DIGITAL OPTICAL CROSS-TALK COMPENSATION SYSTEMS AND METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to and the benefit of U.S. Provisional Application No. 62/906,625, filed Sep. 26, 2019, and entitled, "DIGITAL OPTICAL CROSS-TALK COMPENSATION SYSTEMS AND METHODS," and U.S. Provisional Application No. 62/906,563, filed Sep. 26, 2019, and entitled, "DISPLAY PANEL OPTICAL CROSS-TALK COMPENSATION SYSTEMS AND METHODS," each of which is incorporated herein by reference in its entirety for all purposes. This application is related to U.S. application Ser. No. _____, filed Aug. 26, 2020, entitled "Display Panel Optical Cross-Talk Compensation Systems and Methods," (Attorney Docket No. P43812US1; APPL:1033A), which is incorporated herein by reference in its entirety for all purposes.

SUMMARY

[0002] A summary of certain embodiments disclosed herein is set forth below. It should be understood that these aspects are presented merely to provide the reader with a brief summary of these certain embodiments and that these aspects are not intended to limit the scope of this disclosure. Indeed, this disclosure may encompass a variety of aspects that may not be set forth below.

[0003] The present disclosure generally relates to electronic displays, which may be implemented and/or operated to present visual representations of information by displaying one or more images (e.g., image frames and/or pictures) on its display panel. Accordingly, electronic devices, such as computers, mobile phones, portable media devices, tablets, televisions, virtual-reality headsets, and vehicle dashboards, among many others, often include and/or utilize one or more electronic displays. In any case, an electronic display may generally display image content by actively controlling light emission from display pixels, which each includes one or more color component sub-pixels, implemented on its display panel based on corresponding image data, which is indicative of target characteristics (e.g., color and/or magnitude) of light emission therefrom.

[0004] For example, a display pixel in an electronic display may include one or more red sub-pixels that control magnitude of red light emission from the display pixel, one or more blue sub-pixels that control magnitude of blue light emission from the display pixel, one or more green sub-pixels that control magnitude of green light emission from the display pixel, one or more white sub-pixels that control magnitude of white light emission from the display pixel, or any combination thereof. Additionally, an image pixel (e.g., image data corresponding with point in image content) corresponding with the display pixel may include red component image data (e.g., red grayscale level) indicative of target red light emission from the display pixel, blue component image data (e.g., blue grayscale level) indicative of target blue light emission from the display pixel, green component image data (e.g., green grayscale level) indicative of target green light emission from the display pixel, white component image data (e.g., white grayscale level) indicative of target white light emission from the display pixel, or any combination thereof. In other words, to display image content at the display pixel, the electronic display may actively control magnitude of light emission from the one or more red sub-pixels of the display pixel based on the red component image data, the magnitude of light emission from the one or more green sub-pixels of the display pixel based on the green component image data, and so on.

[0005] Generally, magnitude of light emission from a display pixel (e.g., color component sub-pixel) varies with the amount of electrical energy stored therein. For example, in some instances, a display pixel may include a light-emissive element, such as an organic light-emitting diode (OLED), that varies its light emission with current flow therethrough, a current control switching device (e.g., transistor) coupled between the light-emissive element and a pixel power (e.g., VDD) supply rail, and a storage capacitor coupled to a control (e.g., gate) terminal of the current control switching device at an internal node of the display pixel. As such, varying the amount of electrical energy stored in the storage capacitor may vary voltage applied to the control input of the current control switching device and, thus, magnitude of electrical current supplied from the pixel power supply rail to the light-emissive element. In other words, at least in such instances, light emission from a display pixel may be controlled at least in part by controlling magnitude of electrical power (e.g., voltage and/or current) supplied to its internal node.

[0006] However, it should be appreciated that the organic light-emitting diode (OLED) electronic display examples described in the present disclosure are merely intended to be illustrative and not limiting. In particular, it should be appreciated that the techniques described in the present disclosure may be applied to and/or implemented for other types of electronic displays. For example, the techniques may be adapted to a liquid crystal display (LCD) that uses a pixel electrode and a common electrode as a storage capacitor and a light-emitting diode (LED) backlight as a light-emissive element.

[0007] To facilitate controlling supply of electrical power and, thus, resulting light emission, an electronic display may include driver circuitry electrically coupled its display pixels. For example, the driver circuitry may include a scan (e.g., gate) driver electrically coupled to each of the display pixels via a corresponding scan line and a data (e.g., source) driver electrically coupled to each of the display pixels via a corresponding scan line. To write a display pixel (e.g., color component sub-pixel), the scan driver may output an activation (e.g., logic high) control signal to a scan line coupled to the display pixel, thereby causing the display pixel to electrically connect its storage capacitor to a data line coupled to the display pixel, and the data driver may output an analog electrical (e.g., voltage and/or current) signal to the data line based at least in part on corresponding image data.

[0008] As described above, image data (e.g., image pixel in image content) corresponding with a display pixel on a display panel may be indicative of target characteristics (e.g., color and/or magnitude) of light emission therefrom, for example, by indicating one or more target achromatic brightness (e.g., grayscale) levels (e.g., values) that are mapped to a light emission magnitude range associated with a panel brightness setting used to display corresponding image content on the display panel. Additionally, as described above, a display pixel may include one or more color component sub-pixels, which are each implemented