Logitech C310 Webcam Application Note

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Abstract:

A webcam is a video camera that feeds what it is seeing in real time to electronic devices such as computers, phones, tablets, microcontrollers, and some other devices. Webcams are usually either integrated into newer generation of electronics as seen in laptop, tablets, and phones or connected via a USB, FireWire, or other similar input cables.

Webcams are most commonly used people for video chatting or conferencing for personal and business uses. Thus naming it a webcam since its most common application is being used through the Internet. Even though video chatting is the most common use, webcams are also used for surveillance, computer vision, video broadcasting, and recording videos.

Keywords:
USB (Universal Serial Bus), ISO (international standards organization), Contrast, Aperture, Shutter Speed, FPS (frames per second), Firmware, Lens, Resolution (XXXXi-interlaced, XXXXP-progressive scan)

Introduction:

The fantastic design of the Logitech C310 features a built-in microphone that is able to make your recorded audio sound clear and bright during usage due to the RightSound technology that reduces background noise. The software also gives you enhanced performance in low-lit environment with RightLight 2 technology. Fluid Crystal technology built into the webcam also enhances the video quality by smoothing out the video captured. On top of these technologies, the Logitech C310 is a webcam with 720P video capability, 5-megapixel sensor, and mounting clip.

With Logitech Vid software video calling is free, fast and easy. The webcam also gives you compatibility with popular instant messenger programs means you can use the camera with AIM, Skype and more. The mounting clip makes it easy for one to place in many different places to record or stream whatever content they would like.



Figure 1: Logitech C310

Objective:

The main purpose of a webcam is to take videos, audio, or pictures and either record them or stream them with the assistance of a computer giving it commands. To achieve this, there is a routine that the device has to go through in order for the computer to receive the data.

Steps:

In order for streaming or recording, this basic process needs to be conducted:

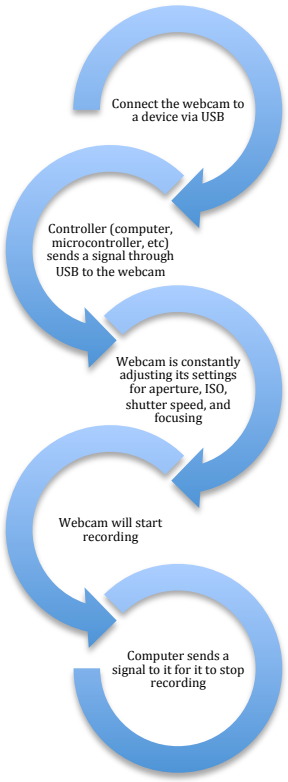


Figure 2: Recording Process

In order for the controller to send a signal to the webcam, besides needing a compatible USB connection the webcam has to have firmware that is compatible with the operating system on the machine running it. Luckily the Logitech C310 has proper firmware on it to be able to run on any platform on the market.

The webcam has auto-adjusting abilities that will be able to adjust settings such as aperture, ISO, shutter speed, and focusing to produce great video quality. Under most conditions with proper lighting the camera will keep a great image with low ISO and

changing the aperture and shutter speed in order to make sure there is no over exposure. During night time the cameras capability of absorbing light is good enough to produce an image quality but has to increase the ISO creating more noise then ideal.



Figure 4: Daytime

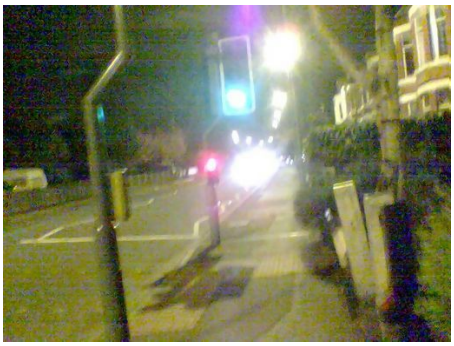


Figure 3: Night With Low Light

Outside of ISO, aperture, and shutter speed, the camera can also be fine tuned in post processing software. In post processing software white balance, contrast and changing values of whites, black, shadows, and highlights can further help the video quality seen.

On start up the controller has to communicate with the webcam to start recording and create a video file. Depending on USB speeds as well, the processing speed of the controller there may be delay on the startup. In order to insure there is no lag, use a USB 2.0 connection and make sure the processor is fast enough. This lag can also seen when the webcam stops recording, as it has to cut off and finish making the video file.

The resolution and frame rate are fairly high at 720p and 30fps. Even though the higher the resolution the clearer the video and the higher the fps the smoother the video, this could pose a problem if one were to record hours and hours of video. The good thing is the Logitech C310 can be adjusted in order to decrease resolution and frame rate in order to reduce video file size. The Logitech C310 supports a resolution of 640x480 at 5 FPS and 15 FPS. This is great for situations when small file size is more important than quality. Even if lower quality settings are requested, one can take the video file recorded and change contrast, brightness, coloring, resolution, fps and many other traits in order to increase video quality.

If there is movement while recording or streaming, vibration can be a big issue. Fluid Crystal technology built into the webcam can help decrease some of the vibration and make the video look more fluid. If it is still not enough one will simply have to use different mounting equipment to stabilize the camera.

Software:

Logitech Vid HD: The webcam comes with Logitech's software that can be used to capture images or video. It can also be used to place audio or video calls

Firmware compatibility: As mentioned above, the firmware installed on the Logitech C310 makes it compatible with most operating systems such as Windows XP-Windows 8, OSX, Android, Linux, and more.

Adobe Premiere Pro/Final Cut Pro: Adobe Premiere Pro/Final Cut Pro are two professional video editing softwares use in industry in order to add visual/audio effects or enhance videos. As mentioned above the software is very powerful and can change many elements after the video is recorded.



Figure 5: Premiere Pro

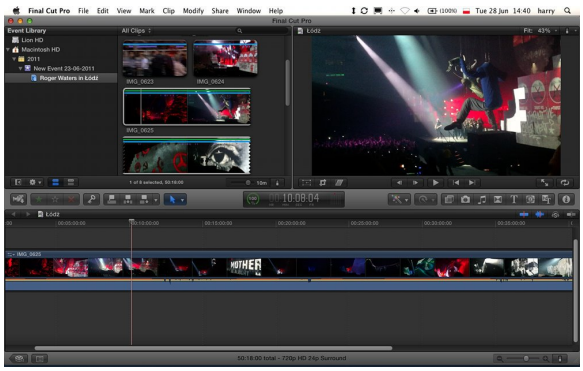


Figure 6: Final Cut Pro

Chatting Programs: the Logitech C310 also has a lot of support from developers of chatting programs. The camera is supported on multiple applications such as Skype, Facetime, AIM, etc. Even those that are built in browser such as Google Hangout and Facebook Video Chat have support for it.



Figure 5: Skype



Figure 6: Facetime

Other Application Software: Many softwares have been created in order to use the webcam for multiple purposes. A few Open source softwares such as Zoneminder and GUVCVIEW can be used to take the Logitech C310 and instead of using it as a traditional webcam, it can be used as a security camera with fps information time and date stamped as well:

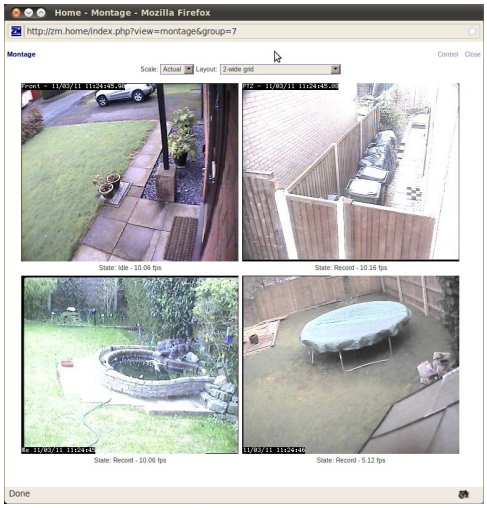


Figure 7: Zoneminder

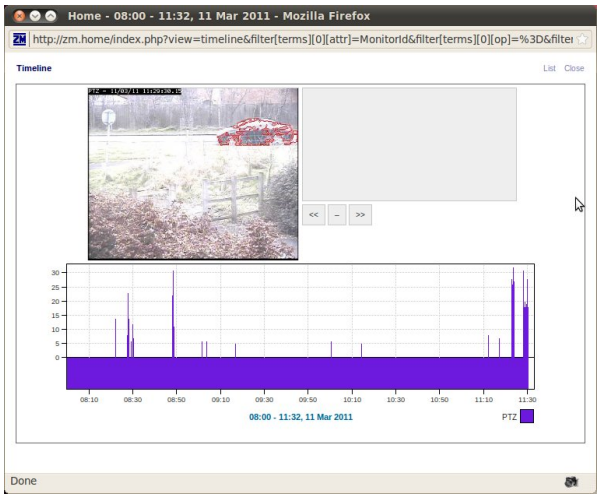


Figure 8: Zoneminder

Hardware:

Mounting Equipment: external mounting equipment can be added to the webcam in order to mount it to walls, ceilings, and various other places.



Figure 9: Security Camera Mount



Figure 6: Glass Mount

Conclusions:

The Logitech C310 is a great quality webcam that is very versatile. The camera is small so it can be easily mounted and moved around while at the same time offers great video in low light situations with a resolution of 720p. On top of that it is fairly inexpensive for a webcam of its class

Recommendations:

The hardware itself is fairly adequate a few changes could be made to improve it such as:

1. Increase megapixel count
2. Increase aperture
3. Increase FPS for still shots
4. Better mounting stand that can be universally attached to various mounts and stands

Many more improvements can be made through the software side to make it a lot more efficient:

1. Auto contrasting and color correction could be added in order to give sharper video quality.
2. Software could be programmed to all a 1080p option
3. New algorithms could be added in order to decrease lag when starting to record and stopping to record, faster light correction, etc

Appendix:

Resources:
http://www.zoneminder.com
http://guvcview.sourceforge.net
http://www.logitech.com/en-us/product/hd-webcam-c310
http://www.adobe.com/products/premiere.html
http://www.skype.com/en/
http://www.apple.com/ios/facetime/
http://www.apple.com/finalcutpro/