June 29, 2015

Ms. Jacqueline Charlesworth
General Counsel and Associate
  Register of Copyrights
U.S. Copyright Office
Library of Congress
101 Independence Ave., SE
Washington, DC 20559

**Re: Docket No. 2014-7 Exemptions to Prohibition
              against Circumvention of Technological
              Measures Protecting Copyrighted Works**

Subject: Class 1

Dear Ms. Charlesworth:

On behalf of DVD CCA and AACS LA, we are submitting the following response to the below post-hearing question to Proposed Class 1: Audiovisual works–educational uses–colleges and universities.

Question:

At the hearing and in their papers, opponents of the proposed exemption referenced a variety of screen capture technologies as potentially viable alternatives to circumvention, including Camtasia, Movavi, Snagit, WM Capture, EzVid, CamStudio, Jing, and Screencast-O-Matic. Please address which, if any, of this software is operable on a Mac versus a PC, respectively. The Office is interested in understanding any differences with respect to the impact of older versus newer operating systems, including Mac OS 10.7, 10.8, and 10.9. The Office is also interested in understanding whether any limitations in software functionality can be overcome by installing an alternate operating system on a computer, such as by using Boot Camp on a Mac, or by using a virtualization program, such as Parallels Desktop, to emulate an alternate operating system. In responding to this question, please describe any differences that exist in using screen capture technology with respect to DVDs, Blu-Ray discs, and streaming services.

Response:

As described in detail below, there is a simple "work-around" for Mac users to be able to make use of screen capture software to record playback from DVDs. The concerns about the apparent modification to the Apple operating system for Macs in the most recent versions that prevents the video recording capability of currently available screen capture programs are thereby overcome. Consequently, clips created on the Mac users' computer using screen capture in the Windows environment are just as available for Mac users to manipulate for the purposes for which the exemptions have been requested.

Screen Capture of DVD and BD Playback

In the *Windows* environment, we are unaware of any limitations of the ability of screen capture software to record DVD playback.

In the Mac environment, Apple's native operating system apparently prevents screen capture from recording DVD playback on a licensed player such as the Apple DVD Player or QuickTime player. Attempts to screen capture DVD playback on a licensed player will result in a recording that contains only the audio.[1] The video portion of the recording appears as a gray screen. Neither the CSS license nor the implementation of the Robustness Rules for the CSS license requires this result. (Note this limitation seems to apply to any DVD playback, including those not protected by CSS, such as personal recordings made on DVDs).

With respect to Blu-ray, we are unaware of any screen capture software that is capable of recording the video portion of Blu-ray playback from a licensed BD player. Attempts to record BD playback will result in a recording of only the audio portion of the content; the video portion appears as a black screen. This result is consistent with the Robustness Rules for the implementation of the AACS license, which require the licensee to protect the content from interception from the point of decryption to the point of display.[2]

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[1] This limitation on licensed players in the Mac environment however does not seem to apply to unlicensed (and unauthorized) DVD players such as the VLC player. As discussed at the hearing a Mac user can successfully screen capture DVD playback from the unlicensed VLC player. The VLC player however is decrypting the content on the DVD without the benefit of a license from DVD CCA and accordingly, it constitutes a circumvention device. In acknowledging this fact, we are not in any way endorsing the use of the VLC player or any other unlicensed player for the purpose of accomplishing screen capture of DVD playback.

[2] On Panel 7, while noting remixers generally could not screen capture BD playback, the proponents put forth a video from one remixer, who was described as "lucky" because she was able to screen capture BD playback of a scene from Captain America with Snagit. We subsequently tested Snagit with a BD copy of the Avengers, and Snagit was unable to record the video portion of the BD playback (i.e., Snagit performed like all other noncircumventing screen capture software and recorded only the audio). The "lucky" remixer most likely had to have circumvented the BD, knowingly or unknowingly, prior to playback such that the BD playback was not recognized as decrypted AACS content. If content is not recognized as decrypted AACS content then none of the additional protections required under the Robustness Rules would be in play to prevent the recording of the video portion of the content.

<u>Alternative Approach to Screen Capture of DVD Playback in the Mac Environment</u>

Mac users can use screen capture to record DVD playback if they take advantage of Mac's ability to run the *Windows* operating system. Mac users can run *Windows* on their machines through either *Boot Camp* or *Parallels Desktop*. While both methods would permit the Mac user to make use of any screen capture software made for the *Windows* operating system, below we only describe the *Boot Camp* method. We then suggest that *Parallels Desktop* may be used to compliment the *Boot Camp* method to facilitate the transfer of video files created with screen capture back into the Mac environment.

Boot Camp

Since 2006 Apple has included *Boot Camp* as a free utility in Macs to permit the user to run the *Windows* operating system.[3] While Apple preinstalls its native operating system to run the Mac, *Boot Camp* allows the user to install a separate partition on the hard drive from which to run the *Windows* operating system, which the user must license separately (Windows 8.1, currently the most up-to-date version available, retails for $119.99).

The Mac user is now able to run his or her machine with either the native Apple operating system or with the *Windows* operating system. Generally, without the benefit of additional software, the machine can run only one operating system at a time; the user is prompted to choose which operating system to load upon turning on the computer.

If the computer boots to *Windows*, the user can make use of any software applications intended to run in the *Windows* environment, including screen capture applications. Software and content associated with the *Windows* operating system will however remain isolated on the separate partition (that is, if the user boots to the Mac operating system, he or she will not be able to access files associated with the *Windows* partition). If the Mac user desires to move content created in the *Windows* environment to the Mac environment the user must either use the *Parallels* system described below or make use of an intermediary process to transfer the content back to the Mac partition (e.g., copying the software to a removable storage device such as an external hard drive, or a cloud storage service such as Google Drive or Dropbox).

Parallels Desktop

Parallels Desktop, which retails for $79.99, is another software application that enables Mac users to run the *Windows* operating system, but unlike the *Boot Camp* approach, *Parallels* allows the two operating systems to run simultaneously (the Windows environment essentially appears as any other program would within the Mac environment). *Parallels Desktop* thus results in a more integrated experience where *Windows*-based applications and content are not segregated by the partitioned Mac and content can be moved more seamlessly between the *Windows* and Apple environments. Like the Boot Camp approach, the Mac user must have a version of *Windows* to operate the Windows-based applications.

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[3] *See* https://support.apple.com/en-us/HT204048 (detailing system requirements for all Boot Camp Windows compatible Macs with Intel processors since 2006.)

After installing *Parallels Desktop* and a copy of *Windows*, a Mac user can run *Windows*-based screen capture software just like any other *Windows*-based software. Because screen capture software requires significant processing power and RAM memory, older or less-well-resourced machines may experience difficulty running screen capture software by way of *Parallels Desktop*. (The machine is essentially running (i) the Apple operating system and (ii) *Windows;* (iii) playing back a DVD and (iv) recording it - all at the same time.) The *Boot Camp* approach described above is less taxing as it involves only the latter three tasks. Nevertheless, *Parallels Desktop* is a useful tool to transfer the video after its capture from the *Boot Camp* process.

Results

Through the above *Boot Camp* method, we were able to screen capture DVD playback using WM Capture software. The resulting quality through the *Boot Camp* method was identical to the screen capture videos submitted as exhibits and presented during the panels. Using *Parallels Desktop*, we were then able to access and seamlessly transfer the videos created with WM Capture from the *Windows* partition back into the Mac environment without issue.

Conclusion

In light of the foregoing, screen capture software is completely available to Mac users as an alternative to the circumvention of DVDs, and as an alternative to circumvention, the value of screen capture software cannot be overstated. For all of those unidentified activities, which could qualify under the proposed – yet unacceptable – class of "any educational use," the intended beneficiaries can make use of improved screen capture technology to accomplish those activities. As far as those activities, which will continue to be eligible under a renewed exemption on the same or similar terms, the Register should expect the exemption to warrant far fewer incidents of circumvention than what she previously anticipated. Because screen capture recordings now much more closely approximate DVD quality, the details in DVD playback are clearly visible in the screen capture recordings. Consequently, if the class beneficiaries conform to the expectation to make use of screen capture technology before engaging in circumvention, then they should engage in circumvention far less frequently as we have demonstrated that screen capture technology can satisfy proponents' articulated needs.

Sincerely,

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