

LICENSING

Microsoft offers fair and reasonable licensing terms to Manufacturers and Suppliers of web-cams and video cameras.

For licensing information, contact Microsoft Hardware Licensing at askmsip@microsoft.com, Subject Line "Flicker Detect".

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VIDEO FLICKER DETECTION

Microsoft

INTRODUCTION

MICROSOFT AUTOMATIC VIDEO FLICKER DETECTION (AVFD) IS AN INNOVATIVE TECHNOLOGY CURRENTLY SHIPPING IN MICROSOFT'S LATEST HIGH-DEFINITION 1080P WEBCAM CALLED THE LIFECAM STUDIO™.



This technology is available as an Intellectual Property (IP) license to third-party manufacturers of webcams and other video camera/capture devices.

WHAT

THE IMAGE SENSORS IN VIDEO CAMERAS USE AN ELECTRONIC ROLLING SHUTTER TO CONTROL THE INTEGRATION TIME OF THE EXPOSURE.

Each row in the image is exposed over a differential time interval. If the illumination of the scene changes, the camera may exhibit an alternating light intensity across rows in the image and result in flickering through the sequence. Flicker can cause significant degradation in video quality from webcams and other digital camera devices.

WHY

FLUORESCENT LIGHT IS ONE OF THE COMMON SOURCES WHICH CONTRIBUTE TO FLICKER IN CAMERAS.

The illumination from a fluorescent light varies with AC power around the world, typically 50Hz or 60Hz. Webcams and other digital camera devices usually allow the user to select AC power frequency; however, this can be inconvenient for the user.

If some compromise of video performance is acceptable (such as smoothness and SNR), there are other flicker avoidance approaches (such as limiting integration time and FPS space) which can be used to avoid video flicker.

HOW

MICROSOFT OFFERS TWO APPROACHES TO THE SOLUTION.

The first method, referred to as the "Photo Sensor" approach, is based on image processing of the captured videos. The second method, referred to as the "Photo Transistor" approach, is based on a low-cost combination hardware/firmware solution. Licensees receive the rights to practice one or both patent-pending solutions within their respective video products.

Automatic Video Flicker Detection, via the "Photo Sensor" approach, is an algorithm which uses the camera sensor and color-accumulation blocks of the In-System Programming (ISP) to analyze the images and identify if video flicker is present. This algorithm requires no additional hardware.

The detection method exploits the Color Accumulation (CA) blocks available on camera controllers, such as those used in Microsoft's LifeCam Cinema and LifeCam Studio webcams. The accumulated color-channel values (over frames) are measured to detect any flicker in the videos.

The "Photo Transistor"-based approach detects the flickering frequency of the light source in the operating environment using an external photo transistor. Either solution enables a video camera to automatically select the appropriate set of exposure timings (either 50Hz or 60Hz) to prevent banding in the captured video.

Each approach is a low-cost solution, for flicker frequency detection, and requires minimal memory resources.

The technical documentation supplied to Licensees includes:

- Image Analysis (Provides a mathematical foundation to help maximize detection capability)
- Detection method
- Guideline for optimizing camera settings
- Procedure to implement the algorithm on camera firmware

BENEFITS

Benefits of the Microsoft Automatic Video Flicker Detection Technology include:

- Reduced manufacturing inventory costs for camera device suppliers. By eliminating the need for two separate SKUs, in 50Hz and 60Hz regions, a single SKU could be offered for 50Hz and 60 Hz applications.
- No need to manually adjust power line frequencies for those video camera end users who travel globally - based on current location.
- No additional hardware is required for the "Photo Sensor" solution.