Production Streaming Guide

a guide to video streaming at the ADC Theatre

Contents

Summary of Changes

- 05/05/2021 – Version 2.0: Easter Term 2021
  - Updated **An Introduction to the Equipment** to better explain remote operation of the switcher from the software control, now that all video switcher operators will be operating it remotely.
  - Removed references to controlling the focus of Microstudio cameras remotely as camera operators have shown they are capable of doing it themselves.
  - Updated **Additional Cameras** section to discourage use of additional cameras.
  - Updated **Cabling** and diagrams to reflect new position of video switcher operating desk.
  - Updated **Sound** to emphasise that personal mics are not needed if a show is not using amplified sound.
  - Added a new **Lighting** section to give guidance on how to light for camera.
  - **Q&A Log** updated to reflect changes to Streaming set-up
- 09/10/2020 – Addition of the **Camera Operation Tips** and **Shot Planning Tips** sections. Substantial rewriting of the **Sound** section following further sound tests in the auditorium – addition of **Sound Choices** flow chart. Addition of two stage plans and details of suggested camera positions in **Cabling**. Addition of **Q&A Log** section.
- 15/09/2020 – **Cabling > Video Points on Panels:** US Stage Panel SDI cable runs updated to two (originally one).
- 02/09/2020 – Document published.

Introduction

This document is intended to give an overview of the video streaming system at the ADC Theatre to help with planning productions for the Easter 2021 season. If you have any specific questions, please email the Technical Manager, Eduardo, at eduardo@adctheatre.com. The most recent version of this document can be found at www.adctheatre.com/technical.

This document is intended to be used in conjunction with the **Pandemic Production Guidelines** (accessible at www.adctheatre.com/productionresources), and the social distancing measures described within.

An Introduction to the Streaming System

Unlike normal film recording, livestreaming requires capture devices (cameras and microphones) to transmit recordings near-instantly to a central location, from which it is then encoded for transmission and streamed out over the internet. For this reason, all cameras have to be connected by cabling to a video switcher, which chooses which camera's output is sent to the encoder and broadcast to the stream.

The general architecture looks like this:

Fig. 1 – Overview of streaming
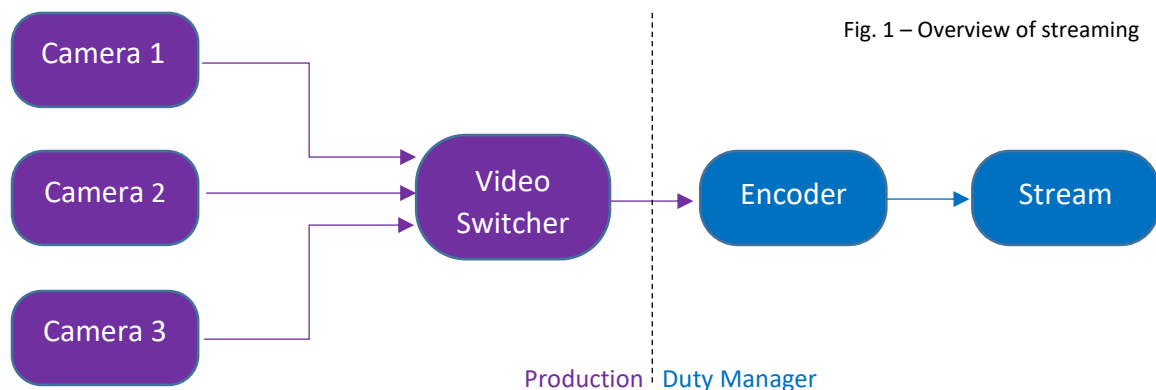
At the ADC, the cameras and switcher will be in the production's hands, but the encoder and stream will be run by the Duty Manager, so production teams don't need to worry about it. The key responsibility of the production is to provide a video and sound feed of the show from the video switcher to the encoder, everything else will be taken care of by Management.

A Note on Video Cabling

Fig. 2 – HDMI vs SDI

HDMI Cable   **SDI cable**

There are two main types of cable in video transmission – HDMI and SDI. HDMI is far more widely used in everyday life, but cannot transmit HD video signal further than about 15 metres. SDI is more specialist, but can carry HD signal about 64 metres. This means that to get from stage to the lighting and sound boxes you have to use SDI. As a general rule the only camera that should run over HDMI to the switcher is the Rear of Auditorium bar wide-shot camera. HDMI can be converted into SDI and vice versa using a **Blackmagic Design Microconverter** (see in 'An Introduction to the Equipment' below).

N.B. There is a third type of video cable – 'composite' – that can only carry standard definition feeds. Most of the ADC's show relay screens run on this. As both SDI and Composite use the same connectors, it is easy to get confused between them. For this reason, please only plan for video cable runs using the SDI points specified in the **Cabling** section later in this document.

An Introduction to the Equipment

There are two core components of the live video system – cameras and switchers. The ADC will have the following equipment available for use by shows next term:

- 1x Blackmagic Design ATEM Television Studio HD
- 1x Blackmagic Design Pocket Cinema Camera 6K (*fixed in position on Rear of Auditorium Bar*)
- 2x Blackmagic Design Microstudio Camera 4K
- 3x Blackmagic Design Microconverter HDMI to SDI
- 5x Blackmagic Design Microconverter SDI to HDMI

- **Video Switcher: The ATEM Television Studio HD**

Fig. 3 - ATEM Television Studio front and back

The purpose of a video switcher is to allow an operator to cut cleanly between different video inputs on a stream. The ATEM Television Studio has 4 HDMI inputs and 4 SDI inputs on the back, and outputs through the 'PGM' ('Program') SDI output, also on the back.

Unlike in Michaelmas Term the switcher will not be operated directly from the buttons on the front, but will instead be operated from a dedicated computer set up at the back of the Stage (see Fig. 7). This is to ensure social distancing with the lighting operator in the lighting box. When using the switcher-control PC, open 'ATEM Software Control' and select 'ATEM Television Studio' switcher from the options. You will see a digital control panel like this:
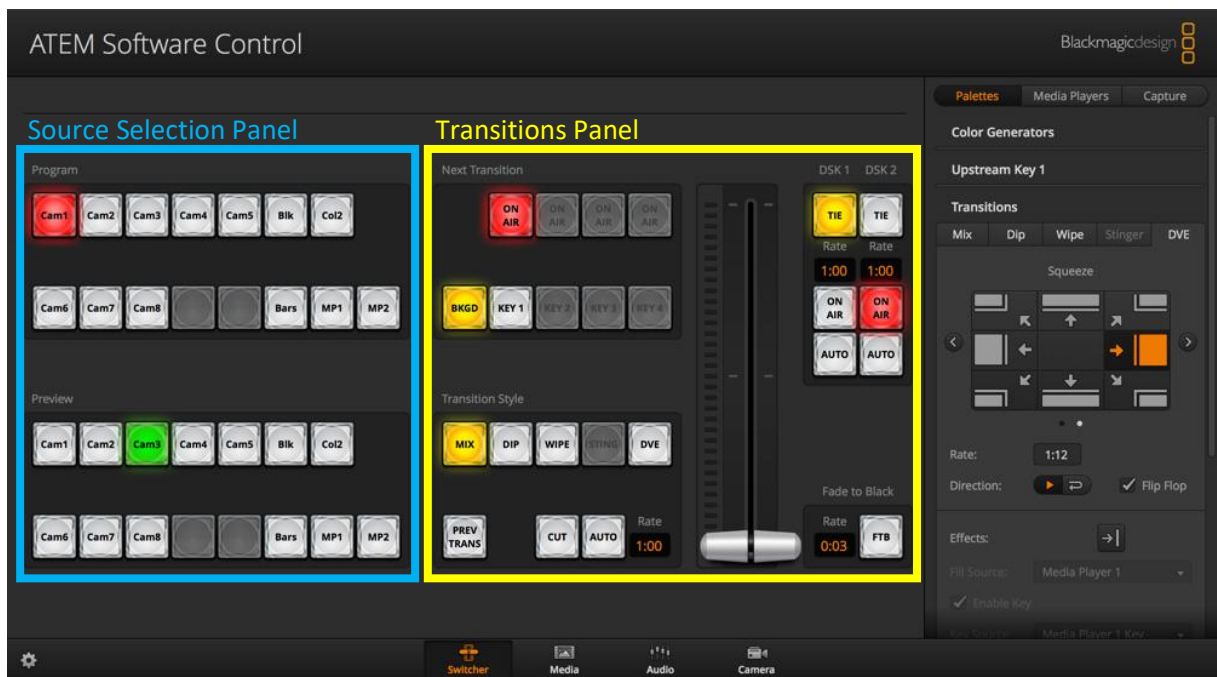

Fig. 4 - ATEM Software Control display

The left side of the control panel is dedicated to selecting which video source (or input) is displayed. The right side gives controls for transitioning between sources (e.g. the 'cut' button).

For simple operation you select a source from the Preview Tab (it will light up green and the source appear in the 'Preview' window of your video display), and when you want to cut to it you press 'Cut' (the corresponding button under the Program Tab will turn red, indicating that source is now live, and the source will appear in the 'Program' window of your video display). That source will then be outputted out of the 'PGM' output on the back of the switcher. All the inputs are displayed via a display on a separate monitor (see Fig. 4), so you can see when to cut.

Pressing the 'Auto' button instead of 'Cut' triggers an auto transition – by default a 1 second fade (called a 'Mix') between the Preview and Program inputs. If you want to adjust this time, or the type of transition, you can adjust the 'Rate' number in the transitions panel, or select a different 'Transition Style' (e.g. Dip, Wipe, or DVE). You can also use the virtual fader (the lever in the Transitions Panel) to manually control the speed of a transition.

This is all you should need to run most productions. However, the switcher can be used for a wide variety of more sophisticated functions, like picture in picture, split-screen, additional transitions, and green screen.

It can also be used to remotely control certain aspects of some cameras. Please see the section on the **Blackmagic Design Microstudio Camera 4K** for more information.

The Switcher also has two XLR inputs, so can receive a stereo input straight from the ADC's sound desk.

More information on the ATEM Television Studio HD can be found here. Please note we have the TV Studio HD, not the Pro or Pro 4K versions.

Fig. 4 - ATEM Television Studio preview display

- **Blackmagic Design Pocket Cinema Camera 6K**
  The Pocket Cinema camera will be permanently mounted from the Rear of Auditorium bar for the duration of next term, and will be focused as a full stage wide-shot. **Do not remove it without consulting Management.** It connects to the video switcher using a direct single HDMI connection, so does not require patching. It cannot be controlled remotely using the Television Studio HD. As it is rigged from a bar, **this camera does not require an operator.**

  More information on the Pocket Cinema Camera 6K can be found here.

- **Blackmagic Design Microstudio Camera 4K**
  The ADC has two Microstudio cameras for use by shows. These cameras can be positioned as suits the show, and can be operated for capturing close-ups or framing scenes. Two tripods will be available for these positions. Unfortunately, as moving camera position can take time, and cameras will require disinfection between shows, we currently cannot permit camera positions to be changed

between the Mainshow and Lateshow. Please contact Management if you have any questions about this.

The cameras output over SDI not HDMI, so connect directly into the video lines in wall panels without need of an adapter. The cameras have 14-140mm MFT lenses. While the cameras do not have inbuilt displays, a display monitor will be fixed to the tripod for use by camera ops.

The Microstudio cameras can also be controlled remotely from the video switcher, via the control software (see Fig. 6). This is mainly useful for adjusting colour balance and light sensitivity.

Fig. 6 - ATEM Television Studio remote camera control

Please note controlling cameras from the switcher requires two SDI cable runs: one from the camera to the switcher to carry the video, and one from the switcher 'SDI out' to the camera to carry remote instructions. This means that it is advisable to plan two video cable runs in advance, particularly if you are placing a camera on stage where you may not have two video sockets in a single wall panel.

More information on the Microstudio Cameras can be found here.

- **Additional Cameras**

  We do not recommend Productions attempt to source additional cameras (above the theatre's three). This is because all the inputs in the system need to be at the same resolution and framerate for the switcher to recognise them, and it can be difficult to guarantee other cameras are compatible. However, if a production strongly wishes to have an additional camera, they will need to source it themselves. Here is a list of considerations when doing so:

  - It will need all accessories (e.g. monitors, tripods, and lenses) as the ADC does not have any spares of these. Lenses particularly can be expensive.
  - It needs to output to the exact same resolution and framerate as the other cameras on the system or the switcher will not recognise it. Currently this is 1080p 60FPS.

- It must output "clean HDMI" or "clean SDI". This means that the video output will not have overlays, like focus marks, battery reads, or recording time counts, which would appear in the feed to the switcher.
- It must be able to record or operate for longer than 30 minutes without cutting out or overheating. (This problem particularly affects SLR cameras, or other primarily still photography cameras with a video output).
- If it outputs HDMI, you should check the theatre has enough spare HDMI to SDI converters to convert it into SDI for transmission to the switcher.

If you think you will need additional cameras or plan to use any unusual video inputs, please email Eduardo at eduardo@adctheatre.com.

- **Blackmagic Design Microconverters**
As the name suggests, these convert from SDI to HDMI or vice versa. They require mains power to do this, so need to be stationary, but are small (76.5mm x 45.8mm x 24.8mm) so can be hidden fairly easily.

Notably the SDI model also has an 'SDI Loop Out' which refreshes the SDI signal, so it can travel approximately another 64 metres. This is especially useful for getting signal from the stage to the Lighting Box by taking SDI signal out of the Patch Bay patch, running it through a Microconverter, and connecting the 'Loop Out' to the line through to the Lighting Box.

Video Team Roles

- **Video Director**
The video director is in charge of the overall output of the stream. They will need to plan closely with both lighting and sound to ensure that the quality of the streamed video is good, as well as with the TD and set designer to set camera positions. They should also have a good knowledge of the blocking of the show to plan what angles would be best for different moments.

As the video switcher does not record cues and must be operated live, **it is strongly advised for the video director to operate the switcher for every performance.** If this is impossible a dedicated video switcher operator should be appointed and should have an excellent knowledge of the shot list and the show's blocking. The video switcher is operated from a desk at the back of the Stage.

The video switcher operator is also responsible for instructing camera ops over headsets throughout the performance on who or what to frame.

- **Camera Op**
The camera op is responsible for framing shots and setting zoom and focus. Camera ops should know the show, particularly if there are any difficult or time critical shots (e.g. during musical numbers) that need to be caught. However, as they are instructed live by the video switcher operator, if necessary another member of the production team can step into this.

In line with **Pandemic Production Guidelines** camera operators should sign in using the Google Form accessible via QR codes at each camera position. They should also disinfect the handles of the tripod and zoom ring on the lens with the alcoholic wipes provided.

They will have a display of their own camera's output and a headset for instructions. Given their proximity to audience they should avoid speaking back to the switcher operator during performances and should wear black. Additionally, they should check their cans packs have their volume set low to avoid the sound disrupting nearby audience.

Cabling

- ## Patches

  The video system has two patches: one in the patch bay, and one in the Lighting Box. There are currently 3 SDI lines connecting these two patches that can be used in either direction.

  Video cables passing through the Patch Bay should be refreshed using a **Blackmagic Design Microconverter SDI to HDMI** as described in 'An Introduction to the Equipment'.

- ## Video Points on Panels

  The video connectors that currently work for SDI transmission are:

  - Floor box by seat F14 in auditorium – two SDI lines to Lighting Box patch
  - OP Juliet panel – two SDI lines to Patch Bay patch
  - PS Juliet panel – two SDI lines to Patch Bay patch
  - Upstage panel – two SDI lines to Patch Bay patch
    - Note: one of the Upstage panel lines will be used to run the Switcher Multiview to the Video Switcher's Desk, so only one is available for camera use.

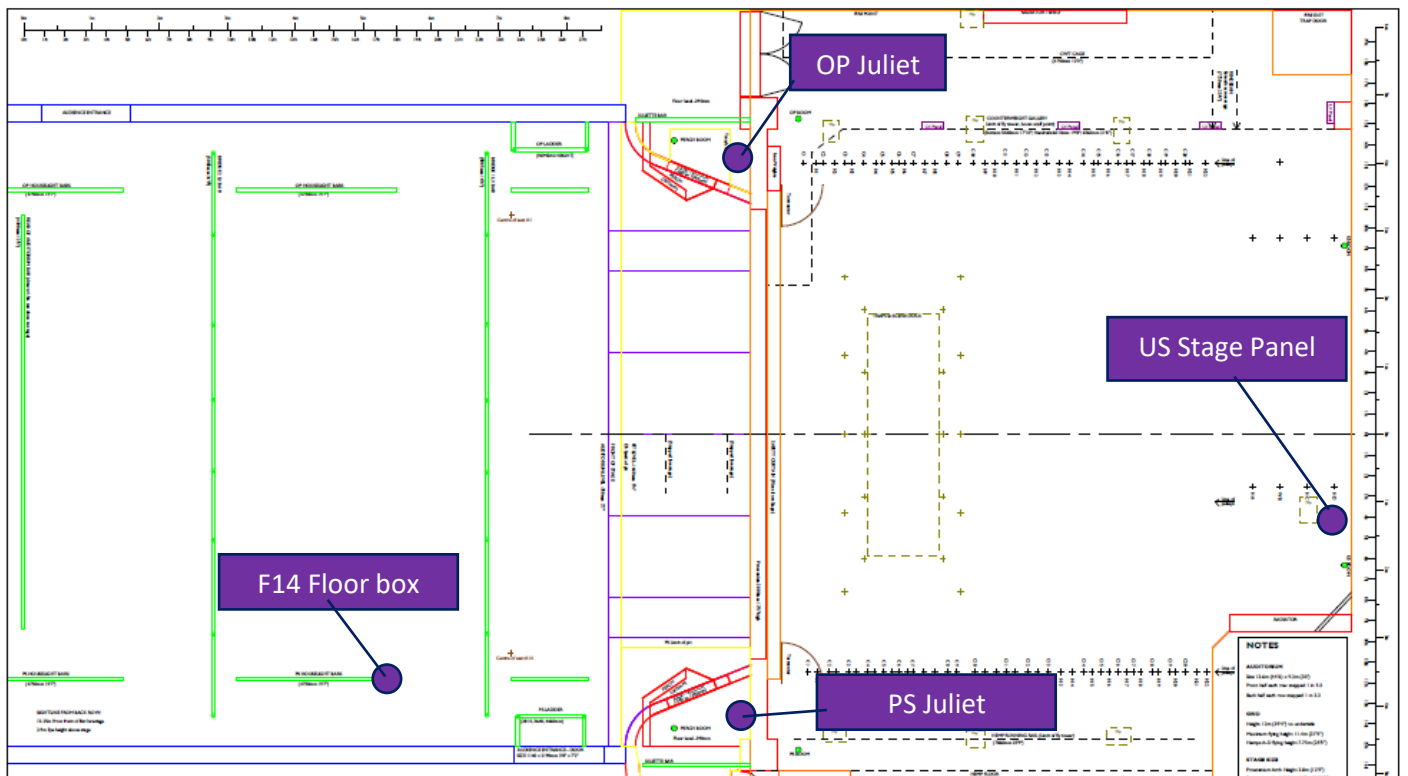These are labelled in the below stage plan (see Fig. 6).

Fig. 6 – Stage plan showing location of SDI connectors

- **Possible Camera Positions**

  This layout leads to some possible camera positions:

  - **Wideshot Camera** (*fixed*) – this will always be one of the three positions. It will be focused to capture the whole stage and forestage.
  - **F14 Camera** (*recommended*) – we recommend you use the F14 camera because it is a good angle and distance for Full to Medium-Close-Up shots (see later). Due to social distancing this is one of the only two places we can put a camera with operator in the auditorium.
  - **Forestage Camera** – it is possible to put a camera on the forestage. If so bear in mind it will be visible to the Wideshot camera, so it may be wise to make this a moving camera (i.e. it moves on and off stage, or is handheld rather than mounted on a tripod).
  - **Onstage Camera** – this would be a very show specific camera position, and could be placed anywhere on stage that can be reached by a single SDI cable. Bear in mind the cable needs to be considered in line with set plans to ensure it will fit and won't present a trip hazard.

  Unfortunately, due to the tight time constraints of the Mainshow-Lateshow change-over, **it is not currently possible for camera positions to be altered between shows on the same evening**. This means that the Lateshow should use the same camera positions as their week's Mainshow. Section 2 for each Mainshow asks for where your cameras will be positioned. Please have this completed so that management can inform other shows in your week of their camera positions. This policy may be revised if change-overs are occurring more efficiently than expected.
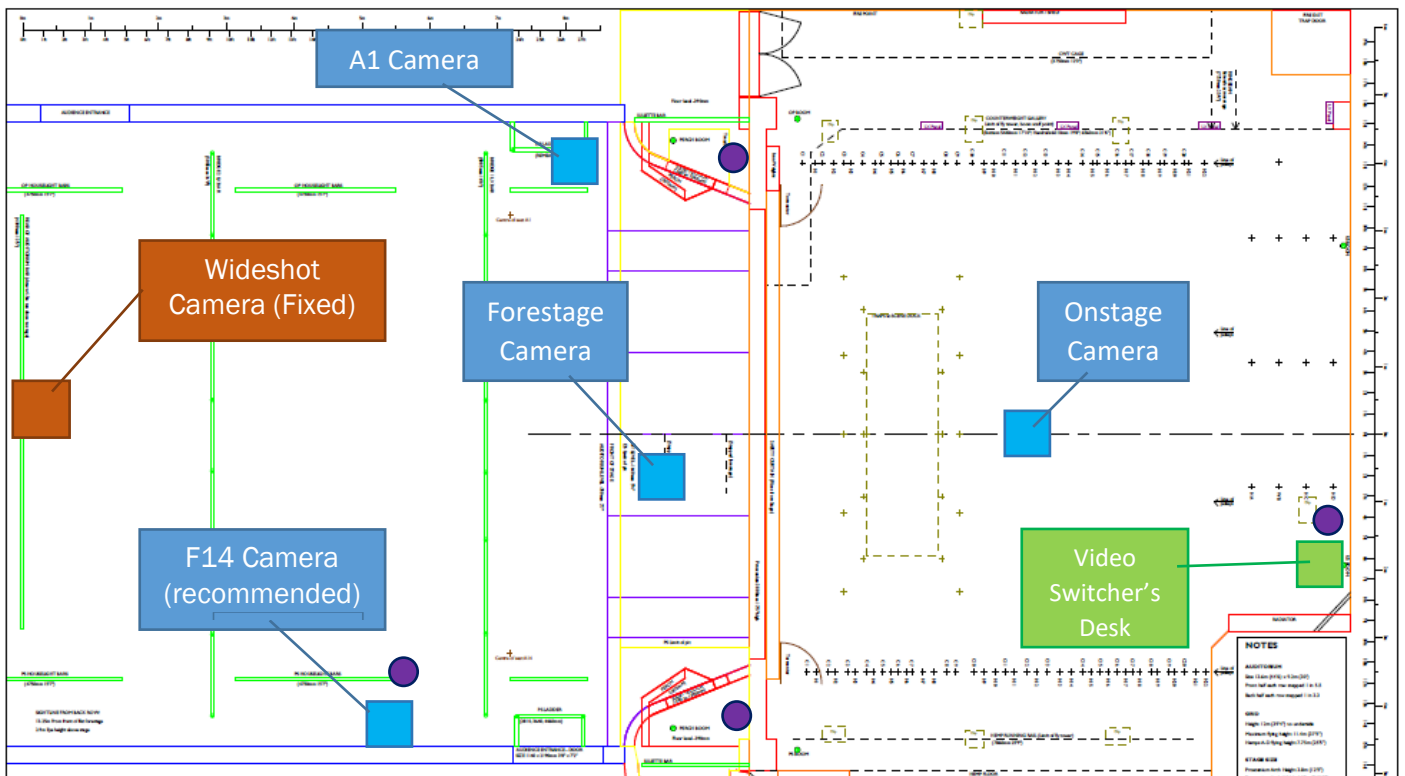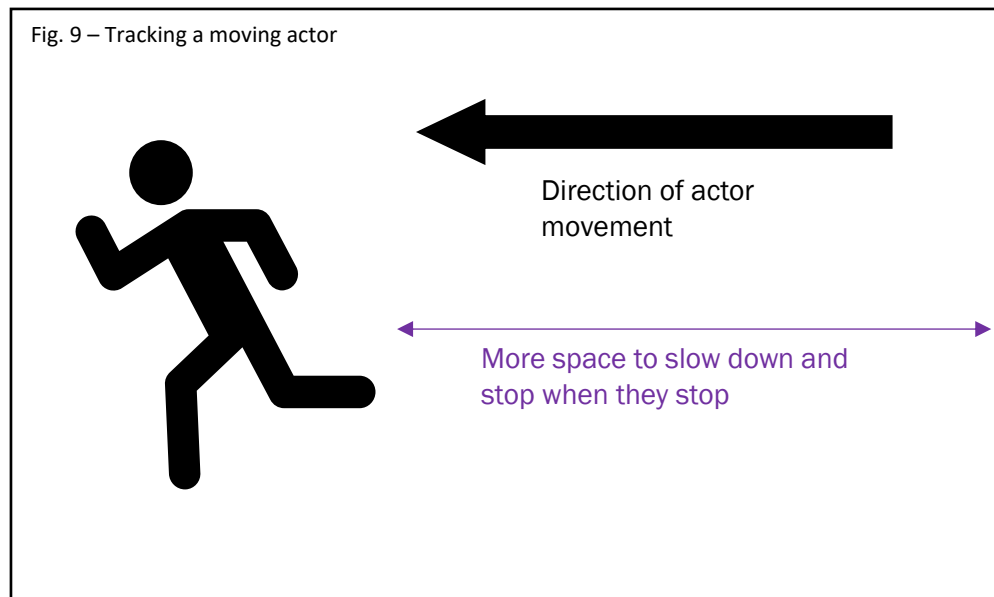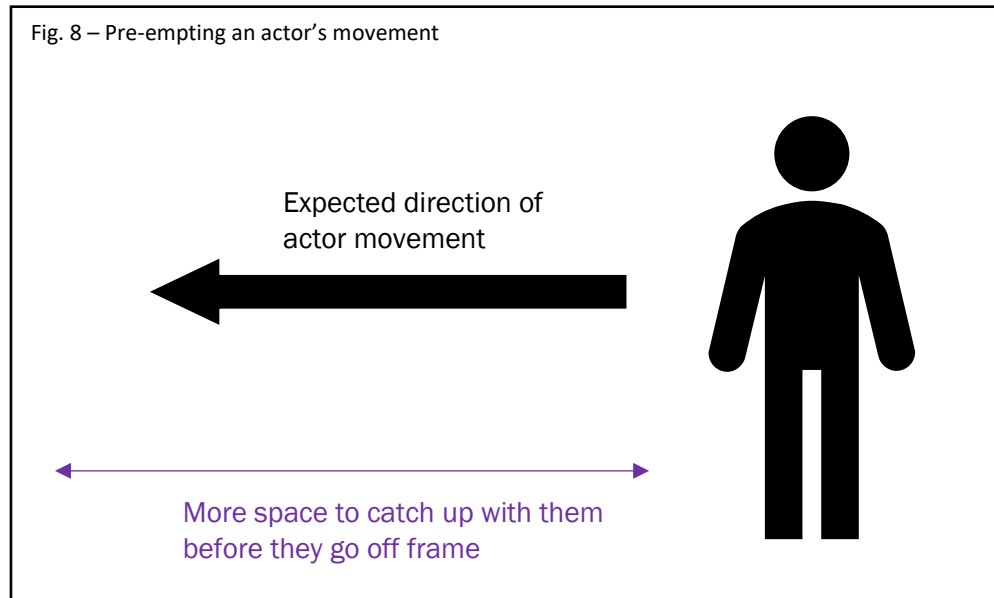
Fig. 7 – Stage plan showing possible camera positions, and the position of the video switcher's desk.

Camera Operation Tips

Camera operation is fairly intuitive, but here are a few tips to bear in mind:

- Unless they are for artistic effect, avoid unnecessary camera movements, particularly if they are sharp, as they draw attention to the camera.
- Similarly avoid zooming in and out while live as it will not look smooth (the cameras have manual zoom) and will draw attention to the camera, unless this is done for artistic effect.
- Your camera display will be outlined in red when you are the 'program' input (i.e. when you are live), and green when you are the 'preview' input (i.e. when you're about to become live).
- When an actor is standing still, and you know, or suspect, which direction they will move next, keep them framed so the edge of the viewfinder furthest from them is the direction they are going to move towards. This gives you more time to react when they start moving to prevent them moving out of shot. (See Fig. 8).
- When tracking an actor (i.e. following them across stage), try to keep them framed so the closest edge is the edge they're moving towards. This means when they stop suddenly, you have the whole screen to centre them smoothly, so don't shoot past and boomerang back. (See Fig. 9).
- If you are not sure what the actor will do next, zoom out a bit, so you have some more space to react.

These will help make your camera operation a lot easier, while helping produce a smooth and polished final product.

Fig. 8 – Pre-empting an actor's movement

Expected direction of actor movement

More space to catch up with them before they go off frame

Fig. 9 – Tracking a moving actor

Direction of actor movement

More space to slow down and stop when they stop

Shot Planning Tips

Planning shots for a live event is hugely creative and varied process, with each event requiring a different selection of shots. Having said this, as with camera operation there are some guidelines that help achieve smoother and more effective capture, as well as making life easier for your camera operators. As with all creative guidelines though, do feel free to ignore them if they do not fit your and your director's artistic vision for the performance.

- **Types of Shot**
  The following is intended to be a very rough guide to types of shot used in film. Some are more useful than others for filming at the ADC, and you are free to define your own type of shot, but as a video director/switcher, it is worth explaining to your camera operators what you want, so that they know what you mean when you ask for it – "medium on Hamlet" could mean anything if you haven't agreed it first.

- **Wide** – Frames the subject (usually an actor) within their full surroundings. The subject is usually small and off- centre in the shot. This is useful for establishing settings and establishing a subject's relationship to their environment.
- **Full** – Frames the subject from head to toe. Has a good balance of surroundings and subject, and is usually used for showing movement (as it captures the full body). Is weaker for showing emotional performances as the face is less prominent. Good for fast tracking shots.
- **Three-Quarter** – frames the subject from head to knee or mid thigh. A middle ground between the Full and Medium shot. Good balance of subject, surroundings, and emotion. Good for medium to slow tracking shots.
- **Medium** – Frames the subject from head to waist. Captures facial and upper body performance while still being feasible for slow tracking shots.
- **Medium-Close-Up** – Frames the subject from head to no lower than elbow. Shows the face of the subject in detail, as well as some of the surroundings. Excellent for facial performance, but poor for capturing movement, as it is so zoomed in that it is very difficult to keep an actor in shot
- **Close-Up** – The face of the subject dominates the frame, though some of the background can still be seen. This shot is popular in film, but difficult to achieve well in live events due to the unpredictability of actors hitting their exactly mark each time. This shot is not advised unless the camera operators have rehearsed moments using it in advance.

Of course, all the above are merely guides to thinking about shots, and in most cases thinking about Wide, Full, and Medium will be enough for live events, but it is worth being aware of the others.

- **Planning Your Shots**

  Planning shots largely comprises of going through a show and deciding who is the subject at each moment, which camera is on focusing on them, and what shot type should be used. The level of detail planning requires varies on what sorts of shots you choose. If you are planning to use lots of Medium and Medium-Close-Ups then you will need to make sure characters are largely still at these times, and that they will be at expected locations. If you are less certain of what the action on stage will be like, you will want to stick largely to Full and Three-Quarter shots, as they are more forgiving on unexpected movement. In any case, it is likely that the show will guide your choices – a naturalistic drama full of still moments and emotional speeches will demand closer shots to capture the actors' performances; big musical numbers will ask for broader shots, likely Wide and Full, to capture movement and the full stage action; improv or comedy will ask for something in between, that can both capture facial expression, without struggling with unexpected movement.

  The other important factor to planning your shots is to think about how you transition between shots. If you want a close-up with a camera, and then after it another close-up on a different character with the same camera, you will need to cut away to a different shot in between to cover the switch. On the other hand, cutting from a close-up or medium close-up to a wideshot can be jarring, so it might be worth going via an in-between shot instead. These are things worth bearing in mind when planning your shots, though again it is likely the show itself will lead you.

What is crucially important is that you are aware of the kind of stage action your show contains. This doesn't need to be exact blocking, though that of course will help, but knowing that one scene is fairly slow and emotional, and another involves fast full-stage action is essential for choosing your approach to each scene. For that reason, **we strongly advise that video directors/switchers watch a full run through of the show before the Technical and Dress Rehearsals.** This will enable you to check whether your shot plan fits the stage action, and revise it if not.

It is also worth producing a written shot plan, or at least a general idea of what kind of shots to use in what scenes. This is valuable both for your own reference, and in case the video switcher operator is unable to operate a show, something that is sadly a higher risk during COVID than it normally would be.

Lighting

Lighting for cameras is different to lighting for stage, but as all shows will have both audiences and streaming a compromise the lighting designer needs to find a compromise between the two. There are two main differences:

- **Brightness** – As a rule, cameras require a lot more light than the human eye, so what appears dark and atmospheric to the eye can be too dark to be visible on camera. Here it's best to err towards the camera, and make sure all acting areas during the show are decently lit. It is a good idea for your video director to check that lighting states are bright enough as you go through the technical rehearsal to prevent the show being too dark.

- **Frontlight vs. Sidelight** – While using sidelight is good practice in stage lighting design to bring out the shape of performer's faces and prevent the stage feeling flattened by too much frontlight, in film this is even more important. Videos are 2D, and so are only as three dimensional as the image makes them appear. Side lighting (i.e. lighting that is not coming from behind the camera) is one of the key ways to create the impression of depth. While a show will be visible if lit from the front, if you want your lighting design to stand out on camera, it's worth thinking about how to provide sidelight at different colour temperatures to sell those three dimensions to the streaming audience.

- **Colour Balance** – Unlike the eye, cameras require some calibration to replicate colour accurately. It is worth configuring the cameras via the Switcher in the technical rehearsal to ensure the colour you get onscreen correctly reproduces colour onstage. This is something the video director should do, but the lighting designer should be aware that this contributes to how their lighting looks on camera.

One thing that shouldn't be affected by the cameras is fades and blackouts. There was initially some concern that the cameras would overcompensate for sudden changes in light by adjusting exposure, but as the cameras are not auto-focused this is not a concern, and the cameras have done an excellent job of picking up sudden lighting changes and effects.

Sound

For livestreaming, sound has to be captured live, mixed, and fed to the video switcher.

- ### Capture

  There are two ways to capture stage sound:

  - **float mics** – a system of microphones rigged and pointed at the stage to capture sound from it;
  - **personal mics** – individual mics given to each actor, that specifically capture that actor's voice, usually either radio or handheld mics.

  The ADC will have a float mic set up that will be the default for shows to use. However, float mics have a major drawback – they will produce feedback, and so be unusable, for situations where a show requires amplification in the auditorium. This is usually in the case of musical numbers where an actor's voice must be balanced against a band or pre-recorded music. If your show requires amplification in the auditorium, you will need to use either radio mics or handheld mics. In this case you will require a sound mixer.

  If your show does not feature amplified performers or band then you do not need to worry about personal mics and can instead just use the float mic system.

  Please inform either Lucia (lucia@adctheatre.com) or Eduardo (eduardo@adctheatre.com) as soon as possible if your show is planning to use personal mics as they introduce social distancing and hygiene considerations.

- ### Mixing

  The sound desk (**Yamaha CL3**) will be used to mix the sound for both the PA system (auditorium) and the stream. The stream sound will be outputted from the sound desk and fed into two XLR inputs on the back of the video switcher. The PA system's sound will be outputted normally.

  Before I get into the weeds of explaining the considerations at play when mixing for both Stream and PA, I want to assure shows that plan to use the float mic system, and that may not have a sound mixer, that **the sound desk will have a default setting that sends sound to both the Stream and PA**. It will require someone to monitor it to check that voice and sound effects are well balanced on the stream, and the auditorium sound effects aren't too loud or too quiet, but this can be done by a sound designer who does not have much experience of the desk. It could also be done by the video switcher operator using an iPad that can control the sound desk remotely. They just need to move three sliders to adjust the levels of the Float Mics, Qlab to the Stream, and Qlab to the auditorium.

  However, if you intend to use any microphones other than the float mics, there are a few things to take into consideration. I have attempted to lay these out using a handy flowchart (Fig. 10) overleaf.
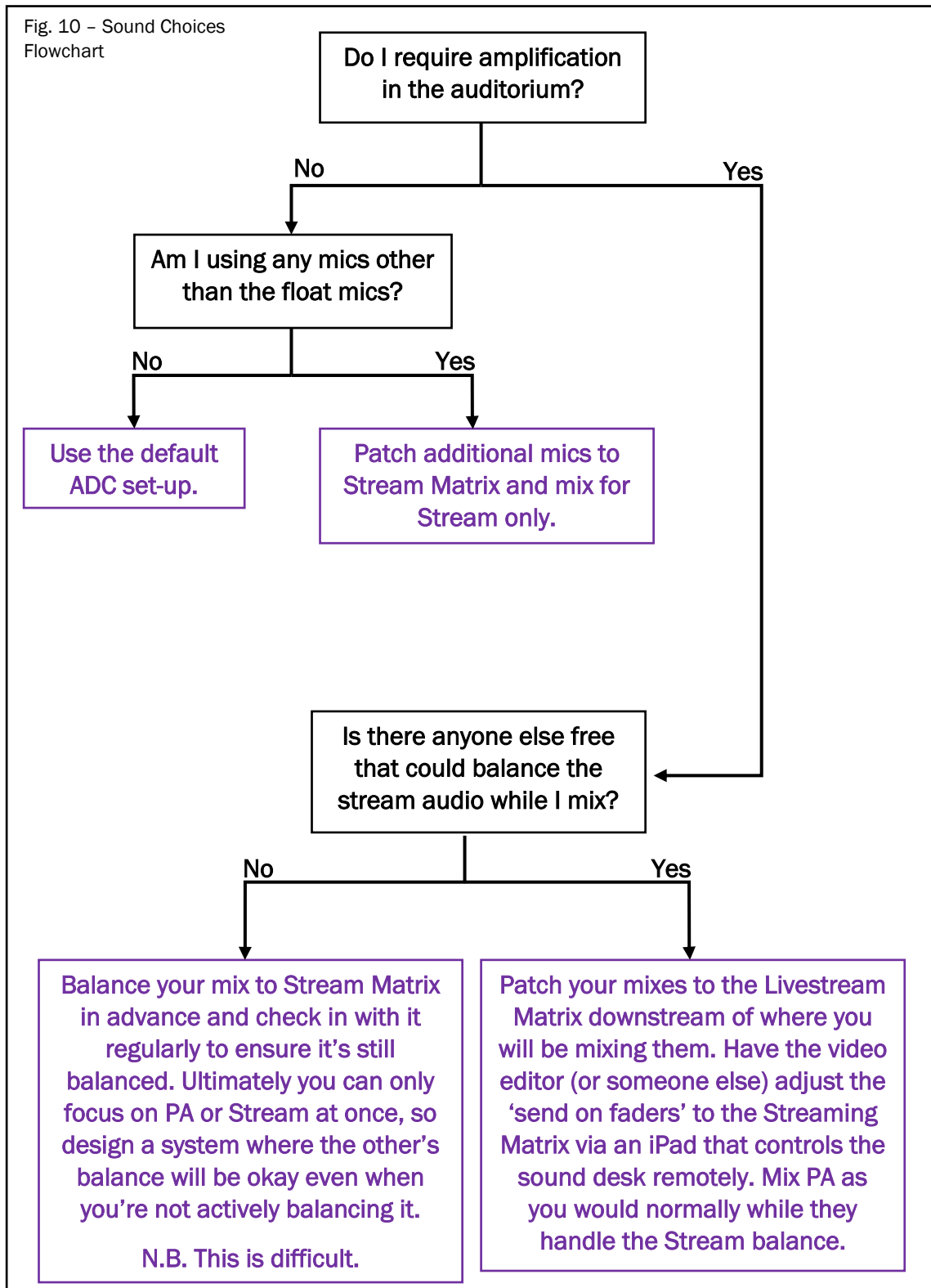
- ### Some technical points

This is mainly for the benefit of Sound Designers this term. The only major change to the desk set-up is that instead of the main PA being output through the desk's main stereo output, it is instead being output via a pair of matrices labelled 'PA L' and 'PA R'. Similarly the Stream mix is being output via a pair of matrices ('Stream L' and 'Stream R'). This so that inputs to both Streaming and the PA can be adjusted from the normal inputs fader bank as standard post-fader sends, rather than having to be adjusted via 'send on faders'. Without this change any input or mix set to 'ON' and with a fader higher than -INF would be audible through PA, likely causing feedback.

An iPad will be available (by default living on the Video Switcher desk) that is configured to be able to remotely control the Sound Desk. This can be used either to allow a second person to balance the Streaming mix, or can be kept near the desk to allow easier editing of 'send on faders' without needed to tab away from your main mixing area for the show on the desk.

As always, the sound desk is a wonderful piece of kit, and I'm fully in favour of sound designers configuring it to suit their show. However, if you are planning to edit anything that carries between Scenes, please let me (eduardo@adctheatre.com) know in advance so that I can take a back-up of the desk before you begin, and check that any adjustments to its configuration do not break the default scene, or anything else other shows sharing your week need to use.

I'm aware that mixing for two outputs will be a new challenge, and that it may take more planning and be prone to more issues than usual, so if you have any questions, or want to discuss your sound plans with me, please drop me an email at eduardo@adctheatre.com and I would be delighted to help. Equally if you are new to sound design and would like an introduction to the desk, let me know and we can set a time.

Fig. 10 – Sound Choices
Flowchart

Do I require amplification in the auditorium?

No → Yes →

Am I using any mics other than the float mics?

No → Yes →

Use the default ADC set-up.

Patch additional mics to Stream Matrix and mix for Stream only.

Is there anyone else free that could balance the stream audio while I mix?

No → Yes →

Balance your mix to Stream Matrix in advance and check in with it regularly to ensure it's still balanced. Ultimately you can only focus on PA or Stream at once, so design a system where the other's balance will be okay even when you're not actively balancing it.

N.B. This is difficult.

Patch your mixes to the Livestream Matrix downstream of where you will be mixing them. Have the video editor (or someone else) adjust the 'send on faders' to the Streaming Matrix via an iPad that controls the sound desk remotely. Mix PA as you would normally while they handle the Stream balance.

A Graphic Overview of the ADC Theatre's Streaming System

Rear of Auditorium

Camera 1

Auditorium F14

Camera 2

Stage

Camera 3

Mic 1

Mic 2

Mic 3

HDMI

SDI

SDI

XLR

XLR

XLR

Patch bay SDI patch

SDI extended here

SDI

Bantam patch (audio signal patch)

Lighting box SDI patch

SDI

SDI

Sound Desk

XLR

Switcher

SDI

Encoder

To Stream

Video (Production)

Sound (Production)

Video (Duty Manager)

To PA System
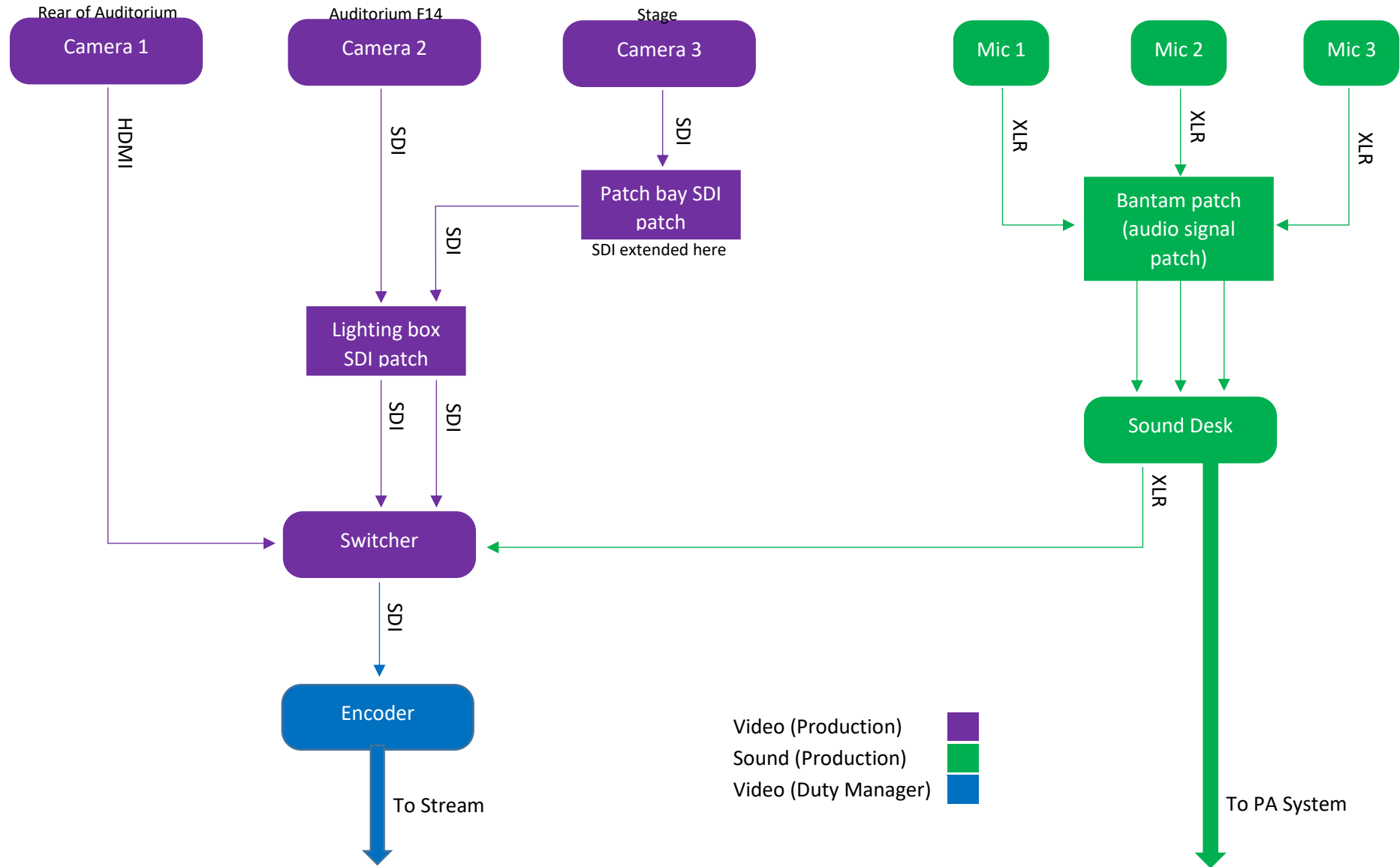
Streaming Q&A Log (07/10/2020)

Video Team Roles

Q: Are video switcher/camera ops communicating over cans?

A: The video switcher operator and camera operators will communicate either over cans (on ring B to prevent too much speech on ring A). It's worth noting the camera operators should avoid talking back to the switcher during performances as they will be audible to audience members and the stream.

Cable Types

Q: How much spare cable is there in the theatre to facilitate longer runs?

A: The longest SDI cable we have available is 10m. However, it is possible to achieve longer runs by using the SDI to HDMI converters to join cables together. Bear in mind each converter requires a power supply when planning your cable run.

Video Switcher

Q: When will there be video switcher/camera operator training?

A: Switcher should get in touch with Eduardo at eduardo@adctheatre.com. We are not planning to offer training intended for camera ops, though we will run through how to use the cameras with the video switcher so that information can be passed on.

Q: Is there any delay at all when switching between cameras or will it be reliably instantaneous?

A: The video switcher cuts to the frame, that is, following registering the 'cut' button being pressed, the switcher will finish outputting its current frame, and then start outputting a new frame from a new source. As it outputs 60 frames per second, this is effectively instantaneous.

Q: Will there be a computer for this software control in the LX box?

A: (Updated 05/05/21) The video switcher operator will now operate from a computer at the back of the Stage using the ATEM Software Control program. A computer will be provided for this.

Cameras and additional inputs

Q: Is there a noticeable difference in general picture quality between the three cameras?

A: Picture quality is equal across the systems, but the Pocket Cinema camera cannot have its colour balance changed from the switcher. It can however have its aperture and ISO (i.e. it's brightness) and white balance adjusted via a Bluetooth app. In reality this changes fairly

little about the image, and they all still run at 1080p 60FPS. The Pocket Cinema also has a different lenses, but that's more to do with angle and focus than image quality.

Q: Will the Mac in the sound box be available to connect to the video switcher or will you need to supply your own laptop?

A: You can send video from the sound box mac to the video switcher. However you cannot send different images or video to the projector and switcher simultaneously.

Q: Can you use overlay graphics through the software?

A: Depends on what sort of thing you want to do – the switcher has a limited number of graphics engines, so can only do a limited number of individual graphical effects (i.e. limited numbers of simultaneous transitions, overlays, picture-in-picture, etc.). You could produce your overlay in Qlab, leaving a green background, and use the switcher's upstream chroma keyer (green screen tool) to make it erase the Qlab green background and superimpose it onto the video feed. Email eduardo@adctheatre.com if you have any particular queries.

Overlays for content notes and for intervals will be managed by the Duty Manager via an interface in the streaming service.

Q: Is the way to use pre-recorded videos to put it through QLab and run it through the sound mac?

A: Yes. The sound mac can output video directly to the video switcher. The sound however should pass through the sound desk as with usual Qlab sound files. The sound mixer can then mute out the stage audio so only the Qlab audio can be heard. Please remember you cannot send different images or video to the projector and switcher simultaneously from Qlab.

Camera Positioning and Cable Runs

Q: Can cameras be changed between a mainshow and a lateshow?

A: Currently, no. This is because repatching the cables takes time, and change-overs will likely be tight between shows this term. If it seems change-overs are occurring more quickly than expected, we may reconsider this position.

Sound

Q: Will there be any kind of audio delay from auditorium to desk to stream?

A: No. We have not encountered any issues with audio not being synced.

<u>General Questions</u>

Q: Any idea about how lighting changes will be picked up?

A: As a rule, cameras require a lot more light than the human eye, so shows are likely to appear darker than expected. Cameras do not have autofocus, so should deal fine with changes in brightness (i.e. they won't overcompensate for a blackout by overexposing).

Please let me (eduardo@adctheatre.com) know if the cameras seem to struggle with certain types of transitions, so I can warn upcoming shows. It's worth keeping an eye on this during your technical rehearsal (we plan for your LD to have a private version of the stream to monitor this), but in principal it should be fine.

The LED lights (both Lustrs and CSPs) have a camera-friendly setting – they should all already be set to this, but if you notice any flickering that is likely to be the issue and can be fixed remotely from the lighting desk – just let Eduardo know and he'll trouble shoot it.