TESTING INFRARED REMOTE CONTROLS

You can use a simple test to determine whether the remote control batteries are exhausted, whether the remote control buttons work or fail, and whether the remote control still produces a blink of infrared (IR) light.

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Introduction

I received a new infrared (IR) remote control for Father's Day 2024, a very thoughtful gift. My original remote control broke years earlier.

After the original broke, I used a remote control app on a tablet. The tablet app had a disadvantage. The app could not respond quickly after the table awakened. The apparent cause was that the tablet disconnected from house WiFi when the tablet went to sleep. When awakened, the tablet took seconds to reconnect.

Even with freshly recharged batteries inside, the new remote control was ***unable to control the device*** it should control. I stood within a foot of the controlled device and pointed the IR emitter end of the new remote control at the controlled device. The device did not react to the Power button or any other button I pushed on the new remote control.

I thought the new remote control was dead on arrival.

I soon remembered an old testing method for IP remote controls: it is easy to determine if the new remote control was in fact producing IR light or not, if the batteries were fresh or exhausted, and if the remote buttons worked or not. Testing is easy without using the controlled device.

I last used this testing method 23 years ago. It is based on the ability of digital camera sensors to **detect IR light and make that light visible** in digital viewfinders. Back then, I was using a 2-megapixel Olympus C-2100UZ digital camera.

That was an era when digital cameras and their sensors were new. My laptop had no built-in camera, my family camcorder was analog and gigantic, and my Single Lens Reflex (SLR) camera shot 35mm film. My cell phone was not equipped with a camera. The Olympus was my only digital camera.

Times have changed

In 2024, digital cameras are inexpensive and widespread. I wondered if the test is still possible.

I set my Canon EOS 7D Mark II digital SLR to use its large rear screen as a viewfinder. I held the new remote control in front of the camera lens. While watching the large rear screen, I tapped buttons on the remote control.

Every button tap on the remote control caused the front end of the remote control, seen in the camera viewfinder, to produce a blink of IR light. The camera made every blink visible to me.

Yes, the camera-based test is still possible.

That test confirmed the batteries in the new remote control were not exhausted, that the remote control buttons worked, and that the new remote transmitted IR light.

Eventually, I decided to read the new remote control description on a Web page. The description reported that the new remote control was ***not compatible with the device*** that the new remote control should control.

I found a different new remote control on the Web, one described to be device-compatible, and I told my gift-giver about it. That person returned the incompatible remote control and bought the compatible remote control as a replacement gift.

How an IR blink appears

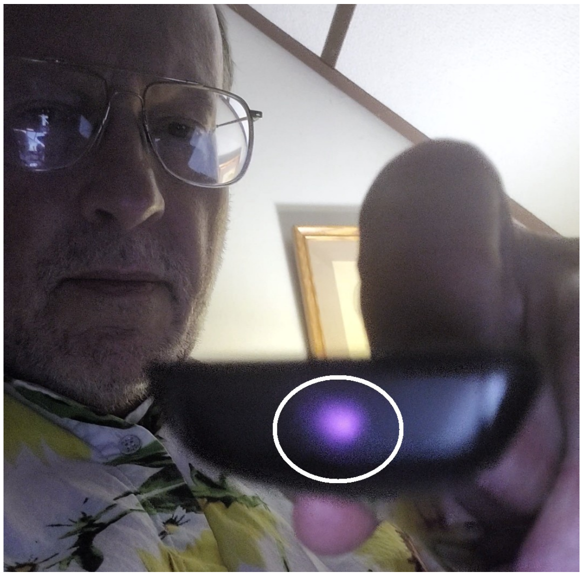

Illustration 1

In the Canon 7D SLR rear screen, the IR blink was white. That may not be the case in all SLRs, depending on the current exposure settings in an SLR.

In the Samsung Galaxy S20 smartphone selfie camera, the IR blink was lavender or vaguely purple. You can see that in **illustration 1.** Again, the color may depend on camera app exposure settings.

Producing the illustration was a challenge. I could not capture a still photo fast enough to include the brief IR blink. So, I set the S20 camera app to record a **selfie video** and repeated the test while recording that video. While viewing that video recording, I paused video playback on a frame displaying an IR blink. I screen-captured the single frame that shows the blink and circled the blink for your convenience.

That blink is a modulated light pattern representing a set of digital bits. The bits identify the button tapped on the remote control.

Other camera devices can do the test

In 2002, I did not have a smartphone yet, and neither did anyone else. Back then, my only option was to use my early digital camera for remote control diagnosis.

Now, the selfie capability on a smartphone turned out to be a useful way to conduct a blink test. Switch the camera app to Selfie, point the remote control at the screen lens, push a remote button. If the blink happens, the result in the smartphone screen is easy to see.

I wondered if my other camera devices can do similar testing.

For the smart phones and the tablets, there is a camera app and, in that app, a selfie cam option. On the camcorder, I have a viewscreen that can face the same direction as the camcorder lens, turning the camcorder into a selfie cam.

The SLR was the sole testing device without that selfie capability.

I have other remote controls that are multi-control backups. I did not test those.

Tests and results

In a nutshell, I tried out six digital camera devices: a Samsung S20 and a iPhone 11 smartphones, the Canon SLR, a Canon Vixia HF R800 camcorder, a Samsung Galaxy Tab A9+ tablet, and an HP Satellite laptop. I tested remote controls for an LG smart TV, a Samsung sound bar, a Roku Premiere+ streaming video box, and a third-party remote control for a Sony Blu Ray player.

Every digital camera device made the IR blink for every tested remote control visible.

Testing nuances

Two nuances became clear to me during the tests.

First, it helps to point the remote IR emitter end at the camera lens, and focus the camera on the remote, or at least to move the remote so that it is close to something else in focus. For selfie cameras, that something else was my face.

Why try to be in focus? Because things out of focus lack contrast**.** Illustration 1 is an example. **Blurring reduces the contrast of the IR blink**. Low contrast makes the blink easy to miss.

For most digital cameras, auto-focus searches for maximum contrast, a process of moving the lens focusing system back and forth rapidly.

Second, it helps tremendously to point the remote control ***directly* at the camera**. That pointing ensures the maximum IR light will reach the camera lens. That camera lens is quite small on the front of smartphones, tablets, and on the top of my laptop screen. However, in selfie mode, it is not difficult to do that aiming, assuming you know where the camera is located.

The IR emitter in a remote control is not wide-angle, but telephoto. It sends the IR in a narrow beam to reach a distant device, such as a TV. Aim the remote control at an angle to the camera lens, and you might not see an IR blink that really does happen.

The least forgiving camera device for IR blink testing was the Canon EOS 7D Mark II digital SLR. It has no selfie lens. The SLR lens I used for testing was not wide-angle. I suspect a wide-angle SLR lens would work better.

Aside from the SLR, all other camera devices include selfie capability with very **wide-angle cameras**. That feature makes it possible to shoot a selfie with friends in the photo. Each lens shows the IR blink even if the remote control is not directly in front of the lens, but at least pointed at the lens.

I have learned that lesson about camera lenses and the blink test. I will use that lesson in the future. Recalling such lessons in the future is a big motivation for my writing. Years later, my articles will help me recall various lessons. Helping you now and later is a huge bonus.

ABOUT THE AUTHOR: John Krout is a retired software developer. He has been writing about and delivering presentations on interesting uses of personal computers since the early 1980s. In the 21st century, as digital tech became more powerful and widespread, he has also been writing and delivering presentations about interesting uses of smartphones, tablets, digital music, digital photography, Electric Vehicles (EVs) and Pluggable Hybrid Electric Vehicles (PHEVs). He lives in Arlington Virginia.