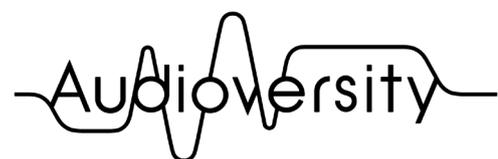




Live Streaming System Setup Guide

for Live Commerce and Webinars



by Yamaha Pro Audio

Table of Contents

1.0	Introduction	3
2.0	Main Equipment	4
2.1	Blackmagic Design ATEM Mini Pro	4
2.2	Yamaha AG06 - Webcasting Mixer	5
2.3	Video Camera (e.g. Sony FDR-AX43).....	8
2.4	Display Monitor	8
2.5	Microphones	9
3.0	System Examples.....	12
3.1	Basic System	12
3.1.1	For Live Commerce.....	12
3.1.2	For Webinar	13
3.2	Improved System	14
3.2.1	For Live Commerce.....	14
3.2.2	For Webinar	16
4.0	System Setup.....	18
4.1	Basic System	18
4.1.1	For Live Commerce.....	18
4.1.2	For Webinar	23
4.2	Improved System	23
4.2.1	For Live Commerce.....	23
4.2.2	For Webinar	30
5.0	Optimize ATEM Mini Pro for Live-streaming	31
6.0	Optimize Yamaha AG 06 for Live-streaming.....	33
7.0	Prepare for Live Streaming.....	35
7.1	For video program.....	35
7.2	Set up and configure the streaming platform.....	36

1.0 Introduction

With the arrival of COVID-19, there has been an increasing demand for online content delivered live. Live commerce, education and webinars have become especially popular.

Live-streaming Commerce (or “Live Commerce”) is a kind of internet TV shopping where presenters can introduce products that viewers can purchase. Live commerce has become popular in some of the world’s largest economies as a new form of mail order, and the number of merchandise sellers and buyers is dramatically increasing, especially in China.

Web seminars (i.e. seminars and training that are conducted online – commonly called “webinars”) have become very useful tools as face-to-face meetings have presented many logistical and health safety challenges.

It is important for both live commerce and webinar hosts to ensure smooth and reliable communication for their attendees. By improving the overall quality of the stream’s video and audio, audiences won’t be distracted by technical issues and will more easily be able to focus on the presenter’s message of motivating them to purchase items, or to learn and experience something new.

This guide will give you an example of how you can build your own seamless live commerce and webinar delivery environments with the ATEM Mini Pro and Yamaha AG06 mixers.

2.0 Main Equipment

Video switcher

Streaming a live event online can be done easily with a single camera, but adding a video switcher provides the opportunity to create a more professional production feel with multi-angle shots and slick transitions. The market is filled with many video switchers, but a compact switcher like the ATEM Mini Pro can get the job done on a relatively small budget.

2.1 Blackmagic Design ATEM Mini Pro

Blackmagic Design ATEM Mini Pro is a video mixer/AV switcher that allows up to four camera inputs (HDMI) in full resolution 1080HD quality and operates up to 60 frames per seconds. It is a compact all-in-one switcher for professional use. It features a USB webcam output which converts all video input sources into digital signals that can be viewed by your PC. It also has functions like Picture-in-Picture, video recording with hard drive, etc.

It also offers functions like:

- Program/Preview switching
- MultiView monitoring
- USB connection as webcam
- Live stream via Ethernet without PC (YouTube, Facebook, Twitch)
- Video recording with USB flash disks
- Video effects such as Picture-in-Picture
- Chroma key composition (i.e. "green screen")
- Includes free control software

NOTE:

The differences between ATEM Mini and ATEM Mini Pro

- Can record (H.264)/record to SSD or USB flash disk.
- The built-in encoder makes live streaming directly via a LAN cable.
- MultiView output.

For further information, refer to Blackmagic Design's Home Page.

<https://www.blackmagicdesign.com/products/atemmini>



ATEM Mini Pro

Mixing Console

A good mixing console will always be your best friend when trying to achieve a high-quality live performance. Yamaha has a wide range of analog and digital mixing consoles.

Generally, analog mixers are less complicated and less expensive, while digital mixers have more onboard features like effects, scene recalls, etc. Yamaha has both analog and digital mixing consoles that can work as audio interfaces, allowing you to easily transfer your audio signals to a PC for recording.

Selecting the right mixing console will depend on the size of the venue and the scale of the production that you will be hosting.

2.2 Yamaha AG06 - Webcasting Mixer

The Yamaha AG Series has an intuitive, easy-to-use interface that is suitable for a diverse range of users and applications. The AG06 integrates the features of both an "analog mixer" and an "audio interface" with loopback functionality.

There are three routing modes to move audio from its analog mixer side to the audio interface by selecting the desired mode with the "TO PC" switch.

The AG06 features flexible digital connectivity via USB, which allows you to transfer the audio signal from your console to your PC for live streaming.

The Yamaha AG06 provides many convenient features for webcasting:

- Two mic inputs
- Phantom Power supported on Ch 1
- Supports headset with mic
- Output for headphones & speakers
- USB connection to PC
- Loopback function
- Amp Simulator and Effects

NOTE:

What differences of between AG03 and AG06

	Input	Output	Effects
AG03	3CH	MONITOR OUT PHONES OUT	COMP/EQ, EFFECT (CH1)
AG06	6CH	MONITOR OUT PHONES OUT STEREO OUT	COMP/EQ, EFFECT (CH1) COMP/EQ, AMP SIM (CH2)

For further information, refer to this link.

<https://www.yamaha.com/2/ag>



Yamaha AG06

Other equipment

To make your livestreaming production look as professional as possible, other equipment such as camera(s), tripods, lights, PCs, power cords, and a stable Internet connection are also very important. Here are some tips:

Camera

Higher quality cameras can produce higher quality videos. To achieve a minimum picture quality, a video camera that supports at least 1080p Full HD is required. For sure using a 4K camera will always give you the best picture for your production. However, please note that ATEM Mini Pro only supports video up to 1080p video output while some of the streaming platforms do not support 4K output. Therefore, a camera which supports Full HD video would be enough for livestreaming in most case. Also, need an HDMI connector to connect your camera to ATEM Mini Pro.

2.3 Video Camera (e.g. Sony FDR-AX43)

Higher quality cameras can produce higher quality videos. To maintain a certain picture quality, a video camera that supports at least 1080p Full HD is required.



Sony FDR-AX43

2.4 Display Monitor

This display monitor is for the operator to control the switcher while being able to monitor the output of the program being streamed. The ATEM Mini Pro supports a variety display monitors, but we recommend using at least 1920x1080 Full HD display.



1920x1080 Full HD display

2.5 Microphones

There are several types of microphone. For this document we'll use a handheld microphone and a pin microphone. Using microphones based on their own unique characteristics will improve the overall performance and response of your system.

The two most common types of microphone are: dynamic microphones and condenser microphones. They differ in structure, price, and sound quality, but should be carefully selected based on the performance, environment and type of use.

Dynamic microphones

Dynamic microphones are designed to be sturdy with a simplified internal mechanism that can withstand small bumps/drops and humidity changes without impacting its performance. The simple design also means they don't require an additional specialized electrical current to work. While this also means they are generally less expensive, there are plenty of high-performance dynamic microphones available.

However, there are some compromises to consider when using dynamic microphones. Compared to condenser microphones, dynamic microphones are less sensitive, don't pick-up higher frequencies or the details of human speech as well, and might add a little noise to the original signal.

Condenser microphones

Condenser microphones are designed to be highly responsive in order to pick up additional nuances in sound. A more delicate pick-up mechanism inside the microphone requires an additional electrical current of +48v (called phantom power) to operate the smaller components. This +48v current can be found as a feature built into most mixers. On the downside, these delicate condenser microphones are more fragile and expensive compared to dynamic microphones, so be careful with your budget.

- **Handheld microphones**

Commonly used by singers, performers, or public speakers, handheld microphones are simple to use and provide flexibility for productions. They can be ideal for experienced performers who like to frequently adjust their distance from the microphone or when the microphones need to be passed between performers. Many models also provide on/off switches to give the presenter additional control. However, some handling noise may be generated while moving about during use.



Shure SM58



AUDIX OM5

- **Lavalier microphones (Pin / Lapel microphones)**

These small microphones are also known as tie-clip or pin microphones since they can be fastened to clothes with a pin or clip. This means performers can move around freely since they don't need to hold a mic in their hands. Since the microphone is held in place and doesn't change distance from the speaker's voice, this makes it easy to preset the speaker's microphone volume and maintain a good sound with minimal effort.



DPA4080



Line6 LM4-T

PC (or Mac)

ATEM Mini Pro can be streamed by yourself, but you can be safe that you have a dedicated streaming PC for more stable.

ATEM Mini Pro has a USB-C output to your PC which will allow you to use the ATEM Mini Pro as a webcam.

ATEM Mini Pro supports only Windows 10 64-bit or Mac OS X 10.14 Mojave or later.

3.0 System Examples

3.1 Basic System

3.1.1 For Live Commerce

Overview

Basic System - Smartphones and Handheld Microphones

*look at a basic Live Commerce setup. We'll use the ATEM Mini Pro and AG06 throughout this guide since they can be used for any of these systems. Be aware that using the ATEM Mini and AG03 is also possible, but only for the Basic System.

In this case, we have used smartphones, when using the smartphone can get decrease your budget. However, the smartphone's microphone is not good for streaming because of the long distance for the presenter. Therefore, we use low-cost dynamic microphones. It also contributes to low cost.

Two smartphones will be used as video inputs by connecting each to the ATEM Mini Pro with an HDMI cable and a smartphone adaptor.

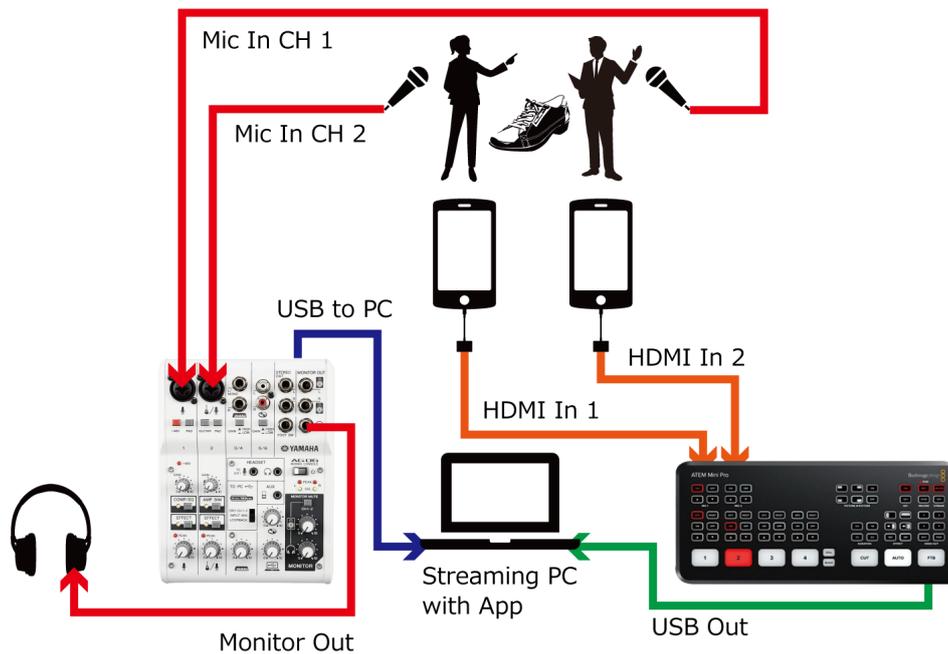
With both smartphones connected to the ATEM Mini Pro, it's possible to switch between them and distribute their images.

For voice inputs, the presenters can use handheld dynamic microphones connected to the AG06 with either a jack or XLR cable. The ATEM Mini Pro and AG06 can also be connected to a PC via their respective USB OUT ports.

By using AG, the sound quality and volume can be adjusted with effects and knobs, enabling higher-quality broadcasting.

System Benefits

With the ATEM Mini Pro and AG06, this basic system allows for simple setup and flexible control of all of your video and audio inputs. The smartphone cameras and handheld microphones also make it easy for presenters and camera operators to move around more freely to create more engaging visuals while promoting your products. It also provides high-quality results with minimal financial investment, allowing you to produce stress-free videos for your customers.



Live Commerce - Basic System

3.1.2 For Webinar

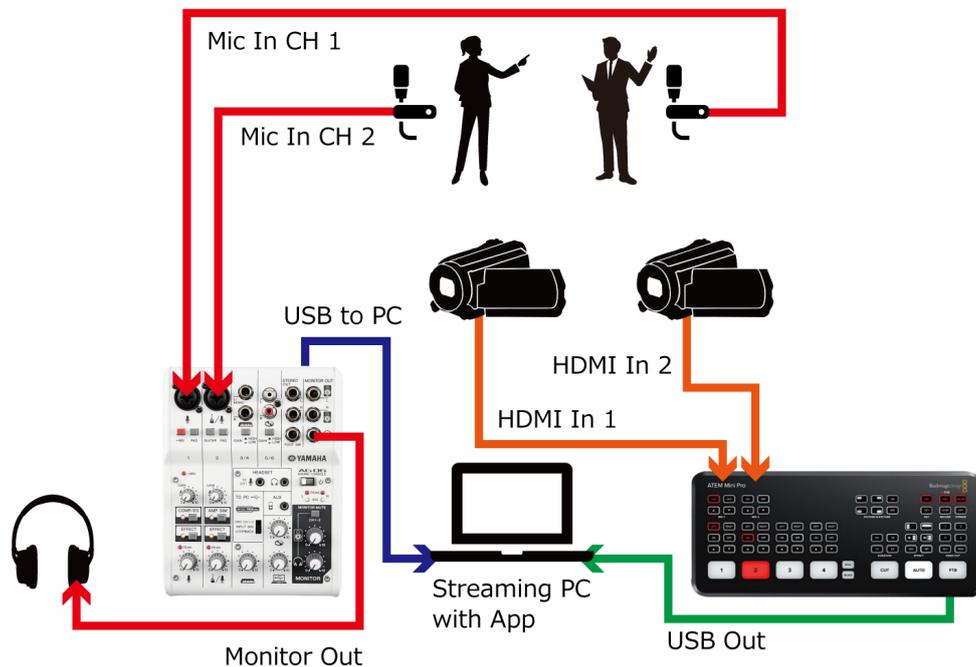
Overview

Basic System - HD Camera Lavalier Microphones

*This setup focuses on a Webinar system. This is similar to is the Live Commerce system described earlier, but will change the handheld microphone to a dynamic lavalier microphone, and upgrade the camera from a smartphone to an HD camera.

System Benefits

In this Webinar is used for two fixed cameras. With both cameras connected to the ATEM Mini Pro, it's possible to switch between them and distribute their images. Lavalier microphones also allow presenters to conduct seminars and training hands free, while adjustments can be made to individual voice levels on the AG06. By producing your webinars in a high-quality environment, attendees will be more easily able to see, hear, and understand any important information you're trying to convey.



Webinar - Basic System

NOTE:

ATEM Mini Pro has a USB-C port to connect to the PC as a video interface. It allows the ATEM Mini Pro to recognize the device as web-cam video source. The “Program” video source will be sent to your PC, which allows you to stream your source live with Teams, Zoom, FB Live, etc.

3.2 Improved System

3.2.1 For Live Commerce

Overview

Improved System - HD Camera, Condenser Mic, and Multiview Monitor

Two HD cameras are used for video input. Both HD cameras are connected to the ATEM Mini Pro with an HDMI cable. A presentation PC for displaying product introduction videos and materials is connected to ATEM Mini Pro with an HDMI cable. Since a total of 3 input sources are connected, it is possible to switch and distribute the images from 2 HD cameras and the presentation PC.

For audio input, one presenter can use a condenser microphone and the other uses a dynamic microphone. Both microphones can be connected to the AG06 with a jack or XLR cable.

A multi-view screen is displayed on an external monitor using the HDMI OUT of the ATEM Mini Pro.

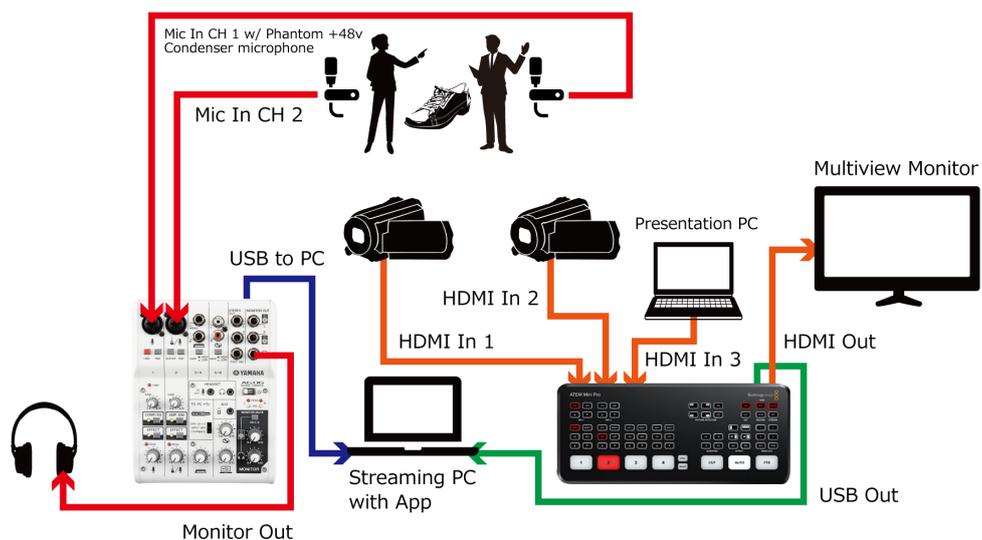
For video output, use a USB-C cable connected the ATEM Mini Pro's USB OUT to a PC for distribution

For audio output, use a USB cable to connect the AG06's USB OUT to a PC for distribution.

System Benefits

In this system, you can switch between the two HD camera feeds and the presenter's PC displaying product introduction videos or higher resolution images. With audio, use the AG06's knobs to balance the microphone levels (with the higher-quality condenser microphone on CH1 for the main presenter) Additionally, using a multi-view monitor allows you to preview a video input source before displaying it to viewers, so you can more easily select what viewers will see next.

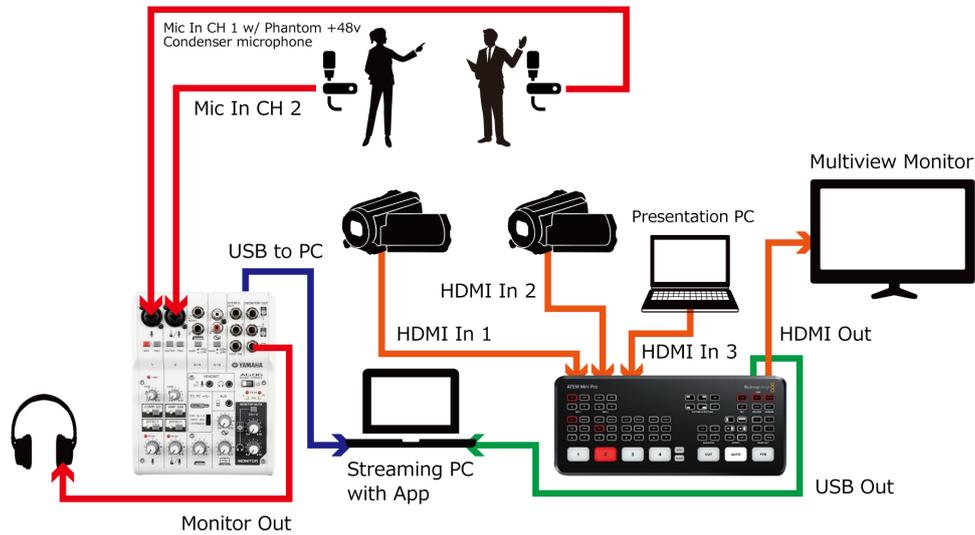
Sharing high-quality video and audio with your customers makes it easier for them to engage with your video and not be distracted by poor quality images or sound. Having outstanding production quality also reinforces the idea that you put the same commitment to quality into your services as you do into your Live Commerce.



Live Commerce - Improved System

3.2.2 For Webinar

This system is similar to the Live Commerce setup.



Webinar - Improved System

NOTE:

What is a Multiview Monitor?

The ATEM Mini Pro supports “Multi-View (M/V)” monitoring.

Multi-View monitoring is a function that allows you to see all of your video and audio sources on a single display. This makes it easier to see both the “Preview” and “Program” video source while you are streaming.

Program (red): Current, live streaming video source that viewers see

Preview (green): View standby streaming video source before sending it to Program



Multiview Monitor

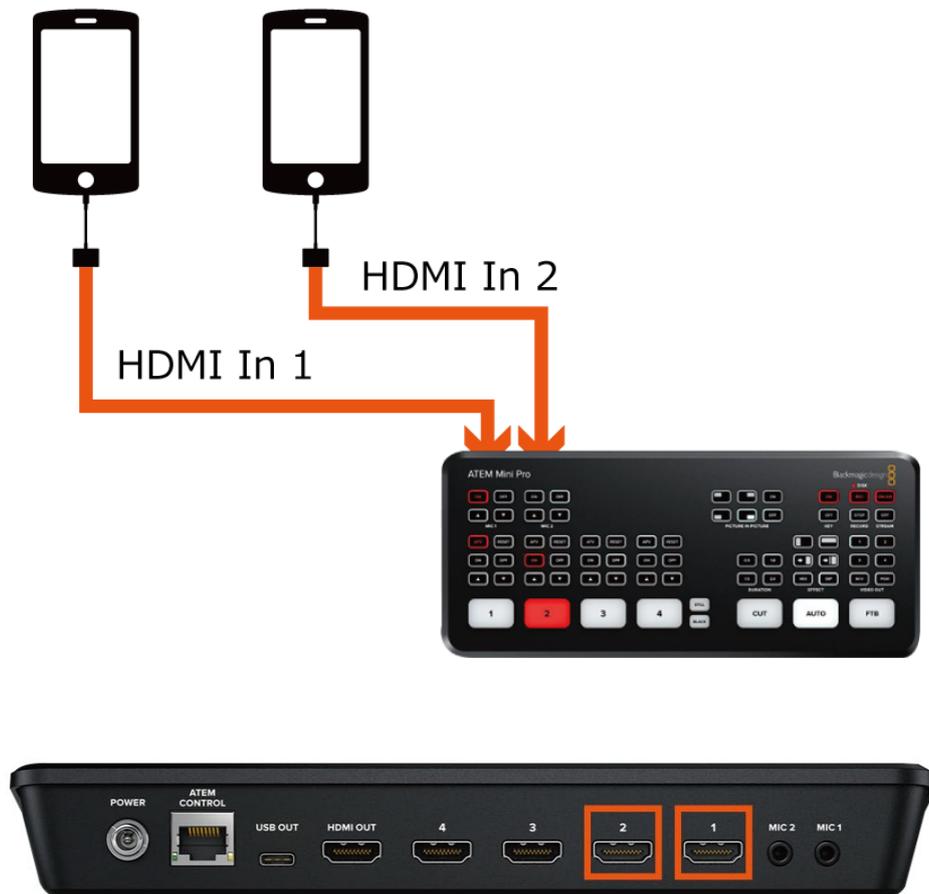
4.0 System Setup

4.1 Basic System

4.1.1 For Live Commerce

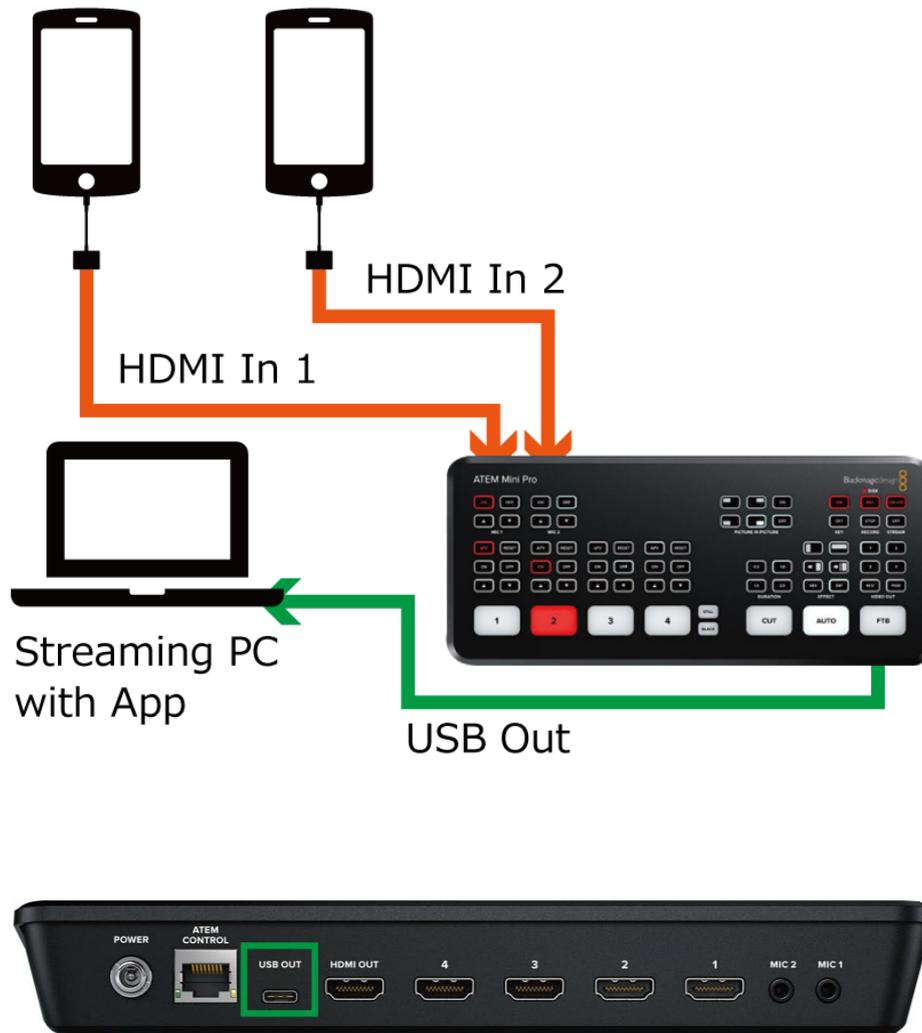
1 Camera Inputs

- Connect the smart-phone to ATEM Mini Pro (HDMI In 1) with HDMI connector
- Connect the smart-phone to ATEM Mini Pro (HDMI In 2) with HDMI connector



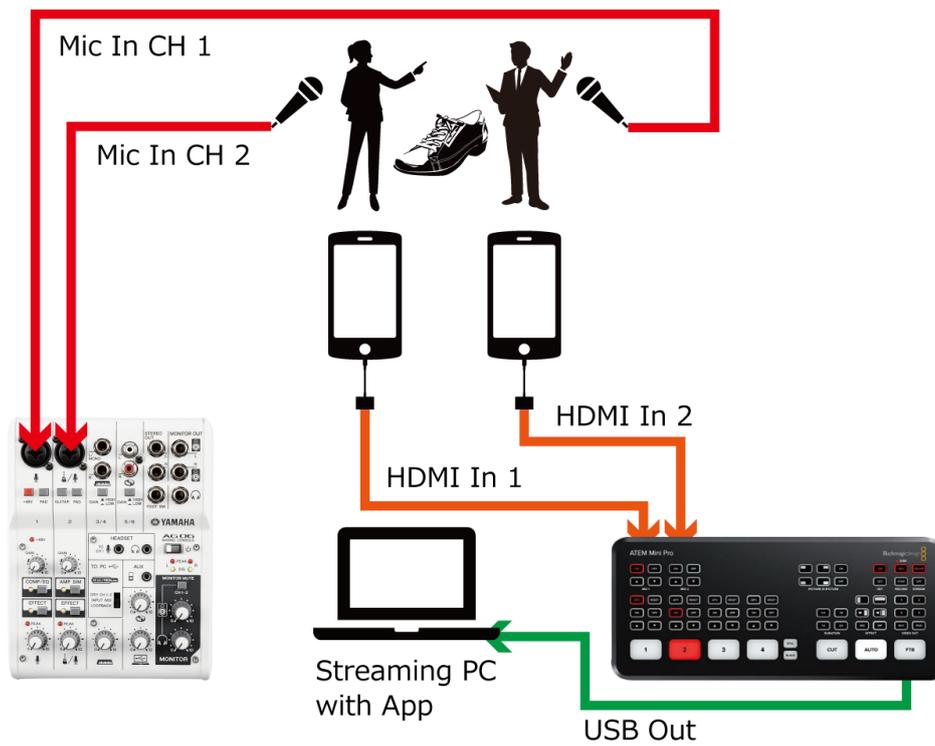
2 USB Outputs

- Connect ATEM Mini Pro to PC via USB



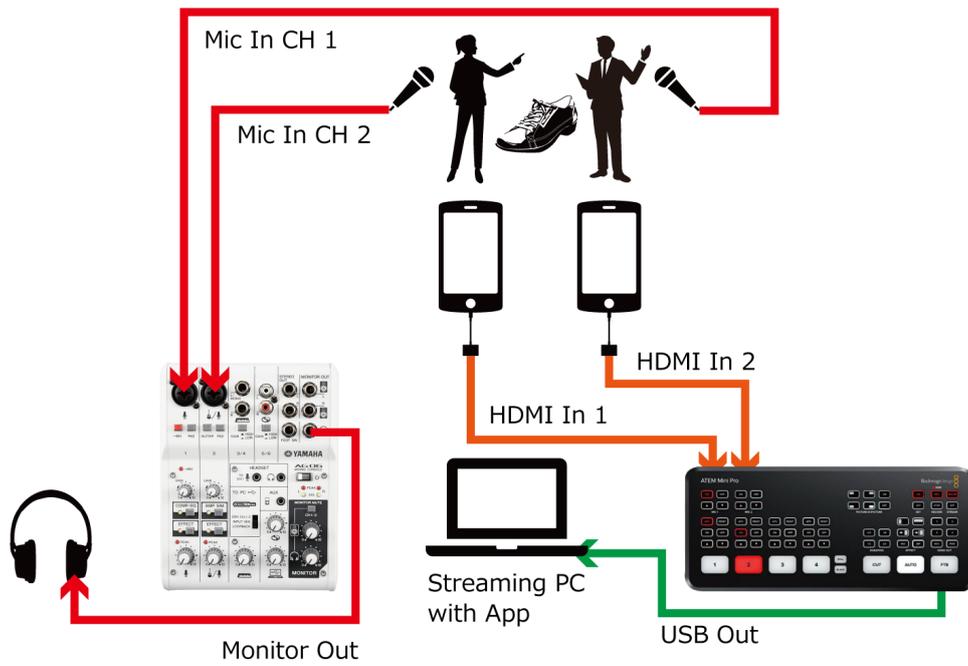
3 Audio Inputs

- Connect microphone to AG06 (Audio CH 1)
- Connect microphone to AG06 (Audio CH 2)



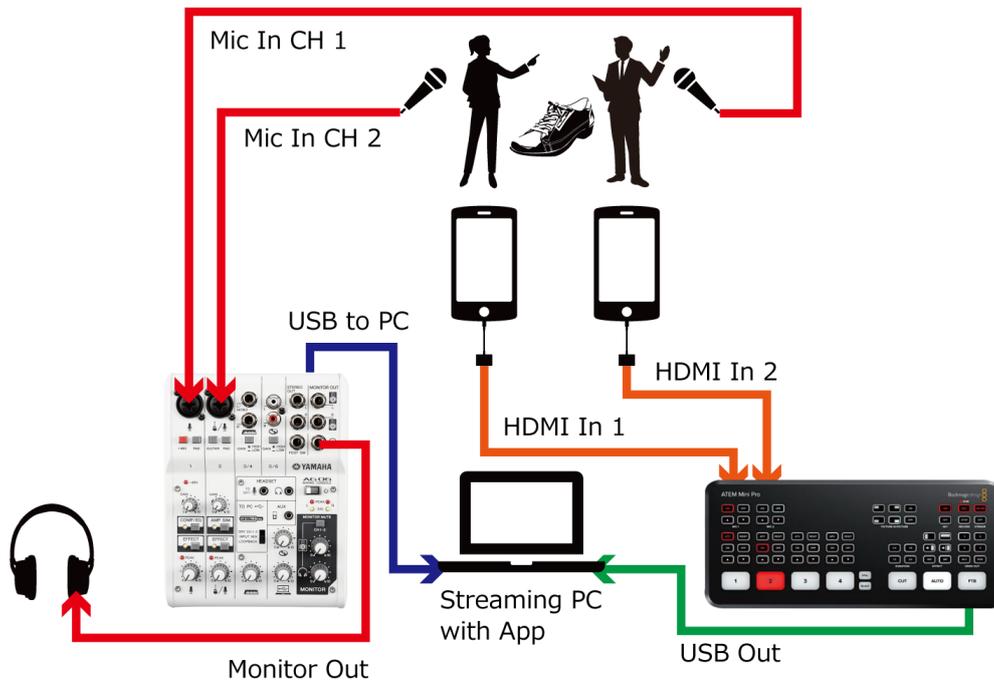
4 Audio Output

- Connect a headphones to AG06 (Monitor Out)



5 USB Output

- Connect AG06 to PC via USB(for USB-C, use 3.1 Gen 1 or higher)



4.1.2 For Webinar

1 Camera Inputs

- Connect the HD Camera to ATEM Mini Pro (HDMI In 1) with HDMI connector
- Connect the HD Camera to ATEM Mini Pro (HDMI In 2) with HDMI connector

2 Audio Inputs

- Connect Lavalier mic to AG06 (Audio CH 1)
- Connect Lavalier mic to AG06 (Audio CH 2)

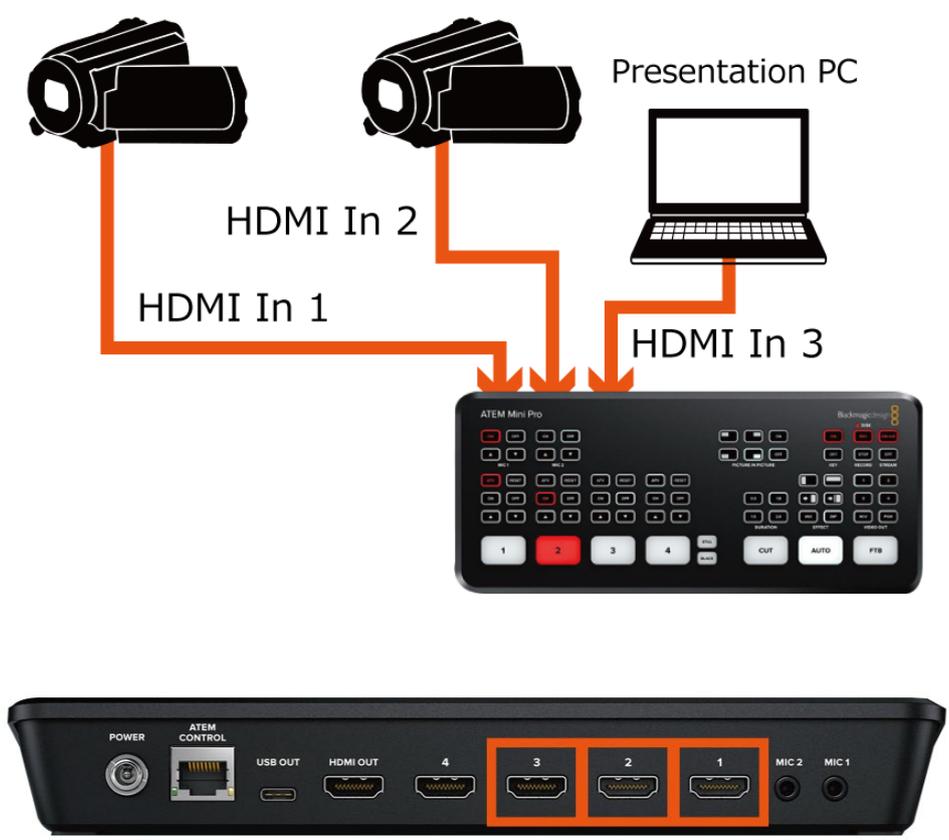
This setup is the same as the Live Commerce system.

4.2 Improved System

4.2.1 For Live Commerce

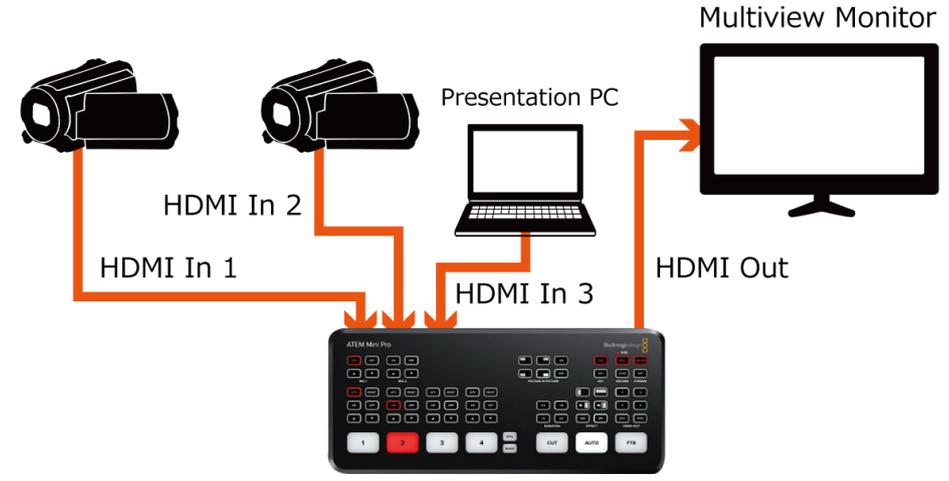
1 Camera Inputs

- Connect HD Camera to ATEM Mini Pro (HDMI In 1) with HDMI connector
- Connect HD Camera to ATEM Mini Pro (HDMI In 2) with HDMI connector
- Connect Presentation PC to ATEM Mini Pro (HDMI In 3) with HDMI connector



2 Camera Outputs

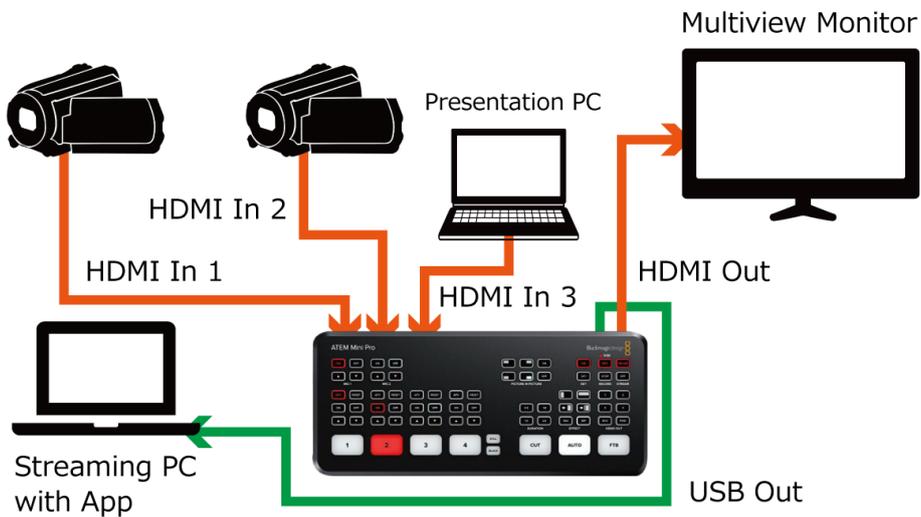
- Connect ATEM Mini Pro to External Monitor (Multi-View Monitor) (HDMI OUT)





3 USB Outputs

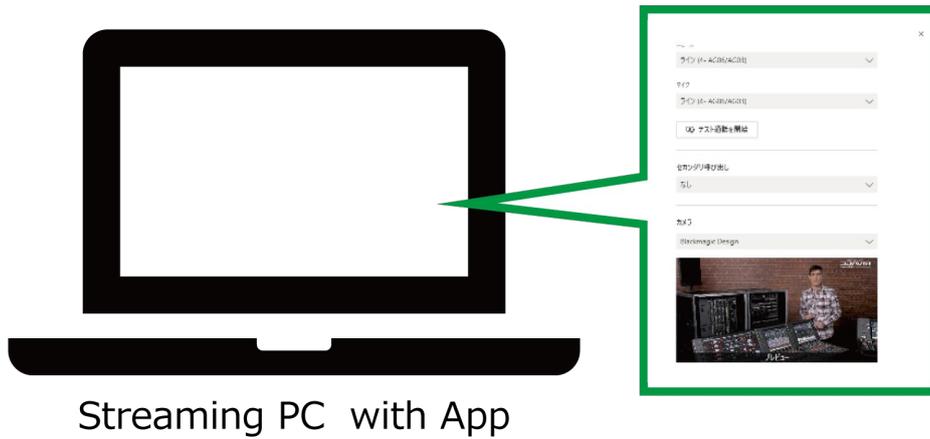
- Connect ATEM Mini Pro to PC with USB (for USB-C, use 3.1 Gen 1 or higher)



NOTE:

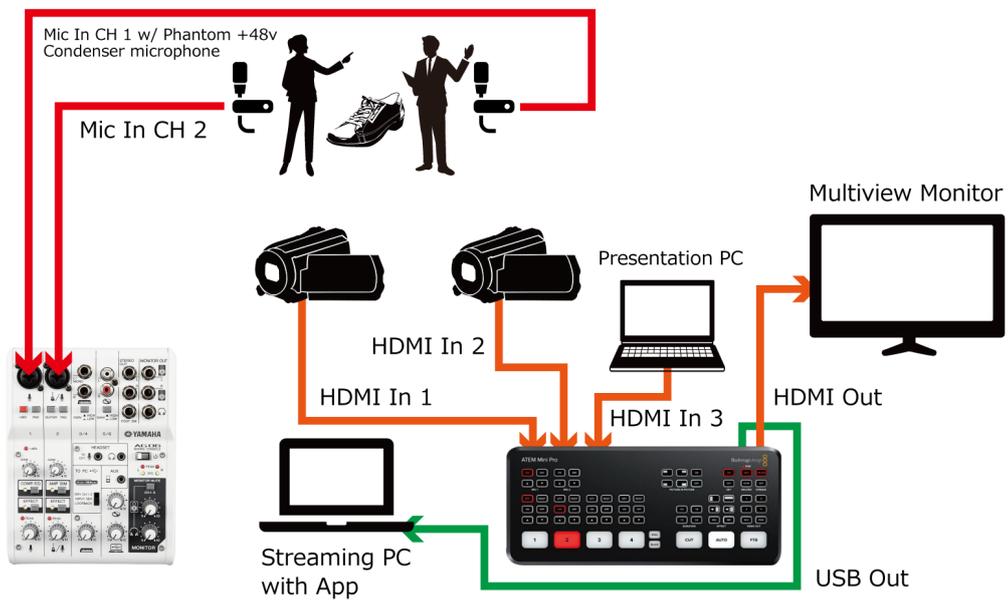
If the PC recognizes the ATEM Mini Pro as a webcam, you can do the followings:

- The “Program” video source will be sent to your PC, which allows you to stream your source live with Teams, Zoom, FB Live, etc.
- Allow PC to use a dedicated software app to optimize and control the ATEM Mini Pro.



4 Audio Inputs

- Connect a condenser Lavalier mic to AG06 (Audio CH 1) with phantom power from AG06)
- Connect a Dynamic Lavalier mic to AG06 (Audio CH 2)



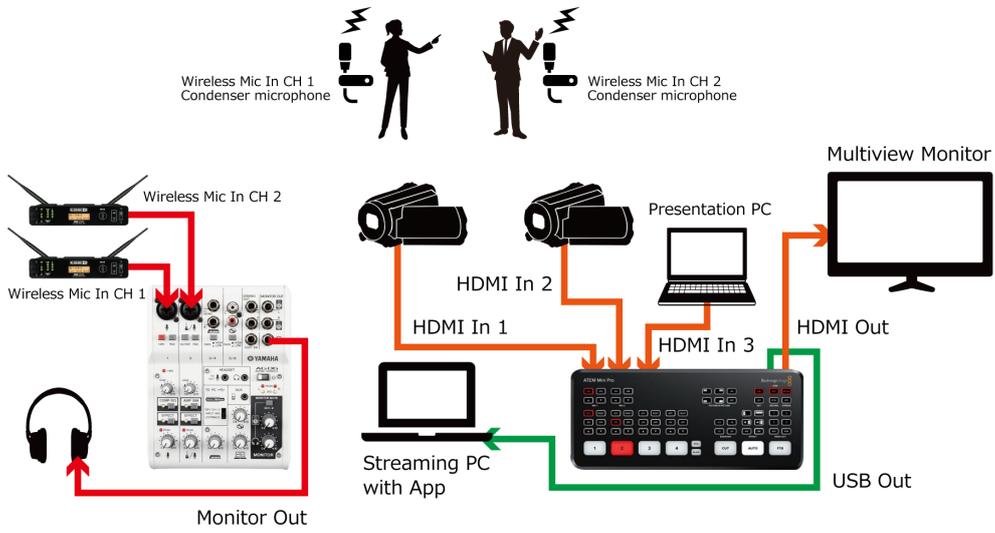


When using phantom power, press this button.

NOTE:
To use a wireless microphone with the AG06

- Connect a Lavalier mic to AG06 (Audio CH 1) via Wireless receiver
- Connect a Lavalier mic to AG06 (Audio CH 2) via Wireless receiver

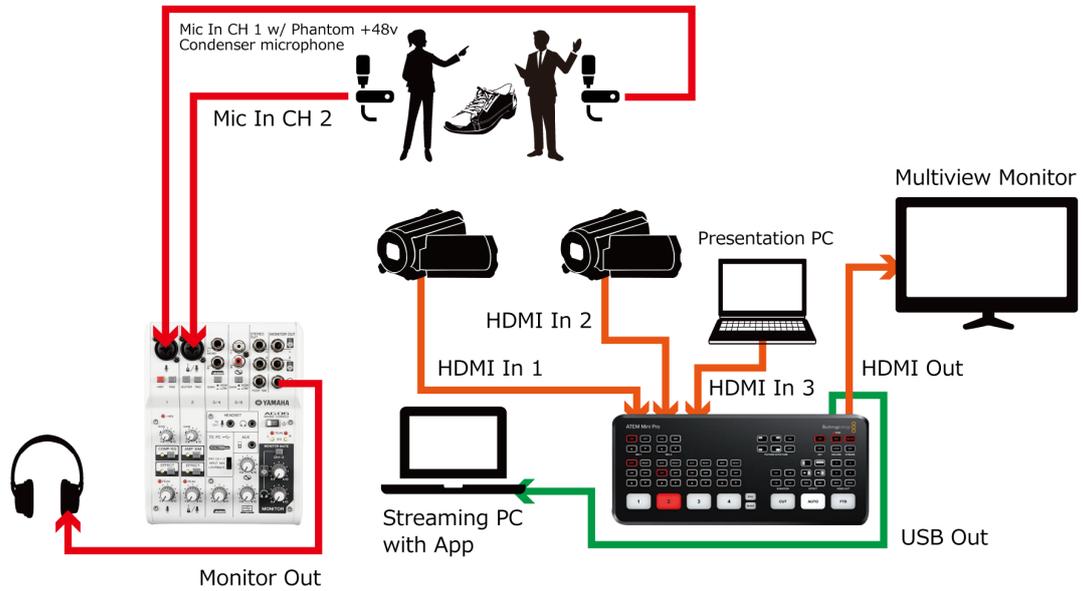
TIPS:
Wireless condenser microphones can be used for improved sound quality. While condenser microphones require phantom power, this is taken care of by the microphone's wireless transmitter/battery pack. This means that wireless receivers can be connected without the need for the +48v phantom power allowing use of a condenser microphone on either channel.



Connect XLR cable to AG06 (Audio CH 1 or CH 2) and the above port.

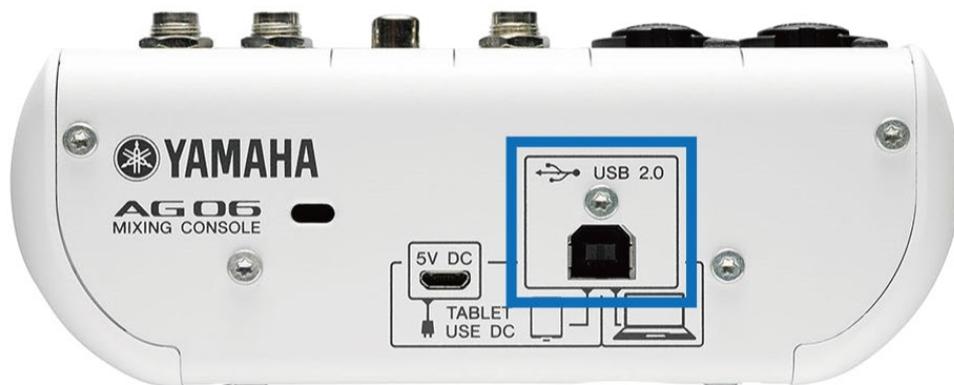
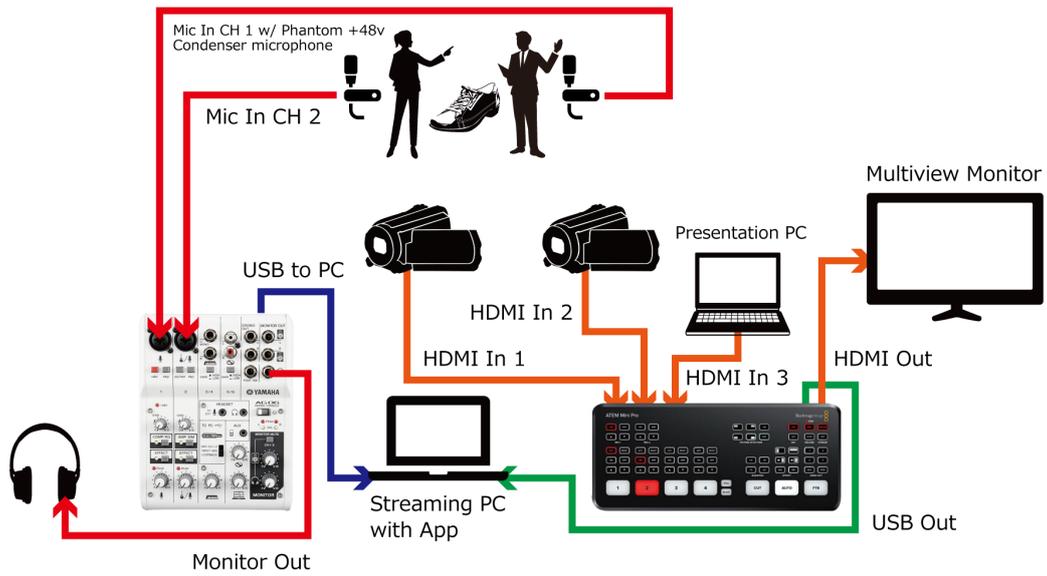
5 Audio Outputs

- Connect headphones to AG06 (Monitor Out)



6 USB Outputs

- Connect AG06 to PC with USB cable



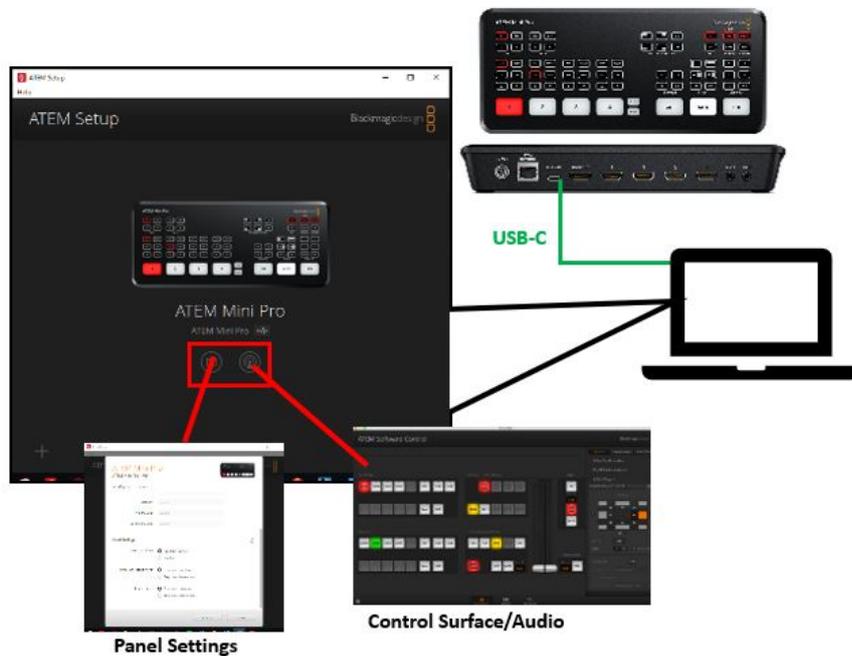
4.2.2 For Webinar

The setup is the same as Live Commerce.

5.0 Optimize ATEM Mini Pro for Live-streaming

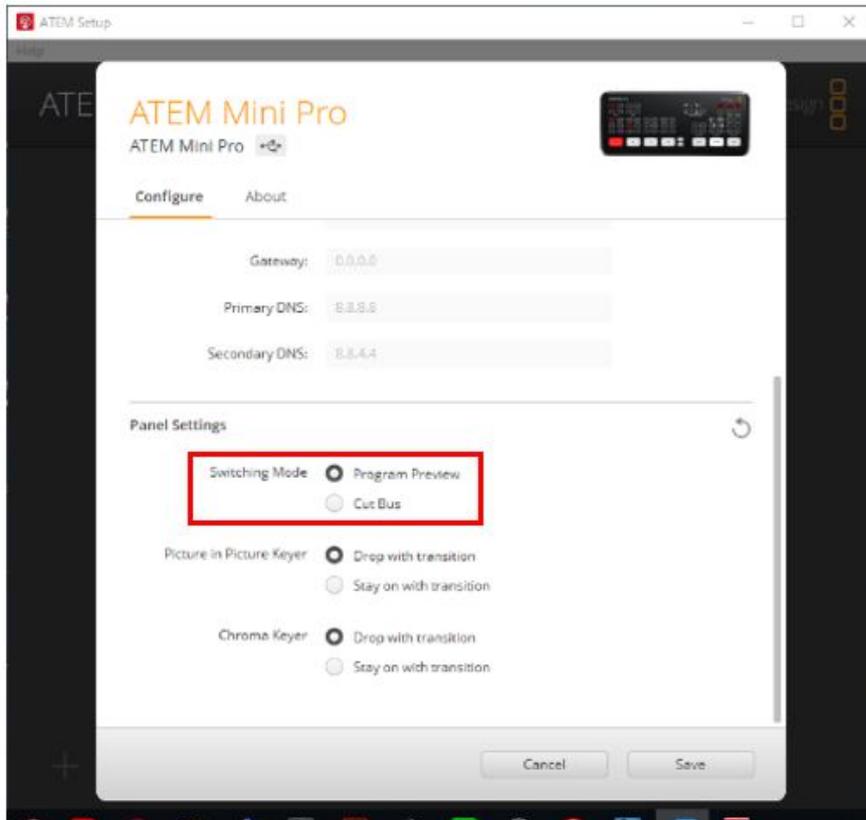
To configure the ATEM Mini Pro, use the ATEM Software Control app. This application contains drivers and User Interface software for the ATEM Mini Pro.

Changes can be made in Panel Settings for adjustments to the switching mode, Picture-in-Picture keyer, etc. The control software has similar functions to the hardware, but allows for more detailed adjustments to the settings.



On the Panel settings page, make sure the switching mode of ATEM Mini pro is set to Program/Preview.

The software also allows you to operate the switcher in Preview mode to check for continuity or improve timing between video input transitions (Cut Bus mode is the default setting.)



6.0 Optimize Yamaha AG 06 for Live-streaming

- Connect USB to your PC (USB2.0)

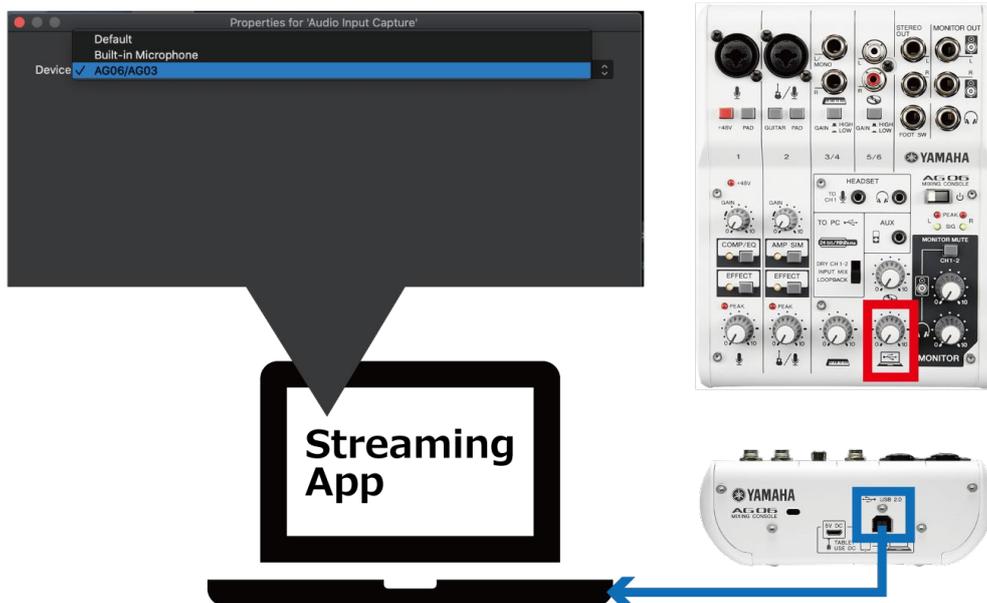
PCs will recognize your AG06 as an audio device. Set both mic and speaker to AG06.

If you are using the AG on Microsoft Windows OS, it is necessary to install the “Yamaha Steinberg USB Driver”.

NOTE:

AG has a DSP controller. You can use the effect to deliver audio with higher sound quality.

<https://www.yamaha.com/2/ag>

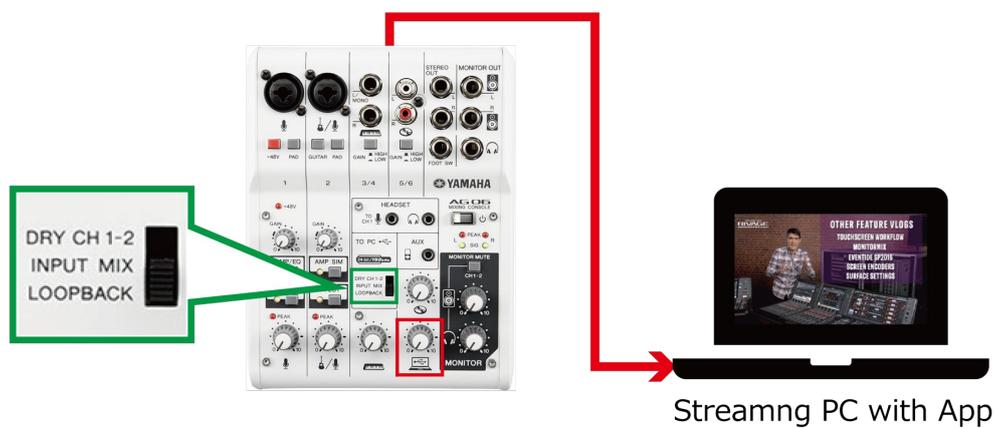


NOTE:

More stable broadcasts are possible if you can have a dedicated PC to play pre-recorded videos. Also, you can switch the video by ATEM Mini Pro.

Also, the AG will set to "INPUT MIX" mode.

If you only have one PC to use for live streaming and playback of video or audio, you can use the "LOOPBACK" mode function of AG06. It will allow audio to be transferred from the PC output back to the input, so it is streamed.



Streaming PC with App

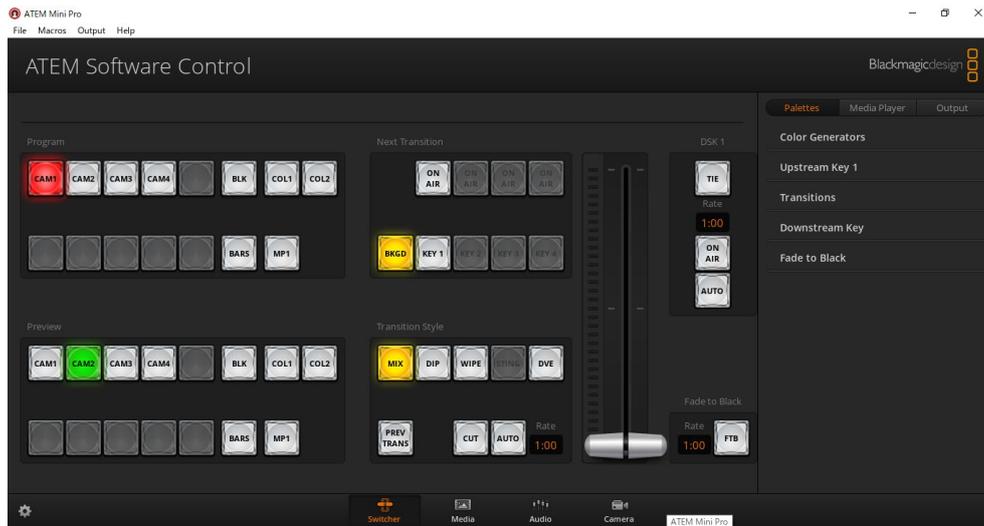
When there is guest joining the webinar from far-end as a panellist, the loopback function must be disabled to avoid distracting echo and additional noise.

7.0 Prepare for Live Streaming

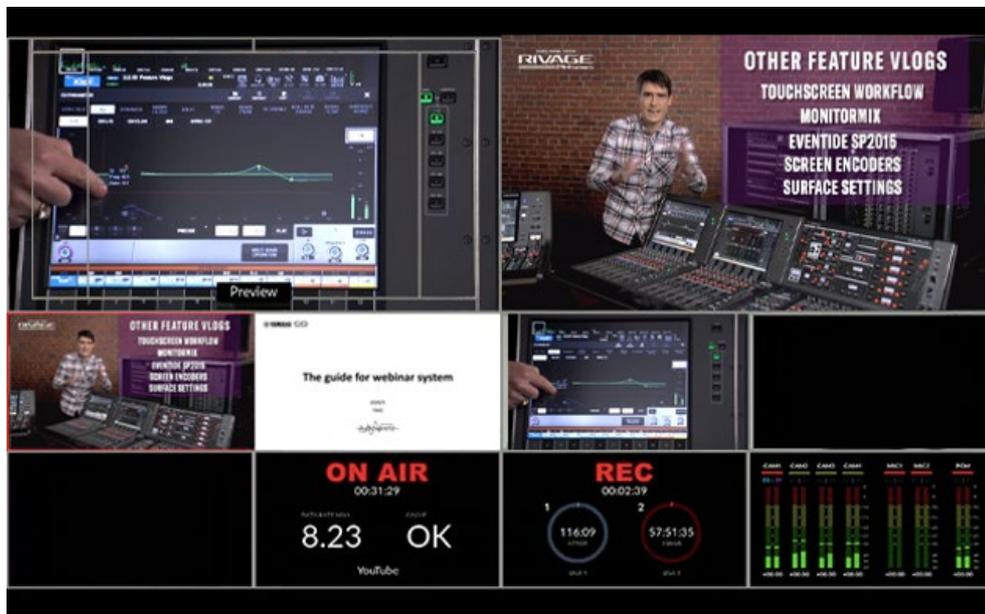
7.1 For video program

On “ATEM Software Control”, prepare the program with various sources.

All sources can be monitored with Multiview function.



ATEM Software Control Panel



Multiview monitoring

Switching Input sources can be done on both the hardware and the software.

Cam1 to Cam4: Video input source 1 to 4
Still: Still graphic stored in the media player
Black: To black screen



Red indicator is “Program”
Green indicator is “Preview”

7.2 Set up and configure the streaming platform

After preparing all your video and audio sources for your live-stream, you can configure your streaming platform. There are two methods to stream using the system introduced in this document.

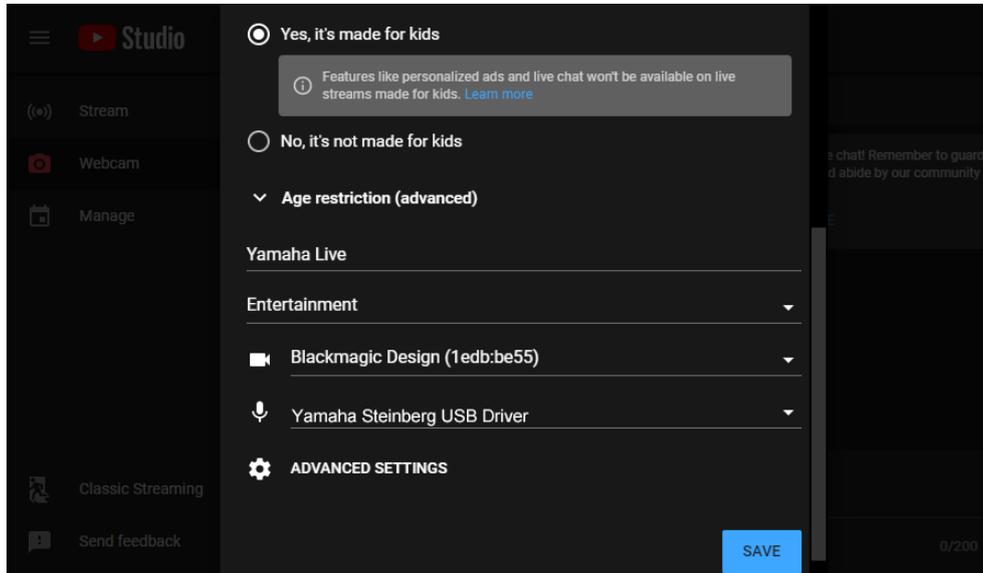
- Use the device as a webcam/audio source directly
- Use the device together with a software encoder (e.g. OBS studio) (*3)

In this document, we will use the steaming platform “YouTube” as an example. Make sure to evaluate and decide which platform makes the most sense for you or your business.

(*3) ATEM Mini Pro itself can be used as hardware encoder, for more details, please refer to the manual.

Use the device as a webcam/audio source directly

The ATEM Mini Pro can be used as a webcam to transmit camera image to the PC directly. After connecting the ATEM Mini Pro and the AG06 to the PC, select the devices as video and audio source on the streaming platform respectively.

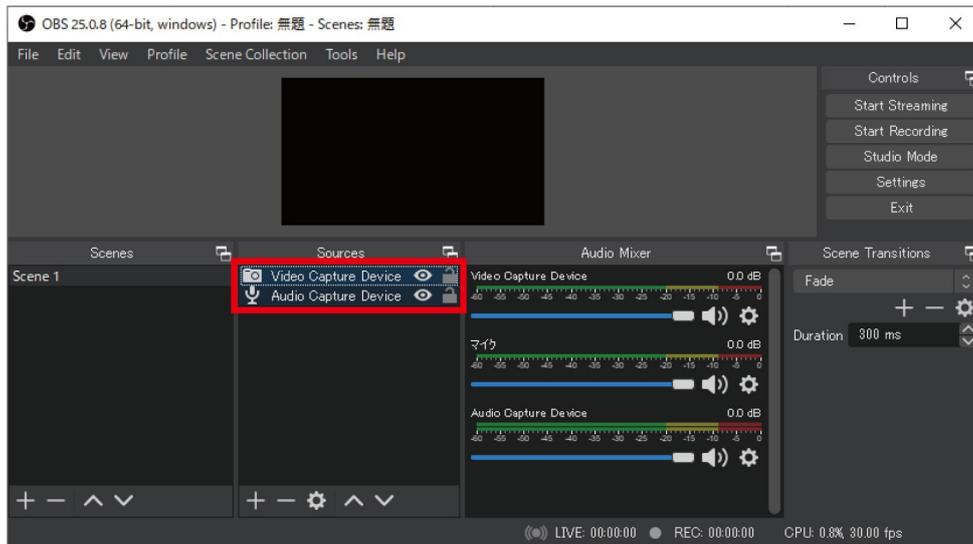


Example: Choosing the devices on YouTube

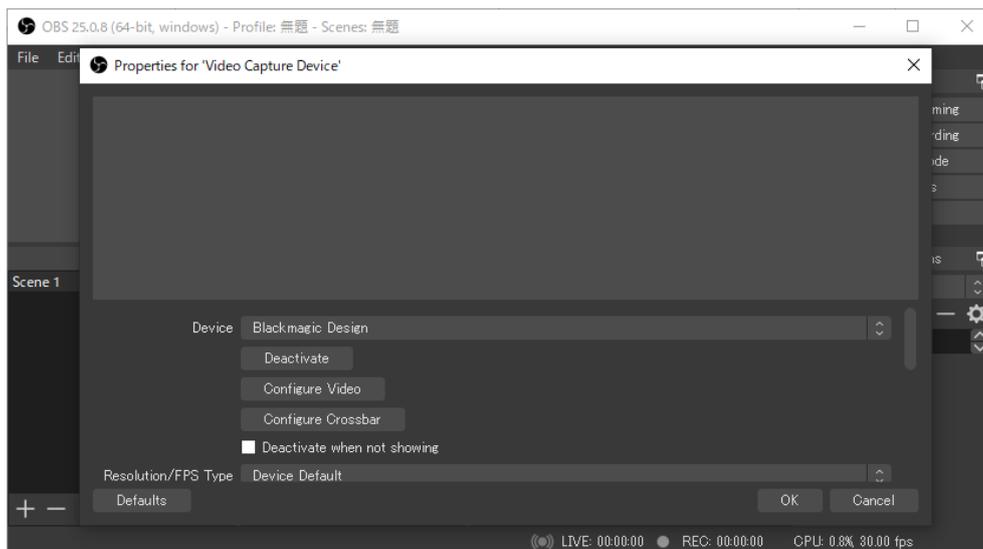
Use the device together with a software encoder (e.g. OBS Studio)

Some live-stream platforms require to use an encoder to convert the content into a digital format for live-streaming. When using a software encoder like OBS Studio for live-streaming together with the system, it is necessary to select the devices as video and source on the OBS first.

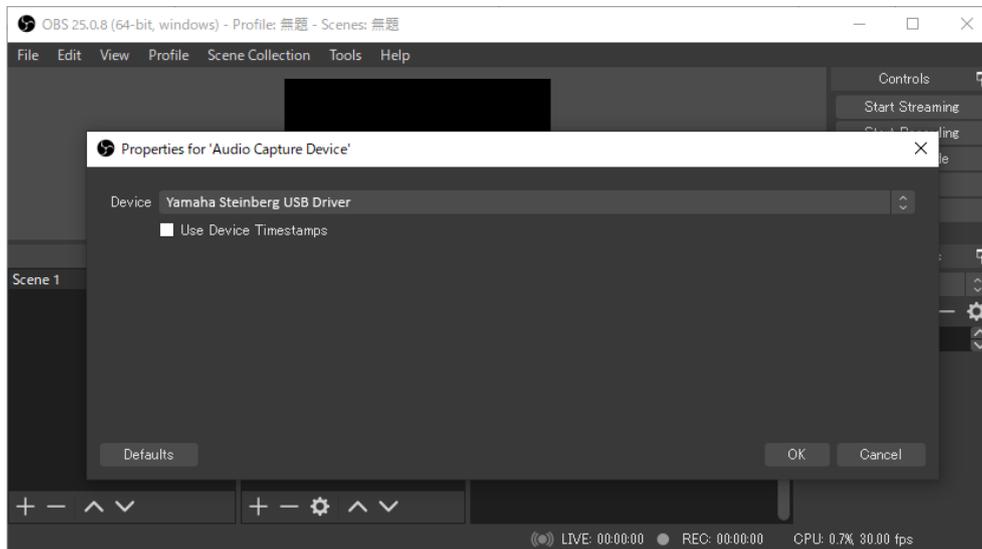
- Set the device in “Properties”



- Choosing the device for video

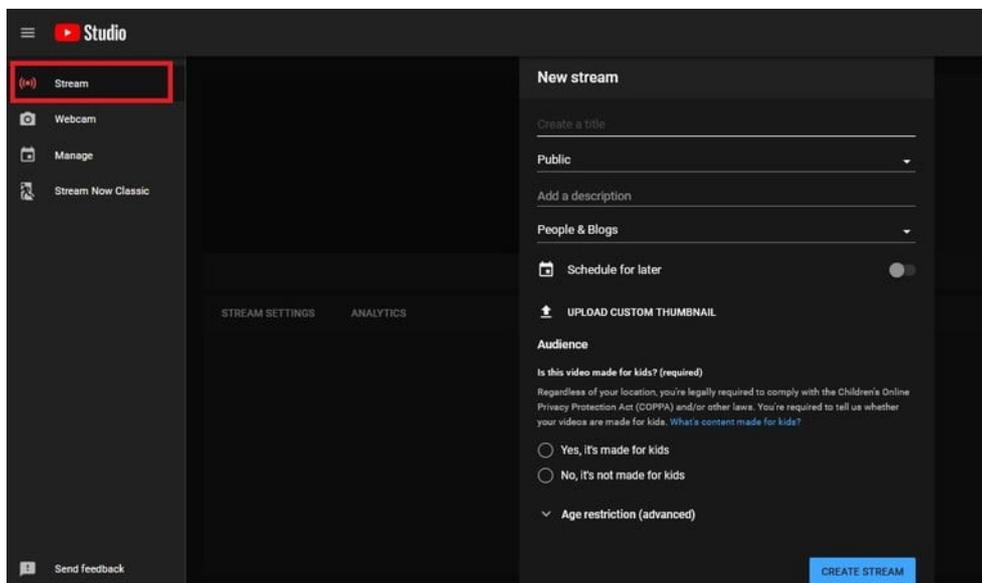


- Choosing the device for audio



After making the configuration on OBS Studio, you can create a stream and generate the Stream Key on your platform and link it to the OBS Studio.

- Create a live-stream on your platform



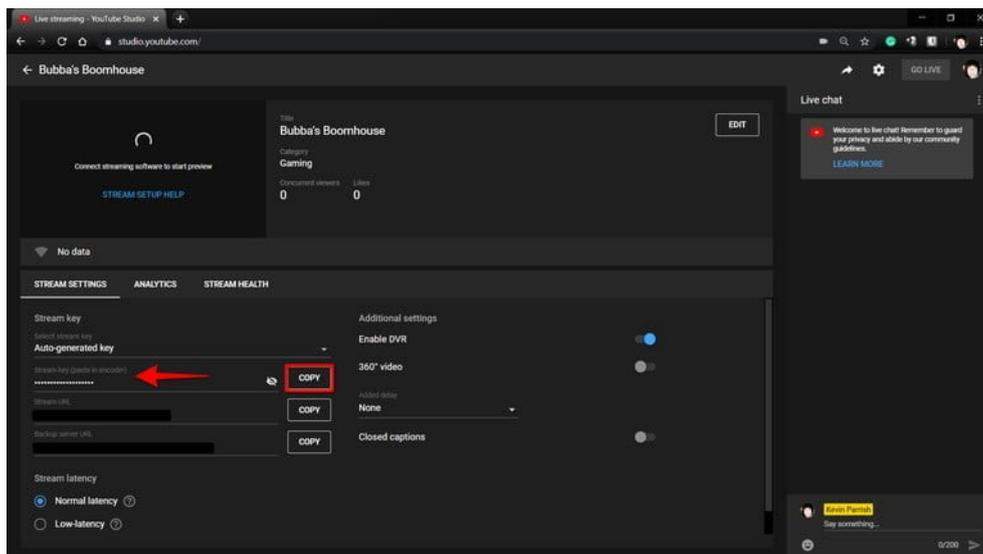
NOTE:

Choosing a video bitrate for your live stream depends on your situation. This is a table that will help you decide on a good video bitrate for OBS.

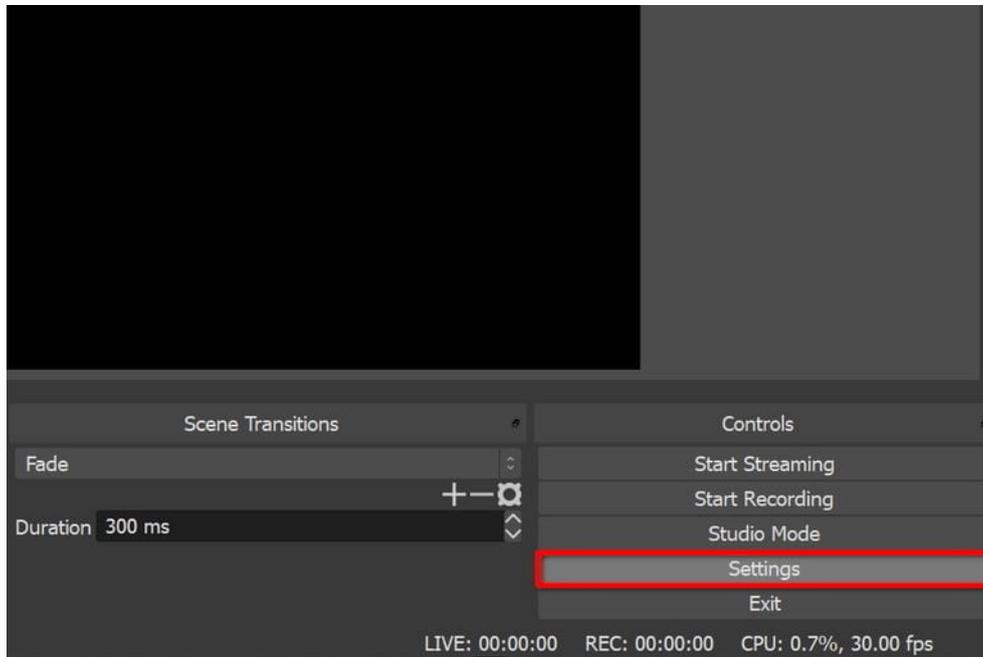
Quality	Resolution	Video Bit Rate (kbps)	Audio Bit Rate (kbps)
High Definition(1)	720	1500	192
High Definition(2)	1080	4000	256

- You can find the Stream key in the Setup page

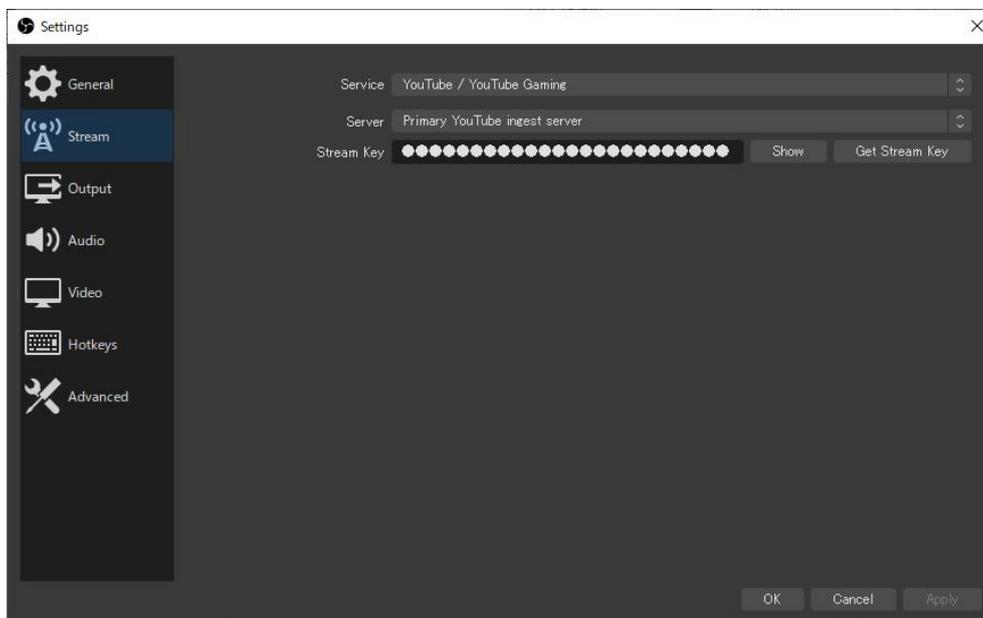
On OBS studio, select “Settings” under “Control” to set the Stream Key.



- “Settings” on OBS Studio

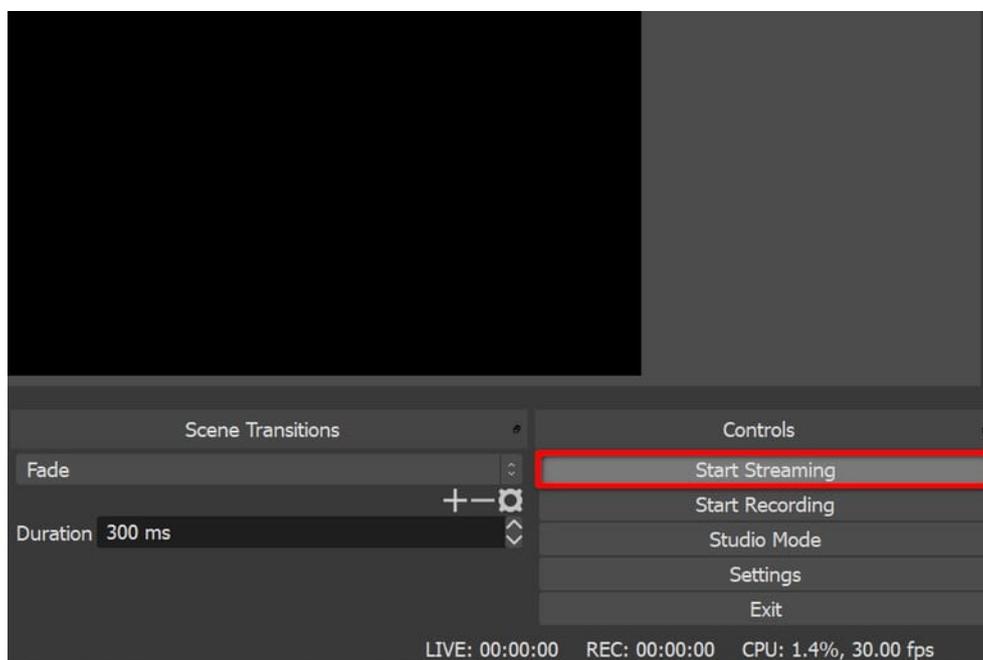


- Select Stream in Settings and copy the stream key > OK



Now, your event is live!

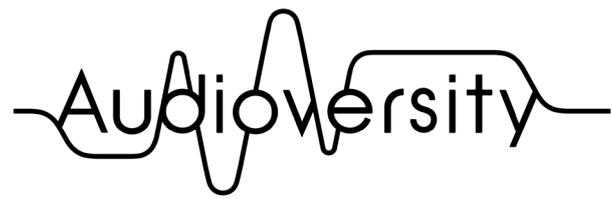
- Click “Start Streaming” to start your live-stream



For OBS and ATEM Mini Pro further information, refer to this link.

OBS: <https://obsproject.com/>

ATEM Mini Pro: <https://www.blackmagicdesign.com/products/atemmini>



by Yamaha Pro Audio