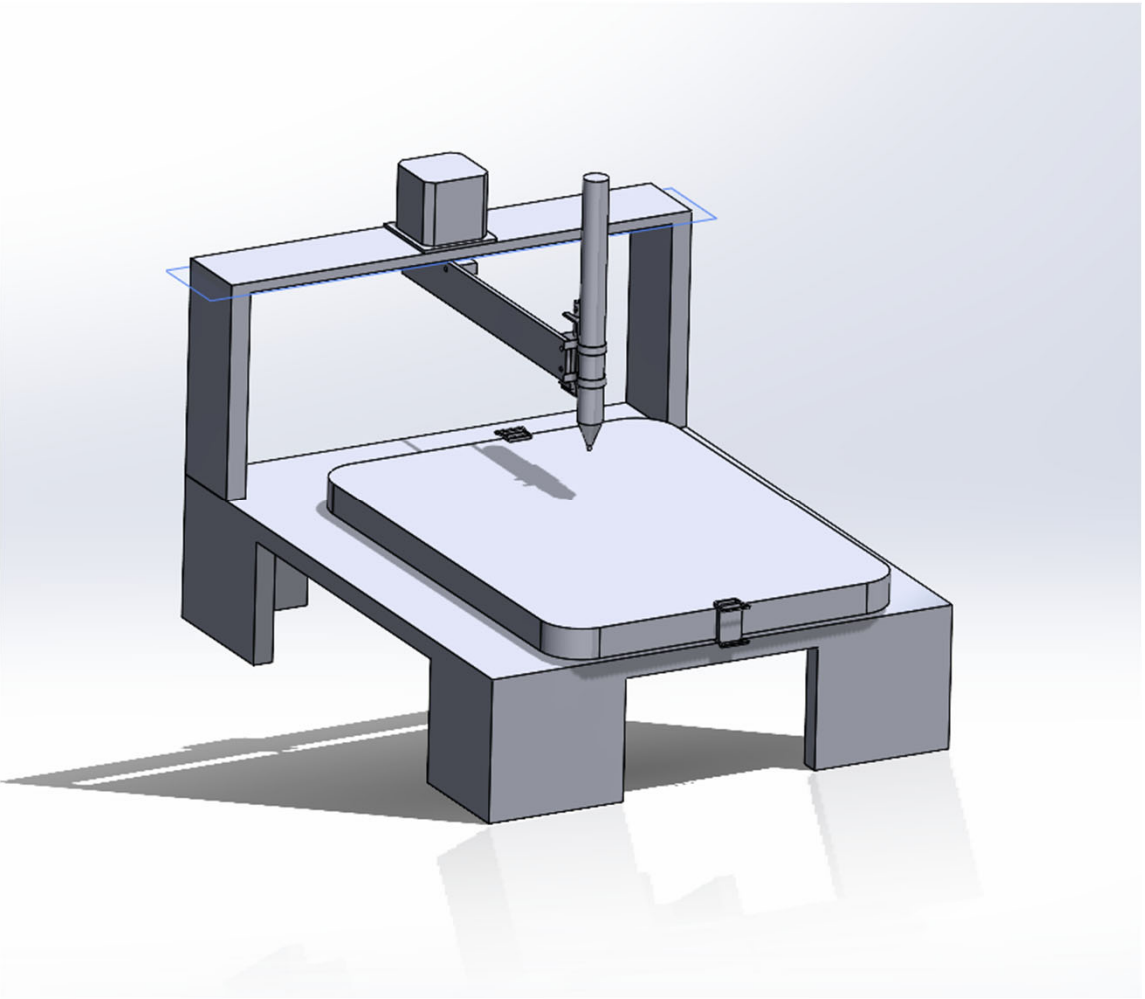
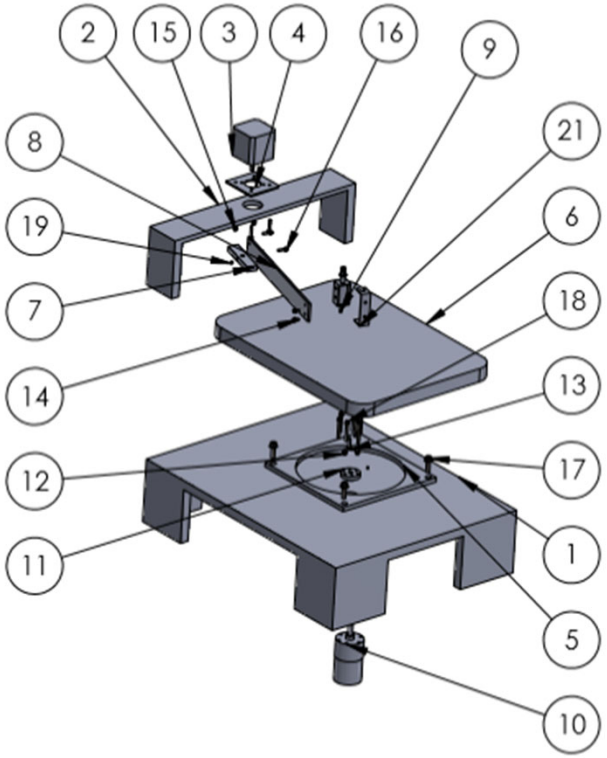


Spin Art Device

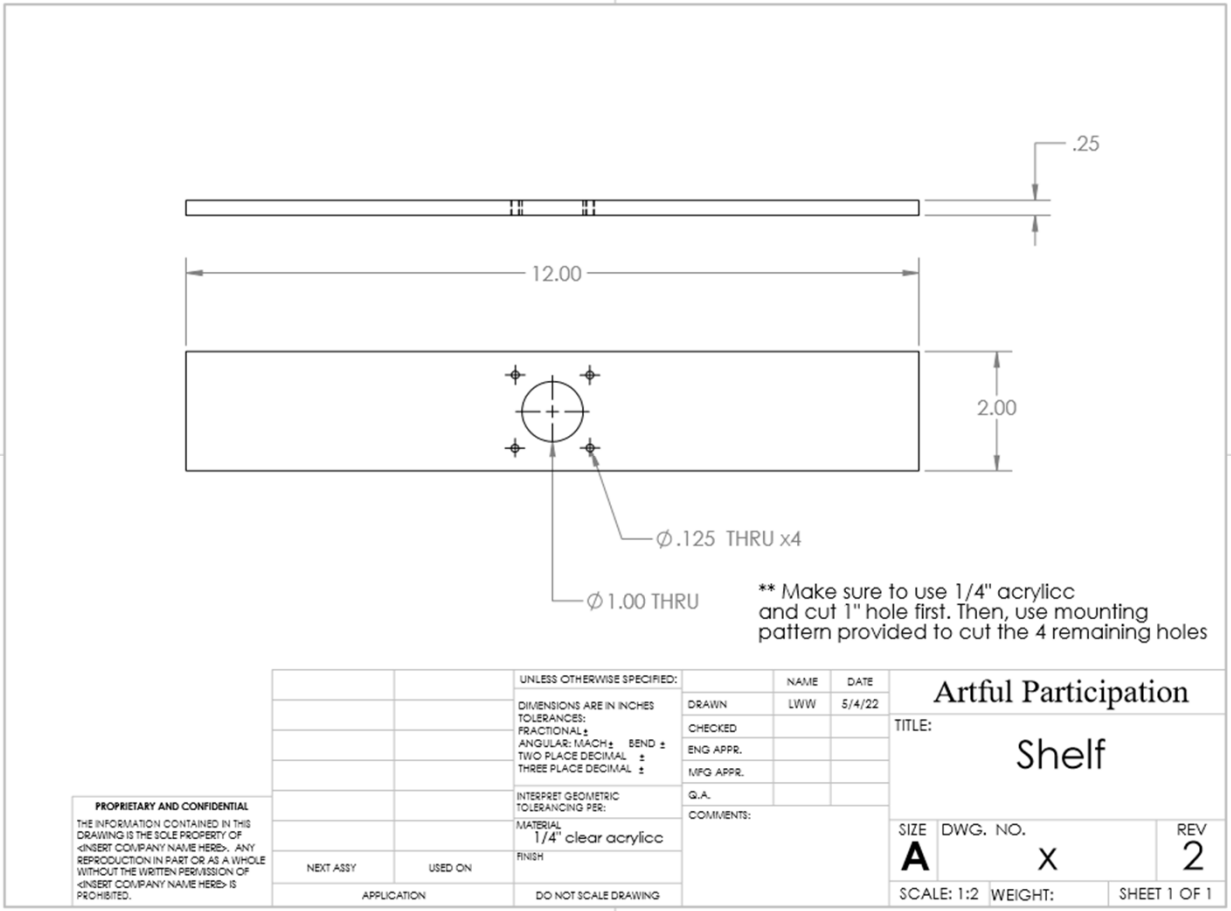
Assembly Manual

Components Needed (BOM)



ITEM NO.	PART NUMBER	QTY.
1	frame_rev2	1
2	shelf_rev2	1
3	stepper_motor	1
4	stepper_facePlate	1
5	lazy susan bearing	1
6	wooden boad (clipboad)	1
7	stepperCoupler_rev2	1
8	arm_rev2	1
9	solenoid_rev2	1
10	dcMotor_rev2	1
11	dcCoupler_rev3	1
12	B18.6.7M - M3 x 0.5 x 4 Indented HFMS --4N	1
13	B18.6.7M - M3 x 0.5 x 13 Indented HFMS --13N	2
14	B18.6.7M - M3 x 0.5 x 5 Indented HFMS --5N	2
15	B18.6.7M - M3 x 0.5 x 16 Indented HFMS --16N	4
16	B18.6.7M - M3 x 0.5 x 10 Indented HFMS --10N	2
17	B18.6.7M - M5 x 0.8 x 16 Indented HFMS --16N	4
18	B18.6.7M - M3 x 0.5 x 25 Indented HFMS --25N	6
19	B18.3.6M - M4 x 0.7 x 3 Hex Socket Cone Pt. SS --N	1
20	B18.3.6M - M3 x 0.5 x 2.5 Hex Socket Cone Pt. SS --N	1
21	C-Plate for Solenoid	1

Shelf Top


.25
12.00
2.00
Ø.125 THRU x4
Ø1.00 THRU
** Make sure to use 1/4" acrylicc and cut 1" hole first. Then, use mounting pattern provided to cut the 4 remaining holes
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
1/4" clear acrylicc
FINISH
NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
LWW
5/4/22
CHECKED
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
PROPRIETARY AND CONFIDENTIAL
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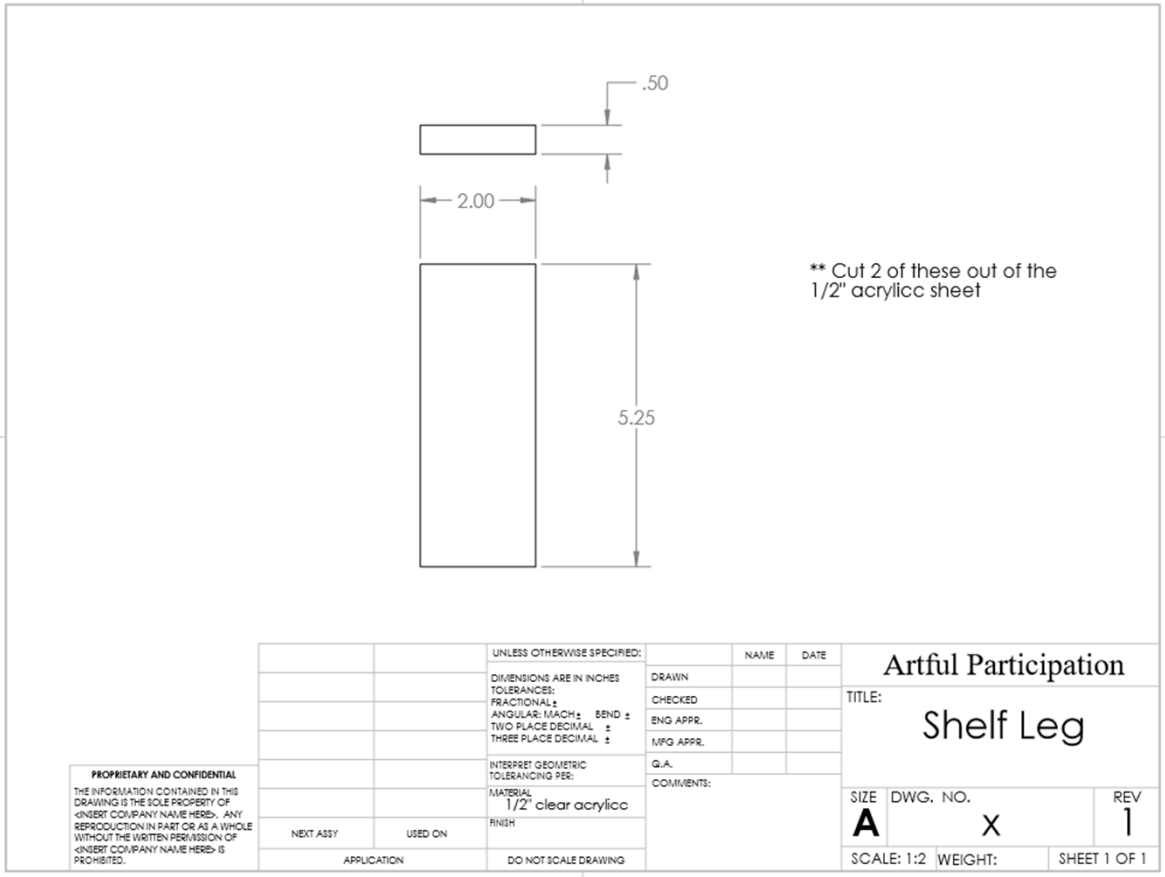
Artful Participation
TITLE:
Shelf
SIZE
A
DWG. NO.
X
REV
2
SCALE: 1:2
WEIGHT:
SHEET 1 OF 1

Shelf Leg


.50
2.00
5.25
** Cut 2 of these out of the 1/2" acrylicc sheet
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
1/2" clear acrylicc
FINISH
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
CHECKED
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
NEXT ASSY
USED ON
APPLICATION
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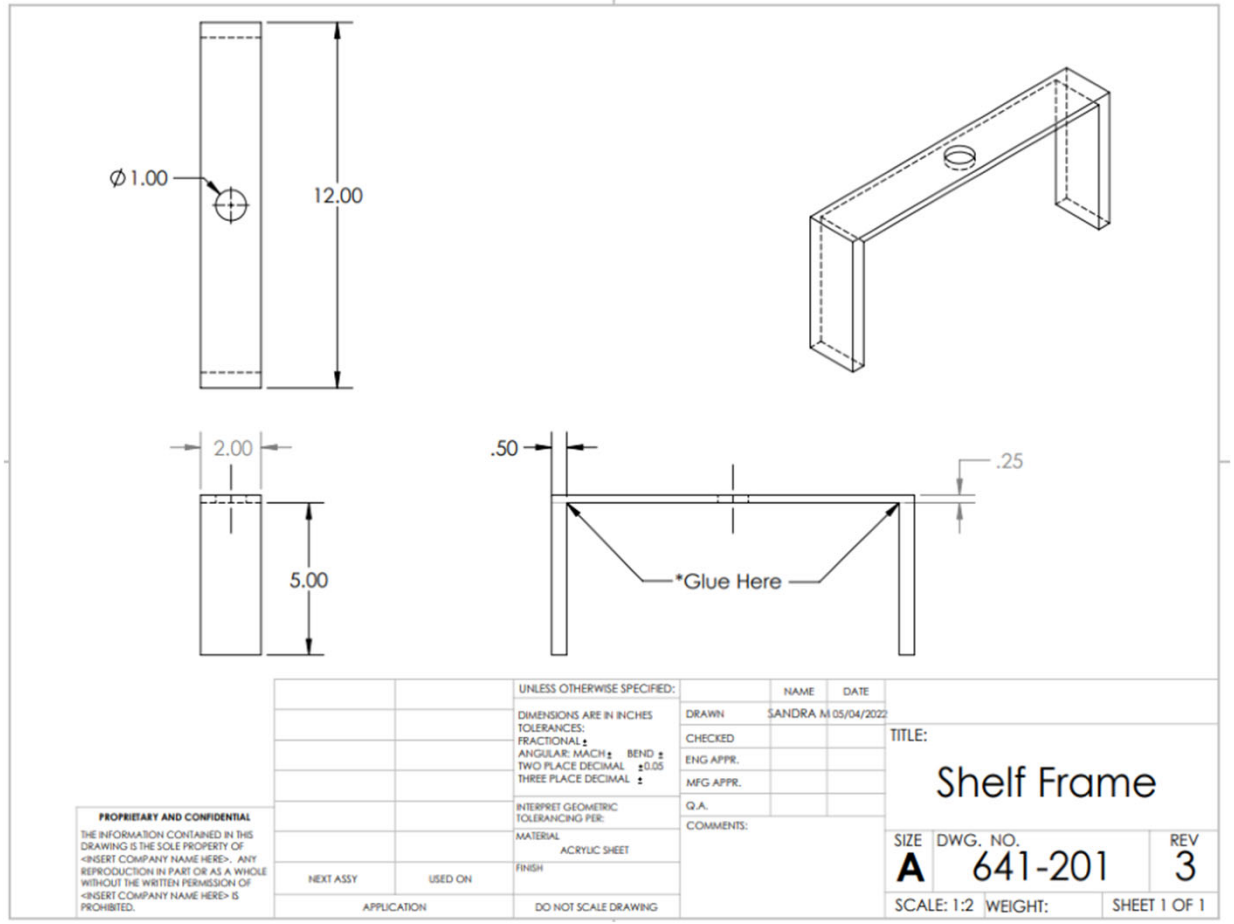
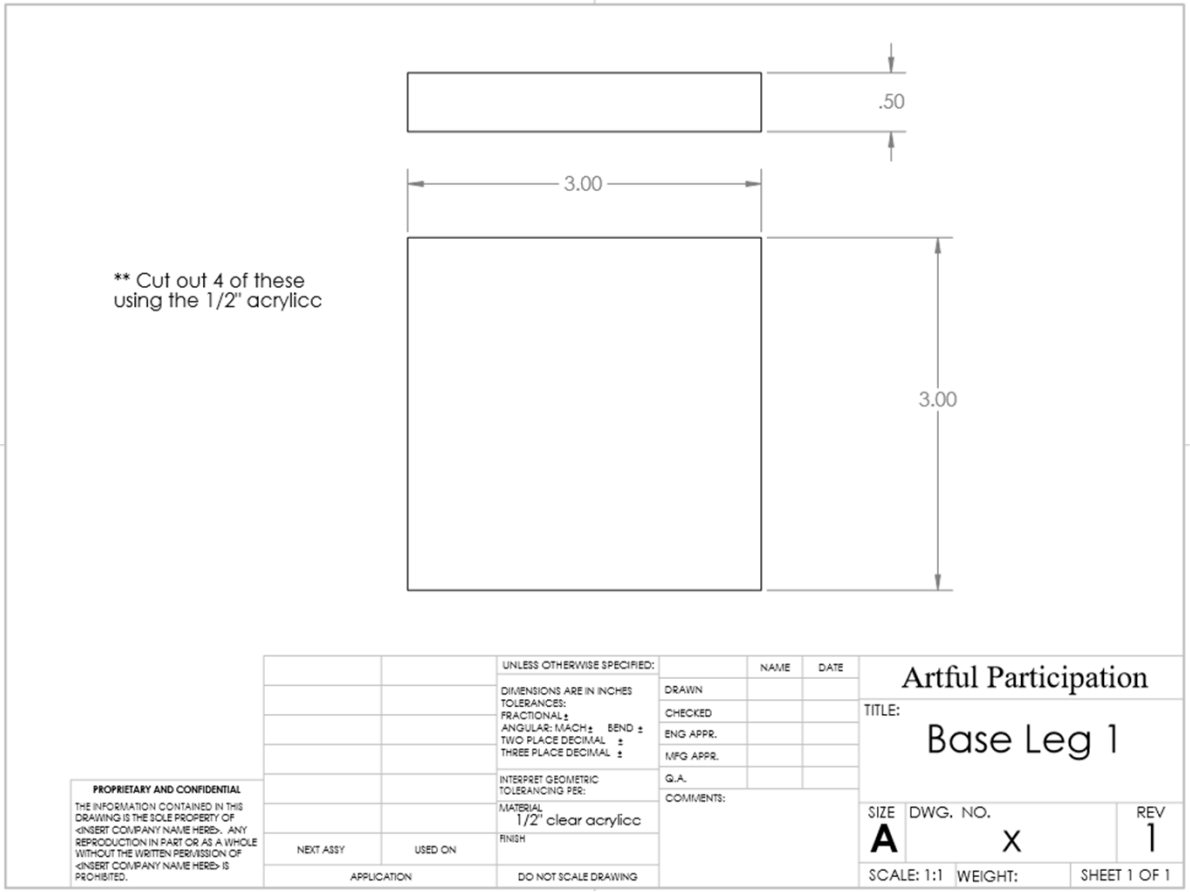
Artful Participation
TITLE:
Shelf Leg
SIZE
A
DWG. NO.
X
REV
1
SCALE: 1:2
WEIGHT:
SHEET 1 OF 1

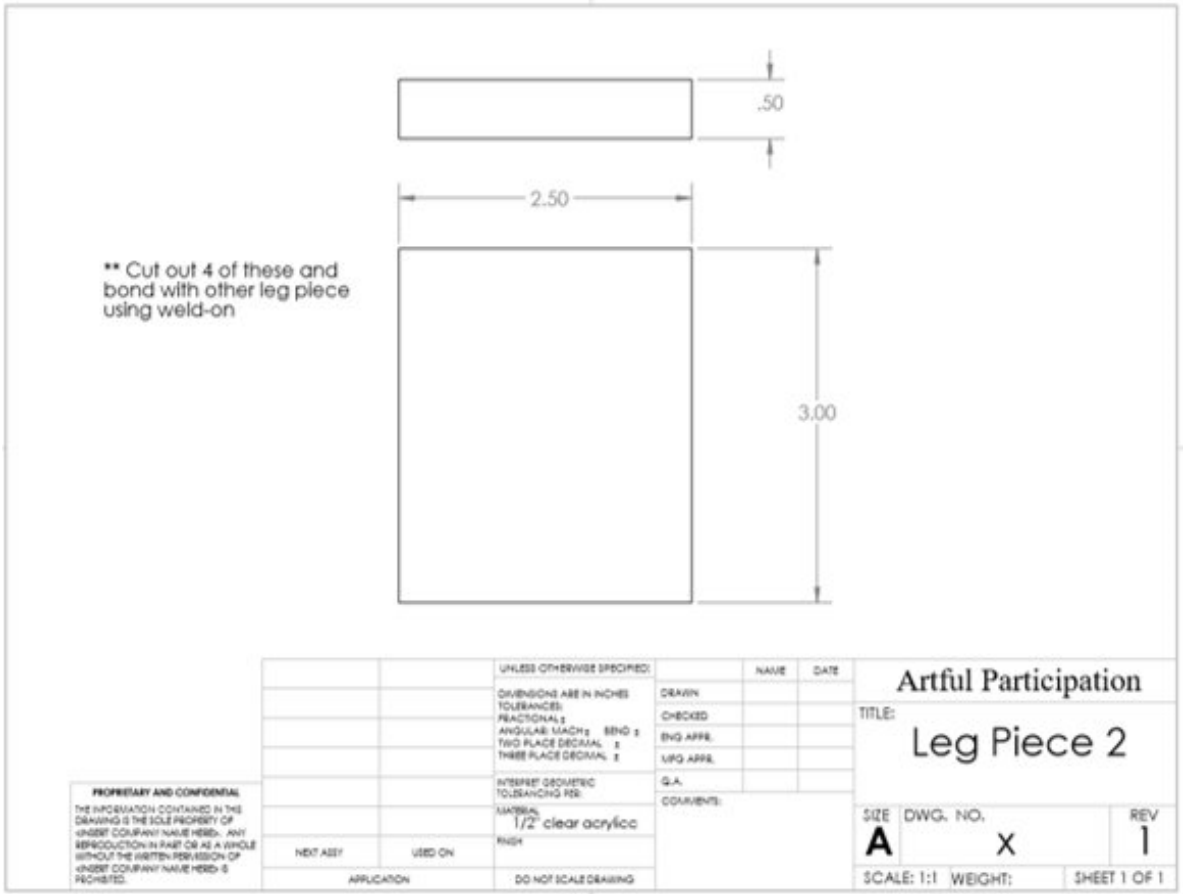
Assembled Shelf



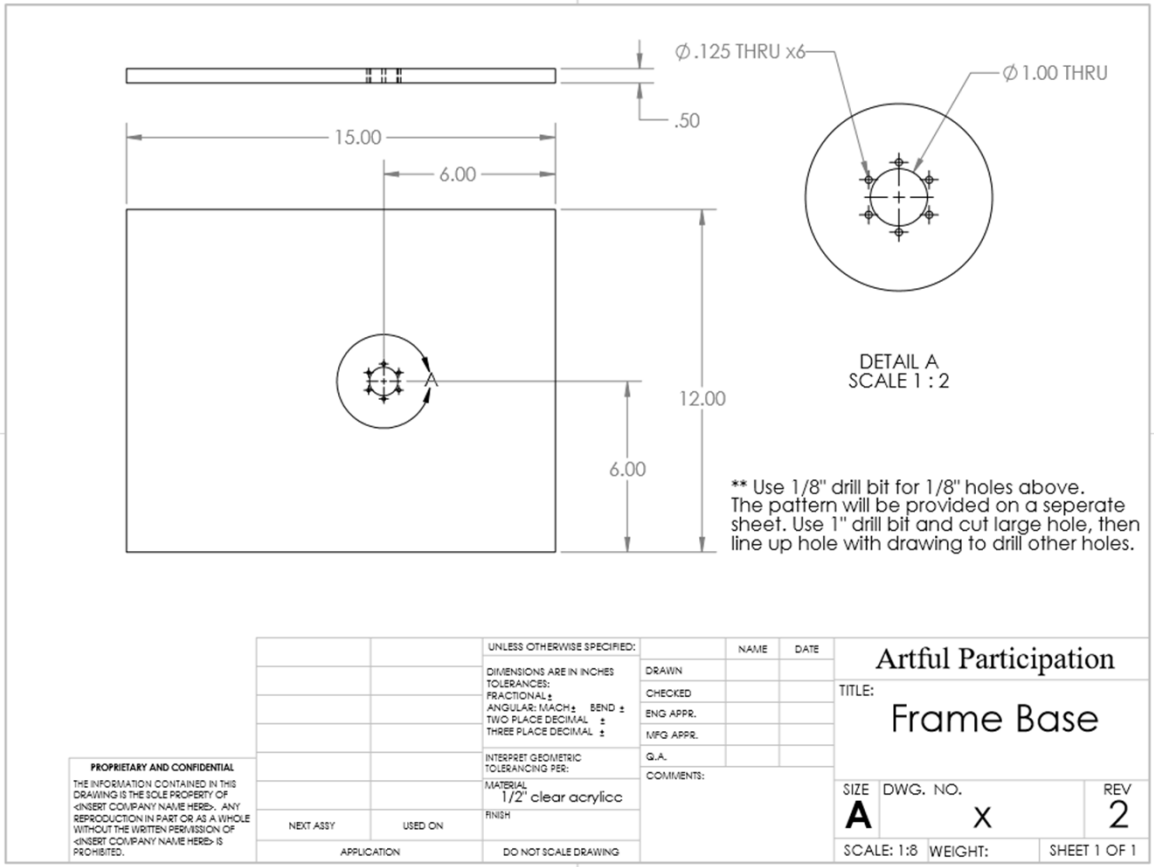
Frame Leg Part 1



Frame Leg Part 2



Frame Base


Ø.125 THRU x6
Ø1.00 THRU
.50
15.00
6.00
12.00
6.00
A
DETAIL A
SCALE 1 : 2
** Use 1/8" drill bit for 1/8" holes above.
The pattern will be provided on a seperate sheet. Use 1" drill bit and cut large hole, then line up hole with drawing to drill other holes.
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
1/2" clear acrylicc
FINISH
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
CHECKED
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
NEXT ASSY
USED ON
APPLICATION
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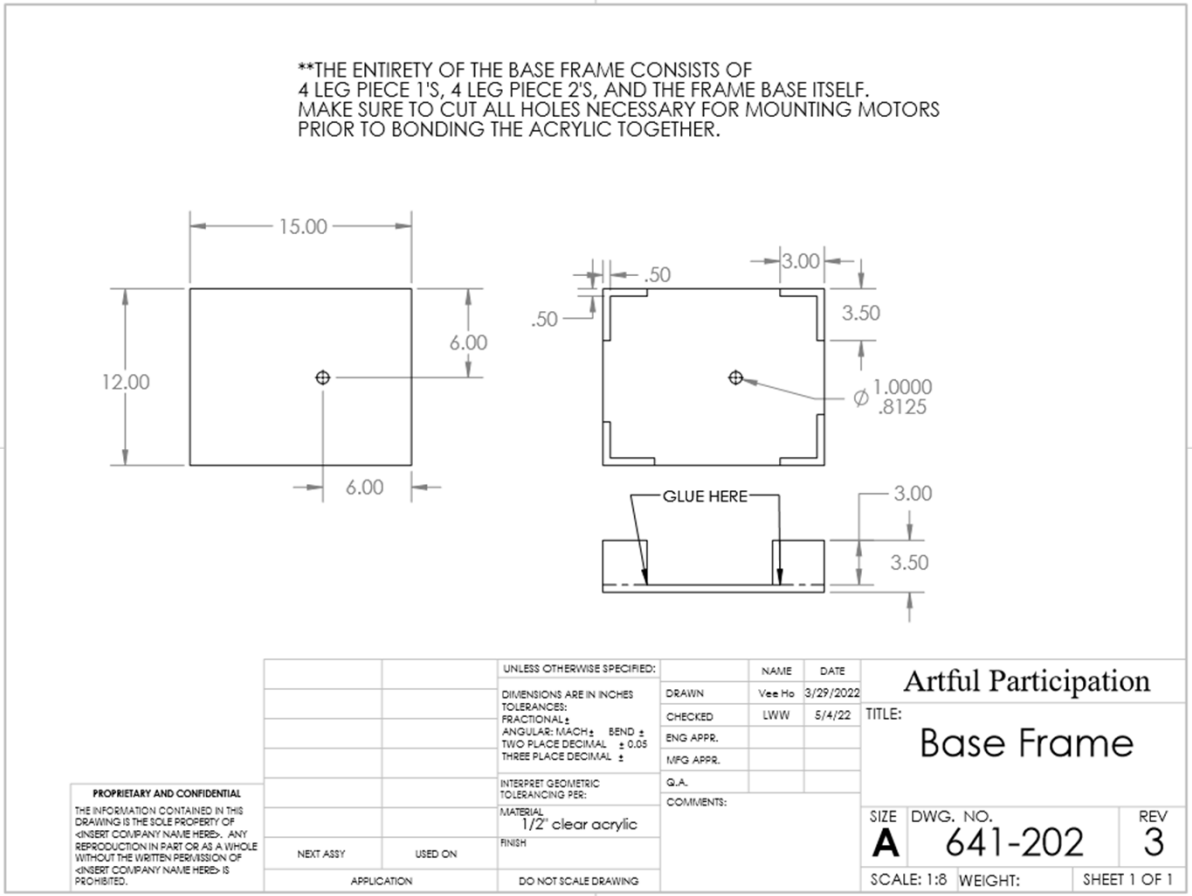
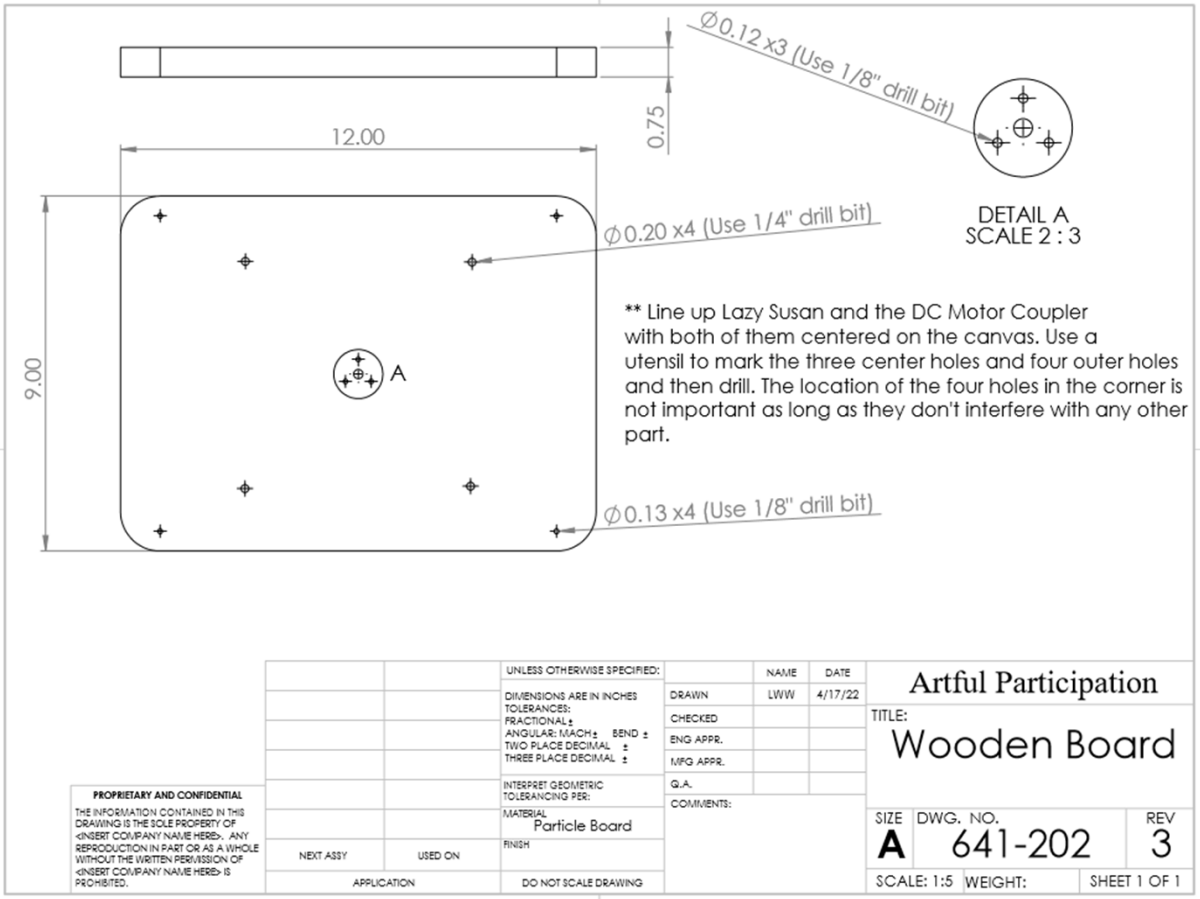
Artful Participation
TITLE:
Frame Base
SIZE
A
DWG. NO.
X
REV
2
SCALE: 1:8
WEIGHT:
SHEET 1 OF 1

Assembled Frame Base



Canvas


Ø0.12 x3 (Use 1/8" drill bit)
0.75
12.00
9.00
Ø0.20 x4 (Use 1/4" drill bit)
A
DETAIL A
SCALE 2 : 3
** Line up Lazy Susan and the DC Motor Coupler with both of them centered on the canvas. Use a utensil to mark the three center holes and four outer holes and then drill. The location of the four holes in the corner is not important as long as they don't interfere with any other part.
Ø0.13 x4 (Use 1/8" drill bit)
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
Particle Board
FINISH
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
LWW
4/17/22
CHECKED
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
Artful Participation
TITLE:
Wooden Board
SIZE
A
DWG. NO.
641-202
REV
3
SCALE: 1:5
WEIGHT:
SHEET 1 OF 1
NEXT ASSY
USED ON
APPLICATION
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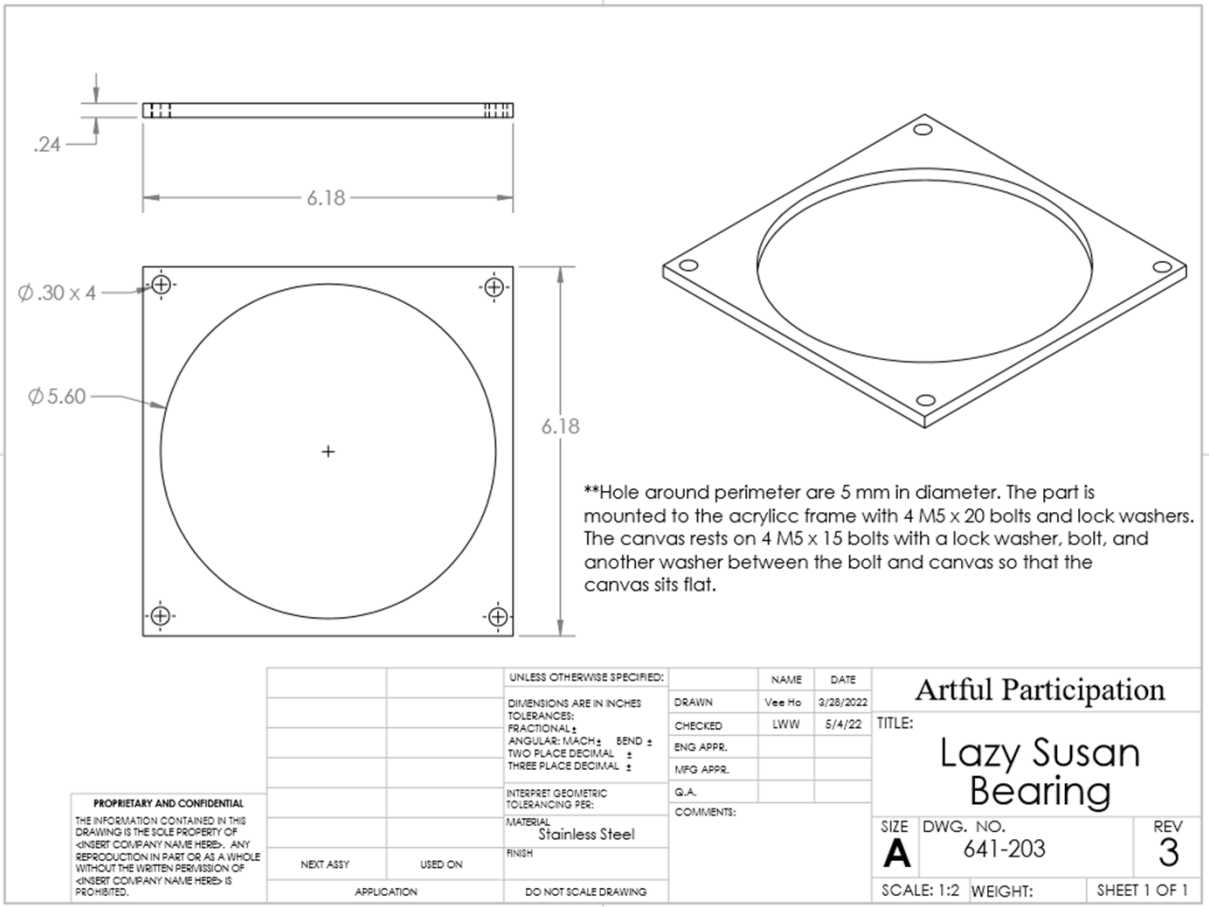
Lazy-Suzan


.24
6.18
Ø.30 x 4
Ø5.60
6.18
**Hole around perimeter are 5 mm in diameter. The part is mounted to the acrylicc frame with 4 M5 x 20 bolts and lock washers. The canvas rests on 4 M5 x 15 bolts with a lock washer, bolt, and another washer between the bolt and canvas so that the canvas sits flat.
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
Stainless Steel
FINISH
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
Vee Ho
3/28/2022
CHECKED
LWW
5/4/22
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
NEXT ASSY
USED ON
APPLICATION
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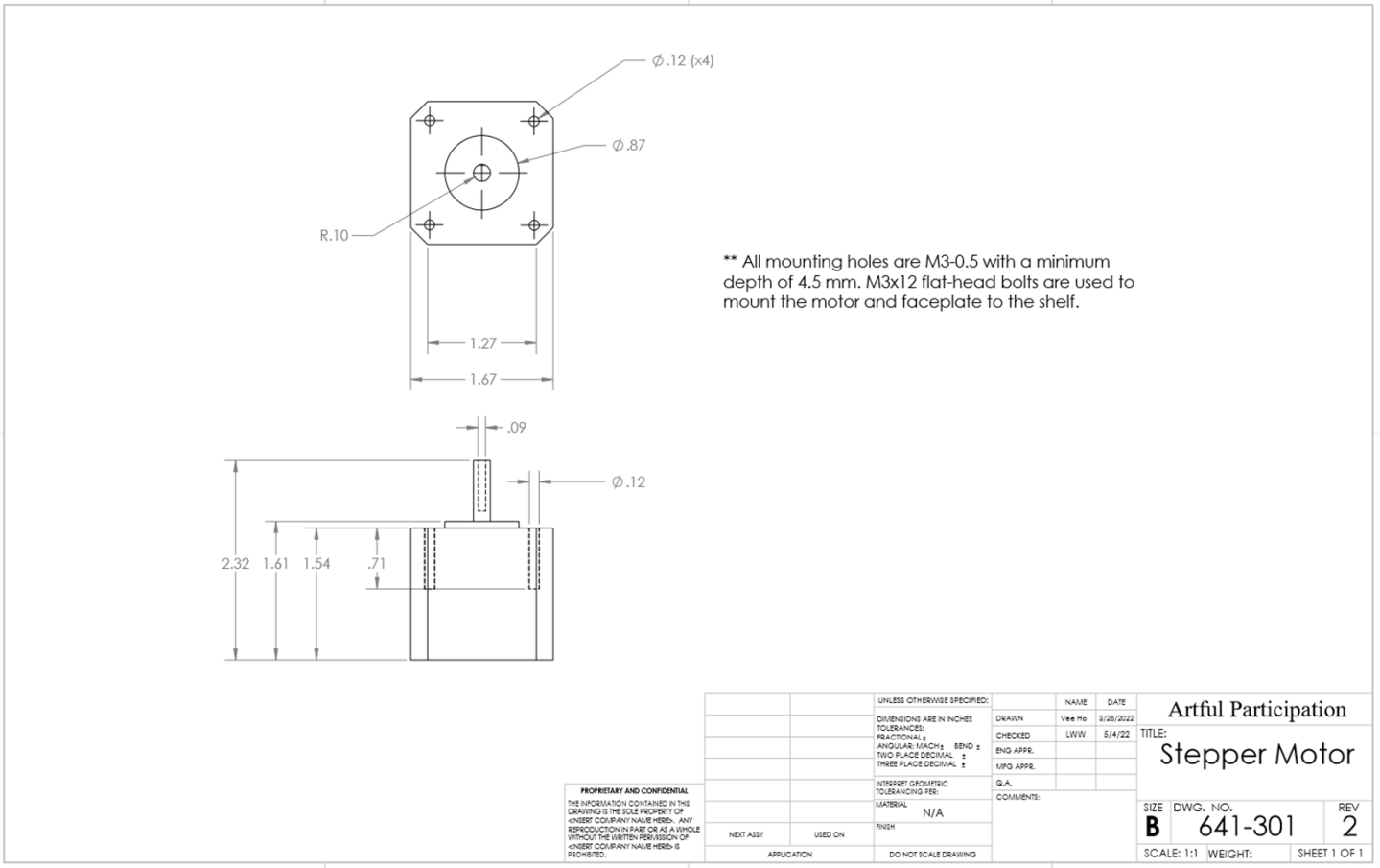
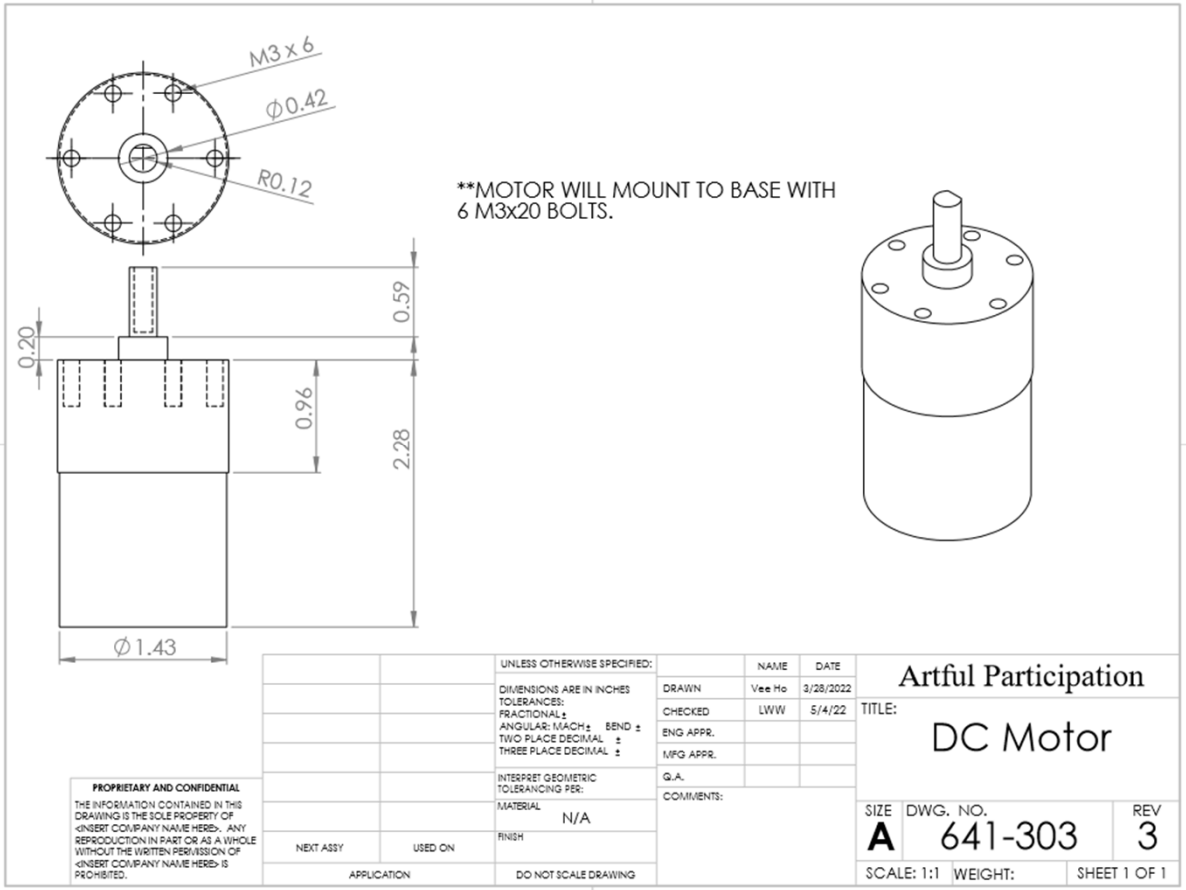
Artful Participation
TITLE:
Lazy Susan Bearing
SIZE
A
DWG. NO.
641-203
REV
3
SCALE: 1:2
WEIGHT:
SHEET 1 OF 1

Stepper Motor



DC Motor


M3 x 6
Ø0.42
R0.12
**MOTOR WILL MOUNT TO BASE WITH
6 M3x20 BOLTS.
0.59
0.20
0.96
2.28
Ø1.43
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
N/A
FINISH
NEXT ASSY
USED ON
APPLICATION
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
Vee Ho
3/28/2022
CHECKED
LWW
5/4/22
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
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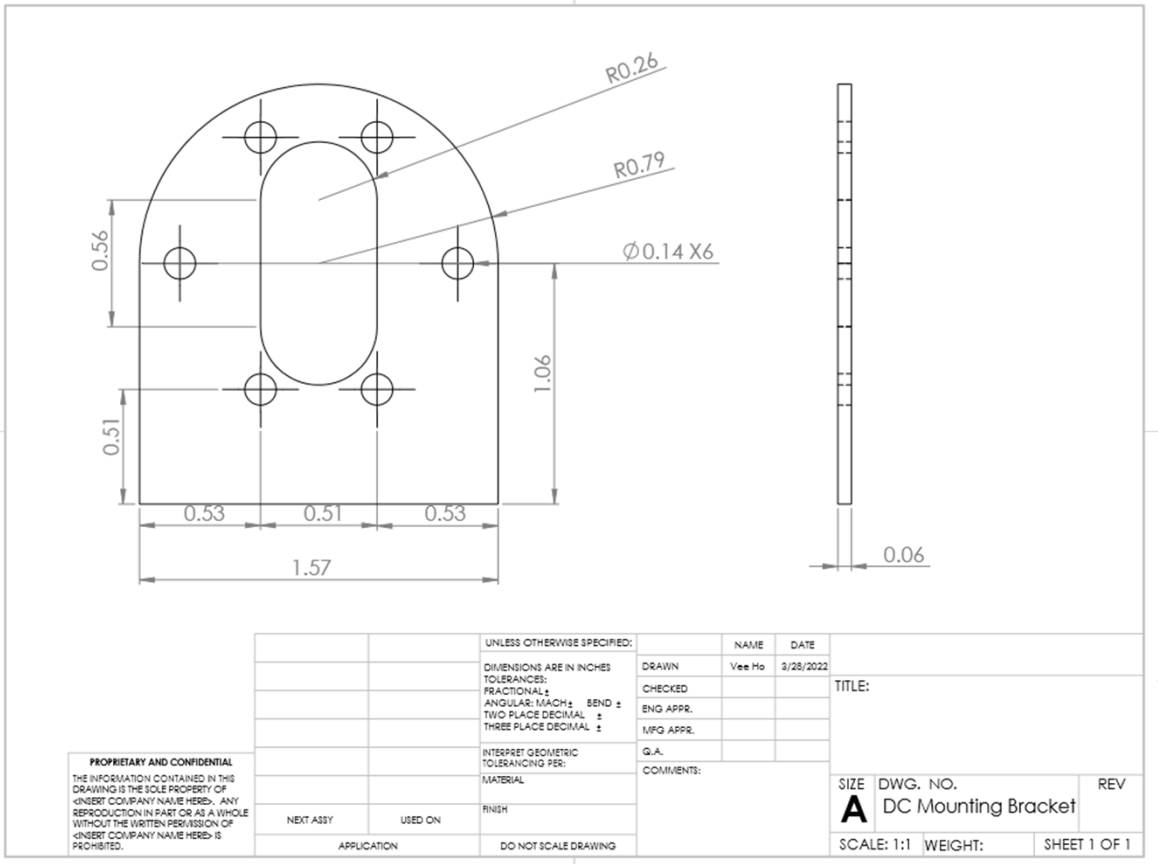
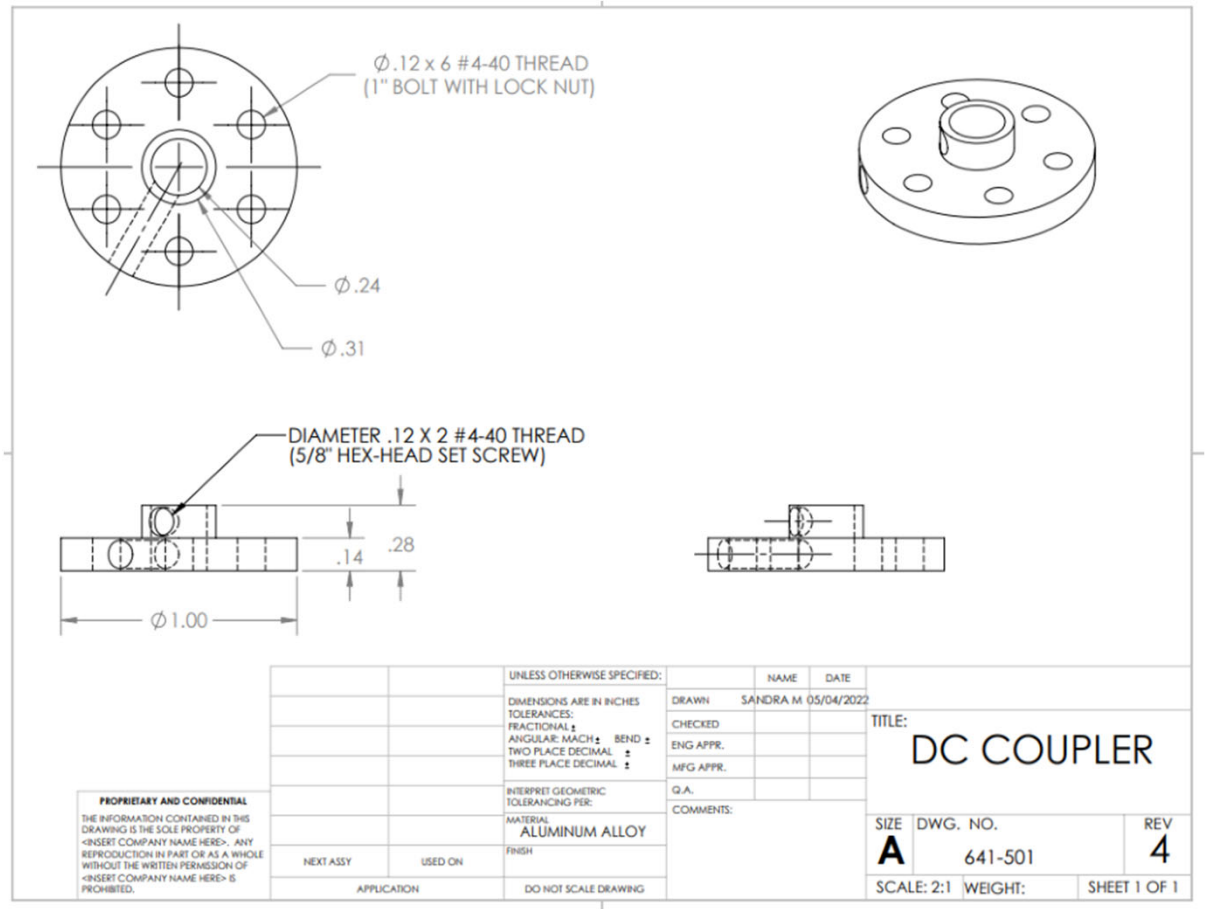
Artful Participation
TITLE:
DC Motor
SIZE
A
DWG. NO.
641-303
REV
3
SCALE: 1:1
WEIGHT:
SHEET 1 OF 1

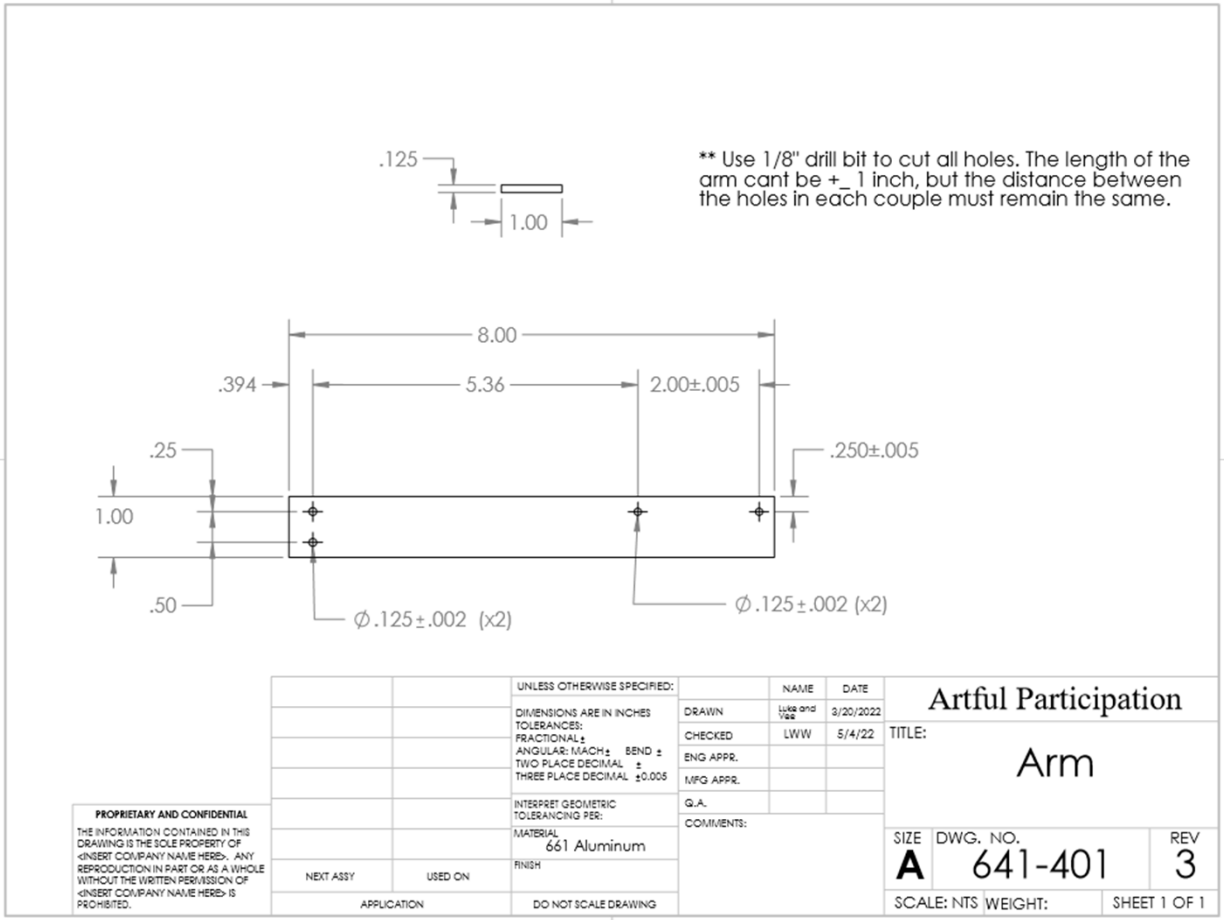
DC Motor Face Plate



DC Motor Coupler



Arm


.125
1.00
** Use 1/8" drill bit to cut all holes. The length of the arm cant be +_ 1 inch, but the distance between the holes in each couple must remain the same.
8.00
.394
5.36
2.00±.005
.25
.250±.005
1.00
.50
Ø.125±.002 (x2)
Ø.125±.002 (x2)
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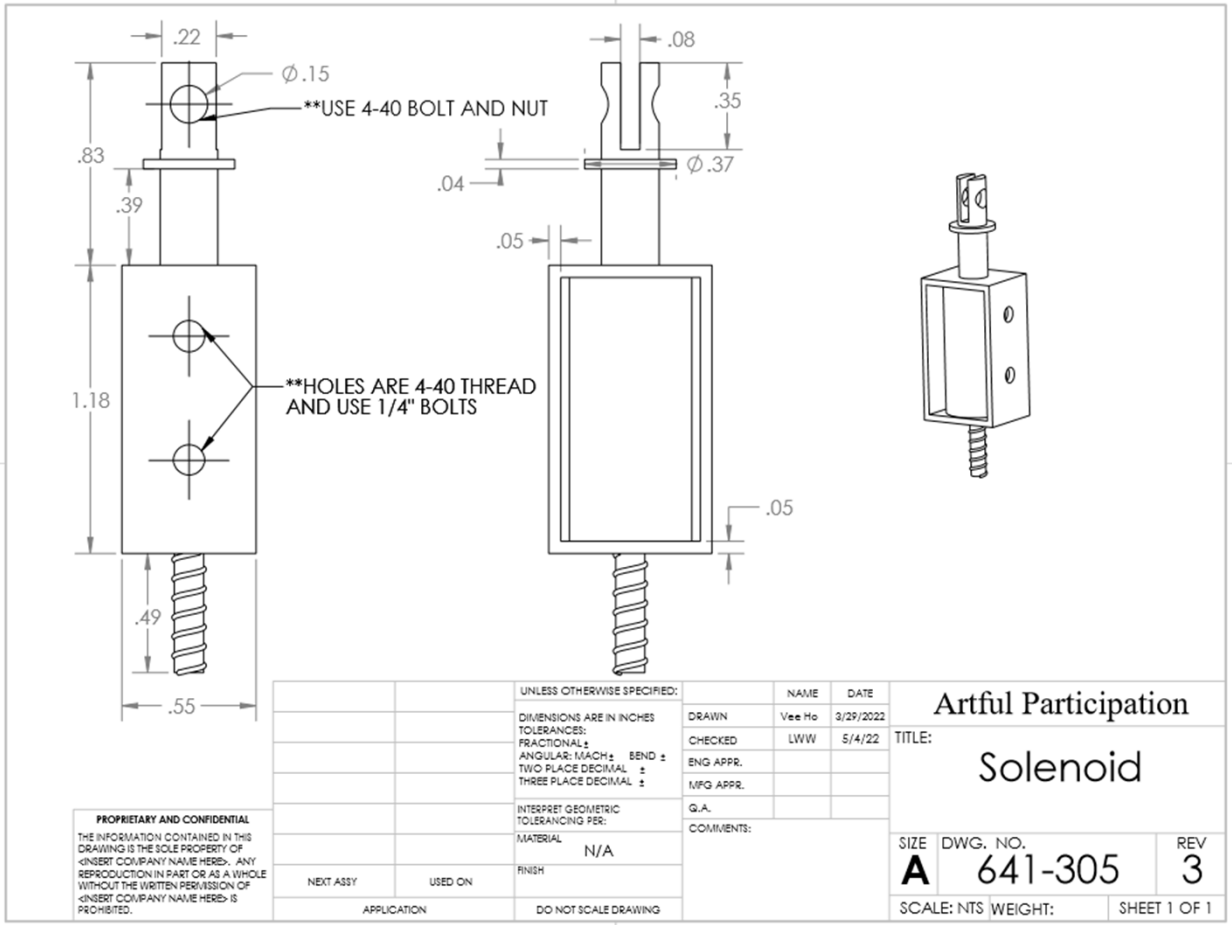
NEXT ASSY
USED ON
APPLICATION
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±0.005
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL 661 Aluminum
FINISH
DO NOT SCALE DRAWING
NAME
DATE
DRAWN Luke and Vee 3/20/2022
CHECKED LWW 5/4/22
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
Artful Participation
TITLE:
Arm
SIZE A
DWG. NO. 641-401
REV 3
SCALE: NTS
WEIGHT:
SHEET 1 OF 1

Solenoid


.22
Ø.15
**USE 4-40 BOLT AND NUT
.83
.39
1.18
**HOLES ARE 4-40 THREAD
AND USE 1/4" BOLTS
.49
.55
.08
.35
Ø.37
.04
.05
.05
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±
INTERPRET GEOMETRIC TOLERANCING PER:
MATERIAL
N/A
FINISH
DO NOT SCALE DRAWING
NAME
DATE
DRAWN
Vee Ho
3/29/2022
CHECKED
LWW
5/4/22
ENG APPR.
MFG APPR.
Q.A.
COMMENTS:
Artful Participation
TITLE:
Solenoid
SIZE
A
DWG. NO.
641-305
REV
3
SCALE: NTS
WEIGHT:
SHEET 1 OF 1
PROPRIETARY AND CONFIDENTIAL
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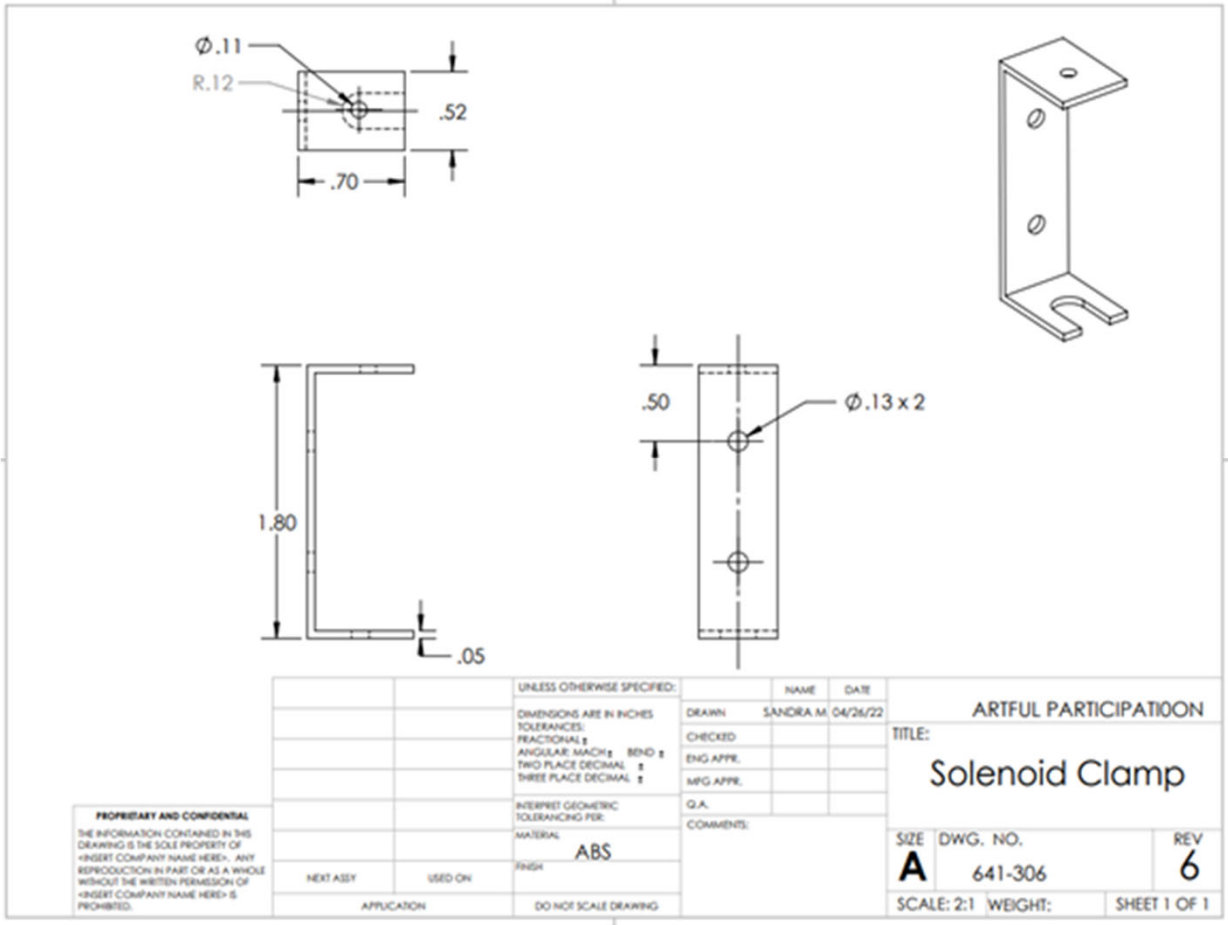
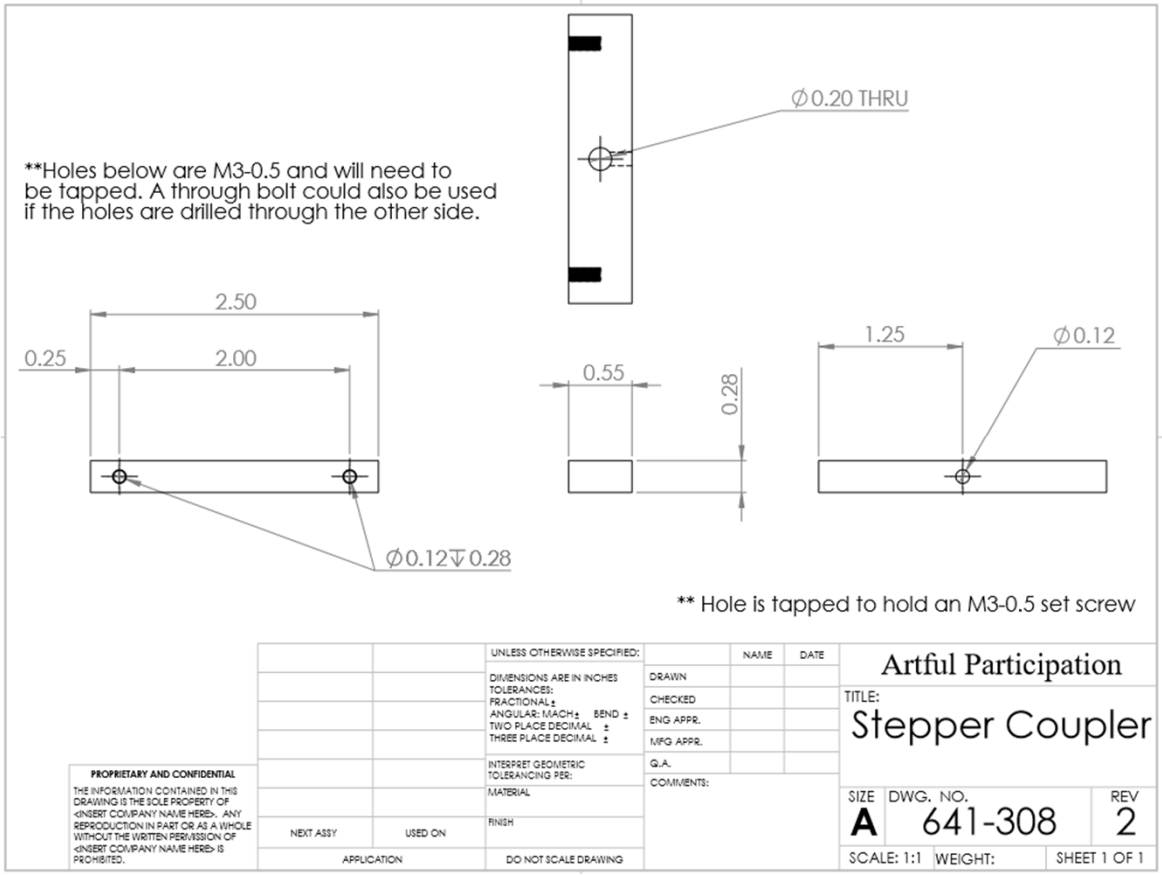
NEXT ASSY
USED ON
APPLICATION

Solenoid Clamp



Stepper Motor Coupler



Construction Instructions

- Assemble all items listed in the Bill of Materials
- Cut acrylic sheets to the sizes specified in “Drawings for Cutting” section of the drawings
- Print the mounting pattern drawings and use them to drill the holes for the motors to be mounting with. The “Frame Mounting Pattern” sheet goes with “Frame Base” and the “Shelf Mounting Pattern” goes with “Shelf”. It is easiest to cut the 1” holes first and then line up the 1” hole with the one on the sheet. Once lined up used a 1/8” drill bit to cut the holes. The stepper face plate can also be used to get the correct shelf mounting pattern.
- After the motor holes have been cut, use the Lazy Suzan bearing to cut the holes for mounting it on “Frame Base”. **MAKE SURE THAT THE LAZY SUZAN BEARING IS CENTERED ABOUT THE 1” HOLE BEFORE CUTTING THE HOLES.**
- Once everything is cut correctly, it is time to bond. (Refer to drawing names)
- **Bonding Order: 1. Leg Piece 1 (x4) -> Leg Piece 2 (x4) 2. Shelf Leg (x2) -> Shelf 3. Combined Leg Pieces (x4) -> Frame Base 4. Combined Shelf -> Frame Base**
- DISCLAIMER: The liquid itself is not harmful to skin, but it should be removed quickly if applied to skin as it will harden and become more difficult to remove. **MAKE SURE TO STORE THE LIQUID SECURELY AS POSSIBLE AS THE FUMES MAY BE HARMFUL IF INGESTED FOR TOO LONG. FOLLOW INSTRUCTIONS ON BOTTLE.**
- Using a funnel or just your hands, pour the Weld-On from the metal container into the applicator bottle. Then, apply the glue generously to one piece of acrylic and press it to the piece you want it connected with. Press gently for 5 seconds to allow the two pieces to soften and then press firmly. Either clamp the pieces together or hold firmly for up to 4 minutes. Let the newly bonded pieces sit for 1-2 days or until the bond is strong.
- Once everything is bonded and strong, it is time to mount everything. To mount the shelf motor, put the stepper coupler and stepper motor together. The stepper motor should slot into the face plate. The motor and faceplate are mounted to the shelf with M3 x 12 bolts. Slot a bolt up through the bottom of the shelf and line a hole on the outer set of the face plate with it. Then line up a hole on the stepper motor and screw the bolt up in. Repeat for the other 3 bolts. The same method is used for the DC motor except there is no faceplate and there are 6 bolts which are M3 x 20. **MAKE SURE THAT ALL BOLTS ARE FASTENED SECURELY.**
- Then, cut or grab the 9”x12” wooden board (and acrylic sheet if you use it). Connect the acrylic sheet to the wooden board with bolts and nuts, if necessary.
- Put 4 M5 x 15 bolts and lock washers through 4 of the mounting holes on the Lazy Suzan and secure with a nut. For stability’s sake a washer should be placed on top of the nut.
- Secure Lazy Suzan to the frame base using 4 M5x20 bolts, nuts, and lock washers.
- Center the wooden board on the Lazy Suzan and press downwards until there are marks on the clipboard from the bolts. Drill ¼” holes centered on the indents.

- Take 3 4-40 x 3/4” bolts and screw them into 3 of the mounting holes on the DC motor coupler. Secure a stop nut to each of the screws. Connect the coupler to the DC motor using the 4-40 x 5/8” set screw and make sure there is no interference between the coupler and the bolts anchoring the DC motor. **MAKE SURE THAT THE SET SCREW IS TIGHTENED TO THE FLAT PART OF THE DC MOTOR SHAFT.**
- Place the board on the Lazy Suzan bolts and press down to make indents. Drill 1/8” holes centered on the new indents. Place the board on the Lazy Suzan and coupler and make sure it’s level. If it is not level, stack washers on the Lazy Suzan bolts until it’s level.
- Manufacture the stepper coupler and arm out of 661 aluminum or similar material according to the drawing file provided
- Drill 1/8” holes in the arm in the spots specified in the drawing file
- Attach the stepper coupler to the arm using 4-40 x 1 ¼” bolts and nuts. Make sure the nuts are on as tight as they can be
- An STL file is included in the zip file that needs to be 3D printed. It is recommended that ABS material is used if possible. Once printed, drill two holes in the long section of the clamp to secure the cable ties. Drill a small pilot hole in the c-clamp and cable ties and then secure the cable tie to the clamp using screws. ¼” length is recommended so that the screws do not go all the way through and touch the solenoid.
- Once the C-Clamp is ready, attach it to the solenoid by unscrewing the nut on the bottom of the solenoid and putting the threaded rod through the bottom hole of the clamp. Then, slide the C around the top of the solenoid and use a #4-40 bolt to secure it. The top hole of the solenoid is threaded.
- Then, using 2 4-40 x ¼” bolts secure the solenoid to the arm using the mounting holes on the side. Secure the screws as tightly as they will go.
- Next, attach the coupler to the using a 10-24 set screw. Attach it tightly on and make sure the arm is able to flex up and down too much.

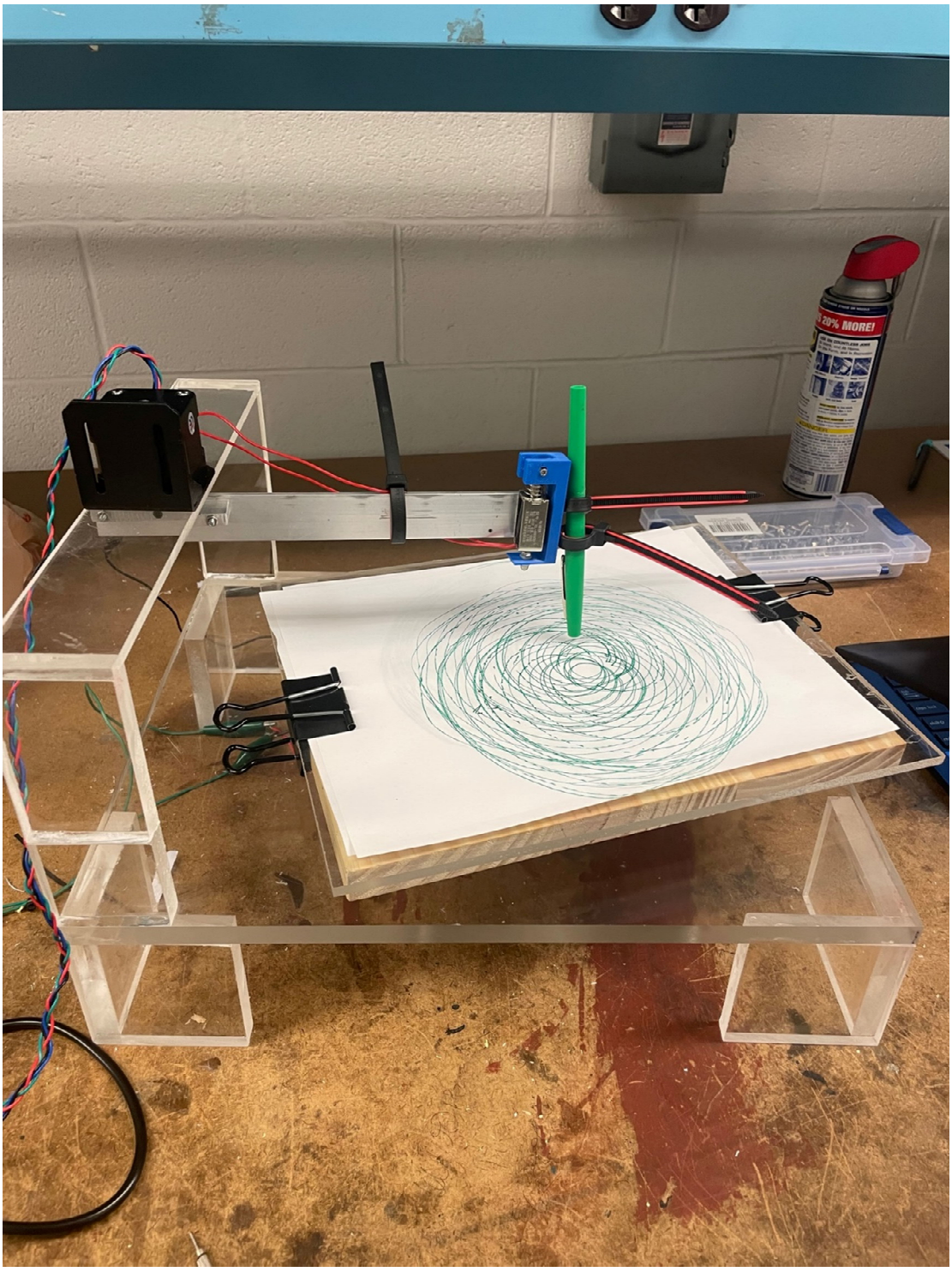
Electrical Components

- First, solder the Adafruit Motorshield onto the Arduino board using the stacking pins that are provided with the motorshield. After this, solder a wire into Digital I/0 pin 2 and another wire into one of the GRND pins. These wires will be used to connect to the button. You will also need to solder wires onto the solder tabs of the DC Motor.
- Next, connect the stepper motor to terminal blocks M1 and M2. From left to right the wires are: red, blue, green, black with nothing connected to the middle pin. Then, using alligator clips and wires if needed, connect the solenoid to terminal block M3 and the DC Motor to terminal block M4. **Make sure that the positive lead of the DC Motor is connected to the left pin.**

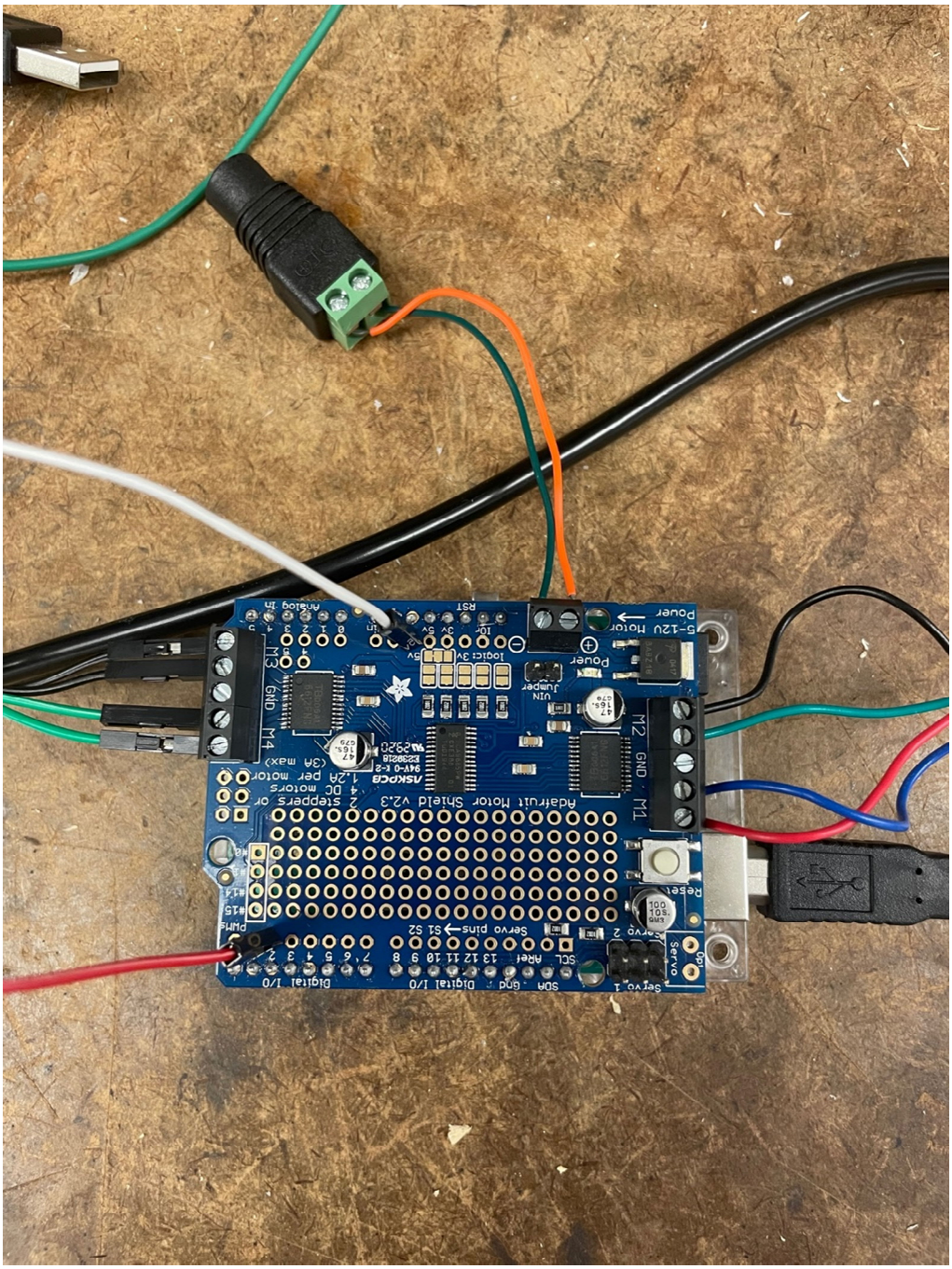
Arduino

- Go to https://www.arduino.cc/en/software and download the Arduino IDE.
- Connect the Arduino to a computer using the USB cord provided in the Bill of Materials. Open the program file (motor_code) and click the right facing arrow in the top left to upload the code to the Arduino Board
- Power the Arduino board itself using the 9V DC Power Supply provided in the Bill of Materials.
- Power the motorshield itself using a 12 V DC Power Supply. The end of the power supply is plugged into a 2-pin terminal block and the wires connect to the terminal block next to the stepper connections which is labeled power. **Make sure the positive lead is connected to the left pin.**
- Now it's ready to use! **Refer to the user manual for operating instructions**

Part Number	Cost	Quantity	Description	Designation in Assembly
641-101	$23.00	1	Arduino Uno	
641-102	$19.95	1	Adafruit Motorshield	
641-103	$8.99	1	DC Motor Speed Control	
641-104	$8.00	2	AC/DC 12 V Adapters	
641-105	$9.50	1	Arduino USB Power Adapter	
641-106	$8.60	1	3mm Mono to 2-Pin Terminal Block Adapter	
641-201	$24.99	1	1/2"x24"x24" acrylicc plexiglass	1
641-202	$3.99	1	Wooden Clipboard	
641-203	$7.99	1	Lazy Suzan Bearing	
641-301	$18.95	1	Stepper Motor	3
641-302	$1.50	1	Stepper Mounting Plate	4
641-303	$14.99	1	DC Motor	5
641-305	$8.99	1	Linear Solenoid	7
641-306	$0.86	1	Marker Clamp	10
641-401	TBD	1	1"x8" Aluminum Bar	8
641-402	TBD	1	Stepper Shaft Coupling	9
641-501	$5.99	1	DC Motor Shaft Coupling	11
641-601	TBD	17	M3 Hex Mounting Screws	
641-6-2	TBD	2	M3 Hex Set Screws	
	$166.29			



Final Product



All Connections to Arduino