

[0022] FIGS. 4A through 4C illustrates in block diagram format exemplary controller systems for multi-layer displays according to various embodiments of the present invention.

[0023] FIG. 5 illustrates a flowchart of one exemplary method for automatically blanking a display screen from a multi-layer display according to one embodiment of the present invention.

DETAILED DESCRIPTION

[0024] Exemplary applications of apparatuses and methods according to the present invention are described as follows. These examples are being provided solely to add context and aid in the understanding of the invention. It will be apparent to one skilled in the art that the present invention may be practiced without some or all of these specific details. In other instances, well known process steps have not been described in detail in order to avoid unnecessarily obscuring the present invention. Other applications are possible, such that the following examples should not be taken as definitive or limiting in scope or setting. Although these examples are described in sufficient detail to enable one skilled in the art to practice the invention, it will be understood that they are not limiting, such that other embodiments may be used and changes may be made without departing from the spirit and scope of the invention.

[0025] Embodiments are described herein in the context of auto blanking one or more display screens for multi-layer display devices. The respective multi-layer display devices can be a part of any number and variety of devices that utilize a display. Although various specific examples are described herein with reference to a wager-based gaming machine, it will be understood that the present invention may be used with such a gaming machine and/or any other suitable device that utilizes a multi-layer display, such as used in personal computers, video games, televisions, monitors, billboard displays, and the like. Other embodiments will readily suggest themselves to such skilled persons having the benefit of this disclosure.

Multi-Layer Displays

[0026] A general overview of multi-layer displays will first be provided. FIGS. 1A and 1B illustrate exemplary devices having multi-layer displays. FIG. 1A shows a generic device 1 having a multi-layer display with two display screens 18a, 18c positioned front-to-back, while FIG. 1B shows a wager-based gaming machine 10 having a multi-layer display with three display screens 18a, 18b, 18c positioned front-to-back. A predetermined spatial distance "D" separates display screens for the multi-layered displays. This predetermined distance, D, represents the distance from the display surface of display screen 18a to the display surface of an adjacent display screen (18b in FIG. 1B or 18c in FIG. 1A). This distance D may be adapted as desired by a multi-layer display manufacturer. In one embodiment, the display screens are positioned adjacent to each other such that only a thickness of the display screens separates the display surfaces. In this case, the distance D depends on the thickness of the exterior display screen. In a specific embodiment, distance "D" is selected to minimize spatial perception of interference patterns between the screens. Distance D can be adapted to improve perception of a three-dimensional display. Spatially separating the

screens 18a and 18c allows a person to perceive actual depth between video output on display screen 18a and video output on rear display screen 18c.

[0027] Layered display devices (i.e., multi-layer displays) may be described according to their position along a common line of sight 2 relative to a viewer 3. As the terms are used herein, 'proximate' refers to a display screen that is closer to a person, along a common line of sight (such as 2 in FIG. 1A), than another display screen. Conversely, 'distal' refers to a display screen that is farther from a person, along the common line of sight 2, than another. While the layered displays of FIGS. 1A and 1B are shown set back from a touchscreen 26, it will be understood that this is for illustrative purposes, such that the exterior display screen 18a may be closer to touchscreen 26. Further, in some embodiments a touchscreen may not be included, such that outer viewing surface 26 can merely be glass, plastic or another see-through material comprising a covering component. In other embodiments, no covering component 26 is provided, and the proximate display screen from the multi-layer display may be directly exposed to a viewer.

[0028] Under the control of an associated display processor, which may store video data and/or also facilitate the transmission of display signals, display devices or screens 18a, 18b, 18c generate visual images and information for display to a person or player 3. The proximate display devices 18a and 18b each have the capacity to be partially or completely transparent or translucent. In a specific embodiment, the relatively flat and thin display devices 18a and 18b are LCDs. Other display technologies are also suitable for use. Various companies have developed relatively flat display devices that have the capacity to be transparent or translucent. One such company is Uni-Pixel Displays, Inc. of Houston Tex., which sells display screens that employ time multiplex optical shutter ("TMOS") technology. This TMOS display technology includes: (a) selectively controlled pixels that shutter light out of a light guidance substrate by violating the light guidance conditions of the substrate and (b) a system for repeatedly causing such violation in a time multiplex fashion. The display screens that embody TMOS technology are inherently transparent and they can be switched to display colors in any pixel area.

[0029] A transparent OLED may also be used. An electroluminescent display may also be suitable for use with proximate display devices 18a and 18b. Also, Planar Systems Inc. of Beaverton, Oreg. and Samsung, of Korea, both produce several display devices that are suitable for the uses described herein and that can be translucent or transparent. Kent Displays Inc. of Kent, Ohio also produces Cholesteric LCD display devices that operate as a light valve and/or a monochrome LCD panel. Other multi-layer display devices are discussed in detail in co-pending U.S. patent application Ser. No. 11/514,808, entitled "Gaming Machine With Layered Displays," filed Sep. 1, 2006, which is incorporated herein by reference in its entirety and for all purposes.

[0030] Regardless of the exact technology used, LCD or otherwise, it will be readily appreciated that each display screen or device 18a, 18b, 18c is generally adapted to present a graphical display thereupon based upon one or more display signals. While each display screen 18a, 18b, 18c is generally able to make its own separate visual presentation to a viewer, two or more of these display screens are positioned (i.e., "stacked") in the multi-layer display such that the various