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RECORDING ON A MAC OR PC

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1. Synching in Premiere

If you are looking for just a refresher or checklist of what to do before recording, they are:

1. Check your OBS video/output/audio settings to make sure they are what you want in terms of video quality.
2. Check that the right sources are turned on in OBS for your recording.
3. Go into your sound system preferences and make sure the proper iShow U devices are selected for I/O. (MAC)
4. (Optional) Start up Audio Hijack and create the Session you need so as to record seperated sources.
5. (Optional) If using Audio Hijack make sure it is outputting sound to the iShow U (Sound Ouput).
6. (Optional) Start Recording with Audio Hijack
7. Start Recording with OBS and make sure your volume on OBS's audio capture is not too high.

PREFACE

This guide is a general tool to aid in research of online (sometimes ephemeral) environments. This guide includes both "at home" instructions for researchers wanting to work outside of the lab, or to record environments that require software not installed on lab computers. It also includes instructions on how to work on the lab computers pre-configured with the software in the guide.

If you are just looking for instructions on specific parts of the process, please check the index on the following page. Anything marked "At Home" you can skip if working in the lab, but you should still go through the rest to make sure your settings are properly configured from the last person to use the software.

FUNCTIONALITIES

This guide is primarily describing a screen recording workflow and set of tools that are aimed at allowing academics to record and have access to otherwise ephemeral video events (i.e. live streaming) and or video streaming services along with their interfaces which might otherwise be changed and remain unpreserved.

There are two types of screen recording that are not the specific goal of this guide, but here is a brief explanation of how you can look into them.

Recording Smartphone Screens and Interactions

The exact methodology of how to do this will be more or less easy depending on what version of phone and OS you are running.

Apple iOS

You can record these screens one of two ways either through the internal phone capability (iOS 11+) or through connecting it via lightning cable to a Mac. I would suggest connecting it to a mac as the quality is better. Your phone must "Trust this mac". Open Quicktime, from the File menu select "New Movie Recording". On the window that pops up, click the arrow next to the record button and select your Iphone. It will now be recording a Screen Capture of your phone. It will not record audio, your phone will actually only output audio if you connect it to headphones. If you want to record audio, you would have to have a male/male audio cable to connect it in to the mic input of your computer or an audio interface.
*Note, not all apps will allow screen capture in this way.

Android

These phones have access to an abundance of in-phone recording apps, as androids will run multiple apps at once. It will be up to you to decide which app works best for your phone.

Archiving "Non-Live" Video Sites

If your research involves cataloguing videos as hosted on non "live streaming" sites, there are a variety of extensions for Firefox that can provide this capability. This can be useful to investigate compression strategies, modified videos or pirate culture. Some long running extensions here are "Video Download Helper" and "Flash Video Downloader", they work on most video hosting sites but not all.

BEFORE YOU START

- This short guide is written based on Mac OSX 10.10+, however some of the utilities mentioned exist for PC and older mac systems, if you are working on a non modern mac system WikiHow has an extensive list of walkthroughs that may be helpful. (OBS for instance requires no "work-arounds" on PC.)
- This guide will aim to guide you through using these tools at home or in the lab, just know that you will have to run tests at home based on your computer's processing/graphics power.

1: Downloading / Setting Up "Open Broadcast Software"



We are going to use a free open source recording program called OBS Studio (or Open Broadcast Software) which is available for Mac, PC and Linux and offers more control than Apple's QuickTime Player Recorder. You can find it at obsproject.com, install it on your computer and continue along in the guide.

- (QUICKTIME: The reason you want to use OBS Studio, is that QuickTime is easy to start, but will make decisions for you. In most cases it will not tell you that you cannot record something, even though your computer cannot handle recording it. Instead it will just reduce your framerate to as low as 1 fps or reduce the quality of the encoding resulting in an ugly looking file. This level of unpredictability and lack of control makes it so that Quicktime should be a last resort only in situations where you cannot install OBS.)

Before we start recording we will have to do some setup, as well as get a program to handle system audio. (There is a work around if you have a specific type of computer and some cabling, see audio section.)

Recording at Home:

You will have to make some decisions about what quality to record at (i.e. 1080p vs 720p, High Bitrate vs Low Bitrate, etc.), this will dictate how to best set up OBS for your systems capabilities (processor speed, RAM, etc.) It's about finding a balance. You don't want to have ugly files at the end of recording, but you also don't either want to tax your system so much that the software you are recording cannot run properly or that OBS is overtaxed and crashes if you have a mid range to low range computer setup. You will have to experiment as we continue on with the guide, there will be instruction on what to try.

The best way to try things is to aim for the best settings and walk things back one at a time until the task you are asking of your machine matches up to it's capabilities.

Recording in the Lab:

The lab stations (especially the edit stations) will not break a sweat running at high settings, so it is suggested you make use of them. The sections of the guide will go through setting up everything from scratch but the lab computers will likely already have everything pre-configured on them. However if you need a new option feel free to add it in.

2: Installing and Configuring Audio Capture

Capturing system audio is a bit tricky on Mac and depending on your capture method you may end up with more or less flexibility in post. Here we will show three possible ways of recording audio:

- **(Lab / Home) iShow U Audio Capture Extension - Most Simple in Editing / Med Quality**
This involves installing a extension that is part of another piece of software that grants you the access to recording system audio through OBS **directly**, generating a fully pre-synched file. However it is a global audio record, meaning any alert sounds or other interruptions that would be heard in your headphones are also recorded and everything recorded is mixed down to two tracks, making it very unlikely you can mix or extract a problematic sound. (This workaround is a free piece of software.)
- **(Lab / Home) Audio Hijack Dual System Recording - Most Flexible in Editing / High Quality**
This involves installing a second program to handle audio recording, it provides better encoders for better quality audio and can separate audio from various system and program sources, ensuring a clean recording and more flexibility in mixing if needed, it is still suggested you install iShowU as this will make it easy to synch. (This involves a pay to use program, which offers a limited free trial.)
- **(Home, Old System) Physical Loop - Easiest (if applicable)**
This is an old workaround for recording audio using a few cheap and easily procurable cables, it is applicable for older (~2010 and earlier) Mac systems as well as some PC / Linux systems. To see if your computer can take advantage of this, look to see if you have separate jacks for microphone input and headphone input, if you do, you can check this option out. It does function in the same way as iShow U Audio Capture listed above, but in a physical manner. This is included because the extension and program described above may not work on some older operating systems.

Note on recording your own voice notes:

Recording your own voice for notes is however relatively simple, you just select your connected microphone in OBS and record from it. As long as you can see the microphone in **System Settings > Sound** it should appear in OBS and we'll cover how to do this later.



A. iShow U Audio Capture Extension

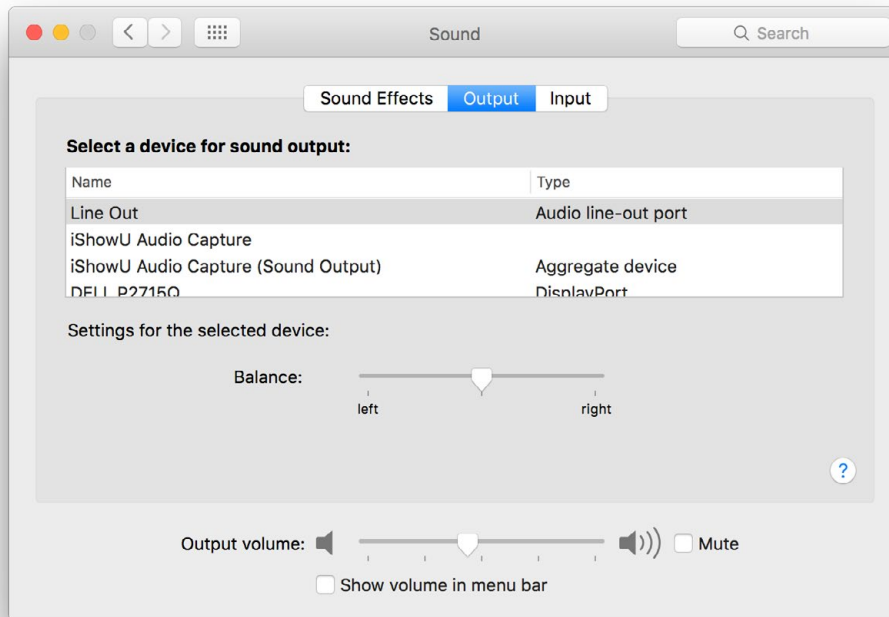
***FOR PC USERS:** You can just use the "Audio Output Capture" in OBS and do not need to do this. This is a recently created extension which can be installed on a mac computer (and is installed on the lab computers) which will create a virtual "collector" for your system audio. Basically this will trick your mac into thinking that your system sound is an external microphone that it can record.

First go and download the extension at the following link:

<https://support.shinywhitebox.com/hc/en-us/articles/204161459-Installing-iShowU-Audio-Capture>

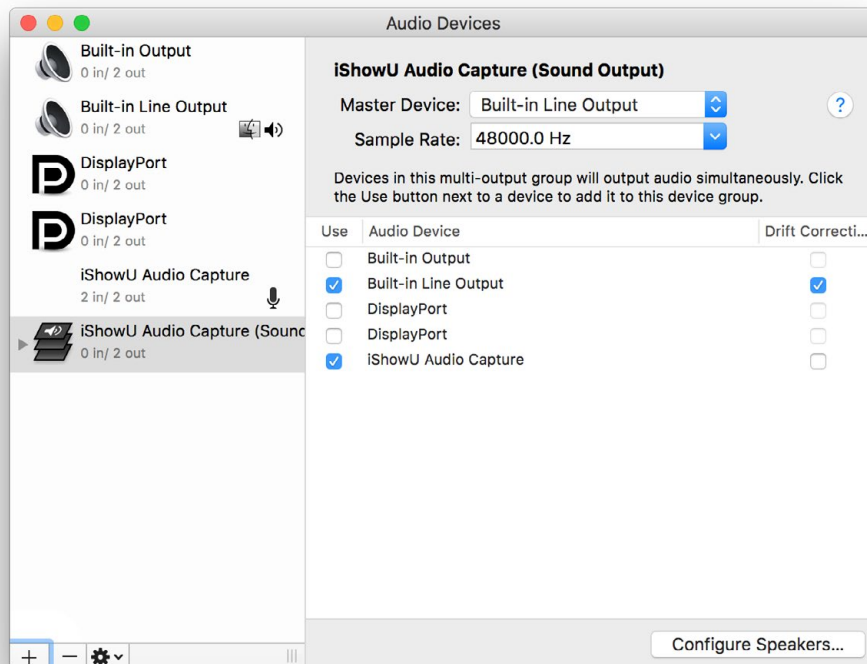
As you will note on the site, this is an extension for Mac OSX that is designed to work with another standalone piece of software, but which we will use for our own purposes. There are installation instructions included on the page. Once the extension is installed we have to do some set-up in another piece of software on your mac for the extension to work properly.

Once you are through the installer go to **System Settings > Sound > Output Tab**.



You will now see an additional option in the system settings menus called "iShowU Audio Capture", do not worry if you do not see 2 options as above, we are about to create the second option, marked "(Sound Output)". We have one more step to configure and then we will come back to this menu.

Go to **Applications > Utilities > Audio MIDI Setup**.



We are going to set-up what is known as a "multi-output device". (Example above.)

This is a necessary step because the extension will capture all of the system audio, but it will not by default relay that captured audio to your headphones or speakers for you to monitor.

Create Aggregate Device
Create Multi-Output Device

Click the bottom left + symbol and select **Create Multi-Output Device**. This will create an option that will appear in your **System Settings > Sound > Output Menu**.

Depending on your set-up, there are two possible ways for you to set this up, depending on whether you intend to use headphones or not. You will see **Built-in Output** (built in speakers) and **Built-in Line Output** (headphone jack), make sure you pick the correct one (headphones are suggested).

Set the options as in the previous screenshot on the last page:

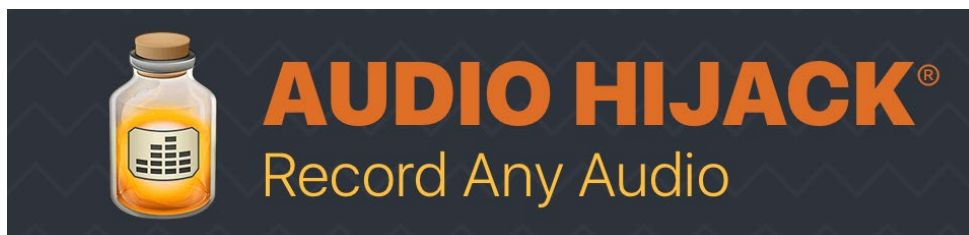
Master Device: Built-In Line Output (or Built-in Output for Speakers)

Sample Rate: 48000.0 Hz

Use: "The output you selected above" and tick the drift correction box here but not on any other line.

Lastly rename the device in the bar on the left side of the window by double clicking the name of the device. I suggest you name it "**iShowU Audio Capture (Sound Output)**".

Now we have all the installations and basic configurations done for recording system audio directly into OBS. Note that all volume must be controlled directly in applications as you will lose volume control.



B. Audio Hijack

So this is a dedicated sound recording program which can handle a diverse set of computer and microphone sources and keep them separated.

This software can be found at the following link:

<http://rogueamoeba.com/audiohijack/>

It is of course pre-installed at the lab, but a free trial is also available if you wish to use it at home. The main limitation of the free trial is that any recording passing a length of 10 minutes will then go blank. (Note that the program will not stop your recording, it will just record nothing, so you have to set a timer for yourself at 10 minutes, which is not ideal but it is a free trial.)

Go through the standard installation steps and you're good to continue. Just note the following, there are some extensions that Audio Hijack uses in order to do specific functions (like record discrete programs) so there may be some prompts to download extra extensions when you start configuring the program in the next step. The extensions are all free, so just install them as they ask you too.

C. Physical Loop

If you are dealing with an old enough Mac system that won't run Hijack or work with the above extension, or a PC / Linux system there is a physical way of doing basically what the iShowU extension does. What your computer needs to have for this to work is a separate headphone and microphone input (i.e. two 3.5mm audio jack inputs.) This doesn't work on new macs as they have one multi-use port. What you will need for this is two cables which you may already have lying around:

1. A "male to male" 3.5mm stereo audio cable. This is the same kind of cable as standard headphones use, but which has two plug ends. (As opposed to a "male to female" which is a headphone extension.)



2. A headphone splitter. These come in many different configurations, any will do.



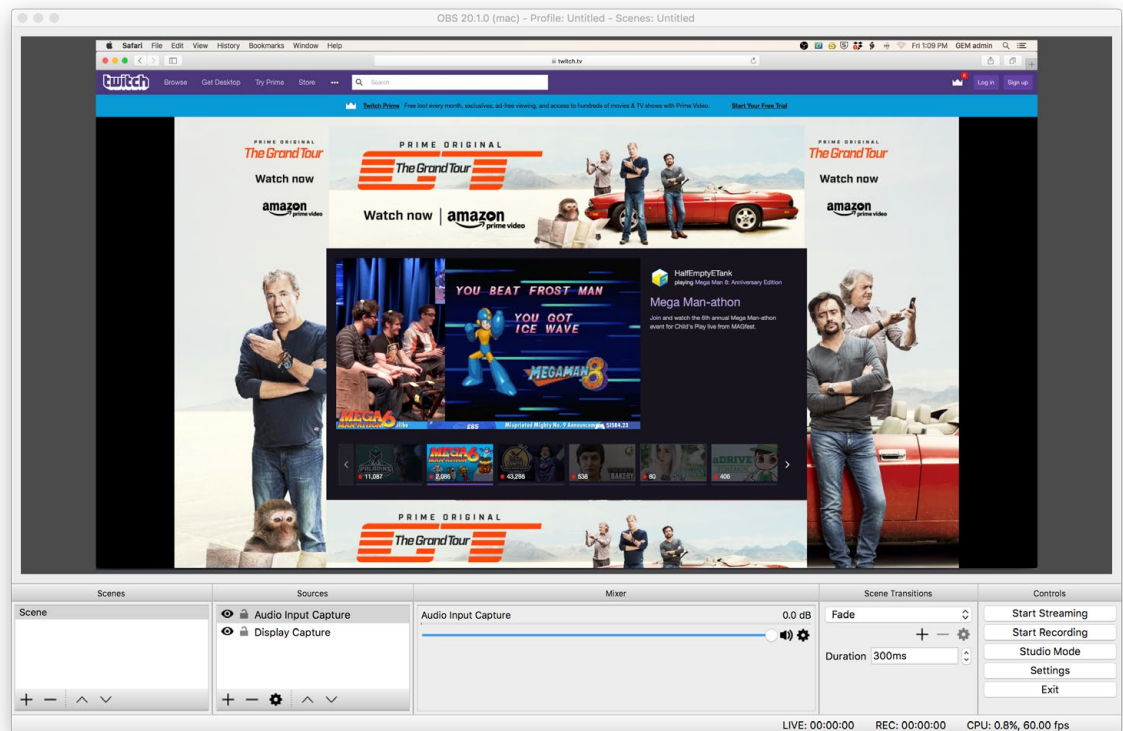
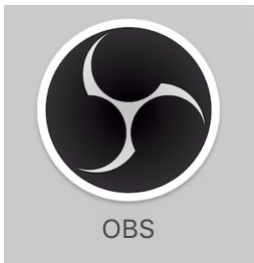
What you will do now is plug your headphone splitter into your headphone jack on your computer. Then plug your own headphones into one port of the splitter. Plug one end of the "male to male" cable into the other port of the headphone splitter and finally plug the other end of the male to male into your microphone input.

Now go into your sound settings and make sure that your computer is set to use your mic input (most likely labeled "Built in Line Input" or "Built in Input") as your microphone. You have now routed it so that your computer will record whatever you hear in your headphones. Please note that as with the iShow U extension, any sounds made by the computer including the alert sound will be recorded. Unlike that extension you will retain audio level control via your keyboard.

1. OBS Source Configuration

So since OBS is handling our video recording (and possibly our audio recording if you aren't using Audio Hijack) we'll start here. Note that if you are in the lab, much of these settings should be pre-configured, but you will still want to check the actual recording settings for things like your resolution and bitrate to make sure they are where you want them.

Open the program. OBS (at time of writing) has a beta version set-up wizard, but we will avoid this as it is in Beta. What you see below is an example of a configured OBS screen, expect your preview to be black if this is the first time you've opened it.



A. Source Selection:

OBS works in a version of the layer system you might see in Photoshop or Premiere. This is mainly so that people using it's streaming capabilities can compose more complex videos with webcam feeds, screen captures and other elements all running at once in the streaming video. Even though we're explaining simpler screen captures, it's useful to know how this works if you want to do more complex things live instead of compositing things later in Premiere.

At the bottom of the screen there are your various control panels.

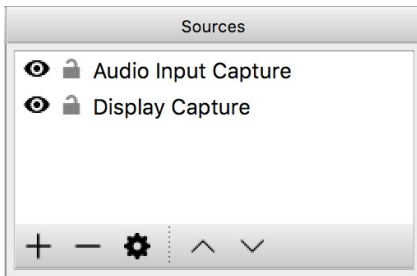
Scenes: These are configurations of different sources (next panel over), scenes can essentially be used to transition from one screen set up to another on the fly while recording. This is more for streaming than our uses. (The scene transition panel further over allows you to add fades to transition between scenes.)

Sources: This is where you will tell OBS what to record (both video and audio) and in the case of video, how to layer it. Audio is all mixed down to a stereo file, so while you can record multiple sources at once they will be permanently mixed upon output as they were recorded.

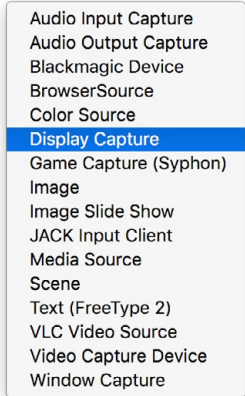
Mixer: This is where you can control your audio sources volume levels, each one will have a volume control and an input level gauge.

Controls: This is where you start and stop a stream, start and stop a recording and adjust settings.

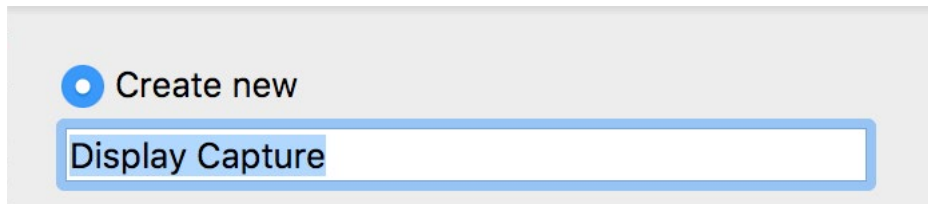
Adding Sources:



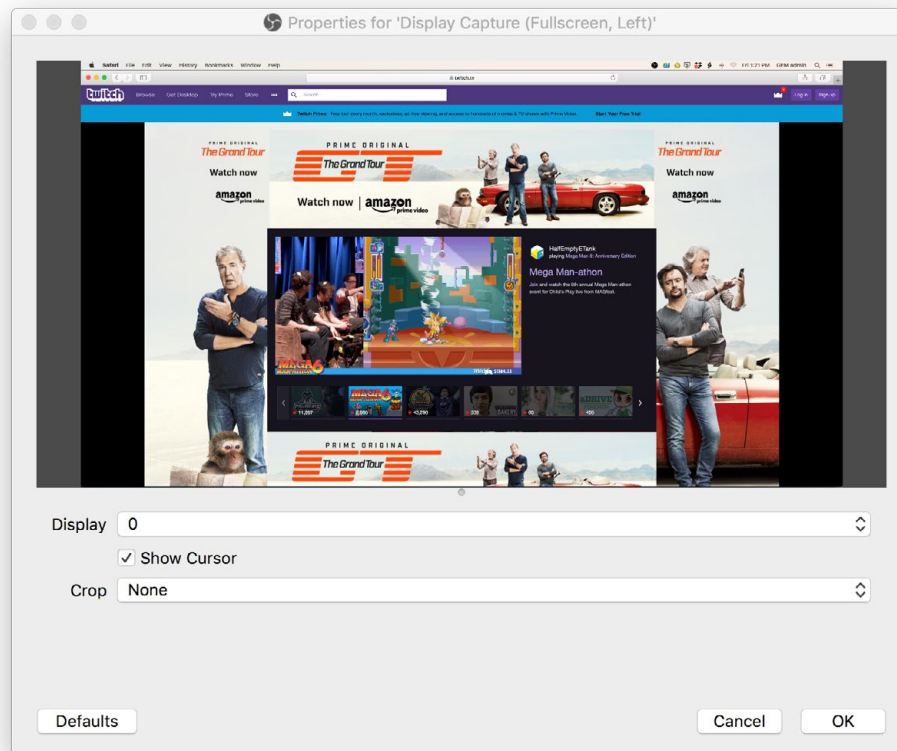
To start recording we'll need to tell OBS what to record by adding a source. First go to **Sources** at the bottom left of the OBS screen click the + icon, this will open a drop down menu of source options.



Since we'll deal with video first, Select **Display Capture**.



You can then name this setting, for this workflow I would name it "Display Capture (Full Screen Recording)", then click OK.



You'll now see a window with a preview of the source you are making, by default this is a fullscreen capture of your first display. As a note, if you can work on a system with two displays it will be helpful as you can control OBS from one and have the other as your "canvas", this is the case working in the lab.

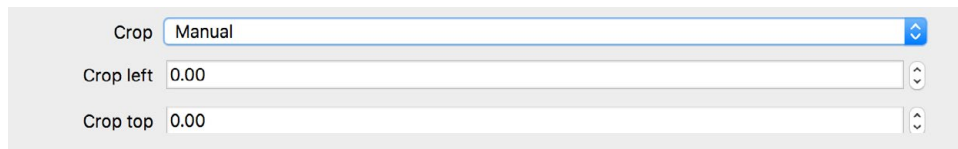
The following options are available to you:

Display: If you are on a multi screen device (like the mac pros) select the Display you want to record (0 or 1), if you are on a device with only one display you will only have one option.

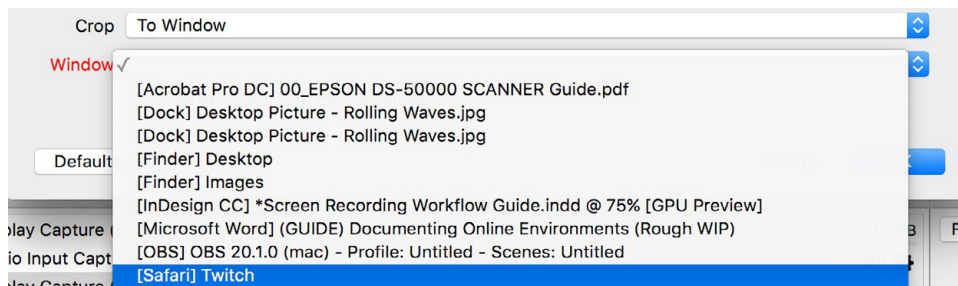
Show Cursor: This will, as it implies, display your cursor in your final image. This is useful if you need to show your interactions with what you are recording, but it can help the recording look seamless if you turn it off.

Crop: You may also choose to record a crop of the screen or a specific window/program, to do so click the Crop dropdown and select either Manual or Window.

Manual will allow you to set a given part of the screen to record. Whatever elements you move into this area will be recorded.



If you selected window, you will get a second dropdown with all your currently open programs (so the program you want to record will only appear if it is already open! If isn't displayed click cancel, open the program and repeat the previous steps to get back here.)



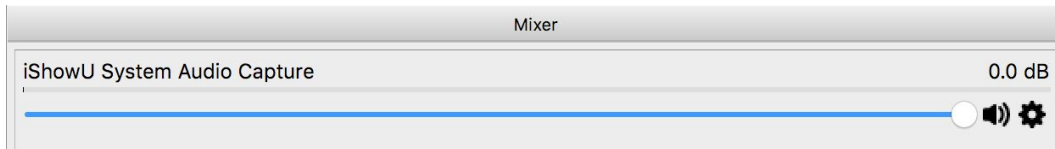
Note that cropping to a program window will set it so that the crop stays with the window if you move it and changes the size of the crop if you change the size of the window, HOWEVER if another program (or the mac doc for instance) is put in front of the application you chose, it will appear in your recording. So just remember this is really just a crop and not a directly recording of only that program.

When you are done, click ok and you should now see an image of your source in the preview section of the window.

Next we'll add an **audio source**, in this case we'll use the iShowU extension from earlier, though it is the same process for a microphone. (Note the microphone must already be connected in order for this to work.)

Again go to **Sources** at the bottom left of the OBS screen click the + icon, this will open a drop down menu of source options. This time select **Audio Input Capture**. (There is an output selection but it doesn't function on Mac, it apparently does function on PC.)

Name the device "iShowU System Audio Capture". You'll then be given a device dropdown, select **iShowU audio capture**.



You'll now have an entry in the mixer section, we'll get a level and set this up later.

B. Source order for video and composition:

If you want to make a composite image to record, i.e. a webcam overlaid on your screen recording, then you'll want to make sure all of your video sources are configured and appear in the Sources section. (You can also configure webcam sources by selecting the Video Capture Device option.)

The order from top to bottom in the Sources section will determine what appears in the "foreground" and "Background" like in Photoshop or Premiere.

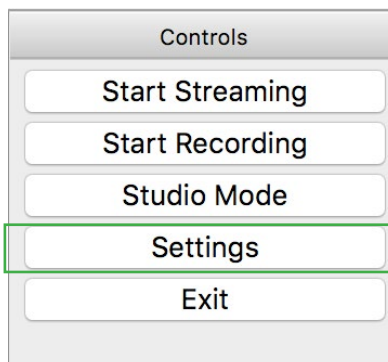
You can also toggle sources on and off by clicking the eye icon.

If you want to resize elements in the recording you can click on them in the preview and change their scale. (Note if you have to crop something at this point, you will need to select it and click on the cog icon in the sources panel to get back to it's settings page and crop it. You can only change their scale of an image in the preview window.)

Once you have your image composed, continue on.

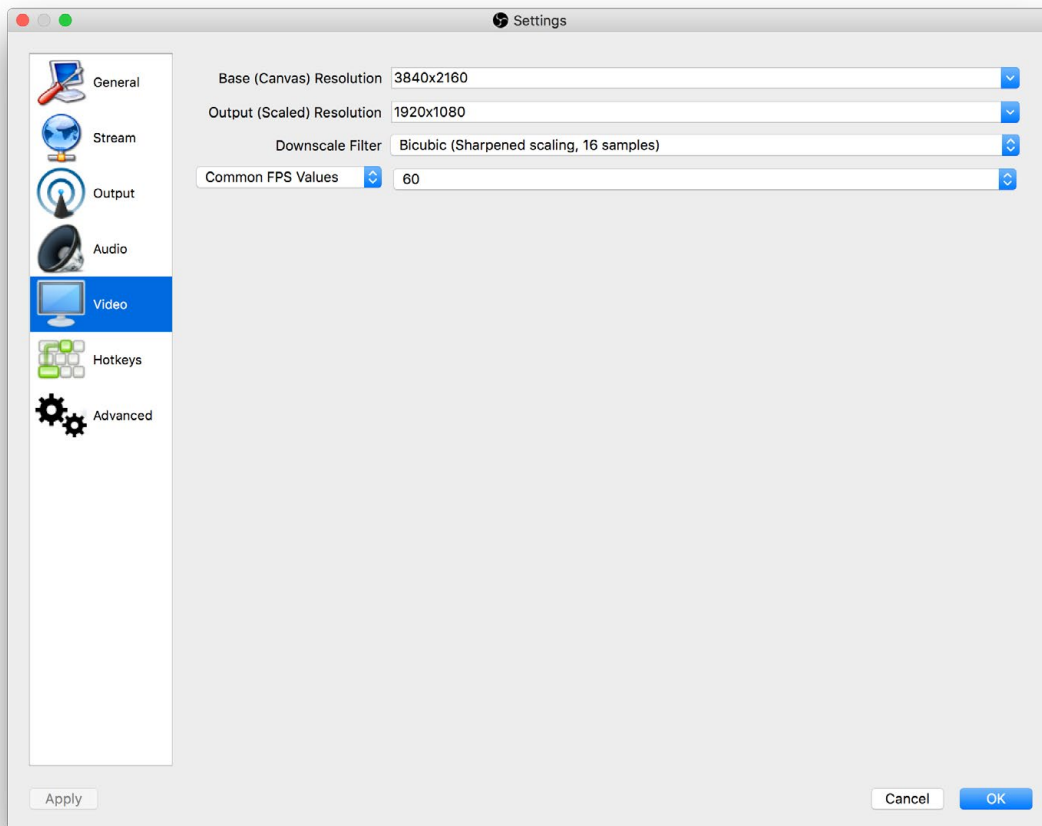
2. OBS Recording Settings:

Now we'll go into the the settings section of the controls panel and make sure everything is set up properly for the recording to make sure we get the best result.



Different quality options will be explained from this point on, the edit stations at the lab can handle all of them turned to maximum quality options suggested, other computers will require some testing. When testing it is suggested that you set up everything to max and record a 2 to 5 minute clip. See if you encounter any errors while recording (or slowdown) and check the resulting file for any issues. If you encounter issues use the suggestions you'll find after this to bring your settings down in quality one by one, running a test between each, to see what will result in a useable file and recording experience.

Additionally, if you want to run a piece of software not already installed on the lab computers, please email the lab technician to see if this will be possible, as you will not have the authorization required to install it on your own.



VIDEO TAB

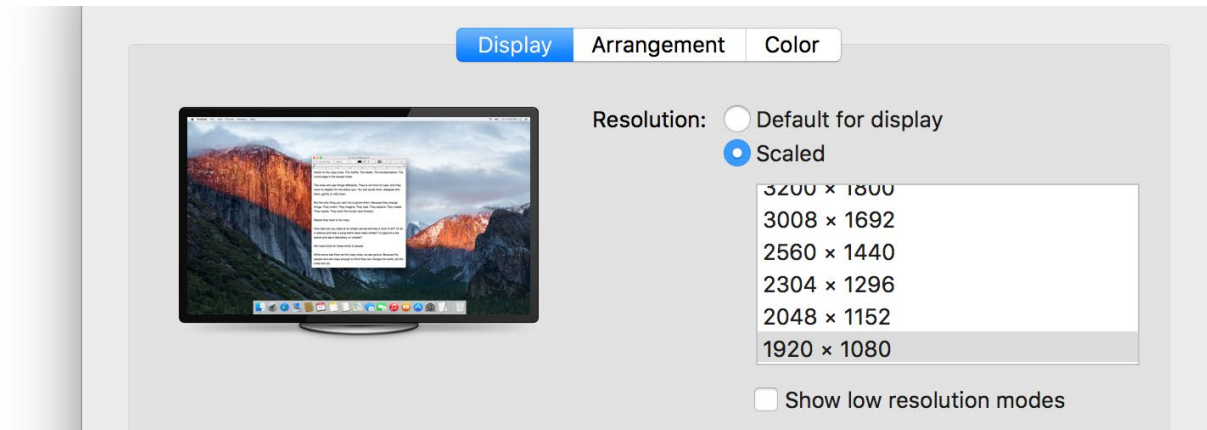
You will want to enter the resolution of your monitor in **Base (Canvas) Resolution** (if it is not already set). (This can be found by going to the Apple symbol in the top bar menu, selecting About this Mac from the drop down and then selecting the Displays tab.)

For the Mac Pros it is 3840x2160.

You then want to set **Output (Scaled) Resolution**, to the desired size of your final recorded video. This should always be maximum 1920x1080 for with a fullscreen video (or the correct relative aspect ratio for your screen), 3840x2160 will lag too much to be useable, if you are doing a smaller crop you could set it to the size of the crop.

If you are recording at home, a scaled output will take more processing power, as such it is suggested you run a test recording to see if you can properly record with a different output setting than your base screen resolution.

If your recording lags or fails, try changing your display's resolution in System Settings. Got to **System Settings > Displays**. You then want to hold down the "option" key on your keyboard and click on **Scaled**.



This will give you access to changing the actual pixel resolution of your display (you can change it back later.) Change the resolution it to 1920 x 1080 and then set both Base and Output resolutions in OBS to 1080p. This should allow you to record a full 1080p image while reducing the stress on your CPU related to downscaling the video.

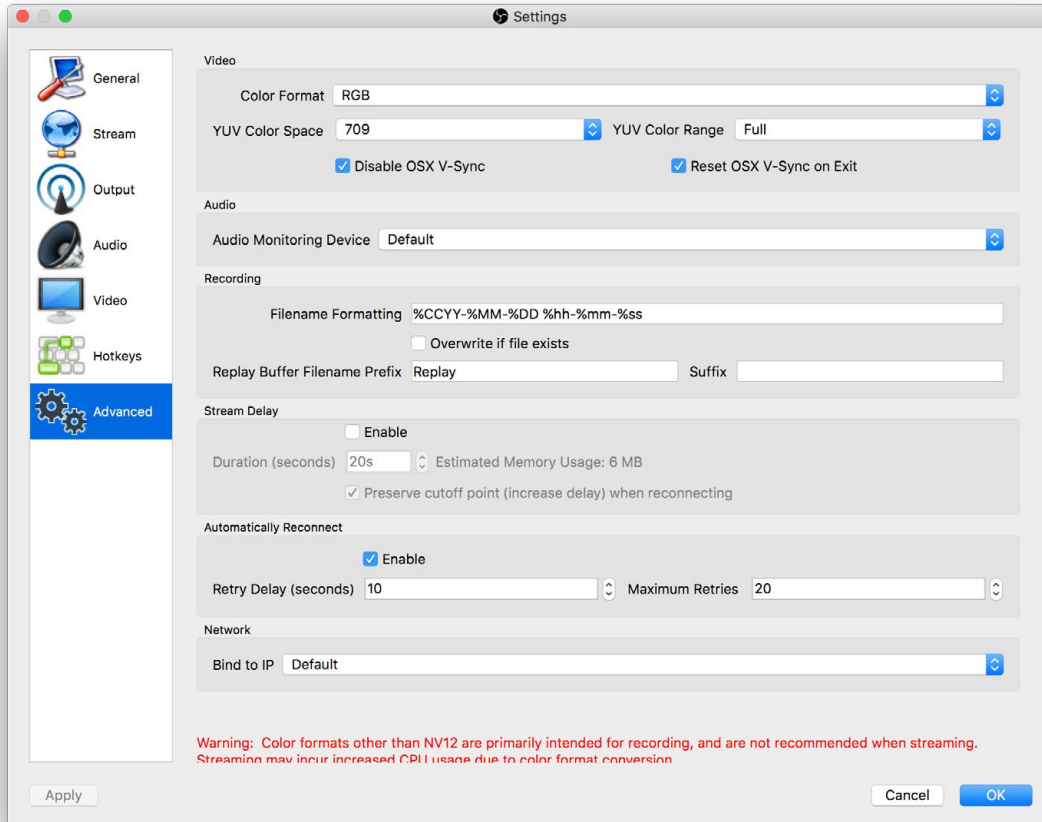
Next, Select the **Downscale Filter**, Bicubic or Lanczos are both fine, do not use Bilinear.

The filter dictates how well the image is processed if your base and output do not match, Bicubic is good and not too hard on the system, Lanczos is better but also demands more of your computers resources.

For the last line, stick to **Common FPS Value** and from the numerical dropdown pick **30** or **60**.

Most computer displays run at 60hz, which equates to roughly 60 fps, this will give you the smoothest quality in terms of mouse movement/page scroll in your recording. However, recording 60fps is also hard on your computer, so 30 is a good option if you need to reduce stress as it is an even half of the display rate and will not make your video look as choppy as 24 fps.

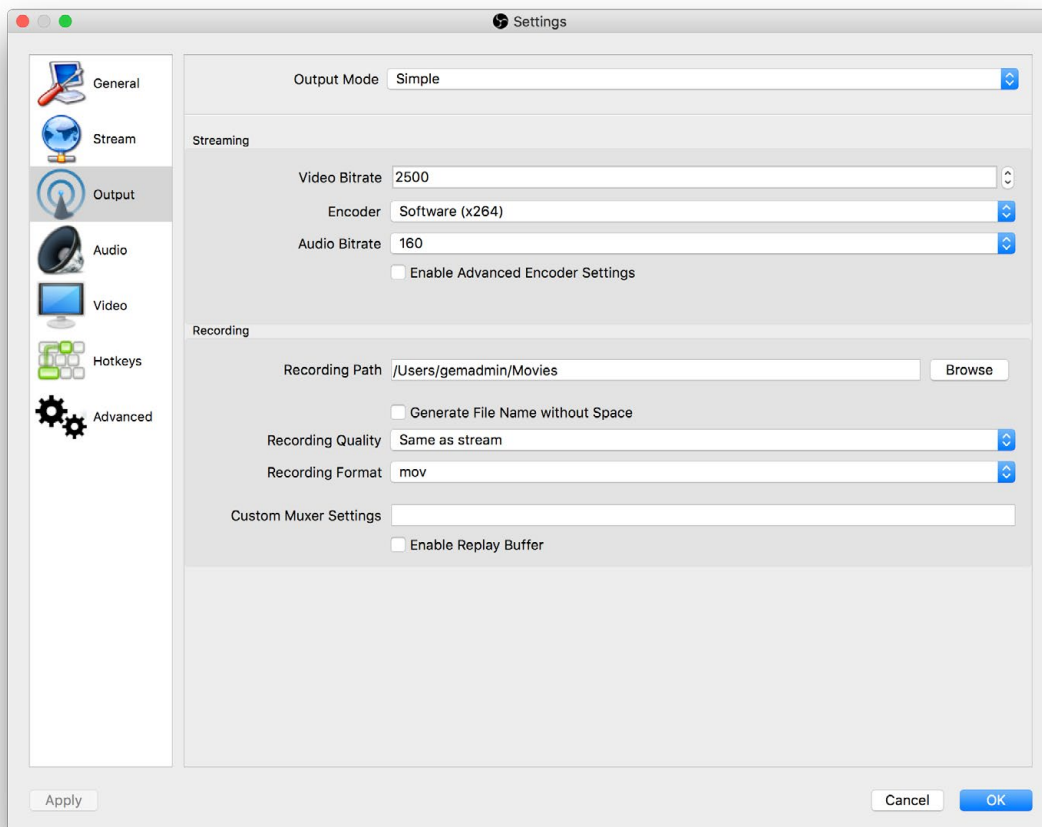
ADVANCED TAB (More Video Settings)



Set **Color Format** to RGB, **YUV Color Space** to 709, **YUV Color Range** to Full. This will ensure your recording will properly represent the color of the actual source you are recording (or close to it).

OUTPUT TAB (More Video Settings)

There are two ways of configuring your output settings, which will determine the quality of the resulting file you will create. Simple and Advanced. If you are only recording once source of audio (your system audio) and/or you are recording your main audio with Audio Hijack, then you can stick with Simple. If you will be doing all your audio recording through OBS and need to separate tracks, then you must use Advanced.



Simple

Video Bitrate: (1080 HD) 15000+, (720 HD) 7500-2500, (Sub HD) 2500-1000

Encoder: Leave as is

Audio Bitrate: (High Quality) 320, (Medium Quality) 256

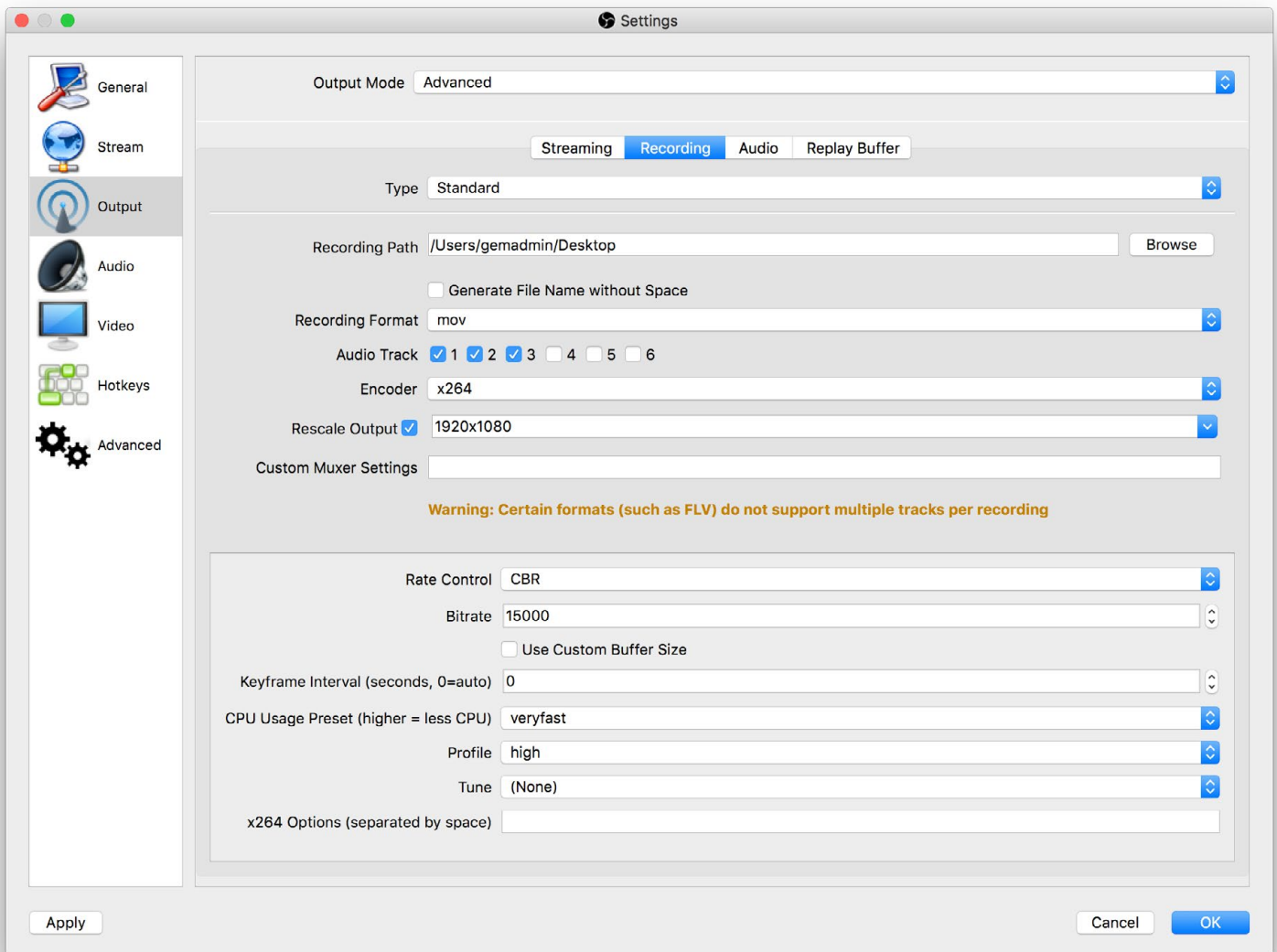
Recording Path: This should be set to where you are saving your video, it is permissible to record to the desktop on the lab stations IF you offload your video to a hard drive later and delete the version on the desktop.

Recording Quality: Same as stream (Meaning it will respect the values as set above.)

If you are having difficulty recording on your home computer, you can reduce the Video Bitrate (hence the ranges given), the audio bitrate can be lowered to the Medium Quality range as well. Additionally, sometimes it can be the drive that you are saving to which causes the problem (if it is too slow) so you can try changing your recording path. (USB 3.0+ or Thunderbolt are necessary for recording, but then it still depends on the drive itself.) The desktop should be a dependable place to record to.

* NOTE: For more information on suggested bitrates, see the end of the advanced section.

OUTPUT TAB (More Video Settings)



Advanced

This mode will give you a whole selection of extra options if you are more knowledgeable with video compression, but we'll stick to what you need to know if you are using this just for the ability to split audio tracks.

Recording Page

Type: Standard

Recording Path: To an SSD is best or an external drive can help.

Recording Format: .mov or .mp4

Audio Track: As Needed for your seperated tracks (to be explained after, but 1 for each source.)

Encoder: x264 (DO NOT USE APPLE VT, If you have "NV[...]" or "AMD[...]" you can use that.)

Rescale Output: Yes, 1920x1080 (or relative to your aspect ratio)

Rate Control: CBR (Constant Bitrate Encoding)

Bitrate: (1080 HD) 15000+, (720 HD) 7500-2500, (Sub HD) 2500-1000

Keyframe Interval: 0

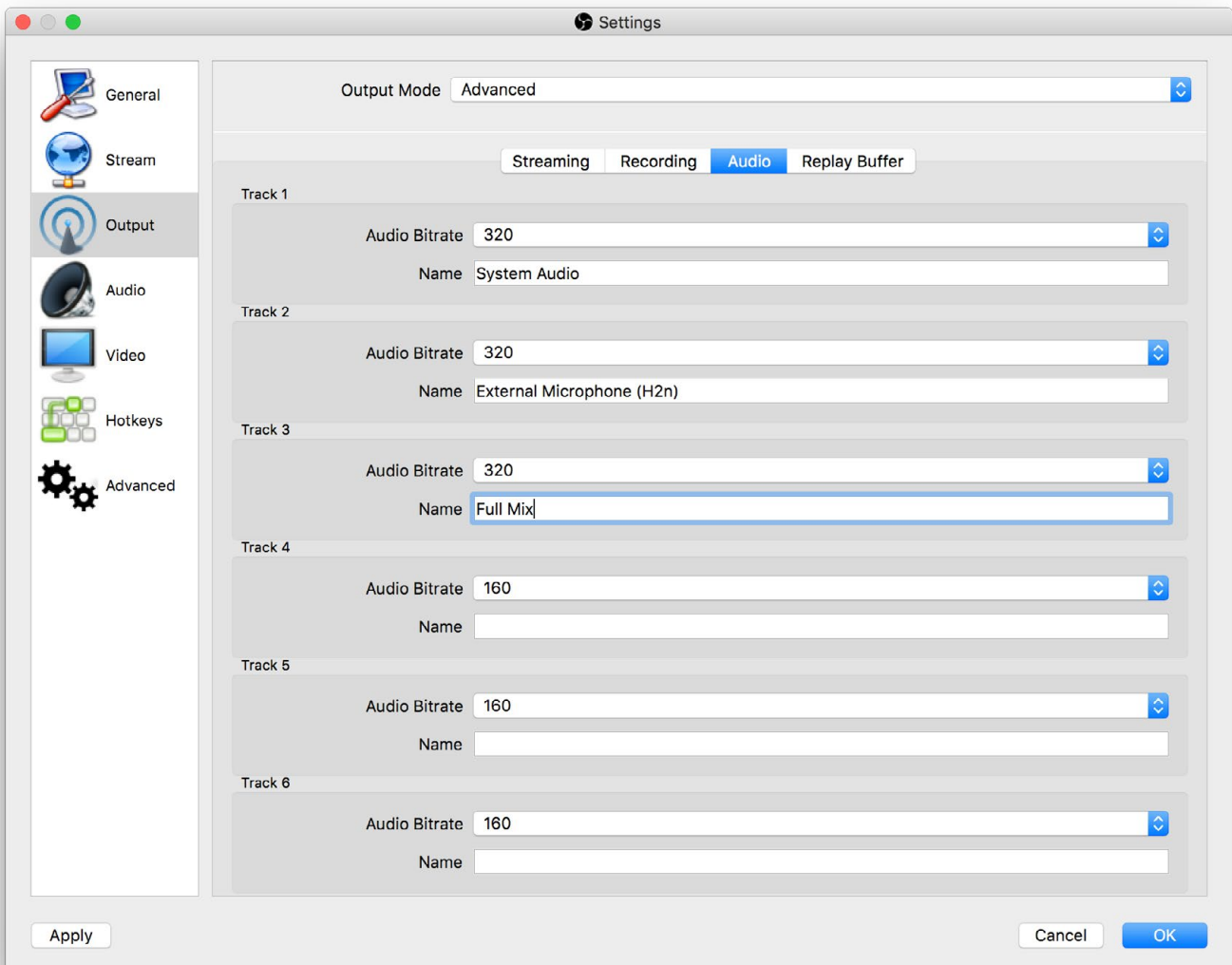
CPU Usage: Whatever makes sense for your computer (Faster is suggested on Mac Pro)

Profile: High (Can be reduced to save processing power)

Tune and x264 Options: Leave Blank

Note on Bitrates

You can research more into this, there are a plethora of youtubers out there posting their recording settings. Most suggest between 30,000 and 50,000 kbps for 1080p. Personally when testing I have not seen a large change in clarity or quality from 15,000 to 30,000. But the file size increase is enormous. So feel free to play with it as you like.



Advanced Audio

Set your bitrate per separated track you are recording. This should always be 320.

Recording Format: I am only going to explain the four most relevant options:

- **FLV** is a streaming video format, it is not always compatible with editing software and will likely need to be converted after recording (possibly losing quality) however it is the least taxing for the software to record, it is also said to be the easiest to recover data from if your computer/the software crashes during a recording. However you will need to convert it after recording in order to work with it in Premiere.
- **MP4** is the default container for H.264 video, which is the standard for online video compression, it is less taxing than MOV (below) but can result in an unrecoverable file if something goes wrong during the recording. (OBS crash, power loss, etc.) It is accepted by most editing software.
- **MOV** also records H.264 video, has a better chance of being recoverable than MP4 is something goes wrong during the recording (OBS crash, power loss, etc.) but is more taxing on the computer to write.
- **MKV** this is an exotic file format called Matroska. It will likely be incompatible with anything but VLC. But, given the way the files are written, the files are recoverable 99% of the time if your computer has an issue with crashing. In order to use the MKV afterwards you will have to use the "Remux" feature in OBS to turn the MKVs into MP4 or MOV files. It's an extra step, but if your computer is struggling, it can give you a backup.

For at home recording, it is your choice as to what you record based on your system capabilities and it's age/stability. (I.e. if you computer crashes a lot, it may be beneficial to record to FLV or MKV just in case and then spend time converting later.) On the lab stations, MOV is suggested.

Now that you are done with this tab click OK and we'll move on to the Audio side of things.

2. Suggested Audio Set-Ups

As discussed in the previous section on installation, you can record audio directly into OBS using the iShow U extension or a Physical Loop if you are working on an older computer. However to have maximum flexibility you should also include Audio Hijack into your workflow. So here are the two suggested set-ups.

Set-up A: OBS only (Suggested for Home / Simple Recordings)

If you are at home or don't want to deal with two programs for recording, just follow the instructions for iShow U. (If you own a PC, you can ignore iShow U as "Desktop" audio recording will just work for you.) You will record your audio directly into the video file, but remember that the volumes levels will be stuck the way they were at time of recording and any alert or error sounds that are generated will be stuck in your recording. (I'm hammering this home in case you are recording live content that you don't have a second chance to record.)

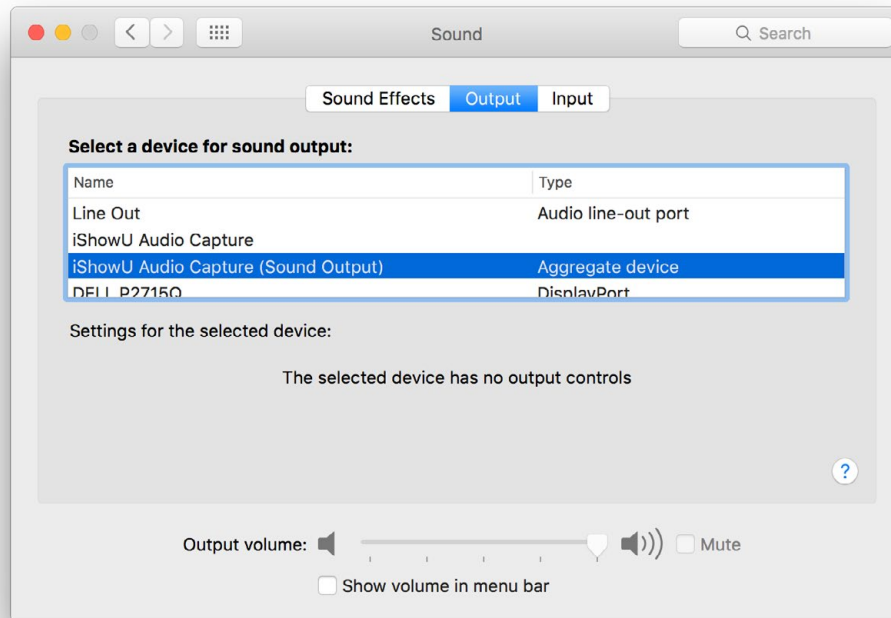
Set-up B: OBS (as a synch track) and Audio Hijack (as your final audio.) Suggested for complex recordings.

If you want to get the track separation and absolute best audio quality out of your recording, Audio Hijack is recommended. However, it is still suggested that you configure your system with iShow U (or record from a PC), as this will allow you to automatically sync your audio files in post through Premiere.

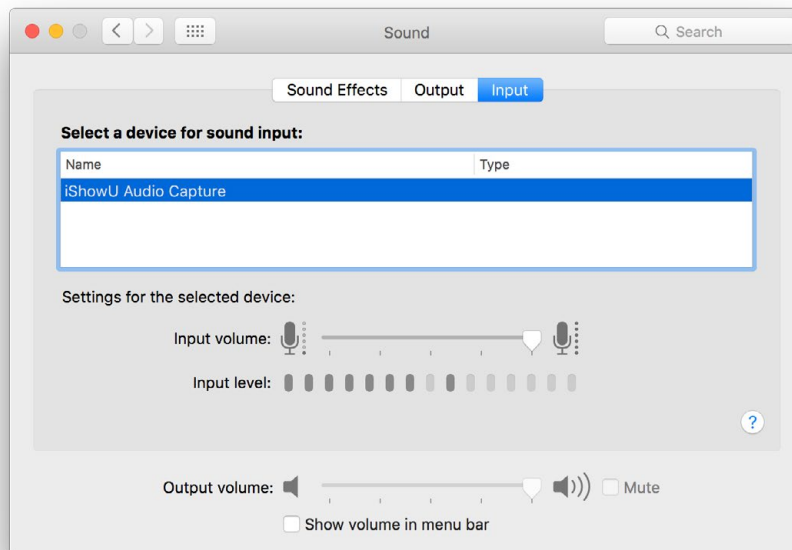
A. iShowU System Audio Capture Settings

So now we are going to make sure that iShowU is ready to record. We're going to have to change a few options in the system settings to make sure the extension works properly for recording.

Go to **System Settings > Sound > Output Tab.**

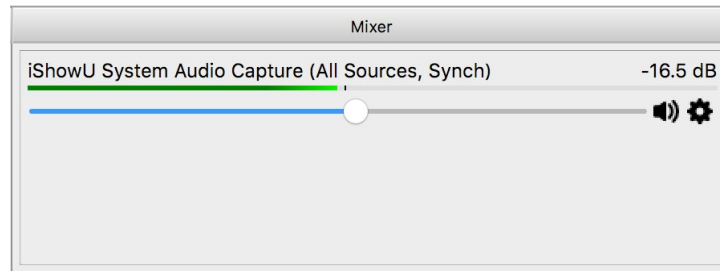


Make sure that **iShowU Audio Capture (Sound Output)** is selected, this is the one that is identified as an "aggregate device" and that we set up using **Audio MIDI Setup** earlier. Next switch to the input tab.



Select the **iShow U Audio Capture** device here.

NOTE: When your audio is set up this way, your volume controls on your keyboard will not work. At the lab you have the headphone amp to increase or decrease the monitor volume to your headphones, otherwise what your program is outputting is both what will be captured and output to the headphones.



Test that these settings are properly assigned by playing something with audio on your computer and making sure you hear the sound in your headphones and that you are getting a volume indication on the mixer section of OBS.

If you only want to use OBS for Audio, you can now skip to Step 3.

Note on also recording a microphone into OBS

If you want to do in time audio notes you will need an external microphone (or a built-in on a laptop.)

What you have to make sure to do if you are adding this element is the following:

1. Mac System Settings

a. **Output** = iShowU Audio Capture (Sound Output) Aggregate Device

b. **Input** = H2n (or any other input mic, might be mic input if mic is not connected USB)

2. OBS Sources

a. Set up source for iShowU Audio Capture

b. Set up source for H2n (or other input)

c. Click on the **Settings Cog** next to either audio source in the mixing panel, go to advanced audio settings.

i. You will see a line in this menu for each separated source you have in your mixer. At the end of each line is a **tracks** area with all selected by default.

ii. You want to make sure there are tracks where only one of your sources is selected. It is up to you whether to also have a mixed track.

iii. DO NOT SELECT Monitoring as this will then mix your sources anyways due to the nature of the iShowU Capture Device.

3. OBS Settings > Output > Advanced > Recording

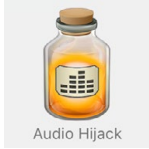
Make sure the tracks you have selected above are selected or they won't be recorded.

It is possible that if you have a mic that is external and removed, that OBS' mixer may freak out and run both inputs to both tracks, in cases like this. Quit OBS, make sure everything is properly connected, then open OBS again and it should be fine.

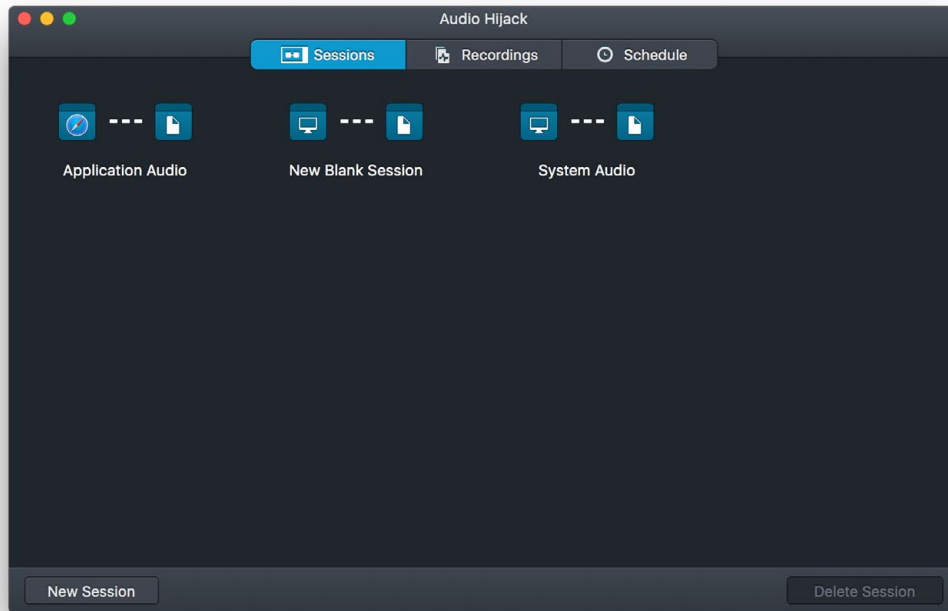
Also if you need to record voice notes at the lab, it is possible to use the H2n, H5 or H6 as USB audio interfaces/mics if reserved from the lab technician.

B. Audio Hijack Set-up

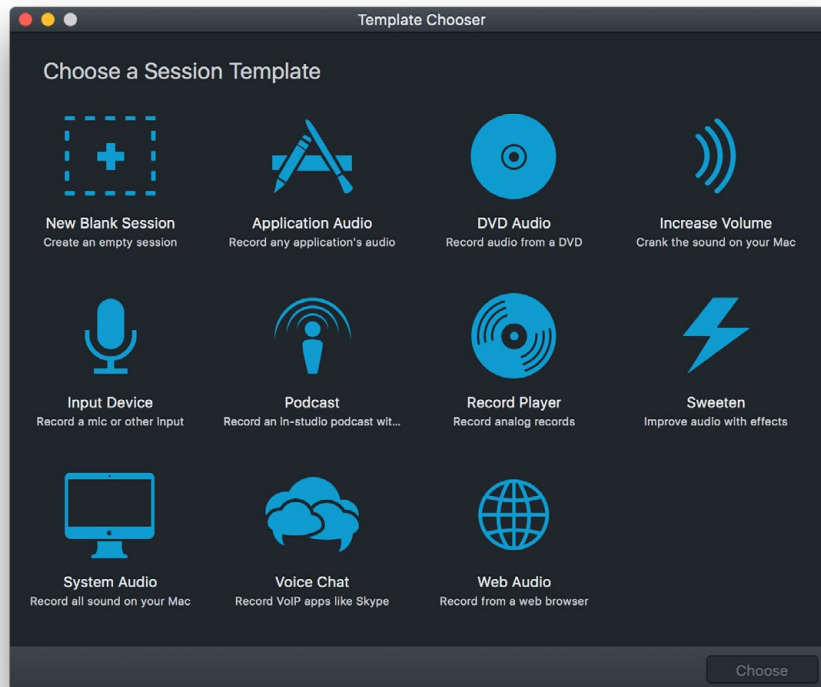
This program is powerful but designed to be pretty user friendly, so we'll run through the basics of how to set it up to capture seperated sources and from there you can add more complexity as you need.



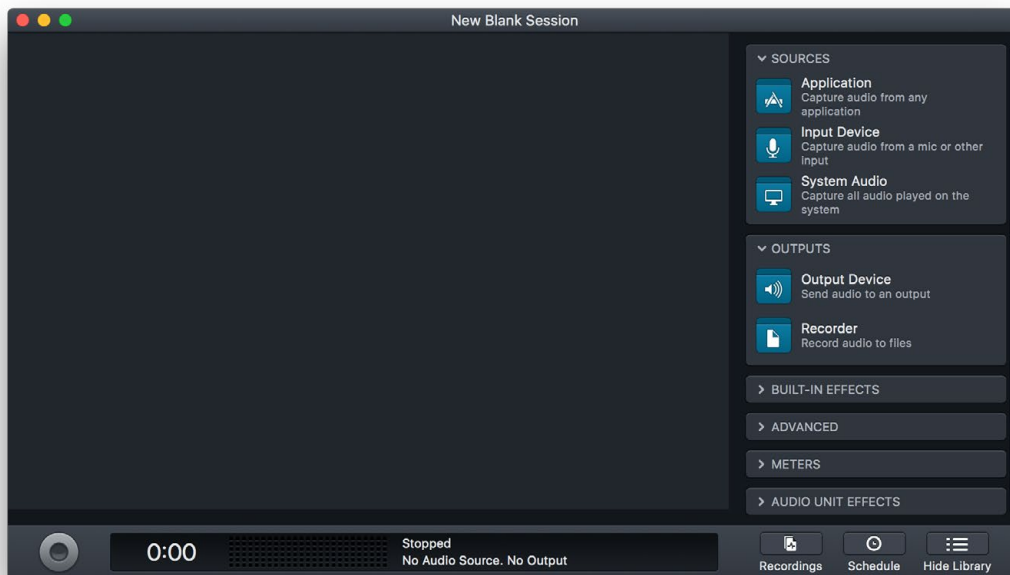
Open **Audio Hijack**.



You should be greeted with this session screen. We'll start with a **New Session** so we can go through how this works and you will know how to customize it for your needs. Click on **New Session** in the bottom left and it will pop-up a window of templates.



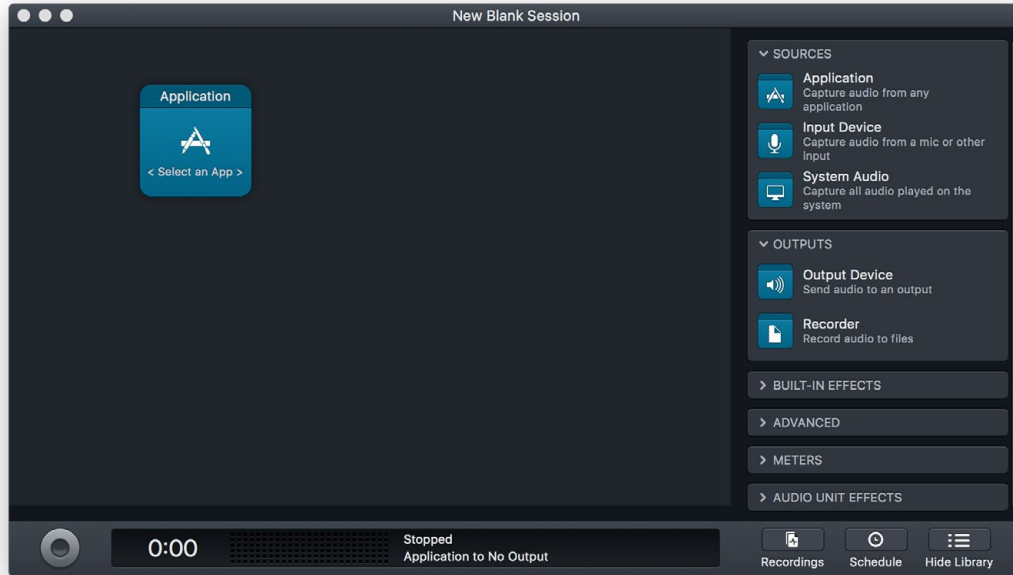
Choose **New Blank Session**. To decrease clutter close the session window which is probably still open in the background.



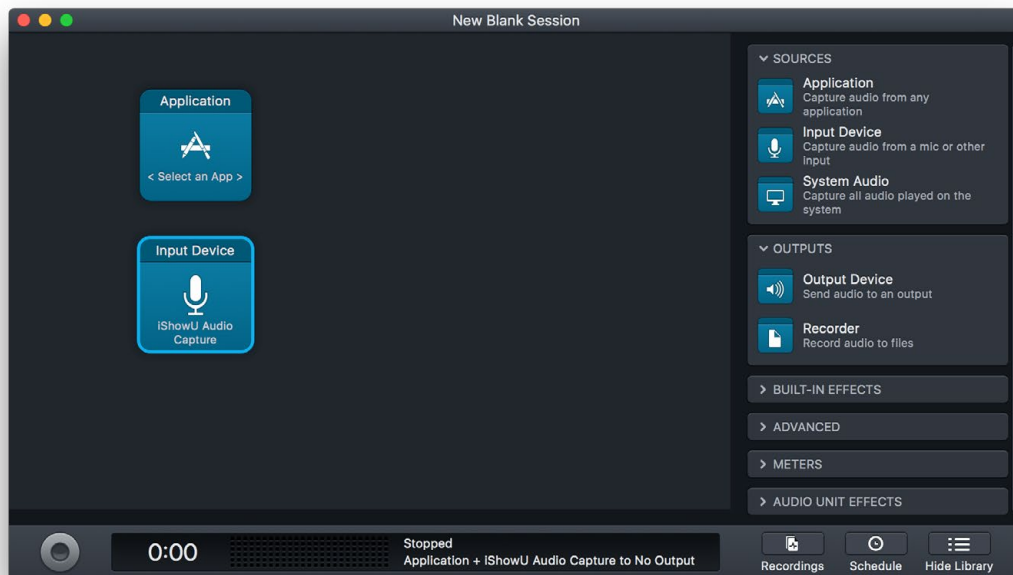
So this is what the basic window of Audio Hijack looks like. Working with the program consists of dragging elements you need from the bar on the right, into the currently blank space in the middle and then ordering and configuring them as needed.

So first lets drag our sources onto the canvas, we'll pick these from the Sources drop down on the right side and we'll say for this example we want to record audio from a streaming service which we are watching through Safari and an external mic for our own notes.

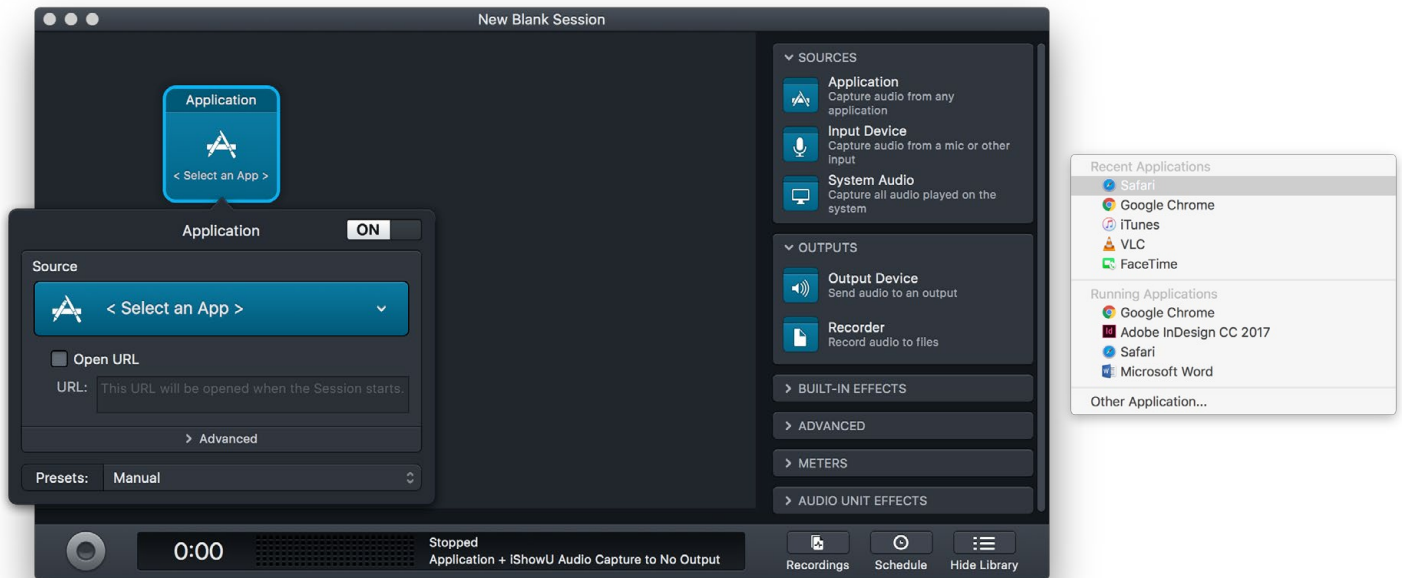
Click and drag Application from the sources section and put it to the left of the canvas.



To add our microphone input we'll then add an input device block, we'll put it just under the application block. (Note, in this example this will say "iShowU" as the device, as the stations do not have a built in microphone, but on your home computer this should be set to your built-in.)



We'll configure the application block now. Click on the block and the configuration pop-up should appear.



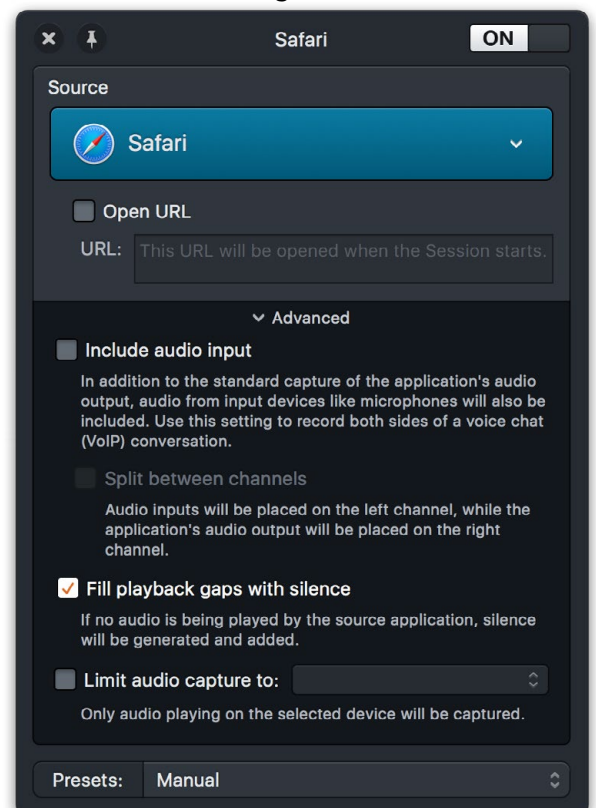
Click on **Select and App** and you'll get the drop down you see above. As you can see it divides between applications that have recently been used and currently running applications. It will always find currently running applications, but may not find all recent applications, so make sure the application you want to record is running. For this example we select Safari and it will now change it's icon to reflect that.

Now we want to click on the advanced drop down.

The option you want to click regardless of what source you are setting up is **"Fill playback gaps with silence"**. This will ensure that this channel of audio is recorded as one continuous file, rather than a string of small bits.

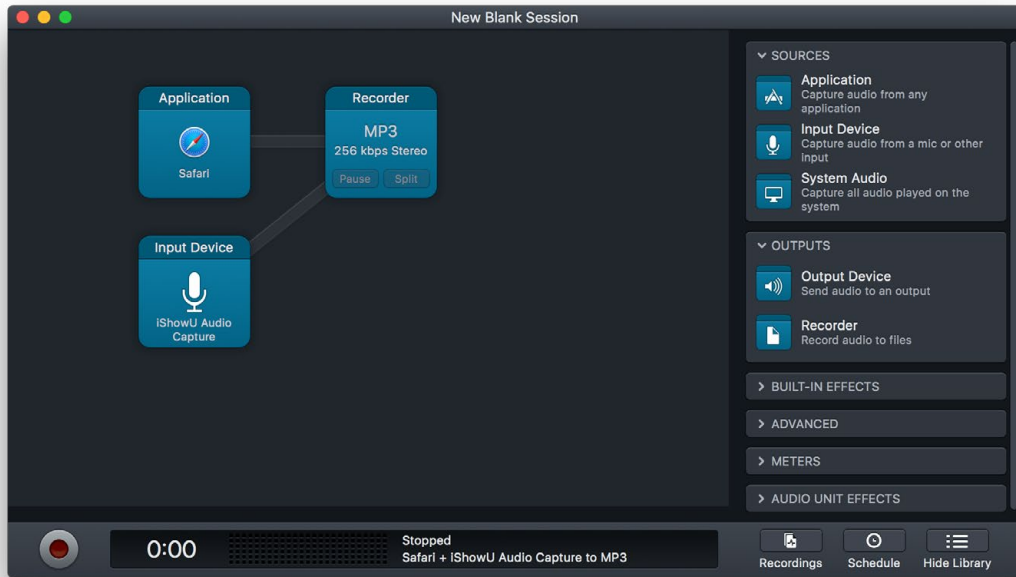
As you can see there is also an option to include audio input here, and record both to a single file. This can be useful as it suggests for VOIP applications like Skype. For that application make sure you click "Split between channels" so that you can edit later.

We don't want to use the option currently, because we don't want to mix the sound coming out of our application to mono and we also want to keep our sources separate.

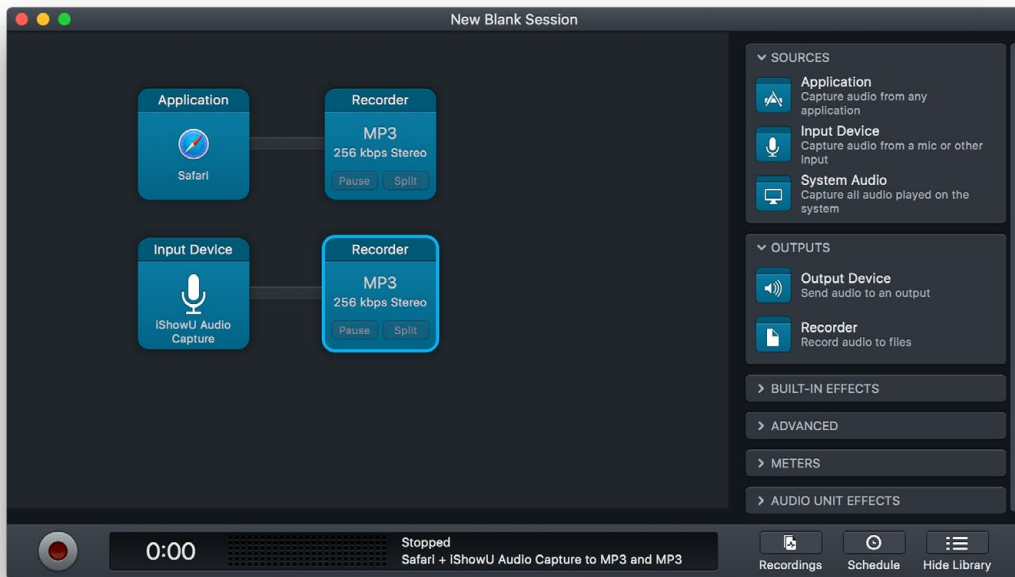


Continue by configuring your microphone, in this case it is as simple as making sure the right microphone input is selected (i.e. not the iShow U extension that you will see in these examples.)

Now that we have our sources configured, we need them to be recorded. Under **Outputs** on the right, drag a **Recorder block** next to the Application block.

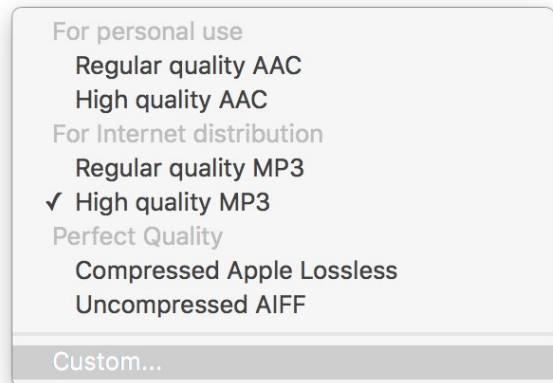
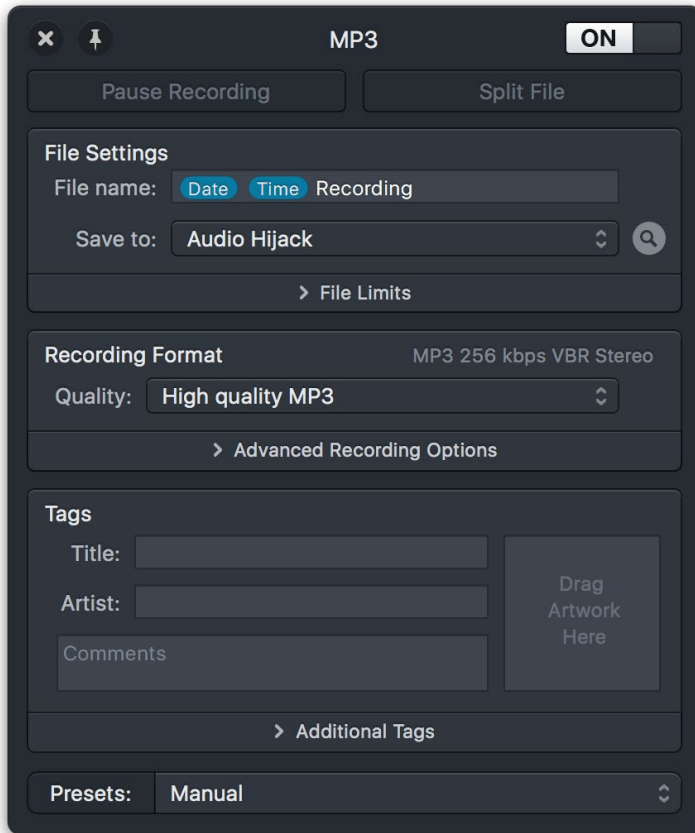


As you can see it will automatically link to all the sources we've set up. Since we want to keep our sources separate, we'll drag another recorder next to Input device.



Now the second recorder has linked to the Input device and eliminated the extraneous link from earlier. Now we have to configure the **Recorder** blocks.

By default the recorder will be set to MP3, we are going to want to set it to WAV as that is the file format preferred by programs like Premiere and is a high quality codec with reasonable file size. Click the dropdown in the **Recording Format** Section next to **Quality** and select **Custom...**

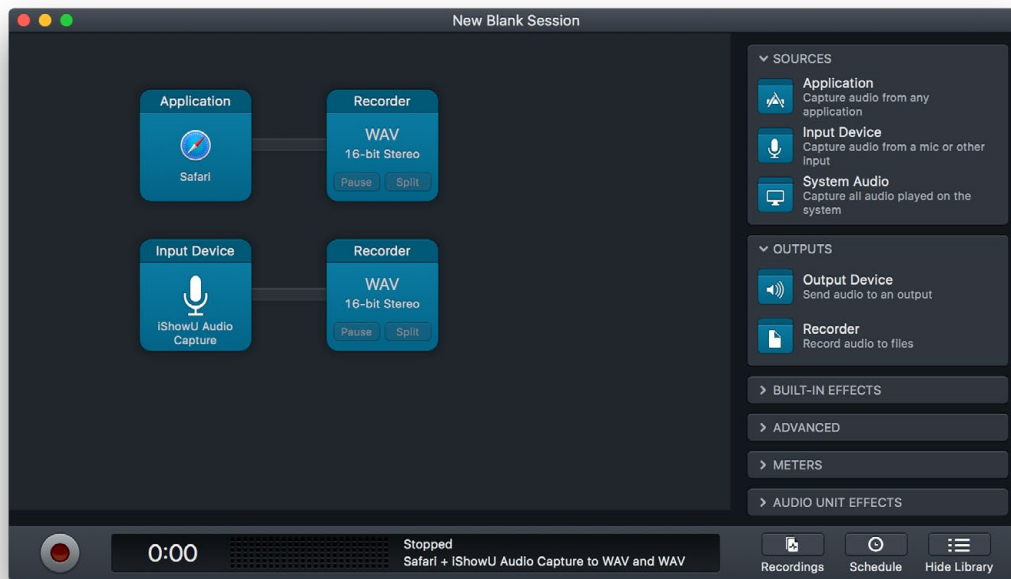


Input the following settings for both recording blocks this will ensure you end up with high quality files.

When you are done with this, I suggest you change the information in the file settings section. Enter a custom filename, it is suggested you enter what you are recording and the name of the source being recorded here.

Then select where you want the file to be saved to.





Now your screen should look like what we have above, we have just one thing left to do, which is add an **Output Device Block**. We need to do this for 2 reasons.

1. If we don't add an output device block, what we are recording will not be relayed to our headphones.
2. If we don't add an output device block, and set it properly, the iShow U extension which is running audio to OBS won't function properly.

So drag the **Output Device block** behind the two recorders and in the middle space so both link up to it like below.

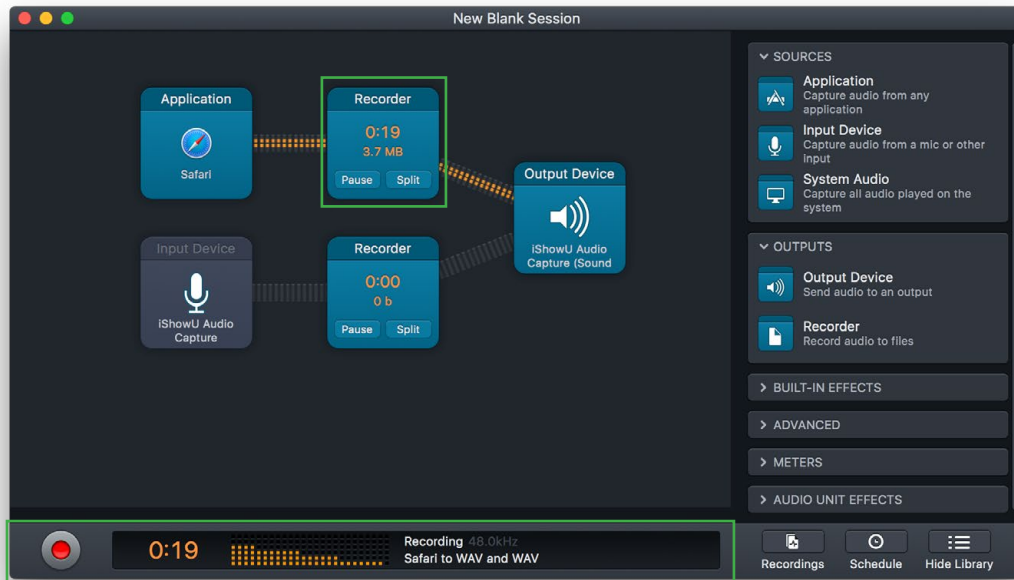


Now we want to make sure that this output block is set to the aggregate device we set up for iShow U earlier. As once Audio Hijack starts recording it will take over audio control from your computer. If you named the audio device the same as it is named on the lab computers, your output block should look like the one below when you click on it.



Congratulations Audio Hijack is now set-up and ready to roll.

Now we are ready to start recording! If you are using Audio Hijack, I would suggest hitting the record button on that program first and then hitting the record on OBS. Your windows should now look like this.

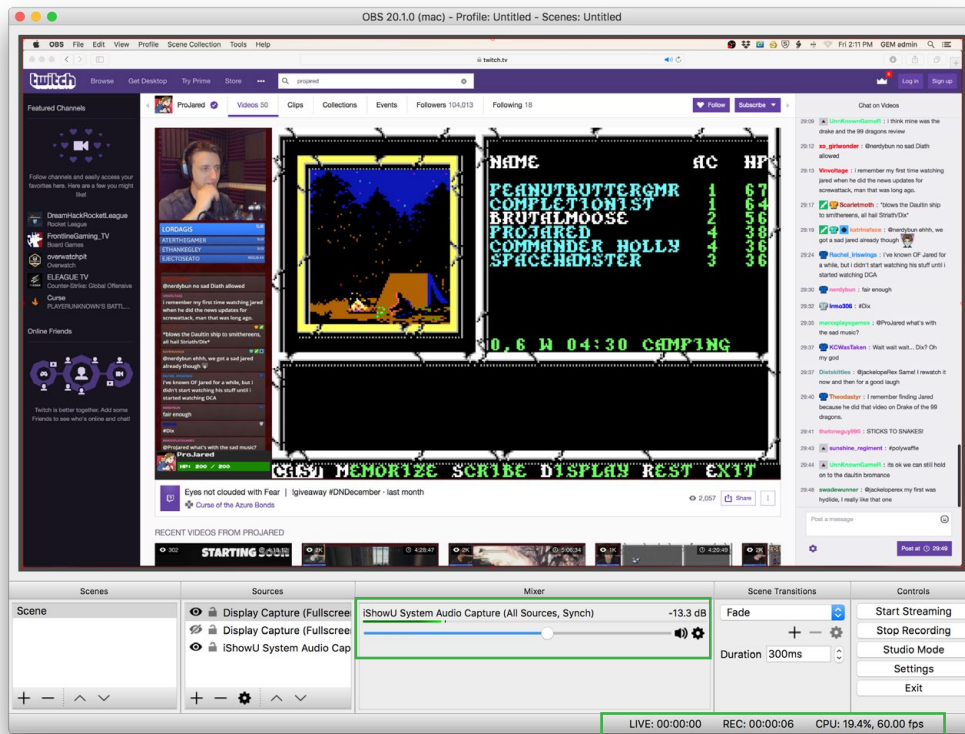


*Note that in this image the second input device is not recording as there is not a microphone connected to the station.

One thing to note in Audio Hijack, you have to control the volume of your sources via their individual volume controls. (i.e. the Volume Setting in the program or the volume slider on a video website.) If these are left at max with loud content, the recording may peak, causing distortion. As such it is suggested you set them at roughly 75% of their total volume to give yourself some headroom.

Audio Hijack will show a red record symbol, a total time recording and a volume readout at the bottom of the screen as well as a recording time indicator and total filesize indicator on the recorders.

Note, if the volume readout is constantly full, your audio is too hot and you should lower it in the source program.



In OBS you'll see your REC counter at the bottom of the screen running, the total percentage of the CPU of your computer OBS is using and the frames per second being recorded in the bottom right.

You should also double verify that you are seeing an audio signal from iShow U in your mixer section, if you have to adjust the volume lower in your programs for Audio Hijack you should remember that you might want to increase it here. Ideally it should never hit the right side of the meter and should peak approximately 3/4s of the way across the meter.

When you are finished recording, stop OBS first and then Audio Hijack if applicable.

Post Recording Best Practices

Now that you are done recording, you should have one video file (with sync audio) and more audio files if you used Audio Hijack.

Make sure that all of these files are properly identified and match each other, with Audio Hijack you had the option of custom naming your files before recording, but with OBS you will have to do it after. For instance, for the example above the files were:

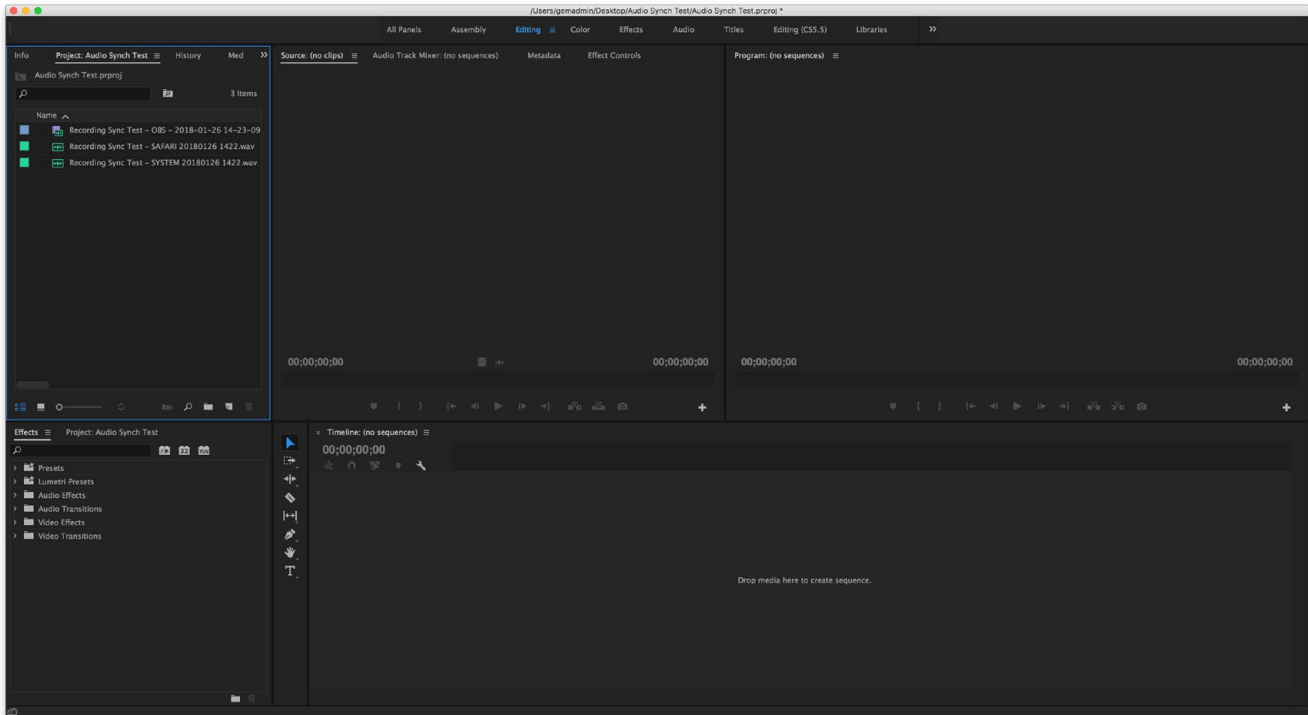
"Recording Sync Test - OBS - 2018-01-26 14-23-09.mov"

"Recording Sync Test - SYSTEM - 20180126 1422.wav"

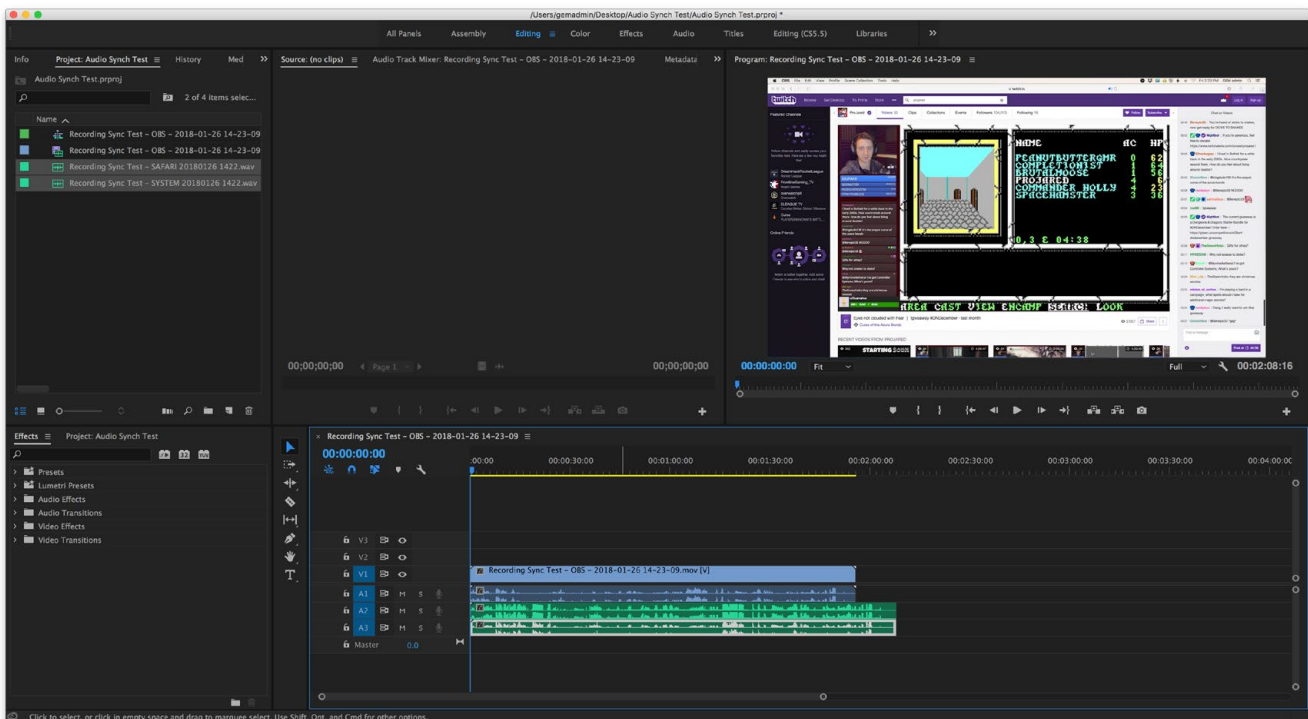
"Recording Sync Test - SAFARI - 20180126 1422.wav"

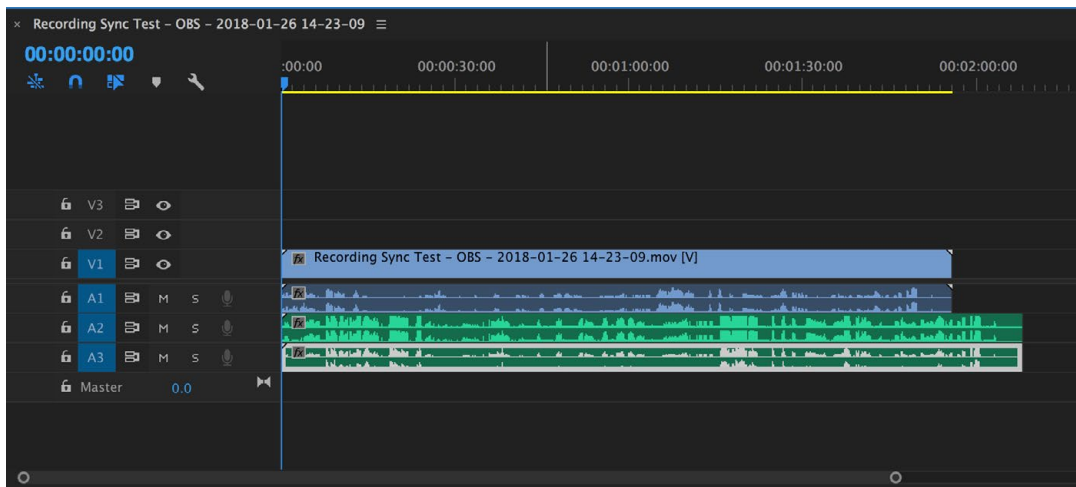
This way all the files are clearly labelled. The beginning tells you which recording they belong too, the second section which program they are from (in the case of video) or are a recording of (in the case of audio.) Lastly keeping the timestamps means you have time and date information if you are archiving.

So now that we have our recording that we intend to either trim, do an audio mix on, or edit we'll look at how to synchronize our WAV files from Audio Hijack and Video files from OBS. (If you only recorded audio with OBS, the audio comes pre-synched, so you can just move onto editing.) This process is simple, to do it, we will create a sequence and use the synchronize tool.

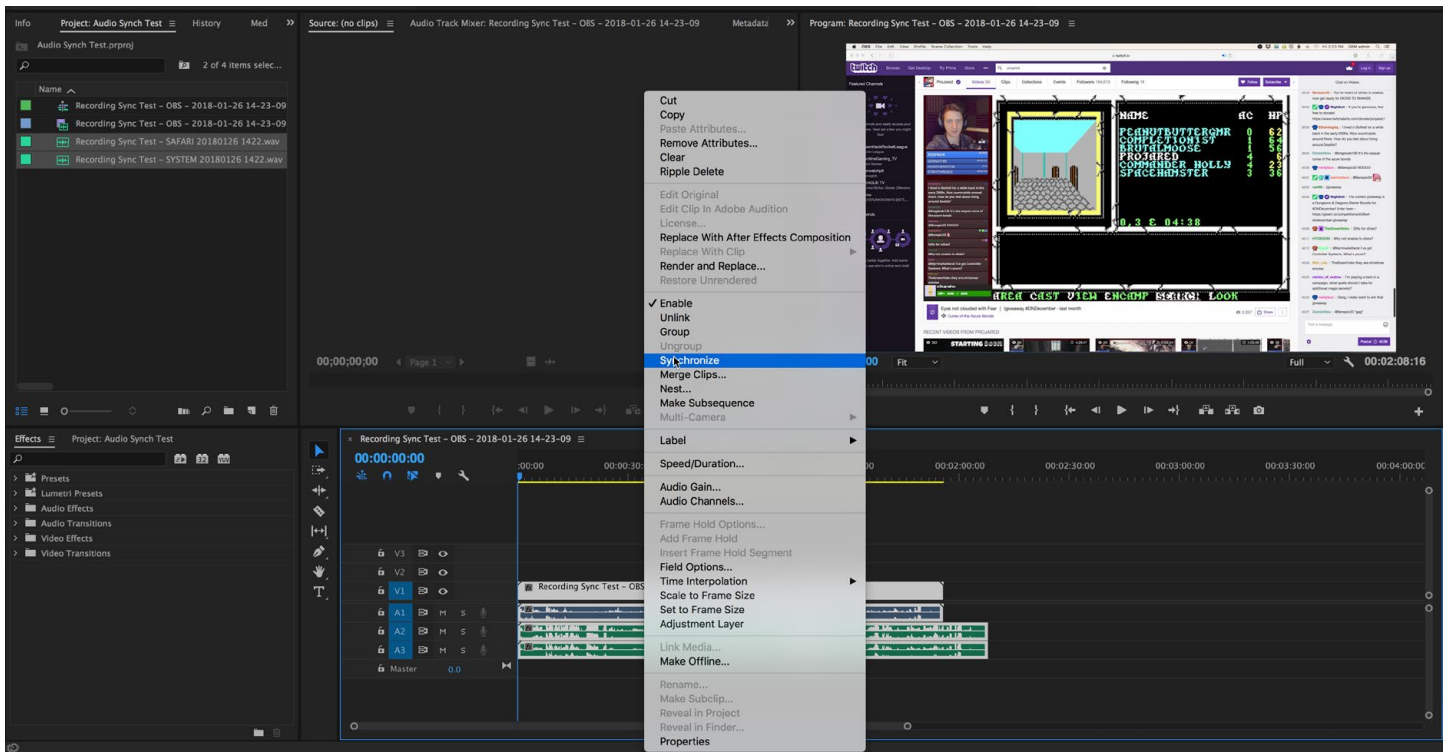


We start off with our footage loaded into our premiere file, we'll then create a sequence using the video and match settings, then we'll drag the two extra audio tracks into the timeline, which will then look like below.



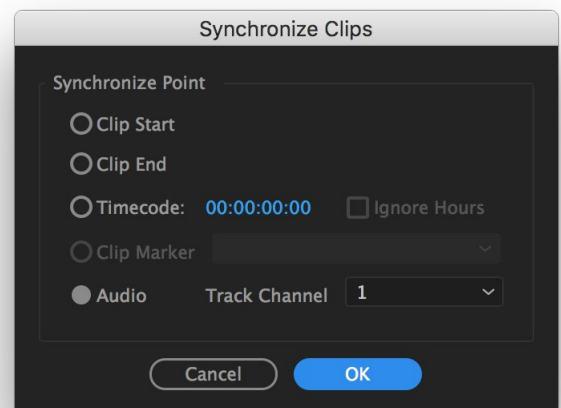


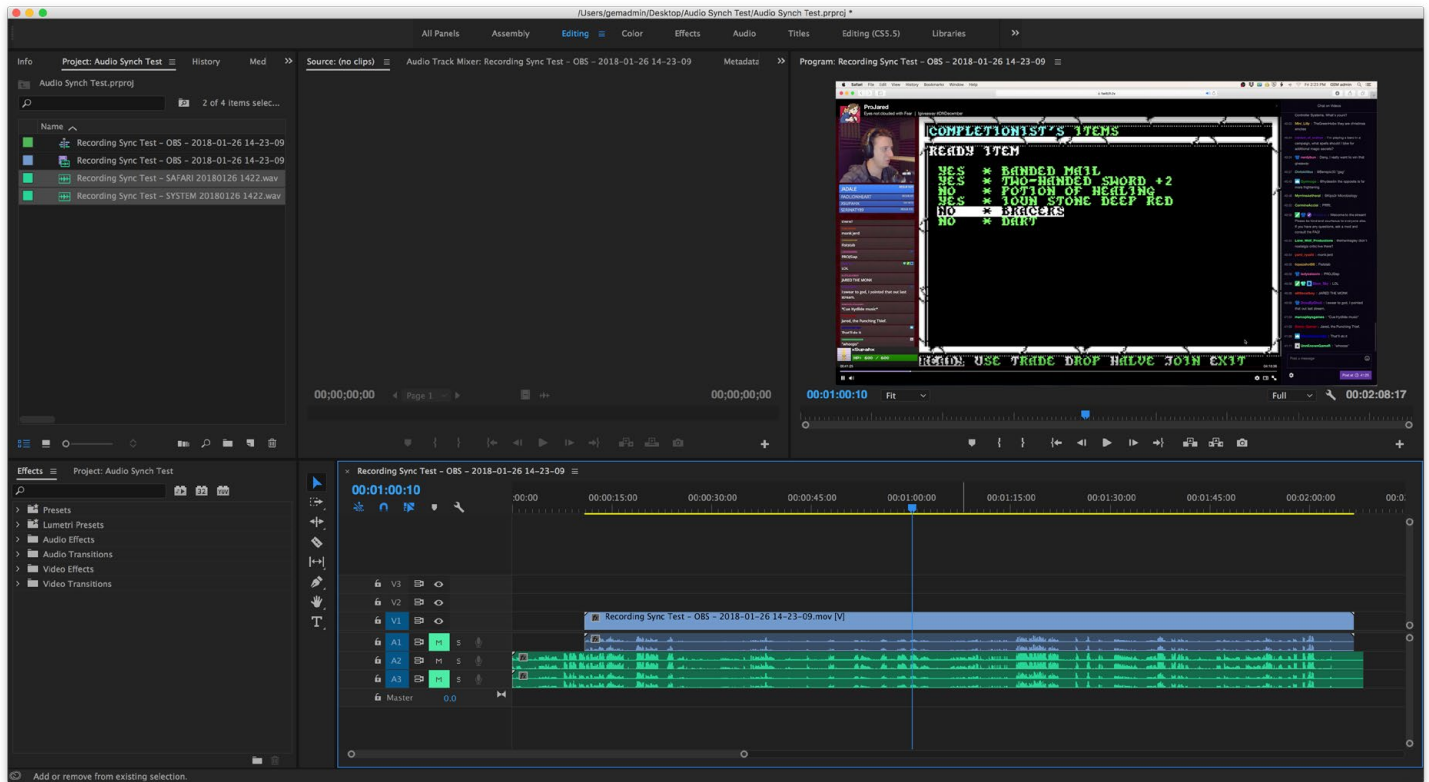
Since we haven't synched the audio yet, everything will be misaligned. So we will select all of our files on the timeline and select, right click and select **Synchronize**.



Now in synchronize clips we want to make sure that we have selected **Audio**. This will have Premiere process the audio from all of the sources and align them automatically.

This process is usually hit or miss with actual camera clips, but with system audio the audio is identical so it works 100% of the time. It may not align audio notes made with an external mic, if this is the case, align them manually with the other Audio Hijack tracks that it did synch, as they should all have the same length as well as start and stop points.





And there you have it, your audio is now correctly aligned. You can now mute the audio track that OBS recorded, as it will be a lower quality than the Audio Hijack WAV files and you are ready to edit the footage however you need with full control over mixing multiple audio sources.

1. My source (audio or video) is not being previewed/is not showing a level.

Causes:

- Disconnecting and reconnecting monitors / microphones / occasional bugs in the program

Solution:

- Delete the source and re-add it to the list via the sources palette.
- If it is still bugged, re-start OBS.
- If it is still bugged, restart all equipment.

2. I just added an external microphone track and it's audio meter level is identical to the system audio. (i.e. it looks like both tracks are recording from both the system audio and external microphone.)

Causes:

- General programming bug, more common on Mac using work arounds.

Solution:

- Close OBS. (Do not disconnect any microphones or monitors!)
- Re-Open OBS
- This usually resolves the bug and your tracks should show as separate. (If not see the above issue.)

3. My computer cannot record in 1080p (it's maximum screen resolution is lower) what do I do?

Solution:

- Record at the maximum resolution your screen goes to, it will still retain the detail you see on your screen.

4. I recorded an OBS file with seperated audio using the settings your suggested (PG. 16, Ouput > Advanced > Recording) but when I play back the file, I only hear one of the tracks.

Causes:

- OBS records audio tracks in a weird way, that makes them appear to most software as seperated audio. (Think of selecting a language on a DVD, or a Director's commentary track.)
- As such only certain software will read it correctly, and it will only play simultaneously in an editing program.

Solutions:

- FOR CHECKING THE FILE: If you open the file in VLC and go to the top bar **Audio menu > Audio Tracks**, you should see options for multiple audio tracks, most likely all marked Unknown, this way you can preview the different tracks recorded.
- FOR EDITING THE FILE (Premiere): Premiere will automatically recognize all the audio tracks associated with the file, play them simultaneously and allow you to bring them onto a timeline. If you see less tracks on the file than you expected do the following; **right-click the file in the project panel, go down to modify > audio channels**. Make sure the clip channel format Stereo and change the number of Audio clips to the number of tracks you recorded. This should fix the problem.
- FOR EDITING THE FILE IN NON-PROFESSIONAL PROGRAMS (iMovie, etc.): These programs lack professional audio handling, so you'll have to export out your tracks seperately. You can do this by downloading Handbrake, a free DVD ripping program. I won't describe the entire process, but you can select the file and under audio tracks, select a single audio track, then export multiple video copies for each track. (Note: that you must export a new video copy for each track, as Handbrake will standardize your video frame rate, which may slightly fluctuate in your source recording, so for the timing to line up, you must re-export each track and the video to match.)

Adding Voice Notes/Voice Over in Post-Production (Premiere Pro CC)

In order to add in your final commentary for your assignments, assuming this was not done simultaneously with your recording, you can record in several ways. The easiest is to record through QuickTime with a connected microphone, which you could synch later. However, if you are using Premiere, you can record your voice over directly to the timeline in synch.

Set-up

1. First select the sequence you want to record onto and load it into the timeline. (It is generally advisable that you make a duplicate of your sequence beforehand in case you overwrite something.)
2. Go to the Premiere Pro CC dropdown menu in the top bar. Go down to Preferences and a dropdown menu will open, select Audio Hardware.
3. We are now going to make sure the settings are correct for your audio input. (Note that depending on the system you will have different options.)
 - Device Class: (Leave as is)
 - Default Input: (Set this to the microphone you are using or Built-in Microphone if using your webcam microphone.)
 - Default Output: (Leave as is)
 - Master Clock: (Leave as is)
 - I/O Buffer Size: (Leave as is)
 - Sample Rate: 48000
4. You are now set-up for recording directly onto your timeline.

Recording:

1. First make sure you have a free track to record to in Premiere.
 - If you do not, right click the space just above the track controls. (Above the lock symbol, V#/A#, Routing, Eye Symbol, etc.)
 - Select Add Tracks...
 - Under Video Tracks, change the amount of tracks to 0.
 - Under Audio Tracks, add 1 audio track, after your last audio track, type is standard.
2. Open the Audio Track Mixer.
 - Go to Window (on the top bar) and select Audio Track Mixer, if already open this will have a drop down menu, select the relevant sequence.
 - If your sequence does not appear here, open it in your timeline.
 - This will pop up the window for audio track mixing which looks very similar to a mixing board layout. Each Audio track has a strip in this control panel, the names and numbers are listed at the bottom. The strip has the following controls from top to bottom.
 - Recording Source
 - Submix Track

Workflow Guide - Screen Recording Digital Environments

- Pan Control (L/R)
- Mixing Volume Control (Read, Latch, Write, etc.)
- M(ute), S(olo), R(ecord Enable)
- Volume Control Slider
- Numerical Representation of Volume Control
- A# (Track#), Track Name

3. Select the track you want to record to by click the R on that tracks strip (on the M S R line.) It will become red when selected.

- Your recording input will become ungreyed, since we set it earlier you don't need to set it now.
- You can also change it's name at the bottom of the strip to "Voice Over", as this will change the file name of the sound files you will be recording.

4. Next "arm" the system for recording by pressing the Red Record Button at the bottom of the Audio Track Mixer Panel. When "armed" the record button will be surrounded by a blue circle.

- Move your playhead, if it is not already where you want to start recording, to where you want to start it recording from.
- If you want to give yourself some warm up time before you start speaking, you will have to move your footage down the timeline by that many seconds.
- If you want to just re-record a line, you can move your playhead to where you want to start re-recording and "record over" your original piece of voice over. It will not delete that section of the original, it will just overwrite it on the track with the new recording.
- It is always advisable to do a short test take first so you can adjust your levels. So we will do this first.

5. Since your track is selected with R and you're "armed" for recording by pressing the Red Record Button, when you press the spacebar to playback your timeline it will record audio in synch with the playback.

- The file will only appear on your timeline after you have hit spacebar again to stop the recording.
- During this test take, watch the signal on the strip for the track you are recording to. If it is hitting the limiter at the top of the track (Two Red Bars will appear), it will be distorted. Lower the volume control on the track to keep your general speaking voice below that threshold. You can then adjust overall volume after.
- Now that you have done your test take and gotten your volume level correct you are ready to record your proper voice over.

iOS Screen Recording:

There are two broad ways of recording iOS screens (assuming you are not using a jailbroken device, at which point proceed at your own risk.) If you have iOS 11, there is an onboard screen recording tool, this is how you access it, though I will go through why it is not the ideal tool.

Enabling the Onboard video feature:

1. This will show as a small record button (a circle within a circle) on the quick "Control Center" menu you get when you slide your finger up from the bottom of your screen. (where your flashlight button is.)
2. If it is not already there, go to **Settings > Control Center > Customize Controls**.
3. Scroll down until you see the option for "Screen Recording" click + to add it to your "Control Center".

To Start a recording using the onboard video feature:

1. Pull up the **Control Center** and Tap the **Recording Button**.
2. You'll see it start counting down from 3.
3. When it has started recording you'll see a **red bar at the top of your screen**. (This will be visible in all recordings.)
4. When you want to stop the recording **tap the red bar**, it will ask you to confirm that it should stop.

Why you might not want to record this way:

1. Depending on the app it may slow your device down/cause it to lag.
2. Not all apps are recordable, most are though. (note: this is also true of the other recording method.)
3. There is the red bar throughout your video.
4. The only sound you can record is from your phone's microphone. (You could work around this, but you would need an external sound recorder, you'll see the method described in the following workflow.)
5. The storage of your phone will fill up pretty quickly with the video file resulting from this process.

It is ideal if you have to record something that functions based on GPS usage, as the next way of recording requires you to have a USB connection to a computer.

Recording via Quicktime on a Mac or PC:

This is the suggested manner of recording an iOS device's screen.

Installation Steps / Connection Steps:

1. If you are on PC, make sure Quicktime Player is installed.
2. If you want to record app audio get a male to male (plug to plug) 3.5mm (headphone type) audio cable. (They are cheaply available everywhere including the dollar store and most pharmacies. The price indicates the quality, though a decent one can be had for ~5\$ on Amazon.)
 - Connect one end to the headphone jack of your iPhone, the other to the computer's mic input.
 - New mac computers have a single multi-use headphone/microphone jack. If your computer has only one jack, and you want to hear your app audio while

you record, you will also need a headphone splitter.

- In this case, plug the splitter into the phone, then connect the male to male cable to one of the splitter outputs and to the computer and some headphones to the other splitter output.

3. Connect your iPhone/iPad to your computer via its lightning cable.
 - If asked by your device whether you trust the computer, you must select "Trust".
 - Quit iTunes if it launches, if it is open when you attempt to connect to quicktime it tends to create a glitch loop that disconnects and reconnects your device repeatedly.

Set-up / Recording:

1. Open QuickTime Player.
 - Instead of opening a file go to the **File** and select **New Movie Recording** (not new screen recording).
 - It will probably immediately engage your webcam.
2. Next to the record button, there is a **small down arrow**, click this and it will open an **input selection menu**.
 - You should see the **name of your iPhone or iPad** in this list **select it**.
 - If you do not see it, **make sure it is unlocked**.
 - If you still do not see it, disconnect and reconnect it and make sure to **select "Trust" if prompted**.
 - If it connects and disconnect, make sure iTunes is not open as it will create a looping disconnection glitch.
3. You should now see the display of your device appear inside the QuickTime window.
 - This should also still work if you lock your phone and unlock it as long as it remains connected by USB.
4. Next **make sure that your audio cables are correctly connected** and click the **small down arrow** again. Under **Microphone** select **Built-In Input** and not "Built in Microphone" or "Facetime HD Microphone."
 - o Open this menu one more time and make sure that **Quality** is set to **High**, if the option is present.
5. You can now record your screen and device audio by pressing the **record button**.
6. When you finish your recording you will be prompted to save it if you close the window.
 - The screen recording will average 12mbps and just over 35fps.

If you want to record commentary via your webcam microphone (in sync):

1. Go back to **File** and select **New Screen Recording**. (It should be the only other available option.)
 - o This will open a **small window with no preview**.
 - o Next to the record button, there is a **small down arrow**, click this and it will open an **audio input selection menu**. Select your **webcam mic or other microphone**.
2. Click the **record button**, it will ask you to click on a display or drag a area to record.
3. **Drag a box over your recording window tfor your phone screen capture**.
 - You will now have an **icon in the top bar of your mac, a circle with a square in it**, meaning you are currently recording. **This is the stop recording button for the screen recording**. This will serve as your audio recording for voice notes.
4. **Start the recording of your Phone/iPad screen**.

5. When you are finished, stop the recording of your phone screen and then stop the screen recording from the button in your top bar.
6. You should be asked by the screen recorder (your voice notes) where to save the file to.
7. The movie recorder will ask you to save it if you try to close it or hit Command+S.
 - The screen recording will average 12mbps and just over 35fps.
8. You now have your screen capture and voice notes, you can bring them into your NLE (i.e. Premiere or FCP) and line them up via the video feed in the voice notes. (You can then turn that video layer off.)
 - Note: It may be a good idea to convert your files before hand if you know how to do so. You can keep all the quality settings the same, but you can lock the frame rate at 30fps. NLEs don't often like working with the variable frame rates that QuickTime creates, they will likely work but they may stress the computer you're working on.

Android Screen Recording:

Recording your Android is fairly simple, though it must be done on the phone itself.

Installation Steps:

1. Download AZ Screen Recorder.

- This is a free and generally very well liked screen recording app, it does have a paid version (2.99\$) however this only adds the ability to trim and edit videos, which you can do after in post and add in “facecam” to the video which is unnecessary, so it is in effect free.
- As long as your Android is post the Lollipop update (5.0) from 2014 this should work for your phone.
- There is also a method for connecting to a computer to record your android, however the compatibility varies wildly from phone maker to phone maker and thus this app is suggested.

What to expect from this recording process:

- A Screen Recording (Video) with System Sound (Audio).
- It will not have your commentary recorded, so this must be recorded separately and synched.
- It will record your entire screen and any app on your phone.

2. Set-up:

- Once the app is downloaded, open it. You will get greeted with a bar with 4 icons on your screen.
 - **Red Aperture Circle = Video Record**
 - **Green Camera = Screenshot**
 - **Gear = Settings**
 - **Picture = View Recording**
- Open settings and we will set up for recording. (YOU MAY HAVE TO RE-ADJUST SETTINGS IF YOUR DEVICE CANNOT HANDLE THE SUGGESTED SETTINGS.)
 - User Interface
 - **Controller Type: (Either)**
This changes your controller from the bar to a more discrete control “wheel” on either side of the screen. Most people seem to prefer the “Bubble” option for it’s discreteness.
 - Control Options
 - **Encoder: Standard**
Advanced can cause crashes. There is a possible “green screen” issue some people experience with their recordings, there is an option here to help fix it.
 - **Magic Button: Off**
 - **Stop Options: Stop on Screen Off**
You can select another option but this is probably the most useful option.
 - Video Configuration
 - **Resolution: 1920x1080**
Reduce to 1280x720 if your phone cannot handle it.
 - **Frame Rate: 60fps (Native refresh of the screen.)**
Reduce to 30fps if your phone cannot handle it.

- Bitrate: 24 or 16 or 12mbps
Depending on what your phone can handle.
- Orientation: (Either)
Auto will change along with you, or you can lock it.
- Time-Lapse: Off
- Audio Configuration
 - Record Audio: Off
The app natively records your app audio, if you record notes this way it will mix it into your app audio, meaning you cannot fix the levels later if the app is too loud or you are too quiet. Record your audio via your laptop or another means.
- Overlay Information
 - Text and Logo: Off
 - Show Touches: (Either, it will show points where you tap, if you need this visual.)
 - Show Camera: Off
 - Camera Settings: (Irrelevant due to Show Camera Off)
- Timer
 - Time Recording: Off
 - Countdown before start: On
 - Countdown Value: 3s

3. Recording:

- Hit the red Circle Aperture Button to start your recording.
 - You will be warned that it will record your entire screen. So if you get notifications, type in passwords, etc. those will also be recorded.
- It will countdown. 3, 2, 1, and then it is recording.
- If you wish to record your Voice Notes simultaneously, you will want to start it recording now and create a “synch mark”.
- When you are done recording, lock your phone via the power button and the recording will finish.

4. Post-Production:

- Offload the video from your phone.
- Load it into your NLE (i.e. Premiere or Final Cut), synch your Voice Notes on a timeline with your video and then edit as necessary.