RECURRENT RAYUELA, TEXT STREAM 6

BY RAFAEL LOZANO-HEMMER - 2024'S REDESIGN (AVLINK DISPLAY)

Version: 2025-01-31

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GENERAL IMPORTANT INFORMATION

This short section must be read for proper operation.

RECURRENT RAYUELA (2020)

BY RAFAEL LOZANO-HEMMER

Technique

Custom-made circular display, rotary encoder, computer and custom software.

Description

"Recurrent Rayuela" (Text Stream 6) is a generative artwork made with the 155 chapters of the experimental novel "Rayuela" (Hopscotch) published in 1963 by Argentine writer Julio Cortázar. The piece consists of a black circular screen that shows a cube with thousands of letters from the book in a fluid, animated pool. When the screen is manually rotated by a visitor, the cube tumbles around and the letters become turbulent; after a few seconds, random excerpts from the novel emerge on screen from the turbulence. As soon as the rotation ends the excerpts disappear and the pool of letters stabilizes again.

This is the 6th piece in the series of Text Stream series of generative artworks which present fluid-dynamic animations that never repeat themselves.

Operation

Please refer to Appendix I - Installation for detailed system information and wiring diagram.

1. To turn the piece **ON**, press the power button of the computer for half a second then release it. Be patient: once you see the display illuminate, wait another minute for the software to start up. *Important notes: Please do not push the button again as this will shut down the piece. Wait at least 5 minutes before pressing it again as the computer might take that long to boot. After 5 minutes (maybe faster), you should see the artwork.*

2. To turn the piece **OFF**, press the power button for a second (no more than 2 seconds).

3. Please wait until the display and computer have finished their shutdown routine and have cooled down before turning the piece **ON** again. At minimum, this should be after waiting at least 5 minutes.

General Artwork Behaviors

At rest, a cube is displayed with thousands of letters from the book in a fluid, animated pool.

When the screen is manually rotated by a visitor, the cube tumbles around and the letters become turbulent; after a few seconds, random excerpts from the novel emerge on screen from the turbulence being displayed leveled to the ground to make it easy to read. The text will stay leveled and visible as long as the display rotates.

As soon as the rotation ends the excerpts disappear and the pool of letters stabilizes again at the bottom of the cube.

Maintenance

Always use gloves when you manipulate the artwork to avoid having to clean it. Please do not clean the display surfaces with Windex or soap. Use a lint-free cloth, or micro fiber cloth and LCD screen liquid cleaner, such as Kensington Screen Guardian found in most computer stores. The frame can be cleaned with a different cloth with a simple damp cloth. Do not use harsh cleaners or rough sponges.

The metal outer casing can be cleaned with a regular all-purpose cleaner. Do not use harsh cleaners or rough sponges. Remove dust using a feather duster, such as those produced by Swiffer. We recommend cleaning the piece at least every two months.

Placement Instructions

The piece weighs approximately 31.5 kg and can only be hung on a reinforced, load-bearing wall. The screen's center should be positioned at 150 centimeters from the ground, which means that the bracket's bottom edge should be anchored to the wall at 16.3 cm from the ground - the bottom edge of the bracket is 13.3 cm above the center of the piece.

Before mounting the piece on the wall make sure that the rotation lock is properly inserted into the slot at the top of the piece. See the image below for an example.

Photo of the rotation lock inserted.

Test that the lock is properly inserted by gently placing your hand on the top of the screen and attempting to move it. If light pressure does not rotate the piece then the rotation lock is securely in place.

Finally before sliding the piece onto the cleft bracket seen below ensure that it is turned the right way. On the pack of the piece there will be a label with an arrow pointing towards the top as seen in the image below. Use this to orient yourself and hang the piece using the cleat on the top side.

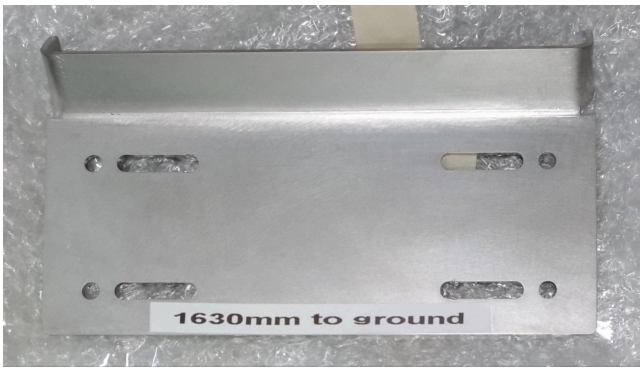


Photo of the bracket.

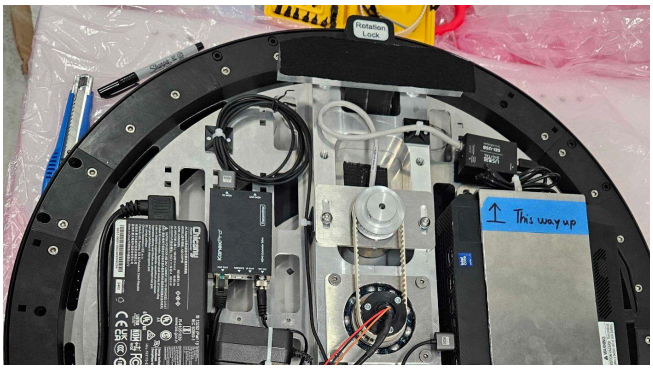


Photo of the label pointing towards the top.

The following images show the piece properly hung on the wall. Use them as reference when installing the piece.

Mounted piece left hand side with cover removed.

Mounted piece left hand side with cover.

The piece needs ample space around it to allow for user participation. There cannot be loose fabrics, wall hangings or cabinetry next to the piece that can get caught in the piece while spinning or restrict movement.

The piece should also not sit in direct sunlight as it will make the display harder to see and will heat the piece's internal electronics to a higher-than-functional operating temperature.

DETAILED TECHNICAL INFORMATION

Normal Software Operation

Recurrent Rayuela uses a custom software run on Touch Designer 099 2019.20140. This software should start up automatically when you turn on the computer, more or less a minute after you see light on display. If the piece does not start up automatically after that delay, you can start-up the application by double clicking on the icon on the desktop of the computer seen in the image below. With the wireless keyboard provided, turn the keyboard ON, then use the mouse to double-click on the application icon. If you cannot see the mouse pointer, move it to the top left of the screen until you can. If you are still having issues, try changing the keyboard's batteries. Once done, turn the keyboard OFF to preserve batteries.

Manual Software Calibration

To see if the piece is properly calibrated, give the display a good spin and observe the position of the text.

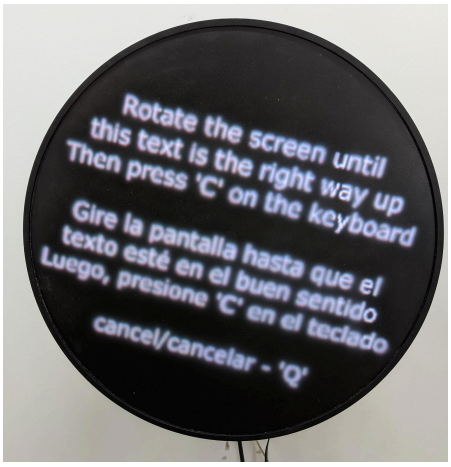
Text properly centered.

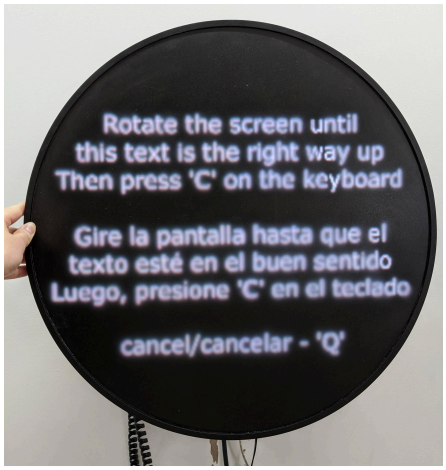
Text askew, calibration needed.

During the rotation, if the text is not centered on the screen, the sensor will need to re-learn its relationship to the screen, in order for the text to be straightened out anew. The sensor (located inside the piece) keeps track of the screen's rotation and offsets the displayed text accordingly.

To re-calibrate, press **key C** on the keyboard, which should display a text like in pictures below.

After pressing key C to calibrate, you should see these onscreen instructions. Rotate the screen until the text is upright, as shown in the above image. Press **key C** again when done, or **key Q** to exit calibration. Rotate the screen slowly, until the text being displayed on the screen is correctly positioned, as shown in the images below. Press **key C** again to get out of the calibration. **Press key S to save calibration**.





*Left: After pressing **key C** to calibrate, you should see these onscreen instructions.*
*Right: Rotate the screen until the text is upright, as shown in the above image. Press **key C** again when done, or **key Q** to exit calibration*

Once you're out of the calibration mode and have saved it, confirm the calibration is correct by ensuring the words are horizontal and centered on the screen and that the pool of letters stabilizes towards the bottom of the screen, matching the gravity.

Important Note: Usually, the circular display's playback default is a 256 x 256 window from the top left side of the screen. If you need to find the cursor and are having a hard time finding it, try moving it towards the top left.

Remote Access to Artwork's Computer

There is a software installed on the computer running this artwork that allows the studio to connect remotely to the artwork. This feature is helpful when you require assistance from the studio, as we can remotely connect to it, do a quick inspection, and do a debugging session of your components, if needed. In order to enable this feature, the computer has to be connected to the internet at all times. Depending on the computer's operating system (Windows 7/8/10/11, OSX), the procedure to set the computer online will vary. Please look online for tutorials, if necessary.

Preliminary Troubleshooting Steps

After pressing the on button, nothing seems to happen.

Ensure the computer is receiving power correctly: its power LED should turn On/Off when the computer switches On/Off. Ensure the power cable connects firmly to the computer and to the power source. Ensure the power cable connects firmly to the artwork's power port and to a power source.

If the LED for the computer is not lighting up when pressed, remove the screen from the wall following the Placement Instructions and Photos and ensure that all cable connections are secured. Refer to the Wiring Diagrams and Connections section to see how things should be properly connected.

The piece is on but the screen is dark.

Try turning the piece off and on. If when the piece initially turns on you see a blue screen before it goes to black the video signal is not properly making its way to the display. Remove the screen from the wall following the Placement Instructions and Photos and ensure that the video cable connections are properly secured. Refer to the Wiring Diagrams and Connections section to see how things should be properly connected and identify where the HDMI extender is. If the HDMI extender's receiver does not have its green lights on it is not receiving power via the RJ45 cable. Try unplugging and replugging this cable and ensure all other accessible connections are firmly in place.

If you never see a blue screen you should test the display on its own. To do this follow the instructions in APPENDIX III: REPAIRS AND MAITENANCE: Accessing the Connections to remove the sides of the piece. Once this is done, disconnect the display's HDMI and power cable. Then connect an external C13 power cable and an external device (e.g., a laptop) to the display using an HDMI cable. If no video is still visible contact the studio.

While spinning, the piece does not react, and/or the image is frozen.

If the image is frozen, it might be because the display connection has been disrupted. Follow the instructions in APPENDIX III: REPAIRS AND MAITENANCE: Accessing the Connections and ensure the HDMI cable is well connected. Turn the computer OFF, wait a minute, then turn it ON again.

While the display is rotating, the text is not centered.

Follow the re-calibration instructions in the Manual Software Calibration Section.

While rotating, is the text offset, but then moves back to center as it slows down

The software normally has a bit of a motion blur. However if you're seeing significant movement in the positioning of the text when in motion versus when slowing down or at rest this could be a software or an encoder issue. Please contact the studio for assistance.

The piece is on but rotating the display does not change the content.

There may be a problem with the encoder. Refer to the Wiring Diagram section and check that all of the connections going into the encoder are firmly in place. If so check that the timing belt is properly engaged on its two gears as seen in the reference photos.

While the display is rotating, the text appears very jittery.

The text might appear shaky or glitchy if the software is running at a lower-than-ideal framerate. Ensure that no cables are exposed or pressed along the wall, and that all cable connections are tight. If necessary follow the instruction in APPENDIX III: REPAIRS AND MAITENANCE: Accessing the Connections to access more of the pieces' connections.

If the output scaling on the display seems off, things are too large or too small

Check that the computer is properly set to a resolution of 1280 x 1280. This is necessary for the piece to be rendered properly.

The display is completely unable to spin

The display should turn easily when light pressure is applied. If you find it unable to move do not brute force movement. Instead double check that the rotation lock has been properly removed from the piece and that nothing is stuck in the sides of the piece.

Troubleshooting Assistance

Prior to contacting the Antimodular Studio with a problem about your artwork, please ensure that you went through the preliminary troubleshooting steps outlined in the previous section.

The troubleshooting process will vary depending on the problem. In order to make the process easier, it is recommended that you collect and send the following information to the studio:

- Date and time when the problem first happened;
- Description of the problem;
- Actions taken so far and conclusions;
- Detailed photographs (or videos) displaying the problem;
- Detailed photographs (or videos) of the suspected faulty component;
- Detailed photographs (or videos) of the whole artwork and its surroundings;
- Personnel involved.

Support (Contact Us)

If you would like support for the piece, please feel free to call Lozano-Hemmer's studio in Canada:

Antimodular Research
4462 rue Saint-Denis
Montréal, Québec, Canada
H2J 2L1
Tel 1-514-597-0917
info@antimodular.com
www.antimodular.com

APPENDIX I - INSTALLATION

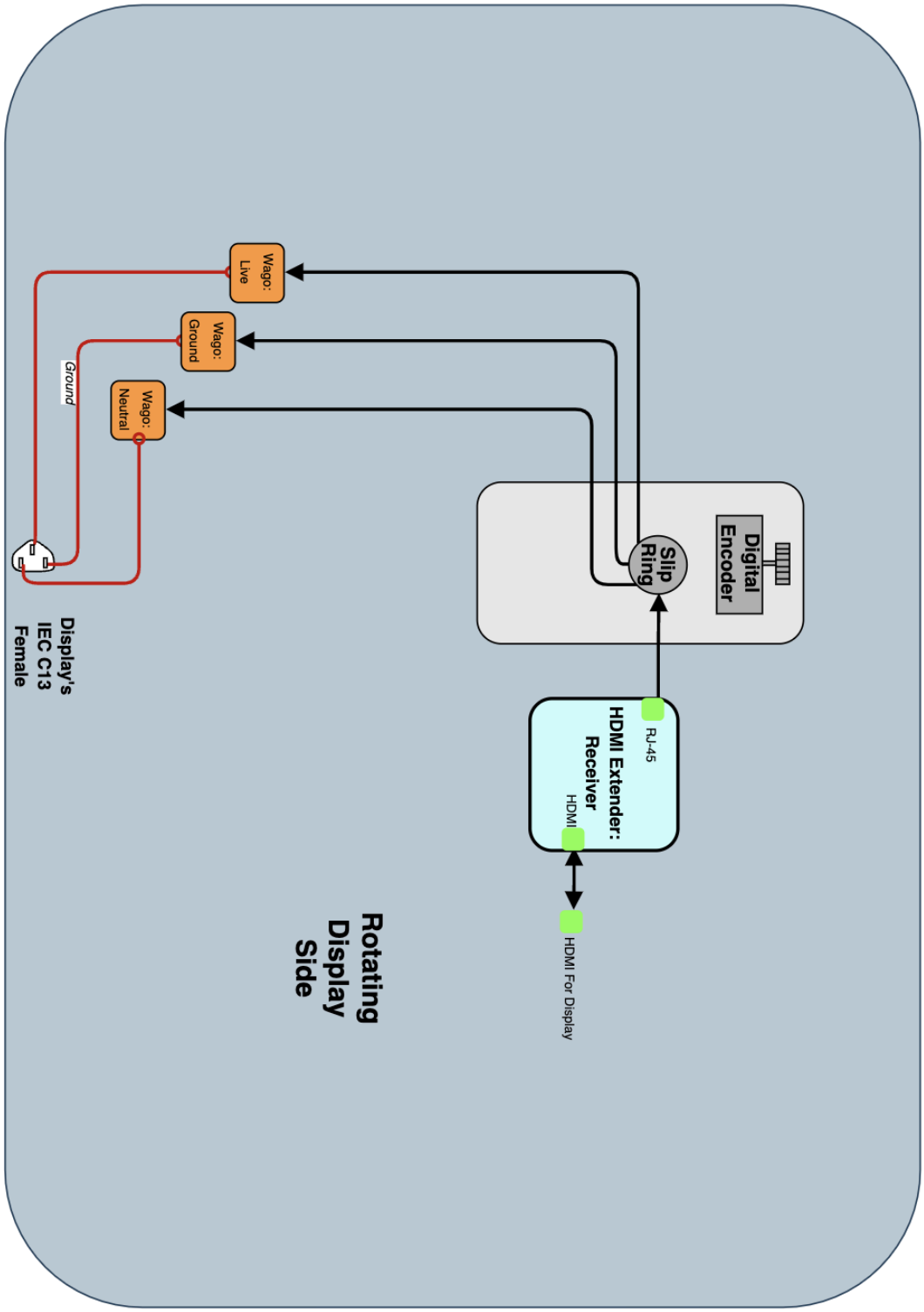
Description of Components

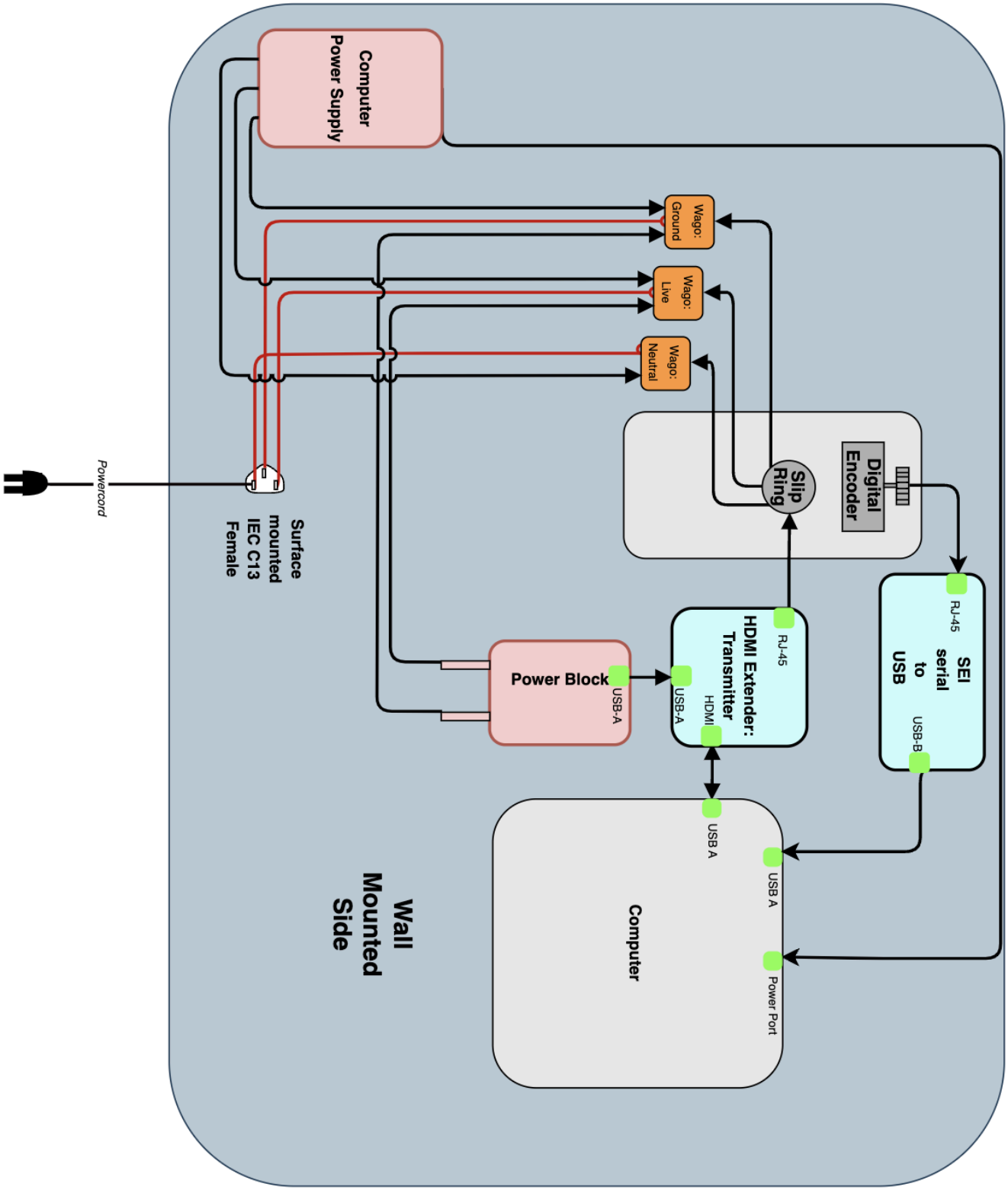
This artwork requires the following components:

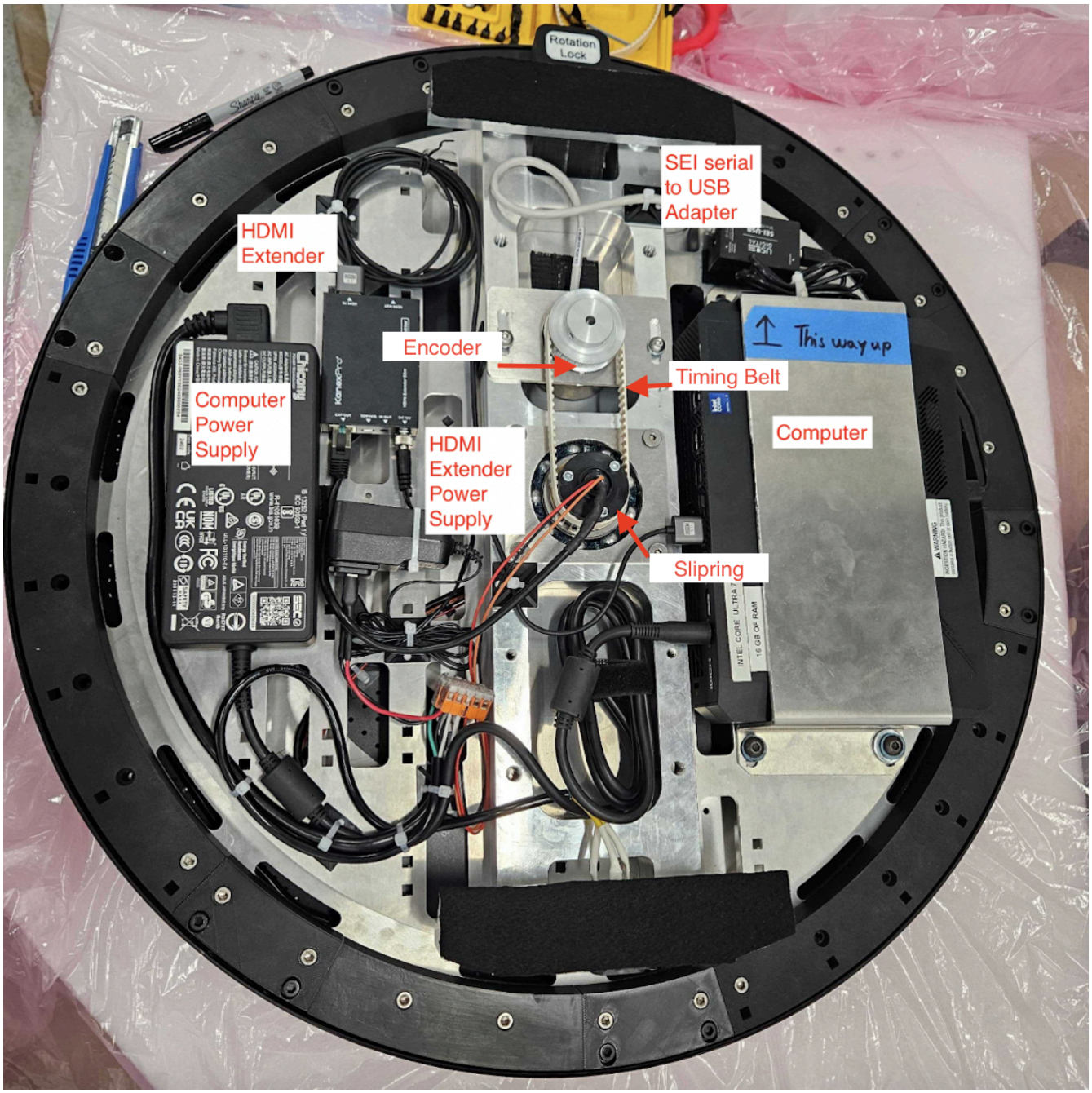
Component	Description
Computer	The computer integrated in this artwork is an Asus ROG NUC14SRK: it runs on Windows 11, with 16Gb of RAM. NVIDIA RTX 4060 graphic card.
Custom Circular Display	Circular display with an approximate diameter of 60cm, mounted in an enclosure.
Slip Ring	Allows power and video signal to get to the display, while allowing the display rotation.
Bearing	Allows the display to rotate freely.
Steel Gear	Attached to the display to transmit its rotation to the encoder.
Timing Belt	Transmits rotation between steel gear and 3D printed gear.
3D printed Gear	Gets rotation from the belt and transmits it to the encoder.
Encoder	Used to detect the display rotation.
SEI serial to USB adapter	USB Bus specifically designed for the encoder to convert serial data to USB signal.
HDMI Extender	Transmits video from the computer to the display. It has two components, a transmitter located on the wall mounted side of the piece and a receiver on the rotating display side of the piece.
Frame	Custom created frame to the piece.
Rotation Lock	Custom 3d printed lock that can be used to prevent the screen from moving.

Component	Description
Ethernet cable	A CAT5e cable transmits signal from encoder to SEI serial adapter.
HDMI cable	Conveys video signal from computer to HDMI extender.
USB cable	Conveys encoder signal from SEI serial adapter to computer.
Keyboard	While not required for normal use of the artwork, it allows you to troubleshoot the artwork.

Wiring Diagrams and Connections




Computer Power Supply
Wago: Ground
Wago: Live
Wago: Neutral
Slip Ring
Digital Encoder
Powercord
Surface mounted IEC C13 Female
RJ-45
SEI serial to USB
USB-B
RJ-45
HDMI Extender: Transmitter
HDMI
USB-A
Power Block
USB-A
USB A
Computer
USB A
Power Port
Wall Mounted Side

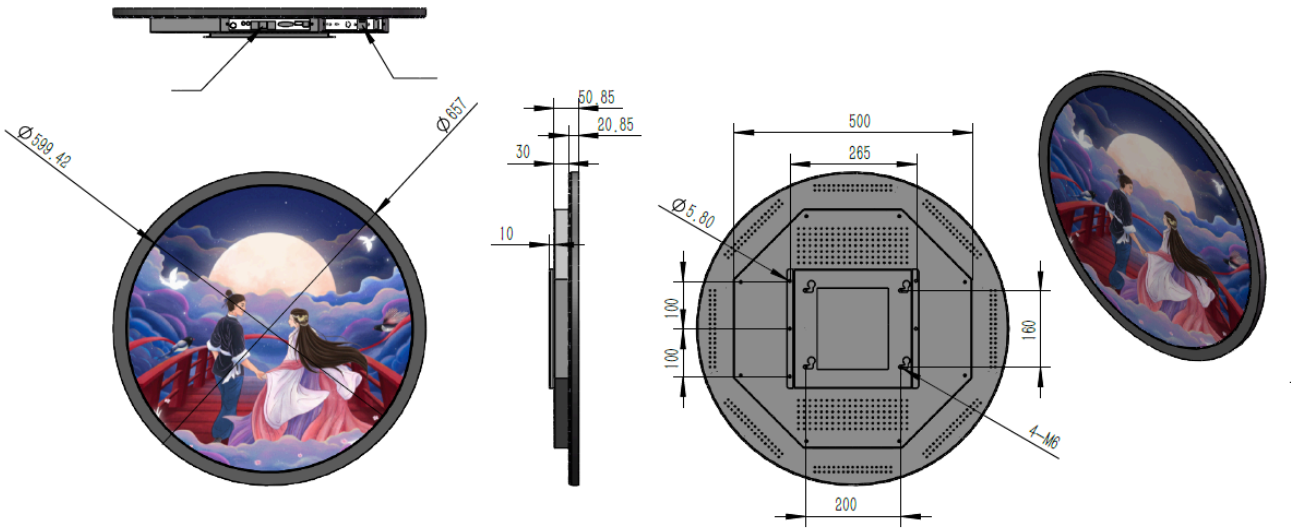

Rotation Lock
SEI serial to USB Adapter
HDMI Extender
Encoder
Timing Belt
This way up
Computer Power Supply
HDMI Extender Power Supply
Computer
Slipring

APPENDIX II - TECHNICAL DATA SHEETS

Computer

Specification	Details
Manufacturer	ASUS
Model Number	NUC14SRK
Processor	NUC Intel Core Ultra 7
RAM	16GB
Graphics Card	RTX4060
Storage	500GB
Operating System	Windows 11
Dimensions	27 x 18 x 6 cm (10.62" x 7.09" x 2.36")
Power Supply	19VDC, 6.32A, 120W
Weight	2.6 kg

Circular Display



Specification	Details
Manufacturer	Shenzhen Avlink Technology
Model Number	AVL-ID236R
Resolution	1280x1280
Display Area (mm)	600.4(H)*600.4(V)
Aspect Ratio	1:1
Brightness (nits)	700 - 1500
Display Color	16.7M
Contrast	1000:1
Visual Angle	178 degrees (H/V)
Input	HDMI
Power	Maximum 120W on AC110~240V 50/60 HZ

HDMI Extender

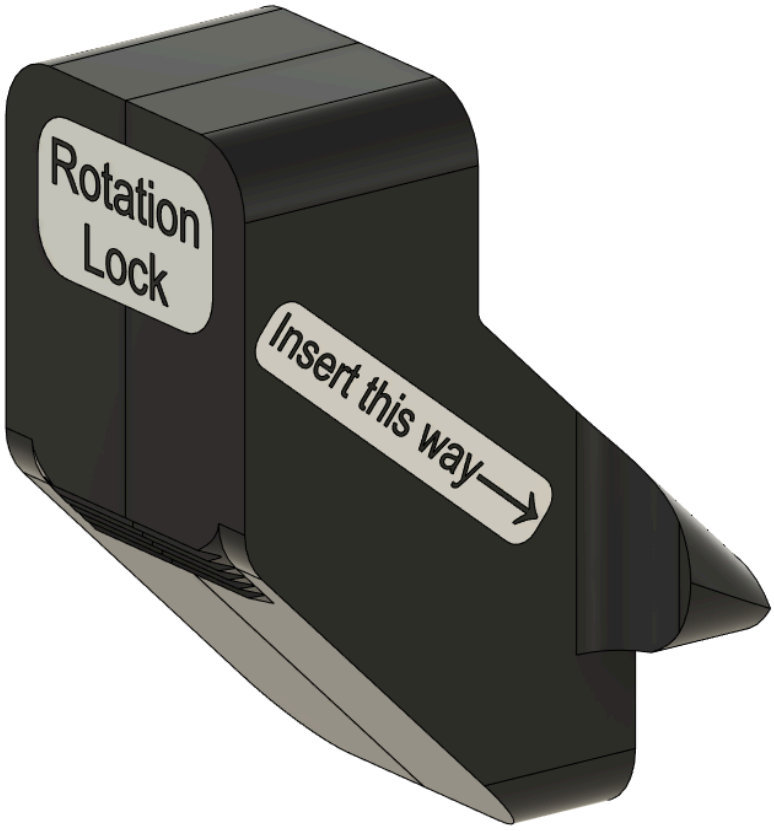
Specification	Details
Manufacturer	Kanex Pro
Model Number	EXT-HD50C
Video Resolution	Up to 4K@30Hz 4:2:0
Video Port	HDMI
Data Port	RJ45
Bandwidth	10.2Gps
Power	DC 5V/1A

SEI serial to USB adapter

Specification	Details
Power Supply	8.5-16.0V/120mA
Input Port	USB-B
Output Port	RJ45

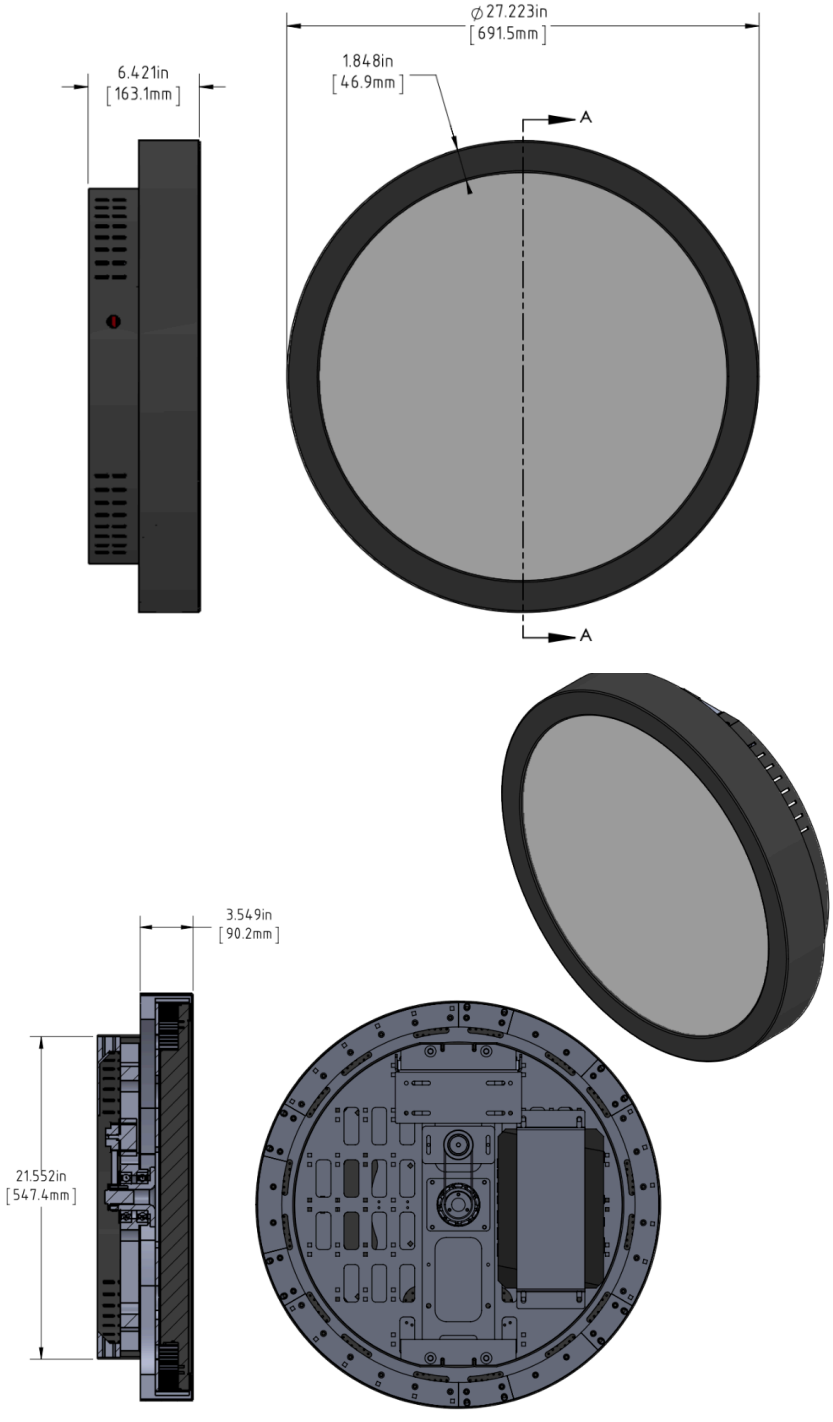
Rotation Lock

Custom 3D printed rotation lock that prevents the display from moving.

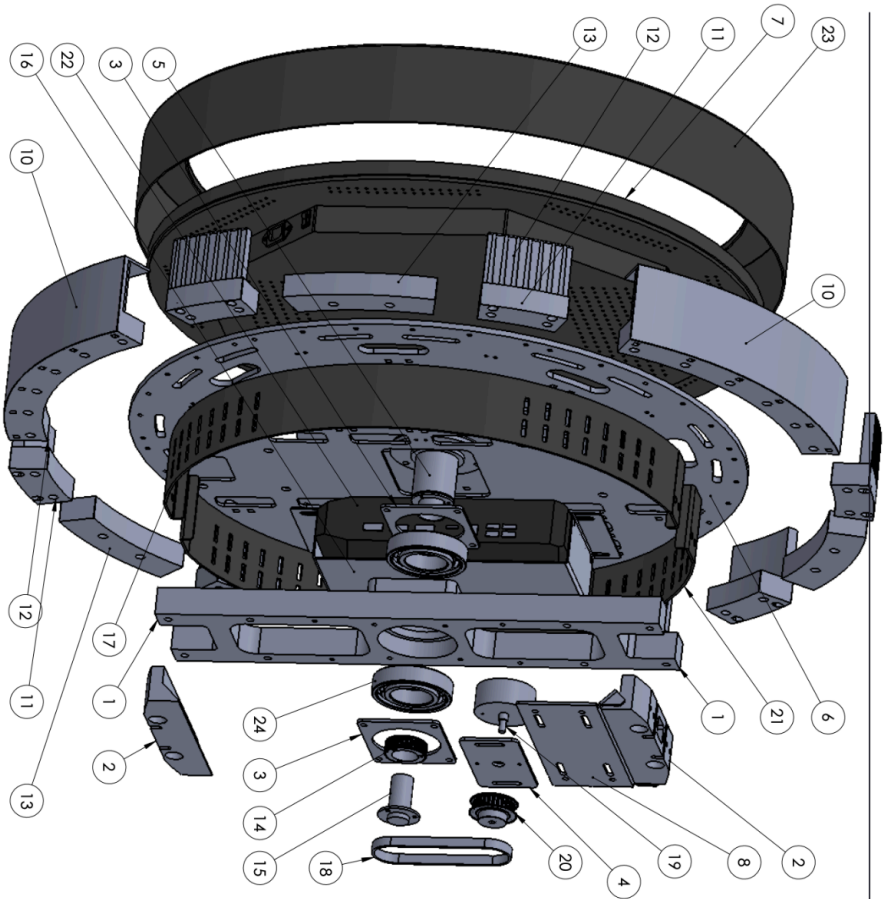


Frame

Overall Plan View



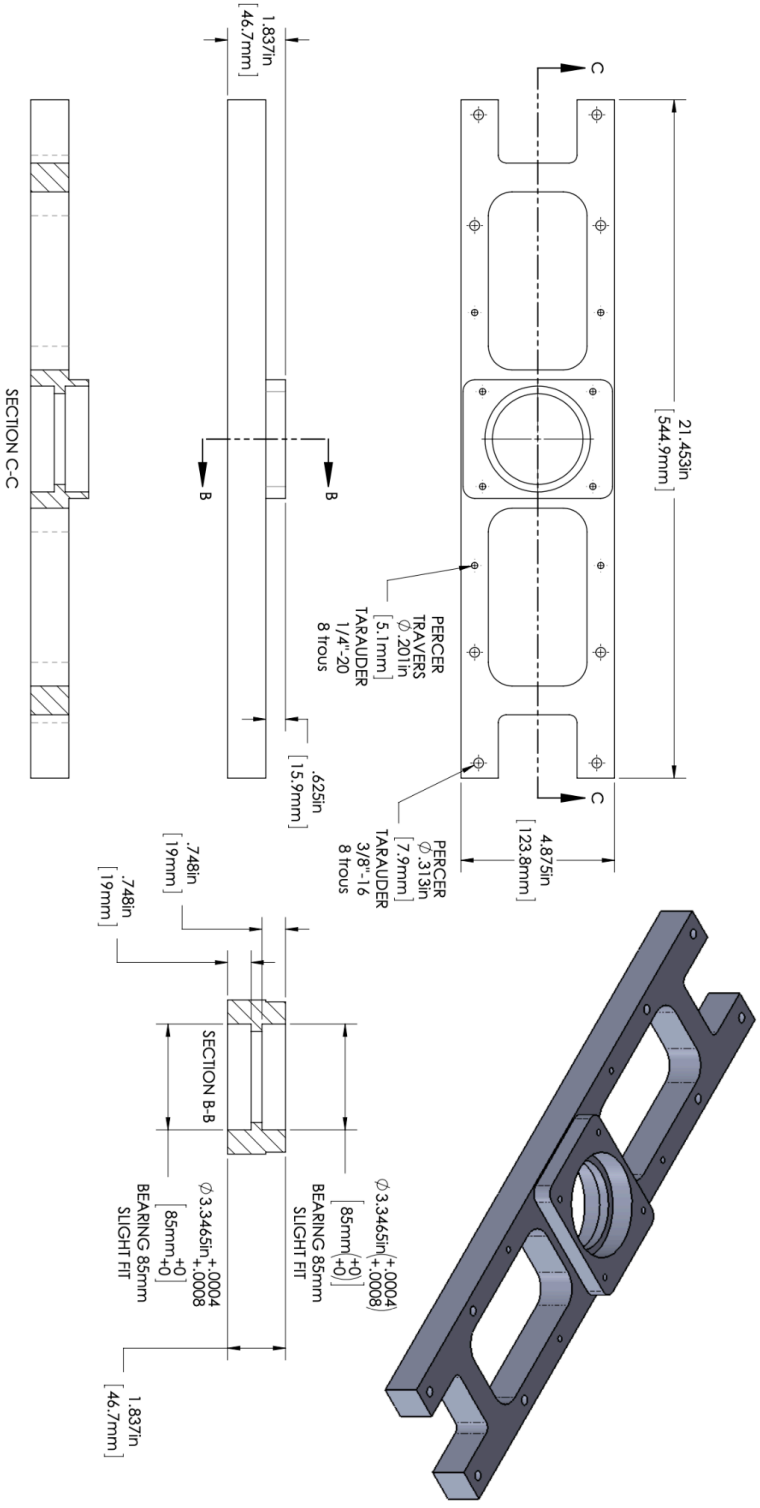
BILL OF MATERIAL



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	P-283-104_beam	ALUMINUM CUSTOM MACHINED PART	1
2	P-283-105_crochet	ALUMINUM CUSTOM MACHINED PART	2
3	P-283-108_bearing plate	ALUMINUM CUSTOM LASER CUTTED PART	2
4	P-283-109_encoder plate	ALUMINUM CUSTOM LASER CUTTED PART	1
5	P-283-103_axe	STAINLESS CUSTOM MACHINED PART	1
6	P-283-102_disque	ALUMINUM CUSTOM LASER CUTTED PART	1
7	MODEL_ECRAN_chinois sans verre	CLIENT PURCHASED PART	1
8	P-283-107_mural	STAINLESS CUSTOM LASER CUTTED PART	1
9	P-283-106_grid	ALUMINUM CUSTOM LASER CUTTED PART	1
10	P-283-101_section drum	3D PRINTED NYLON CUSTOM PART	3
11	P-283-203_drum catch support	3D PRINTED NYLON CUSTOM PART	6
12	P-283-204_drum catch	3D PRINTED NYLON CUSTOM PART	6
13	P-283-205_drum fill	3D PRINTED NYLON CUSTOM PART	3
14	1277N53_Corrosion-Resistant Timing Belt Pulley	McMasterCarr part	1
15	MODEL_SLIP RING_mini carbazar	CLIENT PURCHASED PART	1
16	P-283-111_bracket ordi	ALUMINUM CUSTOM LASER CUTTED PART	1
17	P-283-110_skirt	ALUMINUM CUSTOM LASER CUTTED PART	1
18	6484K224_XL Series Timing Belt_simplifie	McMasterCarr Part	1
19	Q-283-101_encoder us digital	CLIENT PURCHASED PART	1
20	1277N53_Corrosion-ResistantTiming Belt Pulley_non modifiee	McMasterCarr Part	1
21	P-283-110-B_skirt avec trou	ALUMINUM CUSTOM LASER CUTTED PART	1
22	MODEL_COMPUTER_asus rog nuc	CLIENT PURCHASED PART	1
23	P-283-202_drum spinning	ALUMINUM CUSTOM SPINNED PART	1
24	5972K115_Ball Bearing	McMasterCarr Part	2

Aluminum Beam

Item Number 1 in BOM



Aluminum Crochet

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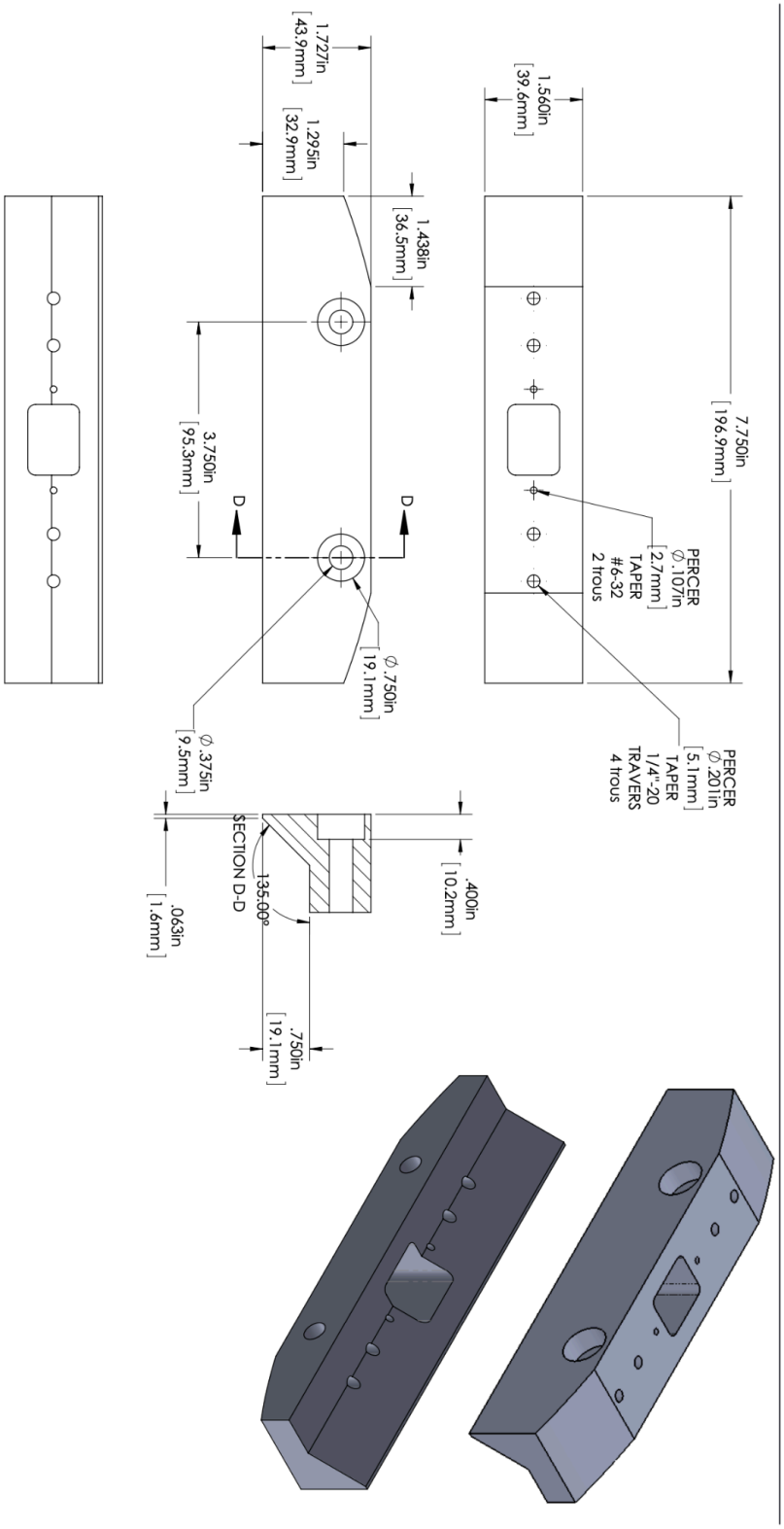
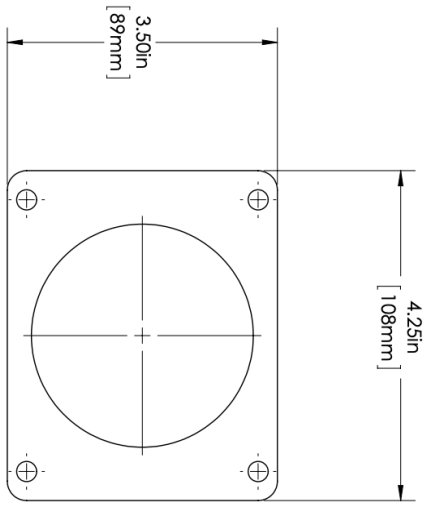
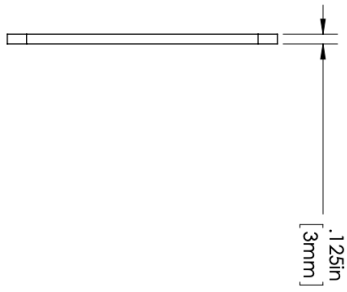
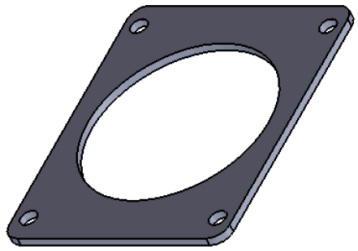


Aluminum Bearing Plate

Item Number 3 in BOM

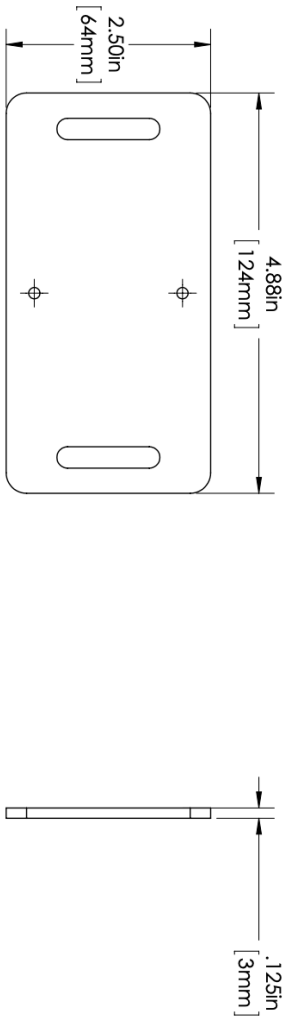


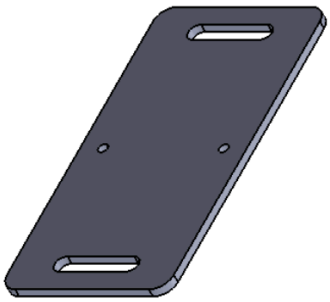




Aluminum Encoder Plate

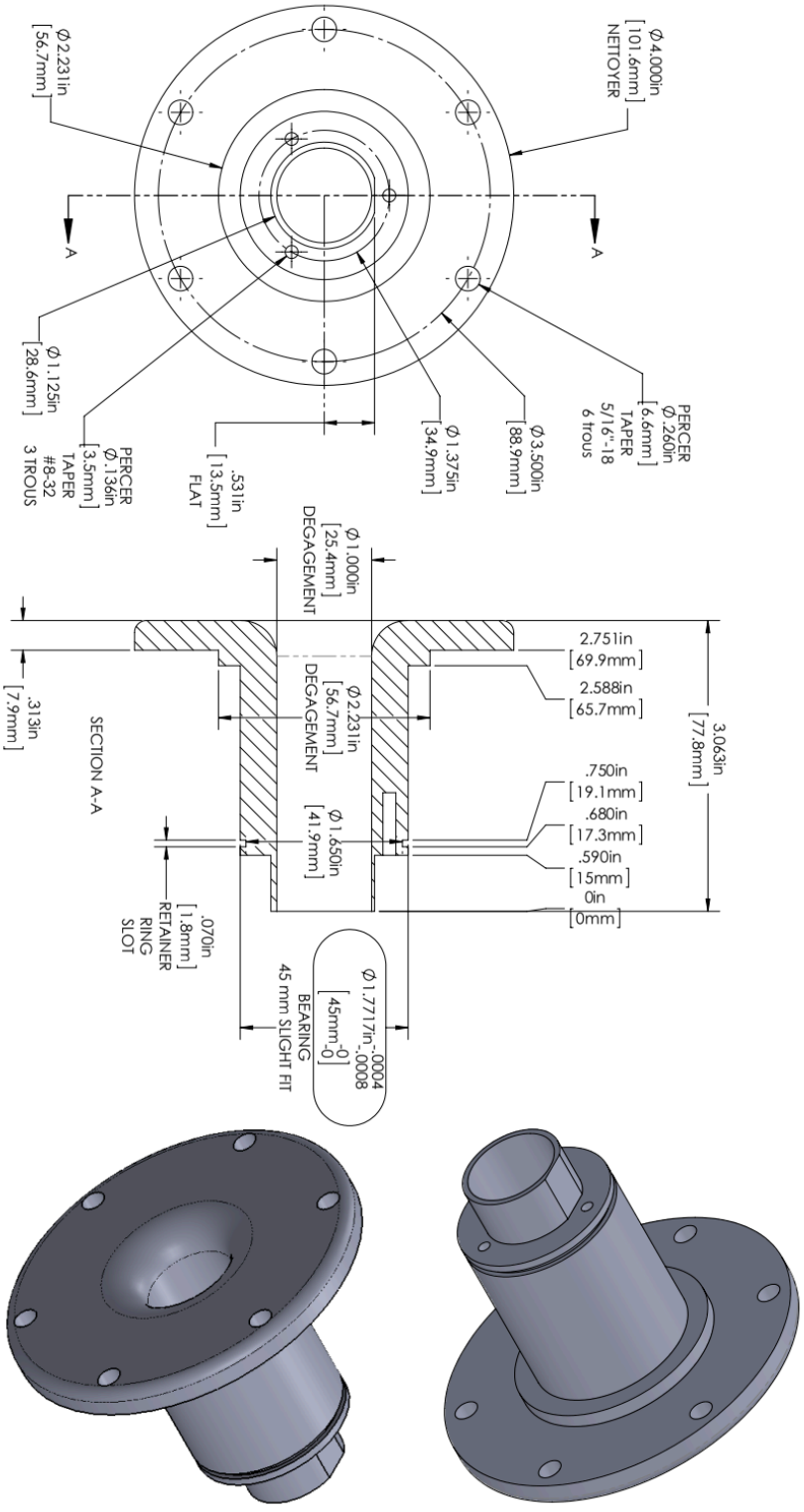
Item Number 4 in BOM





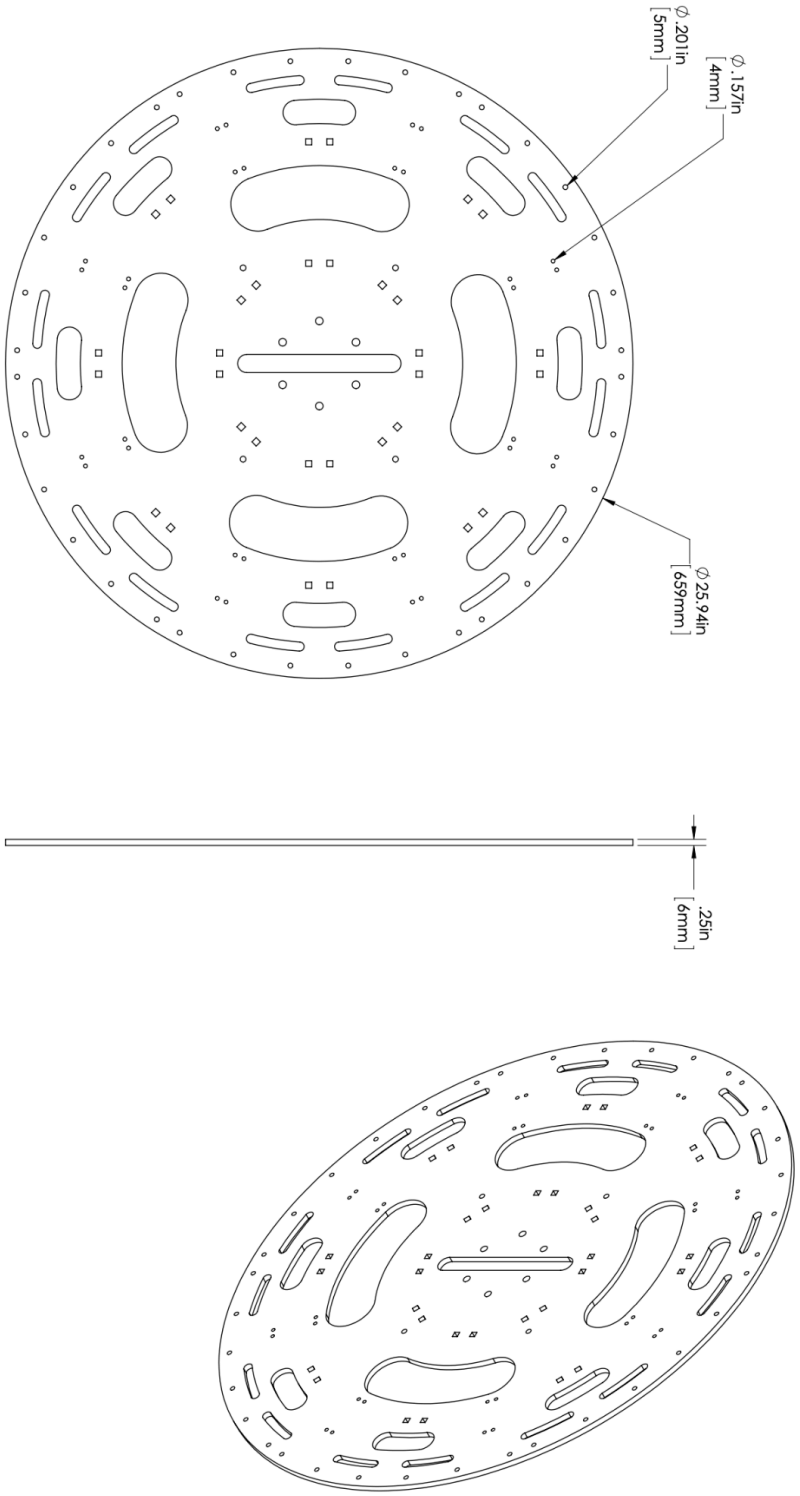
Stainless Steel Axe

Item Number 5 in BOM



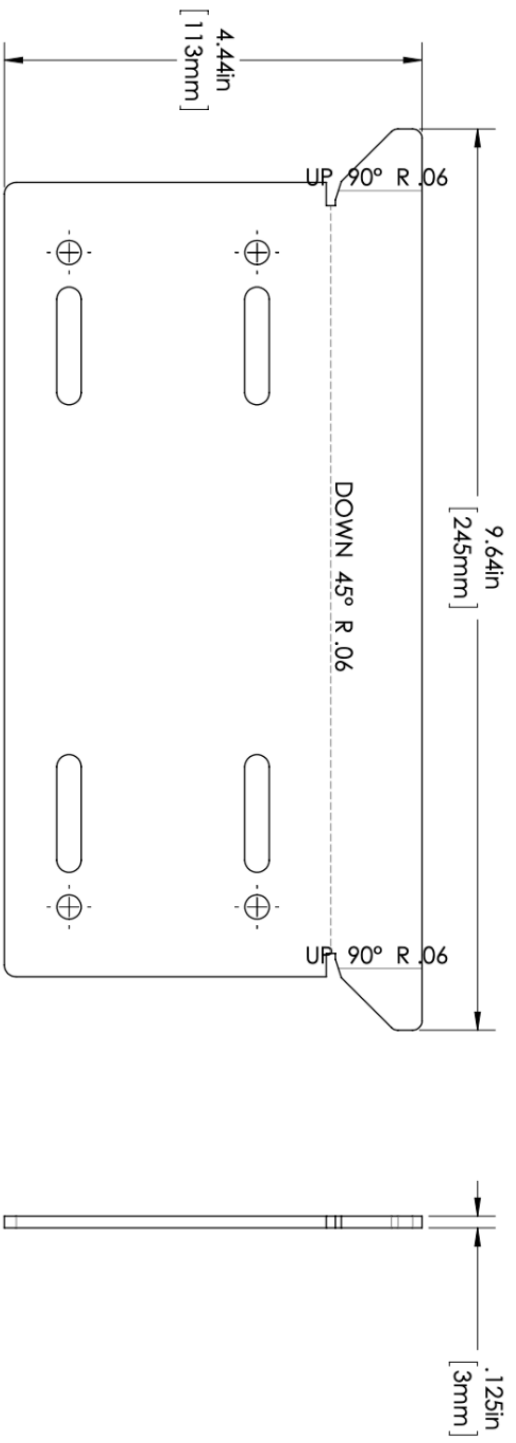
Aluminium Disc

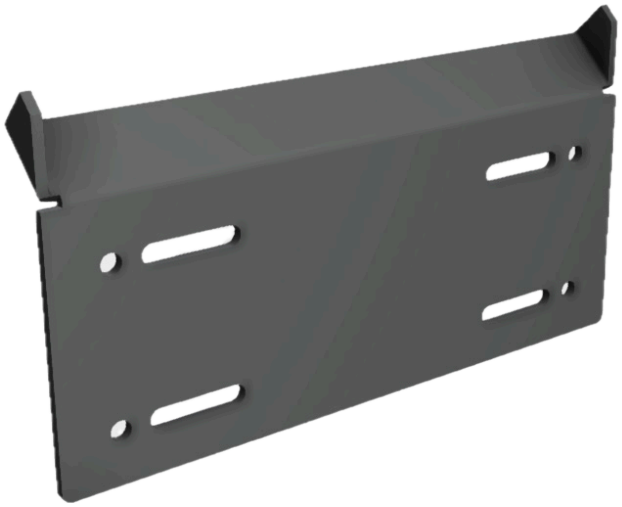
Item Number 6 in BOM



Stainless Steel Mural

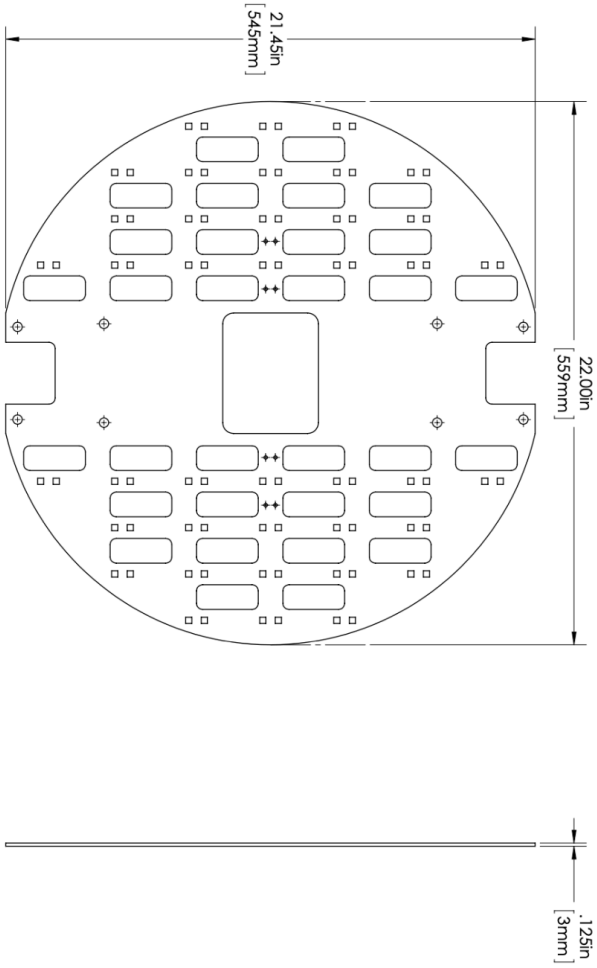
Item Number 8 in BOM

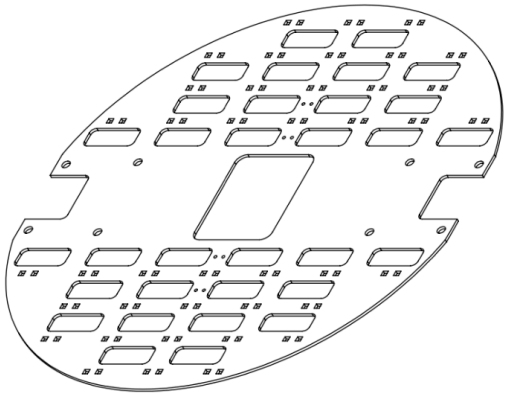




Aluminum Grid

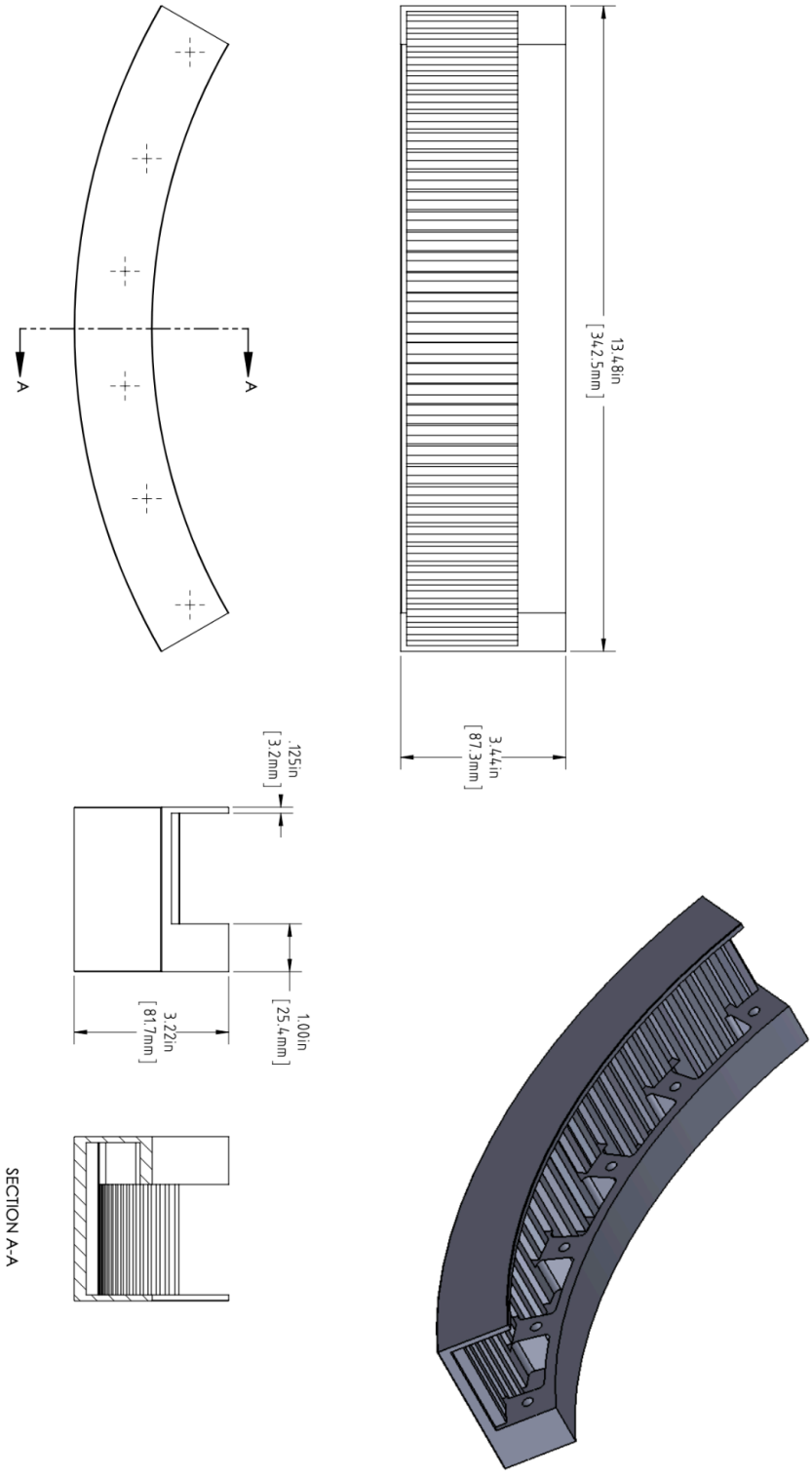
Item Number 9 in BOM





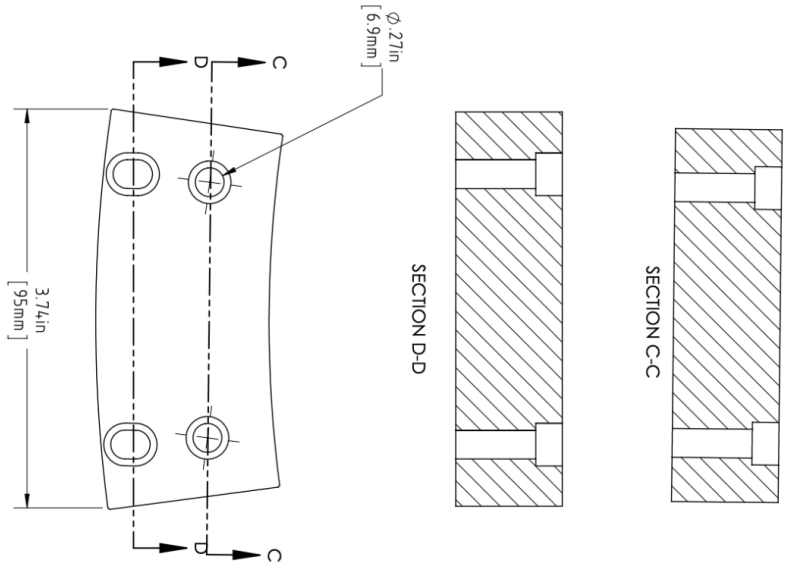
3D Printed Nylon Drum Section

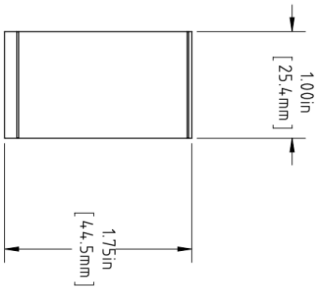
Item Number 10 in BOM

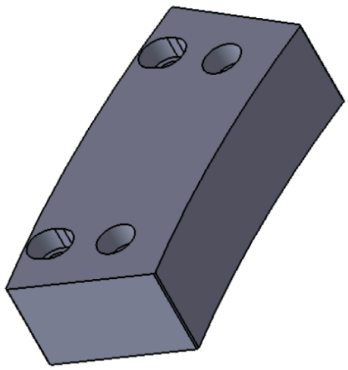


3D Printed Nylon Drum Catch

Item Number 12 in BOM

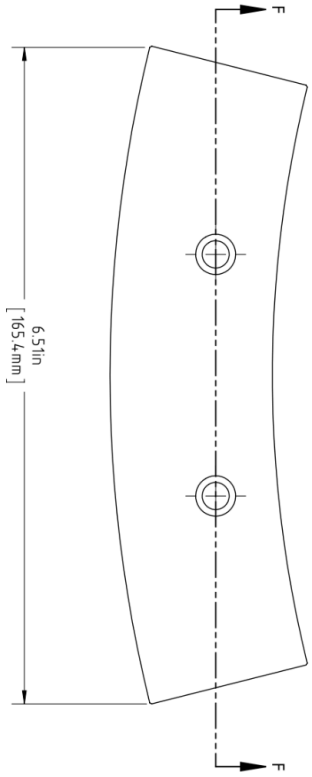


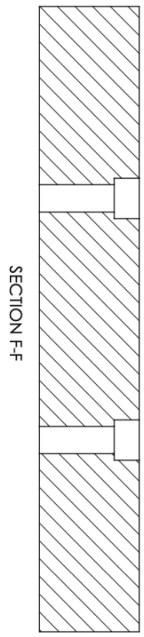


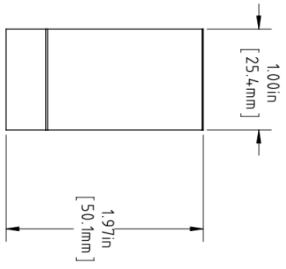


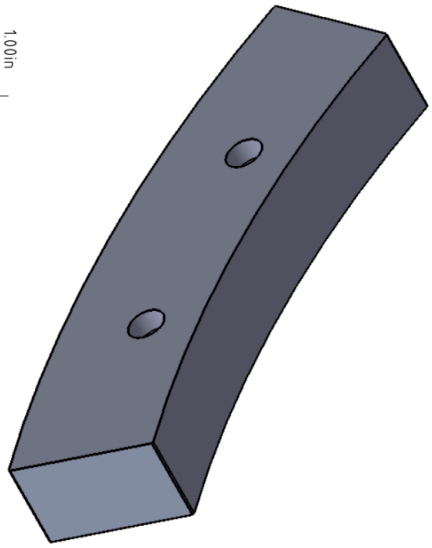
3D Printed Nylon Drum Fill

Item Number 13 in BOM



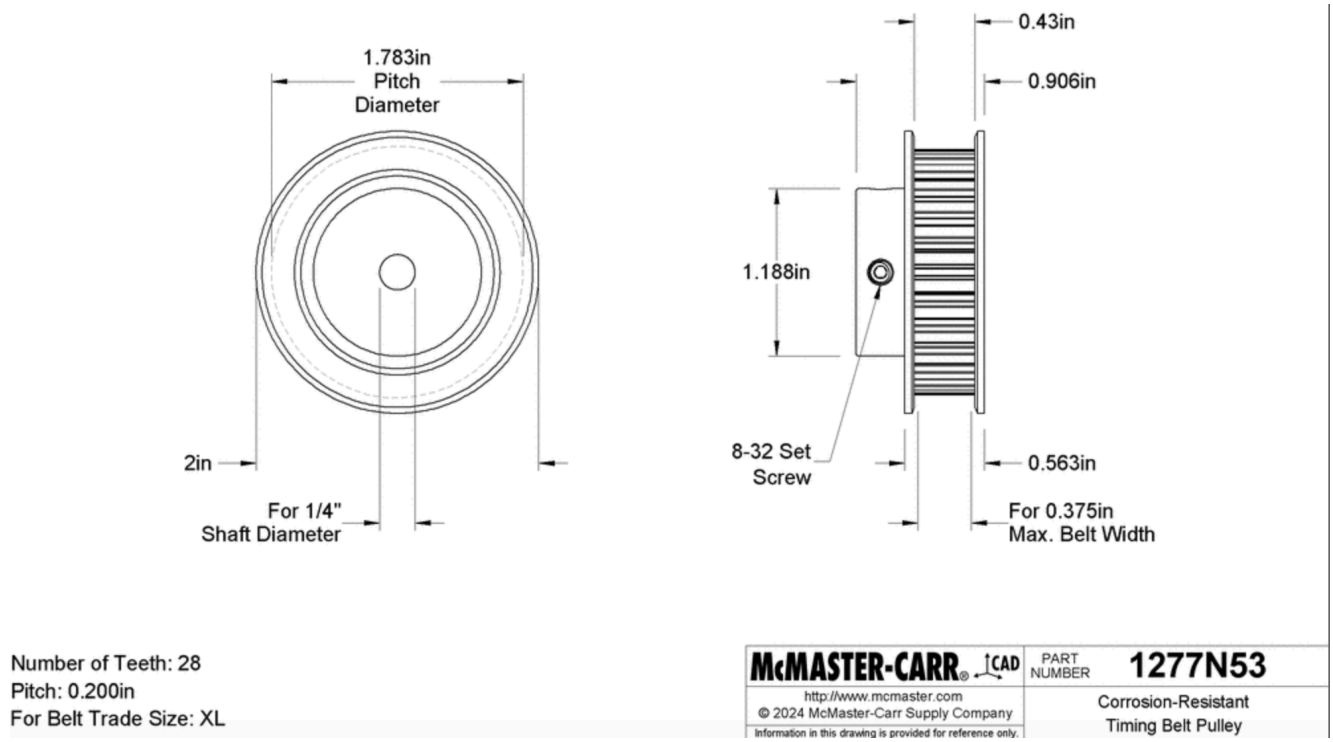






Timing Belt Pully

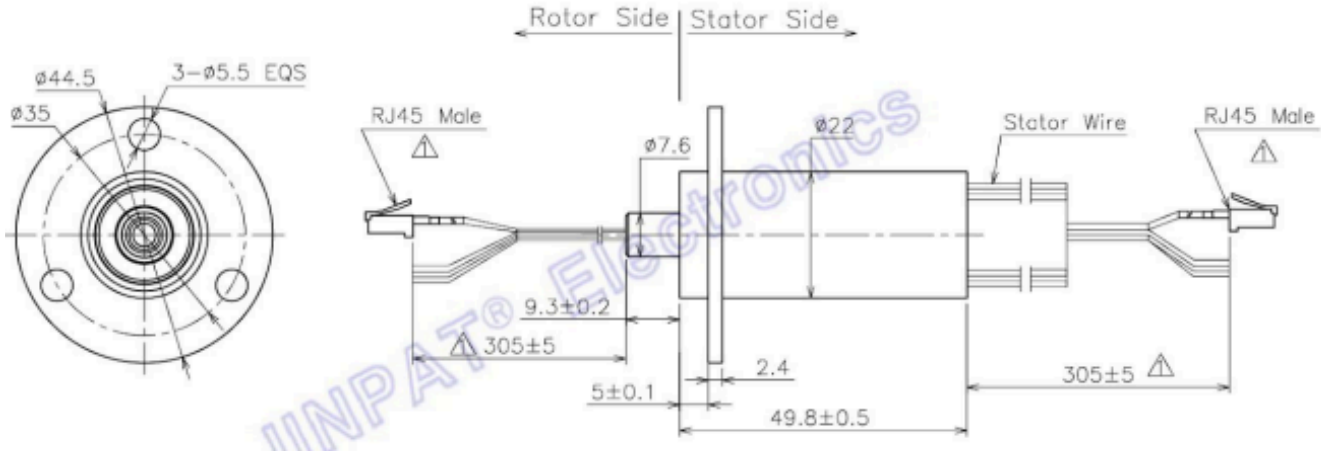
Item Number 14 in BOM



Specification	Details
Manufacturer	McMaster-Carr
Model Number	XL Series: 1277N53

Slip Ring

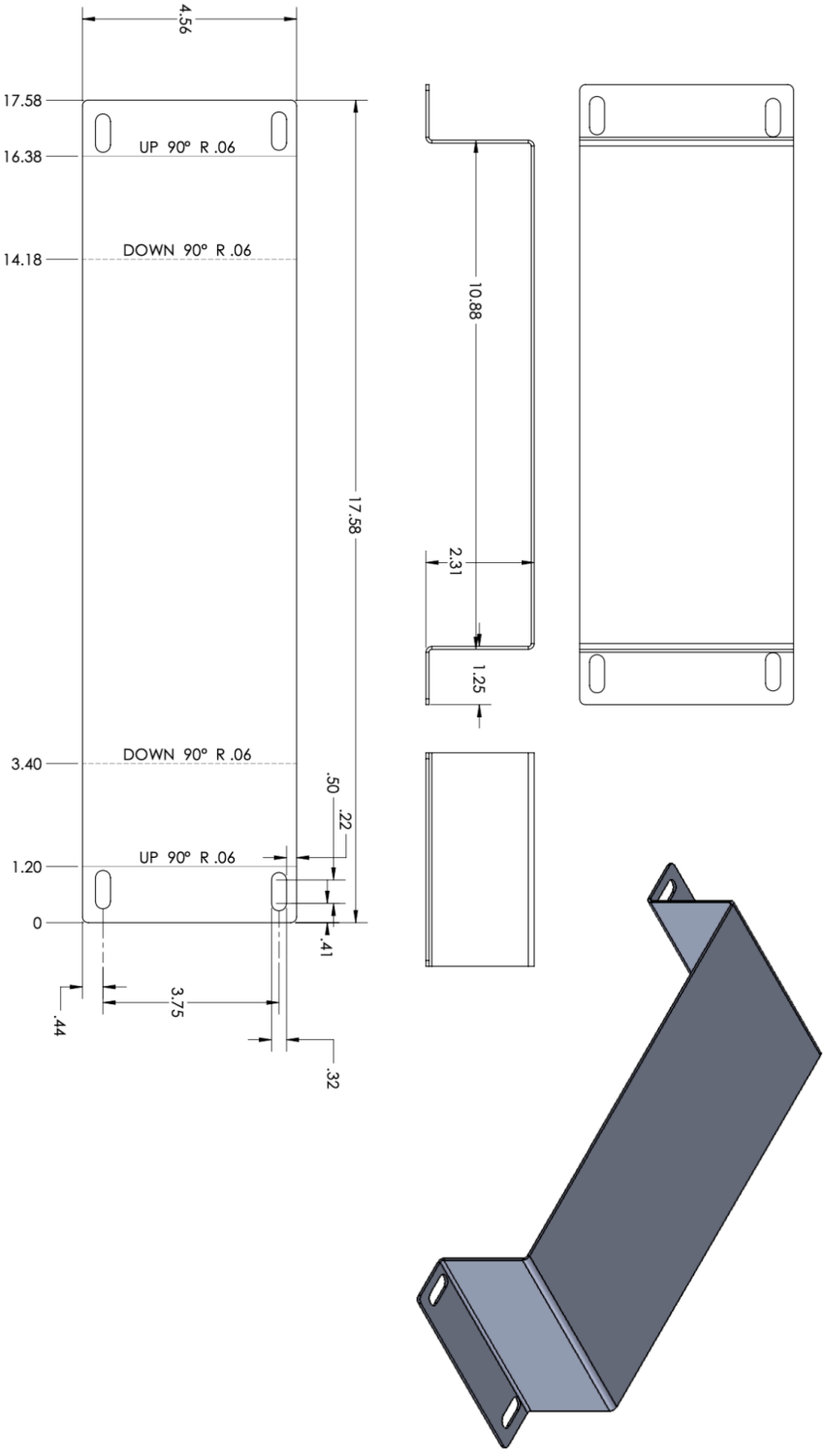
Item Number 15 in BOM. Custom manufactured slip ring by Jinpat.



Specification	Details
Model	LPC-30A-0310-E3
Number of leads	30 circuits
Contacts	Gold-gold contacts
Temperature Range	-20℃ to 60℃
Voltage	Up to 240 VAC/DC
Operating Speed	Up to 300 rotation per minute
Wire connectors	RJ45 Male
Units in Diagram	Millimeters

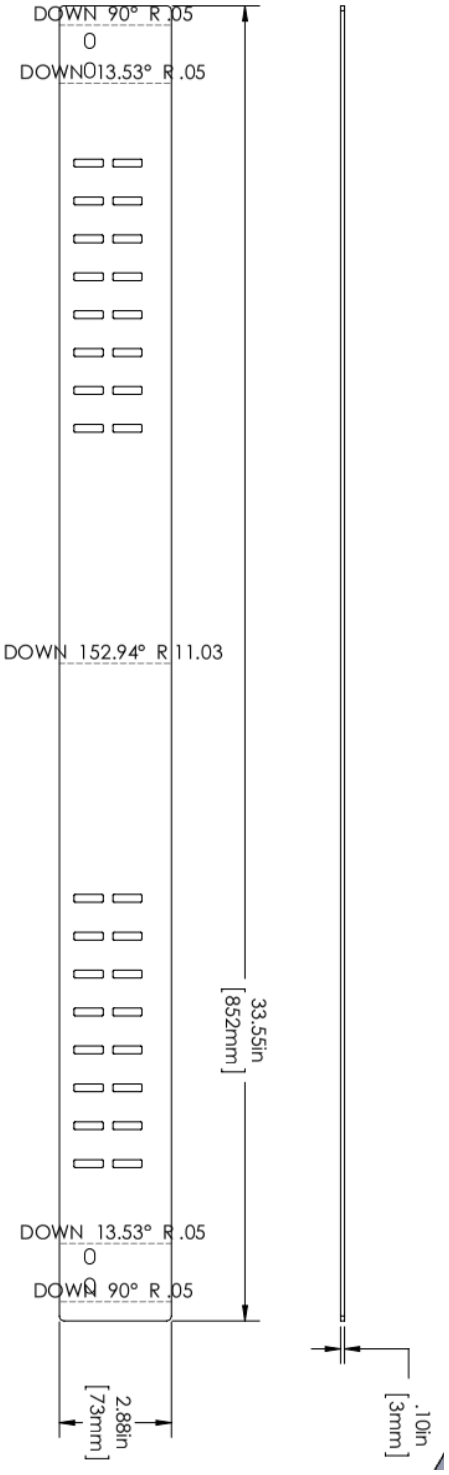
Aluminium Bracket

Item Number 16 in BOM



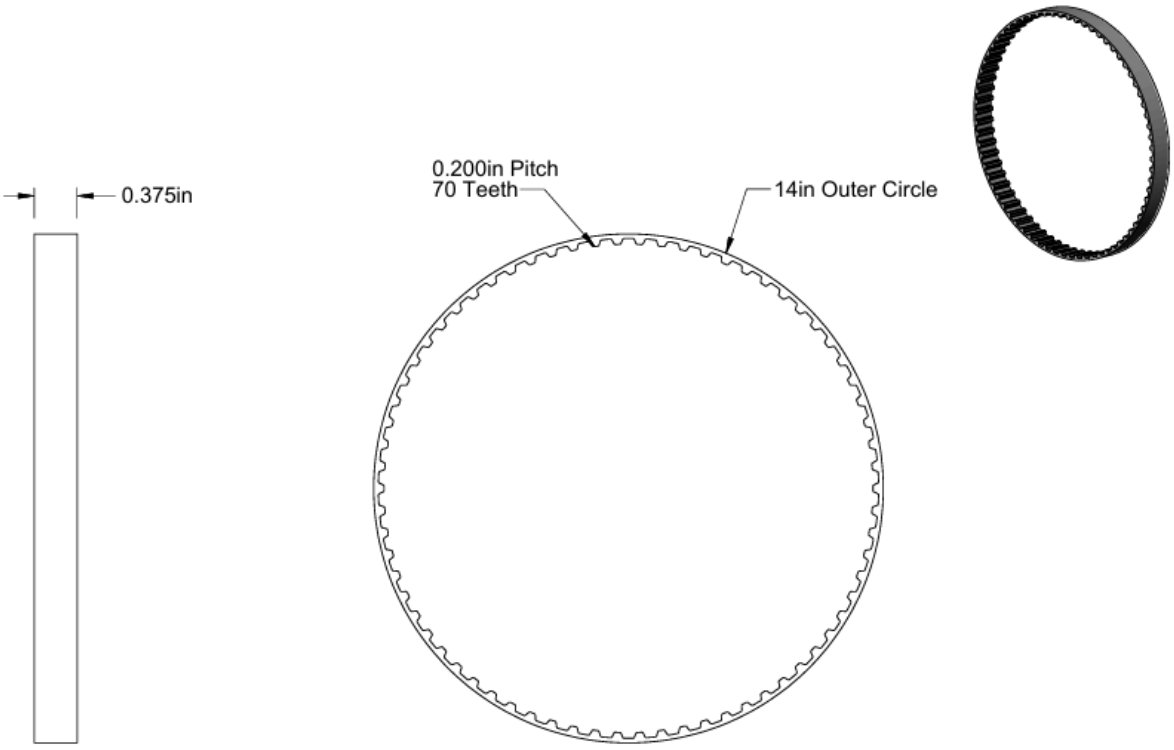
Aluminium Skirt - A

Item Number 17 in BOM



Timing Belt

Item Number 18 in BOM



Belt Trade Number: 140XL037

McMASTER-CARR CAD PART NUMBER 51514T316
http://www.mcmaster.com
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Information in this drawing is provided for reference only.
Heat-Resistant Timing Belt

Specification	Details
Manufacturer	McMaster-Carr
Model Number	XL Series Heat-Resistant Timing Belt: 51514T316

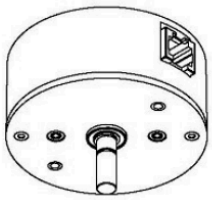
Encoder

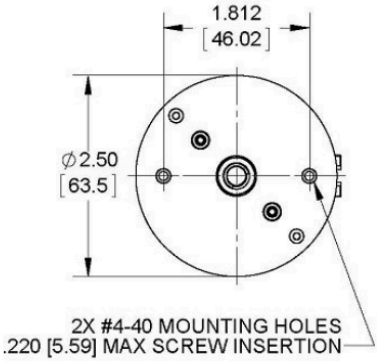
Item Number 19 in BOM

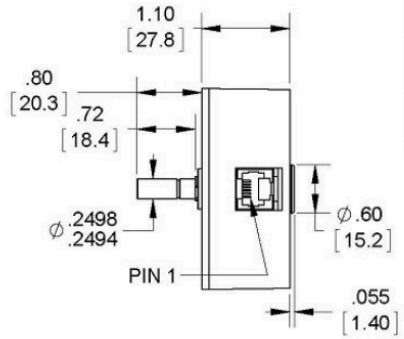
PIN	DESCRIPTION
1	Ground
2	Busy+ Analog+
3	Busy- Analog-
4	Power
5	Data L
6	Data H

Specification	Details
Manufacturer	US Digital
Model Number	A2 Absolute Optical Shaft Encoder (Ball Bearing Version)
Baud Rate	9,600 baud default data rate adjustable up to 115K baud
Power Supply	12V 14mA
Max Shaft Speed	10000 RPM
Max Shaft Acceleration	100000 rad/sec²
Max Shaft Weight	2 lb
Output Port	RJ45

A2 Absolute Optical Shaft Encoder
Ball Bearing Version

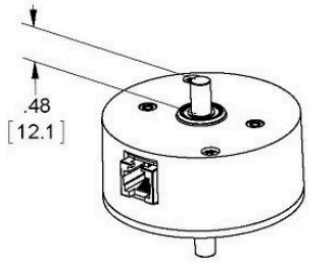




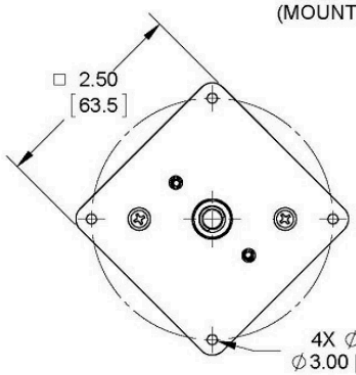


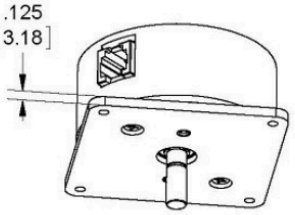
RELEASE DATE: 07/17/2014

E-OPTION COVER
(REAR SHAFT EXTENSION)



M-OPTION BASE
(MOUNTING PLATE)





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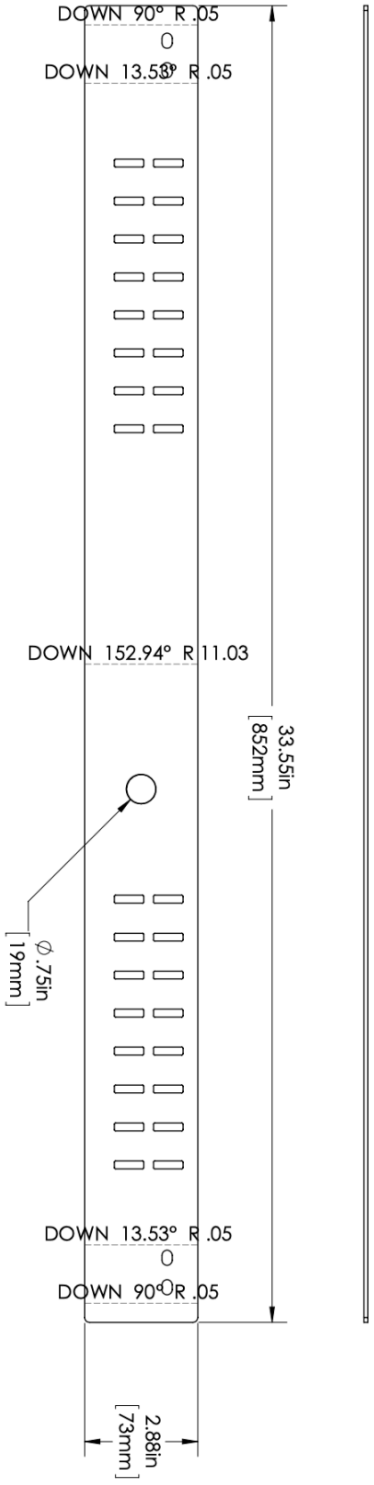
Toll-free: 800.736.0194

UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

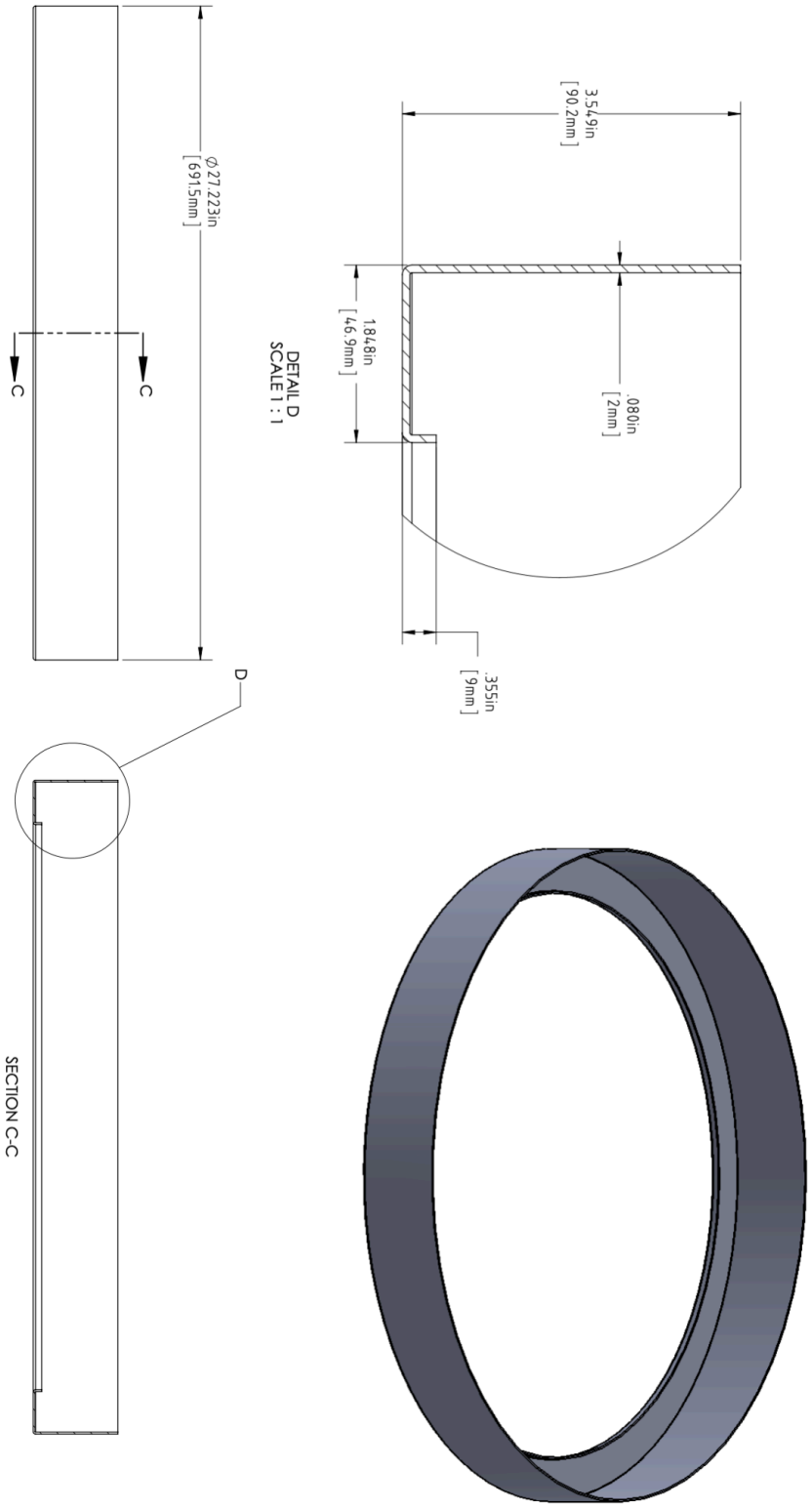
Aluminium Skirt - B

Item Number 21 in BOM



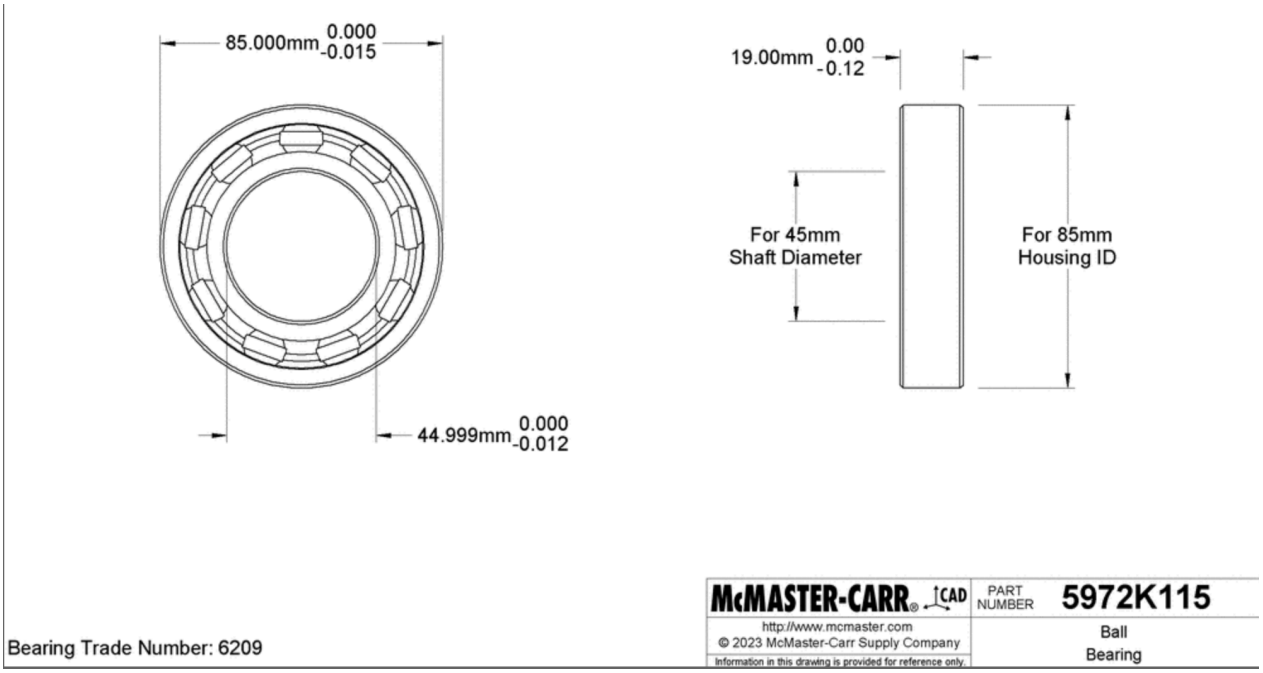
Aluminium Drum Spinning

Item Number 23 in BOM



Ball Bearing

Item Number 24 in BOM



Specification	Details
Manufacturer	McMaster-Carr
Model Number	Ball Bearing: 5972K115

APPENDIX III - REPAIRS AND OTHER MANIPULATIONS

Accessing the Connections

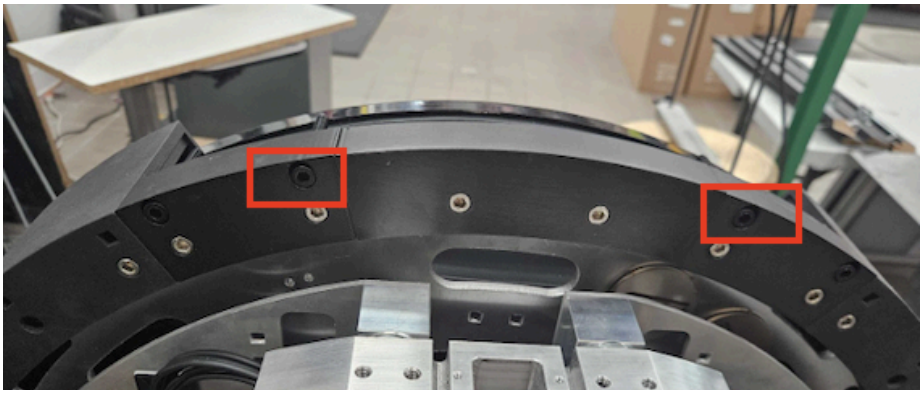
1. Removing the Drum

For reference the Drum is Item No. 23 in the BOM and a detailed sketch can be found in the APPENDIX II: Technical DataSheets: Aluminum Drum. The image below shows the drum alone and as a side view.

Drum removed and placed on a cover.

Side view of Drum.

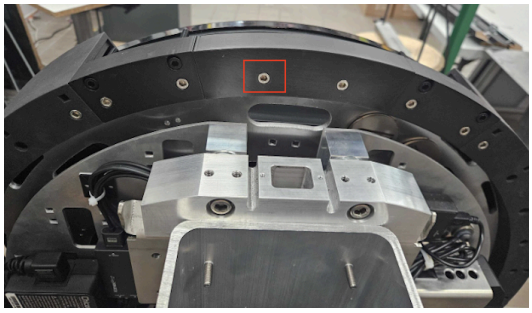
Locate and remove the 12 black nylon screws securing the drum. Two of these screws are outlined in red in the image below. Once the screws are removed, grip the drum and gently pull it towards you to detach it. Place it somewhere with a foam or cloth covering to avoid scratching it.



Drum with nylon screws highlighted.

2. Removing the stainless steel screws

The 3D printed Nylon Section Drum is the next piece to remove. It is Item No. 10 in the BOM and a technical drawing can be viewed here. You can remove this piece by unscrewing the stainless steel screws along the same section of the piece that you accessed for the previous step. One example of the stainless steel screws are highlighted in the image below.



Drum with stainless steel screws highlighted.

Once the screws are removed gently grip the nylon cover and pull it towards you gently as seen in the image below on the left. As with the metal drum please place this item carefully down on a covered area. Removing the sides should give you an unobstructed view of the piece's ports as seen in the image below on the right.

Removing the nylon covers.

Exposed ports.

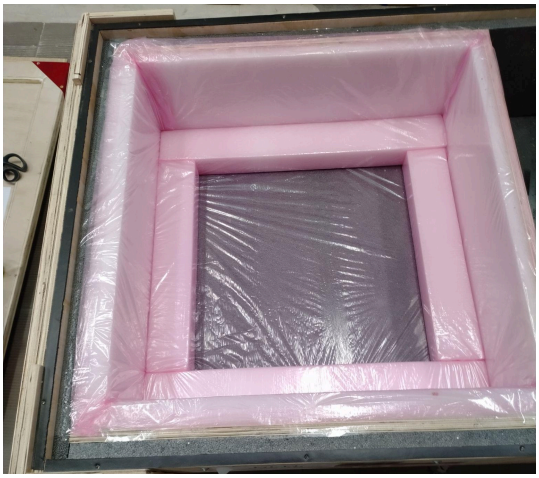
APPENDIX IV - PACKING

The rotation lock must be placed and taped in place to prevent the screen from moving during shipping. We recommend you do this before removing the screen from the wall. Protection gloves should be worn when manipulating the piece to avoid leaving fingerprints.

Rotation lock taped in place.

The crate used to ship the piece should contain a frame of at least 4 cm of thick foam on all sides, this helps the heavy display be supported while protecting the back side of the piece that contains the electronics. This foam should also be wrapped in anti static film.

Another foam frame must be placed on top of the crated display to help protect the screen and safely compact the piece in place to avoid any movements during shipping. The mounting bracket and any other accessories should be packed in the compartment next to the display. No pieces should be loose in the compartment for the screen. See the images below for reference.



Crate without the piece in it.

Piece properly placed in a crate.

Side compartment of the crate for cables.

Before placing the screen in the crate wrap it entirely in antistatic plastic. Once ready, the piece should be placed in the crate so that the screen side is facing up (see picture below).

Placing the screen in the crate.