

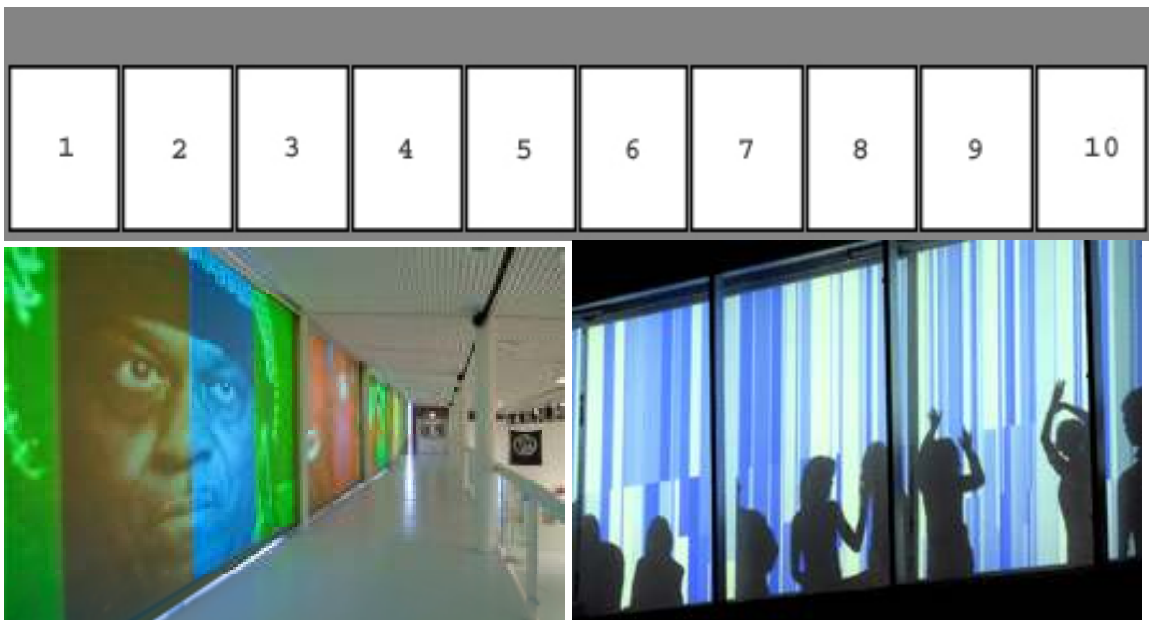
# Manual for production of a *Jackman Goldwasser Catwalk Gallery* Façade Production

**Third Draft**

## **An Overview of the System**

### **1. The Catwalk:**

- Along the east side of the upstairs catwalk, there are ten windows 7.5' x 10', along with five *opaque screens* and five *black screens*. Along the west side of the catwalk is the center gallery below and 10 projectors hanging from the ceiling.
- The five opaque screens function as the projection surface, which allows for internal and external viewing, while the black screens block out the sun during the day and raise up at night, allowing for periods of inside-only viewing and inside-outside viewing. Both screens are on rolls with separate timers that automatically raise and lower at specified times during the day.
- Rather than appearing continuous, the ten windows are each visually bordered by the window frames. From the inside, these windows are visually framed by four support beams every two windows. From the outside, each window appears bordered by the window frames.



## **2. The Projectors:**

- The Façade consists of **10 NEC GT5000 projectors** lined up in a row. Each Projector uses **dual 5000 lumens lamps** that can operate continuously for 2000 hours.
- These projectors are mounted on their sides, so the video image display is turned sideways (this is not a problem because the orientation is automatically corrected in the computer video output to the projectors).
- The projectors and screens are controlled using an *AMX controller* that tells the projectors and screens to automatically turn on and off at a specific time each day.
- The projectors can not be moved, and the orientation of the projectors is permanent. There is slight overlapping of the image, inconsistently across the 10 screens, which is an unavoidable byproduct of the throw and custom hanging hardware.

## **3. The Control Room:**

- In the control room there are **5 display computers** each sending its output to 2 projectors, and **one head computer** that controls everything including the display computers, the projectors and screens, and the lighting events in the gallery. These computers communicate with each other over a static IP network.
- The video output to the projectors is controlled using a program called **Dataton: Watchout**. This program is used because of its ability to route multiple video streams over a network and to specific computer video cards that send video streams to the projectors. You can download and use a demo for PC from the Dataton website.
- Keep in mind that other software may be used, such as flash or powerpoint, as long as it operates continuously without technical assistance. If you know how to build a similar network application to do something that Dataton can't do on its own you are welcome to do so (see Network Control Cues section). However, while you can hook your personal computer up to act as a remote controller, or run things from a network or sensors, you can not hook up your own computer to operate the displays. We will not disconnect these computers from our network.
- There is an **8 input, 8 output Audio Mixer** in the control room, used to route audio to the catwalk, using **70volt speakers**. There are 5 speakers inside, and 2 outside. The inputs on this mixer can be configured to take the output from any or all computers, or any external input source (up to 7 inputs CD/DVD/Tuner). The output goes directly to the catwalk where the speakers hang opposite from the screens. For the specific configuration of these speakers see the “working with audio” section below.
- The lighting events in gallery 1 are controlled through a port in the head computer with a hardware/software package called *Lutron: Graphic Eye*. This software can control specific lighting changes in time for the shows on the first floor in the main gallery (used only for shows in gallery 1).

#### **4. The Software: Dataton Watchout:**

- The Dataton:Watchout program has two components, *Watchout: Production* and *Watchout: Display*. The Head Computer is the only one running the production software, and the other 5 computers running the display software. All media files are located on the production computer, where they are sent over the network to the 5 display computers (and then to the projectors via VGA cable).
- The Production software is set up with a timeline and a “Stage,” and acts similar to linear video editing software. The timeline is used to arrange the separate media components temporally (video, audio, and images) in a sequence that plays through and can loop or change with control cues.
- The stage is where the media is spatially arranged. Aside from media files, there are display windows on the stage. Everything in the timeline appears somewhere on the stage, and must be arranged into one of the display windows.
- The five display windows are set to a 3/2 aspect ratio for this system, with a resolution of 1536x1024. The media files do not necessarily have to be in this ratio or resolution (see Media Production section).
- There are optional control cues that can be used to create complex events along the timeline. These control cues can be cued over a remote IP address, creating endless possibilities for control through other sources (see Control Cues section).
- **File Types:** For video, we’ve discovered the best format to use with Dataton is *Uncompressed Quicktime*, split into 5 horizontal segments. Segments should also be split into a file size under 4 gigabytes. If using compressed, please use *.MOV encoded with H.264 encoder*. It also accepts *JPEG, WAV, and AIFF* files. All audio files must be included separately from the movie files because the system handles them differently. Please see audio section for complete description.
- For the complete Watchout manual in PDF format, or to download a demo version of watchout, please visit <http://www.dataton.com/watchout>

## **Digital Media Production**

#### **5. Working with Video:**

One of the most frequent questions artists ask is about how to create video for this oddly shaped presentation. The fact is that there are many different ways to do it as long as you are aware of what the system is capable of.

Many people are interested in trying to achieve a seamless image across the entire screen area. There is no flawless way to achieve a seamless continuous image, unless

stretching and pixilation isn't a concern for your project. Therefore, its helpful to think of different strategies for dividing the video field into multiple channels.

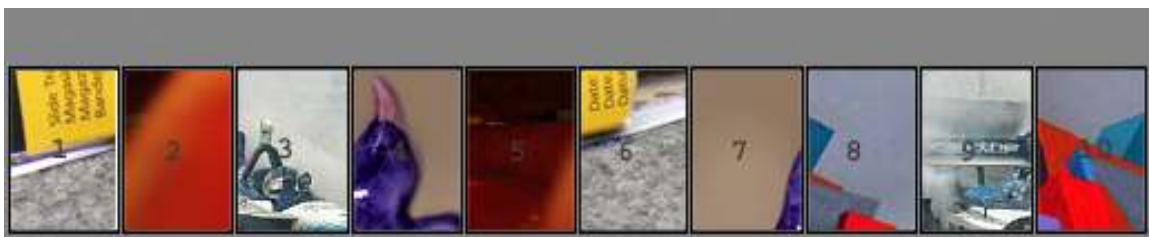
When creating media for this system, it is important to keep in mind that you don't have to think in terms of one image or 10 images, instead you can divide the area many different ways.

**The aspect ratio and resolution is relative to how the screen is divided.** Most cameras can only shoot in a standard aspect ratio, so each presentation starts with the problem of how to divide the video plane into segments for multiple video channels:

If you wanted to fill the projection area as simply as possible, the simplest presentation to create and execute would be 5 videos of equal length with a resolution of **1536 x 1024 (3:2 aspect ratio)**. Lined up horizontally, these videos would span 2 windows each, projected from two projectors each. Because these videos can be scaled to fit the windows, the aspect ratio for this application must be proportionate to a 3:2 ratio (which could be 720x480 for most cameras or 320x240 for streaming) to prevent stretching.



Another way to do it would be to have 10 videos oriented horizontally, in which case the aspect ratio would have to be **3:4 with 7658 x 1024 resolution** (1536/2, turned horizontally = 768x1024), where each video fits into its own window and uses 1 projector. To produce a video like this, you could shoot with the camera on it's side, or crop down to this size.



Video can be arranged anywhere in the projection area, as long as negative space isn't a concern. The video doesn't have to be seamless, continuous, or even the same size or duration. You can use any combination of resolutions to make this presentation. You can pile video on top of other video, cascade small sections, or use alpha channels for blue screening effects.



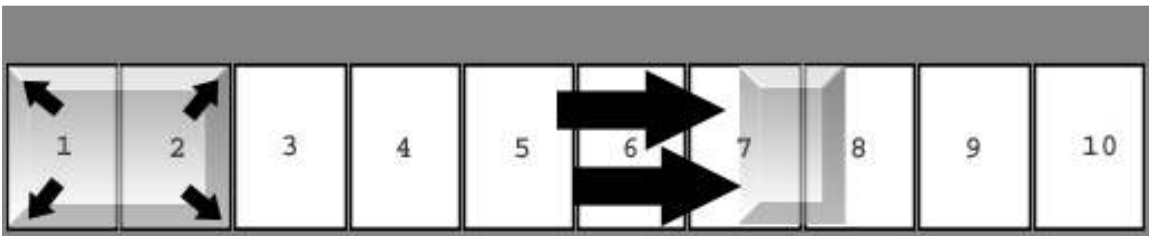
If you wanted to create a continuous video, much of this would have to be accomplished in the production of the video before bringing it to HPAC. You could try to crop video footage in it's post-production to create one long seamless image with an aspect ratio of *15:2*, but at a low original resolution this would create unavoidably massive pixilation from blowing up the pixils to this size.



You could also try setting up multiple cameras to capture simultaneous footage, but you would first have to consider how throw distance, overlapping and camera angles would factor into the final piece.

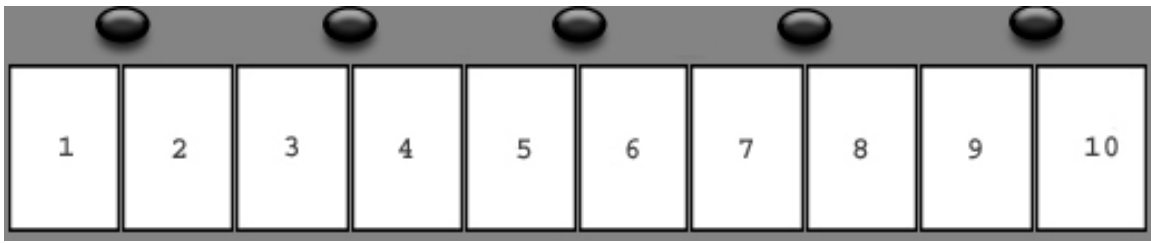
**Special Controls:**

1. There are other specialized effects in Watchout that you can use in your production. You can move, rotate, flip, overlap, and scale video along the façade over a period of time.

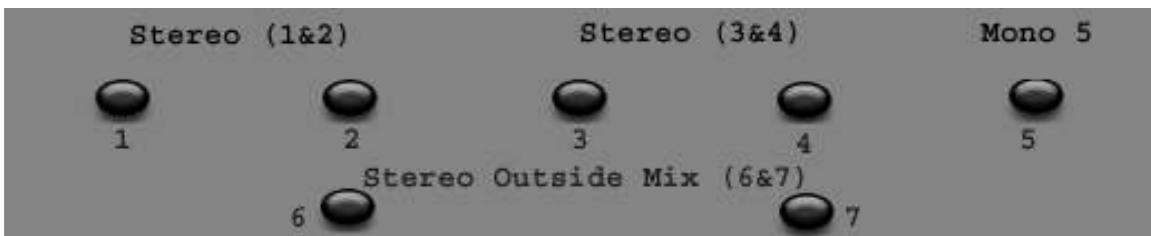


## Working with audio:

- The speakers are mounted on the ceiling opposite the screens and are directed towards the catwalk. They are spaced one per screen or every 2 projectors, and 2 outside mounted under the canopy of the catwalk under screen 2 and screen 4.
- Because of the difficulty in changing the audio setup, this configuration will normally be decided upon and set for the duration of the show. The speakers can be moved to some degree, but are basically where they will stay. The 2 exterior speakers can not be moved.



- **You can use up to 7 channels of audio.** The inputs to the audio mixer can be reconfigured to take inputs from a variety of places, but normally they are set up to take one channel of video from each of the 5 display computers and 2 channels to the outside of the building.
- **Please do not encode your audio with your video.** The audio must be routed in a specific way to reach their appropriate destinations. Usually this means 3 stereo and 1 mono. The diagram below illustrates how the audio files are routed through the mixer.



- Other sources of audio output such as CD/DVD, radio, or microphones can be used as well.
- **Normalize, EQ, Compress!!!** These are easy ways to achieve a fuller sound. The speakers are 70 volt, and can't get very loud, so we need quality and volume.
- Audio on the façade has the limitation of not interfering with our other shows, and will be played at a volume comfortable to visitors in other areas of the building.

## **Network and Control Cues:**

*Control cues* are like bookmarks along the timeline used for easy location and control of timeline events. Over a network IP address, it is possible to trigger changes in the video based on external things in the environment using things like motion sensors or other hardware control devices. The result is a system that responds to the viewer or user or external stimuli.

We frequently use a program called Max/MSP, which is an object-based programming environment that allows users to build custom applications to control the program in a variety of ways. Max/MSP was created as an environment for routing MIDI (musical instrument digital interface) but has since expanded into the realms of audio and video networking. Watchout doesn't respond to MIDI messages itself, but routing through Max/MSP makes it possible to convert and customize control cues along the timeline that respond to sensors and other things. For Example: For one project we purchased motion sensors from a company called *I-Cube X* that manufactures a sensor-to-midi interface. With motion sensors placed along the catwalk we were able to create a system that responded to the presence or absence of people watching the presentation. Another project utilized a simple Max patch that changed Watchout's place in the timeline based on time of day. Any sensor or hardware that can be connected to this software can be configured to control timeline events in Watchout.

## **In Conclusion:**

The Catwalk gallery is an experiment and a work in progress. This system was designed for and by HPAC and is the first of its kind, so there are potentially many unforeseen bugs to work out. While The Media Technician at HPAC knows the hardware/software setup with the network and how to create applications that communicate with our system, there are many other ways of doing something different that you can discover to create more complex compositions. This document is meant to be an introduction to the façade system we currently have set up, and is not meant to be viewed as a complete production manual. If you have an idea for something to do, there is probably a way to do it given the right time and resources, and while we will try as best as we can, we won't always have the necessary resources or technical ability to realize every project. All questions are encouraged sooner rather than later, as technical difficulties are often unexpected and unpredictable. Please contact Chris Hammes or Allison Peters for more information.