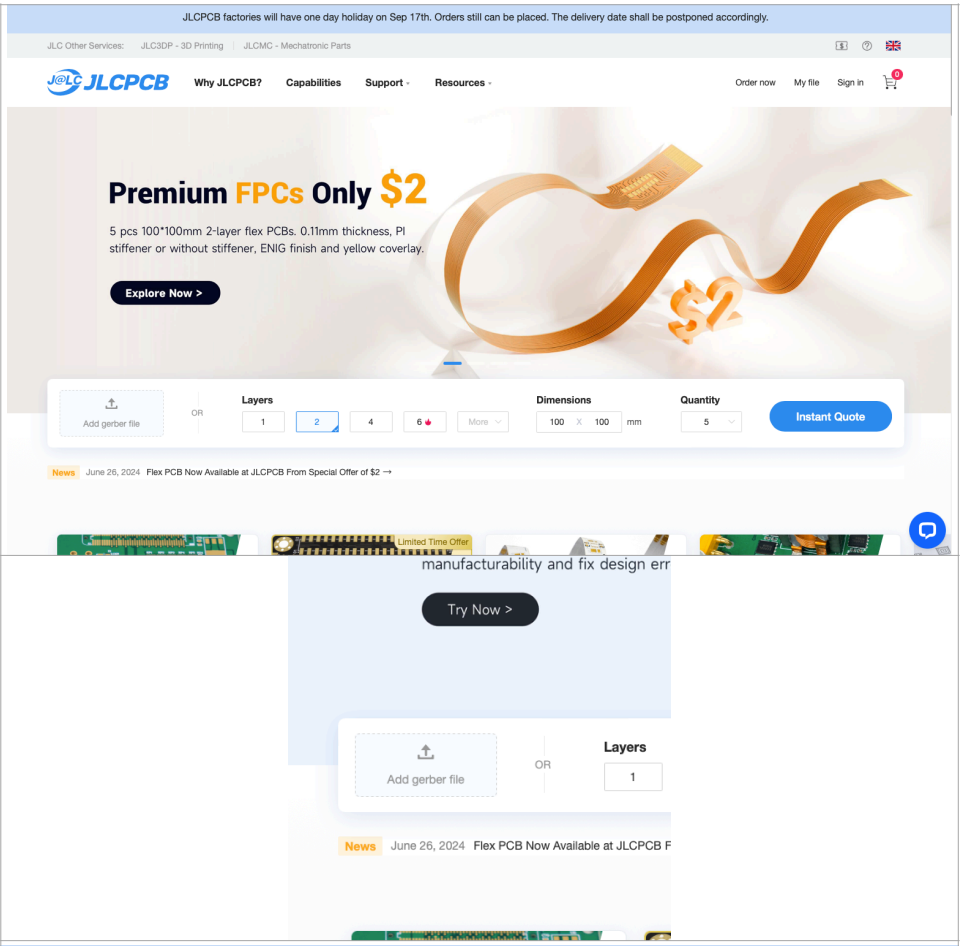
OR

Common Cathode (requires a code change)
JLCPCB-
Gerber_PCB_BL28Z-3005ZSK04Y_(K_Version)_Bargraph_Version_to_HT16K33_Driver_PCB_2023-11-28.zip

Once you have the files needed then you can visit the PCB manufacturers website to order the PCBs. In this example it will be JLCPCB.

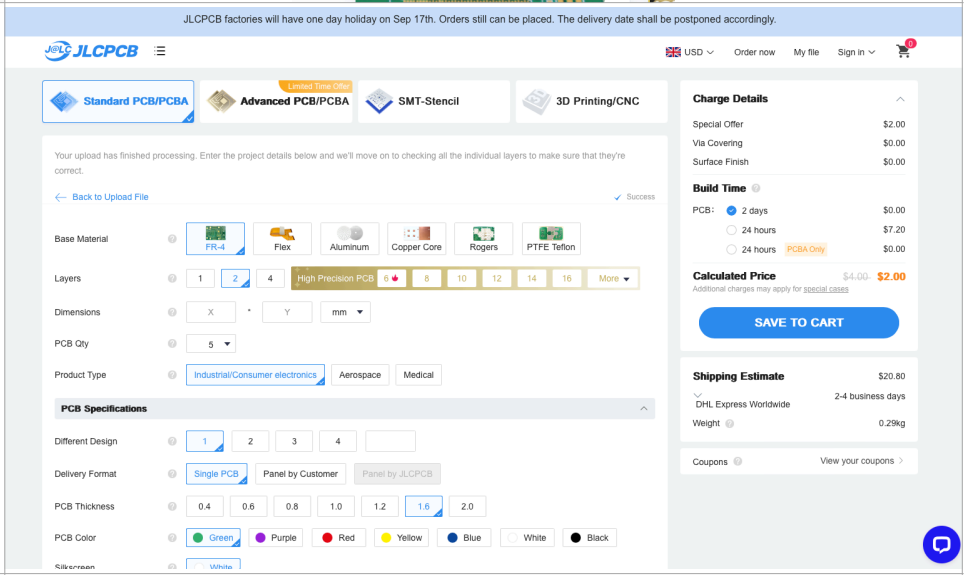
https://jlcpcb.com/

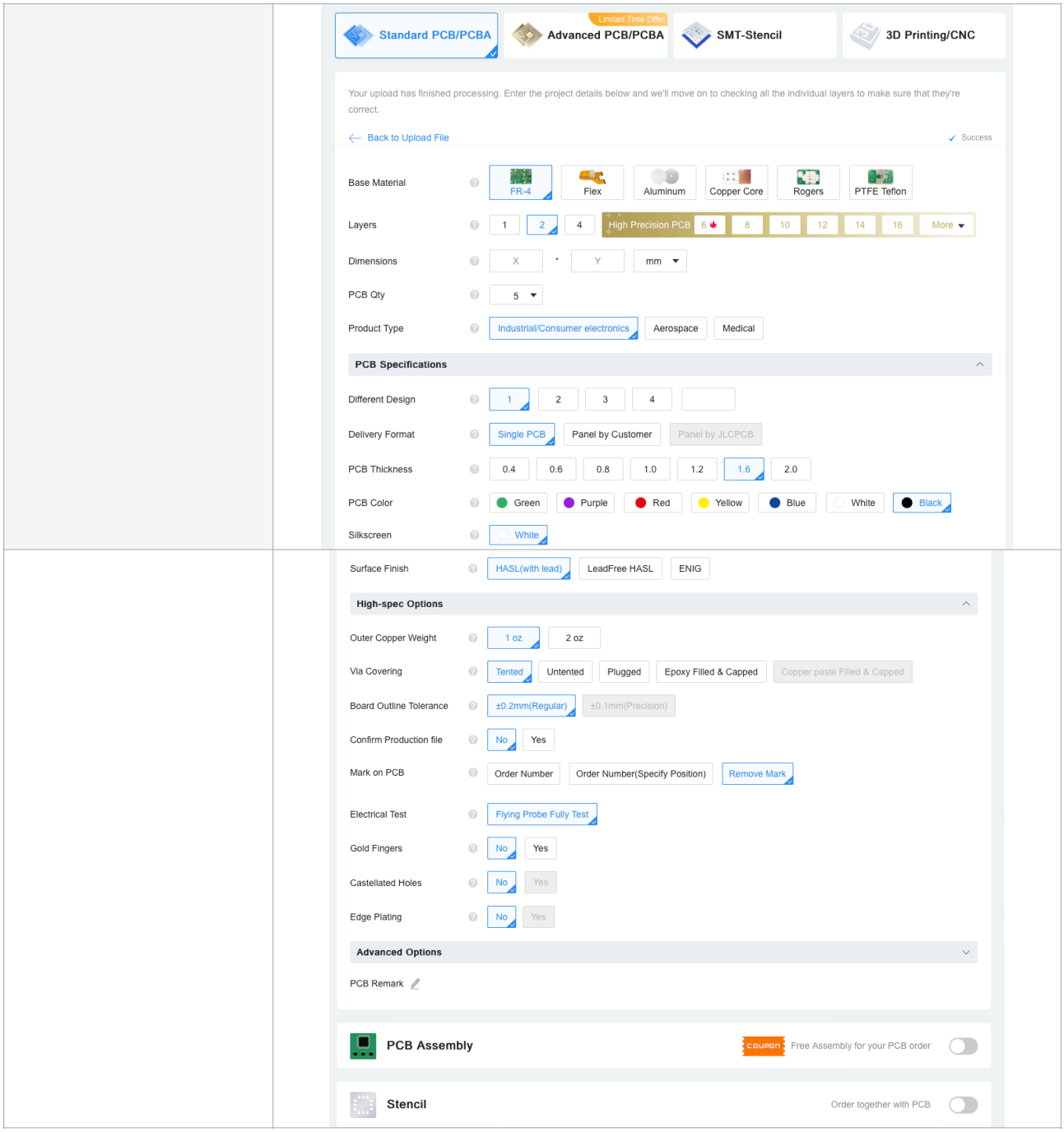
On the home page of the JLCPCB website, drag your first zip file on to the “Add Gerber file” button.

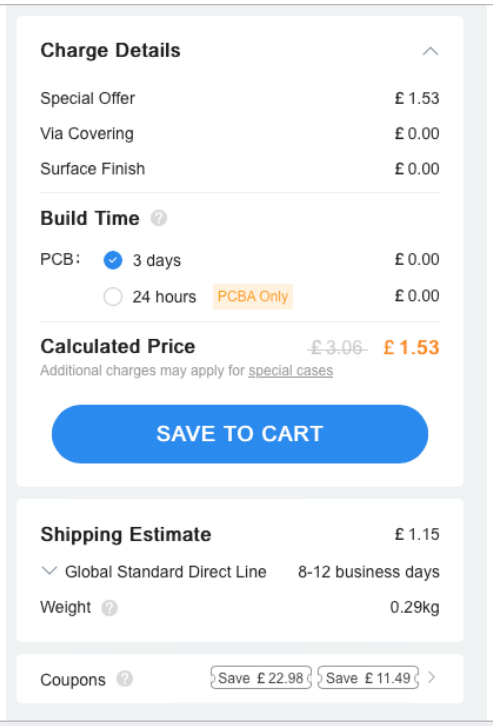
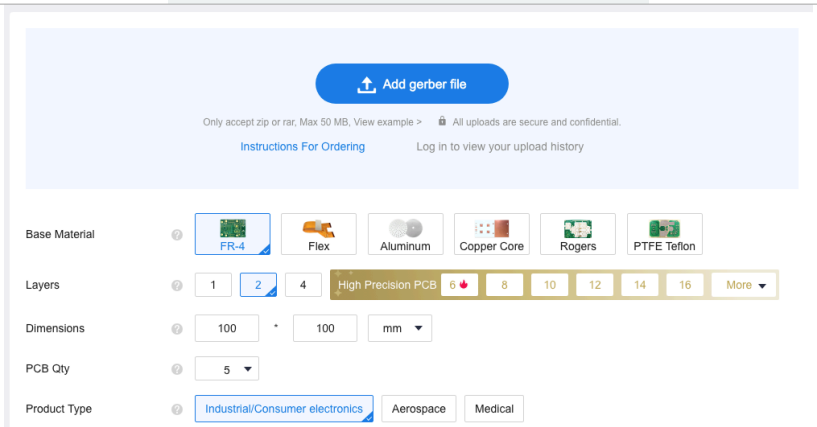
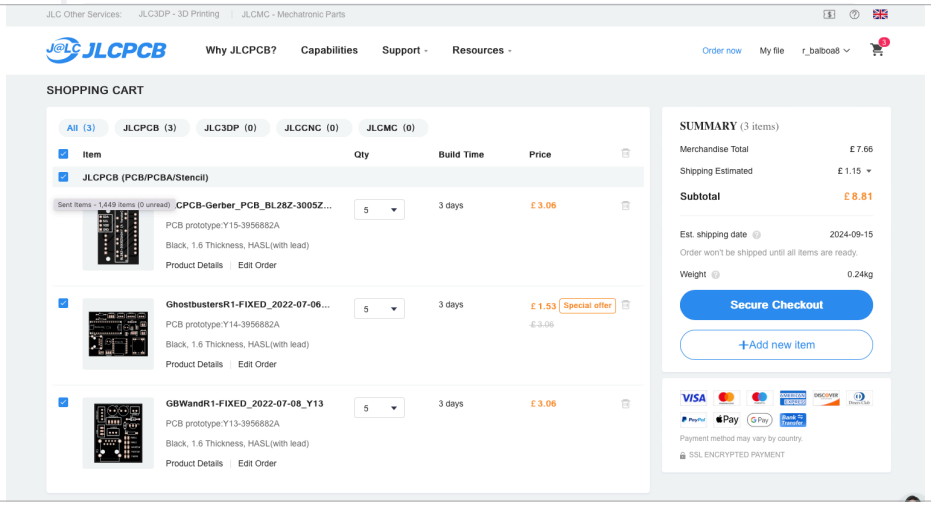



Following the adding of your first zip file you will automatically see the next page where you fill in your specific requirements for the boards. The following images are the setting I use, feel free to change them if you wish/know what you are doing.

Remember there is a minimum purchase of 5 boards per PCB design.




Standard PCB/PCBA
Limited Time Offer
Advanced PCB/PCBA
SMT-Stencil
3D Printing/CNC
Your upload has finished processing. Enter the project details below and we'll move on to checking all the individual layers to make sure that they're correct.
Back to Upload File
Success
Base Material
FR-4
Flex
Aluminum
Copper Core
Rogers
PTFE Teflon
Layers
1
2
4
High Precision PCB
6
8
10
12
14
16
More
Dimensions
X
Y
mm
PCB Qty
5
Product Type
Industrial/Consumer electronics
Aerospace
Medical
PCB Specifications
Different Design
1
2
3
4
Delivery Format
Single PCB
Panel by Customer
Panel by JLCPCB
PCB Thickness
0.4
0.6
0.8
1.0
1.2
1.6
2.0
PCB Color
Green
Purple
Red
Yellow
Blue
White
Black
Silkscreen
White
Surface Finish
HASL(with lead)
LeadFree HASL
ENIG
High-spec Options
Outer Copper Weight
1 oz
2 oz
Via Covering
Tented
Untented
Plugged
Epoxy Filled & Capped
Copper paste Filled & Capped
Board Outline Tolerance
±0.2mm(Regular)
±0.1mm(Precision)
Confirm Production file
No
Yes
Mark on PCB
Order Number
Order Number(Specify Position)
Remove Mark
Electrical Test
Flying Probe Fully Test
Gold Fingers
No
Yes
Castellated Holes
No
Yes
Edge Plating
No
Yes
Advanced Options
PCB Remark
PCB Assembly
COUPON
Free Assembly for your PCB order
Stencil
Order together with PCB

| | |
|---|---|
| When you are happy with the settings you “can save to cart”.<br>At this point you may need to sign in/sign up.<br>Once you have signed in you may notice nothing in your cart, if so, use the “Save to cart” button once more. |  |
| Once the first pcb has been added to your cart you should see this screen where you can add the next pcb. Repeat until all PCBs you require have been added to your basket. |  |
| Once you have added all the PCBs you need to your cart, proceed to your cart and finish your purchase. |  |

That’s it. Delivery will vary, depending on your choice, but to the UK where I am based it generally takes 1-2 weeks.