REPORTERS WITH BORDERS, SHADOW BOX 6

BY RAFAEL LOZANO-HEMMER - INTEL REALSENSE VERSION

Version : 2025-02-04

TABLE OF CONTENTS

GENERAL IMPORTANT INFORMATION

This short section must be read for proper operation.

REPORTERS WITH BORDERS, SHADOW BOX 6 (2007)

BY RAFAEL LOZANO-HEMMER

Technique

Computer, camera, monitor.

Description

"Reporters With Borders" (Shadow Box 6) is a high-resolution interactive display that simultaneously shows 864 video clips of news anchors taken from TV broadcasts in the United States and Mexico. As the viewer stands in front of the piece his or her silhouette is shown on the display and within it reporters begin to talk. Every 5 minutes the piece switches the video clips - from a database of 1600 - and classifies them along gender, race and country, so that for instance on the left there are only American reporters and on the right only Mexicans.

The piece exists as a small "shadow box" version and as a large-scale projection room. A C-print lightjet edition also exists.

Operation

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

1. Connect the computer and the display to electrical power with the supplied power cables.

2. To turn the piece ON, press the power button of the computer for half a second then release it. *Important notes: Please do not push the button again as this will shut down the piece. Wait at least 2 minutes before pressing it again as the computer might take that long to boot. After 2 minutes (maybe faster), you should see the artwork. The display might need to be turned on separately, for this use it's remote or the button at the back of the display. That said, we typically rely on the display's input detection to automatically turn on the display.*

3. To turn the piece OFF, press the computer's button all the way down until you've seen the "Shutting down..." screen appearing and fading to a black screen (shouldn't be required for more than 2 seconds). *The display might need to be turned off separately, for this use it's remote or the button at the back of the display.*

4. If the piece doesn't start within 2 minutes, try to turn on the piece again. If it still doesn't turn on, then hold the power button all the way down for 10 seconds. Then, wait at least 3 seconds and press the power button all the way down for 1 second and you should be up and running again.

General Artwork Behaviors

The display shows a grid of hundreds of low brightness video clips of news anchors taken from TV broadcasts in the United States and Mexico. The grid is organized in two panels, left and right, separated by a narrow border. Every 5 minutes the piece switches the video clips - from a database of 1600 - and classifies them along gender, race and country, so that for instance on the left there are only American reporters and on the right only Mexicans.

Interacting with the Artwork

As the viewer stands in front of the piece their silhouette is shown on the display and within it reporters begin to talk. The active clips - the ones with sound playback - are highlighted with a small bounding box. It takes 5 seconds to load the sound from the first video, then slightly shorter for the second sound stream, even shorter for the next, and so on.

It takes about 30 seconds to load the maximum of output channels within a fairly stable silhouette. If the silhouette is moving, it will take longer as videos stop being played back when they get outside the active silhouette.

Maintenance

Please do not clean the display surfaces with Windex or soap. Use a lint-free cloth and LCD screen liquid cleaner, such as Kensington Screen Guardian found in most computer stores. While cleaning the camera, avoid applying too much pressure onto its surface, otherwise the camera could move on its mounting base and get misaligned or the lens could be rotated and become unfocused.

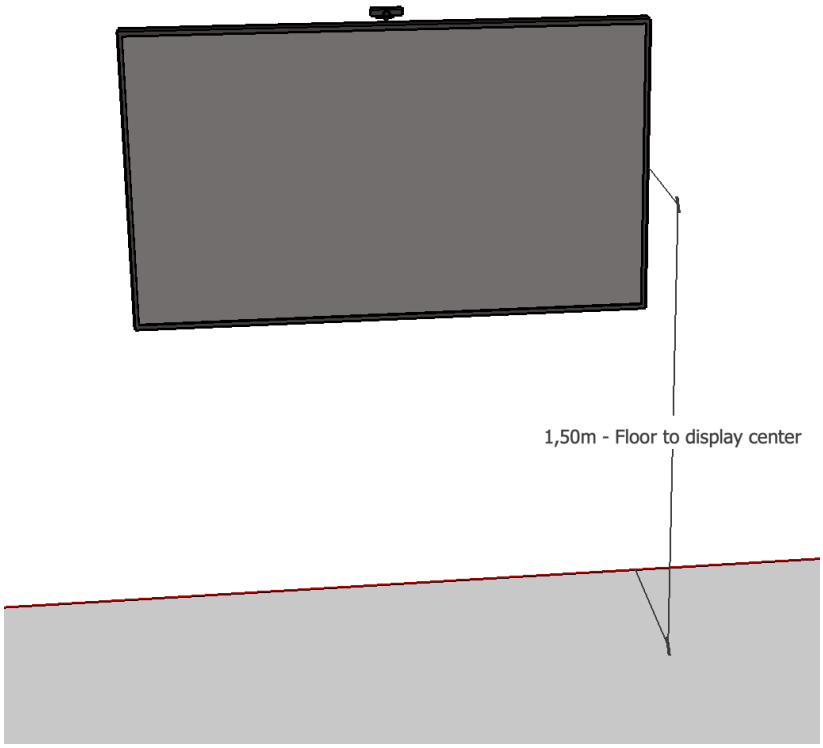
The camera lens shouldn’t be cleaned with the same product: please use an air puffer to remove the dust from the lens, if need be.

We recommend cleaning the piece at least every two months.

Placement Instructions

This artwork is made up of 3 main components: the display, the computer and the camera. You should begin by screwing your display mount into the wall. Set the display mount so that there is 1.5 metres (59”) from the floor to the centre of the screen.

While setting your display on the mount, ensure you have access to the power cable and HDMI ports, then connect these to your computer.



Mounting the Camera

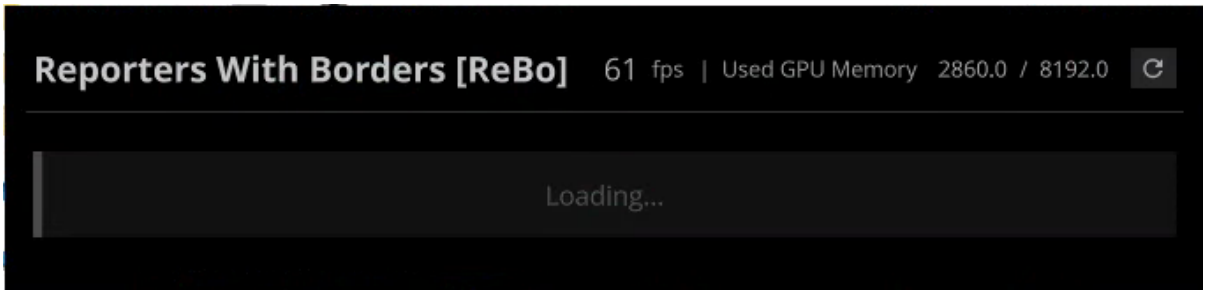
The camera and its bracket should be installed behind the display so that almost only the camera is visible above the display, while the camera mount is mostly hidden behind the display. The camera should be slightly tilted down so it aims at a 1.8 metres (6ft) tall person standing in front of the artwork, about 2 metres (6’6”) away from it.

DETAILED TECHNICAL INFORMATION

Normal Software Operation

The artwork, programmed in TouchDesigner 2023.11340, is set to automatically start when the computer is powered on - with a slight delay - and is set to reboot daily, at night. We do recommend turning off the artwork when you don't plan to look at it for a longer period, to extend the lifetime of the components.

At startup of the software, videos will be loaded from the drive, stored into the graphic card memory and finally the camera captures a background reference: so it is important to stay away from the artwork's camera field of view for the first three minutes or so, in order to let the system boot properly. When all videos are loaded, the software will switch to the regular grid view generated by the software.



Software while loading

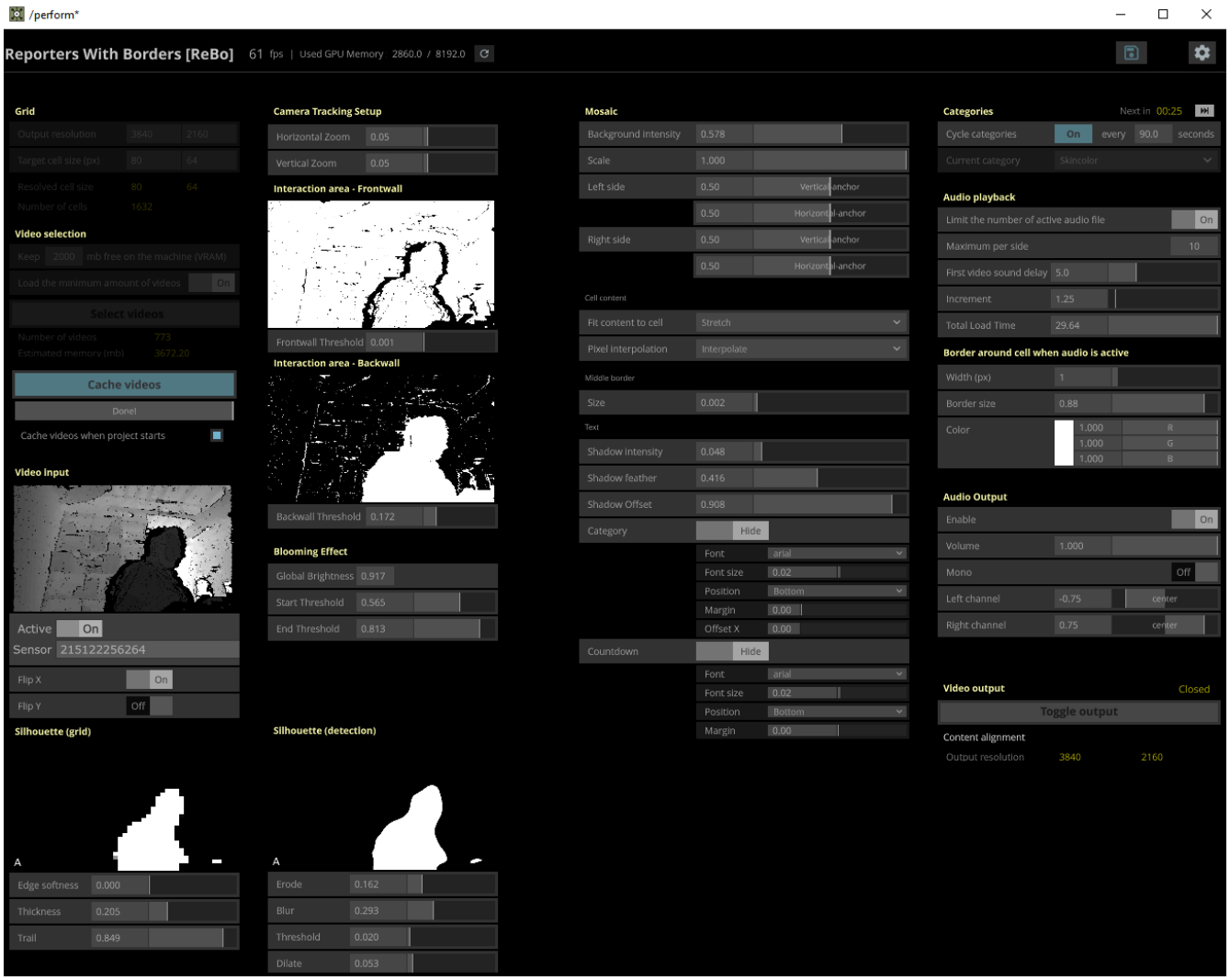
Software as it should be rendered once videos are loaded.

Manual Software Calibration

While the system has been calibrated to make the artwork react in the best way for your setup, tweaks and modifications might be needed over time to apply some touch ups. Here are the different sections that are available in the menu.

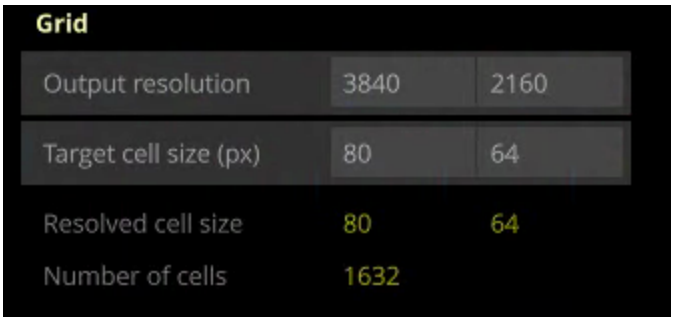
Important shortcuts to know: CTRL+G will show and hide the GUI and CTRL+A will allow jumping from regular to advanced menu and vice versa. Careful: Escape key or clicking the X button will quit the software. Here's how the advanced menu looks like.

Any change to the different settings will require clicking on the save button (floppy disk icon located near the top right corner of the menu), about 0,5 seconds after clicking the icon, the message "Saved." will appear: if not, click the icon again.



Grid

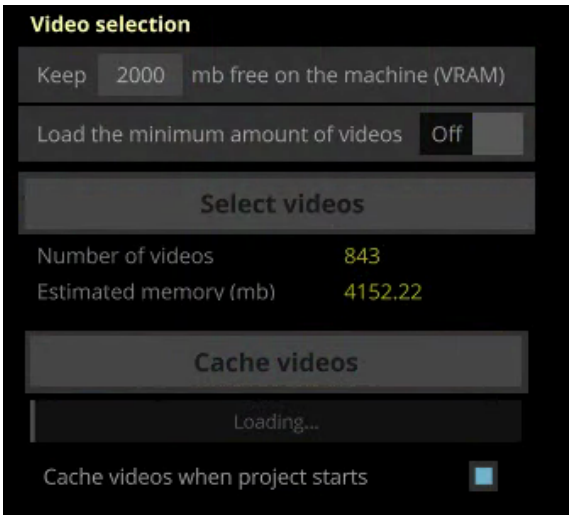
The following settings allow you to adjust the software to the display in use and to define the grid size (size of cells mapped in the grid).



Setting	Description
Output resolution	This should match the display resolution: width first followed by height.
Target cell size (px)	Targeted video resolution. Typically 80x64 to match the native resolution of source videos.
Resolved cell size	Depending on the Output resolution and the Cell content settings under the Mosaic section, the targeted cell resolution will be adjusted to fit the screen accordingly. This setting shows the value of such calculation.
Number of cells	This returns the amount of cells displayed in the grid. Width **/** resolved cell width **X** Height **/** resolved cell height

Video Selection

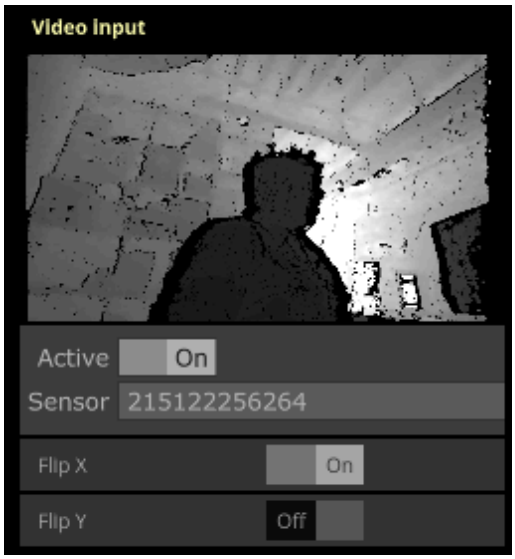
The following settings allow you to control the number of videos the software could load to use them in the grid.



Setting	Description
Keep *XXXX* **mb free on the machine (VRAM)**	We recommend never going lower than 2000 mb to leave some headspace to the computer system. Isn't used if the "minimum amount" setting below is turned On.
Load the minimum amount of videos	If turned On, the software will load the minimum amount of videos it could to render a grid that would display fewest videos, meaning there would be more instances of the same videos displayed at the same time. **This feature shouldn't be turned on**, unless you need to debug the software and attempt to reload the grid a lot of times in a short span.
Select videos	Clicking this button will allow you to pick new videos to be loaded (cache).
Number of videos	The number of videos loaded in cache, to be displayed in the grid.
Estimated memory (mb)	The actual memory size used to store the videos in the VRAM.
Cache videos	If you clicked the Select videos button, clicking on Cache videos will force them to load.
Cache videos when project starts	Should always be checked, to ensure it automatically loads videos on startup

Video Input

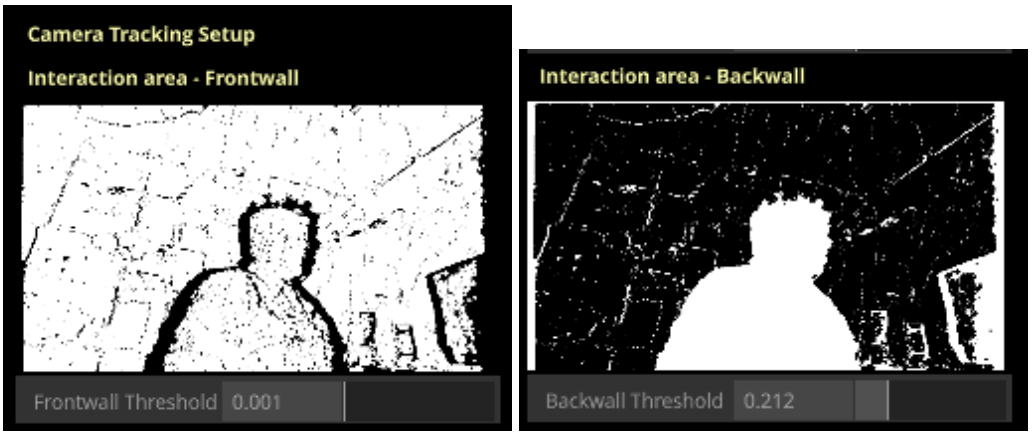
The following settings allow you to control the depth camera's feed input and how it will be managed by the software.



Setting	Description
Active	Toggle that activates and deactivates the sensor's feed input. By default, this should be turned On.
Sensor	Allows you to pick the RealSense Sensor ID: useful if you replace the sensor or change its port. By default, this should have a serial number listed like in the picture above.
Flip X	Toggle that flips the input feed horizontally. Typically On as we mostly set the sensor above the display, like a mirror.
Flip Y	Toggle that flips the input feed vertically. Typically Off.

Camera Tracking Setup / Interaction area

The following settings allow you to adjust how far the system will track in space. The frontwall is a virtual wall, closer to the camera, from which we'll accept tracking elements: anything between the camera and that wall will be discarded. The backwall is a virtual wall, further away from the camera, up to which we'll accept tracking elements: anything passed that point will be discarded.



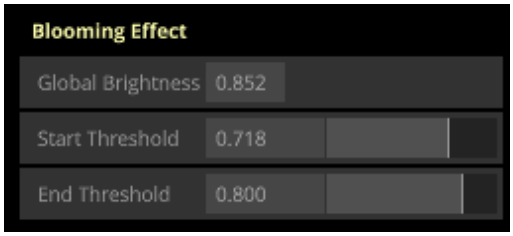
Setting	Description
Frontwall Threshold	We recommend keeping this value to 0.001 to track the elements as close as possible to the camera. Increasing the setting will move the virtual wall further away from the camera. Anything set to be trackable will be shown in white, anything discarded will be displayed in black.
Backwall Threshold	This threshold is applied *after* the frontwall one and will need to be asserted in any new space. Increasing the setting will move the virtual wall further away from the camera. Anything set to be trackable (anything located between the front and the backwall) will be shown in white, anything discarded will be displayed in black. Anything shown in white will then be used to be displayed within the rendered grid.

Blooming Effect

The following settings are a sort of a safety feature for the rendering of the silhouette, preventing dead spots in closer elements.

When a person interacting with the artwork is getting too close to the camera (typically between the camera and the frontwall), we trigger the blooming effect: the active silhouette will gradually inflate and take over the whole screen.

When they step back, past a “safety wall”, the blooming effect will retract and return to the regular silhouette. We recommend setting the 2 threshold parameters at the same time.

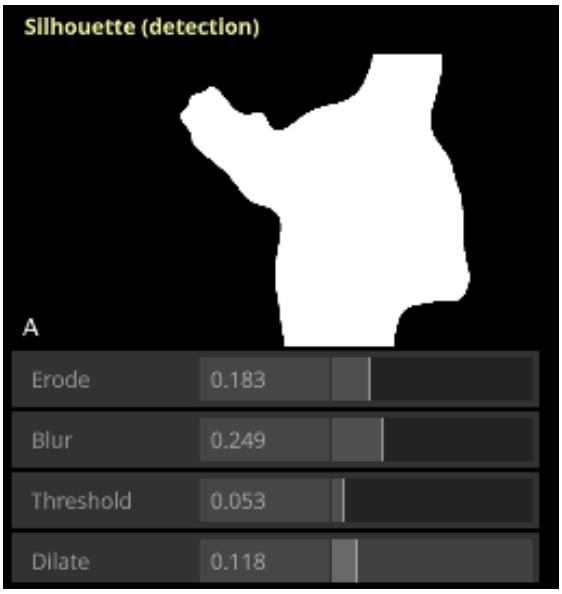


Setting	Description
Global Brightness	This value returns the average brightness of the camera field of view.
Start Threshold	This value should be lower than the End Threshold one. Position your hand to the closest point from the sensor you feel people should go - we recommend a distance of about 60 centimeters (24 inches), but it could be closer. Look at the Interaction area - Frontwall image where you’d need to get a portion of your hand drawn in black: if it is not the case, you would need to adjust the Frontwall Threshold explained previously. Refer to the Global Brightness value and set the Start Threshold to this value. Anytime someone will get near that close to the sensor, the blooming effect will be triggered.
End Threshold	This value should be bigger than the Start Threshold one. With the same logic as the Start Threshold, get your hand in front of the sensor, this time a little further away from the sensor, where you’d like the blooming effect to stop. Look at the Global Brightness value and set the Start Threshold to this value. Anytime someone too close to the sensor will step back past this reference, the blooming effect will be ended.

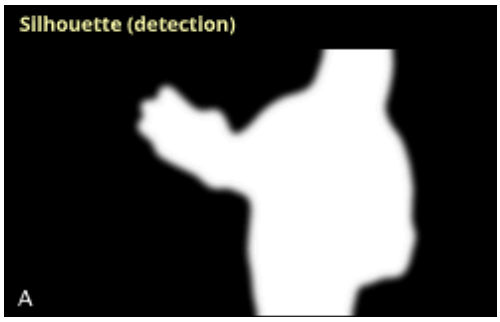
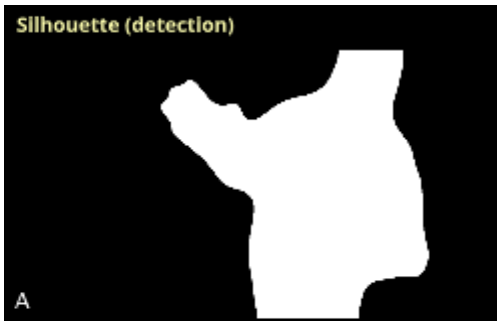
Silhouette (detection)

The following settings allow you to get rid of surrounding artefacts/noise and to control the shape of the rendered silhouette. In sequence, the system erodes the silhouette, blur it, applies a threshold and finally dilates the silhouette.

A full reset and recalibration is easier when setting all values to 0. The settings presented in the picture below are generic values known to work well.



Setting	Description
Erode	We typically partially erode the silhouette to remove noise around the silhouette and reduce the impact of small surrounding elements that could get wrongly tracked. The goal here is to erode as much as we can, without deforming the silhouette. A good reference is, while standing close to the sensor, to look at your opened hand and ensure you see some tip of your fingers, like if you'd have palmed hands. 

Setting	Description
Blur	Blurring the image is the second layer to help getting rid of surrounding noises (small artefacts), in a less aggressive way than the erosion. Here we want to get rid of any little dots that might pop here and there in the background of the silhouette. Note the rendered silhouette will only be blurry if the threshold is set to 0. 
Threshold	The more the setting value will be increased, the more the blurred silhouette will become dense: the zone where the silhouette is blurred and not fully white will become full white and visible. We typically want this value low to make a sharp mask around the tracked person. Setting it too high will bring back background artefacts. 
Dilate	Increasing the dilate value will increase the size of the silhouette. We generally want this value low. 

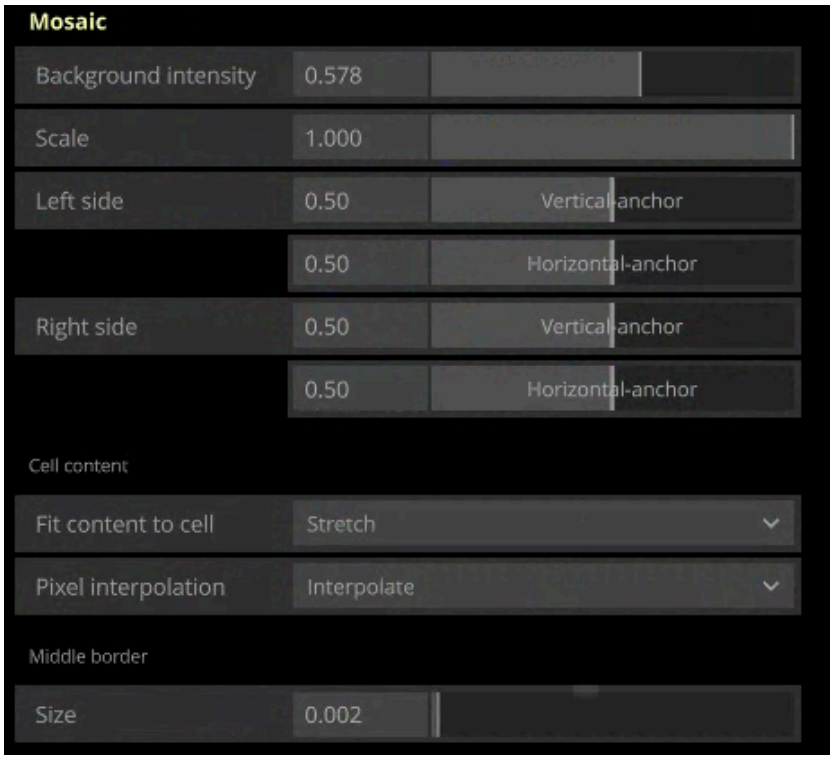
Silhouette (grid)

The following settings allow you to control how the silhouette will be rendered within the grid (cells playing back the videos, forming the grid in rows and columns. Values found in the following picture are standards.

Setting	Description
Edge Softness	While the parameter is present, we tend to keep this value to 0 as the created effect isn't really desired. Increasing the value will add a sort of dimmed aura around the silhouette.
Thickness	Increasing this value will dilate the space the silhouette will take within the grid layout. This helps doing a final reshape of the silhouette according to the final render type.
Trail	The trail here is desired to add an effect of the time in the rendering: this makes the silhouette render less live and less bulky. Increasing the value will increase the duration and length of the trail.

Mosaic

The next settings allow adjustments on the way the videos will be rendered within the display.



Setting	Description
Background intensity	This will impact the brightness of the inactive cells.
Scale	Typically set to **1.000**, reducing this value will scale down the left and right frames presented around the border.
Left/Right sides Vertical-anchor and Horizontal-anchor	The left and right sides are 2 different planes: each can get aligned independently, when the scale isn't 1.000.
Fit content to cell	Should remain set to **Stretch**, this affects how the Target cell size will be modified to fit the Resolved cell size, both described under Grid.
Pixel interpolation	Renderer used to adapt the video to the Resolved cell size resolution.
Middle border - Size	Impacts the width of the border dividing the display in 2 halves.

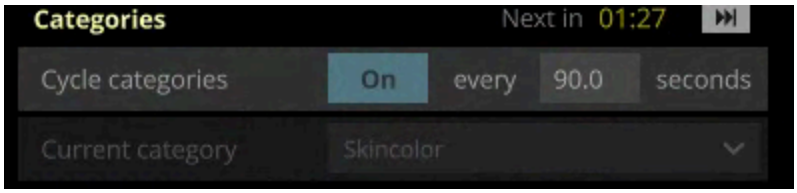
The next settings allow adjustments about the way the categories in use and the timer will be displayed.

Setting	Description
Shadow intensity	The shadow will be black and shown behind the category labels and timer, shown in white. We usually align all these at the bottom of the display with no or just a slight gradient to enhance the text. The shadow intensity is controlling how dark the shadow will be. Typically between **0.05 and 0.1**.
Shadow feather	This value should be near **0.5**. This controls how the shadow edge is smoothed. At 0, the shadow ends drastically, the more we increase it, the more the edge is softened.
Shadow Offset	The smaller this value will be, the higher the shadow will drop into the screen. Typically set near **0.65**.
Category/Countdown - Hide	Should always be turned **Off**, so the Categories are displayed on screen, as seen under Normal Software Operation.

Setting	Description
Category/Countdown - Font	Should always be **Arial**, or Helvetica. The text shouldn't be prominent in the display, as seen under Normal Software Operation.
Category/Countdown - Font size	Is typically set to **0.02**, so the text height is about 2% of display size.
Category/Countdown - Position	Should always be **Bottom**.
Category/Countdown - Margin	Is typically set to **0**, increasing the value will bring the text up (if positioned to Bottom) or down (positioned to Top).
Category - Offset X	Is typically set to **0**, increasing the value will bring the categories labels closer to the Middle border, while decreasing will push them away from the border. Value 0 should center the labels on the midpoint of each video plane.

Categories

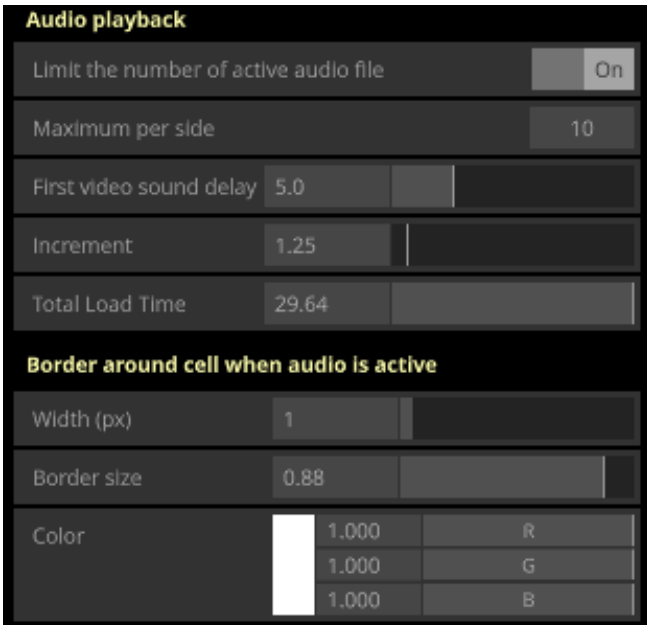
This menu is useful for debug purposes. We can select a video cell from the grid (in X and Y coordinates) and see details about it. Selected video is highlighted in display.



Setting	Description
Next button	Will make you jump into the next category of videos. Next to it, you have the timer showing how long it will take to change to the next category.
Cycle categories toggle (On/Off)	It should be turned **On**. If turned Off, the grid category would remain the same forever.
Cycle categories every X **seconds**	This impacts the timer system: ensuring there is an exact amount of seconds between the different categories reloading. We typically set this value to 90 seconds.
Current category	Only available when the categories cycle is turned Off. Let you pick between the 3 different modes: gender, nationality, skin color.

Audio Playback

The next settings allow adjustments about the way the sound is played back and represented within the display. We typically want to hear a cacophonic sound when we have several videos triggered (bigger silhouette), while still achieving to hear clearly the different voices. The videos are playing back instantly, but the sound playback is happening gradually: first video output happening X seconds after a target is detected, then the next one happening X / Increment after and so on.



Setting	Description
Limit the number of active audio file	When checked On, this will respect the guideline given by the next settings, otherwise, it would playback the maximum amount of sound files and it would be too cacophonous.
Maximum per side	We estimate that a maximum of 50 sounds (25 per side) is the right amount for this artwork.
First video sound delay	Number of seconds before we playback a sound output from a newly tracked target.
Increment	Speed to which the next video will be loaded. An exponential formula is used: every next step, we decrease the delay time by dividing with this value. So for a first video load of 5 seconds and an increment of 1.25, the second video will playback sound 4 seconds after, the third 3.2 seconds after the second, etc.
Total load time	Shows the amount of time in seconds the animation of videos sound playback loading sequence will take.

When a cell is activated for sound output, it is highlighted by showing a frame (bounding box) within the cell: we can control a few settings, making this obvious yet subtle at the same time.

Two cells, the one on the left is not highlighted for audio playback, the one on the right, yes.

Setting	Description
Width (px)	Typically set to 1, we like this border to be present, but conspicuous.
Border size	The border will always be centered into the activated cell. It will take a specific percentage of the current width and height. Typically set to 0.88.
Color	Controlled in RGB values, this should remain white: so all values at 1.

Audio Output

In completion to the previous section, we can control the sound output in a more general way while controlling the following values.

Setting	Description
Enable	Should be set to **On**, otherwise, there will be no sound output.
Volume	You can control here the output volume for the whole software, we recommend keeping this one to 1.0 (100%), while adjusting the computer or the audio system to fine tune the volume in your space.
Mono	This setting must be turned Off (Stereo), besides exception. If turned On, the voices will be single channel and either output from the left OR right channel.
Left channel	While in stereo mode, we can adjust how offset from center the sound should be outputted: a video on the left side of the display should be heard more within the left side sound output than the right side. We recommend a **-0.75** value here.
Right channel	While in stereo mode, we can adjust how offset from center the sound should be outputted: a video on the right side of the display should be heard more within the right side sound output than the left side. We recommend a **0.75** value here.

Video Output

This menu is useful for debug purposes. We can inspect the loaded videos or the videos stored on the hard drive.

Note that used videos (***.vid) should have been generated via the VidMaker software and stored within the same folder as the Eye Contact software. They would actually be stored within a subfolder named according to the video's resolution, eg: Videos90x108. Default resolution is 64x80, however this may vary based on equipment in use.

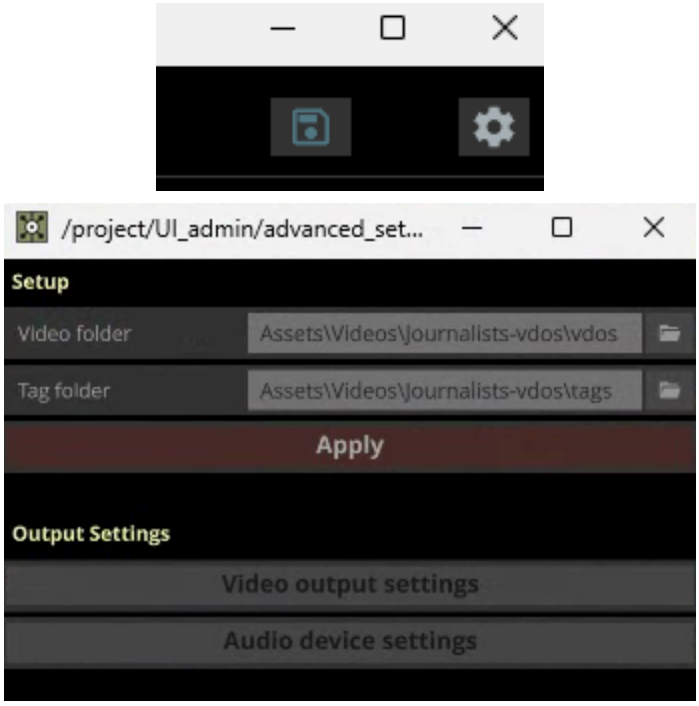
Setting	Description
Toggle output	This button shouldn't be clicked: output should always be Open.
Content alignment	Shows you the output resolution (display size) and the content resolution (full resolution needed for all the videos).
Alignment widget (next to Scale and Anchors)	The easiest way to control alignment in this section: this is a 9 zones clickable button. The typical way to set this is to have the alignment dead center as is the picture above, but you can top / center / bottom align and left / center / right align.
Scale	Typically set to 1. Reducing this value would scale down the content output size.
Anchor H	Typically set to 0. Changing this value would offset the video grid either to the left or the right more precisely than with the widget, when there's leeway between the output resolution and the content resolution width.
Anchor V	Typically set to 0. Changing this value would offset the video grid either to the top or the bottom more precisely than with the widget, when there's leeway between the output resolution and the content resolution width.

Advanced Features - Debug only

In case of any issue with the display render or the audio feedback, while none of the settings presented in previous pages helped: there's an advanced menu for the video and the audio settings. The same menu also allows selecting the right videos files and tags folders.

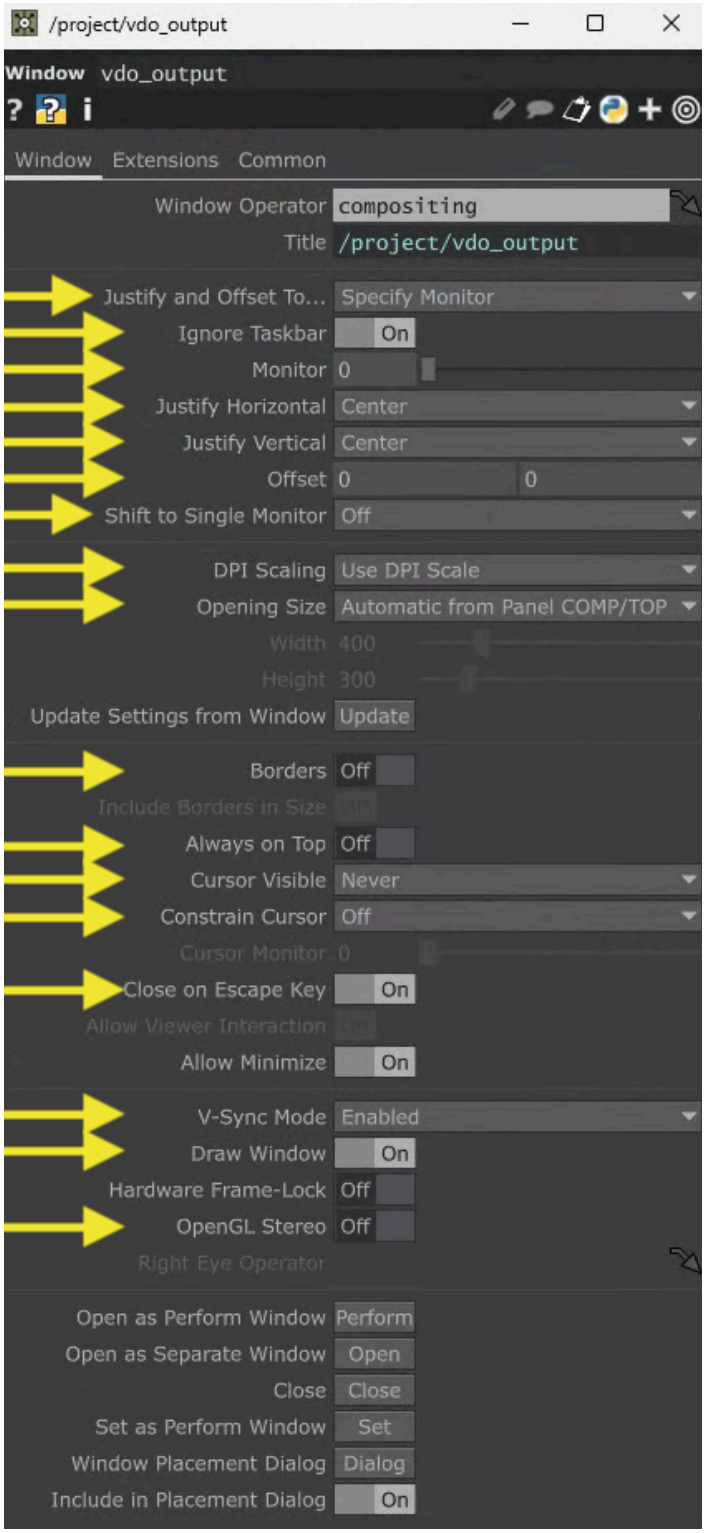
To access the menu, press the parameters (gear wheel) button on top right of the display.

Any changes done within the advanced features must, like the rest of the settings, be saved by clicking the save button.

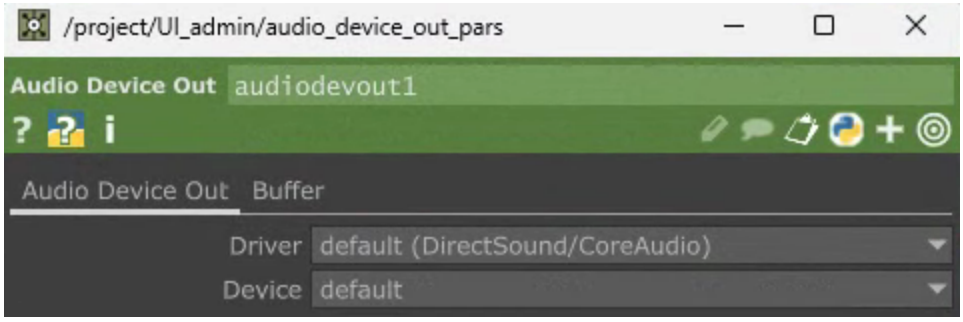


Setting	Description
Video folder	This is the video files folder in the set computer. Should theoretically live under C:\ReportersWithBorders\Assets\Videos\Journalists-vdos\vdos
Tag folder	This is the tag files folder in the set computer. Should theoretically live under C:\ReportersWithBorders\Assets\Videos\Journalists-vdos\tags
Video output settings button	Clicking this button will prompt the advanced video output control page. Note this should technically require no modification.
Audio output settings button	Clicking this button will prompt the advanced audio output control page. Note this should technically require no modification.

Here are the Video output settings accessible by clicking the button described previously. Yellow arrows present in the following image are the important settings retrieved in this page and should always be set as is.



Here are the Audio output settings accessible by clicking the button described previously. Both Driver and Device should be set to Default. If no sound output is heard from the display, the Device could be changed to the display device to force the software to use the display as the output system.



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, OSX), the procedure to set the computer online will vary. Please look online for tutorials, if necessary.

Preliminary Troubleshooting Steps

Always attempt a fully artwork reboot as the first remedy, most of the time, this fixes any issue. Simply press the computer's power button for a fraction of a second and it should turn off the computer. Once off, press the power button again and the system will boot back into the software within two minutes

After pressing the button, nothing seems to happen.

Do you hear any sound coming from the computer? If so, the computer is running and the monitor should display the piece shortly. If not, check if the monitor is well powered and try to turn it on with its remote control and also check that the monitor's source is set to the same port where the cable is plugged in.

The system doesn't react to the presence of people in front of it.

If the video grid is displayed, but there is no reaction while you move in front of the camera, ensure the camera is well connected to the computer and nothing blocks its field of view. The next step is to ensure the right camera is selected, or at least visible in the camera list from the Video Input settings: if it's not visible in the list, restart the system, it should fix the issue. If the camera is in the list, ensure it is selected, that the feed viewer shows live image capture and adjust the camera and interaction settings to get a decent brightness and color, similar to what is shown in the Camera Tracking, Blooming Effect sections.

If the camera is visible and has a proper calibration, the issue is elsewhere. Maybe the silhouette calibration isn't well set, please refer to Silhouette (detection) and Silhouette (grid). Otherwise, the artwork might need more advanced adjustments, assistance from the studio might be required.

The user's silhouette doesn't react like a mirror would.

Ensure the camera is set the right way for your setup: flipping (X or Y) the image might fix the issue here. Please refer to the Video Input section for more details.

There is no volume while a silhouette is live displayed in the grid.

Ensure your display or sound output device is turned On and its volume set to a decent (high) level. Ensure Windows is set to output sound into said device. Ensure Windows sound output isn't muted and volume set to a decent (high) level. Usual way to set volumes is to have Windows' volume and software's volume to 100% and adjust the output device volume to a lower value to prevent breaking the speakers membranes.

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

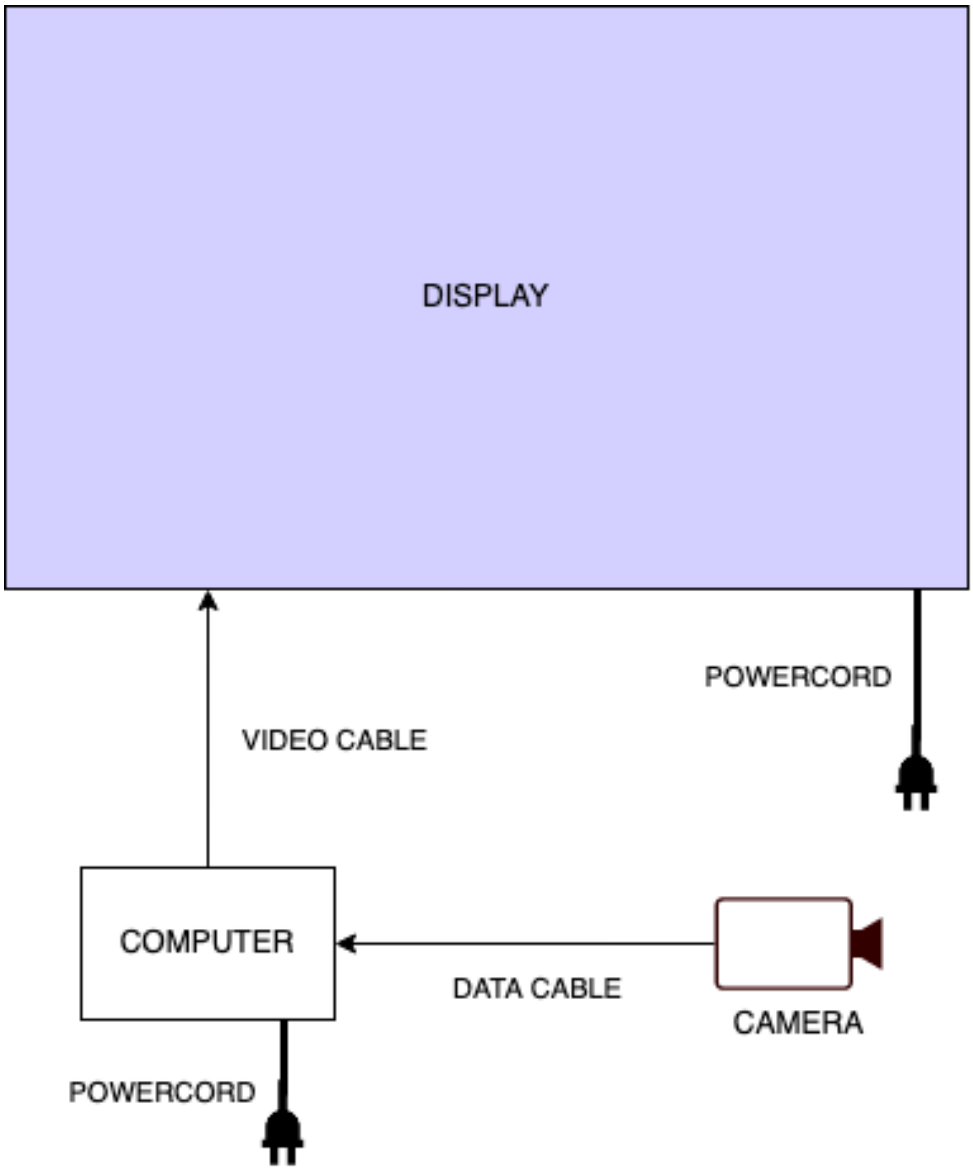
Description of Components

This artwork requires the following components:

Component	Description
Computer	PC running on at least Windows 10, with a dedicated graphic card (at least 8GB), USB 3.0 ports. And at least 16 Gb of RAM.
Video signal cable	Is used to connect the computer to the display. Usually it is an HDMI cable.
Display	A 4K display of at least 50” of diagonal. Ideally the monitor would be as matte (non-reflective) as possible, as slim as possible with bevels as small as possible.
Camera (Depth Sensor)	Allows the system to track people present in front of the artwork.
Camera Mount	Screw-in wall bracket with screw adjustments to aim camera at target. Could alternatively be a C-clamp.
Data cable	Data cable interconnecting camera to computer, typically USB 3.0 cable and could be USB-C or USB-A.

Wiring Diagrams and Connections

In order for the piece to run properly, the computer should be connected according to the following diagrams. At the moment of writing this manual, the camera uses a USB connection. Please refer to your equipment packing list to ensure the exact components you own.

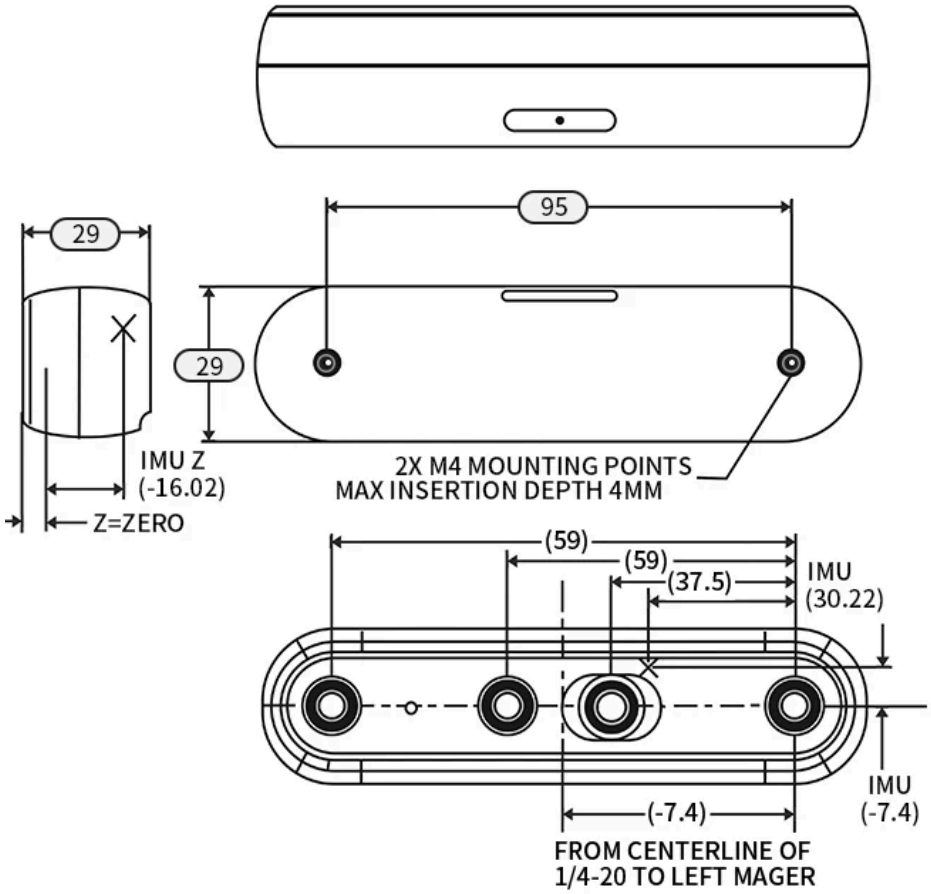


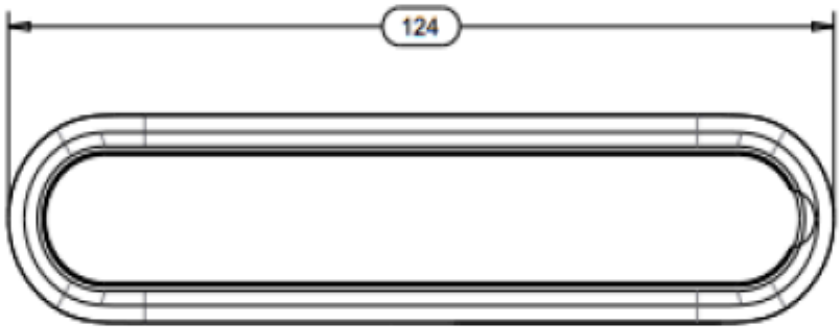
APPENDIX II - TECHNICAL DATA SHEETS

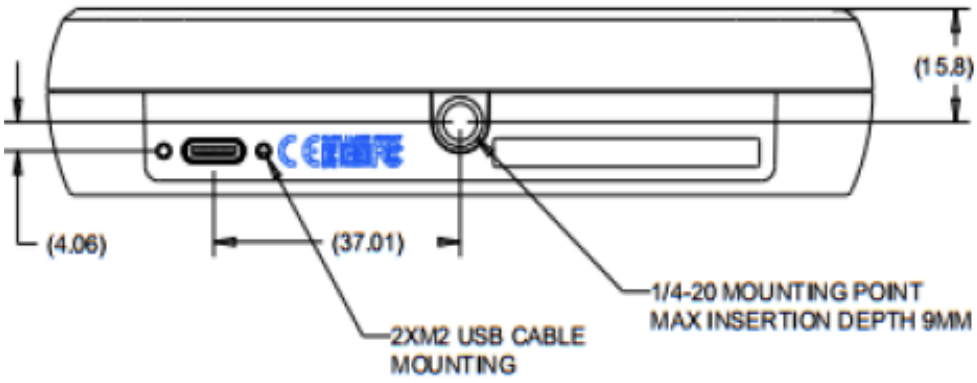
Intel RealSense D455 Camera (Depth Sensor)

At the moment of writing this manual, the Intel RealSense D455 sensor is used in this version of the artwork. This stereoscopic depth camera detects the elements in space in front of the display and can return the distance of such elements from the sensor. The artwork software will require that exact device to be used. Future versions might rely on different sensors: here are the minimal specs to match or improve for an easier migration process.

Specification	Details
Tracking range	0.6m to 6m
Depth Field of View	87 degrees (horizontal) X 58 degrees (vertical)
Resolution	Up to 1280 x 720, up to 90 fps
Mounting Point	¼-20 UNC thread




124


(15.8)
(4.06)
(37.01)
2XM2 USB CABLE
MOUNTING
1/4-20 MOUNTING POINT
MAX INSERTION DEPTH 9MM