TSMD Part No. M0100V1
Dec. 2022

OPERATION MANUAL

14-segment display pedestal for PSA-graded collector's cards

TSMD
Tyler Sims Mechanical Design

Use of Operation Manual

Please read through and understand this Operation Manual before operating the product. After reading, always keep the manual nearby so that you may refer to it as needed.

If you find any misplaced or missing pages in this manual, they will be replaced. If the manual gets lost or soiled, a new copy can be provided for a fee. In either case, please get in touch with your TSMD distributor/agent, and provide the “TSMD Part No.” given on the cover.

This manual, alongside all other documentation, can be found in our GitHub repository at:

https://github.com/tylerssims/PSA_Display_Pedestal

This manual has been prepared with the utmost care; however, if you have any questions or note any errors or omissions, please see our GitHub page for contact information.

How to Read This Manual

Preface

Thank you for your support! We do hope that you find the enclosed PSA Display Pedestal to your satisfaction.

(Hereafter abbreviated as Pedestal).

This manual is intended for first-time users of the Pedestal. It gives an overview of the product and describes various settings, operating, maintenance, safety precautions, etc.

Read through this manual thoroughly to use the function of the Pedestal effectively. You can also review this manual; when you are confused about an operation or when a problem occurs.

Shall you remain confused for more than 4 hours, please stop using the Pedestal and consult your doctor.

How to read this manual

This manual is designed to be read from beginning to end.

Intended readers of this manual

This manual is intended for those using the Pedestal, but those not using it can read it too. For those reading this manual in the latter group, please get in touch with your TSMD distributor/agent to purchase a Pedestal.

The notation used in this manual:

The following marks are used with the corresponding explanations in this manual.

⚠WARNING	Indicates an imminently hazardous situation which, if ignored, could result in death or serious injury.
⚠CAUTION	Indicates a potentially hazardous situation which, if ignored, may result in damage to the product and other property.
NOTE	Indicates information that you should know.
DESCRIPTION	Explanation of terminology or operation principle.
See	Indicates reference to detailed information.

Section 1: General Description

This chapter gives an overview and introduces the features of the Pedestal.

1.1 Product Overview

The PSA Display Pedestal is a high-performance digital display pedestal that displays the current value of the card alongside the current population count. Adopting an ESP8266 on the control module allows the Pedestal to update its cost and population data over a wireless network.

1.2 Features

- 6061 Aluminum top with two slots for standard PSA-graded cases
  - Made in the USA
- Cherry base
  - Made in the USA
- Stainless Steel hardware
- Purple velvet PLA/ PHA 3D printed rear panel
- Purple Printed circuit boards from Oshpark LLC
  - Made in the USA
- Four pairs of 14-segment alphanumeric displays NOTE
  - Two pairs of green displays
  - Two pairs of white display units
- NKK Switches
- Battery powered operation
  - Molicel M35A 18650 3500mAh protected button top cells
  - 7000mAh total ampacity
  - USB charging
- WIFI integrated ESP8266 microcontroller
- Live value and population updates through an online server

NOTE

Documentation on all features can be found in the GitHub PSA Display Pedestal repository.

Section 2: Device Operation

This section gives a quick reference on how to use the features of the Pedestal.

2.1 Power

The Pedestal is powered via a USB cable which supplies 5V power to the control board. The integrated Lithium-Ion battery pack can power the display continuously in its highest power state for 24 hours. It is vital that the USB power block used to plug into the wall is a high-quality unit with a stable 5V DC output.

The control board has an integrated circuit on the Huzzah module to handle the charging of the Li-ion cells. The cells are also individually protected with button-top protection circuits. Should an issue arise with the battery pack, unplug the JST connector on the Huzzah module and remove the battery pack. The Pedestal will still retain power through the USB port.

⚠WARNING

DO NOT MODIFY THE BATTERY PACK. *Doing so may damage the cells and cause them to catch fire. Lithium-ion battery fires are very dangerous. Water may not prevent a battery from burning and spreading. Battery cells are known to explode and quickly spread to another battery. It can spread to other devices.*

2.2 Display Modes

The Pedestal has three operation modes.

1. **Continuous Operation**
2. **Power Saver**
3. **Ultra-Power Saver**

In Mode 1, Continuous Operation Mode, the displays will remain on indefinitely when the green push button is activated. The device will connect to the server once every 30 minutes to update.

In Mode 2, Power Saver Mode, the displays will remain on indefinitely when the green push button is activated. The device will connect to the server once every 24 hours to update.

In Mode 3, Ultra-Power Saver Mode, the displays will remain on indefinitely when the green push button is activated. The device's WIFI connectivity will be switched off, and the device will not update until switched into mode 1 or 2.

Push button 1 (SW1) on the Huzzah Control PCB cycles between the modes. The switch is labeled on the PCB silkscreen.

See

2.3 Switches

The Pedestal features 5 NKK push button switches:

- 1 ON-ON DPDT push button switch
  - Green without illumination
  - Located on the front of the Pedestal
- 4 ON-(ON) SPDT push button switch
  - Two red, two black, without illumination
  - Located on the control board

The main green push button is used to turn the displays on-off.

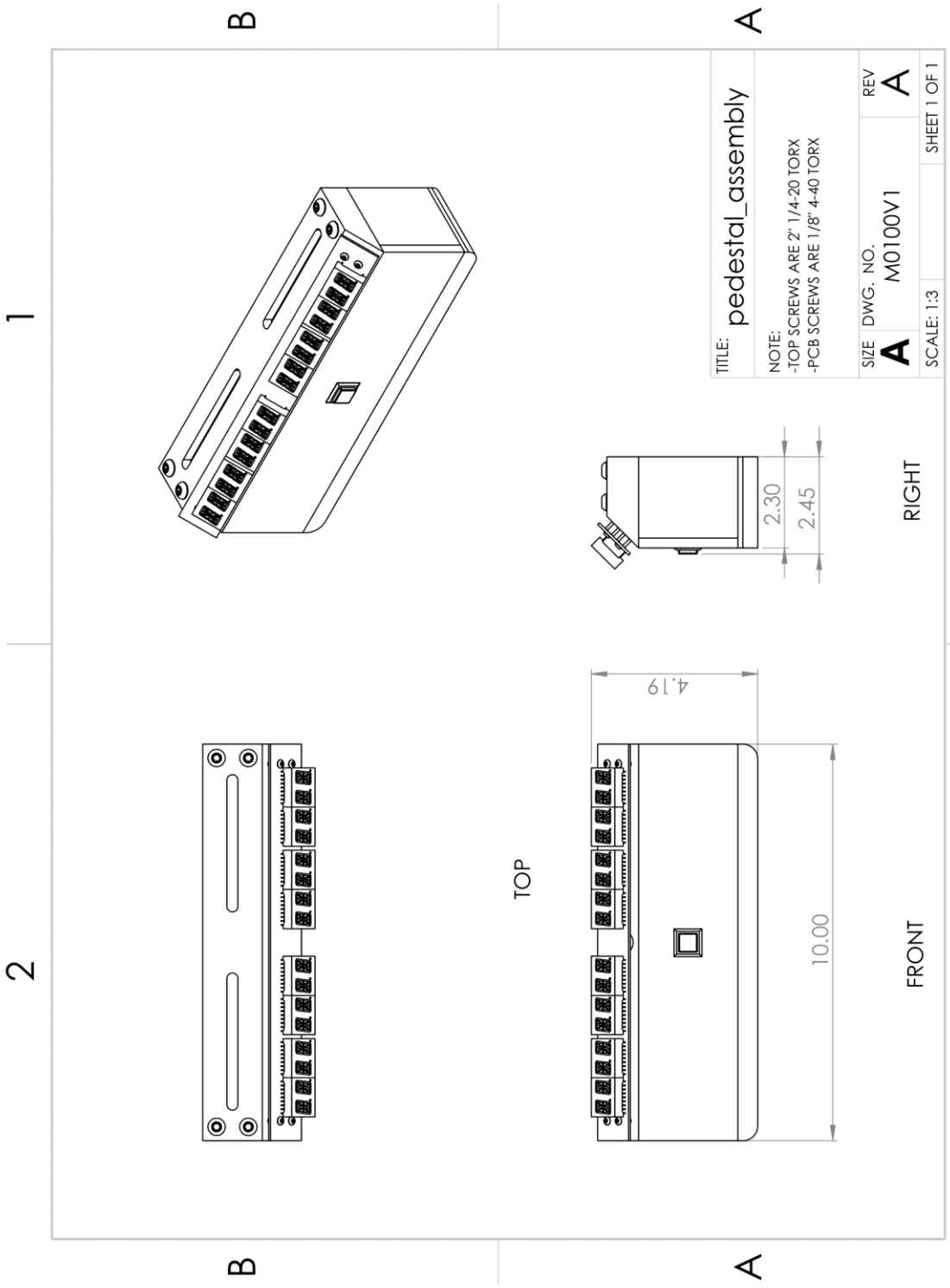
See

See pg. 14 for the Huzzah Breakout PCB layout.

Section 3: Design Files

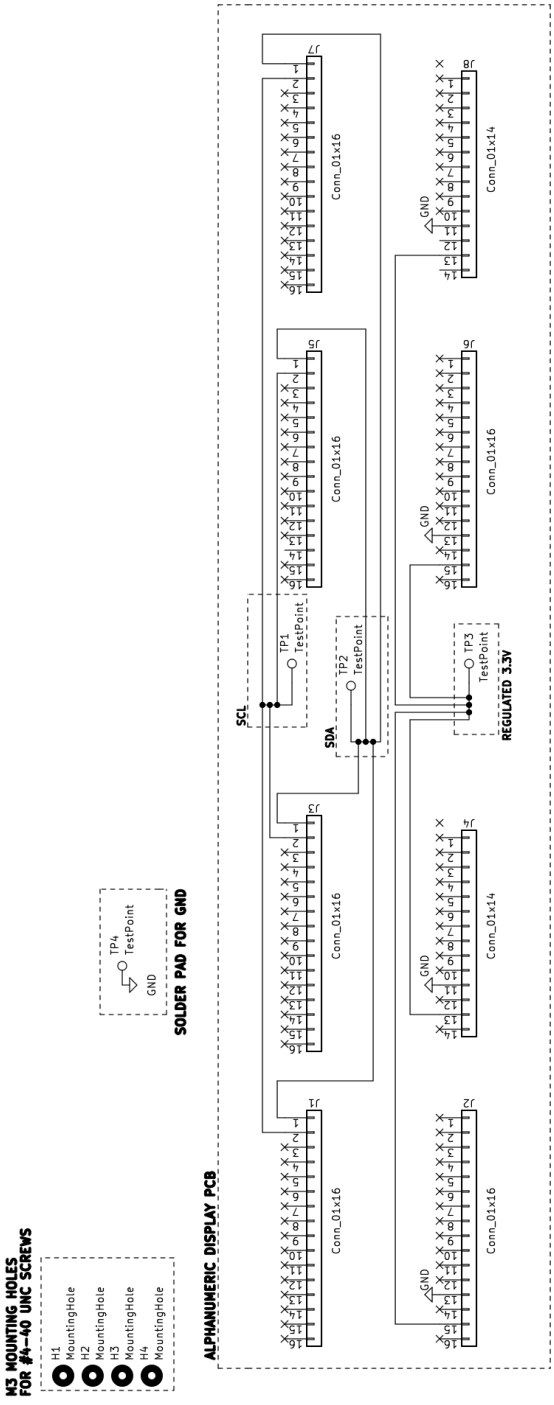
This section contains the drawing required to produce the components designed by TSMD. Further documentation is available in the PSA Display Pedestal GitHub repository.

Section 3.1: Complete Assembly Drawing

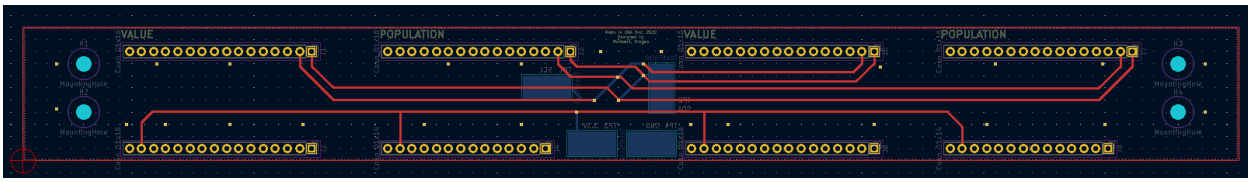


Section 3.2: Front Panel PCB

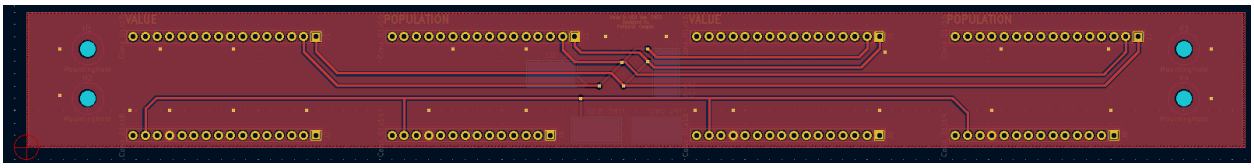
Section 3.2.1: Schematic



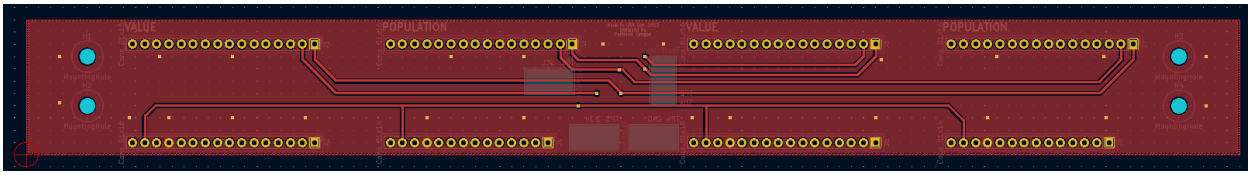
Section 3.2.2: Layout with Copper Planes Removed



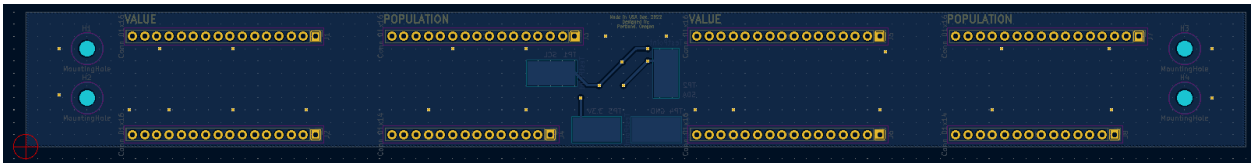
Section 3.2.3: Layout with Both Planes Visible



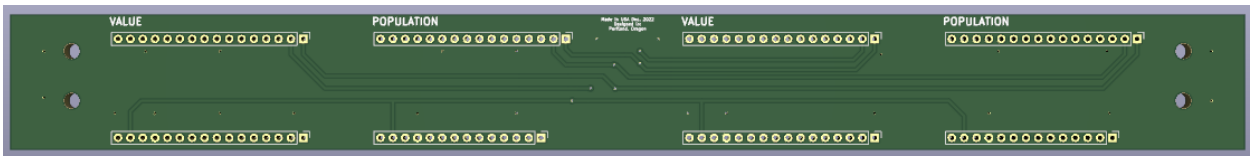
Section 3.2.4: Layout with Front Copper Only



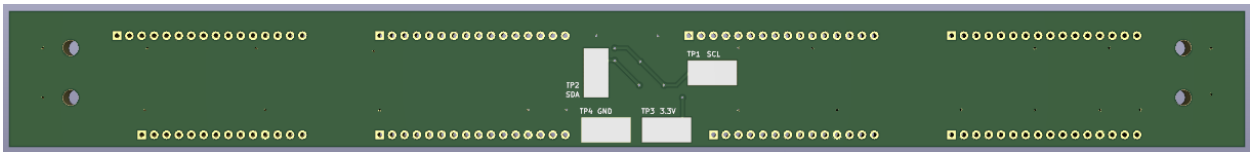
Section 3.2.5: Layout with Back Copper Only



Section 3.2.6: 3D Front

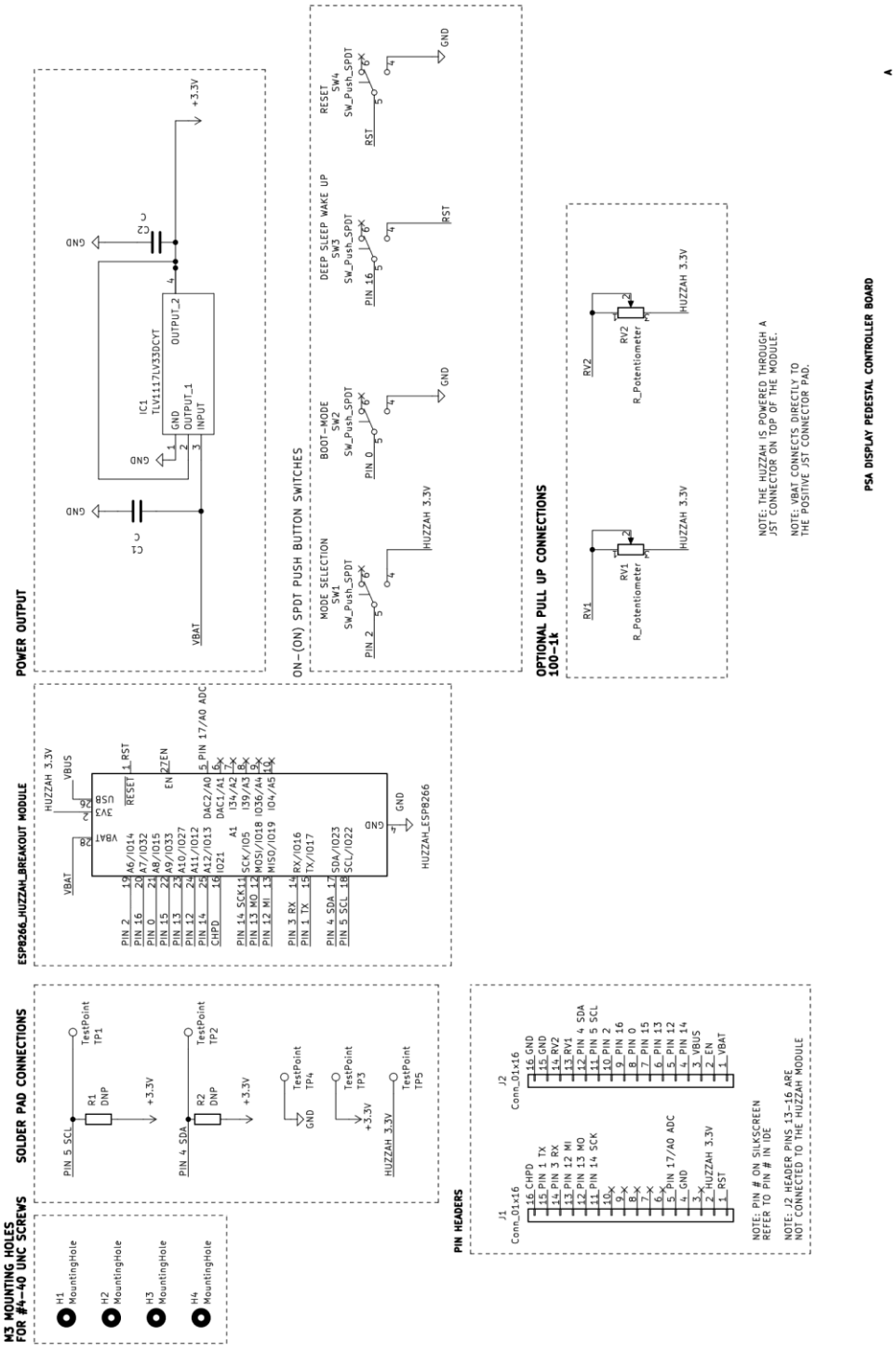


Section 3.2.7: 3D Back

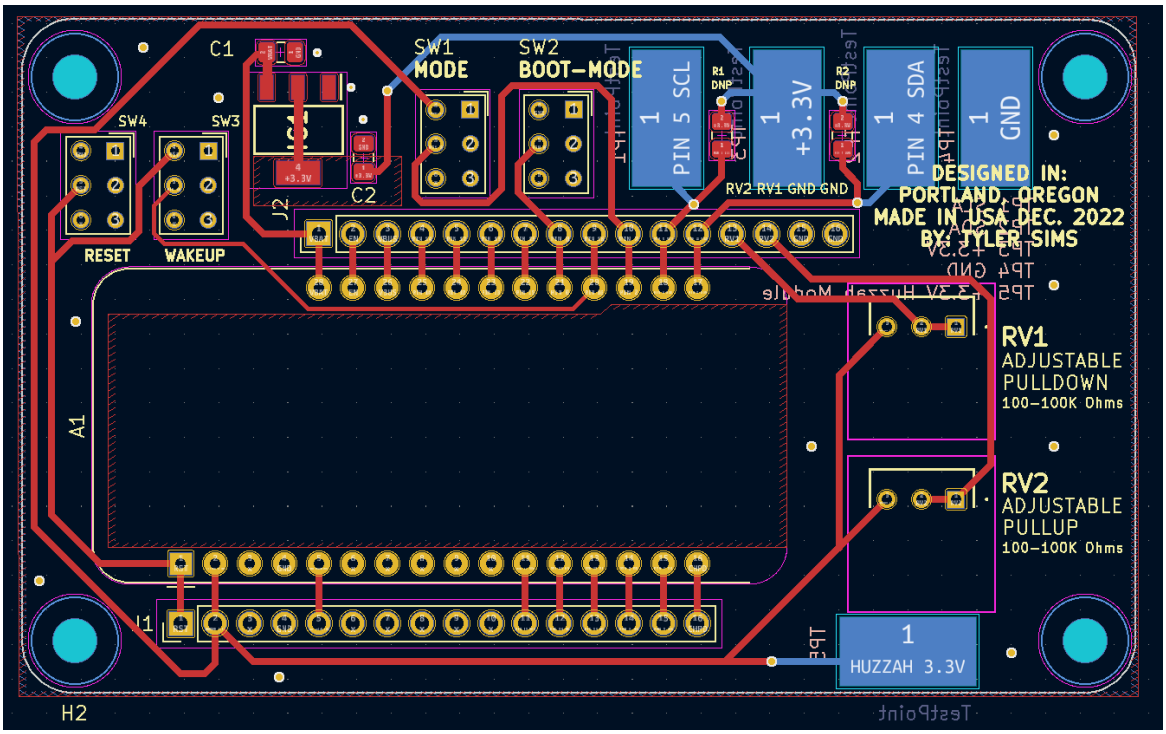


Section 3.3: Huzzah Control PCB

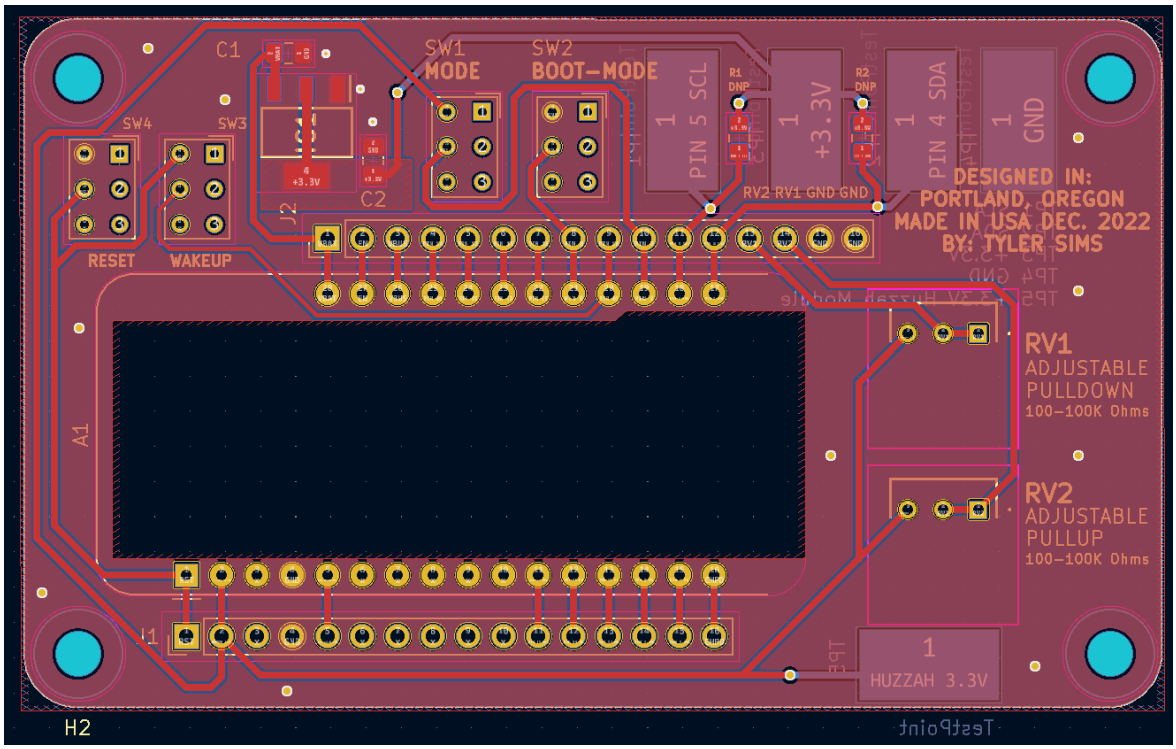
Section 3.3.1: Schematic



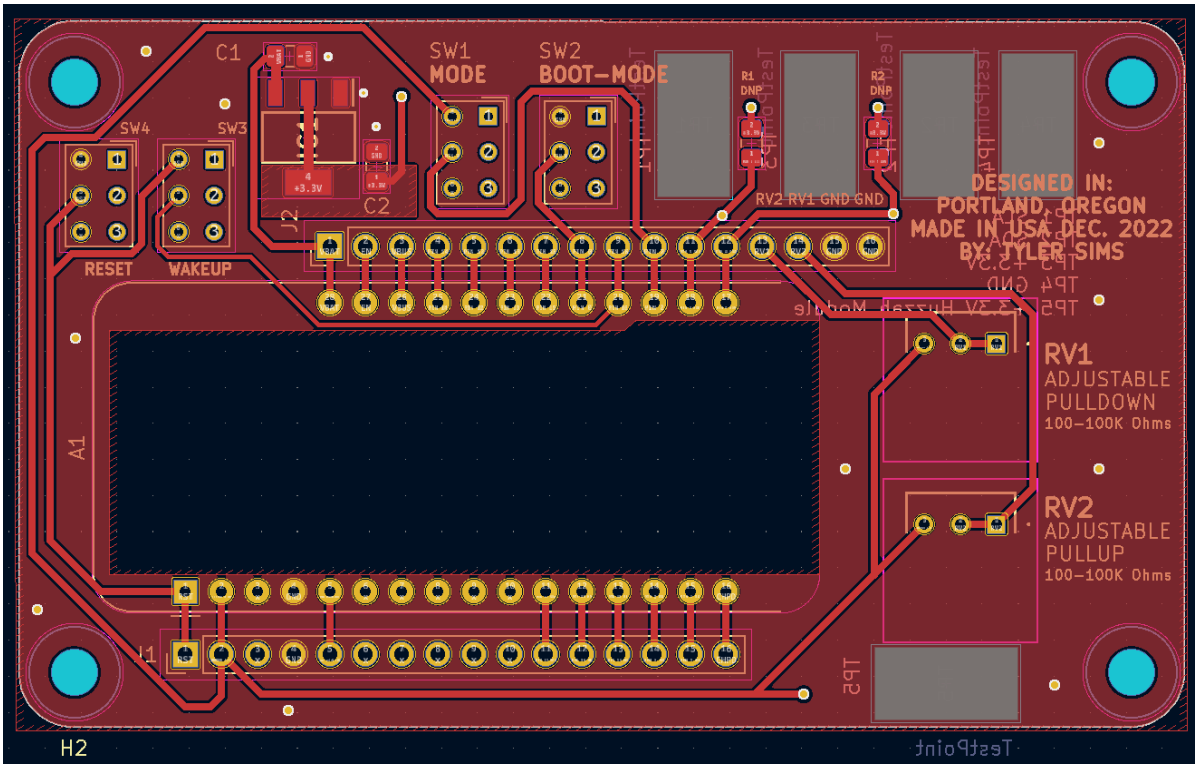
Section 3.3.2: Layout with Copper Planes Removed



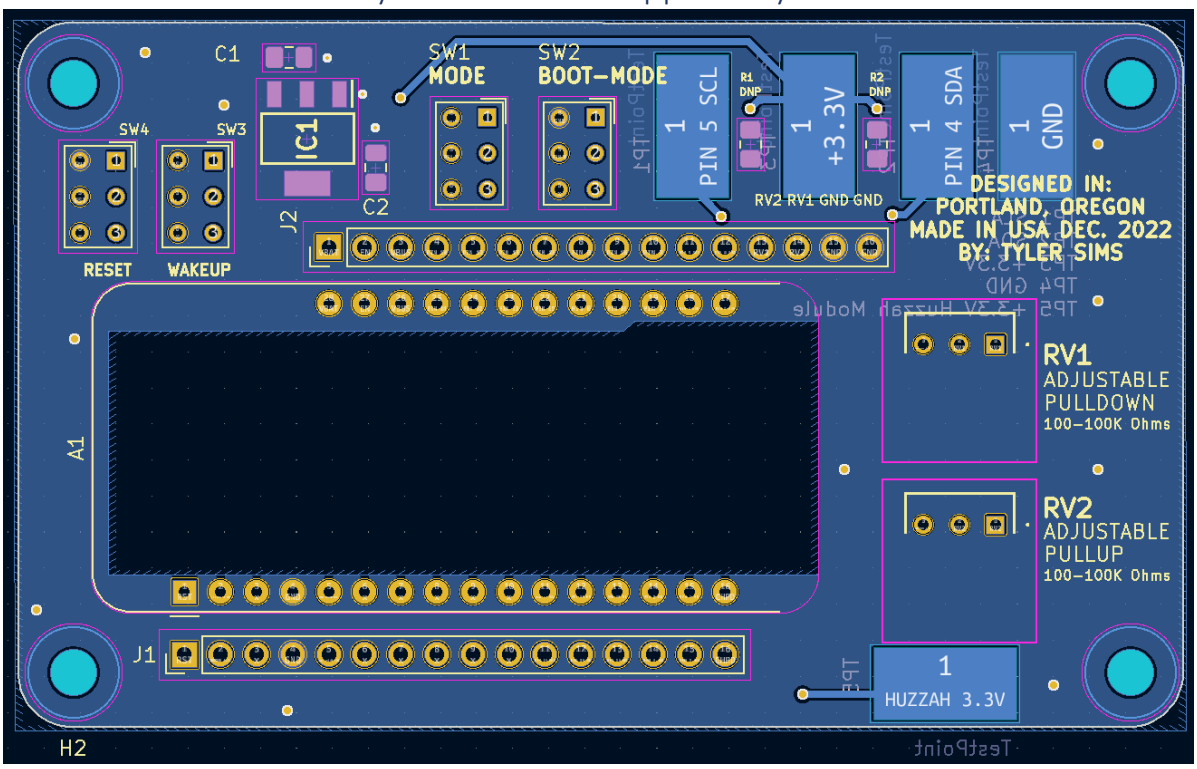
Section 3.3.3: Layout with Both Planes Visible



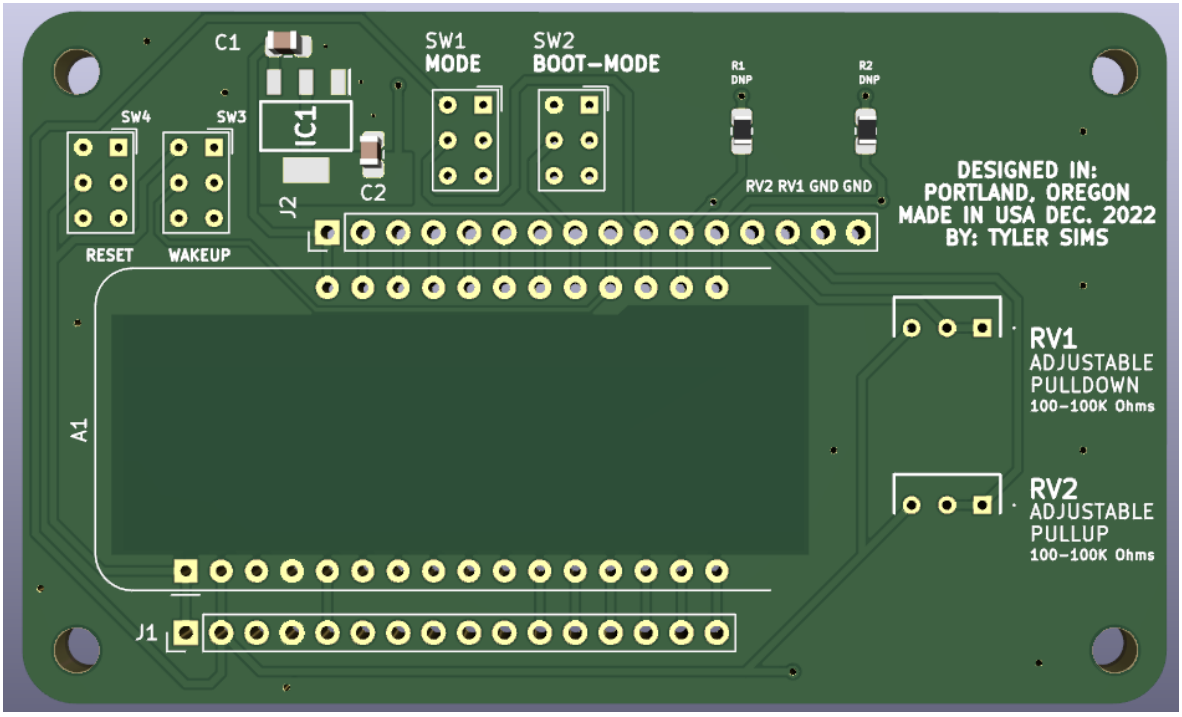
Section 3.3.4: Layout with Front Copper Only



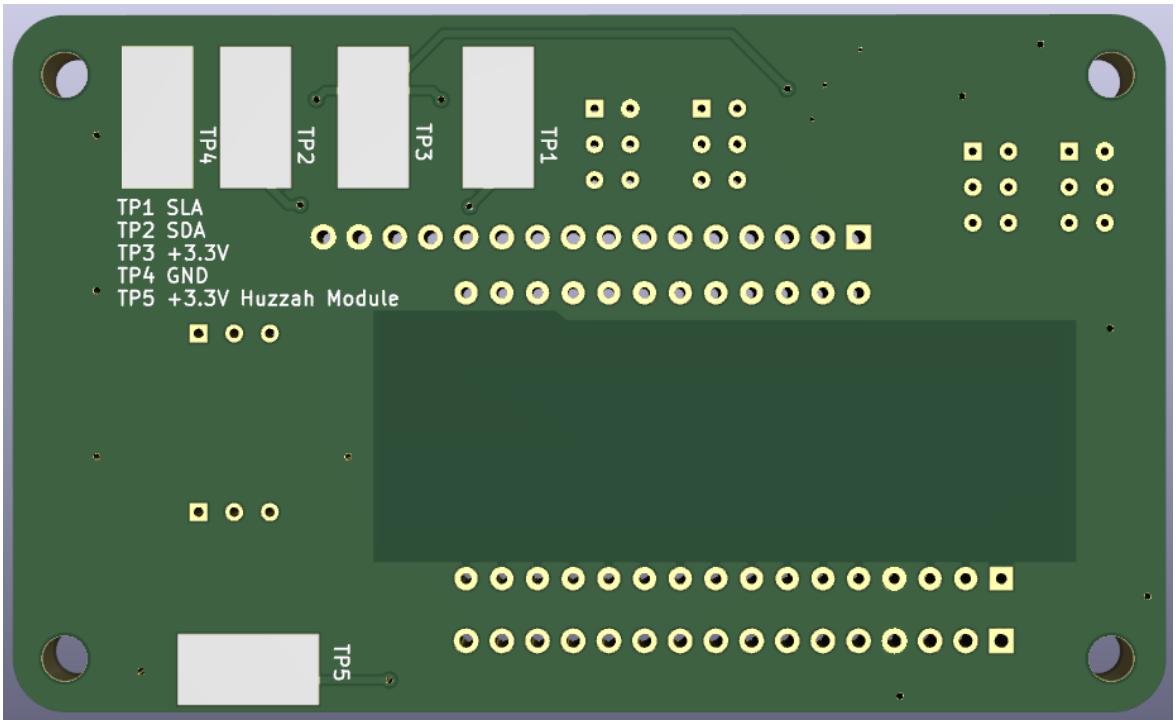
Section 3.3.5: Layout with Back Copper Only



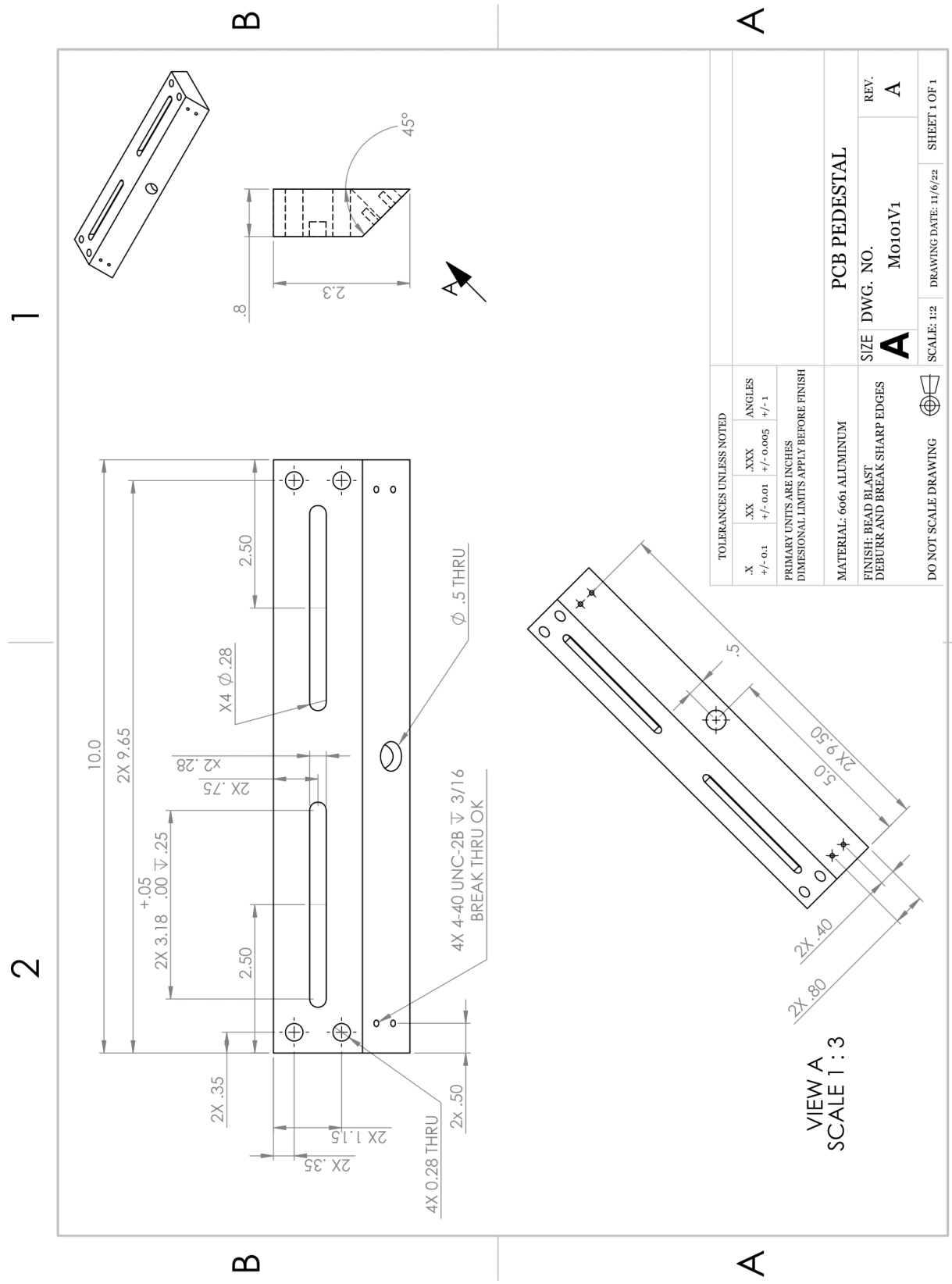
Section 3.3.6: 3D Front



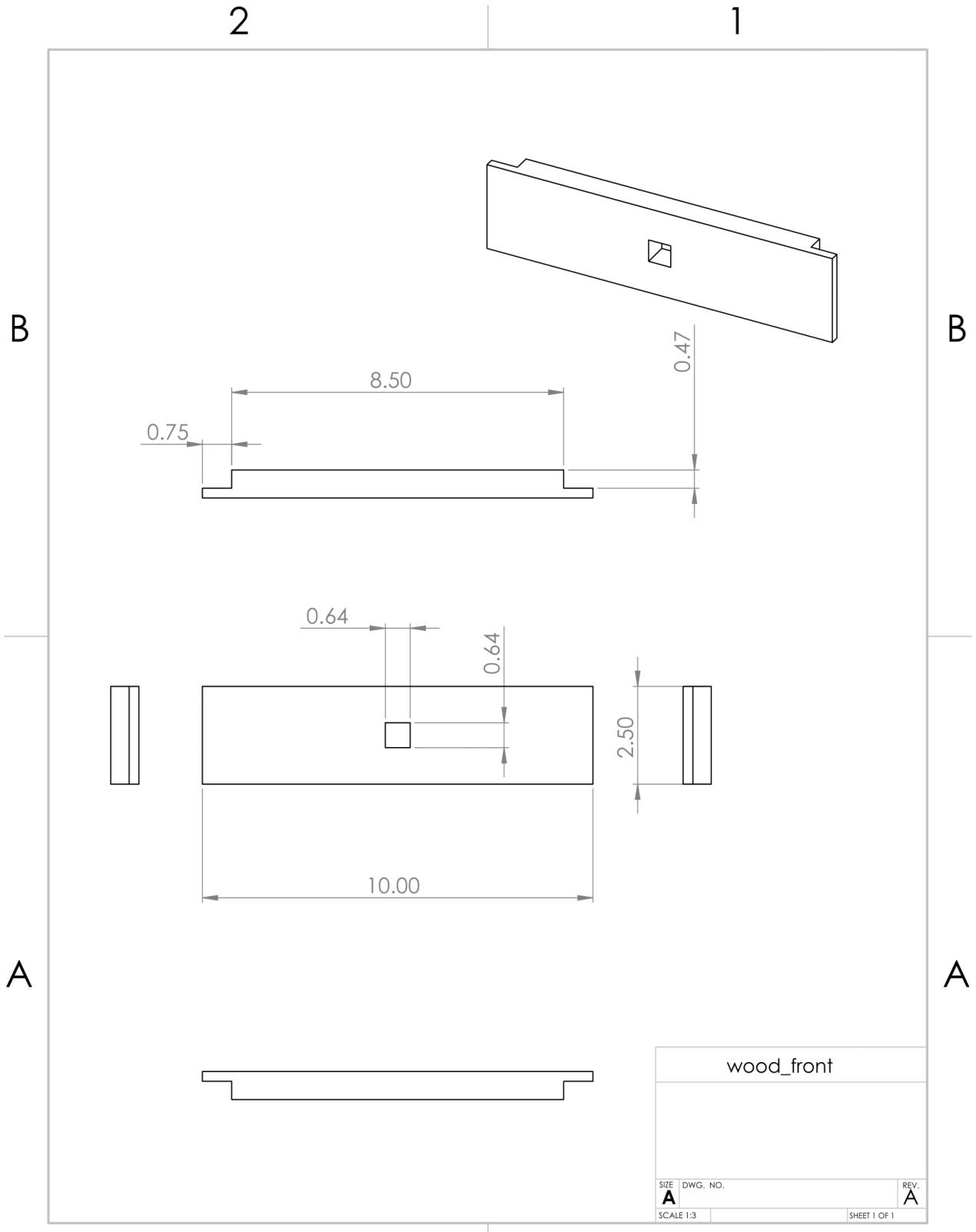
Section 3.3.7: 3D Back



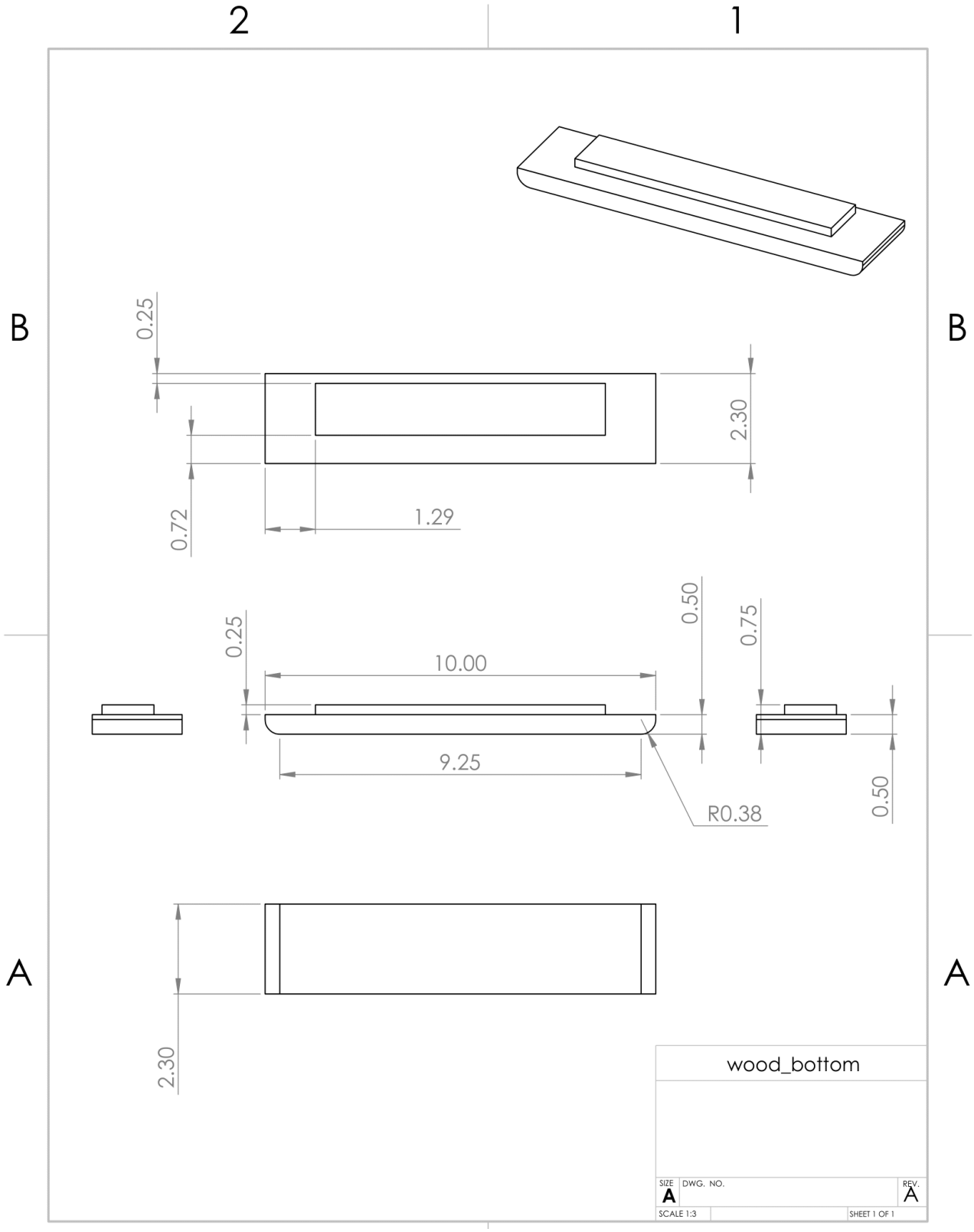
Section 3.4: Aluminum Top



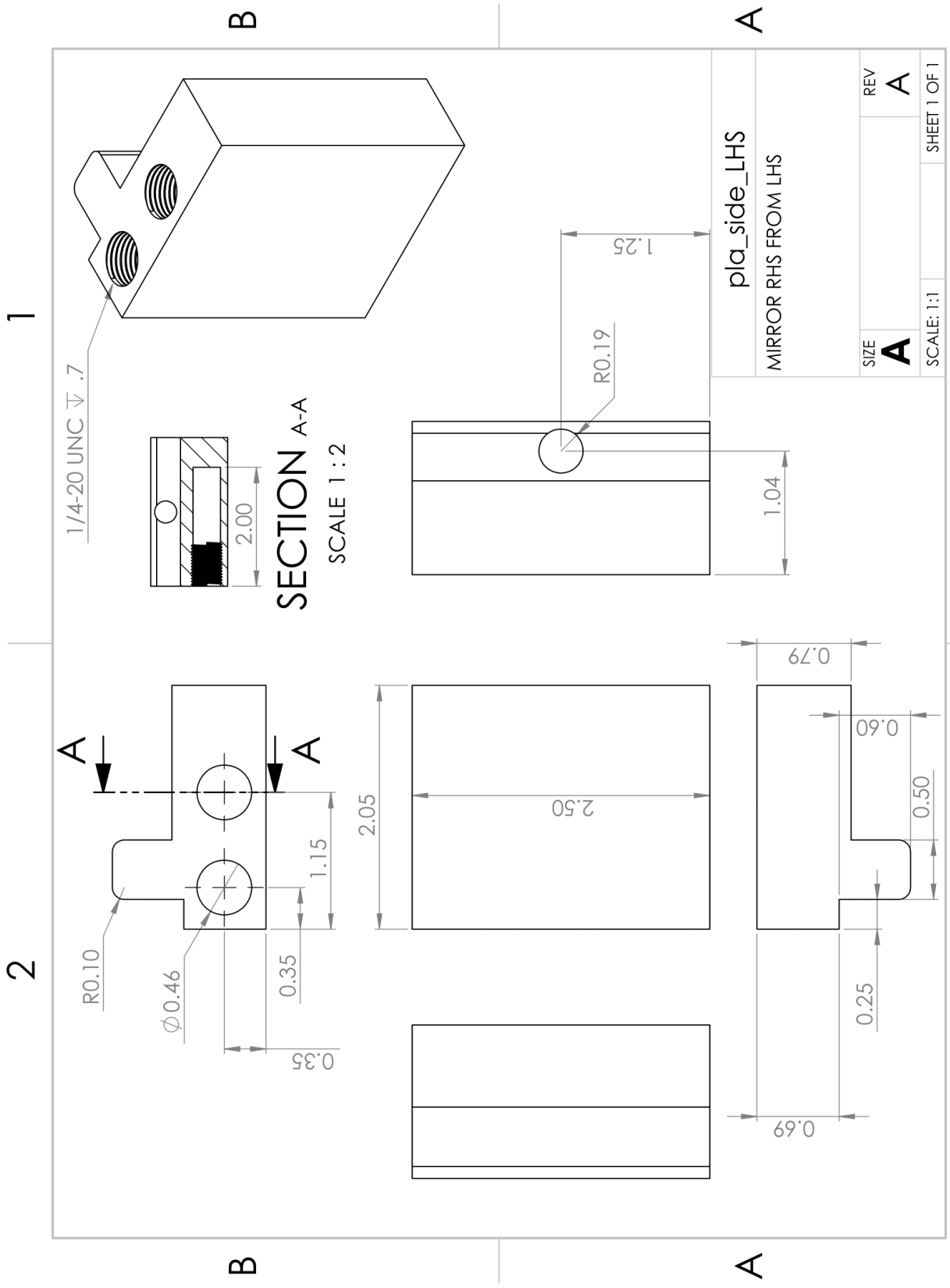
Section 3.5: Cherry Wood Front



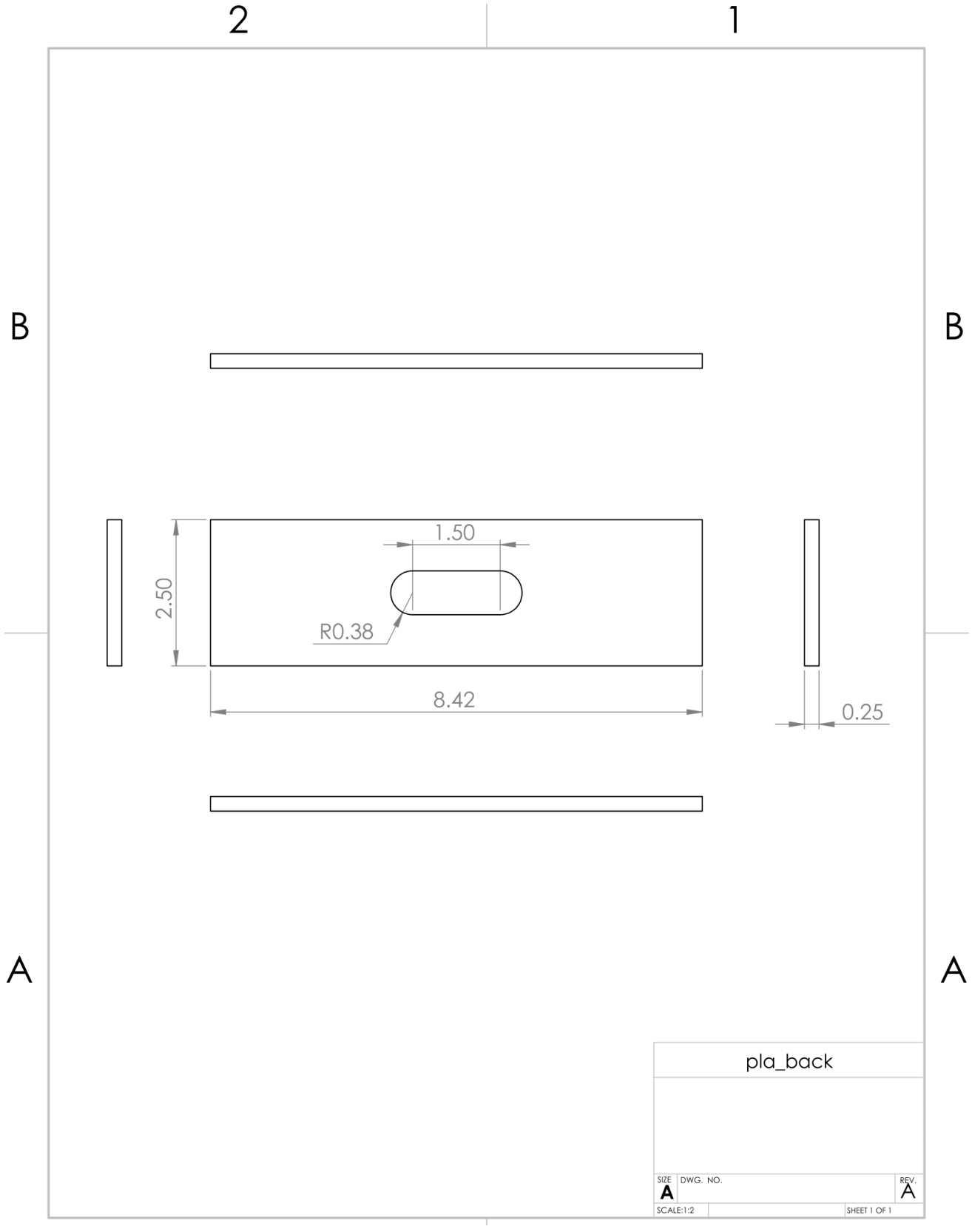
Section 3.6: Cherry Wood Bottom



Section 3.7: PLA/ PHA 3D Printed Sides (Right Side Mirrored for Left)



Section 3.8: PLA/PHA Back



PSA Display Pedestal BOM									
No.	VENDOR	Size/ Value	Description	Part Number	Qt. Needed	Qt. in Pack	Cost per Pack (USD)	Cost per Unit (USD)	Total Cost
1	TSMD	0.8"x2.5"x10"	Machined 6061 Aluminum Pedestal	MM0101V1	1	2			
2	Woodcraft	NA	Cherry Lumber	NA	NA	NA			
3	Mcmaster Carr	#4-40 to #4-40	Male-Femal Threaded Hex Standoff	93505A430	8	1			
4	Mcmaster Carr	#4-40	Button Head Torx Screw	90910A783	8	25			
5	Mcmaster Carr	1/4"-20	18-8 SS Button Head Torx Screw	90600A629	4	10			
6	Mcmaster Carr	#4-40	Screw-to-Expand Insert for for Plastic	90742A115	4	25			
7	Mcmaster Carr	1/4"-20	Brass Tapping Insert for Hardwood	90016A029	4	25			
8	Mcmaster Carr	1/4"	Installation Bit for Brass Inserts	94110A140	1	1			
9	Mcmaster Carr	5/16"OD, 1/8" Thick	Neodymium Magnet	5862K156	4	1			
10	Adafruit	Display: 0.8"x1"x.3" Feather Driver Board: 2"x.9"x.165"	Adafruit 0.54" Quad Alphanumeric Featherwing Display- Green	3129	2	1			
11	Adafruit	Display: 0.8"x1"x.3" Feather Driver Board: 2"x.9"x.165"	Adafruit 0.54" Quad Alphanumeric Featherwing Display- White	3127	2	1			
12	Adafruit	12in cable, #4-40 embedded screws	Panel Mount Extention USB Micro B Cable	3258	1	1			
13	Adafruit	100mm	PST PH 2-Pin Cable - Female Connector	261	1	1			
14	Adafruit	2"x0.9"x0.28"	Feather Huzzah with ESP8266	3046	1	1			
15	Oshpark	1.1'X10'	Font panel PCB	ME0100V1	1	3			
16	Oshpark	1.93"x3.23"	Controller PCB	ME0200V1	1	3			
17	Digikey	100-1000Ohm	Potentiomenter	3352T-1-104LF	2	1			
18	Digikey	5A 125V	NKK DPDT ON-ON Pushbutton Switch	UB26KKW015F-FF-ND	1	1			
19	Digikey	0.4A 28V, Black	NKK SPDT ON-(ON) Pushbutton Switch	GB15AP-XA	2	1			
20	Digikey	0.4A 28V, Red	NKK SPDT ON-(ON) Pushbutton Switch	GB15AP-XC	2	1			
21	Digikey	3A 250V	Female Header, 100mil, 1x16, Gold, TH	PPPC161LFBN-RC	2	1			
22	Digikey	1UF 10V	Low ESR X7R Ceramic Capacitor	LMK212B7105KGHTR	2	1			
23	Mouser	1A 3.3V	LDO Voltage Regulator	TLV1117LV33DCYT	1	1			
24	BNTECHGO	6", 26AWG, Blue	Stranded Tinned Copper Silicone Wire	NA	2	NA			
25	BNTECHGO	6", 20AWG, Red	Stranded Tinned Copper Silicone Wire	NA	1	NA			
26	BNTECHGO	6", 20AWG, Black	Stranded Tinned Copper Silicone Wire	NA	1	NA			
27	Amazon (EWUONU)	6.6'	Right Angle Micro USB Charging Cable	NA	1	2			
28	Amazon (BENECREAT)	10"x2.3"	Adhesive backed Velvet Sheet	NA	1	20			
29	Amazon (Instockbolts)	#4-40 SS Hex Nut	SS Hex Nut	NA	2	100			
30	Amazon (FURNIMATE)	20.6mm Adhesive, Clear	Adhesive Clear Round Pad	NA	4	18			
31	Makestickers	3"x3", Clear	Square Stickers	NA	1	5			
32	Amazon (PACKHOME)	13"x9.7"x3.4", Glossy Metallic Purple	Large Gift Box with Magnetic Lid	NA	1	1			
33	ColorFabb	1.75mm, Blue Grey	PLA/PHA Filament	NA	NA	NA			