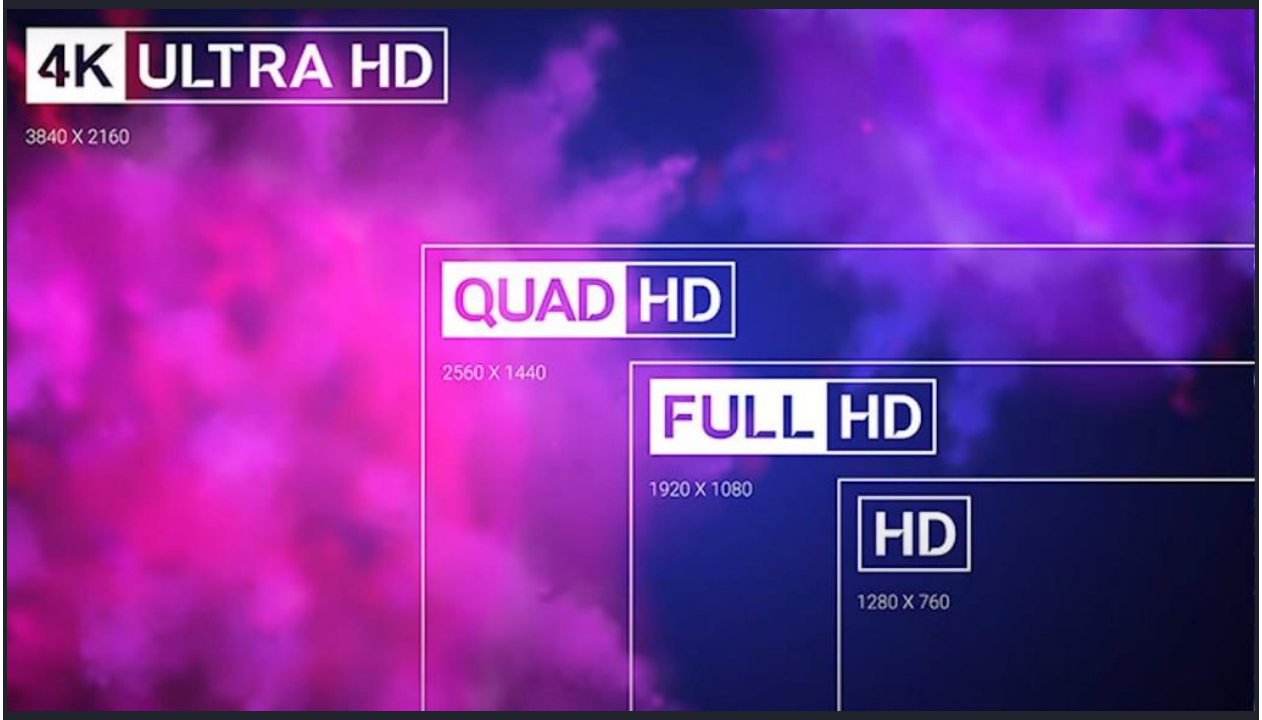
**HDMI 4K Camera (Approx.. Price: $150.00)** https://amzn.to/2Vu1XuV

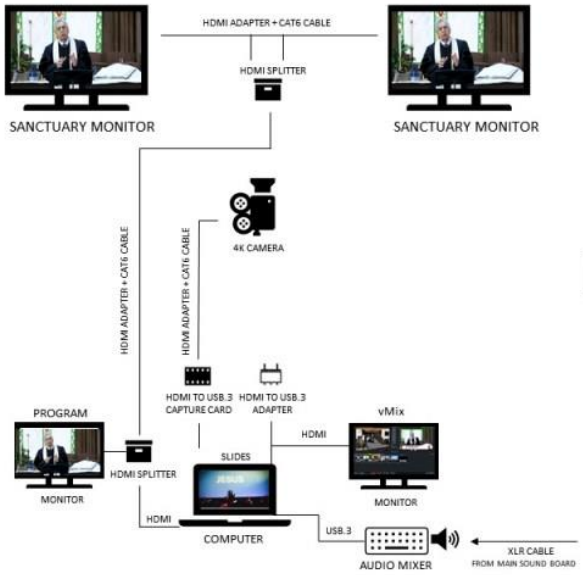
When streaming, the most optimum resolution used with an optimum internet speed is Full HD at a 1920×1080 resolution dimension. After time researching for an affordable, yet with good quality image, for churches, we found a 4K camera resolution camera https://amzn.to/3zlo7hN that will provide a 3840 × 2160 resolution. Why should we use a 4K camera when streaming in Full HD?

There is a technique called "region of interest" that allow us through vMix (in this case using this software) to have multiple shots with just one camera.




Therefore, instead of using a Robotic PTZ camera (Pan, Tilt, and Zoom) we can create the same effect without spending the money. PTZ cameras are more costly, not only per unit but also because, in addition, a control surface for the camera has to be purchased most of the times to make camera adjustments and movements.


So, sticking to just using one camera for instance, as long as our compositions are within the margin dimensions of the “region of interest” (as set in the diagram above), your your video will not be pixelated and you will be able to create various shots, ranging from a long shot to a medium shot, to a close up of your subject. There are many tutorials online about how to do this technique, however, we will be cover this “region of interest” and many others during our zoom live streaming workshops. Here is how it would look like:




# FLOW DIAGRAM

**HDMI to USB.3 Capture Card (Approx. Price: $33.00)** https://amzn.to/3AVUlS7

4K HDMI Capture Card will allow you to capture video+audio content in very high quality into your computer via a USB.3 connection. Note, that although the card captures also your camera audio, in your church's scenario you will be using the audio and sound coming through your church's audio system. This last will be connected to an USB Audio interface to be captured through the streaming software.  THe 4K HDMI Capture Card supports up to 4K@60fps HDMI input and it is a plug and play device. This means that it lets the device work instantly with stream media like vMix or any other streaming software.


**Audio Mixer USB Interface (Approx. Price: $70.00)** https://amzn.to/3hV4MNi

This Portable Audio Interface Covers it All – a USB sound card that delivers 48 kHz audio resolution for pristine sound every time. Vocals or stereo line input signals with two combo XLR / Line / Instrument Inputs with phantom power allows you to have more control when you input the sound into your streaming software. Note, that it is paramount that your original sound coming through your church's audio system must be optimum, otherwise, however this device can do some adjustments to correct the sound from origin, it does not do magic when the sound it is poor or distorted from origin.

Additionally, if you are up to creating your own podcast, this device will do a great job for that. It has everything you demand from an Audio Interface for Fuss-Free Monitoring – 1/4" headphone output and stereo 1/4" outputs for total monitoring flexibility; USB/Direct switch for zero latency monitoring, and to get the best out of your Microphones – M-Track Duo's transparent Crystal Preamps guarantee optimal sound from all your microphones including condenser mics.


**HDMI Video Splitter/s (Approx. Price: $14.00)** https://amzn.to/2U2HFZd

HDMI Splitter 1 in 2 Out will allow you to split one HDMI input signal to two HDMI output signals identical to the input signal. We will use this splitter to get the program signal from vMix (from the livestream/recording) to a confidence monitor to have a better look at your output signal. (see flow diagram above). That is just one output, the other output can directly be connected to your church's monitors in the sanctuary. Remember, that you can connect as many monitors as needed by connecting multiple splitters, this is know as Daisy Chain.


This unit is Fully Compatible with any HDMI 1.4/ 1.3/ 1.2 version, easily split signal for devices with standard HDMI interface. Input: Camera, Computer, XBox 360, XBox one, PS3, PS4 Pro, Fire Stick, Blu-Ray DVD player, Satellite Receiver, Route Roku, Chromecast, PC, Projectors etc. Output: Full HsD TVs, HD Monitors, Samsung TV, and more.

**HDMI to USB.3 Monitor Adapter (Approx. Price: $60.00)** https://amzn.to/2VARez5

Now, we want to have an additional monitor to have the interface of the vMix software in that monitor to easily see where we want to click to appear in your worship service being stream, camera shots, overlayed lower thirds, powerpoint presentations, anything you can think of that can connect via a device like a video capture card into your computer or via **NDI**® (Network Device Interface). This is a free protocol for Video over IP. It is designed to allow distribution of live professional video over existing IP infrastructure, freeing users from hardware constraints and gives the benefits of reduced cost and deployment time.

The good thing about this device is that you can connect the 4K UHD dual monitor adapter directly to your computer without the need for an additional power supply. Note, that this a USB 3.0 to Dual HDMI Adapter and it is only compatible with Windows operating systems and does not support MacBook devices. There are similar adapters from Mac computers in the market.


**One computer or laptop [to run vMix software] Please see specifications:**
https://www.vmix.com/software/supported-hardware.aspx

If you're thinking about buying a computer you may be overwhelmed with the number of brands, types, and specs on offer and wondering how much you need to spend and what to look for. On the other hand, you might already have a computer and you are wondering how you could upgrade it to suit your needs at the moment instead of purchasing a new one. Here a list of things to look for in a new computer for your computer to run and compute the requirements of live streaming or editing video.

**What to look for when purchasing a Laptop or PC for vMix?**

**GRAPHICS CARD**

This is the most important component when running vMix.
It is used for all mixing, video processing and GT graphics, and can also be used for MP4 recording and streaming to lower CPU usage.

Minimum: NVIDIA GeForce GTX 1650
Recommended: NVIDIA GeForce GTX 2060 or higher.
Avoid: Intel Integrated Graphics, AMD Radeon Graphics, NVIDIA "MX" series graphics on Laptops. NVIDIA Quadro cards with 3 digit model numbers (such as P600 or P520)

**CPU**

This is used for all video playback, video calls, instant replay and recording in most formats other than MP4.

***Laptops***
Minimum: Quad Core CPU 2.0Ghz per core (Intel i7, i5, AMD Ryzen 4000 series)
Recommended: Six Core CPU 2.6Ghz per core (Intel i7, AMD Ryzen 4800H or higher)
Avoid: Any CPUs with a base clock of under 2.0Ghz or less than 4 cores.

***PCs***
Minimum: Quad Core CPU 2.8Ghz per core. (Intel i7, i5, AMD Ryzen 3000 or 5000 series)
Recommended: Eight Core CPU 3Ghz per core. (Intel I7 10700K, AMD Ryzen 3800X or 5800X)
Avoid: 1st and 2nd gen AMD Ryzen and Threadripper CPUs. Older Xeon and dual processor server systems. Older Intel CPUs based on X99 motherboard chipset.

***Memory***
16GB of memory is recommended for most productions.
This should be at least 2x memory modules on most motherboards and laptops and a minimum of 4x memory modules when using Intel X299 or AMD Threadripper systems.
Using only a single memory module can cause severe performance issues and is not recommended.

**CAPTURE CARDS**

***Laptops***
Thunderbolt A Thunderbolt port can be used with an external enclosure to install any capture cards with up to 4 inputs.
Cards with 8 inputs should not be used on laptops.

USB 3.0 A maximum of 2 USB capture devices can be used on laptops with only USB ports available.

NDI If the laptop has at least a six core processor and a gigabit ethernet port, then NDI encoders can be used to bring in up to 4 cameras over the network.

***PCs***
PCI Express Check the motherboard manual to make sure it has a full x8 PCI Express slot available which can be used with most capture cards listed on our supported hardware page.
Most off the shelf PCs from Dell, HP etc do not have this extra slot available and many motherboards do not either, so it is crucial to check the manual carefully prior to purchasing.
At a minimum the motherboard chipset will need to be Z390/Z490/X299 for Intel processors and X570 for AMD processors.

USB 3.0 A maximum of 2 USB capture devices can be used on PCs.

NDI If the PC has at least a quad core 3Ghz processor and a gigabit ethernet port, then NDI encoders can be used to bring in up to 4 cameras over the network.

## System Requirements

**Note:** For more detailed PC specifications and recommended laptops see the Reference Systems page. VMIX REFERENCE SYSTEMS

| | Minimum | Recommended |
|---|---|---|
| Operating System | Windows 10 | Windows 10 |
| Processor | 2Ghz Quad-Core Processor | Intel Core i7 Processor 3Ghz+ |
| Memory | 4GB DDR4 | 8GB DDR4 |
| Hard Drive | 7200 RPM Hard Drive (for recordings) | Solid State Disk |
| Graphics Card | Dedicated DirectX 10.1 Compatible Graphics Card | Dedicated Nvidia Card with 2GB+ Memory |
| Screen Resolution | 1280x720 | 1920x1080 |

## Graphics Cards

**Note:** All DirectX 10 Compatible graphics cards are supported. The speed of the graphics card will determine how many HD cameras, inputs and simultaneous recording, streaming and outputs are possible.

| | HD Inputs | Outputs |
|---|---|---|
| Intel HD Graphics 530 / 630 or higher | 2 Cameras + 4 Inputs | 1080p recording or 720p recording + streaming |
| NVIDIA GeForce 1050 / 1650 / 3050 | 4 Cameras + 8 Inputs + Instant Replay | 1080p recording and streaming |
| NVIDIA GeForce 1060 / 1660 / 2060 / 3060 | 2 4K or 8 HD cameras + Instant Replay | 1080p recording and streaming |

**HDMI Extender CAT5e/CAT6 196 ft Cable, Zero Latency, Transmitter and Receiver Kit (Approx. Price: $72.00)** https://amzn.to/3ka0CUt

These Lossless Extension adapters extend Full HD HDMI video to 196ft (60m) over a single CAT6 cable. This are great instead than using conventional HDMI cables which are usually expensive. Another pro of this adapter is that when connected to a CAT6 cable, the diameter of the cable is smaller than those in HDMI cables what makes this way of connecting your video equipment easier when the cables need to be hidden under existing molding, run through air ducts, etc…

These adapters have ZERO quality loss and ZERO latency.

Also its advanced auto EDID Pass-through technology allows the extender to copy EDID from EDID compliant displays and assures accurate display performance and no configuration is needed.

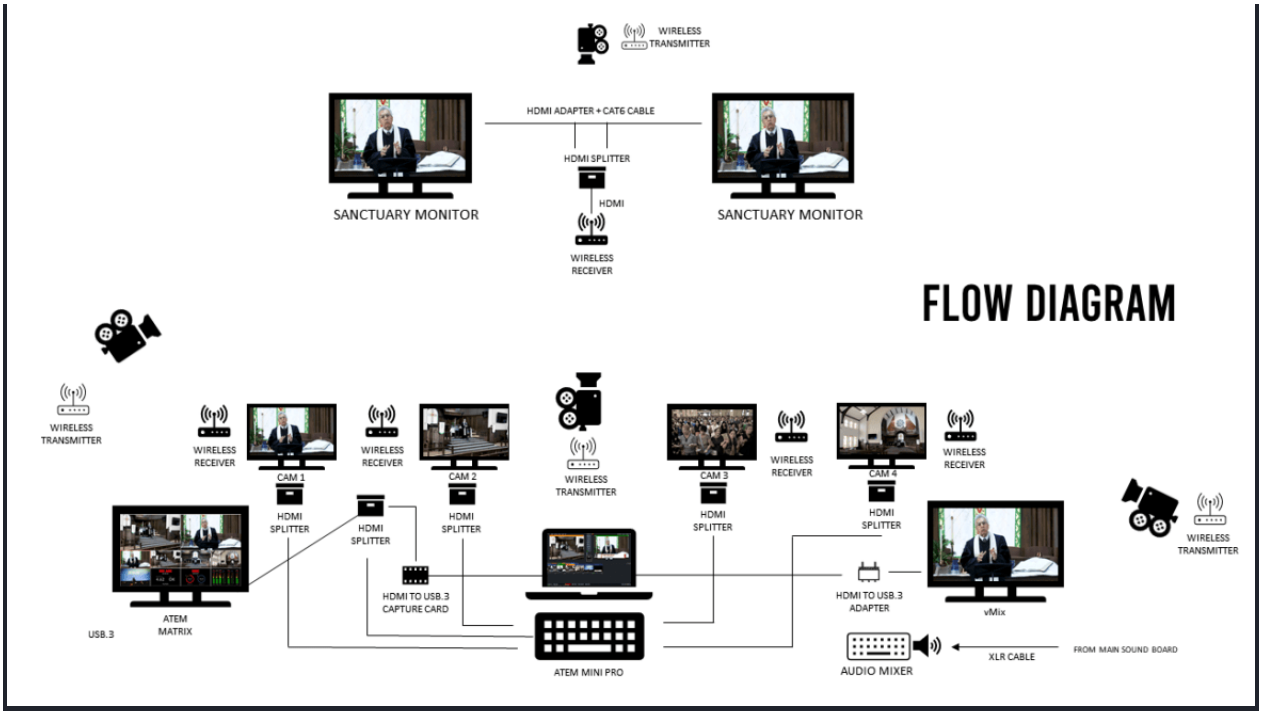
The package includes: 1× HDMI Transmitter, 1× HDMI Receiver, 2× micro USB to IR and Power Cables, 1× IR Blaster, 1× IR Receiver, User Manual. Powered by USB (e.g. a USB port on USB Hub, computer, laptop, TV, projector, etc.), no proprietary AC power adapters required.

Note that when connecting the transmitter to a camera you will need to add a HDMI to Mini HDMI Adapter.


**HDMI Wireless Video Transmitters/Receivers [zero or low latency] (Approx.. Price: $159.00)**
https://amzn.to/3hwJfLM

Another way to connect your video sources through a Video Capture Card into your computer is via a Wireless Video Transmitter/Receiver if you want to avoid using cables. These usually have a bit of delay to near zero, so when using them into your system (single or multicam configuration) you have to consider this. It is recommended that if using multiple cameras, using wireless transmitters/receivers, that all cameras use a wireless device. This way you make sure that all video sources will be synchronized and with the same latency.

You might wonder about that delay… no worries, vMix software can be adjusted to help you synchronize the cameras audio and video delays when necessary. However, if all the cameras use the same type you will not run into this. Note that the person opereating the equipment for the live streaming will hear a delay of the sound in comparison to the sound in the room, that's normal. The important thing is that the live streaming video and audio are synchronized as well as the recording of your event.



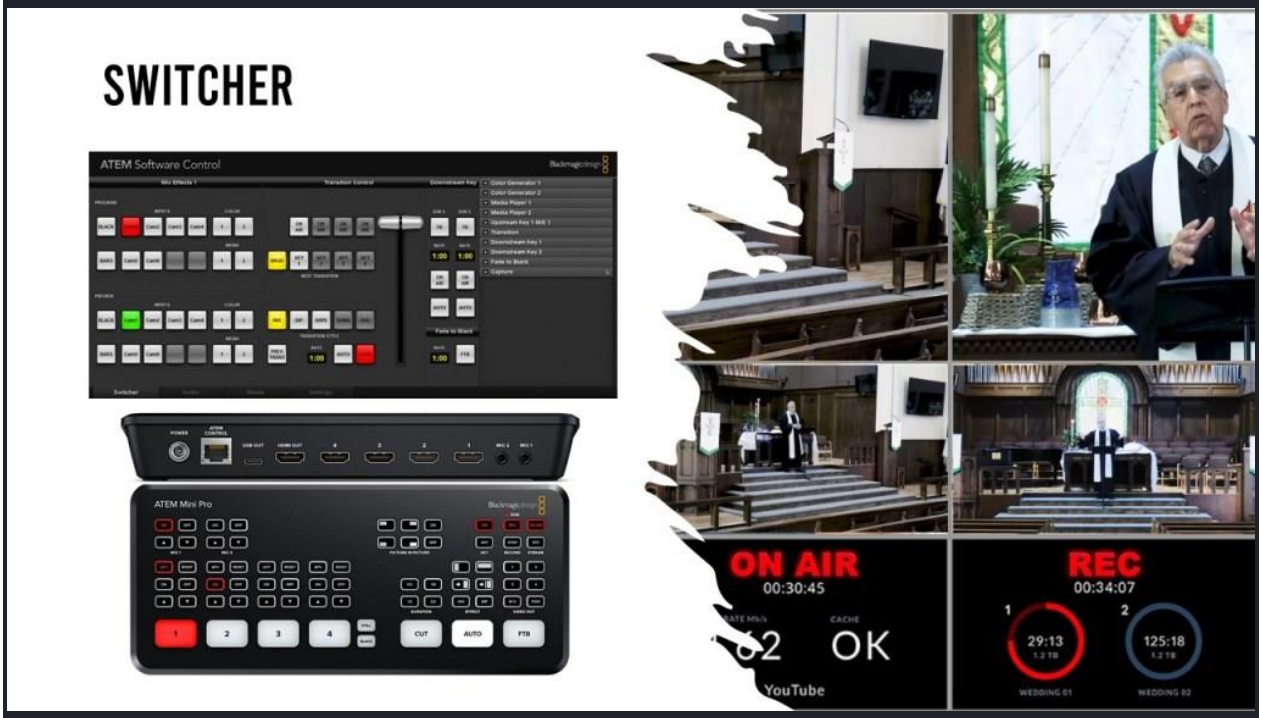


**Switcher [Atem Mini Pro recommended] (Approx.. Price: $495.00)** https://amzn.to/3e5OXCn

The Atem Mini Pro Multicamera live streaming switcher will give your church a lot for its money's worth. If you think about it, its cost is about the same or less than 4 top-of-the-line Video Capture Cards that will require a lot of computing power to run and process through your computer.

If you have a more basic computer, you can use this device as a solo piece of equipment, or combined with vMix, it will increase your production value a lot. The Atem Mini Pro can stream directly to one destination, however, combined with vMix you will be able to stream to 4 simultaneous destinations at once. Note that in order to do this your internet upload speed capabilities from your internet provider will need to be in the rage of between 4.4 Mbps and 6.2 Mbps. For 1080p video at 30 frames per second, the bitrate should be 3,500 to 5,000 kbps.

Please check the tutorials above in the Multi-Camera Production Configuration section to learn more details about this product.



# MULTI-CAM PRODUCTION