

EYE CONTACT, SHADOW BOX 1

BY RAFAEL LOZANO-HEMMER - MIGRATION 2023



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GENERAL IMPORTANT INFORMATION

This short section must be read for proper operation.

EYE CONTACT, SHADOW BOX 1 (2006)

BY RAFAEL LOZANO-HEMMER

Technique

Computer, camera, monitor.

Description

"Eye Contact" (Shadow Box 1) is the first piece of the Shadow Box series of interactive displays with a built-in computerized tracking system. This piece shows eight hundred simultaneous videos of people lying down, resting. As soon as a participant is detected, their presence triggers the miniature video portraits to wake up: hundreds of people simultaneously turn to look at the visitor directly, creating an uncanny experience that questions who is the observer and who is the observed.

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 piece. The display might require to be turned on, for this use it's remote or the button at the back of 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).
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.

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.

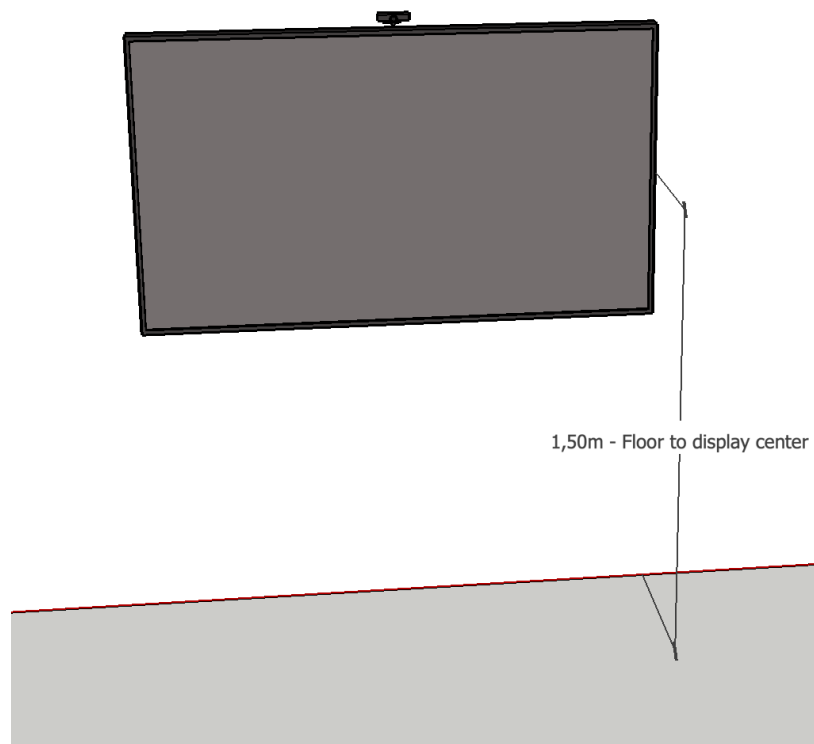
The camera lens shouldn't be cleaned with the same product: please use an air puffer to remove the dust from the lens, if need be.

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 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

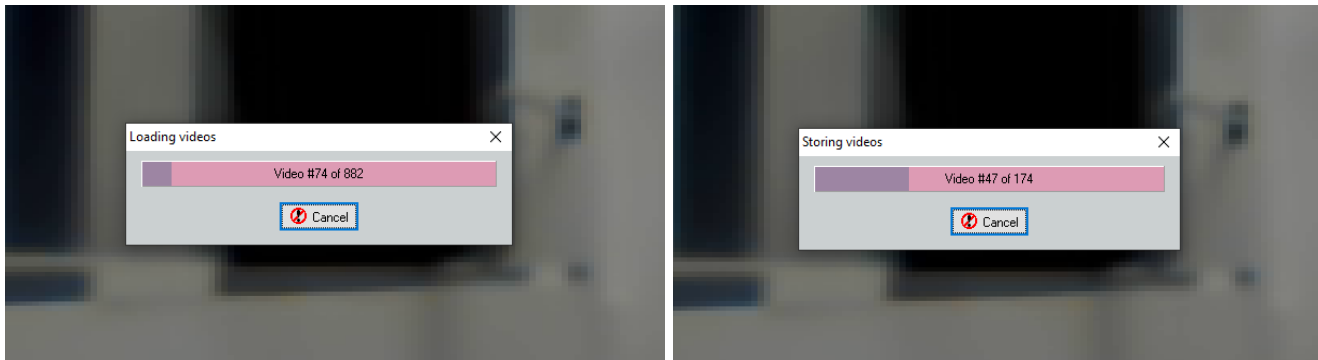
The camera and its bracket should be installed behind the display so that almost only the camera is visible above the display, while the camera mount is mostly hidden behind the display. The camera should be tilted so it aims at a 1.8 metres (6ft) tall person standing in front of the artwork, about 2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

DETAILED TECHNICAL INFORMATION

Normal Software Operation

The artwork, programmed in Delphi, 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.

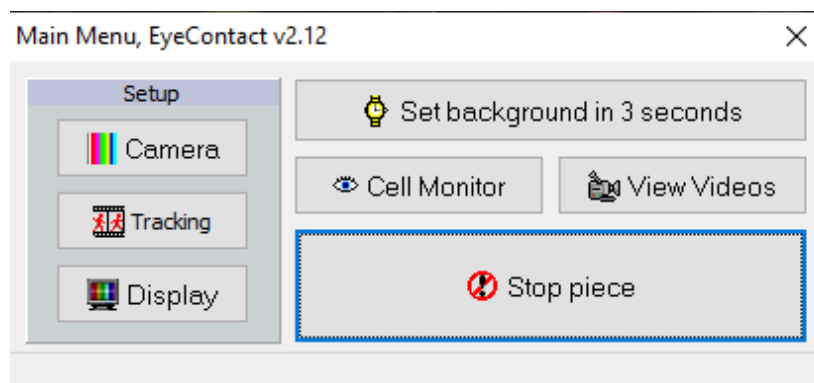
At startup of the software, videos will be loaded from the drive, then stored into memory and finally the camera captures a background reference: so it is important to stay away from the artwork's camera field of view for the first minute or so, in order to let the system boot properly.



Manual Software Calibration

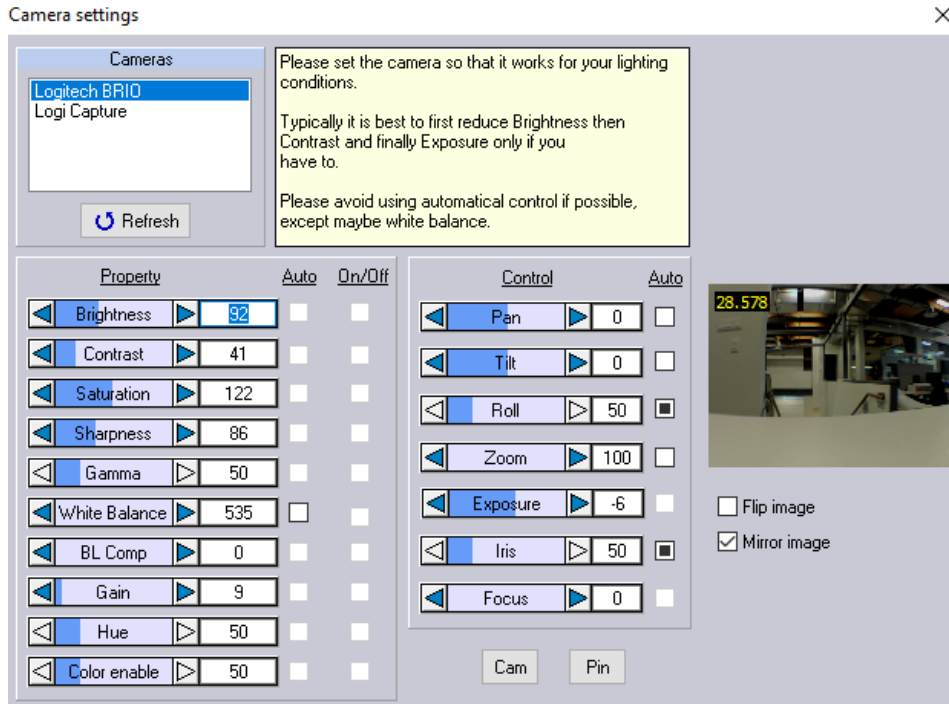
While the system has been calibrated to make the artwork react in the best way for your setup, tweaks and modifications might be needed over time to apply some touch ups. Here are the different sections that are available in the menu.

Right-clicking anywhere in the display would bring up the software's main menu, allowing you to reach different subsections that will be described later in this manual: Camera, Tracking, Display, Cell Monitor, View Videos. Also in the main menu, there are two quick action buttons: **Set background in 3 seconds** which will take a new background reference picture in 3 seconds and **Stop piece** which will quit the software.



Camera Setup

The following settings allow you to control the camera feed input into software.



Cameras and Feed Viewer settings	Description
Cameras - Selection list	This list will show the different cameras detected by the software. At the time of writing these lines, the Logitech BRIO is the camera to use. Clicking on the wanted camera will make it active within the software.
Cameras - Refresh	Clicking it refreshes the camera list detected by the software.
Camera Feed Viewer	Located on the right side of the window, this viewer allows you to see the camera's frame rate per second (FPS) and the effects of the different settings modifications. The following settings are tweaked to have an image where people are bright and sharp, while the background is darker.
Flip image	When checked, this setting flips vertically the image: gets the bottom part of the camera image to show at the top and vice-versa.
Mirror image	When checked, this setting mirrors horizontally the image: gets the left part of the camera image to show on the right and

	vice-versa. This setting is used to ensure the system reacts like a mirror for the person interacting with the artwork.
Cam Button	Clicking this button will pop up a new window giving you access to the Property and Control settings, directly in the selected camera driver. Mainly used for debug purposes, this window might be useful in the case where your modifications done within the regular interface aren't permanently saved.
Pin Button	Clicking this button will pop up a new window giving you access to more settings of the selected camera. Used for debug.

The following property settings are controllable, except if arrows are greyed out, in such case they can't be modified as they are automated by camera driver.

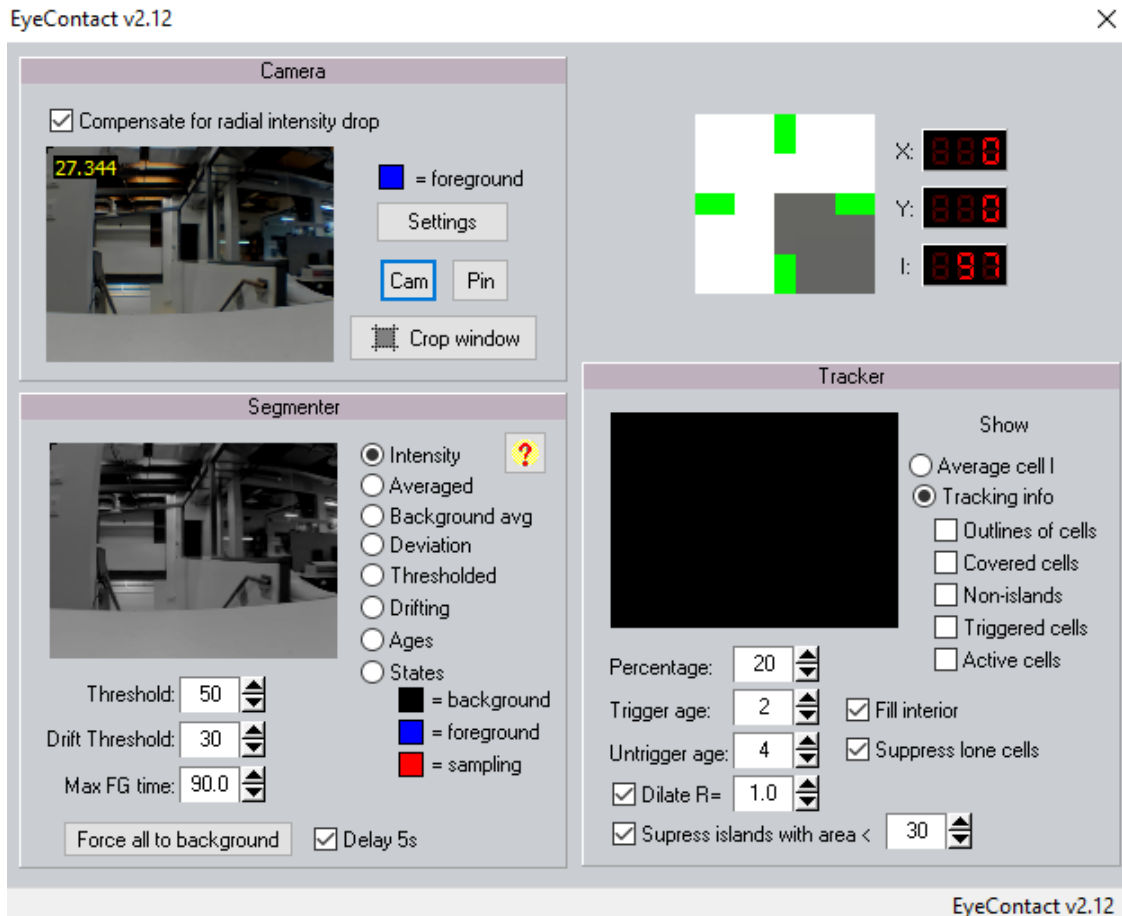
Property Settings	Description
Brightness	Affects the amount of light in the view. With a high value, less of the background is enhanced. With a low value, more of the background is enhanced.
Contrast	Affects the difference between the lightest and darkest areas of the view.
Saturation	Affects the amount of pure colors rendered in the view.
Sharpness	Affects how sharp (or blurred, smooth) the view will be.
Gamma	Affects the conversion of light intensity into pixels, typically, it is not necessary to adjust this value.
White Balance	Adjusts the color temperature of the view. We want people in front of the camera to be coloured as close as they naturally are. Usually, its Auto feature is checked, to ensure a good balance at all times.
BL Comp	Can help balance under and overexposed parts of the view without reducing the brightness of the entire scene. Usually not used: 0.
Gain	Adjusts the amplification of the signal from the camera sensor, making the view brighter or darker.
Hue	Adjusts the color balance of the view.
Color Enable	Can toggle between Black and White or Color image rendering.

The following control settings are controllable, except if arrows are greyed out, in such case they can't be modified as they are automated by camera driver. The Auto checkbox next to value, if not greyed out, can be selected to allow the camera driver to manage this value.

Control Settings	Description
Pan	Shifts the video feed more to the left or right. Usually set at 0 or 100 and can't be modified.
Tilt	Shifts the video feed more to the top or bottom. Usually set at 0 or 100 and can't be modified.
Roll	Rotates the video feed. Usually set at 0 or 100 and can't be modified.
Zoom	Zooms in or out within the image. Usually set at 100 - unzoomed.
Exposure	Adjusts how long the camera takes before sending view info to the computer and cycles to the next frame. A good value is typically -6 or -5. The bigger the number is, the brighter the whole image is, but also slower the image frame rate is getting.
Iris	Can adjust how sensible to the light the camera is. Mostly unused / unavailable.
Focus	Can adjust at what depth the focus of the camera will be. Mostly unused / unavailable. When available, we want to bring the focus as close as possible to the camera's origin point: everything should be on focus.

Tracking Setup

The following settings allow you to tweak the camera feed, the tracking and the way the software renders the tracked elements into the cells grid.



Camera Buttons	Description
Compensate for radial intensity drop	Leave checked.
Feed Viewer	Shows what the RAW camera feed looks like in software.
Settings Button	Clicking this button will pop up the Camera Settings window explained in the previous section.
Cam Button	Clicking this button will pop up a new window giving you access to the Property and Control settings, directly in the selected camera driver. Mainly used for debug purposes, this window might be useful in the case where your modifications done within the regular interface aren't permanently saved.

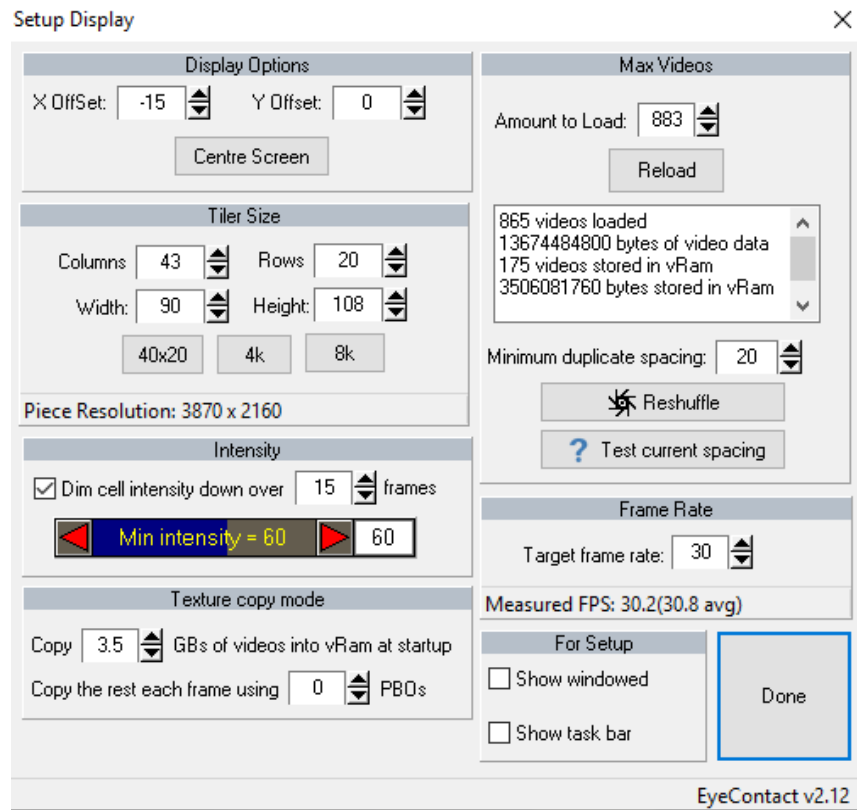
Pin Button	Clicking this button will pop up a new window giving you access to more settings of the selected camera. Mainly used for debug purposes.
Crop Window	Clicking this button will pop up a new window allowing you to select the wanted tracking area - restricting it to a smaller portion of the field of view.

Segmenter Settings and Buttons	Description
Feed Viewer	Shows, depending on the selected segmenter mode, the system segmentation views used to track people in front of the artwork.
Segmenter Mode	The different modes are: <ul style="list-style-type: none"> - intensity: shows the RGB feed transformed to grayscale; - averaged: shows what the foreground reference is; - background avg: shows what the background reference is; - deviation: shows how much each pixel varies from the average; - thresholded: shows pixels different than background by more than threshold value; - drifting: shows pixels different than background by less than drift threshold value; - ages: shows the duration pixels were detected as foreground element - the brighter pixel is the longer it was part of the foreground; - states: shows the state of pixels - background, foreground, sampling.
Threshold	The amount a pixel must differ from its background reference before it's considered part of the foreground.
Drift Threshold	Allows the system to continuously sample the background and allows the system to update in response to small changes in the background, such as natural lighting changing throughout a day.
Max FG time	Maximum allowed time, in seconds, where a pixel can be triggered as part of the foreground. Past that duration, the system resample a background value for said pixel.
Force all to background	Clicking this button will force the system to resample a background value for every pixel in the feed. If the Delay 5s checkbox next to it is checked, resampling will happen 5 seconds after the button is pressed, otherwise, it will be done instantly.

Tracker Settings and Buttons	Description
Feed Viewer	Shows the feed transformed into the same form factor as the display (video grid). Depending on the selected tracker show mode, the view will be different.
Show	<p>The different modes are:</p> <ul style="list-style-type: none"> - Average cell I: shows the actual video feed; - Outlines of cells: show the video cells boundaries; - Covered cells: cells where segmenter detects a foreground presence; - Triggered cells: shows triggered cells by the foreground presence; - Active cells: cells detected as foreground presence and triggered.
Percentage	Helps with the reactivity of the system. Leave value as is.
Trigger age	Number of frames a cell needs to be covered - detected as a foreground element - before triggering the playback of the video occupying said cell.
Untrigger age	Number of frames a cell needs to be 'uncovered' - detected again as background - before untriggering the playback of the video occupying said cell.
Dilate R	Inflates the silhouette tracked by the system: makes the rendered silhouette looking better in the artwork's grid.
Suppress islands with area <	Islands are blocks (blobs) of activated pixels that
Fill interior	When checked, it would fill the interior of the tracked silhouettes. It is usually left checked.
Suppress lone cells	When checked, cells that triggered, but have no neighbouring cell activated, we will bypass and prevent it from being triggered.

Display Setup

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



Display Options	Description
X Offset	Will move the whole cell grid to the left (negative) or to the right (position) from origin point. Used to center the grid on the display.
Y Offset	Will move the whole cell grid to the left (negative) or to the right (position) from origin point. Used to center the grid on the display.
Centre Screen	Click this button should automatically calculate X and Y Offset values.

Tiler Size	Description
Columns	This will create X amount of columns of video cells to be displayed.
Rows	This will create X amount of rows of video cells to be displayed.

Width	The width, in pixels, of any single video cell displayed. If this value is changed, the used videos should be reexported to such format to prevent degradation in the rendering. See VidMaker software section for more details on this process. Contact the studio to get approval if you're about to use more than 872 videos.
Height	The height, in pixels, of any single video cell displayed. If this value is changed, the used videos should be reexported to such format to prevent degradation in the rendering. See VidMaker software section for more details on this process. Contact the studio to get approval if you're about to use more than 872 videos.

Intensity	Description
Dim cell intensity down over ??? frames	Number of frames it will take to a previously triggered cell to return to the typical minimal brightness, at the same time it goes back to pause.
Min intensity	Minimal intensity for the video cells, when they are not activated.

Texture copy mode	Description
Copy ??? GB	This has been optimized for your computer. The GB value sets a limit preventing overloading the memory resource available from the graphic card. Past that amount, the system continues loading the videos into the RAM instead. The more VRAM the graphic card has, the less will be needed from the computer.
Copy the rest each frame using ??? PBOs	This should remain at a value of 0.

Max Videos	Description
Amount to load	Maximum amount of videos we want the software to load from hardware.
Reload	Clicking this button would reload all videos from the hard drive and store them into the video ram.

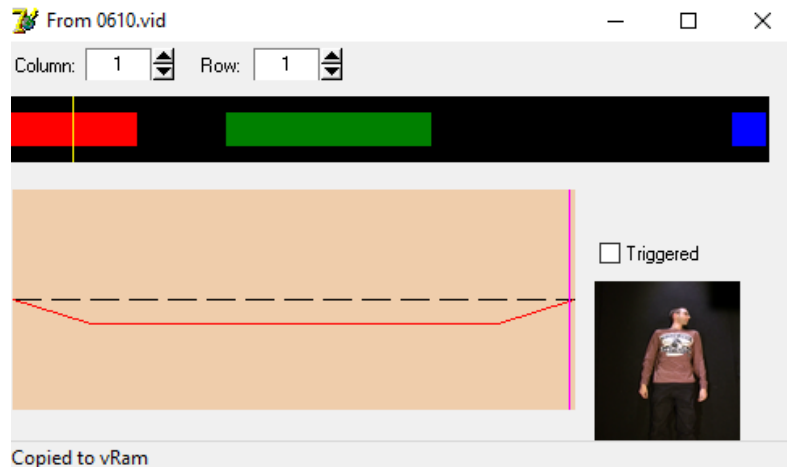
Text box	This section will list the total amount of loaded videos, the total memory size used by all videos, the amount of videos loaded in the video RAM and the memory size used by videos in video RAM.
Maximum duplicate spacing	If duplicate videos are needed, they will be spaced by at least this amount of cells, when feasible.
Reshuffle	Clicking this button would redistribute currently loaded videos to different locations.
Test current spacing	Clicking this button will pop up a window stating the smallest distance between 2 instances of the same video displayed on screen.

Frame Rate	Description
Target frame rate	The frames per second rate the software will try to run at.

For Setup	Description
Show windowed	Used for debug purposes. When checked, the software will be displayed within a framed window. Keep unchecked.
Show task bar	Used for debug purposes. When checked, the operating taskbar will be displayed on top of the software. Keep unchecked.

Cell Monitor

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.

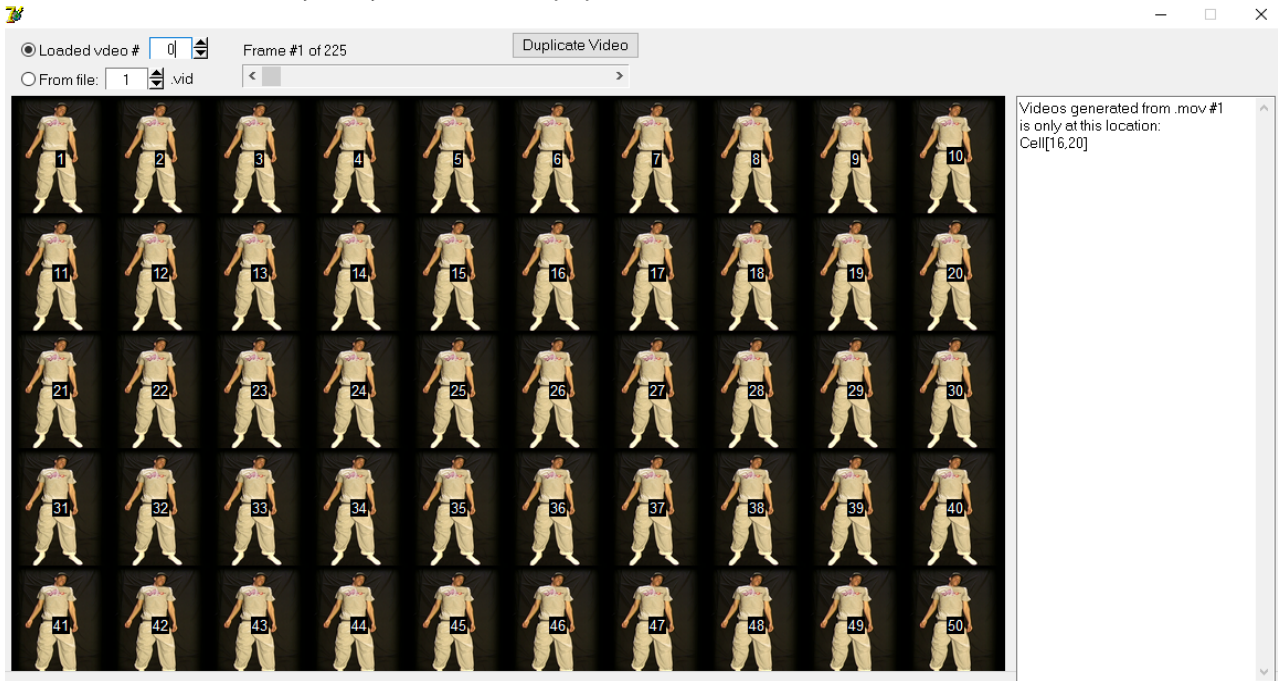


Display Options	Description
Column	Moves the position of the selected video on the X axis.
Row	Moves the position of the selected video on the Y axis.
Video playhead	Shows the current playhead position on the video file. Videos all have the same structure: asleep state (red area), eye contact state (green area), second asleep state (blue area). Between these moments, the character wakes up or falls asleep (black area).
Triggered	This checkbox will be checked if the cell is currently triggered by the presence of something in the foreground.
Status bar	The status bar tells you if the video is copied to VRAM (stored in RAM), or stored directly in VRAM.

View Videos

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.



Display Options	Description
Loaded video #	When selected, allows to select the video loaded in software (VRAM and RAM), at specified position.
From file	When selected, allows to select the video stored in the hard drive, at specified position.
Frame # Of	Used with the progressive bar located under, this allows to see and scroll across all frames of the selected video.
Duplicate video	Clicking this button would copy the selected video within all cells. If clicked, you will eventually have to quit the software and start it again.
Text box	This box relates to the loaded video. Tells from which hard drive video the loaded video has been generated from, and in which cell(s) of the grid the selected video has been copied to.

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

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.

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

Ensure the USB 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 Camera 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 settings to get a decent brightness and color, similar to what is shown in the [Camera Setup](#) section.

If the camera is visible and has a proper calibration, the issue is elsewhere. Maybe the Min intensity from the [Display Setup](#) is set too high, giving the impression the system doesn't react: decreasing this value might help. Otherwise, the [Tracking Setup](#) might need adjustments, [assistance from the studio](#) might be required.

User's silhouette doesn't react like a mirror would.

Ensure the camera is set the right way for your setup: flipping and/or mirroring the image might fix the issue here. The other element to verify is to ensure the Crop Window setting isn't too offset from the center of camera view. Please refer to the [Camera Setup](#) section for more details.

There is black bars in the edges of the artwork rendering.

Quit the software and ensure Windows doesn't react the same way: if so adjust Windows resolution to ensure the whole display is used. Once this is fixed, start the software by double-clicking the artwork's shortcut on the desktop. If the problem persists, go into [Display Setup](#) and ensure the Tiler Size is set properly (using enough columns and rows of the right width and height) to fill the display. Also verify the X and Y offsets are properly set by clicking the Centre Screen button, or adjusting manually the values.

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

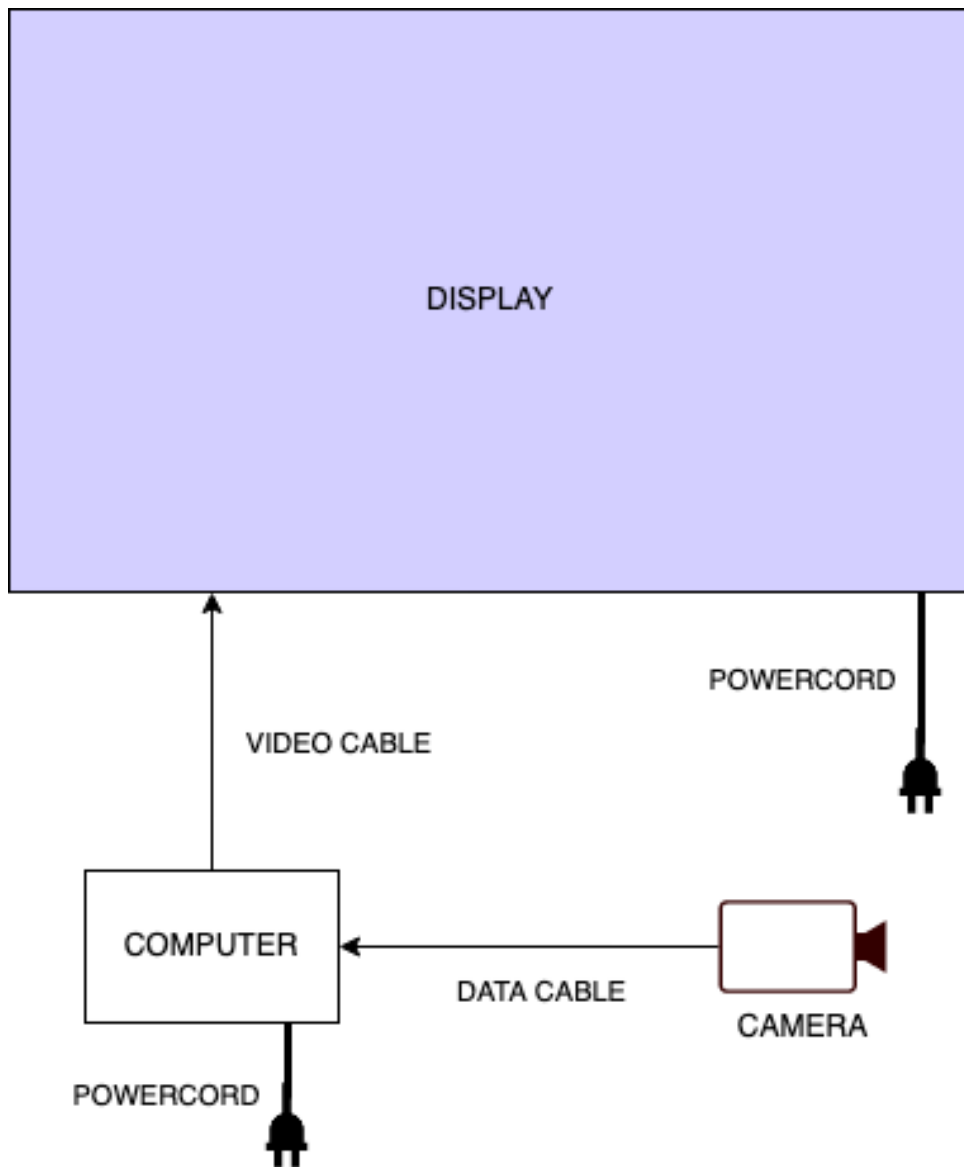
Description of Components

This artwork requires the following components:

Component	Description
Computer	PC running on at least Windows 10, with a dedicated graphic card (at least 4GB), 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 a 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	Allows the system to track people present in front of the artwork. At the time of writing this manual, a modified Logitech Brio is used.
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




Kurokesu Logitech Brio 4K mk2

At the moment of writing this manual, the Logitech Brio 4K camera is the preferred camera by the studio. We set this camera within a Kurokesu enclosure, which allows more controls, especially on the viewing angle. Note that other cameras could be recommended in future.

Resolution FPS	2160p@30fps / 1080p@30 or 60fps / 720p@30 , 60, or 90fps
Diagonal Field of View	65°, 78° , and 90°
H.264 video compression	No



♥ ≡

Logitech BRIO 4K Pro rework kit mk2

Product Code: BRIO_REWORK_KIT2

Available Options

- * Filter

No filter
- * Reworked

Logitech Brio + Rework
- * Silicone dust cap

With dust cap

Description

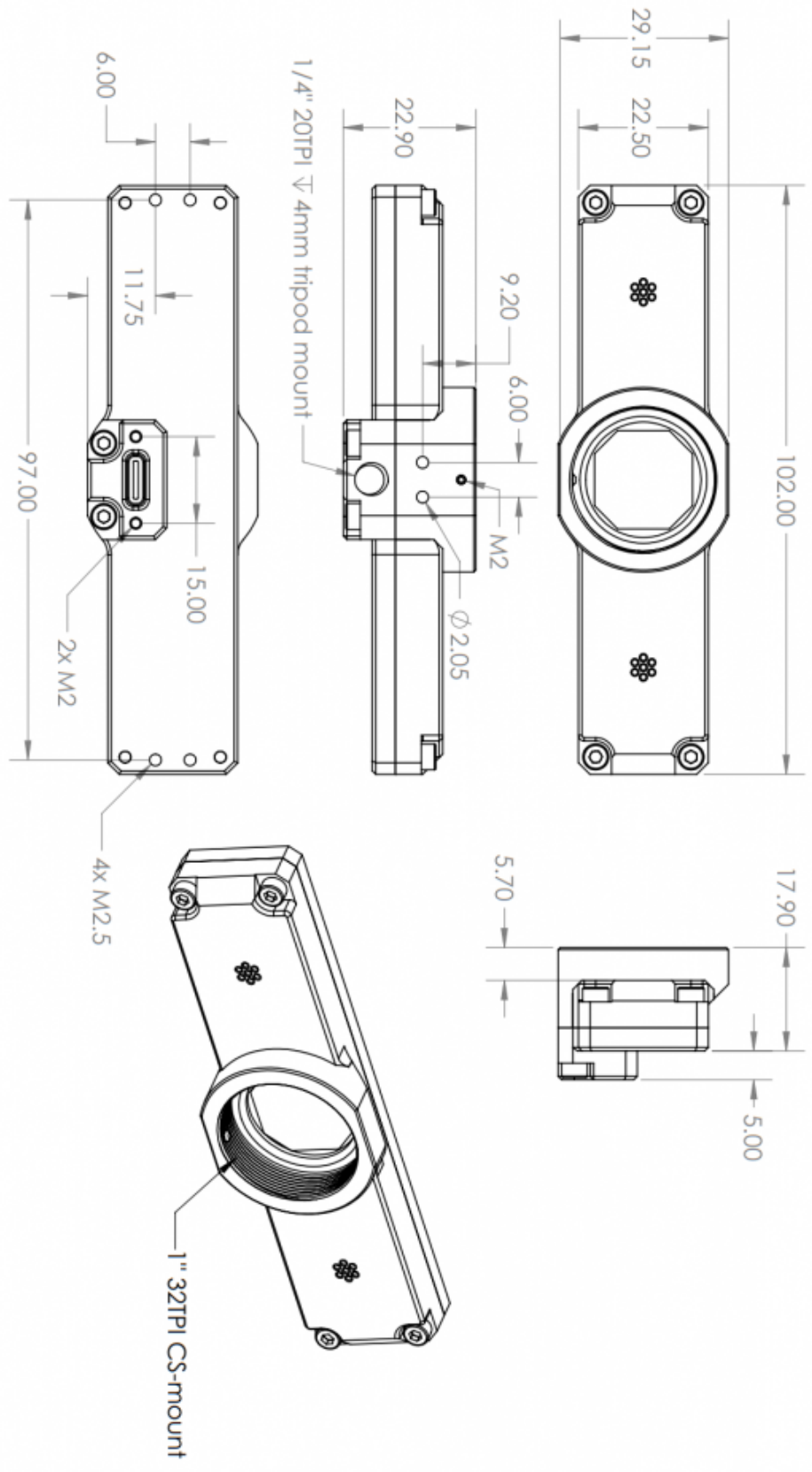
Rework kit mk2 for Logitech BRIO 4K Pro web camera. It allows using full advantage of [CS-mount](#) or [C-mount lenses and filters](#).

Included parts

- Hex keys
 - M2x20x83
 - M1.5x17x75
- Screws
 - DIN912 M1.6x4 – 6 pcs (for PCB mounting)
 - DIN912 M2x3 – 2 pcs (for microphones)
 - DIN912 M2.5x8 – 4 pcs (for enclosure)
 - DIN912 M2.5x10 – 2 pcs (for enclosure)
- Two aluminum enclosure parts

Change list (mk1 vs mk2)

- Added threaded holes for [USB-C lock cable](#)
- Larger pockets for microphone wires for easier assembly
- Larger opening for a sensor - allows use of short back-focal lenses with [M12 lens adapter](#)
- Chamfered edges - small cosmetic change and weight saving



APPENDIX III - UTILITIES AND OTHER SOFTWARES

Logitech Software

While this artwork isn't necessarily tied to Logitech equipment, it first got programmed with a Logitech Brio camera. If your equipment is using such a camera, the installation of Logitech LogiTune software is necessary: this would give access to specific camera settings that have to be controlled from there.

At the time of writing this manual, the settings are accessible via Logitech Camera Settings. In there, we want the following settings. Once these are set in such a way, the modifications applied to Eye Contact's software settings will be saved properly.

HDR	Turned Off
Image	Standard
Field Of View	78 degrees
Auto focus	Turned Off
Auto white balance	Turned Off

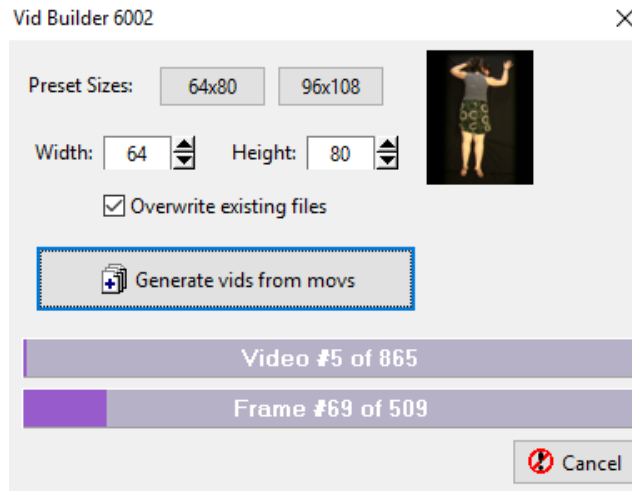
QuickTime Player

Apple QuickTime Player is a required software to ensure a proper video playback within software: without it, the main software will simply not work. Quicktime is also needed when we desire to (re)generate new videos with the VidMaker software explained below.

VidMaker software

The VidMaker software should be used only under supervision from the studio: while this tool is built to allow adapting the original videos to a new grid format, the artist wants to ensure the quality of video files generated - and ultimately rendered in the artwork software - is meeting desired standards. The software generates videos of a specific resolution (should be kept along the original videos form factor). The original movies (***.mov located within Mavs subfolder) and scrub texts (videos keypoints are stored in ***.txt files located with ScrubTxt subfolder).

The system will generate 2 subfolders: Bmps and Videos??x?? - eg: Videos64x80 for videos with a resolution of 64x80. These subfolders and contained files should be stored within the artwork software main folder and software set to use that file resolution once we are done with the generation. The different options and settings are as follows.



Preset Sizes - 64x80	Clicking this button will affect 64x80 values to Width and Height settings.
Preset Sizes - 96x108	Clicking this button will affect 96x108 values to Width and Height settings.
Width	Width in pixels the generated videos will have.
Height	Height in pixels the generated videos will have.
Overwrite existing files	If checked, the system will regenerate the videos even if they exist in the system.
Generate vids from movs	Clicking the button will start the video generation process.
Cancel	Clicking the button will stop the video generation process.