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<center>"Office Broadcast" Studio Elements – V6</center>

Goal:

Increase experience for all on a virtual meeting through the delivery of higher(est) quality video and audio.

A chronology of my own setup and its evolution

<u>March 2020 V1</u> – Basic setup with a 35mm camera as an HDMI – to – USB-C input

- Sony 35mm mirrorless A7RIII + Sigma lens https://www.bestbuy.com/site/combo/mirrorless-cameras/b5183db0-1af1-438e-b061-817b31b7800f
- https://en.j5create.com/collections/video-capture/products/jva04 *note if you skip to V3 and get the ATEM Mini or Mini Pro – you don't need the $230 J5 Create.*

<u>April 2020 V2</u> – Added lights – note both have high CRI (color reliability index) which means you will get superior natural lighting when coupled with a camera and sensor that can process it.

- Newer Kit https://www.amazon.com/Neewer-Pieces-Bi-color-Video-Light/dp/B06XW3B81V/ref=sr_1_3?dchild=1&keywords=newer+lights&qid=1607597065&sr=8-3
- Arputure key light https://www.amazon.com/AL-MX-Camera-Light-Pocket-Lighting/dp/B005VNNWDS?ref_=ast_sto_dp

<u>June 2020 V3</u> – Added ATEM Mini HDMI switcher and overhead camera (Cannon Vixia HF R800) for desk view and PIP.

- https://www.amazon.com/Blackmagic-Design-ATEM-Stream-Switcher/dp/B086R79PBC/ref=sr_1_3?dchild=1&keywords=atem+mini+pro&qid=1607596724&sr=8-3
- https://www.amazon.com/Canon-VIXIA-R800-Camcorder-Black/dp/B01N7OAH3I/ref=sr_1_6?dchild=1&keywords=canon+vixia+hf+r800&qid=1607596686&sr=8-6

<u>October 2020 V4</u> – Update on Audio Tweaks and a discussion on FONTS (Lexend is the way to go)

<u>November 2020 V5</u> – Added teleprompter so I can look into the screen and people's eyes at the same time. Makes meetings feel better.

- Monitor https://www.amazon.com/LILLIPUT-350nits-Monitor-1920X1200-Official/dp/B07LGQ7THR/ref=sr_1_3?crid=2NHA2FZB9K5PV&dchild=1&keywords=lilliput+a8s&qid=1607597272&s=electronics&sprefix=lillipu%2Celectronics%2C146&sr=1-3
- Small HDMI replicator and switcher
- Mirror https://www.amazon.com/Glide-Gear-TMP100-Adjustable-Teleprompter/dp/B019AJOLEM/ref=sr_1_3?crid=39SFQ1W57FZR2&dchild=1&keywords=glide+gear+tmp100&qid=1607597298&s=electronics&sprefix=glide+gear%2Celectronics%2C140&sr=1-3
- HDMI replicator and switcher for input selection (camera out, or laptop out) https://www.amazon.com/gp/product/B01BV1XBHK/ref=ppx_yo_dt_b_asin_title_o09_s01?ie=UTF8&psc=1
- https://www.amazon.com/gp/product/B07DQBY5TX/ref=ppx_yo_dt_b_asin_title_o01_s00?ie=UTF8&psc=1
- I use the teleprompter as a discrete camera out display or as an extended screen where I move my "talking heads" to.

December 2020 V6 – Added this simple list up front and down sized the parts list to ones that work.

Learn from where I learned as well. Here are two channels on Youtube which influenced me and have taken what I did even further.

- https://www.youtube.com/watch?v=2AecAXinars
- https://www.youtube.com/watch?v=9hWvN01bEPY&t=17s

Scope: Concerning remote collaboration using common platforms (zoom,skype,webex etc)

The what:

- How you appear to others
- How you sound to others
- How responsive and in tune you are

The Problems aka Usual Suspects:

- Low or distorted audio
- Background noises
- Poor lighting in video
- Out of focus
- Choppy video

Note In version 5 of this setup (V5) I have added the GlideGear teleprompter and the Lilliput 8" 4K monitor to create a box where I look directly into the Zoom or whatever talking heads and through them into my camera. The result is everyone on the other end feels like Im looking right at them. Benefit for me – I don't have to swivel my eyes or head down or to the left or right to look at material.

Rationale:

We are aware of these considerations, but when we get a stable internet connection and the meeting seems to be staying up, we readily accept what the video collaboration tool of choice hands us. The problem is unless someone tells us and often times they don't, we could be sending choppy video or audio and not know it.

For someone who has to facilitate and drive remote sessions, your delivery of quality and the attention to its detail becomes table stakes.

I have researched solutions and tips as well as gear in my own journey, and my motivation is to share it.

Video: Lighting and face position, size, eye-focus, or what we communicate in where we look.

Audio: Level required, dealing with background noise, synching face to voice signals, and assuring consistent outcomes.

TLDR

What can be done:

Video:

We want to remove webcam artifacts such and their position errors which cause you (the speaker) to "look down" at the screen while talking, wherein a typical conference room setting even remote users, with high-quality cameras setup at the right distance, are able to participate without looking as though they were looking near and then far.

We also want to increase audio here while on the video topic – cameras mounted in a laptop also pickup the clack clack of keyboards.

Let's add life and color back to our faces – through decent light and better framing away from the blue-white monitor light our webcams usually are perched on.

EX: This is what someone in Zoom (or similar) would see on the other end. I used a black background to dramatize it, standard issue webcam at the top of the screen. Low resolution, no sense of place, glasses reflect screen light. And again, eyes darting up and down

My side of the call, I would see this. And that's a 17" laptop!
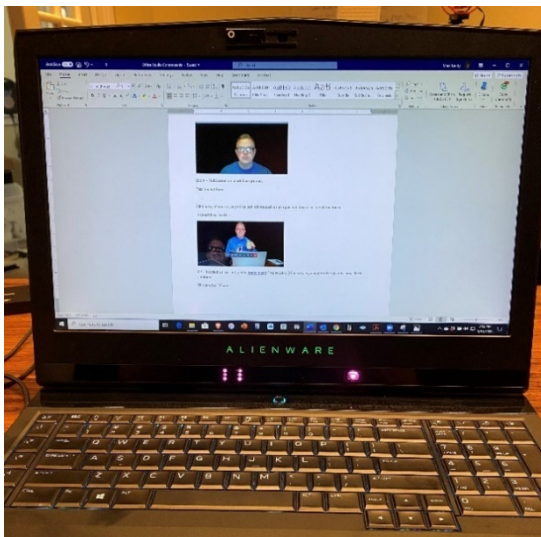
In the new office studio setup – what's different ?

Viewers on Zoom, or Webex, or your favorite tool. Me, on the same black background, much better lighting, a real high end studio grade camera across the table at 4K 60fps and zoomed into me with the right ISO, Speed, and Aperture. You see me, as if you were sitting across the table. I measured the average conference room table width to figure this out. You even see the wood desktop to get a sense of place. Its about 4 feet away. Look's better ?! compared to above.

OK – I added a nice shirt, and a home made Frappuccino (thanks to my daughter Lizzy).

BTW – this is an iphone pic – if I thought more about it – I could have done a screen shot.

This is what "I" see from the new-view. It takes some getting used to – you do feel like you are "on air".

So what got added - Yup – A real 35mm mirrorless Sony camera. An A7 IIIR (retail about $2K with the lens). And a few other items I will detail now.

In essence, the mirrorless DSLR (not a real DSLR since its mirrorless) is a high end static camera and video recorder which can record or output HDMI at 4K and 60 frames per second. More over its sensor (where the image is focused in the lens) is about 50X more size than a standard iPhone or more so than a webcam. So you have many more options. Plus – when done, you can take it on trips with you as a nice regular camera.

Sharing is fun...

Not virtual desktop sharing, but actual real desktop. And this approach can be used for a white board behind you.

Desktop sharing (actual desktop) via an overhead camera, reminiscent of youtube or craft videos which focus on the hands, tools, and drawings or work being done on a desk. For this I would need a second camera – Im looking at these now and I would need a 4 input studio mixer. (V4 update – I have it)

I began seriously considering something for the remote interaction scenario in 2019, began opportunistic research over the preceding 6 months. Decided to lean in and begin to spec out pieces and costs right around the onset of mass travel restrictions due to Covid-19.

The list

Here is what I have so far and remaining to finish it up. Again – fairly decent/thorough research on where to spend the $$ on, and where not. Total cost for this level – near $3,000

<u>Researched and happy with:</u>

    <u>Main Camera:</u> Sony A7R-III plus 24-150 lens Best Buy retail near $1,950. Any really will do provided it can generate an HDMI output signal, when idle (no recording) and you can remove the marker symbols from it (focus, fstop, status etc). Most can – but check. A mirrorless cam is pretty much what you want, otherwise you are mucking with the video side of a still camera. You do not need all of this kit, you can get a cheaper 35mm camera but please make it mirrorless and ensure it has an HDMI output.

    <u>Overhead camera:</u> – Cannon Vixia HF R800 – widely available $249. To be used for the overhead "hand drawn" segments. Coupled with a switcher such as the ATEM mini you can pick one of four cameras. Or use your meeting "app" to pick which one to use.

    <u>Lighting:</u> A pair of NEWER LED studio lights – battery or Adapter powered, on tripods. 2 lights, 2.4ghz remote, color and intensity variable. Amazon for $189 a pair. Arranged left and right pointed at me. One key-light, Apurture (its spelled this way on purpose) 4x6 LED light. Color and intensity variable, battery powered. Amazon for $149 (one only needed – pointed directly at me)

    <u>Connectivity:</u> One J5Create 4K USB converter – which maps the HDMI output of the Sony into USB input suitable for a webcam input on the computer. Although I could directly incorporate 4K HDMI – it would be too much overhead for the web conferencing systems to use. However when I want to create a video for streaming or youtube – I have that option. Amazon or Best buy approx. $300. **PS – YOU DON'T NEED THIS IF YOU BUY THE ATEM MINI PRO (BELOW).**

    <u>Other:</u> Backdrop black cloth and posts for simple background – amazon price eMart Muslin 8.5X10 $39 for the cloth and kit.

    66 inch camera tripod K&F concept at amazon $145.99

    Rode Shoe Mount shotgun mic - $300 – much better than using stock.

In consideration, may buy:

    ATEM Mini live switcher – allows mixing of 4 inputs HDMI+audio into one, and live switching between including picture in picture. Will be used to overhead desk camera view, which looks at the writing surface on the desk (paper). $295 at b&h photo or similar. (bought in V3!)

Update: 4/2020 – I did buy and install an ATEM Mini Pro. $595.00 -
https://www.blackmagicdesign.com/products/atemmini

It is now my input switcher, live stream engine, and outputs via USB-C a webcam device that can be included in any video meeting software.

For this I have incorporated a desk-view camera – Canon H800 ($199) video cam corder

Glide Gear Teleprompter $250 https://www.amazon.com/Glide-Gear-TMP100-Adjustable-Teleprompter/dp/B019AJOLEM/ref=sr_1_3?dchild=1&keywords=glide+gear+teleprompter&qid=1607544840&sr=8-3

Lilliput Monitor (invertible) - $259 https://www.amazon.com/LILLIPUT-350nits-Monitor-1920X1200-Official/dp/B07LGQ7THR/ref=sr_1_3?dchild=1&keywords=lilliput+4k+monitor&qid=1607544874&sr=8-3

Great source of information – https://dslrvideoshooter.com/ very good and well done equipment reviews which helped sort out the noise.

LOOK

When creating documents, I have switched over to **LEXEND** for my fonts.
https://www.lexend.com/

Lexend is a font created for increased readability. It makes text smoother and easier to digest, particularly in a screen share.

V4 update (adding in sound).

SOUND

When making changes to your microphone or speaker or their levels, please test your setup to ensure you are loud enough and not distorted. Try https://mictests.com/ to get this done.

If you notice delay between your mic and the video – chances are you need to route the mic through a camera or switcher which has audio delay for video v.s. sound. The ATEM Mini Pro version 8.2.3 just added up to 8 frames of delay. Work's fine.

Use a recording the determine a hand clap and then using final cut or premeir – review the visual of the clap v.s. the spike in audio – count the frame differences and that's it

Better Yet (V4)! Use some SMARTS (aka AI) - I was going to do a tutorial on Audio tuning, but that is even harder to master than video setups. If you want to **short circuit the entire room audio and background noise problem**, try krisp audio www.krisp.ai It uses AI and Machine Learning to remove the barking dog, the running fan and the ever-present leaf blower.

Without something that uses AI/ML to help audio – you need to do mic tests or have a colleague do a periodic calibration call with you. Use a cell phone too – its worse.

Close

In close – spend the $$ on the front view camera. Buy a cheaper overhead or alternate view camera (video camcorder). Be careful when integrating webcam (USB) cameras back in the mix – they tend to look pretty weak in terms of depth, and richness and they may "shutter" roll if the LED lighting has noise in it where the video camcorders or Mirrorless 35 mm won't.

When using a laptop for your meeting – keep it lightweight, with minimal tasks on it. If it has a fan it will get hot – the difference is with the mic you should use you will "hear" this. The Rode mic I used has a nice hi and low combo filter just for that.

Other views

Camera and Mic
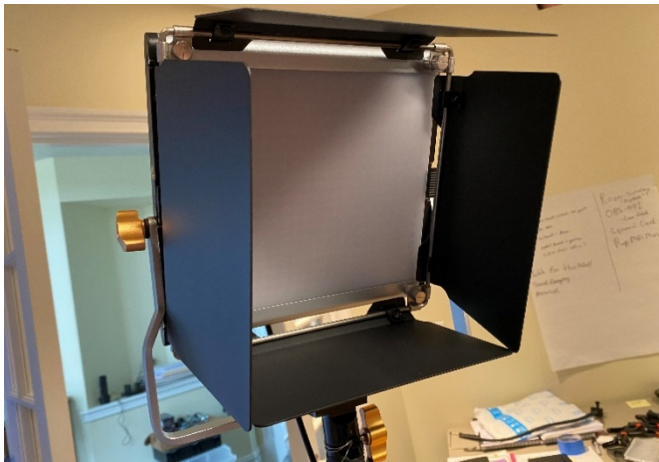
One of the two NEWER light (led)

Apurture LED keylight (left of cam), Sony Z7RIII, RODE mic on top, (excuse mess under table)

Another view of the Apurture Key Light (its spelled that way) and the cam+mic

Excuse the mess again – its still under construction.

J5 Create Box – maps Sony cam HDMI out to webcam in on PC. Allows the camera and mic to connect to Zoom, or Webex or whatever you have.

V3

ATEM Mini console

ATEM Mini program view for live broadcast

V5 - Teleprompter & Lilliput monitor for Teleprompter

The whole setup