

# Live Streaming DerbyNet with OBS

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With the COVID-19 pandemic, many organizations find themselves live streaming their “virtual pinewood derby” events. This document provides some hints and tips for live streaming with DerbyNet and Open Broadcaster Software (<http://obsproject.com>). Many of the suggestions here likely apply to using DerbyNet with other encoders as well.

## General Set-Up Considerations

### USB Cable Lengths and Power Distribution

Passive USB 2.0 cables are limited to about 5 meters, or 16 feet, in length, according to the USB standard. Longer cables *may* work, but there’s no guarantee. A pinewood derby track, on the other hand, might be 40 or 50 feet in length. Especially if you’re using multiple USB cameras, it may not be possible to position a single computer within 5 meters of each of them. If that’s the case for you, you’ll need either powered USB hub(s) or “active” repeater cables, or both.

In particular, note that an active repeater cable itself draws power, in addition to the power requirements of the camera or other device at the end. This may require more total power than a laptop USB port can provide. To avoid an undervoltage condition at the camera or device, you may need to use a powered USB hub in addition an active repeater cable.

If you suspect or anticipate problems along these lines, consider investing in a USB power meter.

Some products and further reading:

[http://www.yourcablestore.com/USB-Cable-Length-Limitations-And-How-To-Break-Them\\_ep\\_42-1.html](http://www.yourcablestore.com/USB-Cable-Length-Limitations-And-How-To-Break-Them_ep_42-1.html)

<https://www.amazon.com/Monoprice-Extension-Repeater-PlayStation-Keyboard/dp/B009GUTFX8/>

<https://www.amazon.com/MakerHawk-3-7-30V-Voltage-Multimeter-Voltmeter/dp/B07FMQZVW2/>

<https://www.aliexpress.com/item/32922333751.html>

### Bit Rates

The default bit rates set by OBS are pretty low. For better-looking video, check the recommended bit rate for your video platform. E.g., for YouTube, take a look at <https://support.google.com/youtube/answer/2853702?hl=en>.

### Wi-Fi

If you have a choice between connecting over Wi-Fi and connecting over Ethernet, prefer Ethernet. That’s not to say that Wi-Fi will give you problems; lots of people stream successfully over Wi-Fi. It’s just that a wired connection, if easily available, lets you avoid risk of radio interference or other issues.

### Scene Switching with a USB Keypad

OBS can be configured with “hot keys” for scene switching. Assigning hot keys to a cheap USB

keypad lets your emcee do scene switching with minimal instruction and fuss. (And for way less than the cost of an [Elgato Stream Deck](#).)

There's also the [OBS Remote app](#) that uses a phone in place of dedicated hardware.

### Take Events Directly from derby-timer.jar

Recent releases of DerbyNet include extras/livestream/obs-derbynet.lua, which can trigger OBS scene changes when the track timer reports the start or end of a heat. derby-timer.jar now supports a -trigger-file-directory command line argument; if provided, derby-timer.jar writes an empty file to that directory on heat start or end. The obs-derbynet.lua script polls for these files, and takes action when one is discovered.

This functionality is still quite experimental, but you're welcome to try it out. Feedback welcome!

## Some DerbyNet Easter Eggs

### Kiosk With Specified Content

Kiosk content is normally controlled by the race coordinator, from the Kiosk Dashboard page. For broadcast, you may wish to have inset views of specific kiosk pages. In OBS, use a "Browser" view for this, and add a 'page' [query parameter](#) to the URL, to set a specific page. The argument gives the relative path to the kiosk page file, normally "kiosks/*the-page*.kiosk".

For example, for a hosted DerbyNet instance, the URL for an inset of the "Now Racing" page would look like:

<https://hosting.jeffpiazza.org/derbynet/2020/ma/demo/kiosk.php?page=kiosks/now-racing.kiosk>

### On-Deck Display for the Audience

Normally, the on-deck page or kiosk is focused on the heat that will *follow* the heat currently staging. (This helps the wrangler get an early start gathering the cars for that next heat, to minimize the time between heats.) If you instead intend to show the on-deck page directly to the audience, add the 'focus\_current' query parameter to the URL. E.g.

[https://my-local-server.local/derbynet/kiosk.php?page=kiosks/ondeck.kiosk&focus\\_current](https://my-local-server.local/derbynet/kiosk.php?page=kiosks/ondeck.kiosk&focus_current)

The value of the focus\_current parameter is ignored and can be omitted, as here.

Note that the kiosk version of the on-deck page automatically scrolls so that the current focused heat is vertically centered in the window. For an inset, you may wish to adjust the width and height so that just one row is visible; that single row will always show the current heat.

## Scene Suggestions

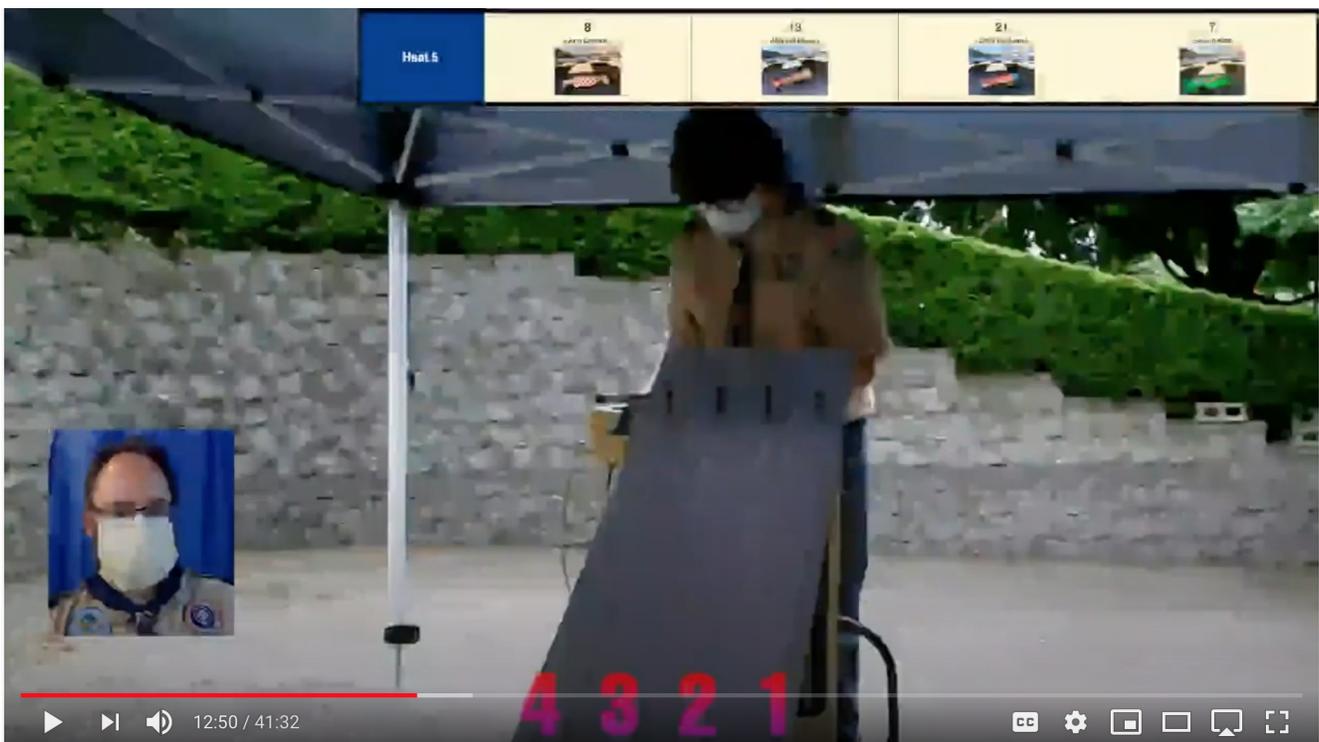
### Track View Scene

While a heat is running, your audience would most like to see a view of the track. Place a camera near the finish line, aimed to capture as much of the track as possible. You may wish to add an inset of the "Now Racing" page to remind the audience what cars they're seeing, and/or an inset of the you or your emcee



### Starting Gate Scene

If you have a second camera, consider a view of just the start of the track, so the audience can see the cars as they're being staged. You might also add an inset of the “On Deck” (see ‘focus\_current’, above) or “Now Racing” page. If your track lanes don't read left to right in this view, consider adding some overlaid lane labels.



## Kiosk Scenes

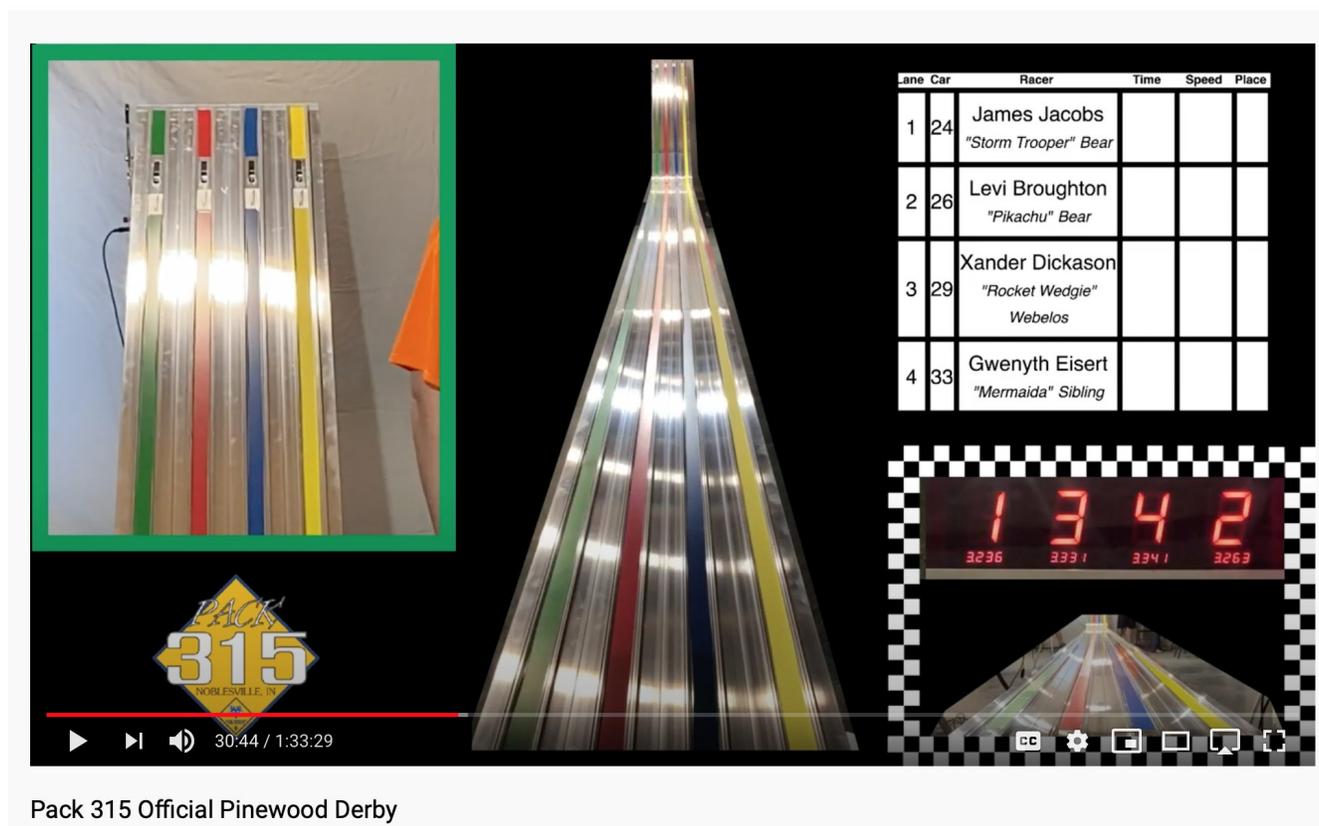
Set a scene that's primarily or exclusively a kiosk browser. In fact, it can be useful to have two such scenes, one having an inset of the emcee and one focusing just on the kiosk display.

Note that an OBS "Browser" source won't work if you need to interact with the page as part of the set up. In particular, a replay kiosk requires interaction from the user, so in OBS it must be set up as either a "Window Capture" or "Display Capture" source in OBS. However, see the note below about replay kiosk performance.

Note further that OBS on MacOS has a bug which causes flicking of "Window Capture" sources. To avoid the flickering, the only real option is to use "Display Capture," which may be difficult unless you can attach a second display to your Mac.

## "All in One" Scenes

Here's an example of using an OBS image mask and combining several video sources into one scene.



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## Single-Computer Performance Concerns with Replay

DerbyNet's replay kiosk feature provides "instant replay" capability in a kiosk. It's a real audience-pleaser, but it's also computationally demanding.

OBS, and likely any other software stream encoder, also requires some significant computing horsepower.

My personal experience has been that my quad-core laptop just wasn't able to meet the challenge of

running both OBS and a replay kiosk at the same time. YouTube would initially report “excellent” stream quality, but would then warn that too little video was being received. Also, Chrome would warn (in the console) that many frames were taking too long to be captured, and the actual replay would be jerky and nearly unwatchable.