Zoom Tips For Musical Performance

A Handbook By Zev Pogrebin

Introduction

The purpose of this handbook is to provide advice on how to effectively use Zoom for live musical performances. Specific focus is given to reducing latency, feedback, and distortion within this context. This guide assumes that you already know how to use Zoom. Feel free to skip over any sections that you already know about or that aren't relevant.

If you are performing with multiple people, everyone should try to have their Zoom client and physical space set up properly if they're able to.

Note

It's a crazy and difficult time, and I hope you're doing as well as you can! Stay safe.

Also, the settings in this guide are shown in the Mac OS Zoom client, but all this works on the latest Windows and iOS versions of Zoom too (with some slight differences that a bit of googling might help).

Setup & Gear

1: Headphones

Use a pair of headphones to avoid feedback. Generally Zoom has an algorithm to prevent feedback, which makes it easy to use Zoom with speakers or monitors. To improve audio fidelity we'll turn that feature off though, making headphones key.

I personally wouldn't recommend using wireless headphones. Bluetooth devices generally introduce a delay that's *at least* 30ms. (if you use both a bluetooth speaker and microphone, your total delay could be as long as a ¹⁄₁₆th note at 120bpm!)

2: Microphones/Inputs

If you are a singer or use an acoustic instrument, use an external microphone if you have one. If you need to use the computer's built in mic, that's not a big deal.

If you play an electric instrument or anything with direct line outs, you'll want to use that as your input to Zoom. If you need to use a microphone to speak or sing as well, there are a few ways to deal with that depending on what equipment you have. I'll explain later in this booklet

Aim for non-square rooms with lots of soft objects to deflect and absorb reverberations

Milliseconds: 1000ms = 1s

???

🎤 **Audio interface** 🎧

line in **Zoom Computer**

3: Your Space

While having a quiet space is important for a typical Zoom call, setting up your space becomes much more important in this setting. The noise reduction and echo reduction programs that Zoom usually applies will be turned off, which will make it more likely for background noise to seep in. Multiply this by every performer who's mic is on at the same time and there may be a large amount of background noise coming through. If possible, the ideal space is one with no background noise, good accoustic properties, and proper mic placement. If the reality of your home setup doesn't fit this, do not worry. Just do your best to reduce noise and get comfortable!

4: Internet

Moving a home router around the house isn't an option for everyone. If at all possible, try to have your wi-fi router close to (ideally in the same room) where you're performing. If you can plug in via ethernet, do that. This will speed up your connection. If you're using a wi-fi network that has a 2.4Ghz and 5Ghz option, make sure you're using the right one (⤴ link). Finally, your signal will be much faster if you limit other traffic on your network while performing.

5: Summary

Try to find a quiet room, with fast internet and good acoustics (if you're using a mic). Make sure you have a pair of wired headphones and if needed, a mic/gear.
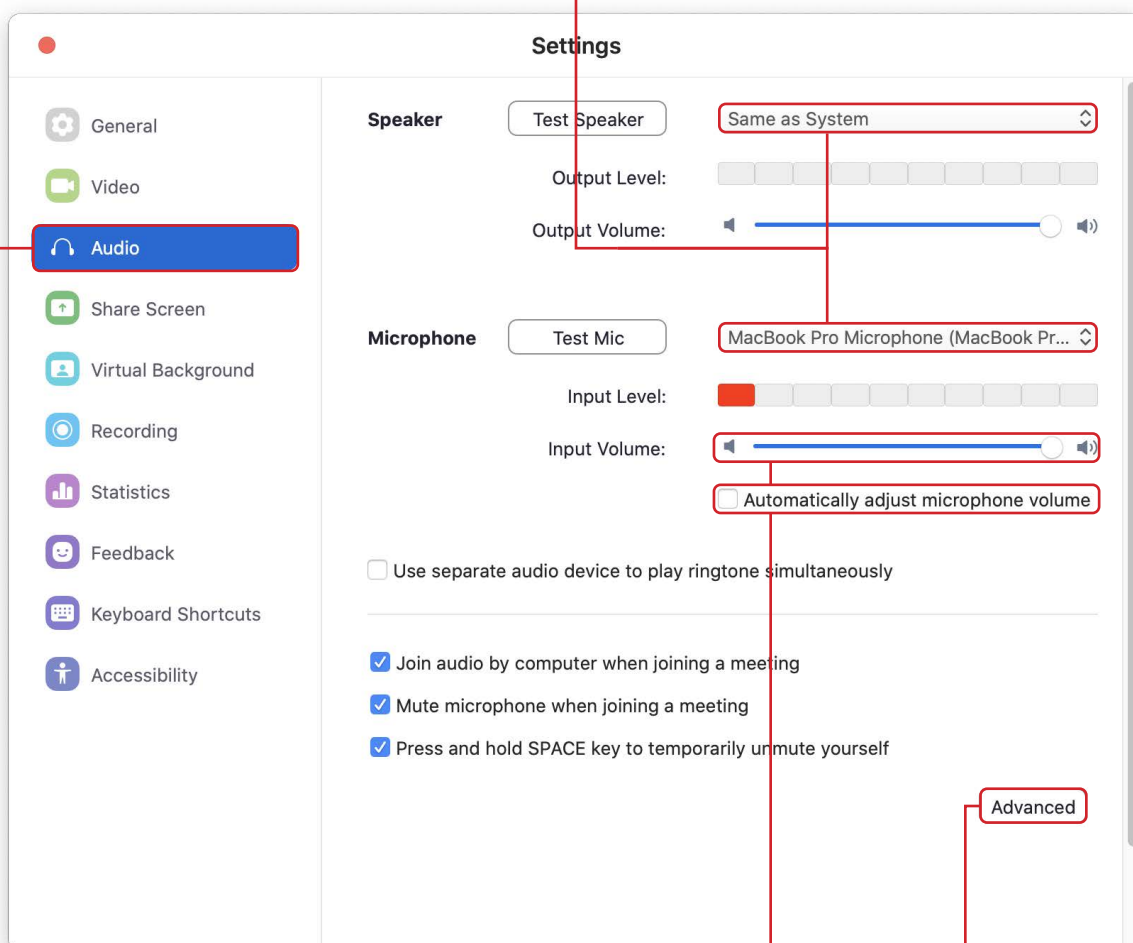
Audio Settings Part 1/2

1: Settings

After entering Settings (⌘+ , on Mac), click "Audio" to edit audio settings

2: Choose I/O

Select the desired inputs and outputs for your system (your microphone/audio interface and headphones)

Settings

General

Video

Audio

Share Screen

Virtual Background

Recording

Statistics

Feedback

Keyboard Shortcuts

Accessibility

Speaker   Test Speaker   Same as System

Output Level:

Output Volume:

Microphone   Test Mic   MacBook Pro Microphone (MacBook Pr...

Input Level:

Input Volume:

☐ Automatically adjust microphone volume

☐ Use separate audio device to play ringtone simultaneously

☑ Join audio by computer when joining a meeting
☑ Mute microphone when joining a meeting
☑ Press and hold SPACE key to temporarily unmute yourself

Advanced

3: Input Level

Uncheck "Automatically adjust microphone volume," which will prevent Zoom from meddling with your mic level. This means we'll need to manually adjust the volume to the desired level and create a "mix" as a group.
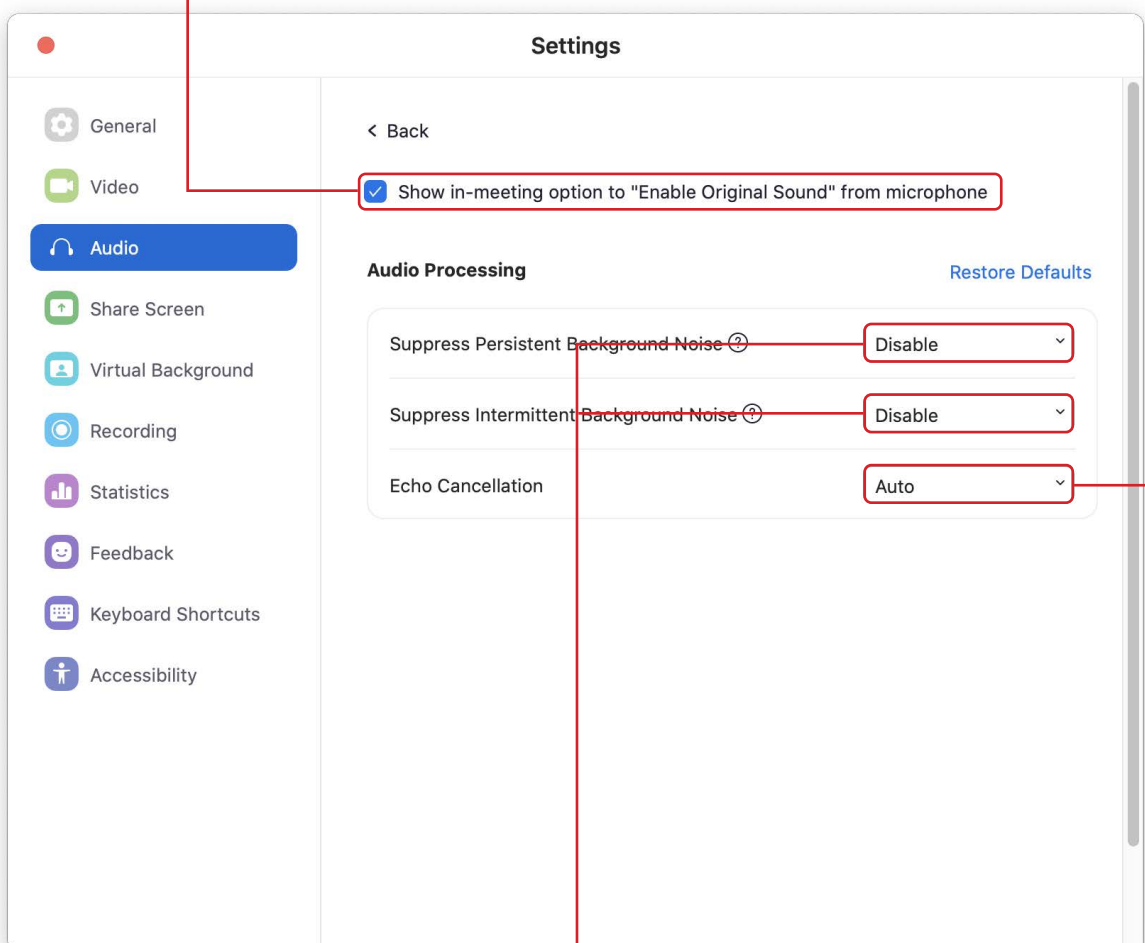
4: →

When you're done, click advanced to apply some more settings. Head to the next page!

Audio Settings Part 2/2

5: Allow "Enable Original Sound"

This is the most important setting in this whole pamphlet. This allows you to prevent Zoom from deliberately degrading your sound quality to speed up the connection

Settings

< Back

General

Video

Audio

Share Screen

Virtual Background

Recording

Statistics

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Accessibility

☑ Show in-meeting option to "Enable Original Sound" from microphone

Audio Processing   Restore Defaults

Suppress Persistent Background Noise ⑦ | Disable ⌄ |

Suppress Intermittent Background Noise ⑦ | Disable ⌄ |

Echo Cancellation | Auto ⌄ |

6: Disable Noise Suppression

Set both noise suppression tools to "Disable." The algorithm may damage the sound quality.

7: Echo Cancellation

This setting prevents feedback. It generally doesn't damage the audio quality terribly and should be left at auto. However, if you're having problems with audio quality, you may want to experiment with this setting.

Other tips

Tips for Latency

Latency is the delay time asscociated with your audio signal as it is transmitted. If latency is too large, it can cause problems because you're hearing a delayed signal. With large latencies people will become out of sync.
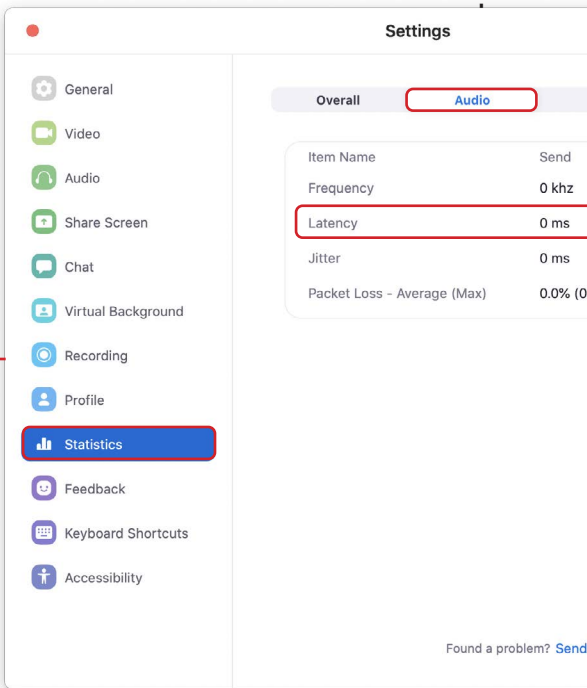
Checking Latency

In Zoom settings, if you go to "*Statistics*" on the left bar and then click the "*Audio*" pane, you can see the latency level in ms. Here's what different latencies sound like
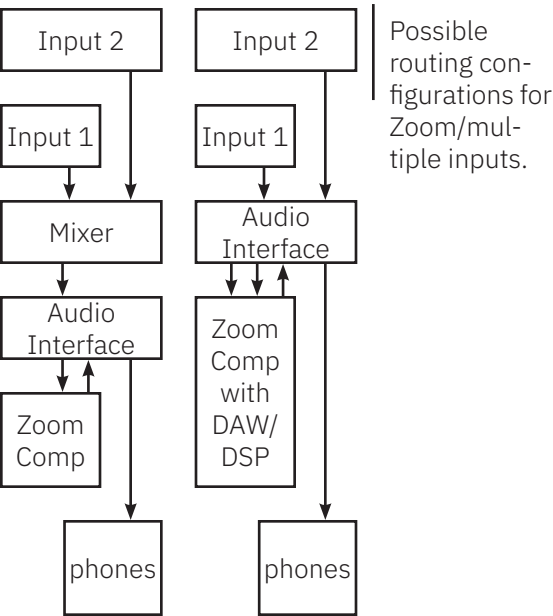
Troubleshooting Latency

So what if your latency is too high? Some latency is a fact of Zoom, but there are some ways to reduce it to manageable levels.

↳ If you can, move closer to your router or plug in via an ethernet cable. You want to have a connection that can supply at least 5Mbps upload and download ([speed test](#)).
↳ If video isn't needed, turn off video. A good practice is to have only key people using video at one time.
↳ **Advanced:** If you're using an audio interface or USB mic, lower its quality and/or lower your audio buffer size.

Settings

Overall	Audio		
Item Name			Send
Frequency			0 khz
Latency			0 ms
Jitter			0 ms
Packet Loss - Average (Max)			0.0% (0

General / Video / Audio / Share Screen / Chat / Virtual Background / Recording / Profile / **Statistics** / Feedback / Keyboard Shortcuts / Accessibility

Found a problem? Send

Latency	How it feels
<8ms	not perceptable
8-20ms	feels slightly "off"
20-40ms	performance still possible, but hard
40-100ms	music impossible, but talking OK
100-150ms	conversations become awkward

Handling multiple sources

Input 2 → Input 1 → Mixer → Audio Interface → Zoom Comp → phones

Input 2 → Input 1 → Audio Interface → Zoom Comp with DAW/DSP → phones

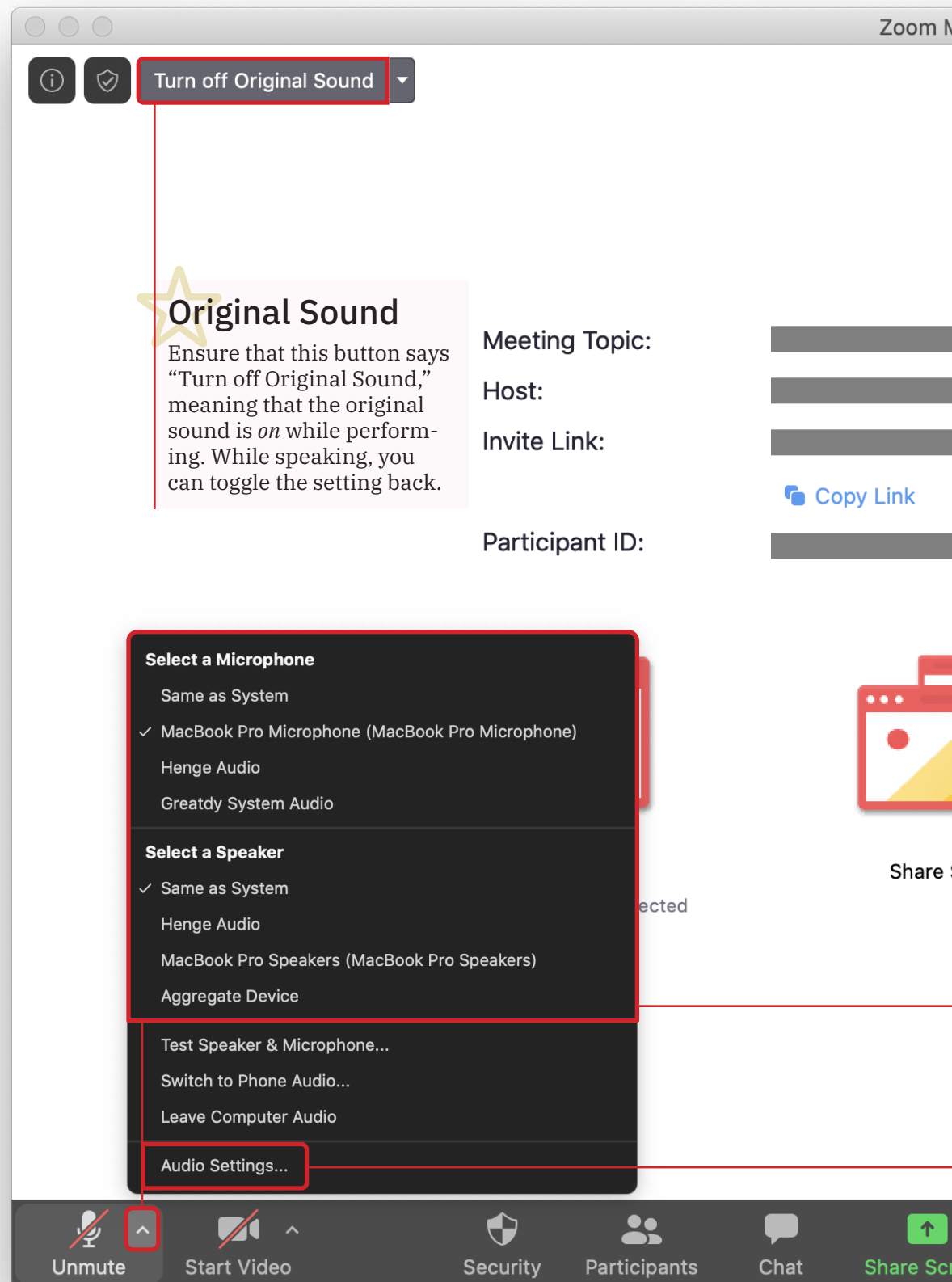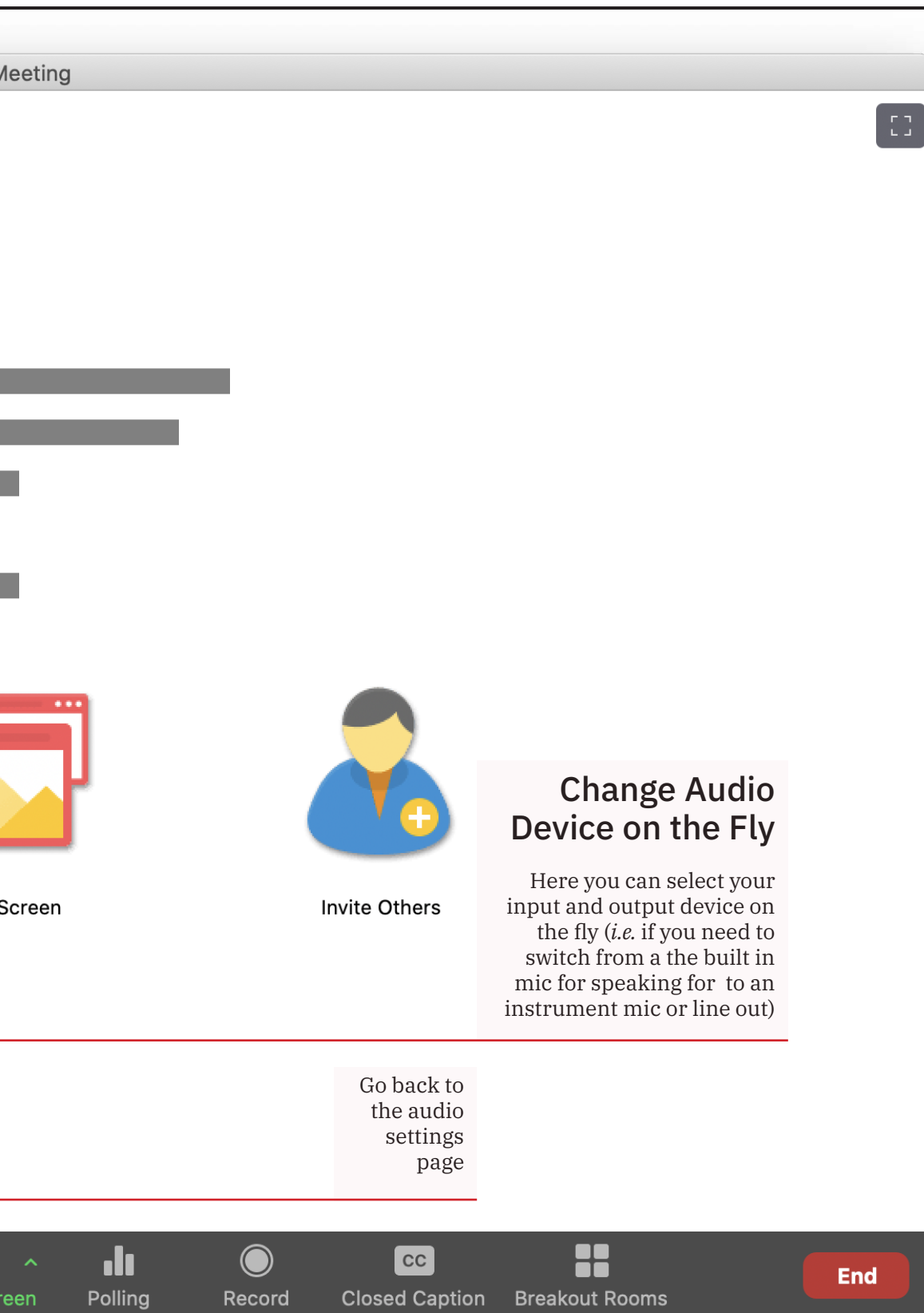Possible routing configurations for Zoom/multiple inputs.

If you need to use both a microphone and insturment, or multiple microphones, there are several ways to do this. If you never need more than one different audio source at once, easy! You can switch your input source on the fly (see the next page for Zoom controls).

If you need to play with multiple input sources at the same time, the best option is to use an audio interface/mixer if you have one. Most audio interfaces have a routing interface where you can mix inputs and outputs making a mixer obsolete.

Describing exact routing configurations is beyond the scope of this pamphlet. If you can't get a hold of the right gear , a last resort is screen sharing. When you use screen sharing, it is possible to use two audio inputs at once, one for the screen sharing ('ouput of your computer') and one for your 'mic'.

In Zoom

Turn off Original Sound

Original Sound

Ensure that this button says "Turn off Original Sound," meaning that the original sound is *on* while performing. While speaking, you can toggle the setting back.

Meeting Topic:

Host:

Invite Link:

Copy Link

Participant ID:

Select a Microphone

Same as System

✓ MacBook Pro Microphone (MacBook Pro Microphone)

Henge Audio

Greatdy System Audio

Select a Speaker

✓ Same as System

Henge Audio

MacBook Pro Speakers (MacBook Pro Speakers)

Aggregate Device

Test Speaker & Microphone...

Switch to Phone Audio...

Leave Computer Audio

Audio Settings...

Unmute   Start Video   Security   Participants   Chat   Share Sc

Meeting

Screen

Invite Others

Change Audio Device on the Fly

Here you can select your input and output device on the fly (*i.e.* if you need to switch from a the built in mic for speaking for to an instrument mic or line out)

Go back to the audio settings page

Polling

Record

cc Closed Caption

Breakout Rooms

End

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⋀ Zev Pogrebin

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Screenshots are from Mac OS Zoom 5.0.3.

This booklet is set on A4 paper and uses
the IBM Plex font family and Apple's SF
symbols library.

The latest version can always be found:

[Revision 0]