



Technical Documentation for Kracum Performance Hall

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Technical Documentation for Kracum Performance Hall

Summary: These brief instructions will help you get started quickly with concert production in Kracum and beyond. The other topics on the side help provide additional information and detail about working with other aspects of technical theater.

Note: If you're reading this documentation, you're probably doing concert/theater of some kind. I have a [YouTube Channel](#) hosting some example work.

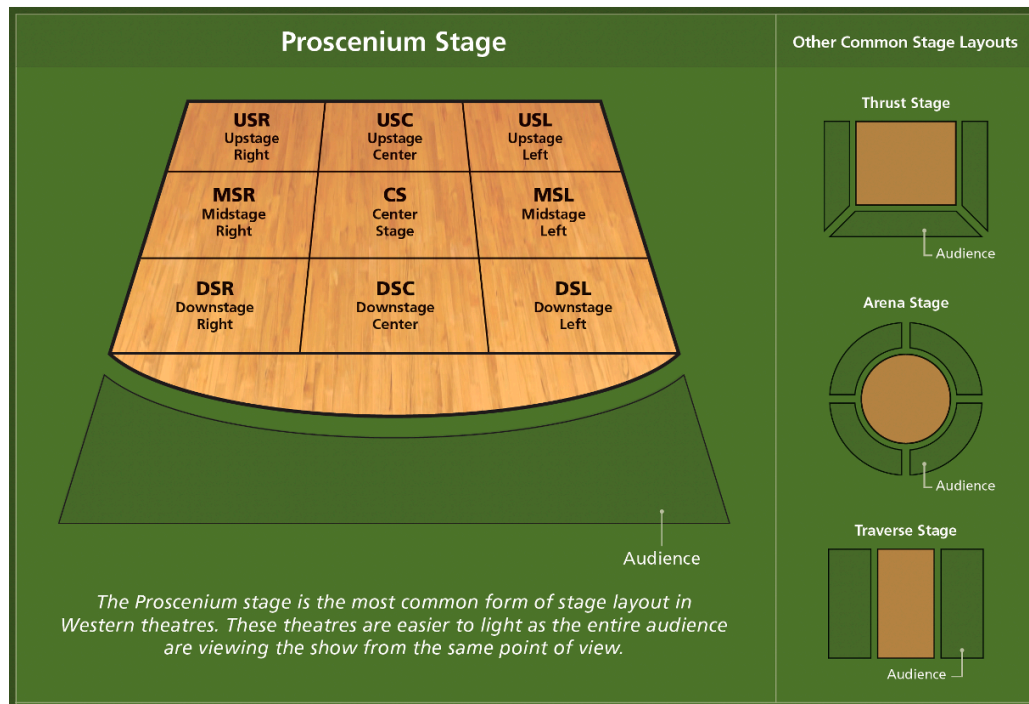
You can download the PDF version of this documentation Download from [here](#) .
Download show file backups [here](#) .

The navigation blocks above mimic the steps you might encounter for your shifts here. The following establishes some basic concepts.

Parts of a Theater

Stage

The area where the performance takes place is referred to as the **stage**. We refer to the stage from the perspectives of the performers.



Stage Positions.

The area of the stage furthest from the audience is **upstage**, and the closest is **downstage**. The area of the stage to the *performer's* left is **stage left**, and to the *performer's* right is **stage right**. The area surrounding the playing space not visible to the audience is **backstage** or **offstage**.

House

The house is any area that is not backstage or onstage. Typically, this refers to anywhere the audience is seated. Therefore, the house positions are in the perspectives of the audience. **House Left** is the audience's left, and **House Right** is the audience's right. (For a typical proscenium stage, House Left is in front of Stage Right.)

Front of House

This is a broad category that can contain multiple positions:

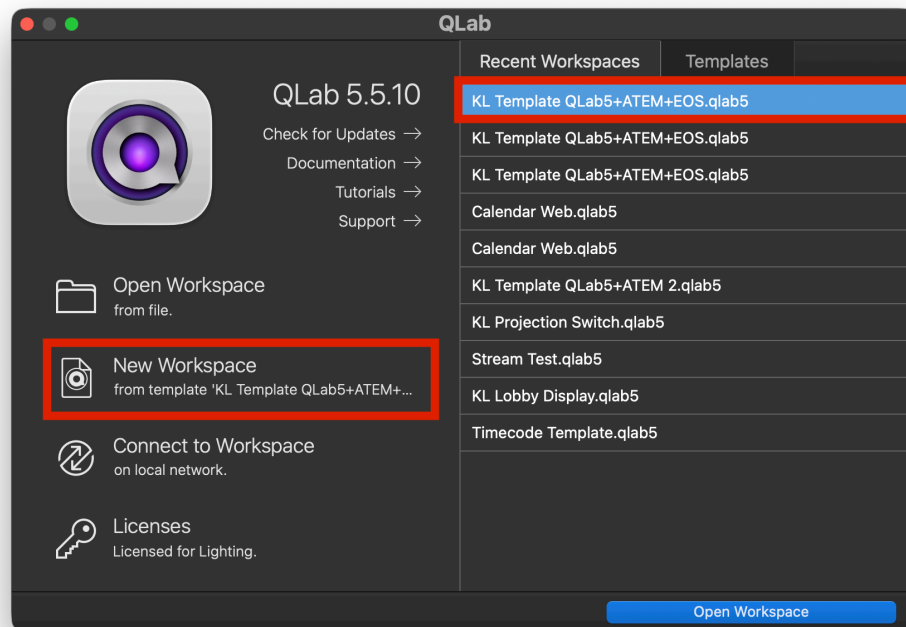
- **Control Booth:** The section of the theater designated for the operation of live lighting/audio/video equipment, and is sometimes the location of the stage manager's station.
- **Lobby / Box Office:** The public entry to the building from the outside.

QLab Video Graphics

Summary: Follow these instructions to get started on the graphics side of production. We use QLab for lower-thirds and credits, as well as video and audio playback.

Open the template

If you haven't already, make sure you launch **QLab 5**  as opposed to **QLab 4**  in the dock. When you do, you will be greeted with an interface that asks you to select the template. You want to select “**KL Template QLab5+ATEM+EOS**”:



This is a sample QLab Homescreen.

Note: Your home screen will look different from this depending on what has been opened in the past. QLab ranks the list of show files by how recently they were opened (higher is more recent). If you can't find the template, you have a few options:

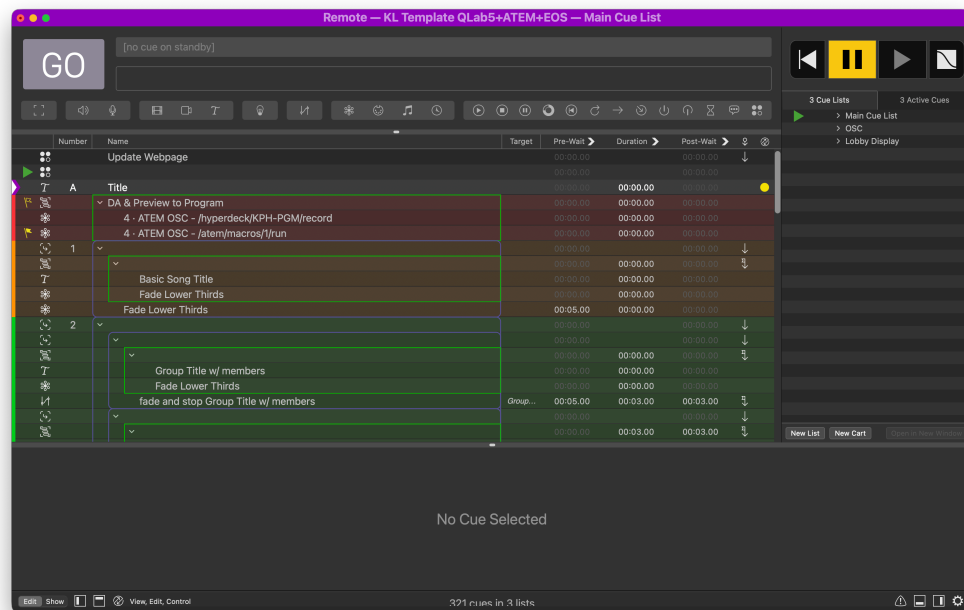
1. Check the **desktop** of your computer.

2. Select **New Workspace** from template “KL Template...”.
 3. Download from [here](#).
- Understand that options 2 and 3 might present you with obsolete show files.

Check [here \(page 0\)](#) for common troubleshooting techniques if you have trouble getting started.

Save the template as a new file

Once you’re in, you will see the following workspace:

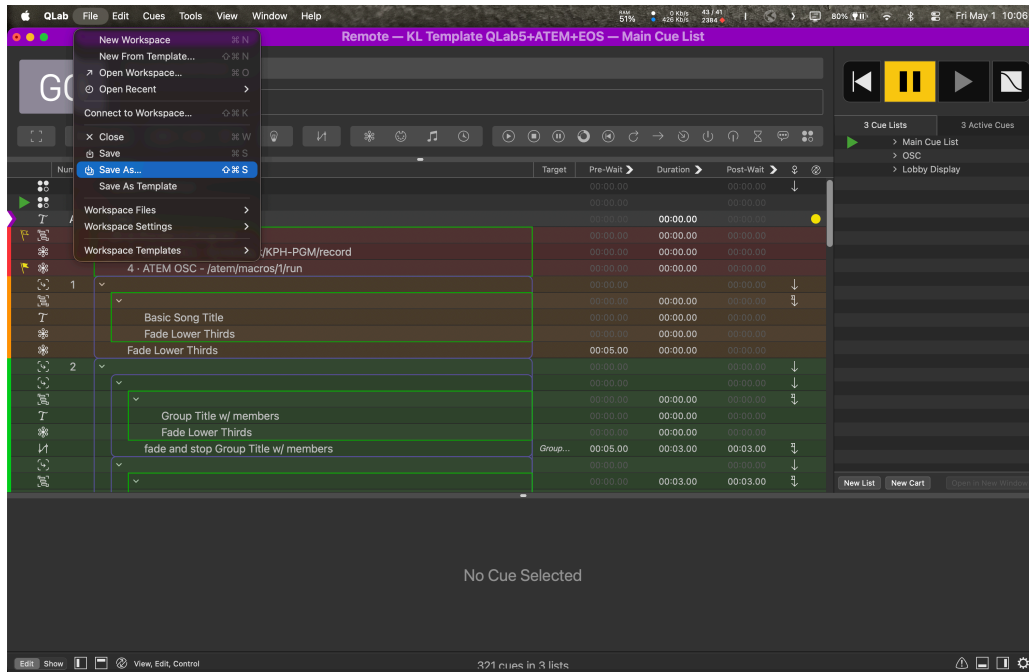


This is a sample QLab Workspace.

Check [here \(page 0\)](#) if you see **red X** warnings. (Your app title bar won’t be purple. I remoted into the system when I wrote this, which is why it’s showing purple.)

⚠ Important: The first thing you want to do when you open a template is to **save it as a new file**, so you don’t overwrite the template.

To do this, go to **File** and select **Save As...**. Alternatively, press **command+shift+s**.



For good practice, keep the files organized in a folder with consistent naming conventions. An example of such a folder/directory is **Documents → QLab Archive → 2025-2026 → 3. S26 QLab**. An example of a workspace name is **04262026_Kingston-Recital**.

Edit the template

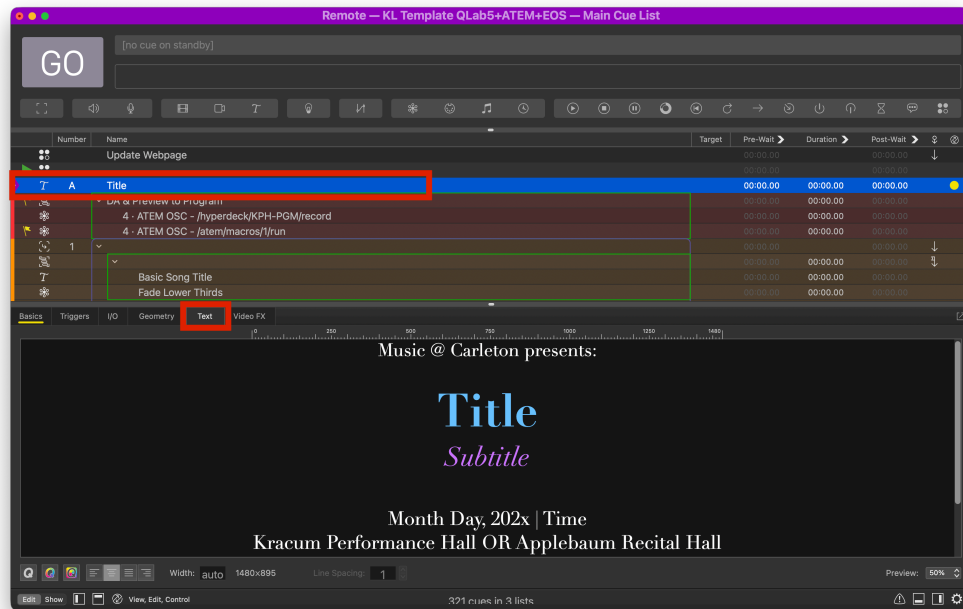
Now we're onto actually filling in the details according to a show. We will use several examples throughout to illustrate the different scenarios you might encounter.

If you need a refresher navigating the workspace, check [here \(page 0\)](#). For our purposes, the part that matters to us the most is the **playhead**, which controls what **cue** is being selected/pending/on standby (highlighted in blue).

- You can click to select any cue, and that puts it in into standby.
- To play a cue, hit **space** to play the cue on standby.
- To stop cues, hit **escape** to **panic all** cues; this fades everything down in 1 second, making the stop seem intentional when it's not.

Title

First navigate to the **Text** column of the **Title** cue (cue name: **Title**; cue number: **A**). This is where you enter the appropriate information. Notice the **T** icon at the top of the playhead. This indicates that it is a *text* cue, which displays its content as a static png file onto the designated output.



Edit Title Cue

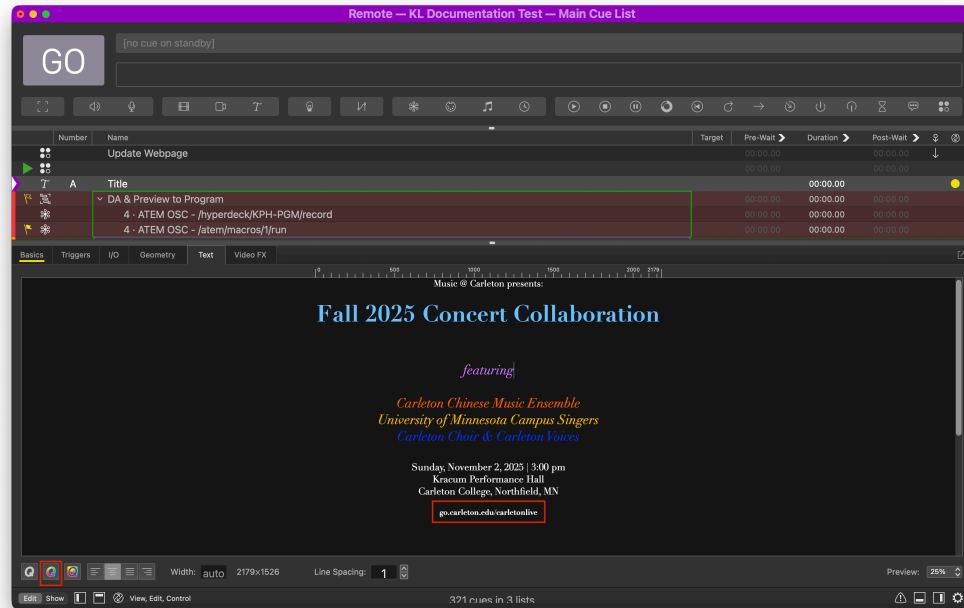
If the template is set up correctly, you should see the static image on **input 7** of the ATEM Multiview. Check [here \(page 0\)](#) if you're seeing otherwise. (Your multiview will not look like this. I'm using the multiview here to show you both the QLab progress bars and the program output.)

Your browser does not support the video tag.

Take a look at this following program.

Usually, there's just enough information to fill out the titles and subtitles (optional). In this case, we have too much information, so we have to make a decision. Typically, the title is the name of the concert, i.e., **Orchestra Concert**, **Jazz**

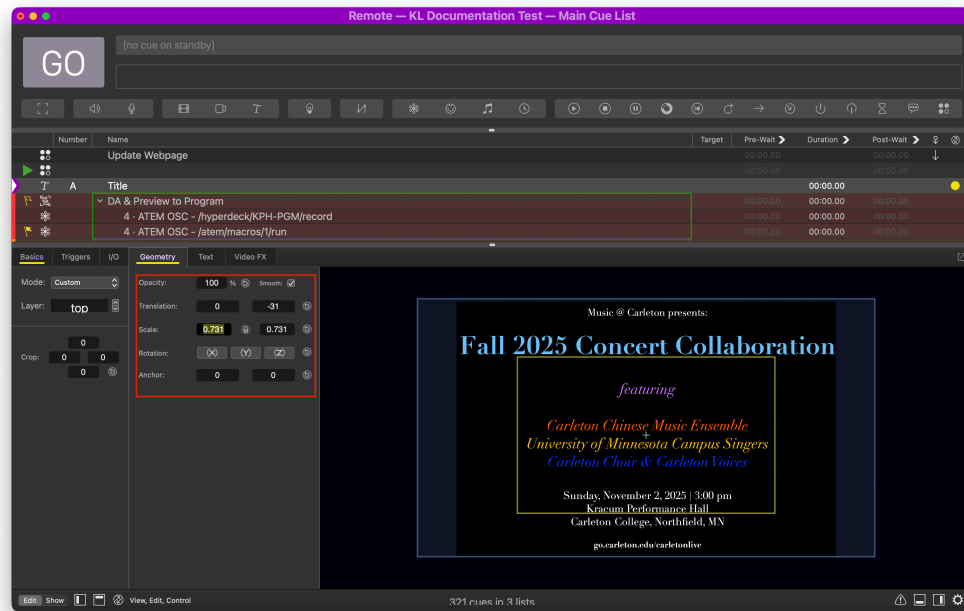
Area Concert, etc.; the subtitle consists of the directors, soloists, etc. Here, we not only have the event name— **Fall 2025 Concert Collaboration** —but also the different ensembles and their respective directors. In this case, we omit the directors. The result would look something like this:



Edited Title

You can select the text and change its color however you desire using the **text color panel**. When we livestream an event, leave the Carleton Livestream URL go.carleton.edu/carletonlive (page 0) in. Otherwise, delete the link. Contact [Alexi Carlson](#) if you don't know whether the event is being streamed or not.

Tip: If the text exceeds the boundaries of the output screen, rather than adjusting the font sizes individually, you can adjust the **Scale** of the entire cue in the **Geometry** tab. You can also adjust the **Translation** and **Rotation** of cues, if the properties apply. All these parameters are “draggable”, so you don't have to enter the values manually.



Edit Cue Geometry

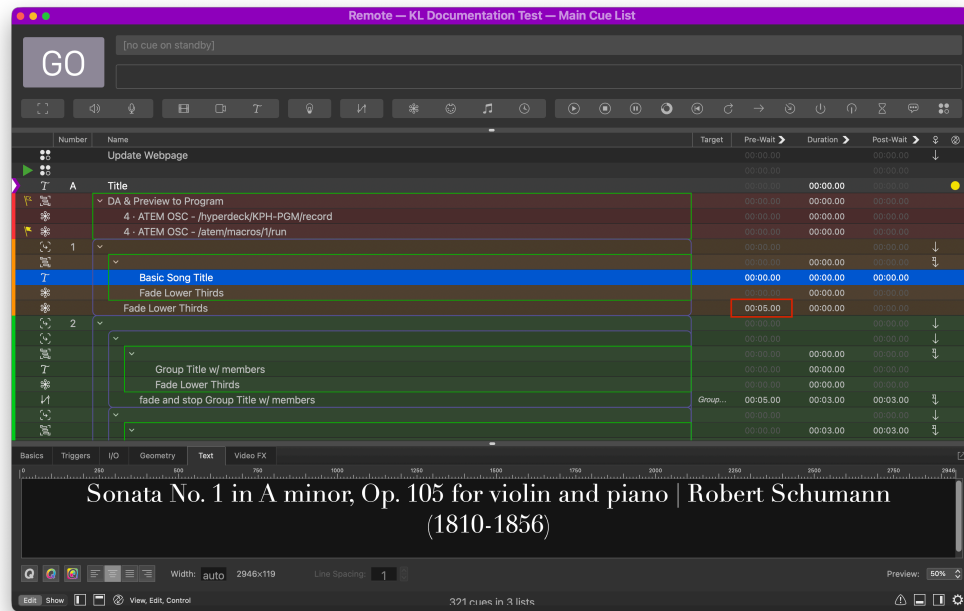
Lower-Thirds

We want to give credits to all the performers that make events possible. We use lower thirds to indicate the *performers*, the *piece* they're performing, the *composer* of the piece, and any *group name* if applicable. There are a few different types of lower thirds, and we use them according to which scenario we encounter:

1. When there's only one artist performing the concert, or when the artist or group has been introduced at a previous lower-third.

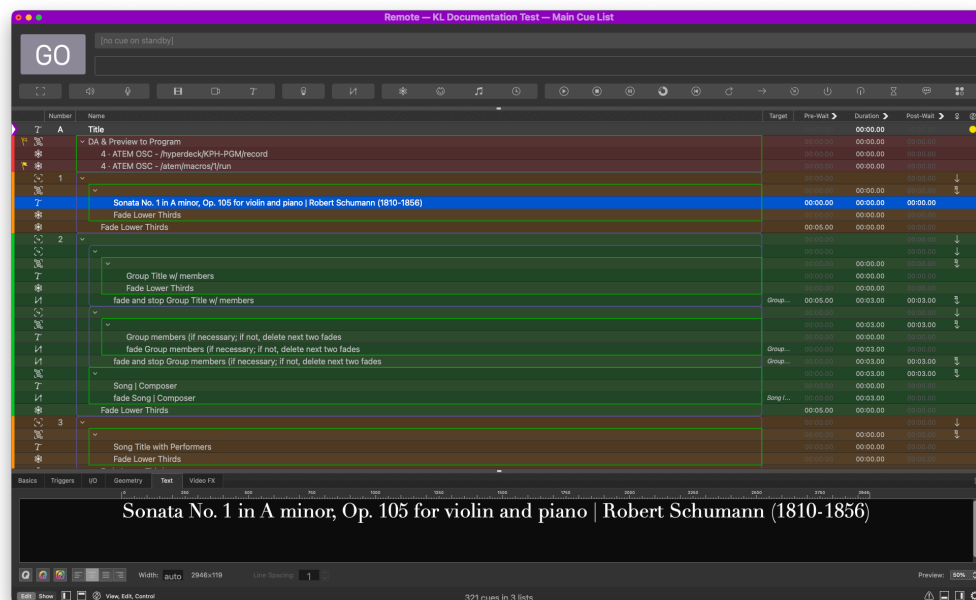
Typically, when there's only one artist performing, their name is introduced in the title or the subtitle. We avoid redundancy here by only introducing the piece they perform and the composer of that piece. (Similarly for when a group has been introduced.) Take a look at the following program.

The only two performers **Susie Park** and **Timothy Lovelace** are both introduced in the titles, so we use cue 1 as a template here. To edit a lower third, as it is the case with all other cues in this template, the only type of cues you need to edit is a **Text** cue. Go to the **Text** tab of the text cue, and enter the piece information.



Title with Piece Information.

You will note that I also omitted the movements. This is because the sonata only contains three movements. The real-estate of a lower-third limits how much information we can put out. We only include movements when not all movements are being played. For instance, if an artist is playing only the second movement, we would write **Sonata, Movt. II**. When there are multiple movements, we use a dash to connect them: **..., Movt. I-III**.



Cues without names will display text content.

Note: You can **rename** a cue by either double-clicking the Name tab or use the keyboard shortcut **Q**. The keyboard shortcut for **renumbering** is **N**. Cues whose cue name is empty will display its text content or filename.

To play this lower-third, you want to go to the top of the group cue, i.e., **Cue 1**, and hit **space**. From there, you don't need to do anything. The automation scripts will bring up the **Downstream Keys** in ATEM and the text cue you just created and take them out after a specified amount of time, i.e., 5 seconds.

Your browser does not support the video tag.

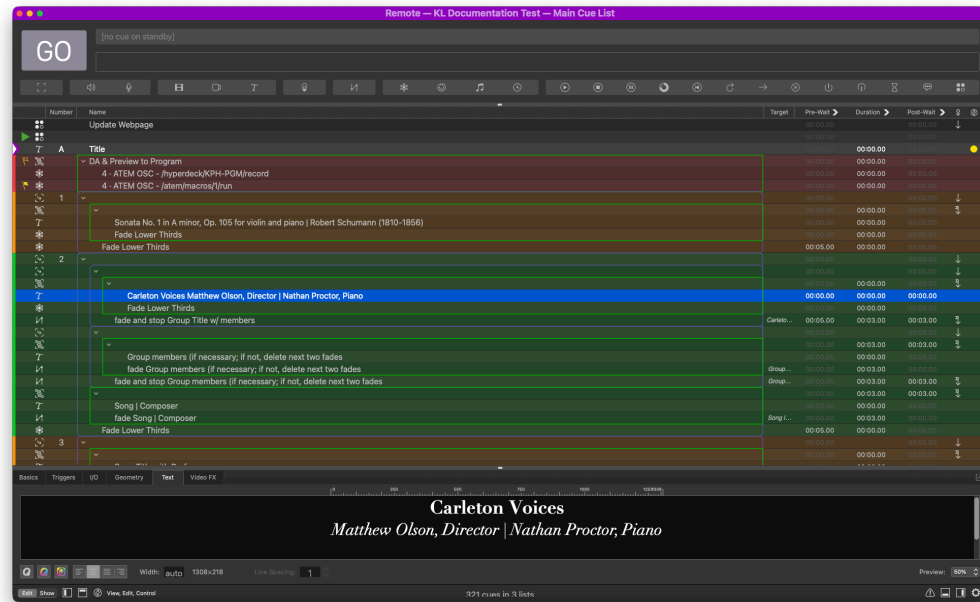
Important: As always, check the **Geometry** or play the cue before show starts to make sure there's no overflow.

2. When there is a named group or a large group performing.

We always introduce the group before they perform their first piece. When the group is large enough that we can't fit them into a single lower-third, or when the group has a group name, we use the second template. When a group is performing multiple pieces, use **Cue 2** to introduce the group and the first piece. For brevity, use **Cue 1** for the remaining pieces until a different group performs or when there's a soloist to highlight. Let's see this in action. Take a look at this program again. We want to do the lower-thirds for the first piece performed by **Carleton Voices**, i.e., **Hey Harmonika**.

- Group Titles

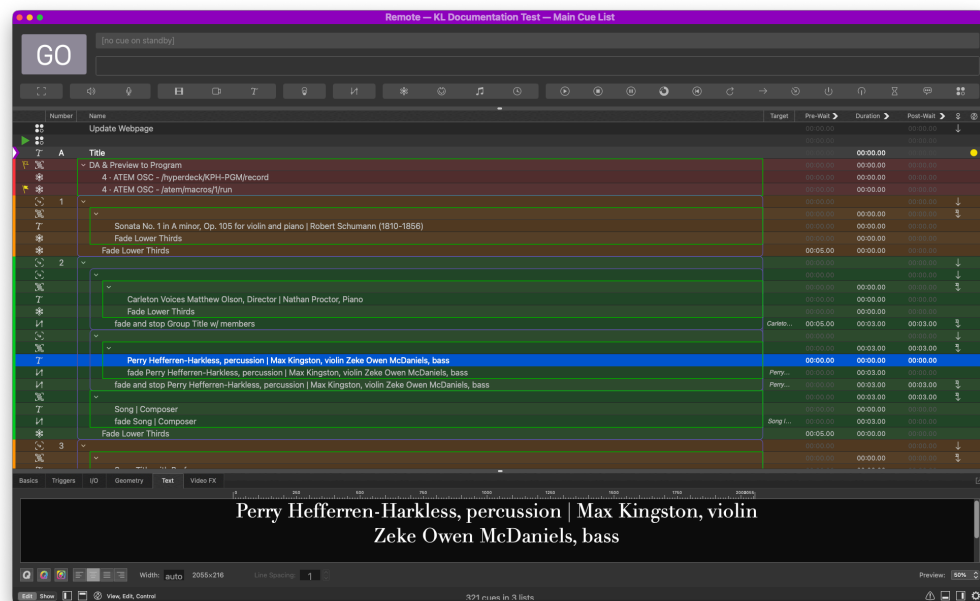
Since we didn't highlight the directors in the subtitles, we put the directors here. So the first text cue under **Cue 2** will be the following. We use **|** as the delimiter between two performers; you don't need a delimiter at the end of a line. This first text cue will always contain the group title (and the director, if applicable).



Group Title with Directors

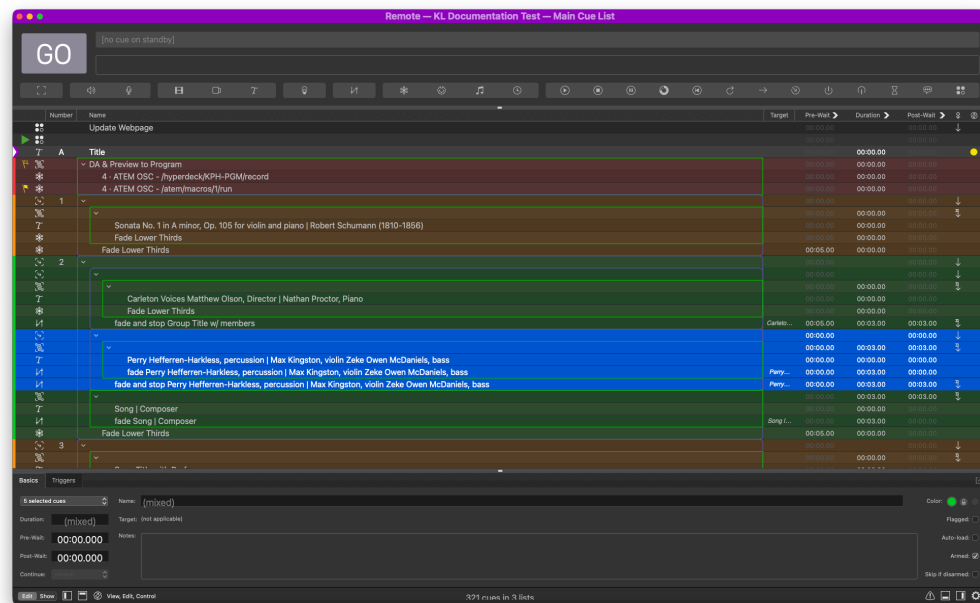
- Group Members

The second text cue is where we fill in the group members or the soloists. For a large ensemble like choir, it is usually infeasible to list all members. In this case, we only highlight the soloists.



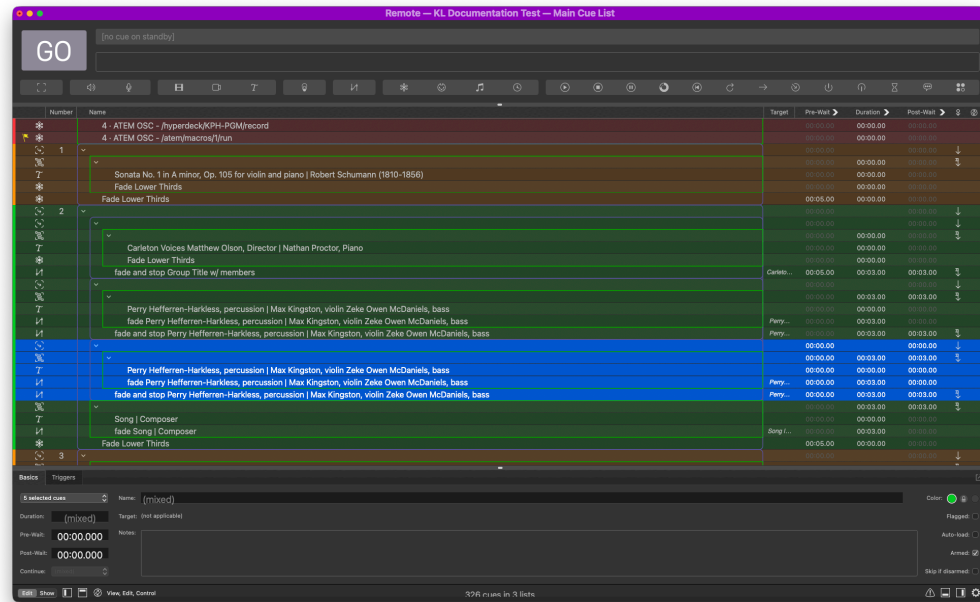
Group Members

- There are a few scenarios where you don't need this second group of cues.
 - If there are no soloists, you can delete the second group cue.
 - If there are too many people in the ensemble to list completely, my advice is to not list anyone at all; in this case, you can also delete the second group cue.
 - If there are very few soloists (1-4 artists) that you think you can fit under the first text cue, go ahead and do that and delete the second group cue.



Delete Group Members Cue

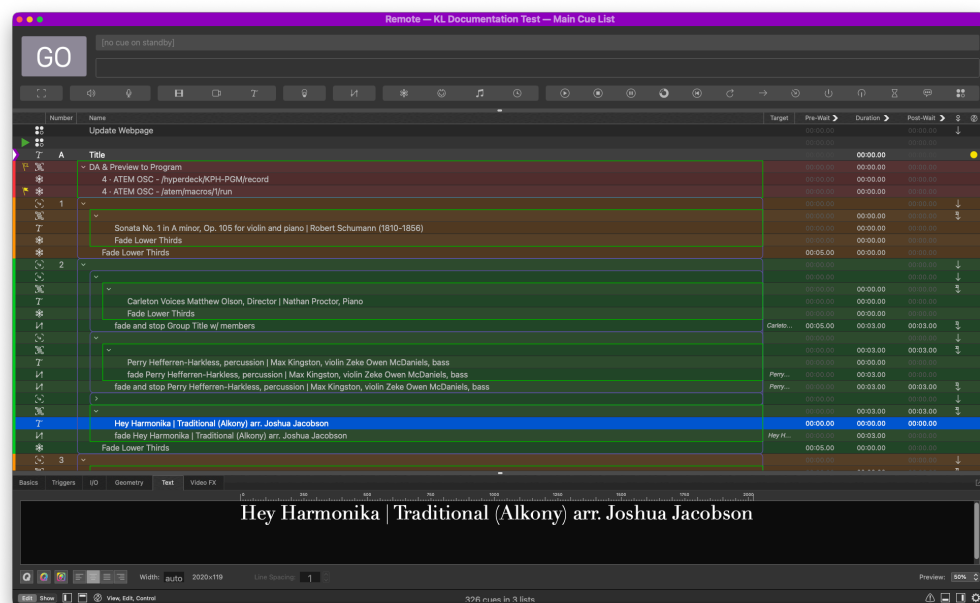
- If you're feeling adventurous, you **can** list all members in an ensemble. Here's how you do it.
 - Select all cues in the second group like above, and copy with **command+c**.
 - Go to the top of this group and paste with **command+v**. The reason you want to paste at the top of the cue is because otherwise the pasted group will be *nested* inside the original group.



Duplicate Group Members Cue

- The first piece

The last group of this cue simply presents the first piece that the group performs. Note that the text cue is identical to that under **Cue 1**. Follow the instructions above to fill in the details.



Group First Piece

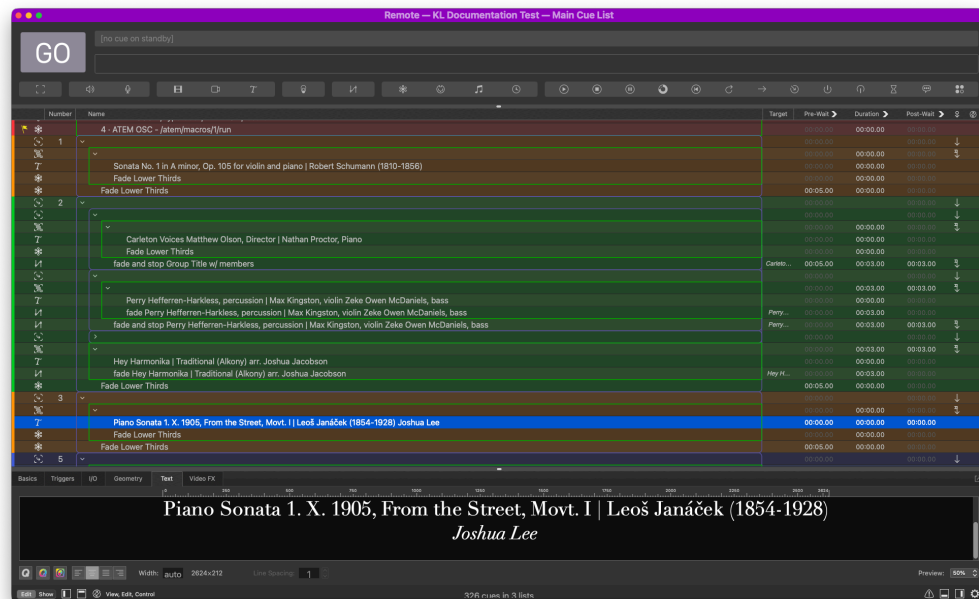
To play, you go to the top of **Cue 2** and hit **space** for go. You would use **Cue 1** to present the remaining pieces of this group that don't need to highlight new soloists. Just to illustrate, in that same program above, **Carleton Choir** performs three pieces. The first piece has a group of soloists, the second piece has no soloists (or the same group of soloists), and the third has a different group of soloists. You should use **Cue 2** for the first piece, **Cue 1** for the second piece, and **Cue 3** for the third piece, which we will introduce next.

Your browser does not support the video tag.

3. When there is a small group performing.

As we said, when there's only a small group performing, we use **Cue 3** as a template. This is common for chamber and studio recitals, where typically there's only 1-3 students performing one or two pieces. Take a look at this following program.

Joshua Lee is performing one piece. In particular, through Googling, only the first movement. We abbreviate it like the following.



Solo Piece

Note: You will note that the composer of this piece contains special characters. To input accents on Mac, hold **option** and type the letter associated with that accent, listed in the following image. For more information, check [this Apple help article](#).



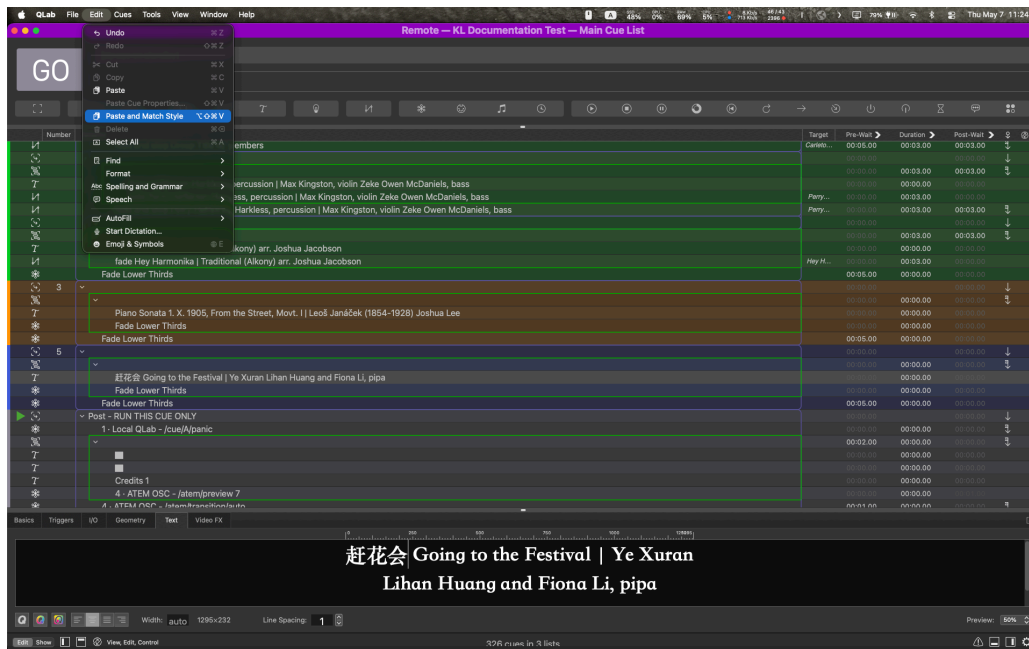
Accents on Mac

Play the lower thirds by putting **Cue 3** into standby and hit **space** for go.

Your browser does not support the video tag.

4. Chinese Music Ensemble.

You might encounter non-Western music here at Carleton, and they often contain foreign language characters. If you know how to input them, go ahead. The Kracum QLab Mac has Simplified Chinese (Pinyin) installed; you can switch input by pressing **fn**. Otherwise, my advice is to get the program PDF, **copy** the characters, and **paste** into the template. Contact [Alexi Carlson](#) if you have trouble accessing the program.



Chinese Music Ensemble

Note: You can **Paste and Match Style**, under the edit menu. The default keyboard shortcut is **command+option+shift+v**. You can define whatever keyboard shortcut you'd like; the Kracum Mac has it set to **command+shift+v** to match the common shortcuts. To learn how to do that, check [this Apple help article](#).

Play the lower thirds by putting **Cue 5** into standby and hit **space** for go.

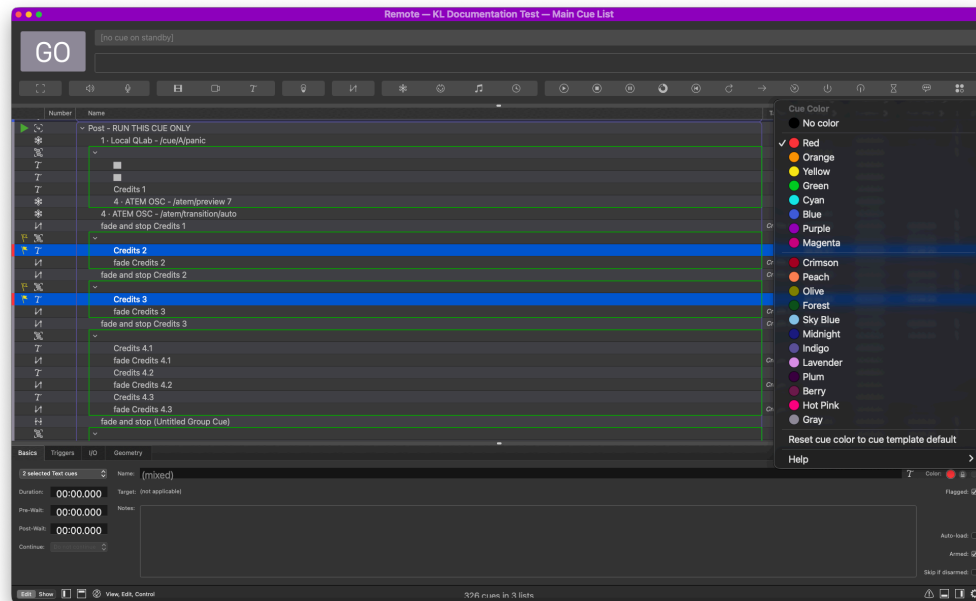
Your browser does not support the video tag.

Post-show Credits

Now that we've given credits to the performers, we want to give credits to ourselves 🙄. Not every event will have a program, but every event will have a **Event Info Sheet**, like the following.

Here, you will find information about the schedule, the staff assigned, recording/streaming needs, and strike notes if applicable. (You find out whether the show is being streamed here.) We want to fill out the personnel's working any particular show (though there are separate text cues acknowledging all students on the

roster and all staff members that have helped with the production.) You will note that this last group cue contains an unusually large amount of cues. This is because a large portion of the switching/fading has been automated to reduce repetitive workloads and to ensure consistency. The only cues you will need to edit are **Text Cues**, which are coded in **red**.

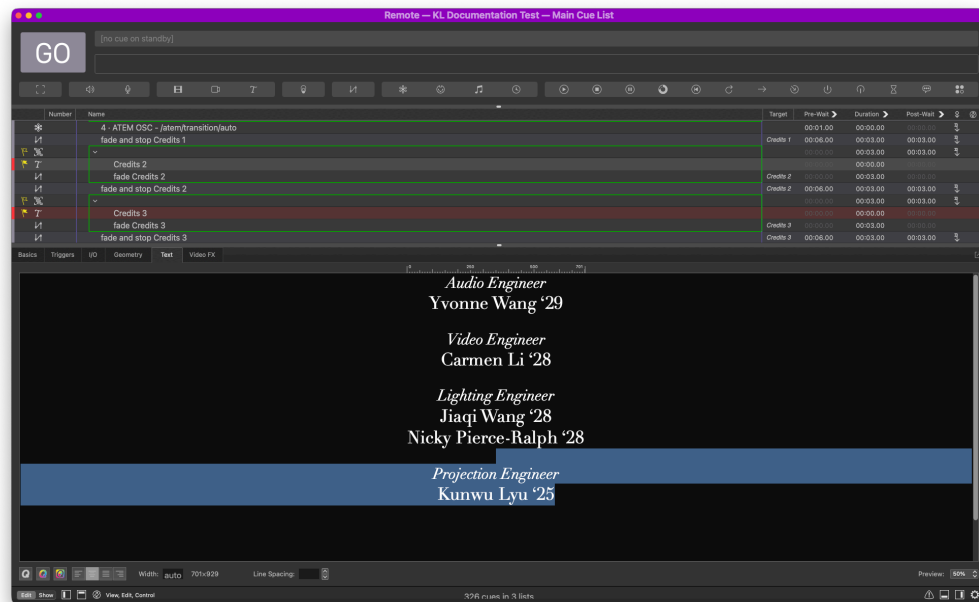


Post Show Credits

Credits 2 contains all the tech people. If there are no projectionists, simply delete the entry.

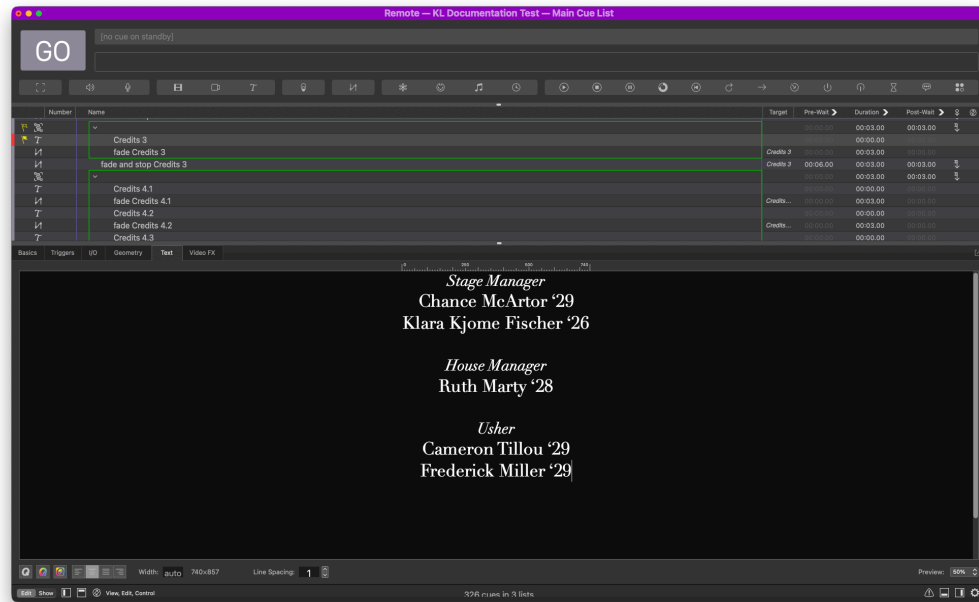
Abbreviation	Position
Proj	Projection
A1, A2, A3, etc.	Audio
LBO	Light Board Operator
Video	Video
SM	Stage Manager
HM	House Manager
Stage	Stage Hand

Abbreviation	Position
U	Usher
Door	Door Access (Obsolete)



Tech Credits

Credits 3 contains the rest of the crew, including stage managers and house managers. If there's not a position, i.e., Door Access, put them under **Usher**.



House Credits

To play the post show credits, simply go to the top of this group (named **Post – RUN THIS CUE ONLY**), and hit **space** for go. The scripts will take care of everything.

Your browser does not support the video tag.

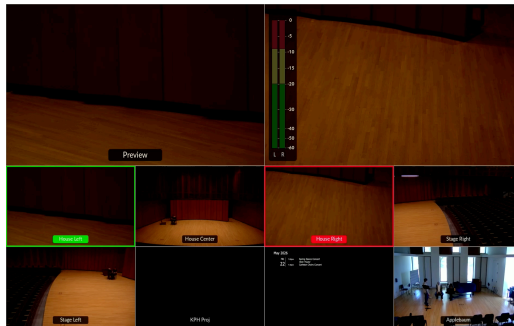
ATEM Software Control

Summary: Select [1] - [8] to bring inputs to preview. Hit [space] for cuts, and use [return] for dissolves.

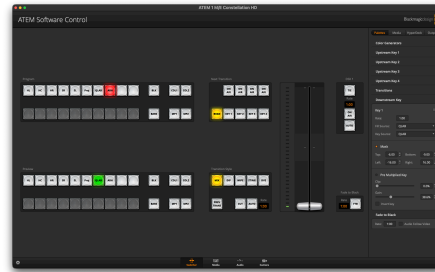
Switching Basics

We use [ATEM Software Control](#) to control the Blackmagic switchers in our spaces. We'll use the main switcher, [ATEM 1 M/E Constellation HD](#), as our example.

When you sit down at the broadcast booth, you will likely see the multiview on the monitor, and the ATEM software on the ATEM laptop.



ATEM Multiview



ATEM Software

Inputs

On the multiview, you will see a selection of **Inputs**, along with **Preview** and **Program**. Think of program as the end result, i.e., what shows up on the recording/livestream, and preview as the “scene” before program. We are using 8 out of 10 inputs on the switcher. They’re:

Input 1	Input 2	Input 3	Input 4	Input 5	Input 6	Input 7	Input 8
House Left	House Center	House Right	Stage Right	Stage Left	Projector	QLab	Applebaum

Input 1-5 corresponds to the 5 PTZ cameras in Kracum, and Input 8 corresponds to the PTZ camera in Applebaum. Input 7 mirrors the Kracum projector output, if applicable, and Input 7 is the graphics output from QLab.

Transitions

To control the switcher:

- Press any key from **1** through **8** to bring up a particular input to **Preview**. This allows you to make any adjustments to the image before you sends it to program.
- Press **space** to **cut Preview** to **Program**; this immediately switches **Preview** and **Program**.

Your browser does not support the video tag.

- Press **return** to **dissolve Preview** to **Program**; this fades between **Preview** and **Program** at the rate specified below. The default rate is 1 second.

Your browser does not support the video tag.

Your browser does not support the video tag.

⚠ Important: While dissolving, if you select any other input to preview, the program will eventually **dissolve to the last selected preview**. For instance, if you had input 2 on preview and input 3 on program, and while dissolving, you selected input 4 to preview, the program will be input 4 as opposed to input 2 after transition. This might happen when there's a quick transition. Just keep in mind to only select previews **after** the transition is complete.

Switcher Parameters

Outputs

Output 1	Output 2	Output 3	Output 4	Output 5	Output 6
Crestron DA	Hyperdeck Record	Preview	Output 4	Output 5	Output 6

The switcher has 6 routable outputs. We're using at least 3.

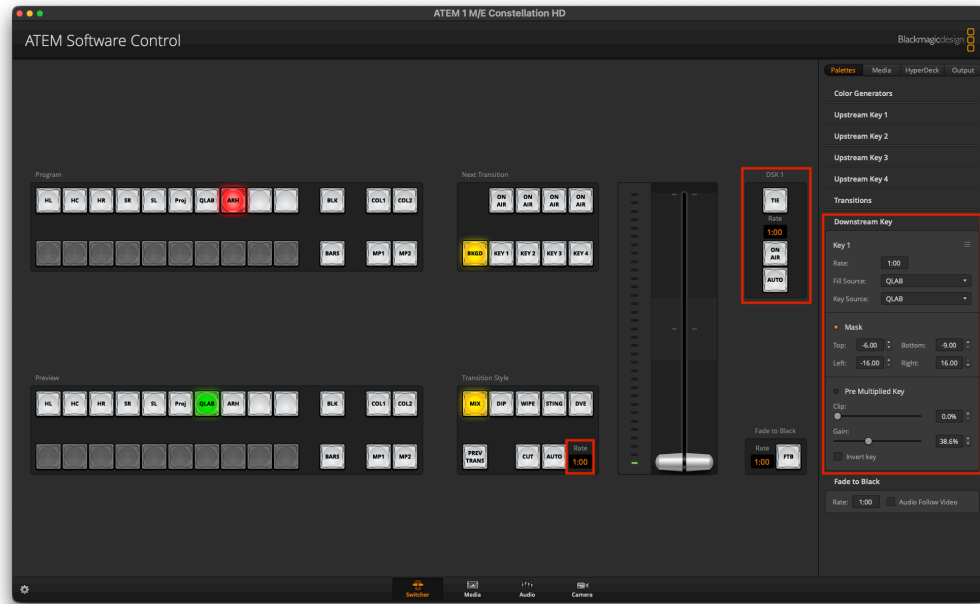
- Output 1 goes to a **Creston** encoder that distributes broadcast video to the Lobby, Backstage, and Greenroom monitors.
 - During rehearsals, this is set to **QLab**, which only displays the **Title** of the event, so the video engineers can set camera presets.
 - About 30 to 15 minutes before show starts, this is set to **Program**, so the monitors can follow whatever the recording gets.
 - After the show ends, this will be automatically set to **QLab** again, displaying the calendar program for upcoming events.
- Output 2 goes to our **Hyperdeck Recorder**. This will always be set to **Program**.
- Output 3 goes to a confidence monitor in the broadcast booth. This will follow whatever output 1 gets, so the technicians have an idea of what the audience is seeing.

The rest of the outputs are defaulted to program. We sometimes use it for extra recording, a dedicated streaming feed into our **Pearl Nano** streamer, etc.

Keys

▲ Important: Make sure you have the **Downstream Key** set to the following parameters.

- * You may adjust the **Clip** and the **Gain** to your liking, but these just affect the transparency of the lower thirds.
- * The **Rate** for **DSK 1** controls the amount of time it takes to fade in/out the key; I recommend leaving this at 1 second.
- * The **Rate** under **Transition style** controls the fade time for **Dissolve**.

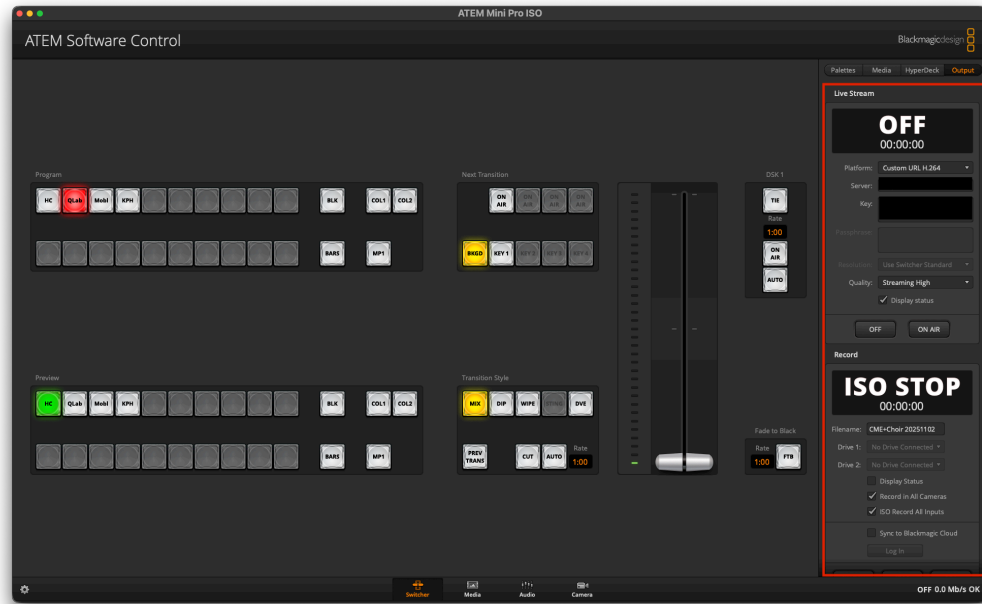


Downstream Key Parameters.

If you somehow messed up the parameters, check the **Document** folder for backup. Otherwise, download a copy [here](#).

Recording and Streaming

This part only applies to the ATEM Mini in Applebaum. You can ISO recording all inputs and outputs to an external drive through the USB-C port at the back of the ATEM. The **Record** button will show up on the right under output once the drive is plugged in. You may also stream to Carleton's IBM RTMP server. Refer to the **Stream Keys** document for details about the server and the key. We don't recommend streaming via any Blackmagic devices, because of [this](#) issue here. Instead, see [this section \(page 0\)](#) on how to set up recording and streaming.

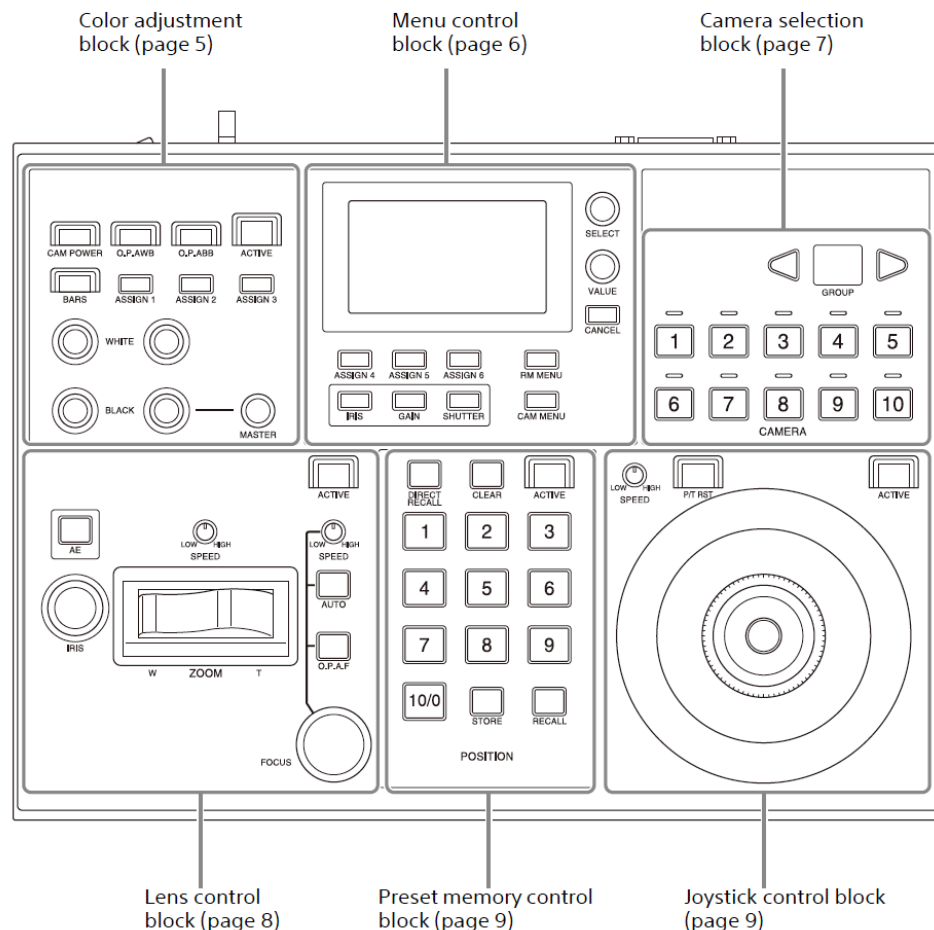


ATEM Mini Record and Stream.

Sony PTZ Control

Summary: You can insert notes, tips, warnings, and important alerts in your content. These notes make use of Bootstrap styling and are available through data references such as `site.data.alerts.note`.

We use Sony's [RM-IP500](#) to control the 6 [Sony PTZ Cameras](#) we have in our space.



Sony PTZ Control

⚠ Important: Note that the camera selection in PTZ control is **separate** from the input selection in ATEM. To control a camera that's been put on Preview, you have to **first select the correct Input on the ATEM computer AND select the correct Camera on the PTZ control**. PTZ control and ATEM are

separated.

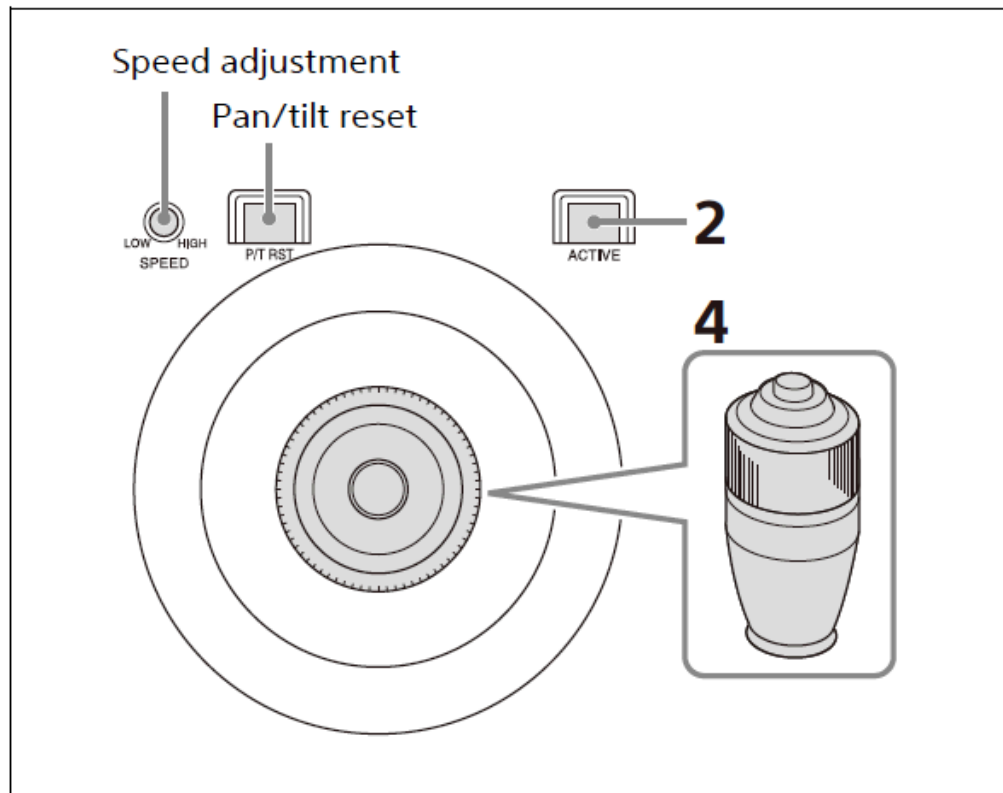
Selecting a camera

You can select the camera you want to control using the **Camera Selection Block**. Camera 1-5 corresponds to Input 1-5 on the ATEM, and Camera 6 is the Applebaum camera (Input 8). If the network is set up correctly, the **buttons** for camera 1-6 should light in **blue**. Press the number of the CAMERA button to select. The selected button will light in **yellow**.

Operating a camera

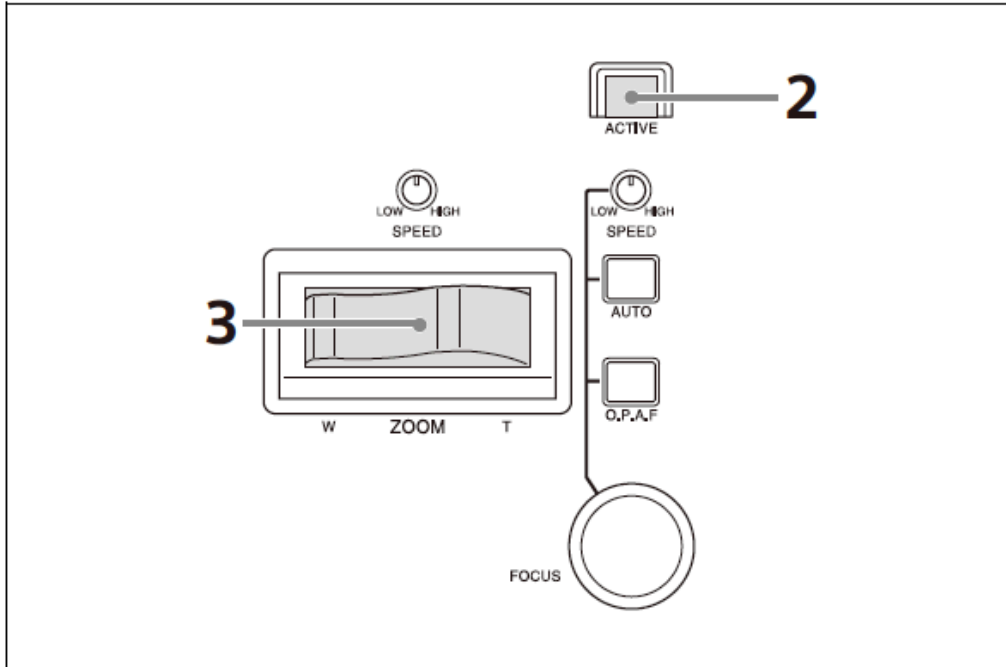
Pan and tilt control

1. Select the target camera to control.
2. Make sure the ACTIVE button is lit on the joystick control block.
3. Adjust the PAN-TILT SPEED. Turning the PAN-TILT SPEED knob clockwise increases the speed, and turning counterclockwise decreases the speed.
4. Incline to the right/left to pan camera to the right/left. Push the joystick down to move the camera down, and pull the joystick up to move the camera up.

*Pan-Tilt Control*

Zoom control

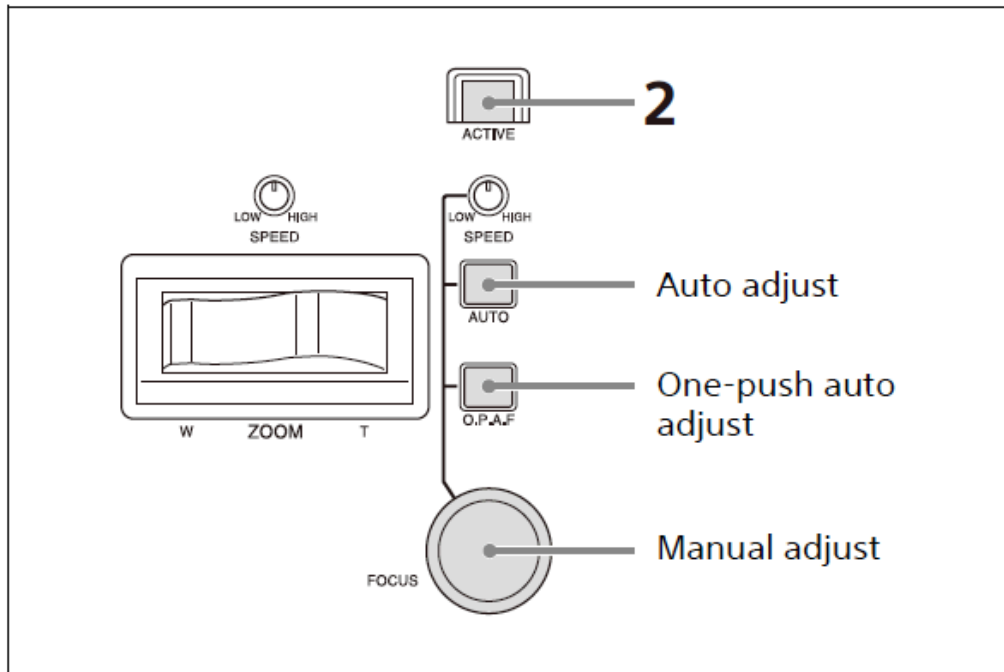
1. Select the target camera to control.
2. Make sure the ACTIVE button is lit on the lens control block.
3. Move the ZOOM lever left/right to make the subject appear smaller/larger.
4. Adjust the ZOOM SPEED as needed. Turning the ZOOM SPEED knob clockwise increases the zoom speed, and turning counterclockwise decreases the zoom speed.



Zoom Control

Adjusting the focus

1. Select the target camera to control.
2. Make sure the ACTIVE button is lit on the lens control block.
3. Leave the mode on AUTO FOCUS, making sure the button is lit yellow.

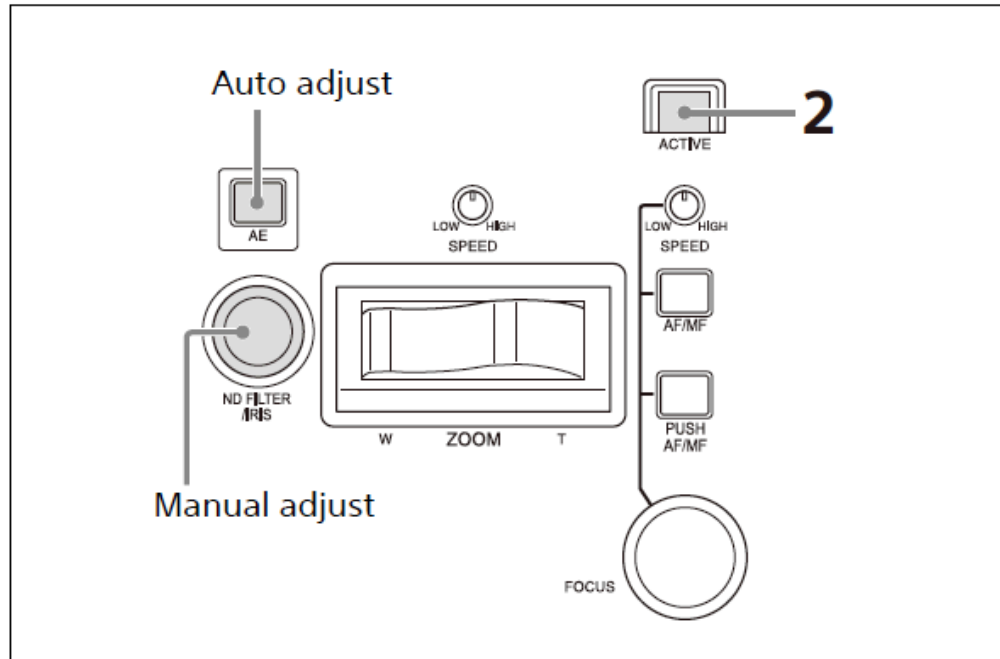


Focus Control

Adjusting the brightness

We don't recommend the auto-exposure (AE) function. It simply looks bad.

1. Make sure the AE button is off (button is not lit).
2. Turn the IRIS knob counterclockwise until the iris is all the way up (F=1.6, lower is better).
3. Press the GAIN button in the menu control block to highlight the corresponding value on the camera image and turn the VALUE knob to adjust the value.

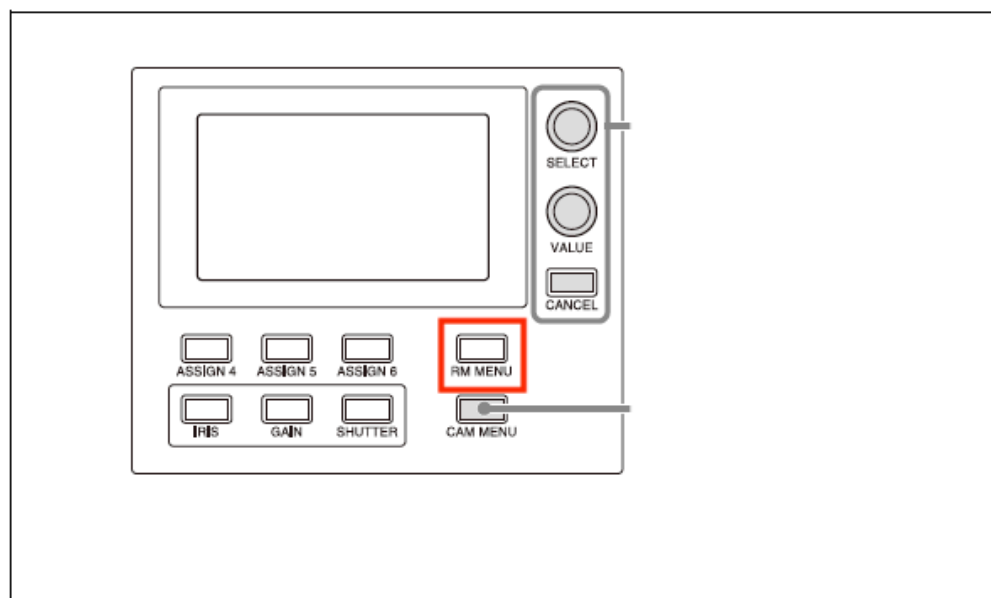


Brightness Control

By opening up the iris to its max setting, we're letting as much light into the camera as possible. This reduces the level of noise in our video.

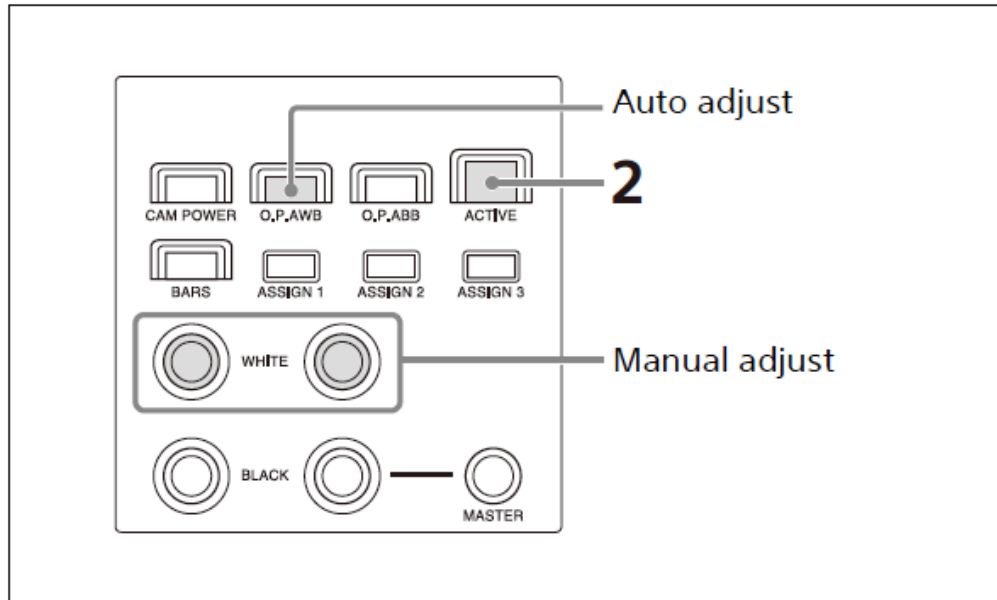
Adjusting the white balance

We don't recommend the auto-adjust white balance function. It simply looks bad.



RM Menu

1. Select the target camera to control.
2. Go to **RM MENU > OPERATION > WHITE**. Set **WB MODE** to **MANUAL**.
3. Adjust the white balance using the **R-WHITE** knob and the **B-WHITE** knob.



White Balance Control

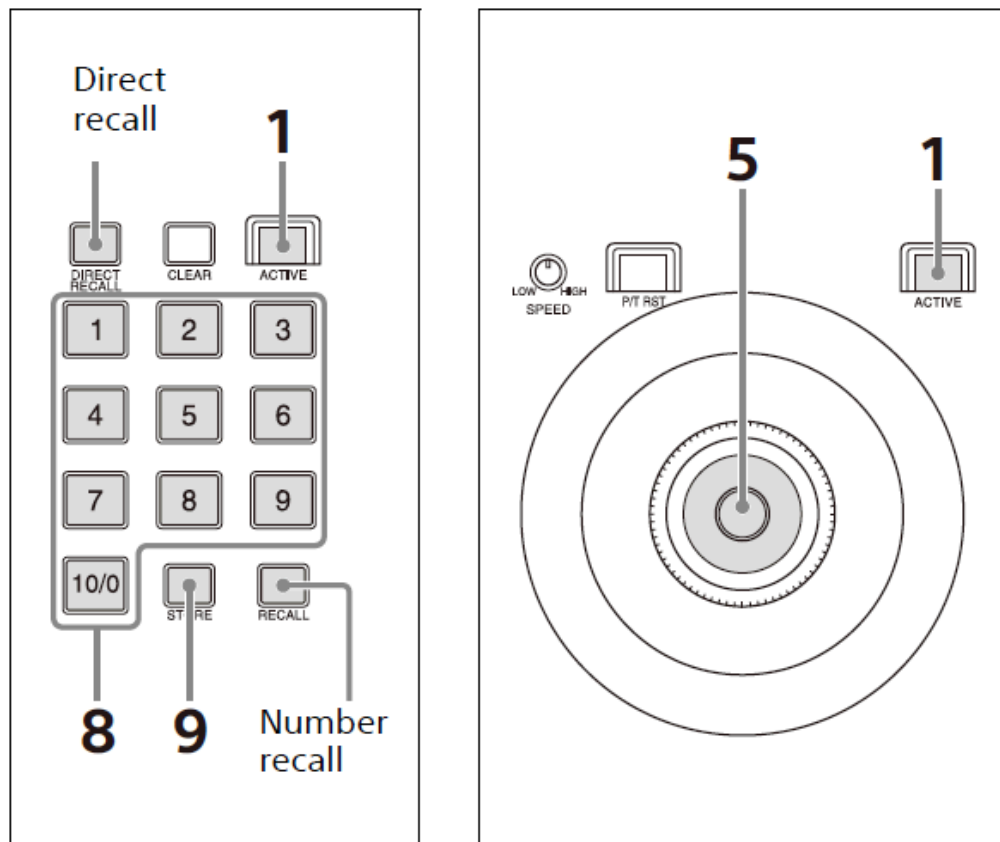
We find that you achieve best results when **R.WHITE = +60** and **B.WHITE = +70**.

Storing the Camera Presets

All camera parameters we just mentioned can be stored as presets to recall during the show.

1. Make sure the ACTIVE button is on (button is lit) on the joystick control block and preset memory control block.
2. Select the camera whose status you want to store.
3. Operate the joystick to pan/tilt the orientation of the camera.
4. Perform zoom, focus, backlight compensation, flicker compensation, and white/black balance adjustments, as required.

5. Check that the DIRECT RECALL button is off.
6. Enter the preset number you want to store. Use the PRESET 10/0 button to enter a “0” digit. You can store up to 100 presets per camera.
7. Press and hold the STORE button. The preset number at the bottom right of the LCD panel is displayed highlighted, and storing is completed when the display disappears.



Storing Presets

Recalling presets

There are two methods for recalling stored status: direct recall and number recall.

- Direct recall
 1. Make sure the DIRECT RECALL button is on (button is lit yellow).
 2. Press the PRESET 1 to PRESET 10/0 buttons to recall preset numbers 1 to 10. **Only preset numbers 1 to 10 can be recalled using direct recall.**

We recommend this because it saves you a lot of time during the show. For this reason, we suggest you limit and store your presets to 1-10.

- Number recall
1. Make sure the DIRECT RECALL button is off (button is NOT lit yellow).
 2. Enter the preset number using the PRESET 1 to PRESET 10/0 buttons, in the same way as when storing a preset.
 3. Press the RECALL button. Preset numbers 1 to 100 can be recalled using number recall.

Broadcast Audio

Summary: Bring faders to unity and adjust the analog gain. Keep levels between -20dB to -10dB.

We use the [Yamaha QL1](#) as our broadcast audio mixer.



QL 1

Patching

The QL1 receives (and can transmit) audio signal via [Dante](#), as it is with all audio devices in our space. By default, it has the following patches:

Inputs

Input 1	Input 2	Input 3	Input 4	Input 5	Input 6	Input 7	Input 8
CL 5L	CL 5R	DPA L	DPA R	KM 184 L	KM 184 R	Choir L	Choir R

Inputs 1-8 are inputs for Kracum.

- Inputs 1-2 are coming from a stereo mix from the [CL 5](#) at Front of House (FoH).
- Inputs 3-4 are the omnidirectional mics hanging close to the stage.
- Inputs 5-6 are room mics hanging from the balcony.
- Inputs 7-8 are room mics placed upstage, behind the towers.

Input 9	Input 10	Input 11	Input 12	Input 13	Input 14	Input 15	Input 16
ARH L	ARH R	DM3 L	DM3 R	ARH Pdm	ARH Aux	ARH HDMI	ARH HDMI

Inputs 9-16 are inputs for Applebaum, though they can be used for other purposes.

- Inputs 1-2 are the room mics in Applebaum.
- Inputs 3-4 are the stereo mix coming from the [DM 3](#) from the FoH in Applebaum.
- Input 5 is the Applebaum podium mic.
- Input 6 is the 3.5 mm Aux connection from the Applebaum podium.
- Inputs 7-8 are the HDMI audio going to the Applebaum projector.

Outputs

- All inputs send to the **STEREO** bus, which goes to our ATEM switcher and feeds our recorder.
- The **MONITOR** outputs to a pair of stereo speakers (Mackie MR5 MK 2) in the broadcast booth; it receives the stereo feeds from the **STEREO** bus.
- In addition, **MATRIX 1** and **MATRIX 2** are the stereo feed going into our streamer. This feed is heavily compressed; we will talk about this in a [later section \(page 42\)](#).



QL MTRX 1 & 2



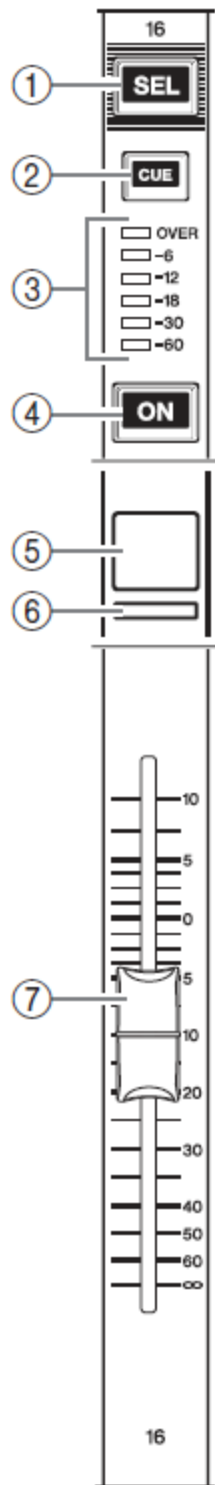
MTRX Inserts

If you have more questions about the broadcast audio topology, contact [Matthew Zimmerman](#).

Adjusting the Analog Gain

You want to set the levels before you start any recording. This is done during rehearsals.

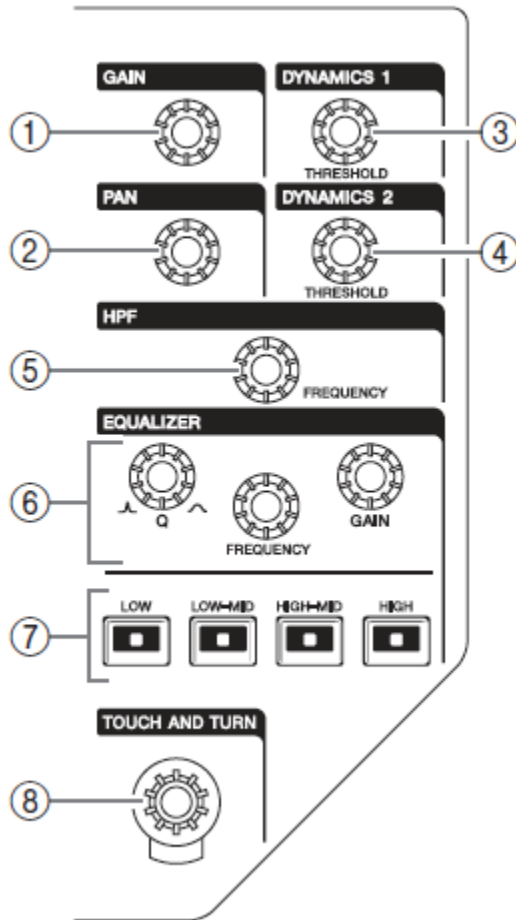
- Press the **SEL** key for the channel that you want to adjust in the Channel Strip section.



QL Channel Strip

- Click the **GAIN** knob once to bring up the gain menu. While checking the

sound level through the meters, adjust the channel **GAIN** knob of the Selected Channel section. Click Analog Gain, and use the **TOUCH AND TURN** knob to bring up/down the gain.



Selected Channel Knobs

- Adjust the gain level for other channels in the same way, by pressing their **SEL** keys, and then rotating the **GAIN** knobs.

Sending an input channel signal to the STEREO bus



Selected Channel Display

1. Press the **SEL** key of the input channel you want to control.
2. Press one of the knobs in the Selected Channel section, to return to the SELECTED CHANNEL VIEW screen.
3. In the **TO ST PAN/BALANCE** field, make sure the **ST** button is on (lights in pink).
4. In the top panel, press the **ON** key of the corresponding input channel to turn it on.
5. In the Master section, turn on the **ON** key of the **STEREO** channel, and raise the STEREO channel fader to 0dB.
6. Raise the fader of the currently selected input channel to an appropriate volume. Ideally, the stereo levels should be in the -10dB to -20dB range. Turn down the gain if the mic starts clipping, i.e., meter level is **OVER**.

- Turn on the **ON** key of the **MONITOR** channel, and raise the MONITOR fader to an appropriate volume.

Check [here \(page 0\)](#) if sound isn't working.

Monitor and Cue functions

The Monitor function lets you monitor various outputs through your nearfield monitors. By default, the monitor source is the STEREO channel. You can adjust this to your needs. Above the meters, click **MONITOR**.



QL Monitors

The Cue function enables you to check an individual channel or DCA group by temporarily monitoring it via MONITOR OUT. You can press the **CUE** key for any channel/group to turn cue on. This console has CUE set to **post fader**, so you'll hear all the processing/panning that goes into the STEREO feed. You can change

this in the **CUE** window. Note that **PFL** means pre-fader and **AFL** means post-fader. When something is being cued, the meter field will indicate the output level of the cue out.



QL Cues

Dynamics

There are different ways to adjust the dynamics parameters.

On channel

Broadcast Video

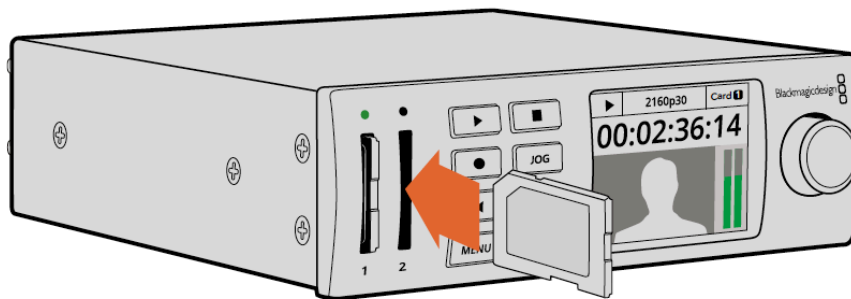
Summary: Complete graphics. Set camera/audio levels. Bring Title graphics to program. Start recording/streaming.

Recording and Streaming

We use an [Blackmagic Hyperdeck Studio Mini](#) as our recorder. It takes SDI input from **output 2** of the Constellation switcher, which is always set to **Program**.

You should format an SD Card via its front LCD-based menu settings. To plug in an SD card:

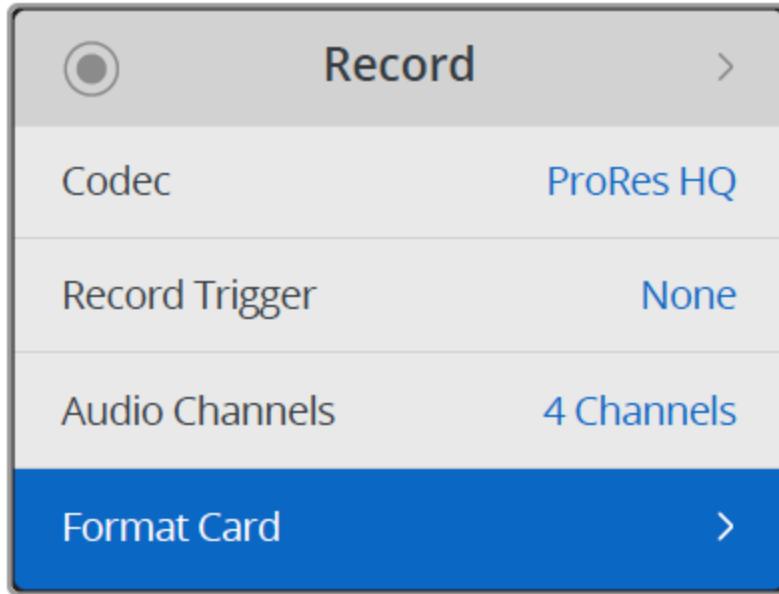
1. Hold the SD card with the gold connectors facing your HyperDeck's LCD and align it with the media slot. Now gently push the card into the slot until you feel it lock firmly into place.
2. Your HyperDeck will verify the SD card. This is shown by an illuminated green indicator above the SD card slot. When the indicator turns off and the stop button on the control panel is illuminated, your HyperDeck is ready to record.



Gently push the SD card into the slot until you feel it click into place

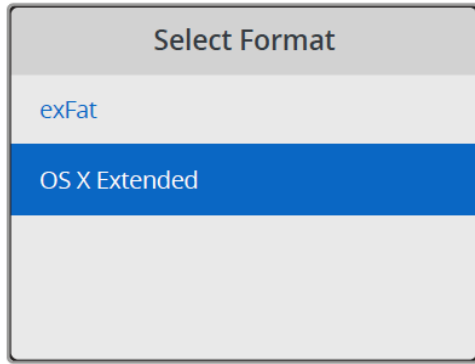
Formatting SD cards

Media used by HyperDeck must be formatted as either HFS+ or exFAT. HFS+ is also known as Mac OS Extended and is the recommended format for HyperDeck as it supports journaling. Data on a journaled disk is more quickly recovered in the rare event it becomes corrupted, and less likely to be corrupted in the first place. HFS+ is natively supported by Mac OS. To format using your HyperDeck:

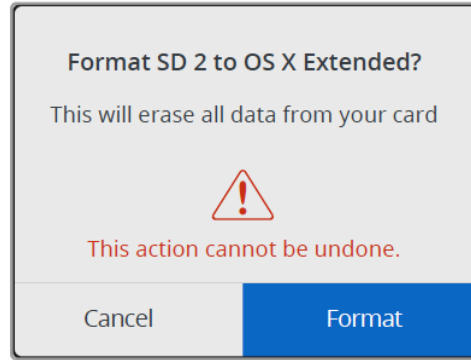


the *format card* setting is in the *record* menu.

1. Insert the media you want to format into either of the SD card or SSD slots.
2. Press the “menu” button on your HyperDeck’s control panel.
3. On HyperDeck Studio Mini, turn the jog/shuttle wheel and use the set button to enter the “record” menu on the LCD and select format card.
4. Select the SD card or SSD you want to format on the LCD using the jog/shuttle wheel. Remember to press the ‘set’ button to confirm your selection.
5. Now set your desired format from the ‘HFS+’ or ‘exFAT’ options.
6. A warning message will appear on the LCD asking you to confirm the format. Make sure you have backed up any important data before you confirm as this action cannot be undone. Confirm the format by selecting ‘format’ for SD cards using the jog/shuttle wheel and pressing the ‘set’ button.



*On HyperDeck Studio Mini, HFS+ is labeled **OS X Extended***



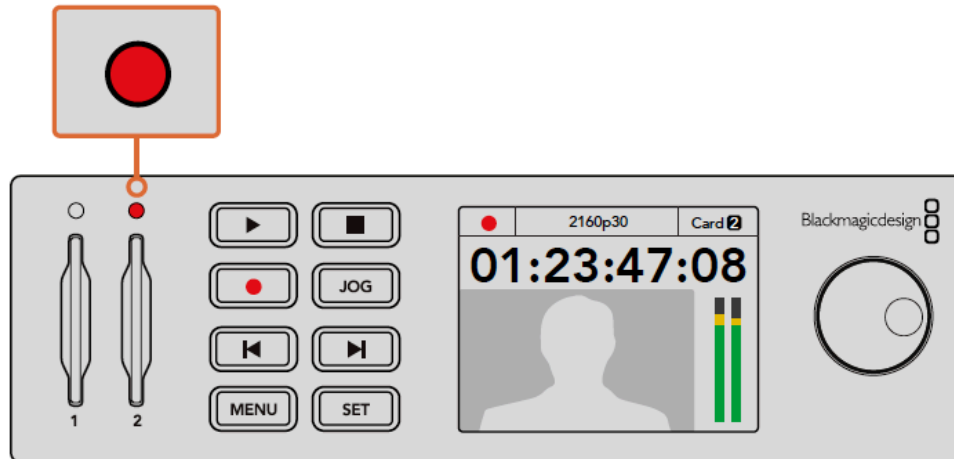
Confirm the format by using the jog/shuttle wheel and pressing the set button

A progress bar will show you the formatting progress. When your HyperDeck has finished formatting, 'formatting complete' will display on the LCD. Press the 'set' button again to return to the menu.

Recording Video

To record video:

1. Insert your formatted SD card into either of the SD card slots. The indicator above the slot will illuminate green as your HyperDeck reads the card. When the indicator turns off, HyperDeck Studio Mini is ready to record.
2. HyperDeck Studio Mini automatically detects when SDI video is connected and displays the image on the control panel LCD. If you want to change the codec, you can choose from a variety of codecs using the control panel LCD menu or the Blackmagic HyperDeck Setup utility software. We use **H.264 Low**, which records at 22 Mbps, or about **9.9 GB per hour** of recording.
3. Press the 'record' button and the indicator above the slot will illuminate red. As your HyperDeck is recording, the slot indicator on the control panel LCD will alternate between displaying the active slot, and record time remaining on the card.
4. Press the 'stop' button to finish recording.



The indicator above the SD card slot illuminates red when recording video

Streaming

We use an [Epiphan Pearl Nano](https://go.carleton.edu/carletonlive) to stream to Carleton's IBM server at <https://go.carleton.edu/carletonlive>.



Pearl Nano front panel

To start/stop streaming:

- Press the **Streaming control key (6)**. The button glows blue when the device is streaming. Flashing means that user action is required and streaming has either stopped or won't start. Color is white when the system is powered on and not streaming.

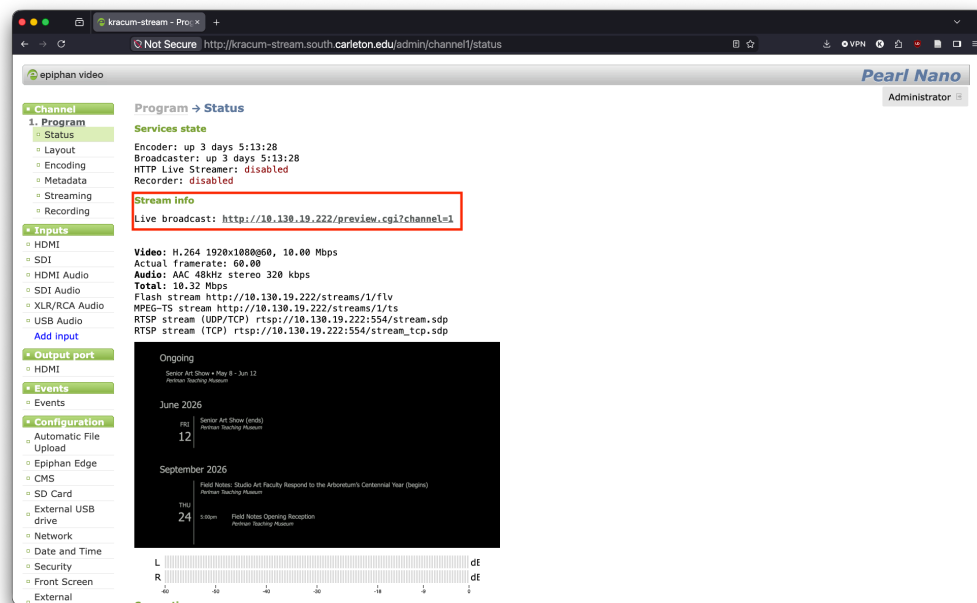
The Nano can also record to its internal SD/SSD. To start/stop recording:

- Press the **Recording control key (5)**. The button glows red when the device is recording. Flashing means that user action is required and recording has either stopped or won't start. Color is white when the system is powered on and not recording.

Configuring the Nano

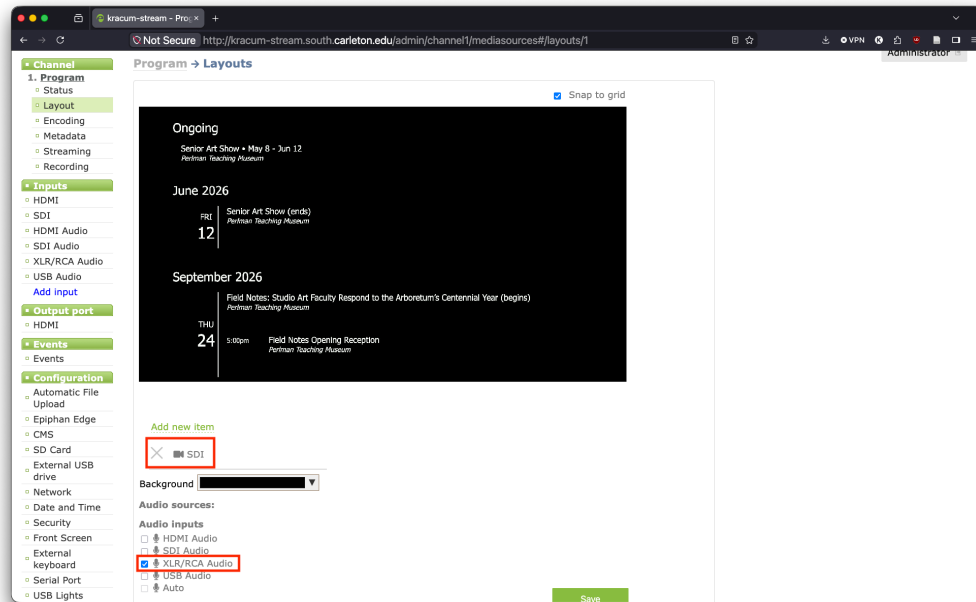
The Nano has an HTML interface where you can configure its settings. Open a browser, and go to <http://kracum-stream.south.carleton.edu/>. You can configure various settings here once you log in. I note a few features here.

- You can preview the livestream/recording at [URL below](http://10.130.19.222/preview.cgi?channel=1). You'll need to log in.



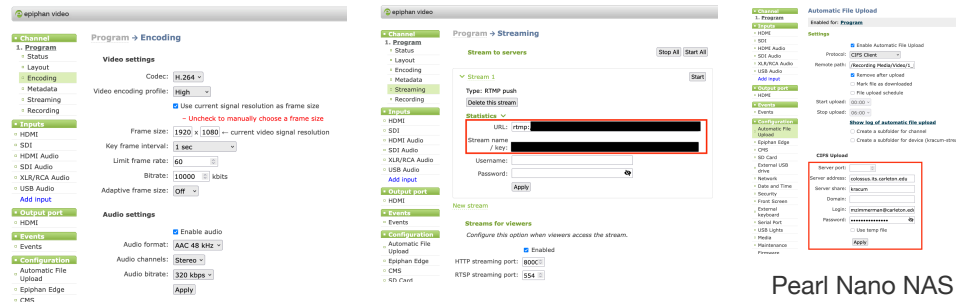
Pearl Nano Status

- Layout is where you choose where the inputs are coming from. The video is coming from the SDI loop out of the Hyperdeck (**Output 2** of ATEM, always set to **Program**). The audio takes the dedicated livestream feed from the QL1 (**MTRX 1 and 2**); this comes out of the XLR omni ports from the QL to the Nano. If you don't want to use livestream audio (and want clean audio instead), this is where you'll need to select **SDI audio** and deselect **XLR/RCA audio**.



Pearl Nano Layout

- You can change the [encoder settings](#), enter the [RTMP server information](#), and the [automatic file upload location](#) in the following locations.



Pearl Nano Encoder Settings

Pearl Nano Stream Settings

Pearl Nano NAS connection

Preshow checklist

By this point, you should be able to start a show. Typically, this is what a tech shift will look like. (Your exact responsibilities will depend on the shift you're assigned to.)

Arrival

You're typically scheduled to arrive **1-2 hours before** the event. Performers typically arrive 15-30 minutes after you arrive.

1. Video: You should use the time before artists arrive to start building the QLab graphics. At the very least, you should be able to complete the **Title** page.
2. After completing the title page, you should run the cue with **space**. This brings it onto **Input 7** of the ATEM.
3. **Set Output 1 (Crestron DA) to QLab.** (You can also achieve this via **Macro 2** in ATEM.)

Rehearsals

Rehearsals start **1-1.5 hours before** the event. Performers may run pieces according to the program, but they may not.

1. Video: LBOs should bring the stage to their actual lighting cues during the show. You can use this opportunity to adjust the camera exposure and save any presets if needed.
2. Use this rehearsal time to finish any lower-thirds and credits.
3. Adjust the audio levels during run-throughs.

Preshow

1. **30 minutes before** the event, you should finish all prep work, including any graphics, presets, and audio levels.
2. When done, press **space** to bring up the **Title** cue in QLab, and bring the QLab input (**Input 7**) to **Program**, and set **Output 1 (Crestron DA) to Program**. (You can also achieve this via **Macro 1** in ATEM.)
3. We typically start and end transitions with a wide shot; you can use **House Center** for this. Once you've done that, wait until the house opens, and bring **Input 2** to **Program**.
4. Once you've brought **Input 2** to **Program**, you can **escape** to **panic** the QLab title cue. This is to prevent the **Title** cue to overlap with any following Lower Thirds cues.
5. **15 minutes before** the event, format an SD card and start the stream, if applicable. You can greet the audience in the [livestream chat](#), if you want. You should use one of the Carleton computers, so you're logged in as **Carleton College**.
6. **5 minutes before** the event, start the recording.
 - You may use the following cue to start recording and streaming at the same time.

DA & Preview to Program	00:00.00	00:00.00	00:00.00
4 · ATEM OSC - /hyperdeck/KPH-PGM/record	00:00.00	00:00.00	00:00.00
4 · ATEM OSC - /atem/macros/1/run	00:00.00	00:00.00	00:00.00
Start Nano Recording	00:00.00	00:00.00	00:00.00
Start Nano Streaming	00:00.00	00:00.00	00:00.00

Start Recording and Streaming

- When you don't need to stream, make sure you **disarm** the streaming cue by unchecking the **Armed** box of the **Start Nano Streaming** Cue. This disables this particular cue from running.

The screenshot shows the KPH software interface. The top section displays a list of cues. The 'Start Nano Streaming' cue is highlighted with a blue background and a red border. Below this, the 'Basics' tab is selected, showing the details for the 'Start Nano Streaming' cue. The 'Armed' checkbox is checked, indicating the cue is active.

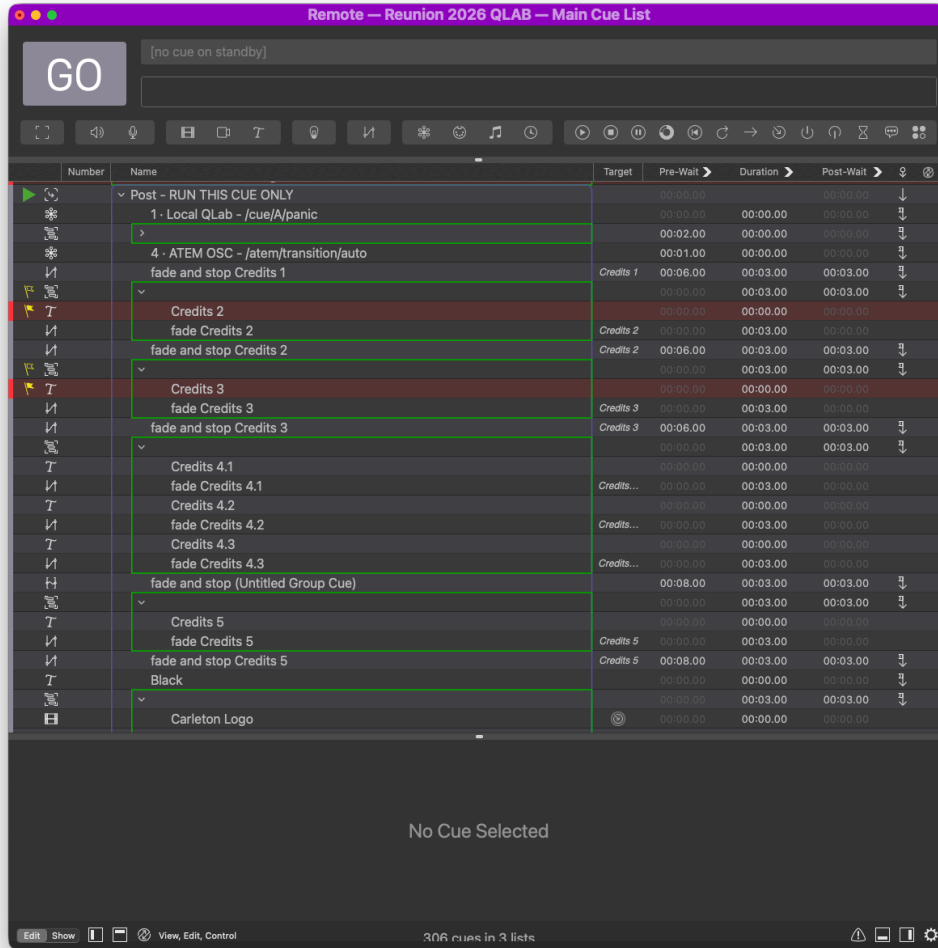
Disarm Streaming

During the show

- Press space to advance the lower thirds cues. Select / use **up** or **down** arrows to choose different cues in case order changes.

Postshow

- Fire the post-show sequence



Post-show sequence

1. The postshow sequence in QLab will automatically stop the Hyperdeck recording. The Pearl Nano recording needs to be stopped manually.
2. When the indicator light on the Hyperdeck stops being red, this means the deck has finished writing to the disk. Do not take out the SD card until **AFTER** the disk has finished writing.
3. The Pearl Nano will automatically transfer its recording to our NAS.
4. Manually transfer the Hyperdeck recording to the Mac Studio in the recording booth (M102A). Give the file a legible name consistent with our naming convention, and store it under the **Pre-Edited Media** folder in the **KPH Team Drive**.
5. Shut down and leave.
 - Alternatively, you may use **Hyperduck** to transfer recording from the

Hyperdeck to the NAS. See [here \(page 103\)](#) on how to do it.

QLab

Summary: something to do later

Workspace

Before we begin, we highlight some things below in the workspace to pay attention to.



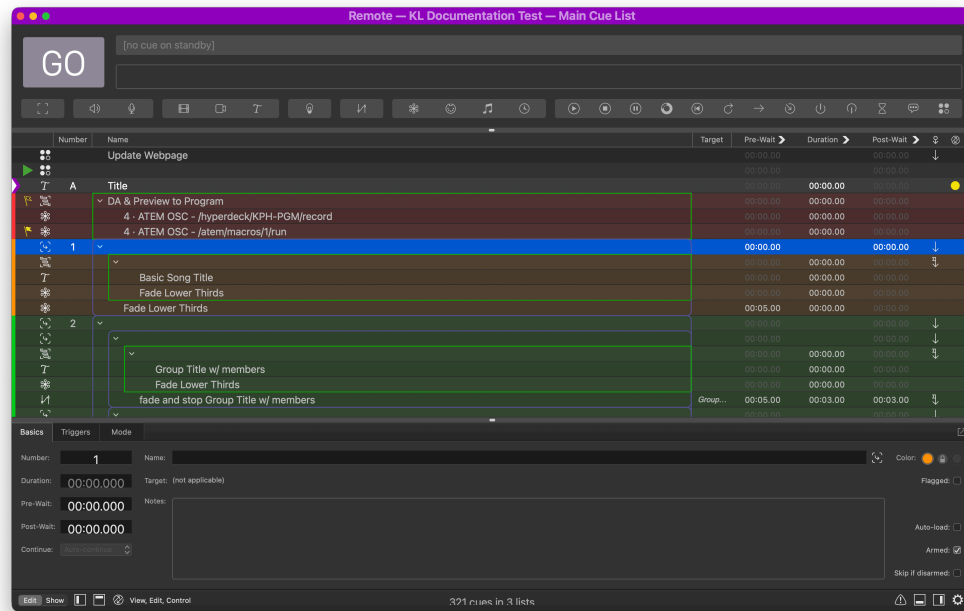
Some workspace elements. Image credit: <https://qlab.app/docs/v5/fundamentals/workspace/>.

General	Cue types	Cue list elements	Inspector elements
1: The GO Button	4: Group cue	30: Playhead	41: Selected cue number

General	Cue types	Cue list elements	Inspector elements
2: The Standby display	5: Audio cue	31: Cue type icon	42: Selected cue duration
3: The Notes field	7: Video cue	32: Cue number	43: Selected cue pre-wait
29: Cue	9: Text cue	33: Cue name	44: Selected cue post-wait
40: Inspector tabs	11: Fade cue	34: Target	45: Selected cue continue mode
66: Workspace settings	12: Network cue	35: Pre-wait	46: Selected cue name
	28: Script cue	36: Duration	47: Selected cue target
		37: Post-wait	48: Selected cue notes
		38: Continue mode	50: Selected cue color
		39: Status icon	51: Selected cue second color
			54: Reveal target
			57: Selected cue armed

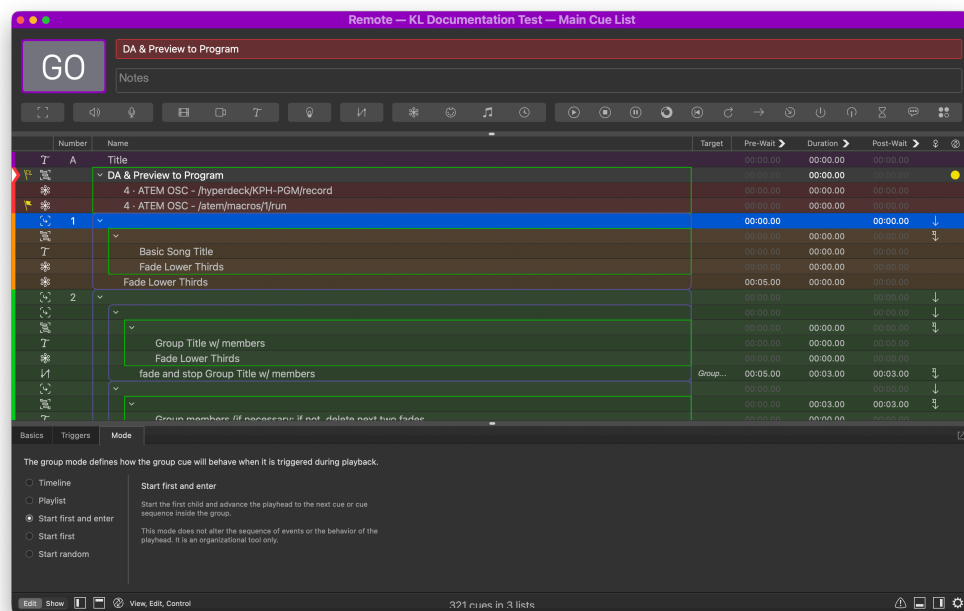
Cue Types

Take a look at **Cue 1**. Note that this is a **group cue**. Think of a group cue as a *folder* that can contain other cues (including group cues), and group cues can have different modes that determine the playback behavior.



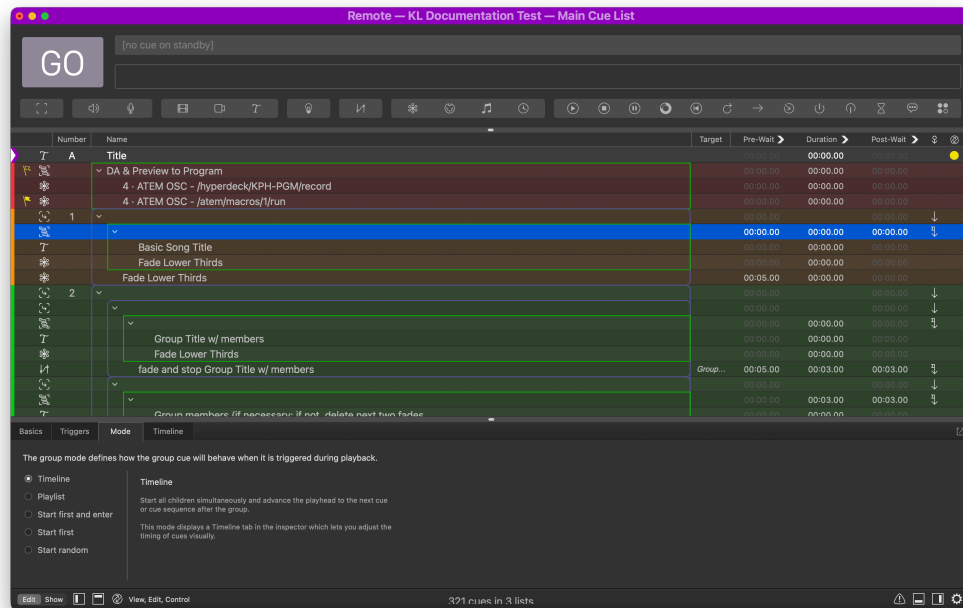
Basic Title with no Performers

For instance, **Cue 1** contains a total of 5 cues, including itself. This cue was created for organizational purposes, since it doesn't affect the playback behavior. (That is, playback will behave the same as if one plays the first cue inside the group.) It is indicated by a purple border around the cues that it contains. I use group cues to indicate the *scope* of a group of lower thirds.



Start first and enter mode

The next cue after **Cue 1** is also a group cue. This time, it is in **Timeline** mode; all children of this cue will begin playback simultaneously. Note that one can achieve the same result by setting everything to **Auto Continue**. Doing it this way with a group cue gives me a clear indication of the scope of all cues being played back.



Timeline mode

ATEM 1 M/E Broadcast Panel

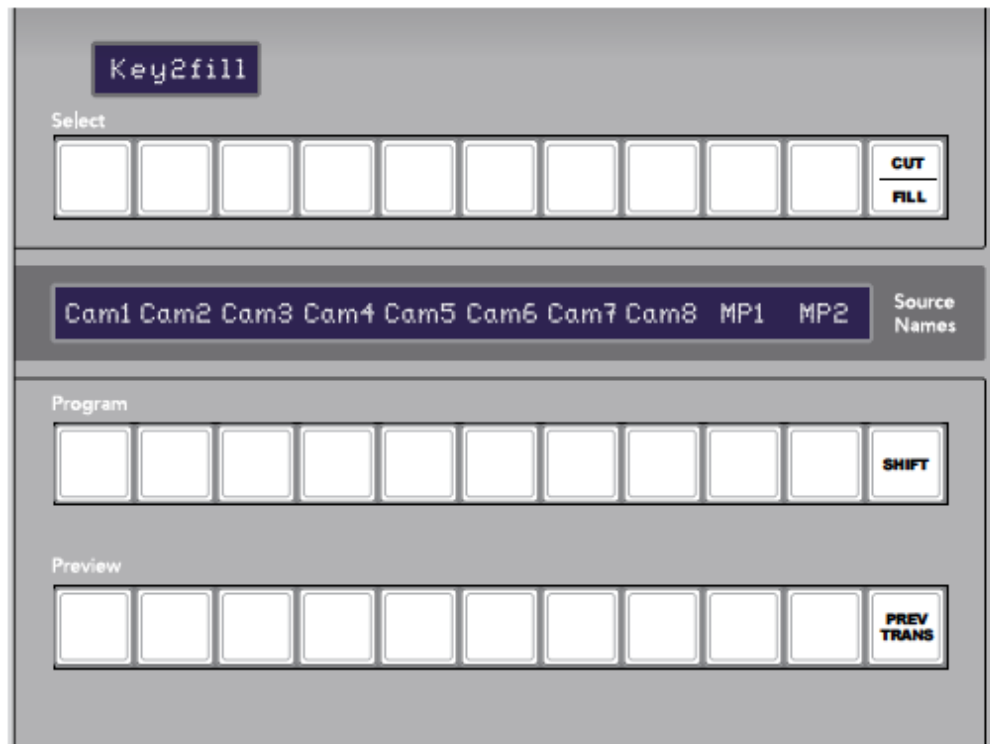
Summary: You can control ATEM switchers through software or dedicated control panels.

We use an [ATEM 1 M/E Constellation HD](#) as our main video switcher in Kracum. Applebaum has an [ATEM Mini Pro ISO](#) as a secondary video switcher. Both switchers (and other Blackmagic products) can be controlled with [ATEM Software Control](#). The only difference is that the ATEM Mini allows for ISO recording of all video/audio sources and streaming, whereas the Constellation is just a (very powerful) switcher.

In addition to software, we use the [ATEM 1 M/E Broadcast Panel](#) to control the ATEM switchers. This is a fairly new addition to our ATEM family. The keyboard has similar functions to the software panel, and the main buttons are laid out in a similar M/E style, so it's easy to move between the hardware and software interfaces.

Layout

The program bus, preview bus and source names display are used together to switch sources on the program and preview outputs.



ATEM Mix Effects

The source names display uses a *4 character label* to represent the switcher's external inputs or internal sources.

- Labels for the 8 external inputs can be edited on the settings tab of the software control panel.
- Labels for the internal sources are fixed and don't need to be changed.
- **Pressing the **SHIFT** button** will change the source names display to show extra sources.
- **Pressing the **SHIFT** and **CUT/FILL** buttons simultaneously** will change the source names display to show protected sources, available for routing to auxiliary outputs. Protected sources are **program**, **preview**, **clean feed 1** and **clean feed 2**.

In particular, **MP1** (labeled) **Logo** displays the Carleton Logo.



ATEM Media Player 1

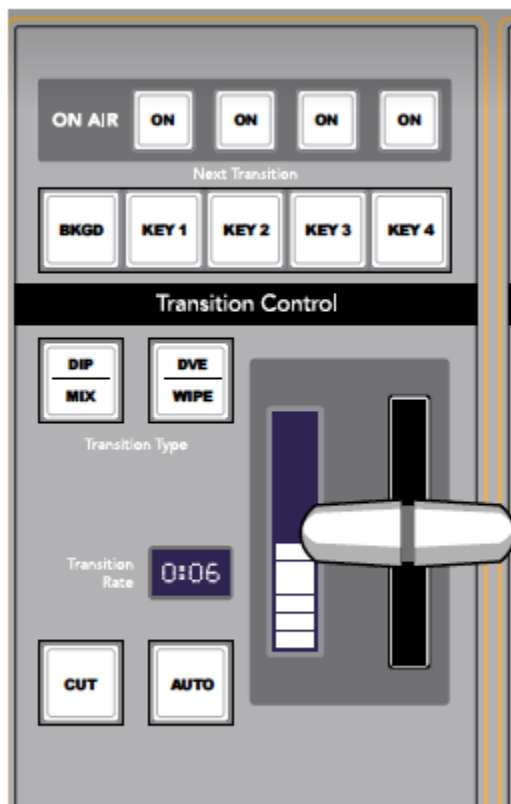
Program

The program bus is used to **hot switch background sources to the program output**. The source currently on air is indicated by a button that is illuminated **red**.

Preview

The preview bus is used to select a source on the preview output. This source is sent to program **when the next transition occurs**. The selected source is indicated by a button that is illuminated green.

Transitions



ATEM Transitions and Upstream Keys

Cut

The CUT button performs an **immediate transition** of the Program and Preview outputs, regardless of the selected transition type.

AUTO and Transition Rate

The AUTO button will **perform the selected transition (fade)** at the rate specified in the transition rate window.

The AUTO button illuminates **red** for the duration of the transition and the transition rate display updates to indicate the number of frames remaining as the transition progresses.

Fader Bar and Fader Bar Indicator

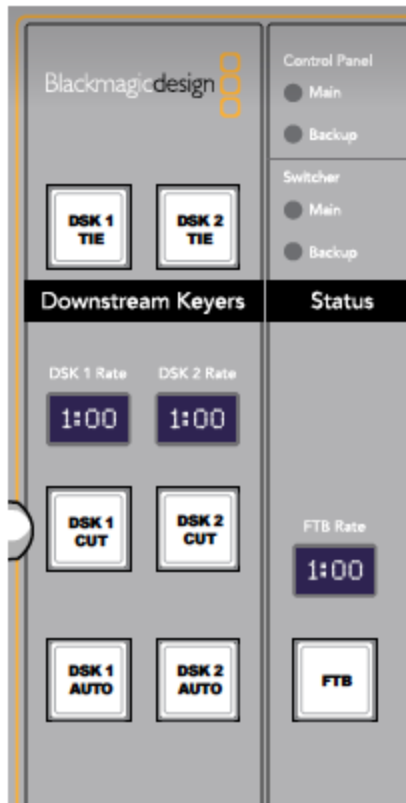
The fader bar is used as an alternative to the AUTO button and allows the operator to **manually control the transition**. The fader bar Indicator next to the fader bar provides visual feedback on the progress of the transition.

Next Transition

The **BKGD** , **KEY 1** , **KEY 2** , **KEY 3** , **KEY 4** buttons are used to select the elements which will transition on air or off air with the next transition.

- The default is **BKGD** (**Preview**)
- Pressing **Key 1** puts the **Projector** input source to the bottom left of **Preview** .
- Pressing **ON** above **Key 1** puts the **Projector** input source to the bottom left of **Program** .

Downstream Keys



ATEM Downstream Keys and Fade to Black

DSK TIE

The DSK TIE button will **enable the DSK on the preview output**, along with the next transition effects, and tie it to the main transition control so that the DSK can be taken to air with the next transition.

We don't typically use this since QLab is doing the transitions for us.

DSK Cut

The DSK CUT button is used to **cut the DSK on or off air** and indicates whether the DSK is currently on or off air. The button is illuminated if the DSK is currently on air.

DSK AUTO

The DSK AUTO button will **mix the DSK on or off air at the rate specified** in the DSK rate window.

This is what QLab triggers during the lower-thirds cues.

Fade to Black

The **FTB** button will **fade the program output to black at the rate specified** in the FTB rate window.

Once the program output has been faded to black, the FTB button will remain illuminated red until it is pressed again, fading the program output up from black at the same rate.

System Control

The twelve menu buttons, the display window, the four knobs and the four soft buttons under the knobs together are called the system control. The 4 line display is used to identify the operation of the soft buttons and knobs.

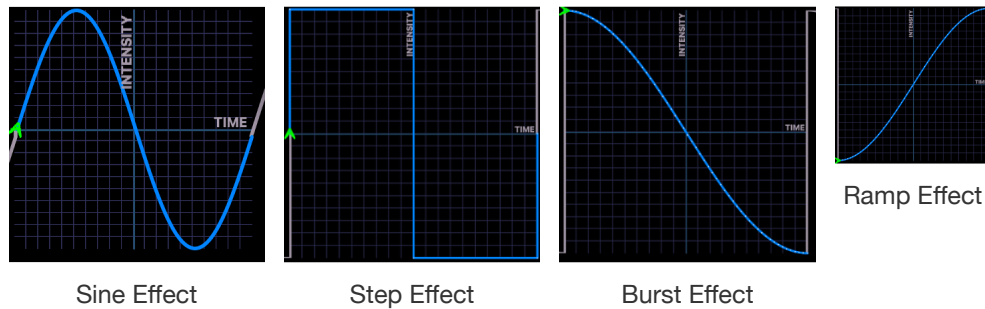
The system control is **context-sensitive** and allows you to adjust parameters for the current operation.

PTZ control with Joystick

In particular, when combined with the joystick, it allows you to perform basic Pan, Tilt, and Zoom functions (PTZ) to the Sony cameras.

To do this:

- Make sure you're in the home page of the menu.
- Press **PTZ > SDI** and select the camera you wish to operate, i.e., **CAM 1**. Cam number corresponds to the input number. For instance, **Cam 2** is **House Center**, and **Cam 8** is **Applebaum**.
- Use the joystick to pan, tilt, and zoom (with the zoom ring).



1. Sine effect: parameters **fades in**, and then **fades out**.
2. Step effect: parameters **snaps in**, and then **snaps out**.
3. Burst effect: parameters **snaps in**, and then **fades out**.
4. Ramp effect: parameters **fades in**, and then **snaps out**.

Tens and Hundreds correspond to CPs (211.1 = CP 21, 111.1 = CP 11)

	CSE	StopAllEffect	StopEffect		OFS MO	OFS RAND		Rep Upd	Fan	Fan MO	
Group 401 TOP	CP Dk Red 21	CP Dk Orange 22	CP Dk Yellow 23	CP Dk Green 24	CP Dk Teal 25	CP Dk Blue 26	CP Dk Purple 27	CP Dk Pink 28	CP Dk Amber 29	CP N/C 30	
	CP Lt Red 11	CP Lt Orange 12	CP Lt Yellow 13	CP Lt Green 14	CP Lt Teal 15	CP Lt Blue 16	CP Lt Purple 17	CP Lt Pink 18	CP Lt Amber 19	CP White 20	
Group 402 H-MID	211.1 111.1	221.1 121.1	231.1 131.1	241.1 141.1	251.1 151.1	261.1 161.1	271.1 171.1	281.1 181.1	291.1 191.1	301.1 201.1	
	112.1 122.1	122.1 132.1	132.1 142.1	142.1 152.1	152.1 162.1	162.1 172.1	172.1 182.1	182.1 192.1	192.1 202.1		
Group 403 L-MID	213.1 113.1	223.1 123.1	233.1 133.1	243.1 143.1	253.1 153.1	263.1 163.1	273.1 173.1	283.1 183.1	293.1 193.1	303.1 203.1	
	114.1 124.1	124.1 134.1	134.1 144.1	144.1 154.1	154.1 164.1	164.1 174.1	174.1 184.1	184.1 194.1	194.1 204.1		
Group 404 BOT	Sine	761	761.1	761.2	761.3	761.4	761.5	761.6	761.7	761.8	Fast 951 Rainbow 951.1
	Step	762	762.1	762.2	762.3	762.4	762.5	762.6	762.7	762.8	Flash 960 953 Abs Rbw 953.1
Group 405 WALL	Burst	763	763.1	763.2	763.3	763.4	763.5	763.6	763.7	763.8	Slow 952 Rainbow 952.1
	Ramp	764	764.1	764.2	764.3	764.4	764.5	764.6	764.7	764.8	Flicker 961 954 Abs Rbw 954.1

Decimals represent grouping (0 = spread, 1 = all)

Ones represent effect type (1 = sine, 2 = step)

Pop-up Magic Sheet

Numbering Convention

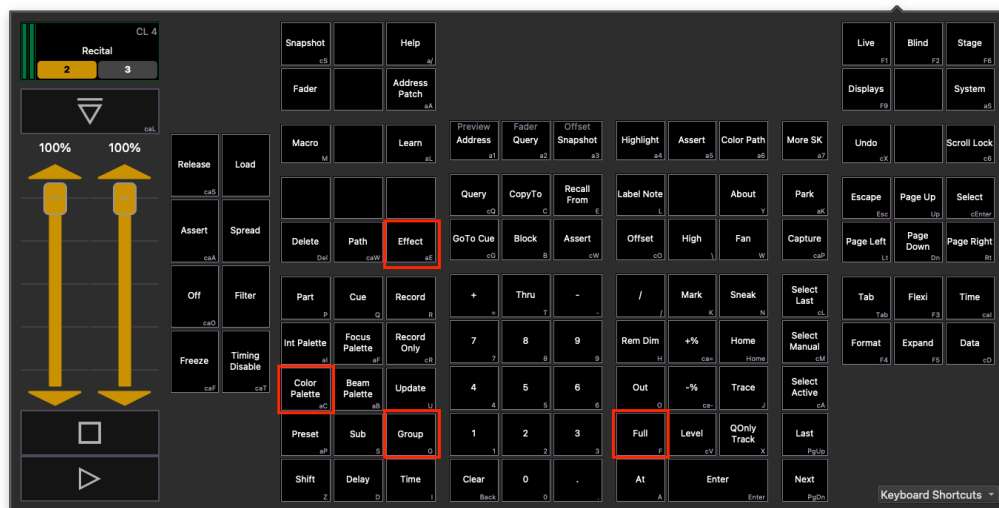
The parameters can be intensity or non-intensity parameters (such as color). Our effects pop-up magic sheet is organized such that

- The unit digit represents the **type** of basic effect: sine, step, burst, ramp.
- The hundreds and the tens represent the **color** of that effect, if applicable, i.e., the color will vary between the base color, and the color associated with that color palette.

- The decimals represent the **grouping** of that effect, i.e., whether the effect applies to all channels one after another (grouping of 0, or spread), all channels at once (grouping of 1), every other channel (grouping of 2), etc.

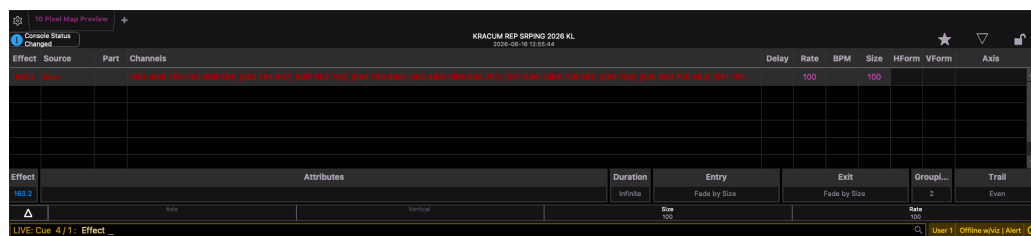
For intensity effects, I programmed grouping up to 8; for color effects, grouping is up to 4. For instance, if my wall is on **Color Palette 28** (Dark Pink), and I apply **Effect 163.2**, I would type:

- **[Group] [405] [Full] [Full]**
- **[Group] [405] {Color Palette} [28] [Enter]**
- **[Group] [405] [Effect] [163.2] [Enter]**



ML Control - Effects

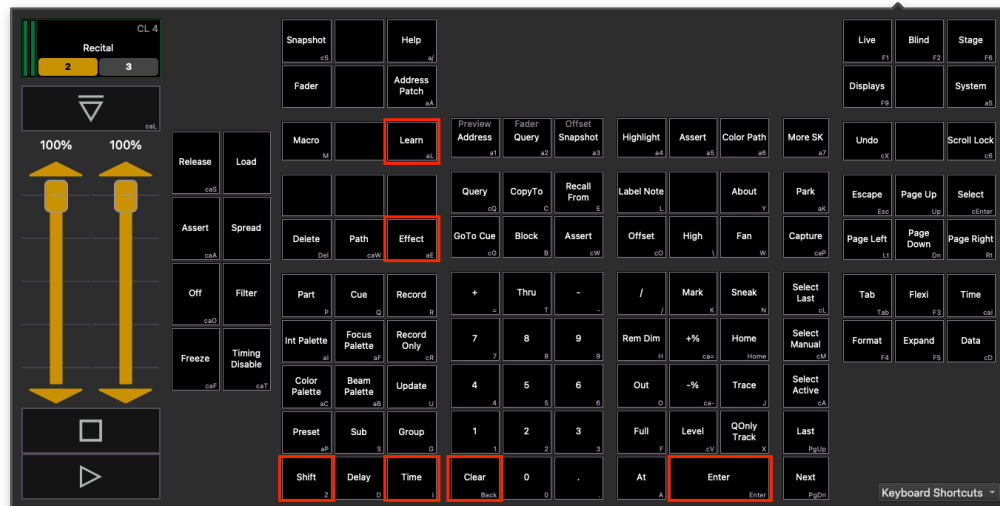
I would see a two color burst effect being applied as groups of 2: every other channel will snap into light blue from dark pink, and then fades back gradually into dark pink again. If you clear the command line with **[Shift] [Clear]**, and press **[Effect]**:



Effect Property

You can adjust the rate and the size, and the BPM, if you know it. If you don't know what the BPM is, you can learn it by selecting the effect you wish to adjust and press:

- **[Effect] [163.2] [Enter]**
- **[Learn] [Time]**



Learn BPM

You can now use the **[Enter]** key to tap to tempo. When done, press **[Learn]** again to finalize it. You can now save this into a cue.

Offset vs. Fan

Offset

{Offset} applies at the **channel level**. If you want to alter the order of the channel selection, you should use **{Offset}**.

By default, **[Group] [405]** has our wall selected from **left to right**. If you apply:

- **[Group] [405] [Effect] [761] [Enter]**

You will see a sine wave going from left to right. If you want the sine wave to **start from the center** instead, you would apply:

- **[Group] [405] {Offset} {Mirror Out} [Effect] [761] [Enter]**

Now the sine wave would start from the center instead. There are many other orderings. If you want the wall to **split between the left half and the right half**, you can use

- **[Group] [405] {Offset} {Num Groups} [2] [Effect] [761] [Enter]**

If you want the ordering to be random, you can use

- **[Group] [405] {Offset} {Random Channels} [Effect] [761] [Enter]**

Note that this ordering applies horizontally, since the original **[Group] [405]** is organized horizontally. If you want vertical orderings instead, you should use **[Group 406]**.

You can combine **{Offset}** with **{Color Palette}**s to make things more interesting. For instance,

- **[Group] [405] {Offset} {Random Channels} {Color Palette} [11] [+] [16] [+] [28] [Enter]**

will randomly place **Light Red**, **Light Blue**, and **Dark Pink** onto the wall. If you only select 2 color palettes, this will be equivalent to **fanning** between the two palettes, introduced below.

Fan

{Fan} applies at the *parameter level*. You can use **{Fan}** to have the wall fade between two colors:

- **[Group] [405] {Fan} {Color Palette} [11] [+] [16] [Enter]** will fade the wall from **Light Red** (left) to **Light Blue** (Right).
- **[Group] [405] {Fan} {Color Palette} {Mirror Out} [11] [+] [16] [Enter]** will fade the wall from **Light Red** (stage center) to **Light Blue** (house).

Discrete Timing

You can apply discrete timing at the channel or parameter level. You can combine discrete timing with Offset/Fan to make interesting things.

Time

Let's say you have two cues, **Cue 1** and **Cue 2**. **Cue 1** has the wall in **Dark Blue** and **Cue 2** has the wall in **Dark Red**. Instead of fading everything together, you want the wall to change color from left to right. In that case, while in **Cue 2**, you can do:

- **[Group] [405] [Time] [5] [Thru] [20] [Enter]**
- **[Update] [Cue Only] [Enter]**

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Now the first channel of that group (leftmost) will take 5 seconds to fade, while the last channel (rightmost) will take 20 seconds to fade. This creates the illusion that the color changes from left to right. Once you've updated the cue, you will see a small  on the top right of cue times to indicate that you've applied discrete timing. To get rid of discrete timing: press

- **[Group] [405] [Time] [Enter]**
- **[Update] [Cue Only] [Enter]**

Delay

Alternatively, you can use delay and offset to make things more dramatic. You can also specify you just want discrete timing on specific parameters such as intensity or color:

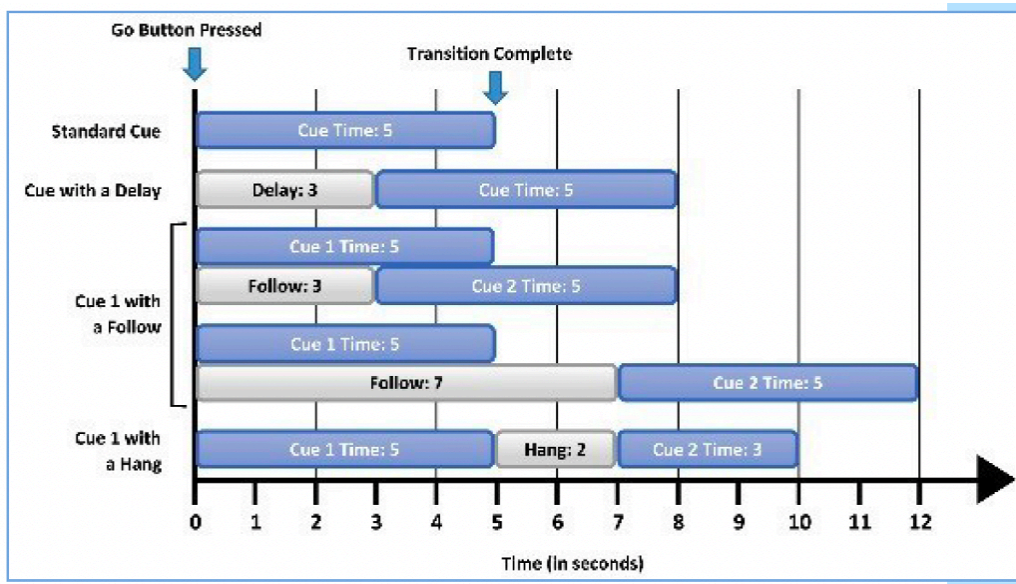
- **[Group] [405] {Offset} {Mirror Out} [Delay] [0] [Thru] [10] [Enter]**
- **[Update] [Cue Only] [Enter]**

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To get rid of discrete delays: press

- **[Group] [405] [Delay] [Enter]**
- **[Update] [Cue Only] [Enter]**

Delay vs Time



Cue Timing

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Using Discrete Time

Your browser does not support the video tag.

Using Discrete Delay

Macros

You might come across a time when you have to do repeated updates for multiple cues in the cue list, and there might be **auto-blocks** preventing you from **tracking** through (or that you just want to apply changes to some but not all cues afterwards). You can use **Macro**s to easily achieve this. Go to the first cue where you want to apply the changes:

- **[Learn] [456] [Enter]**
- **[Enter]** again to confirm you want to overwrite. Now apply the changes
- **[Group] [405] {Int Palette} [100] [Enter] ...**
- **[Update] [Cue Only] [Enter]**
- **[Learn]** to save.

Now use **[Shift] [GO]** to advance. Once you're in the cue you want the changes to apply, single-click **Macro 456** to apply the changes. Repeat this step for all cues you want to change.



Repeated Update Macro

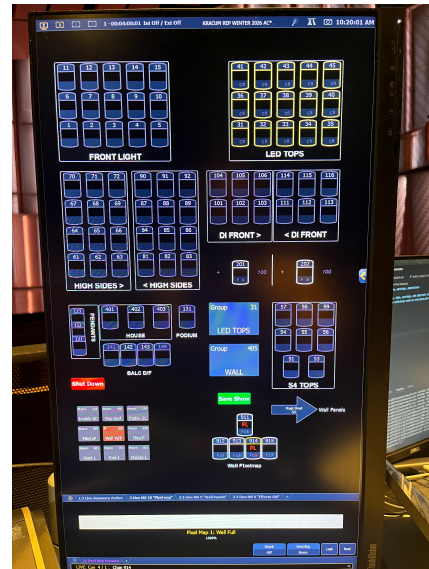
Pixel Mapping

There's a pixel map already configured for this hall. It represents a 1-1 map of the LED Wall Panels. To make our lives easier, you can use **Macro 2** to view and edit those channels. Your monitors will instead look like this.

- **[Macro] [2] [Enter]**



ION Screen 1



ION Screen 2

Virtual Channels

You will notice immediately five hidden channels: **[911] [Thru] [915]**. These are **virtual** channels corresponding to the **physical** channels of the wall. We use these virtual channels to create layouts of fixtures, known as pixel maps, which then applies media content (images, movies, text, and procedurally generated effects)

by way of virtual media layers to the pixel map. A pixel map is a layout of fixtures onto a grid, which determines order of playback and how the data will be interpreted and outputted to create the desired image or effect. A virtual media layer contains one piece of media content.



Magic Sheet Pixel Map Channels

911	* Virtual Server Ver 1.0
912	* Virtual Layer Ver 1.0
913	* Virtual Layer Ver 1.0
914	* Virtual Effect Layer Ver 1.1
915	* Virtual Effect Layer Ver 1.1

Patch Pixel Map Channels

From the patch above, you can see that

- **Chan [911]** is a **virtual server**; think of this as the **master layer**.
- **Chan [912 + 913]** are **media layers**; these channels are where you load images or videos.
- **Chan [914 + 915]** are **effect layers**; these channels have some built-in stock effects.

Our wall is a **74 (width) x 4 (height)** grid, so it doesn't have high enough resolution for media layers to appear properly. So for our purposes, we will be mostly using the effect layers.

Effect Layer

To apply a pixel map effect, you need both the virtual server (911) and an effect layer (i.e. 914) to be on. Press:

- **[911] [Full] [Full]** to turn Channel 911 to full.

Use Moving Light (ML) Controls (**[Tab] [5]**) on your left screen to turn **Crossfade** to **-100** (by pressing **Min**). This will ensure the virtual channels takes control over the physical channel. If **Crossfade** is set to **100**, then the physical channels will take over the virtual channels.



ML Control - Crossfade

Then turn the one of the effect layers on:

- **[914] [Full] [Full]**

In ML Controls, set:

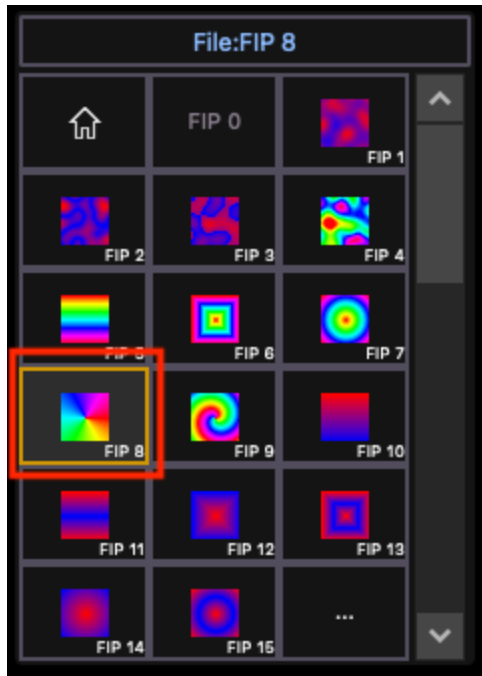
- **[914] [Width] [74] [Enter]**
- **[914] [Height] [04] [Enter]**



ML Control - Width & Height

You will need to enter the leading 0 before 4. EOS omits trailing zeros, so if you just enter **4**, EOS will interpret it as **40**. Now we can start setting the effects. There are three main effect types:

1. Two color gradients - adjustable gradients with start and end colors
2. Rainbow gradients - fixed gradient, full hue spectrum
3. Perlin noise - good for animating random color effects, adjustable gradients



Effect Files

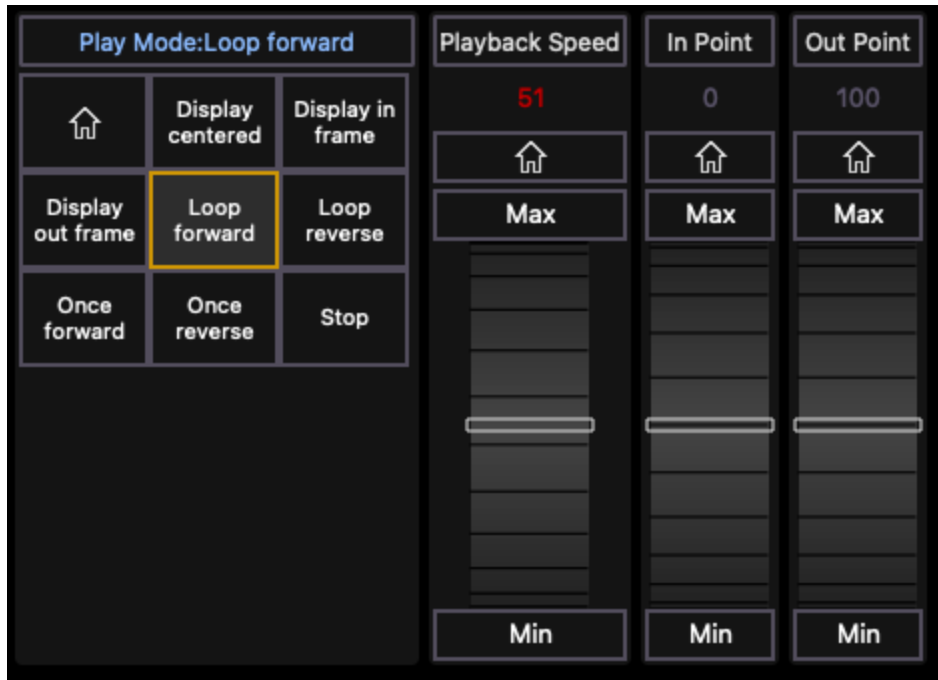
The effects are stored in file 1. File 1:0 is a home position of no effect. 1 through 3 are perlin noise effects, 4 is a perlin noise/ rainbow gradient, 5 through 9 are rainbow gradients, and 10 through 19 are two color gradients. We will demonstrate two types:

Rainbow Gradients

For instance, if we select **File 8** in ML Controls, you will see the following rainbow effect radiating from the center.

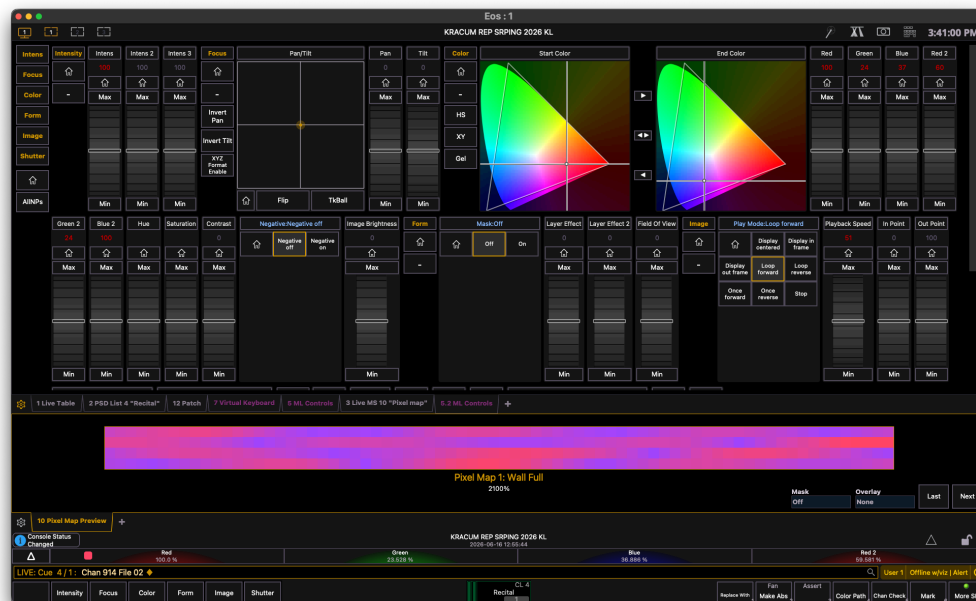
Your browser does not support the video tag.

You may adjust any non-intensity parameter from the ML Controls tab, including playback speed.



Effect Playback Speed

Two Color Perlin Noise



Two Color Effects

Any file with only red and blue icons are *two-color* effects, where you can set a start and an end color. For instance, **File 2** is a two color Perlin noise effect. This is what it looks like:

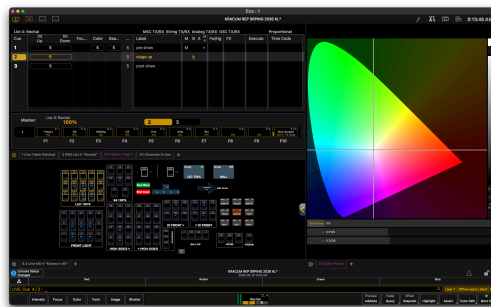
Your browser does not support the video tag.

You can save these channels just like you would with other channels. Check [here](#) if you're unsure how to record them into cues.

Busking Page

Typically, theatrical lighting assumes linear playback. You design all cues in advance, and go through each cue when the time comes. This requires the designer to be familiar with the piece being performed, and that there is some rehearsal time for that design process to happen.

More often than not, you'll find yourself in situations where you don't know what's going to happen. Linear playback becomes less feasible. Most concert lighting, in contrast, typically assumes non-linear playback. For convenience, I've set up the board and the fader wing to do that. **Macro 3** takes you to the busking setup. When you run **[Macro] [3]**, you will notice that the board and the fader shifts to the following:



ION Busking Screen 1



ION Busking Screen 2

Meanwhile, the fader wing is displaying **Page 9-10**. These are direct selects where you can quickly play according to the music. The faders have cue lists and effects where you can advance and adjust the effect rates according to the music.

A/B Color

These are **Scenes** where the wall colors are split into two groups. You can double-click to quickly change half of the wall to a different color.

Colors AB											9998
Wall A	811	Lt Red (96/1)	Lt Orange (96/2)	Lt Yellow (96/3)	Lt Green (96/4)	Lt Teal (96/5)	Lt Blue (96/6)	Lt Purple (96/7)	Lt Pink (96/8)	Lt Amber (96/9)	White (96/10)
	56	Dk Red (97/1)	Dk Orange (97/2)	Dk Yellow (97/3)	Dk Green (97/4)	Dk Teal (97/5)	Dk Blue (97/6)	Dk Purple (97/7)	Dk Pink (97/8)	Dk Amber (97/9)	Black (97/10)
Wall B	812	Lt Red (96/1)	Lt Orange (96/2)	Lt Yellow (96/3)	Lt Green (96/4)	Lt Teal (96/5)	Lt Blue (96/6)	Lt Purple (96/7)	Lt Pink (96/8)	Lt Amber (96/9)	White (96/10)
	73	Dk Red (98/1)	Dk Orange (98/2)	Dk Yellow (98/3)	Dk Green (98/4)	Dk Teal (98/5)	Dk Blue (98/6)	Dk Purple (98/7)	Dk Pink (98/8)	Dk Amber (98/9)	Black (98/10)

A/B Color

Effects

These are **Scenes** containing basic intensity effects, the white color effects, and rainbow special effects. They have groupings up to 2. Typically, one uses **White** as an **accent color**. You can combine it with different base colors, whether it be A/B colors or whatever color it is in the current cue.

Intensity FX						9997	Color FX						9998
WALL	405	Sine (91/1)	Step (91/2)	Ramp (91/3)	Burst (91/4)	10	RelD Rbw Wall (97/1)	Abs1 Rbw Wall (97/2)					
	144	Sine (92/1)	Step (92/2)	Ramp (92/3)	Burst (92/4)	1							
	155	Sine (93/1)	Step (93/2)	Ramp (93/3)	Burst (93/4)	2	White Sine (94/1)	White Step (94/2)	White Ramp (94/3)	White Burst (94/4)			

Effects

Colors Full

These are **Scenes** where the entire group of fixtures uses just one color (grouping of 1).

Colors Full											9999
WALL	405	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)
LED TOPS	31	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)	Lt Red (80/1)

Full Colors

A/B Color

These are color macros that apply color palettes to **Cue 997/1 Thru 2**. Instead of being applied immediately, they only apply when you advance into those cues, so you can use the **[GO]** button to tap it to tempo.

A Lt Red	61	A Lt Orange	62	A Lt Yellow	63	A Lt Green	64	A Lt Teal	65	A Lt Blue	66	A Lt Purple	67	A Lt Pink	68	A Lt Amber	69	A White	70
B Lt Red	71	B Lt Orange	72	B Lt Yellow	73	B Lt Green	74	B Lt Teal	75	B Lt Blue	76	B Lt Purple	77	B Lt Pink	78	B Lt Amber	79	B NIC	80

Color Macro

Fader Config

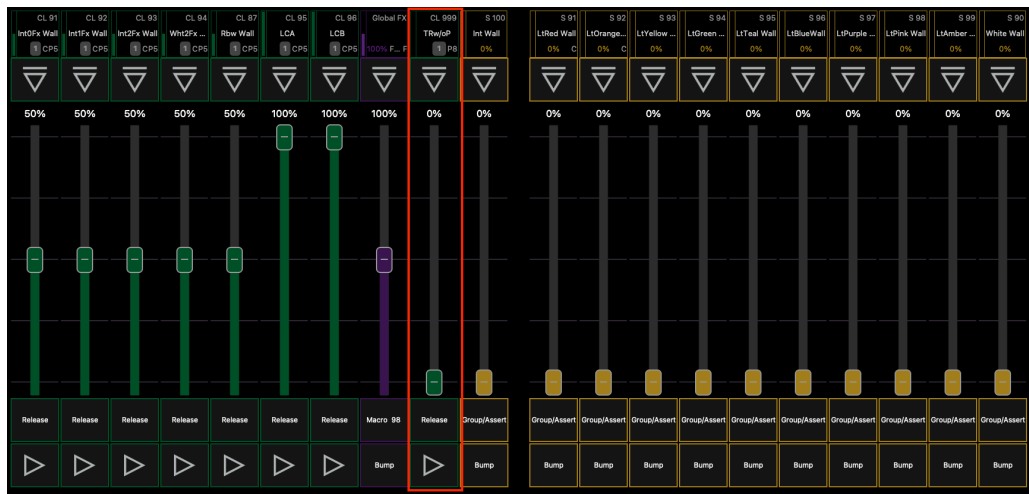
The fader wing contains some similar functionalities with more tactile control. For instance, they allow you to advance hidden cue lists more easily, adjust the effect size and rate live, and run macros.



Fader Config

Transition Cues

In particular, **Cue 999/1** is a default transition cue (that you use when there's no projection). It stops any running effect and renders the stage into a blue-out. This is mapped to the usual fader pages 11-12 (**Fader 12/8**) as well.



Fader Pages 9-10

Pressing the bottom button takes you into the default transition cue, and pressing the top releases that cue. You can **advance cues while in the transition cue and release it when you're in the new cue.**



Transition Cue

When you're using projection, you can click **Macro 998** to map **Cue 998/1** instead to this fader. This simply applies **Int Palette 100** to the wall, making the center of the stage dimmer around the projector screen.



Transition Macros

Resources

Summary: Some useful online tutorials

Here are some helpful video tutorials:

Lighting

EOS Manual

- [Online Manual](#)

Video Tutorials

- [Level 1: Essentials](#)
- [Level 2: Enhanced](#)
- [Level 3: Intermediate](#)
- [Level 4: Proficient](#)

- [EOS Effects](#)
- [EOS Busking](#)
- [EOS Pixelmap](#)
- [EOS Colorpath](#)
- [EOS Augment3D](#)
- [EOS Magicsheet](#)

Audio

Dante

- [Online Manual](#)

- [Dante Levels 1-3](#)
- [Dante Domain Manager](#)

- [Category Cables](#)
- [Dante AV](#)

Yamaha

- [CL Manual](#)
 - [QL Manual](#)
 - [DM Manual](#)
 - [RIO Manual](#)
-
- [CL/QL Training Series](#)
 - [DM3 Training Series](#)

Video

- [PTZ Camera Manual](#)
 - [PTZ Controller Manual](#)
 - [ATEM Manual](#)
 - [Hyperdeck Manual](#)
 - [Nano Manual](#)
 - [QLab Manual](#) . Also available at qlab.wtf (page 0)
-
- [ATEM Switchers](#)
 - [Switcher Support](#)
 - [Broadcast Converters](#)
 - [Capture and Playback](#)
 - [Latest QClass](#)

Video isn't working

Summary: This page lists common errors and the steps needed to troubleshoot them.

I can't see QLab / QLab is displaying this weird calendar thing

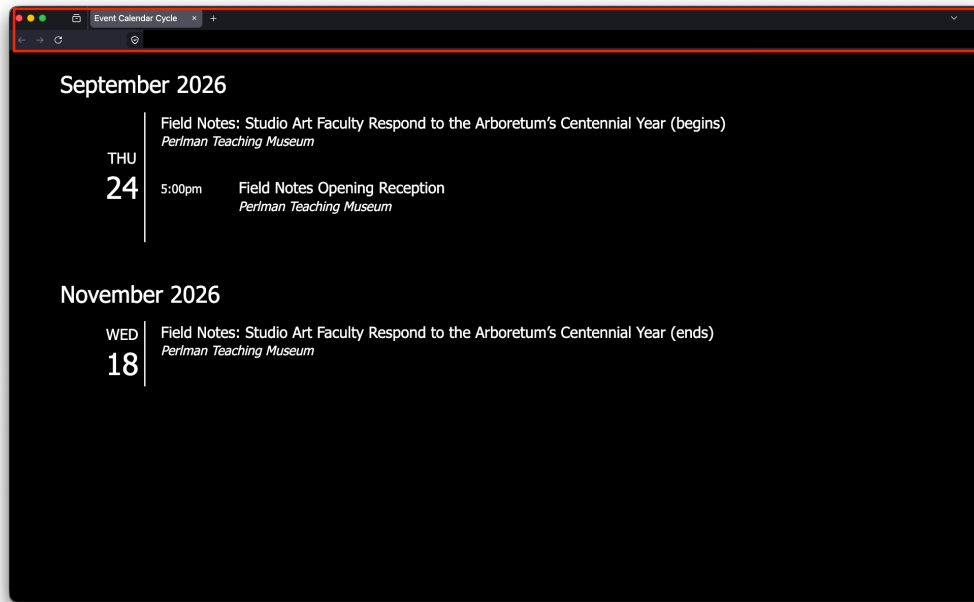
You might be presented with a calendar display when you approach the QLab computer. This is another small script I wrote [here](#). It pulls and displays the [Carleton Arts Calendar](#) and updates that at midnight. The program displays an HTML file in Firefox. What you're seeing is likely Firefox being full screened.

To get out of Firefox, simply press **command+q** (shortcut to quit apps on MacOS in general) to quit. Firefox will ask you to confirm. Hit **return** to confirm. You will then be presented with the QLab interface (hopefully). Hit **escape** to panic all cues to make sure the midnight update cue is not running anymore. You may now [resume \(page 0\)](#) to production.

Your browser does not support the video tag.

This weird calendar thing has a menu bar on top, which I don't want

This happens when Firefox couldn't properly full screen itself. It might be your palm resting on the touchpad when the Mac is trying to pull focus to the app.



Firefox Arts Calendar

To properly full screen firefox, press **ctrl+shift+f**.

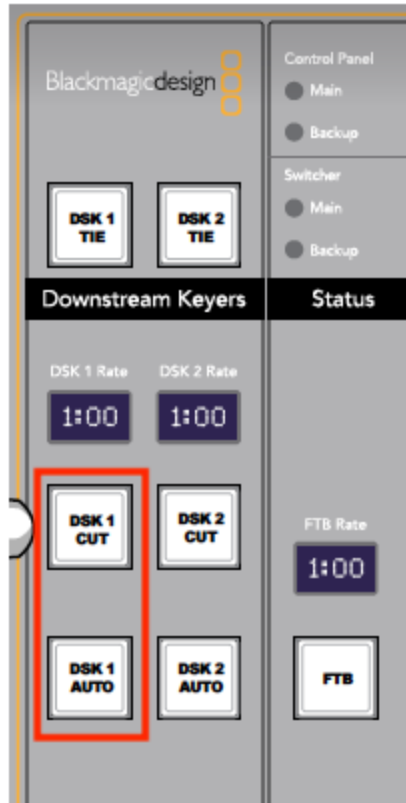
To **quit Firefox properly**, always make sure you press **command+q** and **return** to confirm. Otherwise, Firefox is still on the extended screen, and it might be overlaid on top of any QLab text cues you want to run.

The lower thirds are “out of order”

If you're seeing the lower thirds key (black) still overlaying on the program after the cue, or the QLab cues are first fading out the keying and then fading in the keying (as opposed to fading in the key and then taking out the key), chances are the **DSK** was left on / accidentally triggered before you run the QLab cues. If you **accidentally panic (escape) QLab cues too early**, you might end up in this situation.

Your browser does not support the video tag.

To get out of this situation, make sure **DSK 1** is NOT on air (not lit up red) when you run the QLab script. You can take **DSK 1** off the air by pressing **DSK 1 CUT** or **DSK 1 AUTO** (which fades out the DSK in 1 second).



ATEM DSK

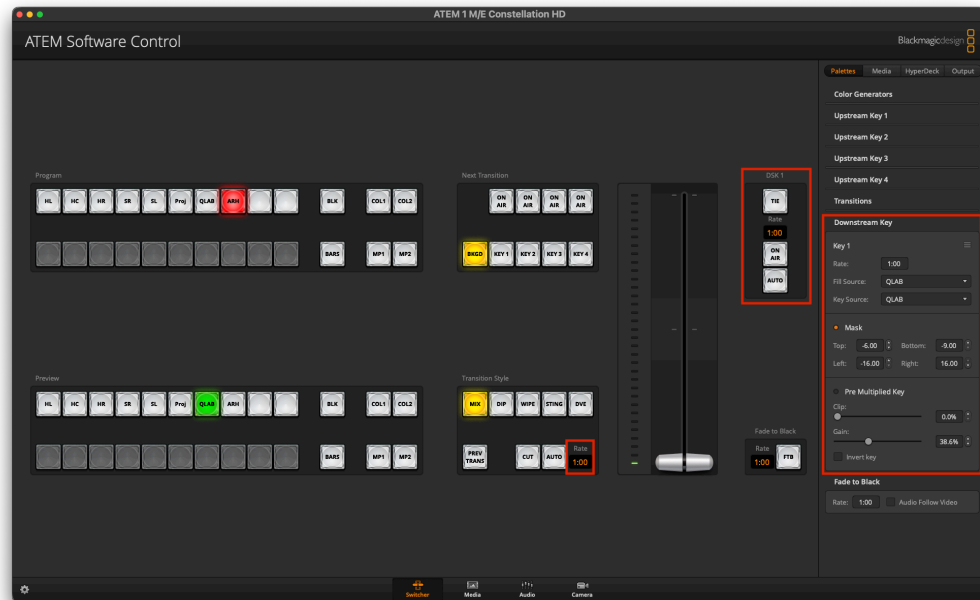
You can now run the lower thirds cues normally. Remember to always wait for the cues to fully finish to avoid this situation.

QLab lower thirds are displaying only to the QLab output / not overlaying on the program

Sometimes this happens after a power outage where everything is power-cycled. The ATEM switcher or the laptop controlling the ATEM refreshes its **Downstream Key** settings. Make sure the **Downstream Key** has the following settings:

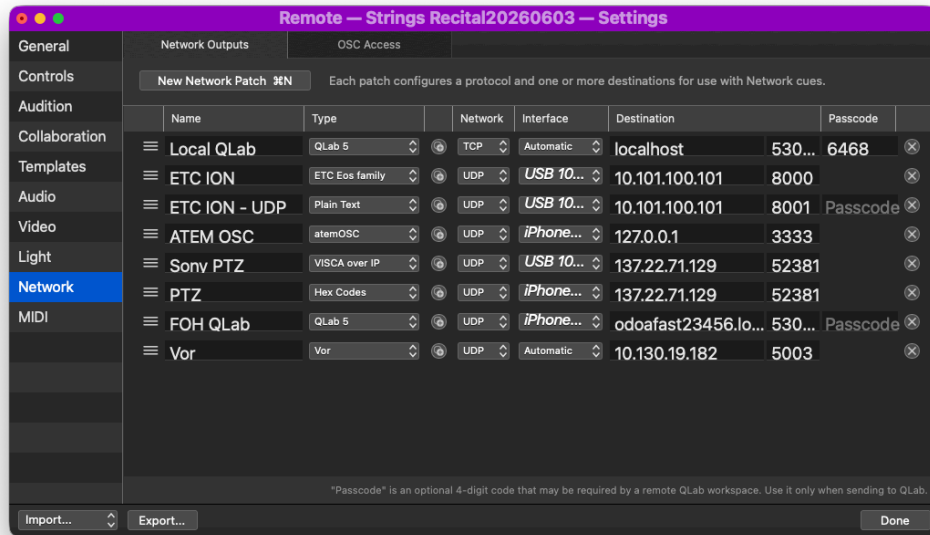
Fill Source	QLAB
Key Source	QLAB
Top Mask	-6
Bottom Mask	-9

Left Mask	-16
Right Mask	16
Clip	0%
Gain	40%



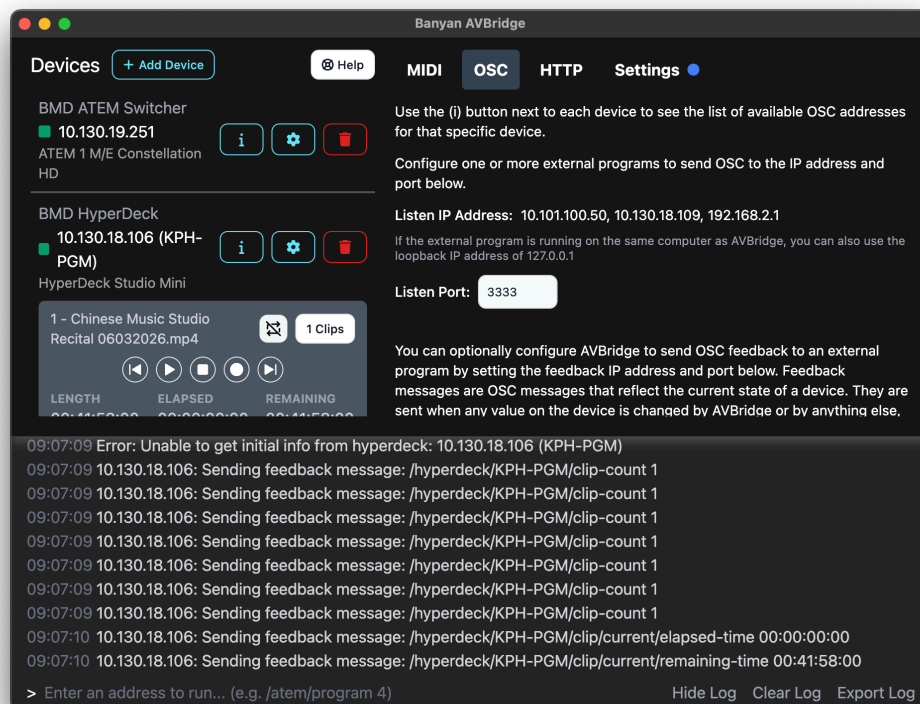
Downstream Key Parameters

If after configuring the ATEM, the lower thirds are still not displaying on the program, the next step is to check the QLab settings. Click the gear icon at the bottom right of the QLab window, or click **cmd+,** to bring up the settings menu. Go to network, and you should see the network connections configured like the following.



QLab Network Settings

Lastly, on the same computer, open AV Bridge (formerly atemOSC) from the dock. This program receives OSC messages from QLab and convert and transmit to ATEM. Make sure the destinations have the correct IP's.



ATEM OSC

QLab credits aren't playing

Your browser does not support the video tag.

This is an instance where there might be **multiple** QLab workspaces open, and the program is having trouble discerning which workspace to prioritize. Close any additional workspace and trigger the cue again.

I'm seeing some weird characters when I try to enter texts

You might see the following when you want to enter texts in QLab:



Input Source

This is the Chinese characters input source on MacOS. To go back to English,

press **fn** or the  **globe key** to switch between input sources.

Sound isn't working

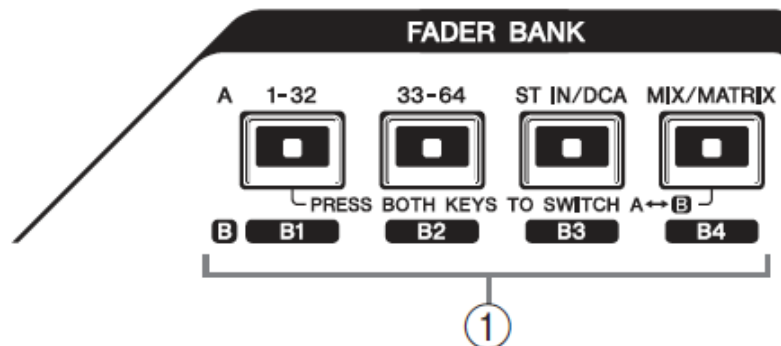
Summary: This page lists common errors and the steps needed to troubleshoot them.

No sound?

At this point, you should hear sound from the booth speakers. If you don't hear sound, check whether the L/R meters are moving in the METER field of the **QL**.

- If the L/R meters are moving on **BOTH the QL and the ATEM:**

It may be that the **MONITOR** channel hasn't been turned on. Make sure you're actually in **SCENE A**, and the Master section has **ST L** and **MONIT** as opposed to **ST L** and **MONO**. You're likely in **SCENE B** if you see **MONO**. In that case, Press the **1-32** key and **MIX/MATRIX** key simultaneously to switch between fader bank A and custom fader bank B.



Fader Bank Select Keys

- If the L/R meters are moving on **the QL BUT NOT the ATEM:**

It may be that the Aux cable behind the ATEM got detached, or that the connection has come loose somewhere along the snake. Check the STEREO connection in the back.

- If the L/R meters are not moving:

Make sure that signals are being routed correctly to the patched input channels.

I can't move the faders

This is because the console is locked. If you see a black console screen with **CONSOLE LOCK** text on it, touch anywhere on the touchscreen to unlock. Then proceed with production.

I can't control the headamps/phantom power

I will show this for QL/CL and DM series, since the interfaces are different. If you still can't see headamp on the console, make sure the channels are **patched in DANTE Controller**. When devices are unmounted and then remounted, the patching tends to disappear.

Mounting DANTE I/O on QL/CL

We use an I/O device to remotely control head amp that is connected to the QL/CL console.

1. Go to **SETUP** , **DANTE SETUP** , and press the **DEVICE MOUNT** tab in the lower part of the window.
2. Press any of the I/O device select button (the box after #x). A connected I/O device should indicate green. If you see a yellow bar with **virtual** text, you need to remount this device.
3. In the DEVICE SELECT window, press the **ONLINE DEVICE LIST** .
4. Use the [TOUCH AND TURN] knob to select devices within the network, e.g., RIO1608, Shure receivers, etc..
5. When you have finished making settings, press the OK button to close the window.
6. Check the patching in Dante Controller.
7. Reboot the I/O devices (first) and the Console (last), in that order.



Device Mount



Online Device

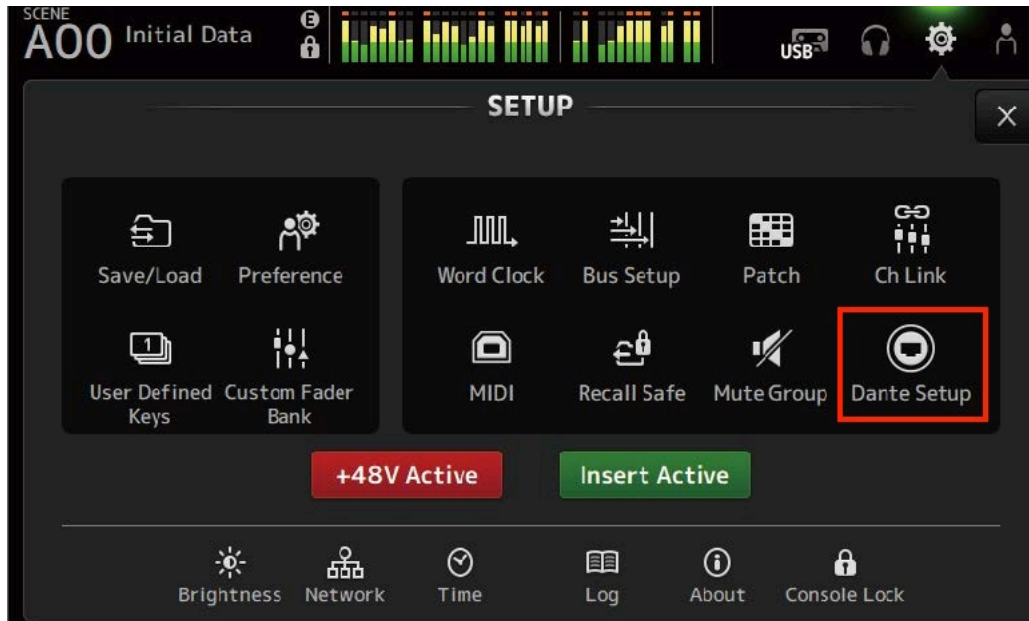
Mounting DANTE I/O on DM3

DM3 will automatically mount any **patched and supported** DANTE I/O. If you have a patched I/O that's not showing up, check below for their Dip Switches settings. To check that DANTE I/Os are automatically configured:



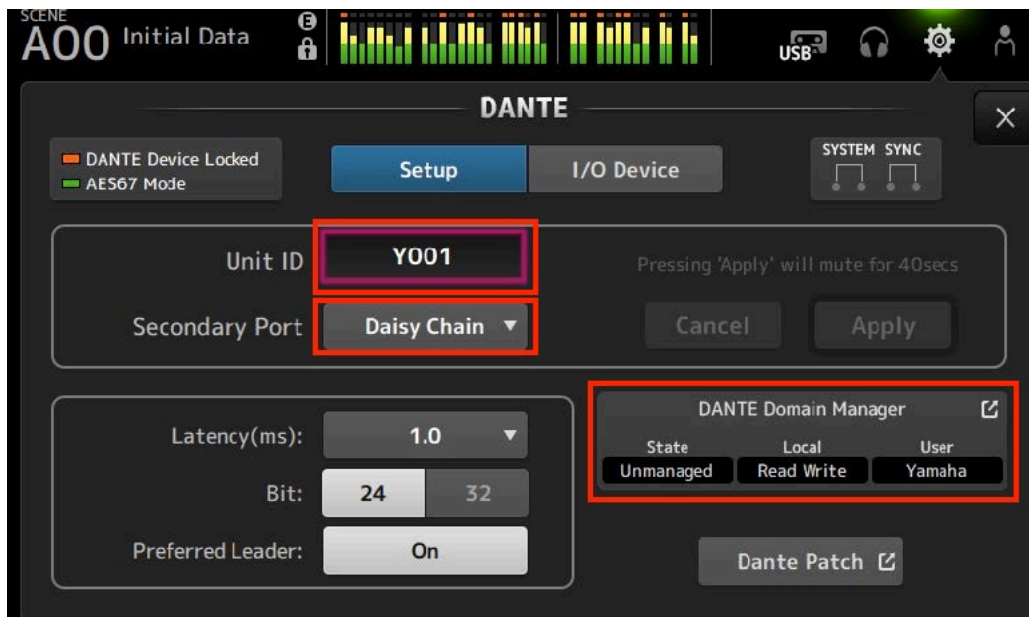
DM3 Homescreen

- On the **homescreen**, press the gear icon on the top right to enter the **setup** page.



DM3 setup

- From there, go to **Dante Setup**. In **Dante Setup**, you want to make sure:
 - Unit ID is set to **Y003***,
 - Secondary Port is set to **Daisy Chain**, and
 - You're logged into **DANTE Domain Manager** (You might need read *and* write privileges to change the patching).



DM3 Dante setup

- If things are patched in Dante Controller, you can go to **I/O Device** to check that devices are patched. You want to make sure the R I/O unit has both **System** and **Sync** lights indicate green. If not, check the following section on how to set the R I/O unit and power cycle both devices.

*DM3 I/O Device***Note on R I/O Dip Switch settings**

Long story short, here's the dip switches settings for

- Kracum: **only 2 and 4 down**, the rest is up
- Applebaum: **only 2 and 7 down**, the rest is up.

Here's what each dip switch does.

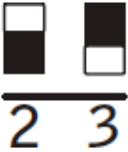
- Switch 1 (Unit ID) This switch determines whether the hex setting of the UNIT ID Switch will range from 0 to F or from 10 to 1F.

Switch	Setting	Description
	UNIT ID ranging from 0 to F	The setting range of the [UNIT ID] rotary switch is from 0 to F.
	UNIT ID ranging from 10 to 1F	The setting range of the [UNIT ID] rotary switch is from 10 to 1F.

RIO Dip Switches

- Switch 2 and 3 (IP Select Mode)

These switches specify (basically) the ranges/type of IP addresses used when communicating. This is what we were having trouble with before.

Switch	Setting	Description
	AUTO IP	Dante networks will automatically assign the IP address.
	DHCP	The IP address assigned by the DHCP server will be used.
	STATIC IP (AUTO)	The IP address will be set to 192.168.0.xx (xx=UNIT ID).
	STATIC IP (MANUAL)	The IP address is specified from an external device such as R Remote.

RIO Dip Switches

To confuse their users, Yamaha uses 3 different IP schemes: DHCP, Auto IP, and Static IP. Older devices, such as the first generation of RIOs, don't have the ability to specify this themselves, so you'll have to set this manually. DHCP (the Yamaha setting) is when the IP addresses are handed out by an external DHCP (the technology) server (e.g., 10.210.x.x); this is what we're using, so you should put **2 down and 3 up**.

Auto IP is a Yamaha setting. It can be DHCPed (the technology). This is when IP's are in the 192.168.x.x range, which is typical for a home router. Follow this if you're using this range.

To further confuse you, you can set it to STATIC IP Auto, so the IP of each device will be 192.168.0.x, where x is the unit ID.

Lastly, you can always set IP's statically.

- Switch 4 (Secondary Port)

Switch	Setting	Description
	DAISY CHAIN	The [SECONDARY] connector is used for a daisy chain connection. A signal at the [PRIMARY] connector will be transmitted to the next device in the chain as is.
	REDUNDANT	The [SECONDARY] connector is used for a redundant network. It will function as backup connection, independent of the network to which the [PRIMARY] connector is connected.

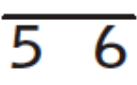
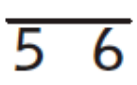
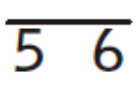
RIO Dip Switches

For places with a dedicated secondary Dante network (i.e., Kracum), you want to have the switch on redundant mode. For places without a secondary network (Applebaum), it's best to leave this on daisy chain mode.

Always check if you have a secondary network in place. If you daisy chain two separate networks together when they're not supposed to, you can create a broadcast (network) storm. This is true for consoles as well. Make sure they're set to redundant mode when they have a redundant network connected.

- Switches 5 and 6 (Remote)

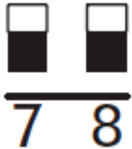
Set this to NATIVE since we only use Yamaha consoles.

Switch	Setting	Description
 	NATIVE	An Rio-native device will control the Rio.
 	AD8HR	A non-Rio-native device will control the Rio as AD8HRs. In this case, Rio3224-D and Rio1608-D are recognized as four AD8HRs and two AD8HRs respectively. Set the UNIT ID number between 1 and F. The unit with any other UNIT ID numbers will not be controllable.
 	INITIALIZE	Initialize the settings. For details on the settings that are initialized, refer to “Initializing the Rio” (page 14).

RIO Dip Switches

- Switches 7 and 8 (Start up)

You can leave this the way it is. Whenever you recall a scene on a console, you'll recall the headamp settings, so it's not a huge deal if the headamp gets refreshed.

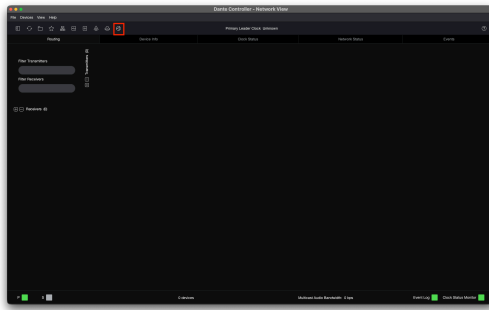
Switch	Setting	Description												
	REFRESH	The Rio starts up with part of the internal memory initialized. The following settings are initialized. <table><tr><td>HA GAIN</td><td>–6 dB</td></tr><tr><td>+48V</td><td>OFF</td></tr><tr><td>HPF</td><td>OFF</td></tr><tr><td>HPF FREQ</td><td>80Hz</td></tr><tr><td>Gain Compensation</td><td>OFF</td></tr><tr><td>Dante Patch</td><td>OFF</td></tr></table>	HA GAIN	–6 dB	+48V	OFF	HPF	OFF	HPF FREQ	80Hz	Gain Compensation	OFF	Dante Patch	OFF
HA GAIN	–6 dB													
+48V	OFF													
HPF	OFF													
HPF FREQ	80Hz													
Gain Compensation	OFF													
Dante Patch	OFF													
	RESUME	The unit starts up using the settings assigned prior to the most recent power-off.												

RIO Dip Switches

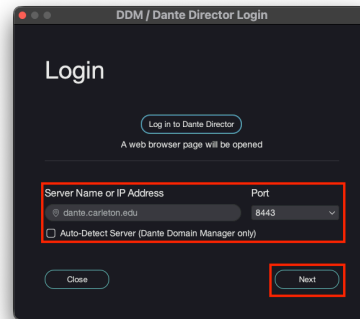
I'm doing a separate broadcast mix from the FoH mix, and I can only hear audio coming out of one console

This happens when multiple consoles are sharing the same Dante channel, but the transmitting channel doesn't have **multicast** enabled. Before we begin, it's always good practice to check the Rx and Tx channels are patched correctly.

By default, Dante uses **unicast** to transmit audio. You'll need to enable **multicast** manually if you want the same channel of audio to go to different devices downstream. To do this, first log into Dante Domain Manager.

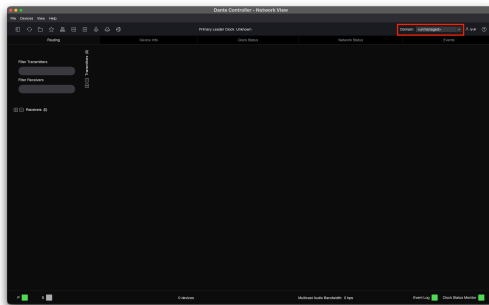


Dante Controller

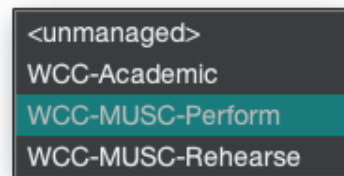


DDM Login

1. Open up **Dante Controller**. Because we have **Dante Domain Manager** (DDM) installed, click the DDM icon on the toolbar to login.
2. You'll see the login interface. Enter our DDM server dante.carleton.edu (page 0), and select **Next**. You'll then be asked to enter your credentials. Enter your Carleton username and password.
3. Once logged in, go to the domain selector and select **WCC-MUSC-Perform**.

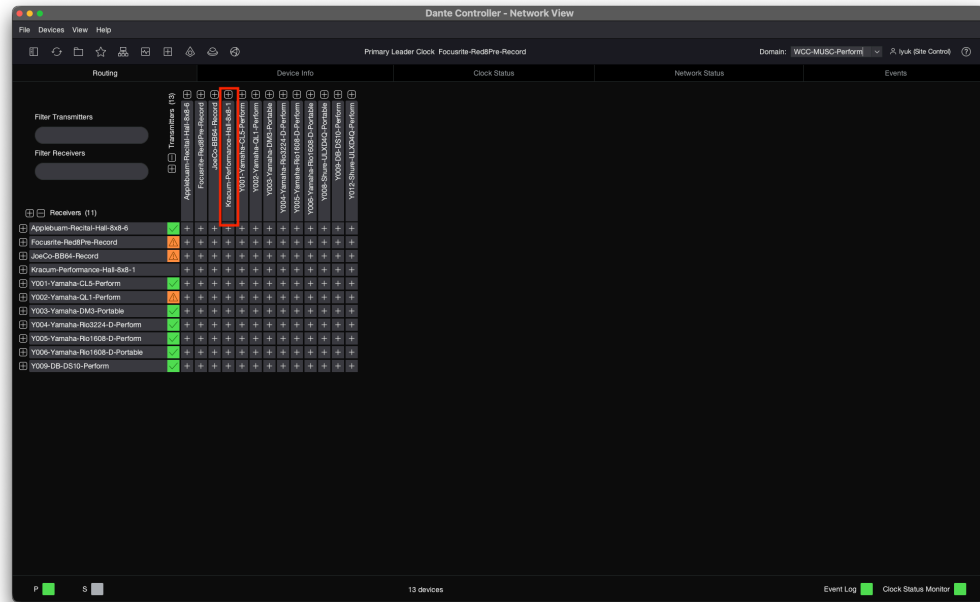


Dante Controller



DDM Domains

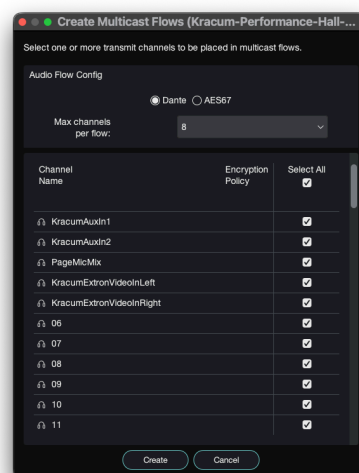
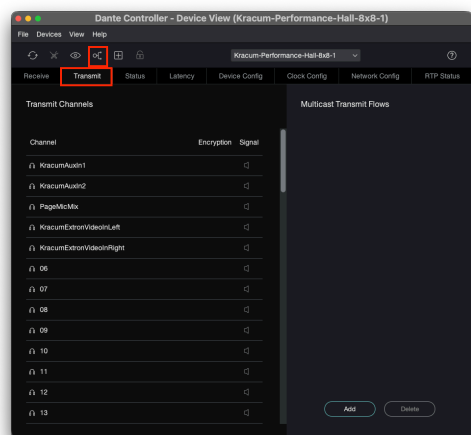
You should see the following devices:



Dante Performance Domain

Now that you're logged in, choose the Transmitting device you wish to configure multicast on. In my example, I'll be using Kracum's Symetrix Prism DSP:

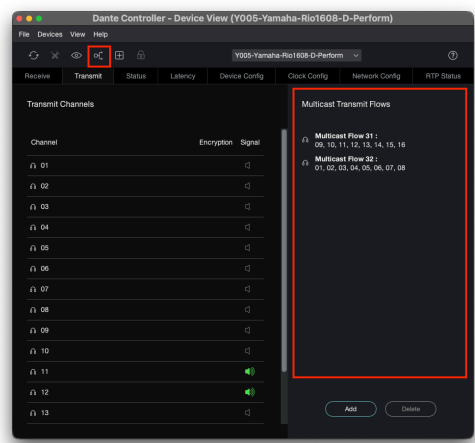
1. Double-click the transmitter to bring up the device view. Navigate to the **Transmit** tab. Click the multicast icon, highlighted in red below.
2. This brings up the page to create multicast flows, if none are already configured. Click **Dante**, choose **8** for max channels per flow, and select the channels. You may pick specific channels, but you can also simply **Select All**. Click **Create** to finish.



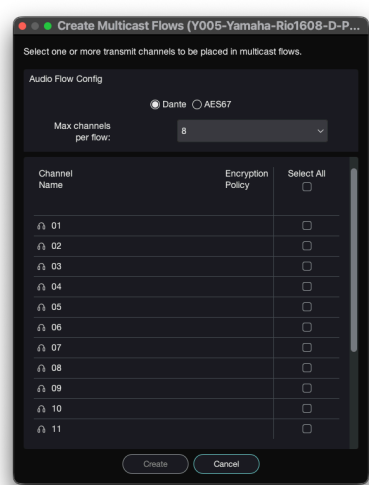
Dante Device View

Dante Multicast

Note that if there is already a multicast flow containing a certain channel, you won't be able to create another flow containing the same channel. If you wish to re-create flows, first select the flows to the right on the device view, delete them, and then follow the steps above to create a new flow. Audio will be briefly interrupted while you do this.



Dante Device View



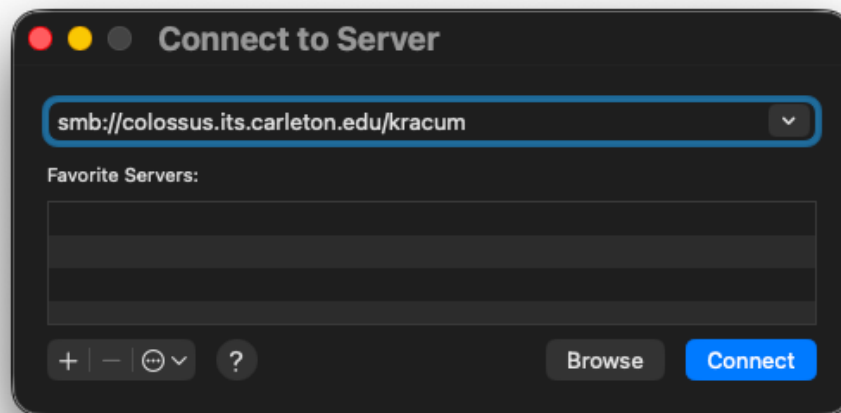
Dante Multicast

Network isn't working

Summary: This page lists common errors and the steps needed to troubleshoot them.

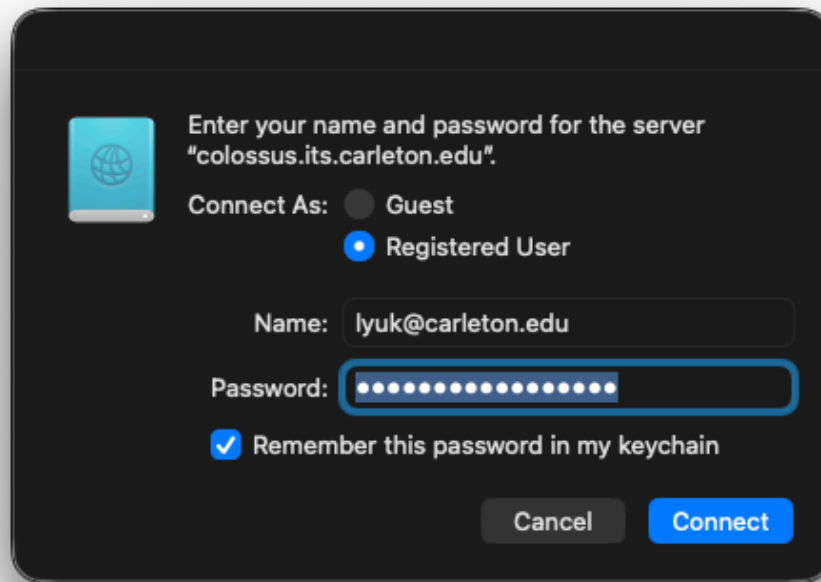
I can't see the NAS

On the Mac you wish to connect to the NAS, go to **Finder**, hit **Command + K**. You should see the following.



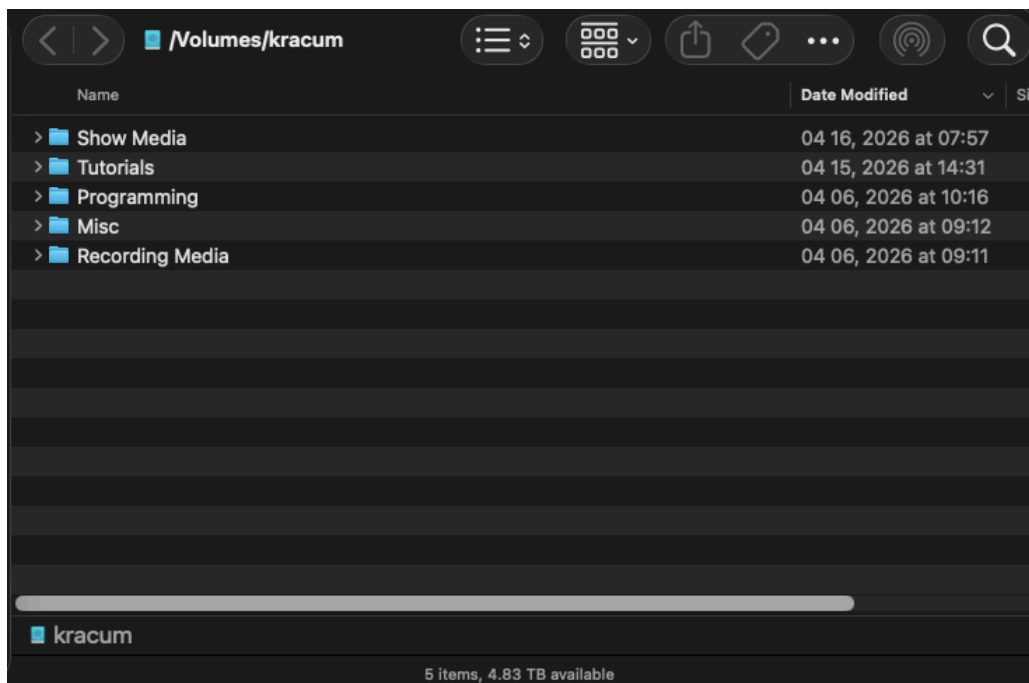
Mounting Network Drives

Enter this <smb://colossus.its.carleton.edu/kracum> (page 0) into the address bar. It'll then ask you to authenticate:



NAS LDAP Authentication

Enter your full Carleton email and password. You can save these credentials in your keychain to avoid re-entering them. The folder should now be visible.



Kracum Folder

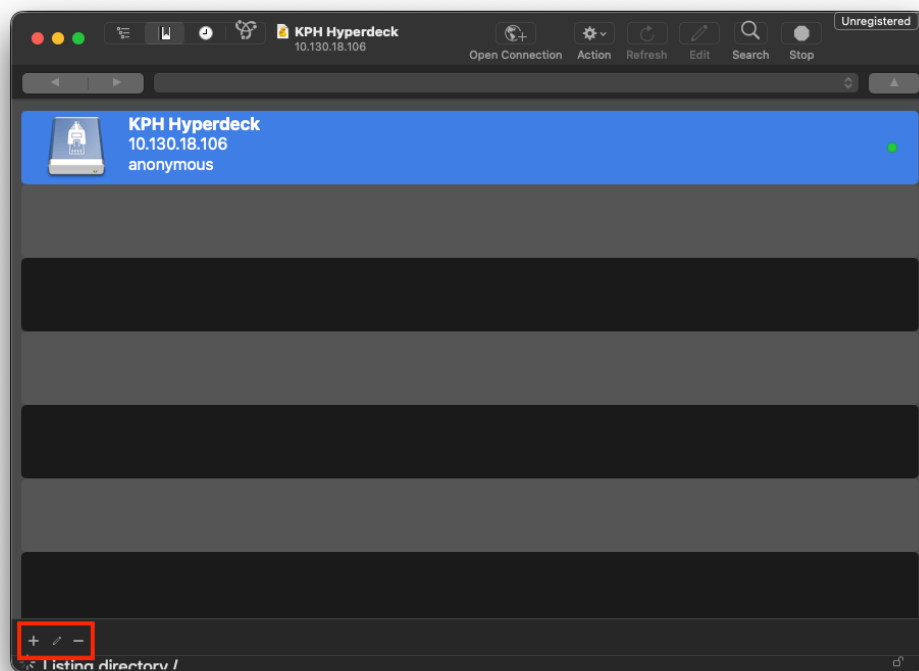
If you want to have this folder open automatically when the computer boots up, go to **System Settings**, **General**, and **Login Items & Extensions**. Then click the **+** icon and select the Kracum folder from the sidebar. If you've remembered your credentials in the keychain, the folder will launch at system start-up.

How do I transfer files from the HyperDeck to the NAS?

Our BMD HyperDeck supports FTP, which means we can download and upload its recordings without having to remove the media. To do this, launch **Cyberduck**



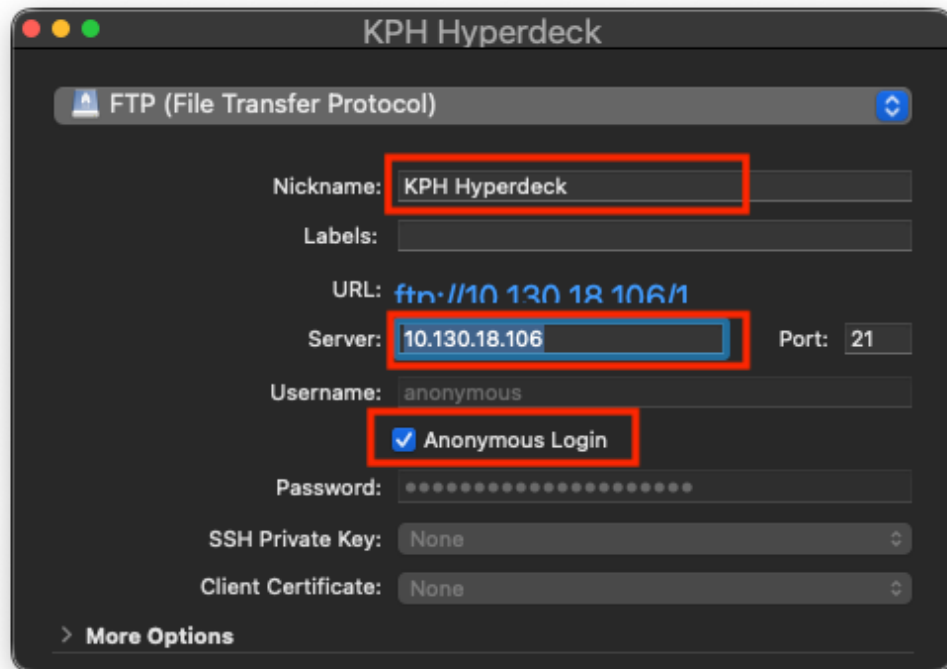
in the Dock.



Cyberduck Bookmark

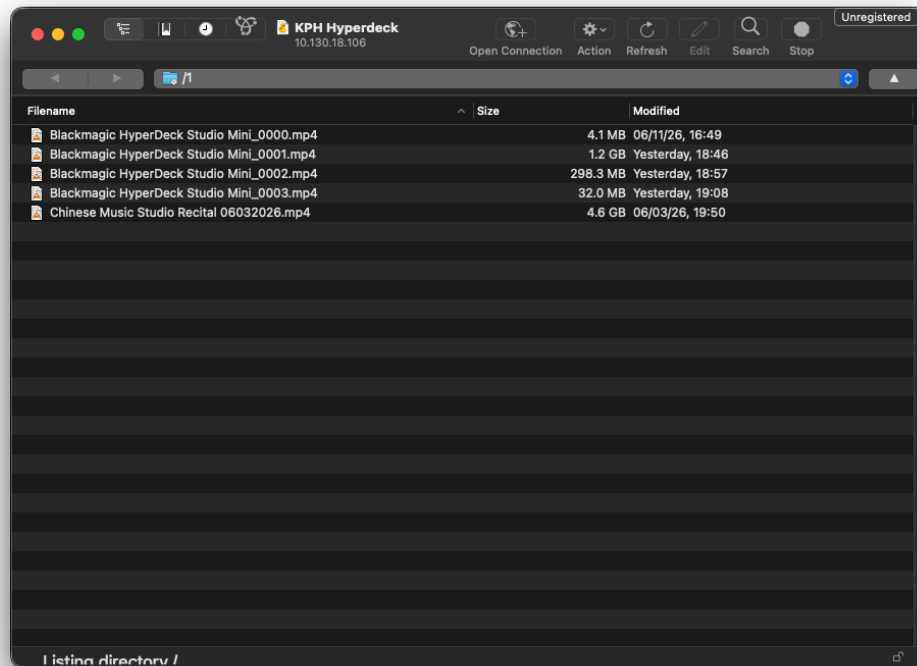
1. If you don't see a bookmark called **KPH HyperDeck** already, click the **+** icon on the bottom left to create a connection. If you do, skip the following step.
2. Enter the **nickname**, **server address** ([10.130.18.106 \(page 0\)](#)), and enable **anonymous login** as shown below. You can now connect to the

HyperDeck.



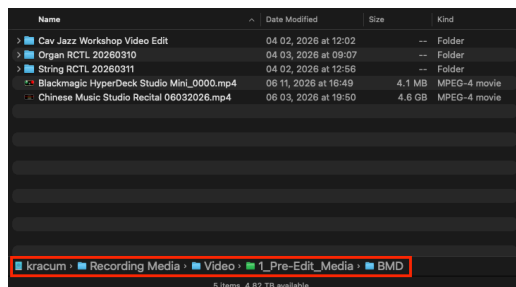
Create Cyberduck Bookmark

Now you should see a bookmark like that in step 1. You can double-click the bookmark to view the files inside the HyperDeck.

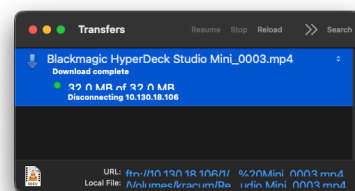


Cyberduck File Tree

You can now open our NAS and drag the desired files from the HyperDeck into a NAS folder. I recommend putting them inside a designated folder to keep things organized. An example would be `/Volumes/kracum/Recording Media/Video/1_Pre-Edit_Media/BMD`.



BMD NAS Folder



Cyberduck File Transfer

While transferring, Cyberduck will display real-time statistics and provide a confirmation when complete.

How do I use the iPad to control the light board?

On the iPad, make sure your Wi-Fi is connected to **Kracum Lighting**. Go to the **Lighting** folder, open **MobileRFR**. It should connect to **WCC ION (10.101.100.101)** automatically. You can then use the **Facepanel** or the **Channel Check** function to control the light board.

After you're done, switch the Wi-Fi back to **eduroam**.

Support

Summary: (Don't) Contact me for any support issues.

I won't be actively working on this documentation after June 17, 2026. However, feel free to click **Feedback** on the top navbar to email me or open an issue on [GitHub](#).

Instead, here is a list of technical support contacts you can reach out to:

Lighting

ETC Technical Support

- [\(800\) 688-4116 \(page 0\)](#) in the US
- [\(608\) 831-4116 \(page 0\)](#) for the Midwest
- service@etcconnect.com

Audio

Yamaha

- [\(714\) 522-9000 \(page 0\)](#) for tech support
- [Submit a ticket](#) here.

Audinate

- support@audinate.com
- [Submit a ticket](#) here.

Video

Blackmagic Design

- [\(408\) 954-0550 \(page 0\)](#)
- [Submit a ticket](#) here.

QLab

- support@figure53.com

Extron

- [\(800\) 633-9877 \(page 0\)](#)
- [\(800\) 633-9876 \(page 0\)](#)