

PTZ Optics Camera Settings Guide

Now includes Color Correction & Low Light Setup Guides



SHUTTER SPEED
(Motion Control)



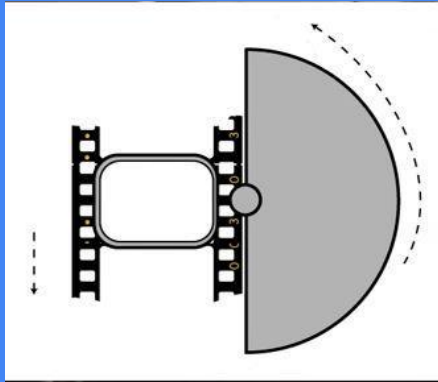
GAIN
(Image Noise aka ISO)

APERTURE
(Depth of Field)

Always start with the proper
frame rate, shutter speed, and
aperture when setting up your
camera...

Then you can adjust the
advanced settings for optimal
video picture...

Understand the 180 Degree Shutter Speed Angle Rule:



$$\frac{1}{2X \text{ Frame Rate}}$$

The 180 Degree Shutter Speed Angle Rule:

Most of the time you will be using either 30 or 60 frames-per-second (fps) and because of 180-degree shutter angle rule, which means that your shutter speed should be double your frame rate.

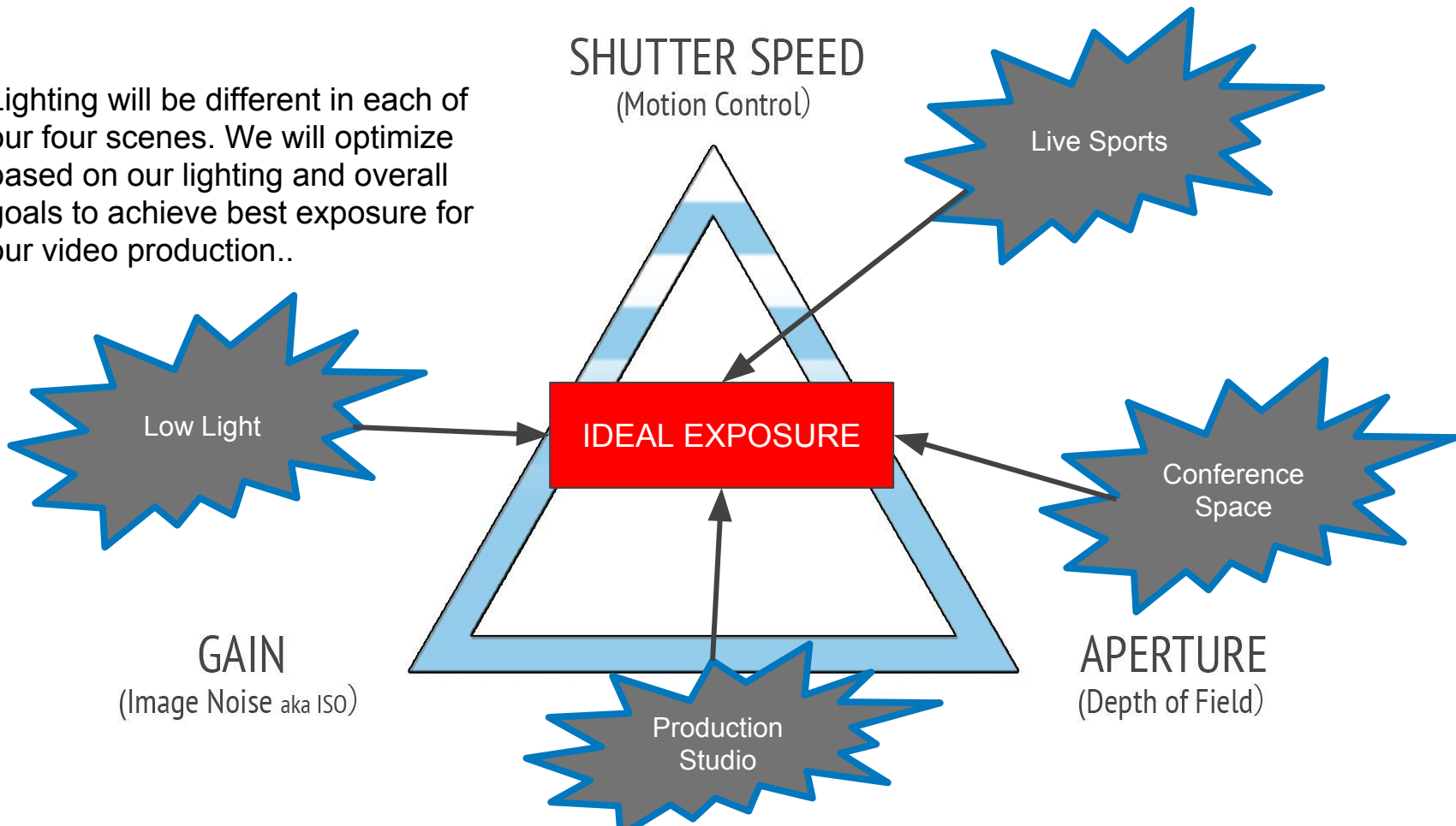
- At 30fps, your shutter speed should be 1/60
- At 60fps, your shutter speed should be 1/120.

PTZ Optics cameras offer advanced features to optimize your exposure in almost any setting...



Getting your camera settings perfect is a requirement for live video... because there is usually no post-production options.

Lighting will be different in each of our four scenes. We will optimize based on our lighting and overall goals to achieve best exposure for our video production..



CONFERENCE SPACE



PRODUCTION STUDIO



LIVE SPORTS



LOW LIGHT



COMPLEXITY FOR PERFECT EXPOSURE



Exposure Settings

Auto - Fully automatic settings for shutter speed and aperture with ability to adjust gain, dynamic range, backlight and anti-flicker.

Manual - Full iris, shutter speed and range control

SAE - Shutter Automatic Exposure - The camera will measure light and automatically set the aperture based on your desired shutter speed.

AAE - Aperture Automatic Exposure - The camera will measure light and automatically set the shutter speed based on your desired iris opening (aperture).

TIP: Use SAE when you are looking for a specific shutter speed. When you have fast moving objects in your scene you may want to set a faster shutter speed. Use AAE when you want to lock in a depth of field effect from a specific aperture setting.

Aperture: The aperture also known as the f/stop controls the opening of the iris and therefore light on the sensor.

Tips

1. Use a large aperture (small f/stop number) for a shallow depth of field. A shallow depth of field is useful for close up subjects where you want the background to be out of focus.
2. Use a small aperture (large f-stop number) when you want a large depth of field. A large depth of field is useful for sporting events or large areas where you want everything in focus.



A shallow depth of field is ideal for portraits, artistic video and green screens used with a chroma key.



A deep depth of field is used to keep everything in the picture in focus. This is ideal for live news, sports and most broadcasts.

12X IRIS OPTIONS

Aperture / F-Stop :

F1.8, F2.0, F2.4, F2.8, F3.4, F4.0, F4.8, F5.6, F6.8, F8.0, F9.6, F11.0, Close (Effective only in Manual, AAE mode)

20X IRIS OPTIONS

Aperture / F-Stop :

Aperture value. Optional items: F1.8, F2.0, F2.4, F2.8, F3.4, F4.0, F4.8, F5.6, F6.8, F8.0, F9.6, F11.0, Close (Effective only in Manual, AAE mode)

* The aperture is the same for both models. The main difference is the field of view both wide angle and fully zoomed in.

Shutter Speed: The shutter speed supplies is the amount of time it takes the shutter to open and close each frame.

Tips

1. Use a fast shutter speed for scenes with a lot of movement such as Sports.
2. The faster your shutter speed is the less light will make it through to your sensor. You will notice this when you adjust your frame rates because the picture will become brighter or darker depending on your speed.
3. Keep in mind that most motion pictures use 24fps with a shutter speed of 1/50. Most professionals say this is the most natural setting.



A low shutter speed can make moving objects look blurry.



A fast shutter speed will make moving objects more clear. This is extremely important for slow-motion video.

12X SHUTTER SPEED

1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000 (Effective only in Manual, SAE mode)

20X SHUTTER SPEED

1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000 (Effective only in Manual, SAE mode)

* The shutter speed options are the same for both models. The main difference is the field of view both wide angle and fully zoomed in.

Color Balance: The color balance of your image will change the colors (including black and white) rendered in your image.

Tips

1. Start with an auto-white balance. This can be found on the OSD (On Screen Display Menu). Zoom your camera into the white image and allow the camera to make the appropriate adjustments.
2. Use the Red & Blue gain/fine-tuning to remove any unwanted coloring from either colors.
3. Use Hue/Saturation for additional color tuning.



Color balancing is crucial for recording live video because there is no post-production option. Many video production systems offer help with color balance but it's still best practice to handle color and white



balance in the camera. In low light situations consider using a color checker as seen here.

12X & 20X COLOR OPTIONS

WB-MODE: AUTO, INDOOR, OUTDOOR, ONE PUSH (OK), MANUAL

RED GAIN: 0~255 (EFFECTIVE ONLY IN MANUAL MODE)

BLUE GAIN: 0~255 (EFFECTIVE ONLY IN MANUAL MODE)

RED GAIN FINE-TUNING: -10~10 (EFFECTIVE ONLY IN AUTO, INDOOR, OUTDOOR MODE)

BLUE GAIN FINE-TUNING: OPTIONAL -10~10 (EFFECTIVE ONLY IN AUTO, INDOOR, OUTDOOR MODE)

SATURATION: 60% ~200%.

HUE: CHROMA ADJUSTMENT - 0 ~ 14

IR FILTER: 1 ~ 3

AWB SENS: THE WHITE BALANCE SENSITIVITY NORMAL, HIGH, LOW.

Contrast: Contrast is what adds dimension to your images. Good contrast means your image has a full range of color tones.

Tips

1. Try setting the camera to black and white. This will make your job of measuring contrast easier because you only have to look for the most rich setting for lights and darks.
2. Consider the mood you are trying to convey. If you are looking for a light and fresh mood use a lighter gray area. If you are looking for a dramatic mood use darker settings.
3. If you are using a green screen with a chroma key try adjusting the contrast and hue.



Contrast can be one of the most important settings when shooting live video. In order to judge contrast broadcasters use high contrast ratio field monitors. Contrast that is too low looks underexposed and gray. Perfect contrast should look clear and represent the real world perfectly.



Playing with contrast can produce extremely interesting colors and reflections as seen here..

12X & 20X COLOR OPTIONS

LUMINANCE: BRIGHTNESS ADJUSTMENTS FROM 0 ~ 14

CONTRAST: CONTRAST ADJUSTMENT FROM 0 ~ 14

SHARPNESS: SHARPNESS ADJUSTMENT FROM AUTO, 0 ~ 15

More Tips

1. Luminance can help you brighten up and image but may wash out your image if used too much. Try reducing reliance on luminance and add naturally or professional lighting.
2. PTZOptics camera can be used to produce extremely sharp images. While full sharpness can be helpful for certain applications, a softer sharpness setting can make the picture look more “natural.”

Noise Reduction: Noise is generally defined as aberrant pixels that are not representing the color or exposure properly generally due to low light.

Tips

1. 2D noise reduction settings is ideal for scenes with movement. The technology produces superior results for moving objects.
2. 3D noise reduction settings are ideal for static fields of view.
3. By using both 2D and 3D noise reduction together you can effectively enhance both moving and static imagery.

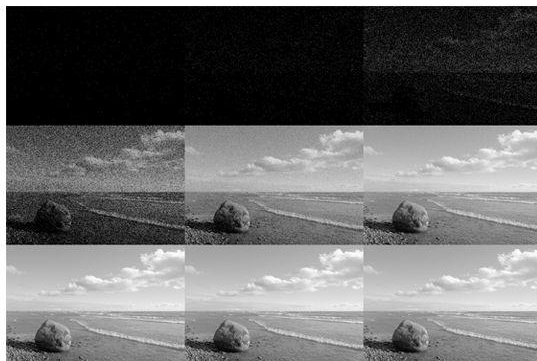


Image noise is extremely distracting to viewers and must be removed to achieve a broadcast quality image. Many PTZOptics users do not notice any image noise because they are shooting in a well lit environment.

Image Noise is generally only noticed in low light scenes where the gain has been increased. The gain is usually increased to brighten an image where aperture and shutter speed have already been optimized.

Using a mix of 2D and 3D noise cancellation is ideal for most live broadcast environments.

12X & 20X COLOR OPTIONS

2D NOISE REDUCTION: OFF, AUTO, 1 ~ 5

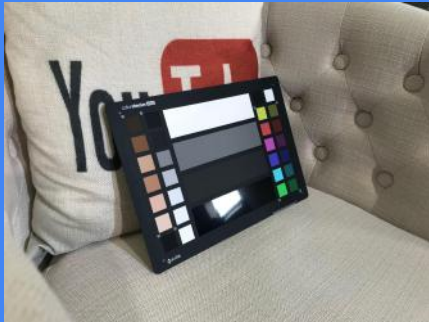
3D NOISE REDUCTION: OFF, 1 ~ 8

D-HOTPIXEL: OFF, 1 ~ 5

More Tips

1. Hot pixels (sometimes called stuck pixels) appear as brightly coloured spots in your images. They are often more noticeable with slow shutter speeds or high ISO settings. Given the location of these hot pixels, the D-Hotpixel feature can automatically remove them.

Tools you may need



Color Checker, Gray Card, White Balance Filter, Calibrated Monitor, Vectorscope, Waveform Monitor, Adobe Premiere...

Considerations:

1. Color matching and correcting is not a “1 click process”
2. It takes time
3. Colorist’s are hired by movie companies for one job only.
Color correcting
4. Plan ahead for your shoots to give ample time to color match your cameras and footage in post production, so you’re not disappointed.
5. Different angles cameras might pick up a hairline light as something else.
6. Make sure you use reliable monitors. Not all monitors are built the same.



Workflow



Setup Camera



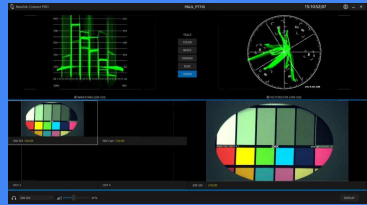
Configure



White Balance



Check Colors



Test



Color Match

Step by Step Process

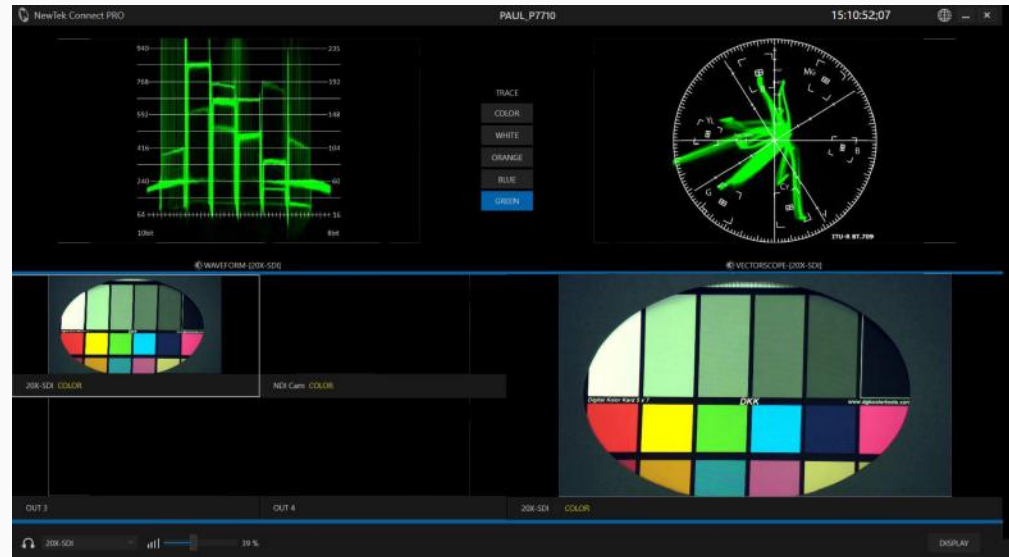
1. Setup your lighting. Light the room and/or your subject.
2. Consider your basic camera settings such as Shutter Speed, Aperture and Gain... (More on Next Slide)
3. Place your White Balance / Gray Scale Card in the area your subjects will be and work on white balance first.
4. You can use a White Balance Filter and “One Push” to get a starting point for white balancing
5. Then place your color checker in the area your subject will be. Zoom your camera into the area.
6. Here you can start to tune more advanced settings such as Hue, Red/Blue Gain and contrast...
7. You can now start to use a Vectorscope and Waveform monitor to make sure your exposure is perfect (more in latest slides...



Waveform Monitor

The waveform monitor is the counterpart for the vectorscope available to handle brightness and exposure. With a waveform monitor, you can easily see if your image is clipping at the top or if the blacks are getting crushed. The waveform monitor will allow camera operators the ability to adjust the image preferably in the camera first to ensure your image has a good exposure.

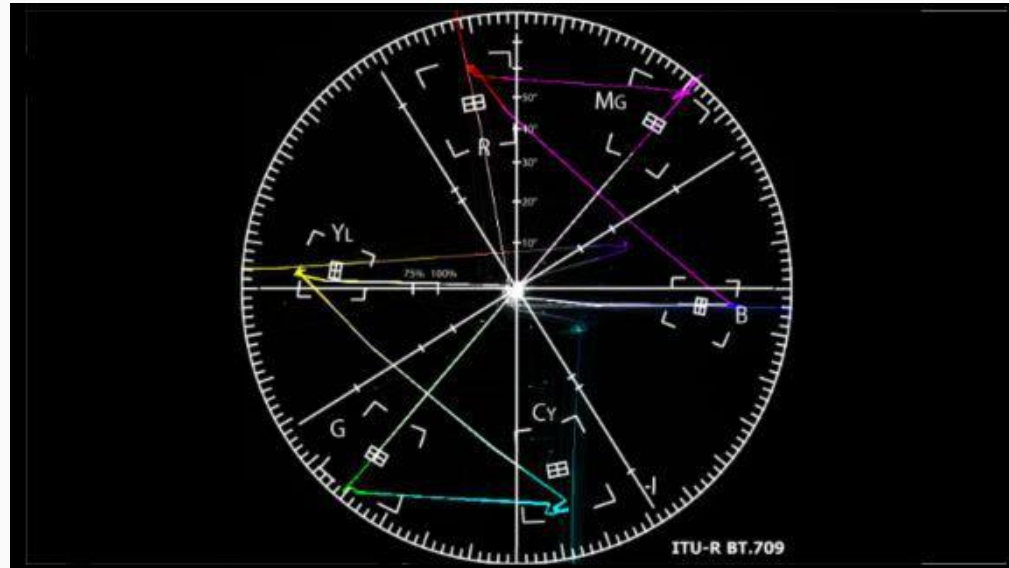
Using the waveform monitor to influence your camera settings adjustments, you want your camera's image to be within the lines of your monitor. You can use vMix to make sure your video has perfect whites and blacks using the tools as needed.



Vectorscope

A vectorscope is a tool that represents the color of your camera image. It's like an x and y graph representation of the color accuracy of your live video feed. At the top of a vectorscope you have red, toward the bottom you have cyan and there is also a green similar to what you have seen in color correction software.

The vectorscope graph allows you to see the balance of the colors coming from your live video camera. To accurately tune your camera you can put up a color chart in your space and zoom into it with your camera.



Advice

One of the key things with color corrections is that most people try to do all of the color correction and exposure inside the camera. Many times the highlights can be blown out before they even get into your video production software. Using a vectorscope and waveform monitor you can bring down the range of your camera to make sure that you are not clipping. These tools make sure that you are not crushing the blacks or overexposing the whites with the settings in your camera. The waveform monitor specifically allows users to stretch the exposure to the perfect white and black settings.



Camera Settings for a Conference Space

Resolution: 1920x1080p 30fps

Camera Aperture: Automatic

Camera Shutter Speed: Automatic

Camera Focus: Automatic

Camera Control: IR Remote



Camera Settings for a Production

Resolution: 1920x1080p 30-60fps

Camera Aperture: small such as 1.8

Camera Shutter Speed: Automatic

Camera Focus: Manual

Camera Control: IR Remote / Joystick

Other Settings: Contrast and Hue perfect for chroma key.



Camera Settings for Live Sports

Resolution: 1920x1080p 60fps

Camera Aperture: Large such as 1.8

Camera Shutter Speed: Fast 1/120 or more

Camera Focus: Manual ∞

Camera Control: Joystick w/ monitor

Other Settings: 60 fps ideal for post production and slow motion



Camera Settings for Low Light Performance

Resolution: 1920x1080p 30fps

Camera Aperture: small such as 1.8

Camera Shutter Speed: slow 1/120

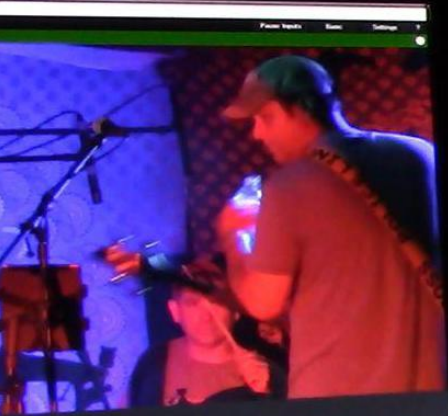
Camera Focus: Manual ∞

Camera Control: Joystick w/ monitor

Other Settings: Contrast and Hue and Wide Dynamic Range



Camera Settings for Low Light Live Streaming



What is a Flat Image?

Most people try to do all of the color correction and exposure inside the camera. Many times the highlights can be blown out before they get into your video production software. Using a vectorscope and waveform monitor you can bring down the range of your camera to make sure that you are maximizing your video sensor and your video is not clipping. These tools make sure that you are not crushing the blacks or overexposing the whites with the settings in your camera.

Low Light: Exposure Settings

Resolution: 1920x1080p 30fps

Camera Aperture: small such as 1.8

Camera Shutter Speed: slow 1/60

Gain: Adjust until image shows noise and dial back (0 ~ 15)

WDR: Adjust to improve lighting especially if backlighting is an issue



Low Light: Image Settings

Luminance: Adds additional light to image

Contrast: Make blacks darker and whites whiter until they realistic to the eye

Tip: Try using the PTZOptics IP Controller to easily adjust these settings on the fly.



Low Light: Noise Reduction

2D Noise Reduction: Ideal for scenes with a lot of movement.

3D Noise Reduction: Ideal for static fields of view.

Tip: Try using a combination of 2D & 3D Noise Reduction for best results



Download this checklist in PDF Format!



YouTube Live
Streaming Checklist

Don't start your next live stream with it!

**DON'T START YOUR NEXT
EVENT WITHOUT THIS!**

 **FREE DOWNLOAD** ▶ Broadcast
Quality Made
Affordable

<https://ptzoptics.imagerelay.com/share/b19150d7662a45bbb2af1c057d44750b>

Need help getting started?



The image shows a screenshot of a Udemy course page. At the top, there are three course cards. The first card is titled "Introduction to Green Screens and Virtual Sets" by Mr Paul Richards, Chief Streaming Officer, with a 5-star rating and 2 reviews, priced at \$20. The second card is titled "Live Streaming to YouTube - Tips & Tricks for Success" by Mr Paul Richards, Chief Streaming Officer, with a 5-star rating and 0 reviews, priced at \$20. The third card is titled "Introduction to Live Streaming - Intern" by Mr Paul Richards, Chief Streaming Officer, with a 5-star rating and 0 reviews, priced at \$20. Below the course cards, the text "FREE LIVE STREAMING & VIDEO PRODUCTION COURSES!" is displayed. At the bottom left, there is a logo for "OPTICS" with the letters P, T, and Z in circles. In the center, there is a yellow button that says "GET STARTED ▶". At the bottom right, the text "Broadcast Quality Made Affordable" is displayed.

Introduction to Green Screens and Virtual Sets
Mr Paul Richards, Chief Streaming Officer
★★★★★ (2)
\$20

Live Streaming to YouTube - Tips & Tricks for Success
Mr Paul Richards, Chief Streaming Officer
★★★★★ (0)
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OPTICS **GET STARTED ▶** Broadcast Quality Made Affordable

<https://www.udemy.com/user/6443d745-3d7f-473d-bf74-6e7ff0379fda/>

Check out our Live Channel as an Example...

<http://youtube.com/c/ptzoptics/live>