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(54) **DISPLAY FOR ELECTRONIC DEVICE**

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(57) **ABSTRACT**

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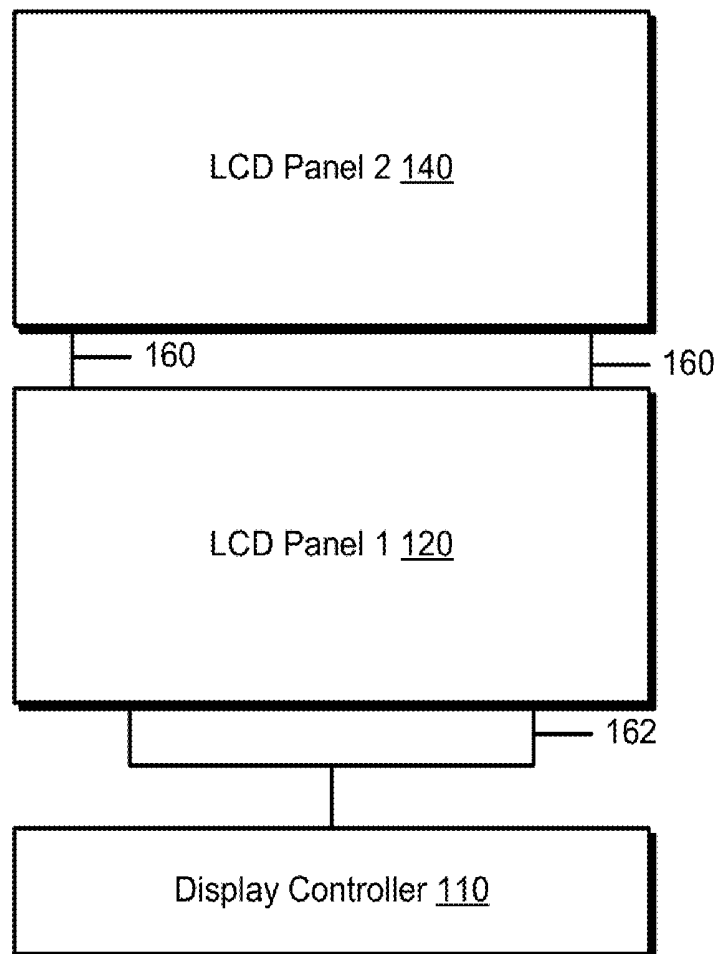
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In one embodiment a display assembly comprises a backlight assembly, a first display panel proximate a first side of the backlight assembly, wherein the first liquid crystal panel is to be communicatively coupled to a controller, and a second display panel proximate a second side of the backlight assembly, opposite the first side, wherein the second display panel is to be communicatively coupled to the controller. Other embodiments may be described.

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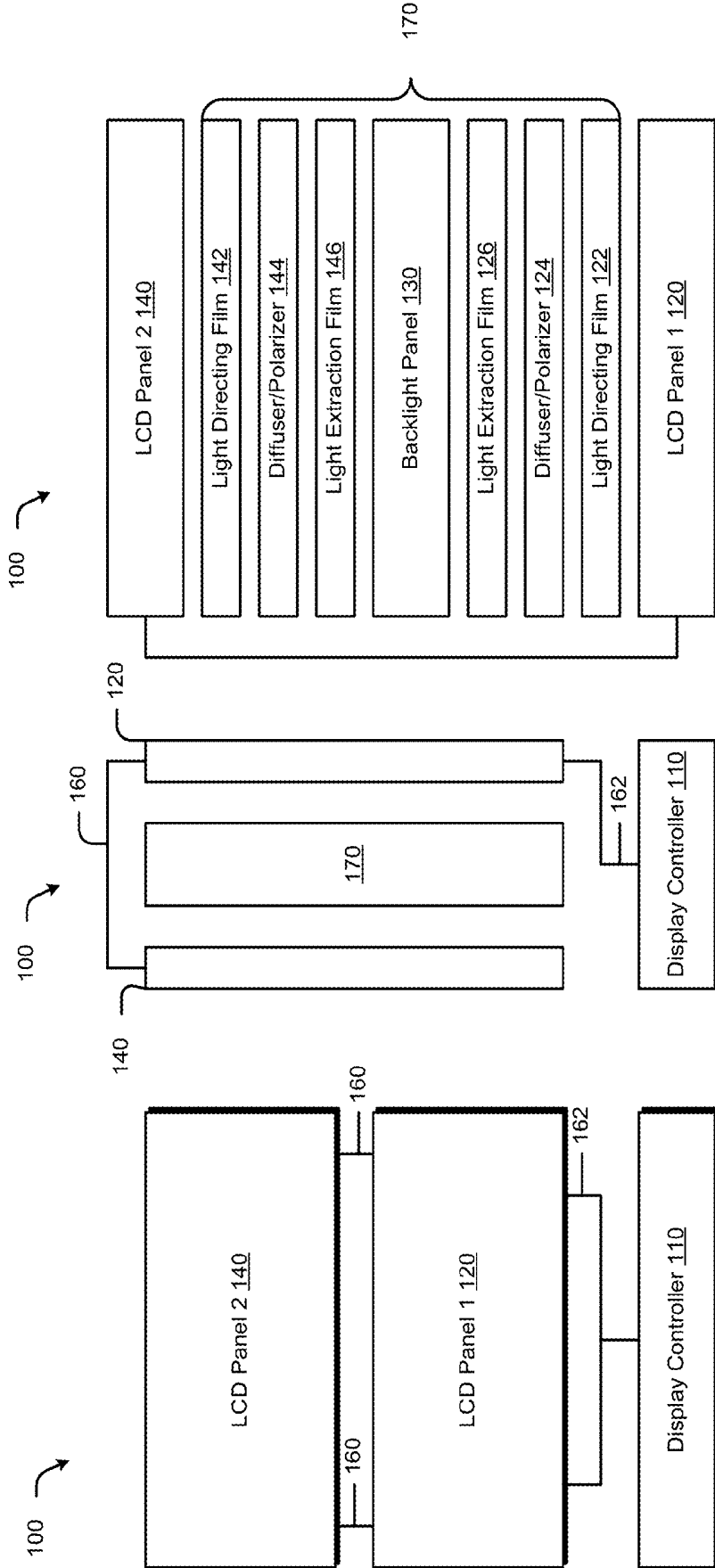


FIG. 1A

FIG. 1B

FIG. 1C

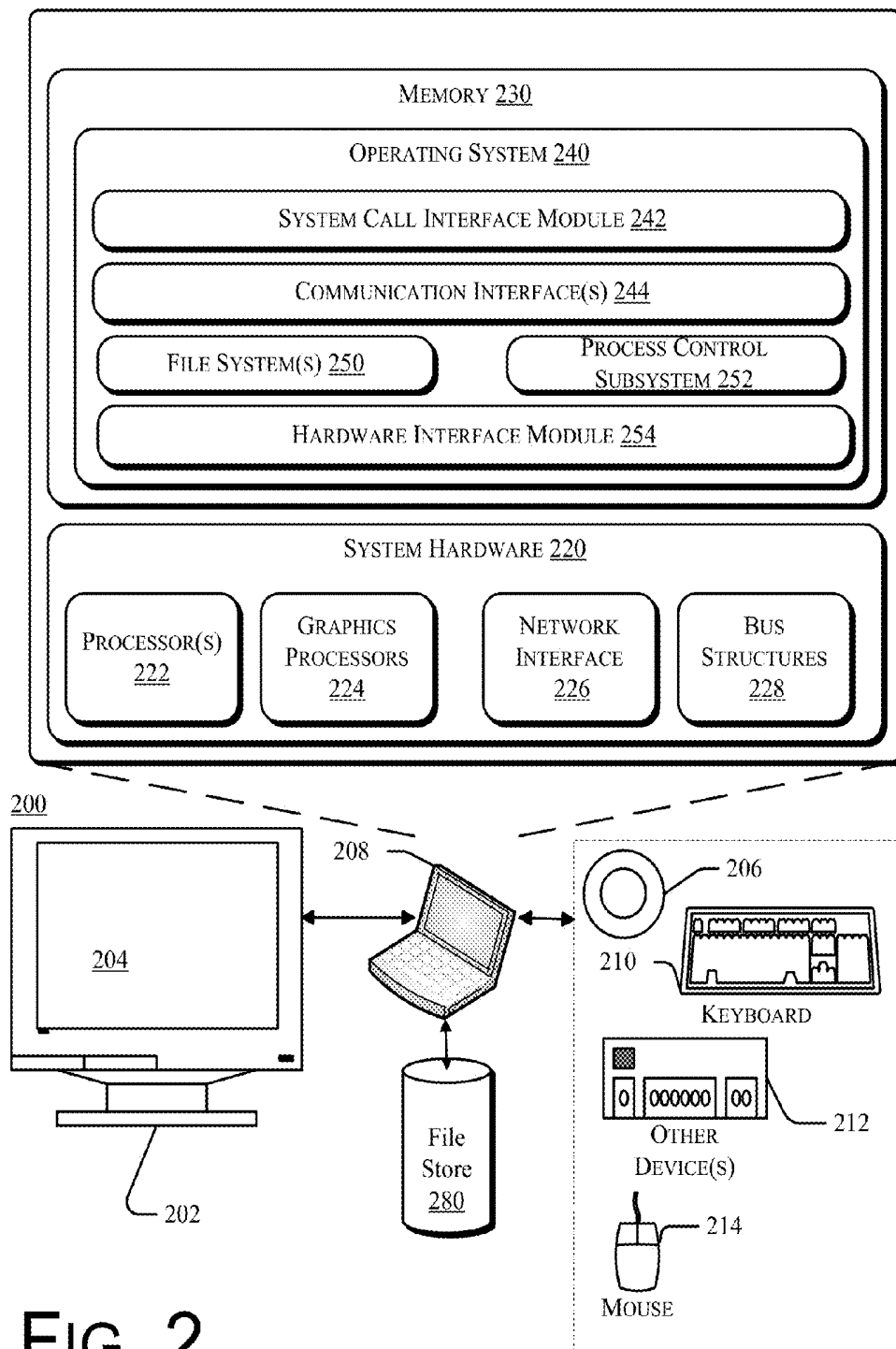
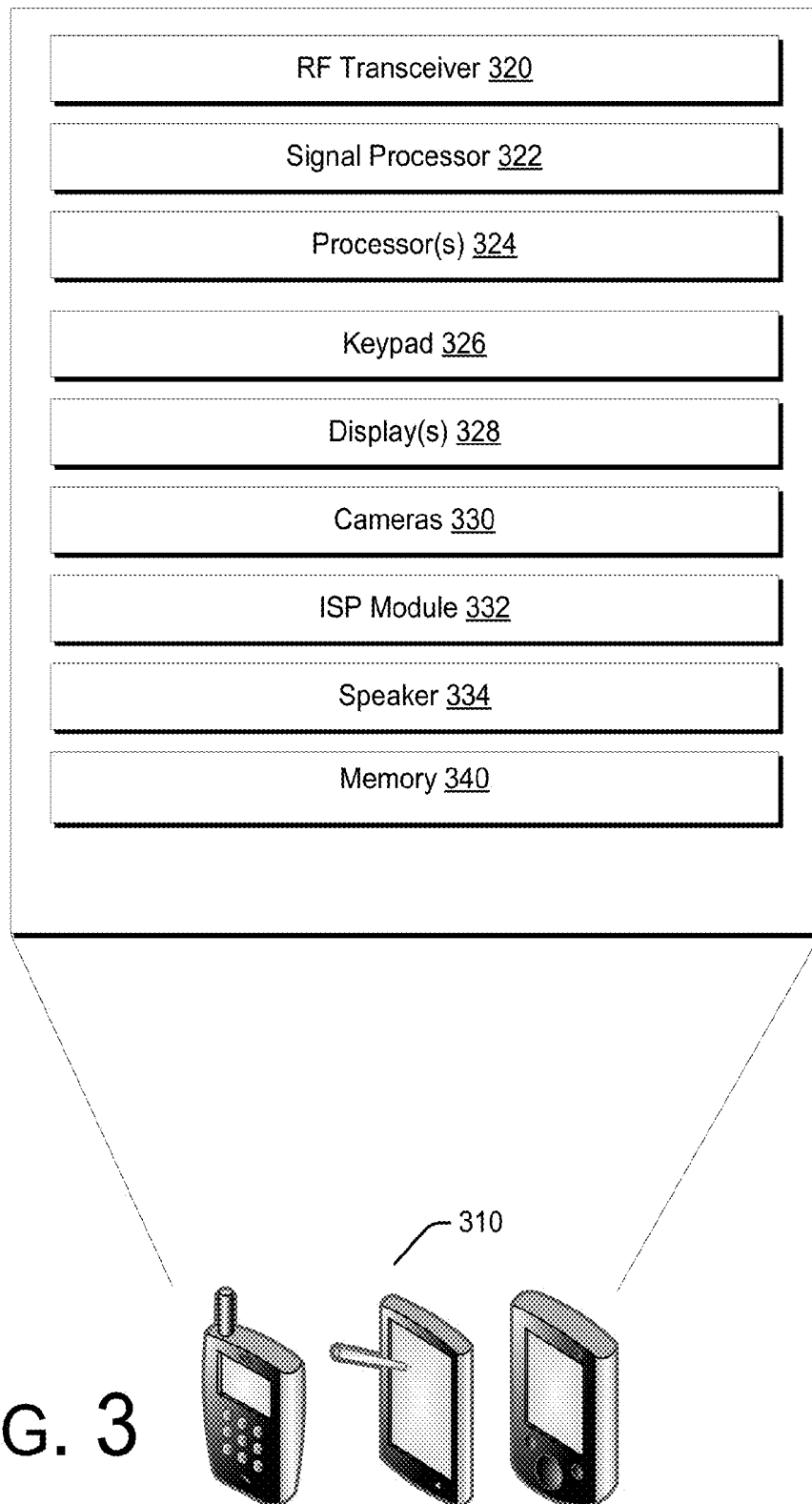


FIG. 2

**FIG. 3**

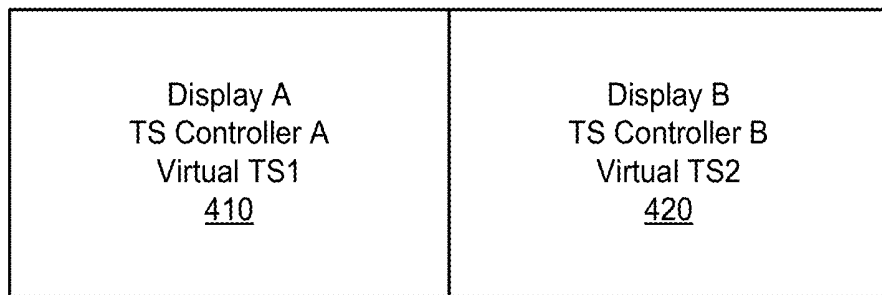


FIG. 4A

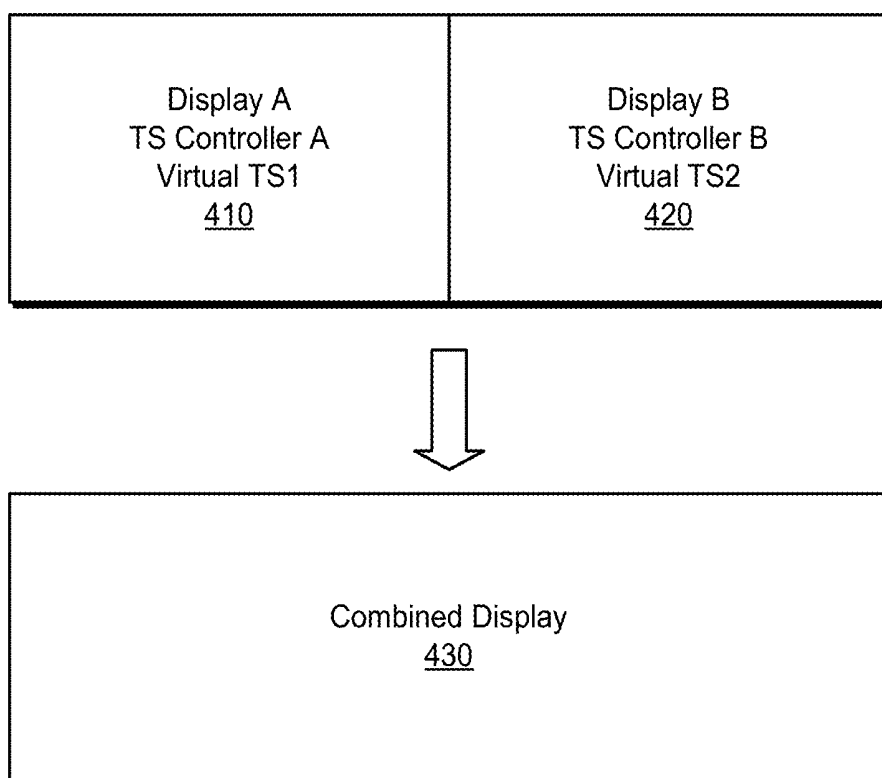


FIG. 4B

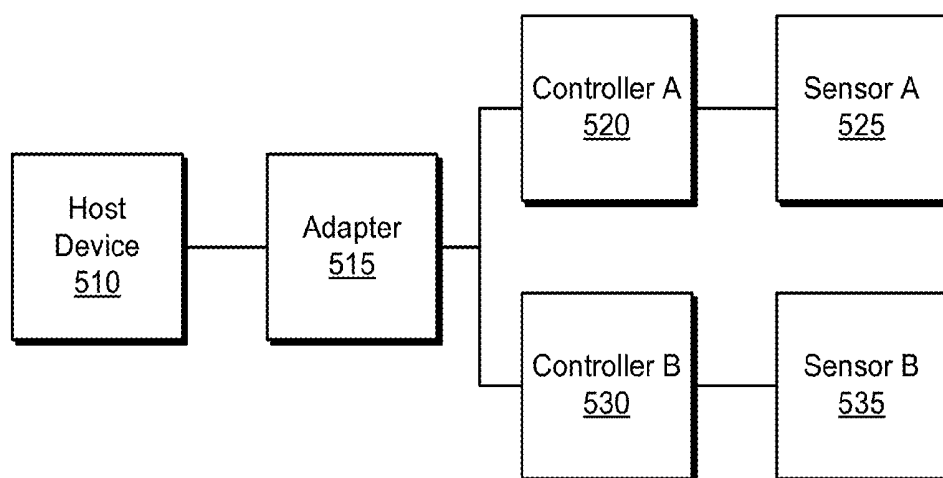


FIG. 5

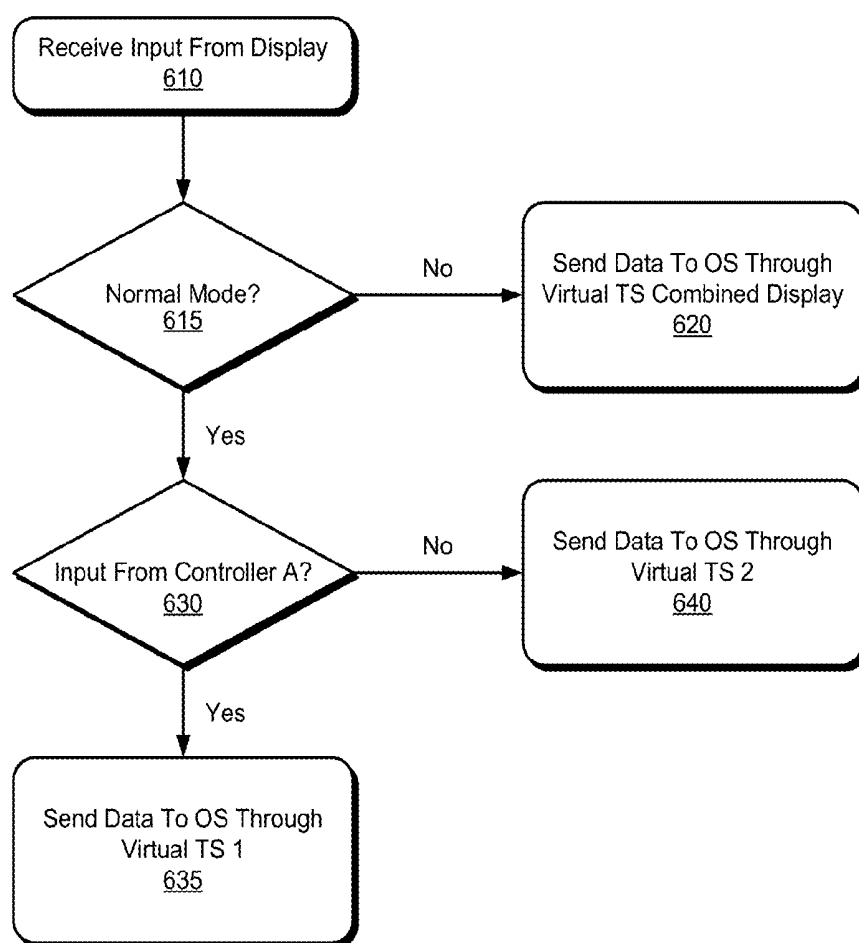


FIG. 6

Input Conversion

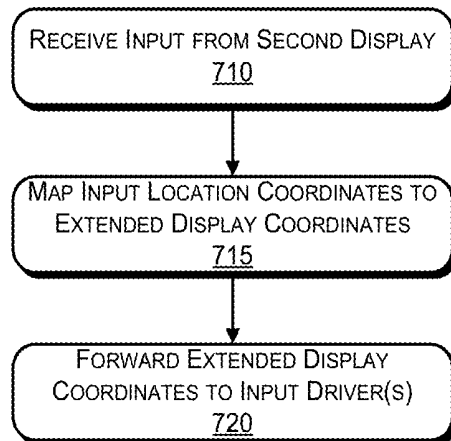


FIG. 7A

Output Conversion

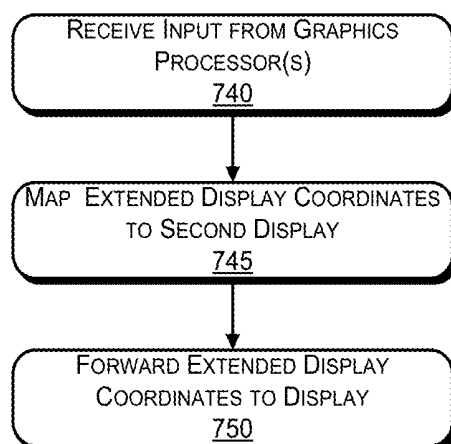
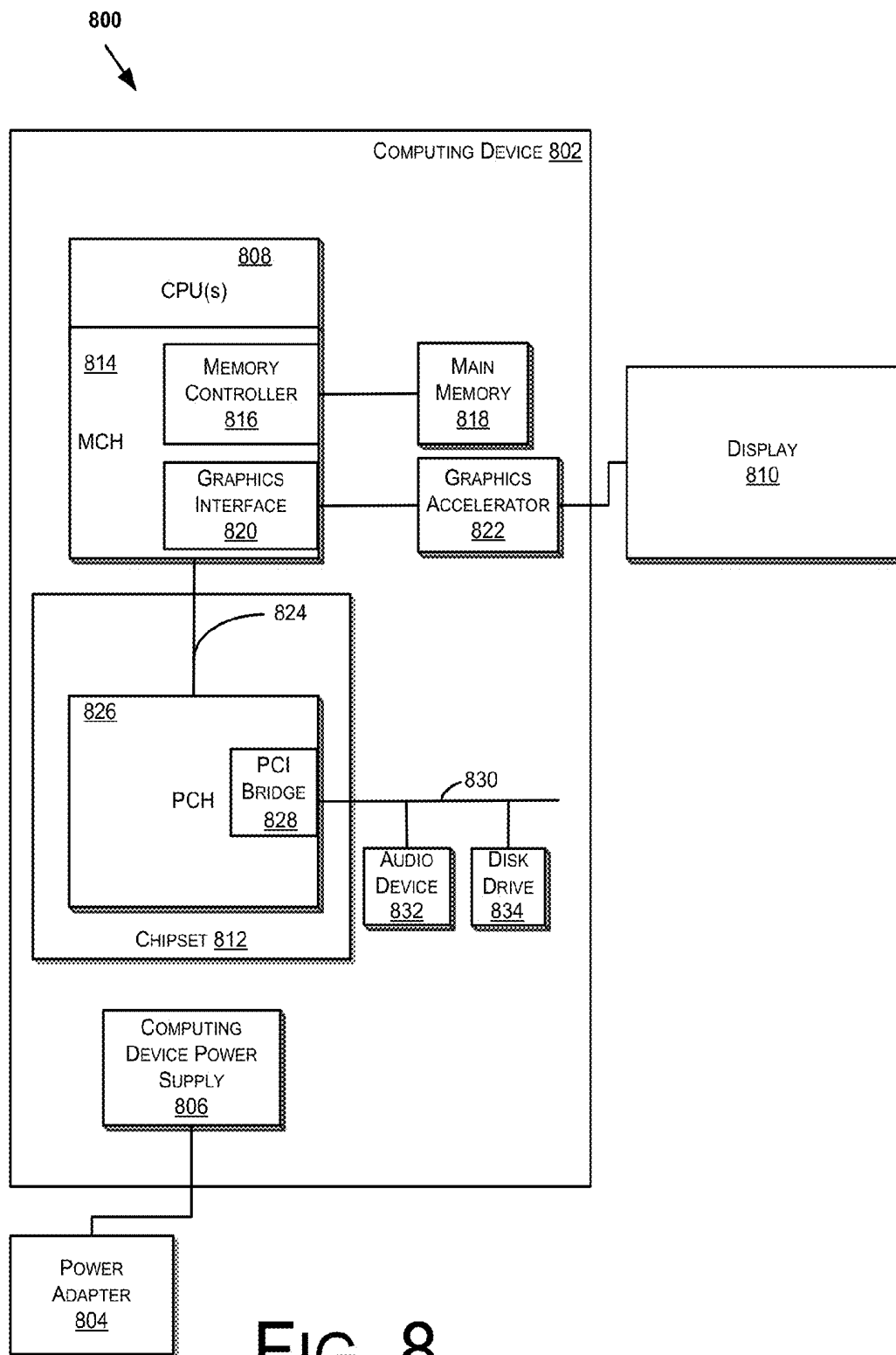


FIG. 7B



DISPLAY FOR ELECTRONIC DEVICE**RELATED APPLICATIONS**

[0001] None.

BACKGROUND

[0002] The subject matter described herein relates generally to the field of electronic devices and more particularly to a display assembly for electronic devices.

[0003] Electronic devices such as, e.g., laptop computers, notebook computers, tablet computers, and the like have traditionally had a single display. In some situations it may be useful for an electronic device to include two displays accordingly display assemblies for electronic commerce may find utility.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] The detailed description is described with reference to the accompanying figures.

[0005] FIGS. 1A-1C are schematic illustrations of an exemplary backlight assembly for electronic devices in accordance with some embodiments.

[0006] FIGS. 2 and 3 are high-level schematic illustrations of electronic device which may be adapted to include displays in accordance with some embodiments.

[0007] FIGS. 4A-4B and 5 are schematic illustrations of architectures for displays in accordance with some embodiments.

[0008] FIG. 6 is a flowchart illustrating operations in a method to manage displays for electronic devices in accordance with some embodiments.

[0009] FIGS. 7A-7B are flowcharts illustrating operations in a method to convert location coordinates for a display in accordance with some embodiments.

[0010] FIG. 8 is a schematic illustration of an electronic device which may be including displays in accordance with some embodiments.

DETAILED DESCRIPTION

[0011] Described herein are exemplary systems and methods to implement displays in electronic devices. In some embodiments described herein first and second liquid crystal display (LCD) panels are configured to share a common backlight assembly and a single display controller. The display controller maps inputs from and outputs to the second LCD panel onto a virtual extended LCD panel, such that the second LCD panel is presented as an extension of the first LCD panel to other components of the electronic device. This enables a low-cost dual display assembly to be integrated into electronic devices without modifications to other components of the electronic devices.

[0012] In the following description, numerous specific details are set forth to provide a thorough understanding of various embodiments. However, it will be understood by those skilled in the art that the various embodiments may be practiced without the specific details. In other instances, well-known methods, procedures, components, and circuits have not been illustrated or described in detail so as not to obscure the particular embodiments.

[0013] FIGS. 1A-1C are schematic illustrations of an exemplary backlight assembly for electronic devices in accordance with some embodiments. Referring to FIGS. 1A-1C, in some embodiments a display assembly 100 comprises a display controller 110, a first LCD panel 120 and a second LCD panel 140. The first LCD panel 120 is communicatively coupled to the display controller 110 via a suitable communication bus 162.

[0014] The second LCD panel 140 is also coupled to the display controller 110. In some embodiments the second LCD panel 140 may be coupled to the display controller 110 via a communication connection with the first LCD panel 120. By way of example, in some embodiments the second LCD panel may be connected to the first LCD panel by one or more flexible ribbon cables 160.

[0015] As illustrated in FIG. 1B, in some embodiments the first LCD panel 120 and the second LCD panel 140 may be positioned proximate a first side of a backlight assembly 170 and the second LCD panel 140 may be positioned proximate a second side of the backlight assembly 170, such that the first LCD panel 120 and the second LCD panel 140 share the backlight assembly 170. In the embodiment depicted in FIG. 1B the second LCD panel 140 is communicatively connected to the display controller 110 via the first LCD panel 120 provided by ribbon cable(s) 160. In alternate embodiments the second LCD panel 140 may have a direct communication connection to display controller 110 via a suitable communication bus.

[0016] FIG. 1C is a schematic view of backlight assembly 170, according to some embodiments. Referring to FIG. 1C, backlight assembly may comprise a backlight panel 130. A light extraction layer 126, a diffuser 124 and a light directing layer 122 is disposed proximate a first side of the backlight panel 130. Similarly, a light extraction layer 146, a diffuser 144 and a light directing layer 142 is disposed proximate a second side of the backlight panel 130. In some embodiments, diffuser 144 may also act as a polarizer to polarize light emitted by light-emitting diodes (LEDs) in the backlight assembly.

[0017] A first LCD panel 120 is positioned adjacent light directing layer 122 and a second LCD panel 140 is positioned adjacent light directing layer 142. In some embodiments, LCD panel may be a twisted nematic LCD, an in-plane switching LCD, or a vertical alignment (VA) LCD and may comprise other components for the display image formation such as TFT backplane, polarizer, analyzer, color filter array, etc. In alternate embodiments the display may comprise an OLED display, which does not require a backlight.

[0018] FIG. 2 is a schematic illustration of an exemplary system which may be adapted to include a backlight assembly as described herein, in accordance with some embodiments. In one embodiment, system 200 includes an electronic device 208 and one or more accompanying input/output devices including a display 202 having a screen 204, one or more speakers 206, a keyboard 210, one or more other I/O device(s) 212, and a mouse 214. The other I/O device(s) 212 may include a touch screen, a voice-activated input device, a track ball, and any other device that allows the system 200 to receive input from a user.

[0019] In various embodiments, the electronic device 208 may be embodied as a personal computer, a laptop computer, a personal digital assistant, a mobile telephone, an entertainment device, or another computing device. In one embodiment, the computing device further comprises a housing having a lid 207.

[0020] The electronic device 208 includes system hardware 220 and memory 230, which may be implemented as random access memory and/or read-only memory. A file store 280

may be communicatively coupled to computing device **208**. File store **280** may be internal to electronic device **208** such as, e.g., one or more hard drives, CD-ROM drives, DVD-ROM drives, or other types of storage devices. File store **280** may also be external to electronic device **208** such as, e.g., one or more external hard drives, network attached storage, or a separate storage network.

[0021] System hardware **220** may include one or more processors **222**, at least two graphics processors **224**, network interfaces **226**, and bus structures **228**. In one embodiment, processor **222** may be embodied as an Intel® Core2 Duo® processor available from Intel Corporation, Santa Clara, Calif., USA. As used herein, the term “processor” means any type of computational element, such as but not limited to, a microprocessor, a microcontroller, a complex instruction set computing (CISC) microprocessor, a reduced instruction set (RISC) microprocessor, a very long instruction word (VLIW) microprocessor, or any other type of processor or processing circuit.

[0022] In some embodiments one of the processors **222** in system hardware **220** may comprise a low-power embedded processor, referred to herein as a manageability engine (ME). The manageability engine **222** may be implemented as an independent integrated circuit or may be a dedicated portion of a larger processor **222**.

[0023] Graphics processor(s) **224** may function as adjunct processor that manages graphics and/or video operations. Graphics processor(s) **224** may be integrated onto the motherboard of electronic device **208** or may be coupled via an expansion slot on the motherboard.

[0024] In one embodiment, network interface **226** could be a wired interface such as an Ethernet interface (see, e.g., Institute of Electrical and Electronics Engineers/IEEE 802.3-2002) or a wireless interface such as an IEEE 802.11a, b or g-compliant interface (see, e.g., IEEE Standard for IT-Telecommunications and information exchange between systems LAN/MAN—Part II: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications Amendment 4: Further Higher Data Rate Extension in the 2.4 GHz Band, 802.11 G-2003). Another example of a wireless interface would be a general packet radio service (GPRS) interface (see, e.g., Guidelines on GPRS Handset Requirements, Global System for Mobile Communications/GSM Association, Ver. 3.0.1, December 2002).

[0025] Bus structures **228** connect various components of system hardware **228**. In one embodiment, bus structures **228** may be one or more of several types of bus structure(s) including a memory bus, a peripheral bus or external bus, and/or a local bus using any variety of available bus architectures including, but not limited to, 11-bit bus, Industrial Standard Architecture (ISA), Micro-Channel Architecture (MSA), Extended ISA (EISA), Intelligent Drive Electronics (IDE), VESA Local Bus (VLB), Peripheral Component Interconnect (PCI), Universal Serial Bus (USB), Advanced Graphics Port (AGP), Personal Computer Memory Card International Association bus (PCMCIA), and Small Computer Systems Interface (SCSI).

[0026] Memory **230** may include an operating system **240** for managing operations of electronic device **208**. In one embodiment, operating system **240** includes a hardware interface module **254** that provides an interface to system hardware **220**. In addition, operating system **240** may include a file system **250** that manages files used in the operation of com-

puting device **208** and a process control subsystem **252** that manages processes executing on electronic device **208**.

[0027] Operating system **240** may include (or manage) one or more communication interfaces that may operate in conjunction with system hardware **220** to transceive data packets and/or data streams from a remote source. Operating system **240** may further include a system call interface module **242** that provides an interface between the operating system **240** and one or more application modules resident in memory **230**. Operating system **240** may be embodied as a UNIX operating system or any derivative thereof (e.g., Linux, Solaris, etc.) or as a Windows® brand operating system, or other operating systems.

[0028] FIG. 3 is a schematic illustration of another embodiment of an electronic device **310** which may be adapted to include a backlight assembly as described herein, according to embodiments. In some embodiments electronic device **310** may be embodied as a mobile telephone, a personal digital assistant (PDA), a laptop computer, or the like. Electronic device **310** may include an RF transceiver **320** to transceive RF signals and a signal processing module **322** to process signals received by RF transceiver **320**.

[0029] RF transceiver **320** may implement a local wireless connection via a protocol such as, e.g., Bluetooth or 802.11x. IEEE 802.11a, b or g-compliant interface (see, e.g., IEEE Standard for IT-Telecommunications and information exchange between systems LAN/MAN—Part II: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications Amendment 4: Further Higher Data Rate Extension in the 2.4 GHz Band, 802.11 G-2003). Another example of a wireless interface would be a general packet radio service (GPRS) interface (see, e.g., Guidelines on GPRS Handset Requirements, Global System for Mobile Communications/GSM Association, Ver. 3.0.1, December 2002).

[0030] Electronic device **310** may further include one or more processors **324** and a memory module **340**. As used herein, the term “processor” means any type of computational element, such as but not limited to, a microprocessor, a microcontroller, a complex instruction set computing (CISC) microprocessor, a reduced instruction set (RISC) microprocessor, a very long instruction word (VLIW) microprocessor, or any other type of processor or processing circuit. In some embodiments, processor **324** may be one or more processors in the family of Intel® PXA27x processors available from Intel® Corporation of Santa Clara, Calif. Alternatively, other CPUs may be used, such as Intel’s Itanium®, XEON™, ATOM™, and Celeron® processors. Also, one or more processors from other manufactures may be utilized. Moreover, the processors may have a single or multi core design.

[0031] In some embodiments, memory module **340** includes random access memory (RAM); however, memory module **340** may be implemented using other memory types such as dynamic RAM (DRAM), synchronous DRAM (SDRAM), and the like. Memory **340** may comprise one or more applications which execute on the processor(s) **322**.

[0032] Electronic device **310** may further include one or more input/output interfaces such as, e.g., a keypad **326** and one or more displays **328**. In some embodiments electronic device **310** comprises one or more camera modules **330** and an image signal processor **332**, and speakers **334**.

[0033] In some embodiments two displays may be presented to the host device as two separate displays. By way of example, referring to FIG. 4A, in some embodiments the two

displays may be embodied as touch screens. A first display **410** may comprise a touch screen controller and a second display **420** may comprise a second touch screen controller. In one mode of operation, referred to herein as a normal mode, the first display **410** and the second display **420** may be exposed to the host device's operating system as separate displays.

[0034] In some embodiments electronic devices allow only a single touch screen to be active. In order to implement a display with two touch screens the two screens are presented to the host device as a single display by combining the frame buffers. By way of example, referring to FIG. 4B, in some embodiments the first display **410** and the second display **420** are exposed to the host device's operating system as a single, combined display **430**.

[0035] FIG. 5 is a schematic illustration of an architecture to implement a dual touch device. Referring to FIG. 5, a host device **515** is coupled to a touch adapter **515** by a suitable connection, e.g., a universal serial bus (USB) link. A first touch controller **520** is coupled to a first sensor **525**, which may be embodied as a touch screen sensor. Similarly, a second controller **530** is coupled to a second sensor **535**.

[0036] FIG. 6 is a flowchart illustrating operations in a method to manage displays for electronic devices in accordance with some embodiments. Referring to FIG. 6, at operation **610** a touch screen driver receives input from a touch screen. If, at operation **615** the display is not operating in normal mode (i.e., if the display is operating in a combined mode) then control passes to operation **620** and the touch screen input data is sent to the operating system through the virtual touch screen combined display.

[0037] By contrast, if at operation **615** the display is operating in normal mode, then control passes to operation **630**. If, at operation **630** the touch screen input is from controller A **520**, then the touch screen data is sent to the operating system through virtual touch screen 1 (operation **635**). By contrast, if at operation **630** the input did not come from controller A **520**, then the touch screen data is sent to the operating system through virtual touch screen 2 (operation **640**).

[0038] As described above, in some embodiments the display controller **110** is configured to present the second LCD panel **140** as an extension of the first LED panel **120**. By way of example, if the first and second LCD panels have a resolution of 1920×1080 pixels, the display controller **110** is configured to present the LCD panels **120**, **140** as an extended LCD panel having a resolution of 1920×2160, or 3940×1080 pixels. In such embodiments the display controller **110** implements a method to convert location coordinates associated with inputs to and outputs from the second LCD panel **140** from the actual coordinates on the second LCD panel to coordinates on the extended LCD panel. One skilled in the art will recognize that the LCD panels could have different resolutions, e.g., 2560×1400, or 3200×1600.

[0039] FIGS. 7A and 7B are flowcharts illustrating operations in a method to convert location coordinates for a display in accordance with some embodiments. In the embodiments depicted the operations depicted in the flowchart of FIGS. 7A-7B may be implemented by the display controller **110**.

[0040] FIG. 7A is a flowchart illustrating operations in an exemplary input location conversion method. Referring first to FIG. 7A, at operation **710** the display controller **110** receives an input from the second LCD panel **140**. By way of example, the input may originate from an input device such as a mouse, a keyboard, or the like, or from a touch on a touch

screen. At operation **715** the display controller maps the input location coordinates from the second LCD panel **140** to coordinates on an extended panel. By way of illustration, in an embodiment in which two 1920×1080 displays are presented as a single extended display with a resolution of 1920×2160, the display controller may add **1080** to the row location coordinate on the second display to obtain the row location in the extended display. Because the displays are combined in a vertical fashion the column location coordinate remains the same. One skilled in the art will recognize that similar mapping conversions may be performed for LCD panels of different resolutions. At operation **720** the display controller forwards the converted location coordinates to one or more input drivers on the electronic device.

[0041] FIG. 7B is a flowchart illustrating operations in an exemplary output location coordinate conversion method. Referring to FIG. 7B, at operation **740** the display controller **110** receives an input from a graphics processor such as the graphics processor **224** depicted in FIG. 2. As described above, the display controller **110** presents the LCD panels **120**, **140** as a single, extended display. Thus, the input from the graphics controller is mapped to the extended display. At operation **745** the display controller maps the location coordinates received from the graphics controller **224** to the second display. By way of illustration, in an embodiment in which two 1920×1080 displays are presented as a single extended display with a resolution of 1920×2160, the display controller may subtract 1080 from the row location coordinate on the extended display to obtain the row location in the second display. Again, because the displays are combined in a vertical fashion the column location coordinate remains the same. One skilled in the art will recognize that similar mapping conversions may be performed for LCD panels of different resolutions. At operation **750** the display controller forwards the converted location coordinates to the display.

[0042] As described above, in some embodiments the electronic device may be embodied as a computer system. FIG. 8 is a schematic illustration of a computer system **800** in accordance with some embodiments. The computer system **800** includes a computing device **802** and a power adapter **804** (e.g., to supply electrical power to the computing device **802**). The computing device **802** may be any suitable computing device such as a laptop (or notebook) computer, a personal digital assistant, a desktop computing device (e.g., a workstation or a desktop computer), a rack-mounted computing device, and the like.

[0043] Electrical power may be provided to various components of the computing device **802** (e.g., through a computing device power supply **806**) from one or more of the following sources: one or more battery packs, an alternating current (AC) outlet (e.g., through a transformer and/or adaptor such as a power adapter **804**), automotive power supplies, airplane power supplies, and the like. In some embodiments, the power adapter **804** may transform the power supply source output (e.g., the AC outlet voltage of about 110VAC to 240VAC) to a direct current (DC) voltage ranging between about 7VDC to 12.6VDC. Accordingly, the power adapter **804** may be an AC/DC adapter.

[0044] The computing device **802** may also include one or more central processing unit(s) (CPUs) **808**. In some embodiments, the CPU **808** may be one or more processors in the Pentium® family of processors including the Pentium® II processor family, Pentium® III processors, Pentium® IV, CORE2 Duo processors, or Atom processors available from

Intel® Corporation of Santa Clara, Calif. Alternatively, other CPUs may be used, such as Intel's Itanium®, XEON™, and Celeron® processors. Also, one or more processors from other manufactures may be utilized. Moreover, the processors may have a single or multi core design.

[0045] A chipset **812** may be coupled to, or integrated with, CPU **808**. The chipset **812** may include a memory control hub (MCH) **814**. The MCH **814** may include a memory controller **816** that is coupled to a main system memory **818**. The main system memory **818** stores data and sequences of instructions that are executed by the CPU **808**, or any other device included in the system **800**. In some embodiments, the main system memory **818** includes random access memory (RAM); however, the main system memory **818** may be implemented using other memory types such as dynamic RAM (DRAM), synchronous DRAM (SDRAM), and the like. Additional devices may also be coupled to the bus **810**, such as multiple CPUs and/or multiple system memories.

[0046] The MCH **814** may also include a graphics interface **820** coupled to a graphics accelerator **822**. In some embodiments, the graphics interface **820** is coupled to the graphics accelerator **822** via an accelerated graphics port (AGP). In some embodiments, a display (such as a flat panel display) **840** may be coupled to the graphics interface **820** through, for example, a signal converter that translates a digital representation of an image stored in a storage device such as video memory or system memory into display signals that are interpreted and displayed by the display. The display **840** signals produced by the display device may pass through various control devices before being interpreted by and subsequently displayed on the display.

[0047] A hub interface **824** couples the MCH **814** to a platform control hub (PCH) **826**. The PCH **826** provides an interface to input/output (I/O) devices coupled to the computer system **800**. The PCH **826** may be coupled to a peripheral component interconnect (PCI) bus. Hence, the PCH **826** includes a PCI bridge **828** that provides an interface to a PCI bus **830**. The PCI bridge **828** provides a data path between the CPU **808** and peripheral devices. Additionally, other types of I/O interconnect topologies may be utilized such as the PCI Express™ architecture, available through Intel® Corporation of Santa Clara, Calif.

[0048] The PCI bus **830** may be coupled to an audio device **832** and one or more disk drive(s) **834**. Other devices may be coupled to the PCI bus **830**. In addition, the CPU **808** and the MCH **814** may be combined to form a single chip. Furthermore, the graphics accelerator **822** may be included within the MCH **814** in other embodiments.

[0049] Additionally, other peripherals coupled to the PCH **826** may include, in various embodiments, integrated drive electronics (IDE) or small computer system interface (SCSI) hard drive(s), universal serial bus (USB) port(s), a keyboard, a mouse, parallel port(s), serial port(s), floppy disk drive(s), digital output support (e.g., digital video interface (DVI)), and the like. Hence, the computing device **802** may include volatile and/or nonvolatile memory.

[0050] The terms “logic instructions” as referred to herein relates to expressions which may be understood by one or more machines for performing one or more logical operations. For example, logic instructions may comprise instructions which are interpretable by a processor compiler for executing one or more operations on one or more data objects. However, this is merely an example of machine-readable instructions and embodiments are not limited in this respect.

[0051] The terms “computer readable medium” as referred to herein relates to media capable of maintaining expressions which are perceivable by one or more machines. For example, a computer readable medium may comprise one or more storage devices for storing computer readable instructions or data. Such storage devices may comprise storage media such as, for example, optical, magnetic or semiconductor storage media. However, this is merely an example of a computer readable medium and embodiments are not limited in this respect.

[0052] The term “logic” as referred to herein relates to structure for performing one or more logical operations. For example, logic may comprise circuitry which provides one or more output signals based upon one or more input signals. Such circuitry may comprise a finite state machine which receives a digital input and provides a digital output, or circuitry which provides one or more analog output signals in response to one or more analog input signals. Such circuitry may be provided in an application specific integrated circuit (ASIC) or field programmable gate array (FPGA). Also, logic may comprise machine-readable instructions stored in a memory in combination with processing circuitry to execute such machine-readable instructions. However, these are merely examples of structures which may provide logic and embodiments are not limited in this respect.

[0053] Some of the methods described herein may be embodied as logic instructions on a computer-readable medium. When executed on a processor, the logic instructions cause a processor to be programmed as a special-purpose machine that implements the described methods. The processor, when configured by the logic instructions to execute the methods described herein, constitutes structure for performing the described methods. Alternatively, the methods described herein may be reduced to logic on, e.g., a field programmable gate array (FPGA), an application specific integrated circuit (ASIC) or the like.

[0054] In the description and claims, the terms coupled and connected, along with their derivatives, may be used. In particular embodiments, connected may be used to indicate that two or more elements are in direct physical or electrical contact with each other. Coupled may mean that two or more elements are in direct physical or electrical contact. However, coupled may also mean that two or more elements may not be in direct contact with each other, but yet may still cooperate or interact with each other.

[0055] Reference in the specification to “one embodiment” or “some embodiments” means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least an implementation. The appearances of the phrase “in one embodiment” in various places in the specification may or may not be all referring to the same embodiment.

[0056] Although embodiments have been described in language specific to structural features and/or methodological acts, it is to be understood that claimed subject matter may not be limited to the specific features or acts described. Rather, the specific features and acts are disclosed as sample forms of implementing the claimed subject matter.

What is claimed is:

1. A display assembly, comprising:

a backlight assembly;

a first display panel proximate a first side of the backlight assembly, wherein the first liquid crystal panel is to be communicatively coupled to a controller; and

a second display panel proximate a second side of the backlight assembly, opposite the first side, wherein the second display panel is to be communicatively coupled to the controller.

2. The display assembly of claim 1, wherein the backlight assembly comprises:

a backlight panel;

a first light extraction layer proximate a first side of the backlight panel;

a first diffuser layer proximate the first light extraction layer;

a first light directing layer proximate the first diffuser layer;

a second light extraction layer proximate a second side of the backlight panel;

a second diffuser layer proximate the second light extraction layer;

a second light directing layer proximate the second diffuser layer.

3. The display assembly of claim 1, wherein at least one of the first display panel or the second display panel comprises a touch screen.

4. The display assembly of claim 1, further, wherein the controller is configured to map the second display panel as an extension of the first liquid crystal panel.

5. The display assembly of claim 4, wherein:

the second display panel is to be communicatively coupled to the controller via a communication connection with the first display panel.

6. The display assembly of claim 4, wherein:

at least one of the first display panel or the second display panel comprises a liquid crystal panel.

7. An electronic device, comprising:

an electronic component;

a backlight assembly;

a controller;

a first display panel proximate a first side of the backlight assembly, wherein the first display panel is to be communicatively coupled to the controller; and

a second display panel proximate a second side of the backlight assembly, opposite the first side, wherein the second display panel is to be communicatively coupled to the controller.

8. The electronic device of claim 7, wherein the backlight assembly comprises:

a backlight panel;

a first light extraction layer proximate a first side of the backlight panel;

a first diffuser layer proximate the first light extraction layer;

a first light directing layer proximate the first diffuser layer;

a second light extraction layer proximate a second side of the backlight panel;

a second diffuser layer proximate the second light extraction layer;

a second light directing layer proximate the second diffuser layer.

9. The electronic device of claim 7, wherein at least one of the first display panel or the second display panel comprises a touch screen.

10. The electronic device of claim 7, wherein:

the controller is configured to map the second display panel as an extension of the first display panel.

11. The electronic device of claim 10, wherein:

the second display panel is to be communicatively coupled to the controller via a communication connection with the first display panel.

12. The electronic device of claim 10, wherein:

at least one of the first display panel or the second display panel comprises a liquid crystal panel.

13. A computer program product comprising logic instruction stored in a non-transitory computer readable medium which, when executed by a controller, configure the controller to perform operations comprising:

receiving, in the controller, an input from a display, wherein the input corresponds to location coordinates on the display;

converting the input from the display to an output corresponding to location coordinates on an extended display; and

forwarding the output corresponding to the location coordinates on the extended display to an input driver.

14. The computer program product of claim 13, further comprising logic instruction stored in a non-transitory computer readable medium which, when executed by a controller, configure the controller to perform operations comprising:

receiving, in the controller, an output from a graphics processor, wherein the output corresponds to location coordinates on the extended display;

converting the output corresponding to the location coordinates on the extended display to data corresponding to location coordinates on the display; and

forwarding the data corresponding to location coordinates to the display.

15. The computer program product of claim 14, wherein the display comprises:

a backlight assembly;

a first display panel proximate a first side of the backlight assembly, wherein the first liquid crystal panel is to be communicatively coupled to a controller; and

a second display panel proximate a second side of the backlight assembly, opposite the first side, wherein the second display panel is to be communicatively coupled to the controller,

wherein the second display panel is to be communicatively coupled to the controller via a communication connection with the first display panel.

16. A controller, comprising logic to:

receive, in the controller, an input from a display, wherein the input corresponds to location coordinates on the display;

convert the input from the display to an output corresponding to location coordinates on an extended display; and forward the output corresponding to the location coordinates on the extended display to an input driver.

17. The controller of claim 16, further comprising logic to: receive, in the controller, an output from a graphics processor, wherein the output corresponds to location coordinates on the extended display;

convert the output corresponding to the location coordinates on the extended display to data corresponding to location coordinates on the display; and

forward the data corresponding to location coordinates to the display.

18. The controller of claim 17, wherein the display comprises:

a backlight assembly;
a first display panel proximate a first side of the backlight assembly, wherein the first liquid crystal panel is to be communicatively coupled to a controller; and
a second display panel proximate a second side of the backlight assembly, opposite the first side, wherein the second display panel is to be communicatively coupled to the controller,
wherein the second display panel is to be communicatively coupled to the controller via a communication connection with the first display panel.

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专利名称(译)	电子设备显示		
公开(公告)号	US20140160365A1	公开(公告)日	2014-06-12
申请号	US13/710740	申请日	2012-12-11
[标]申请(专利权)人(译)	邝华耀 黄匡		
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IPC分类号	G02F1/13 G02F1/1333		
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其他公开文献	US9395575		
外部链接	Espacenet USPTO		

摘要(译)

在一个实施例中，显示组件包括背光组件，靠近背光组件的第一侧的第一显示板，其中第一液晶板通信地耦合到控制器，以及靠近第二侧的第二显示板。背光组件，与第一侧相对，其中第二显示面板通信地耦合到控制器。可以描述其他实施例。

